ISVforce Guide

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@salesforcedocs

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CHAPTER 1 Welcome to the ISVforce Guide

In this chapter ...

- Resources for Partners
- Roles in the Solution Lifecycle
- How to Sign Up for Test Environments

Hello, partner! Welcome to the ISVforce Guide. Learn to plan, build, distribute, market, sell, and support solutions that run on the Salesforce platform. Get your feet wet with the quick start tutorials. Then, dive in for a close look at the concepts, procedures, tools, and resources you need to successfully navigate the stages of the solution lifecycle.

Resources for Partners

The Partner Community, at https://partners.salesforce.com, is the primary resource for all ISVs. To get started, we recommend visiting the Education page, your one-stop shop for all ISV content. In addition, you can use the Partner Community to:

- Collaborate with other partners and Salesforce.
- Stay up-to-date on news and events related to the Salesforce Partner Program.
- Log cases for access to partner-specific features and customer support.
- Use enhanced search, integrated with the Trailblazer Community, to quickly find relevant resources.
- Browse the Salesforce Partner Online Training catalog and sign up for courses.

The Partner Community is self-service—the first person to register your partnership becomes your designated administrator and manages the creation of additional users for your company. You can change or add administrators, as required.

Roles in the Solution Lifecycle

This guide covers the entire lifecycle of a solution, so not all topics are relevant for every role. The following list has topic suggestions by role.

An application *architect*

The application architect determines the scope of the solution and the internal structures that support it. Architects need details about the underlying Lightning Platform platform that determine not only the solution's use, but which editions it supports, how it's installed, configured, and upgraded. We strongly recommend that architects review this entire guide, but especially the following chapters:

- Design and Build Your Solution on page 18
- Pass the AppExchange Security Review on page 106

A *developer* creates, packages, and uploads a solution

A developer, or often a team of developers, creates a solution, packages it, and uploads it to AppExchange. Developers also update the solution with bug fixes and new features. As a developer, review the following chapters:

- Design and Build Your Solution on page 18
- Package and Test Your Solution on page 84
- Developing App Documentation on page 51
- Update Your Solution on page 389

A *publisher* distributes, sells, and supports the solution

The publisher of a solution is the person or company who has a profile and one or more listings for the solution on AppExchange. Publisher listings contain a link to a solution they uploaded to AppExchange or to a third-party website. Publishers also set default license settings. As a publisher, review the following chapters:

- Publish Your Solution on AppExchange on page 119
- Provide a Free Trial of Your Solution on page 364
- Support Your AppExchange Customers on page 381

An *administrator* installs the solution

An administrator, or *admin*, downloads your solution from AppExchange and installs it into their organization. Admins can also customize the solution to further suit their business needs. To learn how admins interact with your solution, see the following topic.

- Installing a Package on page 94

How to Sign Up for Test Environments

To sign up for test environments (orgs), use the Environment Hub.

Note: If you're a new Salesforce user, log in to the org that you received when you signed up for the Partner Program. The Environment Hub is enabled in this org by default. If you're an existing Salesforce user and are using a different org to manage development, log a support case in the Salesforce Partner Community to enable the Environment Hub. For product, specify **Platform**. For topic, specify **AppExchange & Managed Packages**.

1. Log in to the organization where Environment Hub is enabled.
2. On the Environment Hub tab, click **Create Organization**.
3. In the Purpose dropdown list, select **Test/Demo**.
4. In the Edition dropdown list, choose the edition that you want to test against.
5. Fill in the remaining required fields.
6. Agree to the terms, and then click **Create**.
7. You receive an email that prompts you to log in and change your password. Click the link, change your password, and create a password question and answer.

CHAPTER 2 ISVforce Quick Start

In this chapter ...

- Tutorial #1: Sign Up for AppExchange
- Tutorial #2: Developing Your App
- Tutorial #3: Publishing and Licensing
- Tutorial #4: Updating Your App

Get ready to build and sell solutions on AppExchange by completing short tutorials.

Note: Some features in this quick start are available only to eligible Salesforce partners. For more information on the Partner Program, including eligibility requirements, visit https://partners.salesforce.com.

Tell Me More

If you're new to app development, or if you're a smell-the-roses type, review these resources before you get started.

- For an introduction to the Salesforce platform, complete the Admin Beginner, Admin Intermediate, and Developer Beginner trails.
- For Salesforce developer documentation and other resources, visit Salesforce Developers at https://developer.salesforce.com.
- For a list of useful terms, see the Glossary on page 415.

Tutorial #1: Sign Up for AppExchange

In this tutorial, you set up the tools you need to develop, sell, and support apps and components built on the Lightning Platform platform. You start by signing up for the Partner Program. You then have access to the Partner Community, which allows you to view helpful resources, create support cases, and collaborate with other partners and Salesforce. The Partner Community is also the best source for news and events about the Partner Program. In addition, you can access the Environment Hub, where you can create development and test organizations.

If you're familiar with Salesforce, you know that an organization is a cloud unto itself. If you're new to Salesforce, think of your organization as a separate environment for developing, testing, and publishing your offering.

Step 1: Sign Up for the Partner Program

The first step is to sign up for the Partner Program.

1. In your browser, go to https://partners.salesforce.com and click **Join Now**.

   Note: The signup process varies according to the region or country. Follow the instructions presented.

2. Fill in the fields about you and your company.
3. Select the first option: **Independent Software Vendor (ISV)**.
4. Click **Submit Registration**.

In a moment, you'll receive a confirmation, followed by an email welcoming you to the Partner Program and including login credentials.

Congratulations, you're now part of the Salesforce ISV Partner Program! Click the link to the Partner Community (https://partners.salesforce.com) and log in. Bookmark this page. You'll be using it a lot.

Step 2: Create a Development and Test Environment

To build and sell on the Lightning Platform, you need different environments for different tasks. We call these environments *organizations*, or orgs for short. You use the Environment Hub to create these orgs. The first org you need is the Partner Developer Edition, which is where you develop and package your offering. If you already have a Developer Edition org, we recommend signing up for the Partner Developer Edition org because you can have more data storage, licenses, and users.

Note: If you're a new Salesforce user, log in to the org that you received when you signed up for the Partner Program. The Environment Hub is enabled in this org by default. If you're an existing Salesforce user and are using a different org to manage development, log a support case in the Salesforce Partner Community to enable the Environment Hub. For product, specify **Platform**. For topic, specify **AppExchange & Managed Packages**.

1. Log in to the org where the Environment Hub is enabled, usually your partner business org.
2. Click the **Environment Hub** tab, and then click **Create Organization**.
3. In the Purpose dropdown list, select **Development**. For simplicity, we refer to this as your *dev org*.
4. Fill in the required fields.
5. Agree to the terms, and then click **Create**.
6. In the Purpose dropdown list, select **Test/Demo** and **Partner Enterprise** for the org edition. This process creates a test org, where you test the app or component that you're developing.
7. Shortly, you receive emails that prompt you to log in and change your password for your dev and test orgs.

Tell Me More...

The Environment Hub has several types of test orgs available, because different editions of Salesforce have different features. If you plan to distribute your app or component to a particular edition, you want to test your offering and make sure that it works there. However, that's beyond the scope of this quick start. For more information, see Architectural Considerations for Group and Professional Editions on page 61.

Step 3: Get a Business Org

In the previous step, you created orgs for developing and testing your offering. To manage sales and distribution, you need one more org. In this step, you log a case in the Salesforce Partner Community to have a Partner Business Org (PBO) provisioned for you. Your PBO contains the apps that you use to manage sales and distribution, including the License Management App (LMA) and Channel Order App (COA).

1. Log in to the- Salesforce Partner Community.
2. Click the question icon and then click **Log a Case for Help**.
3. Select **Salesforce Partner Program Support**.

   Tip: If you don't see the Salesforce Partner Program Support tile, use the org picker to select the org that's associated with your Salesforce partnership account.
4. For product, enter and select **Partner Programs & Benefits**.
5. For topic, enter and select **Demo & Partner Business Orgs**.
6. Tell us if you have an existing org or if you need a new one. If you have an existing Salesforce org, provide the org ID to add two more CRM licenses to that org. If you don't have an existing org, we provide a new one for you. In either case, make sure to enter your business address.
7. Provide any other required details, and then click **Create Case**.

   Note: It can take 24–48 hours for your case to be closed. You can check the status of your case at any time under the Support tab of the Partner Community.
8. You receive an email prompting you to log in and change your password. Do that, and then bookmark the page.

Step 4: Edit Your Publisher Profile

In this step, you log in to the Partner Community and provide information about your company. We display some of this information on AppExchange listings to help customers get to your business.

1. Log in to the Partner Community using the username and password of your business org.
2. On the Publishing page, click **Company Info**.
3. Fill out the information in the Provider Profile, and then click **Save**.

Sign-up Summary

In this first tutorial, you signed up for the Partner Program and all the organizations you need to develop, test, and sell your offering. Let's review what you signed up for and the purpose of each.

Partner Program
The Partner Program gives you access to the Partner Community, where you can get help and training information, log cases for support issues, and collaborate with other partners. You also get access to the Environment Hub, which lets you create and manage new test and development orgs.

Partner Developer Edition
Also known as your *dev org*, this is where you develop your offering and eventually package it for distribution.

Test Organization
Also know as your *test org*, this is where you install and test your offering.

Partner Business Organization
This is where you license and manage your offering.

Tutorial #2: Developing Your App

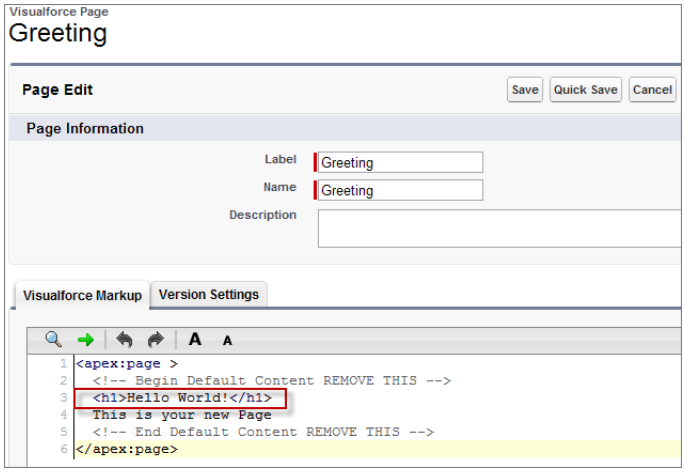
In this tutorial you'll create a very simple "Hello World" application. It won't do much, but it's enough to understand where development takes place in the lifecycle of a packaged application.

Step 1: Create an App

In this step you're going to create an app that contains a page, and a tab to display the page.

1. In your browser, log in to your Partner Developer Edition organization. Hereafter we'll call this your "dev org".
2. From Setup, enter *`Visualforce Pages`* in the `Quick Find` box, then select **Visualforce Pages**.
3. In the Visualforce list, click **New**.
4. In the `Label` field enter *`Greeting`*.
5. In the Visualforce Markup area, replace the contents of the `<h1>` tag with *`Hello World`*.

Visualforce Page Editor



6. Click **Save**.

Now you'll associate the page with a tab.

1. In the sidebar menu, enter *`Tabs`* in the `Quick Find` box, then select **Tabs**.

2. In the Visualforce Tabs list, click **New**.
3. In the New Visualforce Tab wizard, click the drop-down box and select the Hello World page you just created.
4. For the Tab Label, enter *Hello*.
5. Click the Tab Style field and choose any icon to represent your tab.
6. Click **Next**, then **Next** again, and **Save** on the final page.

Now you'll create a new app that contains your tab and page.

1. In the sidebar menu, enter *Apps* in the Quick Find box, then select **Apps**.
2. Click **New**.
3. In the App Label field enter Hello World and then click **Next** and **Next** again on the following page.
4. On the Choose the Tabs page, scroll to the bottom of the Available Tabs list, find your Hello tab, and add it to the Selected Tabs list. Click **Next**.
5. Select the **Visible** checkbox to make this app visible to all profiles and then click **Save**.

Tell Me More....

If it seems like you just created a page within a container, within another container, you did. And you're about to put all of that in another container! What's with all these containers and what do they do?

- A *tab* is a container for things you want to display on the same page, such as a chart, a table, or the Visualforce page your created.
- An *app* is a container for tabs that appear next to each other. When you create an app, it's available in the app picker in the upper right hand corner of the screen.
- A *package* is a container for things you upload to the AppExchange. Usually a package contains an app your customers can install in their org, but you can also upload packages that extend existing apps. You haven't created a package yet, you'll do that in the next step.

Step 2: Package Your App

In this step you'll package the app so you can distribute it on the AppExchange. A package is simply a container for components. In this case it's your app, tab, and page.

1. From Setup, enter *Packages* in the Quick Find box, select **Packages**, and then click **New**.
2. In the Package Name field enter *Hello World* and then click **Save**.
3. On the Package Detail page click **Add Components**.
4. Select your Hello World app and then click **Add to Package**.

Tell Me More....

When you clicked **Add to Package**, did you notice that your Hello tab and Greeting page were automatically added to the package? When you create a package, the framework automatically detects dependent components and adds them to the package.

Step 3: Assign a Namespace

In this step you'll choose a unique identifier called a namespace. A namespace differentiates your components from other components and allows you to do things such as upgrade the app after it's been installed. Choose your namespace carefully as it can't be changed later.

1. From Setup, enter *Packages* in the Quick Find box, then select **Packages**.
2. In the Developer Settings list, click **Edit** and on the following page click **Continue**.
3. In the Namespace Prefix field, enter a 1-15 character alphanumeric ID and then click **Check Availability**. Repeat this step until you have a unique namespace.
4. In the Package to be managed field choose your Hello World package and then click **Review Your Selections**.
5. Review the information on the page and then click **Save**.

Tell Me More....

Within the underlying code, your namespace is prepended to all components that are packaged from your dev org. This allows your package and its contents to be distinguished from those of other developers, and ensures your exclusive control of all packaged components.

Step 4: Upload a Beta

Before you upload a production version of your app, it's a common practice to upload a beta version for testing.

1. From Setup, enter *Packages* in the Quick Find box, then select **Packages**.
2. On the Packages page, click your **Hello World** package and then click **Upload**.
3. On the Upload Package page, enter a version name and number.
4. For the Release Type, make sure to choose **Managed — Beta**.
5. Scroll to the bottom and click **Upload**. It may take a moment for the upload to complete.

Congratulations, you've uploaded an app to the AppExchange! Your app isn't available to the public, but you can access it through an install link. You'll do that in the next step.

Tell Me More....

The purpose of a beta is for testing only. Therefore, a beta can only be installed in a test org, Developer Edition, or sandbox (more on that later). Next you'll install the beta in the test org you created in Step 2: Create a Development and Test Environment.

Step 5: Install and Test the Beta

Installing the beta is easy, just click the link and provide the username and password you use for your test org.

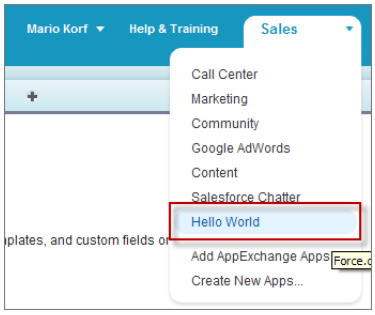
1. Click the Installation URL now.

Installation URL Link

2. On the login page, enter the Username and Password of your test org.

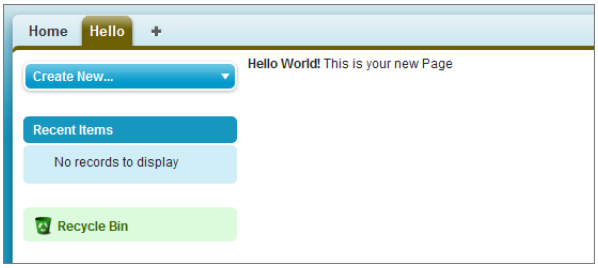
3. On the Package Installation Details page, click **Continue**.
4. Click **Next**.
5. On the Security Level page, **Grant access to all users** and click **Next**.
6. Click **Install**.
7. After the installation completes, you can select your app from the app picker in the upper right corner.

Hello World App



8. You should see your Hello tab, and the greeting text on your page.

Hello World Tab and Page



At this point you would normally test the application and make sure it works as designed. Your app installs easily and displays what you want, so let's move on.

Tell Me More....

Beta packages can also be installed in sandboxes. A sandbox is a replica of your customer's org that allows them to develop, test, or install apps, and verify the changes they want to commit. None of the orgs you've signed up for in this workbook have a sandbox, but if you have a sandbox in another org and want to install your app in it, you must replace the initial portion of the **Installation URL** with `https://test.salesforce.com` or the My Domain name for your sandbox in the format `https://MyDomainName--SandboxName.sandbox.my.salesforce.com`. You can find the My Domain name for your org on the My Domain page in Setup.

Development Summary

Congratulations, you just completed an essential part of the software development lifecycle! Further changes to your app will follow the same procedure:

1. Modify the existing app in your dev org.

2. Package the app.
3. Upload as a beta package.
4. Install the beta in a test org.
5. Test the installed app.

Tutorial #3: Publishing and Licensing

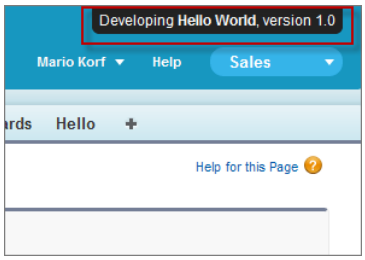
Imagine you've been through a few development cycles with your beta and you're ready to publish a public app. The next step is to upload a production app, or what we call a *managed released* version of your app. Then you can create a listing so that other people can find your app and know what it does. Finally, you want to connect your app to your business org so you manage the licenses for people that install your app.

Step 1: Uploading to the AppExchange

This step will seem familiar, it's similar to uploading a beta.

1. If you've been following along non-stop, you're probably still logged in to your test org. Go ahead and log in to your dev org now.
2. Notice in the upper right corner there's a link that says **Developing Hello World, version 1.0**. Click that link to go directly to the Package Detail page.

Developing Hello World, version 1.0

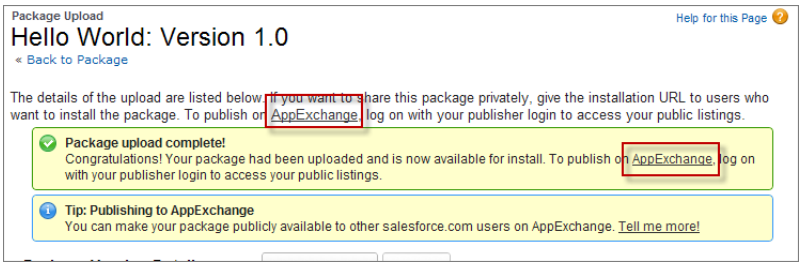


3. On the Package Detail page, click **Upload**.
4. For the Release Type, choose **Managed — Released**.
5. Scroll to the bottom and click **Upload**.
6. Click **OK** on the popup.

Step 2: Create an AppExchange Listing

In this step, you create an AppExchange listing, which is the primary way customers discover apps, components, and services to enhance their Salesforce experience.

1. After your package uploads, click the link to publish on the AppExchange. You are directed to the Listings tab on the Publishing page.



2. If prompted, enter your login credentials for the Partner Community.
3. Read and agree to the terms and conditions, and then click **I Agree**.
4. The first question asks if you've already listed on the AppExchange. You did that in Tutorial 1, Step 4: Edit Your Publisher Profile on page 6, so select **Yes** and click **Continue**.
5. Click **Link New Organization**.
6. You're prompted for your username and password. Enter the values for your development org.
7. Click the **Publishing** tab.
8. Click **New Listing**.
9. Enter a listing title, such as `Hello World App by <your name>`. Adding your name helps ensure that your listing title is unique.
10. Choose **App**, and then click **Save & Next** to open the AppExchange publishing console.
11. On the Text tab, fill in the required fields, and then click **Save & Next** again.

Tell Me More...

Don't be concerned with making your listing perfect, because it's not public yet, and you can change the listing at any time.

Step 3: Complete the AppExchange Listing

Many customers like to see and experience a product before they decide to purchase. We give you several ways to show off your app or component in an AppExchange listing. For example, you can add screenshots and videos to draw attention to key features, or add white papers to help demonstrate business value. You can also let customers try your offering in their own organizations or set up a test environment that you've customized.

1. If you're not already there, click the Media tab in the AppExchange publishing console.
2. Add an app logo, tile image, and screenshot. Because your listing isn't used outside of this tutorial, use any image file that you have available.
3. Click the **App** tab, and then select **An app that includes a package (entirely or in part)**.
4. Click **Select Package** and choose the package that you uploaded in the previous step.
5. For the installation method, select **Directly from the AppExchange**.
6. Choose whether you want the app to be installed for every user in the customer's organization or just system administrators. For this tutorial, either option is fine.
7. For app specifications, select editions and languages. For this tutorial, you can select any available edition and language.
8. Click **Save & Next**.
9. Click **Save & Next** twice, because you don't want to configure a free trial or set up lead collection for this app.

10. For pricing, select **Free**. Use the default values for all other fields.

11. Agree to the terms and conditions, and then click **Save**.

Congratulations—you've completed your first listing! Like everything else you've done so far, you can go back and change it later if you want.

Step 4: Manage Licenses for Your App

The License Management App (LMA) helps you manage sales, licensing, and support for your offering. The LMA comes preinstalled in your business organization. In this step, you connect your app to the LMA.

Note: This feature is available to eligible partners. For more information on the Partner Program, including eligibility requirements, visit www.salesforce.com/partners.

1. If you haven't done so already, log in to the Partner Community.
2. On the Publishing page, click the **Packages** tab.
3. Find the package that you want to link, and then click **Manage Licenses**.
4. Click **Register**.
5. Enter the login credentials of your partner business org, and then click **Submit**.
6. For the default license type, choose free trial.
7. Enter a trial length in days.
8. For the number of seats, choose the site-wide license.
9. Click **Save**.

It can take up to 30 minutes for your app to be connected to the LMA. Take a break; you've earned it!

Publishing and Licensing Summary

In this tutorial, you uploaded your managed-released package to AppExchange and created a listing for your solution. You also linked your solution to the License Management App (LMA) available in your business org. You can use the LMA to manage and renew licenses and to set default license settings. For example, you can license your solution as a free trial that expires after a specified number of days. For more information, see Manage Licenses for Managed Packages.

Right now your solution has a private listing on AppExchange. You can share the listing with potential customers, but the public doesn't see it unless they have the link. Before you can list the solution publicly, it must pass a security review, which is beyond the scope of this quick start. For more information, see Pass the AppExchange Security Review on page 106.

Tutorial #4: Updating Your App

If you're familiar with Salesforce, you know we do weekly patch releases to fix bugs, and a few times a year we have a major release to introduce new features. As an ISV, you can do the same thing by delivering a patch release to fix bugs and a major release for new features.

- For new features, the process is the same as you've experienced. You start by modifying your app, package it, upload a beta, test the beta, and then upload a managed-released version. Major releases increment the version to the next whole number, from 1.0 to 2.0, for example, and minor releases to the first dot from 1.0 to 1.1. There are no hard rules for what constitutes a major or minor release. That's up to you.

- For bug fixes, the process is slightly different. You start by creating a patch org, a special environment which has limited functionality and can only be used to develop a patch for a specific package.

Since the process for developing a major release is already familiar, let's do a patch release and then deliver it by pushing the patch to our customers.

To learn how to push an upgrade to customers, see Pushing an Upgrade.

Step 1: Creating a Patch Organization

In order to create a patch, you need to generate a new patch development organization.

To create a patch version:

1. From Setup, enter `Packages` in the Quick Find box, then select **Packages**.
2. Click the name of your managed package.
3. On the Patch Organization tab, click **New**.
4. Select the package version that you want to create a patch for in the Patching Major Release dropdown. The release type must be Managed - Released.
5. Enter a username for a login to your patch org.
6. Enter an email address associated with your login.
7. Click **Save**.

   Note: If you ever lose your login information, click **Reset** on the package detail page under Patch Development Organizations to reset the login to your patch development org.

The name of the patch development org's My Domain name is randomly generated.

In a moment you receive an email with your login credentials. After you log in and change your password, proceed to the next step.

Tell Me More

Development in a patch development org is restricted.

- You can't add package components.
- You can't delete existing package components.
- API and dynamic Apex access controls can't change for the package.
- No deprecation of any Apex code.
- You can't add new Apex class relationships, such as `extends`.
- You can't add Apex access modifiers, such as `virtual` or `global`.
- You can't add new web services.
- You can't add feature dependencies.

Step 2: Developing a Patch

We're going to make a simple change to your app. Instead of displaying just Hello World, you'll add today's date.

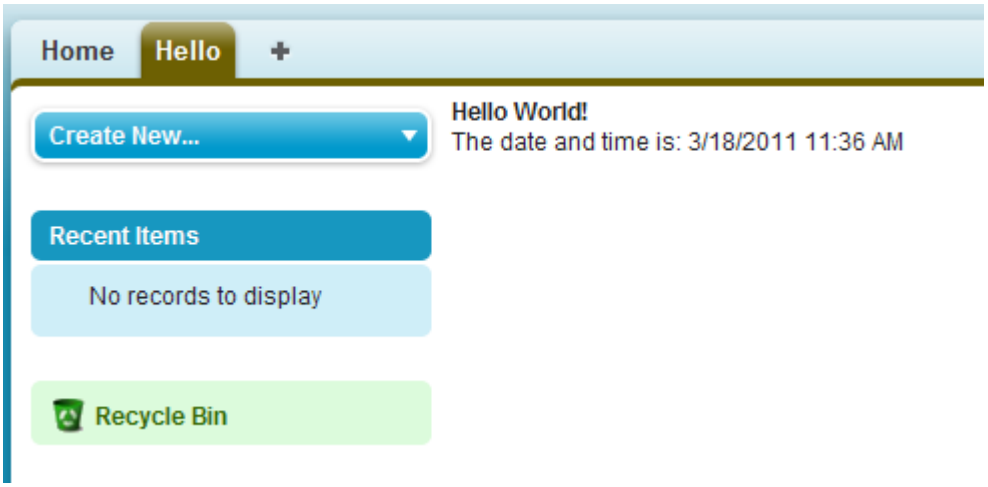
1. In your patch org, from Setup, enter `Packages` in the `Quick Find` box, select **Packages**, then click your **Hello World** package.
2. In the list of Package Components, click your **Greeting** page.

3. Click **Edit**.
4. Right after the closing `</h1>` tag, enter the following:

```
<br/>
<apex:outputText value="The date and time is: {!NOW()}"/>
```

5. Click **Save**.
6. To see the output, click the **Hello** tab and you'll notice that today's time and date are displayed.

Display the date and time



That's as much as we need to do in this patch. Let's move on.

Tell Me More....

The `!NOW` function returns the date in a standard format. There are many more built-in functions and ways to format the output. For more information, see the *Visualforce Developer's Guide*.

Step 3: Uploading the Patch

Typically the next step is to upload a beta patch and install that in a test organization. Since this is very similar to Step 4: Upload a Beta and Step 5: Install and Test the Beta, that you completed in Tutorial #2: Developing Your App, we won't make you do that again.

1. In your patch org, from Setup, enter *`Packages`* in the `Quick Find` box, select **Packages**, and click your **Hello World** package.
2. On the Upload Package page, click **Upload**.
3. Enter a version name, such as today's date.
4. Notice that the `Version Number` has had its `patchNumber` incremented.
5. Select **Managed — Released**.
6. Optionally, enter and confirm a password to share the package privately with anyone who has the password. Don't enter a password if you want to make the package available to anyone on AppExchange and share your package publicly.
7. Salesforce automatically selects the requirements it finds. In addition, select any other required components from the `Package Requirements` and `Object Requirements` sections to notify installers of any requirements for this package.

8. Click **Upload**.

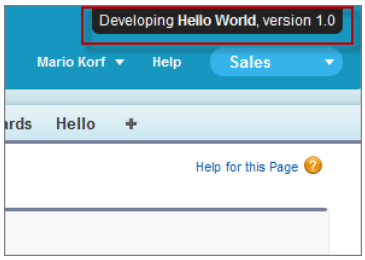
Congratulations, you've uploaded a patch release. You'll want to share that patch with others, and you'll do that next.

Step 4: Installing or Pushing a Patch

There are two ways to deliver a patch, you can have your customers install it, or you can *push* it to them. Push upgrades happen automatically, that is, the next time your customer logs in, they have the updates. Let's try that.

1. Log in to your dev org.
2. In the upper right corner, click **Developing Hello World, version 1.0**.

Developing Hello World, version 1.0



3. On the Package Detail page, click **Push Upgrades**.
4. Click **Schedule Push Upgrades**.
5. From the Patch Version drop-down list, select the patch version to push.
6. In the **Scheduled Start Date** field, enter today's date.
7. In the Select Target Organizations section, select your test org.
8. Click **Schedule**.

And you've done it! You pushed a patch release to your subscriber so that they automatically get your updates. You should verify that your customers received the patch to ensure it was installed successfully.

Tell Me More....

Beta versions aren't eligible for push upgrades. You must uninstall a beta and then install a new one.

You can also exclude specific subscriber orgs from the push upgrade by entering the org IDs, separated by a comma, in the Push Upgrade Exclusion List.

Updating Your App Summary

In this tutorial you learned how to update your app in a patch org and push that update to your customers. You started by creating a patch organization that was specific to a released package version. Then you modified your app, uploaded it, and scheduled the push upgrade to your customers.

Congratulations, you're done! Or have you really just begun? You can modify your existing app to be anything you want it to be, or create a new dev org in the Environment Hub and build another app. You can use the same sales and test orgs and everything else you've configured to publish and manage many more apps. You're on your way to ISVforce success!

CHAPTER 3 Grow Your AppExchange Business

Track your company's growth throughout the partner journey with the AppExchange Partner Trailblazer Score. Get a comprehensive view of your contributions across three pillars: customer success, innovation, and engagement. Explore detailed metrics within each pillar to see your company's progress as a Salesforce partner.

SEE ALSO:

Salesforce AppExchange Partner Program

CHAPTER 4 Design and Build Your Solution

In this chapter ...

- Create a Secure Solution
- Prevent Common Violations of Secure Coding Guidelines
- Overview of Packages
- Components Available in Managed Packages
- About API and Dynamic Apex Access in Packages
- Architectural Considerations for Group and Professional Editions
- Connected Apps
- Environment Hub
- Developer Hub
- Notifications for Package Errors

Discover the architectural concepts that influence AppExchange solution design. Learn how to plan, build, and package your solution for customers.

Create a Secure Solution

Learn about practices and resources that help you develop a solution that resists common security threats. Designate a security expert on your development team. Review the AppExchange Security Requirements Checklist sections and Open Web Application Security Project (OWASP) guidelines that apply to your solution.

Designate a Security Expert

Protecting your solution from security threats is easier when you integrate security considerations into all stages of development. One of the best ways to ensure that your solution follows security guidelines is to designate a security expert on your development team.

Have your entire development team collaborate with the security expert through all stages of development: design, implementation, and testing. Postponing security considerations until the final stages of development increases the likelihood that your team unknowingly propagates security violations as they code.

Regular collaboration prevents needless accumulation of security violations, and helps avoid delays in preparing a successful AppExchange security review submission.

Learn How to Develop Secure Web Solutions

In Prevent Common Violations of Secure Coding Guidelines and in the Secure Coding Guide, learn how to identify, prevent, and remediate security violations in solutions built on or integrated with the Salesforce Platform. Find out which violations most commonly appear, why they pose security risks, and how to avoid them in your code.

Review the AppExchange Security Requirements

The AppExchange Security Requirements Checklist is our most comprehensive information resource for evaluating the security of your solution. To understand our baseline technical security requirements, review this checklist. As you develop your solution, meet the security requirements that apply to your code.

Be sure to parse through the entire AppExchange Security Requirements Checklist. Requirements that apply to your solution can be spread out in various sections. However, the Best Practices for Security section applies to all solutions.

Note: In the checklist, *composite submission* refers to any solution that involves a third-party, non-Salesforce endpoint, system, or API.

Follow Open Web Application Security Project Guidance

The Open Web Application Security Project (OWASP) website provides comprehensive information about web app security risks. It includes detailed guidance on how to test for, prevent, and resolve security issues. Familiarize yourself with the key resources on the OWASP website.

We recommend that you use the OWASP Top Ten Project as a primary reference for securing your solution. This section of the OWASP site documents the 10 most prominent security risks that appear in web apps. The guidelines are especially pertinent to web apps and services that aren't hosted on the Salesforce Platform.

Aim to follow development practices and security guidelines that conform as closely as possible to the OWASP Secure Coding Practices - Quick Reference Guide.

SEE ALSO:

- Prevent Common Violations of Secure Coding Guidelines
- Secure Coding Guide
- AppExchange Security Review Trailhead module
- Secure Coding Guide
- OWASP site
- OWASP Top Ten
- OWASP Secure Coding Practices-Quick Reference Guide

Prevent Common Violations of Secure Coding Guidelines

The AppExchange security review assesses a solution's vulnerability to the most common security attacks. To pass the review, a solution can't violate secure coding guidelines. Only solutions that pass the review can be publicly distributed on AppExchange. Increase the likelihood that your solution passes. Learn which violations appear the most in reviewed solutions, why they pose security risks, and how to avoid them in your code.

Loading JavaScript Files from Third-Party Endpoints

Avoid dynamically loading third-party JavaScript files from content delivery networks (CDNs). Instead, load the code from the static resources folder of your package.

Loading Third-Party CSS in Lightning Components

Include cascading style sheets (CSS) and other resources in static resources rather than loading from a third party.

Using CSS Outside Components

The Salesforce Platform tries to ensure that each namespace is an isolated sandbox, but isolation can't always be guaranteed. Where a namespace isolation breach occurs, one component can steal clicks from another component, or otherwise interfere with another component's intended use. To prevent this type of abuse, don't use CSS directives known to be incompatible with style isolation in your components.

Running JavaScript in the Salesforce Domain

JavaScript code from multiple vendors can run in the same origin. To prevent code interference, vendor JavaScript code is sandboxed. Don't attempt to break out of a sandbox or run code outside your origin. Use Visualforce, Aura, or Lightning Web Components, which run in the proper origin.

Exposing Secret Data When Debugging

In production environments, logging secret data with debug statements is a security vulnerability. Don't log secret data, sensitive information, passwords, keys, or stack traces in production environments. Redact the data or omit it from the logs.

Storing Sensitive Data Insecurely

Follow enterprise security standards when you export data from the Salesforce Platform and when you store secret data in the platform.

Using Software That Has Known Vulnerabilities

Using software that has documented common vulnerabilities and exposures (CVE) related to your use cases is a security vulnerability. If your solution has known vulnerabilities, test and deploy security patches as soon as they're available. If your solution uses software that has CVE-documented vulnerabilities unrelated to your use cases, prepare false positive documentation.

Using Sample Code in Production

Only use sample code as an educational tool in preparation for developing your own application. When building your production code, always write the code yourself. Avoid copying code from sources that you don't directly control.

Bypassing Object-Level and Field-Level Access Settings

Design your solutions to enforce the org's create, read, update, and delete (CRUD) and field-level security (FLS) settings on standard and custom objects.

Bypassing Sharing Rules in Apex

Respect profile-based permissions, field-level security, sharing rules, and org-wide defaults in your Apex code.

SOQL Injection Due to Insecure Database Query Construction

To prevent Salesforce Object Query Language (SOQL) injection, use bind variables and input sanitation.

Cross-Site Request Forgery

A cross-site request forgery (CSRF) is an attack that forces an end user to execute unwanted actions during their authenticated web application session. To protect against CSRF, use `confirmationTokenRequired`, or trigger state changes with user actions.

Open Redirects

An open redirect occurs when an application dynamically redirects to a user-controlled parameter value without any validation. Prevent open redirects by using hardcoded redirects.

Lightning LockerService Disabled

Lightning LockerService is a critical security feature for Lightning code. It provides component isolation that allows code from many sources to execute and interact using safe, standard APIs and event mechanisms. Enable Lightning Locker for AppExchange packages that contain Lightning components or applications.

Insufficient Escaping in Lightning Components

Each component in a bundle is responsible for sanitizing the input provided to it by parent components, apps, or in URL parameters.

Asynchronous Code in Components

Hackers can manipulate the timing of asynchronous code to produce malicious results. To preserve current execution context, wrap asynchronous function calls or batch actions into a single request.

Loading JavaScript Files from Third-Party Endpoints

Avoid dynamically loading third-party JavaScript files from content delivery networks (CDNs). Instead, load the code from the static resources folder of your package.

Dynamically loading third-party JavaScript files from CDNs or other third parties isn't permitted for two reasons.

- You must version your entire solution with a package version ID so that there's a well-defined product to review and track. If your solution dynamically loads code from third-party endpoints, the externally managed code can change without the package version ID changing. The administrator and the Salesforce security review team aren't made aware of the change.

  Salesforce can't ensure that the third-party code continues to safeguard against the latest security vulnerabilities. To ensure that the code is subject to package version control, dynamically load the code from the static resources folder of your package. You can't change packaged code without changing the package version ID. Plus, version ID changes signal to administrators and the AppExchange security team that the code changed.

- Dynamically loading code from a third-party endpoint grants that endpoint the ability to inject code into any Salesforce org in which the package is installed. Only dynamically load code from Salesforce approved CDNs, where Salesforce manages the code, rather than the partner.

At a high level, the solution is:

1. Save third-party JavaScript files in static resources.

2. Add the resources to your solution package.
3. Load each JavaScript file from a `$Resource` URL.

Visualforce Example

These code snippets depict the security violation and how to fix it in Apex and for Lightning components in Aura. This Visualforce code isn't secure because jQuery is loaded from a third-party source.

```
<apex:includescript value="https://code.jquery.com/jquery-3.2.1.min.js"/>
```

This Visualforce code is secure because it loads a version of jQuery from the static resources folder of your package using a `$Resource` URL.

```
<apex:includeScript value="{! $Resource.jQuery }"/>
```

Aura Example

This Aura component code isn't secure because jQuery is directly loaded from a third-party source.

```
<aura:component>
   <ltng:require afterScriptsLoaded="{!c.initializeUI}"
   scripts="https://code.jquery.com/jquery-2.2.0.min.js”/>
<aura:component>
```

This Aura component code is secure because jQuery is loaded from the solution package and referenced as a static resource using a `$Resource` URL.

```
<aura:component>
   <ltng:require afterScriptsLoaded="{!c.initializeUI}"
   scripts="{!$Resource.jsLibraries + '/jsLibOne.js'}"/>
<aura:component>
```

Loading Third-Party CSS in Lightning Components

Include cascading style sheets (CSS) and other resources in static resources rather than loading from a third party.

This requirement is enforced for the same reasons outlined in Loading JavaScript Files from Third-Party Endpoints. The entire solution must be under version control, and the org administrator and Salesforce security review team must be aware of the change.

Using the `<link>` tag to load an external CSS resource violates this security policy.

At a high level, the solution is:

1. Save third-party CSS files in static resources.
2. Add the resources to your solution package.
3. Reference the CSS using a `<ltng:require>` tag in your .cmp or .app markup.

For more information, see Using External CSS in the Lightning Aura Components Developer Guide.

Aura Example

These code snippets depict the security violation and how to fix it in a Lightning component in Aura. This Aura component code isn't secure because it uses the `<link>` tag to load an external CSS resource.

```
<aura:component>
     <link rel="stylesheet" href="https://example.com/styles.css" type="text/css">
<aura:component>
```

This Aura component code uses `<ltng:require>`, which is a more secure way to reference an external CSS resource that you uploaded as a static resource.

```
<aura:component>
    <ltng:require styles="{!$Resource.SLDSv1 +
'/assets/styles/lightning-design-system-ltng.css'}" />
</aura:component>
```

Using CSS Outside Components

The Salesforce Platform tries to ensure that each namespace is an isolated sandbox, but isolation can't always be guaranteed. Where a namespace isolation breach occurs, one component can steal clicks from another component, or otherwise interfere with another component's intended use. To prevent this type of abuse, don't use CSS directives known to be incompatible with style isolation in your components.

CSS Example

This CSS code is vulnerable because it uses absolute positioning, which is incompatible with style isolation.

```
#some_element {
   position: absolute;
   right: 80px;
   top: 160px;
}
```

This CSS code prevents the vulnerability by using relative positioning.

```
#some_element_revised {
   position: relative;
   right: 80px;
   top: 160px;
}
```

For more information, see Tips for CSS in Components in the Lightning Aura Components Developer Guide.

Running JavaScript in the Salesforce Domain

JavaScript code from multiple vendors can run in the same origin. To prevent code interference, vendor JavaScript code is sandboxed. Don't attempt to break out of a sandbox or run code outside your origin. Use Visualforce, Aura, or Lightning Web Components, which run in the proper origin.

Many different types of JavaScript code run in a Salesforce org, including unpackaged customer code, Salesforce code, and packaged code. Typically, the code is from multiple vendors that have no way of collaborating with each other. If their code runs in the same origin, code from one vendor can interfere with other vendors' code.

To prevent code interference, vendor JavaScript code is sandboxed. With Visualforce solutions, JavaScript code is sandboxed in unique, vendor-specific origins. With Lightning solutions and Lightning Web Components (LWCs), JavaScript is sandboxed in unique, vendor-specific lockers.

Any attempt to break out of a sandbox and run code outside your origin is a secure coding violation. A secure coding violation includes attempts to run vendor-written JavaScript code in the Salesforce origin via homepage components, web links, or custom buttons.

In most situations, you can achieve the same functionality by using Visualforce, Aura, or Lightning Web Components, which run in the proper origin.

Metadata Example

The metadata in this example represents a custom object. A web link within this custom object is defined using the `REQUIRESCRIPT` statement. In a managed package, using `REQUIRESCRIPT` is a security vulnerability because the vendor is injecting its code into a Salesforce origin. Managed packages must stay within their namespace sandbox and can't execute scripts outside this sandbox.

```
<?xml version=”1.0”encoding="UTF-8"?>
<CustomObject xmlns="http://soap.sforce.com/2006/04/metadata">
<actionOverrides>
<actionName>Accept</actionName>
      <type>Default</type>
</actionOverrides>
<webLinks>
     <fullName>Add_to_List</fullName>
     <openType>onClickJavaScript</openType>
     <url>{!REQUIRESCRIPT(&quot;/soap/ajax/30.0/connection.js&quot;)}</url>
</webLinks>
...
</CustomObject>
```

Instead of embedding the code directly in the object, create a Visualforce button in a Visualforce Aura component, or use a Lightning Web Component.

Exposing Secret Data When Debugging

In production environments, logging secret data with debug statements is a security vulnerability. Don't log secret data, sensitive information, passwords, keys, or stack traces in production environments. Redact the data or omit it from the logs.

Revealing secret data with debug statements makes it difficult for the Salesforce org admin to control access to the data. Typically, the profiles permitted to view logs aren't the same profiles that are permitted to view secrets.

Apex Example

In this Apex code, `authenticationToken` is a cryptographic secret written to the debug log. To avoid this vulnerability, remove the `system.debug` statement from the production code.

```
if (varCount > 0){
   sensitiveUserData = JSON.serialize(AssignUsrs);
   ReqSignature = RequestWrapper.generateHmacSHA256Signature(sensitiveUserData,
authenticationToken);
   system.debug('Token--->'+authenticationToken);
}
```

Storing Sensitive Data Insecurely

Follow enterprise security standards when you export data from the Salesforce Platform and when you store secret data in the platform.

Insecure sensitive data storage provides many avenues for hackers to pose threats. For example, an org administrator is the only person who is supposed to know the API key. Hackers can use an exposed key to communicate data over admin channels to remote endpoints.

Salesforce takes threats to data that originate in your solution seriously. A data breach or loss caused by a vulnerability in your solution jeopardizes your relationship with Salesforce.

Follow the enterprise standards in **Storing Sensitive Data** when:

- Exporting customer data from the Salesforce platform.
- Storing secrets such as cryptographic keys, session ids, or passwords in the Salesforce Platform.

Metadata Example

The metadata in this example represents a custom object. This custom object definition isn't secure because the `<visibility>` tag for the API key field is set to `Public`. The field can be viewed in plain text.

```
<CustomObject xmlns="http://soap.sforce.com/2006/04/metadata">
   <fields>
        <fullName>apiKey__c</fullName>
        <externalId>false</externalId>
        <fieldManageability>DeveloperControlled</fieldManageability>
        <label>apiKey</label>
        <length>50</length>
        <required>false</required>
        <type>Text</type>
        <unique>false</unique>
   </fields>
   <label>Phone Verify Setting</label>
   <pluralLabel>Phone Verify Settings</pluralLabel>
   <visibility>Public</visibility>
</CustomObject>
```

When storing a secret in a custom object, such as an API key, encrypt it. Store the encryption key separately in a protected custom setting or a protected custom metadata API field.

Using Software That Has Known Vulnerabilities

Using software that has documented common vulnerabilities and exposures (CVE) related to your use cases is a security vulnerability. If your solution has known vulnerabilities, test and deploy security patches as soon as they're available. If your solution uses software that has CVE-documented vulnerabilities unrelated to your use cases, prepare false positive documentation.

Hackers are quick to attack disclosed software vulnerabilities. Most vendors provide patches or updates for vulnerabilities discovered in their software. To find out if your solution uses software with known vulnerabilities, check the Common Vulnerabilities and Exposures (CVE) database.

Apply all patches or updates related to your solution's use cases. If the vulnerabilities are unrelated to your use cases, document them as false positives. Explain why it's safe for your solution to use the vulnerable software. Our security review team uses this information when deciding whether to approve the software for use in your solution. Learn more in False Positives.

Using Sample Code in Production

Only use sample code as an educational tool in preparation for developing your own application. When building your production code, always write the code yourself. Avoid copying code from sources that you don't directly control.

There's great sample code available to developers all over the internet. While useful in learning best practices or new technologies, don't directly include sample code in production packages. Direct reuse can propagate vulnerabilities throughout many packages, whether intentional or not on the part of the sample code author.

Bypassing Object-Level and Field-Level Access Settings

Design your solutions to enforce the org's create, read, update, and delete (CRUD) and field-level security (FLS) settings on standard and custom objects.

On the Salesforce Platform, you can configure CRUD access and FLS on profiles and permission sets. CRUD settings determine which objects a user can access. FLS determines which object fields a user can access. Use CRUD and FLS to restrict access to standard and custom objects and individual fields.

Customers expect that your solution doesn't violate the settings they have set in their orgs. Design your solutions to enforce the org's CRUD and FLS settings on standard and custom objects. Also, ensure that your solution gracefully handles situations where a user's access is restricted.

In certain use cases, it's acceptable to bypass CRUD and FLS, such as when:

- Creating Roll-Up summaries or aggregates that don't directly expose the data.
- Modifying custom objects or fields, such as logs or system metadata, so that they aren't directly accessible to the user via CRUD or FLS.
- Accessing objects from a high-privileged method, a method that non-admin users can't access.
- Denying guest user access to underlying objects when your solution is a community or site.
- Accessing custom objects belonging to your namespace with a bespoke security policy. In this case, document the policy as part of your AppExchange security review submission.

To learn more about CRUD and FLS enforcement, check out Secure Server-Side Development module on Trailhead.

Apex Example

In this Apex code, the `insert account` data manipulation language (DML) statement runs without checking if the user has create access permission for the Account object. The code doesn't enforce the org's access settings.

```
public static Account createIndividualModalData(String name, String email, String mobile)
 {
   RecordType recordType = [Select Id from RecordType where DeveloperName =
'IndustriesIndividual' and SobjectType = Account'];
   Account account = new Account();
   account.Name = name;

   if(recordType != null) account.RecordTypeId = recordType.id;
   insert account;
    ...
}
```

This Apex code is more secure because it enforces the org's access settings. It calls the `isCreatable()` method before the `insert account` DML statement executes. If `isCreatable()` returns true, the user has create access permission for the Account object and the `insert account` statement executes. Otherwise, an insufficient-access error is reported.

```
public static Account createIndividualModalData(String name, String email, String mobile)
 {
   RecordType recordType = [Select Id from RecordType where DeveloperName =
'IndustriesIndividual' and SobjectType = 'Account'];
   Account account = new Account();
   account.Name = name;

   if(recordType != null) account.RecordTypeId = recordType.id;

   if (Schema.sObjectType.Account.isCreateable()) {
      insert account;
   } else {
      ApexPages.addMessage(new ApexPages.Message(ApexPages.Severity.ERROR,'Error:
Insufficient Access'));
   }
   ...
}
```

Bypassing Sharing Rules in Apex

Respect profile-based permissions, field-level security, sharing rules, and org-wide defaults in your Apex code.

The Salesforce Platform makes extensive use of data-sharing rules. Each object can have unique permissions that indicate which users and profiles can read, create, edit, and delete records of that object type. These restrictions are enforced when your code uses a standard controller.

However, a custom Apex class or Visualforce page doesn't intrinsically respect built-in profile permissions, field-level security restrictions, or sharing rules. By default, an Apex class can read and update all data within an org.

In your Apex code, don't expose sensitive data that is otherwise hidden from users. Respect profile-based permissions, field-level security, sharing rules, and org-wide defaults.

Follow these general rules for correctly enforcing sharing.

- Declare `with sharing` on all global classes or classes containing `@NamespaceAccessible` methods. Don't omit a sharing declaration or use `without sharing` on these entrypoints to your solution.
- For controller classes that aren't global or marked `@NamespaceAccessible`, either declare the class as `with inherited sharing` or `with sharing`. Don't omit a sharing declaration or use `without sharing` on these entrypoints to your solution.
- Declare all classes that directly perform data access operations as `with sharing`. If no class in your solution is marked `without sharing`, then `with inherited sharing` can also be used.

However, there are some notable exceptions. Don't follow the general rules when:

- You're building a site or community and want to deny guest-user access to data.
- You're accessing custom objects belonging to your namespace with a bespoke security policy. In this case, document the policy as part of your AppExchange security review submission documents. This exception doesn't apply to standard objects. The org admin solely owns security policy for standard objects.

Apex Example

In this Apex code, the `with sharing` keyword isn't added to class header. By default, sharing rules aren't enforced.

```
public class maincontroller {
   @AuraEnabled public static String saveJobApplication(String vacId, String userId) {
      ...
   }
}
```

In this Apex code, the `with sharing` keyword is used. Sharing rules are enforced.

```
public with sharing class maincontroller {
   @AuraEnabled public static String saveJobApplication(String vacId, String userId) {
       ...
   }
}
```

To learn more about sharing rules enforcement, check out the Secure Server-Side Development module on Trailhead.

SOQL Injection Due to Insecure Database Query Construction

To prevent Salesforce Object Query Language (SOQL) injection, use bind variables and input sanitation.

SOQL injection is a vulnerability in which a user directly controls portions of a SOQL database query. SOQL queries executed in Apex don't respect user permissions. Therefore, SOQL injections can be used to elevate users' privileges and allow them to access to data beyond their user permissions.

The two types of SOQL injection vulnerabilities require different protection approaches.

In the first type, the user supplies an incorrect table or field name to query against. When user data identifies a field or table name, you must verify that the user has permission to access the named table or field. Keep in mind that this type isn't a quoted context.

In the second type, the user supplies a portion of a quoted WHERE clause. When user data is inserted into a quoted string context, the data can break out of the quoted context. The preferred protection approach is to use bind variables. Alternatively, you can use `EscapeSingleQuotes()`. Both of these approaches prevent the user data from breaking out of the quoted context.

Never allow users to supply portions of SOQL queries other than field names, table names, and WHERE clause inputs.

Avoid executing user-generated queries in Apex, where they run in system mode. If you must generate more complex client-side SOQL, use the REST or SOAP API, which make SOQL calls safely.

To learn more about SOQL injection and how to prevent it in your code, check out the Secure Server-Side Development module on Trailhead.

SOQL Example

This SOQL statement is insecure because it's built by concatenating a string with embedded user input. No input sanitization occurs before the `database.query` statement executes.

```
string objType = id.valueOf(deduped[0].recordId).getSObjectType().getDescribe().getName();
string soql = 'select id, ' + string.join(fields, ', ') + ' from ' +    objType +' where
id in: lrIDs';
list<sobject> records = database.query(soql);
```

If you must use dynamic SOQL, use the `EscapeSingleQuotes()` method to sanitize user-supplied input. This method adds the escape character (\) to all single quotation marks in the user-supplied string. Adding the escape character ensures that all single quotation marks are treated as enclosing strings instead of as database commands.

```
string objType =
escapeSingleQuotes(id.valueOf(deduped[0].recordId).getSObjectType().getDescribe().getName());
string soql = 'select id, ' + string.join(fields, ', ') + ' from ' +    objType +' where
id in: lrIDs';
list<sobject> records = database.query(soql);
```

Cross-Site Request Forgery

A cross-site request forgery (CSRF) is an attack that forces an end user to execute unwanted actions during their authenticated web application session. To protect against CSRF, use `confirmationTokenRequired`, or trigger state changes with user actions.

All form requests made on the Salesforce Platform are protected. Insert, delete, update, and upsert state change operations triggered by user action, such as a button click, are also protected.

However, state change or data manipulation language (DML) operations triggered on page instantiation execute before the rest of the page loads, and they bypass the platform's default CSRF protection. State change and DML operations in class constructors are vulnerable if they're triggered from:

- Visualforce pages
- Lightning web components (LWC)
- Aura
- Any methods called from the action parameter of a Visualforce page

Apex Example

This Visualforce page is vulnerable to CSRF because the `!init` action is triggered on page initialization.

```
<apex:page controller="maincontroller" action="{!init}">

public pageReference init(){

   UserSetting__c accountToUpdate;
   pageReference p = page.mainview;
   // Retrieve the password and redirect query string parameters from the current page URL

   String password = ApexPages.currentPage().getParameters().get('password');
   String redirect =   ApexPages.currentPage().getParameters().get('redirect');
   if(string.isBlank(redirect)){
       p.getParameters().put('redirect', '/home/home.jsp');
       p.setRedirect(true);
   } else {
       p.getParameters().put('redirect', redirect);
   }
   if(string.isBlank(password)){
       p.getParameters().put('password', 'blank');
       p.setRedirect(true);
   } else {
       p.getParameters().put('password', password);
       accountToUpdate = [SELECT password__c FROM UserSetting__c LIMIT 1];
```

```
        accountToUpdate.password__C = password;
        update accountToUpdate;
    }
    if(p.getRedirect()== true){
       return p;
    }
    else {
        return null;
    }
}
```

A hacker can craft a URL containing parameters that alter database statements, allowing them to perform malicious actions of their choosing. When a user opens such a URL while logged in to your app, the code executes using the hacker's chosen URL parameters. The unintended database actions execute from the context of the victim's browser.

Visualforce Page Protection

To protect against the CSRF vulnerability in a Visualforce page when state change or DML operations execute on page initialization, enable the `confirmationTokenRequired` boolean metadata field in the Visualforce page.

If `confirmationTokenRequired` is set to true, GET requests to the page require a CSRF token in the URL. If the token is omitted, the page is inaccessible.

The default setting is false, which removes Apex's built-in CSRF token protection. You can configure this field by going to relevant Visualforce page settings in org setup.

For more info about `confirmationTokenRequired`, refer to ApexPage in the Metadata API Developer Guide.

Lightning and LWC CSRF Protection

Don't perform any state change or DML operations in an Apex controller during instantiation of Lightning or LWC. Instead, trigger a state change with a user action, such as a button click. To learn more about CSRF and how to prevent it in your code, check out the Secure Server-Side Development module on Trailhead.

Open Redirects

An open redirect occurs when an application dynamically redirects to a user-controlled parameter value without any validation. Prevent open redirects by using hardcoded redirects.

Open redirects are also known as arbitrary or unvalidated redirects. This vulnerability is used in phishing attacks to redirect users to any URL.

Apex Example

In this function definition, the `String.redirect` statement retrieves the `redirect` URL parameter for the current page. The parameter is used to craft a redirection URL, and then to perform a client-side redirect to the crafted URL.

```
public PageReference changepassword(){
    PageReference savePage;
    String redirect = ApexPages.currentPage().getParameters().get('redirect');
    redirect = (redirect == NULL) ? '/home/home.jsp' : redirect;
    savePage = new PageReference(redirect);
    savePage.setRedirect(true);
```

```
    return savePage;
}
```

The `<apex:form>` Visualforce markup view triggers the `changepassword` action, which results in an open redirect vulnerability in a package.

```
<apex:form>
    Redirection action: <apex:inputText value="{!userInput}" />
    <br/><apex:commandButton value="Submit" action="{!changepassword}" />
</apex:form>
```

Revised Code

Open redirects expose your redirection parameters to potential attackers. You can prevent open redirects using multiple strategies. One strategy is to use hardcoded redirects. In a hardcoded redirect, you set the value explicitly as shown in this example:

```
public PageReference changepassword(){
    PageReference savePage;
    savePage = new PageReference('/home/home.jsp');
    savePage.setRedirect(true);
    return savePage;
}
```

To learn more about open redirects and how to prevent them in your code, check out the Secure Server-Side Development module on Trailhead.

Lightning LockerService Disabled

Lightning LockerService is a critical security feature for Lightning code. It provides component isolation that allows code from many sources to execute and interact using safe, standard APIs and event mechanisms. Enable Lightning Locker for AppExchange packages that contain Lightning components or applications.

Lightning LockerService is enabled for all custom Lightning web components. The service was activated for customers in the Summer '17 release. Lightning LockerService isn't enforced for components that use API version 39.0 and lower, which covers any component created before Summer '17. When a component is set to at least API version 40.0, it's enabled. New AppExchange security reviews and periodic re-reviews require components to be version 40.0 or higher so that Locker is enabled.

Metadata Example

In this component's `<AuraDefinitionBundle>` metadata, the `<apiVersion>` field sets the API version to 39.0. LockerService is disabled for components that use API version 39.0 and lower.

```
<?xml version="1.0" encoding="UTF-8"?>
<AuraDefinitionBundle xmlns="http://soap.sforce.com/2006/04/metadata">
     <apiVersion>39.0</apiVersion>
     <description>My Component</description>
</AuraDefinitionBundle>
```

In this component's revised `<AuraDefinitionBundle>` metadata, the `<apiVersion>` field sets the API version to 40.0. LockerService is enforced for components that use API version 40.0 and higher.

```
<?xml version="1.0" encoding="UTF-8"?>
<AuraDefinitionBundle xmlns="http://soap.sforce.com/2006/04/metadata">
```

```
    <apiVersion>40.0</apiVersion>
    <description>My Component</description>
</AuraDefinitionBundle>
```

For more information, read the Summer 2017 Release Notes and Security with Lightning Locker in the Lightning Web Components Developer Guide.

Insufficient Escaping in Lightning Components

Each component in a bundle is responsible for sanitizing the input provided to it by parent components, apps, or in URL parameters.

The security boundary of an individual component is the component bundle. Each component in a bundle is responsible for sanitizing the input provided to it by parent components, apps, or in URL parameters. Public or global component attributes are assumed to contain attacker-controlled inputs unless sanitized by the component in an `onInit` handler.

Failure to sanitize inputs can lead to cross-site scripting (XSS) or URL redirection attacks.

Aura Example

In this Aura code, a component reads data from a global attribute and then renders it to the document object model (DOM) without sufficient escaping. One parameter has the tag `unescapedHTML`, which is open to exploitation. A hacker or malware can inject HTML or JavaScript into the view and trigger a cross-site scripting (XSS) attack.

```
<aura:component controller="name_NewsController" access="global" extends="c:name_Name"
implements="force:appHostable,flexipage:availableForAllPageTypes,forceCommunity:availableForAllPageTypes">

   <aura:handler name="baseReady" event="c:name_Name" action="{!c.doInit}"/>
   ...
   <aura:attribute name="newsDetails" type="String" default="" access="global"/>
   ...
   <div class="slds-col_padded slds-size_1-of-1 textDetail">
      <div class="slds-text-longform">
         <aura:unescapedHtml aura:Id="newsDetail" value="{!v.newsDetails}"/>
       </div>
   </div>
   ...
</aura:component>
```

This Aura component code is secure because it doesn't use the `unescapedHTML`.

```
<aura:component controller="name_NewsController" access="global" extends="c:name_Name"
implements="force:appHostable,flexipage:availableForAllPageTypes,forceCommunity:availableForAllPageTypes">

   <aura:handler name="baseReady" event="c:name_Name" action="{!c.doInit}"/>
   ...
   <aura:attribute name="newsDetails" type="String" default="" access="global"/>
   ...
   <div class="slds-col_padded slds-size_1-of-1 textDetail">
      <div class="slds-text-longform">
         <aura:Id="newsDetail" value="{!v.newsDetails}"/>
       </div>
   </div>
   ...
</aura:component>
```

For more info, refer to Lightning Security in the Secure Coding Guide.

Asynchronous Code in Components

Hackers can manipulate the timing of asynchronous code to produce malicious results. To preserve current execution context, wrap asynchronous function calls or batch actions into a single request.

When you use an asynchronous function such as `setTimeout()` and `setInterval()` to reference a component, you exit the framework's lifecycle. If you navigate elsewhere in the user interface while asynchronous code is executing, the framework unrenders and destroys the component that made the asynchronous request. You can still have a reference to that component, but it's no longer valid. Hackers exploit this vulnerability in harmful ways, for example, crash an app.

To reenter the framework safely, wrap the code in the `$A.getCallback()` function. Then, to ensure that the component is still valid, use the `component.isValid()` function before executing anything in the callback. Alternatively, batch multiple actions into one request by using `enqueueAction()`.

Note: This vulnerability doesn't apply to components created against the Summer '17 release (API v40.0) or later.

These examples depict the security violation and how to fix it.

Aura Example

The `setInterval()` function gives you access to the document object model (DOM). However, accessing the DOM with `setInterval()` occurs in a context outside of the Lightning framework. There are no guarantees about the parent component's state—it's possible the function doesn't have a parent component at all. If the state changes, the callback function can act on data that it doesn't own, or it can wait for data that never shows up. In these scenarios, the app throws an error message that halts the entire Salesforce page, and the component stops responding.

```
vars.Timer = setInterval(function(){ helper.action(component); },1);
```

Revised Code Using getCallback() Example

To reenter the framework safely, wrap the code in the `$A.getCallback()` function. Then, to ensure that the component is still valid, use the `component.isValid()` function before executing anything in the callback.

Use `$A.getCallback()` to wrap any code that accesses a component outside the normal re rendering lifecycle, such as in a `setTimeout()` or `setInterval()` call. `$A.getCallback()` preserves the current execution context and grants the correct access level to the asynchronous code. Otherwise, the framework loses context and only allows access to global resources.

```
window.setTimeout(
    $A.getCallback(function() {
        if(cmp.isValid()){
            cmp.set("v.visible", true);
        }
    }), 5000
);
```

Revised Code Using enqueueAction() Example

Alternatively, use `enqueueAction()`, which adds the server-side controller action to the queue of actions to be executed. Rather than sending a separate request for each individual action, the framework processes the event chain and batches the actions in the queue into one request. The actions are asynchronous and have callbacks.

```
var action = component.get("c.usually_a_server_side_controller");
action.setCallback(this, function()(response) {...});
$A.enqueueAction(action2);
```

To learn more, check out our Secure Client-Side Development module on Trailhead.

Overview of Packages

A *package* is a container for something as small as an individual component or as large as a set of related apps. After creating a package, you can distribute it to other Salesforce users and organizations, including those outside your company.

Packages come in two forms—unmanaged and managed:

Unmanaged packages

Unmanaged packages are typically used to distribute open-source projects or application templates to provide developers with the basic building blocks for an application. Once the components are installed from an unmanaged package, the components can be edited in the organization they are installed in. The developer who created and uploaded the unmanaged package has no control over the installed components, and can't change or upgrade them. Unmanaged packages should not be used to migrate components from a sandbox to production organization. Instead, use Change Sets.

As a best practice, install an unmanaged package only if the org used to upload the package still exists. If that org is deleted, you may not be able to install the unmanaged package.

Managed packages

Note: Salesforce has two ways that you can build managed packages, first-generation packaging (1GP) and second-generation packaging (2GP). This guide describes 1GP. For new solutions, use 2GP as described in the Second-Generation Managed Packages section of the Salesforce DX Developer Guide.

Managed packages are typically used by Salesforce partners to distribute and sell applications to customers. These packages must be created from a Developer Edition organization. Using the AppExchange and the License Management Application (LMA), developers can sell and manage user-based licenses to the app. Managed packages are also fully upgradeable. To ensure seamless upgrades, certain destructive changes, like removing objects or fields, can not be performed.

Managed packages also offer the following benefits:

- Intellectual property protection for Apex
- Built-in versioning support for API accessible components
- The ability to branch and patch a previous version
- The ability to seamlessly push patch updates to subscribers
- Unique naming of all components to ensure conflict-free installs

EDITIONS

Available in: Salesforce Classic (not available in all orgs) and Lightning Experience

Available in: **Developer** Edition

Package uploads and installs are available in **Group**, **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

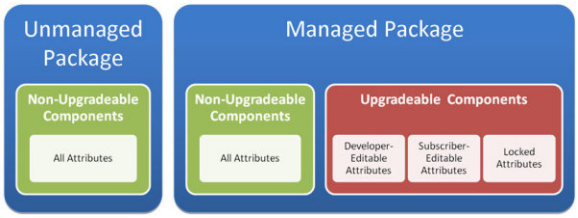
USER PERMISSIONS

To create packages:
- Create AppExchange Packages

To upload packages to the AppExchange:
- Upload AppExchange Packages

The following definitions illustrate these concepts:

Unmanaged and Managed Packages



Components

A *component* is one constituent part of a package. It defines an item, such as a custom object or a custom field. You can combine components in a package to produce powerful features or applications. In an unmanaged package, components are not upgradeable. In a managed package, some components can be upgraded while others can't.

Attributes

An *attribute* is a field on a component, such as the name of an email template or the `Allow Reports` checkbox on a custom object. On a non-upgradeable component in either an unmanaged or managed package, attributes are editable by both the developer (the one who created the package) and the subscriber (the one who installed the package). On an upgradeable component in a managed package, some attributes can be edited by the developer, some can be edited by the subscriber, and some are locked, meaning they can't be edited by either the developer or subscriber.

For information on which components can be included in a package and which attributes are editable for each component, see the *ISVforce Guide*.

Packages consist of one or more Salesforce components, which, in turn, consist of one or more attributes. Components and their attributes behave differently in managed and unmanaged packages.

If you plan to distribute an app, it is important to consider packaging throughout the development process. For example:

- While creating your app, consider how components and their attributes behave in different packages and Salesforce editions.
- While preparing your app for distribution, consider how you want to release it to your customers.
- While installing a package, consider your organization's security and license agreements.

Planning the Release of Managed Packages

Releasing an AppExchange package is similar to releasing any other program in software development. You may want to roll it out in iterations to ensure each component functions as planned. You may even have beta testers who have offered to install an early version of your package and provide feedback.

Once you release a package by publishing it on AppExchange, anyone can install it. So, plan your release carefully. Review the states defined below to familiarize yourself with the release process. Salesforce automatically applies the appropriate state to your package and components depending on the upload settings you choose and where it is in the release process.

State	Description
Unmanaged	The package has not been converted into a managed package or the component has not been added to a managed package. Note that a component that is "Managed - Beta" can become "Unmanaged" if it is removed from a managed package. All packages are unmanaged unless otherwise indicated by one of the managed icons below.

State	Description
Managed - Beta	The package or component was created in the current Salesforce organization and is managed, but it is not released because of one of these reasons: • It has not been uploaded. • It has been uploaded with `Managed - Beta` option selected. This option prevents it from being published, publicly available on AppExchange. The developer can still edit any component but the installer may not be able to depending on which components were packaged. Note: Don't install a Managed - Beta package over a Managed - Released package. If you do, the package is no longer upgradeable and your only option is to uninstall and reinstall it.
Managed - Released	The package or component was created in the current Salesforce organization and is managed. It is also uploaded with the `Managed - Released` option selected, indicating that it can be published on AppExchange and is publicly available. Note that once you have moved a package to this state, some properties of the components are no longer editable for both the developer and installer. This type of release is considered a major release.
Patch	If you need to provide a minor upgrade to a managed package, consider creating a patch instead of a new major release. A patch enables a developer to change the functionality of existing components in a managed package. Subscribers experience no visible changes to the package. This type of release is considered a patch release.
Managed - Installed	The package or component was installed from another Salesforce organization but is managed.

A developer can refine the functionality in a managed package over time, uploading and releasing new versions as the requirements evolve. This might involve redesigning some of the components in the managed package. Developers can delete some, but not all, types of components in a Managed - Released package when upgrading it.

Create a Package

Packages are containers for distributing custom functionality between Salesforce orgs. Create a package to upload your app or Lightning component to AppExchange or to deploy changes between orgs.

1. From Setup, enter *Package Manager* in the Quick Find box, then select **Package Manager**.
2. Click **New**.
3. Enter a name for your package. You can use a different name than what appears on AppExchange.
4. From the dropdown menu, select the default language of all component labels in the package.
5. Optionally, choose a custom link from the Configure Custom Link field to display configuration information to installers of your app. You can select a predefined custom link to a URL or s-control that you have created for your home page layouts; see the Configure Option on page 51. The custom link displays as a **Configure** link within Salesforce on the Salesforce AppExchange Downloads page and app detail page of the installer's organization.
6. Optionally, in the Notify on Apex Error field, enter the username of the person to notify if an uncaught exception occurs in the Apex code. If you do not specify a username, all uncaught exceptions generate an email notification that is sent to Salesforce. This option is only available for managed packages. For more information, see Handling Apex Exceptions in Managed Packages.

   Note: Apex can only be packaged from Developer, Enterprise, Unlimited, and Performance Edition organizations.

7. Optionally, in the Notify on Packaging Error field, enter the email address of the person who receives an email notification if an error occurs when a subscriber's attempt to install, upgrade, or uninstall a packaged app fails. This field appears only if packaging error notifications are enabled. To enable notifications, contact your Salesforce representative.
8. Optionally, enter a description that describes the package. You can change this description before you upload it to AppExchange.
9. Optionally, specify a post install script. You can run an Apex script in the subscriber organization after the package is installed or upgraded. For more information, see Running Apex on Package Install/Upgrade.
10. Optionally, specify an uninstall script. You can run an Apex script in the subscriber organization after the package is uninstalled. For more information, see Running Apex on Package Uninstall.
11. Click **Save**.

EDITIONS

Available in: Salesforce Classic (not available in all orgs) and Lightning Experience

Available in: **Developer** Edition

Package uploads and installs are available in **Group**, **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To create packages:
- Create AppExchange Packages

Developing and Distributing Unmanaged Packages

Unmanaged packages are traditionally used for distributing open-source projects to developers, or as a one time drop of applications that require customization after installation. You should never use unmanaged packages for sandbox to production migration. Instead, use the Salesforce Extensions for Visual Studio Code or the Ant Migration Tool. If you're using Enterprise, Unlimited, or Performance Edition, see Change Sets.

SEE ALSO:

Components Available in Unmanaged Packages

Convert Unmanaged Packages to Managed

Before you convert an existing package to managed, alert any current installers that they must save their data:

1. Export all the data from the previous, unmanaged version of the package.
2. Uninstall the unmanaged package.
3. Install the new managed version of the package.
4. Import all the exported data into the new managed package.

> Note: Note to installers: if you have made customizations to an installation of an unmanaged package, make a list of these customizations before uninstalling since you may want to implement them again.

To convert an unmanaged package into a managed package:

1. Register a namespace.
2. From Setup, enter *Package Manager* in the Quick Find box, then select **Package Manager**.
3. Edit the package that you want to make managed, then select **Managed**.

EDITIONS

Available in: Salesforce Classic (not available in all orgs) and Lightning Experience

Available in: **Developer** Edition

Package uploads and installs are available in **Group**, **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To configure namespace settings:
- Customize Application

To create packages:
- Create AppExchange Packages

To upload packages:
- Upload AppExchange Packages

Create and Upload an Unmanaged Package

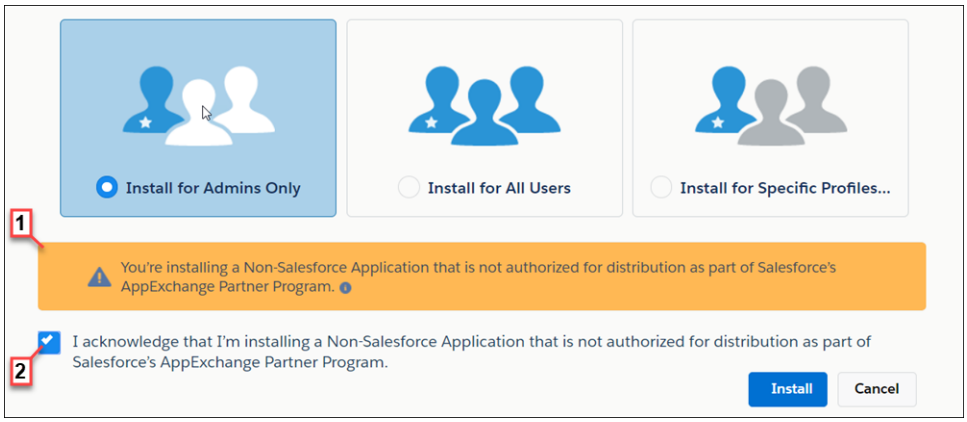
Use the following procedure to upload an unmanaged package through the UI. (You can also upload a package using the Tooling API. For sample code and more details, see the PackageUploadRequest object in the *Tooling API Developer Guide*.)

1. Create the package:
   a. From Setup, enter *Packages* in the Quick Find box, then select **Packages**.
   b. Click **New**.
   c. Fill in the details of the package.
   d. Click **Save**.
2. Click **Add Components**.
3. From the dropdown list, choose the type of component.
4. Select the components you want to add.
5. Click **Add To Package**.
6. Repeat these steps until you have added all the components you want in your package.
7. Click **Upload**.

You will receive an email that includes an installation link when your package has been uploaded successfully. Wait a few moments before clicking the installation link or distributing it to others, as it might take a few minutes for it to become active.

Install Notifications for Unauthorized Managed Packages

When you distribute a managed package that the AppExchange Partner Program hasn't authorized, we notify customers during the installation process. The notification is removed after the package is approved.



The notification appears when customers configure the package installation settings (1). Before customers install the package, they must confirm that they understand that the package isn't authorized for distribution (2).

The notification displays when a managed package:

- Has never been through security review or is under review
- Didn't pass the security review
- Isn't authorized by the AppExchange Partner Program for another reason

If the AppExchange Partner Program approves the package, it's authorized for distribution, and the notification is removed. When you publish a new version of the package, it's automatically authorized for distribution.

For information about the AppExchange Partner Program and its requirements, visit the Salesforce Partner Community.

Components Available in Managed Packages

Each metadata component that you include in a 1GP or 2GP managed package has certain rules that determine its behavior in a subscriber org. Manageability rules determine whether you, or the subscriber, can edit or remove components after the package version is created and installed.

This page has moved. For details about components supported in first-generation and second-generation managed packages, see Components Available in Managed Packages in the Salesforce DX Developer Guide.

Components Automatically Added to Packages

When adding components to your first-generation managed package, related components are automatically added. For example, if you add a Visualforce page to a package that references a custom controller, that Apex class is also added.

To understand what components are automatically included in first-generation managed packages, review the following list:

When you add this component	These components are automatically added
Action	Action target object (if it's a custom object), action target field, action record type, predefined field values, action layout; and any custom fields that the action layout or predefined values refer to on the target object
Reporting Snapshot	Reports

When you add this component	These components are automatically added
Apex class	Custom fields, custom objects, and other explicitly referenced Apex classes, and anything else that the Apex class references directly Note: If an Apex class references a custom label, and that label has translations, you must explicitly package the individual languages desired for those translations to be included.
Apex trigger	Custom fields, custom objects, and any explicitly referenced Apex classes, and anything else that the Apex trigger references directly
Article type	Custom fields, the default page layout
Compact layout	Custom fields
Custom app	Custom tabs (including web tabs), documents (stored as images on the tab), documents folder, asset files
Custom button or link	Custom fields and custom objects
Custom field	Custom objects
Custom home page layouts	Custom home page components on the layout
Custom settings	Apex sharing reasons, Apex sharing recalculations, Apex triggers, custom fields, list views, page layouts, record types, validation rules, or custom buttons or links.
Custom object	Custom fields, validation rules, page layouts, list views, custom buttons, custom links, record types, Apex sharing reasons, Apex sharing recalculations, and Apex triggers Note: • Apex sharing reasons are unavailable in extensions. • When packaged and installed, only public list views from an app are installed. If a custom object has any custom list views that you want to include in your package, ensure that the list view is accessible by all users.
Custom object (as an external object)	External data source, custom fields, page layouts, list views, custom buttons, and custom links Note: • When packaged and installed, only public list views from an app are installed. If an external object has any custom list views that you want to include in your package, ensure that the list view is accessible by all users. • In managed and unmanaged packages, external objects are included in the custom object component.
Custom tab	Custom objects (including all of its components), s-controls, and Visualforce pages
Dashboard	Folders, reports (including all of its components), s-controls, and Visualforce pages
Document	Folder
Email template (Classic)	• Folder

When you add this component	These components are automatically added
	• Letterhead • Custom fields • Documents (stored as images on the letterhead or template)
Email template (Lightning)	• Custom object • Custom field references (in Handlebars Merge Language syntax) • Enhanced folder (except the default public and private folders) • Inline images referencing Salesforce Files • Attachments referencing Salesforce Files For Lightning email templates created before Spring '21, attachments aren't automatically added to the package. Open and resave these templates to turn the attachments into content assets, which are then automatically added to the package These items aren't included and can't be added to a package: • Enhanced letterhead • The associated FlexiPage • CMS files (Pardot only)
Email template (Lightning) created in Email Template Builder	• Custom object • Custom field references (in Handlebars Merge Language syntax) • Enhanced folder (except the default public and private folders) • Inline images referencing Salesforce Files • Attachments referencing Salesforce Files • The associated FlexiPage These items aren't included and can't be added to a package: • Enhanced letterhead • CMS files (Pardot only)
Field set	Any referenced fields
Lightning page	All Lightning resources referenced by the page, such as record types, actions, custom components, events, and interfaces. Custom fields, custom objects, list views, page layouts, Visualforce pages, and Apex classes referenced by the components on the page.
Lightning page tab	Lightning page
Flow	Custom objects, custom fields, Apex classes, and Visualforce pages
Folder	Everything in the folder
Lightning application	All Lightning resources referenced by the application, such as components, events, and interfaces. Custom fields, custom objects, list views, page layouts, and Apex classes referenced by the application.

When you add this component	These components are automatically added
Lightning component	All Lightning resources referenced by the component, such as nested components, events, and interfaces. Custom fields, custom objects, list views, page layouts, and Apex classes referenced by the component.
Lightning event	Custom fields, custom objects, list views, and page layouts
Lightning interface	Custom fields, custom objects, list views, and page layouts
Lightning web component	All Lightning web component resources referenced by the component, such as nested components and modules. Custom fields, custom objects, list views, page layouts, and Apex classes referenced by the component.
Page layout	Actions, custom buttons, custom links, s-controls, and Visualforce pages
Permission set	Any custom permissions, external data sources, Visualforce pages, record types, and Apex classes that are assigned in the permission set
Record type	Record type mappings, compact layout
Report	Folder, custom fields, custom objects, custom report types, and custom s-controls
S-control	Custom fields and custom objects
Translation	Translated terms for the selected language on any component in the package
Validation rule	Custom fields (referenced in the formula)
Visualforce home page component	Associated Visualforce page
Visualforce pages	Apex classes that are used as custom controllers, Visualforce custom components, and referenced field sets
Workflow rule	All associated workflow alerts, field updates, outbound messages, and tasks; also, if the workflow rule is designed for a custom object, the custom object is automatically included

Note: Some package components, such as validation rules or record types, don't appear in the list of package components, but are included and install with the other components.

Protected Components

Developers can mark certain components as *protected*. Protected components can't be linked to or referenced by components created in a subscriber org. A developer can delete a protected component in a future release without worrying about failing installations. However, once a component is marked as unprotected and is released globally, the developer can't delete it.

The developer can mark the following components as protected in managed packages.

- Custom labels
- Custom links (for Home page only)
- Custom metadata types
- Custom objects
- Custom permissions

- Custom settings
- Workflow alerts
- Workflow field updates
- Workflow outbound messages
- Workflow tasks
- Workflow flow triggers

  The pilot program for flow trigger workflow actions is closed. If you've already enabled the pilot in your org, you can continue to create and edit flow trigger workflow actions. If you didn't enable the pilot in your org, use Flow Builder to create a record-triggered flow, or use Process Builder to launch a flow from a process.

Considerations for Protected Custom Objects in Subscriber Sandboxes

When a subscriber creates a partial sandbox copy, they can't include protected custom objects in the sandbox copy because protected components aren't visible in subscriber orgs. Data contained in the records of protected custom objects can't be copied via a partial sandbox copy.

Set Up a Platform Cache Partition with Provider Free Capacity

Salesforce provides 3 MB of free Platform Cache capacity for AppExchange-certified and security-reviewed managed packages. This is made available through a capacity type called Provider Free capacity and is automatically enabled in all Developer edition orgs.

Follow the steps here to allocate the Provider Free capacity to a Platform Cache partition before adding it to your managed package.

Note: If a Platform Cache partition is already part of your managed package, you can choose to edit the existing partition and allocate the Provider Free capacity to it.

Create a partition from the Platform Cache page and then set it up to use the Provider Free capacity

1. From Setup, in the Quick Find box, enter `Platform Cache`, and then select **Platform Cache**.

   As the Provider Free capacity is automatically enabled in all Developer edition orgs, the Org's Capacity Breakdown donut chart shows the Provider Free capacity.

2. Click **New Platform Cache Partition**.
3. In the `Label` box, enter a name for the partition. The name can contain alphanumeric characters only and must be unique in your org.
4. In the `Description` box, enter an optional description for the partition.
5. In the Capacity section, allocate separate capacities for session cache and org cache from the available Provider Free capacity.
6. Save the new Platform Cache partition.

You can add this new Platform Cache partition to your managed package. When an AppExchange-certified, security-reviewed managed package with Platform Cache partition is installed on the subscriber org, the Provider Free capacity is allocated and automatically made available to the installed partition. The managed package can start using the Platform Cache partition; no post-install script or manual allocation is required.

Note: If the managed package is not AppExchange-certified and security-reviewed, the Provider Free capacity resets to zero and will not be allocated to the installed Platform Cache partition.

When a Platform Cache partition with Provider Free capacity is installed in a subscriber org, the Provider Free capacity allocated is non-editable. The provider free capacity of one installed partition can't be used for any other partition.

Tip: After you install a Platform Cache partition with Provider Free capacity, you can edit the partition and make additional allocations from the available platform cache capacity of the org.

Understanding Dependencies

Package dependencies are created when one component references another component, permission, or preference that is required for the component to be valid. Lightning Platform tracks certain dependencies, including:

- Organizational dependencies, such as whether multicurrency or campaigns are enabled
- Component-specific dependencies, such as whether particular record types or divisions exist
- References to both standard and custom objects or fields

Packages, Apex classes, Apex triggers, Visualforce components, and Visualforce pages can have dependencies on components within an organization. These dependencies are recorded on the Show Dependencies page.

Dependencies are important for packaging because any dependency in a component of a package is considered a dependency of the package as a whole.

Note: An installer's organization must meet all dependency requirements listed on the Show Dependencies page or else the installation will fail. For example, the installer's organization must have divisions enabled to install a package that references divisions.

Dependencies are important for Apex classes or triggers. Any component on which a class or trigger depends must be included with the class or trigger when the code is deployed or packaged.

In addition to dependencies, the *operational scope* is also displayed on the Show Dependencies page. The operational scope is a table that lists any data manipulation language (DML) operations (such as `insert` or `merge`) that Apex executes on a specified object. The operational scope can be used when installing an application to determine the full extent of the application's database operations.

To view the dependencies and operational scope for a package, Apex class, Apex trigger, or Visualforce page:

1. Navigate to the appropriate component from Setup:
   - For packages, enter *`Packages`* in the `Quick Find` box, then select **Packages**.
   - For Apex classes, enter *`Apex Classes`* in the `Quick Find` box, then select **Apex Classes**.
   - For Apex triggers, from the management settings for the appropriate object, go to Triggers.
   - For Visualforce pages, enter *`Visualforce Pages`* in the `Quick Find` box, then select **Visualforce Pages**.
2. Select the name of the component.
3. Click **View Dependencies** for a package, or **Show Dependencies** for all other components, to see a list of objects that depend upon the selected component.

If a list of dependent objects displays, click **Fields** to access the field-level detail of the operational scope. The field-level detail includes information, such as whether Apex updates a field. For more information, see Field Operational Scope.

Packages, Apex code, and Visualforce pages can depend many components, including but not limited to:

- Custom field definitions
- Validation formulas
- Reports

EDITIONS

Available in: Salesforce Classic (not available in all orgs)

AppExchange packages and Visualforce are available in: **Group**, **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Apex available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To upload packages:
- Upload AppExchange Packages

To view Visualforce dependencies:
- Developer Mode

- Record types
- Apex
- Visualforce pages and components

For example, if a Visualforce page includes a reference to a multicurrency field, such as `{!contract.ISO_code}`, that Visualforce page has a dependency on multicurrency. If a package contains this Visualforce page, it also has a dependency on multicurrency. Any organization that wants to install this package must have multicurrency enabled.

Metadata Access in Apex Code

Use the `Metadata` namespace in Apex to access metadata in your package.

Your package may need to retrieve or modify metadata during installation or update. The `Metadata` namespace in Apex provides classes that represent metadata types, as well as classes that let you retrieve and deploy metadata components to the subscriber org. These considerations apply to metadata in Apex:

- You can create, retrieve, and update metadata components in Apex code, but you can't delete components.
- You can currently access records of custom metadata types and page layouts in Apex.
- Managed packages not approved by Salesforce can't access metadata in the subscriber org, unless the subscriber org enables the **Allow metadata deploy by Apex from non-certified Apex package version** org preference. Use this org preference when doing test or beta releases of your managed packages.

If your package accesses metadata during installation or update, or contains a custom setup interface that accesses metadata, you must notify the user. For installs that access metadata, notify the user in the description of your package. The notice should let customers know that your package has the ability to modify the subscriber org's metadata.

You can write your own notice, or use this sample:

```
This package can access and change metadata outside its namespace in the Salesforce
org where it's installed.
```

Salesforce verifies the notice during the security review.

For more information, see Metadata in the *Apex Developer Guide*.

Permission Sets and Profile Settings in Packages

Developers can use permission sets or profile settings to grant permissions and other access settings to a package. When deciding whether to use permission sets, profile settings, or a combination of both, consider the similarities and differences.

Important: Where possible, we changed noninclusive terms to align with our company value of Equality. We maintained certain terms to avoid any effect on customer implementations.

Behavior	Permission Sets	Profile Settings
What permissions and settings are included?	• Assigned custom apps • Custom object permissions • External object permissions • Custom field permissions	• Assigned custom apps • Assigned connected apps • Tab settings • Page layout assignments

EDITIONS

Available in: Salesforce Classic (not available in all orgs)

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Permission sets available in: **Contact Manager**, **Professional**, **Group**, **Enterprise**, **Performance**, **Unlimited**, **Developer**, and **Database.com** Editions

Behavior	Permission Sets	Profile Settings
	• Custom metadata types permissions • Custom permissions • Custom settings permissions • Custom tab visibility settings • Apex class access • Visualforce page access • External data source access • Record types Note: Although permission sets include standard tab visibility settings, these settings can't be packaged as permission set components. If a permission set includes an assigned custom app, it's possible that a subscriber can delete the app. In that case, when the package is later upgraded, the assigned custom app is removed from the permission set.	• Record type assignments • Custom field permissions • Custom metadata type permissions • Custom object permissions • Custom permissions • Custom settings permissions • External object permissions • Apex class access • Visualforce page access • External data source access
Can they be upgraded in managed packages?	Yes.	Profile settings are applied to existing profiles in the subscriber's org on install or upgrade. Only permissions related to new components created as part of the install or upgrade are applied.
Can subscribers edit them?	Subscribers can edit permission sets in unmanaged packages, but not in managed packages.	Yes.
Can you clone or create them?	Yes. However, if a subscriber clones a permission set or creates one that's based on a packaged permission set, it isn't updated in subsequent upgrades. Only the permission sets included in a package are upgraded.	Yes. Subscribers can clone any profile that includes permissions and settings related to packaged components.
Do they include standard object permissions?	No. Also, you can't include object permissions for a custom object in a master-detail relationship where the master is a standard object.	No.
Do they include user permissions?	No.	No.
Are they included in the installation wizard?	No. Subscribers must assign permission sets after installation.	Yes. Profile settings are applied to existing profiles in the subscriber's org on install or

Behavior	Permission Sets	Profile Settings
		upgrade. Only permissions related to new components created as part of the install or upgrade are applied. Affected components (listed with the developerName) can include new: • Fields (CustomField) • Objects (CustomObject), • Tabs (CustomTab) • Apps (CustomApplication) • Apex classes (ApexClass) • Apex pages (ApexPage) • Layouts (Layout) • Record types (RecordType) • Custom permissions (CustomPermission) • Custom settings (CustomSetting) • Custom metadata types (CustomMetadata)
What are the user license requirements?	A permission set is only installed if the subscriber org has at least one user license that matches the permission set. For example, permission sets with the Salesforce Platform user license aren't installed in an org that has no Salesforce Platform user licenses. If a subscriber later acquires a license, the subscriber must reinstall the package to get the permission sets associated with the newly acquired license. Permission sets with no user license are always installed. If you assign a permission set that doesn't include a user license, the user's existing license must allow its enabled settings and permissions. Otherwise, the assignment fails.	None. In a subscriber org, the installation overrides the profile settings, not their user licenses.
How are they assigned to users?	Subscribers must assign packaged permission sets after installing the package.	Profile settings are applied to existing profiles.
Can permission sets in an extension package grant access to objects installed in a base package?	If the base package is a managed package: A permission set in the extension package can't modify access permissions for either the parent objects in the base package or the associated child objects in the extension package.	Same behavior as for permission sets.

Behavior	Permission Sets	Profile Settings
	If the base package isn't a managed package: A permission set in the extension package can modify entitlements normally.	

Best Practices

- Use permission sets in addition to packaged profiles so your subscribers can easily add new permissions for existing app users.
- If users need access to apps, standard tabs, page layouts, and record types, don't use permission sets as the sole permission-granting model for your app.
- Create packaged permission sets that grant access to the custom components in a package, but not standard Salesforce components.

Permission Set Groups

You can organize permission sets into groups and include them in first and second-generation managed packages. Permission set groups can be updated when you upgrade the package.

Keep these considerations in mind when you organize permission sets into groups to include in your managed packages:

Important: You can't include object permissions for standard objects in managed packages. During package installation, all object permissions for standard objects are ignored, and aren't installed in the org.

Also:

- You can’t add permission sets constrained by a permission set license to managed or unmanaged packages.
- You can only package permissions for metadata that’s included in your package.

SEE ALSO:

Create a Permission Set Group

Permission Set Groups Considerations

Custom Profile Settings

When building your AppExchange app, create profiles to define how users access objects and data, and what they can do within your app. For example, profiles specify custom object permissions and the tab visibility for your app. When installing or upgrading your app, admins can associate your custom profiles with existing non-standard profiles. Permissions in your custom profile that are related to new components created as part of the install or upgrade are added to the existing profile. The security settings associated with standard objects and existing custom objects in an installer’s organization are unaffected.

Consider these tips when creating custom profiles for apps you want to publish.

- Give each custom profile a name that identifies the profile as belonging to the app. For example, if you’re creating a Human Resources app named “HR2GO,” a good profile name would be “HR2GO Approving Manager.”
- If your custom profiles have a hierarchy, use a name that indicates the profile’s location in the hierarchy. For example, name a senior-level manager’s profile “HR2GO Level 2 Approving Manager.”
- Avoid custom profile names that can be interpreted differently in other organizations. For example, the profile name “HR2GO Level 2 Approving Manager” is open to less interpretation than “Sr. Manager.”

- Provide a meaningful description for each profile. The description displays to the user installing your app.

Alternatively, you can use permission sets to maintain control of permission settings through the upgrade process. Permission sets contain a subset of profile access settings, including object permissions, field permissions, Apex class access, and Visualforce page access. These permissions are the same as those available on profiles. You can add a permission set as a component in a package.

Note: In packages, assigned apps and tab settings aren't included in permission set components.

Protecting Your Intellectual Property

The details of your custom objects, custom links, reports, and other installed items are revealed to installers so that they can check for malicious content. However, revealing an app's components prevents developers from protecting some intellectual property.

The following information is important when considering your intellectual property and its protection.

- Only publish package components that are your intellectual property and that you have the rights to share.
- After your components are available on AppExchange, you cannot recall them from anyone who has installed them.
- The information in the components that you package and publish might be visible to customers. Use caution when adding your code to a formula, Visualforce page, or other component that you cannot hide in your app.
- The code contained in an Apex class, trigger, or Visualforce component that's part of a managed package is obfuscated and can't be viewed in an installing org. The only exceptions are methods declared as global. You can view global method signatures in an installing org. In addition, License Management Org users with the View and Debug Managed Apex permission can view their packages' obfuscated Apex classes when logged in to subscriber orgs via the Subscriber Support Console.
- If a custom setting is contained in a managed package, and the `Visibility` is specified as Protected, the custom setting isn't contained in the list of components for the package on the subscriber's org. All data for the custom setting is hidden from the subscriber.

Creating Packaged Applications with Chatter

The objects, field settings, and field settings history of Chatter are packageable. However, an object's field is only tracked if the object itself is tracked. For example, you can create a new custom field on the Account standard object, but the field will only be tracked if you have enabled feed tracking on Accounts.

When developing applications that use Chatter, it's important to be aware that some organizations might not have Chatter enabled. By default, when you upload Chatter applications, the package is only available to organizations that have Chatter enabled. You can change this behavior and allow organizations to install the package even if they don't have Chatter. Note the following:

- You must use a managed package. Unmanaged packages that include Chatter functionality can only be installed in organizations that have Chatter enabled.
- DML operations and SOSL, and SOQL calls will throw a runtime exception if the subscriber organization does not have Chatter enabled. You must catch and handle any Apex exceptions that are thrown as a result of the missing Chatter feature. These exceptions are of the type `REQUIRED_FEATURE_MISSING_EXCEPTION` for SOSL and SOQL calls. For DML calls, you must check for the specific `REQUIRED_FEATURE_MISSING` status code on a DML Exception.
- When you upload the package, deselect the Chatter required checkbox (this is automatically selected if you have an Apex reference to Chatter).

  Note: If the Chatter required checkbox can't be deselected, then some component in the package has a special requirement for Chatter. This can happen, for example, if you package a custom report type that relies on Chatter. If the Chatter-required checkbox can't be disabled, then the package can only be installed in organizations that have Chatter enabled.

The following example tries to post to feeds and get a user's feed. If Chatter is not enabled in the organization, the code catches the `REQUIRED_FEATURE_MISSING` exception. Note that this is an incomplete code example and does not run.

```
public void addFeedItem(String post, Id objId) {
   FeedItem fpost = new FeedItem();
   // Get the parent ID of the feed
   fpost.ParentId = objId;
   fpost.Body = post;
   try{
      insert fpost;
   } catch (System.DmlException e) {
         for (Integer i = 0; i < e.getNumDml(); i++) {
         // Chatter not endabled, do not insert record
            System.assertEquals(StatusCode.REQUIRED_FEATURE_MISSING, e.getDmlType(i));
           System.Debug('Chatter not enabled in this organization:' + e.getDMLMessage());

        }
   }
}

  public List<NewsFeed> getMyFeed() {
    List<NewsFeed> myfeed;
     try{
         myfeed = [SELECT Id, Type, CreatedById, CreatedBy.FirstName,CreatedBy.LastName,
                   CreatedDate, ParentId, Parent.Name,FeedItemId, Body,
                   Title, CreatedById, LinkUrl,
                    (SELECT Id, FieldName, OldValue, NewValue
                     FROM FeedTrackedChanges ORDER BY Id DESC),
                       (SELECT Id, CommentBody, CreatedDate, CreatedById,
                        CreatedBy.FirstName, CreatedBy.LastName
                        FROM FeedComments ORDER BY CreatedDate DESC, ID DESC LIMIT 10)
                   FROM NewsFeed
                   ORDER BY CreatedDate DESC, ID DESC LIMIT 20];
     } catch(System.RequiredFeatureMissingException e){
        // The above has returned an empty NewsFeed
        // Chatter is not enabled in this organization
        myfeed = new List<NewsFeed>{};
              System.Debug('Chatter not enabled in organization:' + e.getMessage());
     }
     return myfeed;
   }
```

Matching the Salesforce Look and Feel

Apps that resemble the Salesforce user interface look and feel are instantly more familiar to users and easy to use. The easiest way to model the design of your app after the Salesforce user interface look and feel is to use Visualforce. When you use a standard controller with a Visualforce page, your new page takes on the style of the associated object's standard tab in Salesforce. For more information, see Using Salesforce Styles in the *Visualforce Developer's Guide*.

Maintaining My Domain and Visualforce URLs

Salesforce org application URLs vary based on multiple configuration options. A My Domain setting can further alter the format of Visualforce, Experience Builder, and content URLs. Enabling enhanced domains affects almost all application URL formats, including URLs for Experience Cloud sites and Salesforce Sites. It changes domain suffixes (the static part at the end of the URLs) and removes instance names from all URLs. To build packages that support all the possible URL formats, replace hard-coded URL references with relative URLs.

Because enhanced My Domains meet the latest browser requirements, they're the future standard. However, until they're enabled in all Salesforce orgs, packages must accommodate all possible URL formats. If your package includes URLs, use relative URLs to avoid any issues with domain names. Otherwise, users can have page functionality issues when using outdated packages.

For example, there are three possible Visualforce URL formats:

- `MyDomainName--PackageName.visualforce.com`
- `MyDomainName--PackageName.InstanceName.visual.force.com`
- `MyDomainName--PackageName.vf.force.com`

To account for all these formats, if the URL for one of your org's Visualforce pages is `MyDomainName--PackageName.vf.force.com/{Case.Id}`, use the relative path when referencing the page: `/{Case.Id}`.

For more information on enhanced domains, see Enhanced Domains in *Salesforce Help*. For information on the various login and application URLs for Salesforce orgs, see My Domain URL Formats in *Salesforce Help*.

Developing App Documentation

Salesforce recommends publishing your app on AppExchange with the following types of documentation:

EDITIONS

Available in: Salesforce Classic (not available in all orgs)

Available in: **Group**, **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Configure Option

You can include a **Configure** option for installers. This option can link to installation and configuration details, such as:

- Provisioning the external service of a composite app
- Custom app settings

The **Configure** option is included in your package as a custom link. You can create a custom link for your home page layouts and add it to your package.

1. Create a custom link to a URL that contains configuration information or a Visualforce page that implements configuration. When you create your custom link, set the display properties to `Open in separate popup window` so that the user returns to the same Salesforce page when done.
2. When you create the package, choose this custom link in the `Configure Custom Link` field of your package detail.

Data Sheet

Give installers the fundamental information they need to know about your app before they install.

Customization and Enhancement Guide

Let installers know what they must customize after installation as part of their implementation.

Custom Help

You can provide custom help for your custom object records and custom fields.

Components Available in Unmanaged Packages

Not all components can be packaged for distribution. The following table lists:

- Components that are available in an unmanaged package
- How the component is included in the package
- Whether the component supports automatic renaming

Packaged Explicitly or Implicitly

Components can be added either explicitly or implicitly. Explicit components must be included directly in the package, while implicit components are automatically added. For example, if you create a custom field on a standard object, you must explicitly add the custom field to your package. However, if you create a custom object and add a custom field to it, the field is implicitly added to the package when you add the custom object.

- **Explicitly**: The component must be manually added to the package.
- **Implicitly**: The component is automatically added to the package when another dependent component, usually a custom object, is added.

Automatic Renaming

Salesforce can resolve naming conflicts automatically on install.

- **No**: If a naming conflict occurs the install is blocked.
- **Yes**: If a naming conflict occurs Salesforce can optionally change the name of the component being installed.

Component	Packaged Explicitly or Implicitly	Automatic Renaming
Reporting Snapshot	Explicitly	Yes
Apex Class	Explicitly	No
Apex Sharing Reason	Implicitly On an extension: Explicitly	No
Apex Sharing Recalculation	Implicitly	No
Apex Trigger	On a standard or extension object: Explicitly On an object in the package: Implicitly	No
Application	Explicitly	No
Custom Button or Link	On a standard object: Explicitly On a custom object: Implicitly	No
Custom Field	On a standard object: Explicitly On a custom object: Implicitly	No
Custom Label	Implicitly	No
Custom Object	Explicitly	No
Custom Permission	Implicitly With required custom permissions: Explicitly	No

Component	Packaged Explicitly or Implicitly	Automatic Renaming
Custom Report Type	Explicitly	No
Custom Setting	Explicitly	No
Dashboard	Explicitly In a folder: Implicitly	Yes
Document* (10 MB limit)	Explicitly In a folder: Implicitly	Yes
Email Template (Classic)	Explicitly In a folder: Implicitly	Yes
External Data Source	Explicitly Referenced by an external object: Implicitly Assigned by a permission set: Implicitly	No
Flow Definition	Implicitly	No
Folder	Explicitly	Yes
Home Page Component	Explicitly	No
Home Page Layout	Explicitly	No
Inbound Network Connection	Explicitly	No
Letterhead	Explicitly	Yes
Lightning Application	Explicitly	No
Lightning Component	Explicitly	No
Lightning Event	Explicitly	No
Lightning Interface	Explicitly	No
Lightning Page	Explicitly	No
List View	On a standard object: Explicitly On a custom object: Implicitly	Yes
Named Credential	Explicitly	No
Outbound Network Connection	Explicitly	No
Page Layout	On a standard object: Explicitly On a custom object: Implicitly	No
Record Type	On a standard object: Explicitly On a custom object: Implicitly	No

Component	Packaged Explicitly or Implicitly	Automatic Renaming
Report	Explicitly In a folder: Implicitly	Yes
S-Control* (10 MB limit)	Explicitly	No
Static Resource	Explicitly	No
Tab	Explicitly	No
Translation	Explicitly	No
Validation Rule	On a standard object: Explicitly On a custom object: Implicitly	No
Visualforce Component	Explicitly	No
Visualforce Page	Explicitly	No
Workflow Email Alert	Explicitly	No
Workflow Field Update	Explicitly	No
Workflow Outbound Message	Explicitly	No
Workflow Rule	Explicitly	No
Workflow Task	Explicitly	No

*The combined size of S-Controls and documents must be less than 10 MB.

SEE ALSO:

Components Automatically Added to Packages

About API and Dynamic Apex Access in Packages

Apex Package components have access via dynamic Apex and the API to standard and custom objects in the organization where they are installed.

`API Access` is a package setting that controls the dynamic Apex and API access that s-controls and other package components have to standard and custom objects. The setting displays for both the developer and installer on the package detail page. With this setting:

- The developer of an AppExchange package can restrict API access for a package before uploading it to Salesforce AppExchange. Once restricted, the package components receive Apex and API sessions that are restricted to the custom objects in the package. The developer can also enable access to specific standard objects, and any custom objects in other packages that this package depends on.

EDITIONS

Available in: Salesforce Classic (not available in all orgs)

Available in: **Contact Manager**, **Group**, **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

- The installer of a package can accept or reject package access privileges when installing the package to his or her organization.
- After installation, an administrator can change Apex and API access for a package at any time. The installer can also enable access on additional objects such as custom objects created in the installer's organization or objects installed by unrelated packages.

There are two possible options for the `API Access` setting:

- The default `Unrestricted`, which gives the package components the same API access to standard objects as the user who is logged in when the component sends a request to the API. Apex runs in system mode. Unrestricted access gives Apex read access to all standard and custom objects.
- `Restricted`, which allows the administrator to select which standard objects the components in the package can access. Further, the components in restricted packages can only access custom objects in the current package if the user has the object permissions that provide access to them.

Considerations for API and Dynamic Apex Access in Packages

By default, dynamic Apex can only access the components with which the code is packaged. To provide access to standard objects not included in the package, the developer must set the `API Access`.

1. From Setup, enter *`Packages`* in the `Quick Find` box, then select **Packages**.
2. Select the package that contains a dynamic Apex that needs access to standard objects in the installing organization.
3. In the Package Detail related list, click **Enable Restrictions** or `Restricted`, whichever is available.
4. Set the access level (Read, Create, Edit, Delete) for the standard objects that the dynamic Apex can access.
5. Click **Save**.

Choosing `Restricted` for the `API Access` setting in a package affects the following:

- API access in a package overrides the following user permissions:
  - Author Apex
  - Customize Application
  - Edit HTML Templates
  - Edit Read Only Fields
  - Manage Billing
  - Manage Call Centers
  - Manage Categories
  - Manage Custom Report Types
  - Manage Dashboards
  - Manage Letterheads
  - Manage Package Licenses
  - Manage Public Documents
  - Manage Public List Views
  - Manage Public Reports
  - Manage Public Templates
  - Manage Users
  - Transfer Record
  - Use Team Reassignment Wizards
  - View Setup and Configuration

  - Weekly Export Data

- If `Read`, `Create`, `Edit`, and `Delete` access are not selected in the API access setting for objects, users do not have access to those objects from the package components, even if the user has the "Modify All Data" and "View All Data" permissions.
- A package with `Restricted` API access can't create new users.
- Salesforce denies access to Web service and `executeanonymous` requests from an AppExchange package that has `Restricted` access.

The following considerations also apply to API access in packages:

- Workflow rules and Apex triggers fire regardless of API access in a package.
- If a component is in more than one package in an organization, API access is unrestricted for that component in all packages in the organization regardless of the access setting.
- If Salesforce introduces a new standard object after you select restricted access for a package, access to the new standard object is not granted by default. You must modify the restricted access setting to include the new standard object.
- When you upgrade a package, changes to the API access are ignored even if the developer specified them. This ensures that the administrator installing the upgrade has full control. Installers should carefully examine the changes in package access in each upgrade during installation and note all acceptable changes. Then, because those changes are ignored, the administrator should manually apply any acceptable changes after installing an upgrade.
- S-controls are served by Salesforce and rendered inline in Salesforce. Because of this tight integration, there are several means by which an s-control in an installed package could escalate its privileges to the user's full privileges. In order to protect the security of organizations that install packages, s-controls have the following limitations:
  - For packages you are developing (that is, not installed from AppExchange), you can only add s-controls to packages with the default `Unrestricted` API access. Once a package has an s-control, you cannot enable `Restricted` API access.
  - For packages you have installed, you can enable access restrictions even if the package contains s-controls. However, access restrictions provide only limited protection for s-controls. Salesforce recommends that you understand the JavaScript in an s-control before relying on access restriction for s-control security.
  - If an installed package has `Restricted` API access, upgrades will be successful only if the upgraded version does not contain any s-controls. If s-controls are present in the upgraded version, you must change the currently installed package to `Unrestricted` API access.

Manage API and Dynamic Apex Access in Packages

`API Access` is a package setting that controls the dynamic Apex and API access that s-controls and other package components have to standard and custom objects. The setting displays for both the developer and installer on the package detail page. With this setting:

- The developer of an AppExchange package can restrict API access for a package before uploading it to Salesforce AppExchange. Once restricted, the package components receive Apex and API sessions that are restricted to the custom objects in the package. The developer can also enable access to specific standard objects, and any custom objects in other packages that this package depends on.
- The installer of a package can accept or reject package access privileges when installing the package to his or her organization.
- After installation, an administrator can change Apex and API access for a package at any time. The installer can also enable access on additional objects such as custom objects created in the installer's organization or objects installed by unrelated packages.

EDITIONS

Available in: Salesforce Classic (not available in all orgs)

Available in: **Group**, **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To edit API and dynamic Apex access for a package you have created or installed:

- Create AppExchange packages

To accept or reject package API and dynamic Apex access for a package as part of installation:

- Download AppExchange packages

Setting API and Dynamic Apex Access in Packages

To change package access privileges in a package you or someone in your organization has created:

1. From Setup, enter *Packages* in the `Quick Find` box, then select **Packages**.
2. Select a package.
3. The `API Access` field displays the current setting, `Restricted` or `Unrestricted`, and a link to either **Enable Restrictions** or **Disable Restrictions**. If `Read`, `Create`, `Edit`, and `Delete` access are not selected in the API access setting for objects, users do not have access to those objects from the package components, even if the user has the "Modify All Data" and "View All Data" permissions.

   Use the `API Access` field to:

   Enable Restrictions
   This option is available only if the current setting is `Unrestricted`. Select this option if you want to specify the dynamic Apex and API access that package components have to standard objects in the installer's organization. When you select this option, the Extended Object Permissions list is displayed. Select the `Read`, `Create`, `Edit`, or `Delete` checkboxes to enable access for each object in the list. This selection is disabled in some situations. Click **Save** when finished. For more information about choosing the `Restricted` option, including information about when it is disabled, see Considerations for API and Dynamic Apex Access in Packages on page 55.

   Disable Restrictions
   This option is available only if the current setting is `Restricted`. Select this option if you do not want to restrict the Apex and API access privileges that the components in the package have to standard and custom objects. This option gives all the components in the package the same API access as the user who is logged in. For example, if a user can access accounts, an Apex class in the package that accesses accounts would succeed when triggered by that user.

   Restricted
   Click this link if you have already restricted API access and wish to edit the restrictions.

Accepting or Rejecting API and Dynamic Apex Access Privileges During Installation

To accept or reject the API and dynamic Apex access privileges for a package you are installing:

- Start the installation process on Salesforce AppExchange.
- In **Approve API Access**, either accept by clicking **Next**, or reject by clicking **Cancel**. Complete the installation steps if you have not canceled.

Changing API and Dynamic Apex Access Privileges After Installation

To edit the package API and dynamic Apex access privileges after you have installed a package:

1. From Setup, enter *Installed Packages* in the Quick Find box, then select **Installed Packages**.
2. Click the name of the package you wish to edit.
3. The API Access field displays the current setting, Restricted or Unrestricted, and a link to either **Enable Restrictions** or **Disable Restrictions**. If Read, Create, Edit, and Delete access are not selected in the API access setting for objects, users do not have access to those objects from the package components, even if the user has the "Modify All Data" and "View All Data" permissions.

   Use the API Access field to:

   Enable Restrictions
   This option is available only if the current setting is Unrestricted. Select this option if you want to specify the dynamic Apex and API access that package components have to standard objects in the installer's organization. When you select this option, the Extended Object Permissions list is displayed. Select the Read, Create, Edit, or Delete checkboxes to enable access for each object in the list. This selection is disabled in some situations. Click **Save** when finished. For more information about choosing the Restricted option, including information about when it is disabled, see Considerations for API and Dynamic Apex Access in Packages on page 55.

   Disable Restrictions
   This option is available only if the current setting is Restricted. Select this option if you do not want to restrict the Apex and API access privileges that the components in the package have to standard and custom objects. This option gives all the components in the package the same API access as the user who is logged in. For example, if a user can access accounts, an Apex class in the package that accesses accounts would succeed when triggered by that user.

   Restricted
   Click this link if you have already restricted API access and wish to edit the restrictions.

Configuring Default Package Versions for API Calls

A package version is a number that identifies the set of components uploaded in a package. The version number has the format *majorNumber.minorNumber.patchNumber* (for example, 2.1.3). The major and minor numbers increase to a chosen value during every major release. The *patchNumber* is generated and updated only for a patch release. Publishers can use package versions to evolve the components in their managed packages gracefully by releasing subsequent package versions without breaking existing customer integrations using the package.

Default package versions for API calls provide fallback settings if package versions are not provided by an API call. Many API clients do not include package version information, so the default settings maintain existing behavior for these clients.

You can specify the default package versions for enterprise API and partner API calls. The enterprise WSDL is for customers who want to build an integration with their Salesforce organization only. It is strongly typed, which means that calls operate on objects and fields with specific data types, such as int and string. The partner WSDL is for customers, partners, and ISVs who want to build an integration that can work across multiple Salesforce organizations, regardless of their

EDITIONS

Available in: Salesforce Classic

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer**, Editions

USER PERMISSIONS

To configure default package versions for API calls:
- Customize Application

custom objects or fields. It is loosely typed, which means that calls operate on name-value pairs of field names and values instead of specific data types.

You must associate the enterprise WSDL with specific package versions to maintain existing behavior for clients. There are options for setting the package version bindings for an API call from client applications using either the enterprise or partner WSDL. The package version information for API calls issued from a client application based on the enterprise WSDL is determined by the first match in the following settings.

1. The PackageVersionHeader SOAP header.
2. The SOAP endpoint contains a URL with a format of `serverName/services/Soap/c/api_version/ID` where `api_version` is the version of the API, such as 54.0, and `ID` encodes your package version selections when the enterprise WSDL was generated.
3. The default enterprise package version settings.

The partner WSDL is more flexible as it is used for integration with multiple organizations. If you choose the Not Specified option for a package version when configuring the default partner package versions, the behavior is defined by the latest installed package version. This means that behavior of package components, such as an Apex trigger, could change when a package is upgraded and that change would immediately impact the integration. Subscribers may want to select a specific version for an installed package for all partner API calls from client applications to ensure that subsequent installations of package versions do not affect their existing integrations.

The package version information for partner API calls is determined by the first match in the following settings.

1. The PackageVersionHeader SOAP header.
2. An API call from a Visualforce page uses the package versions set for the Visualforce page.
3. The default partner package version settings.

To configure default package versions for API calls:

1. From Setup, enter `API` in the `Quick Find` box, then select **API**.
2. Click **Configure Enterprise Package Version Settings** or **Configure Partner Package Version Settings**. These links are only available if you have at least one managed package installed in your organization.
3. Select a `Package Version` for each of your installed managed packages. If you are unsure which package version to select, you should leave the default selection.
4. Click **Save**.

Note: Installing a new version of a package in your organization does not affect the current default settings.

About the Partner WSDL

The Partner Web Services WSDL is used for client applications that are metadata-driven and dynamic in nature. It is particularly—but not exclusively—useful to Salesforce partners who are building client applications for multiple organizations. As a loosely typed representation of the Salesforce data model that works with name-value pairs of field names and values instead of specific data types, it can be used to access data within any organization. This WSDL is most appropriate for developers of clients that can issue a query call to get information about an object before the client acts on the object. The partner WSDL document needs to be downloaded and consumed only once per version of the API.

For more information about the Partner WSDL, see Using the Partner WSDL in the *SOAP API Developer Guide*.

Generating an Enterprise WSDL with Managed Packages

If you are downloading an enterprise WSDL and you have managed packages installed in your organization, you need to take an extra step to select the version of each installed package to include in the generated WSDL. The enterprise WSDL is strongly typed, which means that it contains objects and fields with specific data types, such as `int` and `string`.

A package version is a number that identifies the set of components uploaded in a package. The version number has the format *majorNumber.minorNumber.patchNumber* (for example, 2.1.3). The major and minor numbers increase to a chosen value during every major release. The *patchNumber* is generated and updated only for a patch release. Publishers can use package versions to evolve the components in their managed packages gracefully by releasing subsequent package versions without breaking existing customer integrations using the package. A subscriber can select a package version for each installed managed package to allow their API client to continue to function with specific, known behavior even when they install subsequent versions of a package. Each package version can have variations in the composition of its objects and fields, so you must select a specific version when you generate the strongly typed WSDL.

EDITIONS

Available in: Salesforce Classic

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer**, Editions

USER PERMISSIONS

To download a WSDL:
- Customize Application

To download an enterprise WSDL when you have managed packages installed:

1. From Setup, enter *API* in the `Quick Find` box, then select **API**.
2. Click **Generate Enterprise WSDL**.
3. Select the `Package Version` for each of your installed managed packages. If you are unsure which package version to select, you should leave the default, which is the latest package version.
4. Click **Generate**.
5. Use the **File** menu in your browser to save the WSDL to your computer.
6. On your computer, import the local copy of the WSDL document into your development environment.

Note the following in your generated enterprise WSDL:

- Each of your managed package version selections is included in a comment at the top of the WSDL.
- The generated WSDL contains the objects and fields in your organization, including those available in the selected versions of each installed package. If a field or object is added in a later package version, you must generate the enterprise WSDL with that package version to work with the object or field in your API integration.
- The SOAP endpoint at the end of the WSDL contains a URL with a format of *serverName*`/services/Soap/c/`*api_version*`/`*ID* where *api_version* is the version of the API, such as 52.0, and *ID* encodes your package version selections when you communicate with Salesforce.

You can also select the default package versions for the enterprise WSDL without downloading a WSDL from the API page in Setup. Default package versions for API calls provide fallback settings if package versions are not provided by an API call. Many API clients do not include package version information, so the default settings maintain existing behavior for these clients.

Work with Services Outside of Salesforce

You might want to update your Salesforce data when changes occur in another service. Likewise, you might also want to update the data in a service outside of Salesforce based on changes to your Salesforce data. For example, you might want to send a mass email to more contacts and leads than Salesforce allows. You can use an external mail service that allows users to build a recipient list of names and email addresses using the contact and lead information in your Salesforce organization.

An app built on the Lightning Platform platform can connect with a service outside of Salesforce in many ways. For example, you can:

- create a custom link or custom formula field that passes information to an external service.

- use the Lightning Platform API to transfer data in and out of Salesforce.
- use an Apex class that contains a Web service method.

Before any Visualforce page, Apex callout, or JavaScript code using XmlHttpRequest in an s-control or custom button can call an external site, that site must be registered in the Remote Site Settings page, or the call fails. For information on registering components, see Configure Remote Site Settings.

Warning: Do not store usernames and passwords within any external service.

Provisioning a Service External to Salesforce

If your app links to an external service, users who install the app must be signed up to use the service. Provide access in one of two ways:

- Access by all active users in an organization with no real need to identify an individual
- Access on a per user basis where identification of the individual is important

The Salesforce service provides two globally unique IDs to support these options. The user ID identifies an individual and is unique across all organizations. User IDs are never reused. Likewise, the organization ID uniquely identifies the organization.

Avoid using email addresses, company names, and Salesforce usernames when providing access to an external service. Usernames can change over time and email addresses and company names can be duplicated.

If you are providing access to an external service, we recommend the following:

- Use Single Sign-On (SSO) techniques to identify new users when they use your service.
- For each point of entry to your app, such as a custom link or web tab, include the user ID in the parameter string. Have your service examine the user ID to verify that the user ID belongs to a known user. Include a session ID in the parameter string so that your service can read back through the Lightning Platform API and validate that this user has an active session and is authenticated.
- Offer the external service for any known users. For new users, display an alternative page to collect the required information.
- Do not store passwords for individual users. Besides the obvious security risks, many organizations reset passwords on a regular basis, which requires the user to update the password on your system as well. We recommend designing your external service to use the user ID and session ID to authenticate and identify users.
- If your application requires asynchronous updates after a user session has expired, dedicate a distinct administrator user license for this.

Architectural Considerations for Group and Professional Editions

Salesforce CRM is offered in five tiers, or editions:

- Group Edition (GE)*
- Professional Edition (PE)
- Enterprise Edition (EE)
- Unlimited Edition (UE)
- Performance Edition (PXE)*

Note: Group and Performance Editions are no longer sold. For a comparison chart of editions and their features, see the Salesforce Pricing and Editions page.

If you plan to sell your app to existing Salesforce customers, it's important to understand the differences between these editions because they will affect the design of your app. It's convenient to think about them in clusters, GE/PE and EE/UE/PXE, as the editions in each cluster have similar functionality. For example, you might only want to support EE/UE/PXE if your app requires certain objects and features

that aren't available in GE/PE. Also, instead of a single solution that supports all editions, you can have a tiered offering. This would consist of a basic solution for GE/PE and an advanced one for EE/UE/PXE customers that takes advantage of the additional features.

EE/UE/PXE have the most robust functionality. They support Lightning Platform platform licenses in addition to Salesforce CRM licenses. If your app doesn't require Salesforce CRM features (such as Leads, Opportunities, Cases, etc.), Lightning Platform platform licenses provide you with the most flexibility in deploying your app to users who might not normally be Salesforce users. Your app is still subject to the edition limits and packaging rules.

GE/PE don't contain all of the functionality that you can build in a Developer Edition (DE). Therefore, an application developed in your DE organization might not install in a GE/PE organization. If you're designing an application to work specifically in GE/PE, you must be aware of how these editions differ.

There are a number of other considerations to keep in mind when deciding whether to support these editions. Lightning Platform platform licenses cannot be provisioned in GE/PE organizations. This means that only existing Salesforce CRM users can use your app. There are some features that aren't available in GE/PE. There are several special permissions available to eligible partner apps that overcome these limitations.

See the following sections for available features, limits, and other design considerations.

- Features in Group and Professional Editions
- Limits for Group and Professional Editions
- Access Control in Group and Professional Editions
- Using Apex in Group and Professional Editions
- API Access in Group and Professional Editions
- Designing Your App to Support Multiple Editions
- Sample Design Scenarios

Features in Group and Professional Editions

The easiest way to determine which features and objects are available in a particular edition is by reviewing the Edition Comparison Table. You can also look up which editions support a specific feature or object by searching the online help. It's important that you check these resources before you start designing your app to make an informed decision on which editions to target. When you're finished building your app, we recommend that you test it by installing your package in GE and PE test orgs to ensure that everything functions properly.

The following table shows the key differences between GE and PE.

Feature	Group Edition	Professional Edition
Assets	No	Yes
Campaigns	No	Yes
Contracts	No	Yes (with the Sales Cloud)
Forecasts	No	Yes (no Opportunity Splits or Custom Field forecasts)
Ideas	No	Yes
Products	No	Yes
Solutions	No	Yes
Record types	No	Yes

Feature	Group Edition	Professional Edition
Permission sets	Yes	Yes
Custom profiles	No	Yes
Custom report types	No	Yes
Workflow and approvals	No	No (See note.)
Apex code	See note.	See note.
Sharing rules	No	Yes (for some features)
API	See note.	See note.
Sites	No	No

Note:

- All listed features are available in DE.
- As a partner, workflows within your application run in a Professional Edition org. However, customers can't create their own workflows. They must purchase the feature directly from Salesforce.
- A client ID allows your app to use the API for integration to composite apps. For more information, see Using Apex in Group and Professional Editions and API Access in Group and Professional Editions.

Limits for Group and Professional Editions

All Salesforce editions have limits that restrict the number of apps, objects, and tabs that can be used. For details on the limits for various editions, see the Edition Limits Table.

For partners who are enrolled in the ISV Program, any managed package publicly posted on the AppExchange no longer counts against the apps/objects/tabs limits for your Salesforce Edition. This effectively means that ISV partners no longer have to worry about package installation failures because of apps/objects/tabs limits being exceeded. This feature is automatically enabled after your app passes the security review.

Access Control in Group and Professional Editions

Group Edition doesn't support field-level security or custom profiles. You can manage field-level security by using the page layout for each object instead. When customers install your app, they can't define which profiles have access to what. Ensure that your design works for the Standard User Profile. Permission sets can be installed but not updated in Group and Professional Edition orgs.

Because the page layout handles field level security, add any fields you want to be visible to the page layout. For fields to be accessible via the API or Visualforce, add them to the page layout.

Using Apex in Group and Professional Editions

Your app can contain business logic such as classes, triggers, email services, etc. written in Apex. As a general rule, Apex is not supported in GE/PE, so it will not run in these editions. However, Apex developed as part of an ISV app and included in a managed package can run in GE/PE, even though those editions do not support Apex by default.

You must be an eligible partner with Salesforce and your app has to pass the security review. The appropriate permissions will automatically be enabled after you pass the security review.

Here are some important considerations for using Apex in GE/PE.

- GE/PE customers can't create or modify Apex in your app; they can only run the existing Apex.
- Your Apex code should not depend on features and functionality that exist only in DE, EE, UE, or PXE, or your app will fail to install.
- Make sure to use REST if you plan to expose an Apex method as a Web service. Apex classes that have been exposed as a SOAP Web service can't be invoked from an external web app in GE/PE.
- Using Apex to make Web service callouts is allowed in GE/PE. For instance, if you're planning to make a Web service callout to an external Web service, as long as the managed package is authorized, these classes will function in GE/PE.

API Access in Group and Professional Editions

API access is not normally supported in GE and PE orgs. However, after your app passes the security review, you're eligible to use some APIs for building composite applications.

- Currently, the standard Data SOAP and REST APIs are supported for GE and PE apps, and Metadata API is supported in PE apps. To request API access, see How do I get an API token for my app? You can also contact Salesforce to allowlist a connected app to use REST API in GE or PE orgs.
- Other APIs, such as the Bulk API 2.0 and Apex methods exposed as SOAP Web services, remain unavailable.
- You can enable REST-based Web services using connected app consumer allowlisting.
- You can enable SOAP-based Web services, including Metadata API, using an API token called a Client ID. Append the Client ID to your SOAP headers in integration calls. This special key enables your app to make calls to GE and PE orgs for Data API and PE orgs for Metadata API, even if the customer does not have API access.

The Client ID has these properties.

- You can't use the Client ID with the AJAX Toolkit in custom JavaScript, S-controls, or anywhere in your app where its value would be exposed to the end customer.
- For development purposes, GE and PE orgs created via the Environment Hub already have the Metadata API and SOAP API (Data API) enabled. You can then develop and test your app before the security review. After your app passes the security review and you obtain an API token, test your app again to ensure that it's working correctly.
- The Client ID grants GE and PE access to SOAP API, and PE access to the Metadata API. With the Metadata API, you can dynamically create various components that you typically create in Setup. For instance, you can create a custom field dynamically in a PE organization with the API token.

This table shows which APIs are accessible when using GE and PE and the method of access.

API	Access to GE and PE
Web Services (SOAP)	Yes, with token
Apex methods exposed as Web services (SOAP)	No
Web services (REST)	Yes, with connected app consumer allowlisting
Apex methods exposed as Web services (REST)	Yes, with connected app consumer allowlisting
Connect REST API	Yes
Metadata API	Yes, with token
Bulk API 2.0	No

API	Access to GE and PE
Data Loader tool (uses SOAP Web services)	No, can't set the token

Accessing REST API in Group and Professional Editions

The Lightning Platform REST API provides you with a powerful, convenient, and simple API for interacting with Lightning Platform. As a qualified partner, you can request that we enable your application for REST API calls to GE or PE orgs.

To get access to REST API, you must meet these conditions.

- Access to the Partner Community. If you're new, learn about and join one of the ISV Partner Programs.
- Pass the security review. All applications enrolled in the AppExchange or OEM Program must go through a periodic security review.
- Access to Salesforce Developer Edition. If you don't already have access to a DE org, you can get the Partner Developer Edition from the Environment Hub.

To request a REST API token:

1. Create a connected app from your DE org. Log in to your Salesforce org with your developer account. From Setup, in the Quick Find box, enter *Apps*, and then select **Apps**. In the Connected Apps section, click **New**.

   Note: We strongly recommend that you work in an org that you plan to use for a long time, such as the one where you build your managed package or your Trialforce management org (TMO).

2. Enter the information requested, and click **Save**. Saving your app gives you the Consumer Key and Consumer Secret that the app uses to communicate with Salesforce.
3. Log a support case in the Salesforce Partner Community. For product, specify **Partner Programs & Benefits**. For topic, specify **ISV Technology Request**. Provide your DE Org ID and the credentials for your connected app.

We evaluate your request and enable the appropriate permission. You receive a case notification from us. Wait 24 hours to make sure that the permission is activated. Your client_id (or Consumer Key) and client_secret (or Consumer Secret) are checked against the information that you submit via the case during the OAuth authentication. If it matches, the system allows you to communicate with GE and PE editions.

Note:

- This permission is intended solely for REST API. It doesn't enable your application to use SOAP API, Bulk API, or Metadata API for GE and PE editions.
- This permission is applied only to your application. We don't turn on the API in the GE and PE org.

Designing Your App to Support Multiple Editions

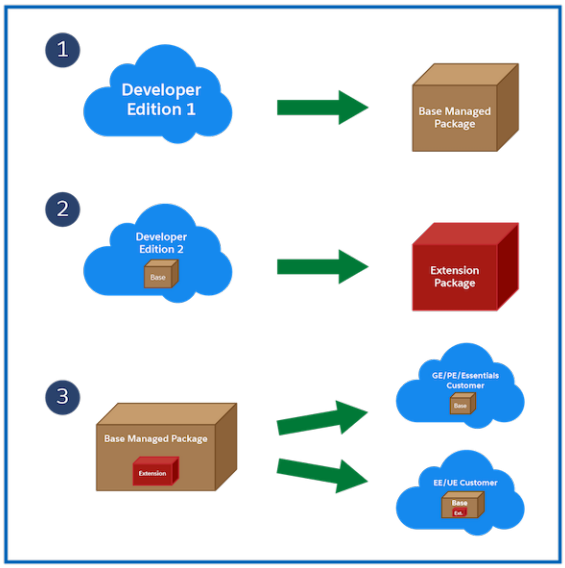
Supporting multiple editions provides the opportunity to release richer versions of your app that can support more advanced features found in EE, UE, and PXE. There are two technologies that can be leveraged to support multiple editions. The first approach uses extension packages and the second leverages Dynamic Apex. There are benefits to both, so be sure to review both strategies before designing your app.

Supporting Multiple Editions Using an Extension Package

This approach uses a base-managed package that contains core app functionality. The base package only contains features supported in Group and Professional Editions. You then use a second managed package, or extension package, that extends and enhances the

base package. The extension package adds more features supported in Enterprise, Unlimited, and Performance Editions. For example, you have a warehouse application that tracks inventory and an extension to this app includes workflow (which isn't available in Group). Your Group and Professional Edition customers can install the base warehouse application, while your other customers install the base package and then the extension package with workflow components.

Using a Base and Extension Package to Support Multiple Editions



Using extension packages enables you to avoid multiple code sets and to upsell your customers. Upgrading a customer only requires installing the extension package.

Here is the process for creating an extension package.

1. Create your base-managed package that uses features supported by Group and Professional Editions.
2. Install your base-managed package in a separate Developer Edition org.
3. In this org, create your extension package that includes more functionality supported in Group and Professional Editions. You can reference the base-managed package to avoid duplicating functionality. Any component that references the base-managed package automatically triggers this package to be an extension package.

Since your extension package depends on your base package, it's important to spend time designing your app and the interfaces between the packages. For example, if the extension package calls an Apex class in the base package, you must make sure that the desired Apex class is made global.

It's also important to consider the entire application life cycle. For example, If you want to add new features, include them in the appropriate package. Ensure that updates to the base package do not break the extension package.

Note: To access history information for custom objects in your extension package, work with the base package owner to enable history tracking in the org for the base package. Enabling history tracking in a base package can result in an error when you install the package and create patch orgs for the extension package.

Supporting Multiple Editions using Dynamic Apex

Using dynamic Apex, dynamic SOQL, and dynamic DML, it's possible to create one managed package for all editions you plan to support without having to use extension packages. Your app behavior can change dynamically based on the features available in your customer's edition. This is useful when designing an app with the intent to support multiple editions.

Make sure that Apex, workflows, etc. in your package do not contain any strongly-typed reference to a feature that isn't supported by GE/PE. This can include adding a custom field on an unsupported standard object, such as Campaigns, or making an Apex reference to features like multi-currency or territory management. When you reference a feature in your package not supported by GE/PE, this package dependency will cause the installation to fail.

Instead, if you use dynamic Apex to first check if these features are available before referencing them, you can install your managed package in GE/PE. The important piece to consider is you must code your Dynamic Apex in a way that can support both use cases. This ensures that if your customer doesn't have a specific feature or object, your app will still function.

Sample Design Scenarios for Group and Professional Editions

Here are some scenarios to help you understand when and how to build for Group and Professional Editions.

Scenario 1: You want to build an app that uses record types

Since record types aren't available in Group Edition, decide if you want to support this edition. Assuming you do, you can build a base-managed package that doesn't include record types. After uploading this managed package in a released state, you can install it into another Developer Edition org to start building the extension. Your extension can add record types that your Professional, Enterprise, Unlimited, and Performance Edition customers can install and use.

Scenario 2: You want to build an app with 80 custom objects

Typically this scenario presents a problem for Group and Professional Edition orgs because of their custom objects limit. However, if you make your app available on the AppExchange, it doesn't count toward custom objects, tabs, and apps limits. So even if your app has 80 custom objects, it installs and works in Group and Professional Edition orgs.

Scenario 3: You want to build an app that makes Apex callouts to a web service

Apex doesn't normally run in Group and Professional Editions. If you get your managed package authorized during the security review, your Apex executes as expected. For this scenario, you build your Apex callout to invoke your external service and then include this class in your package.

Scenario 4: You want to build an app that uses Campaigns

Campaigns are supported by default in Group Edition. For this scenario, you have two options.

- Option 1 - Build a based-managed package that doesn't reference Campaigns. in it's complete, upload, and install it into another Developer Edition org. Build the Campaign functionality as an extension package. Now your Group Edition customers can install the base, while the rest can also install the extension to get extra features.
- Option 2 - This option requires only one package if you use Dynamic Apex as the only reference to Campaigns (as described earlier) and do not include a custom field on the Campaign. Your app can then be installed in Group Edition orgs and higher. If Campaigns is in your customer's edition, then your Dynamic Apex can manipulate Campaigns as expected.

Scenario 5: You want to build a composite app where your receive inbound API calls

You have a separate hosted app that you want to integrate with Salesforce, so you must make API calls to Group and Professional Edition customers. Such calls aren't possible by default. However, if you're an eligible partner, request a special API token that allows your SOAP calls to integrate with Group and Professional Edition orgs. Be sure to embed the Client ID in the SOAP header of your external code.

Connected Apps

A connected app is a framework that enables an external application to integrate with Salesforce using APIs and standard protocols, such as SAML, OAuth, and OpenID Connect. Connected apps use these protocols to authenticate, authorize, and provide single sign-on (SSO) for external apps. The external apps that are integrated with Salesforce can run on the customer success platform, other platforms, devices, or SaaS subscriptions. For example, when you log in to your Salesforce mobile app and see your data from your Salesforce org, you're using a connected app.

By capturing metadata about an external app, a connected app tells Salesforce which authentication protocol—SAML, OAuth, and OpenID Connect—the external app uses, and where the external app runs. Salesforce can then grant the external app access to its data, and attach policies that define access restrictions, such as when the app's access expires. Salesforce can also audit connected app usage.

To learn more about how to use, configure, and manage connected apps, see the following topics in *Salesforce Help*:

- Connected App Use Cases
- Create a Connected App
- Edit a Connected App
- Manage Access to a Connected App

More Resources

Here are some additional resources to help you navigate connected apps:

- *Salesforce Help*: Connected Apps
- *Salesforce Help*: Authorize Apps with OAuth
- *Trailhead*: Build Integrations Using Connected Apps

Environment Hub

The Environment Hub lets you connect, create, view, and log in to Salesforce orgs from one location. If your company has multiple environments for development, testing, and trials, the Environment Hub lets you streamline your approach to org management.

From the Environment Hub, you can:

- Connect existing orgs to the hub with automatic discovery of related orgs.
- Create standard and partner edition orgs for development, testing, and trials.
- View and filter hub members according to criteria that you choose, like edition, creation date, instance, origin, and SSO status.
- Create single sign-on (SSO) user mappings for easy login access to hub members.

Each hub member org corresponds to an EnvironmentHubMember object. EnvironmentHubMember is a standard object, similar to Accounts or Contacts, so you can use the platform to extend or modify the Environment Hub programmatically. For example, you can create custom fields, set up workflow rules, or define user mappings and enable SSO using the API for any hub member org.

EDITIONS

Available in: both Salesforce Classic (not available in all orgs) and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

Get Started with the Environment Hub

Configure the Environment Hub so that users at your company can access the app to create and manage member orgs. Then connect existing orgs to the hub and create SSO user mappings.

Manage Orgs in the Environment Hub

You can manage all your existing Salesforce orgs from one location by connecting them to the Environment Hub. You can also create orgs using Salesforce templates for development, testing, and trial purposes.

Single Sign-on in the Environment Hub

Developing, testing, and deploying apps means switching between multiple Salesforce environments and providing login credentials each time. Single sign-on (SSO) simplifies this process by letting an Environment Hub user log in to member orgs without reauthenticating. You can set up SSO by defining user mappings manually, using Federation IDs, or creating a formula.

Environment Hub Best Practices

Follow these guidelines and best practices when you use the Environment Hub.

Environment Hub FAQ

Answers to common questions about the Environment Hub.

Considerations for the Environment Hub in Lightning Experience

Be aware of these considerations when creating and managing orgs in the Environment Hub.

Get Started with the Environment Hub

Configure the Environment Hub so that users at your company can access the app to create and manage member orgs. Then connect existing orgs to the hub and create SSO user mappings.

Configure the Environment Hub

Enable the Environment Hub in your org, and then configure it to give other users access.

EDITIONS

Available in: both Salesforce Classic (not available in all orgs) and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

Configure the Environment Hub

Enable the Environment Hub in your org, and then configure it to give other users access.

USER PERMISSIONS

To set up and configure the Environment Hub:

- Manage Environment Hub

1. Contact Salesforce to enable the Environment Hub in your org. If you're an ISV partner, you can skip this step. The Environment Hub is already installed in your Partner Business Org.
2. Log in to the org where the Environment Hub is enabled, and then go to Setup.
3. Assign users access to features in the Environment Hub.
   a. From Setup, enter `Profiles` in the `Quick Find` box, then select **Profiles**.
   b. Create a profile, or edit an existing one.
   c. Edit the profile's settings.

Profile Section	Environment Hub Settings
Custom App Settings	Enable the Environment Hub custom app to make it available in the App Launcher in Lightning Experience or App Menu in Salesforce Classic.
Connected App Access	Unless advised by Salesforce, don't adjust settings in this section of the profile.
Service Provider Access	If you enable single sign-on (SSO) in a member org, new entries appear in this section of the profile. Entries appear in the format *Service Provider [Organization ID]*, where *Organization ID* is the ID of the member org. Users who don't have access to the service provider sometimes see this message when attempting to log in via SSO: "User '[UserID]' does not have access to sp '[Service Provider ID]'."

Profile Section	Environment Hub Settings
	When configuring the Environment Hub in a new org, this section is empty.
Administrative Permissions	Enable "Manage Environment Hub" to allow users to: • Create orgs for development, testing, and trials. • Configure SSO for member orgs.
General User Permissions	Enable "Connect Organization to Environment Hub" to allow users to connect existing orgs to the Environment Hub.
Standard Object Permissions	Grant object permissions based on the level of access required by the Environment Hub user. Hub Members object: • "Read"—View existing Hub Member records. • "Create"—This permission has no impact on the ability to create Hub Member records. That's because record creation is handled either by connecting an existing org or creating an org from the Environment Hub. • "Edit"—Edit fields on existing Hub Member records. • "Delete"—Disconnect an org from the Environment Hub and delete its corresponding Hub Member record and Service Provider record (if SSO was enabled for the member). • "View All"—Read all Hub Member records, regardless of who created them. • "Modify All"—Read, edit, and delete all Hub Member records, regardless of who created them. Hub Invitations object: • If you enable the "Connect Organization to Environment Hub" permission, enable "Create", "Read", "Update, and "Delete" for Hub Invitations. Signup Request object: • If you enable the "Manage Environment Hub" permission, enable "Create" and "Read" for Signup Requests to allow users to create orgs. Optionally, enable "Delete" to allow users to remove orgs from the hub.

d. Select **Save**.

Manage Orgs in the Environment Hub

You can manage all your existing Salesforce orgs from one location by connecting them to the Environment Hub. You can also create orgs using Salesforce templates for development, testing, and trial purposes.

EDITIONS

Available in: both Salesforce Classic (not available in all orgs) and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

Connect an Org to the Environment Hub

You can connect existing Salesforce orgs to the Environment Hub, allowing you to manage all your development, test, and trial environments (except scratch orgs) from one location. When you connect an org to the hub, related orgs are automatically discovered so you don't have to manually connect them.

Create an Org from the Environment Hub

You can create orgs from the Environment Hub for development, testing, and trial purposes. If you're an ISV partner, you can also create partner edition orgs with increased limits, more storage, and other customizations to support app development. When you create an org from the Environment Hub, it becomes a hub member and its default language is set by the user's locale.

Connect an Org to the Environment Hub

You can connect existing Salesforce orgs to the Environment Hub, allowing you to manage all your development, test, and trial environments (except scratch orgs) from one location. When you connect an org to the hub, related orgs are automatically discovered so you don't have to manually connect them.

USER PERMISSIONS

To connect or disconnect an org to or from the Environment Hub:

- Connect Organization to Environment Hub

The following types of related orgs are automatically discovered.

- For any organization, all sandbox orgs created from it
- For a release org, all its related patch orgs
- For a Trialforce Management Org, all Trialforce Source Orgs created from it
- For an org with the License Management App (LMA) installed, any release org with a managed package registered in the LMA

Note: You can't connect a sandbox org to the Environment Hub directly. If you want to connect a sandbox, first connect the org used to create the sandbox to the Environment Hub. Then, refresh the sandbox org. The refresh automatically adds it as a hub member.

1. Log in to the Environment Hub, and then select **Connect Org**.
2. Enter the admin username for the org that you want to connect and, optionally, a short description. If your hub has many members, a description makes it easier to find the org later.
3. By default, single sign-on (SSO) is enabled for the org you connected. To disable SSO, deselect **Auto-enable SSO for this org**.
4. Select **Connect Org** again.
5. In the pop-up window, enter the org's admin username and password. If you don't see the pop-up, temporarily disable your browser's ad blocking software and try again.
6. Select **Log In**, and then select **Allow**.

   This process creates a connected app to allow connections to the org. If you can't log in and select Allow, check if the Environment Hub org has a connected app called "Environment org". If you don't see this connected app, contact Salesforce Support.

To disconnect an org, locate the listing for the org, and select **Remove** from the dropdown menu on the far right.

Orgs removed from the Environment Hub aren't deleted, so you can still access the org after you remove it.

Create an Org from the Environment Hub

You can create orgs from the Environment Hub for development, testing, and trial purposes. If you're an ISV partner, you can also create partner edition orgs with increased limits, more storage, and other customizations to support app development. When you create an org from the Environment Hub, it becomes a hub member and its default language is set by the user's locale.

Note: You can create up to 20 member orgs per day. To create more orgs, log a support case in the Salesforce Partner Community. For product, specify **Platform**. For topic, specify **AppExchange & Managed Packages**.

USER PERMISSIONS

To set up and configure the Environment Hub:
- Manage Environment Hub

1. Log in to the Environment Hub, and then select **Create Org**.
2. Choose an org purpose.

Purpose	Lets You Create:
Development	Developer Edition orgs for building and packaging apps.
Test/Demo	Trial versions of standard Salesforce orgs for testing and demos. These orgs are similar to the ones customers create at www.salesforce.com/trial. When you create a Test/Demo org, you can specify a Trialforce template if you want the org to include your customizations.
Trialforce Source Organization	Trialforce Source Organizations (TSOs) as an alternative to using a Trialforce Management Organization (TMO). Unless you need custom branding on your login page or emails, use the Environment Hub to create TSOs.

3. Enter the required information for the org type you selected.
4. Read the Main Services Agreement, and then select the checkbox.
5. Select **Create**.

When your org is ready, you receive an email confirmation, and the org appears in your list of hub members.

Single Sign-on in the Environment Hub

Developing, testing, and deploying apps means switching between multiple Salesforce environments and providing login credentials each time. Single sign-on (SSO) simplifies this process by letting an Environment Hub user log in to member orgs without reauthenticating. You can set up SSO by defining user mappings manually, using Federation IDs, or creating a formula.

The Environment Hub supports these SSO methods for matching users.

EDITIONS

Available in: both Salesforce Classic (not available in all orgs) and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

SSO Method	Description
Mapped Users	Match users in the Environment Hub to users in a member org manually. Mapped Users is the default method for SSO user mappings defined from the member detail page.
Federation ID	Match users who have the same Federation ID in both the Environment Hub and a member org.
User Name Formula	Match users in the Environment Hub and a member org according to a formula that you define.

If you specify multiple SSO methods, they're evaluated in this order: (1) Mapped Users, (2) Federation ID, and (3) User Name Formula. The first method that results in a match is used to log in the user, and the other methods are ignored. If a matching user can't be identified, the Environment Hub directs the user to the standard Salesforce login page.

Note: SSO doesn't work for newly added users or for user mappings defined in a sandbox org. Only add users, edit user information, or define SSO user mappings in the parent org for the sandbox.

Enable SSO for a Member Org
You can enable single sign-on (SSO) to let an Environment Hub user log in to a member org without reauthenticating.

Define an SSO User Mapping
You can manually define a single-sign on (SSO) user mapping between a user in the Environment Hub and a user in a member org. Before you define a user mapping, enable SSO in the hub member org.

Use a Federation ID or Formula for SSO
You can match an Environment Hub user with a user in a member org using a Federation ID or a user name formula. For either method, enable SSO in the hub member org first.

Disable SSO for a Member Org
If you want Environment Hub users to reauthenticate when they log in to a member org, you can disable SSO. Disabling SSO doesn't remove the user mappings that you've defined, so you can always re-enable SSO later.

Enable SSO for a Member Org

You can enable single sign-on (SSO) to let an Environment Hub user log in to a member org without reauthenticating.

1. Log in to the Environment Hub, and then select a member org. If you don't see any member orgs, check your list view.
2. Select **Enable SSO**.
3. Confirm that you want to enable SSO for this org, and then select **Enable SSO** again.

USER PERMISSIONS

To set up and configure the Environment Hub:
- Manage Environment Hub

Define an SSO User Mapping

You can manually define a single-sign on (SSO) user mapping between a user in the Environment Hub and a user in a member org. Before you define a user mapping, enable SSO in the hub member org.

User mappings can be many-to-one but not one-to-many. In other words, you can associate multiple users in the Environment Hub to one user in a member org. For example, if you wanted members of your QA team to log in to a test org as the same user, you could define user mappings.

USER PERMISSIONS

To set up and configure the Environment Hub:
- Manage Environment Hub

1. Log in to the Environment Hub, and then select a member org. If you don't see any member orgs, check your list view.
2. Go to the Single Sign-On User Mappings related list, and then select **New SSO User Mapping**.
3. Enter the username of the user that you want to map in the member org, and then look up a user in the Environment Hub.
4. Select **Save**.

Use a Federation ID or Formula for SSO

You can match an Environment Hub user with a user in a member org using a Federation ID or a user name formula. For either method, enable SSO in the hub member org first.

1. Log in to the Environment Hub, and then select a member org. If you don't see any member orgs, check your list view.
2. Go to SSO Settings, and then choose a method.

Method	Steps
`SSO Method 2 - Federation ID`	Select the checkbox.
`SSO Method 3 - User Name Formula`	Select the checkbox, and then define a formula. For example, to match the first part of the username (the part before the "@" sign) with an explicit domain name, enter: `LEFT($User.Username, FIND("@", $User.Username)) & ("mydev.org")`

3. Select **Save**.

USER PERMISSIONS

To set up and configure the Environment Hub:
- Manage Environment Hub

Disable SSO for a Member Org

If you want Environment Hub users to reauthenticate when they log in to a member org, you can disable SSO. Disabling SSO doesn't remove the user mappings that you've defined, so you can always re-enable SSO later.

1. Log in to the Environment Hub, and then select a member org. If you don't see any member orgs, check your list view.
2. Select **Disable SSO**.
3. Confirm that you want to disable SSO for this org, and then select **Disable SSO** again.

USER PERMISSIONS

To set up and configure the Environment Hub:
- Manage Environment Hub

Environment Hub Best Practices

Follow these guidelines and best practices when you use the Environment Hub.

- If you're an admin or developer, choose the org that your team uses most frequently as your hub org. If you're an ISV partner, the Environment Hub is already installed in your Partner Business Org.
- Because each member org is a standard object (of type EnvironmentHubMember), you can modify its behavior or access it programmatically. For example, you can create custom fields, set up workflow rules, or define user mappings and enable single sign-on using the API for any member org.
- Decide on a strategy for enabling SSO access based on your company's security requirements. Then choose the SSO method (explicit mapping, Federation ID, or custom formula) that meets your needs.

EDITIONS

Available in: both Salesforce Classic (not available in all orgs) and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

- SSO doesn't work for newly added users or for user mappings defined in a sandbox org. Only add users, edit user information, or define SSO user mappings in the parent org for the sandbox.
- The Environment Hub connected app is for internal use only. Don't enable it for any profiles. Unless advised by Salesforce, don't delete the connected app or adjust its settings.

Environment Hub FAQ

Answers to common questions about the Environment Hub.

EDITIONS

Available in: both Salesforce Classic (not available in all orgs) and Lightning Experience

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Can I use the Environment Hub in Lightning Experience?

Where do I install the Environment Hub?

Can I install the Environment Hub in more than one org?

Can I enable the Environment Hub in a sandbox org?

What kinds of orgs can I create in the Environment Hub?

How is locale determined for the orgs I create in the Environment Hub?

Are the orgs that I create in the Environment Hub the same as the ones I created in the Partner Portal?

Can an org be a member of multiple Environment Hubs?

Can I disable the Environment Hub?

Can I use the Environment Hub in Lightning Experience?

Yes, both Salesforce Classic and Lightning Experience support the Environment Hub.

Where do I install the Environment Hub?

If you're an ISV partner, the Environment Hub is already installed in your Partner Business Org.

Otherwise, install the Environment Hub in an org that all your users can access, such as your CRM org. Do not install the Environment Hub in a Developer Edition org that contains your managed package. Doing so can cause problems when you upload a new package version or push an upgrade to customers.

Can I install the Environment Hub in more than one org?

Yes, but you must manage each Environment Hub independently. Although Salesforce recommends one Environment Hub per company, several hubs could make sense for your company. For example, if you want to keep orgs that are associated with product lines separate.

Can I enable the Environment Hub in a sandbox org?

No, you can't enable the Environment Hub in a sandbox org. Enable the Environment Hub in a production org that all your users can access.

What kinds of orgs can I create in the Environment Hub?

You can create orgs for development, testing, and trials. ISV partners can also create partner edition orgs with increased limits, more storage, and other customizations to support app development. If you're a partner but don't see partner edition orgs in the Environment

Hub, log a support case in the Salesforce Partner Community. For product, specify **Platform**. For topic, specify, **AppExchange & Managed Packages**.

Org Type	Best Used For	Expires After
Group Edition	Testing	30 days
Enterprise Edition	Testing	30 days
Professional Edition	Testing	30 days
Partner Developer Edition	Developing apps and Lightning components	Never
Partner Group Edition	Robust testing and customer demos	1 year, unless you request an extension
Partner Enterprise Edition	Robust testing and customer demos	1 year, unless you request an extension
Partner Professional Edition	Robust testing and customer demos	1 year, unless you request an extension
Trialforce Source Org	Creating Trialforce templates	1 year, unless you request an extension
Consulting Partner Edition	Customer demos	1 year, unless you request an extension

How is locale determined for the orgs I create in the Environment Hub?

Your Salesforce user locale determines the default locale of orgs that you create. For example, if your user locale is set to `English (United Kingdom)`, that is the default locale for the orgs you create. In this way, the orgs you create are already customized for the regions where they reside.

Are the orgs that I create in the Environment Hub the same as the ones I created in the Partner Portal?

Yes, the orgs are identical to the ones that you created in the Partner Portal. The Environment Hub uses the same templates, so the orgs come with the same customizations, such as higher limits and more licenses. You can also use the Environment Hub to create the same Group, Professional, and Enterprise Edition orgs that customers use. That way, you can test your app against realistic customer implementations.

Can an org be a member of multiple Environment Hubs?

No, an org can be a member of only one Environment Hub at a time. To remove an org from an Environment Hub so you can associate it with a different one:

1. Go to the Environment Hub tab.
2. Find the org, from the drop-down select **Remove**.
3. Once removed, connect the org to the desired Environment Hub:
   a. In the Environment Hub tab, click **Connect Org**.
   b. Enter the admin username for the org.
   c. Click **Connect Org**.
   d. Enter the org's password, then click **Allow** to allow the Environment Hub to access org information.

Can I disable the Environment Hub?

After you install the Environment Hub in an org, you can't disable it. However, you can hide the Environment Hub from users. Go to Setup and enter `App Menu` in to the Quick Find box, and then select **App Menu**. From the App Menu, you can choose whether to hide an app or make it visible.

Considerations for the Environment Hub in Lightning Experience

Be aware of these considerations when creating and managing orgs in the Environment Hub.

List View Limitations

You can't filter hub members by org expiration date when creating or updating list views in Lightning Experience. If you have an existing list view that includes org expiration date in its filter criteria, that list view won't work in Lightning Experience. To filter hub members by org expiration date, switch to Salesforce Classic and then use the list view.

EDITIONS

Available in: both Salesforce Classic (not available in all orgs) and Lightning Experience

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Developer Hub

The Developer Hub (Dev Hub) lets you create and manage scratch orgs. The scratch org is a source-driven and disposable deployment of Salesforce code and metadata, made for developers and automation. A scratch org is fully configurable, allowing developers to emulate different Salesforce editions with different features and preferences. Scratch orgs are a central feature of Salesforce DX, an open developer experience for developing and managing Salesforce apps across their entire lifecycle.

To work with scratch orgs, you must first enable the Developer Hub (Dev Hub) in your production or business org. You then use the Salesforce command-line interface (CLI) to create scratch orgs.

Note: Use the Dev Hub to manage scratch orgs. Continue using the Environment Hub to manage other types of orgs, including production and trial orgs.

EDITIONS

Available in: Lightning Experience

Available in: **Developer**,**Enterprise**, **Performance**, and **Unlimited** Editions

SEE ALSO:

Salesforce CLI Setup Guide

Salesforce DX Developer Guide

Scratch Org Allocations for Partners

To ensure optimal performance, partners are allocated a set number of scratch orgs in your business org. These allocations determine how many scratch orgs you can create daily, and how many can be active at a given point.

By default, Salesforce deletes scratch orgs and their associated ActiveScratchOrg records from your Dev Hub when a scratch org expires. All partners get 100 Salesforce Limited Access - Free user licenses.

Summit Tier

- 300 active

- 600 daily

Crest Tier

- 150 active
- 300 daily

Ridge Tier

- 80 active
- 160 daily

Base Tier

- 40 active
- 80 daily

Partner Trials

- 20 active
- 40 daily

Enable Dev Hub Features in Your Org

Enable Dev Hub features in your Salesforce org so you can create and manage scratch orgs, create and manage second-generation packages, and use Einstein features. Scratch orgs are disposable Salesforce orgs to support development and testing.

It's not necessary to enable Dev Hub if you plan to use Salesforce CLI with only sandboxes unless you plan to create second-generation (2GP) packages. The 2GP packages use a scratch org during the package generation process.

Enabling Dev Hub in a production or business org is safe and doesn't cause any performance or customer issues. Dev Hub comprises objects with permissions that allow admins to control the level of access available to a user and an org.

Note: You can't enable Dev Hub in a sandbox.

Consider these factors if you select a trial or Developer Edition org as your Dev Hub.

- You can't transfer scratch orgs or package versions to a new Dev Hub.
- You can create up to six scratch orgs and package versions per day, with a maximum of three active scratch orgs.
- Trial orgs expire on their expiration date.
- Developer Edition orgs can expire due to inactivity.
- You can define a namespace in a Developer Edition org that isn't your Dev Hub, and you can enable Dev Hub in a Developer Edition org that doesn't contain a namespace.

EDITIONS

Available in: Salesforce Classic and Lightning Experience

Dev Hub available in: **Developer**, **Enterprise**, **Performance**, and **Unlimited** Editions

Scratch orgs available in: **Developer**, **Enterprise**, **Group**, and **Professional** Editions

- If you plan to create package versions or run continuous integration jobs, it's better to use a production or business org as your Dev Hub because of higher scratch org and package version limits. Package versions are associated with your Dev Hub org. When a trial or Developer Edition org expires, you lose access to the package versions.

Note: Partner trial orgs signed up from the partner community have different scratch org limits. See Scratch Org Allocations for Partners. Partners can create partner edition scratch orgs: Partner Developer, Partner Enterprise, Partner Group, and Partner Professional. This feature is available only if creating scratch orgs from a Dev Hub in a partner business org. See Supported Scratch Org Editions for Partners in the *ISVforce Guide* for details.

The Dev Hub org instance determines where scratch orgs are created.

- Scratch orgs created from a Dev Hub org in Government Cloud are created on a Government Cloud instance.
- Scratch orgs created from a Dev Hub org in Public Cloud are created on a Public Cloud instance.

To enable Dev Hub in an org:

1. Log in as System Administrator to your Developer Edition, trial, or production org (for customers), or your business org (for ISVs).
2. From Setup, enter `Dev Hub` in the Quick Find box and select **Dev Hub**.

   If you don't see Dev Hub in the Setup menu, make sure that your org is one of the supported editions.
3. To enable Dev Hub, click **Enable**.

   After you enable Dev Hub, you can't disable it.

Add Salesforce DX Users

System administrators can access the Dev Hub org by default. You can enable more users to access the Dev Hub org so that they can create scratch orgs and use other developer-specific features.

You can use Salesforce DX with these standard user licenses: Salesforce, Salesforce Platform, and Developer.

If your org has Developer licenses, you can add users with the Developer profile and assign them the provided Developer permission set. Alternatively, you can add users with the Standard User or System Administrator profiles. For a standard user, you must create a permission set with the required Salesforce DX permissions. We recommend that you avoid adding users as system administrators unless their work requires that level of authority and not just Dev Hub org access.

SEE ALSO:

Salesforce Help: User Licenses

Free Limited Access License

Looking to use Dev Hub in your production or business org but don't have a Salesforce user license? Look no further. The Salesforce Limited Access - Free license lets developers access Dev Hub to create and manage scratch orgs. In addition to this functionality, you can access Chatter to collaborate with other users.

The main purpose of this license is to enable developers to create scratch orgs. Your Salesforce admin has to grant appropriate permissions to the Dev Hub objects (ScratchOrgInfo, ActiveScratchOrg, and NamespaceRegistry) to get you started. However, Salesforce objects such as Accounts, Contacts, and Opportunities aren't accessible via this license.

Important: Contact your Salesforce account executive to request the Free Limited Access License.

To use Org Shape for Scratch Orgs or Scratch Org Snapshots (pilot), be sure to assign the Salesforce or Salesforce Platform user license. This license isn't supported at this time.

To give full access to the Dev Hub org, create a permission set that contains these permissions.

- Object Settings > Scratch Org Info > Read, Create, and Delete
- Object Settings > Active Scratch Org > Read and Delete
- Object Settings > Namespace Registry > Read (to use a linked namespace in a scratch org)

For more information, see Add Salesforce DX Users. Salesforce administrators can upgrade a Salesforce Limited Access - Free license to a standard Salesforce license at any time.

Note: This license doesn't provide access to some Salesforce CLI commands, such as `force:limits:api:display`. Contact your Salesforce admin for API limits information.

Manage Scratch Orgs from Dev Hub

You can view and delete your scratch orgs and their associated requests from the Dev Hub.

In Dev Hub, ActiveScratchOrgs represent the scratch orgs that are currently in use. ScratchOrgInfos represent the requests that were used to create scratch orgs and provide historical context.

1. Log in to Dev Hub org as the System Administrator or as a user with the Salesforce DX permissions.
2. From the App Launcher, select **Active Scratch Org** to see a list of all active scratch orgs.

   To view more details about a scratch org, click the link in the Number column.
3. To delete an active scratch org from the Active Scratch Org list view, choose **Delete** from the dropdown.

   Deleting an active scratch org does not delete the request (ScratchOrgInfo) that created it, but it does free up a scratch org so that it doesn't count against your allocations.
4. To view the requests that created the scratch orgs, select **Scratch Org Info** from the App Launcher.

   To view more details about a request, click the link in the Number column. The details of a scratch org request include whether it's active, expired, or deleted.
5. To delete the request that was used to create a scratch org, choose **Delete** from the dropdown.

   Deleting the request (ScratchOrgInfo) also deletes the active scratch org.

Link a Namespace to a Dev Hub Org

To use a namespace with a scratch org, you must link the Developer Edition org where the namespace is registered to a Dev Hub org.

Complete these tasks before you link a namespace.

- If you don't have an org with a registered namespace, create a Developer Edition org that is separate from the Dev Hub or scratch orgs. If you already have an org with a registered namespace, go to Step 1.
- In the Developer Edition org, create and register the namespace.

  Important: Choose namespaces carefully. If you're trying out this feature or need a namespace for testing purposes, choose a disposable namespace. Don't choose a namespace that you want to use in the future for a production org or some other real use case. Once you associate a namespace with an org, you can't change it or reuse it.

1. Log in to your Dev Hub org as the System Administrator or as a user with the Salesforce DX Namespace Registry permissions.

   Tip: Make sure your browser allows pop-ups from your Dev Hub org.

   a. From the App Launcher menu, select **Namespace Registries**.

   b. Click **Link Namespace**.

2. Log in to the Developer Edition org in which your namespace is registered using the org's System Administrator's credentials.

   You cannot link orgs without a namespace: sandboxes, scratch orgs, patch orgs, and branch orgs require a namespace to be linked to the Namespace Registry.

To view all the namespaces linked to the Namespace Registry, select the **All Namespace Registries** view.

Supported Scratch Org Editions for Partners

Create partner edition scratch orgs from a Dev Hub partner business org.

Supported partner scratch org editions include:

- Partner Developer
- Partner Enterprise
- Partner Group
- Partner Professional

Indicate the partner edition in the scratch org definition file.

```
"edition": "Partner Enterprise",
```

If you attempt to create a partner scratch org and see this error, confirm that you're using an active partner business org. Contact the Partner Community for further assistance.

```
ERROR:  You don't have permission to create Partner Edition organizations.
To enable this functionality, please log a case in the Partner Community.
```

License limits for partner scratch orgs are similar to partner edition orgs created in Environment Hub. Get the details on the Partner Community.

Notifications for Package Errors

EDITIONS

Available in: Salesforce Classic

Accurately track failed package installations, upgrades, and uninstallations in subscriber orgs with the Notifications for Package Errors feature. Proactively address issues with managed and unmanaged packages and provide support to subscribers so that they can successfully install and upgrade your apps.

You can choose to send a notification to an email address in your org when a subscriber's attempt to install, upgrade, or uninstall a packaged app fails. To enable this feature, contact your Salesforce representative.

Errors can happen with these package operations:

- Installation
- Upgrade
- Push upgrade
- Uninstallation

When an installation fails, an email is sent to the specified address with the following details:

- Reason for the failure
- Subscriber org information

- Metadata of the package that wasn't installed properly
- Who attempted to install the package

This example email is for a package installation that failed because the base package wasn't installed before the subscriber tried to install an extension.

```
On Mon, Jul 13, 2015 at 11:51 AM, NO REPLY <no-reply@salesforce.com> wrote:
The install of your package failed. Here are the details:

Error Message: 00DD00000007uJp: VALIDATION_FAILED [DB 0710 DE1 Pkg1 1.2: A required package
 is missing: Package "DB 0710 DE1 Pkg1", Version 1.2 or later must be installed first.]
Date/Time of Occurrence = Mon Jul 13 18:51:20 GMT 2015

Subscriber Org Name = DB 071015 EE 1
Subscriber Org ID = 00DD00000007uJp
Subscriber Org Status = TRIAL
Subscriber Org Edition = Enterprise Edition

Package Name = DB 0710 DE2 Pkg1
Package ID = 033D000000060EE
Package Namespace = DB_0710_DE2
Package Type = MANAGED
Package Version Name = 1.2
Package Version Number = 1.2
Package Version Id = 04tD00000006QoF

Installer Name = Admin User
Installer Email Address = dburki@salesforce.com
```

Set the Notification Email Address

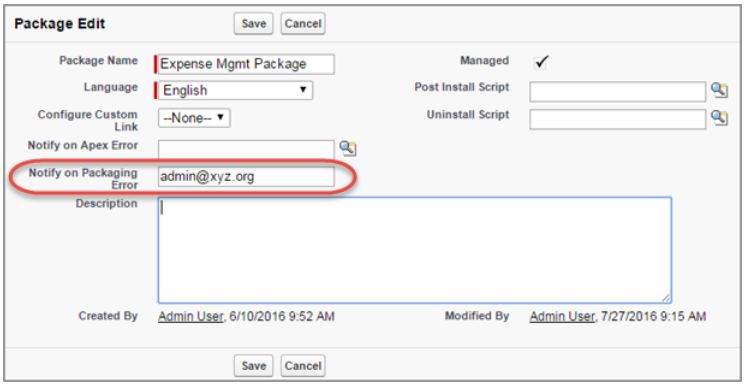
Specify which address to email when a package installation, upgrade, or uninstallation fails.

Notifications are sent only for package versions that are uploaded after the address is added. For example, if you upload package version 1.0 and then set the notification address, notifications aren't sent for failures related to version 1.0. Notifications start when version 2.0 is uploaded.

Also, you can't change or remove the notification email address for the package after it's been uploaded.

1. To enable this feature, contact your Salesforce representative.
2. From Setup, enter *Packages* in the Quick Find box, then select **Packages**.
3. Click the package name, and then click **Edit** on the package detail page.
4. Enter the email address to send notifications to, and click **Save**.

Notifications for Package Errors Configured in a Partner Org



CHAPTER 5 Package and Test Your Solution

In this chapter ...

- About Managed Packages
- Installing a Package
- Uninstall a Managed Package
- Installing Managed Packages Using the API
- Resolving Apex Test Failures
- Running Apex on Package Install/Upgrade
- Running Apex on Package Uninstall
- Publishing Extensions to Managed Packages

Learn how to package, upload, and install a beta version of your solution as part an iterative development approach. After your beta is up and running, learn how to test, fix, extend, and uninstall the solution.

About Managed Packages

Note: Salesforce has two ways that you can build managed packages, first-generation packaging (1GP) and second-generation packaging (2GP). This guide describes 1GP. For new solutions, use 2GP as described in the Second-Generation Managed Packages section of the Salesforce DX Developer Guide.

A managed package is a collection of application components that are posted as a unit on AppExchange, and are associated with a namespace and a License Management Organization.

- You must use a Developer Edition organization to create and work with a managed package.
- Managed packages are depicted by the following icons:
  - Managed - Beta
  - Managed - Released
  - Managed - Installed

Tip: To prevent naming conflicts, Salesforce recommends using managed packages for all packages that contain Apex to ensure that all Apex objects contain your namespace prefix. For example, if an Apex class is called `MyHelloWorld` and your org's namespace is `OneTruCode`, the class is referenced as `OneTruCode.MyHelloWorld`.

EDITIONS

Available in: Salesforce Classic (not available in all orgs) and Lightning Experience

Available in: **Developer** Edition

Package uploads and installs are available in **Group**, **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Register a Namespace

A namespace is a one to 15-character alphanumeric identifier that distinguishes your package and its contents from packages of other developers on AppExchange. Namespace prefixes are case-insensitive. For example, ABC and abc aren't recognized as unique. Your namespace must be globally unique across all Salesforce organizations.

Important: When creating a namespace, use something that's useful and informative to users. However, don't name a namespace after a person (for example, by using a person's name, nickname, or private information.)

Salesforce automatically prepends your namespace, followed by two underscores ("__"), to all unique component names in your Salesforce organization. A unique package component is one that requires a name that no other component has within Salesforce, such as custom objects, custom fields, custom links, and validation rules. For example, if your namespace is abc and your managed package contains a custom object with the API name, Expense__c, use the API name abc__Expense__c to access this object using the API. The namespace is displayed on all component detail pages.

Your namespace must:

- Begin with a letter
- Contain one to 15 alphanumeric characters
- Not contain two consecutive underscores

For example, `myNp123` and `my_np` are valid namespaces, but `123Company` and `my__np` aren't.

To register a namespace:

1. From Setup, enter *`Package Manager`* in the Quick Find box and select **Package Manager**.
2. In the Namespace Settings panel, click **Edit**.

EDITIONS

Available in: Salesforce Classic (not available in all orgs) and Lightning Experience

Available in: **Developer** Edition

Package uploads and installs are available in **Group**, **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Note: After you've configured your namespace settings, this button is hidden.

3. Enter the namespace you want to register.
4. Click **Check Availability** to determine if the namespace is already in use.
5. If the namespace prefix that you entered isn't available, repeat the previous two steps.
6. Click **Review**.
7. Click **Save**.

Specifying a License Management Organization

A license management organization is a Salesforce organization that you use to track all Salesforce users who install your managed package. The license management organization receives notification (in the form of a lead record) when a user installs or uninstalls your package and tracks each package upload on Salesforce AppExchange.

Your license management organization can be any Salesforce Enterprise, Unlimited, Performance, or Developer Edition organization that has installed the free License Management Application (LMA) from AppExchange. To specify a License Management Organization, go to https://appexchange.salesforce.com/publisherHome.

EDITIONS

Available in: Salesforce Classic (not available in all orgs) and Lightning Experience

Available in: **Developer** Edition

Package uploads and installs are available in **Group**, **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

What are Beta Versions of Managed Packages?

A beta package is an early version of a managed package that is uploaded in a Managed - Beta state. The purpose of a Managed - Beta package is to allow the developer to test their application in different Salesforce organizations and to share the app with a pilot set of users for evaluation and feedback.

Before installing a beta version of a managed package, review the following notes:

- Beta packages can be installed in sandbox or Developer Edition organizations, or test organizations furnished through the Environment Hub only.
- The components of a beta package are editable by the developer's organization until a Managed - Released package is uploaded.
- Beta versions aren't considered major releases, so the package version number doesn't change.
- Beta packages are not upgradeable. Because developers can still edit the components of a beta package, the Managed - Released version might not be compatible with the beta package installed. Uninstall the beta package and install a new beta package or released version. For more information, see Uninstall a Managed Package on page 97 and Installing a Package on page 94.

Creating and Uploading a Beta Package

Use the following procedure to create and upload a beta package through the UI. (You can also upload a package using the Tooling API. For sample code and more details, see the PackageUploadRequest object in the *Tooling API Developer Guide*.)

1. Create a package:
   a. From Setup, enter `Package Manager` in the `Quick Find` box, then select **Package Manager**.
   b. Click **New**.

USER PERMISSIONS

To create packages:
- Create AppExchange Packages

To upload packages:
- Upload AppExchange Packages

c. Enter a name for your package. You can use a different name than what appears on AppExchange.

d. From the dropdown menu, select the default language of all component labels in the package.

e. Optionally, choose a custom link from the `Configure Custom Link` field to display configuration information to installers of your app. You can select a predefined custom link to a URL or s-control that you have created for your home page layouts; see the Configure Option. The custom link displays as a **Configure** link within Salesforce on the Salesforce AppExchange Downloads page and app detail page of the installer's organization.

f. Optionally, in the `Notify on Apex Error` field, enter the username of the person to notify if an uncaught exception occurs in the Apex code. If you do not specify a username, all uncaught exceptions generate an email notification that is sent to Salesforce. This option is only available for managed packages. Handling Apex Exceptions in Managed Packages.

Note: Apex can only be packaged from Developer, Enterprise, Unlimited, and Performance Edition organizations.

g. Optionally, in the `Notify on Packaging Error` field, enter the email address of the person who receives an email notification if an error occurs when a subscriber's attempt to install, upgrade, or uninstall a packaged app fails. This field appears only if packaging error notifications are enabled. To enable notifications, contact your Salesforce representative.

h. Optionally, enter a description that describes the package. You can change this description before you upload it to AppExchange.

i. Optionally, specify a post install script. You can run an Apex script in the subscriber organization after the package is installed or upgraded. For more information, see Running Apex on Package Install or Upgrade.

j. Optionally, specify an uninstall script. You can run an Apex script in the subscriber organization after the package is uninstalled. For more information, see Running Apex on Package Uninstall.

k. Click **Save**.

2. Optionally, change the API access privileges. By default, API access is set to `Unrestricted`, but you can change this setting to further restrict API access of the components in the package.

3. Add the necessary components for your app.

a. Click **Add Components**.

b. From the drop-down list, choose the type of component.

c. Select the components you want to add.

d. Click **Add To Package**.

e. Repeat these steps until you have added all the components you want in your package.

Note: Some related components are automatically included in the package even though they might not display in the Package Components list. For example, when you add a custom object to a package, its custom fields, page layouts, and relationships with standard objects are automatically included. For a complete list of components, see Components Automatically Added to Packages on page 39.

4. Optionally, click **View Dependencies** and review a list of components that rely on other components, permissions, or preferences within the package. Click **Done** to return to the Package detail page.

5. Click **Upload**.

6. On the Upload Package page, do the following:

a. Enter a `Version Name`, such as *`Spring 12`*. The version name is the marketing name for a specific release of a package and allows you to create a more descriptive title for the version than just a number.

b. Enter a `Version Number`, such as *`1.0`*. For more information on versions, see Update Your Solution on page 389.

c. Select a `Release Type` of Managed - Released.

d. Optionally, enter and confirm a password to share the package privately with anyone who has the password. Don't enter a password if you want to make the package available to anyone on AppExchange and share your package publicly.

e. Salesforce automatically selects the requirements it finds. In addition, select any other required components from the `Package Requirements` and `Object Requirements` sections to notify installers of any requirements for this package.

f. Click **Upload**.

You will receive an email that includes an installation link when your package has been uploaded successfully.

Create and Upload a Managed Package

Note: Salesforce has two ways that you can build managed packages, first-generation packaging (1GP) and second-generation packaging (2GP). This guide describes 1GP. For new solutions, use 2GP as described in the Second-Generation Managed Packages section of the Salesforce DX Developer Guide.

Use the following procedure to create and upload a managed package through the UI. You can also upload a package using the Tooling API. For sample code and more details, see the PackageUploadRequest object in the *Tooling API Developer Guide*.

These steps assume you have already created a namespace and beta package. If you're uploading a beta package for testing, see Create and Upload a Beta Package.

1. Create a package:

a. From Setup, enter *`Package Manager`* in the `Quick Find` box, then select **Package Manager**.

b. Click **New**.

c. Enter a name for your package. You can use a different name than what appears on AppExchange.

d. From the dropdown menu, select the default language of all component labels in the package.

e. Optionally, choose a custom link from the `Configure Custom Link` field to display configuration information to installers of your app. You can select a predefined custom link to a URL or s-control that you have created for your home page layouts; see the Configure Option on page 51. The custom link displays as a **Configure** link within Salesforce on the Salesforce AppExchange Downloads page and app detail page of the installer's organization.

f. Optionally, in the `Notify on Apex Error` field, enter the username of the person to notify if an uncaught exception occurs in the Apex code. If you do not specify a username, all uncaught exceptions generate an email notification that is sent to Salesforce. This option is only available for managed packages. For more information, see Handling Apex Exceptions in Managed Packages.

Note: Apex can only be packaged from Developer, Enterprise, Unlimited, and Performance Edition organizations.

g. Optionally, in the `Notify on Packaging Error` field, enter the email address of the person who receives an email notification if an error occurs when a subscriber's attempt to install, upgrade, or uninstall a packaged app fails. This field appears only if packaging error notifications are enabled. To enable notifications, contact your Salesforce representative.

h. Optionally, enter a description that describes the package. You can change this description before you upload it to AppExchange.

i. Optionally, specify a post install script. You can run an Apex script in the subscriber organization after the package is installed or upgraded. For more information, see Running Apex on Package Install/Upgrade.

EDITIONS

Available in: Salesforce Classic (not available in all orgs) and Lightning Experience

Available in: **Developer** Edition

Package uploads and installs are available in **Group**, **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To create packages:
- Create AppExchange Packages

To upload packages:
- Upload AppExchange Packages

j. Optionally, specify an uninstall script. You can run an Apex script in the subscriber organization after the package is uninstalled. For more information, see Running Apex on Package Uninstall.

k. Click **Save**.

2. Salesforce sets your package API access privileges to `Unrestricted`. You can change this setting to further restrict API access of Salesforce components in the package. For more information, see Manage API and Dynamic Apex Access in Packages.
3. Add the necessary components for your app.
   a. Click **Add Components**.
   b. From the dropdown list, choose the type of component you want to add to your package.
   - At the top of the list, click a letter to display the contents of the sorted column that begin with that character.
   - If available, click the **Next Page** (or **Previous Page**) link to go to the next or previous set of components.
   - If available, click **fewer** or **more** at the bottom of the list to view a shorter or longer display list.

   c. Select the components you want to add.
   d. Click **Add To Package**.
   e. Repeat these steps until you have added all the components you want in your package.

   Note:
   - Some related components are automatically included in the package even if they don't display in the Package Components list. For example, when you add a custom object to a package, its custom fields, page layouts, and relationships with standard objects are automatically included.
   - When you package a joined report, each block is included in the package. Although the blocks appear in the package as reports, when you click on a block, an error message indicates that you have "insufficient privileges" to view the report. This is expected behavior. Instead, click the name of the joined report to run it.

4. Optionally, click **View Dependencies** and review a list of components that rely on other components, permissions, or preferences within the package. An entity can include such things as an s-control, a standard or custom field, or an organization-wide setting like multicurrency. Your package cannot be installed unless the installer has the listed components enabled or installed. For more information on dependencies, see Understanding Dependencies on page 44. Click **Done** to return to the Package detail page.

   Note: You cannot upload packages that contain any of the following:
   - Workflow rules or workflow actions (such as field updates or outbound messages) that reference record types.
   - Reports that reference record types on standard objects.

5. Click **Upload**.

   Note: If you are creating a managed package to publish on AppExchange, you must certify your application before you package it. For more information, see Security Review on AppExchange.

6. On the Upload Package page, do the following:
   a. Enter a `Version Name`. As a best practice, it's useful to have a short description and the date.
   b. Enter a `Version Number` for the upload, such as *`1.0`*. The format is *`majorNumber.minorNumber`*.

   Note: If you're uploading a new patch version, you can't change the patch number.

   The version number represents a release of a package. This field is required for managed and unmanaged packages. For a managed package, the version number corresponds to a Managed - Released upload. All beta uploads use the same version

number until you upload a Managed - Released package version with a new version number. For example, the following is a sequence of version numbers for a series of uploads.

Upload Sequence	Type	Version Number	Notes
First upload	Managed - Beta	1.0	The first Managed - Beta upload.
Second upload	Managed - Released	1.0	A Managed - Released upload. The version number does not change.
Third upload	Managed - Released	1.1	Note the change of minor release number for this Managed - Released upload.
Fourth upload	Managed - Beta	2.0	The first Managed - Beta upload for version number 2.0. Note the major version number update.
Fifth upload	Managed - Released	2.0	A Managed - Released upload. The version number does not change.

c. For managed packages, select a `Release Type`:

- Choose Managed - Released to upload an upgradeable version. After upload, some attributes of Salesforce components are locked.
- Choose Managed - Beta if you want to upload a version of your package to a small sampling of your audience for testing purposes. You can still change the components and upload other beta versions.

  Note: Beta packages can only be installed in Developer Edition or sandbox organizations, and thus can't be pushed to customer organizations.

d. Change the `Description`, if necessary.

e. Optionally, specify a link to release notes for the package. Click **URL** and enter the details in the text field that appears. This link will be displayed during the installation process, and on the Package Details page after installation.

Note: As a best practice, point to an external URL, so you can make the information available to customers before the release, and update it independently of the package.

f. Optionally, specify a link to post install instructions for the package. Click **URL** or **Visualforce page** and enter the details in the text field that appears. This link will be displayed on the Package Details page after installation.

Note: As a best practice, point to an external URL, so you can update the information independently of the package.

g. Optionally, enter and confirm a password to share the package privately with anyone who has the password. Don't enter a password if you want to make the package available to anyone on AppExchange and share your package publicly.

h. Salesforce automatically selects the requirements it finds. In addition, select any other required components from the `Package Requirements` and `Object Requirements` sections to notify installers of any requirements for this package.

i. Click **Upload**.

7. After your upload is complete you can do any of the following.

- Click **Change Password** link to change the password option.
- Click **Deprecate** to prevent new installations of this package while allowing existing installations to continue operating.

Note: You cannot deprecate the most recent version of a managed package.

When you deprecate a package, remember to remove it from AppExchange as well. See "Removing Apps from AppExchange" in the AppExchange online help.

- Click **Undeprecate** to make a deprecated version available for installation again.

You receive an email that includes an installation link when your package has been uploaded successfully.

Note:

- When using the install URL, the old installer is displayed by default. You can customize the installation behavior by modifying the installation URL you provide your customers.
  - To access the new installer, append the text `&newui=1` to the installation URL.
  - To access the new installer with the "All Users" option selected by default, append the additional text `&p1=full` to the installation URL.
- If you uploaded from your Salesforce production org, notify installers who want to install it in a sandbox org to replace the "login.salesforce.com" portion of the installation URL with "test.salesforce.com."

View Package Details

From Setup, enter *Packages* in the Quick Find box, then select **Packages**. Click the name of a package to view its details, including added components, whether it's a managed package, whether the package has been uploaded, and so on.

The detail page has these sections:

- Package Details on page 91
- Components on page 92
- Versions on page 93
- Patch Organizations on page 94

From the Package Detail page, you can:

- Click **Edit** to change the package name, the custom link that displays when users click Configure, or the description.
- Click **Delete** to delete the package. This action doesn't delete the components contained in the package, but the components are no longer bundled together within this package.
- Click **Upload** to upload the package. You're notified by email when the upload is complete.
- You can enable, disable, or change the dynamic Apex and API access that components in the package have to standard objects in the installing org by using the links next to `API Access`.

View Package Details

For package developers, the package detail section displays these attributes (in alphabetical order).

Attribute	Description
`API Access`	The type of access that the API and dynamic Apex that package components have. The default is **Unrestricted**, which means that all package components that access the API have the same access as the user who is logged in. Click **Enable Restrictions** or **Disable**

Attribute	Description
	Restrictions to change the API and dynamic Apex access permissions for a package.
`Created By`	The name of the developer that created this package, including the date and time.
`Description`	A description of the package.
`Language`	The language used for the labels on components. The default value is your user language.
`Last Modified By`	The name of the last user to modify this package, including the date and time.
`Notify on Apex Error`	The username of the person who receives email notifications when an exception occurs in Apex that isn't caught by the code. If you don't specify a username, all uncaught exceptions send an email notification to Salesforce. This is available only for managed packages. Note: Apex can be packaged only from Developer, Enterprise, Unlimited, and Performance Edition orgs.
`Notify on Packaging Error`	The email address of the person who receives email notifications if an error occurs when a subscriber's attempt to install, upgrade, or uninstall a packaged app fails. This field appears only if packaging error notifications are enabled. To enable notifications, contact your Salesforce representative.
`Package Name`	The name of the package, provided by the publisher.
`Push Upgrade Exclusion List`	A comma-separated list of org IDs to exclude when you push a package upgrade to subscribers.
`Post Install Script`	The Apex code that runs after this package is installed or upgraded. For more information, see Running Apex on Package Install/Upgrade on page 99.
`Type`	Indicates whether this is a managed or unmanaged package.
`Uninstall Script`	The Apex code that runs after this package is uninstalled. For more information, see Running Apex on Package Uninstall on page 103.

View Package Components

For package developers, the Components tab lists each package component contained in the package, including the name and type of each component.

Click **Add** to add components to the package.

Note: Some related components are automatically included in the package even though they might not display in the Package Components list. For example, when you add a custom object to a package, its custom fields, page layouts, and relationships with

standard objects are included. For a list of components that Salesforce automatically includes, see Components Automatically Added on page 39.

Package components frequently depend on other components that aren't always added to the package explicitly. Each time you change a package, Salesforce checks for dependencies and displays the components as package members. Package Manager checks for dependencies and shows the component relationship to the package in the Include By column of the Package Details.

When your package contains 1,000 or more components, you can decide when to refresh the components list in the Package Details and avoid a long wait while this page loads. The components list refreshes automatically for packages with less than 1,000 components. Click **Refresh Components** if the package has new or changed components, and wait for the list to refresh.

Click **View Dependencies** to review a list of components that rely on other components, permissions, or preferences within the package. An entity might include such things as an s-control, a standard or custom field, or an organization-wide setting like multicurrency. Your package can't be installed unless the installer has the listed components enabled or installed. Click **Back to Package** to return to the Package detail page.

Click **View Deleted Components** to see which components were deleted from the package across all its versions.

View Version History

For package developers, the Versions tab lists all the previous uploads of a package.

Click **Push Upgrades** to automatically upgrade subscribers to a specific version. Orgs entered in the Push Upgrade Exclusion List are omitted from the upgrade. The orgs can still install the upgrade when you publish the new version.

Click the version number of a listed upload to manage that upload. For more information, see Managing Versions on page 399.

Note: Push Upgrades is available for patches and major upgrades. Registered ISV partners can request Push Major Upgrade functionality. Log a support case in the Salesforce Partner Community. For product, specify **Partner Community & AppExchange**. For topic, specify **Security Review**.

The versions table displays the package attributes (in alphabetical order).

Attribute	Description
`Action`	Lists the actions you can perform on the package. The possible actions are: • **Deprecate**—Deprecates a package version. Warning: Users can no longer download or install this package. However, existing installations continue to work. • **Undeprecate**—Enables a previously deprecated package version to be installed again.
`Status`	The status of the package. The possible statuses are: • Released: The package is Managed - Released. • Beta: The package is Managed - Beta. • Deprecated: The package version is deprecated.
`Version Name`	The version name for this package. The version name is the marketing name for a specific release of a package. It's more descriptive than `Version Number`.

Attribute	Description
`Version Number`	The version number for the latest installed package version. The format is *`majorNumber.minorNumber.patchNumber`*, such as 2.1.3. The version number represents a release of a package. `Version Name` is a more descriptive name for the release. The `patchNumber` is generated only when you create a patch. If there's no `patchNumber`, it's assumed to be zero (0).

View Patch Development Orgs

Each patch is developed in a *patch development org*, which is the org where patch versions are developed, maintained, and uploaded. To start developing a patch, create a patch development org. Create and Upload Patches Patch development orgs permit developers to change existing components without causing incompatibilities between existing subscriber installations. Click **New** to create a patch for this package.

The Patch Organizations table lists all the patch development orgs created. It lists these attributes (in alphabetical order).

Attribute	Description
`Action`	Lists the actions that you can perform on a patch development org. The possible actions are: • **Login**—Log in to your patch development organization. • **Reset**—Emails a temporary password for your patch development org.
`Administrator Username`	The login associated with the patch org.
`Patching Major Release`	The package version number that you're patching.

Installing a Package

During the development and testing cycle, you might need to periodically install and uninstall packages before you install the next beta. Follow these steps to install a package.

Pre-Installation

1. In a browser, type in the installation URL you received when you uploaded the package.
2. Enter your username and password for the Salesforce organization in which you want to install the package, and then click **Log In**.
3. If the package is password-protected, enter the password you received from the publisher.

Default Installation

Click **Install**. You'll see a message that describes the progress and a confirmation message after the installation is complete.

Custom Installation

Follow these steps if you need to modify the default settings, as an administrator.

1. Choose one or more of these options, as appropriate.
   - Click **View Components**. You'll see an overlay with a list of components in the package. For managed packages, the screen also contains a list of connected apps (trusted applications that are granted access to a user's Salesforce data after the user and the application are verified). To confirm that the components and any connected apps shown are acceptable, review the list and then close the overlay.

     Note: Some package items, such as validation rules, record types, or custom settings don't appear in the Package Components list but are included in the package and installed with the other items. If there are no items in the Package Components list, it's likely that the package contains only minor changes.

   - If the package contains a remote site setting, you must approve access to websites outside of Salesforce. The dialog box lists all the websites that the package communicates with. We recommend that a website uses SSL (secure sockets layer) for transmitting data. After you verify that the websites are safe, select **Yes, grant access to these third-party websites** and click **Continue**, or click **Cancel** to cancel the installation of the package.

     Warning: By installing remote site settings, you're allowing the package to transmit data to and from a third-party website. Before using the package, contact the publisher to understand what data is transmitted and how it's used. If you have an internal security contact, ask the contact to review the application so that you understand its impact before use.

   - Click **API Access**. You'll see an overlay with a list of the API access settings that package components have been granted. Review the settings to verify they're acceptable, and then close the overlay to return to the installer screen.
   - In Enterprise, Performance, Unlimited, and Developer Editions, choose one of the following security options.

     Note: This option is visible only in specific types of installations. For example, in Group and Professional Editions, or if the package doesn't contain a custom object, Salesforce skips this option, which gives all users full access.

     Install for Admins Only

     Specifies the following settings on the installing administrator's profile and any profile with the "Customize Application" permission.

     - Object permissions—`Read`, `Create`, `Edit`, `Delete`, `View All`, and `Modify All` enabled
     - Field-level security—set to visible and editable for all fields
     - Apex classes—enabled
     - Visualforce pages—enabled
     - App settings—enabled
     - Tab settings—determined by the package developer
     - Page layout settings—determined by the package developer
     - Record Type settings—determined by the package developer

     After installation, if you have Enterprise, Performance, Unlimited, or Developer Edition, set the appropriate user and object permissions on custom profiles as needed.

     Install for All Users

     Specifies the following settings on all internal custom profiles.

     - Object permissions— `Read`, `Create`, `Edit`, and `Delete` enabled
     - Field-level security—set to visible and editable for all fields
     - Apex classes—enabled

- Visualforce pages—enabled
- App settings—enabled
- Tab settings—determined by the package developer
- Page layout settings—determined by the package developer
- Record Type settings—copied from admin profile

Note: The Customer Portal User, Customer Portal Manager, High Volume Customer Portal, Authenticated Website, Partner User, and standard profiles receive no access.

Install for Specific Profiles...

Lets you determine package access for all custom profiles in your org. You can set each profile to have full access or no access for the new package and all its components.

- Full Access—Specifies the following settings for each profile.
  - Object permissions`Read`, `Create`, `Edit`, and `Delete` enabled
  - Field-level security—set to visible and editable for all fields
  - Apex classes—enabled
  - Visualforce pages—enabled
  - App settings—enabled
  - Tab settings—enabled
  - Page layout settings—determined by the package developer
  - Record Type settings—determined by the package developer
- No Access—Page layout and Record Type settings are determined by the package developer. All other settings are hidden or disabled.

If the package developer has included settings for custom profiles, you can incorporate the settings of the publisher's custom profiles into your profiles without affecting your settings. Choose the name of the profile settings in the dropdown list next to the profile that you're applying them to. The current settings in that profile remain intact.

Alternatively, click **Set All** next to an access level to give this setting to all user profiles.

2. Click **Install**. You'll see a message that describes the progress and a confirmation message after the installation is complete.

Post-Installation Steps

If the package includes post-installation instructions, they're displayed after the installation is completed. Review and follow the instructions provided. In addition, before you deploy the package to your users, make any necessary changes for your implementation. Depending on the contents of the package, some of the following customization steps are required.

- If the package includes permission sets, assign the included permission sets to your users who need them. In managed packages, you can't edit permission sets that are included in the package, but subsequent upgrades happen automatically. If you clone a permission set that comes with a managed package or create your own, you can edit the permission set, but subsequent upgrades won't affect it.
- If you're reinstalling a package and need to reimport the package data by using the export file that you received after uninstalling, see Importing Package Data.
- If you installed a managed package, click **Manage Licenses** to assign licenses to users.

  Note: You can't assign licenses in Lightning Experience. To assign a license, switch to Salesforce Classic.

- Configure components in the package as required. For more information, see Configuring Installed Packages.

Component Availability After Deployment

Many components have an **Is Deployed** attribute that controls whether they are available for end users. After installation, all components are immediately available if they were available in the developer's organization.

For tips on customizing the installed package and components, see Configuring Installed Packages. Installed packages are available to users in your organization with the appropriate permissions and page layout settings.

Uninstall a Managed Package

Uninstalling a managed package removes its components and data from the org. During the uninstall process, any customizations, including custom fields or links, that you've made to the package are removed.

1. From Setup, enter `Installed Packages` in the Quick Find box, then select **Installed Packages**.
2. Click **Uninstall** next to the package that you want to remove.
3. Determine whether to save and export a copy of the package's data, and then select the corresponding radio button.
4. Select **Yes, I want to uninstall** and click **Uninstall**.

When you uninstall packages, consider the following:

- If you're uninstalling a package that includes a custom object, all components on that custom object are also deleted. Deleted items include custom fields, validation rules, custom buttons, and links, workflow rules, and approval processes.
- You can't uninstall a package whenever a component not included in the uninstall references any component in the package. For example:
  - When an installed package includes any component on a standard object that another component references, Salesforce prevents you from uninstalling the package. An example is a package that includes a custom user field with a workflow rule that gets triggered when the value of that field is a specific value. Uninstalling the package would prevent your workflow from working.
  - When you've installed two unrelated packages that each include a custom object and one custom object component references a component in the other, you can't uninstall the package. An example is if you install an expense report app that includes a custom user field and create a validation rule on another installed custom object that references that custom user field. However, uninstalling the expense report app prevents the validation rule from working.
  - When an installed folder contains components you added after installation, Salesforce prevents you from uninstalling the package.
  - When an installed letterhead is used for an email template you added after installation, Salesforce prevents you from uninstalling the package.
  - When an installed package includes a custom field that's referenced by Einstein Prediction Builder or Case Classification, Salesforce prevents you from uninstalling the package. Before uninstalling the package, edit the prediction in Prediction Builder or Case Classification so that it no longer references the custom field.
- You can't uninstall a package that removes all active business and person account record types. Activate at least one other business or person account record type, and try again.
- You can't uninstall a package if a background job is updating a field added by the package, such as an update to a roll-up summary field. Wait until the background job finishes, and try again.

Installing Managed Packages Using the API

You can install, upgrade, and uninstall managed packages using the API, instead of the user interface. Automating these repeated tasks can help you can work more efficiently and to speed up application development.

To install, upgrade, or uninstall a package, use the standard Metadata API `deploy()` call with the `InstalledPackage` metadata type. The following operations are supported.

- Deploying an `InstalledPackage` installs the package in the deploying organization.
- Deploying a newer version of a currently installed package upgrades the package.
- Deploying an `InstalledPackage` using a manifest called `destructiveChanges.xml`, instead of `package.xml`, uninstalls it from the organization.

Note: You can't deploy a package along with other metadata types. Hence, `InstalledPackage` must be the only metadata type specified in the manifest file.

The following is a typical project manifest (`package.xml`) for installing a package. The manifest must not contain a `fullName` or `namespacePrefix` element.

```
<?xml version="1.0" encoding="UTF-8"?>
  <Package xmlns="http://soap.sforce.com/2006/04/metadata">
    <types>
      <members>*</members>
       <name>InstalledPackage</name>
     </types>
    <version>28.0</version>
  </Package>
```

The package is specified in a file called ***MyNamespace***`.installedPackage`, where ***MyNamespace*** is the namespace prefix of the package. The file must be in a directory called `installedPackages`, and its contents must have this format.

```
<?xml version="1.0" encoding="UTF-8"?>
  <InstalledPackage xmlns="http://soap.sforce.com/2006/04/metadata">
    <versionNumber>1.0</versionNumber>
    <password>optional_password</password>
  </InstalledPackage>
```

InstalledPackage in API version 43.0 and later must include the `activateRSS` field set to either of these values.

true
Keep the isActive state of any Remote Site Settings(RSS) or Content Security Policies(CSP) in the package.

false
Override the isActive state of any RSS or CSP in the package and set it to `false`.

The default value is `false`.

Note: Regardless of what `activateRSS` is set to, a retrieve of `InstalledPackage` always returns `<activateRSS xsi:nil="true"/>`. Therefore, before you deploy a package, inspect the information you have retrieved from `InstalledPackage` and set `activateRSS` to the desired value.

To uninstall a package, deploy this `destructiveChanges.xml` manifest file in addition to the `package.xml` file.

```
<?xml version="1.0" encoding="UTF-8"?>
  <Package xmlns="http://soap.sforce.com/2006/04/metadata">
    <types>
      <members>MyNamespace</members>
```

```
    <name>InstalledPackage</name>
  </types>
</Package>
```

Retrieving an `InstalledPackage`, using the `retrieve()` call creates an XML representation of the package installed in an organization. If the installed package has a password, the password isn't retrieved. Deploying the retrieved file in a different organization installs the package in that organization.

For more information on the `deploy()` and `retrieve()` commands, see the *Metadata API Developer's Guide*.

Resolving Apex Test Failures

Package installs or upgrades may fail for not passing Apex test coverage. However, some of these failures can be ignored. For example, a developer might write an Apex test that makes assumptions about a subscriber's data.

If you're a subscriber whose installation is failing due to an Apex test, contact the developer of the package for help.

If you're a developer and an install fails due to an Apex test failure, check for the following:

EDITIONS

Available in: **Developer** Edition

- Make sure that you are staging all necessary data required for your Apex test, instead of relying on subscriber data that exists.
- If a subscriber creates a validation rule, required field, or trigger on an object referenced by your package, your test might fail if it performs DML on this object. If this object is created only for testing purposes and never at runtime, and the creation fails due to these conflicts, you might be safe to ignore the error and continue the test. Otherwise, contact the customer and determine the impact.

Running Apex on Package Install/Upgrade

App developers can specify an Apex script to run automatically after a subscriber installs or upgrades a managed package. This makes it possible to customize the package install or upgrade, based on details of the subscriber's organization. For instance, you can use the script to populate custom settings, create sample data, send an email to the installer, notify an external system, or kick off a batch operation to populate a new field across a large set of data. For simplicity, you can only specify one post install script. It must be an Apex class that is a member of the package.

The post install script is invoked after tests have been run, and is subject to default governor limits. It runs as a special system user that represents your package, so all operations performed by the script appear to be done by your package. You can access this user by using UserInfo. You will only see this user at runtime, not while running tests.

If the script fails, the install/upgrade is aborted. Any errors in the script are emailed to the user specified in the **Notify on Apex Error** field of the package. If no user is specified, the install/upgrade details will be unavailable.

The post install script has the following additional properties.

- It can initiate batch, scheduled, and future jobs.
- It can't access Session IDs.
- It can only perform callouts using an async operation. The callout occurs after the script is run and the install is complete and committed.
- It can't call another Apex class in the package if that Apex class uses the `with sharing` keyword. This keyword can prevent the package from successfully installing. See the *Apex Developer Guide* to learn more.

Note: You can't run a post install script in a new trial organization provisioned using Trialforce. The script only runs when a subscriber installs your package in an existing organization.

How does a Post Install Script Work?
Example of a Post Install Script
Specifying a Post Install Script

How does a Post Install Script Work?

A post install script is an Apex class that implements the `InstallHandler` interface. This interface has a single method called `onInstall` that specifies the actions to be performed on installation.

```
global interface InstallHandler {
  void onInstall(InstallContext context)
}
```

The `onInstall` method takes a context object as its argument, which provides the following information.

- The org ID of the organization in which the installation takes place.
- The user ID of the user who initiated the installation.
- The version number of the previously installed package (specified using the `Version` class). This is always a three-part number, such as 1.2.0.
- Whether the installation is an upgrade.
- Whether the installation is a push.

The context argument is an object whose type is the `InstallContext` interface. This interface is automatically implemented by the system. The following definition of the `InstallContext` interface shows the methods you can call on the context argument.

```
global interface InstallContext {
  ID organizationId();
  ID installerId();
  Boolean isUpgrade();
  Boolean isPush();
  Version previousVersion();
}
```

Version Methods and Class

You can use the methods in the `System.Version` class to get the version of a managed package and to compare package versions. A package version is a number that identifies the set of components uploaded in a package. The version number has the format *`majorNumber.minorNumber.patchNumber`* (for example, 2.1.3). The major and minor numbers increase to a chosen value during every non-patch release. Major and minor number increases will always use a patch number of 0.

The following are instance methods for the `System.Version` class.

Method	Arguments	Return Type	Description
`compareTo`	System.Version *`version`*	Integer	Compares the current version with the specified version and returns one of the following values: • Zero if the current package version is equal to the specified package version • An Integer value greater than zero if the current package version is greater than the specified package version

Method	Arguments	Return Type	Description
			• An Integer value less than zero if the current package version is less than the specified package version If a two-part version is being compared to a three-part version, the patch number is ignored and the comparison is based only on the major and minor numbers.
`major`		Integer	Returns the major package version of the calling code.
`minor`		Integer	Returns the minor package version of the calling code.
`patch`		Integer	Returns the patch package version of the calling code or `null` if there is no patch version.

The `System` class contains two methods that you can use to specify conditional logic, so different package versions exhibit different behavior.

- `System.requestVersion`: Returns a two-part version that contains the major and minor version numbers of a package. Using this method, you can determine the version of an installed instance of your package from which the calling code is referencing your package. Based on the version that the calling code has, you can customize the behavior of your package code.
- `System.runAs(System.Version)`: Changes the current package version to the package version specified in the argument.

When a subscriber has installed multiple versions of your package and writes code that references Apex classes or triggers in your package, they must select the version they are referencing. You can execute different code paths in your package's Apex code based on the version setting of the calling Apex code making the reference. You can determine the calling code's package version setting by calling the `System.requestVersion` method in the package code.

Example of a Post Install Script

The following sample post install script performs these actions on package install/upgrade.

- If the previous version is null, that is, the package is being installed for the first time, the script:
  - Creates a new Account called "Newco" and verifies that it was created.
  - Creates a new instance of the custom object Survey, called "Client Satisfaction Survey".
  - Sends an email message to the subscriber confirming installation of the package.
- If the previous version is 1.0, the script creates a new instance of Survey called "Upgrading from Version 1.0".
- If the package is an upgrade, the script creates a new instance of Survey called "Sample Survey during Upgrade".
- If the upgrade is being pushed, the script creates a new instance of Survey called "Sample Survey during Push".

```
global class PostInstallClass implements InstallHandler {
  global void onInstall(InstallContext context) {
    if(context.previousVersion() == null) {
      Account a = new Account(name='Newco');
      insert(a);
```

```
    Survey__c obj = new Survey__c(name='Client Satisfaction Survey');
    insert obj;

    User u = [Select Id, Email from User where Id =:context.installerID()];
    String toAddress= u.Email;
    String[] toAddresses = new String[]{toAddress};
    Messaging.SingleEmailMessage mail =
      new Messaging.SingleEmailMessage();
    mail.setToAddresses(toAddresses);
    mail.setReplyTo('support@package.dev');
    mail.setSenderDisplayName('My Package Support');
    mail.setSubject('Package install successful');
    mail.setPlainTextBody('Thanks for installing the package.');
    Messaging.sendEmail(new Messaging.Email[] { mail });
    }
  else
    if(context.previousVersion().compareTo(new Version(1,0)) == 0) {
    Survey__c obj = new Survey__c(name='Upgrading from Version 1.0');
    insert(obj);
    }
  if(context.isUpgrade()) {
    Survey__c obj = new Survey__c(name='Sample Survey during Upgrade');
    insert obj;
    }
  if(context.isPush()) {
    Survey__c obj = new Survey__c(name='Sample Survey during Push');
    insert obj;
    }
  }
}
```

You can test a post install script using the new `testInstall` method of the `Test` class. This method takes the following arguments.

- A class that implements the `InstallHandler` interface.
- A `Version` object that specifies the version number of the existing package.
- An optional Boolean value that is `true` if the installation is a push. The default is `false`.

This sample shows how to test a post install script implemented in the `PostInstallClass` Apex class.

```
@isTest
static void testInstallScript() {
  PostInstallClass postinstall = new PostInstallClass();
    Test.testInstall(postinstall, null);
    Test.testInstall(postinstall, new Version(1,0), true);
    List<Account> a = [Select id, name from Account where name ='Newco'];
    System.assertEquals(a.size(), 1, 'Account not found');
  }
```

Specifying a Post Install Script

Once you have created and tested the post install script, you can specify it in the **Post Install Script** lookup field on the Package Detail page. In subsequent patch releases, you can change the contents of the script but not the Apex class.

The class selection is also available via the Metadata API as `Package.postInstallClass`. This is represented in package.xml as a `<postInstallClass>foo</postInstallClass>` element.

Running Apex on Package Uninstall

App developers can specify an Apex script to run automatically after a subscriber uninstalls a managed package. This makes it possible to perform cleanup and notification tasks based on details of the subscriber's organization. For simplicity, you can only specify one uninstall script. It must be an Apex class that is a member of the package.

The uninstall script is subject to default governor limits. It runs as a special system user that represents your package, so all operations performed by the script will appear to be done by your package. You can access this user by using UserInfo. You will only see this user at runtime, not while running tests.

If the script fails, the uninstall continues but none of the changes performed by the script are committed. Any errors in the script are emailed to the user specified in the **Notify on Apex Error** field of the package. If no user is specified, the uninstall details will be unavailable.

The uninstall script has the following restrictions. You can't use it to initiate batch, scheduled, and future jobs, to access Session IDs, or to perform callouts.

How does an Uninstall Script Work?

Example of an Uninstall Script

Specifying an Uninstall Script

How does an Uninstall Script Work?

An uninstall script is an Apex class that implements the `UninstallHandler` interface. This interface has a single method called `onUninstall` that specifies the actions to be performed on uninstall.

```
global interface UninstallHandler {
  void onUninstall(UninstallContext context)
}
```

The `onUninstall` method takes a context object as its argument, which provides the following information.

- The org ID of the organization in which the uninstall takes place.
- The user ID of the user who initiated the uninstall.

The context argument is an object whose type is the `UninstallContext` interface. This interface is automatically implemented by the system. The following definition of the `UninstallContext` interface shows the methods you can call on the context argument.

```
global interface UninstallContext {
  ID organizationId();
  ID uninstallerId();
}
```

Example of an Uninstall Script

The sample uninstall script below performs the following actions on package uninstall.

- Inserts an entry in the feed describing which user did the uninstall and in which organization

- Creates and sends an email message confirming the uninstall to that user

```
global class UninstallClass implements UninstallHandler {
  global void onUninstall(UninstallContext ctx) {
    FeedItem feedPost = new FeedItem();
    feedPost.parentId = ctx.uninstallerID();
    feedPost.body = 'Thank you for using our application!';
    insert feedPost;

    User u = [Select Id, Email from User where Id =:ctx.uninstallerID()];
    String toAddress= u.Email;
    String[] toAddresses = new String[] {toAddress};
    Messaging.SingleEmailMessage mail = new Messaging.SingleEmailMessage();
    mail.setToAddresses(toAddresses);
    mail.setReplyTo('support@package.dev');
    mail.setSenderDisplayName('My Package Support');
    mail.setSubject('Package uninstall successful');
    mail.setPlainTextBody('Thanks for uninstalling the package.');
    Messaging.sendEmail(new Messaging.Email[] { mail });
  }
}
```

You can test an uninstall script using the `testUninstall` method of the `Test` class. This method takes as its argument a class that implements the `UninstallHandler` interface.

This sample shows how to test an uninstall script implemented in the `UninstallClass` Apex class.

```
@isTest
static void testUninstallScript() {
  Id UninstallerId = UserInfo.getUserId();
  List<FeedItem> feedPostsBefore =
    [SELECT Id FROM FeedItem WHERE parentId=:UninstallerId AND CreatedDate=TODAY];
  Test.testUninstall(new UninstallClass());
  List<FeedItem> feedPostsAfter =
    [SELECT Id FROM FeedItem WHERE parentId=:UninstallerId AND CreatedDate=TODAY];
  System.assertEquals(feedPostsBefore.size() + 1, feedPostsAfter.size(),
    'Post to uninstaller failed.');
}
```

Specifying an Uninstall Script

Once you have created and tested the uninstall script and included it as a member of your package, you can specify it in the **Uninstall Script** lookup field on the Package Detail page. In subsequent patch releases, you can change the contents of the script but not the Apex class.

The class selection is also available via the Metadata API as `Package.uninstallClass`. This is represented in package.xml as an `<uninstallClass>foo</uninstallClass>` element.

Publishing Extensions to Managed Packages

An *extension* is any package, component, or set of components that adds to the functionality of a managed package. An extension requires that the base managed package is installed in the org. For example, if you have built a recruiting app, an extension to this app might include a component for performing background checks on candidates.

The community of developers, users, and visionaries building and publishing apps on AppExchange is part of what makes Salesforce Platform such a rich development platform. Use this community to build extensions to other apps and encourage them to build extensions to your apps.

When working with both first-generation (1GP) and second-generation (2GP) managed packages, only certain combinations of packages are supported.

Can I extend a first-generation managed package with a second-generation managed package?	Yes A second-generation managed package can depend on a first-generation managed package.
Can I extend a second-generation managed package with another second-generation managed package?	Yes
Can I extend a second-generation managed package with a first-generation managed package?	No A first-generation managed package can't depend on a second-generation managed package.
Can I extend a first-generation managed package with another first-generation managed package?	Yes

EDITIONS

Available in: Salesforce Classic (not available in all orgs)

Available in: **Group**, **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To create packages:
- Create AppExchange Packages

To upload packages:
- Upload AppExchange Packages

To publish extensions to a managed package:

1. Install the base package in the Salesforce org that you plan to use to upload the extension.
2. Build your extension components.

   Note: To build an extension, install the base package and include a dependency to that base package in your package. The extension attribute will automatically become active.

3. Create a new package and add your extension components. Salesforce automatically includes some related components.
4. Upload the new package that contains the extension components.
5. Proceed with the publishing process as usual. For information on creating a test drive or registering and publishing your app, go to Salesforce Partner Community.

Note: Packages can't be upgraded to Managed - Beta if they're used within the same org as an extension.

CHAPTER 6 Pass the AppExchange Security Review

In this chapter ...

- AppExchange Security Review
- How Does AppExchange Security Review Work?
- Partner Security Portal
- Test Your Entire Solution
- False Positives
- Security Review Resources

At Salesforce, nothing is more important than the trust of our customers. Trust requires security. To distribute a solution on AppExchange, it must pass our comprehensive security review. Learn how to prepare for and pass the security review.

AppExchange Security Review

Before you can publicly list your solution on AppExchange, the solution must pass a security review. The AppExchange security review tests the security posture of your solution, including how well it protects customer data.

The security review helps you identify security vulnerabilities that a hacker, malware, or other threat can exploit. Salesforce security review teams test your solution with threat-modeling profiles that are based on the most common web vulnerabilities. The teams attempt to penetrate the defenses programmed in your solution. Their goal is to extract or modify data that they don't have permission to access, just as security threats attempt to do.

Here is a small sampling of the common security threats that we test for.

- SOQL and SQL injection
- Cross-site scripting
- Nonsecure authentication and access control protocols
- Vulnerabilities specific to the Salesforce platform, such as record-sharing violations

For more information about the most critical web application security risks, read the Open Web Application Security Project (OWASP) Top Ten awareness document. OWASP is a nonprofit foundation that works to improve the security of software.

The scope of cyberthreats is large, and Salesforce upholds high security standards for solutions distributed on AppExchange. The review process is rigorous. Don't get discouraged if your AppExchange submission isn't approved the first time, or if it requires multiple code changes. Many solutions don't pass security review the first time they're submitted.

We give you a report documenting the security vulnerabilities found during the review. We're also available to meet with you and help you address vulnerabilities. Address the issues in the report, then submit the revised solution for a follow-up review. We offer multiple reviews for each submission, which enables you to fine-tune the security of your solution.

Important: To ensure that upgraded solutions safeguard against the latest security vulnerabilities, Salesforce reserves the right to conduct periodic re-reviews of solutions distributed on AppExchange.

View the security review process as enforcement mechanisms paired with personalized advice and tools. You have access to office hours where you can directly connect with a security review team member to get guidance catered to your solution. And, the security review team points you to security-scanning tools that help automate the process of vetting the security of your solution.

SEE ALSO:

Open Web Application Security Project (OWASP) Top Ten

How Does AppExchange Security Review Work?

Before initiating an AppExchange security review, you perform your own testing and gather supporting materials that help us assess the security of your solution. During a review, our Product Security team attempts to identify security vulnerabilities in your solution. If the team identifies vulnerabilities, you have access to personalized technical guidance to help you address the identified vulnerabilities.

Important: Every version of your managed package that you plan to list publicly on AppExchange must go through a security review. The review for a new version of a package that passed a security review is automated, and typically only takes a few minutes.

Ensure That You're Ready to Start

Knowing when you're ready for a security review is as important as how it works. You're ready to submit a solution for security review after you:

- Confirm with a partner recruitment representative that your solution is enrolled in the AppExchange Partner Program, and that you have a distribution agreement.
- Secure your solution according to industry best security standards.
- Certify that your solution is Lightning Ready. All new solutions submitted for security review must be Lightning Ready.
- In the Salesforce Partner Community Publishing Console:
  - Connect your packaging organization to AppExchange.
  - Create a provider profile.
  - Create a solution listing.
  - Submit a business plan for review, and receive Salesforce approval.

Test Your Solution

Run automated scanning tools and manually test your solution throughout the solution development lifecycle. Security scanning tools provide only first-pass, though useful, insights into solution vulnerabilities. To find vulnerabilities that automated scanning tools don't detect, also manually test your solution.

Tip: We strongly recommend that you test your code throughout the development lifecycle. If you defer testing and remediation, you're likely to encounter a larger accumulation of issues and greatly delay your time to market.

After you finish developing your solution, perform another round of manual testing and run the automated scanning tools that Product Security requires. The type of scans that you're required to run depends on the architecture of your solution.

On the Partner Security Portal, you can access the Source Code Scanner, which is also referred to as the Checkmarx scanner, and the Chimera scanner. These two scanning tools meet the test requirements for many AppExchange solutions.

Before you submit your solution for review, address all security issues that you find with your manual testing and the scanning tools. Either fix the code or document how flagged issues are false positives. A false positive is an issue that appears to pose a security risk but does not.

Test your solution before you submit it and you're much more likely to pass the review the first time. Applicants who don't test beforehand rarely pass and must resubmit after addressing security vulnerabilities identified during a review. Resubmitting significantly delays the solution publishing process.

Gather the Required Materials for Security Review Submission

Assemble the materials that enable Product Security to perform a thorough manual review. For most submissions, you're required to provide a Developer Edition org with the version of the solution that you intend to distribute installed and solution documentation. The security review team uses the Developer Edition org as the solution test environment. The org and documentation aren't required for Marketing Cloud apps. Other required materials vary by solution type.

Tip: You're likely to have questions as you prepare for security review and at other points during or after a security review. To discuss your concerns and get answers to your questions, visit the Partner Security Portal and schedule an office hours appointment. For help with submitting your solution for review, schedule an appointment with the Security Review Operations team. To troubleshoot issues in your solution that were identified during a review, make an appointment with the Product Security team.

Submit Your Solution for Review

After you complete testing and gather the materials required for your submission, you're ready to submit your solution for an AppExchange security review. Use the security review submission interface to share your solution and required materials, and to pay the security review and annual AppExchange listing fees. If you plan to distribute your solution for free, you don't pay the fees.

After you submit everything, expect these turnaround times.

Security Review Stage	Typical Time Frame
Security Review Operations verifies that your submission is ready to review. A submission is ready to review if it includes everything required to test the security of your solution.	1–2 days
Product Security tests your solution for the first time.	4–6 weeks
Product Security tests a resubmission of a package that wasn't approved previously and that shows progress in fixing security vulnerabilities.	2–3 weeks

Follow Up on the Security Review Report

When the security review is complete, you receive a report informing you that your submission is approved or not approved for public listing on AppExchange.

- **Approved**: You can publicly list your solution on AppExchange and distribute it to customers immediately.
- **Not Approved**: The security review team detected security issues in your solution. You can't list your solution on AppExchange or distribute it to customers.

If your solution isn't approved, the report includes information about the types of security issues that we detected. Keep in mind that the security review is a black-box, time-limited process. We can't list every instance of a security issue, and we may not initially detect all issue types. Interpret the security review findings as representative examples of the types of issues you must fix. Then diligently find and fix all instances of each issue across your entire solution.

Address all detected security issues. Rerun the required automated scanning tools to generate reports for your revised solution. Then resubmit your revised solution with the updated scan reports.

SEE ALSO:

- Connect a Packaging Org to the Publishing Console
- Create or Edit Your Provider Profile
- Create or Edit Your AppExchange Listing
- Add a Business Plan to an AppExchange Listing
- Partner Security Portal
- Partner Security Portal site
- Lightning Ready for AppExchange Partners (ISV)

Partner Security Portal

The Partner Security Portal is the main hub for your security review needs. The portal hosts the Source Code Scanner (Checkmarx) and Chimera automated security scanning tools. Use these tools to identify security vulnerabilities in your solution. The portal is also where you go to schedule office hours appointments with AppExchange security engineers and Security Review Operations team members. Office hours provide a forum for you to ask questions about the security review process and to discuss how to rework code that has security vulnerabilities.

Set Up Your Partner Security Portal Login
: Connect your packaging org to your Partner Community account on the Organizations tab of the Salesforce Partner Community publishing console. Then log in to the Partner Security Portal using that org's credentials. Logged in users can access security scanning tools and schedule office hours appointments.

Security Scanners on the Portal
: To identify security vulnerabilities, we require that you run security scanning tools on your solution and all external endpoints that run independently of the Salesforce platform. The Partner Security Portal hosts two of the scanners that we recommend, the Source Code Scanner (Checkmarx) and Chimera.

Office Hours Appointments on the Portal
: Salesforce security review teams host office hours for AppExchange partners. During office hours, you have direct, scheduled, web conference access to security review team members. Get answers about the submission process from Security Review Operations or troubleshoot security vulnerabilities with Product Security.

Set Up Your Partner Security Portal Login

Connect your packaging org to your Partner Community account on the Organizations tab of the Salesforce Partner Community publishing console. Then log in to the Partner Security Portal using that org's credentials. Logged in users can access security scanning tools and schedule office hours appointments.

Note: Before you set up your Partner Security Portal login, ensure that the packaging org that hosts your development work is a Salesforce Developer Edition org.

1. Log in to the Salesforce Partner Community.
2. Click **Publishing**.

USER PERMISSIONS

To access Source Code Scanner (Checkmarx) on the Partner Security Portal:

- Author Apex

3. Click **Organizations**.
4. Click **Connect Org**.
5. Enter the credentials that you use for your packaging org, and then log in.
6. Go to the Partner Security Portal.
7. Click **Login**.

Security Scanners on the Portal

To identify security vulnerabilities, we require that you run security scanning tools on your solution and all external endpoints that run independently of the Salesforce platform. The Partner Security Portal hosts two of the scanners that we recommend, the Source Code Scanner (Checkmarx) and Chimera.

Tip: We strongly recommend that you run security scans on your code and any connected endpoints throughout the development lifecycle. Run periodic scans and fix flagged issues as you go to prevent security vulnerabilities from piling up and creating more work for you later.

USER PERMISSIONS

To access Source Code Scanner (Checkmarx) on the Partner Security Portal:
- Author Apex

The Partner Security Portal provides access to two Salesforce-supported scanners: the Source Code Scanner, also referred to as the Checkmarx scanner, and the Chimera scanner service.

The Source Code Scanner (Checkmarx) checks Apex, Visualforce, and Lightning code, but doesn't check external endpoints of a solution.

Chimera checks external endpoints, but requires you to upload a token to the root of the external server. If your solution connects to endpoints on domains that you own, you can use Chimera. If your solution connects to endpoints on domains that you don't own, you can't upload the token and can't use Chimera. Use an alternative tool. For example, download the free OWASP Zed Attack Proxy (ZAP) scanner or purchase a license for Burp Suite.

Just before you submit your solution, except for mobile clients and API solutions, run the Source Code Scanner in the Partner Security Portal. If your solution connects to any non-Salesforce domains, also run Chimera, OWASP ZAP, or Burp Suite on the external endpoints. Include reports from your scans when you submit your solution for security review.

Security Scanner	Scan Targets	Considerations
Source Code Scanner (Checkmarx)	Apex, Visualforce, and Lightning code	• This static scanning tool uses Checkmarx security technology. • Mandatory for any security review submission that includes a Salesforce package or component. Not required for mobile clients or API solutions. • You're provisioned three Source Code Scanner (Checkmarx) runs per solution version with the security review fee. Consider running an alternative tool as you develop, such as the open-source PMD Source Code Analyzer, and the Source Code Scanner as you finalize your submission. • If you want the flexibility and freedom to scan unpackaged code, or bypass scan limits and package linking requirements, purchase a license from Checkmarx.
Chimera	External endpoints on domains that you own	• Checks for security vulnerabilities in external endpoints of a solution. • Scans solutions from a Salesforce IP address. • Doesn't require a download.

Security Scanner	Scan Targets	Considerations
		• Isn't usable with endpoints on domains that you don't own because it requires upload of a token to the root of the external server. • If your solution connects to external endpoints that you don't own, use OWASP ZAP or Burp Suite instead of Chimera.

SEE ALSO:

Test Your Entire Solution

OWASP Zed Attack Proxy (ZAP)

Burp Suite

Office Hours Appointments on the Portal

Salesforce security review teams host office hours for AppExchange partners. During office hours, you have direct, scheduled, web conference access to security review team members. Get answers about the submission process from Security Review Operations or troubleshoot security vulnerabilities with Product Security.

Note: To schedule an office hours appointment, visit the Partner Security Portal. Need a portal login? Follow the instructions in Set Up Your Partner Security Portal Login.

Operations Office Hours

During operations office hours, Security Review Operations team members answer questions about security review logistics and submission requirements. Typical questions include:

- What components of the solution are in scope for the security review?
- What type of reports and scan results am I required to provide?
- What are the fees for posting a paid solution on AppExchange?
- What is the status of my security review?
- When do I receive the results for my submission?
- What happens if the solution that I submit doesn't pass the review?

Technical Office Hours

Technical office hours are available when you need specific security-related technical assistance from the Product Security team. Typical questions include:

- How do I navigate the AppExchange security requirements?
- What is a secure way to design and implement a specific aspect of my solution?
- How do I address issues that the automated security scanning tools detect?
- What does a finding in my security review report mean?
- What security scan results can I regard as false positives?
- How do I resolve the issues in my security review report that I think are false positives?
- Does my reworking of the code fix the security vulnerabilities identified in the security review?

Test Your Entire Solution

Test the full scope of your solution using manual testing and automated security scanner tools. When you perform security scans, include all external endpoints that run independently of the Salesforce platform. Document false positive security violations and fix all code that doesn't meet Salesforce security guidelines.

Testing Scope

Test all pieces of the solution that you submit for security review. Ensure that the solution architecture is secure, including endpoints that aren't hosted on the Salesforce platform. Your attention to all components and layers of your solution helps minimize the risk of hackers or malware exploiting potential entry points.

The full scope of your solution is subject to security review testing. For example, we can perform penetration tests that attack your Development Edition test org and attempt to access sensitive data or authenticate with false credentials.

To determine testing scope, use a follow-the-data approach. Wherever the customer or data goes is in scope. For example, your Salesforce customer is required to log in to your company website, or data is synced to a third-party server. Test these pieces to ensure that they're securely transferring credentials and data.

When either of the following criteria is true, external endpoints are within the scope of the security review and a required part of your security testing.

- The endpoint plays a role in authenticating the end user as part of buying, getting support for, or using your solution. This definition includes a connected app that doesn't require manual credential entry.
- Salesforce data is transferred to or from the endpoint.

Important: Before you perform security testing on external endpoints that you don't own, complete two actions. First, obtain any necessary permission to perform security testing from the third parties that own the external endpoints. Second, follow the guidelines in Salesforce IP Addresses & Domains to Allow.

Automated Scanning Tools

To identify security vulnerabilities in your solution and external endpoints, we require that you run specific automated security scanning tools.

Tip: We strongly recommend that you run security scans on your code and any connected endpoints throughout the development lifecycle. Run periodic scans and fix flagged issues as you go to prevent security vulnerabilities from piling up and creating more work for you later.

On the Partner Security Portal, you can access two Salesforce-supported security scanners: the Source Code Scanner, also referred to as the Checkmarx scanner, and the Chimera scanner. You can, and sometimes are required to, use scanners that aren't on the Partner Security Portal.

This table summarizes the automated security scanner tools that we require or recommend.

Security Scanner Tool	Scan Targets	Considerations	Results Accepted with Submission	Hosted on the Partner Security Portal
Source Code Scanner (Checkmarx)	Apex, Visualforce, and Lightning code	• This static scanning tool uses Checkmarx security technology.	Yes	Yes

Security Scanner Tool	Scan Targets	Considerations	Results Accepted with Submission	Hosted on the Partner Security Portal
		• You must provide a Checkmarx scan for any security review submission that includes a Salesforce package or component. These scans aren't required for mobile clients or API solutions. • You're provisioned three Source Code Scanner runs per solution version with the security review fee. • If you want the flexibility and freedom to scan unpackaged code, or bypass the three scan limit and package linking requirements, purchase a license from Checkmarx.		
PMD Source Code Analyzer	Apex code	• The PMD scanner is a free, open-source tool. • This tool is an alternative to the Source Code Scanner for solutions that contain Apex code. • As you prepare your solution for security review, and as a supplement to the Source Code scanner, run PMD scans an unlimited number of times. • PMD typically reports more false positives than Source Code Scanner tool.	No	No
Salesforce Code Analyzer Plug-In	Apex, JavaScript, Lightning, TypeScript, and Visualforce code	• The Salesforce Code Analyzer plug-in unifies multiple static scanning tools, ESLint, JavaScript, PMD, and Retire JS, into one easy-to-install Salesforce CLI plug-in. • You can install the Salesforce Code Analyzer plug-in on a local development machine or integrate it into a continuous integration (CI) process. • It includes customized rules to scan Lightning Web Component Javascript. • It doesn't scan external endpoints. • The Salesforce Code Analyzer plug-in offers multiple output formats: csv, html, json, and junit.	No	No
Chimera	External endpoints on domains that you own	• Chimera checks external endpoints of a solution. • Chimera scans solutions from a Salesforce IP address. • This scanner doesn't require a download. • You can use Chimera with endpoints on domains that you don't own because it requires upload of a token to the root of the external server. • If your solution connects to external endpoints that you don't own, use OWASP ZAP or Burp Suite.	Yes	Yes

Security Scanner Tool	Scan Targets	Considerations	Results Accepted with Submission	Hosted on the Partner Security Portal
OWASP Zed Attack Proxy (ZAP)	External endpoints	• The ZAP Scanner is a free, community-driven proxy for web app security testing. • Zap requires a download. • Setting Up ZAP for Browser provides guidance for initiating security scans with this tool.	Yes	No
Burp Suite	External endpoints	• Salesforce doesn't provision Burp Suite licenses for security review. Purchase a license independently. • Burp Suite requires a download.	Yes	No

SEE ALSO:

Security Scanners on the Portal

False Positives

PMD Source Code Analyzer Project Apex Rules

OWASP Zed Attack Proxy (ZAP)

Burp Suite

False Positives

As you navigate the AppExchange security review process, you're likely to encounter *false positive* issues with your solution. A false positive occurs when a security-scanning tool or code reviewer flags code that appears to pose a security vulnerability but actually doesn't. Instead, the flagged vulnerability is nonexistent, nonexploitable, or not required to support a valid use case or functionality.

Improve your likelihood of passing an initial or follow-up security review by addressing false positives in your submission. Include a document that explains why each flagged false positive doesn't pose a security risk.

Document Your Responses to False Positives

Most often, false positives appear in Source Code Scanner (Checkmarx), Chimera, ZAP, or Burp Suite scanner results. False positives occasionally show up in Salesforce security review failure reports. In either case, you can improve your likelihood of passing security review by including a false-positive explanatory document when you submit your code.

Example Responses to False Positives in Checkmarx Scan Results

The following example shows how to document your responses to false positives resulting from a Checkmarx scan. The example is in tabular format, but you can use whatever format suits the reporting of your information.

Example Responses to False Positives in a Security Review Failure Report

The following example shows how to document your responses to false positives listed in a Salesforce security review failure report. It's written to support a retest submission.

Document Your Responses to False Positives

Most often, false positives appear in Source Code Scanner (Checkmarx), Chimera, ZAP, or Burp Suite scanner results. False positives occasionally show up in Salesforce security review failure reports. In either case, you can improve your likelihood of passing security review by including a false-positive explanatory document when you submit your code.

You can use any format to document a false-positive response. For each flagged issue, include:

- Location—State the code location of the reported vulnerability.
- Explanation—Explain why the flagged code doesn't pose a vulnerability.

In addition to providing rationales for false positives, include in your documentation explanations that clarify special use cases, circumstances, or exceptions.

Some categories of security scan results are false positives that don't require documentation or code reworking. These categories exist in most of the security scanners that we accept for security review. Other scan results fall into severity categories that require attention because they highlight known security vulnerabilities. If you can't submit justifiable false positive documentation, rework the flagged code to meet security standards.

Scanner	Scan Results Requiring Attention for Security Review	Scan Results Not Requiring Attention
Source Code Scanner (Checkmarx)	All issues regardless of severity level that aren't labeled "Code Quality"	Issues labeled "Code Quality"
ZAP and Burp Suite	Issues categorized as high severity	Action on low and medium severity issues isn't required, but investigation into whether they pose a security threat is encouraged.
Chimera	All issues regardless of severity level that aren't labeled "Informational/Other"	Issues labeled "Informational/Other"

Example Responses to False Positives in Checkmarx Scan Results

The following example shows how to document your responses to false positives resulting from a Checkmarx scan. The example is in tabular format, but you can use whatever format suits the reporting of your information.

Reported Vulnerability	Location	Response
FLS Update	Paths 1–17	We implemented and called the AuthManager class to check these paths for us or throw an error. You can see that in `ControllerFile.cls` on lines 241, 245, and 249.
FLS Update	Paths 18–24	Have been fixed and are valid.
FLS Update	Paths 25, 26, and 30	Are against our custom object UsageLog__c and not intended for user consumption. They are never exposed to users directly.
FLS Update	Paths 27–29	Must update the Account.NumberRelatedIssues__c field to

Reported Vulnerability	Location	Response
		appropriately count the new object created, irrespective of user input.
Sharing Violation	BatchCleanData.cls	We minimized the functions that this class calls to only the minimum set that requires `without sharing`.
Sharing Violation	LightningController.cls	Changed declaration to `with sharing`.
Sharing Violation	GlobalIssueReporting.cls	Changed to use`inherited sharing` because we don't know which context our calling class requires.
Stored XSS	Issue.page file: paths 1–3	reportIssueList is a list of objectID + '' + integers. It poses no XSS risk.
Stored XSS	Issue.page file: path 4	Fixed by removing `escape="false"`.
Stored XSS	Issue.page	We sanitized usageLog in JavaScript using the Salesforce SecureFilters library.

Example Responses to False Positives in a Security Review Failure Report

The following example shows how to document your responses to false positives listed in a Salesforce security review failure report. It's written to support a retest submission.

Reported Vulnerability	Location	Response
Insecure Software Version	jQueries	Updated.
Insecure Software Version	moment.js	No user input flows into moment parsing. User input flows only to Salesforce Date fields.
Insecure Storage of Sensitive Data	UserConfig_c.object	The apiKey__c field is encrypted before setting with the encryption key, which is stored in a protected custom setting.
Insecure Storage of Sensitive Data	IssueInvite_c.object	The password__c field is a support-agent selected password to share resources publicly with the internet. It's not a user-owned secret.
Insecure Storage of Sensitive Data	APIManagement_c.object	We deprecated this custom setting, but it's impossible to delete custom setting definitions from managed packages.
Insecure Storage of Sensitive Data	AuthManager.cls	The credentials in comments are only example credentials. They do not authenticate to any development or production system.

Reported Vulnerability	Location	Response
Stored XSS	https://content.saslesforce.partner.com	We spoke to Jane Doe at Salesforce during office hours on Feb. 1, 2020. This URL is linked to a nonsensitive content domain. The URL has no session data to access back-end information. We were told that this finding could be a false positive.

Security Review Resources

These resources can help you prepare for the AppExchange security review.

- AppExchange Security Review on page 107
- Security Review Requirements Checklist
- Prevent Common Violations of Secure Coding Guidelines on page 20
- Secure Cloud Development Resources
- Secure Coding Guide
- Open Web Application Security Project (OWASP)
- OWASP Top 10 Issues
- OWASP Testing Guide
- OWASP Secure Coding Guide
- OWASP Secure Coding Practices Quick Reference

CHAPTER 7 Publish Your Solution on AppExchange

In this chapter ...

- What Is AppExchange?
- Business Plans for AppExchange Listings
- Submit a Due Diligence and Compliance Certification
- Publish on AppExchange
- How Does AppExchange Search Work?
- Email Notifications
- Collect AppExchange Leads
- Analytics Reports for Publishers
- Update the Package in Your AppExchange Listing
- AppExchange FAQ

You turned an idea into a solution and are ready to get it in front of customers. To publish your solution on AppExchange, use the AppExchange publishing console. The publishing console is where you create a listing for your solution, connect orgs, manage license settings, and view analytics for your published listings.

What Is AppExchange?

AppExchange is the Salesforce marketplace, offering thousands of solutions and services that extend Salesforce. If you're an ISV partner or consultant, AppExchange helps customers discover your solution or service. If you're a Salesforce admin or user, AppExchange helps you find tools and talent to unleash your company's productivity.

How Does AppExchange Work?

An AppExchange listing is your primary marketing tool for promoting your solution. In the listing, you can describe your solution, pricing, support, and other details so that customers can determine if your offering is right for them. You also have a chance to upload videos, white papers, and other content to help customers understand what you're delivering. Based on the information you provide, an AppExchange curator categorizes the listing into one or more business areas, like sales, marketing, or analytics.

After you create a provider profile and upload your solution package, you can create a listing. You can create only one listing per solution. This approach has several advantages. As the provider, it's easier to maintain and upgrade your offering over its lifecycle. Having one listing also helps you achieve a higher ranking, because the metrics that AppExchange uses to rank apps and components, like page views, aren't diluted across multiple listings. Customers benefit, too, because your offering is easier to find, all your reviews are in one place, and there aren't several similar listings to cause confusion.

Who Can Use AppExchange?

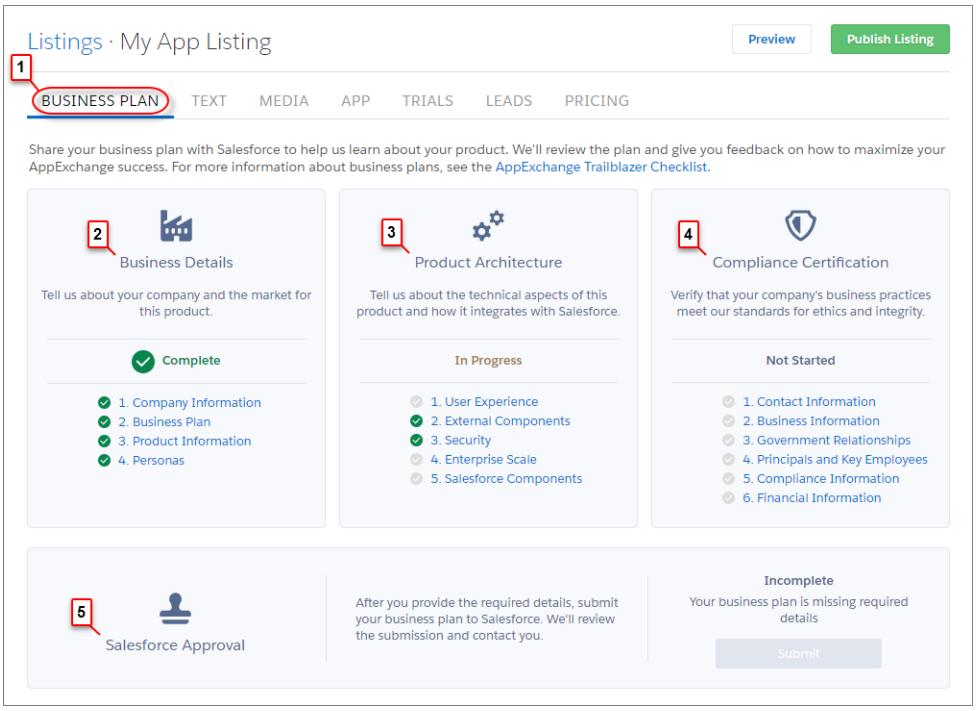
Anyone can browse listings and test-drive solutions. You need the "Download Packages" permission to install solutions in your org. To create a package and upload it to the Partner Community, you must have "Create Packages" and "Upload Packages" permissions. To create and publish a listing, you must have the "Manage Listings" permission.

Business Plans for AppExchange Listings

To publish a listing on AppExchange, we ask you to provide a business plan for your app, Lightning component, or other product. A business plan tells us about your company and the product you're building. It helps us verify that you meet our standards for ethics and integrity. Salesforce must approve your business plan before you can submit your product for security review. If you recently joined the AppExchange Partner Program, you can sign your partnership agreement after we approve your business plan.

You can create and manage the business plan for your listing on the Business Plan tab (1) in the AppExchange publishing console. A business plan has these sections.

Section	Purpose
Business Details (2)	Share information about your company, the market for your product, and its target users. We use this information to understand how your company fits into the Salesforce product ecosystem.
Product Architecture (3)	Share technical information about your product, such as how it stores credentials, passwords, and other sensitive data. We use this information to verify that your product follows Salesforce best practices for architecture and design.
Compliance Certification (4)	Share information about your company's business practices. We use this information to verify that you meet our standards for ethics and integrity. Note: We ask you to provide compliance information only for paid AppExchange listings.



After you finish your business plan, submit it for review. We contact you to discuss your partnership and then either approve the plan or return it to you with comments. If your plan is returned, you can resubmit it when you've addressed our comments. To check the status of your plan, go the Salesforce Approval section (5).

After your business plan is approved, we contact you with instructions for signing your partnership agreement. To check the status of the agreement, go to the AppExchange Partner Agreement section (6). If you're an existing partner, you've already signed an agreement, so this section doesn't display.

Submit a Due Diligence and Compliance Certification

If you're starting a Salesforce consulting practice, submit a Due Diligence and Compliance Certification on behalf of your company. In the certification, you share details about your company and its business practices and relationships. We review these details to ensure that your company meets our standards for ethics and integrity.

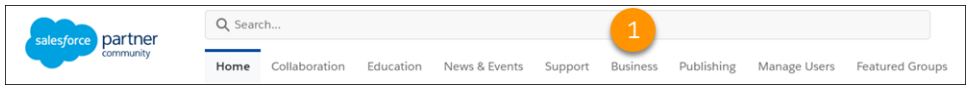
Tip: At many companies, filling out the certification is a team effort. To allow other people to edit your company's certification, assign the Manage Partnership permission.

USER PERMISSIONS

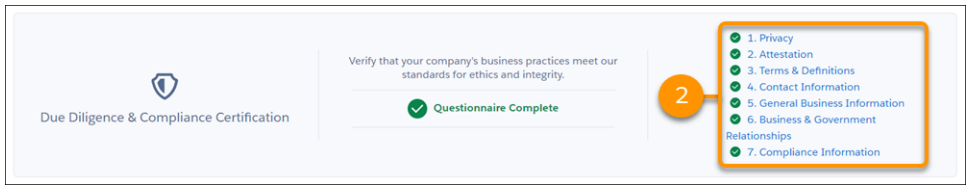
To edit the Due Diligence and Compliance Certification:

- Manage Partnership

1. Join the Salesforce Partner Community.
2. If prompted, click **Go to Certification**. Otherwise, click the **Business** tab (1).

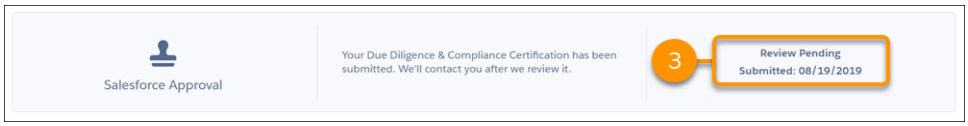


3. For Due Diligence & Compliance Certification, click a questionnaire section (2) to provide the related details.



4. After you've provided all the required information, submit your certification for review.

To check the status of the review (3), go to the Salesforce Approval section. If we approve your certification, you're a step closer to launching your Salesforce consulting practice. Approved practices get access to tools and features for consulting partners, such as the ability to log completed implementation projects.



Publish on AppExchange

Learn how to publish your solution or consulting service listing on AppExchange.

Connect a Packaging Org to the Publishing Console

To add a package to an AppExchange solution listing, first connect the packaging org associated with that package to the Publishing Console.

Create or Edit Your Provider Profile

A polished, accurate provider profile is a key part of establishing customer trust in your app, component, or consulting service. On your profile, you can share a mission statement and tell customers where you're located, how many employees you have, and so on. People browsing listings see this information on the Provider tab.

Create or Edit Your AppExchange Listing

Market your solution or consulting service by listing it on AppExchange. Create or edit a listing that stands out to customers.

Add a Business Plan to an AppExchange Listing

Before submitting your product for security review, add a business plan to your AppExchange listing. The business plan includes details about your company and its operations, your product architecture, and compliance information. To add a business plan, go to your product listing in the AppExchange publishing console.

Make Your AppExchange Listing Effective

A great app, component, or consulting service deserves a listing to match. We gathered feedback from customers and Salesforce marketing experts to provide a list of tips to make your listing stand out.

Select an Installation Option

The easier it is for people to install your solution, the more likely it is they become paying customers. Offer the option that gives your customers the best installation experience.

Register Your Package and Choose License Settings

If you register a package and set up the License Management App (LMA), you receive a license record each time a customer installs your app or component. Licenses let you track who is using your app or component and for how long.

Complete the Security Review Cycle

To distribute a solution on AppExchange, it must pass our comprehensive security review. Use the security review submission interface in the Salesforce Partner Community to manage your reviews. Submit your solution for an initial review. Resubmit a solution you revised to correct security issues detected in a previous review. Pay security review and AppExchange listing fees.

Connect a Packaging Org to the Publishing Console

To add a package to an AppExchange solution listing, first connect the packaging org associated with that package to the Publishing Console.

1. Log in to the Salesforce Partner Community.
2. Click the **Publishing** tab.
3. Click the **Organizations** tab.
4. Click **Connect Org**.
5. Enter the login credentials for the org that contains the package you want to list.
6. Click **Submit**.

If any packages are found in the connected org, they appear on the **Packages** tab of the Publishing Console. From the **Packages** tab, you can create a listing for your packaged solution, or submit the solution for security review.

Create or Edit Your Provider Profile

A polished, accurate provider profile is a key part of establishing customer trust in your app, component, or consulting service. On your profile, you can share a mission statement and tell customers where you're located, how many employees you have, and so on. People browsing listings see this information on the Provider tab.

To create or edit your profile, open the Publishing page in the Partner Community, and then go to the **Company Info** tab.

Create or Edit Your AppExchange Listing

Market your solution or consulting service by listing it on AppExchange. Create or edit a listing that stands out to customers.

Open the Publishing Console in the Salesforce Partner Community, and click the **Listings** tab. To create your listing, click **New Listing**. To edit your listing, find and open the listing.

Here are the tabs you navigate when creating or editing your listing.

Tab	What you do:	Available on these listings types:
Business Plan	• Add a business plan for your offering. • If you're a standard AppExchange partner, sign your Salesforce partnership agreement.	All solution types

Tab	What you do:	Available on these listings types:
Service Offering	• Choose listing categories, such as services offered and industry focus.	Consulting services
App, Component, Data Set, Flow, or Bolt	• Upload the package that contains your solution, or provide an installation link.	App, Component, Lightning Data, Salesforce Flow, or Lightning Bolt solutions, respectively
Security Review	• Submit a solution for security review. • Check the status of a review. • View a listing's review history.	All solution types
Text	• Describe your offering. • Provide contact information so that customers and Salesforce can get in touch.	All solution types and consulting services
Media	• Add branding. • Upload images, videos, and other resources to help customers understand your offering.	All solution types and consulting services
Trials	• Set up a test drive or free trial so that customers can see your offering in action.	All solution types
Leads	• Choose how Salesforce collects leads when customers interact with the listing.	All solution types
Pricing	• Choose whether your offering is free or paid and provide pricing information.	All solution types

Add a Business Plan to an AppExchange Listing

Before submitting your product for security review, add a business plan to your AppExchange listing. The business plan includes details about your company and its operations, your product architecture, and compliance information. To add a business plan, go to your product listing in the AppExchange publishing console.

If your listing is paid, provide pricing details before you add a business plan. Otherwise, you can't provide compliance information. If your listing is free, we don't collect compliance information.

USER PERMISSIONS

To edit AppExchange listings:
- Manage Listings

1. Log in to the Partner Community.
2. Click **Publishing**.
3. On the Listings tab, click a listing tile.
4. On the Business Plan tab, provide details about your company and product architecture.
5. If your listing is paid, provide compliance information.

Note: If you're an existing partner with another published paid listing, we already have your compliance information, so this section is marked as complete.

6. Click **Submit for Approval**.

After you submit your business plan, we contact you to discuss your partnership. You can check the plan's approval status on the Business Plan tab.

Make Your AppExchange Listing Effective

A great app, component, or consulting service deserves a listing to match. We gathered feedback from customers and Salesforce marketing experts to provide a list of tips to make your listing stand out.

Tell Customers, Then Show Them

An effective listing combines concise, customer-oriented writing with compelling visuals. As you craft your listing, keep the following tips in mind.

- **Emphasize a use case**—When customers read your listing, they want to understand the problem you're solving, whether they're part of the target audience, and what makes your offering different. As you explain your solution, put things in terms the customer cares about. For example, if your component helps support reps resolve cases 10% faster, say so.
- **Add screenshots, videos, and demos**—Customers are more likely to interact with listings that have visuals. Most people like to at least see how something works before making a purchase.
- **Make the listing easy to read**—Like you, the typical AppExchange customer is busy. Help customers understand what's important by making your listing easy to read. Keep sentences short and use formatting, like bullets, to draw attention to key points. If you've added screenshots or a video, use zooming and annotations to highlight features.

Aim for Clean and Simple Design

An effective listing tends to have a clean and simple design. When making design decisions, keep the following tips in mind.

- **Find a design reference**—Before you create a logo, banner, or other graphic, find a design that you like and think about what it does well. For example, does it use a visually pleasing font? Keep these ideas in mind as you begin designing.
- **Preview before publishing**—The AppExchange lets you preview your listing before publishing, and you can see exactly how your offering will appear to customers. Put yourself in the customer's shoes and ask, "If I saw this listing, would I feel comfortable buying this app or component?"

For more tips, see *Partner Logo and Branding Usage Guidelines* in the Education section of the Partner Community.

Select an Installation Option

The easier it is for people to install your solution, the more likely it is they become paying customers. Offer the option that gives your customers the best installation experience.

Option	When to choose this option:
`Directly from the AppExchange`	If your offering is packaged, this option provides the simplest installation experience. It allows people to install your offering into their Salesforce sandbox or production environment through the AppExchange installation sequence without assistance from you.

Option	When to choose this option:
	This option is required for components and recommended for apps.
`From your website`	If your app is a downloadable client or needs additional information to be installed, this option is the best. After users click **Get It Now** on your listing and agree to the terms and conditions, they are directed to your website to complete the installation process. Make sure that you've provided clear download instructions and performed the required setup or configuration.
`They should contact us to install it`	If your installation or selection process requires your assistance, you must choose this option. After agreeing to terms and conditions, the customer is told that you'll be in touch shortly to help with installation. Make sure that your company has the resources to assist potential customers.

Register Your Package and Choose License Settings

If you register a package and set up the License Management App (LMA), you receive a license record each time a customer installs your app or component. Licenses let you track who is using your app or component and for how long.

Note: Before you register a package, make sure that:

- Your app or component is in a managed package.
- You have installed the LMA. In most cases, the LMA is installed in your partner business organization.

1. Log in to the Partner Community.
2. On the Publishing page, click the **Packages** tab.
3. Click **Manage Licenses** next to the package that you want to register.
4. Click **Register**. Enter the login credentials for the organization where the LMA is installed. Usually, the organization is your partner business organization.
5. Select whether your default license is Free Trial or Active.
6. If you selected a free-trial license, enter the length of the trial, up to 90 days.
7. Enter the number of seats associated with your default license, or select **License is site-wide** to offer the license to all users in the installer's organization.
8. Click **Save**.

Complete the Security Review Cycle

To distribute a solution on AppExchange, it must pass our comprehensive security review. Use the security review submission interface in the Salesforce Partner Community to manage your reviews. Submit your solution for an initial review. Resubmit a solution you revised to correct security issues detected in a previous review. Pay security review and AppExchange listing fees.

Required Materials for Security Review Submission
Learn about the materials that you must provide, such as test environments and documentation, when submitting your solution for an AppExchange security review. Mobile apps have platform-specific submission requirements. Extension packages undergo security review and Salesforce requires the same materials for them as for a standalone solution.

Security Review and AppExchange Listing Fees
When you submit your solution for an initial security review, you pay security review and AppExchange listing fees. We waive the fees for solutions that are distributed for free on AppExchange. If we find security vulnerabilities in your solution, you can fix and resubmit it a limited number of times at no extra charge.

Update Your Payment Information
Update the payment information that's on file for your AppExchange listings from the Security Review tab of your listing.

Submit Your Solution for Security Review
Use the security review submission interface in the Salesforce Partner Community to submit your solution for review. Share your solution and all required materials, and pay applicable fees.

Check Security Review Progress and History
After you submit your solution for review, find key review information in the progress and history components on your listing's Security Review tab. Check the progress component for review status. Scan the history component for data on past and current reviews.

Act on Security Review Results
Approximately 4–6 weeks after you submit a solution for an initial review, your security review report arrives in your inbox. Check the report to learn if your solution is or isn't approved. Learn how to request a follow-up review for a solution that isn't approved and how to publicly list an approved solution.

Periodic Re-Reviews
We conduct periodic re-reviews for all solutions listed on AppExchange. Re-reviews ensure that solutions continue to safeguard against the latest security vulnerabilities.

Required Materials for Security Review Submission

Learn about the materials that you must provide, such as test environments and documentation, when submitting your solution for an AppExchange security review. Mobile apps have platform-specific submission requirements. Extension packages undergo security review and Salesforce requires the same materials for them as for a standalone solution.

During a security review, Product Security tests the required and optional parts of your solution. To determine testing scope, we typically use a follow-the-data approach. Wherever the customer goes, we go. For example, to use your solution, your Salesforce customer needs an account on your company website, or data is synced to a third-party server. Our review team tests these pieces to ensure that they're securely transferring Salesforce credentials and data.

Provide access to all environments, packages, and external components that your solution uses, including:

- External web applications or services.
- Client or mobile applications that are required or optional.
- All Apex and Visualforce that is included in your solution.

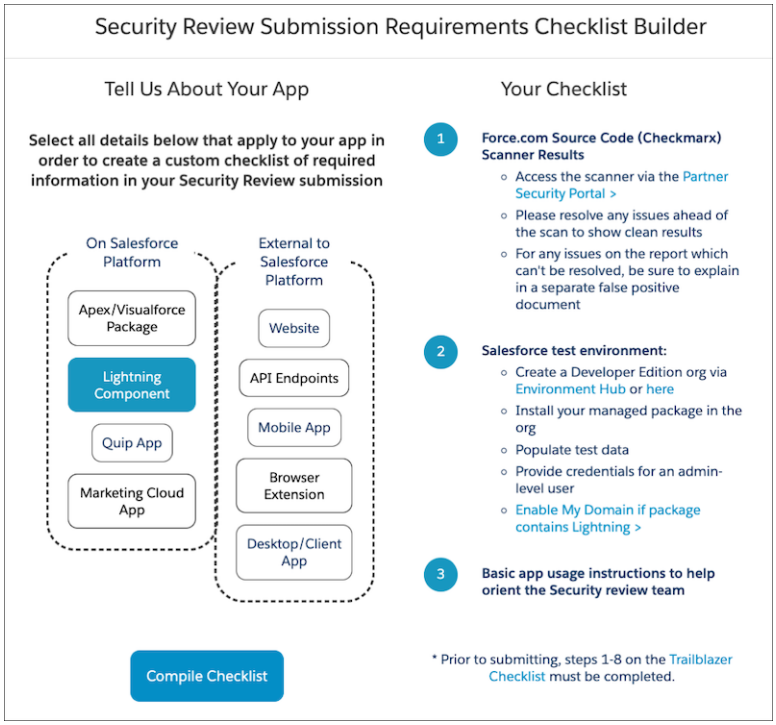
Note: Be sure that your submission is a Managed—Released package. We can't accept an unmanaged or beta package.

If you're not sure whether to include part of your solution, include it anyway. The review team doesn't test parts that are out of scope, but omitting a required part delays your review.

We like to see that you did your due diligence to ensure that your solution meets enterprise security standards. Include security scan reports along with explanations of any false positives that appear in your test results.

We also ask for detailed solution user documentation and your company's information security policies. We understand that providing extensive documentation isn't practicable for smaller or newer companies, so we factor in company size and maturity when reviewing submitted documents.

To generate a checklist that is customized to your solution, use the Security Review Submission Requirements Checklist Builder in the Salesforce Partner Community. Here's the checklist for a Lightning Component.



The following table summarizes what to submit based on the scope of your architecture.

Material for Submission	Salesforce Native Solution	Salesforce Native Solution with Lightning Components	Solution with External Web App or Service	Solution with a Mobile Client	API Only	Marketing Cloud App
Salesforce Developer Edition org	X	X	X	X	X	
Managed package installed a in Developer Edition org	X	X	X	X		
URLs and login credentials for external components requiring authentication			X	X	X	
Checkmarx report	X	X	X	X		
Zap or Chimera scan report			X	X	X	X
False positives documentation (if applicable)	X	X	X	X	X	X
Solution documentation	X	X	X	X	X	
Platform with installation link or file				X		
Credentials to Marketing Cloud environment						X

Mobile Apps

For mobile app testing, provision the app for all the platforms that you plan to distribute on. For iOS, we accept a test flight or an ad hoc deployment. For other platforms, we accept the app in a file, such as an Android Packaging (.apk) file.

Extension Packages

An extension package is a package that is an add-on to a solution or that integrates the functionality of two solutions. Before you can publicly list an extension package on AppExchange, it and the solutions it extends must pass security review.

If your extension package is an add-on to, or integrates with, base solutions that *have passed* the security review, submit only your extension package for review. However, if the base solutions *haven't passed* the security review, submit your extension package plus the unreviewed solutions.

The security review submission requirements for an extension package are the same as for a solution that has a similar architecture. For example, if you have an extension package with external callouts, attach separate web scan results for the packages with the callouts.

The Product Security team reviews the solution as a whole. Install a complete solution in the Development Edition org that you submit with your security review. Include your extension package. Also install all base and dependent packages for the solutions that your package extends or integrates. That's required whether the base solutions have already passed the security review or not.

It's important that the Salesforce security team reviews every extension package. Even small packages can introduce security vulnerabilities.

SEE ALSO:

- False Positives
- Security Review Requirements Checklist Builder

Security Review and AppExchange Listing Fees

When you submit your solution for an initial security review, you pay security review and AppExchange listing fees. We waive the fees for solutions that are distributed for free on AppExchange. If we find security vulnerabilities in your solution, you can fix and resubmit it a limited number of times at no extra charge.

Expect to pay a one-time, upfront total of $2,700 USD to initiate the security review process for most solutions. This payment includes a $2,550 security review fee and $150 first-year AppExchange listing fee. Also expect to pay the $150 AppExchange listing fee annually after the first year. The annual listing fee includes reviews for updates to solutions already listed on AppExchange.

Fees are refundable. Refund requests must be made within 180 days of payment.

If you have questions about security review or listing fees, contact your Partner Account Manager or log a support case in the Salesforce Partner Community. For product, specify **Partner Community & AppExchange**. For topic, specify, **Security Review**.

Here's a detailed breakdown of the fees.

Review Type	Security Review Fee	Annual Listing Fee
Initial review of a paid solution	$2,550 USD	• $150—first-year fee is added to the security review fee and due upon submission • $150 charged annually after the first year of listing
All reviews of free solutions	No charge	• No charge
Follow-up review of a paid solution resubmitted after addressing issues detected in a previous security review	No extra fee—a limited number of follow-up reviews are included in the security review fee paid at original submission of solution	• First-year listing fee paid at initial review submission • $150 fee charged annually after first year of listing
Periodic re-review of a previously approved, listed, paid solution	No extra fee—cost included in the security review fee paid at original submission of solution	• First-year listing fee paid at initial review submission

Review Type	Security Review Fee	Annual Listing Fee
		• $150 fee charged annually after first year of listing

When you submit your solution for an initial review, be prepared to pay the review and first-year listing fees. There are no fees for solutions that you distribute for free on AppExchange.

When you submit a solution for a follow-up or re-review, you're always prompted to confirm your credit card information. However, you're not always charged.

Often, the initial security review and annual listing fees include follow-up and periodic reviews. For example:

- **You resubmit a solution that fixes security issues discovered in an initial review.** Your resubmission exclusively fixes issues discovered in an initial security review, and you fix the code in the existing package. We conduct a follow-up review. If you make other revisions, such as functionality changes, we require that the revised solution go through an initial security review. That's also true if you spin up a new package for the revised code.
- **You list a new version of a package that we previously approved.**. You upload the new version to AppExchange and associate it with your listing. To identify security vulnerabilities, we run a source code scan. This scan is included in the annual listing fee.
- **You create a managed package to upgrade your offering.** You develop the new version in a package that we previously approved. The upgrade is automatically approved when you submit it for review. You can immediately associate the new version to your listing. We review the new version 6 months to 2 years after the solution is listed, depending on potential risk of the solution. The review is included in the initial security review fee.

Update Your Payment Information

Update the payment information that's on file for your AppExchange listings from the Security Review tab of your listing.

USER PERMISSIONS

To access the Salesforce Partner Community Publishing Console:
- Manage Listings

Note: Your listing must have an active subscription.

1. Log in to the Salesforce Partner Community.
2. Click the **Publishing** tab.
3. Open any listing that you submitted for security review.
4. Click the **Security Review** tab.
5. Click **Update Payment**.
6. Edit your payment information.
7. Click **Update**.

Submit Your Solution for Security Review

Use the security review submission interface in the Salesforce Partner Community to submit your solution for review. Share your solution and all required materials, and pay applicable fees.

USER PERMISSIONS

To access the Salesforce Partner Community Publishing Console:
- Manage Listings

Before you submit your solution for security review:

- Receive Salesforce approval of your business plan.
- Have a partner recruitment representative confirm that your solution is enrolled in the AppExchange Partner Program, and that you have a distribution agreement.

- Create your AppExchange solution listing in the Partner Community Publishing Console. If your solution includes a package, connect your packaging org to the Publishing Console and upload the package.
- Configure a Developer Edition test environment with your solution installed. We use the environment to test your solution.
- Certify that your solution is Lightning Ready. All new solutions submitted for security review must be Lightning Ready.

1. Log in to the Salesforce Partner Community.
2. Navigate to the Business Plan tab of your solution listing in the Publishing Console.
3. Verify that your business plan is approved.
4. If your plan is approved, click the solution-type tab. The tab name corresponds to the type of solution you're listing: App, Component, Flow, and so on.
5. Provide solution details.
6. If your solution includes a package, click **Select Package**, then find and select the managed package version that you plan to list. If you can't find the package to associate with your listing, check that the packaging org is connected to the Publishing Console.
7. Save your changes.
8. On the Security Review tab, click **Start Review**. You're guided through the options and settings that require your input, based on the solution type.
9. On the Payment page, select an option for Pricing. Your selection must match the selection on the listing's Pricing tab.
   a. If you plan to sell your solution on AppExchange, select **Paid** and enter payment information. Solutions that require payment later, such as free downloads, free installs, and pay-per-use are considered paid.
   b. If you plan to distribute your solution for free, select **Free**. We don't charge security review or annual listing fees for solutions that are distributed for free on AppExchange.
10. Click **Submit**.

If anything is missing from your submission, the security review team contacts you. When everything is in place, they send you an email confirming that your solution is queued for review. The initial security review of your solution lasts 4–6 weeks. You can expect to receive your report soon after the review is completed.

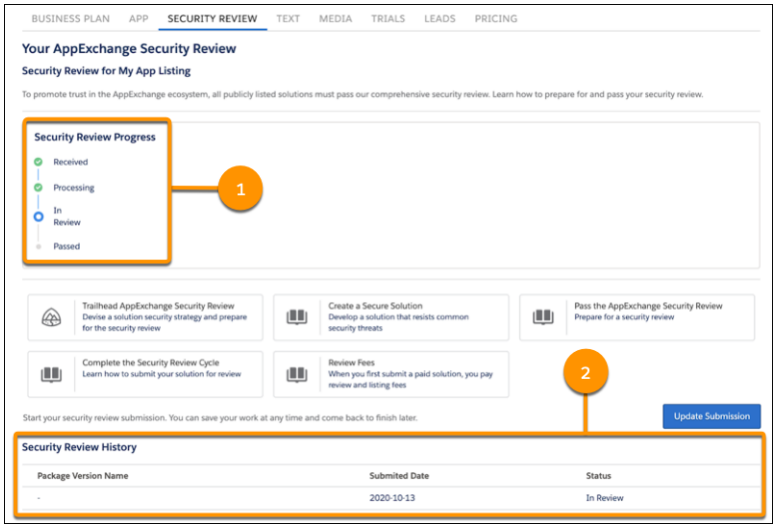
Tip: Schedule a technical office hours appointment right when you receive your confirmation email. Visit the Partner Security Portal and choose a date 4–6 weeks away. If your solution doesn't pass, you have an appointment booked.

Check Security Review Progress and History

After you submit your solution for review, find key review information in the progress and history components on your listing's Security Review tab. Check the progress component for review status. Scan the history component for data on past and current reviews.

The Security Review Progress component (1) gives you a quick look at the current review's status, tasks that require your attention, and requests from the Product Security team.

The Security Review History component (2) catalogs security review activity for a specific listing. For each submitted review, past and present, see the package version name, submission date, and status.



Status	Component	Description
Received	Progress and History	Security Review Operations received your submission.
Processing	Progress and History	Security Review Operations is verifying that your submission is ready to review. A submission is ready to review if it includes everything required to test the security of your solution.
In Review	Progress and History	The review is in progress.
Passed	Progress and History	Product Security completed the review, and your solution passed. You can publicly list and distribute your solution on AppExchange.
Expired	History	Either we received no response to re-review notifications and warnings, or the solution repeatedly failed re-review. To ensure that you receive re-review notifications, keep the contact information on your listing up to date. If you need more time to fix issues discovered in a re-review or to request a deadline extension, log a support case in the Salesforce Partner Community. For product, specify **Partner Community &**

Status	Component	Description
		AppExchange. For topic, specify **Security Review**.

SEE ALSO:

Required Materials for Security Review Submission

Act on Security Review Results

Approximately 4–6 weeks after you submit a solution for an initial review, your security review report arrives in your inbox. Check the report to learn if your solution is or isn't approved. Learn how to request a follow-up review for a solution that isn't approved and how to publicly list an approved solution.

Submit Your Solution for a Follow-Up Review

The security review of your solution is complete, but the Product Security team found security vulnerabilities. Your solution isn't approved for distribution on AppExchange. It's not the result you hoped for, but you're in good company. Most solutions don't pass on the first try. Fix the vulnerabilities, and submit your solution for a follow-up review.

List Your Solution on AppExchange

Your security review is complete and your solution passed. Congratulations! Publicly list and distribute your solution on AppExchange.

Submit Your Solution for a Follow-Up Review

The security review of your solution is complete, but the Product Security team found security vulnerabilities. Your solution isn't approved for distribution on AppExchange. It's not the result you hoped for, but you're in good company. Most solutions don't pass on the first try. Fix the vulnerabilities, and submit your solution for a follow-up review.

The security review report lists the types of security vulnerabilities that Product Security found. For each vulnerability type, the report includes:

- A specific example from your solution
- Steps to reproduce the issue
- Links to documentation or comments about how to fix the issue

Our goal is to find as many different types of vulnerabilities as possible, but keep in mind that the security review is a black-box, time-limited process. We can't always list every instance of a security vulnerability, and we might not initially detect all issue types. Interpret the security review findings as representative examples of the types of issues you must fix. Unless otherwise noted in the report, you're required to fix all classes of issues across the entire solution.

We're available to help you analyze the findings and troubleshoot security vulnerabilities. Schedule a technical office hours appointment on the Partner Security Portal.

As you revise your solution, fix only the security issues discovered in the review and the code in the existing package. If you make other revisions, such as functionality changes, we require that the revised solution go through an initial security review. That's also the case if you spin up a new package for the revised code.

Important: If the package ID and namespace don't change, your resubmission qualifies for a follow-up review.

After you fix the solution, collect the materials necessary for us to complete a follow-up review. Rerun the required scanner tools on your revised solution and generate updated scan reports. If you fixed issues in your managed package, provide updated Source Scanner

results. If you fixed issues detected on an external endpoint, provide updated ZAP or Chimera scan reports. If applicable, document your responses to false positives on page 116.

For more details about what to submit, see Required Materials for Security Review Submission on page 127.

The process to request a follow-up review depends on the scope of changes.

- **New Package Version**—You fixed code that runs on the Salesforce platform. Create and upload a new version of your managed package to your AppExchange listing. Then start a review for the new version. If you also made changes external to the package, include details with your submission.
- **External Code or API-Only Solution**—You changed only the code that runs externally to Salesforce. Edit your existing security review submission. Provide details about the changes. To alert Product Security that you're resubmitting your solution, log a support case in the Salesforce Partner Community. For product, specify **Partner Community & AppExchange**. For topic, specify **Security Review**. Include your package name, ID, and version in the comments.

Request a Follow-Up Review for a New Package Version

To fix security vulnerabilities discovered in a previous review, you changed code that runs on the Salesforce platform. Upload a new version of your managed package, associate it with your AppExchange listing, and request a follow-up review. If you also made changes external to the package, include details with your security review submission.

Request a Follow-Up Review for External Code or an API-Only Solution

To fix security issues discovered in a previous review, you changed only the code that runs externally to Salesforce or you changed an API-only solution. To request a follow-up review, edit your existing security review submission and log a case in the Salesforce Partner Community.

SEE ALSO:

Document Your Responses to False Positives

Required Materials for Security Review Submission

Request a Follow-Up Review for a New Package Version

To fix security vulnerabilities discovered in a previous review, you changed code that runs on the Salesforce platform. Upload a new version of your managed package, associate it with your AppExchange listing, and request a follow-up review. If you also made changes external to the package, include details with your security review submission.

USER PERMISSIONS

To access the Salesforce Partner Community Publishing Console:
- Manage Listings

1. Upload the new version of your managed package to the Publishing Console.
2. Log in to the Salesforce Partner Community.
3. Click the **Publishing** tab.
4. Click your solution's tile.
5. Click the solution-type tab. The tab name corresponds to the type of solution you're listing: App, Component, Flow, and so on.
6. Click **Select Package**, and find and select the new managed package version.
7. Update solution details as needed, and save your changes.
8. Click **Submitted**. You're guided through the options and settings that require your input. Update information as needed.
9. On the Payment page, if you're resubmitting a paid solution, review your stored payment information. A limited number of follow-up reviews are included in the security review fee paid with your initial submission. If you're within the limit, you aren't charged for the follow-up review. If you have questions about security review fees, contact your Partner Account Manager or log a support case in the Salesforce Partner Community.

10. Click **Submit**.
11. To finish resubmitting your solution, log a support case in the Salesforce Partner Community. For product, specify **Partner Community & AppExchange**. For topic, specify **Security Review**. Include your package name, ID, and version in the comments.

If anything is missing from your submission, the security review team contacts you. When everything is in place, we send you an email confirming that your solution is queued for review. A follow-up review lasts 2–3 weeks. You can expect to receive your report soon after the review is completed.

Request a Follow-Up Review for External Code or an API-Only Solution

To fix security issues discovered in a previous review, you changed only the code that runs externally to Salesforce or you changed an API-only solution. To request a follow-up review, edit your existing security review submission and log a case in the Salesforce Partner Community.

USER PERMISSIONS

To access the Salesforce Partner Community Publishing Console:
- Manage Listings

1. If your solution includes a package, upload the new version of your managed package to the Publishing Console.
2. Log in to the Salesforce Partner Community.
3. Click the **Publishing** tab.
4. To request a follow-up review for external code:
   a. Click the **Packages** tab.
   b. Find the solution version that you want to submit.
5. To request a follow-up review for an API-only solution:
   a. On the Listings tab, find and open your listing.
   b. Click the solution-type tab. The tab name corresponds to the type of solution you're listing: App, Component, Flow, and so on.
6. Click **Submitted**.
7. If you're prompted to continue, click **Next**. You're guided through the options and settings that require your input. Update information as needed.
8. On the payment page, if you're resubmitting a paid solution, review your stored payment information. A limited number of follow-up reviews are included in the security review fee paid with your initial submission. If you're within the limit, you aren't charged for the follow-up review. If you have questions about reviews limits and security review fees, contact your Partner Account Manager or log a support case in the Salesforce Partner Community.
9. Click **Submit**.
10. To finish resubmitting your solution, log a support case in the Salesforce Partner Community. For product, specify **Partner Community & AppExchange**. For topic, specify **Security Review**. Include your package name, ID, and version in the comments.

If anything is missing from your submission, the security review team contacts you. When everything is in place, we send you an email confirming that your solution is queued for review. A follow-up review lasts 2–3 weeks. You can expect to receive your report soon after the review is completed.

List Your Solution on AppExchange

Your security review is complete and your solution passed. Congratulations! Publicly list and distribute your solution on AppExchange.

USER PERMISSIONS

To access the Publishing Console:
- Manage Listings

1. Log in to the Salesforce Partner Community.
2. Click **Publishing**.

3. Click **Listings**.
4. Click your solution's tile and edit your listing as needed.
5. Click **Publish Listing**.
6. To confirm, click **Publish Listing** again.

Salesforce validates that your listing is ready to publish. For example, we check that you uploaded a tile image and that your solution passed the security review. After successful validation, your listing is published and visible to anyone visiting AppExchange.

SEE ALSO:

How to Build a Perfect AppExchange Listing

Create or Edit Your AppExchange Listing

Periodic Re-Reviews

We conduct periodic re-reviews for all solutions listed on AppExchange. Re-reviews ensure that solutions continue to safeguard against the latest security vulnerabilities.

When you upgrade a managed package version of a solution that passed security review, you don't have to go through the full review process again. Submit the upgrade for review and it's automatically approved. You can immediately associate the new version to your AppExchange listing.

The automated review isn't the only security review of your upgraded solution. 6 months to 2 years after the solution is listed, we review the new version. This periodic re-review includes automated and manual tests. The actual timing depends on the potential risk of the solution.

To determine which listed solutions are due for re-review, we run risk-factor reports. If your solution shows significant change, it's likely that we conduct a re-review. When the time comes, we contact you to make arrangements. We also reserve the right to conduct random security penetration tests on your solution throughout the year.

There's no additional cost for re-reviews. These reviews are included in the security review fee paid at original submission of your solution.

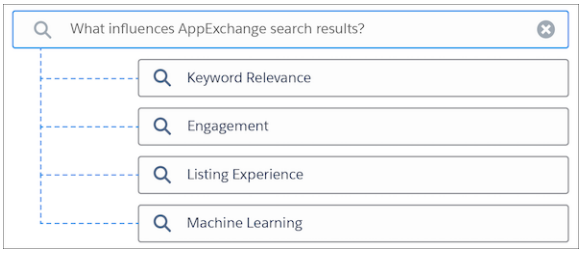
If we find that your solution no longer meets our enterprise security standards, we notify you and provide a timeline to remedy the issues. In extreme cases, we pull the AppExchange listing from public viewing. Before you can relist it for distribution, you must fix the security issues and submit it for a follow-up review.

How Does AppExchange Search Work?

Search is one of the most popular ways that Salesforce customers find solutions on AppExchange. Learn how keyword relevance, engagement, listing experience, and machine learning influence the search results that customers see. Then apply tips to help customers discover your listing when they search for a solution to a business problem.

What Influences AppExchange Search Results?

When someone searches AppExchange, four factors influence the results they see. Keyword relevance is the most important factor, followed by engagement, listing experience, and machine learning.



Keyword Relevance

Keyword relevance considers how closely customers' search terms align with text on your listing. The more that the search terms align with your listing text, the higher its keyword relevance. Title, tagline, and brief description text are weighted more heavily than other listing text.

Example

A customer visits AppExchange to find an app for administering surveys. Their search includes the words feedback and collection. AppExchange listings that include these words have a higher keyword relevance than listings that don't.

Engagement

Engagement is informed by your listing's popularity and considers customer activities like screenshot views, test drives, and installs. We measure these activities daily and in aggregate over the past 30 days. The more customer activities that occur on your listing, the higher its engagement.

Example

A customer visits AppExchange to find a document generation app. After performing a search, they visit two listings. The first listing has only a few low-resolution screenshots, so the customer leaves without interacting. The second listing has high-resolution screenshots, a video, and a free trial, and the customer interacts with each of them. In this scenario, the customer's behavior contributes to higher engagement for the second listing than the first.

Listing Experience

Listing experience considers other aspects of your listing that aren't included in keyword relevance and engagement factors. Some of these aspects relate to your Salesforce partnership, such as participation in the Pledge 1% program. Others relate to customers' experiences with your solution, such as the number and quality of reviews on your listing or when your solution was last updated.

Example

A Salesforce partner lists a new telephony app on AppExchange. To promote awareness and installs, the partner launches a marketing campaign. Then the partner sends follow-up emails to customers who installed the app. The email thanks customers for trying the app and asks them to share their feedback on AppExchange. The number of reviews grows and listing experience increases.

Machine Learning

Machine learning uses AI to improve the search experience on AppExchange. Like other search providers, we don't share details about our machine learning algorithm. But trust and customer success are central to the design of the algorithm. Trust means that the algorithm continuously tunes search results to ensure authenticity. Customer success means that the algorithm makes inferences about a customer's search intent and prioritizes the results that are most likely to drive positive outcomes.

Example

A customer visits AppExchange and searches for a solution called Appy's Maps. In the search results, a competing solution appears alongside Appy's Maps. This solution appears because some who searched for Appy's Maps eventually installed the competing solution. The machine learning algorithm considers this outcome positive and associates the competing solution with Appy's Maps.

How Can I Make My Listing Easy to Find When Customers Search AppExchange?

Here are some tips to help your listing stand out in the AppExchange search results.

Factor	Tips
Keyword Relevance	• Identify the business problems that your offering solves, then select keywords for your listing. When you incorporate keywords into your listing, focus on the title, tagline, and brief description. • Avoid keyword stuffing. If you pack your listing with too many or unrelated keywords, it's difficult for customers to understand the value it provides. Plus, it negatively affects the machine learning algorithms. • Review the keywords that drive your listing activity by using Marketplace Analytics visualizations. These visualizations help you determine the keywords that are associated with the highest number of tile, video, and demo views. To gauge engagement, regularly review your analytics and improve your offering.
Engagement	• Be sure that your listing features screenshots, graphic tiles, a video, and a demo. Engagement is enhanced when customers interact with your media, so focus on quality, not quantity. • Entice your customers to scroll through screenshots that describe your solution's benefits. Add a call to action or a visual aid that directs customers to watch your demo video. • Use your video to advertise your solution. • Use your demo video to provide an in-depth look at your solution's features.
Listing Experience	• Monitor the feedback that your solution receives. Respond to positive feedback with a thank you, and respond to negative feedback with helpful tips and solutions. AppExchange doesn't edit published reviews, but your customers can edit them based on their positive interactions with you. • Keep your listing fresh. When you upload a new package and release a new version, review your listing content. Make sure to describe your current features and use the best-fit keywords.

Factor	Tips
	• Keep up to date with Salesforce releases. Check that your solution works with our latest technology and update your listing accordingly.

Maintaining a strong search position is a marathon, not a sprint. All search factors work together, and can change over time. Periodically review your listing's keywords, content, and analytics so that they contribute to machine learning. Make updates to those factors that you control.

SEE ALSO:

Make Your AppExchange Listing Effective
Collect AppExchange Leads
How Do Customers Find My Listing?

Email Notifications

Installation Notification Emails

Salesforce emails your subscribers 30 days after they install your app or component. The email thanks subscribers and encourages them to share their experiences with others by writing a review. We only send emails when:

- The subscriber has a valid email address.
- The subscriber hasn't already received a notification.
- The subscriber hasn't yet posted a review.

Review Notification Emails

When subscribers post reviews and comments on your listings, Salesforce emails parties who are likely to be interested. The notification that subscribers receive depends on their role in the conversation (provider, author, or commenter).

Type of Email Notification	Sent to	Details
New Review on Your Listing	You, the provider	Sent whenever someone posts a review of your listing.
New Comment on Your Review	The review author	Sent only if someone other than the review author comments on the review and if the author has opted to receive email notifications on their profile. If the author replies to the notification, the reply is posted as a new comment on the review.
Also Commented on the Review	The people who commented on the review	Sent to people who have commented on a review, are not the review author or the author of this comment, and have opted to receive email notifications on their profiles. At most, one email notification is sent to each commenter for each new comment. If the person replies to the notification, the reply is posted as a new comment on the review.

Type of Email Notification	Sent to	Details
New Comment on the Review of Your Listing	You, the provider	Sent whenever someone writes a new comment on a review of your listing.

Collect AppExchange Leads

You can configure your AppExchange listings to collect leads and deliver them to your Salesforce org. Specific customer interactions, such as watching your listing's demo video, can trigger lead collection.

SEE ALSO:

What's the Difference Between Lead Events and Leads in Marketplace Analytics?

Generate Leads from Your Website for Your Sales Teams

AppExchange Leads

When you enable lead collection for your AppExchange listing and a customer interacts with the listing, AppExchange records a lead. If you enabled Web-to-Lead in your Salesforce org, AppExchange can also deliver the lead to that org. Some Web-to-Lead settings can prevent leads from being delivered to your org.

You can collect leads when a customer:

- Installs your solution
- Takes a test drive
- Watches a demo or video
- Signs up for a free trial
- Clicks **Learn More**

Before you enable lead collection on your listings:

- Configure Web-to-Lead in the org where you want to receive leads.
- Disable Require reCaptcha verification in the org's Web-to-Lead settings. If reCaptcha is enabled, no AppExchange leads are sent to the org.

Set up lead collection on a per-listing basis. For each listing, enable the customer interactions that trigger lead collection. For each interaction, also complete any required setup. For example, to collect leads when customers watch your demo, you must add a demo video to your listing.

When a customer interacts with your listing and lead collection is enabled for that interaction, they're prompted to fill out the AppExchange lead sign-up form. Info collected from the form, combined with customer activity data, is shared as a lead.

Note: You can't modify the lead form that customers are asked to fill out. To share ideas for improving the lead form, go to IdeaExchange.

Regardless of your listing's lead-collection settings, customers can still view your demo, take a test drive, click to learn more, and install your solution.

AppExchange Leads and License Activities

When you enable lead collection for your AppExchange listing and a customer interacts with your listing, AppExchange records a lead. License records are generated when a customer installs your solution.

AppExchange can generate leads when a customer takes the specific actions on the listing for which you chose to generate leads.

Leads can be generated when a customer:

- Installs your solution
- Takes a test drive
- Watches a demo or video
- Signs up for a free trial
- Clicks **Learn More**

By contrast, license records are generated only when a customer installs your solution. To receive licenses, you must also have the License Management Application (LMA) enabled in your partner business org.

Enable AppExchange Lead Collection

Collect leads when customers interact with your AppExchange listings.

Before you enable lead collection, verify that the Salesforce org that receives leads is ready.

- You must receive leads in a standard Salesforce org, not a Developer Edition org.
- The org where you receive leads must have Web-to-Lead enabled.
- Require reCaptcha Verification must be disabled in your Web-to-Lead settings.

USER PERMISSIONS

To edit AppExchange listings:

- Manage Listings

1. Log in to the Salesforce Partner Community.
2. Click the **Publishing** tab.
3. On the Listing tab, click a listing tile.
4. Click the **Leads** tab.
5. Enable **Collect leads when customers interact with this listing**.
6. Specify the Salesforce org where you want to receive the leads. We recommend using your partner business org so that you can manage leads and licenses from a single, convenient location.
7. Enable lead collection for one or more activities.
8. Save your changes.

AppExchange Lead Source Codes

Lead source codes provide information about how the lead was created and can help you determine how to proceed.

AppExchange lead source codes always use this format: `SFDC-XX|Listing Name` or `SFDC-dup-XX|Listing Name`. `XX` identifies the action that the user performed to generate the lead.

This table lists AppExchange actions and what they mean.

Action	Description
`IN`	The user clicked **Get It Now** on your listing and started the install process for your solution. This action includes agreeing to the terms and conditions and clicking the install button on the confirmation page. Note: Sometimes users don't complete the installation, or they uninstall your solution later. To track package installations, use the License Management App (LMA).
`DM`	The user clicked **View Demo** on your listing and watched some or all of your demo video.
`LM`	The user clicked **Learn More** on your listing. Note: Listings that previously had Learn More buttons now have Get It Now buttons and receive lead source codes with IN actions.
`TS`	The user clicked **Get It Now** on your listing and started a 30-day free trial of Salesforce and your solution. These users can be existing Salesforce customers.
`TD`	The user clicked **Test Drive** on your listing and tried your solution in a test org.

Package Installation Leads

Package installation is one example of a user activity that triggers lead creation. However, AppExchange isn't the only source of installation leads. The License Management App (LMA) also creates installation leads. Let's look at an example. A user purchases your solution and installs it via an installation URL. AppExchange isn't aware of the user's activity, so it doesn't create a lead. However, the installation triggers the LMA to create a lead. To know which application created the lead, check the lead source code.

Note: The source code for LMA leads is `Package Installation`.

Let's tweak our example to see how multiple installation leads can be created for the same package. First, a user clicks **Get It Now**, and starts but doesn't complete the installation. AppExchange creates a lead with source code `SFDC-IN|Simple Sample App`. Later, the same user purchases your solution and installs it via an installation URL. The LMA creates a second lead with source code `Package Installation`. Same user. Same package. On the surface, the leads appear to be duplicates, but the lead source codes show that they aren't.

Learn more about LMA leads in Lead and License Records in the LMA on page 308.

Duplicate Leads

A duplicate lead is a lead that AppExchange already sent to your org for this user, listing, or action within the past 180 days.

Duplicate lead source codes always contain the string `-dup-` and use the format `SFDC-dup-XX|Listing Name`. For example, `SFDC-dup-DM|Simple Sample App` indicates a duplicate lead from a user who clicked **View Demo** on the Simple Sample App listing.

Troubleshoot AppExchange Leads

You enabled lead collection for your AppExchange listing. However, the lead count in your org is different than you expect. Learn how lead routing rules, reCaptcha verification, and other settings determine which leads AppExchange sends to your Salesforce org.

Custom Lead Routing Rules

Typically, you set up custom lead routing rules to prevent duplicate or unwanted leads from reaching your sales team.

For example, an employee at your company watches your AppExchange listing's demo video. When prompted for contact information, they enter a company email address. AppExchange records this interaction as a lead. From a sales perspective, it's an unwanted lead.

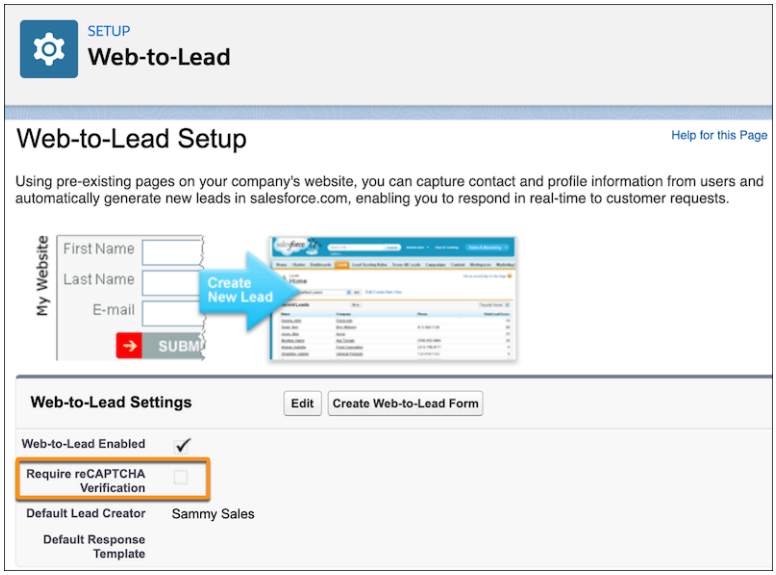
You create a routing rule that prevents leads from users with your company's email address from propagating to your Salesforce org.

Customer Contact Preferences

Customer can choose to share their contact info with, and allow contact from, AppExchange providers. AppExchange sends only leads to your Salesforce org for customers who allow provider contact.

Web-to-Lead reCaptcha

To receive AppExchange leads in your Salesforce org, disable Require reCaptcha Verification in your org's Web-to-Lead settings. If reCaptcha is enabled, AppExchange leads aren't sent to your org.

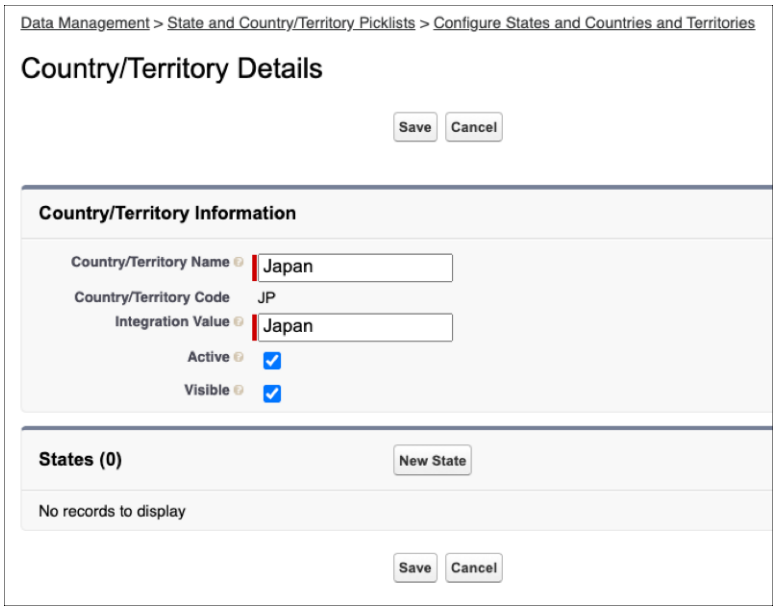


State and Country/Territory Picklists

AppExchange sends leads to your org via Web-to-Lead. Users provide contact info for the lead by completing the AppExchange Web-to-Lead form. They're required to select a country or territory from a picklist. The selected country or territory is saved as a text value. For example, a user selects Japan. The saved value is the full name of the country, Japan. The AppExchange lead is sent to your org with country set to Japan.

In orgs with state and country/territory picklists enabled, you optionally can populate these picklists with predefined, standard state and country lists that Salesforce provides. You can also edit country names and integration values, also know as developer names.

The Web-to-Lead form uses the integration values from the state and country/territory picklists. For AppExchange lead creation to succeed, the integration value for a country/territory in your org must match the value captured on the AppExchange Web-to-Lead form. In our example, they must both be Japan.



Changing country/territory names doesn't affect AppExchange lead creation, but changing integration values does. Don't change integration values. The country or territory sent in an AppExchange lead must match an integration value in your org. If there's no match, lead creation fails. The same issue occurs with state picklists.

To avoid state and country/territory picklist-related lead failures, you have two options. Use the standard picklist integration values, or add duplicate states and countries/territories to your picklists.

Use Standard Picklist Integration Values

To implement this option, use the Salesforce standard state and country/territory picklists in your org, and leave the integration values as-is. We recommend this option for most partners.

With this option, AppExchange leads propagate to your org with full state and country/territory names. The names match integration values in the standard picklists.

Add Duplicate States and Countries/Territories to Your Picklists

Implement this option if you require two-letter state or country/territory abbreviations in your org. For example, you show abbreviations in the user interface, or use them to integrate with other systems.

Add duplicate states and countries/territories to your picklists with different integration values. Set one value to the two-letter state or country/territory abbreviation. Set the other value to the full state or country/territory name. Make only the two-letter abbreviation picklist entries visible.

With this option, AppExchange leads propagate to your org with full state and country/territory names, which match the full name integration values in your org. You also have two-letter integration values to use as needed.

SEE ALSO:

Standard Countries for Address Picklists

List of States and Countries Available from Data.com

Integration Values for State and Country Picklists

Analytics Reports for Publishers

AppExchange analytics reports are powerful visual tools for understanding how your app, component, or consulting partner listing is performing. These reports provide metrics related to the web traffic, number of installations, and other user activities over time. By looking at the reports, you can quickly gain insights about the aspects of your listing that resonate with customers and which areas need refinement.

- To access a report for your listing, open the Publishing page in the Partner Community, and then click the **Analytics** tab.

Report Types

For app and component listings, the available reports are:

- Installs (Get It Now)
- Leads
- Resources & Promotions
- Test Drives, Demos & Screenshots
- Web Analytics

For a consulting partner listing, the available reports are:

- Leads
- Learn Mores, Videos & Screenshots
- Web Analytics

Report Attributes

All the reports share these common attributes.

Listing Name
The title of the listing shown at the top of every report.

Back to Publishing Home link
Returns you to the Publishing Home page.

Show Menu
Allows you to choose from one of the available reports. The reports are sorted alphabetically.

Date Range Menu
Allows you to choose the date range. Last 30 Days is selected by default.

Metrics

Report	Metrics
Installs (Get It Now)	Get it Now, Installs, Click-to-Install Ratio
Leads	Unique Leads, Duplicate Leads, Total Leads
Resources & Promotions	Case Studies, Data Sheets, Promotions, Customer Testimonials, Webinars, Customization Guides, Whitepapers
Test Drives, Demos & Screenshots	Test Drives, Demos, Screenshots

Report	Metrics
Learn Mores, Videos & Screenshots	Learn Mores, Videos, Screenshots
Web Analytics	Page Views, SEO Searches, Visits, Internal Searches, Unique Visitors

Line Graph

Shows one or more lines for each metric you've selected for display. Select the checkboxes beneath the graph for the metrics you want to see. By default, all metrics are included in the graph. The reports show metrics over time grouped by created date. When you click the graph, the date and selected metrics for that date display. Next to each metric, the number of items in the metric over the selected date range displays regardless of whether you have chosen to include the graph of that metric.

Table

Each report includes a table. The first column on all reports is the Date, and the rest of the columns correspond to the metrics associated with the report. The table shows 30 rows at a time. Click **Next** to see more data. By default, the table is sorted by date from oldest to newest. Change the sort order by clicking the column headers. Clicking the selected sort column a second time sorts the data in the opposite direction. The small triangle pointing up or down next to a column header indicates the sort direction and marks that column as the sort column.

Update the Package in Your AppExchange Listing

If you add features to a published solution, update your AppExchange listing so that new customers get access to the latest version. You can associate only an approved package version with your public listing. If your solution passed the security review within the last year, the new version is auto-approved. The package version must use the same namespace as the version that passed the review.

Note: We conduct periodic re-reviews of all solutions listed on AppExchange. If your solution shows significant change, we contact you to arrange a review of the new version.

1. Upload the new version of your package to the Publishing Console.
2. Log in to the Salesforce Partner Community.
3. Click the **Publishing** tab.
4. Click the **Packages** tab. If you developed the new package in the same org as the previous version, the new package displays automatically. If you developed the new package in a different org, first navigate to the Organizations tab and connect the org that contains the package.
5. Find the new package, and then click **Start Review**.
6. If you're prompted to continue, click **Next**. You're guided through the options and settings that require your input. Update information as needed.
7. Click **Submit**. If your solution passed the security review within the last year, the new version is auto-approved, and its status changes to Passed. The status change can take up to 24 hours.
8. After your package is approved, navigate to the Listings tab and select the listing that you want to edit.
9. Click the solution-type tab. The tab name corresponds to the type of solution that you're listing: App, Component, Flow, and so on.
10. Click **Select Package**, and then select the new package you want to associate with the listing.
11. Save your changes.

AppExchange FAQ

The following is a list of frequently asked questions about selling on the AppExchange.

- Can I add more industries?
- Do I need an APO to publish my app or component on the AppExchange?
- Can I change my company name?
- Can I create my app or component on a Salesforce sandbox and upload it to the AppExchange?
- Can I edit a review?
- Can I keep the same listing but change the package it provides?
- Can I Update My Solution with a New Version or Patch?
- How Do Customers Find My Listing?
- How do I edit a package after I've created a listing?
- How do I get an API token for my app?
- How do I increase my listing's popularity?
- How do I offer a free trial of my app or component?
- How do I see listings that Salesforce removed?
- How do I upgrade my customers to a new version?
- What's the difference between a free trial and test drive?
- Where can I share my ideas?
- Where can I write a review?

Can I add more industries?

No. To prevent abuse, you can only specify two industries for each listing. If you cover more industries, mention them in the full or brief description of your listing.

Do I need an APO to publish my app or component on the AppExchange?

No, you no longer need an AppExchange Publishing Organization (APO) to publish your app or component on the AppExchange. You can now connect the organization where you developed the app or component directly to the AppExchange publishing console. To connect an organization, open the Publishing page in the Partner Community, and click the **Organizations** tab. Before connecting an organization, make sure that you have the "Manage Listings" permission in the Partner Community.

Can I change my company name?

Yes, you can change your company name and other aspects of your company profile. Open the Publishing page in the Partner Community, and navigate to the **Company Info** tab. You can change the company name, upload a logo, and modify other details on your company profile.

Can I create my app or component on a Salesforce sandbox and upload it to the AppExchange?

No. You can use a sandbox to install and test your app or component, but you must create and upload it using a Developer edition organization.

Can I edit a review?

You can edit reviews that you authored. You can comment on reviews that you did not write.

Can I keep the same listing but change the package it provides?

Yes, you can change the packages that are linked to your listing. First, make sure that you've uploaded the new package and, if the listing is public, that the package has passed the security review.

On the Publishing page in the Partner Community, navigate to the **Packages** tab and find the package associated with the listing that you want to update. Click **Edit Listing** to open the publishing console. If you're updating an app, you can add a package on the **App** tab. If you're updating a component, add it on the **Component** tab.

Can I Update My Solution with a New Version or Patch?

Yes, but you must submit the new package for an AppExchange Security Review and register the package with your License Management App (LMA).

How Do Customers Find My Listing?

Customers find your solution or consulting service in several ways. On AppExchange, they search using keywords or browse using categories. They also find your listing via external search providers such as Google. Knowing how your listing is ranked in each of these scenarios helps you get the most visibility with potential customers.

Keywords

Most of the time, customers look for solutions and consulting services by searching for a term, also known as a keyword, on AppExchange. AppExchange returns matching results and sorts them based on keyword relevance. Here are some tips on how this works.

- If you include a keyword anywhere in your listing, your listing appears in the search results for that keyword.
- Generally, a keyword's relevance is increased if it appears earlier in the listing.
- Generally, a keyword's relevance is increased if it appears more than once in the listing. Listing a keyword several times doesn't improve the listing's ranking.
- When two or more keywords are searched, only listings with all keywords in the same order are returned. In addition, searches for multiple keywords also match camel-cased words. For example, a search for Great App matches GreatApp.

Popularity

When customers look for solutions or consulting services by browsing categories, the listings in a category are sorted based on popularity during the past 30 days. Popularity is based on actions customers take, such as watching a demo video and clicking the Learn More link. Activities that show greater commitment, such as installing a solution, are weighted more heavily than activities showing less commitment, such as clicking screenshots. The number of reviews and the average rating on a listing don't contribute to popularity.

Sorting

Customers also sort results by rating, Salesforce edition, price, and other attributes. Search results ranked by rating are sorted first by the number of stars and then by the number of reviews. For example, a listing with one review and five stars is ranked above a listing with 20 four-star reviews.

Search Engines

Because AppExchange is a public website, search engines index your listing pages and return them in their search results. To improve your ranking with external search providers, make sure that you cross reference your listing URL on your website, blog, Facebook, and Twitter pages.

SEE ALSO:

How Does AppExchange Search Work?

How do I edit a package after I've created a listing?

Log in to the Partner Community and navigate to the AppExchange Publishing page. Click the **Packages** tab to view a list of all packages uploaded to the AppExchange. From this list you can:

- Search for a package by keyword.
- Select **Unlisted Packages** from the drop-down list to see only the packages that haven't yet been linked to a listing.
- Click **Start Review** to begin the security review process.
- For a listed package, click **Edit Listing** to edit listing details, such as pricing information, banners, and logos.
- For an app or component in a managed package, click **Manage Licenses** to update the license settings for this package version, such as whether your offering is free or for sale, if and when it expires, and how many people in the installer's organization can access it.

How do I get an API token for my app?

You can request an API token for your app after it passes the AppExchange security review. To request a token, log a support case in the Salesforce Partner Community. For product, specify **Partner Programs & Benefits**. For topic, specify **ISV Technology Request**.

Note: This feature is available to eligible partners. For more information on the Partner Program, including eligibility requirements, visit www.salesforce.com/partners.

How do I increase my listing's popularity?

Popularity is based on customer activity. The AppExchange measures everything users do on your listing: install, learn more, test drive, demo, view screenshots, white papers, or data sheets, and more. The AppExchange weighs the activity according to its level of importance as indications of interest and filters out attempts to abuse the system.

The AppExchange recalculates popularity daily and then summarizes and evaluates results over 30 days. When you browse by category, you see listings sorted by their relative popularity over the past 30 days.

How customers have reviewed or rated the listing does not affect popularity. AppExchange visitors can sort by rating if they're interested.

Here are a few hints on improving rankings.

- Include a test drive. People like being able to try out an app or component. The number of test drives influences popularity. You also get the added benefit of being able to collect leads.
- Add images. One of the first things that visitors do is click the **View Screenshots** button. Many people don't even look at a listing that doesn't have screenshots.

- Add resources that demonstrate how your app or component affects the customer's bottom line. For example, if you have research showing that a component helps support representatives resolve cases faster, include that information in a data sheet.
- Be up front with your pricing. If you don't include pricing on your listing, people become disinterested quickly.

How do I offer a free trial of my app or component?

When you're creating or editing a listing, the **Trials** tab asks whether you want to offer a free trial or test drive. A free trial lets customers try your app in an interactive organization that you've customized. A test drive lets customers try a read-only version of your app without logging in to Salesforce. For more information, see Provide a Free Trial of Your Solution on page 364.

How do I see listings that Salesforce removed?

The AppExchange doesn't allow you to view listings that Salesforce removed. However, you can view private listings, which can include listings removed by Salesforce, usually because of problems discovered during the periodic security review. To view your private listings, on the Publishing page, navigate to the **Listings** tab. Click **Private Listings** from the drop-down list.

How do I upgrade my customers to a new version?

Create a new version of your managed package and upload it in the released state. After you upload, you can share the Install URL with your existing customers so that they can upgrade. If you're deploying only a bug fix to your customers and want to upgrade them automatically, see "Scheduling Push Upgrades" in the Salesforce online help. You can use the License Management App (LMA) to find out which customers need to upgrade.

Customers can also check whether an upgrade is available by logging in to the AppExchange and viewing the My Account page. If a new version of the app or component is available, it appears on this page.

What's the difference between a free trial and test drive?

When you're creating or editing a listing, the **Trials** tab asks whether you want to offer a free trial of Salesforce and your app or component. The free trial is a non-production Salesforce organization that includes your package and sample data. If a customer chooses to purchase the app or component instead of letting the trial expire, the organization becomes a production version. We recommend that you write a data cleanup script and include a button in your app or component that gives customers the option to remove sample data.

You can also choose to offer a test drive, which is a read-only version of your app or component that all customers taking the test drive log in to. Like a free trial, a test drive uses Developer Edition organizations that include sample data and whatever configuration options you choose.

Where can I share my ideas?

You can share your ideas on how to improve the AppExchange or Salesforce partner programs in the Collaboration section of the Partner Community. These ideas are only seen by Salesforce and other partners. To share ideas more publicly, please post them on the IdeaExchange.

Where can I write a review?

On the listing page, click the number of reviews or **Write the first**. If there are already reviews, you are directed to the review page where you can click **Write a review**. Each user can write only one review per listing.

Important: You cannot write a review for your own listing. Please review the Terms of Use for AppExchange for additional legal information.

Can I have multiple listings for an app or component?

No, you can associate an app or component with only one listing. In addition, you can't duplicate a package (or create a new package version) just to list the app or component in a new listing. This behavior is to your advantage, because it's easier for you to maintain and upgrade the app or component over its lifecycle. It also helps your listing achieve a higher ranking in the AppExchange, because the metrics that Salesforce uses to rank apps and components, like page views, aren't diluted across multiple listings.

CHAPTER 8 Sell on AppExchange with Checkout

In this chapter ...

- AppExchange Checkout
- Checkout Management App

Bring a modern online shopping experience to your AppExchange listing with Checkout. Transform your Checkout data into insights and actions with the Checkout Management App (CMA).

AppExchange Checkout

Checkout is AppExchange's integrated payments platform. With Checkout, customers can buy your AppExchange solution directly from your listing with a credit card or bank payment. Checkout is also ready to use with the License Management App (LMA) and the Checkout Management App (CMA).

Note: AppExchange Checkout is available in English only to eligible Salesforce partners. For more information on the Partner Program, including eligibility requirements, visit https://partners.salesforce.com.

Here's how Checkout makes it easier to sell a solution on AppExchange.

You're interested in:	Checkout:
A modern and flexible payment experience.	Is built on Stripe, the industry leader in online payments. You can accept credit cards, bank payments, or both. You can offer coupons and trials. You can also collect value-added tax (VAT) and US sales tax.
Automated licensing for your solution.	Is ready to use with the LMA. When a customer purchases your solution using Checkout, a license record is automatically provisioned in the LMA. If a customer upgrades, renews, or cancels their subscription, Checkout updates the license.
Insights about your customers.	Is ready to use with the CMA. The CMA brings the power of Salesforce CRM to Checkout. Use the CMA's dashboards to explore revenue, subscription status, and other key data. Send customizable notifications to customers and team members for trial expirations, declined payments, and other events.

Tip: Just getting started with Checkout? Head to Trailhead and earn the AppExchange Checkout badge.

How Is Revenue Shared in AppExchange Checkout?

The revenue that you share with Salesforce depends on the payment type. If the customer pays with a bank transfer, the revenue share is 15%. If the customer pays with a credit card, the revenue share is 15%, plus a $0.30 per transaction fee charged by our payment partner, Stripe. Regardless of the payment type, there's no minimum revenue share. We also don't charge setup fees, monthly service charges, or card storage fees.

Payment Plans in AppExchange Checkout

Checkout supports two types of payment plans: one-time and subscription. For either type of plan, you can charge customers on a per user or per company basis. If you charge on a per user basis, your customer buys an individual license for every user in their org who uses your solution. If you charge on a per company basis, your customer buys an org-wide license. An org-wide license means that every user in their org can use your solution. To provide customers with flexible payment options, you can combine multiple plans on your listing.

Payment Methods in AppExchange Checkout

Checkout supports two payment methods: credit cards and bank account transfers. You can accept one or both payment methods on your listing.

Get Started with AppExchange Checkout

To begin accepting payments with Checkout, first create a Stripe account. If you plan to offer a subscription for your solution, configure a product and pricing plan in Stripe. Then, enable Checkout on your AppExchange listing and choose payment plans and methods.

Support International Payments in AppExchange Checkout

In a few steps, you can get Checkout ready to accept payments from customers in the European Union (EU) and other regions. First, verify that your company is based in a country that's supported by our payment partner, Stripe. Then, if your country's tax authority requires you to collect Value Added Tax (VAT), enable VAT in the Publishing Console.

Manage AppExchange Checkout Subscriptions

Handle common customer requests related to Checkout subscriptions, such as viewing payment history, adding or removing licenses, and canceling subscriptions.

AppExchange Checkout FAQs

Find answers to common questions about Checkout.

AppExchange Checkout Considerations

Keep these considerations in mind when using Checkout.

How Is Revenue Shared in AppExchange Checkout?

The revenue that you share with Salesforce depends on the payment type. If the customer pays with a bank transfer, the revenue share is 15%. If the customer pays with a credit card, the revenue share is 15%, plus a $0.30 per transaction fee charged by our payment partner, Stripe. Regardless of the payment type, there's no minimum revenue share. We also don't charge setup fees, monthly service charges, or card storage fees.

To see how revenue sharing works, let's look at some examples.

Payment Type	Example
Bank transfer	You sell an app for $50 per user per month. If a customer buys 10 licenses with a bank transfer, here's how revenue is shared. • The overall transaction amount is $500 per month ($50 per user per month x 10 users). • The amount shared with Salesforce is $75 per month (15% x $500 per month).
Credit card	You sell an app for $1,000 per user per year. If a customer buys 5 licenses with a credit card, here's how revenue is shared. • The overall transaction amount is $5,000 per year ($1,000 per user per year x 5 users). • The amount shared with Salesforce is $750.00 per year (15% x $5,000 per year). • The amount shared with Stripe is $0.30 (1 credit card transaction x $0.30 per transaction fee).

Payment Plans in AppExchange Checkout

Checkout supports two types of payment plans: one-time and subscription. For either type of plan, you can charge customers on a per user or per company basis. If you charge on a per user basis, your customer buys an individual license for every user in their org who uses your solution. If you charge on a per company basis, your customer buys an org-wide license. An org-wide license means that every user in their org can use your solution. To provide customers with flexible payment options, you can combine multiple plans on your listing.

Here's a breakdown of the payment plans that you can offer.

Plan	Pricing Options	Customer is billed:	Set up the plan in:
One-time	• Per User • Per Company	Once, at the time of purchase	The Publishing Console on the Salesforce Partner Community
Subscription	• Per User • Per Company	On a recurring basis, either monthly or annually	The Stripe dashboard

To provide customers with the most flexibility, we recommend offering several payment options on a listing.

Payment Methods in AppExchange Checkout

Checkout supports two payment methods: credit cards and bank account transfers. You can accept one or both payment methods on your listing.

Payment Method	Customers pay with:	Notes
Credit card	Visa, MasterCard, American Express, JCB, Discover, or Diners Club credit cards.	Payments are processed immediately.
US bank account	Checking, savings, or money market accounts from banks based in the United States. Payments are processed using the Automated Clearing House (ACH) network.	• Payments can take up to 5 days to process. • Your pricing plan in Stripe must be in US dollars (USD). • Customers must pay with a business bank account. Checkout doesn't support ACH payments from personal bank accounts. • Customers must have a US billing address.
European bank account	Checking, savings, or money market accounts from banks based in the European Union. Payments are processed using the Single Euro Payment Area (SEPA) framework.	• Payments are processed immediately. • Your pricing plan in Stripe must be in euros (EUR). • Customers must have an EU billing address.

Note: Your business address in Stripe determines the type of bank transfers that you can accept. To accept ACH payments, your company must be based in the United States. To accept SEPA payments, your company must be based in the European Union. You can't accept both ACH and SEPA payments.

Get Started with AppExchange Checkout

To begin accepting payments with Checkout, first create a Stripe account. If you plan to offer a subscription for your solution, configure a product and pricing plan in Stripe. Then, enable Checkout on your AppExchange listing and choose payment plans and methods.

Create a Stripe Account for AppExchange Checkout

Before you enable Checkout on a listing, create an account with our payment partner, Stripe.

Create a Stripe Product and Pricing Plan for AppExchange Checkout

To offer a subscription of your solution in Checkout, first create a product and pricing plan in your Stripe dashboard. A product represents the solution or service that you sell. A pricing plan sets the product's cost, currency, and billing frequency.

Activate Bank Payments for AppExchange Checkout

To let customers pay for your solution with a bank transfer, request this payment method in Stripe. After Stripe reviews and approves your request, you're eligible to receive bank payments. Depending on your location, you can accept payments through the Automated Clearing House (ACH) network or the Single Euro Payment Area (SEPA) framework.

Enable Checkout on an AppExchange Listing

After you create a Stripe account and set up pricing plans for your solution, you can enable Checkout on an AppExchange listing. When you enable Checkout, you choose the payment plans and methods that you support.

Send Email Receipts for AppExchange Checkout Purchases

To send customers receipts for Checkout purchases, set up email receipts in your Stripe dashboard.

Preview the AppExchange Checkout Experience

If you've enabled Checkout on your listing, you can preview the customer purchase experience by modifying the AppExchange listing URL.

Convert a Free Listing to Use AppExchange Checkout

If the solution associated with your free AppExchange listing passed security review, you can convert the listing to accept payments using Checkout. A security review fee is collected when you charge for your solution. The fee is waived for free listings.

Create a Stripe Account for AppExchange Checkout

Before you enable Checkout on a listing, create an account with our payment partner, Stripe.

Before you create your account, have the following information available.

- A short description of your business, such as the products you sell
- Basic information about your business, like its physical address
- Login information for an external identity provider, such as Google, Facebook, or LinkedIn
- Account and routing numbers for the bank account where you want to receive payments

USER PERMISSIONS

To manage AppExchange listings:
- Manage Listings

After you've gathered this information, you're ready to go.

1. Log in to the Salesforce Partner Community.
2. Click **Publishing**.
3. Create a listing or edit an existing one.
4. On the Pricing tab, select **Paid, Using Checkout**.
5. Click **Set Up Stripe**.
6. Complete your Stripe account application and submit. If you already have a Stripe account, sign in instead.

After you create the account, you can manage it on the Stripe website. To learn more about Stripe, go to https://stripe.com/docs/dashboard.

Create a Stripe Product and Pricing Plan for AppExchange Checkout

To offer a subscription of your solution in Checkout, first create a product and pricing plan in your Stripe dashboard. A product represents the solution or service that you sell. A pricing plan sets the product's cost, currency, and billing frequency.

You can create multiple pricing plans for your product. For example, you can create one plan that uses monthly billing and another plan that uses annual billing.

1. Log in to Stripe.
2. From your Stripe dashboard, click **Billing** > **Products**.
3. Click **New**.
4. Provide a name for your product, and then click **Create product**.
5. If prompted, enter your Stripe password, and then click **Authenticate**.
6. Provide a nickname for your plan.

   Tip: Include the billing frequency, such as *Annual*, in your plan's nickname.

7. Select a currency.

   Note: To let customers pay with US bank accounts, use US dollars (USD) for the plan. To let customers pay with European bank accounts, use euros (EUR) for the plan.

8. Set a unit price.

   In the Publishing Console, you specify whether to apply this unit price per user or per company (org-wide).

9. Specify a monthly or yearly billing interval.
10. Click **Add pricing plan**.

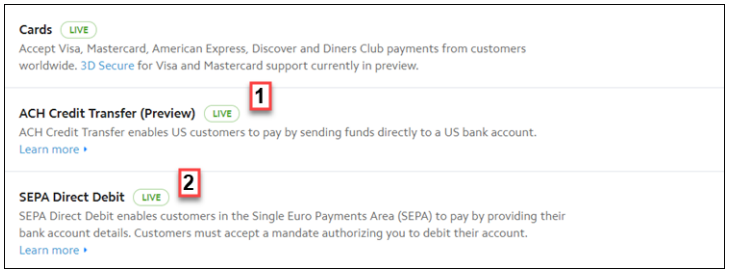
If you've connected your Stripe account to the Publishing Console, your pricing plans are ready to add to your listing.

Activate Bank Payments for AppExchange Checkout

To let customers pay for your solution with a bank transfer, request this payment method in Stripe. After Stripe reviews and approves your request, you're eligible to receive bank payments. Depending on your location, you can accept payments through the Automated Clearing House (ACH) network or the Single Euro Payment Area (SEPA) framework.

Note: Your business address in Stripe determines the type of bank transfers that you can accept. To accept ACH payments, your company must be based in the United States. To accept SEPA payments, your company must be based in the European Union. You can't accept both ACH and SEPA payments.

1. Go to the Stripe website.
2. Log in to your Stripe account.
3. Click **Settings**.
4. Under Payments and Payouts, click **Payment methods**.
5. Request ACH Credit Transfer (1) or SEPA Direct Debit (2) for your account.



Your activation request is sent to Stripe for processing. You receive an email when your request is approved.

6. If you requested ACH Credit Transfer, verify that the activation succeeded.
   a. Go to the Stripe website again.
   b. Log in to your Stripe account.
   c. Go to Stripe's ACH Guide.
   d. Click **Enable ACH**. If you don't see an option to enable ACH, ACH Credit Transfer is already active for your account.

Enable Checkout on an AppExchange Listing

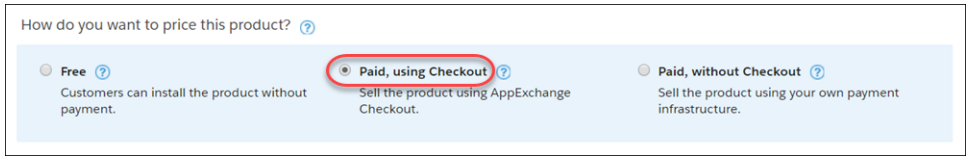
After you create a Stripe account and set up pricing plans for your solution, you can enable Checkout on an AppExchange listing. When you enable Checkout, you choose the payment plans and methods that you support.

Before you enable Checkout on a listing, verify that Salesforce approved your business plan.

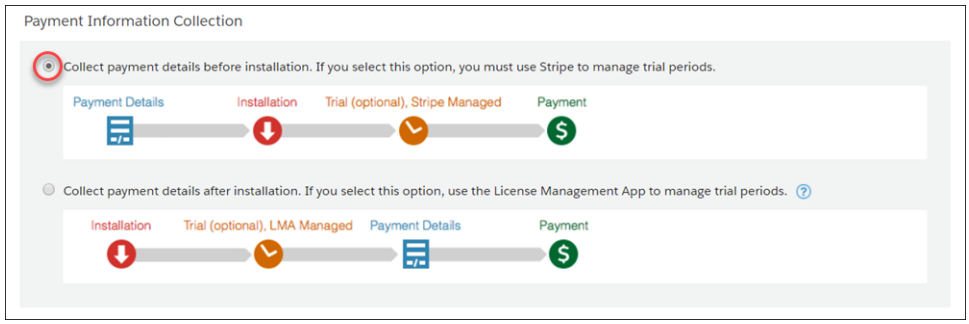
USER PERMISSIONS

To manage AppExchange listings:
- Manage Listings

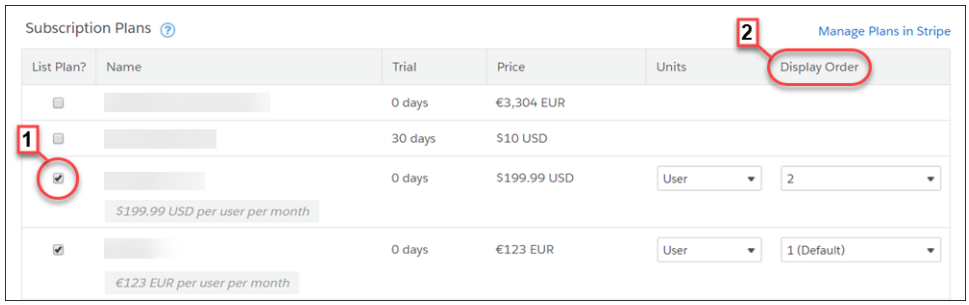
1. Log in to the Salesforce Partner Community.
2. Click **Publishing**.
3. Create a listing, or edit an existing one.
4. On the Pricing tab, select **Paid, using Checkout**.



5. Select when to collect payment details from the customer.



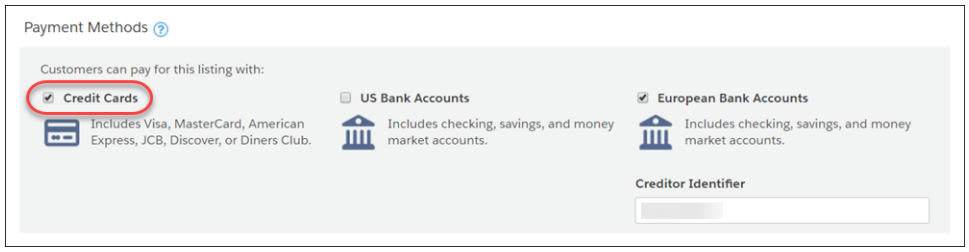
6. Select payment plans (1) and adjust the display order (2).



Tip: You can offer multiple payment plans on a listing. For example, you can offer a one-time payment option and a monthly subscription.

Payment Plan	Steps
Subscription	**a.** Select one of the pricing plans that you created in Stripe. **b.** Select company or per-user pricing.
One-time payment	**a.** Click **Add One Time Price Option**. **b.** Provide a name for the plan. **c.** Select a price and currency. **d.** Select company or per-user pricing.

7. Select the payment methods that you accept.



Note: Your billing address in Stripe determines the type of bank payments that you can accept. Before you enable bank payments, verify that you activated ACH Credit Transfer (for US bank accounts) or SEPA Direct Debit (for European bank accounts) in Stripe. You receive an email from Stripe when your account is ready to receive bank payments.

8. Click **Save**.

SEE ALSO:

Create a Stripe Product and Pricing Plan for AppExchange Checkout

Enable Checkout on an AppExchange Listing

Send Email Receipts for AppExchange Checkout Purchases

To send customers receipts for Checkout purchases, set up email receipts in your Stripe dashboard.

1. Log in to Stripe.
2. From your Stripe dashboard, click **Settings**.
3. Under Payments and Payouts, click **Email receipts**.
4. Enable the setting for successful payments.
5. Click **Save**.

Preview the AppExchange Checkout Experience

If you've enabled Checkout on your listing, you can preview the customer purchase experience by modifying the AppExchange listing URL.

1. Go to your solution's AppExchange listing.
2. Append `&modal=appx_getitnow_buyform_modal` to the listing URL, and then refresh the page.

Convert a Free Listing to Use AppExchange Checkout

If the solution associated with your free AppExchange listing passed security review, you can convert the listing to accept payments using Checkout. A security review fee is collected when you charge for your solution. The fee is waived for free listings.

USER PERMISSIONS

To manage an AppExchange listing:
- Manage Listings

1. Log in to the Salesforce Partner Community.
2. Enable Checkout for the listing.
   a. Click **Publishing**.
   b. Click **Listings**.
   c. Find the listing you want to update, and then click the tile.
   d. On the Pricing tab, select **Paid, using Checkout** and configure the pricing details.
   e. Click **Save**.
3. To pay the security review fee, log a support case.
   a. Click the question icon and then click **Log a Case for Help**.
   b. Select **Salesforce Partner Program Support**.

      Tip: If you don't see the Salesforce Partner Program Support tile, use the org picker to select the org that's associated with your Salesforce partnership account.

   c. For product, enter and select **Partner Community & AppExchange**.
   d. For topic, enter and select **Security Review**.
   e. Provide any other required details, and then click **Create Case**.

Salesforce contacts you to arrange for payment of the security review fee.

Support International Payments in AppExchange Checkout

In a few steps, you can get Checkout ready to accept payments from customers in the European Union (EU) and other regions. First, verify that your company is based in a country that's supported by our payment partner, Stripe. Then, if your country's tax authority requires you to collect Value Added Tax (VAT), enable VAT in the Publishing Console.

Verify AppExchange Checkout Is Supported in Your Country

To accept payments with Checkout, your company must be based in a country that's supported by our payment partner, Stripe.

Collect VAT for AppExchange Checkout Transactions

If your country's tax authority requires you to collect Value-Added Tax (VAT), you can include VAT in Checkout transactions. After you enable this option, VAT is applied to invoices in Stripe. You're responsible for VAT registration, maintaining required data, and distributing the taxes that you collect.

Strong Customer Authentication for AppExchange Checkout

Strong customer authentication (SCA) enhances the security of online payments with an identity verification step. Learn how SCA works, which regions require it, and how it affects Checkout payments. Then get your company and customers ready for SCA.

Verify AppExchange Checkout Is Supported in Your Country

To accept payments with Checkout, your company must be based in a country that's supported by our payment partner, Stripe.

1. To see a list of supported countries, go to https://stripe.com/global.
   If your country is listed, you're eligible to use Checkout.
2. If Stripe isn't supported in the country where your company is based, sign up to get notified when it's available.

Collect VAT for AppExchange Checkout Transactions

If your country's tax authority requires you to collect Value-Added Tax (VAT), you can include VAT in Checkout transactions. After you enable this option, VAT is applied to invoices in Stripe. You're responsible for VAT registration, maintaining required data, and distributing the taxes that you collect.

USER PERMISSIONS

To manage AppExchange listings:
- Manage Listings

1. Log in to the Salesforce Partner Community.
2. Click **Publishing**.
3. Click **Company Info**.
4. Select the option to collect VAT on purchases.

   Note: VAT isn't supported for one-time purchases.

5. Enter a VAT number and country. Use the same country that you provided to Stripe in your billing address.
6. Click **Save**.

If you manage Checkout data with the Checkout Management App, you can use the app to view information for VAT reporting.

Strong Customer Authentication for AppExchange Checkout

Strong customer authentication (SCA) enhances the security of online payments with an identity verification step. Learn how SCA works, which regions require it, and how it affects Checkout payments. Then get your company and customers ready for SCA.

What Is Strong Customer Authentication?
Strong customer authentication (SCA) enhances the security of online payments with an identity verification step. SCA is required for online payments in the European Economic Area, including AppExchange Checkout payments.

How Strong Customer Authentication Affects AppExchange Checkout
Strong customer authentication (SCA) is automatically integrated into the Checkout payment experience for European customers. Learn how SCA affects the initial purchase and recurring payments.

Strong Customer Authentication Best Practices for AppExchange Checkout
If you sell an AppExchange solution in a region that requires strong customer authentication (SCA), follow these Checkout best practices.

What Is Strong Customer Authentication?

Strong customer authentication (SCA) enhances the security of online payments with an identity verification step. SCA is required for online payments in the European Economic Area, including AppExchange Checkout payments.

SCA is mandated by the Second Payment Services Directive (PSD2), which introduces laws to enhance the security of online payments in the European Economic Area. Starting on September 14, 2019, customers who live in this region may be asked to perform an identity verification step to make purchases online.

A customer can verify their identity with a password, a code delivered to a mobile device, or using biometric data, such as a fingerprint. This verification step applies to one-time purchases and recurring payments, such as subscriptions. The customer's bank or credit card issuer determines when to request that the customer authorize the purchase by verifying their identity.

Starting on September 14, 2019, Checkout automatically integrates SCA into the payment experience for European customers. To learn more about SCA, go to https://stripe.com/docs/strong-customer-authentication.

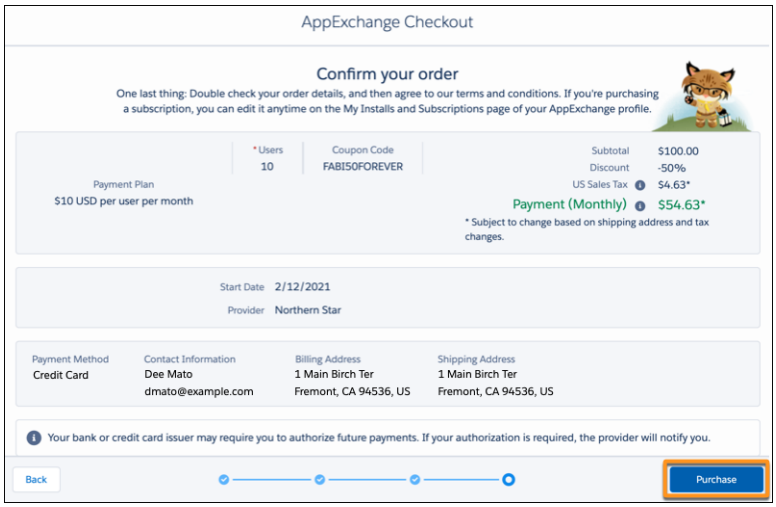
How Strong Customer Authentication Affects AppExchange Checkout

Strong customer authentication (SCA) is automatically integrated into the Checkout payment experience for European customers. Learn how SCA affects the initial purchase and recurring payments.

Initial Purchase

The initial purchase is your customer's first Checkout transaction. In the initial purchase, the customer uses the Checkout wizard to select a payment plan and method, provide billing and contact information, and confirm the payment. In regions that require SCA, the Checkout wizard adds an identity verification step.

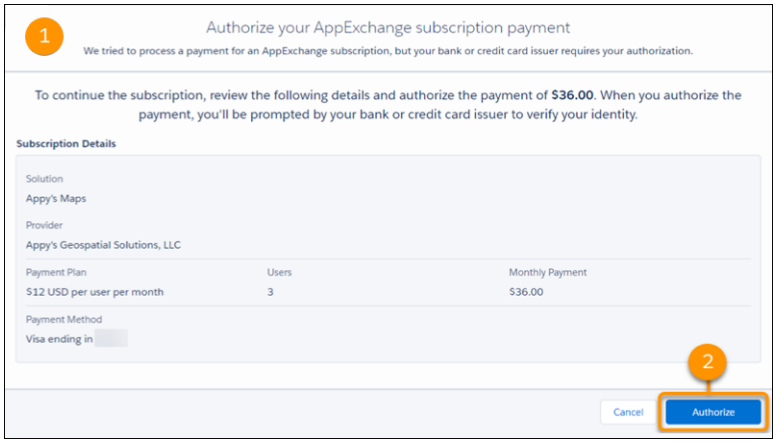
After the customer clicks **Purchase**, Checkout may prompt them to verify their identity. For example, they might be asked to enter a verification code that's sent to the mobile device associated with their payment method. This verification step uses the 3D Secure 2 protocol and is managed by Checkout's payment partner, Stripe. After the customer verifies their identity, Stripe processes the payment.



Recurring Payments

Customers can also make recurring payments, either monthly or annually. In regions that require SCA, the first payment is the initial purchase, and the customer may be asked to verify their identity to complete the transaction. Checkout attempts to process subsequent payments with the billing details provided in the initial purchase, per the terms and conditions of the subscription. In regions that require SCA, the customer's bank or credit card issuer reviews the payment attempt and determines whether to request customer authorization.

If customer authorization is required, Stripe marks the payment as failed. The next time the customer logs in to AppExchange, Checkout prompts the customer to authorize the payment (1). The customer clicks **Authorize** (2), then verifies their identity using the same process as the initial purchase. After the customer verifies their identity, Stripe processes the payment.



Strong Customer Authentication Best Practices for AppExchange Checkout

If you sell an AppExchange solution in a region that requires strong customer authentication (SCA), follow these Checkout best practices.

1. Prepare Your Customers for Strong Customer Authentication
   If you serve customers in the European Economic Area, communicate how strong customer authentication (SCA) affects online payments, including payments for your AppExchange solution.

2. Manage AppExchange Checkout Subscription Payments That Require Customer Authorization
   If a Checkout subscription payment fails because it requires customer authorization, determine how Stripe handles the related subscription. For example, you can configure Stripe to cancel the subscription, mark the subscription as unpaid, or take no action.
3. View AppExchange Checkout Subscription Payments That Require Customer Authorization
   If a Checkout subscription payment can't be processed because it requires customer authorization, Stripe marks the payment as failed. View these payments in the Stripe dashboard to see transaction details, including customer contact information. You can use this information to follow up with the customer and provide instructions for authorizing the payment on AppExchange.
4. Authorize an AppExchange Checkout Subscription Payment
   In regions that require strong customer authentication (SCA), a customer's bank or credit card issuer may require the customer to authorize Checkout subscription payments periodically. To see payments that require customer authorization, check your Stripe dashboard. If authorization is required, we prompt the customer when they log in to AppExchange. However, you can also provide customers with self-service instructions for authorizing a payment.

Prepare Your Customers for Strong Customer Authentication

If you serve customers in the European Economic Area, communicate how strong customer authentication (SCA) affects online payments, including payments for your AppExchange solution.

In your communication, we recommend that you:

- Define SCA and explain how SCA changes the online payment experience.
- Note that SCA impacts many types of online payments in the European Economic Area, including AppExchange payments.
- Explain that the customer may be asked to authorize AppExchange payments periodically, which includes an identity verification step.
- Explain that if authorization is required, we prompt the customer when they log in to AppExchange.
- Provide self-service steps for authorizing an AppExchange subscription payment.

SEE ALSO:

Manage AppExchange Checkout Subscription Payments That Require Customer Authorization

View AppExchange Checkout Subscription Payments That Require Customer Authorization

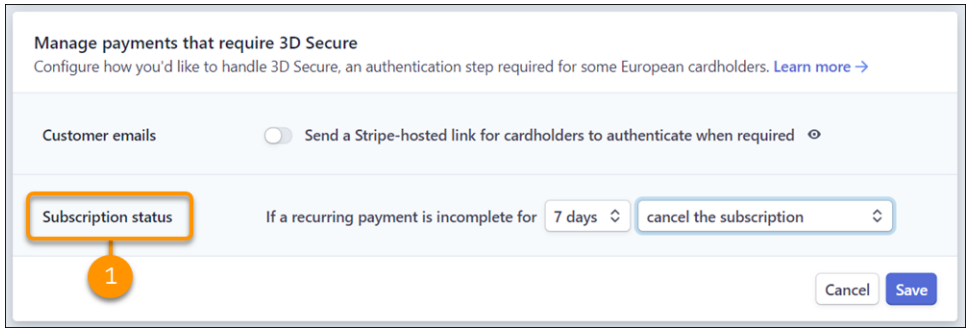
Authorize an AppExchange Checkout Subscription Payment

Manage AppExchange Checkout Subscription Payments That Require Customer Authorization

If a Checkout subscription payment fails because it requires customer authorization, determine how Stripe handles the related subscription. For example, you can configure Stripe to cancel the subscription, mark the subscription as unpaid, or take no action.

1. Log in to Stripe.
2. From your Stripe dashboard, click **Settings**.
3. Under Billing, click **Subscriptions and emails**.
4. Go to Manage payments that require 3D Secure, and then configure `Subscription status` (1).

   Important: Don't enable the `Customer emails` setting. To authorize payments, customers must log in to AppExchange.



View AppExchange Checkout Subscription Payments That Require Customer Authorization

If a Checkout subscription payment can't be processed because it requires customer authorization, Stripe marks the payment as failed. View these payments in the Stripe dashboard to see transaction details, including customer contact information. You can use this information to follow up with the customer and provide instructions for authorizing the payment on AppExchange.

1. Log in to Stripe.
2. From your Stripe dashboard, click **Payments**.
3. Configure the payment filters as follows.

Filter	Value
Status	`Incomplete`

4. Click **Done**.
5. Click a payment to view details about the transaction.

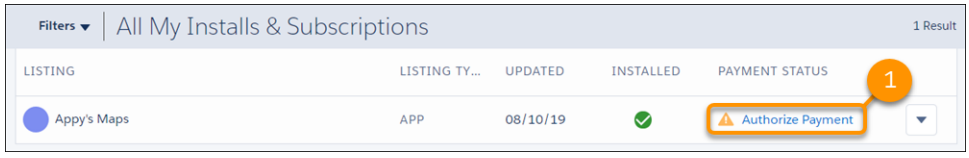
Authorize an AppExchange Checkout Subscription Payment

In regions that require strong customer authentication (SCA), a customer's bank or credit card issuer may require the customer to authorize Checkout subscription payments periodically. To see payments that require customer authorization, check your Stripe dashboard. If authorization is required, we prompt the customer when they log in to AppExchange. However, you can also provide customers with self-service instructions for authorizing a payment.

USER PERMISSIONS

To manage AppExchange subscriptions:
- Manage Billing

1. Log in to AppExchange.
2. From the user profile menu, click **My Installs & Subscriptions**.
3. Find the subscription that requires authorization.
4. Click **Authorize Payment** (1).



5. Review the subscription details, and then click **Authorize**.

SEE ALSO:

View AppExchange Checkout Subscription Payments That Require Customer Authorization

Manage AppExchange Checkout Subscriptions

Handle common customer requests related to Checkout subscriptions, such as viewing payment history, adding or removing licenses, and canceling subscriptions.

View AppExchange Checkout Receipts

If a customer requests a receipt for a previous Checkout payment, you can share self-service steps for viewing payment history on AppExchange.

Add or Remove Licenses from an AppExchange Checkout Subscription

Your customers can add or remove licenses from their Checkout subscriptions on AppExchange. If a customer adds licenses during the current billing period, the additional licenses are available immediately. Checkout charges the customer a prorated amount for their next billing period. If a customer removes licenses, the removal takes effect at the start of their next billing period. Checkout charges the customer for the reduced license count when the removal takes effect. Share these self-service steps for updating their subscription on AppExchange.

Cancel an AppExchange Checkout Subscription

If a customer wants to end a Checkout subscription, you can share self-service steps for canceling the subscription on AppExchange. The cancellation takes effect at the end of the contract term.

View AppExchange Checkout Receipts

If a customer requests a receipt for a previous Checkout payment, you can share self-service steps for viewing payment history on AppExchange.

1. Log in to AppExchange.
2. From the user profile menu, click **My Installs & Subscriptions**.
3. Find the subscription whose payment history you want to view.
4. From the dropdown list, select **Manage Subscription**.
5. Go to Payment History, and then click an invoice to view details about the purchase.

USER PERMISSIONS

To manage AppExchange subscriptions:

- Manage Billing

Add or Remove Licenses from an AppExchange Checkout Subscription

Your customers can add or remove licenses from their Checkout subscriptions on AppExchange. If a customer adds licenses during the current billing period, the additional licenses are available immediately. Checkout charges the customer a prorated amount for their next billing period. If a customer removes licenses, the removal takes effect at the start of their next billing period. Checkout charges the customer for the reduced license count when the removal takes effect. Share these self-service steps for updating their subscription on AppExchange.

Warning: Don't use the Stripe website to change the number of seats included in your AppExchange customers' licenses. The changes won't sync to Checkout or the License

USER PERMISSIONS

To manage AppExchange subscriptions:

- Manage Billing

Management App (LMA). Instead, make license updates with the LMA using the instructions in Modify a License Record.

1. Log in to AppExchange.
2. From the user profile menu, click **My Installs & Subscriptions**.
3. Find the subscription that you want to update.
4. From the dropdown list, select **Manage Subscription**.
5. Click **Edit**.
6. Go to Payment Details, and then edit the number of licenses associated with the subscription.
7. Click **Review Changes**.
8. Agree to the terms and conditions, and then click **Save**.

Cancel an AppExchange Checkout Subscription

If a customer wants to end a Checkout subscription, you can share self-service steps for canceling the subscription on AppExchange. The cancellation takes effect at the end of the contract term.

USER PERMISSIONS

To manage AppExchange subscriptions:
- Manage Billing

1. Log in to AppExchange.
2. From the user profile menu, click **My Installs & Subscriptions**.
3. Find the subscription that you want to cancel.
4. From the dropdown list, select **Manage Subscription**.
5. Click **End Subscription**, and then confirm the cancellation.

AppExchange Checkout FAQs

Find answers to common questions about Checkout.

Does AppExchange Checkout replace the License Management App?

No, Checkout works with the LMA to support the licensing process. When a customer purchases your solution, Checkout creates a license record in the LMA. If a customer edits their subscription on AppExchange, such as by adding seats, the license record in the LMA automatically updates to reflect those changes.

How does AppExchange Checkout affect Trialforce and lead management?

Checkout doesn't affect your Trialforce configuration or how you manage leads. However, when a customer signs up for a trial using Checkout, the corresponding trial user is listed as `Active` in the License Management App (LMA).

Should I collect payment details from AppExchange Checkout customers before or after installation?

Both approaches have advantages. We recommend thinking about your target customers and existing business processes, and then deciding.

Does AppExchange Checkout support multiple currencies?

Yes. To offer another currency on your listing, first create a pricing plan in Stripe that uses this currency. Then, go to the Publishing Console and add the plan to your listing. When a customer purchases your solution, Checkout charges them in the currency that you specified on the plan. When Stripe transfers the payment to you, it's converted to the currency used by your bank account.

If I use AppExchange Checkout to sell my solution, do customers have to purchase from AppExchange?

Yes, purchases must occur on AppExchange and are subject to revenue sharing per your Salesforce partnership agreement. Also, if the transaction is processed another way, Checkout can't associate the purchase with your solution or provision licenses with the License Management App (LMA).

Can my customer switch to another AppExchange Checkout payment plan?

Yes, you can switch the customer to another plan in Stripe. The new plan takes effect at the start of the next billing period. If you want the change to take effect immediately, cancel the current plan in Stripe and ask the customer to purchase the new plan from your listing.

If a customer's credit card payment is declined in AppExchange Checkout, does their license become inactive?

In your Stripe settings, you determine what happens when a credit card is declined. You can retry the payment or deactivate the subscription. If you deactivate the subscription, the license becomes inactive.

How does billing work when AppExchange Checkout customers add or remove licenses during the current billing period?

If a customer adds licenses during the current billing period, the licenses are available for immediate use. Checkout charges the customer a prorated amount for their next billing period. If a customer removes licenses, the reduction takes effect at the start of their next billing period. The customer can continue to use the licenses during their current billing period. Checkout charges the customer for the reduced license count starting with their next billing period.

If an admin purchases and installs a solution with AppExchange Checkout, can another user edit the subscription on AppExchange?

Yes, provided the user has the "Manage Billing" permission in the Salesforce org associated with the subscription.

Does AppExchange Checkout support price tiers in Stripe?

No. If you add multiple price tiers to a pricing plan in Stripe, Checkout can't import the plan to the Publishing Console. If you're interested in providing discounted pricing for your solution, create a coupon in Stripe and share it with your customers.

Why can't my customer make an AppExchange Checkout purchase?

If a customer clicks **Get It Now** on your listing, but can't make a Checkout purchase, verify that the customer is logged in to AppExchange with a supported Salesforce org. Checkout supports only paid orgs whose status is `Active`. Trial orgs, sandbox orgs, and Developer Edition orgs aren't supported.

Does AppExchange Checkout support tax rates created in Stripe?

No. Although Stripe allows you to create tax rates, Checkout doesn't support the Stripe rates. Salesforce internally manages tax rates, including those for US sales tax and value-added tax (VAT).

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Should I collect payment details from AppExchange Checkout customers before or after installation?

Both approaches have advantages. We recommend thinking about your target customers and existing business processes, and then deciding.

Here's a table that you can use to guide your decision.

Collect payment details:	Best if your customers value:	Best if your company:
Before installation	A seamless purchase experience at the end of a trial.	Prefers to manage trials in Stripe.
After installation	The ability to quickly try out your solution.	Prefers to manage trials using the License Management App (LMA).

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Yes. To offer another currency on your listing, first create a pricing plan in Stripe that uses this currency. Then, go to the Publishing Console and add the plan to your listing. When a customer purchases your solution, Checkout charges them in the currency that you specified on the plan. When Stripe transfers the payment to you, it's converted to the currency used by your bank account.

SEE ALSO:

Create a Stripe Product and Pricing Plan for AppExchange Checkout

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No. Although Stripe allows you to create tax rates, Checkout doesn't support the Stripe rates. Salesforce internally manages tax rates, including those for US sales tax and value-added tax (VAT).

AppExchange Checkout Considerations

Keep these considerations in mind when using Checkout.

- You must distribute your product as a managed package.
- You can't use Checkout with OEM apps.

Checkout Management App

The Checkout Management App (CMA) brings the power of Salesforce to AppExchange Checkout. A beautiful dashboard visually displays AppExchange Checkout data, so it's easy to see how your offerings are performing. Automated email notifications keep customers and team members in the loop whenever activity occurs on your offerings.

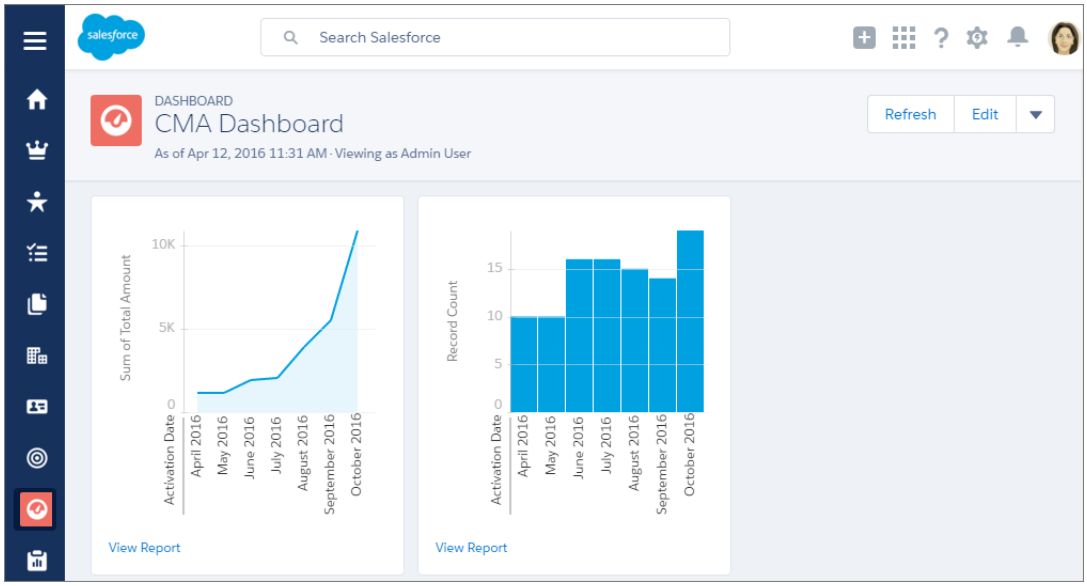
Note: The CMA is available in English and Japanese to eligible Salesforce partners. For more information on the Partner Program, including eligibility requirements, visit https://partners.salesforce.com.

Start with the dashboard to get a big picture view of your AppExchange Checkout data.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

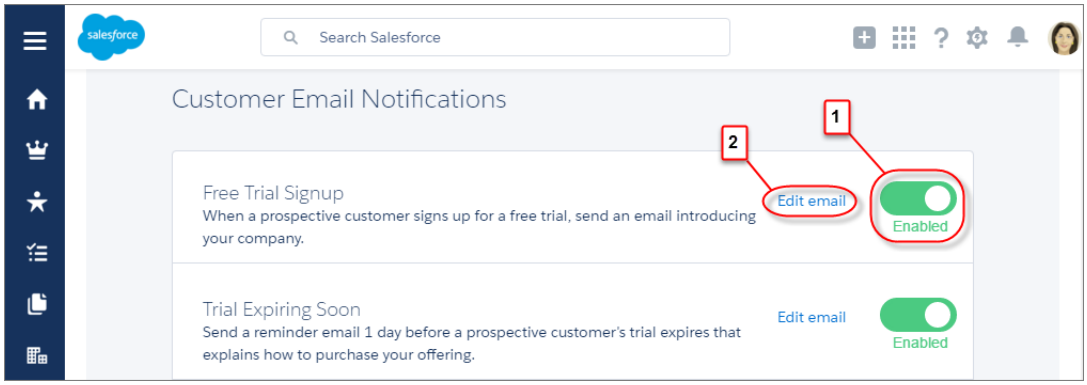


The dashboard is preconfigured to show:

- Revenue by month, so financial performance is always front and center
- New subscribers by month, so it's easy to see where growth is occurring
- Subscription plan by unit, so you know which configurations are popular with customers
- Subscription status by month, so you can stay on top of trials, purchases, and renewals

You can customize the dashboard using standard Salesforce tools. For a detailed look at your data, view individual customer, subscription plan, subscription, invoice, invoice item, and transaction records.

To save time communicating with stakeholders, the CMA can send email notifications for situations that you often encounter as a partner, like renewal notices. Enable email notifications as needed (1) and then customize them to reflect your company's identity (2). Not in the mood to customize anything? No worries—the templates provide friendly and informative default content.



Checkout Management App Best Practices

Follow these guidelines and best practices when you use the Checkout Management App (CMA).

Checkout Management App Objects

Subscription plan, subscription, invoice, invoice item, and transaction objects are the foundation of the Checkout Management App (CMA). To get the most out of the CMA, understand what these objects represent and how they relate to each other.

Get Started with the Checkout Management App

Install the Checkout Management App (CMA) into a Salesforce org, and then configure the app so that users get the right level of access to data. Enable email notifications to simplify communication with customers and team members. You can also customize the notification templates to meet your company's needs.

Sample Checkout Management App Customizations

The Checkout Management App (CMA) is a powerful tool out of the box, but gets even better when you customize it. These examples show how you can modify dashboards and email notifications to delight customers and team members.

Update Settings in the Checkout Management App

Control when customers and team members receive emails from the Checkout Management App (CMA). You can also change the Stripe account associated with the CMA and manually reimport your data into your Salesforce org. Only admin users can update settings in the CMA.

View Checkout Management App Logs

The Checkout Management App (CMA) creates logs when connecting to Stripe or syncing your data. If you experience issues with the CMA, view logs to help diagnose their cause.

Checkout Management App Best Practices

Follow these guidelines and best practices when you use the Checkout Management App (CMA).

- Install the CMA in a Salesforce org where the License Management App (LMA) is already installed. Usually, this is your partner business org. If the LMA isn't installed in your org, you can't install the CMA.
- Don't edit data in managed fields on the subscription plan, subscription, invoice, or transaction object records. The CMA syncs Stripe data in a one-way, read-only manner, so changes that you make aren't reflected in Stripe. To update subscription plan, subscription, invoice, invoice item, or transaction data, use the Stripe dashboard or API.
- Review and customize notification templates before enabling them. By adding your logo and tailoring template content to reflect your company's identity, you set yourself apart from other offerings on the AppExchange. Customizing takes only a couple of minutes and doesn't require any coding.

SEE ALSO:

Modify a Notification Template in the Checkout Management App

Checkout Management App Objects

Subscription plan, subscription, invoice, invoice item, and transaction objects are the foundation of the Checkout Management App (CMA). To get the most out of the CMA, understand what these objects represent and how they relate to each other.

The CMA pulls in data from AppExchange Checkout's payment partner, Stripe, to populate the subscription plan, subscription, invoice, invoice item, and transaction objects. Here's a high-level overview of these objects and how they fit together.

Object	Purpose	Relationships
Subscription plan (1)	Contains information about the pricing model of an offering. For example, site-wide or per user, billed monthly.	Parent object of: • Subscription
Subscription (2)	Contains information about the customer's history and usage of an offering. For example, when the subscription started.	Child object of: • Subscription plan Parent object of: • Invoice

Object	Purpose	Relationships
		• Transaction
Invoice (3)	Contains billing and payment information for a subscription for a specific time period. For example, the total amount owed by the customer.	Child object of: • Subscription Sibling object of: • Transaction
Invoice item (4)	Contains information about a particular billing and payment event for a specific time period. For example, a one-time credit. Multiple invoice items can be associated with an invoice.	Child object of: • Invoice
Transaction (5)	Contains information about a customer payment attempt. For example, method of payment and whether it was successful.	Child object of: • Subscription Sibling object of: • Invoice

We haven't listed it in the table, but there's one more object to be aware of: customer. The customer object contains information about the subscriber and draws from the other objects in the CMA, including subscription, invoice, and transaction.

The CMA automatically syncs new data from Stripe, updating object records as necessary. Just remember: syncing is one way and read only, so changes that you make to object records aren't reflected in Stripe. To update subscription plan, subscription, invoice, invoice item, or transaction data, use the Stripe dashboard or API.

Get Started with the Checkout Management App

Install the Checkout Management App (CMA) into a Salesforce org, and then configure the app so that users get the right level of access to data. Enable email notifications to simplify communication with customers and team members. You can also customize the notification templates to meet your company's needs.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

Install the Checkout Management App

Install the Checkout Management App (CMA) in the Salesforce org where you manage licenses, usually your Partner Business Org. The License Management App (LMA) is required to use the CMA, so make sure that you install the LMA in this org first.

Set Up the Checkout Management App

Use the Checkout Management App (CMA) setup tool to connect your Stripe account and import data into your Salesforce org. Then get familiar with your dashboard and choose when customers and team members receive email notifications from the CMA.

Assign Access to the Checkout Management App

Use permission sets to give team members the right level of access to the Checkout Management App (CMA). You can assign the CMA Standard User permission set or CMA Admin User permission set, depending on the features team members must access.

Modify a Notification Template in the Checkout Management App

The Checkout Management App (CMA) can send email notifications in response to trial installations, purchases, and other subscription changes. We created default notifications to get you started, but you can tailor templates to your company's needs.

Configure Logs in the Checkout Management App

The Checkout Management App (CMA) creates debug logs to help you troubleshoot issues. By default, all logs are saved, but you can configure the CMA to delete logs that you no longer need. Delete logs regularly to stay within the data storage limits for your Salesforce edition.

Install the Checkout Management App

Install the Checkout Management App (CMA) in the Salesforce org where you manage licenses, usually your Partner Business Org. The License Management App (LMA) is required to use the CMA, so make sure that you install the LMA in this org first.

USER PERMISSIONS

To install packages:
- Download AppExchange Packages

Note: If you received a Partner Business Org when you joined the Partner Community, the CMA is preinstalled there. To check if the CMA is installed in your org, go to the App Launcher and look for the CMA in the list of available apps.

1. If you haven't already, log in to the AppExchange using the credentials of the org where you want to install the CMA.
2. Go to the AppExchange listing for the CMA: https://appexchange.salesforce.com/listingDetail?listingId=a0N3A000000rMclUAE.
3. Click **Get It Now**.
4. Click **Install in production**.
5. Agree to the Terms & Conditions, and then click **Confirm and Install**.
6. Log in to the org where you want to install the CMA.
7. Review the package installation details, and then click **Continue**.
8. Approve access by third-party websites, and then click **Continue**.
9. Review the API access requirements for the package, and then click **Next**.
10. Grant access to package contents, and then click **Next**.

    Note: Salesforce recommends granting access to admins only and assigning access to other users as needed after the app is installed.

11. Click **Install**.
12. After the installation completes, go to the App Launcher and confirm that the CMA appears in the list of available apps.

SEE ALSO:

Assign Access to the Checkout Management App

Set Up the Checkout Management App

Use the Checkout Management App (CMA) setup tool to connect your Stripe account and import data into your Salesforce org. Then get familiar with your dashboard and choose when customers and team members receive email notifications from the CMA.

USER PERMISSIONS

To configure the Checkout Management App:
- CMA Admin User

Watch a Demo: Set Up the Checkout Management App

1. Log in to the org where the CMA is installed.
2. Open the App Launcher, and then click **Checkout Management App**.
3. Click **Checkout Setup**.
4. Connect your Stripe account.

a. In the Connect Stripe Account section, click **Do It**.

b. Click **Get API Key from Stripe**.
The Stripe dashboard opens in a new tab.

c. In the Stripe dashboard, copy your live secret API key.

d. In the CMA, paste the key into `Live Secret API Key`, and then click **Connect Stripe Account**.

5. Set up data syncing by creating and configuring a site. After you set up data syncing, new Stripe data syncs to your org automatically.

a. Click **Set Up Data Syncing**.

b. Click **Register a Force.com Domain**, and then follow the setup instructions in the CMA.

c. Click **Create a Force.com Site**, and then follow the setup instructions in the CMA.

d. Click **Configure Site Access**, and then follow the setup instructions in the CMA.

e. Click **Connect the Site to Stripe**, and then follow the setup instructions in the CMA.

6. Import your Stripe data. If you haven't sold an offering using AppExchange Checkout before, you don't have any Stripe data, so you can skip this step.

a. Click **Import Existing Data**.

b. Click **Import Data**.

Importing Stripe data can take awhile depending on how much data you have. Don't use CMA reports or dashboards while data is being imported.

c. After the import finishes, close the dialog to return to the setup wizard.

7. Configure email notifications.

Tip: Before you enable a notification, review the default content we provide. That way, you know exactly what customers and team members receive, and you can tailor it to reflect your company's identity.

a. In the Configure Notification Settings section, click **Do It**.

b. Enable customer notifications as desired.

c. To add the email addresses of team members, click **View/Edit**, and then click **Save**.

d. Enable partner notifications as desired.

e. Go back to the setup wizard.

8. Say hello to your dashboard.

a. In the Meet Your Dashboard section, click **Do It**.

b. View the dashboards we've created for you, or go to Trailhead to learn how to customize dashboards.

You're all set! To update configuration details later, return to Checkout Setup.

SEE ALSO:

Sample Checkout Management App Customizations

Assign Access to the Checkout Management App

Use permission sets to give team members the right level of access to the Checkout Management App (CMA). You can assign the CMA Standard User permission set or CMA Admin User permission set, depending on the features team members must access.

Standard users have read-only access to the dashboard and object records and can't view or update notification settings. System Admins or users with the CMA Admin User permission set have full access to the dashboard, notifications, and objects, including the ability to edit objects. Assign the CMA Admin User permission set only to users who administer or manage the CMA.

USER PERMISSIONS

To assign a permissions set:
- Assign Permission Sets

1. Log in to the org where the CMA is installed.
2. From Setup, enter *Users* in the `Quick Find` box, and then click **Users**.
3. Select a user.
4. In the Permission Set Assignments related list, click **Edit Assignments**.
5. Select the CMA Standard User or CMA Admin User permission set, and then click **Add**.
6. Click **Save**.

Modify a Notification Template in the Checkout Management App

The Checkout Management App (CMA) can send email notifications in response to trial installations, purchases, and other subscription changes. We created default notifications to get you started, but you can tailor templates to your company's needs.

Notification templates in the CMA are based on Visualforce email templates. The templates support advanced customizations, like merge fields and formulas.

Note: Notification templates in the CMA also include custom components that affect email styling. You can't modify these components, but you can remove them.

USER PERMISSIONS

To enable, disable, or customize notifications:
- CMA Admin User

To create or change Visualforce email templates:
- Customize Application

1. Log in to the org where the CMA is installed.
2. Open the App Launcher, and then click **Checkout Management App**.
3. Click **Checkout Notification Settings**.
4. Find the template that you want to customize, and then select **Edit**.
5. Click **Edit Template** and modify as needed, and then click **Save**.

SEE ALSO:

Use an Organization-Wide Address on a Notification

Include a Link in a Notification

Configure Logs in the Checkout Management App

The Checkout Management App (CMA) creates debug logs to help you troubleshoot issues. By default, all logs are saved, but you can configure the CMA to delete logs that you no longer need. Delete logs regularly to stay within the data storage limits for your Salesforce edition.

USER PERMISSIONS

To manage, create, edit, and delete custom settings:
- Customize Application

To save changes to Apex classes and triggers:
- Author Apex

1. Log in to the org where the CMA is installed.
2. Configure how long to save CMA logs.
   a. From Setup, enter *Custom Settings* in the Quick Find box, and then click **Custom Settings**.
   b. For CMALogSettings, click **Manage**.
   c. Click **New**.
   d. Enter a name. For example, *CMA Log Settings*.
   e. For CMALogLifeSpan, enter how many days to save logs. For example, enter *30* to save all logs created in the past 30 days.

   Note: To change how long CMA logs are saved, edit the value configured in this step. Don't add more values to CMALogSettings.
3. Schedule an Apex job to delete old CMA logs.
   a. From Setup, enter *Apex Classes* in the Quick Find box, and then click **Apex Classes**.
   b. Click **Schedule Apex**.
   c. Configure the job as follows.

Field	Value
Job Name	CMA Log Cleanup
Apex Class	ScheduledDeleteCMALogs Note: Namespace prefix: sfcma
Frequency	Specify a weekly or monthly interval—we recommend running the job at least once per week
Start Date	Today's date
End Date	A future date—we recommend specifying a date that's at least several years in the future
Preferred Start Time	Any value—we recommend choosing a time when your org is not under heavy load

   d. Click **Save**.

Sample Checkout Management App Customizations

The Checkout Management App (CMA) is a powerful tool out of the box, but gets even better when you customize it. These examples show how you can modify dashboards and email notifications to delight customers and team members.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

Use an Organization-Wide Address on a Notification

By default, notifications sent by the Checkout Management App (CMA) include a generic email address in the From field. But what if you want to include contact information for a specific team at your company, like support or billing? You can specify an organization-wide address on a notification so that customer replies are directed to the right people at your company.

Include a Link in a Notification

When a customer installs your offering, you often want to provide information that doesn't fit in the notification, such as setup documentation. You can point customers to this information by including links in a Checkout Management App (CMA) notification.

Customize a Report to Show Annual Revenue for an Offering

If the Checkout Management App (CMA) dashboard doesn't show what you need out of the box, try modifying a report. This example steps you through how to display annual revenue for an offering instead of monthly revenue across all offerings.

Use an Organization-Wide Address on a Notification

By default, notifications sent by the Checkout Management App (CMA) include a generic email address in the From field. But what if you want to include contact information for a specific team at your company, like support or billing? You can specify an organization-wide address on a notification so that customer replies are directed to the right people at your company.

Suppose that your company's refund inquiries are fielded by a billing specialist whose email address is `billing@example.com`. Let's step through how to add this email address to the Refund Notification template so that customers know who to contact if they have questions.

USER PERMISSIONS

To enable, disable, or customize notifications:
- CMA Admin User

To configure organization-wide addresses:
- Modify All Data

1. Log in to the org where the CMA is installed.
2. Create an organization-wide email address.
   a. From Setup, enter *`Organization-Wide Addresses`* in the `Quick Find` box, and then click **Organization-Wide Addresses**.
   b. Click **Add**.
   c. For the display name, enter a word or phrase that users who receive the email see as the sender. For this example, enter *`Billing Support`*.
   d. Enter an email address. For this example, enter *`billing@example.com`*.
   e. Choose which profiles can use the address. For this example, enable the address for all profiles.
   f. Click **Save**.
3. Add the organization-wide email address to the notification template.
   a. From Setup, enter *`Email Alerts`* in the `Quick Find` box, and then click **Email Alerts**.
   b. Find the notification template that you want to update, and then click **Edit**. For this example, choose the Refund Customer Notification template.
   c. For `From Email Address`, choose an organization-wide email address. For this example, choose *`"Billing Support" <billing@example.com>`*.

4. Click **Save**.

Include a Link in a Notification

When a customer installs your offering, you often want to provide information that doesn't fit in the notification, such as setup documentation. You can point customers to this information by including links in a Checkout Management App (CMA) notification.

Suppose that you sell a product that requires configuration after it's installed. To help customers get off on the right foot, direct them to a page on your website that offers configuration tips. Let's step through how to add a link to the Free Trial Signup template.

USER PERMISSIONS

To enable, disable, or customize notifications:
- CMA Admin User

To create or change Visualforce email templates:
- Customize Application

1. Log in to the org where the CMA is installed.
2. Open the App Launcher, and then click **Checkout Management App**.
3. Click **Checkout Notification Settings**.
4. Find the template that you want to use, and then click **Edit**. For this example, choose the Free Trial Signup template.
5. Click **Edit Template**.
6. Modify the email template to include the `<apex:outputLink>` component, which lets you point to an external URL. For this example, add this component after the last sentence in the message body.

```
<apex:outputLink value="https://example.com/getstarted" target="_blank">Check out our
website for configuration tips.</apex:outputLink>
```

Note: The `target` attribute is set to blank, which opens the URL in a new page.

7. Click **Save**.

Customize a Report to Show Annual Revenue for an Offering

If the Checkout Management App (CMA) dashboard doesn't show what you need out of the box, try modifying a report. This example steps you through how to display annual revenue for an offering instead of monthly revenue across all offerings.

USER PERMISSIONS

To customize CMA reports:
- CMA Admin User

To create, edit, and delete reports:
- Create and Customize Reports

  AND

  Report Builder

1. Log in to the org where the CMA is installed.
2. Open the App Launcher, and then click **Checkout Management App**.
3. Click **Dashboards**, and then click **CMA Dashboard**.
4. For the Revenue Per Month chart, click **View Report**.
5. From the Edit drop-down list, select **Clone**.
6. Specify field values as follows, and then click **Create**.

Field Name	Value
`Name`	*`Revenue Per Year`* To keep your dashboard organized, include the name of your offering. For example, Revenue Per Year (Sample App).
`Folder`	CMA Reports

7. Click **Edit**.
8. Add a filter to display revenue for a specific offering.
   a. From the Add drop-down list, select **Field Filter**.
   b. Enter filter criteria. To display revenue only for listings named Sample App, create the filter `Listing Name equals Sample App`.
   c. Click **OK**.
9. In the Preview section, from the Activation Date drop-down list, select **Group Dates By** > **Calendar Year**.
   Now the report is set up to show annual revenue instead of revenue by month.
10. Click **Save**, and then click **Run Report**.

Update Settings in the Checkout Management App

Control when customers and team members receive emails from the Checkout Management App (CMA). You can also change the Stripe account associated with the CMA and manually reimport your data into your Salesforce org. Only admin users can update settings in the CMA.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

Change Notification Settings in the Checkout Management App

You can enable or disable individual Checkout Management App (CMA) email notifications depending on your customers' and team members' needs.

Change the Stripe Account Associated with the Checkout Management App

If you start managing subscriptions from another Stripe account, update your account settings in the Checkout Management App (CMA) to keep Stripe data in sync.

Reimport Stripe Data into the Checkout Management App

The Checkout Management App (CMA) automatically pulls new Stripe data into your org, so usually you don't need to import anything manually. However, if data in the CMA is missing or incorrect, you can manually reimport Stripe data.

Change Notification Settings in the Checkout Management App

You can enable or disable individual Checkout Management App (CMA) email notifications depending on your customers' and team members' needs.

USER PERMISSIONS

To enable, disable, or customize notifications:
- CMA Admin User

1. Log in to the org where the CMA is installed.
2. Open the App Launcher, and then click **Checkout Management App**.
3. Click **Notification Settings**.
4. Enable or disable a customer or partner notification.

SEE ALSO:

Modify a Notification Template in the Checkout Management App

Change the Stripe Account Associated with the Checkout Management App

If you start managing subscriptions from another Stripe account, update your account settings in the Checkout Management App (CMA) to keep Stripe data in sync.

USER PERMISSIONS

To configure the Checkout Management App:
- CMA Admin User

1. Log in to the org where the CMA is installed.
2. Open the App Launcher, and then click **Checkout Management App**.
3. Click **Checkout Setup**.
4. In the Connect Stripe Account section, click **Change**.
5. Note: If you change or disconnect the current Stripe account, existing Stripe data in your org remains.

   To associate a new Stripe account, click **Change Stripe Account**, and then enter a new live secret API key.

Reimport Stripe Data into the Checkout Management App

The Checkout Management App (CMA) automatically pulls new Stripe data into your org, so usually you don't need to import anything manually. However, if data in the CMA is missing or incorrect, you can manually reimport Stripe data.

USER PERMISSIONS

To configure the Checkout Management App:
- CMA Admin User

Warning: The reimport process overwrites existing Stripe data in your org. Changes you've made to existing data are lost. Report and dashboard customizations and notification settings aren't affected.

1. Log in to the org where the CMA is installed.
2. Open the App Launcher, and then click **Checkout Management App**.
3. Click **Checkout Setup**.
4. In the Import Existing Data section, select **Re-import Data**.
5. Confirm that you want to overwrite the existing Stripe data, and then click **Yes, Reimport Data**.

View Checkout Management App Logs

The Checkout Management App (CMA) creates logs when connecting to Stripe or syncing your data. If you experience issues with the CMA, view logs to help diagnose their cause.

USER PERMISSIONS

To manage apps:
- Customize Application

To view CMA logs:
- CMA Admin User

1. Log in to the org where the CMA is installed.
2. To view CMA logs in Lightning Experience:
   a. Open the App Launcher, and click **Other Items**.
   b. Click **Checkout Logs**.
3. To view CMA logs in Salesforce Classic:
   a. Open the App Launcher, and click **Checkout Management App**.
   b. Click the plus icon (+) next to the main tabs.

   c. Click **Checkout Logs**.

CHAPTER 9 Monitor Performance with Analytics for AppExchange Partners

In this chapter ...

- Monitor AppExchange Listing Performance with Marketplace Analytics
- AppExchange App Analytics

Discover how customers find and interact with your AppExchange listing in the Marketplace Analytics dashboard. Learn how subscribers use your package by exploring App Analytics data.

Monitor AppExchange Listing Performance with Marketplace Analytics

View trends and metrics in Marketplace Analytics to discover how customers find and interact with your AppExchange listings.

Marketplace Analytics Dashboard

The Marketplace Analytics dashboard uses metrics, trends, and visualizations to show how customers find and interact with your AppExchange listing. For AppExchange Marketing Program (AMP) participants, the dashboard provides insights about the performance of your promotions.

Get Started with the Marketplace Analytics Dashboard

View the Marketplace Analytics dashboard to see how your AppExchange listing is performing. To allow team members to view the dashboard, assign them permission in the Partner Community. To explore data outside of the dashboard, export it. To give feedback about the dashboard, use the Marketplace Analytics feedback tool.

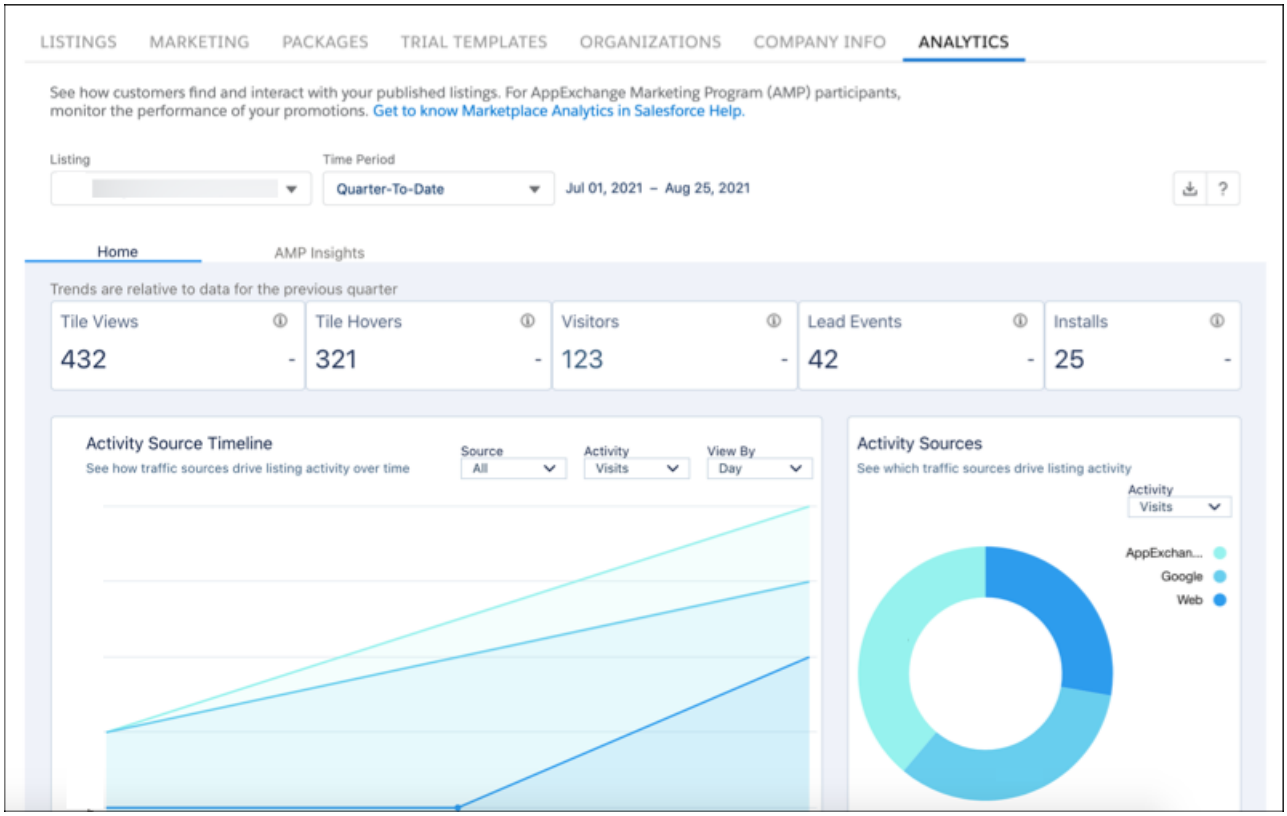
Marketplace Analytics FAQs

Here are some answers to frequently asked questions about Marketplace Analytics.

Marketplace Analytics Dashboard

The Marketplace Analytics dashboard uses metrics, trends, and visualizations to show how customers find and interact with your AppExchange listing. For AppExchange Marketing Program (AMP) participants, the dashboard provides insights about the performance of your promotions.

Note: Marketplace Analytics is available to eligible Salesforce partners. For more information on the Partner Program, including eligibility requirements, visit https://partners.salesforce.com.



Check the dashboard to discover:

- How often customers view or hover over your listing
- How traffic sources, such as Google Ads, contribute to activity on your listing
- The AppExchange search terms that customers use to find your listing
- Which resources, such as screenshots, customers click or view as they explore your listing
- How your AMP promotions contribute to listing activity

Use these details to shape your AppExchange marketing strategy and drive more leads, installs, and purchases.

Activity Summary in the Marketplace Analytics Dashboard

Use the activity summary to check your AppExchange listing's key metrics. On the Home page, the key metrics are tile views, tile hovers, visitors, lead events, and installs. On the AMP Insights page, the key metrics are sponsored tile views, sponsored tile hovers, visitors, lead events, and installs. Each metric includes a trend indicator to compare how your listing is performing relative to previous time periods.

Filters in the Marketplace Analytics Dashboard

Use filters to focus on the AppExchange listing data that interests you. Global filters, such as the time period, affect all components in the dashboard. Local filters, such as the source, affect individual visualizations.

Visualizations in the Marketplace Analytics Dashboard

Use visualizations to explore your AppExchange listing's data. Activity Source Timeline and Customer Engagement show how and when customers interact with your listing and its resources. Activity Sources and Top AppExchange Searches show total activity over time. Activity Summary by Region shows how customers around the world and within the United States interact with your listing and its resources. Lead Events Timeline and Lead Events show the contribution of specific listing activities to overall lead events. Chat Engagement shows how customers interact with your AppExchange Chat implementation.

Marketplace Analytics CSV Files

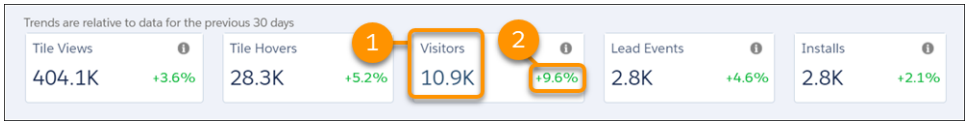
You can export data from the Marketplace Analytics dashboard in comma-separated value (.csv) format. When you export data, Marketplace Analytics creates a separate .csv file for each dashboard visualization and then packages all the files in a .zip file.

What's the Difference Between Lead Events and Leads in Marketplace Analytics?

Learn how we define lead events for your AppExchange listing and how they differ from the leads that appear in your Salesforce org.

Activity Summary in the Marketplace Analytics Dashboard

Use the activity summary to check your AppExchange listing's key metrics. On the Home page, the key metrics are tile views, tile hovers, visitors, lead events, and installs. On the AMP Insights page, the key metrics are sponsored tile views, sponsored tile hovers, visitors, lead events, and installs. Each metric includes a trend indicator to compare how your listing is performing relative to previous time periods.



Note: Customers can hover over listing tiles on AppExchange's category, collection, and search result pages. Similarly, customers can hover over sponsored listing tiles on category and collection pages. Tile hover and sponsored tile hover actions aren't available on home page listing tiles.

Element	Description
Metric (1)	Number of times that an event or interaction occurred during a time period. For values over 1,000, the dashboard shows a rounded number. To view the exact number, hover over the metric.
Trend Indicator (2)	Percentage change relative to a previous time period. A positive value represents a period-over-period increase, and a negative value represents a period-over-period decrease.

The default time period is 30 days, but you can choose another fixed time period or define a custom one.

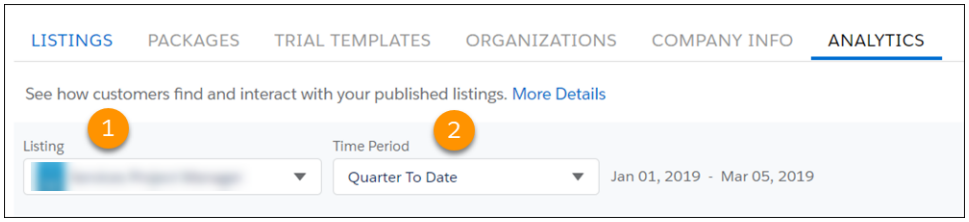
Example:

This summary of the example solution called Appy's Maps shows that it received 98,000 tile views (3) in the past 7 days, which is a 3.6% increase (4) compared to the previous 7-day period (5).

Filters in the Marketplace Analytics Dashboard

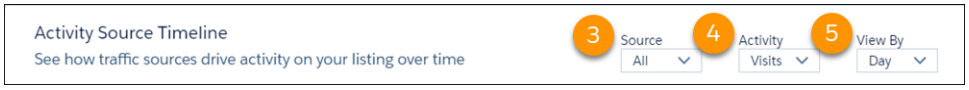
Use filters to focus on the AppExchange listing data that interests you. Global filters, such as the time period, affect all components in the dashboard. Local filters, such as the source, affect individual visualizations.

Global Filters



Global Filter	Description
Listing (1)	Select an AppExchange listing to view. You can view only your company's published listings in the dashboard.
Time Period (2)	Select the time period that you want to explore. You can select one of the fixed time periods, such as the last quarter, or you can define a custom period. The time period's start and end dates appear next to the filter.

Local Filters



Local Filter	Description	Visualization
Source (3)	Select the traffic sources to show in the visualization. Traffic sources help you understand where an activity on your AppExchange listing originated, such as an AppExchange search or a Facebook ad.	• Activity Source Timeline • Activity Summary by Region
Activity (4)	Select the activity metrics to show in the visualization. An activity metric tells you how often an event or interaction occurred on your AppExchange listing.	• Activity Source Timeline • Activity Sources • Activity Summary by Region • AMP Performance Timeline • Chat Engagement • Customer Engagement • Top AppExchange Searches

Local Filter	Description	Visualization
View By (5)	Adjust the time scale of the visualization, such as days, weeks, months, or quarters. In the x-axis of a visualization, weeks are formatted as Wn, where n is a week number. For example, W1 represents the first week of the year. Likewise, quarters are formatted as Qn, where n is a quarter number. For example, Q4 represents the fourth quarter of the year. For both weeks and quarters, the year starts on January 1.	• Activity Source Timeline • AMP Performance Timeline • Chat Engagement • Customer Engagement • Lead Events Timeline
Lead Type	Select the types of lead events to show in the visualization, such as lead events from demo views. Note: Marketplace Analytics categorizes lead events by listing activity starting on April 16, 2021. Before that date, we show only historical lead events.	• Lead Events Timeline • Lead Events
Promotion Name	Select the AppExchange Marketing Program (AMP) promotions to show in the visualization.	• AMP Performance Timeline

Visualizations in the Marketplace Analytics Dashboard

Use visualizations to explore your AppExchange listing's data. Activity Source Timeline and Customer Engagement show how and when customers interact with your listing and its resources. Activity Sources and Top AppExchange Searches show total activity over time. Activity Summary by Region shows how customers around the world and within the United States interact with your listing and its resources. Lead Events Timeline and Lead Events show the contribution of specific listing activities to overall lead events. Chat Engagement shows how customers interact with your AppExchange Chat implementation.

Activity Source Timeline

See how internal and external traffic sources contribute to activity on your AppExchange listing over a specific time period. Internal traffic originates on the AppExchange website, such as a customer who clicks a personalized recommendation to reach your listing. External traffic originates outside of AppExchange, such as a customer who clicks a Facebook ad to reach your listing.

Activity Sources

See how traffic sources drive activity on your AppExchange listing. To see a breakdown of activities for a specific day, week, month, or quarter, use the Activity Source Timeline.

Customer Engagement

See how customers interact with your listing and its resources over time. Resources include screenshots, demos, test drives, and other items that you've added to your listing in the Publishing Console.

Top AppExchange Searches

See the 10 search terms that result in the most activity on your listing. Only searches performed with the search bar on the AppExchange website are included. Search terms from external search engines aren't available.

Activity Summary by Region

See how internal and external traffic sources contribute to activity on your AppExchange listing around the world and within the United States. Internal traffic originates on the AppExchange website, such as a customer who clicks a personalized recommendation to reach your listing. External traffic originates outside of AppExchange, such as a customer who clicks a Facebook ad to reach your listing.

Lead Events Timeline

See the activities that drive lead events on your AppExchange listing.

Lead Events

See the activities that drive lead events on your AppExchange listing. To see a breakdown of lead events over time, use the Lead Events Timeline.

Chat Engagement

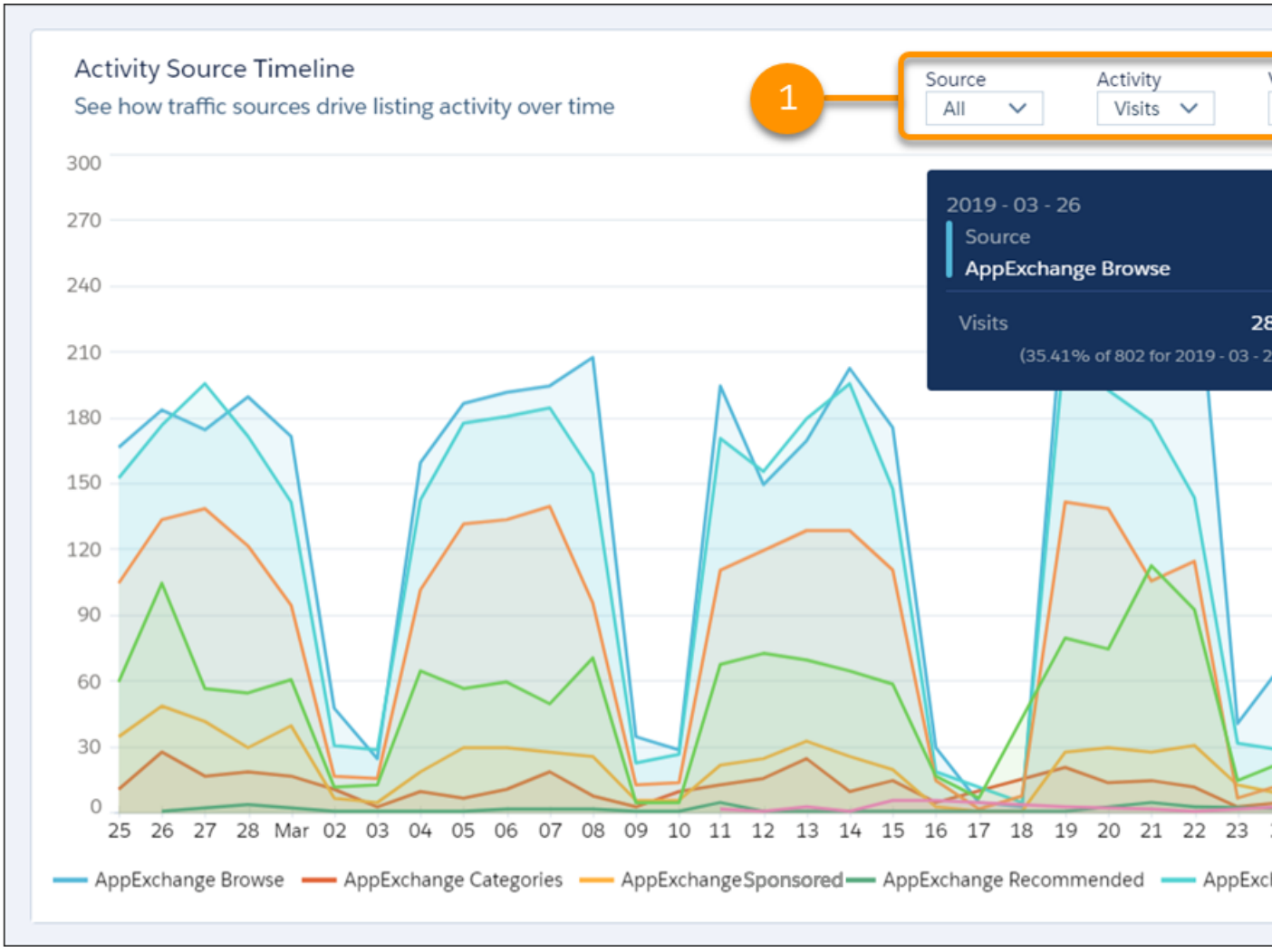
See how customers interact with your AppExchange Chat experiences, such as the number of conversations that your sales reps hosted.

AMP Performance Timeline

See how your AppExchange Marketing Program (AMP) promotions contribute to listing activity over time.

Activity Source Timeline

See how internal and external traffic sources contribute to activity on your AppExchange listing over a specific time period. Internal traffic originates on the AppExchange website, such as a customer who clicks a personalized recommendation to reach your listing. External traffic originates outside of AppExchange, such as a customer who clicks a Facebook ad to reach your listing.



To change traffic sources, activities, or time scale, adjust the local filters (1). The y-axis resizes based on the traffic sources and activities that you select. To resize the x-axis, change the View By filter. To see exact values, hover over a line in the chart (2).

If the visualization doesn't display data, try filtering by different metrics, or change the time period.

Definitions

Here's how we define the metrics that appear in this visualization.

Metric	Description
Installs	Installs of your solution initiated on AppExchange, your website, or from a code repository. For AppExchange installs, we count the number of successful completions of the Get It Now installation flow. Includes installs in production and sandbox orgs.
Lead Events	Lead events on your listing. Events include: demos, test drives, chat interactions, Learn More clicks, and Get It Now clicks or installs. A customer who clicks Get It Now and then installs your solution is counted as a single lead event.
Tile Hovers	Hovers over your listing tile. To qualify as a hover, the customer must pause long enough over the tile to display the listing detail popover. The count includes repeat hovers by the customer. Note: Customers can hover over listing tiles on AppExchange's category, collection, and search pages. The tile hover action isn't available on home page listing tiles.
Tile Views	Views of your listing tile. To qualify as a view, the entire tile must be visible in the customer's browser. Includes any repeat views by the customer.
Visits	Visits to your listing. Includes repeat visits by the customer.

These internal traffic sources are associated with activities.

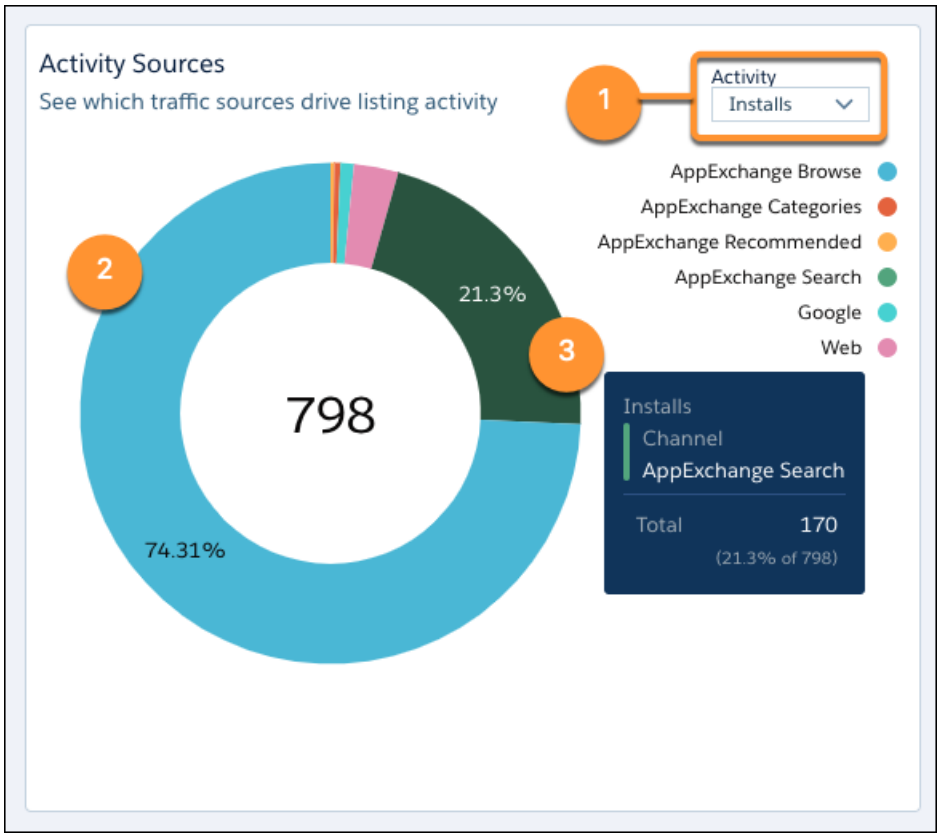
Traffic Source	Description
AppExchange Browse	Activity by customers who reached your listing from areas of AppExchange that aren't included in other sources. For example, a customer who browses a Product Collection, an Industry Collection, or the AppExchange home page.
AppExchange Categories	Activity by customers who reached your listing from one of AppExchange's Solutions by Type categories.
AppExchange Sponsored	Activity by customers who reached your listing from AppExchange's Sponsored Solutions section.
AppExchange Recommended	Activity by customers who reached your listing from an AppExchange personalized recommendation. Includes Recommended for You and Appy's Picks for You.
AppExchange Search	Activity by customers who reached your listing from a search made using the AppExchange search bar.

These external traffic sources are associated with activities.

Traffic Source	Description
Facebook	Activity by customers who reached your listing from a Facebook page or ad. Includes organic traffic and traffic from ads shown on the Facebook site or Facebook's Audience Network.
Google	Activity by customers who reached your listing from a Google search or ad. Includes organic search traffic and traffic from ads shown on the Google Search Network or Google Display Network.
Web	Activity by customers who reached your listing from a web source that isn't affiliated with Facebook or Google. Includes traffic from your company's website.

Activity Sources

See how traffic sources drive activity on your AppExchange listing. To see a breakdown of activities for a specific day, week, month, or quarter, use the Activity Source Timeline.



To change activities, adjust the local filter (1). The percentage (2) within a chart segment represents the contribution of the traffic source to the activity's total. To see exact values, hover over a chart segment (3).

If the visualization doesn't display data, try filtering by different metrics, or change the time period.

Definitions

Here's how we define the metrics that appear in this visualization.

Metric	Description
Demos	Demo button clicks associated with the search term.
Installs	Installs associated with the search term. Qualifying installs include those initiated on AppExchange, your website, or from a code repository. For AppExchange installs, the number represents successful completions of the Get It Now installation flow, and includes installs in production and sandbox orgs.
Lead Events	Lead events associated with the search term. Lead events include: demos, test drives, chat interactions, Learn More clicks, and Get It Now clicks or installs. A customer who clicks Get It Now and then installs your solution is counted as a single lead event.
Test Drives	Test drive button clicks associated with the search term.
Visits	Unique listing visits associated with the search term.

These internal traffic sources are associated with activities.

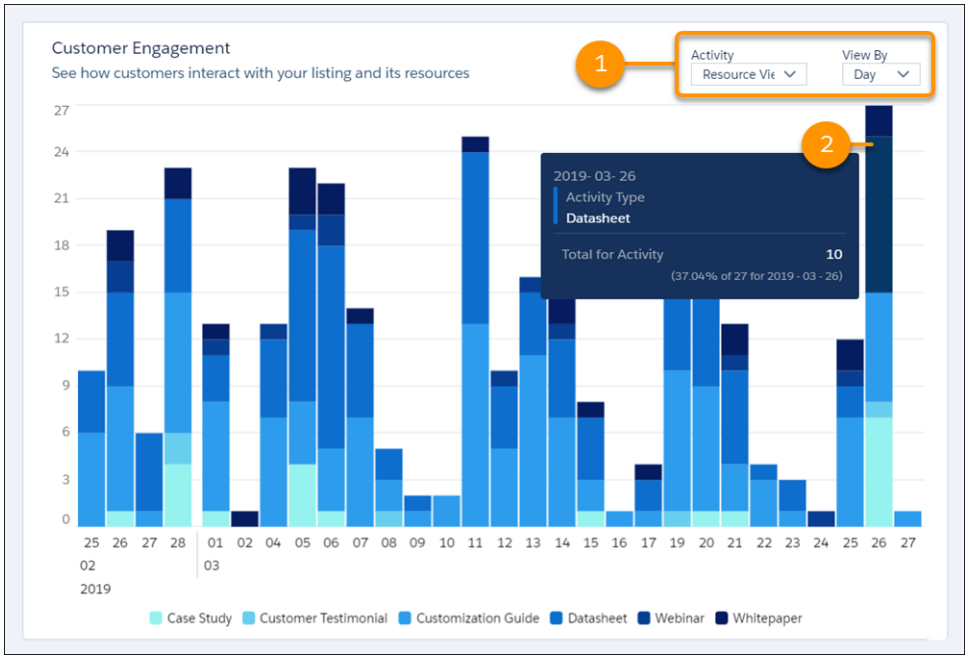
Traffic Source	Description
AppExchange Browse	Activity by customers who reached your listing from areas of AppExchange that aren't included in other sources. For example, a customer who browses a Product Collection, an Industry Collection, or the AppExchange home page.
AppExchange Categories	Activity by customers who reached your listing from one of AppExchange's Solutions by Type categories.
AppExchange Sponsored	Activity by customers who reached your listing from AppExchange's Sponsored Solutions section.
AppExchange Recommended	Activity by customers who reached your listing from an AppExchange personalized recommendation. Includes Recommended for You and Appy's Picks for You.
AppExchange Search	Activity by customers who reached your listing from a search made using the AppExchange search bar.

These external traffic sources are associated with activities.

Traffic Source	Description
Facebook	Activity by customers who reached your listing from a Facebook page or ad. Includes organic traffic and traffic from ads shown on the Facebook site or Facebook's Audience Network.
Google	Activity by customers who reached your listing from a Google search or ad. Includes organic search traffic and traffic from ads shown on the Google Search Network or Google Display Network.
Web	Activity by customers who reached your listing from any web source that isn't affiliated with Facebook or Google. Includes traffic from your company's website.

Customer Engagement

See how customers interact with your listing and its resources over time. Resources include screenshots, demos, test drives, and other items that you've added to your listing in the Publishing Console.



To change activities or the time scale, adjust the local filters (1). The y-axis resizes based on the activities that you select. To resize the x-axis, change the View By filter. To see exact values, hover over a chart segment (2).

If the visualization doesn't display data, try filtering by different metrics, or change the time period.

Definitions

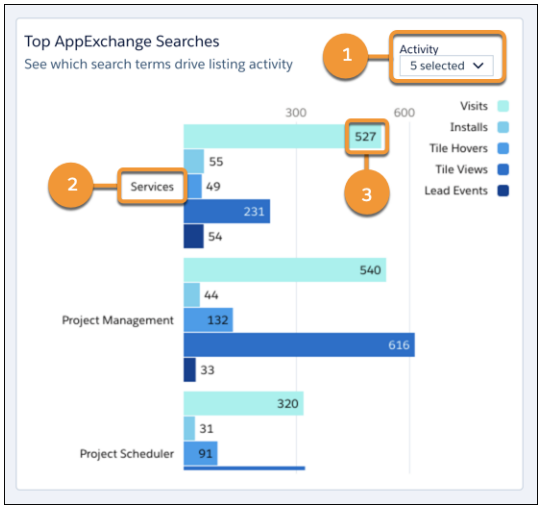
Here's how we define the metrics that appear in this visualization.

Metric	Description
Case Studies	Views of your listing's case studies.
Customization Guides	Views of your listing's customization guides.
Data Sheets	Views of your listing's data sheets.
Demos	Clicks on your listing's Watch Demo button.
Get It Nows	Clicks on your listing's Get It Now button. Customers who click the button start the Get It Now installation flow, but might not complete it.
Tile Hovers	Hovers over your listing tile. To qualify as a hover, the customer must pause long enough over the tile to display the listing detail popover. Includes repeat hovers by the customer. Note: Customers can hover over listing tiles on AppExchange's category, collection, and search pages. The tile hover action isn't available on home page listing tiles.

Metric	Description
Installs	Installs of your solution initiated on AppExchange, your website, or from a code repository. For AppExchange installs, we count the number of successful completions of the Get It Now installation flow. Includes installs in production and sandbox orgs.
Lead Events	Lead events on your listing. Events include: demos, test drives, chat interactions, Learn More clicks, and Get It Now clicks or installs. A customer who clicks Get It Now and then installs your solution is counted as a single lead event.
Saves	Clicks on your listing's Save button.
Screenshot *n*	Views of screenshot number *n*. This number corresponds to the number shown in the image carousel on your listing.
Test Drives	Clicks on your listing's Test Drive button.
Testimonials	Views of your listing's testimonials.
Tile Views	Views of your listing tile. To qualify as a view, the entire tile must be visible in the customer's browser. Includes repeat views by the customer.
Webinars	Views of your listing's webinars.
White Papers	Views of your listing's white papers.
Visits	Visits to your listing. Includes repeat visits by the customer.

Top AppExchange Searches

See the 10 search terms that result in the most activity on your listing. Only searches performed with the search bar on the AppExchange website are included. Search terms from external search engines aren't available.



Select the activities that you want to view (1). The search term (2) associated with the activities appears on the left of the chart. Activity metric values appear on the right (3).

Depending on your filter selections, some search terms might not be visible. To see all available search terms, position your pointer over the visualization and scroll down.

If the visualization doesn't display data, try filtering by different metrics, or change the time period.

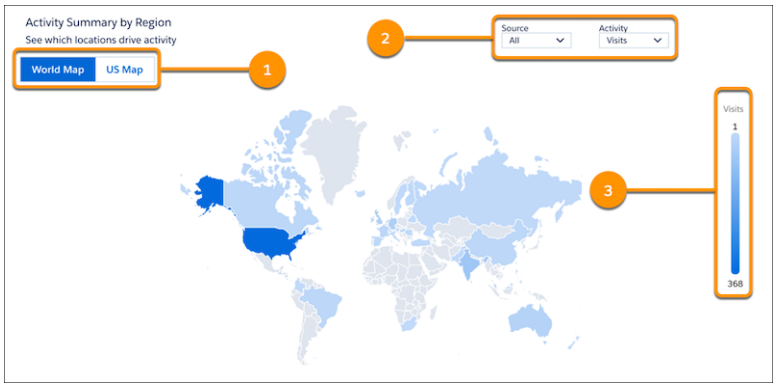
Definitions

Here's how we define the metrics that appear in this visualization.

Metric	Description
Installs	Installs of your solution initiated on AppExchange, your website, or from a code repository. For AppExchange installs, we count the number of successful completions of the Get It Now installation flow. Includes installs in production and sandbox orgs.
Lead Events	Lead events on your listing. Events include: demos, test drives, chat interactions, Learn More clicks, and Get It Now clicks or installs. A customer who clicks Get It Now and installs your solution is counted as a single lead event.
Tile Hovers	Hovers over your listing tile. To qualify as a hover, the customer must pause long enough over the tile to display the listing detail popover. Includes any repeat hovers by the customer. Note: Customers can hover over listing tiles on AppExchange's category, collection, and search pages. The tile hover action isn't available on home page listing tiles.
Tile Views	Views of your listing tile. To qualify as a view, the entire tile must be visible in the customer's browser. Includes any repeat views by the customer.
Visitors	Unique listing visitors. If a customer visits your listing more than once in a 30-day period, only a single visitor is counted.

Activity Summary by Region

See how internal and external traffic sources contribute to activity on your AppExchange listing around the world and within the United States. Internal traffic originates on the AppExchange website, such as a customer who clicks a personalized recommendation to reach your listing. External traffic originates outside of AppExchange, such as a customer who clicks a Facebook ad to reach your listing.



View data by country or by US state or territory. To view data by country, select the World Map; to view data by US state or territory, select the US Map (1). To change traffic sources or activities, adjust the local filters (2). Notice that the gradient displays the range of

values for the activity you select (3). To see detailed metrics for a selected area on the World Map, hover over a country. Or on the US Map, hover over a state or territory.

If the visualization doesn't display data, try filtering by different metrics.

Definitions

Here's how we define the metrics that appear in this visualization.

Metric	Description
Installs	Installs of your solution initiated on AppExchange, your website, or from a code repository. For AppExchange installs, we count the number of successful completions of the Get It Now installation flow. Includes installs in production and sandbox orgs.
Lead Events	Lead events on your listing. Events include: demos, test drives, chat interactions, Learn More clicks, and Get It Now clicks or installs. A customer who clicks Get It Now and then installs your solution is counted as a single lead event.
Tile Hovers	Hovers over your listing tile. To qualify as a hover, the customer must pause long enough over the tile to display the listing detail popover. The count includes repeat hovers by the customer. Note: Customers can hover over listing tiles on AppExchange's category, collection, and search pages. The tile hover action isn't available on home page listing tiles.
Tile Views	Views of your listing tile. To qualify as a view, the entire tile must be visible in the customer's browser. Includes any repeat views by the customer.
Visits	Visits to your listing. Includes repeat visits by the customer.

These internal traffic sources are associated with activities.

Traffic Source	Description
AppExchange Browse	Activity by customers who reached your listing from areas of AppExchange that aren't included in other sources. For example, a customer who browses a Product Collection, an Industry Collection, or the AppExchange home page.
AppExchange Categories	Activity by customers who reached your listing from one of AppExchange's Solutions by Type categories.
AppExchange Sponsored	Activity by customers who reached your listing from AppExchange's Sponsored Solutions section.
AppExchange Recommended	Activity by customers who reached your listing from an AppExchange personalized recommendation. Includes Recommended for You and Appy's Picks for You.
AppExchange Search	Activity by customers who reached your listing from a search made using the AppExchange search bar.

These external traffic sources are associated with activities.

Traffic Source	Description
Facebook	Activity by customers who reached your listing from a Facebook page or ad. Includes organic traffic and traffic from ads shown on the Facebook site or Facebook's Audience Network.
Google	Activity by customers who reached your listing from a Google search or ad. Includes organic search traffic and traffic from ads shown on the Google Search Network or Google Display Network.
Web	Activity by customers who reached your listing from a web source that isn't affiliated with Facebook or Google. Includes traffic from your company's website.

Lead Events Timeline

See the activities that drive lead events on your AppExchange listing.

To change lead type or the time scale, adjust the local filters (1). The y-axis resizes based on the lead type that you select. To resize the x-axis, change the View By filter. To see exact values, hover over a line in the chart (2).

If the visualization doesn't display data, try filtering by different metrics, or change the time period.

Definitions

Here's how we define the metrics that appear in this visualization.

Metric	Description
Chat	A lead event that results from an AppExchange Chat interaction. These interactions include conversations with a human or chatbot and meetings booked. Note: AppExchange Chat is required to view chat data in Marketplace Analytics. This feature is available to eligible Salesforce partners through the AppExchange Marketing Program (AMP). Learn more about AppExchange Chat in the Salesforce Partner Community.
Demo	A lead event that results from a Watch Demo button click.
Get It Now	A lead event that results from a Get It Now button click.

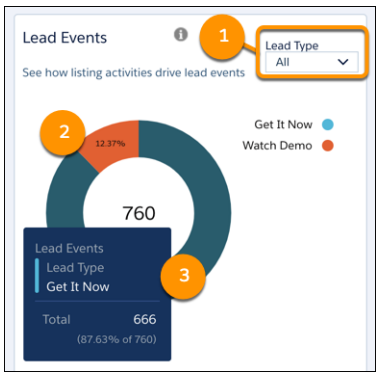
Metric	Description
Learn More	A lead event that results from a Learn More button click.
Historical	A lead event that occurred on your listing before April 16, 2021. Historical lead events are created by test drives, demos, Learn More clicks, and installs or Get It Now clicks, but aren't categorized.
Test Drive	A lead event that results from a Test Drive button click.

Considerations

Marketplace Analytics categorizes lead events by listing activity starting on April 16, 2021. Before that date, we show only *historical* lead events.

Lead Events

See the activities that drive lead events on your AppExchange listing. To see a breakdown of lead events over time, use the Lead Events Timeline.



To change lead types, adjust the local filter (1). The percentage (2) within a chart segment represents the contribution of the lead type to the total number of lead events. To see exact values, hover over a chart segment (3).

Definitions

Here's how we define the metrics that appear in this visualization.

Metric	Description
Chat	A lead event that results from an AppExchange Chat interaction. These interactions include customer conversations with a human or chatbot and meetings booked. **Note:** AppExchange Chat is required to view chat data in Marketplace Analytics. This feature is available to eligible Salesforce partners through the AppExchange Marketing Program (AMP). Learn more about AppExchange Chat in the Salesforce Partner Community.
Demo	A lead event that results from a Watch Demo button click.
Get It Now	A lead event that results from a Get It Now button click.

Metric	Description
Learn More	A lead event that results from a Learn More button click.
Historical	A lead event that occurred on your listing before April 16, 2021. Historical lead events are created by test drives, demos, Learn More clicks, and installs or Get It Now clicks, but aren't categorized.
Test Drive	A lead event that results from a Test Drive button click.

Considerations

Marketplace Analytics categorizes lead events by listing activity starting on April 16, 2021. Before that date, we show only *historical* lead events.

Chat Engagement

See how customers interact with your AppExchange Chat experiences, such as the number of conversations that your sales reps hosted.

Note: AppExchange Chat is required to view chat data in Marketplace Analytics. This feature is available to eligible Salesforce partners through the AppExchange Marketing Program (AMP). Learn more about AppExchange Chat in the Salesforce Partner Community.

To change activities, adjust the local filter (1). To see exact values, hover over a chart segment (2).

If the visualization doesn't display data, first verify that AppExchange Chat is enabled on your listing. Then try filtering by different metrics, or change the time period.

Definitions

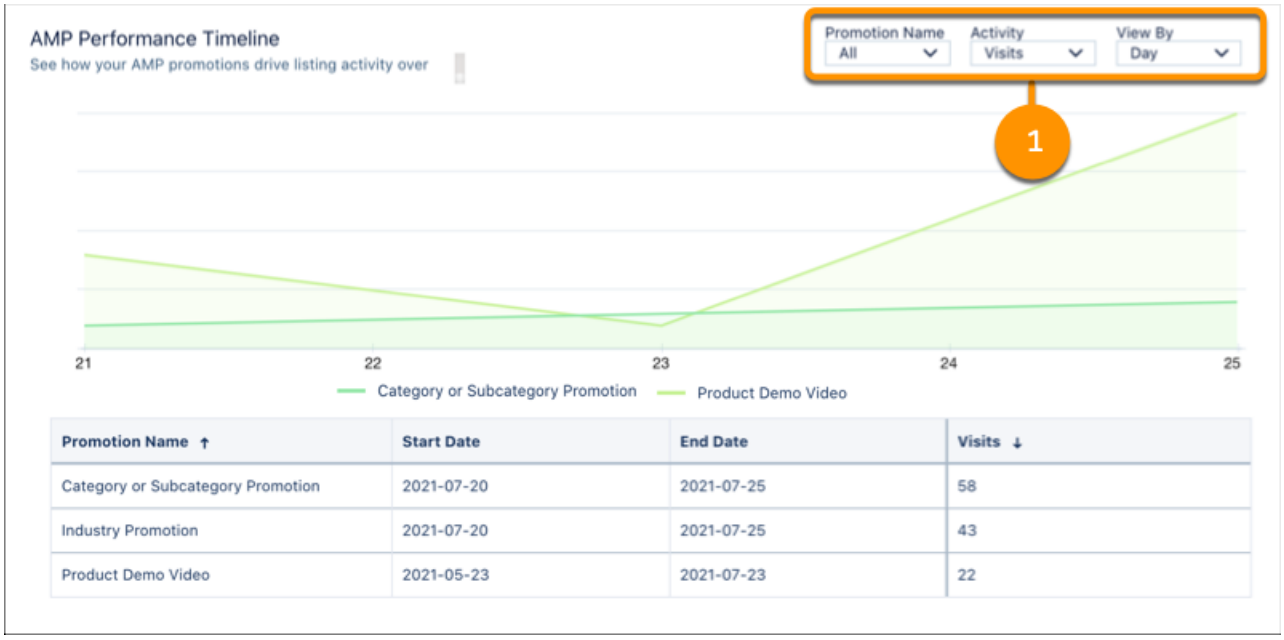
Here's how we define the metrics that appear in this visualization.

Metric	Description
Chat Leads Created	Unique leads passed from AppExchange Chat to your CRM implementation, such as Salesforce or Pardot. A single chat lead can be associated with multiple chat lead events. For example, if a customer chats with your reps several times across multiple listing visits, we record a lead event for each interaction. However, we pass only one chat lead to your CRM. This behavior prevents unwanted duplication of lead records in your CRM.
Chat Lead Event	Lead events on your listing from AppExchange Chat activity, such as human or chatbot conversations.
Chatbot Conversation	Conversations between a customer and a chatbot experience that you configure.
Human Conversation	Real-time conversations between a customer and a rep at your company.
Meetings Booked	Meetings booked with a customer during a live chat or chatbot conversation.

AMP Performance Timeline

See how your AppExchange Marketing Program (AMP) promotions contribute to listing activity over time.

Note: You must participate in the AppExchange Marketing Program to view data in the AMP Performance Timeline. Learn more about AMP on AppExchange.



To change AMP promotions, activities, or time scale, adjust the local filters (1). The y-axis is resized based on the promotions and activities that you select. To resize the x-axis, change the View By filter. To see exact values, hover over a line in the chart.

If the visualization doesn't display data, try filtering by different metrics, or change the time period. Data is available for AMP promotions from August 18, 2021 forward.

Definitions

Here's how we define the metrics that appear in this visualization.

Metric	Description
Installs	Installs of your solution on AppExchange, your website, or from a code repository attributed to an AMP promotion. For AppExchange installs, we count the number of successful completions of the Get It Now installation flow. Includes installations in production and sandbox orgs.
Lead Events	Unique lead events attributed to an AMP promotion. Events include: demos, test drives, chat interactions, Learn More clicks, and Get It Now clicks or installs. A customer who clicks Get It Now and installs your solution is counted as a single lead event.
Visits	Visits to your listing attributed to an AMP promotion. Includes repeat visits by the customer.
Sponsored Tile Hovers	Hovers over your sponsored listing tile. To qualify as a hover, the customer must pause long enough over the tile to display the listing detail popover. Includes any repeat hovers by the customer. Note: Customers can hover over sponsored listing tiles on AppExchange's category and app collection pages. The sponsored hover action isn't available on home page listing tiles.
Sponsored Tile Views	Views of your sponsored listing tile during home page, industry, or category promotions. To qualify as a view, the entire tile must be visible in the customer's browser. Includes any repeat views by the customer.

Marketplace Analytics CSV Files

You can export data from the Marketplace Analytics dashboard in comma-separated value (.csv) format. When you export data, Marketplace Analytics creates a separate .csv file for each dashboard visualization and then packages all the files in a .zip file.

We format .csv files as follows.

- The first row is the header and provides column names. Subsequent rows represent records.
- Within rows, values are separated by commas.
- Negative values are prefixed with a minus sign.

Note: Activity Summary by Region and AMP Performance Timeline data isn't available in .csv format.

Activity Source Timeline File

Provides data from the Activity Source Timeline visualization with your global and local filter selections applied.

Example: This example shows the header row and four rows of sample data. These filters were applied.

- Global filter set to show data for the last 30 days.
- Local filters set to show visits by day for these traffic sources: AppExchange Featured and AppExchange Search.

```
Date,Source,Activity,Count of Activity
2019-01-01,AppExchange Featured,Visits,25
2019-01-01,AppExchange Search,Visits,50
2019-01-02,AppExchange Featured,Visits,30
2019-01-02,AppExchange Search,Visits,60
```

Customer Engagement File

Provides data from the Customer Engagement visualization with your global and local filter selections applied.

Example: This example shows the header row and four rows of sample data. These filters were applied.

- Global filter set to show data for the last 30 days.
- Local filters set to show resource views by day.

```
Date,Activity,Count of Activity
2019-01-01,Customization Guide,10
2019-01-01,Datasheet,20
2019-01-02,Customization Guide,20
2019-01-02,Datasheet,40
```

Activity Sources File

Provides data from the Activity Sources visualization with your global and local filter selections applied.

Example: This example shows the header row and four rows of sample data. These filters were applied.

- Global filter set to show data for the last 30 days.
- Local filter set to show visits.

```
Source,Activity,Count of Activity,Percentage of Total Activity,Rank
AppExchange Browse,Visits,500,20.41,1
AppExchange Categories,Visits,450,18.37,2
AppExchange Search,Visits,400,16.33,3
AppExchange Recommended,350,14.29,4
```

Note: For brevity, this sample shows only four traffic sources: AppExchange Browse, AppExchange Categories, AppExchange Search, and AppExchange Recommended. The file that you export from your dashboard provides all traffic sources.

Top AppExchange Searches File

Provides data from the Top AppExchange Searches visualization with your global and local filter selections applied.

Example: This example shows the header row and four rows of sample data. These filters were applied.

- Global filter set to show data for the last 30 days.
- Local filters set to show the top search terms associated with visits and demos.

```
Search Term,Activity,Count of Activity
Geolocation,Visits,50
Geolocation,Demos,40
Maps,Visits,30
Maps,Demos,20
```

Lead Events Timeline File

Provides data from the Lead Events Timeline visualization with your global and local filter selections applied.

Example: This example shows the header row and four rows of sample data. These filters were applied.

- Global filter set to show data for the last 30 days.

- Local filter set to show Get It Now clicks and demos.

```
Date,Lead Type,Count of Leads
2021-05-03,Get It Now,31
2021-05-03,Watch Demo,3
2021-05-04,Get It Now,40
2021-05-04,Watch Demo,8
```

Lead Events File

Provides data from the Lead Events visualization with your global and local filter selections applied.

Example: This example shows the header row and two rows of sample data. These filters were applied.

- Global filter set to show data for the last 30 days.
- Local filter set to show Get It Now clicks and demos.

```
Lead Type,Count of Leads,Percentage of Total Leads
Get It Now,666,87.6
Watch Demo,94,12.4
```

Chat Engagement File

Provides data from the Chat Engagement visualization with your global and local filter selections applied.

Note: AppExchange Chat is required to view chat data in Marketplace Analytics. This feature is available to eligible Salesforce partners through the AppExchange Marketing Program (AMP). Learn more about AppExchange Chat in the Salesforce Partner Community.

Example: This example shows the header row and four rows of sample data. These filters were applied.

- Global filter set to show data for the last 30 days.
- Local filter set to show conversations.

```
Date,Activity,Type,Total for Activity
2021-05-03,Conversations,Chatbot Conversations,26
2021-05-03,Conversations,Human Conversations,4
2021-05-04,Conversations,Chatbot Conversations,22
2021-05-04,Conversations,Human Conversations,2
```

What's the Difference Between Lead Events and Leads in Marketplace Analytics?

Learn how we define lead events for your AppExchange listing and how they differ from the leads that appear in your Salesforce org.

Marketplace Analytics records a lead event when a customer visits your listing and:

- Watches a demo
- Takes a test drive
- Interacts with AppExchange Chat
- Clicks **Get It Now**
- Clicks **Learn More** (applies only to consultant listings)
- Installs your solution

Note: AppExchange Chat is required to view chat data in Marketplace Analytics. This feature is available to eligible Salesforce partners through the AppExchange Marketing Program (AMP). Learn more about AppExchange Chat in the Salesforce Partner Community.

If you configured Web-to-Lead and enabled lead collection for the listing, each of these activities also creates a lead in your org. However, custom lead routing rules, customer contact preferences, and Web-to-Lead reCaptcha can cause the number of leads in your org to differ from the number of lead events shown in Marketplace Analytics.

Custom Lead Routing Rules

Typically, you set up custom lead routing rules to prevent duplicate or unwanted leads from reaching your sales team. Here are some common examples of routing rules where Marketplace Analytics lead events aren't recorded as leads in your org.

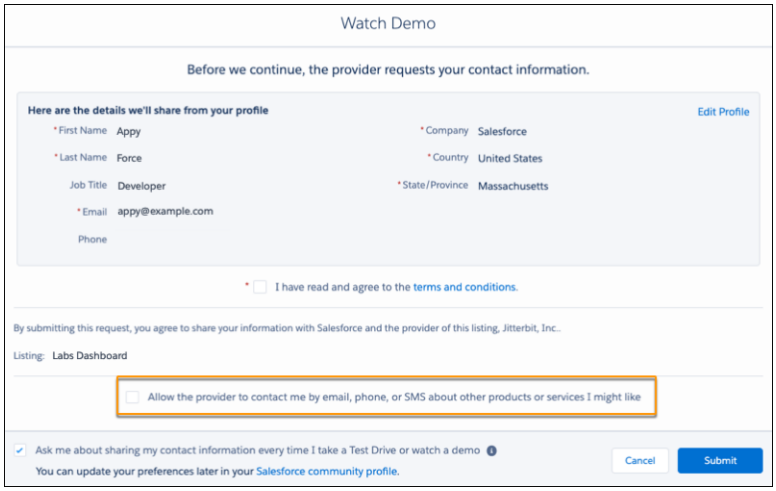
Lead Routing Rule	Example	Marketplace Analytics	Your Org
Domain Restriction You filter leads from customers whose email address includes your company's domain.	An employee at your company watches your listing's demo video and uses a company email address when AppExchange asks for contact information. In this scenario, Marketplace Analytics records a lead event, but the lead routing rule filters the lead in your org.	A lead event is recorded.	A lead isn't recorded. The lead routing rule filters out the lead.
Duplicate Email Addresses You filter leads associated with an email address that's been captured in an existing lead.	A new customer goes to your listing and watches a video, takes a test drive, and installs your solution. For each activity, the customer provides the same email address. In this scenario, Marketplace Analytics records three lead events: one for each activity. In your org, the lead routing rule creates a lead for the first activity. The others are marked as duplicates because they're associated with the same email address.	Three lead events are recorded, one for each activity.	A lead is created for the first activity only. The others are marked as duplicates because they're associated with the same email address.

Trailblazer.me Contact Preferences

In a customer's Trailblazer.me settings, the customer can choose to share their contact info with, and allow contact from, AppExchange providers. Their choices impact lead creation in your org. For customers who allow provider contact, AppExchange lead events are recorded in Marketplace Analytics and propagate to your org as leads. Here are common examples of how contact preferences impact lead creation.

Trailblazer.me Contact Preference	Example	Marketplace Analytics	Your Org
Allow	A prospect who allows provider contact watches your listing's demo video.	A lead event is recorded.	If custom lead routing rules don't filter out the lead, then a lead is created in your org.
Prohibit	A prospect who prohibits provider contact takes a test drive of your solution.	A lead event is recorded.	If custom lead routing rules don't filter out the lead, then a lead is created in your org. The lead is flagged as contact prohibited.

Customers can override their default Trailblazer.me contact preferences when interacting with AppExchange listings. AppExchange recognizes when a customer interacts with your listing in a way that you chose to collect leads for. These customers are prompted to fill out the AppExchange lead sign-up form.



The form prepopulates with the customer's contact info and preferences from their Trailblazer.me settings. On the form, the customer can choose to allow or prohibit provider contact, effectively overriding the contact preference that they set in their Trailblazer.me profile.

Web-to-Lead reCaptcha Verification

To receive AppExchange leads, disable Require reCaptcha Verification in your org's Web-to-Lead settings.

SEE ALSO:

- Collect AppExchange Leads
- Troubleshoot AppExchange Leads

Get Started with the Marketplace Analytics Dashboard

View the Marketplace Analytics dashboard to see how your AppExchange listing is performing. To allow team members to view the dashboard, assign them permission in the Partner Community. To explore data outside of the dashboard, export it. To give feedback about the dashboard, use the Marketplace Analytics feedback tool.

Grant Access to the Marketplace Analytics Dashboard
The Manage Listings permission provides access to the Marketplace Analytics dashboard. Assign this permission to the people on your team who monitor the performance of your AppExchange solution.

View an AppExchange Listing in the Marketplace Analytics Dashboard
You can check how an AppExchange listing is performing in the Marketplace Analytics dashboard.

View the Marketplace Analytics Glossary
To see definitions for activity metrics and traffic sources, open the Marketplace Analytics glossary.

Export Data from the Marketplace Analytics Dashboard
To explore Marketplace Analytics data outside of the dashboard, export it. Data is exported in comma-separated value (.csv) format with your global and local filter selections applied.

Give Feedback About Marketplace Analytics
To give feedback about Marketplace Analytics, use the dashboard's feedback tool. Tell us what's working well, what we can improve, or anything else you'd like to share about your experience.

Grant Access to the Marketplace Analytics Dashboard

The Manage Listings permission provides access to the Marketplace Analytics dashboard. Assign this permission to the people on your team who monitor the performance of your AppExchange solution.

Note: The Manage Listings permission provides access to all Publishing Console features, including the ability to create, edit, and publish listings. We suggest assigning the permission to the people on your team who also manage your company's AppExchange listing.

USER PERMISSIONS

To assign permissions to Partner Community users:
- Manage Users

1. Log in to the Salesforce Partner Community.
2. Click **Manage Users**.
3. Search for a user at your company.
4. Under Listings, select the checkbox.

View an AppExchange Listing in the Marketplace Analytics Dashboard

You can check how an AppExchange listing is performing in the Marketplace Analytics dashboard.

USER PERMISSIONS

To view Marketplace Analytics:
- Manage Listings

1. Log in to the Salesforce Partner Community.
2. Click **Publishing**.
3. Click **Analytics**.
4. Select the listing to view.

View the Marketplace Analytics Glossary

To see definitions for activity metrics and traffic sources, open the Marketplace Analytics glossary.

1. Log in to the Salesforce Partner Community.
2. Click **Publishing**.
3. Click **Analytics**.
4. Click ?.

USER PERMISSIONS

To view Marketplace Analytics:
- Manage Listings

Export Data from the Marketplace Analytics Dashboard

To explore Marketplace Analytics data outside of the dashboard, export it. Data is exported in comma-separated value (.csv) format with your global and local filter selections applied.

Note: Export isn't available for the Activity Summary by Region and AMP Insights visualizations.

1. Log in to the Salesforce Partner Community.
2. Click **Publishing**.
3. Click **Analytics**.
4. Select a listing, and then choose the time period.
5. For each visualization, select activity metrics and, if available, change the time scale.
6. Click , and then click **Export**.

USER PERMISSIONS

To view Marketplace Analytics:
- Manage Listings

Give Feedback About Marketplace Analytics

To give feedback about Marketplace Analytics, use the dashboard's feedback tool. Tell us what's working well, what we can improve, or anything else you'd like to share about your experience.

1. Log in to the Salesforce Partner Community.
2. Click **Publishing**.
3. Click **Analytics**.
4. Click **Feedback**.
5. Share your feedback about the dashboard, and then click **Give Feedback**.

USER PERMISSIONS

To view Marketplace Analytics:
- Manage Listings

Marketplace Analytics FAQs

Here are some answers to frequently asked questions about Marketplace Analytics.

Can I grant access to the Marketplace Analytics dashboard but not other publishing features?
What's the earliest date that Marketplace Analytics data is available for?
Is aggregate data for all AppExchange listings available in Marketplace Analytics?
Is there a Marketplace Analytics API?
Why doesn't data appear in my Marketplace Analytics activity summary or visualization?

Can I view my consulting service listing in the Marketplace Analytics dashboard?
How often is Marketplace Analytics data updated?
Can I customize Marketplace Analytics visualizations?
Can I import data into the Marketplace Analytics dashboard?
Does Marketplace Analytics change how customers experience my listing?
Why doesn't the sum of installs, demos, and test drives match the number of leads in Marketplace Analytics?
What's the difference between a Get It Now click and an install?
Does the redesigned AppExchange home page affect Marketplace Analytics metrics?

Can I grant access to the Marketplace Analytics dashboard but not other publishing features?

No. The Manage Listings permission provides access to all features in the Publishing Console. We suggest assigning this permission to the people on your team who also manage your company's AppExchange listing.

What's the earliest date that Marketplace Analytics data is available for?

Marketplace Analytics data dates back to August 2019.

Is aggregate data for all AppExchange listings available in Marketplace Analytics?

No. You can view only the data that's associated with your published AppExchange listings.

Is there a Marketplace Analytics API?

No. However, you can export data from the Marketplace Analytics dashboard. To export data, go to the dashboard and click  .

Why doesn't data appear in my Marketplace Analytics activity summary or visualization?

Typically, this happens when Marketplace Analytics can't find data for the selected time period or activity metric. Try filtering by different metrics, or change the time period.

Can I view my consulting service listing in the Marketplace Analytics dashboard?

Yes. Marketplace Analytics supports all listing types, including consulting service listings. If your listing doesn't have a managed package, some activity metrics, such as installs, won't have data.

How often is Marketplace Analytics data updated?

Marketplace Analytics data is updated once per day.

Can I customize Marketplace Analytics visualizations?

From the global filter menu, you can adjust the time period shown in visualizations. Within a visualization, you can choose the activity metrics that display and, for certain visualizations, time period scale. You can't modify the layout of the dashboard or change the appearance of individual visualizations.

Can I import data into the Marketplace Analytics dashboard?

No. To use Marketplace Analytics data with an external dataset, use the dashboard's export tool. To export your data, go to the dashboard and click  .

Does Marketplace Analytics change how customers experience my listing?

No. Marketplace Analytics doesn't affect how customers browse, search for, or interact with listings on AppExchange.

Why doesn't the sum of installs, demos, and test drives match the number of leads in Marketplace Analytics?

Typically, this happens when Web-to-Lead isn't set up in your org or when Web-to-Lead isn't configured correctly. To learn more about Web-to-Lead, search for "Generate Leads from Your Website for Your Sales Teams" in Salesforce Help.

What's the difference between a Get It Now click and an install?

The AppExchange installation process has several steps. To start the installation process, a customer clicks **Get It Now** on a listing. Marketplace Analytics records this interaction as a Get It Now click. Next, the customer chooses a destination for the package and agrees to our terms and conditions. Then, the customer clicks **Confirm and Install**. Marketplace Analytics records this interaction as an install.

Does the redesigned AppExchange home page affect Marketplace Analytics metrics?

Yes. The redesigned home page introduces design changes for listing tiles that can affect some metrics in Marketplace Analytics. Specifically, the home page contains simplified tiles that provide more information on the tile itself instead of the listing detail popover. Because of these changes, the listing detail popover and the related tile hover action are no longer available for home page listing tiles. If your listing appeared frequently on the home page, you may notice fewer tile hovers in Marketplace Analytics.

AppExchange App Analytics

AppExchange App Analytics provides usage data about how subscribers interact with your AppExchange solutions. You can use these details to identify attrition risks, inform feature development decisions, and improve user experience.

Note: AppExchange App Analytics is subject to certain usage restrictions as described in the AppExchange Program Policies. Usage data from Government Cloud and Government Cloud Plus orgs isn't available in App Analytics.

App Analytics is available for packages that have passed security review and are registered to a License Management App. Usage data is provided as package usage logs, monthly package usage summaries, or subscriber snapshots. All usage data is available as downloadable comma-separated value (.csv) files. To view the data in dashboard or visualization format, use Tableau CRM or a third-party analytics tool.

In a 24-hour period, you can download a maximum 20 GB of AppExchange App Analytics data.

Request AppExchange App Analytics

You can request access to AppExchange App Analytics package usage logs and subscriber snapshots. Package usage summaries are available by default.

Download Package Usage Logs, Package Usage Summaries, and Subscriber Snapshots

To request package usage logs, monthly package usage summaries, and subscriber snapshots, use AppAnalyticsQueryRequest in SOAP API. Usage logs, usage summaries, and subscriber snapshots are downloadable comma-separated value (.csv) files.

AppExchange App Analytics Best Practices

To plan and maximize your AppExchange App Analytics query strategy, follow our best practices. First, use file compression to reduce your data results file size. Second, schedule and automate your regular App Analytics queries. Third, plan, schedule, and automate catch-up queries to supplement your regular query data.

Package Usage Summaries

Package usage summaries provide high-level metrics by calendar month. Discover how many users access your package and which operations they perform.

Package Usage Logs

Analyze adoption and user behavior, then make informed feature development decisions based on data from package usage logs. AppExchange App Analytics tracks UI, API-based, Lightning-based, and Apex operations, and it logs each CRUD operation on components and custom objects in packages. Events from sandbox and trial orgs are tracked in package usage logs. Events from scratch orgs aren't tracked.

Subscriber Snapshots

Subscriber snapshots provide a point-in-time summary of your subscribers' activity. Use subscriber snapshots to see usage trends by org and package over time.

Test Custom Integrations

To test your custom integrations in a nonproduction environment, use AppExchange App Analytics Simulation Mode. Submit an App Analytics query request and receive sample usage data.

AppExchange App Analytics Developer Cookbook

Delve deeper into your AppExchange App Analytics managed package usage data by creating key performance indicators (KPIs). First, complete some prerequisites and retrieve your App Analytics data. Next, prepare your Tableau CRM analytics environment. Finally, to build your KPIs, complete App Analytics recipes.

Request AppExchange App Analytics

You can request access to AppExchange App Analytics package usage logs and subscriber snapshots. Package usage summaries are available by default.

Note: AppExchange App Analytics is subject to certain usage restrictions as described in AppExchange Program Policies.

1. Log in to the Salesforce Partner Community.
2. Click the question icon and then click **Log a Case for Help**.
3. Select **Salesforce Partner Program Support**.

   Tip: If you don't see the Salesforce Partner Program Support tile, use the org picker to select the org that's associated with your Salesforce partnership account.
4. For product, enter and select **Partner Programs & Benefits**.
5. For topic, enter and select **ISV Technology Request**.
6. Provide any other required details, such as the package ID that you want to track analytics data for, and then click **Create Case**.

Use the subscriber package ID that begins with `033`. To retrieve a list of your second-generation managed package IDs, run `sfdx force:package:list --verbose` in Salesforce CLI.

7. We review your case, and notify you when App Analytics is enabled.

Download Package Usage Logs, Package Usage Summaries, and Subscriber Snapshots

To request package usage logs, monthly package usage summaries, and subscriber snapshots, use AppAnalyticsQueryRequest in SOAP API. Usage logs, usage summaries, and subscriber snapshots are downloadable comma-separated value (.csv) files.

To request access to AppExchange App Analytics, log a support case in the Salesforce Partner Community. For product, specify **Partner Programs & Benefits**. For topic, specify **ISV Technology Request**.

Then determine which team members need CRUD access to the AppAnalyticsQueryRequest object, and consider creating a permission set for them. By default, admins have the permissions required to request package usage logs and usage summaries using the AppAnalyticsQueryRequest object.

In a 24-hour period, you can download up to 20 GB of AppExchange App Analytics data.

Package usage summary data is available to download for 10 years from the summary file log date. Package usage log data is available to download for 45 days from the date that the log event occurred. Subscriber snapshot data is available to download for 45 days from the snapshot date.

The usage data that AppExchange App Analytics collects depends on the org type and data type.

DataType	Production Org	Sandbox Org	Scratch Org	Trial Org
`PackageUsageLog`	Yes	Yes	No	Yes
`PackageUsageSummary`	Yes	No	No	No
`SubscriberSnapshot`	Yes	No	No	Yes

Note: AppExchange App Analytics is subject to certain usage restrictions as described in AppExchange Program Policies.

1. Log in to the License Management Org (LMO) that the package is registered to.
2. From the LMO, complete the required fields in AppAnalyticsQueryRequest in SOAP API.
3. Retrieve the App Analytics Query Request object created in the API request. The `DownloadURL` field populates after the request is completed.
4. Click the URL in the `DownloadURL` field in the App Analytics Query Request object, and download the .csv file.

   Note: The download URL expires after 60 minutes.

AppExchange App Analytics Best Practices

To plan and maximize your AppExchange App Analytics query strategy, follow our best practices. First, use file compression to reduce your data results file size. Second, schedule and automate your regular App Analytics queries. Third, plan, schedule, and automate catch-up queries to supplement your regular query data.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

How Does AppExchange App Analytics Data Flow?

As your customers use your managed packages, they produce data. Their usage data is collected daily in our data lake from each Salesforce instance. Usage data arrives to our data lake throughout the day. From time to time, there can be occasional data arrival delays. Also, data builds and timestamps vary by data type. For these reasons, to optimize your data retrieval, plan out your AppExchange App Analytics query strategy.

How Should I Plan My App Analytics Query Strategy?

Your detailed query strategy depends on the size and scope of your business and the data types that you're querying.

Recommendations

Your query strategy varies based on your business size and scope. Also, your query strategy must adapt as your business grows. To stay current, follow our App Analytics query recommendations for small, medium, and large-sized partners.

Where Do I Go for More Information About AppExchange App Analytics Queries?

Questions are natural when you start automating your queries and planning your query strategy. To find a good solution when you have questions, review your code base and the size and skill of your development team.

How Does AppExchange App Analytics Data Flow?

As your customers use your managed packages, they produce data. Their usage data is collected daily in our data lake from each Salesforce instance. Usage data arrives to our data lake throughout the day. From time to time, there can be occasional data arrival delays. Also, data builds and timestamps vary by data type. For these reasons, to optimize your data retrieval, plan out your AppExchange App Analytics query strategy.

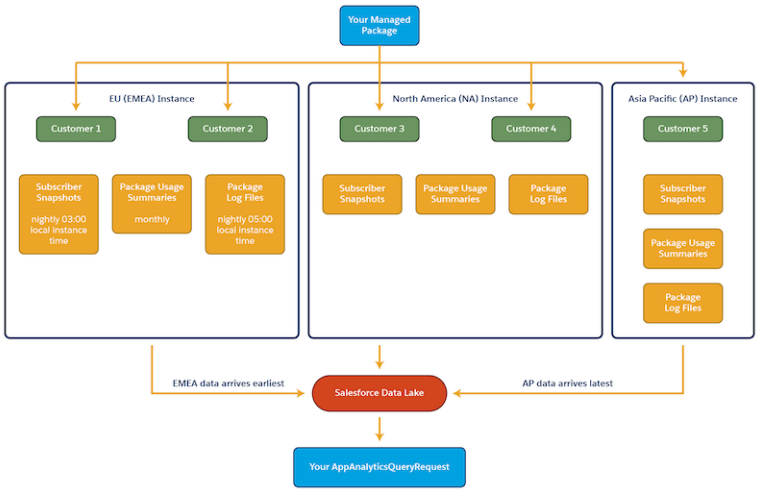
EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Because Salesforce instances are located around the world, the time of data collection varies by region. EU (EMEA) data arrives first, then North America (NA) data. Data from Asia Pacific (AP) instances arrives last.

Our AppExchange App Analytics jobs run on local instance times on a non-peak schedule. Depending on when you query for your data and where your customers are located, sometimes you retrieve 100% of your data at one time. Other times you must issue more queries to retrieve it all.



Data delivery to and arrival in our data lake also depends on factors that can affect a given instance, such as the health of the instance or technical dependencies. Ordinarily you can expect all your org data to arrive in the data lake by `23:00` Coordinated Universal Time (UTC) the day after it was recorded. However, occasionally, there can be delays.

Each AppExchange App Analytics data type is also compiled at different times:

Data Type	Build Information	Example
Subscriber Snapshots	• Snapshots use data collected at approximately `01:00` instance local time. • Snapshots are generated nightly at approximately `03:00` instance local time. • All timestamps are normalized to `00:00 UTC` of that day.	For the March 1, 2021 snapshot: • All records have this timestamp: `2021-03-01T00:00:00Z`. • All data normally arrives by March 2, 2021 `23:00 UTC`.
Package Usage Summaries	• Summaries use data collected for an entire month. • Summaries are built monthly. • All timestamps are normalized to `00:00 UTC` on the last day of the month.	For the March 2021 summary available on April 1, 2021: • All records have this timestamp: `2021-03-31T00:00:00Z`. • All data normally arrives by April 1, 2021 `23:00 UTC`.
Package Usage Logs	• Usage logs use data from the previous day. • Usage logs are generated nightly at approximately `05:00` instance local time.	For the March 1, 2021 log file: • All records have precise timestamps associated with when that log event occurred. • All data normally arrives by March 2, 2021 `23:00 UTC`.

How Should I Plan My App Analytics Query Strategy?

Your detailed query strategy depends on the size and scope of your business and the data types that you're querying.

All partners can take advantage of these query strategies:

- Choose a data results `FileType` value, and select a corresponding `FileCompression`, which allows you to request `gzip` compression for `csv` files or `snappy` column compression for `parquet` files.
- Create regularly scheduled, automated queries.
- To sweep in late-arriving data, create catch-up queries using the `AvailableSince` field.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Compress Your Results Files

Your App Analytics query plan starts with your results file type and file compression. Data can eat up time and space, so do more with less by specifying the type of file you download. Reduce your data download time by specifying how your results file is compressed.

If you don't specify file type or file compression, your results file defaults to `csv` with no compression for backwards compatibility reasons. If you choose the `parquet` file type, your results file includes data type information for each column.

We recommend that you always compress your results files. Choose from these SOAP API `AppAnalyticsQueryRequest` `FileType` and `FileCompression` value combinations:

FileType	FileCompression
`csv` (default)	• `none` (default when `FileType` is `csv`) • `gzip`
`parquet`	• `snappy` (default when `FileType` is `parquet`) • `gzip` • `none`

Note: When you download your App Analytics query result data, the HTTP response contains one or two important headers. The Content-Type header indicates the file type (`txt/csv` or `application/parquet`). For queries with `csv` FileType and `gzip` FileCompression, the Content-Encoding header indicates `gzip` encoding. Modern browsers often decode the `gzip`-encoded file automatically which results in a saved, uncompressed .csv file. Regardless if the file is automatically decoded or not, its filename extension is .csv.

Schedule and Automate Your Queries

After you determine what queries to run and how often to run them, you want to schedule those queries. The easiest way is via automation.

What do we mean by automation? Write code that creates query request records on your schedule, monitors them, retrieves the data, and stores your AppExchange App Analytics data somewhere. For example, you can store the data in a custom object in your License Management Org.

Your automation options include, but aren't limited to:

- Custom API integrations using REST or SOAP API calls
- Salesforce DX automation using the CLI

- Salesforce flows
- Apex triggers

For example, automate the retrieval of package usage summaries using Apex triggers.

If you want to also automate the retrieval of package usage log data, look to a different storage solution that scales with the data volume the logs contain.

Create Catch-Up Queries

A catch-up query is like a broom, sweeping for data newly added to our data lake. Catch-up queries rely on you already having regular queries in place.

For example, on March 2, 2021 `18:00 UTC` you run this regular query that retrieves package usage log data for March 1, 2021:

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-03-01T00:00:00Z
EndTime=2021-03-02T00:00:00Z
DataType=PackageUsageLog
FileType=csv
FileCompression=gzip"
```

Rerun that exact same query on March 3, 2021 `18:00 UTC`, but add the `AvailableSince` field set to the day and time you ran your original query: `2021-03-02T18:00:00Z`. This query is your ad hoc catch-up query. It retrieves any data newly added to the data lake for March 2 since you ran your regular query:

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-03-01T00:00:00Z
EndTime=2021-03-02T00:00:00Z
DataType=PackageUsageLog
FileType=csv
FileCompression=gzip
AvailableSince=2021-03-02T18:00:00Z"
```

You can use catch-up queries in many different ways, which we discuss in more detail in the Recommendations section.

When creating catch-up queries, keep these considerations in mind.

- If `StartTime` is specified, the `AvailableSince` date must be later.
- If `EndTime` is specified, the `AvailableSince` date must be later.
- All queries must include `StartTime` or `AvailableSince` or both.
- `AvailableSince` must be earlier than now.

Note: What happens when you want to create an ad hoc catch-up query, but you forgot when you ran the original query? Use Salesforce CLI and your original query's `sObjectID` to look up the `QuerySubmittedTime`, like this: `sfdx force:data:record:get --sobjecttype AppAnalyticsQueryRequest --sobjectid 0XIXXXXXXXXXXXXXXX` Set your ad hoc catch-up query `AvailableSince` value to equal the `QuerySubmittedTime`.

SEE ALSO:

Apache Parquet

Automate AppAnalytics - AWS Stack

Recommendations

Your query strategy varies based on your business size and scope. Also, your query strategy must adapt as your business grows. To stay current, follow our App Analytics query recommendations for small, medium, and large-sized partners.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Note: In the unlikely event of data delays, we regenerate data for log events that happened up to 30 days in the past. To ensure that you consistently retrieve the most complete data, we recommend that you schedule catch-up queries that look back 30 days.

Small-Sized Partners

Small-sized partners have manageable subscriber bases and one or two managed packages. A small partner's total daily usage data across all managed packages is 5 GB or less. Also, small partner's queries complete well under the 15-minute processing time limit.

Medium-Sized Partners

Medium-sized partners have bigger subscriber bases and about six managed packages. A medium-sized partner's total daily usage data across all managed packages is at or just over 20 GB. Also, this partner's queries approach or hit the 15-minute processing time limit.

Large-Sized Partners

Large partners have large subscriber bases and many managed packages. A large partner's total daily usage data is more than 20 GB. Sometimes a large partner's data from just one managed package is larger than the 20-GB daily limit. Also, large partners often must create a smaller time range for each query to complete in under the 15-minute processing time limit.

Small-Sized Partners

Small-sized partners have manageable subscriber bases and one or two managed packages. A small partner's total daily usage data across all managed packages is 5 GB or less. Also, small partner's queries complete well under the 15-minute processing time limit.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Given how manageable smaller partners' data is, after you run your regular queries one time, we recommend that you run a daily catch-up query as your main query. Sweep in all data for all your managed packages looking back 30 days.

Data Type	How to Get Started	How to Schedule Catch-Up Queries
Subscriber Snapshots	An initial query to retrieve data from when App Analytics was enabled for your managed package.	• One daily catch-up query. • Set `AvailableSince` to the day and time your last regular query ran. • Set `StartTime` to 30 days ago. • Omit `EndTime`. • Each day, advance `StartTime` and `AvailableSince` by 1 day.

Data Type	How to Get Started	How to Schedule Catch-Up Queries
Package Usage Summaries	An initial query to retrieve data from when App Analytics was enabled for your managed package.	• One daily catch-up query. • Set `AvailableSince` to the day and time your last regular query ran. • Set `StartTime` to the first of the previous month. • Omit `EndTime`. • Each day, advance `AvailableSince` by 1 day. • Each month, advance `StartTime` to the first of the previous month.
Package Usage Logs	An initial query to retrieve data from when App Analytics was enabled for your managed package.	• One daily catch-up query. • Set `AvailableSince` to the day and time your last regular query ran. • Set `StartTime` to 30 days ago. • Omit `EndTime`. • Each day, advance `StartTime` and `AvailableSince` by 1 day.

Example: Most of your customers use your package on an NA or EU instance, so you run your queries at `18:00 UTC`. You have a couple customers on an AP instance, so you create catch-up queries to ensure that you capture data from around the world.

1. On March 31 at `18:00 UTC`, run your regular queries.

   Subscriber Snapshot

   ```
   sfdx force:data:record:create
   --sobjecttype AppAnalyticsQueryRequest
   --values "DataType=SubscriberSnapshot
   FileType=csv
   FileCompression=gzip
   StartTime=2020-03-30T00:00:00Z
   EndTime=2020-03-31T00:00:00Z"
   ```

   Package Usage Summary

   ```
   sfdx force:data:record:create
   --sobjecttype AppAnalyticsQueryRequest
   --values "DataType=PackageUsageSummary
   FileType=csv
   FileCompression=gzip
   StartTime=2020-02-01T00:00:00Z
   EndTime=2020-03-01T00:00:00Z"
   ```

   Package Usage Log

   ```
   sfdx force:data:record:create
   --sobjecttype AppAnalyticsQueryRequest
   ```

```
--values "DataType=PackageUsageLog
FileType=csv
FileCompression=gzip
StartTime=2020-03-30T00:00:00Z
EndTime=2020-03-31T00:00:00Z"
```

2. On April 1 at `18:00 UTC` run these three catch-up queries.

   Subscriber Snapshot Catch-Up Query

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "DataType=SubscriberSnapshot
FileType=csv
FileCompression=gzip
StartTime=2020-03-02T00:00:00Z
AvailableSince=2020-03-31T18:00:00Z"
```

   Package Usage Summary Catch-Up Query

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "DataType=PackageUsageSummary
FileType=csv
FileCompression=gzip
StartTime=2020-03-01T00:00:00Z
AvailableSince=2020-03-31T18:00:00Z"
```

   Package Usage Log Catch-Up Query

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "DataType=PackageUsageLog
FileType=csv
FileCompression=gzip
StartTime=2020-03-02T00:00:00Z
AvailableSince=2020-03-31T18:00:00Z"
```

3. On April 2 at `18:00 UTC`, run the same catch-up queries, but advance the subscriber snapshot and package usage log `AvailableSince` and `StartTime` date by 1 day each. Advance the package usage summary `AvailableSince` by 1 day.

   Subscriber Snapshot Catch-Up Query

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "DataType=SubscriberSnapshot
FileType=csv
FileCompression=gzip
StartTime=2020-03-03T00:00:00Z
AvailableSince=2020-04-01T18:00:00Z"
```

   Package Usage Summary Catch-Up Query

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "DataType=PackageUsageSummary
```

```
FileType=csv
FileCompression=gzip
StartTime=2020-03-01T00:00:00Z
AvailableSince=2020-04-01T18:00:00Z"
```

Package Usage Log Catch-Up Query

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "DataType=PackageUsageLog
FileType=csv
FileCompression=gzip
StartTime=2020-03-03T00:00:00Z
AvailableSince=2020-04-01T18:00:00Z"
```

Medium-Sized Partners

Medium-sized partners have bigger subscriber bases and about six managed packages. A medium-sized partner's total daily usage data across all managed packages is at or just over 20 GB. Also, this partner's queries approach or hit the 15-minute processing time limit.

We recommend that after you run your regular queries one time, use catch-up queries as your main queries for subscriber snapshots and package usage summaries. Use a combination of daily queries and catch-up queries for package usage logs.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Data Type	How to Get Started	How to Schedule Catch-Up Queries
Subscriber Snapshots	An initial query to retrieve data from when App Analytics was enabled for your managed packages.	• One daily query. • Set `AvailableSince` to the day and time your last regular query ran. • Set `StartTime` to 30 days ago. • Omit `EndTime`. • Each day, advance `StartTime` and `AvailableSince` by 1 day.
Package Usage Summaries	An initial query to retrieve data from when App Analytics was enabled for your managed packages.	• One daily catch-up query. • Set `AvailableSince` to the day and time your last regular query ran. • Set `StartTime` to the first of the previous month. • Omit `EndTime`.

Data Type	How to Get Started	How to Schedule Catch-Up Queries
		• Each day, advance `AvailableSince` by 1 day. • Each month, advance `StartTime` to the first of the previous month.
Package Usage Logs	One regular daily query per package.	• One daily catch-up query per package. • Set `AvailableSince` to the day and time your last regular query ran. • Set `StartTime` to 30 days ago. • Set `EndTime` equal to the `StartTime` of your regular query. • Each day, advance `StartTime`, `EndTime`, and `AvailableSince` by 1 day.

Example: Half of your customers use your package on an NA or EU instance, so you run your regular queries at `18:00 UTC`. The other half of your customers are on an AP instance, so you create catch-up queries to ensure that you capture data from around the world.

1. On March 31 at `18:00 UTC`, run your regular package usage log queries for each of your packages.

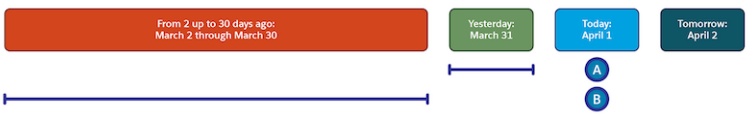
   Package 1

   ```
   sfdx force:data:record:create
   --sobjecttype AppAnalyticsQueryRequest
   --values "StartTime=2021-03-30T00:00:00Z
   EndTime=2021-03-31T00:00:00Z
   DataType=PackageUsageLog
   PackageIds=0336XXXXXXXXXX
   FileType=csv
   FileCompression=gzip"
   ```

   Package 2

   ```
   sfdx force:data:record:create
   --sobjecttype AppAnalyticsQueryRequest
   --values "StartTime=2021-03-30T00:00:00Z
   EndTime=2021-03-31T00:00:00Z
   DataType=PackageUsageLog
   PackageIds=0337XXXXXXXXXX
   FileType=csv
   FileCompression=gzip"
   ```

2. On April 1 at `18:00 UTC` onwards, run regular and catch-up package usage log queries.



A. Regular Queries

Package 1

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-03-31T00:00:00Z
EndTime=2021-04-01T00:00:00Z
DataType=PackageUsageLog
PackageIds=0336XXXXXXXXX
FileType=csv
FileCompression=gzip"
```

Package 2

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-03-31T00:00:00Z
EndTime=2021-04-01T00:00:00Z
DataType=PackageUsageLog
PackageIds=0337XXXXXXXXX
FileType=csv
FileCompression=gzip"
```

B. Catch-Up Queries

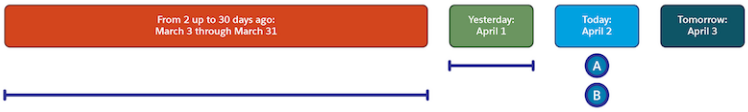
Package 1

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-03-01T00:00:00Z
EndTime=2021-03-31T00:00:00Z
AvailableSince=2021-03-31T18:00:00Z
DataType=PackageUsageLog
PackageIds=0336XXXXXXXXX
FileType=csv
FileCompression=gzip"
```

Package 2

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=021-03-01T00:00:00Z
EndTime=2021-03-31T00:00:00Z
AvailableSince=2021-03-31T18:00:00Z
DataType=PackageUsageLog
PackageIds=0337XXXXXXXXX
FileType=csv
FileCompression=gzip"
```

3. On April 2, repeat the same queries that you ran on April 1, but advance the queries by a day.



A. Regular Queries

Package 1

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-04-01T00:00:00Z
EndTime=2021-04-02T00:00:00Z
DataType=PackageUsageLog
PackageIds=0336XXXXXXXXX
FileType=csv
FileCompression=gzip"
```

Package 2

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-04-01T00:00:00Z
EndTime=2021-04-02T00:00:00Z
DataType=PackageUsageLog
PackageIds=0337XXXXXXXXX
FileType=csv
FileCompression=gzip"
```

B. Catch-Up Queries

Package 1

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-03-02T00:00:00Z
EndTime=2021-04-01T00:00:00Z
AvailableSince=2021-04-01T18:00:00Z
DataType=PackageUsageLog
PackageIds=0336XXXXXXXXX
FileType=csv
FileCompression=gzip"
```

Package 2

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2020-03-02T00:00:00Z
EndTime=2021-04-01T00:00:00Z
AvailableSince=2021-04-01T18:00:00Z
DataType=PackageUsageLog
PackageIds=0337XXXXXXXXX
FileType=csv
FileCompression=gzip"
```

Large-Sized Partners

Large partners have large subscriber bases and many managed packages. A large partner's total daily usage data is more than 20 GB. Sometimes a large partner's data from just one managed package is larger than the 20-GB daily limit. Also, large partners often must create a smaller time range for each query to complete in under the 15-minute processing time limit.

Large partners frequently create one query per managed package per 12, 6, or 1-hour increments throughout a 24-hour period. How frequently you schedule your queries really depends on your data volume.

We recommend that you use a combination of queries and multiple catch-up queries for all data types

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Data Type	How to Get Started	How to Schedule Catch-Up Queries
Subscriber Snapshots	One daily query per package.	• One daily query per package. • Set `AvailableSince` to the day and time your last regular query ran. • Set `StartTime` to 30 days ago. • Omit `EndTime`. • Each day, advance `StartTime` and `AvailableSince` by 1 day.
Package Usage Summaries	One daily query per package.	• One daily catch-up query per package. • Set `AvailableSince` to the day and time your last regular query ran. • Set `StartTime` to the first of the previous month. • Omit `EndTime`. • Each day, advance `AvailableSince` by 1 day. • Each month, advance `StartTime` to the first of the previous month.
Package Usage Logs	• To retrieve all your data, create multiple segmented daily, automated App Analytics queries spread throughout the day. • Break up your requests by managed package and by time increments throughout the day.	Create two levels of catch-up queries per day. • Create one catch-up query per package that sweeps data from 2 days ago. • Create a second catch-up query that sweeps data from 3 to 30 days ago. • Each day, advance `StartTime`, `EndTime`, and `AvailableSince` by 1 day.

Example: Your customers use your package on all Salesforce instances around the world, and your managed packages produce significant amounts of data. You schedule queries to run at the same time, each covering a 12-hour period, and you create a layered catch-up query plan to capture data from all instances.

In this example, we show two of your dozens of managed packages.

1. On March 31 at `18:00 UTC`, run your regular package usage log queries.

   Package 1

   ```
   sfdx force:data:record:create
   --sobjecttype AppAnalyticsQueryRequest
   --values "StartTime=2021-03-30T00:00:00
   EndTime=2021-03-30T12:00:00
   DataType=PackageUsageLog
   PackageIds=0336XXXXXXXXX
   FileType=parquet
   FileCompression=snappy"
   ```

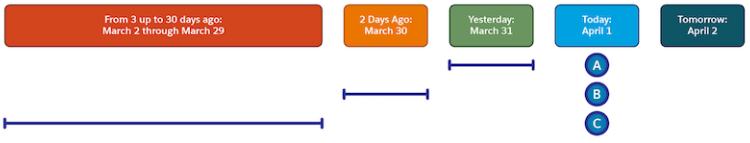
   ```
   sfdx force:data:record:create
   --sobjecttype AppAnalyticsQueryRequest
   --values "StartTime=2021-03-30T12:00:00
   EndTime=2021-03-31T00:00:00
   DataType=PackageUsageLog
   PackageIds=0336XXXXXXXXX
   FileType=parquet
   FileCompression=snappy"
   ```

   Package 2

   ```
   sfdx force:data:record:create
   --sobjecttype AppAnalyticsQueryRequest
   --values "StartTime=2021-03-30T00:00:00
   EndTime=2021-03-30T12:00:00
   DataType=PackageUsageLog
   PackageIds=0337XXXXXXXXX
   FileType=parquet
   FileCompression=snappy"
   ```

   ```
   sfdx force:data:record:create
   --sobjecttype AppAnalyticsQueryRequest
   --values "StartTime=2021-03-30T12:00:00
   EndTime=2021-03-31T00:00:00
   DataType=PackageUsageLog
   PackageIds=0337XXXXXXXXX
   FileType=parquet
   FileCompression=snappy"
   ```

2. On April 1 at `18:00 UTC`, run your regular and catch-up package usage log queries.



A. Package Usage Log Regular Queries

Package 1

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-03-31T00:00:00Z
EndTime=2021-03-31T12:00:00Z
DataType=PackageUsageLog
PackageIds=0336XXXXXXXXX
FileType=parquet
FileCompression=snappy"
```

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-03-31T12:00:00Z
EndTime=2021-04-01T00:00:00Z
DataType=PackageUsageLog
PackageIds=0336XXXXXXXXX
FileType=parquet
FileCompression=snappy"
```

Package 2

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-03-31T00:00:00Z
EndTime=2021-03-31T12:00:00Z
DataType=PackageUsageLog
PackageIds=0337XXXXXXXXX
FileType=parquet
FileCompression=snappy"
```

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-03-31T12:00:00Z
EndTime=2021-04-01T00:00:00Z
DataType=PackageUsageLog
PackageIds=0337XXXXXXXXX
FileType=parquet
FileCompression=snappy"
```

B. Package Usage Log 2 Days Ago Catch-Up Queries

Package 1

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-03-30T00:00:00Z
EndTime=2021-03-31T00:00:00Z
DataType=PackageUsageLog
PackageIds=0336XXXXXXXXX
FileType=parquet
FileCompression=snappy
AvailableSince=2020-03-31T18:00:00Z"
```

Package 2

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-03-30T00:00:00Z
EndTime=2021-03-31T00:00:00Z
DataType=PackageUsageLog
PackageIds=0337XXXXXXXXX
FileType=parquet
FileCompression=snappy
AvailableSince=2020-03-31T18:00:00Z"
```

C. Package Usage Log From 3 to 30 Days Ago Catch-Up Queries

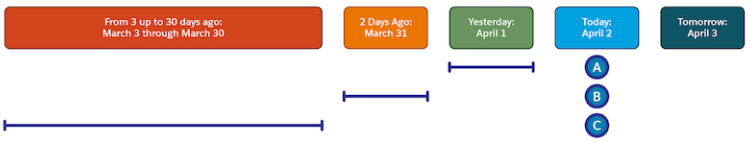
Package 1

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-03-01T00:00:00Z
EndTime=2021-03-30T00:00:00Z
DataType=PackageUsageLog
PackageIds=0336XXXXXXXXX
FileType=parquet
FileCompression=snappy
AvailableSince=2020-03-31T18:00:00Z"
```

Package 2

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-03-01T00:00:00Z
EndTime=2021-03-30T00:00:00Z
DataType=PackageUsageLog
PackageIds=0337XXXXXXXXX
FileType=parquet
FileCompression=snappy
AvailableSince=2020-03-31T18:00:00Z"
```

3. On April 2 onwards, run your regular and your catch-up package usage log queries, advancing the dates by 1 day.



A. Package Usage Log Regular Queries

Package 1

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-04-01T00:00:00Z
EndTime=2021-04-01T12:00:00Z
DataType=PackageUsageLog
PackageIds=0336XXXXXXXXX
```

```
FileType=parquet
FileCompression=snappy"
```

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-04-01T12:00:00Z
EndTime=2021-04-02T00:00:00Z
DataType=PackageUsageLog
PackageIds=0336XXXXXXXXXX
FileType=parquet
FileCompression=snappy"
```

Package 2

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-04-01T00:00:00Z
EndTime=2021-04-01T12:00:00Z
DataType=PackageUsageLog
PackageIds=0337XXXXXXXXXX
FileType=parquet
FileCompression=snappy"
```

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-04-01T12:00:00Z
EndTime=2021-04-02T00:00:00Z
DataType=PackageUsageLog
PackageIds=0337XXXXXXXXXX
FileType=parquet
FileCompression=snappy"
```

B. Package Usage Log 2 Days Ago Catch-Up Queries

Package 1

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-03-31T00:00:00Z
EndTime=2021-04-01T00:00:00Z
DataType=PackageUsageLog
PackageIds=0336XXXXXXXXXX
FileType=parquet
FileCompression=snappy
AvailableSince=2020-04-01T18:00:00Z”
```

Package 2

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-03-31T00:00:00Z
EndTime=2021-04-01T00:00:00Z
DataType=PackageUsageLog
PackageIds=0337XXXXXXXXXX
FileType=parquet
```

```
FileCompression=snappy
AvailableSince=2020-04-01T18:00:00Z"
```

C. Package Usage Log From 3 to 30 Days Ago Catch-Up Queries

Package 1

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-03-02T00:00:00Z
EndTime=2021-03-31T00:00:00Z
DataType=PackageUsageLog
PackageIds=0336XXXXXXXXX
FileType=parquet
FileCompression=snappy
AvailableSince=2020-04-01T18:00:00Z"
```

Package 2

```
sfdx force:data:record:create
--sobjecttype AppAnalyticsQueryRequest
--values "StartTime=2021-03-02T00:00:00Z
EndTime=2021-03-31T00:00:00Z
DataType=PackageUsageLog
PackageIds=0337XXXXXXXXX
FileType=parquet
FileCompression=snappy
AvailableSince=2020-04-01T18:00:00Z"
```

Where Do I Go for More Information About AppExchange App Analytics Queries?

Questions are natural when you start automating your queries and planning your query strategy. To find a good solution when you have questions, review your code base and the size and skill of your development team.

If you still need help, try these resources:

- If you have an assigned AppExchange Partner Account Manager (PAM) or AppExchange Technical Evangelist (TE), reach out to them.
- Otherwise, go to the Partner Community and post a question to the ISV TE Experts - Partner Intelligence Chatter group.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Package Usage Summaries

Package usage summaries provide high-level metrics by calendar month. Discover how many users access your package and which operations they perform.

Note: AppExchange App Analytics is subject to certain usage restrictions as described in the AppExchange Program Policies.

AppExchange App Analytics tracks UI, API-based, Lightning-based, and Apex operations and logs each CRUD operation on components and custom objects in packages. Events from sandbox, scratch, and trial orgs aren't tracked in package usage summaries.

Partners and subscribers can access package usage data. Usage summaries become available at the beginning of the subsequent month. For example, you can get the usage summary for May at the beginning of June.

- AppExchange Partners can request monthly usage summaries using the AppAnalyticsQueryRequest in SOAP API from the license management org that owns the package.
- Subscribers can download usage summaries from Setup for any package that they installed that passed security review.

Package Usage Summary
Use the package usage summary to discover how many users access your package and which operation they perform.

Package Usage Summary

Use the package usage summary to discover how many users access your package and which operation they perform.

Note: In Summer '20, we changed the names of the DataType enums in the AppAnalyticsQueryRequest.

Field	Description
`custom_entity`	The developer name of the component or custom object.
`custom_entity_type`	The type of component or custom object that the user viewed or manipulated. Examples: • `AnalyticsDashboard` • `AnalyticsLens` • `ApexClass` • `ApexTrigger` • `CustomObject` • `LightningPage` • `LightningComponent` • `VisualforcePage`
`managed_package_namespace`	Namespace of the package.
`month`	The month that this usage summary applies to in YYYY-MM format. Example: `2019-03`.
`num_creates`	The number of new records created from the package.
`num_deletes`	The number of deleted records associated with the package.
`num_events`	The number of log records associated with a `custom_entity_type`.
`num_reads`	The number of records associated with the package that were read.
`num_updates`	The number of records associated with the package that were updated.
`num_views`	The count of times the component or page has been viewed.
`organization_edition`	The name of the Salesforce edition that the subscriber org is using. Examples: • `Developer Edition` • `Enterprise Edition` • `Unlimited Edition`

Field	Description
`organization_id`	The 15-character ID of the subscriber org.
`organization_name`	The name of the subscriber org. Example: `Acme, Inc.`
`organization_status`	The paid status of the subscriber org. Examples: • `Active` • `Demo` • `Free` • `Trial`
`package_id`	The ID of the package.
`user_id_token`	The hashed token representing the ID of the user who accessed the package. The token persists over time, even if a user's details change. The token also persists across any packages that the user interacts with. The user ID token starts with the prefix 005-. In compliance with privacy regulations, our systems can't access the actual user ID. Likewise, the hashed token can't be linked to the user ID.
`user_type`	The user license category of the user accessing Salesforce services through the UI or API. Examples: • `Guest` • `Partner` • `Standard`

Package Usage Logs

Analyze adoption and user behavior, then make informed feature development decisions based on data from package usage logs. AppExchange App Analytics tracks UI, API-based, Lightning-based, and Apex operations, and it logs each CRUD operation on components and custom objects in packages. Events from sandbox and trial orgs are tracked in package usage logs. Events from scratch orgs aren't tracked.

Note: AppExchange App Analytics is subject to certain usage restrictions as described in the AppExchange Program Policies.

Package Usage Logs
Make informed development decisions based on package usage log data. Analyze adoption, user behavior, company information, and Lightning app and page usage data. Package usage logs list activity during a 24-hour period, between 12:00 AM and 11:59 PM UTC.

Package Usage Logs

Make informed development decisions based on package usage log data. Analyze adoption, user behavior, company information, and Lightning app and page usage data. Package usage logs list activity during a 24-hour period, between 12:00 AM and 11:59 PM UTC.

Note: In Summer '20 Salesforce changed the names of the DataType enums in the AppAnalyticsQueryRequest .

Field	Description
`api_type`	The type of API request. Examples: • `BULK_API` • `E`: SOAP Enterprise • `O`: Old SOAP • `P`: SOAP Partner • `X`: XmlRPC • REST
`api_version`	The version of the API that's used. Example: `45.0`.
`app_name`	The name of the Lightning application the user accessed. Examples: • `one:one` • `FieldServiceApp` • `Chatter`
`bulk_batch_id`	The batch ID for the Bulk API job.
`bulk_job_id`	The ID for the Bulk API job.
`bulk_operation`	The operation for the Bulk API job. Examples: • `delete` • `hardDelete` • `insert` • `query` • `queryAll` • `update` • `upsert`
`class_name`	The name of the Apex class. Examples: • `Help_HomeController` • `ROAppController_v2` • `FSL`
`cloned_from_organization_id`	The ID of the org from which this subscriber org was cloned. Applies to sandbox orgs only. Example: `00Dxx0000000000`

Field	Description
`custom_entity`	The developer name of the component or custom object.
`custom_entity_type`	The type of component or custom object that the user viewed or manipulated. Examples: • `AnalyticsDashboard` • `AnalyticsLens` • `ApexClass` • `ApexTrigger` • `CustomObject` • `LightningComponent` • `LightningPage` • `VisualforcePage`
`entry_point`	The entry point of the executed Apex event. • `GeneralCloner.cloneAndInsertRecords` • `VF- /apex/CloneUser`
`event`	The name or ID of the platform event. Examples: • `/event/011xx0000005akx` • `SomeCustomEvent`
`event_count`	The number of platform events consumed by the subscriber. Example: `2`.
`event_subscriber`	The ID of the platform event subscriber. Example: `01qxx0000004Coy`.
`http_method`	The type of HTTP request method. Example: `GET`.
`http_status_code`	The HTTP response status code. Example: `404`.
`login_key`	The hashed string that ties together all events in a given user's login session. The session starts with a login event and ends with either a logout event or the session expiring. All log lines with the same login key occurred during the same user login session.
`log_record_type`	Type of log record. Examples: • `AnalyticsAssetView` • `API` • `ApexExecution` • `ApexRestApi` • `ApexSoap` • `ApexUnexpectedException` • `BulkApiV1` • `BulkApiV2`

Field	Description
	• CronJob • LightningInteraction • LightningPageView • PlatformEventConsumer • QueuedExec • RestApi • URI • VFRemoting • VisualforceRequest
managed_package_namespace	Namespace of the package.
method_name	The name of the Apex method. Examples: • getUserAccessLevelBean • getCurrentDocumentsRates • getAdditionalHelpTemplate
num_fields	The number of fields accessed by the user in this transaction.
num_soql_queries	The number of SOQL queries completed during the executed Apex event.
operation_count	The number of records accessed by the user in this transaction.
operation_type	The operation performed on the component or custom object. Examples: • INSERT • READ • UPDATE • DELETE
organization_country_code	The ISO-3166 two-character country code corresponding to the subscriber org's address at the time of sign-up. Examples: • US • CA • FR
organization_edition	The name of the Salesforce edition the subscriber org is using. Examples: • Developer Edition • Enterprise Edition

Field	Description
	• `Unlimited Edition`
`organization_id`	The 15-character ID of the subscriber org.
`organization_instance`	The name of the subscriber org's instance. Examples: • `AP2` • `EU7` • `NA44`
`organization_language_locale`	The 2–5 character code that represents the language and locale ISO-639 code of the subscriber org. This code controls the language for the labels displayed in an application. Examples: • `de-DE` • `en-US` • `fr-CA`
`organization_name`	The name of the subscriber org. Example: `Acme, Inc.`
`organization_status`	The paid status of the subscriber org. Examples: • `Active` • `Demo` • `Free` • `Trial`
`organization_time_zone`	The default time zone of the subscriber org. Examples: • `America/New York` • `America/Los Angeles` • `Europe/Paris`
`organization_type`	The subscriber org environment type. Examples: • `Production` • `Sandbox`
`package_id`	The ID of the package.
`package_version_id`	The ID of the package version.

Field	Description
`page_app_name`	The internal name of the Lightning application that the user accessed from the App Launcher. Examples: • `LightningSales` • `Chatter`
`page_context`	The context of the Lightning page where the event occurred. Example: `clients:cardContainer`.
`page_entity_type`	The Lightning entity type of the event. Examples: • `Contact` • `Task`
`page_url`	The relative URL of the top-level Lightning Experience or Salesforce mobile app page that the user accessed. The page can contain one or more Lightning components. Multiple record IDs can be associated with page_url. Example: `/sObject/0064100000JXITSASS/view`
`parent_ui_element`	The parent scope of the Lightning page element where the event occurred. Example: `ChatterFeed`.
`prevpage_url`	The relative URL of the previous Lightning Experience or Salesforce mobile app page that the user opened. Example: `/sObject/0064100000`
`quiddity`	The type of outer execution associated with the executed Apex event. Examples: • `A`: `QueryLocator` Batch Apex • `B`: Bulk API and Bulk API 2.0 • `BA`: Batch Apex • `C`: Scheduled Apex • `E`: Inbound Email Service • `F`: Future • `H`: Apex REST • `I`: Invocable Action • `K`: Quick Action • `L`: Lightning • `M`: Remote Action • `Q`: Queuable • `R`: Synchronous Uncategorized • `S`: Serial Batch Apex • `TA`: Tests Async • `TD`: Tests Deployment

Field	Description
	• TS: Tests Synchronous • V: Visualforce • W: SOAP Webservices • X: Execute Anonymous
referrer_uri	The referring URI from the HTTP request. URIs are redacted in the following ways: • Query strings are removed. • User IDs display as hashed tokens. • Subscriber-created URIs, such as VisualForce pages, are removed.
related_list	A section of a record or other detail page that lists items related to that record. Examples: • Open Activities • Stage History
request_id	The ID of the HTTP request made to the server by the browser. If multiple log lines have the same request ID, they all occurred as part of the same user interaction.
request_size	The size of the callout request body in bytes.
request_status	The status of the HTTP request for the page or action that accesses a component or custom object in a package. Examples: • A = Auth Error • F = Failure • N = 404 error • R = Redirect • S = Success • U = Undefined
response_size	The size of the callout response in bytes.
rows_processed	The number of rows that were processed in the request.
session_key	The HTTP session ID for the HTTP request to access a component or custom object in a package. The session ID is hashed.
stack_trace	The stack trace associated with the Apex exception.
target_ui_element	The Lightning target page element where the event occurred. Examples: • label body truncate • tabitem-link

Field	Description
`timestamp_derived`	The access time of a component or custom object in a package in ISO8601-compatible format (YYYY-MM-DDTHH:MM:SS.sssZ). Example: `2018-07-27T11:32:59.555Z`.
`ui_event_sequence_num`	An auto-incremented sequence number of the current Lightning event since the session started.
`ui_event_source`	The user action on the Lightning record or records. This value indicates whether the user's action was on a single record or multiple records. For example, `read` indicates that one record was read, such as on a record detail page. In contrast, `reads` indicates that multiple records were read, such as in a list view. Examples: • `click` • `create` • `delete` • `hover` • `read` • `update`
`ui_event_type`	The type of Lightning event. Examples: • `crud` • `system` • `user`
`url`	The redacted URL of the request to access a component or custom object in a package. URLs are redacted in the following ways. • Query strings are removed. • User IDs display as hashed tokens. • Subscriber-created URIs, such as VisualForce pages, are removed. For Lightning-based URLs, only /aura is displayed. For Visualforce-based URLs that aren't pages owned by the managed package, either /apex or /apexrest is displayed.
`user_agent`	The browser and operating system of the device used to make the request. Examples: • Mozilla/5.0 (iPhone; CPU iPhone OS 12_0 like Mac OS X) AppleWebKit/605.1.15 (KHTML, like Gecko) CriOS/69.0.3497.105 Mobile/15E148 Safari/605.1 • Mozilla/5.0 (Linux; Android 8.0.0; SM-G960F Build/R16NW) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/62.0.3202.84 Mobile Safari/537.36
`user_country_code`	The default ISO-3166 two-character country code of the user. Examples: • `CA` • `FR`

Field	Description
	• US
user_id_token	The hashed token representing the ID of the user who accessed the package. The ID persists, even if a user's details change. The token also persists across any packages that the user interacts with. The user ID token starts with the prefix 005-. In compliance with privacy regulations, our systems can't access the actual user ID. Likewise, the hashed token can't be linked to the user ID.
user_time_zone	The default time zone of the user. Example: America/New_York.
user_type	The user license category of the user accessing Salesforce services through the UI or API. Examples: • Guest • Partner • Standard

Subscriber Snapshots

Subscriber snapshots provide a point-in-time summary of your subscribers' activity. Use subscriber snapshots to see usage trends by org and package over time.

Note: AppExchange App Analytics is subject to certain usage restrictions, as described in the AppExchange Program Policies.

AppExchange App Analytics takes a daily snapshot of org, package, and custom entity data. Snapshots are captured daily at 00:00 UTC and become available for download immediately thereafter. You request a date and time, or range of dates and times, and you receive one snapshot per valid date and time requested. For example, if on April 7, 2020 you request a date and time range of StartTime=2020-04-04T00:00:00Z EndTime=2020-04-07T00:00:00Z, you receive three snapshots, one for each completed day.

Note: Starting in Summer '20 we changed the names of the DataType enums in the AppAnalyticsQueryRequest.

Field	Description
attribute_name	Represents a characteristic of a custom entity, managed package, package version, or org. Example: UsersWithMFA
attribute_value	A string that represents a characteristic or measure of an attribute_name. Examples: • 0.570 • 1.000 • Acme, Inc. • Active • Deprecated

Field	Description
custom_entity	The developer name of the component or custom object. Examples: • `Amount` • `Travel_Expense`
date	The subscriber snapshot date requested, in `YYYY-MM-DDT00:00:00Z` format. Each point-in-time snapshot is captured at `00:00 UTC` on the date specified. Example: `2020-04-04T00:00:00Z`
managed_package_namespace	Namespace of the package. Example: `sfdx_isv_pkg001`
organization_edition	The name of the Salesforce edition the subscriber org is using. Examples: • `Developer Edition` • `Enterprise Edition` • `Unlimited Edition`
organization_id	The 15-character ID of the subscriber org. Example: `00D4m000000Td8Y`.
organization_name	The name of the subscriber org. Example: `My_Org`.
organization_status	The paid status of the subscriber org. Examples: • `ACTIVE` • `DEMO` • `FREE` • `TRIAL`
package_id	The ID of the managed package. Example: `033xx00000000CI`.
package_version_id	The ID of the managed package version. Example: `04t6A0000004eytQAA`.
record_count	Total records for the custom entity in that org on the specified snapshot date.

The `attribute_name` and `attribute_value` fields are a `key-value` pair. Each pair has a specific scope. Some pairs provide org-level metadata, and others provide custom entity, managed package, or package version metadata,

Interpret these two fields in tandem using the information in this table.

attribute_name	Description	attribute_value	Scope
`UsersWithMFA`	Represents the percentage of your unique, standard users who have enabled multi-factor	Percent Examples: • 0.060	Org-level. Note: For all packages installed into an org, the same org-level `UsersWithMFA` percent repeats on every package version row.

attribute_name	Description	attribute_value	Scope
	authentication (MFA) using one of these methods. • User permission sets • Profile permission sets • High-assurance session security level The corresponding `attribute_value` is always between 0–1, where 0 represents 0% and 1 represents 100%.	• 0.940	

Test Custom Integrations

To test your custom integrations in a nonproduction environment, use AppExchange App Analytics Simulation Mode. Submit an App Analytics query request and receive sample usage data.

Note: AppExchange App Analytics is subject to certain usage restrictions as described in the AppExchange Program Policies.

To receive sample usage data, enable simulation mode, then submit a query request that includes a simulation mode package ID.

USER PERMISSIONS

To enable simulation mode:
- ModifyMetadata

1. Enable simulation mode in your test org using the Metadata API AppAnalyticsSettings `enableSimulationMode` org preference.
2. To simulate package usage log, usage summary, or subscriber snapshot downloads, complete the required fields in your SOAP API AppAnalyticsQueryRequest. Include `DataType`, and leave `OrganizationIDs` blank. For `PackageIDs`, include at least one simulation mode package ID that matches the scenario you're testing.

Package Type	Simulation Mode Package ID	Description
Small Data Set	`033xx00SIMsmall`	Contains a small amount of data. For use with all query types. Use this package ID to download data for any query-allowed timespan.
Large Data Set	`033xx00SIMlarge`	Contains a large amount of data for two org IDs (`00Dxx00SIM00foo` and `00Dxx00SIM00bar`). For use only with package usage log queries.
Empty Data Set	Use any other 15-character package ID prefixed with `033xx00SIM`. Examples: • `033xx00SIMempty` • `033xx00SIM44444`	Contains no data. For use with all query types. Use one of these package IDs to return an empty data set.

3. Submit your query.
4. Check your API request, then do one of the following:
   - Upon success, retrieve the App Analytics Query Request object created in the API request. The `DownloadURL` field populates when the request is completed.
   - Upon error, edit your query. Use a smaller time window, such as a 14 days, or specify one org ID. Then resubmit your query.
5. Download the .csv file containing sample usage data from the `DownloadURL` field in the App Analytics Query Request object.

Important: When simulation mode is enabled, you can only access our sample usage data. Disable simulation mode to access your production data.

AppExchange App Analytics Developer Cookbook

Delve deeper into your AppExchange App Analytics managed package usage data by creating key performance indicators (KPIs). First, complete some prerequisites and retrieve your App Analytics data. Next, prepare your Tableau CRM analytics environment. Finally, to build your KPIs, complete App Analytics recipes.

Note: AppExchange App Analytics is subject to certain usage restrictions as described in the AppExchange Program Policies.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

1. What Are Recipes?
   The AppExchange App Analytics Developer Cookbook uses two distinct types of recipes: Tableau CRM (TCRM) recipes and App Analytics recipes. The TCRM recipes are foundational work that you must complete before creating App Analytics recipes. App Analytics recipes build on your TCRM recipe analytics environment and result in key performance indicators (KPIs).
2. Before You Begin
   Complete these prerequisites before you create App Analytics recipes.
3. Tableau CRM Recipes
   Set up your org to create AppExchange App Analytics recipes by building your Tableau CRM (TCRM) environment. You first create a country-codes dataset. Then you create two TCRM recipes to produce a dataset of your subscriber info, and an aggregate dataset of all of your daily data.
4. App Analytics Recipes
   To understand how your customers are using your managed packages and components, create App Analytics recipes. Each App Analytics recipe produces a Tableau CRM (TCRM) lens and is a key performance indicator (KPI). Use TCRM dashboards to visualize your KPIs and gain deeper insights.

What Are Recipes?

The AppExchange App Analytics Developer Cookbook uses two distinct types of recipes: Tableau CRM (TCRM) recipes and App Analytics recipes. The TCRM recipes are foundational work that you must complete before creating App Analytics recipes. App Analytics recipes build on your TCRM recipe analytics environment and result in key performance indicators (KPIs).

You can use any reporting tool to create KPIs, but we recommend our analytics powerhouse, TCRM. With TCRM, you can easily integrate your License Management App (LMA) data with your App Analytics data using datasets and TCRM recipes.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

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Tableau CRM Recipes

If you're familiar with TCRM, you're familiar with dataflows and TCRM recipes. Dataflows are great for combining data from multiple sources, while TCRM recipes are great for performing transformations on a single dataset. To set up your App Analytics recipe environment, create TCRM recipes that combine a country code dataset, your LMA data, and your App Analytics data. These TCRM recipes are required to create App Analytics recipes.

App Analytics Recipes

App Analytics recipes are TCRM lens formulas with SAQL code provided. Each App Analytics recipe results in a KPI that you can use to visualize your data on a dashboard. Some examples include Daily and Monthly Active Users, and Custom Object Reads Per Day. Complete your Tableau CRM recipes before starting with App Analytics recipes.

Before You Begin

Complete these prerequisites before you create App Analytics recipes.

To brush up on your AppExchange App Analytics or Tableau CRM skills, we recommend completing these Trailhead modules.

- AppExchange Partner Intelligence Basics
- Tableau CRM Data Integration Basics

1. Set up your License Management Org (LMO).

   You use your LMO to track all Salesforce users who install your managed package. The LMO receives a notification in the form of a lead record when a user installs or uninstalls your package. It also tracks each package upload on AppExchange. Typically, as an AppExchange partner, you use your Partner Business Org (PBO) as your LMO.

2. Register your security-reviewed managed package with your LMO. Follow the directions in Link a Package with Your License Management Organization.

3. If you're not using your PBO as your LMO, install the License Management App (LMA) in your LMO. The LMA lets you manage leads and licenses for your AppExchange offerings. To install the LMA, read Get Started with the License Management App.

   Note: If you're using your PBO as your LMO, you're all set. The LMA is automatically installed for you.

4. Create an App Analytics Admin permission set that includes create and read access on the AppAnalyticsQueryRequest object. Assign this permission to any non-Admin users so that they can create App Analytics requests. Read Create Permission Sets in Salesforce Help if you need instructions.

EDITIONS

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USER PERMISSIONS

To access License Management App data, packages, and package versions:

- Read on Licenses, Packages, Package Versions

To request and retrieve AppExchange App Analytics data:

- Create, Read, Edit, Delete, View All, and Modify All on the `AppAnalyticsQueryRequest` object

To use Tableau CRM:

- Tableau CRM Plus Admin user

5. Set up the CLI using the Salesforce CLI Setup Guide. If you need a CLI refresher, take the App Development with Salesforce DX Trailhead module.
6. Enable Tableau CRM in your Salesforce org.
7. Create a Tableau CRM app named PartnerIntelligence.
8. To request and retrieve a sample package usage log, create an AppExchange App Analytics query request using the CLI. Save the CSV data file as `RawPackageLogFile.csv`.
9. To request and retrieve package usage logs automatically, create an automation. Which automation method you choose depends on your business specifications and which data volume you're automating.
   - For smaller datasets, such as package usage summaries, Apex scales well for automation. This GitHub repo has the details.
   - For larger datasets, such as package usage logs, automate using an Amazon Web Services (AWS) stack.
   - You can also use the free Salesforce Labs app, App Analytics. It offers great functionality to retrieve and automate data collection and to get started with recipes and dashboards. Salesforce Labs apps are developed by Salesforce employees and are unsupported.

Get Help with Prerequisites

If you need help with setting up your solution, you can request a consultation with a Platform Expert.

Get Help with Prerequisites

If you need help with setting up your solution, you can request a consultation with a Platform Expert.

1. Log in to the Salesforce Partner Community.
2. Click the question icon and then click **Log a Case for Help**.
3. Select **Salesforce Partner Program Support**.

   Tip: If you don't see the Salesforce Partner Program Support tile, use the org picker to select the org that's associated with your Salesforce partnership account.
4. For product, enter and select **Partner Programs & Benefits**.
5. For topic, enter and select **Platform Expert or Technology & Product Roadmap Consultation**.
6. Provide any other required details, and then click **Create Case**.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Tableau CRM Recipes

Set up your org to create AppExchange App Analytics recipes by building your Tableau CRM (TCRM) environment. You first create a country-codes dataset. Then you create two TCRM recipes to produce a dataset of your subscriber info, and an aggregate dataset of all of your daily data.

- The first TCRM recipe, LMAJoin, combines package and license data from your LMA with your accounts and leads. It produces a dataset of your subscribers.
- The second TCRM recipe, DailyAggregation, joins the LMAJoin dataset with your App Analytics data. It produces the DailyAggregation dataset. All your App Analytics recipes are built on top of your DailyAggregation dataset.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

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1. Create the Country-Codes Dataset
   To create visualizations of your country-based data in map format, you normalize the LMA country-code data to TCRM country-code format.
2. Connect to Your License Management App Data
   Create an SFDC_Local connection to your License Management App (LMA) data.
3. Create the LMAJoin TCRM Recipe
   Create a Tableau CRM (TCRM) recipe that contains your License Management App (LMA) data.
4. Create Your App Analytics Dataset
   Create a RawPackageLogFile App Analytics dataset using your `RawPackageLogFile.csv` file.
5. Create Your DailyAggregation TCRM Recipe
   You join your raw package log file data with your License Management App (LMA) data to create the DailyAggregation Tableau CRM (TCRM) recipe. The recipe produces a dataset called DailyAggregation that you use to create App Analytics recipes.

SEE ALSO:

Explore Data and Take Action with Tableau CRM

Create the Country-Codes Dataset

To create visualizations of your country-based data in map format, you normalize the LMA country-code data to TCRM country-code format.

1. Click country-codes.csv to download standardized country code data.
2. Right-click **Raw** and click **Save Link As**.
3. Name the file `country-codes.txt`, and save it to your desktop.
4. In Tableau CRM Analytics Studio, click **Create**.
5. Click **Dataset**.
6. Click **CSV File**.
7. Select your `country-codes.txt` file.
8. Click **Next**.
9. Name your dataset *`country-codes`*.
10. Select your **PartnerIntelligence** app.
11. Click **Next**.
12. Click **Upload File**.

EDITIONS

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Connect to Your License Management App Data

Create an SFDC_Local connection to your License Management App (LMA) data.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

1. In Tableau CRM Analytics Studio Data Manager, click **Connect**.
2. Click **Connect to Data**.
3. Click **SFDC_LOCAL**.
4. Click **Account**.
5. Click **Continue**.
6. Select all fields.
7. Click **Continue**.
8. Click **Save**.
9. Repeat steps 2 through 8 to connect to these objects.
   - **Lead**
   - **sfLma__License__c**
   - **sfLma__Package__c**
   - **sfLma__Package_Version__c**
10. Next to Account, click the down arrow.
11. Click **Run Data Sync**.
12. Repeat step 11 for these objects in your Connect window.
    - **Lead**
    - **sfLma__License__c**
    - **sfLma__Package__c**
    - **sfLma__Package_Version__c**

Create the LMAJoin TCRM Recipe

Create a Tableau CRM (TCRM) recipe that contains your License Management App (LMA) data.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

1. In Tableau Analytics Studio Data Manager Dataflows & Recipes on the Recipes tab, click **Create Recipe**.
2. Click **Add Input Data**.
3. Select **sfLma__License__c**, and select all columns.
4. Create a transform named `License` with these specifications.
   - Custom Formula: `string(Id)`
   - Output Type: **Text**
   - Length: `255`
   - Default Value: `blank`
   - Show Results In: **New Column (and Keep Original)**
   - Column Label: `LicenseRecordId`
5. Add a join to Lead with these specifications.

- Select Input Data to Join: **Lead**
- Columns to Select: **Company**, **First Name**, **Id**, **Last Name**
- Join Type: **Lookup**
- Join Keys: **License: Record ID = Lead ID**
- API Name Prefix for Right Columns: *Lead*

6. Add a join to Account with these specifications.
   - Select Input Data to Join: **Account**
   - Columns to Select: **Name**
   - Join Type: **Lookup**
   - Join Keys: **Account Name = Account Name**
   - API Name Prefix for Right Columns: *Account*
7. Add a join to sfLma__Package__c with these specifications.
   - Select Input Data to Join: **sfLma__Package__c**
   - Columns to Select: *All fields*
   - Join Type: **Lookup**
   - Join Keys: **Package = Record ID**
   - API Name Prefix for Right Columns: *Package*
8. Create a transform between the join and `sfLma__Package__c` with these specifications.
   - Custom Formula: *substr(sfLma__Package_ID__c, 1, 15)*
   - Output Type: **Text**
   - Length: *255*
   - Default Value: none
   - Show Results in: **New Column (and Keep Original)**
   - Column Label: *PackageID15*
9. Create another join with these specifications.
   - Select Input Data to Join: **sfLma__Package_Verzion__c**
   - Columns to Select: *All fields*
   - Join Type: **Lookup**
   - Join Keys: **Package Version = Record ID**
   - API Name Prefix for Right Columns: *PackageVersion*
10. Create an output with these specifications.
    - Write To: **Dataset**
    - Dataset Display Label: *LMAJoin*
    - App Location: **PartnerIntelligence**
    - Sharing Source: default
    - Security Predicate: **Apply row-level security to the target dataset by adding a predicate filter condition**
11. Click **Apply**.

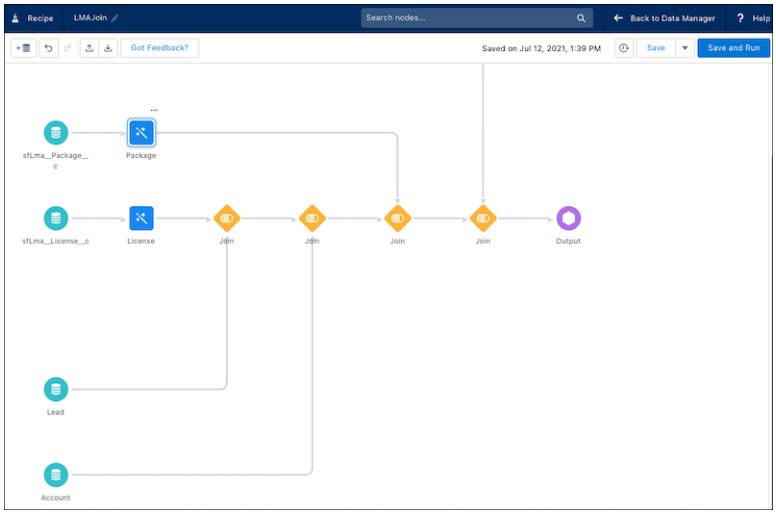
12. Click **Save**.

13. Save your recipe as *LMAJoin*.

14. Click **Save and Run**.

15. To monitor the status of your job, click **Go to Data Monitor**.

Example: When complete, your LMAJoin TCRM recipe looks like this.



1. Monitor Your LMAJoin TCRM Recipe
   TCRM recipes can take a while to complete. Use these steps to monitor the status of your LMAJoin recipe.
2. Run the LMAJoin TCRM Recipe
   To create a reusable dataset, schedule your LMAJoin TCRM recipe to run on a regular basis. We recommend daily at midnight.

Monitor Your LMAJoin TCRM Recipe

TCRM recipes can take a while to complete. Use these steps to monitor the status of your LMAJoin recipe.

1. In Tableau Analytics Data Manager, click **Monitor**.

2. On the Jobs tab, locate your LMAJoin job.

3. When your job is Successful, click **Data** to view your completed LMAJoin dataset.

EDITIONS

Available in: both **Salesforce Classic** and **Lightning Experience**

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Run the LMAJoin TCRM Recipe

To create a reusable dataset, schedule your LMAJoin TCRM recipe to run on a regular basis. We recommend daily at midnight.

1. In Tableau CRM Data Manager, click **Dataflows & Recipes**.
2. Click the **Recipes** tab.
3. Next to your LMAJoin TCRM recipe, click the arrow.
4. Click **Schedule**, and set up your schedule.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Create Your App Analytics Dataset

Create a RawPackageLogFile App Analytics dataset using your `RawPackageLogFile.csv` file.

1. In Tableau CRM Analytics Studio, click **Create** and select **Dataset**.
2. Click **CSV File** and select your `RawPackageLogFile.csv` file.
3. Click **Next**.
4. Name your dataset *`RawPackageLogFile`* and select your **PartnerIntelligence** app.
5. Click **Next**.
6. For **event_count**, **num_fields**, **num_soql_queries**, **operation_count**, and **rows_processed** fields, change the field type from **Dimension** to **Measure** and add these specifications.
   - Default value: *`0`*
   - Scale: *`0`*
   - Precision: *`18`*
7. Search for **timestamp_derived** and make sure that its field type is **Date**.
8. Click **Upload File**.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Create Your DailyAggregation TCRM Recipe

You join your raw package log file data with your License Management App (LMA) data to create the DailyAggregation Tableau CRM (TCRM) recipe. The recipe produces a dataset called DailyAggregation that you use to create App Analytics recipes.

1. In Tableau CRM Analytics Studio Data Manager Dataflows & Recipes on the Recipes tab, click **Create Recipe**.
2. Click **Add Input Data**.
3. Select **RawPackageLogFile**.
4. Select all the columns.
5. Create an aggregate with these specifications.

Field	Aggregate By
`event_count`	`Sum`
`login_key`	`Unique`

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Field	Aggregate By
num_fields	Sum
num_soql_queries	Sum
operation_count	Sum
rows_processed	Sum
session_key	Unique

6. In the aggregate, in Group Rows, click **+**, and select **timestamp_derived**.
   a. Select **Year**, **Month**, and **Day**.
   b. Click **Add**.
7. In the aggregate, in Group Rows, create a group for each of these fields.
   - **api_type**
   - **api_version**
   - **app_name**
   - **class_name**
   - **cloned_from_organization**
   - **custom_entity**
   - **custom_entity_type**
   - **entry_point**
   - **event**
   - **event_subscriber**
   - **http_method**
   - **http_status_code**
   - **log_record_type**
   - **managed_package_namespace**
   - **method_name**
   - **operation_type**
   - **organization_country_code**
8. Create a transform named *Create DMY Field* with this formula:
   `to_date(concat(timestamp_derived_DAY,"/",timestamp_derived_MONTH,"/",timestamp_derived_YEAR),"dd/MM/yyyy"))`
9. Join your RawPackageLogFile dataset to your LMAData dataset using this information.
   - Select Input Data to Join: **LMAData**
   - Columns to Select: *All fields*
   - Join Type: **Lookup**
   - Join Keys: **organization_id = Subscriber Org ID** and **package_id = PackageID15**
   - API Name Prefix for Right Columns: *LMAData*
10. Join your country-codes dataset to your LMAData dataset using this information.

- Select Input Data to Join: **country-codes**
- Columns to Select: `All fields`
- Join Type: **Lookup**
- Join Keys: **user_country_code = ISO3166-1-Alpha-2**
- API Name Prefix for Right Columns: `UserCountry`

11. Create a transform named `Feature Name`.

a. Create as many TCRM buckets as you need for your features, such as Inventory, Orders, and a catch-all bucket called Other.

b. Note: A TCRM bucket represents a category that you use to group your data. For example, say your app contains multiple features, such as an inventory tracking feature and an order processing feature. Create a TCRM bucket for each feature. Each bucket contains the custom objects, pages, Lightning components, and Apex classes that pertain to that feature. You can use these buckets to create Feature Adoption App Analytics recipes

Add your custom entities to the appropriate bucket.

12. Select **Output** and use these settings.

- Write To: **Dataset**
- Dataset Display Label: `DailyAggregation`
- App Location: **PartnerIntelligence**
- Sharing Source: default
- Security Predicate: **Apply row-level security to the target dataset by adding a predicate filter condition**
- Name: `Create Daily Aggregation Dataset`

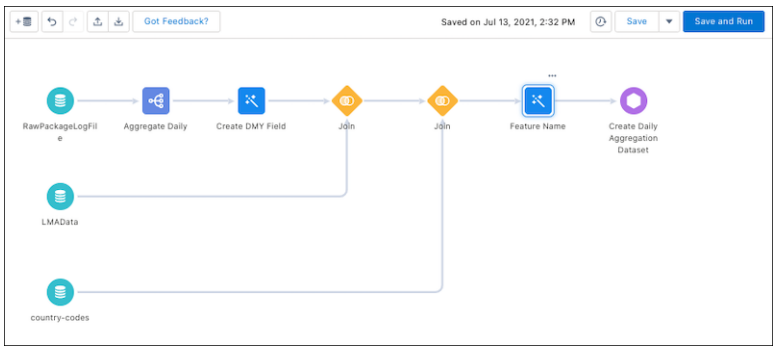
13. Click **Apply**.

14. Click **Save**.

15. Name your recipe `DailyAggregation`.

16. Click **Save and Run**.

Example: When complete, your DailyAggregation recipe looks like this:



1. Monitor the DailyAggregation TCRM Recipe
   TCRM recipes can take a while to complete. Use these steps to monitor the status of your DailyAggregation recipe.
2. Run the DailyAggregation TCRM Recipe
   To create a reusable dataset, schedule your DailyAggregation TCRM recipe to run on a regular basis. We recommend daily at midnight.

Monitor the DailyAggregation TCRM Recipe

TCRM recipes can take a while to complete. Use these steps to monitor the status of your DailyAggregation recipe.

1. In Tableau Analytics Data Manager, click **Monitor**.
2. On the Jobs tab, locate your DailyAggregation job.
3. When your job is Successful, click **Data** to view your completed DailyAggregation dataset.

EDITIONS

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Run the DailyAggregation TCRM Recipe

To create a reusable dataset, schedule your DailyAggregation TCRM recipe to run on a regular basis. We recommend daily at midnight.

1. In Tableau CRM Data Manager, click **Dataflows & Recipes**.
2. Click the **Recipes** tab.
3. Next to your DailyAggregation TCRM recipe, click the arrow.
4. Click **Schedule**, and set up your schedule.

EDITIONS

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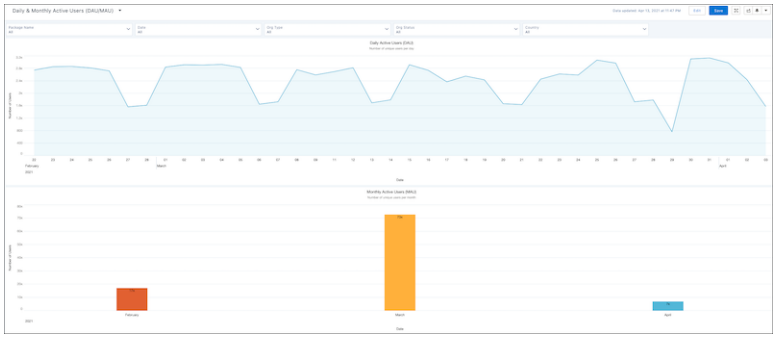
App Analytics Recipes

To understand how your customers are using your managed packages and components, create App Analytics recipes. Each App Analytics recipe produces a Tableau CRM (TCRM) lens and is a key performance indicator (KPI). Use TCRM dashboards to visualize your KPIs and gain deeper insights.

Note: AppExchange App Analytics is subject to certain usage restrictions as described in the AppExchange Program Policies. To request and retrieve package usage logs and subscriber snapshots, activate App Analytics on your security-reviewed managed package by logging a support case in the Salesforce Partner Community. For product, specify **Partner Programs & Benefits**. For topic, specify **ISV Technology Request**. You can access package usage summaries without activation.

For example, to analyze a wide range of daily and monthly package usage metrics, build Daily and Monthly Active User App Analytics recipes.

Example:



EDITIONS

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Customer Success Recipes
Customer success is a relationship-focused method of ensuring that your customers achieve their desired outcomes while using your managed packages.

Custom Object Usage Recipes
Understanding how your customers use your custom objects is critical to managing the lifecycle of your managed package and its custom objects. Start by measuring custom object usage by create, read, update, and delete (CRUD) operations.

Customer Success Recipes

Customer success is a relationship-focused method of ensuring that your customers achieve their desired outcomes while using your managed packages.

To measure customer success, you can create metrics that help you understand:

- Overall managed package usage
- Depth of managed package usage
- Growth
- Length of time as a customer
- Number of renewals
- Number of upsells
- Overall relationship

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

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As you learn more about your customers and how they use your managed packages, your list of customer success metrics expands.

To analyze user behavior, we rely on user-related and CRUD (create, read, update, and delete) App Analytics data fields to calculate metrics. All user behavior calculations rely on how a unique user is defined.

- An individual that has used your managed package and its components
- Measured for a specified time period, such as a day, month, or year

An active user can be defined as: A user who has logged some type of package usage, such as CRUD activity, page views, or Lightning interactions, during a specified time period.

Segment the unique and active users by time period, such as day, month, or quarter.

Create a Daily Unique Users Recipe
This recipe produces a unique count of users by day.

Create a Weekly Unique Users Recipe
This recipe produces a unique count of users by week.

Create a Monthly Unique Users Recipe
This recipe produces a unique count of users by month.

Create a Daily Unique Users Recipe

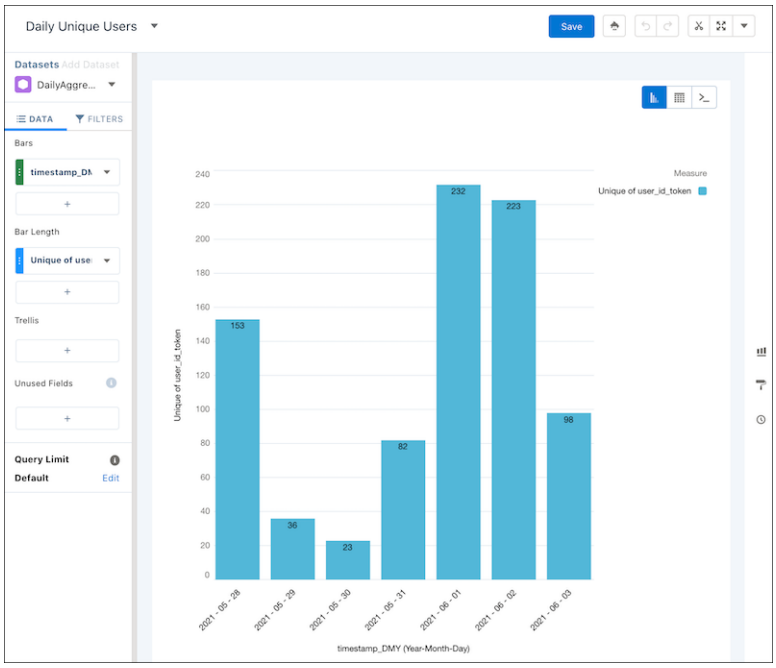
This recipe produces a unique count of users by day.

In your org in Tableau CRM Analytics Studio:

1. In All items on the Datasets tab, select your DailyAggregation dataset.

2. Under Bar Length, click **Count of Rows**.
3. Click **Unique**.
4. Select **user_id_token**.
5. Select **Charts**.
6. Click **Column**.
7. Under Bars, click **+** and search for *timestamp_DMY*.
8. Select **Year-Month-Day**.
9. Click **Save**.
10. Name your lens *Daily Unique Users*.
11. Select your PartnerIntelligence app.
12. Click **Save**.

Example:



SAQL:

```
q = load "DailyAggregation";
q = group q by ('timestamp_derived_DAY_formula_Year',
'timestamp_derived_DAY_formula_Month', 'timestamp_derived_DAY_formula_Day');
q = foreach q generate 'timestamp_derived_DAY_formula_Year' + "~~~" +
'timestamp_derived_DAY_formula_Month' + "~~~" + 'timestamp_derived_DAY_formula_Day'
as
'timestamp_derived_DAY_formula_Year~~~timestamp_derived_DAY_formula_Month~~~timestamp_derived_DAY_formula_Day',
 unique('user_id_token') as 'unique_user_id_token';
q = order q by
'timestamp_derived_DAY_formula_Year~~~timestamp_derived_DAY_formula_Month~~~timestamp_derived_DAY_formula_Day'
```

```
 asc;
q = limit q 2000;
```

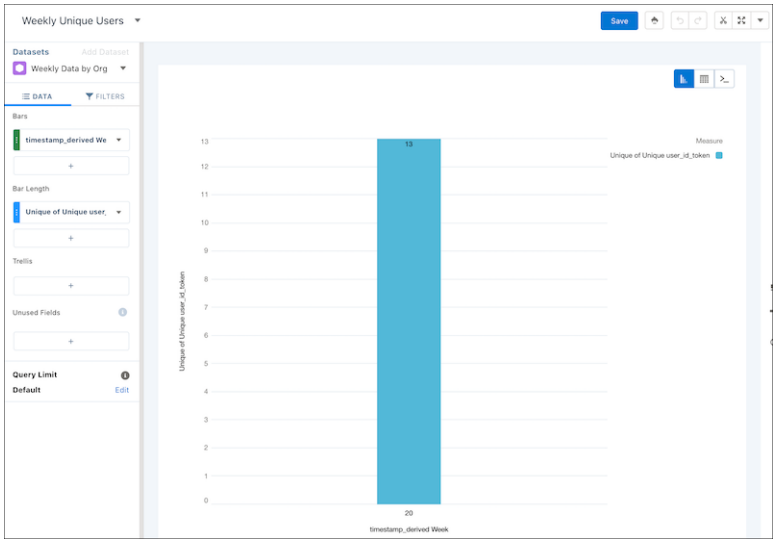
Create a Weekly Unique Users Recipe

This recipe produces a unique count of users by week.

In your org in Tableau CRM Analytics Studio:

1. In All items on the Datasets tab, select your DailyAggregation dataset.
2. Under Bar Length, click **Count of Rows**.
3. Click **Unique**.
4. Select **user_id_token**.
5. Select **Charts**.
6. Click **Column**.
7. Under Bars, click **+** and search for *timestamp_DMY*.
8. Select **Year-Week**.
9. Click **Save**.
10. Name your lens *Weekly Unique Users*.
11. Select your PartnerIntelligence app.
12. Click **Save**.

Example:



SAQL:

```
q = load "DailyAggregation";
q = group q by ('timestamp_derived_DAY_formula_Year',
'timestamp_derived_DAY_formula_Week');
q = foreach q generate 'timestamp_derived_DAY_formula_Year' + "~~~" +
```

```
'timestamp_derived_DAY_formula_Week' as
'timestamp_derived_DAY_formula_Year~~~timestamp_derived_DAY_formula_Week',
unique('user_id_token') as 'unique_user_id_token';
q = order q by 'timestamp_derived_DAY_formula_Year~~~timestamp_derived_DAY_formula_Week'
 asc;
q = limit q 2000;
```

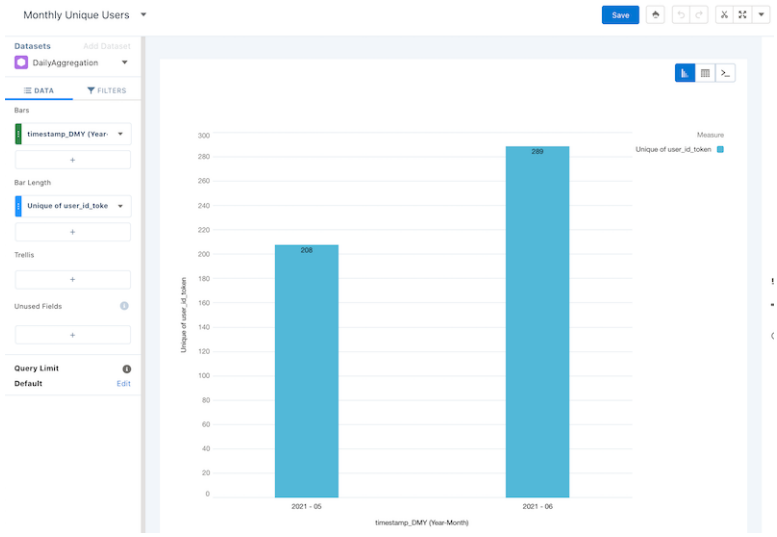
Create a Monthly Unique Users Recipe

This recipe produces a unique count of users by month.

In your org in Tableau CRM Analytics Studio:

1. In All items on the Datasets tab, select your DailyAggregation dataset.
2. Under Bar Length, click **Count of Rows**.
3. Click **Unique**.
4. Select **user_id_token**.
5. Select **Charts**.
6. Click **Column**.
7. Under Bars, click **+** and search for **timestamp_DMY**.
8. Select **Year-Month**.
9. Click **Save**.
10. Name your lens *`Monthly Unique Users`*.
11. Select your PartnerIntelligence app.
12. Click Save.

Example:



SAQL:

```
q = load "DailyAggregation";
q = group q by ('timestamp_derived_DAY_formula_Year',
'timestamp_derived_DAY_formula_Month');
q = foreach q generate 'timestamp_derived_DAY_formula_Year' + "~~~" +
'timestamp_derived_DAY_formula_Month' as
'timestamp_derived_DAY_formula_Year~~~timestamp_derived_DAY_formula_Month',
unique('user_id_token') as 'unique_user_id_token';
q = order q by 'timestamp_derived_DAY_formula_Year~~~timestamp_derived_DAY_formula_Month'
 asc;
q = limit q 2000;
```

Custom Object Usage Recipes

Understanding how your customers use your custom objects is critical to managing the lifecycle of your managed package and its custom objects. Start by measuring custom object usage by create, read, update, and delete (CRUD) operations.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Create a Custom Object Creates Per Day Recipe
This recipe produces a unique count of how many times per day a custom object was created.
Create a Custom Object Updates Per Day Recipe
This recipe produces a unique count of how many times per day a custom object was created.
Create a Custom Object Reads Per Day Recipe
This recipe produces a unique count of how many times per day a custom object was read.

Create a Custom Object Creates Per Day Recipe

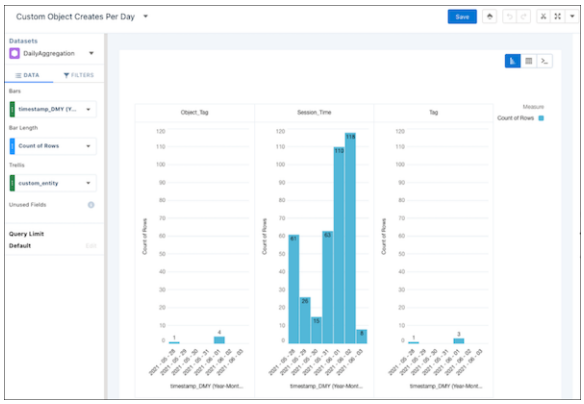
This recipe produces a unique count of how many times per day a custom object was created.

In your org in Tableau CRM Analytics Studio:

1. In All items on the Datasets tab, select your DailyAggregation dataset.
2. Select **Charts**.
3. Click **Column** and leave Bar Length as **Count of Rows**.
4. Under Bars, click **+** and search for **timestamp_DMY**.
5. Select **Year-Month-Day**.
6. Click **Filters**.
7. Click **+**.
8. Select **custom_entity_type** equals **CustomObject**.
9. Click **Apply**.
10. Click **+**.
11. Select **operation_type** Equals **INSERT**.
12. Click **Apply**.
13. Click **Data**.

14. Under Trellis, click **+**.
15. Select **custom_entity**.
16. Click **Save**.
17. Name your lens *Custom Object Creates Per Day*.
18. Select your PartnerIntelligence app.
19. Click **Save**.

Example:



SAQL:

```
q = load "DailyAggregation";
q = filter q by 'custom_entity_type' == "CustomObject";
q = filter q by 'operation_type' == "INSERT";
q = group q by ('timestamp_derived_DAY_formula_Year',
'timestamp_derived_DAY_formula_Month', 'timestamp_derived_DAY_formula_Day',
'custom_entity');
q = foreach q generate 'timestamp_derived_DAY_formula_Year' + "~~~" +
'timestamp_derived_DAY_formula_Month' + "~~~" + 'timestamp_derived_DAY_formula_Day'
as
'timestamp_derived_DAY_formula_Year~~~timestamp_derived_DAY_formula_Month~~~timestamp_derived_DAY_formula_Day',
 'custom_entity' as 'custom_entity', count() as 'count';
q = order q by
('timestamp_derived_DAY_formula_Year~~~timestamp_derived_DAY_formula_Month~~~timestamp_derived_DAY_formula_Day'
 asc, 'custom_entity' asc);
q = limit q 2000;
```

Create a Custom Object Updates Per Day Recipe

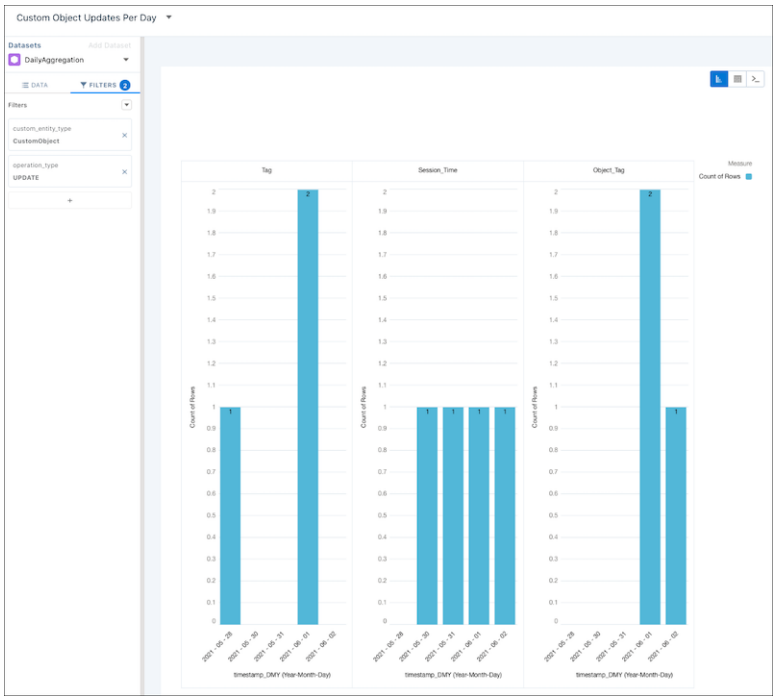
This recipe produces a unique count of how many times per day a custom object was created.

In your org in Tableau CRM Analytics Studio:

1. In All items on the Datasets tab, select your DailyAggregation dataset.
2. Select **Charts**.
3. Click **Column** and leave Bar Length as **Count of Rows**.
4. Under Bars, click **+** and select **timestamp_DMY**.

5. Select **Year-Month-Day**.
6. Click the **Filters** tab.
7. Click **+**.
8. Select **custom_entity_type** Equals **CustomObject**
9. Click **Apply**.
10. Click **+**.
11. Select **operation_type** Equals **UPDATE**.
12. Click **Apply**.
13. Click the **Data** tab.
14. Under Trellis, click **+**.
15. Select **custom_entity**.
16. Click **Save**.
17. Name your lens *`Custom Object Creates Per Day`*.
18. Select your PartnerIntelligence app.
19. Click **Save**.

Example:



SAQL:

```
q = load "DailyAggregation";
q = filter q by 'custom_entity_type' == "CustomObject";
q = filter q by 'operation_type' == "UPDATE";
q = group q by ('timestamp_derived_DAY_formula_Year',
```

```
'timestamp_derived_DAY_formula_Month', 'timestamp_derived_DAY_formula_Day',
'custom_entity');
q = foreach q generate 'timestamp_derived_DAY_formula_Year' + "~~~" +
'timestamp_derived_DAY_formula_Month' + "~~~" + 'timestamp_derived_DAY_formula_Day'
as
'timestamp_derived_DAY_formula_Year~~~timestamp_derived_DAY_formula_Month~~~timestamp_derived_DAY_formula_Day',
 'custom_entity' as 'custom_entity', count() as 'count';
q = order q by
('timestamp_derived_DAY_formula_Year~~~timestamp_derived_DAY_formula_Month~~~timestamp_derived_DAY_formula_Day'
 asc, 'custom_entity' asc);
q = limit q 2000;
```

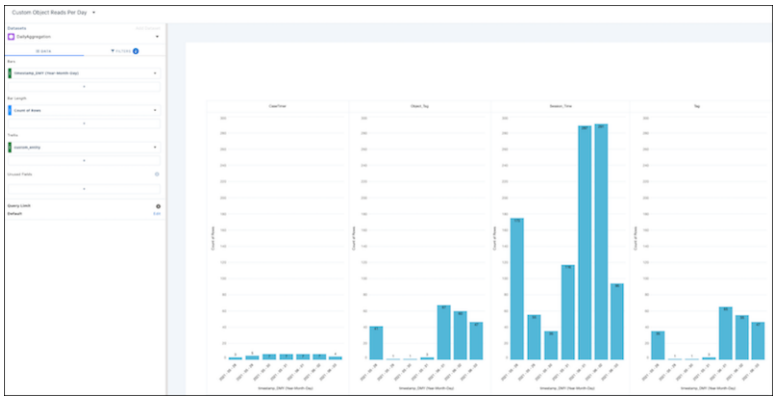
Create a Custom Object Reads Per Day Recipe

This recipe produces a unique count of how many times per day a custom object was read.

In your org in Tableau CRM Analytics Studio:

1. In All items on the Datasets tab, select your DailyAggregation dataset.
2. Select **Charts**.
3. Click **Column** and leave Bar Length as **Count of Rows**.
4. Under Bars, click **+** and search for **timestamp_DMY**.
5. Select **Year-Month-Day**.
6. Click **Filters**.
7. Click **+**.
8. Select **custom_entity_type** Equals **CustomObject**
9. Click **Apply**.
10. Click **+**.
11. Select **operation_type** Equals **READ**.
12. Click **Apply**.
13. Click **Data**.
14. Under Trellis, click **+**.
15. Select **custom_entity**.
16. Click **Save**.
17. Name your lens *`Custom Object Reads Per Day`*.
18. Select your PartnerIntelligence app.
19. Click **Save**.

Example:



SAQL:

```
q = load "DailyAggregation";
q = filter q by 'custom_entity_type' == "CustomObject";
q = filter q by 'operation_type' == "READ";
q = group q by ('timestamp_derived_DAY_formula_Year',
'timestamp_derived_DAY_formula_Month', 'timestamp_derived_DAY_formula_Day',
'custom_entity');
q = foreach q generate 'timestamp_derived_DAY_formula_Year' + "~~~" +
'timestamp_derived_DAY_formula_Month' + "~~~" + 'timestamp_derived_DAY_formula_Day'
as
'timestamp_derived_DAY_formula_Year~~~timestamp_derived_DAY_formula_Month~~~timestamp_derived_DAY_formula_Day',
 'custom_entity' as 'custom_entity', count() as 'count';
q = order q by
('timestamp_derived_DAY_formula_Year~~~timestamp_derived_DAY_formula_Month~~~timestamp_derived_DAY_formula_Day'
 asc, 'custom_entity' asc);
q = limit q 2000;
```

CHAPTER 10 Manage Orders

In this chapter ...

- Channel Order App
- Set Up the Channel Order App
- Upgrade the Channel Order App
- Manage Orders in the Channel Order App
- Channel Order Apex API

Create, manage, and submit orders to the Partner Operations team with the Channel Order App (COA). If you're an OEM partner, you can use the COA to provision Salesforce licenses and for revenue sharing. If you're an ISVforce partner, you can use the COA for revenue sharing.

The COA is preinstalled in your Partner Business Org, but before you use it, you must complete the training offered by the Partner Operations team. Acquire your Partner Business Org, pass the solution security review, and then sign up for COA training.

To sign up, log a support case in the Salesforce Partner Community. For product, specify **ISV Billing & Order Support**. For topic, specify **Channel Order App Setup & Product Catalog Support**.

Note: Submit orders based on the sales and licensing of your solutions to customers, as required by your partner agreement.

Channel Order App

When a customer buys your AppExchange product or requests changes to a subscription, submit an order with the Channel Order App (COA). After Salesforce receives your order, we activate or provision the product in the customer's org and invoice you based on the terms of your partnership agreement.

Note: The COA is available in English to eligible Salesforce partners. For more information on the Partner Program, including eligibility requirements, visit https://partners.salesforce.com.

With the COA, you can:

- Submit initial orders for new customers
- Submit add-on, upgrade, renewal, reduction, and cancellation orders for existing customers
- Edit, recall, and clone orders that you've submitted
- Delete order drafts
- View details about your customers, such as order history

To comply with your revenue-sharing agreement, submit an order after every customer transaction. The information that you provide keeps our records up to date and ensures that the invoices you receive are accurate.

For questions about your agreement, log a support case in the Salesforce Partner Community. For product, specify **Partner Programs & Benefits**. For topic, specify **AppExchange Partner Program**.

Tip: If you're a new AppExchange partner, stop by Trailhead and earn the Channel Order App Basics badge before you get started with the COA. You learn how order submission fits into the partnership experience and have an opportunity to test your knowledge.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

Channel Order App Objects

Before you start working with the Channel Order App (COA), learn about the app's objects. Understanding what the objects contain makes it easier to create accurate orders that are processed quickly by Salesforce.

Order Types

When you create an order in the Channel Order App (COA), you choose an order type that tells Salesforce how to process the products on the order. Learn how to select the correct type based on your customer's needs.

Order Status

After you create an order in the Channel Order App (COA), Salesforce assigns an order status to help you track progress and, if needed, resolve issues. Order status also determines the actions you can perform on an order, like editing or cloning.

Channel Order App Permission Sets

You control access to the Channel Order App (COA) with the COA User and COA Admin user permission sets. The permission sets determine how users can interact with objects and features in the COA. Learn how to assign the correct permission set based on a user's role on your team.

Channel Order App Objects

Before you start working with the Channel Order App (COA), learn about the app's objects. Understanding what the objects contain makes it easier to create accurate orders that are processed quickly by Salesforce.

Name	Description
Customer	Contains details about a customer who's purchased your product, such as the billing address and Salesforce org ID. When you create an initial order in the order submission wizard, the COA creates a customer record using the customer information that you provide.
Partner Product Catalog	Contains a product in your catalog that you can sell to customers. For example, more API calls or an increase in storage in the customer's org. Salesforce configures the products in your catalog based on your partnership agreement. During setup, you import your catalog to the COA. Unless permitted by your agreement, you can't edit your product catalog.
Partner Contract Terms	Contains the contract terms that apply to a product. For example, the default length of a contract and how often a customer is billed. Salesforce configures contract terms based on your partnership agreement. During setup, you import the terms to the COA. Unless permitted by your agreement, you can't edit your contract terms.
Service Order	Contains information about an order that you're submitting to Salesforce. For example, the date the customer signed the Salesforce agreement. When you create an order in the order submission wizard, the COA creates a service order automatically.
Service Order Detail	Contains deal-specific information about a product line item on an order. For example, the number of licenses the customer is buying and the price per license. When you add products to an order in the order submission wizard, the COA configures service order details automatically. You can't access service order detail records directly unless you submit orders with the Channel Order Apex API.

To understand how these objects fit together, let's look at an example.

You sell a human resources app on AppExchange, and a new customer decides to buy some licenses. After you work out the terms of the purchase with the customer, you use the License Management App (LMA) to provision the licenses in their org. Then you submit an order in the COA to tell Salesforce about the sale.

1. On the Service Orders tab, you launch the order submission wizard. The COA creates a service order record.
2. You provide details about the customer, like the billing address. The COA uses these details to create a customer record. In the future, if the customer requests changes to the subscription, you can look up and reuse the details that you provided.
3. You select the contract terms that apply to the order. The COA looks up the corresponding partner contract terms record.
4. You select the product from your catalog that you sold. The COA looks up the corresponding partner product catalog record.
5. You tell us how many licenses you sold and for how much. The COA configures the service order details for the order.
6. You select a start date, review the order, and submit it to Salesforce for invoicing. The COA adds the service order record to the list of existing orders.

Other Channel Order App Objects

Salesforce uses other objects to help process and manage your orders or to assist with debugging. Most of the time, you don't see or interact with these objects.

Name	Description
Customer Order Product History	Contains deal-specific information about an active product on an order, along with the corresponding customer details. After Salesforce activates or provisions an order, we create a customer order product history record for each product on the order. These records become part of the customer's order history, which includes all active products associated with the customer. You can't access customer order product history records directly. To see a customer's order history, open the customer record in the COA and go the Products related list.
Partner Pricebook Entry	Contains one or more products from a catalog. Salesforce uses partner pricebook entries to organize your product catalog. Unless you receive instructions from us, don't modify the partner pricebook entries in your org.
Service Order Log	Stores information about the performance of the COA for debugging purposes. Salesforce uses service order logs to troubleshoot issues with the COA. Unless you receive instructions from us, don't modify the service order logs in your org.

Order Types

When you create an order in the Channel Order App (COA), you choose an order type that tells Salesforce how to process the products on the order. Learn how to select the correct type based on your customer's needs.

Note: Your agreement with Salesforce determines the order types available to you. You might not be able to submit every order type.

Order type reflects the stage of your relationship with the customer: beginning, middle, or end. Order type also determines when we activate or provision the order for the customer.

Type	Stage	Use To	Effective Date
Initial	Beginning	Submit a first order for a new customer.	The service start date you specify on the order.
Add On	Middle	Add products or increase the number of licenses on a customer contract.	The service start date you specify on the order.
Upgrade	Middle	Increase the quantity and price of licenses mid-contract, or upgrade a customer to a higher-priced product mid-contract.	The service start date you specify on the order.
Reduction	Middle	Remove products, or decrease the number of licenses on a customer contract.	The customer's contract renewal date. Notify Salesforce of the reduction according to the terms of your partnership agreement,

Type	Stage	Use To	Effective Date
			usually at least 30 days before a contract renews. You can't submit a reduction order within 5 days of a contract renewal date.
Renewal	Middle	Renew a contract that isn't set to auto-renew, or change the price of existing products on contract renewal.	The customer's contract renewal date.
Cancellation	End	End a contract with a customer and cancel all products. A cancellation order permanently removes your products from the customer's org.	The customer's contract renewal date. Notify Salesforce of the cancellation according to the terms of your partnership agreement, usually at least 30 days before a contract renews. You can't submit a cancellation order within 5 days of a contract renewal date.

Order Status

After you create an order in the Channel Order App (COA), Salesforce assigns an order status to help you track progress and, if needed, resolve issues. Order status also determines the actions you can perform on an order, like editing or cloning.

Here's how we assign order status.

Status	Assigned When
Draft	You save your order, but don't submit it to Salesforce. After you create, clone, or recall an order, its status is Draft by default.
Received	Salesforce receives your order, but hasn't started processing it. You have 2 hours from the time Salesforce receives the order to recall it and edit products, license quantities, and pricing.
In Process	Salesforce is reviewing and processing your order.
Activated	Salesforce has processed your order and is ready to invoice you for revenue sharing. This status applies to: • ISVforce orders that don't provision licenses in a customer's org • Processed OEM orders that have a future start date • All OEM and ISVforce cancellation and reduction orders
Provisioned	Salesforce has processed your order, provisioned licenses in the customer's org, and is ready to invoice you for revenue sharing. This status applies only to OEM orders that provision licenses in the customer's org.

Status	Assigned When
Error	Salesforce encounters an issue that prevents us from processing your order. We return the order and ask you to fix the issue before resubmitting.

Order status determines what you can do with the order. Here are the actions that you can perform for each order status.

	Possible Actions				
Order Status	**Edit**	**Recall**	**Delete**	**Submit**	**Clone**
Draft	*		*	*	*
Received	*	*			*
In Process					*
Activated					*
Provisioned					*
Error					*

Channel Order App Permission Sets

You control access to the Channel Order App (COA) with the COA User and COA Admin user permission sets. The permission sets determine how users can interact with objects and features in the COA. Learn how to assign the correct permission set based on a user's role on your team.

Permission Set	Users Can	Assign To
COA User	Create and manage customers. Submit, edit, recall, and clone orders, and delete order drafts. View COA custom objects.	Team members who submit and manage customer orders.
COA Admin User	Create and manage customers. Submit, edit, recall, and clone orders, and delete order drafts. Configure whether orders are sent to Salesforce or a test environment. Modify COA custom objects.	Team members who administer the COA and whose role includes these tasks: • Setting up the COA • Assigning access to the COA • Building custom integrations using COA objects • Serving as the context user for the COA email service

Set Up the Channel Order App

Install the Channel Order App (COA) and get it ready to sync your product data from Salesforce. After the app is configured, provide access to the right people on your team by assigning permission sets. Then configure a tab to display customer information, such as order history and related products.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

1. Install the Channel Order App
   Install the Channel Order App (COA) in the Salesforce org where you manage licenses for your products, usually your Partner Business Org. If you're an existing partner and the COA is already installed in your org, you don't need to reinstall the app to receive upgrades. Salesforce pushes new versions of the app to your org.
2. Assign Permission Sets to Channel Order App Users
   Assign a Channel Order App (COA) permission set to give team members access to the app. Assign the COA User permission set to users who submit and manage customer orders. Assign the COA Admin User permission to users who need full access to the app's objects and features, including the ability to set up a connection to Salesforce.
3. Define a Channel Order App Email Service
   After you assign Channel Order App (COA) permission sets, define an email service to make your org ready to sync your product catalog.
4. Connect the Channel Order App to Salesforce
   After you install the Channel Order App (COA), connect the app to Salesforce and import your product catalog. Your product catalog includes the products that you can sell and the contract terms that apply to your orders. After the connection is configured, Salesforce pushes catalog updates to your org.
5. Display Customers in the Channel Order App
   After you install the Channel Order App (COA), create a custom tab to display customer information.
6. Assign Page Layouts in the Channel Order App
   After you install the Channel Order App (COA), assign a custom page layout to the customer object.

Install the Channel Order App

Install the Channel Order App (COA) in the Salesforce org where you manage licenses for your products, usually your Partner Business Org. If you're an existing partner and the COA is already installed in your org, you don't need to reinstall the app to receive upgrades. Salesforce pushes new versions of the app to your org.

USER PERMISSIONS

To install packages:
- Download AppExchange Packages

1. Log in to AppExchange using the credentials of the org where you want to install the COA.
2. Go to the AppExchange listing for the COA: https://appexchange.salesforce.com/listingDetail?listingId=a0N300000055ailEAA.
3. Click **Get It Now**.
4. Click **Install in Production**.
5. Agree to the Terms & Conditions, and click **Confirm and Install**.
6. Log in to the org where you want to install the COA.
7. Review the package installation details, and click **Continue**.
8. Approve access by third-party websites, and click **Continue**.

9. Review the API access requirements for the package, and click **Next**.
10. Grant access to package contents, and click **Next**.

    Note: Salesforce recommends granting access only to admins and assigning access to other users as needed after the app is installed.

11. Click **Install**.
12. After the installation completes, go to the App Launcher and confirm that Partner Order appears in the list of available apps.

Assign Permission Sets to Channel Order App Users

Assign a Channel Order App (COA) permission set to give team members access to the app. Assign the COA User permission set to users who submit and manage customer orders. Assign the COA Admin User permission to users who need full access to the app's objects and features, including the ability to set up a connection to Salesforce.

USER PERMISSIONS

To assign a permission set:
- Assign Permissions Sets

1. Log in to the org where the COA is installed.
2. From Setup, enter *Users* in the Quick Find box, then click **Users**.
3. Select a user.
4. In the Permission Set Assignments related list, click **Edit Assignments**.
5. Select the COA User or COA Admin User permission set, and click **Add**.
6. Click **Save**.

Define a Channel Order App Email Service

After you assign Channel Order App (COA) permission sets, define an email service to make your org ready to sync your product catalog.

USER PERMISSIONS

To configure Apex email services and email service addresses:
- Modify All Data

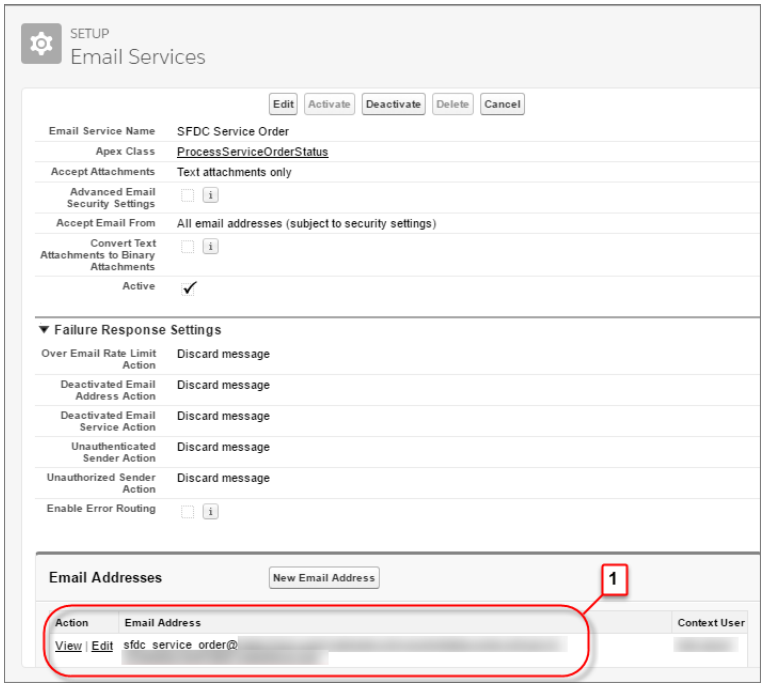
1. Log in to the org where the COA is installed.
2. From Setup, enter *Email Services* in the Quick Find box, then click **Email Services**.
3. Click **New Email Service**.
4. Specify values for the following fields. Leave the other fields as is.

Field	Value
Email Service Name	*SFDC Service Order*
Apex Class	*ProcessServiceOrderStatus*
Accept Attachments	**Text attachments only**
Active	Select to enable

5. Click **Save and New Email Address**.
6. Specify values for the following fields. Leave the other fields as is.

Field	Value
Email Service Name	`SFDC_Service_Order`
Active	Select to enable
Context User	Select a Salesforce admin in your org

7. For **Accept Email From**, remove the autopopulated email address. This field must be blank. Otherwise, the email service can't connect to Salesforce.
8. Click **Save**. Salesforce generates a unique address for the email service (1), which the COA uses to sync your product data.



9. Confirm that the COA Admin User permission set is assigned to the email service's context user. If the context user doesn't have this permission set, assign it to them.

Connect the Channel Order App to Salesforce

After you install the Channel Order App (COA), connect the app to Salesforce and import your product catalog. Your product catalog includes the products that you can sell and the contract terms that apply to your orders. After the connection is configured, Salesforce pushes catalog updates to your org.

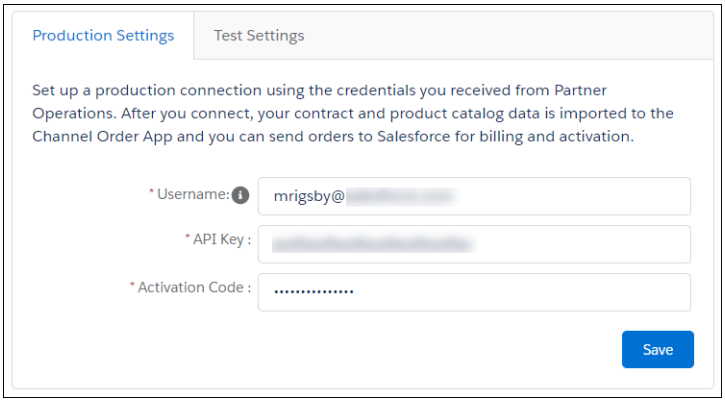
Tip: Before you configure your connection, make sure that you have credentials for your COA production connection. These credentials are unique to your company and are provided to you by Salesforce. If you don't have credentials, log a support case in the Salesforce Partner Community. For product, specify **ISV Billing & Order Support**. For topic, specify **Channel Order App Setup & Product Catalog Support**.

USER PERMISSIONS

To manage custom apps:
- Customize Application

To import product data:
- COA Admin User

1. Log in to the org where the COA is installed.
2. Open the App Launcher.
3. Under All Items, click **COA Setup**.
4. Go to Production Settings and provide your username, API key, and activation code.



5. Click **Save**.
   The COA imports your product catalog and contract terms.

Display Customers in the Channel Order App

After you install the Channel Order App (COA), create a custom tab to display customer information.

USER PERMISSIONS

To create and edit custom tabs:
- Customize Application

1. Log in to the org where the COA is installed.
2. From Setup, enter *Tabs* in the Quick Find box, then click **Tabs**.
3. In the Custom Object Tabs related list, click **New**.
4. Specify values for the following fields. Leave the other fields as is.

Field	Value
Object	**Customer**
Tab Style	Select your preferred tab style

5. Click **Next**.
6. Select the user profiles for which the tab is available, and click **Next**.
7. Add the tab to the Partner Order custom app.
8. Click **Save**.

Assign Page Layouts in the Channel Order App

After you install the Channel Order App (COA), assign a custom page layout to the customer object.

1. Log in to the org where the COA is installed.
2. From Setup, enter `Object Manager` in the Quick Find box, then click **Object Manager**.
3. Click **Customer**.
4. Click **Page Layouts**.
5. Click **Page Layout Assignment**.
6. Click **Edit Assignment**.
7. Select at least one profile.
8. From the list of available layouts, choose **COA Customer Layout**.
9. Click **Save**.

USER PERMISSIONS

To create and edit custom objects:
- Customize Application

Upgrade the Channel Order App

If you've installed a previous version of the Channel Order App (COA), Salesforce pushes new versions to your org as they become available. Before you install an upgrade, review the considerations to understand how customizations in your org could be affected. Depending on the COA version you use, some additional configuration might be required after upgrading.

Channel Order App Upgrade Considerations
Before you install a new version of the Channel Order App (COA), understand what's changed in the app and how the changes can affect your customizations.

Upgrade the Channel Order App
Follow these steps to upgrade an earlier version of the Channel Order App (COA) to v2 and later.

Field Mapping in Channel Order App v2 and Later
In Channel Order App (COA) v2, we retired some fields on the service order detail object. If you're upgrading from v1.39 or earlier to v2 or later, the table shows how the retired fields map to new ones.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

Channel Order App Upgrade Considerations

Before you install a new version of the Channel Order App (COA), understand what's changed in the app and how the changes can affect your customizations.

Upgrades from v1.39 or Earlier to v2

If you're using COA v1.39 or earlier, the following considerations apply when upgrading to v2 or later.

Replaced Service Order Credentials Page
In v2 and later, the COA Setup page replaces the Service Order Credentials page. After you upgrade, go to the setup page and refresh your connection to Salesforce. If the connection isn't refreshed, Salesforce can't receive your orders.

New Permission Sets for Accessing the COA
In v1.39 and earlier, a custom profile controls access to the COA. In v2 and later, you control access with permission sets. After you upgrade, assign a permission set to the people on your team who use the COA, including those who accessed the app using the custom profile. Without a permission set, your users can't access the COA.

New Customers Tab
In v2 and later, the new Customers tab shows you customer information, including order history and related products. After you upgrade, you must create this tab and configure it to display in the app.

Replaced Orders Tab
In v2 and later, the Service Orders tab replaces the Orders tab. After you upgrade, remove the Orders tab from the app and configure the Service Orders tab.

Updated Page Layouts
In v2 and later, the customer, service order, partner contract terms, and partner product catalog objects have updated page layouts. After you upgrade, assign the updated layouts to each object.

Replaced Partner Order Submit API
In v2 and later, the Channel Order API replaces the Partner Order Submit API. When you upgrade, you can still submit orders using the Partner Order Submit API, and your existing integrations continue to function. However, the Partner Order Submit API doesn't include features introduced in the Channel Order Apex API, such as the ability to edit, recall, and clone orders.

Other Changes to the API
We changed how the API sets the status of submitted orders. In v1.39 and earlier, the Partner Order API automatically updated the `Service_Order_Status__c` field of a submitted order. In v2 and later, the Channel Order API provides a response that reports if the submit operation succeeded, but doesn't update `Service_Order_Status__c` field.

Upgrade the Channel Order App

Follow these steps to upgrade an earlier version of the Channel Order App (COA) to v2 and later.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

1. Assign Permission Sets to Channel Order App Users
   If you're upgrading to Channel Order App (COA) v2 and later, assign permission sets to give team members access to the app. Assign the COA User permission set to users who submit and manage customer orders. Assign the COA Admin User permission to users who need full access to the app's objects and features, including the ability to set up a connection to Salesforce.
2. Display Customers in the Channel Order App
   If you're upgrading to Channel Order App (COA) v2 and later, create a custom tab to display customer information in the app.
3. Display Service Orders in the Channel Order App
   If you're upgrading to Channel Order App (COA) v2 and later, remove the existing Orders tab and replace it with the new Service Orders tab.
4. Update Page Layouts in the Channel Order App
   If you're upgrading to Channel Order App (COA) v2 and later, assign updated page layouts to the customer, service order, partner contract terms, and partner product catalog objects.
5. Refresh the Channel Order App's Connection to Salesforce
   If you're upgrading the Channel Order App (COA) to v2 or later, refresh your production connection to Salesforce. After your connection refreshes, you can submit orders to Salesforce.

Assign Permission Sets to Channel Order App Users

If you're upgrading to Channel Order App (COA) v2 and later, assign permission sets to give team members access to the app. Assign the COA User permission set to users who submit and manage customer orders. Assign the COA Admin User permission to users who need full access to the app's objects and features, including the ability to set up a connection to Salesforce.

USER PERMISSIONS

To assign a permission set:
- Assign Permissions Sets

1. Log in to the org where the COA is installed.
2. From Setup, enter *Users* in the Quick Find box, then click **Users**.
3. Select a user.
4. In the Permission Set Assignments related list, click **Edit Assignments**.
5. Select the COA User or COA Admin User permission set, and click **Add**.
6. Click **Save**.

Display Customers in the Channel Order App

If you're upgrading to Channel Order App (COA) v2 and later, create a custom tab to display customer information in the app.

USER PERMISSIONS

To create and edit custom tabs:
- Customize Application

1. Log in to the org where the COA is installed.
2. From Setup, enter *Tabs* in the Quick Find box, then click **Tabs**.
3. In the Custom Object Tabs related list, click **New**.
4. Specify values for the following fields. Leave the other fields as is.

Field	Value
Object	**Customer**
Tab Style	Select your preferred tab style

5. Click **Next**.
6. Select the user profiles for which the tab is available, and click **Next**.
7. Add the tab to the Partner Order custom app.
8. Click **Save**.

Display Service Orders in the Channel Order App

If you're upgrading to Channel Order App (COA) v2 and later, remove the existing Orders tab and replace it with the new Service Orders tab.

1. Log in to the org where the COA is installed.
2. From Setup, enter `App Manager` in the Quick Find box, then click **App Manager**.
3. For Partner Order, click ( ) and select **Edit**.
4. From the Selected Tabs list, remove **Orders**.
5. Add **Service Orders** to the Selected Tabs list.
6. Click **Save**.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

USER PERMISSIONS

To manage custom apps:
- Customize Application

Update Page Layouts in the Channel Order App

If you're upgrading to Channel Order App (COA) v2 and later, assign updated page layouts to the customer, service order, partner contract terms, and partner product catalog objects.

1. Log in to the org where the COA is installed.
2. From Setup, enter `Object Manager` in the Quick Find box, then click **Object Manager**.
3. Assign the updated page layout to the customer object.
   a. Click **Customer**.
   b. Click **Page Layouts**.
   c. Click **Page Layout Assignment**.
   d. Click **Edit Assignment**.
   e. Select at least one profile.
   f. From the list of available layouts, choose **COA Customer Layout**.
   g. Click **Save**.
4. Repeat these steps for service order, partner contract terms, and partner product catalog. These objects use the following page layout names.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

USER PERMISSIONS

To create and edit custom objects:
- Customize Application

Object	Page Layout Name
Service Order	Service Order Layout
Partner Contract Terms	Partner Contract Terms Layout
Partner Product Catalog	Partner Product Catalog Layout

Refresh the Channel Order App's Connection to Salesforce

If you're upgrading the Channel Order App (COA) to v2 or later, refresh your production connection to Salesforce. After your connection refreshes, you can submit orders to Salesforce.

1. Log in to the org where the COA is installed.
2. Open the App Launcher.
3. Under All Items, click **COA Setup**.
4. Go to Production Settings, and click **Refresh Connection**.
   After you refresh the connection, your order history is imported to the app.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

USER PERMISSIONS

To manage custom apps:
- Customize Application

To import product data:
- COA Admin User

Field Mapping in Channel Order App v2 and Later

In Channel Order App (COA) v2, we retired some fields on the service order detail object. If you're upgrading from v1.39 or earlier to v2 or later, the table shows how the retired fields map to new ones.

Note: Field names are prefixed with `CHANNEL_ORDERS__` unless otherwise noted.

Fields

Old Field (Retired)	New Field	Notes
`Application__c`	None	Field retired. This field doesn't populate with data for orders created in COA v2 and later.
`Customer_Price__c`	`Customer_Price_Per_Month__c`	Represents the product price per unit per month.
`Fixed_Price__c`	`pc_Fixed_Price__c`	Represents the fixed price of the product at the time the order was created.
`Floor_Price__c`	None	Field retired. This field doesn't populate with data for orders created in COA v2 and later.
`Estimated_SFDC_Price_Per_Month__c`	`SFDC_Price__c`	Represents the total amount due to Salesforce based on the estimated value of the product.
`Number_Of_Users_ISVforce__c`	None	Field retired. This field doesn't populate with data for orders created in COA v2 and later.
`pc_Floor_Price__c`	None	Field retired. This field doesn't populate with data for orders created in COA v2 and later.
`pc_PNR__c`	`PNR__c`	Represents the percent net revenue of the product at the time the order was created.
`pc_Pricing_Unit__c`	None	Field retired. This field doesn't populate with data for orders created in COA v2 and later.
`pc_Product_ID__c`	`Product_ID__c`	Represents the ID of the product.

Old Field (Retired)	New Field	Notes
`Pricing_Type__c`	`pc_Pricing_Type__c`	Represents the pricing model of the product.
`Product_Line_Desc_Overridden__c`	None	Field retired. This field doesn't populate with data for orders created in COA v2 and later.
`Special_Instructions__c`	None	Field retired. This field doesn't populate with data for orders created in COA v2 and later.

Manage Orders in the Channel Order App

When a customer purchases your AppExchange product or requests changes to a subscription, submit an order to Salesforce. After you create the order, you can edit, recall, or clone it. If the order is a draft, you can delete it.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

Submit an Order

Submit an order to Salesforce when a customer purchases new products or requests changes to a subscription. If you're ordering products for a new customer, verify that you have the customer's Salesforce org ID before you create the order.

Edit an Order

You can edit the product, quantity, and pricing details of an order within 2 hours of submitting it to Salesforce. After 2 hours, the order is processed and can't be edited. To change customer details or order type, you must recall the order and create a new one.

Clone an Order

When creating an order that's similar to one you've submitted previously, you can save time by cloning the original order.

Recall an Order

If you don't want Salesforce to process an order you've submitted, recall it. After you recall an order, it becomes read-only, and you can't edit or resubmit it. You can recall an order within 2 hours of submitting it to Salesforce.

Delete a Draft Order

You can delete draft orders that you don't want to submit, like duplicate orders. After you delete a draft order, you can't recover it.

Fix Errors on Returned Orders

If you submit an order that Salesforce can't process, we return the order and ask you to fix the errors that we identified. You can resolve the errors by reading the comments we provide, cloning the returned order, and then submitting the new order with the changes applied.

Submit an Order

Submit an order to Salesforce when a customer purchases new products or requests changes to a subscription. If you're ordering products for a new customer, verify that you have the customer's Salesforce org ID before you create the order.

USER PERMISSIONS

To submit orders:

- COA User

  OR

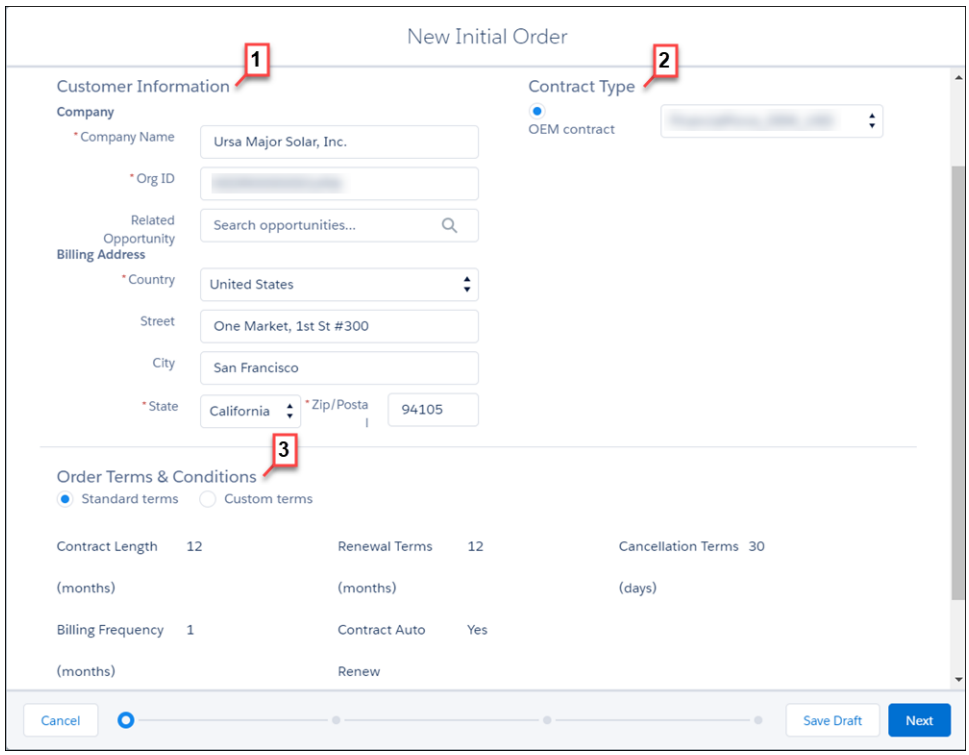
  COA Admin User

1. Log in to the org where the COA is installed.
2. Open the App Launcher, and click **Partner Order**.

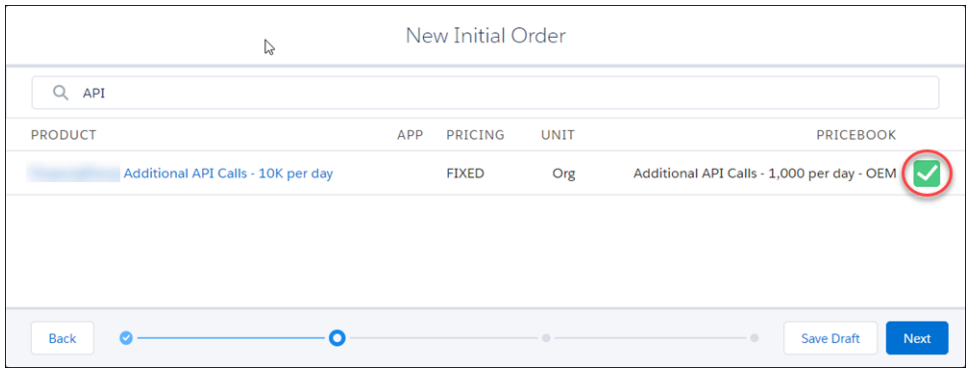
3. On the Service Orders tab, click **New** to open the order submission wizard.
4. Choose **New customer** to create an initial order. Otherwise, choose **Existing customer** and select an order type.

   Tip: If a customer is buying your product for the first time, create an initial order.

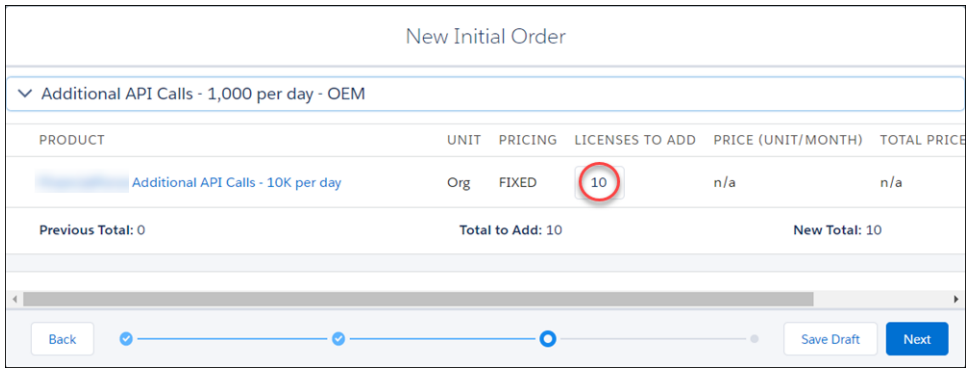
5. Specify customer details (1), contract type (2), and the terms and conditions (3), and then click **Next**.



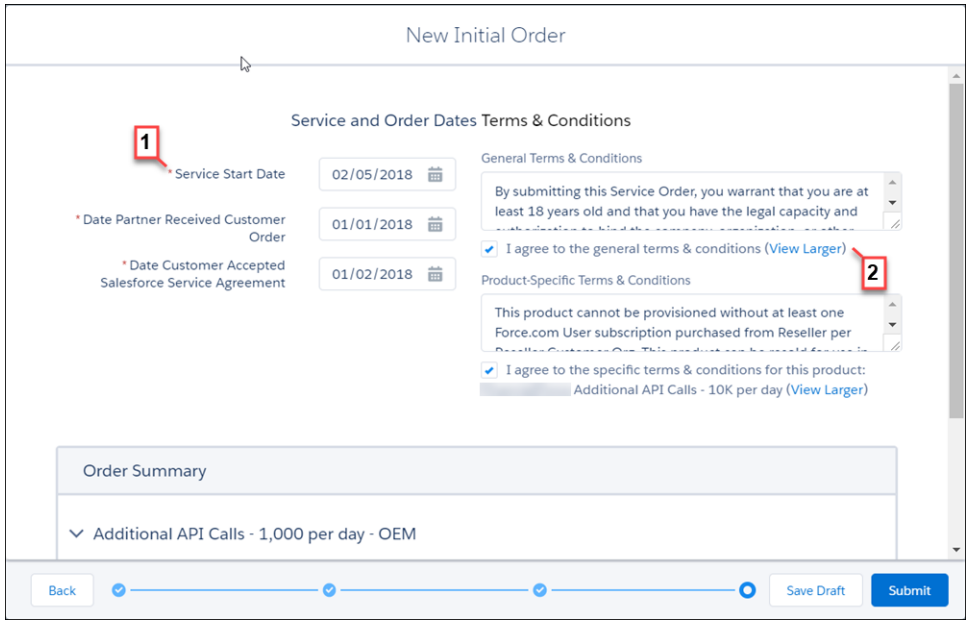
6. Select products for the order, and click **Next**.



7. Adjust the license quantities and, optionally, pricing, and then click **Next**.



8. Enter the service and order dates (1), and then review and accept the terms and conditions (2).



9. Click **Submit**, or save the order as a draft and submit it later.

After you submit an order, it's sent to Salesforce for processing and activation or provisioning. To check the status of an order, go the Service Orders tab.

Edit an Order

You can edit the product, quantity, and pricing details of an order within 2 hours of submitting it to Salesforce. After 2 hours, the order is processed and can't be edited. To change customer details or order type, you must recall the order and create a new one.

1. Log in to the org where the COA is installed.
2. Open the App Launcher, and click **Partner Order**.
3. On the Service Orders tab, find the order you want to edit.

   If you can't find the order, verify that you selected the correct list view.

USER PERMISSIONS

To edit orders:

- COA User

  OR

  COA Admin User

4. Click ( ) and select **Edit**.
5. Update the order's products, quantities, and pricing details, and then click **Resubmit**.

Clone an Order

When creating an order that's similar to one you've submitted previously, you can save time by cloning the original order.

USER PERMISSIONS

To clone orders:
- COA User

  OR

  COA Admin User

1. Log in to the org where the COA is installed.
2. Open the App Launcher, and click **Partner Order**.
3. On the Service Orders tab, find the order you want to clone.

   If you can't find the order, verify that you selected the correct list view.
4. In the Custom Actions column, click **Clone**.
5. Confirm that you want to clone the order, and click **Continue**.
6. Edit the order as needed, and then click **Save Draft**.

Recall an Order

If you don't want Salesforce to process an order you've submitted, recall it. After you recall an order, it becomes read-only, and you can't edit or resubmit it. You can recall an order within 2 hours of submitting it to Salesforce.

USER PERMISSIONS

To recall orders:
- COA User

  OR

  COA Admin User

1. Log in to the org where the COA is installed.
2. Open the App Launcher, and click **Partner Order**.
3. On the Service Orders tab, find the order that you want to recall.

   If you can't find the order, verify that you selected the correct list view.
4. In the Custom Actions column, click **Recall**.
5. Confirm that you want to recall the order, and click **Continue**.

Delete a Draft Order

You can delete draft orders that you don't want to submit, like duplicate orders. After you delete a draft order, you can't recover it.

USER PERMISSIONS

To delete orders:
- COA User

  OR

  COA Admin User

1. Log in to the org where the COA is installed.
2. Open the App Launcher, and click **Partner Order**.
3. On the Service Orders tab, find the order that you want to delete.

   If you can't find the order, verify that you selected the correct list view.
4. Click ( ) and select **Delete**.
5. Click **Delete** again to confirm.

Fix Errors on Returned Orders

If you submit an order that Salesforce can't process, we return the order and ask you to fix the errors that we identified. You can resolve the errors by reading the comments we provide, cloning the returned order, and then submitting the new order with the changes applied.

USER PERMISSIONS

To clone orders:
- COA User

  OR

  COA Admin User

1. Log in to the org where the Channel Order App (COA) is installed.
2. Open the App Launcher, and click **Partner Order**.
3. On the Service Orders tab, find the returned order.

   If you can't find the order, verify that you selected the correct list view.
4. Click the order, and go to Error Comment to see details about the error.
5. Click **Clone Order**.
6. Apply the requested changes, and then click **Submit**.

If you have trouble resolving the errors, log a support case in the Salesforce Partner Community. For product, specify **ISV Billing & Order Suport**. For topic, specify **Partner Order Errors & Revisions**.

Channel Order Apex API

You can submit orders to Salesforce programmatically using the Channel Order Apex API. To submit an order, use one of the classes provided in the `CHANNEL_ORDERS` namespace.

CHANNEL_ORDERS Namespace

The `CHANNEL_ORDERS` namespace provides classes for submitting orders to Salesforce Partner Operations. After you send an order, you can use other classes in the namespace to edit, recall, or clone the order.

Service Order

Represents an order that you're submitting to Salesforce Partner Operations for processing and activation.

Service Order Detail

Represents an instance of a product on a service order.

Partner Order Submit API

(No longer supported and available only in version 1.39 and earlier of the Channel Order App.) Send orders to Salesforce immediately or asynchronously using the Partner Order Submit API.

CHANNEL_ORDERS Namespace

The `CHANNEL_ORDERS` namespace provides classes for submitting orders to Salesforce Partner Operations. After you send an order, you can use other classes in the namespace to edit, recall, or clone the order.

To use `CHANNEL_ORDERS` namespace classes, you must have Channel Order App v2 or later installed in your Salesforce org. For information on how to invoke methods defined in managed packages, refer to the *Apex Developer Guide*.

The following classes are in the `CHANNEL_ORDERS` namespace.

COA_ServiceOrderSubmit Class

Submit orders to Salesforce Partner Operations for processing and activation.

COA_ServiceOrderEdit Class

Edit orders that you've submitted to Salesforce Partner Operations.

COA_ServiceOrderRecall Class

Recall orders that you've submitted to Salesforce Partner Operations.

COA_ServiceOrderClone Class

Clone an existing order in the org where the Channel Order App (COA) is installed.

COA_ServiceOrderSubmit Class

Submit orders to Salesforce Partner Operations for processing and activation.

Namespace

CHANNEL_ORDERS

Usage

The COA_ServiceOrderSubmit class contains a single `@InvocableMethod` for submitting orders to Salesforce Partner Operations. When invoking a method defined in this class, include the `CHANNEL_ORDERS` namespace prefix:

```
CHANNEL_ORDERS.class.method(args)
```

For details about namespace prefixes or the `@InvocableMethod` annotation, see the *Apex Developer Guide*.

Example

This example receives a list of service orders, submits them, and returns a list of outputs from the submit operation.

Note: For brevity, the methods invoked in this example omit the `CHANNEL_ORDERS` namespace prefix. If you use this code in your implementation, you must include the namespace prefix.

```
public static void submitOrders(List<Service_Order__c> serviceOrders){
    List<COA_ServiceOrderSubmit.COA_ServiceOrderSubmitInput> serviceOrderSubmitInput = new
 List<COA_ServiceOrderSubmit.COA_ServiceOrderSubmitInput>();

    for(Service_Order__c serviceOrder: serviceOrders){
        COA_ServiceOrderSubmit.COA_ServiceOrderSubmitInput input = new
COA_ServiceOrderSubmit.COA_ServiceOrderSubmitInput();
        input.serviceOrderId = serviceOrder.Id;
        serviceOrderSubmitInput.add(input);
    }

    List<COA_ServiceOrderSubmit.COA_ServiceOrderSubmitOutput> serviceOrderSubmitOutputs =
 COA_ServiceOrderSubmit.submit(serviceOrderSubmitInput);

    for(COA_ServiceOrderSubmit.COA_ServiceOrderSubmitOutput serviceOrderSubmitOutput:
serviceOrderSubmitOutputs){
        System.debug('Service Order Id: '+serviceOrderSubmitOutput.serviceOrderId);
        System.debug('Success?: '+serviceOrderSubmitOutput.isSuccess);
        System.debug('Response Messages: '+serviceOrderSubmitOutput.responseMessages);
    }
}
```

Order Status

When you submit a draft order using the COA_ServiceOrderSubmit class, the response tells you if the operation succeeded. The response doesn't set the status of the related service order record, so the `Service_Order_Status__c` field remains `Draft`. If you build an implementation to set the status of submitted orders, we suggest the following logic: if the response includes a success code, set the order status to `Received`. Otherwise, set the status to `Error`. For orders with errors, you can store notes from Salesforce Partner Operations in the `Error_Comment__c` field.

COA_ServiceOrderSubmit Methods

COA_ServiceOrderSubmitInput Class

Wrapper class for input parameters passed to the submit operation.

COA_ServiceOrderSubmitOutput Class

Wrapper class for output parameters returned from the submit operation.

COA_ServiceOrderSubmit Methods

The following are methods for `COA_ServiceOrderSubmit`.

submit(serviceOrderSubmitInput)

Provides an entry point for submitting orders to Salesforce Partner Operations.

`submit(serviceOrderSubmitInput)`

Provides an entry point for submitting orders to Salesforce Partner Operations.

Signature

```
global static List<COA_ServiceOrderSubmit.COA_ServiceOrderSubmitOutput>
submit(List<COA_ServiceOrderSubmit.COA_ServiceOrderSubmitInput> serviceOrderSubmitInput)
```

Parameters

`serviceOrderSubmitInput`

Type: List<COA_ServiceOrderSubmit.COA_ServiceOrderSubmitInput>

List of wrapper classes to pass as input for the submit operation

Return Value

Type: List<COA_ServiceOrderSubmit.COA_ServiceOrderSubmitOutput>

COA_ServiceOrderSubmitInput Class

Wrapper class for input parameters passed to the submit operation.

Namespace

CHANNEL_ORDERS

COA_ServiceOrderSubmitInput Properties

COA_ServiceOrderSubmitInput Properties

The following are properties for `COA_ServiceOrderSubmitInput`.

serviceOrderId
Specifies the ID of the order you are submitting. This field is required.

`serviceOrderId`

Specifies the ID of the order you are submitting. This field is required.

Signature

```
global Id serviceOrderId;
```

Property Value

Type: Id

COA_ServiceOrderSubmitOutput Class

Wrapper class for output parameters returned from the submit operation.

Namespace

CHANNEL_ORDERS

COA_ServiceOrderSubmitOutput Properties

COA_ServiceOrderSubmitOutput Properties

The following are properties for `COA__ServiceOrderSubmitOutput`.

isSuccess
Indicates the success of the submit operation. If true, the order was successfully submitted.

responseMessages
Holds response messages generated by the submit operation.

serviceOrderId
References the order ID passed in by the submit operation.

`isSuccess`

Indicates the success of the submit operation. If true, the order was successfully submitted.

Signature

```
global Boolean isSuccess;
```

Property Value

Type: Boolean

`responseMessages`

Holds response messages generated by the submit operation.

Signature

```
global List<String> responseMessages;
```

Property Value

Type: List<String>

`serviceOrderId`

References the order ID passed in by the submit operation.

Signature

```
global Id serviceOrderId;
```

Property Value

Type: Id

COA_ServiceOrderEdit Class

Edit orders that you've submitted to Salesforce Partner Operations.

Namespace

CHANNEL_ORDERS

Usage

The COA_ServiceOrderEdit class contains a single `@InvocableMethod` for editing orders that have been submitted to Salesforce Partner Operations but haven't been processed. When invoking a method defined in this class, include the `CHANNEL_ORDERS` namespace prefix:

```
CHANNEL_ORDERS.class.method(args)
```

For details about namespace prefixes or the `@InvocableMethod` annotation, see the *Apex Developer Guide*.

Example

This example receives a list of service orders that have been edited, submits them, and returns a list of outputs from the edit operation.

Note: For brevity, the methods invoked in this example omit the `CHANNEL_ORDERS` namespace prefix. If you use this code in your implementation, you must include the namespace prefix.

```
public static void editOrders(List<Service_Order__c> serviceOrders){
    List<COA_ServiceOrderEdit.COA_ServiceOrderEditInput> serviceOrderEditInput = new
List<COA_ServiceOrderEdit.COA_ServiceOrderEditInput>();

    for(Service_Order__c serviceOrder: serviceOrders){
        COA_ServiceOrderEdit.COA_ServiceOrderEditInput input = new
COA_ServiceOrderEdit.COA_ServiceOrderEditInput();
        input.serviceOrderId = serviceOrder.Id;
        serviceOrderEditInput.add(input);
    }

    List<COA_ServiceOrderEdit.COA_ServiceOrderEditOutput> serviceOrderEditOutputs =
COA_ServiceOrderEdit.edit(serviceOrderEditInput);

    for(COA_ServiceOrderEdit.COA_ServiceOrderEditOutput serviceOrderEditOutput:
serviceOrderEditOutputs){
        System.debug('Service Order Id: '+serviceOrderEditOutput.serviceOrderId);
        System.debug('Success?: '+serviceOrderEditOutput.isSuccess);
        System.debug('Response Messages: '+serviceOrderEditOutput.responseMessages);
    }
}
```

COA_ServiceOrderEdit Methods

COA_ServiceOrderEditInput Class

Wrapper class for input parameters passed to the edit operation.

COA_ServiceOrderEditOutput Class

Wrapper class for output parameters returned from the edit operation.

COA_ServiceOrderEdit Methods

The following are methods for `COA_ServiceOrderEdit`.

edit(serviceOrderEditInput)

Provides an entry point to edit orders that you've submitted to Salesforce Partner Operations. You can edit only orders that haven't been processed.

`edit(serviceOrderEditInput)`

Provides an entry point to edit orders that you've submitted to Salesforce Partner Operations. You can edit only orders that haven't been processed.

Signature

```
global static List<COA_ServiceOrderEdit.COA_ServiceOrderEditOutput>
edit(List<COA_ServiceOrderEdit.COA_ServiceOrderEditInput> serviceOrderEditInput)
```

Parameters

serviceOrderEditInput
Type: List<COA_ServiceOrderEdit.COA_ServiceOrderEditInput>

List of wrapper classes to pass as input for the edit operation

Return Value

Type: List<COA_ServiceOrderEdit.COA_ServiceOrderEditOutput>

COA_ServiceOrderEditInput Class

Wrapper class for input parameters passed to the edit operation.

Namespace

CHANNEL_ORDERS

COA_ServiceOrderEditInput Properties

COA_ServiceOrderEditInput Properties

The following are properties for `COA_ServiceOrderEditInput`.

serviceOrderId
Specifies the ID of the order you are editing. This field is required.

`serviceOrderId`

Specifies the ID of the order you are editing. This field is required.

Signature

```
global Id serviceOrderId;
```

Property Value

Type: Id

COA_ServiceOrderEditOutput Class

Wrapper class for output parameters returned from the edit operation.

Namespace

CHANNEL_ORDERS

COA_ServiceOrderEditOutput Properties

COA_ServiceOrderEditOutput Properties

The following are properties for `COA_ServiceOrderEditOutput`.

isSuccess
Indicates the success of the edit operation. If true, the order was successfully edited.

responseMessages
Holds response messages generated by the edit operation.

serviceOrderId
References the order ID passed in by the edit operation.

`isSuccess`

Indicates the success of the edit operation. If true, the order was successfully edited.

Signature

```
global Boolean isSuccess;
```

Property Value

Type: Boolean

`responseMessages`

Holds response messages generated by the edit operation.

Signature

```
global List<String> responseMessages;
```

Property Value

Type: List<String>

`serviceOrderId`

References the order ID passed in by the edit operation.

Signature

```
global Id serviceOrderId;
```

Property Value

Type: Id

COA_ServiceOrderRecall Class

Recall orders that you've submitted to Salesforce Partner Operations.

Namespace

CHANNEL_ORDERS

Usage

The COA_ServiceOrderRecall class contains a single `@InvocableMethod` for recalling orders that have been submitted to Salesforce Partner Operations but haven't yet been processed. When you recall an order, it's removed from the processing queue and isn't activated. When invoking a method defined in this class, include the `CHANNEL_ORDERS` namespace prefix:

```
CHANNEL_ORDERS.class.method(args)
```

For details about namespace prefixes or the `@InvocableMethod` annotation, see the *Apex Developer Guide*.

Example

This example receives a list of service orders, recalls them, and returns a list of outputs from the recall operation.

Note: For brevity, the methods invoked in this example omit the `CHANNEL_ORDERS` namespace prefix. If you use this code in your implementation, you must include the namespace prefix.

```
public static void recallOrders(List<Service_Order__c> serviceOrders){
        List<COA_ServiceOrderRecall.COA_ServiceOrderRecallInput> serviceOrderRecallInput
= new List<COA_ServiceOrderRecall.COA_ServiceOrderRecallInput>();

        for(Service_Order__c serviceOrder: serviceOrders){
            COA_ServiceOrderRecall.COA_ServiceOrderRecallInput input = new
COA_ServiceOrderRecall.COA_ServiceOrderRecallInput();
            input.serviceOrderId = serviceOrder.Id;
            serviceOrderRecallInput.add(input);
        }

       List<COA_ServiceOrderRecall.COA_ServiceOrderRecallOutput> serviceOrderRecallOutputs
 = COA_ServiceOrderRecall.recall(serviceOrderRecallInput);

    for(COA_ServiceOrderRecall.COA_ServiceOrderRecallOutput serviceOrderRecallOutput:
serviceOrderRecallOutputs){
        System.debug('Service Order Id: '+serviceOrderRecallOutput.serviceOrderId);
        System.debug('Success?: '+serviceOrderRecallOutput.isSuccess);
        System.debug('Response Messages: '+serviceOrderRecallOutput.responseMessages);
    }
}
```

COA_ServiceOrderRecall Methods

COA_ServiceOrderRecallInput Class

Wrapper class for input parameters passed to the recall operation.

COA_ServiceOrderRecallOutput Class

Wrapper class for output parameters returned from the recall operation.

COA_ServiceOrderRecall Methods

The following are methods for `COA_ServiceOrderRecall`.

recall(serviceOrderRecallInput)

Provides an entry point to recall orders that you've submitted to Salesforce Partner Operations. You can recall only orders that haven't been processed.

`recall(serviceOrderRecallInput)`

Provides an entry point to recall orders that you've submitted to Salesforce Partner Operations. You can recall only orders that haven't been processed.

Signature

```
global static List<COA_ServiceOrderRecall.COA_ServiceOrderRecallOutput>
recall(List<COA_ServiceOrderRecall.COA_ServiceOrderRecallInput> serviceOrderRecallInput)
```

Parameters

`serviceOrderRecallInput`

Type: List<COA_ServiceOrderRecall.COA_ServiceOrderRecallInput>

List of wrapper classes to pass as input for the recall operation

Return Value

Type: List<COA__ServiceOrderRecall.COA__ServiceOrderRecallOutput>

COA_ServiceOrderRecallInput Class

Wrapper class for input parameters passed to the recall operation.

Namespace

CHANNEL_ORDERS

COA_ServiceOrderRecallInput Properties

COA_ServiceOrderRecallInput Properties

The following are properties for `COA_ServiceOrderRecallInput`.

serviceOrderId
Specifies the ID of the order you are recalling. This field is required.

`serviceOrderId`

Specifies the ID of the order you are recalling. This field is required.

Signature

```
global Id serviceOrderId;
```

Property Value

Type: Id

COA_ServiceOrderRecallOutput Class

Wrapper class for output parameters returned from the recall operation.

Namespace

CHANNEL_ORDERS

COA_ServiceOrderRecallOutput Properties

COA_ServiceOrderRecallOutput Properties

The following are properties for `COA_ServiceOrderRecallOutput`.

isSuccess
Indicates the success of the recall operation. If true, the order was successfully recalled.

responseMessages
Holds response messages generated by the recall operation.

serviceOrderId
References the order ID passed in by the recall operation.

`isSuccess`

Indicates the success of the recall operation. If true, the order was successfully recalled.

Signature

```
global Boolean isSuccess;
```

Property Value

Type: Boolean

`responseMessages`

Holds response messages generated by the recall operation.

Signature

```
global List<String> responseMessages;
```

Property Value

Type: List<String>

`serviceOrderId`

References the order ID passed in by the recall operation.

Signature

```
global Id serviceOrderId;
```

Property Value

Type: Id

COA_ServiceOrderClone Class

Clone an existing order in the org where the Channel Order App (COA) is installed.

Note: Only fields that you have permission to create are cloned. DML errors can occur if you don't have sufficient privileges.

Namespace

CHANNEL_ORDERS

Usage

The COA_ServiceOrderClone class contains a single `@InvocableMethod` to clone orders and, optionally, associated line items. When invoking a method defined in this class, include the `CHANNEL_ORDERS` namespace prefix:

```
CHANNEL_ORDERS.class.method(args)
```

For details about namespace prefixes or the `@InvocableMethod` annotation, see the *Apex Developer Guide*.

Example

This example receives a list of service orders, clones them, and returns a list of outputs from the clone operation.

Note: For brevity, the methods invoked in this example omit the `CHANNEL_ORDERS` namespace prefix. If you use this code in your implementation, you must include the namespace prefix.

```
public static void cloneOrders(List<Service_Order__c> serviceOrders){
        List<COA_ServiceOrderClone.COA_ServiceOrderCloneInput> serviceOrderCloneInput =
```

```
new List<COA_ServiceOrderClone.COA_ServiceOrderCloneInput>();

        for(Service_Order__c serviceOrder: serviceOrders){
            COA_ServiceOrderClone.COA_ServiceOrderCloneInput input = new
COA_ServiceOrderClone.COA_ServiceOrderCloneInput();
            input.serviceOrderId = serviceOrder.Id;
            input.cloneProducts = true;
            serviceOrderCloneInput.add(input);
        }

        List<COA_ServiceOrderClone.COA_ServiceOrderCloneOutput> serviceOrderCloneOutputs
= COA_ServiceOrderClone.clone(serviceOrderCloneInput);
        //Further processing of serviceOrderCloneOutputs
    }
```

COA_ServiceOrderClone Methods

COA_ServiceOrderCloneInput Class

Wrapper class for input parameters passed to the clone operation.

COA_ServiceOrderCloneOutput Class

Wrapper class for output parameters returned from the clone operation.

COA_ServiceOrderClone Methods

The following are methods for `COA_ServiceOrderClone`.

clone(serviceOrderCloneInput)

Provides an entry point to clone orders in your org and, optionally, associated line items.

`clone(serviceOrderCloneInput)`

Provides an entry point to clone orders in your org and, optionally, associated line items.

Signature

```
global static List<COA_ServiceOrderClone.COA_ServiceOrderCloneOutput>
edit(List<COA_ServiceOrderClone.COA_ServiceOrderCloneInput> serviceOrderCloneInput)
```

Parameters

`serviceOrderCloneInput`

Type: List<COA_ServiceOrderClone.COA_ServiceOrderCloneInput>

List of wrapper classes to pass as input for the clone operation

Return Value

Type: List<COA__ServiceOrderClone.COA__ServiceOrderCloneOutput>

COA_ServiceOrderCloneInput Class

Wrapper class for input parameters passed to the clone operation.

Namespace

CHANNEL_ORDERS

COA_ServiceOrderCloneInput Properties

COA_ServiceOrderCloneInput Properties

The following are properties for `COA_ServiceOrderCloneInput`.

serviceOrderId
Specifies the ID of the order you are cloning. This field is required.
cloneProducts
Indicates whether to clone the original order's line items. If true, the line items are cloned. This field is required.

`serviceOrderId`

Specifies the ID of the order you are cloning. This field is required.

Signature

```
global Id serviceOrderId;
```

Property Value

Type: Id

`cloneProducts`

Indicates whether to clone the original order's line items. If true, the line items are cloned. This field is required.

Signature

```
global Boolean cloneProducts;
```

Property Value

Type: Boolean

COA_ServiceOrderCloneOutput Class

Wrapper class for output parameters returned from the clone operation.

Namespace

CHANNEL_ORDERS

COA_ServiceOrderCloneOutput Properties

COA_ServiceOrderCloneOutput Properties

The following are properties for `COA__ServiceOrderClone.COA__ServiceOrderCloneOutput`.

isSuccess
Indicates the success of the clone operation. If true, the order was successfully recalled.

responseMessages
Holds response messages generated by the clone operation.

originalServiceOrderId
Specifies the ID of the original order that you cloned.

cloneServiceOrderId
Specifies the ID of the newly created clone order.

`isSuccess`

Indicates the success of the clone operation. If true, the order was successfully recalled.

Signature

```
global Boolean isSuccess;
```

Property Value

Type: Boolean

`responseMessages`

Holds response messages generated by the clone operation.

Signature

```
global List<String> responseMessages;
```

Property Value

Type: List<String>

`originalServiceOrderId`

Specifies the ID of the original order that you cloned.

Signature

```
global Id originalServiceOrderId;
```

Property Value

Type: Id

`cloneServiceOrderId`

Specifies the ID of the newly created clone order.

Signature

```
global Id cloneServiceOrderId;
```

Property Value

Type: Id

Service Order

Represents an order that you're submitting to Salesforce Partner Operations for processing and activation.

Note: Field names are prefixed with `CHANNEL_ORDERS__` unless otherwise noted.

When you submit an order with the Channel Order App API, include the following fields.

Fields

Field	Details
Label Created with New COA **Name** `Created_with_new_COA__c`	**Type** boolean **Properties** Create, Defaulted on create, Filter, Group, Sort, Update **Description** Indicates that you're using the latest version of the Channel Order App (COA). To ensure that your order is processed, check this field.
Label Contract **Name** `Partner_Contract_Rules__c`	**Type** reference **Properties** Create, Filter, Group, Nillable, Sort, Update **Description** Lookup to the related contract terms record. This field is required.
Label Customer Name **Name** `Customer__c`	**Type** reference **Properties** Create, Filter, Group, Nillable, Sort, Update

Field	Details
	Description Lookup to a customer record. Specify an existing customer record. You can't populate customer details using the API. This field is required.
Label Date Partner Received Customer Order **Name** `Date_Partner_Received_Customer_Order__c`	**Type** date **Properties** Create, Filter, Group, Nillable, Sort, Update **Description** Date you received the order from the customer. This field is required.
Label Date Customer Accepted SFDC Service Agreement **Name** `Date_Customer_Accepted_SFDC_Svc_Agrmnt__c`	**Type** date **Properties** Create, Filter, Group, Nillable, Sort, Update **Description** Date the customer accepted the Salesforce service agreement. This field is required for OEM contracts.
Label Error Comment **Name** `Error_Comment__c`	**Type** textarea **Properties** Create, Nillable, Sort, Update **Description** Stores comments or instructions from Salesforce Partner Operations when a submitted order can't be processed.
Label I Certify a Corresponding Order is Rec'd **Name** `I_certify__c`	**Type** picklist **Properties** Create, Filter, Group, Nillable, Sort, Update **Description** Confirmation that the order was received. Possible values are `Yes` and `No`. This field is required.
Label Order Type **Name** `Order_Type__c`	**Type** picklist **Properties** Create, Filter, Group, Nillable, Sort, Update **Description** The type of order that you're submitting for processing and activation. Possible values are `Initial`, `Add-On`, `Reduction`, `Cancellation Order`, `Upgrade`

Field	Details
	`- Partner App`, and `Upgrade - Org Edition`. Specify `Upgrade - Partner App` for a renewal order. Specify `Upgrade - Org Edition` for an upgrade order. This field is required.
Label Service Order Status **Name** `Service_Order_Status__c`	**Type** picklist **Properties** Create, Defaulted on create, Filter, Group, Nillable, Sort, Update **Description** Status of the order. Possible values are `Draft`, `Submitted`, `Received`, `In Process`, `Error`, `Activated`, and `Provisioned`. You can submit only orders with a status of `Draft`.
Label Service Start Date **Name** `Service_Start_Date__c`	**Type** date **Properties** Create, Filter, Group, Sort, Update **Description** Date to activate or provision the customer's order. You can specify today's date or a date in the future. This field is required.

Service Order Detail

Represents an instance of a product on a service order.

Note: Field names are prefixed with `CHANNEL_ORDERS__` unless otherwise noted.

When you submit an order with the Channel Order App API, include the following fields.

Fields

Field Name	Details
Label App **Name** `Application__c`	**Type** string **Properties** Create, Filter, Group, Nillable, Sort **Description** Name of the app associated with the product.
Label Billing Frequency	**Type** double

Field Name	Details
Name `pc_Billing_Frequency__c`	**Properties** Create, Filter, Nillable, Sort, Update **Description** How often the customer is billed per year. This value must match your Salesforce contract, unless you've been granted override permissions.
Label Cancellation Terms (days) **Name** `pc_Cancellation_Terms__c`	**Type** double **Properties** Create, Filter, Nillable, Sort, Update **Description** Number of days the customer has to cancel the contract. This value must match your Salesforce contract, unless you've been granted override permissions.
Label Contract Auto Renew **Name** `pc_Contract_Auto_Renew__c`	**Type** picklist **Properties** Create, Filter, Group, Nillable, Sort, Update **Description** Whether the contract automatically renews at the end of the term. Possible values are `Yes` and `No`. This value must match your Salesforce contract, unless you've been granted override permissions.
Label Contract Length **Name** `pc_Contract_Length__c`	**Type** double **Properties** Create, Filter, Nillable, Sort, Update **Description** Length of the contract in months. This value must match your Salesforce contract, unless you've been granted override permissions.
Label Currency **Name** `Currency__c`	**Type** string **Properties** Filter, Nillable, Sort **Description** The default contract currency from the contract terms associated with this order. Read-only.
Label Customer Price **Name** `Customer_Price_Per_Month__c`	**Type** double **Properties** Create, Filter, Nillable, Sort, Update

Field Name	Details
	Description Price per unit per month. This field is required for PNR products.
Label Fixed Price **Name** `pc_Fixed_Price__c`	**Type** double **Properties** Create, Filter, Nillable, Sort, Update **Description** Fixed price of the product at the time the order was created. This field must be explicitly set when using the API.
Label Partner Contract Term **Name** `pc_Partner_Contract_Term__c`	**Type** reference **Properties** Create, Filter, Group, Nillable, Sort, Update **Description** Lookup to the related contract terms record.
Label PNR % **Name** `pc_PNR__c`	**Type** double **Properties** Create, Filter, Nillable, Sort, Update **Description** Percent net revenue of the product at the time the order was created. This field must be explicitly set when using the API.
Label Pricing **Name** `pc_Pricing_Type__c`	**Type** picklist **Properties** Create, Filter, Group, Nillable, Sort, Update **Description** Pricing model of the product. Possible values are `Fixed` and `PNR`. This field must be explicitly set when using the API.
Label Product **Name** `Product_Name__c`	**Type** reference **Properties** Create, Filter, Group, Nillable, Sort, Update **Description** Lookup to the related product catalog record.

Field Name	Details
Label Product ID **Name** `pc_Product_ID__c`	**Type** string **Properties** Create, Filter, Group, Nillable, Sort, Update **Description** ID of the product. This field must be explicitly set when using the API.
Label Renewal Terms (months) **Name** `pc_Renewal_Terms__c`	**Type** double **Properties** Create, Filter, Nillable, Sort, Update **Description** Renewal term in months. This value must match your Salesforce contract, unless you've been granted override permissions.
Label Service Order **Name** `Partner_Order__c`	**Type** reference **Properties** Create, Filter, Group, Sort **Description** Lookup to the related service order record.
Label SFDC Invoice Description **Name** `Product_Line_Description__c`	**Type** string **Properties** Create, Filter, Group, Nillable, Sort, Update **Description** Contains additional invoice details for the product or order. This field is optional.
Label Total Quantity **Name** `Quantity__c`	**Type** double **Properties** Create, Filter, Nillable, Sort, Update **Description** Number of product catalogs on the service order.

Partner Order Submit API

(No longer supported and available only in version 1.39 and earlier of the Channel Order App.) Send orders to Salesforce immediately or asynchronously using the Partner Order Submit API.

Important: In Channel Order App (COA) v2.0 and later, the Channel Order Apex API replaces the Partner Order Submit API. If you have any existing integrations with the Partner Order Submit API, migrate them to the Channel Order Apex API.

Syntax

```
channel_orders.ServiceOrderProcessor.sendOrder()
channel_orders.ServiceOrderProcessor.sendOrderAsync()
```

Note: When you submit an order using `sendOrder` or `sendOrderAsync`, include an order ID or set of order IDs as the argument. For example, `channel_orders.ServiceOrderProcessor.sendOrder(orderId)`.

Usage

Use `sendOrderAsync` when you want to create or update multiple orders and send them in the same transaction. See the example in this section for more details.

Rules and Guidelines

This is an Apex implementation, so all Apex usage rules and limits apply. Salesforce supports only one order per call.

Use the Partner Submit API to send an order after it has been created using a valid Service Order ID. You can create Service Order and Service Order Detail records using the Channel Order App, data loading, or automated processing.

Each order must include the fields listed on the Service Order and Service Order Detail objects.

Methods

The ServiceOrderProcessor object supports the following methods.

Name	Arguments	Description
`sendOrder`	ID	Submit an order with a single ID immediately.
`sendOrder`	Set of IDs	Submit an order with a set of IDs immediately.
`sendOrderAsync`	ID	Submit an order with a single ID asynchronously (`@future`).
`sendOrderAsync`	Set of IDs	Submit an order with a set of IDs asynchronously (`@future`).

Example: Batching on the Partner Order Submit API

You can only invoke ServiceOrderProcessor once per Apex transaction. If you pass a set of IDs to `sendOrder` or `sendOrderAsync`, the maximum set size is 5. This example uses a batch job to work around this limitation.

In this example, if you have 100 orders in Draft status, the code creates one batch job with 100 executions, because only one record is processed per execution.

```
//Batch Apex class
global class COABatchClass implements Database.batchable<sObject>, Database.AllowsCallouts,
 Database.Stateful{
   final String DRAFT_STATUS = 'Draft';
```

```
   global final String query =
      'select Id, CHANNEL_ORDERS__Service_Order_Status__c ' +
     ' from CHANNEL_ORDERS__Service_Order__c where CHANNEL_ORDERS__Service_Order_Status__c
 =: DRAFT_STATUS';

   global Database.QueryLocator start(Database.BatchableContext BC){
      return Database.getQueryLocator(query);
   }

  global void execute(Database.BatchableContext info, List<CHANNEL_ORDERS__Service_Order__c>
 scope){
       for(CHANNEL_ORDERS__Service_Order__c s : scope){
         CHANNEL_ORDERS.ServiceOrderProcessor.sendOrder(s.Id);
         }
   }
   global void finish(Database.BatchableContext BC){}
}

//Batch call
Id batchInstanceId = Database.executeBatch(new COABatchClass(), 1);
```

CHAPTER 11 Managing Licenses for Managed Packages

In this chapter ...

- Get Started with the License Management App
- Lead and License Records in the License Management App
- Modify a License Record
- Refresh Licenses for a Managed Package
- Extending the License Management App
- Move the License Management App to Another Salesforce Org
- Troubleshoot the License Management App
- Best Practices for the License Management App
- Troubleshoot Subscriber Issues

Use the License Management App (LMA) to manage leads and licenses for your AppExchange solutions. By integrating the LMA into your sales and marketing processes, you can better engage with prospects, retain existing customers, and grow your ISV business. The LMA is a managed package that is installed in all partner business orgs (PBO) and includes custom objects that track details on packages, package versions, and licenses.

I need to...	Permissions	For details, see...
Configure the LMA	System Admin profile	Get Started with the License Management App on page 305
Bill subscribers or monitor license expiration	Object Permissions: Read	Lead and License Records in the LMA on page 308
Convert trial subscriptions into paying customers	Object Permissions: Edit	Modify a License Record on page 308
Customize the LMO	Object Permissions: Edit	Extend the LMA on page 309
Provision licenses to a subscriber	Object Permissions: Edit	Modify a License Record on page 308
Support subscribers with technical issues	Various permissions (see Assign Permissions to the Subscriber Support Console on page 307 for details)	Support Your AppExchange Customers on page 381

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

Note: The LMA is available only in English.

The LMA is available to eligible Salesforce partners. For more information on the Partner Program, including eligibility requirements, visit https://partners.salesforce.com.

Get Started with the License Management App

To start managing leads and licenses with the License Management App (LMA), complete these installation and configuration steps.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

Install the License Management App
The License Management App (LMA) is a managed package that is installed in all partner business orgs. The org that the LMA is installed in is called the License Management Org (LMO).

Associate a Package with the License Management App
To receive lead and license records for your package, you connect your License Management Org (LMO), your package, and AppExchange Publishing Console.

Configure Permissions for the License Management App
Determine who needs access to the LMA, and set object permissions. Consider using a permission set to assign user permissions.

Install the License Management App

The License Management App (LMA) is a managed package that is installed in all partner business orgs. The org that the LMA is installed in is called the License Management Org (LMO).

We strongly recommend that you use your partner business org (PBO) as your LMO. However, you can choose to install the LMA in another production org. Consider installing the LMA in an org that your company is already using to manage sales, billing, and marketing.

Commercial use of the LMA is prohibited in Developer and Partner Developer Edition orgs. Installing the LMA in a Developer Edition org is allowed only if you're building integrations with the LMA and need an environment only for development and testing purposes. You can install the LMA in Enterprise, Unlimited, or Performance Edition production orgs.

USER PERMISSIONS

To install packages:
- Download AppExchange Packages

Note: To confirm whether your PBO already has the LMA installed, skip to step 4.

1. To install the LMA in an org other than your PBO, log in to the Salesforce Partner Community.
   a. Click the question icon and then click **Log a Case for Help**.
   b. Select **Salesforce Partner Program Support**.

      Tip: If you don't see the Salesforce Partner Program Support tile, use the org picker to select the org that's associated with your Salesforce partnership account.

   c. For product, enter and select **Partner Programs & Benefits**.
   d. For topic, enter and select **ISV Technology Request**.
   e. Provide any other required details, and then click **Create Case**.
   After we review the case, you receive an email with an installation URL.
2. Log in to the org where you want to install the LMA, and then go to the installation URL included in the email.
3. Choose which users can access the LMA, and then click **Install**.
4. To confirm that the LMA is installed, open the App Launcher. If the installation was successful, the License Management App appears in the list of available apps.

Associate a Package with the License Management App

To receive lead and license records for your package, you connect your License Management Org (LMO), your package, and AppExchange Publishing Console.

A single LMO can manage multiple 1GP and 2GP packages, but a package can be associated with only one LMO.

USER PERMISSIONS

To manage licenses in the Partner Community:
- Manage Listings

1. Connect your packaging org (for 1GP) or your Dev Hub org (for 2GP) to the publishing console on the Partner Community.
   a. Log in to the Partner Community, and select the **Publishing** tab.
   a. Select the Organizations tab, and click **Connect Org**.
   a. Enter the login credentials, and then click **Submit**.

      For 1GP packages, enter the login credentials for the packaging org. Repeat this step for all your 1GP packages.

      For 2GP packages, enter the login credentials for the Dev Hub org. When you connect the Dev Hub org, all the 2GP packages owned by the Dev Hub org are linked to the publishing console.
2. Select the **Packages** tab.
3. Locate the package you want to link to the LMO, and then click **Register Package**. To register each package you own, repeat this step.
4. Set the default behavior you want for your package license, and then click **Save**.

You can view which packages are linked on the Packages tab in the LMA.

Note: Beta package versions don't display in the LMA. Only managed-released package versions (1GP) and promoted package versions (2GP) are visible in the LMA. Unlocked packages aren't supported.

Configure Permissions for the License Management App

Determine who needs access to the LMA, and set object permissions. Consider using a permission set to assign user permissions.

Ensure that you have the LMA installed, and that you've linked your package to the LMO and AppExchange Publishing Console.

1. Set object permissions for the license, package, and package version custom objects.

Custom Object	Object Permissions
License	To view license records: Assign READ permissions To modify license records: Assign READ and EDIT permissions
Package	To view package records: Assign READ permissions To modify package records: Assign READ and EDIT permissions

Custom Object	Object Permissions
Package Version	To view package version records: Assign READ permissions We recommend leaving all package version records as read-only.

2. Set field-level security in user profiles or permission sets.

Custom Object	Field-Level Permissions
License	Make all fields read-only.
Package	Make all fields read-only.
Package Version	Make all fields read-only.

3. Add related lists to page layouts.

To enable...	Add the Licenses related list to the...
License managers to view the licenses associated with a particular lead	Lead page layout
LMA users to view the licenses associated with a particular account	Account page layout
LMA users to view the licenses associated with a particular contact	Contact page layout

Assign Permissions to the Subscriber Support Console
Create a permission set to provide users access to the Subscriber Support Console.

Assign Permissions to the Subscriber Support Console

Create a permission set to provide users access to the Subscriber Support Console.

Note: If you've already assigned these permissions via a profile or another permission set, you can skip this task.

1. From Setup, in the Quick Find box, enter `Permission Sets`, and select **Permission Sets**.
2. Click **New** and enter your permission set information.
3. On the Permission Set Overview page, locate the Apps section, and select **Visualforce Page Access**.
   a. Click **Edit**.
   b. Add **sfLma.LoginToPartnerBT** and **sfLma.SubscriberSupport** to the list of Enabled Visualforce pages, and then click **Save**.
4. On the Permission Set Overview page, locate the System section, and select **System Permissions**. Click **Edit**.

   a. Select **Log in to Subscriber Organization**, and click **Save**.

5. From Setup, in the Quick Find box, enter `Profiles`, and select **Profiles**.
   a. Click **Edit**.
   b. Under Custom App Settings, select **License Management App**.
   c. Under Custom Tab Settings, locate the Subscribers tab and select **Default On**.
   d. Click **Save**.

Lead and License Records in the License Management App

Each time a customer installs your managed package, the License Management App (LMA) creates lead and license records.

The key objects in the LMA are Package, Lead, and License.

- Package—The LMA includes a Package custom object and a Package Version custom object. These objects display details about each 1GP or 2GP package and package version you've listed on AppExchange.
- Lead —The Lead standard object gives you details about who installed your package, such as the installer's name, company, and email address. Lead records created by the LMA are just like the ones you use elsewhere in Salesforce, except the lead source is Package Installation. You can manually convert leads into accounts and contacts. When you convert a lead, the license record links to the converted account or contact.
- License—The License custom object gives you control over how many users in the customer's org can access your package and for how long. Each license record links to a lead record and a package record.

To understand which actions you must take and which actions the LMA handles for you, review this table.

Action	Who Takes This Step
Your package is installed by a new subscriber.	Customer or prospect
A lead record is created with the customer's name, company, and email address.	LMA
A license record is created according to the values you specified when you registered the package.	LMA
The lead record is converted to account and contact records. (Optional)	You (ISV partner)
Account and contact records are associated with the license record.	LMA

Modify a License Record

You can change a customer's access to your offering by modifying a license record using the License Management App (LMA). For example, you can increase or decrease the number of seats included with a license or change the expiration date.

1. In the LMA, locate the license.
2. Click **Modify License**.

   When the LMA is installed, the Edit button doesn't appear on the license page layout, and the Modify License button is included instead. This setup is intentional. Only edit license records on the Modify License page. Don't attempt to edit license records programmatically via Apex classes, triggers, or the API.

3. Update the field values as needed.

Field	Description
Expiration	Enter the last day that the customer can access your package, or select **Does not expire**.
Seats	Enter the number of licensed seats, or select **Site License** to make your package available to all users in the customer's org. You can allocate up to 99,000,000 seats.
Status	Select a value from the dropdown. • **Trial**—Lets the customer try your offering for up to 90 days. After the trial license converts to an active license, it can't return to a trial state. • **Active**—Lets the customer use your package according to the license agreement. • **Suspended**—Prohibits the customer from accessing your offering. Note: When your offering is uninstalled, its status is set to Uninstalled, and the license can't be edited.

4. Click **Save**.

Refresh Licenses for a Managed Package

To sync all license records for a package across all subscriber installations, you refresh the license. Refreshing the license can also resolve discrepancies between the number of licenses in a subscriber's org and the number displayed in the License Management App (LMA). Refreshing is required when you move the LMA to a different org.

Note: For each package, you can refresh licenses only one time per week.

1. From the LMA, select the **Packages** tab.
2. Open the package record.
3. Click **Refresh Licenses**. In Lightning Experience, Refresh Licenses is located in the dropdown menu.

Extending the License Management App

The License Management App (LMA) is a managed package that you can customize and extend. In addition to using the LMA to manage leads and licenses, many partners also integrate it into their existing business processes.

The LMA includes these custom objects:

- License on page 310
- Package on page 310
- Package Version on page 310

You can add custom fields to the objects as long as you don't mark your custom fields as required.

Package and Package Version Object Fields

The License Management App (LMA) includes a Package custom object and a Package Version custom object. These objects display details about each 1GP or 2GP package and package version you've listed on AppExchange.

License Object Fields
Use the License custom object to set limits on how many users in the subscriber's org can use your app and for how long.
Adding Custom Automation to License Management App Objects
Here are some examples of how you can use the License Management App (LMA) to grow your business and retain customers.

Package and Package Version Object Fields

The License Management App (LMA) includes a Package custom object and a Package Version custom object. These objects display details about each 1GP or 2GP package and package version you've listed on AppExchange.

To view details about a package record, from the LMA, select the **Packages** tab, and then select the package name. You can view package versions in the Package Version related list.

Note: The LMA creates the package records, which contain critical information for tracking your licenses and packages. Treat these fields as read-only and ensure that your object permissions protect package records.

Package Custom Object Fields	Description
`Developer Name`	The name of the org that owns the package. For 1GP, the org name is the packaging org. For 2GP, it's the Dev Hub org.
`Developer Org ID`	The 18-character ID of the org that owns the package. For 1GP, the org ID is the packaging org ID. For 2GP, it's the Dev Hub org ID.
`Last License Refresh`	The date when the License Refresh tool was last run.
`Latest Version`	The most recent package version you've released.
`Lead Manager`	The owner of the lead records that the LMA creates when a customer installs your package.
`Next Available Refresh`	The date when the License Refresh tool can be run again.
`Owner`	The LMA owns all package records.
`Package ID`	The 18-character ID that identifies the package. This ID starts with 033.
`Package Name`	The name you specified when you created the package.

Package Version Object Fields	Description
`Package`	The package name and links to the package record's detail page.
`Package Version Name`	The name you specified when you created the package version.
`Release Date`	The date you created this package version.
`Version Number`	The version number in major.minor.patch format. For example, 3.1.0.
`Version ID`	The 18-character ID of this package version.

License Object Fields

Use the License custom object to set limits on how many users in the subscriber's org can use your app and for how long.

The License Management App (LMA) creates a license record every time your package is installed in an org. For example, if a subscriber installs two of your 1GP packages and three of your 2GP packages, you have five license records for that subscriber in your LMA. If you deliver a 2GP app that is composed of multiple packages, a unique license record is created for each package in the app. You can allocate up to 99,000,000 seats per subscriber license.

To view details about a license record, select the **Licenses** tab in the LMA, and then select and open the license record.

License records are automatically created and contain critical information for tracking licenses. Do not directly edit the license record. Instead, use the Modify License on page 308 tool to change the expiration date, license status, and the number of licensed seats.

License Custom Object Fields	Description
`Account`	A lookup field to the account record for a converted lead.
`Contact`	A lookup field to the contact record for a converted lead.
`Created By`	License records are always created by the LMA.
`Expiration Date`	Displays the expiration date or `Does not expire` (default).
`Install Date`	The date the subscriber installed this package version.
`Instance`	The Salesforce instance where the subscriber's org resides.
`Lead`	The lead record that the LMA created when the package was installed. A lead represents the user who owns the license. If you convert the lead into an opportunity, the lead name is retained but the lead record no longer exists.
`License Name`	An auto-generated number that represents an instance of a license. License names are in the format of L-00001, and each new license is incremented by one.
`Licensed Seats`	Displays the number of licenses or `Site License` (default).
`License Status`	The type of license: Active, Suspended, Trial, or Uninstalled.
`License Type`	This is a legacy field and can be ignored.
`Org Edition`	The edition of the subscriber's org.
`Org Expiration Date`	Applies only if the subscriber installs your package in a trial org. Indicates the date when the trial org expires. It isn't related to the package license expiration.
`Org Status`	The status of the subscriber's org: Active, Free, or Trial.
`Owner`	The LMA owns all license records. Don't edit this field.
`Package Version`	A lookup field that links to the package version associated with this license.
`Package Version Number`	The version number in major.minor.patch format. For example, 3.1.0.
`Sandbox`	Indicates whether the license is for a package installed in a sandbox org.
`Subscriber Org ID`	The 15-character ID representing the subscriber's org.
`Used Licenses`	Displays the number of users who have a license to the package. This field is blank if: • A customer uninstalled the package.

License Custom Object Fields	Description
	• `Licensed Seats` is set to Site License.

Adding Custom Automation to License Management App Objects

Here are some examples of how you can use the License Management App (LMA) to grow your business and retain customers.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

Alert Sales Reps Before a License Expires

If you're managing licenses for several packages, it can be difficult to track the various expirations. If a license expires accidentally, you could even lose a customer. To help your customers with renewals, set up a workflow rule to email a sales rep on your team before the license expires.

To automatically email the sales rep, follow these high-level steps.

1. Create an email template for the notification.
2. Create a workflow rule with a filter that specifies enough time before the expiration date to discuss renewal options.
3. Associate the workflow rule with a workflow alert that sends an email to the appropriate team member or sales rep.

Notify Customer-Retention Specialists When an Offering Is Uninstalled

If a customer uninstalls your offering, find out why. By speaking to the customer, you have an opportunity to restore the business relationship or receive feedback that helps you improve your offering.

To notify a customer-retention specialist on your team, follow these high-level steps.

1. Create an email template for the notification.
2. Create a workflow rule with a filter that specifies that the `License Status` equals *`Uninstalled`*.
3. Associate the workflow rule with a workflow alert that sends an email to the retention specialist.

Move the License Management App to Another Salesforce Org

You can move an LMA to a different org, but your package and license records don't automatically move with it. You must manually relink your packages and refresh the licenses.

USER PERMISSIONS

To install packages:
- Download AppExchange Packages

To manage licenses in the Partner Community:
- Manage Listings

1. To remove the association between the LMA and the org where it's currently installed, log a case with the Partner Community.
   a. Log in to the Salesforce Partner Community.
   b. Click the question icon and then click **Log a Case for Help**.
   c. Select **Product or Technical Support**.
   d. For product, enter and select **Platform**.
   e. For topic, enter and select **AppExchange & Managed Packages**.
   f. Provide any other required details, and then click **Create Case**.
2. Install the LMA in the new org on page 305.

3. Associate your packages with the new org on page 306.
4. Refresh licenses for your packages on page 309.

Troubleshoot the License Management App

If you're experiencing issues with the License Management App, review these troubleshooting tips.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

Leads and Licenses Aren't Being Created in the License Management App
When a customer installs your package, leads and license records are created. If these records aren't being created, review these configurations in the License Management Org (LMO). If you resolve your issue using one of these recommendations, your missing licenses appear in the LMA within a few days.

Proxy User Has Deactivated Message in the LMA
If you're editing a license and see a "proxy user has deactivated" message, check whether the subscriber org is locked, deleted, or disabled.

Leads and Licenses Aren't Being Created in the License Management App

When a customer installs your package, leads and license records are created. If these records aren't being created, review these configurations in the License Management Org (LMO). If you resolve your issue using one of these recommendations, your missing licenses appear in the LMA within a few days.

Did the customer complete the package installation?

When a customer clicks **Get it Now** on your AppExchange listing, Salesforce counts this selection as an installation. However, the customer can cancel the installation before it's completed, or the installation could have failed. If the installation doesn't finish, a license isn't created.

Is State and Country picklist validation enabled?

To avoid state and country picklist-related lead failures, you have two options. Use the standard picklist integration values, or add duplicate states and countries to your picklists.

Standard picklist integration values

To implement this option, use the Salesforce standard state and country picklists in your org, and leave the integration values as-is. We recommend this option for most partners.

With this option, AppExchange leads propagate to your org with full state and country names, and the names match integration values in the standard picklists.

Add duplicate states and countries to your picklists.

Implement this option if you have a requirement to use the two-letter state or country abbreviations in your org. For example, you display abbreviations in the user interface or use them to integrate with other systems. Add duplicate states and countries to your picklists with different integration values. Set one value to the two-letter state or country abbreviation. Set the other value to the full state or country name. Make only the two-letter abbreviation picklist entries visible.

With this option, AppExchange leads propagate to your org with full state and country names, which match the full name integration values in your org. You also have two-letter integration values to use as needed.

Does the lead or license object have a trigger?

Don't use `before_create` or `before_update` triggers on leads and licenses. Instead, use `after_` triggers, or remove all triggers. If a trigger fails, it can block license creation.

Does the lead or license record have a required custom field?
If yes, remove the requirement. The LMA doesn't populate a required custom field, so it can prevent licenses or leads from being created.

Is the lead manager a valid, active user?
If not, the LMA can't create leads and licenses.

Does the lead or license record have a validation rule?
Validation rules often block the creation of LMA lead or license records because the required field isn't there.

Does the lead or license have a workflow rule?
Workflow rules sometimes prevent leads and licenses from being created. Remove the workflow rule.

Was the lead converted to an account?
When leads are converted to accounts, they're no longer leads.

Are you using standard duplicate rules for leads?
When a customer installs your package, the LMA checks for existing leads and contacts. If an existing contact matches the customer who installed your package, a lead record isn't created. To complete these checks, the LMA applies standard lead duplicate rules and matching rules. If you prefer to have the LMA associate every license with a lead regardless of whether there's an existing contact match, customize the standard duplicate rule for leads and remove the matching rule for contacts.

Proxy User Has Deactivated Message in the LMA

If you're editing a license and see a "proxy user has deactivated" message, check whether the subscriber org is locked, deleted, or disabled.

- If the org has been deleted, delete the corresponding license record.
- If the org is locked or if the package has been uninstalled, license records can't be updated.

Best Practices for the License Management App

Follow these best practices when you use the License Management App (LMA).

- To take advantage of entitlements that are unique to AppExchange partners, use your partner business org as your License Management Org.
- Create a list view filter for leads created by installed packages. The filter helps your team separate subscriber-based leads from leads coming from other sources.
- Use the API to find licensed users. The `isCurrentUserLicensed` method determines if a user has a license to a managed package. For more information, see the *Apex Reference Guide*.
- Treat the LMA custom objects as read-only. Use the Modify License page to edit licenses. Don't attempt to directly or programmatically edit license records.
- The LMA automatically creates package, package version, and license records. Customizations, such as adding required custom fields or creating workflow rules, triggers, or validation rules that require custom fields, can prevent the LMA from working properly.

Troubleshoot Subscriber Issues

Use the Subscriber Support Console to access information about your subscribers. Subscribers can also grant you login access to troubleshoot issues directly within your app. After you're granted access, you can log in to the subscriber's org and view their configuration and data to troubleshoot and resolve issues.

To access the Subscriber Overview page, click the organization's name from the **Subscribers** tab in the LMA.

Note: This feature is available to eligible Salesforce partners. For more information on the Partner Program, including eligibility requirements, see www.salesforce.com/partners.

Request Login Access from Subscribers
To log in to a subscriber org, first request login access from the subscriber.

Log In to Subscriber Orgs
After your subscriber has granted you login access, you can log in to the subscriber org to troubleshoot the issue.

Debug Subscriber Orgs
After logging in to a subscriber's org, you can view logs, obfuscated code in your package, and initiate ISV Customer Debugger sessions.

Request Login Access from Subscribers

To log in to a subscriber org, first request login access from the subscriber.

Ask the subscriber to enable either **Grant Account Login Access** or **Grant Login Access**. If they don't see your company listed, one of the following applies.

- A system admin disabled the ability for non-admins to grant access.
- The user doesn't have a license for the package.
- The package is licensed to the entire org. In this scenario, only an admin with the Manage Users permission can grant access.
- The org setting **Administrators Can Log in as Any User** is enabled.

Note: When the org setting **Administrators Can Log in as Any User** is disabled, login access is granted for a limited amount of time, and the subscriber can revoke access at any time.

Any changes you make while logged in as a subscriber are logged in the subscriber org's audit trail.

Log In to Subscriber Orgs

After your subscriber has granted you login access, you can log in to the subscriber org to troubleshoot the issue.

Available in: **Enterprise**, **Performance**, and **Unlimited** Editions

USER PERMISSIONS

To log in to subscriber orgs:
- Log in to Subscriber Org

Note: You can only log in to orgs with a Salesforce Platform or full Salesforce license. You can't log in to subscriber orgs on Government Cloud instances.

Multi-Factor Authentication Required to Log In to a Subscriber Org

Starting in Spring '22, multi-factor authentication (MFA) is required when logging into the License Management Org (LMO). MFA is required only for LMO users who require access to the Subscriber Support Console. This requirement provides subscribers an extra layer of security by verifying the identity of the user accessing their org. You also have more control over which users log in to a subscriber org.

Determine which users require access to the Subscriber Support Console, and then set up multi-factor authentication (MFA) for those users.

Log In to a Subscriber Org

After you've logged in to the LMO using multi-factor authentication (MFA), and your subscriber has granted you login access, you're ready to log in.

1. In the License Management App (LMA), click the **Subscribers** tab.
2. To find a subscriber org, enter a subscriber name or org ID in the search box, and click **Search**.
3. Click the name of the subscriber org.
4. On the Org Details page, click **Login** next to a user's name. You have the same permissions as the user you logged in as.
5. When you're finished troubleshooting, log out of the subscriber org.

Note: Some subscribers require MFA in addition to the MFA required for the LMO. Ask your subscriber if their org requires MFA to log in. If so, your login attempt sends an MFA notification to your subscriber, and your login is blocked until your subscriber responds to the notification. To ensure that your subscriber is available to respond to the MFA notification, consider coordinating a specific login time.

Best Practices for Logging In

- Create an audit trial that indicates when and why a subscriber org login has occurred. You can create an audit trail by logging a case in your LMO before each subscriber org login.
- When you access a subscriber org, you're logged out of your LMO. You can set up a My Domain to not be automatically logged out of your LMO when you log in to a subscriber org. To set up a My Domain subdomain, from Setup, in the Quick Find box, enter `My Domain`, then select **My Domain**.
- Allow only trusted support and engineering personnel to log in to a subscriber's org. Because this feature can include full read/write access to customer data and configurations, it's vital to your reputation to preserve their security.
- Control who has login access by giving the Log in to Subscriber Org user permission to specific support personnel via a profile or permission set. See Assign Permissions to the Subscriber Org Console on page 307.

Debug Subscriber Orgs

After logging in to a subscriber's org, you can view logs, obfuscated code in your package, and initiate ISV Customer Debugger sessions.

Troubleshoot with Debug Logs

You can debug your code by generating Apex debug logs that contain the output from your managed package. Using this log information, you can troubleshoot issues that are specific to that subscriber.

1. If the user has access, set up a debug log: From Setup, in the Quick Find box, enter `Debug Logs`, and then select **Debug Logs**.
2. Launch the Developer Console.
3. Perform the operation, and view the debug log with your output.

Subscribers are unable to see the logs you set up or generate because they contain your unobfuscated Apex code.

You can also view and edit data contained in protected custom settings from your managed packages when logged in as a user.

Troubleshoot with the ISV Debugger

Each License Management Org can use one free ISV Customer Debugger session at a time. The ISV Customer Debugger is part of the Salesforce Extensions for Visual Studio Code. You can use the ISV Customer Debugger only in sandbox orgs, so you can initiate debugging sessions only from a customer's sandbox.

For details, see the ISV Customer Debugger documentation.

SEE ALSO:

Salesforce Help: Open the Developer Console

CHAPTER 12 Partner Licensing Platform (Developer Preview)

In this chapter ...

- Enable the Partner Licensing Platform (Developer Preview)
- Quick Start: Get Started with the Partner Licensing Platform (Developer Preview)
- Partner Licensing Platform Components and Concepts (Developer Preview)
- Design Your Package Licensing Structure (Developer Preview)
- Implement Your Package Licensing (Developer Preview)
- Test Your Licensing Structure (Developer Preview)
- Manage Migrations to the Partner Licensing Platform (Developer Preview)

The Partner Licensing Platform (PLP) is a robust new platform that revolutionizes how Salesforce Partners and ISVs price, license, and distribute their applications. Product owners, architects, and developers who build apps for AppExchange can transform their business and products with the power of PLP.

Note: The Partner Licensing Platform is available as a developer preview. The Partner Licensing Platform isn't generally available unless or until Salesforce announces its general availability in documentation or in press releases or public statements. All commands, parameters, and other features are subject to change or deprecation at any time, with or without notice. Don't implement functionality developed with these commands or tools in your production package.

Our forward-looking statement applies to custom supplement permission set licenses, user license restrictions, and partner business org provisioning. Make your purchasing decisions based on currently available technology.

Now for the first time, you can develop and distribute multiple license types for your package that entitle specific features, without breaking up your package structure. With this functionality you can increase and diversify your revenue stream by selling multiple tiers, versions, or supplements for your products via these license types.

In a future release, you may also be able to create licenses that can be assigned only to specific types of users. For example, a license for internal Salesforce users with complete functionality, and a separate license for external Experience Cloud users with the same or limited functionality, for a lesser price. You can potentially recover revenue for products that were previously only contractually restricted.

This onboarding guide outlines how to sign up for the developer preview and design and implement your new licensing strategy. Starting now, you can get ready to take advantage of the incredible capabilities of the next generation of licensing for Salesforce Partners.

What's Available in the Developer Preview?

The following features are available in the Spring '22 release:

- Custom (foundation) permission set licenses
- Licensed custom permissions

The following features are expected eventual capabilities of the Partner Licensing Platform:

- Custom supplement permission set licenses
- User license restrictions
- Partner business org provisioning of custom permission set license seats

For info and updates about the developer preview, join the Partner Licensing Platform Developer Preview Partner Community group. For general news about PLP, join the Partner Licensing Platform Partner Community group.

SEE ALSO:

TrailheaDX '21 Presentation: Next Generation Licensing for ISV Partners

Enable the Partner Licensing Platform (Developer Preview)

Review requirements for the developer preview and set up necessary orgs before submitting a participation request.

Note: The Partner Licensing Platform is available as a developer preview. The Partner Licensing Platform isn't generally available unless or until Salesforce announces its general availability in documentation or in press releases or public statements. All commands, parameters, and other features are subject to change or deprecation at any time, with or without notice. Don't implement functionality developed with these commands or tools in your production package.

Scope of the Developer Preview

The developer preview isn't available for your production development and packaging orgs. To participate in the developer preview, you must create **new** orgs for using and testing the new Partner Licensing Platform.

You're encouraged to use your existing package code to see how you would transform your package and product with the new licensing capabilities. You can also consider creating a new repository or branch in your package code source control for implementing the new functionality alongside your production package development.

Alternatively, we prepared a demo application that you can use to test out the new functionality with your new developer preview orgs.

Requirements

The Partner Licensing Platform supports both 1GP and 2GP. To participate in the developer preview, you must have access to an Environment Hub (Env Hub) and a Developer Hub (Dev Hub). Both hubs are available to all AppExchange partners as part of your Partner Business Org (PBO).

Participants must be familiar with scratch org-based development using the Salesforce Developer Experience command-line interface (SFDX CLI). Scratch orgs are required as development and testing environments during the developer preview.

Create Your New Orgs

You must create the following orgs for end-to-end development, packaging, and testing with the Partner Licensing Platform enabled:

- A new Partner Enterprise org with Dev Hub enabled
  - See Create an Org from the Environment Hub and create a Test/Demo org using the Partner Enterprise edition.
  - See Enable Dev Hub Features in Your Org to enable your Dev Hub.
  - See Authorization to authenticate the Salesforce CLI to your Dev Hub.
- A new Partner Developer org with a namespace prefix that starts with **plpdp_**
  - See Create an Org from the Environment Hub and create a Development org using the Partner Developer edition.
  - See Register a Namespace and make sure that the namespace prefix you choose for your Partner Developer org starts with plpdp_ (such as "plpdp_mytest").
  - If testing with 1GP, use this Partner Developer org as your packaging org.
  - If testing with 2GP, link a namespace to your Dev Hub to allow creation of second-generation packages with your new namespace.

Sign Up for the Developer Preview

After you create the required orgs, make note of their org IDs. Then, submit a participation request via the Partner Licensing Platform Developer Preview Partner Community group. After the request is reviewed and approved, Salesforce will enable the developer preview in the new orgs that you created.

Note that there is limited space and Salesforce may close the developer preview to new partners when the current cohort is full.

Set Up the Development Environment

In the developer preview, you'll create your new custom permission set licenses in scratch orgs created from your new Dev Hub. After your request to join the developer preview is approved, the Partner Licensing Platform will be enabled for your Dev Hub. This will allow you to create scratch orgs with the `PartnerLicensingPlatform` feature enabled in the scratch org definition file. For more information about enabling features in scratch orgs, see Build Your Own Scratch Org Definition File, or take a look at the demo application scratch org definition.

After you implement your new licenses and settings, you're ready to create a new package with this metadata. For 1GP, deploy the metadata to the new packaging org and create a new package. For 2GP, add the metadata source to your package directory's source and create a new package using SFDX.

Finally, when you're ready to install and test your new package from the package subscriber's perspective, use a new scratch org created from your new Dev Hub. Packages with the new functionality can only be installed in scratch orgs that have the `PartnerLicensingPlatform` feature enabled in their scratch org definition files.

Note: To use the Partner Licensing Platform, you must use API version 54.0 or later.

Quick Start: Get Started with the Partner Licensing Platform (Developer Preview)

Get up and running with the Partner Licensing Platform with a demo application.

Note: The Partner Licensing Platform is available as a developer preview. The Partner Licensing Platform isn't generally available unless or until Salesforce announces its general availability in documentation or in press releases or public statements. All commands, parameters, and other features are subject to change or deprecation at any time, with or without notice. Don't implement functionality developed with these commands or tools in your production package.

Our forward-looking statement applies to custom supplement permission set licenses, user license restrictions, and partner business org provisioning. Make your purchasing decisions based on currently available technology.

After your development environment is set up, you can use the demo application to try out the Partner Licensing Platform (PLP).

The demo app contains all of the code and metadata components needed to demonstrate how an AppExchange application's functionality can be gated using licensed custom permissions and custom permission set licenses. We go into detail about these new components in Partner Licensing Platform Components and Concepts (Developer Preview), but you can set up and use the demo app immediately.

Detailed instructions for setting up and using the demo application are located in the README file of the demo application repository. Follow the steps outlined there to continue.

Considerations During the Developer Preview

During the developer preview, custom permission set licenses can only be tested via an installed package, as a subscriber of your package. For testing in the developer preview, the subscriber org where the managed package is installed is provisioned a default count of 10

seats for each custom permission set license in the package. When the functionality is available, you'll be able to provision a number of seats for your custom permission set licenses to each of your subscribers from your partner business org.

Using the Demo App

After you've finished setting up the demo app, you're ready to see how the Partner Licensing Platform works for a subscriber. First, log in to your subscriber org using the admin user and assign the Feature Access Demo permission set to the standard user. Then, log in to your subscriber org using the standard user and navigate to the Feature Access Visualforce page via the App Launcher in Lightning Experience.

The Feature Access page simulates access to package features that are gated behind licenses. Clicking the buttons allows you to see which features are accessible to the current user. Without the proper custom permission set licenses and permission sets assigned to the user, the user can't access the features on the page.

Now log in to your subscriber org as the admin user. Assign the **Feature_A** custom permission set license to your standard user. Now, that user is entitled to use Feature A in that org.

While the standard user is **entitled** to Feature A via a license assignment, the user still can't access Feature A until the admin further **grants access** to the user to Feature A via the **FeatureA User** permission set.

This grant is only possible after the admin has assigned the **Feature_A** custom permission set license to the standard user. The custom permission set license **entitles** the standard user to Feature A, and then the permission set **grants access** to the standard user for Feature A. This process of assigning licenses and permission sets results in a two-step access check for accessing a licensed feature.

Now, you'll see that the standard user can access Feature A, but not Feature B. To further illustrate how licenses and permission sets work together, try to grant access to the standard user to Feature B by assigning the **FeatureB User** permission set. This assignment isn't allowed because Feature B can only be **granted** via permission set to users who are first **entitled** to use Feature B via a license assignment. In this way, users are only able to **access** features that they're both **entitled** and **granted**.

You can explore combinations of custom permission set license and permission set assignments with the standard user and see how their access changes for gated features. Later in this guide, the concept of entitlements and granting access is explored in more detail.

In this demo app, we demonstrated how to gate access to your package features using custom permission set licenses and licensed custom permissions. You can also use this demo later as reference when you implement your package licensing.

What's Next?

Now that you've used the demo app to try out PLP, it's time for you to take advantage of the power of the platform to transform your own business and products. You can develop and distribute multiple license types for your package that entitle specific features, without breaking up your package structure. With this functionality, you can increase and diversify your revenue stream by selling multiple tiers, versions, or supplements for your products via these license types. In a future release, you may also be able to create licenses that can be assigned only to specific types of users, such as internal Salesforce users and external Experience Cloud users, separately.

The following sections dive into the data model of the new Partner Licensing Platform, covering how the platform works and how this new metadata and permissioning lifecycle is structured. Then, we walk you through the end-to-end process for how to redesign your product licensing with these capabilities using an example product.

As you go through the journey, you're welcome to ask questions and collaborate on the Partner Licensing Platform Developer Preview Partner Community group. For general news about PLP, join the Partner Licensing Platform Partner Community group.

Partner Licensing Platform Components and Concepts (Developer Preview)

Learn about the components of the Partner Licensing Platform and how they're connected.

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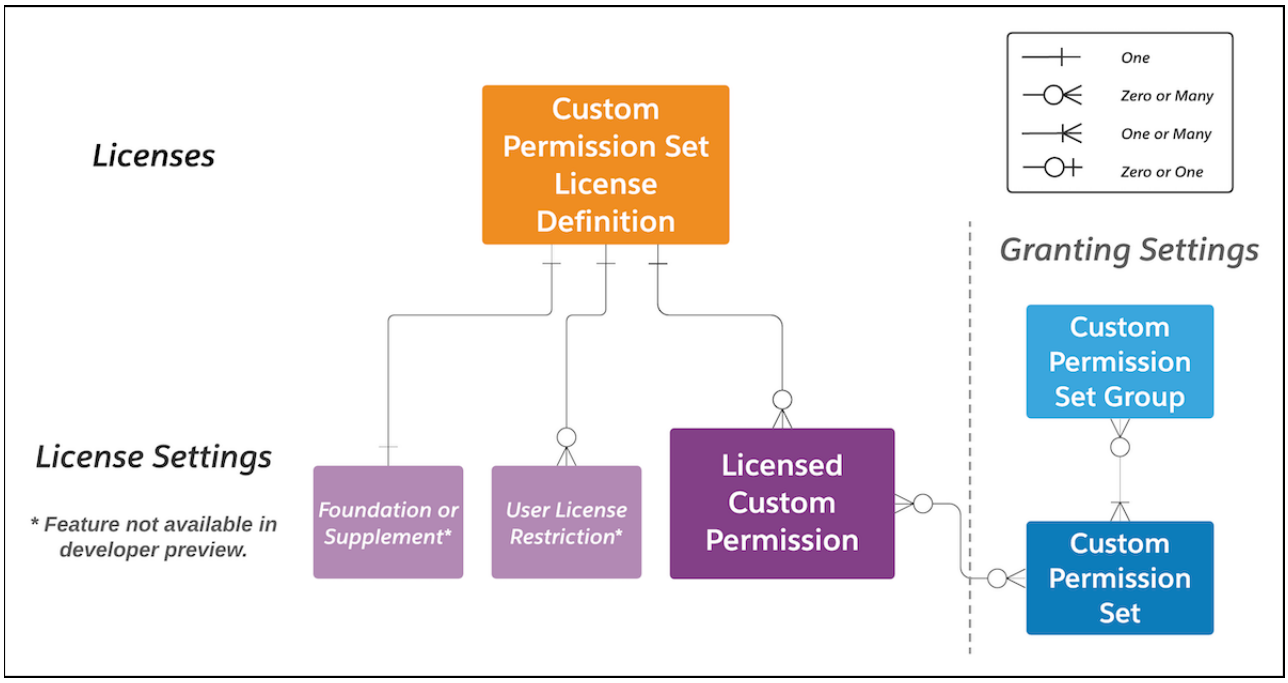
Our forward-looking statement applies to custom supplement permission set licenses, user license restrictions, and partner business org provisioning. Make your purchasing decisions based on currently available technology.

Before you dig into this material on the Partner Licensing Platform, we recommend that you take the Salesforce Licensing Trailhead module for an overview of licensing at Salesforce.

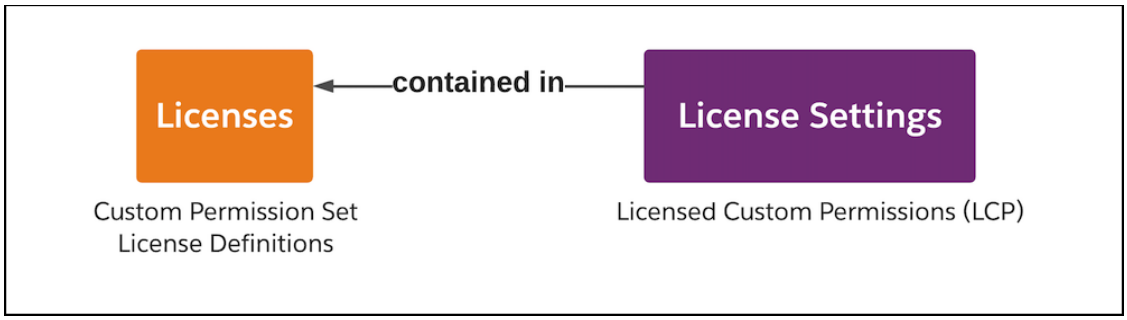
This diagram summarizes the main components that you create and how they're structured.



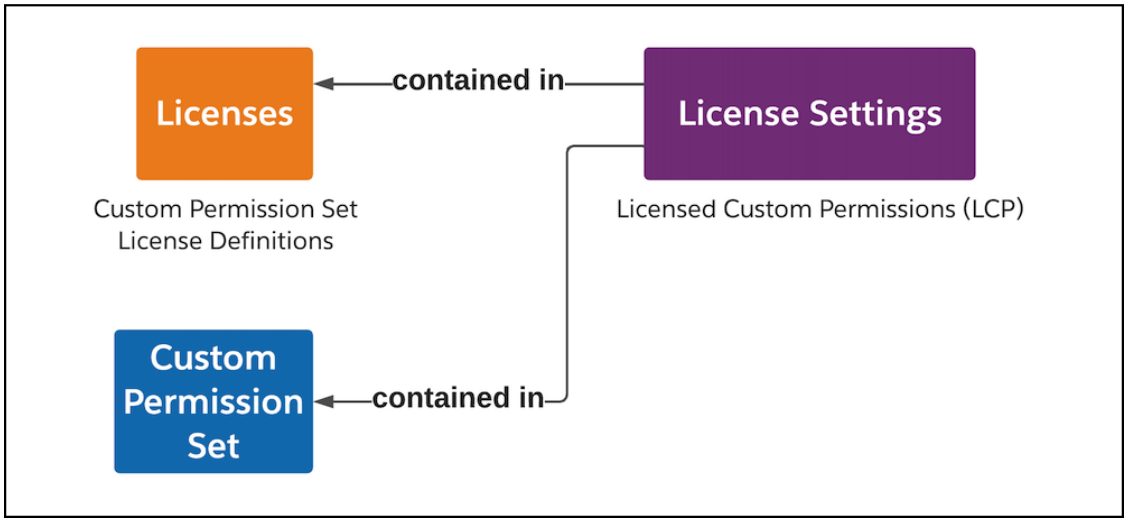
At a high level, you create custom permission set license definitions that are a part of your managed package metadata, just like custom objects and permissions. Then, you create license settings, such as licensed custom permissions, that are contained in the custom permission set license definitions. The licensed custom permissions are also contained within custom permission sets, which in turn can be bundled into permission set groups.

Let's go one step further and look in this diagram how these components and their relationships are used to gate a feature in your package.

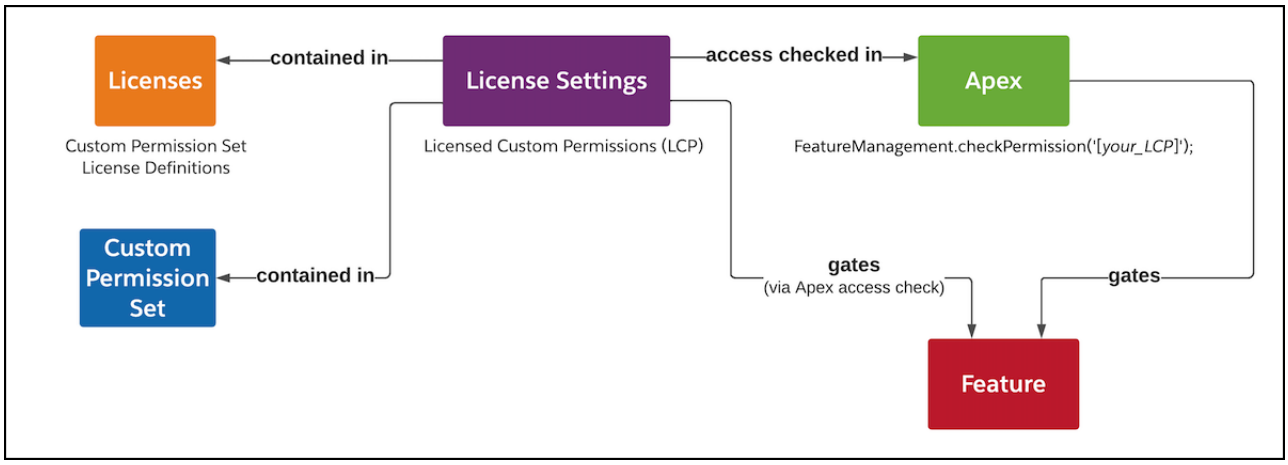
For example, you have a feature that you want to sell and provision. First, you create a licensed custom permission in your development scratch org, then put this custom permission into a new custom permission set license definition, which **entitles** this custom permission.



Next, you put the custom permission into a custom permission set, which **grants** this custom permission.



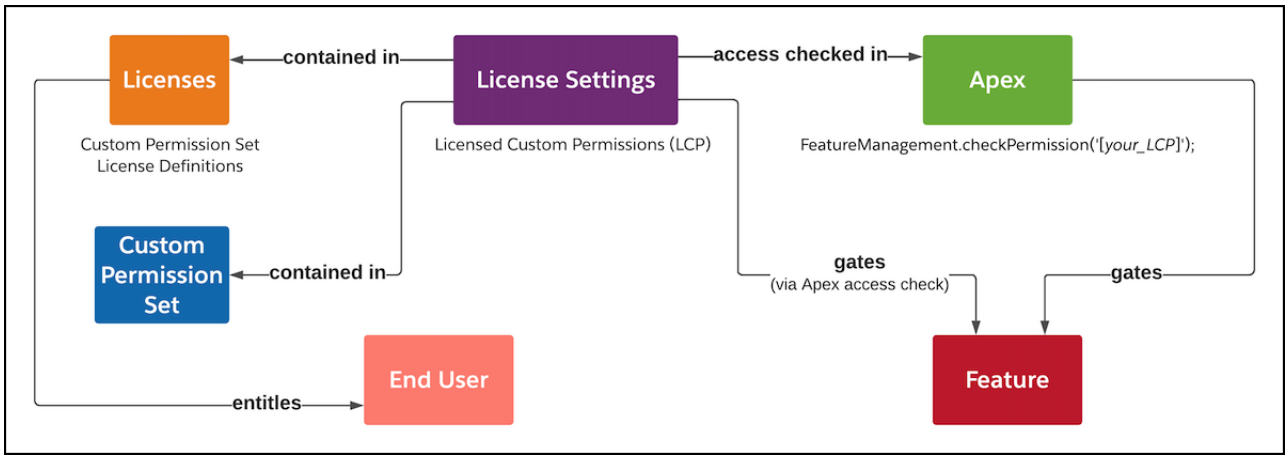
Finally, you put an access check for the licensed custom permission in your Apex code for a specific feature. This access check gates access to the feature.



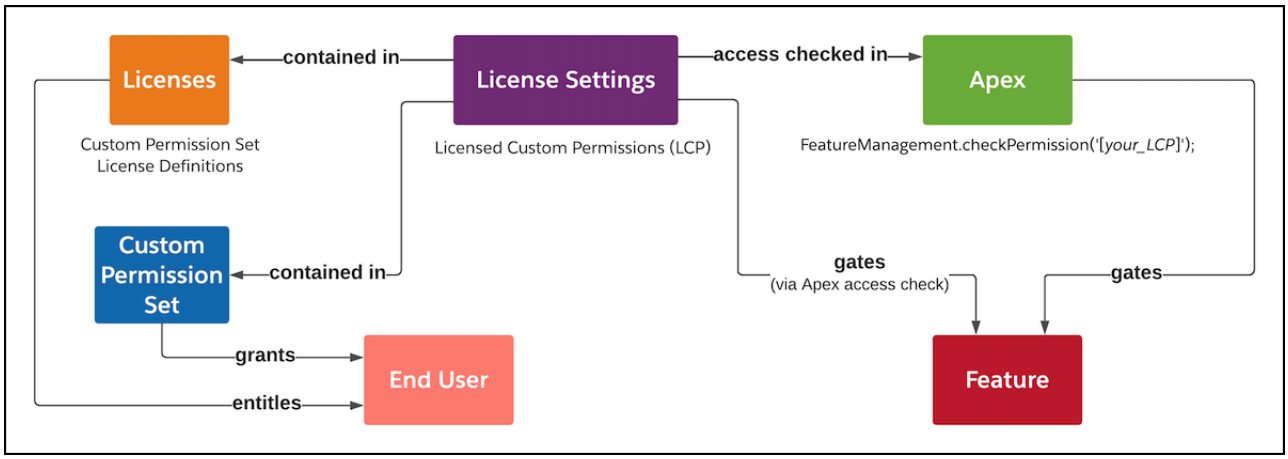
All that's left is uploading and shipping your managed package with these entities. The configuration of licensing as package metadata is separate from provisioning specific quantities of seats for your licenses for a subscriber.

Next, when the functionality is available, you'll provision a number of seats for your custom permission set licenses to each of your subscribers from your partner business org.

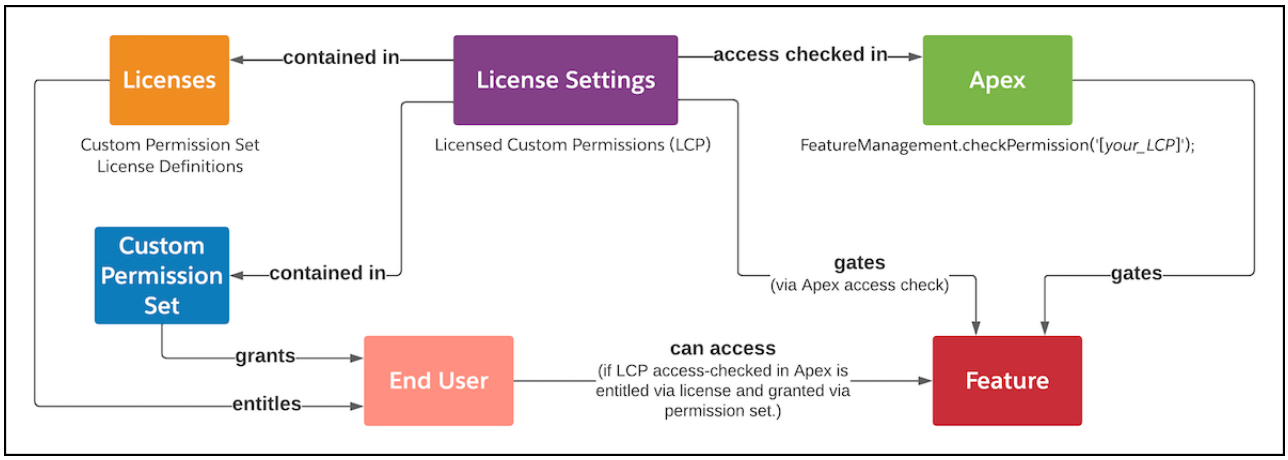
On the subscriber's side, they receive the new metadata as part of your package and a number of custom permission set license seats. First, the subscriber admin assigns the custom permission set license to an end user, which **entitles** the user the licensed custom permission, or feature. This entitlement allows the user to be granted the permission by the admin in the next step.



Next, the admin assigns the custom permission set to the end user, which **grants** that user the licensed custom permission, or the feature. Since this permission set contains a licensed custom permission, it can only be assigned to the user after the user has a license assigned with the licensed custom permission.



The end user can now access the feature gated by the licensed custom permission, because the user is both **entitled** by a license assignment and **granted** access by a permission set assignment.



This process of assigning licenses and permission sets results in a two-step access check for accessing a specific feature. Since the quantity of each license available to a subscriber is provisioned from your partner business org, once available, this mechanism allows both you and your subscribers granular control for which features are purchased and then how they are entitled and granted to each user.

Note: Partner business org provisioning of custom permission set license seats isn't available in the developer preview. The channels and interface for provisioning custom permission set license seats are to be determined and will likely be separate from the current License Management App. For testing in the developer preview, the subscriber org where the managed package is installed is provisioned a default count of 10 seats for each custom permission set license in the package.

In these topics, we go into more detail about individual licensing components as well as entitlements and grants.

Licensing Components (Developer Preview)

Review the different components that are created as part of your licensing and packaging structure and how these pieces fit together.

Entitlements and Grants (Developer Preview)

For users to be able to use a package feature, they must first have access to the overall package. Then, they must be entitled to the feature with a license assignment, and then granted the feature with a permission set assignment.

Licensing Components (Developer Preview)

Review the different components that are created as part of your licensing and packaging structure and how these pieces fit together.

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Our forward-looking statement applies to custom supplement permission set licenses, user license restrictions, and licensing and provisioning integration with Sales Cloud. Make your purchasing decisions based on currently available technology.

Custom Permission Set Licenses

A custom permission set license lets Salesforce Partners and ISVs incrementally sell user-level functionality for individual users. By assigning custom permission set licenses to users, admins can extend a user's entitlements, just like Salesforce-managed permission set licenses.

Each custom permission set license is either a foundation or a supplement license. The default, custom foundation permission set licenses, are like managed package licenses. They entitle and grant a user access to enter the package namespace, which is required before any

further use of the package or its components. A user's managed package license assignment can be replaced with a custom foundation permission set license and the user will retain the same level of access. Custom foundation permission set licenses can also entitle the user to specific licensed features. Note that a permission set assignment is still required to grant the user access to specific components of the managed package, such as custom objects.

Custom foundation permission set licenses are available in the developer preview. In a later release, you may be able to create custom supplement permission set licenses, which only entitle the user to certain features, and not the overall package.

Admins in subscriber orgs can view their custom permission set licenses in the Company Information page in Setup, after their Salesforce org is provisioned custom permission set licenses. Then, they can assign custom permission set licenses, along with their related custom permission sets, to users who need the permissions in the license.

Note: Custom permission set licenses are provisioned and assignable license seats on the subscriber side. On the developer side, they're called permission set license **definitions**, as they're the package metadata, not the actual seats of the license.

User-Level License Settings

User-level license settings gate individual features of your product for each user and are **entitled** by a license. The following settings are optional, depending on your licensing design.

- Licensed Custom Permission: A regular custom permission but with the **License Required** checkbox enabled. The field indicates that this custom permission is licensed and must first be entitled via a custom permission set license for a user to be able to access it via a custom permission set.
- Foundation or Supplement (In Development): In a future release, you may be able to indicate whether the custom permission set license is a foundation or supplement license. By default, custom permission set licenses are foundation licenses and entitle and grant a user access to enter the package namespace.
- User License Restriction (In Development): In a future release, you may be able to specify the users that can be assigned the custom permission set license.

Permission Sets and Permission Set Groups

Permission set and permission set groups **grant access** to a license's settings, such as a licensed custom permission, or other regular components of your package.

- Permission Sets: Permission sets are groups of permissions and settings that extend users' functional access without changing their profiles. You create custom permission sets in your package that contain the licensed custom permissions. After a user becomes **entitled** to permissions via a license, admins use permission sets to actually **grant** access to these permissions. Permission sets are defined in the managed package as part of the package metadata.
- Permission Set Groups: Permission set groups bundle permission sets together, for example, based on user job functions. Users assigned to the permission set group receive the combined permissions of all the permission sets in the group. Depending on the personas for whom you're creating your features, consider using permission set groups. Permission set groups provide admins with flexibility, since the admins can choose to mute specific permissions in a permission set group, depending on their business needs.

Order Management

You can use the Sales Cloud functionality that comes with your partner business org or another order management system (CRM). We recommend that you use Sales Cloud for its enhanced functionality and for built-in licensing and provisioning integration that may be available in a future release.

SEE ALSO:

Salesforce Help: Permission Sets

Salesforce Help: Permission Set Groups

Entitlements and Grants (Developer Preview)

For users to be able to use a package feature, they must first have access to the overall package. Then, they must be entitled to the feature with a license assignment, and then granted the feature with a permission set assignment.

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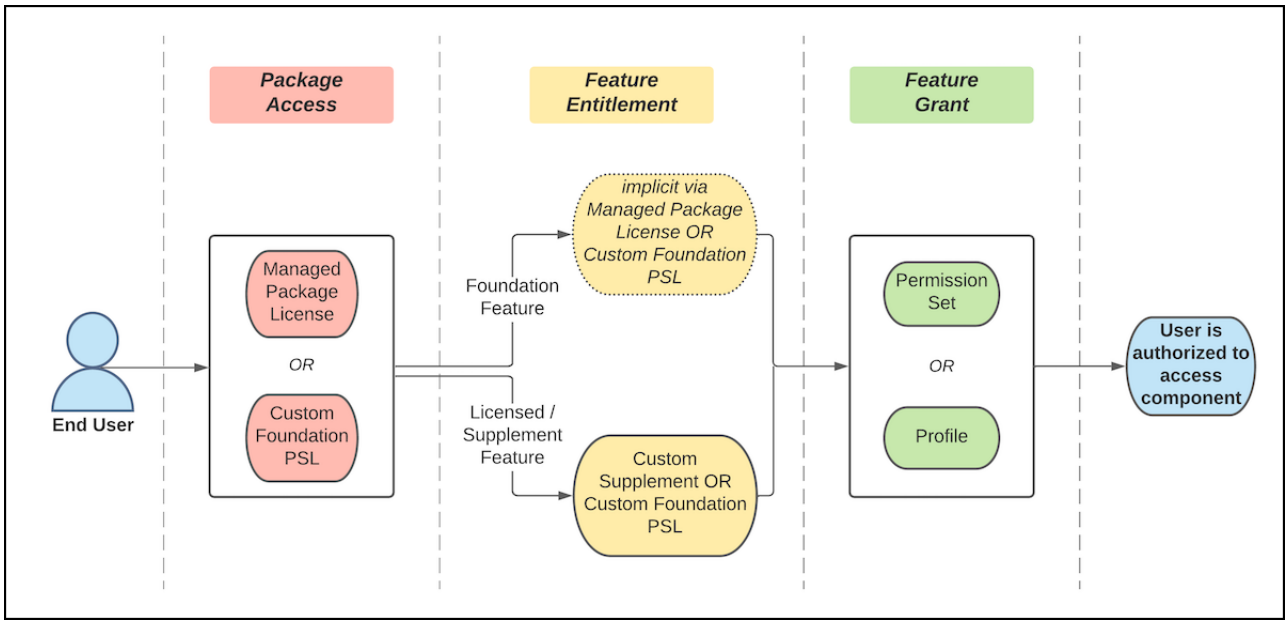

Package Access

Package access is the ability for a user to enter the namespace of a package. This access doesn't include further entitlements or grants necessary for the user to access any components of the package. However, it's necessary for a user to first have package access before receiving any further use of the package or its components.

Either a managed package license or a custom foundation permission set license (PSL) can provide package access to a user for a given package or namespace. A permission set or profile isn't necessary to give the user package access.

Foundation Feature Entitlement

Managed packages primarily contain foundation features, such as non-licensed custom permissions, custom objects, Apex classes, and Visualforce pages. All components of your package are considered foundation features, except for licensed custom permissions. Foundation features aren't explicitly licensed or named in a custom permission set license, which means a user doesn't require an explicit entitlement to access these features. Their entitlement is given to the user implicitly via the assignment of a managed package license or via a custom foundation permission set license. Both of these licenses provide implicit entitlement for all foundation features in your package, including as your package changes over time.

Licensed Feature Entitlement

Licensed or supplement features are features that are explicitly licensed. These features are gated with licensed custom permissions that are named in a custom permission set license. A user must have an explicit entitlement to access these features. When the admin assigns the user a custom permission set license, it provides the **entitlement** to the license settings or features it contains. Admins can then grant users the features they're entitled to with a permission set. The assigned licenses define the maximum set of features entitled to the user, but don't grant access to those features. The only package components that can explicitly be both entitled and granted for end users are licensed custom permissions.

Licensed features can be included in either a custom foundation or, eventually, a custom supplement permission set license. Custom supplement permission set licenses don't give the user package access or entitlement to access the foundation features of the package. They can only give entitlement for licensed or supplement features of a package.

Feature Grant

Finally, the admin must assign the user a permission set to **grant** access to the license settings (or features) already entitled by a license assignment. Now, the user has access to the package and is authorized to access this feature.

This process of assigning licenses and permission sets results in a two-step access check for accessing a specific feature. Since the quantity of each license available to a subscriber is provisioned from your partner business org, once available, this mechanism allows both you and your subscribers granular control for which features are purchased and then how they are entitled and granted to each user.

For example, a subscriber purchases five seats of a custom permission set license that contains three features. The subscriber admin can assign one seat to a user, giving the user the **entitlement** for those three features. Then the admin can assign a permission set to the user, giving them the **grant** for only one of those features. In this scenario, the admin has authorized the user to access only one feature, and not the other two available with the license.

Design Your Package Licensing Structure (Developer Preview)

To make sure that your license development process proceeds as smoothly as possible, design the feature breakdown of your product and its associated licenses carefully before you begin implementation.

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Outline Pricing Feature Strategy (Developer Preview)
Define what features and functionality you want to sell as part of your product offering. Then, map these features to the products that you'll sell.

Identify Licenses (Developer Preview)
After you develop your feature pricing strategy, identify the licenses that each product contains. Your licenses contain the underlying features that your products entitle.

Identify License Settings Use Cases (Developer Preview)
Identify the correct settings to include in your licenses that gate specific functionality so that users have the access to the intended features.

Map Settings to Licenses (Developer Preview)
After you confirm a list of license settings for your features, decide which settings to include in which custom permission set licenses.

Design Permission Sets (Developer Preview)
The design of permission sets is based on your intended end-user personas and the appropriate access they require to perform their tasks. The goal is to enable your customers to have a convenient administration experience.

Review Your Structure (Developer Preview)
Review your design to ensure that your licensing and permissions are structured as you need for your feature pricing and licensing strategy.

Outline Pricing Feature Strategy (Developer Preview)

Define what features and functionality you want to sell as part of your product offering. Then, map these features to the products that you'll sell.

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Plan Your Packaging Strategy

At this point in the design process, differentiate which features are available at a user-level vs. org-level. For user-level features, your customers purchase and assign a license for each user who needs access. For org-level features, your customers can purchase one product and all of their users, or their whole Salesforce org, have access to that feature.

For example, say you're developing a product called Travel Navigation, which includes:

- A basic set of functionality, such as being able to view, create, and edit visual maps with custom labels.
- An add-on for enhanced functionality, such as being able to color code labels and add symbols.
- An add-on for functionality around territories, which allows creating visual territories and subterritories.

You plan to sell each of these three sets of functionalities separately on a per-user basis.

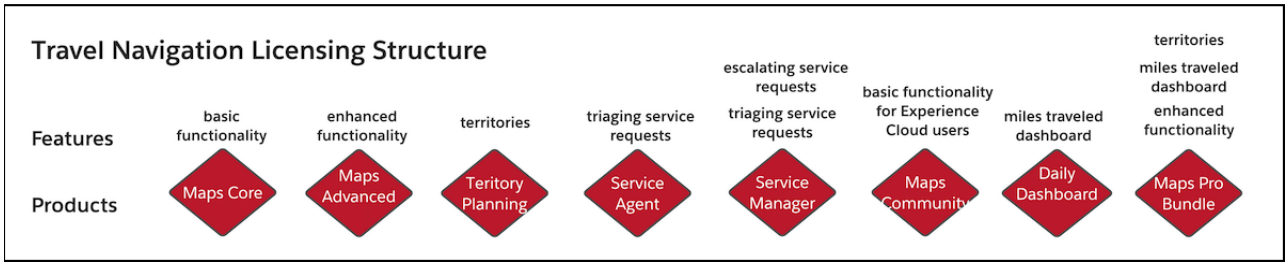
Your product also has a miles traveled dashboard functionality, which shows your customer how many miles in a given day that a sales or service person travels. You plan to sell this dashboard at the org-level.

Identify Products

Next, map the features to the products that you want to sell and that entitle the customer to those features. For each of the distinct features that you define in your pricing and feature strategy, you can have one or more products that contain a feature. You can also have more than one feature in one product.

For our Travel Navigation example, you create this matrix to outline your product mapping.

Feature	Relationship	Product
basic functionality	contained in	Maps Core
enhanced functionality	contained in	Maps Advanced
territories	contained in	Territory Planning
triaging service requests	contained in	Service Agent
triaging service requests	contained in	Service Manager
escalating service requests	contained in	Service Manager
basic functionality for Experience Cloud users	contained in	Maps Community
miles traveled dashboard	contained in	Daily Dashboard
territories	contained in	Maps Pro Bundle
miles traveled dashboard	contained in	
enhanced functionality	contained in	



Note that the triaging service requests feature is contained in both Service Agent and Service Manager products and that Service Manager contains two features.

We recommend using a visual diagramming tool to build your licensing design.

SEE ALSO:

Licensing Components (Developer Preview)

Identify Licenses (Developer Preview)

After you develop your feature pricing strategy, identify the licenses that each product contains. Your licenses contain the underlying features that your products entitle.

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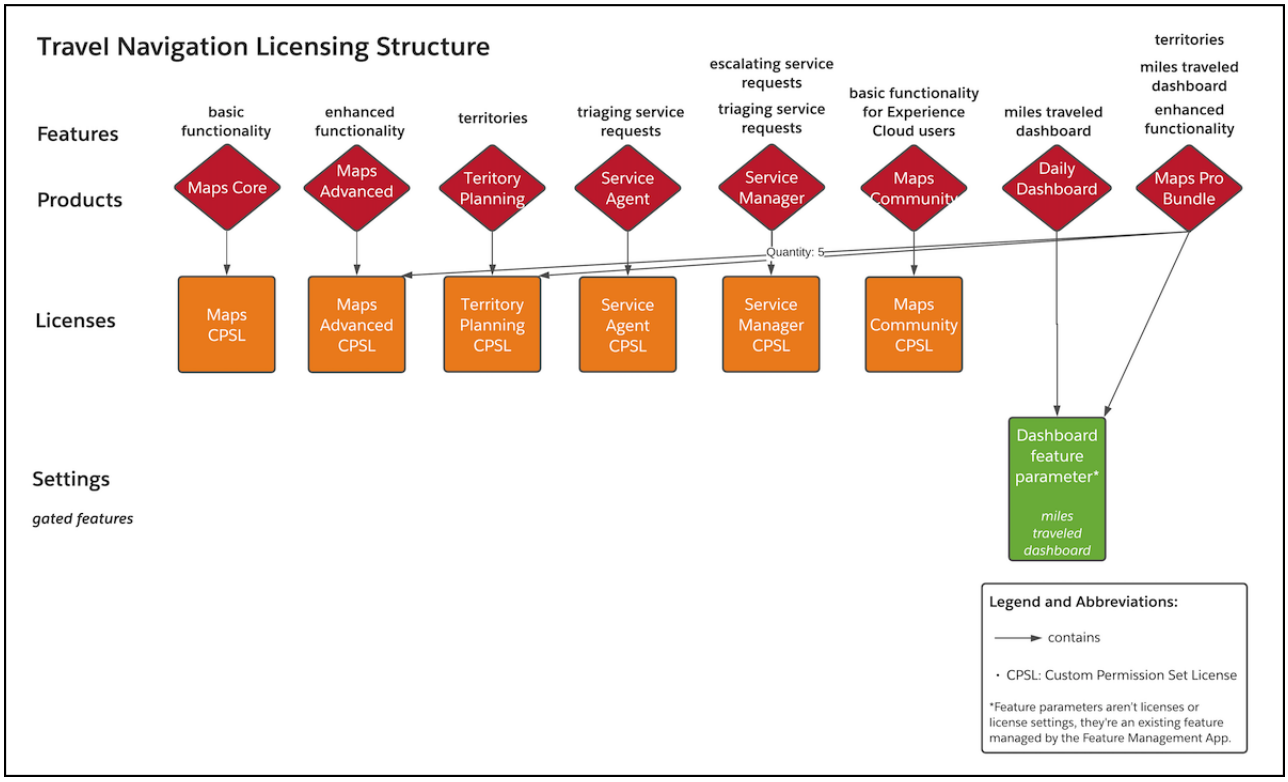
Consider what custom permission set licenses you must create. Custom permission set licenses are assigned to users and give the entitlements contained within the custom permission set license to the users.

Next, consider how to include your set of licenses into your set of products. When a product is purchased by your customers, you'll provision the underlying licenses to their org. The customer then assigns these licenses and permission sets to users to access the functionality entitled by the license.

For Travel Navigation, you create this matrix to outline the relationship between your products and custom permission set licenses (CPSLs).

Product	Relationship	License
Maps Core	contains 1	Maps CPSL
Maps Advanced	contains 1	Maps Advanced CPSL
Territory Planning	contains 1	Territory Planning CPSL
Service Agent	contains 1	Service Agent CPSL
Service Manager	contains 1	Service Manager CPSL
Maps Community	contains 5	Maps Community CPSL
Daily Dashboard	contains 1	Dashboard feature parameter*
Maps Pro Bundle	contains 1	Dashboard feature parameter*
	contains 1	Territory Planning CPSL
	contains 5	Maps Advanced CPSL

*Feature parameters aren't licenses. They are an existing feature and are managed by the Feature Management App.



Note that the Maps Pro Bundle product contains multiple licenses, and some individual licenses are contained within multiple products. This many-to-many mapping of licenses and products is common.

SEE ALSO:

- Manage Features
- Licensing Components (Developer Preview)

Identify License Settings Use Cases (Developer Preview)

Identify the correct settings to include in your licenses that gate specific functionality so that users have the access to the intended features.

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In this table, we summarize the licensing mechanism for each type of access for your product.

	Feature Access	Object Access	Package Access	Usage Entitlement
User-Level	Licensed Custom Permission	*In Consideration*	Managed Package License or Custom Foundation Permission Set License	Not Applicable

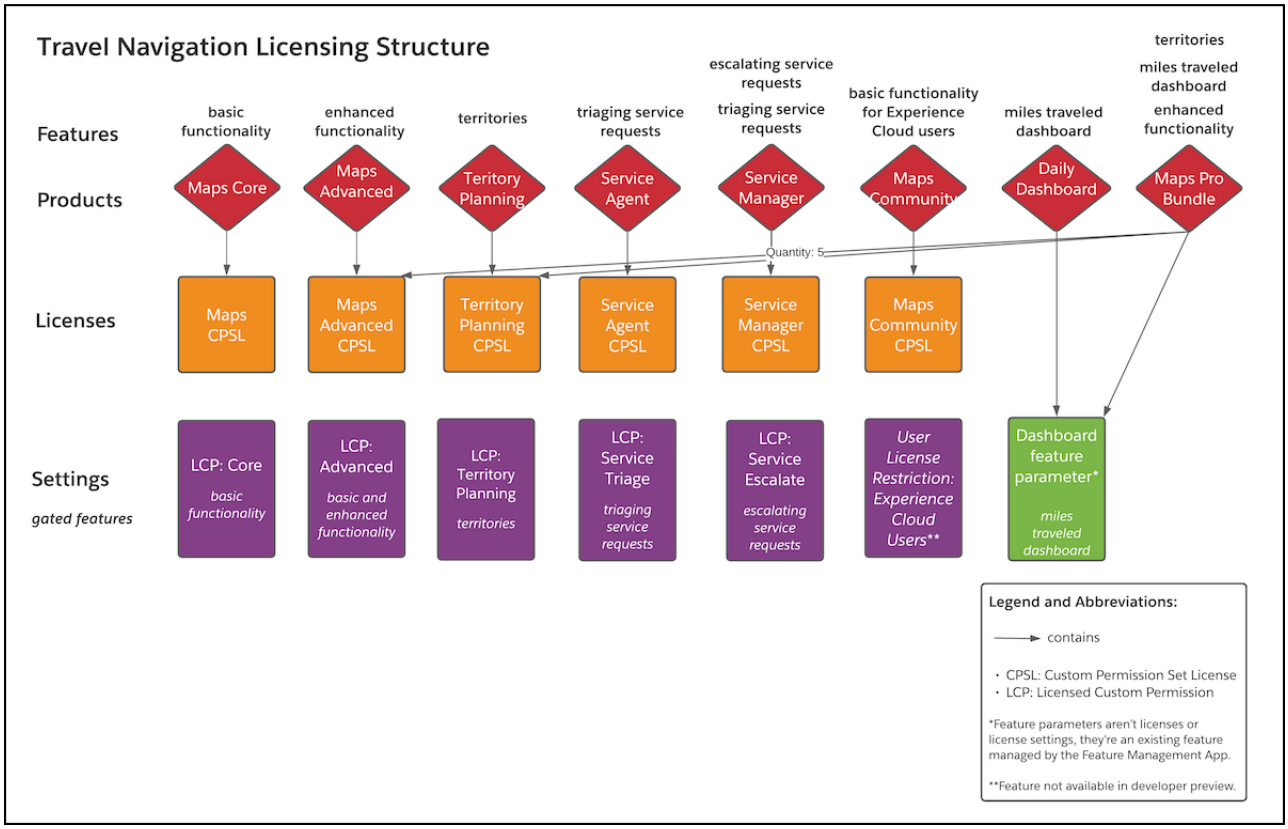
Org-Level	LMO-to-Subscriber Boolean Feature Parameter*	Custom Object	Site-wide license setting in LMA	Subscriber-to-LMO Integer Feature Parameter (usage metric) and LMO-to-Subscriber Integer Feature Parameter (usage limit) pairing*

*Feature parameters aren't license settings. They are an existing feature and are managed by the Feature Management App.

Continuing our Travel Navigation example, we create this matrix to capture the exact settings and licensed custom permissions (LCPs), and their relation to your identified features.

Setting	Relationship	Feature
Custom Foundation Permission Set License	gates	overall package namespace access
LCP: Core	gates	basic functionality
LCP: Advanced	gates	enhanced functionality
LCP: Territory Planning	gates	territories
LCP: Service Triage	gates	triaging service requests
LCP: Service Escalate	gates	escalating service requests
LCP: Core and User License Restriction: Experience Cloud users	gates	basic functionality for Experience Cloud users
Dashboard feature parameter*	gates	miles traveled dashboard

*Feature parameters aren't license settings. They are an existing feature and are managed by the Feature Management App.



For examples of gating access in other pricing scenarios, refer to these topics.

User-Level Feature Gating (Developer Preview)
When you're ready to design your user-level license settings, review these common scenarios and suggested solutions.

Org-Level Feature Gating (Developer Preview)
When you're ready to design your org-level licensing strategy, review these common scenarios and suggested solutions.

Advanced Use Cases and Compound Gating (Developer Preview)
Review advanced pricing scenarios that require compound solutions or specific configurations.

SEE ALSO:

Licensing Components (Developer Preview)

Drive App Behavior with LMO-to-Subscriber Feature Parameters

Track Preferences and Activation Metrics with Subscriber-to-LMO Feature Parameters

User-Level Feature Gating (Developer Preview)

When you're ready to design your user-level license settings, review these common scenarios and suggested solutions.

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Our forward-looking statement applies to user license restrictions. Make your purchasing decisions based on currently available technology.

Requirements	Solution
You want to sell a feature via a license that must be bought and assigned individually for each user.	Licensed custom permissions. These permissions are checked in your Apex code during runtime. The user is given access to the gated feature if the user has a custom permission set license containing the licensed custom permission and a permission set assigned that grants them the licensed custom permission.
You want to sell access to your whole package via a license that must be bought and assigned individually for each user. You're migrating away from managed package licenses, which perform a similar function.	A custom foundation permission set license. This license gives the user the ability to enter the package namespace and the entitlement to access all foundation features, similar to managed package licenses.
You want to sell a feature that your subscriber can purchase separately for their standard internal Salesforce users and external Experience Cloud site users. For example, you want to sell a product and license for internal users for $20 per user per month and a similar but separate product and license for external users for $2 per user per month. You want to ensure that the subscriber doesn't use the cheaper license for a more expensive type of user.	In a future release, you may be able to specify which users can be assigned the custom permission set license.

SEE ALSO:

- Identify License Settings Use Cases (Developer Preview)
- Licensing Components (Developer Preview)
- Org-Level Feature Gating (Developer Preview)
- Advanced Use Cases and Compound Gating (Developer Preview)

Org-Level Feature Gating (Developer Preview)

When you're ready to design your org-level licensing strategy, review these common scenarios and suggested solutions.

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Requirements	Solution
You want to sell a feature via a product that must be bought only one time to give all users in the Salesforce org access to the feature.	Feature parameter of type boolean. This is access checked in your Apex code during runtime and gives any user in the org access to the gated feature. No permission set or custom permission set license assignment is required for a user to access the feature. Note: Feature parameters are managed by the Feature Management App. The Feature Management App is an

Requirements	Solution
	existing feature that is separate from the Partner Licensing Platform.
You want to sell access to your whole package via a product that must be bought only one time to give all users in the Salesforce org access to your whole package.	Use the License Management App to set licensing for a particular subscriber to be site-wide. Note: The License Management App is an existing feature that is separate from the Partner Licensing Platform. Note that permission set assignments for various permissions, such as custom object permissions, are still required for users in the org to access those features.
You want to sell a consumption-based entitlement, such as a number of API calls or call center minutes, in a specific quantity for the entire Salesforce org. This quantity is consumed by any user accessing this entitlement in the org.	At a high level, this requirement can be achieved via a LMO-to-Subscriber feature parameter to track the total sold quantity and a Subscriber-to-LMO feature parameter for tracking the used quantity from your package code. There may be other considerations depending on your specific needs, such as billing, usage periods, overages, and restricting or allowing access when the total sold quantity is consumed. Note: Feature parameters are managed by the Feature Management App. The Feature Management App is an existing feature that is separate from the Partner Licensing Platform.

SEE ALSO:

- Identify License Settings Use Cases (Developer Preview)
- Licensing Components (Developer Preview)
- User-Level Feature Gating (Developer Preview)
- Advanced Use Cases and Compound Gating (Developer Preview)

Advanced Use Cases and Compound Gating (Developer Preview)

Review advanced pricing scenarios that require compound solutions or specific configurations.

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Our forward-looking statement applies to custom supplement permission set licenses. Make your purchasing decisions based on currently available technology.

Example: Org-Level Feature with User-Level Licenses

Requirement: You want to sell access to a feature via a product that must be bought one time for the org and a license that must be bought and assigned individually for each user. The Salesforce org must have both the org-level product and the user-level license assigned for a user to be able to access the feature.

For example, an intelligence dashboard, which you want to sell for $200/month for the org to have access as the standard price, and then an incremental $25/user/month for each user to access the dashboard.

Solution: A combination of a boolean feature parameter and a licensed custom permission. Both the feature parameter and licensed custom permission are access checked in Apex code during runtime. If the user has a custom permission set license containing the licensed custom permission and the org has the feature parameter turned on, the user gets access to the feature. Remember that the user must also have a permission set assigned that grants them access to the licensed custom permission.

Note: Feature parameters are managed by the Feature Management App. The Feature Management App is an existing feature that is separate from the Partner Licensing Platform.

Example: Org-Level Feature with Admin-Controlled Access

Requirement: You want to sell access to a product that must be bought one time for the Salesforce org and no further licenses are needed for each user. However, you want to ensure that the org admin decides which users get access to this feature.

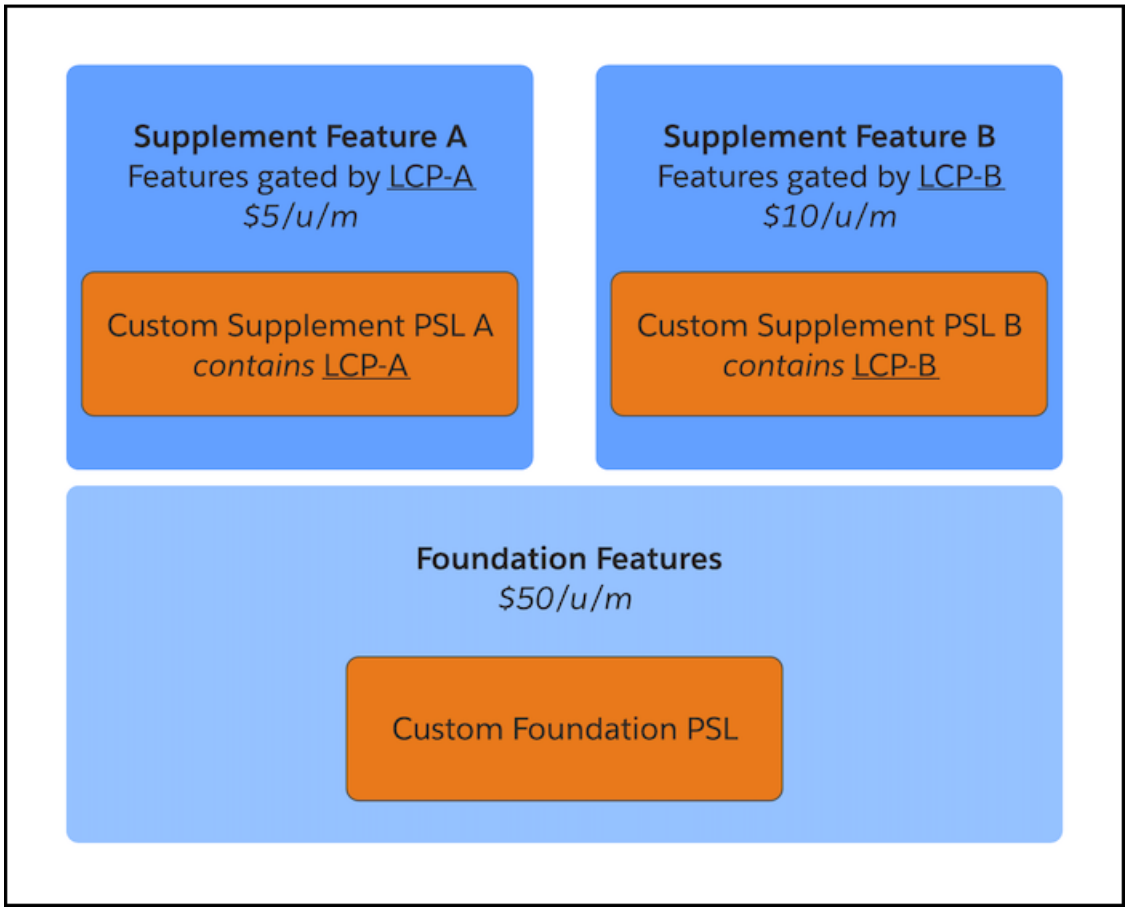
Solution: Use a boolean feature parameter to gate access to the feature for an org, and then a regular custom permission to gate access for the user. Both the feature parameter and custom permission are access checked in Apex code during runtime to give access to the feature. Note that the user doesn't require a license for the feature and the org admin can assign the user a permission set that grants them the custom permission.

Example: Foundation and Supplement Features

Note: This example includes functionality not yet available in the developer preview. However, we included it to help you understand the expected eventual capabilities of the Partner Licensing Platform.

Requirement: You want to sell access to foundation features in one license, and then sell supplement features in supplement licenses. You want to ensure that the supplement licenses don't give access to the foundation features and that a user must first be assigned the foundation license to receive the supplement licenses.

For example, you sell access to foundation features and your package namespace for $50 per user per month. Then, you sell supplement feature A for $5 per user per month, and supplement feature B for $10 per user per month. You want to ensure that the customer doesn't get access to the foundation features and your overall package only by assigning the cheaper supplement license.



Solution: Create a custom foundation permission set license for your foundation features. This license entitles access to all your foundation features, including your package namespace, and doesn't entitle access to the supplement features A or B.

Then, create custom supplement permission set license A containing licensed custom permission A, and custom supplement permission set license B containing licensed custom permission B. Your feature A and feature B are gated by licensed custom permissions A and B in Apex code, respectively. Since these two licenses are supplement licenses, they don't give access to your foundation features, including your package namespace.

Since your custom supplement permission licenses don't give access to your foundation features, a user must first have your custom foundation permission set license assigned in order to receive either or both of the custom supplement permission set licenses. This setup ensures that the customer can't assign only a cheaper supplement license and get access to all the foundation features, including your package namespace.

Additionally, users sometimes only require access to the foundation features and not the additional supplement features. These users can be assigned only the custom foundation permission set license and not the supplement licenses.

Example: Multiple Foundation and Supplement Features

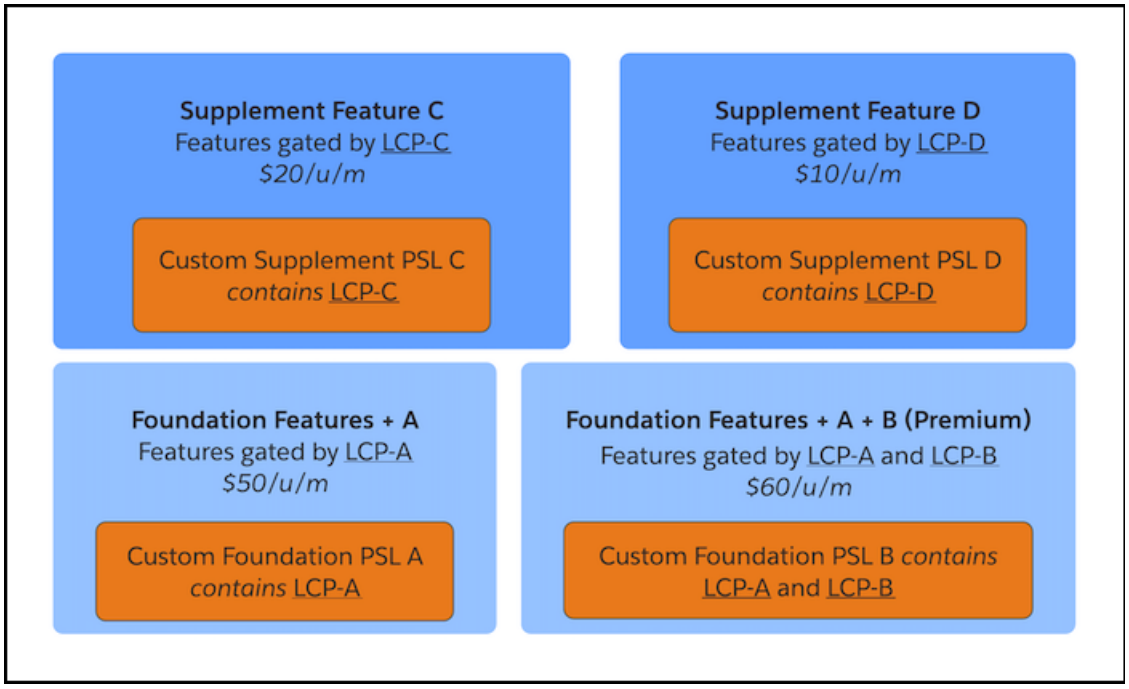
Note: This example includes functionality not yet available in the developer preview. However, we included it to help you understand the expected eventual capabilities of the Partner Licensing Platform.

Requirement: You want to sell two versions of foundation licenses, where every user of your package must have at least one of the two foundation licenses assigned. One of the foundation licenses contains an additional feature A and the other contains additional features A and B.

Then, you also want to sell supplement features in supplement licenses. You want to ensure that the supplement licenses don't give access to the foundation features and that a user must first be assigned a foundation license to receive the supplement licenses.

For example, you sell access to the foundation features, your package namespace, and feature A for $50 per user per month. You also sell access to the foundation features, your package namespace, and features A and B for $60 per user per month. These two licenses are only differentiated by which additional features they entitle, and are considered as two "versions" of your product, one being more premium with an additional feature.

Then, you sell supplement feature C for $20 per user per month, and supplement feature D for $10 per user per month. You want to ensure that the customer doesn't get access to the foundation features and your overall package only by assigning the cheaper supplement license.



Solution: Create a custom foundation permission set license A containing licensed custom permission A. Create a second custom foundation permission set license B containing licensed custom permissions A and B. Your feature A and feature B are gated by licensed custom permissions A and B in Apex code, respectively. These licenses entitle access to all your foundation features, including your package namespace, and either feature A or features A and B. They don't entitle access to the supplement features C or D.

Then, create custom supplement permission set license C containing licensed custom permission C, and custom supplement permission set license D containing licensed custom permission D. Your feature C and feature D are gated by licensed custom permissions C and D in Apex code, respectively. Since these two licenses are supplement licenses, they don't give access to your foundation features, including your package namespace.

Since your supplement licenses don't give access to your foundation features, a user must first have one of your custom foundation permission set licenses assigned in order to receive either or both of the custom supplement permission set licenses. This setup ensures that the customer can't assign only a cheaper supplement license and get access to all the foundation features, including your package namespace.

Additionally, users sometimes only require access to the foundation features and not the supplement features. These users can be assigned only one of the custom foundation permission set licenses and not the supplement licenses.

An alternative approach is that you could consider having only the licensed custom permission B in your premium custom foundation permission set license. In this case, you would gate access to feature A with either licensed custom permission A or B. This way, the user

with the premium custom foundation permission set license would get access to both features A and B with only one "premium" licensed custom permission B. This may be desired if you'd like to present licensed custom permission B as giving access to both features or make it simpler for your customer admins to authorize both features with one permission. This example illustrates the flexibility of licensing and access check capabilities to meet your desired feature pricing and access strategy.

Important: Be deliberate when creating foundation vs. supplement licenses for your package features. Most often, you'll create foundation licenses, as these licenses allow the user to enter the package namespace and are a replacement for the original managed package licenses. Supplement licenses are usually used for additional functionality that you want to sell on top of your foundation features, as these licenses require the user to have at least one foundation license assigned first.

SEE ALSO:

- Identify License Settings Use Cases (Developer Preview)
- Licensing Components (Developer Preview)
- User-Level Feature Gating (Developer Preview)
- Org-Level Feature Gating (Developer Preview)

Map Settings to Licenses (Developer Preview)

After you confirm a list of license settings for your features, decide which settings to include in which custom permission set licenses.

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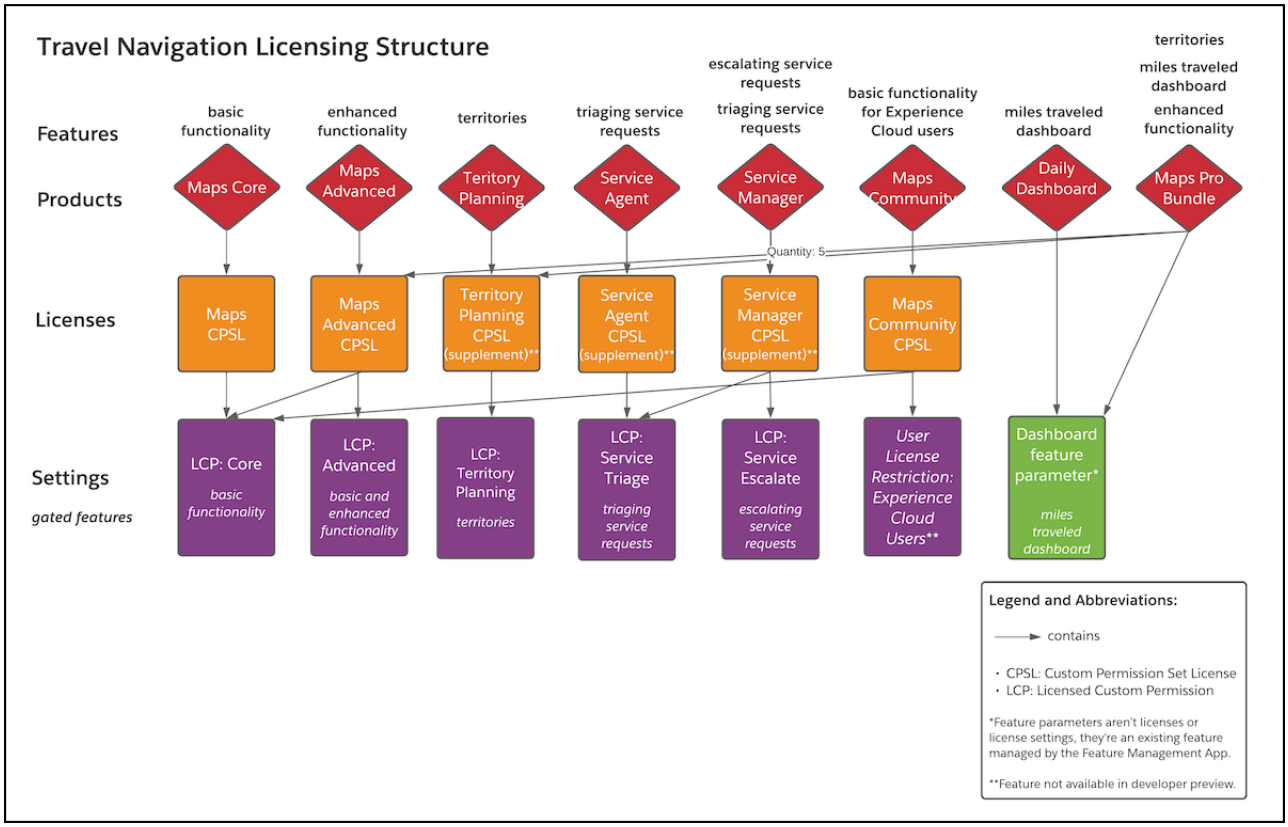
Our forward-looking statement applies to custom supplement permission set licenses and user license restrictions. Make your purchasing decisions based on currently available technology.

Licenses can contain multiple settings, and one setting can be contained in multiple licenses.

For the Travel Navigation product, you create this matrix to match up your settings, or licensed custom permissions (LCPs), to your custom permission set licenses.

License	Relationship	Setting
Maps	contains	LCP: Core
Maps Advanced	contains	LCP: Core
		LCP: Advanced
Territory Planning (supplement license)	contains	LCP: Territory Planning
Service Agent (supplement license)	contains	LCP: Service Triage
Service Manager (supplement license)	contains	LCP: Service Triage
		LCP: Service Escalate
Maps Community	contains	LCP: Core and User License Restriction: Experience Cloud users
Daily Dashboard (product, not license)	contains	Dashboard feature parameter*

*Feature parameters aren't license settings. They are an existing feature and are managed by the Feature Management App.



Note: In a later release, you may be able to create custom supplement permission set licenses, which only entitle the user to certain features, not the package overall. The Territory Planning, Service Agent, and Service Manager licenses are custom supplement permission set licenses that must be assigned to a user in conjunction with a custom foundation permission set license to be functional.

SEE ALSO:

Licensing Components (Developer Preview)

Design Permission Sets (Developer Preview)

The design of permission sets is based on your intended end-user personas and the appropriate access they require to perform their tasks. The goal is to enable your customers to have a convenient administration experience.

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So far, you've completed the bulk of your licensing design. You have a set of products, licenses, and license settings that will **entitle** your package features according to your feature pricing and licensing strategy. Now, it's time to design your permission sets to enable your customers to easily **grant** your package features out of the box.

Your customers often have multiple other products with their own licenses and permission sets. Giving your customers easy-to-understand and out-of-box personas packaged as custom permission sets enables them to administer and onboard onto your product faster.

Permission Sets

First, review your customer personas. Think through what types of user personas will access your product functionality, what features of your package they'll need access to, and in what capacity.

Next, design the permission sets for these personas. Think of each persona as having one permission set that gives them the required access. In many cases, you can define one permission set that contains all the permissions for the features you intend for a persona.

Keep in mind that your customer admin can always create custom permission sets in their org and assign any combination of permissions from your licenses as well as Salesforce licenses. However, such a permission set can only be assigned to a user who has all the necessary underlying licenses assigned to them.

As a best practice, make sure that no permission set contains more permissions than what its intended, related custom permission set license contains. If one permission set contains permissions from multiple custom permission set licenses, break up that permission set into multiple permission sets. Then use a permission set group to group those permission sets together. This practice ensures that each permission set can be associated with a single custom permission set license, such that it grants some or all of the entitlements from that license, and not more. Also note there can be multiple permission sets that contain license settings from one custom permission set license.

For our Travel Navigation example, you've identified these personas:

Persona	Relationship	Feature
Org Manager	can access	enhanced functionality
		territories
		triaging service requests
		escalating service requests
Service Agent	can access	triaging service requests
Service Manager	can access	triaging service requests
		escalating service requests
Service Support	can access	escalating service requests
Territory Planner	can access	territory planning

Here's one process by which you can design the permission sets for these personas.

1. Create one permission set, which contains one or more licensed custom permissions (LCPs), for each custom permission set license. Then, map them to each other.

Settings/Permission	Relationship	Permission Set	Relationship	Custom Permission Set License
LCP: Core	is contained in	Maps Core	maps to	Maps
LCP: Advanced	is contained in	Maps Advanced	maps to	Maps Advanced
LCP: Territory Planning	is contained in	Territory Planning	maps to	Territory Planning
LCP: Service Triage	is contained in	Service Agent	maps to	Service Agent
LCP: Service Triage	is contained in	Service Manager	maps to	Service Manager
LCP: Service Escalate				

2. Consider if a particular persona needs only a subset of the access from a custom permission set license. Let's say that you have a custom permission set license that maps to four permissions, but the persona only needs two of them. Create another permission set with the limited access.

   In this example, the Service Support persona doesn't need all the permissions licensed by the Service Manager custom permission set license, and similarly needs less access than the Service Manager persona. So we add the following permission set:

Settings/Permission	Relationship	Permission Set	Relationship	Custom Permission Set License
LCP: Service Escalate	is contained in	Service Support	maps to	Service Manager

Permission Set Groups

A permission set group streamlines permissions assignment and management by grouping together multiple permission sets based on user job functions. Users assigned the permission set group receive the combined permissions of all the permission sets in the group.

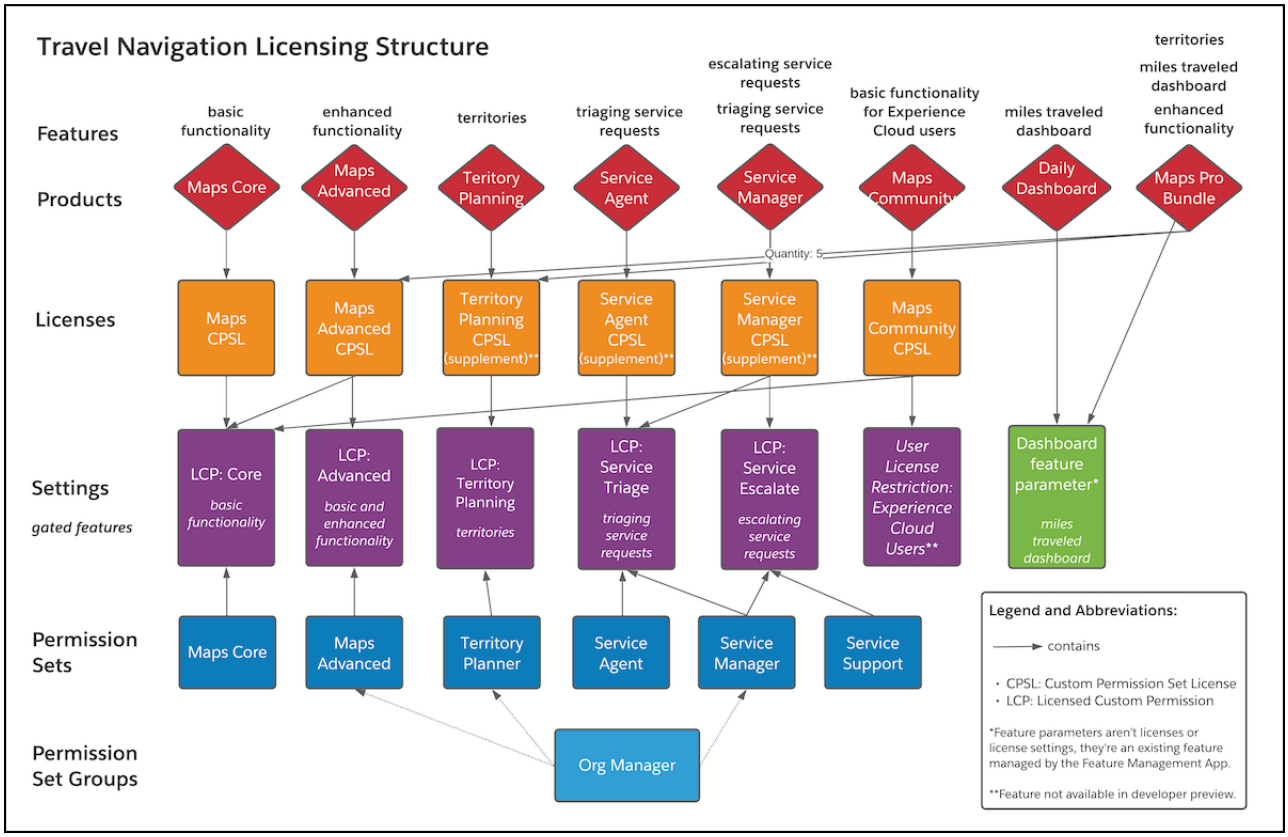
In our example, we check if a particular persona needs a superset of access from more than one permission set, and group those permission sets into a permission set group. The Org Manager overseeing both the maps and service teams must access the advanced maps functionality, territories functionality, and all service agent functionality. Note that the feature access of this persona crosses over multiple custom permission set licenses.

We create the following permission set group:

Permission Set Group	Relationship	Permission Set	Relationship	Settings/Permission
Org Manager	contains	Maps Advanced	contains	LCP: Advanced
		Territory Planner	contains	LCP: Territory Planning
		Service Manager	contains	LCP: Service Triage
				LCP: Service Escalate

Remember that assigning the Org Manager permission set group to a user grants the user all permissions from the underlying permission sets. The permission sets themselves aren't directly assigned on their own. If subscriber admins don't want to grant every permission from the permission set group, they can mute a specific permission in the group with a muting permission set.

Finally, assess whether any permission set is unnecessary, meaning the personas you designed are getting the access they need through another permission set or permission set group.



Design Notes

- The Maps Advanced custom permission set license includes both Core and Advanced licensed custom permissions, but the Maps Advanced permission set only includes the Advanced permission. This structure implies that both the basic Core functionality and enhanced Advanced functionality can be accessed by the Advanced licensed custom permission.

  The Apex code gating those two functionalities accounts for this design choice. It access checks for either the Core or Advanced licensed custom permission when gating basic functionality, and access checks only the Advanced permission when gating enhanced functionality.

  Alternatively, you could include both Core and Advanced licensed custom permissions in the Maps Advanced permission set, and access check basic and enhanced functionality separately with Core and Advanced licensed custom permissions, respectively.

- A user needing only basic functionality can still be assigned the Maps Advanced permission set license. Then, the user is assigned a permission set with the Core licensed custom permission only so that they're granted only basic functionality while having the Maps Advanced permission set license.
- In this example, an Experience Cloud functionality permission set isn't designed. Instead, we're using the Customer Community Plus profile to control access to all users of that profile.

Note: There are many ways by which you can design your permission sets. This topic is a guideline to help you think through your personas, but you can design your permission sets in a different way. Ultimately, ease of administration and out-of-box configuration for your customers is the goal.

SEE ALSO:

- Licensing Components (Developer Preview)
- Entitlements and Grants (Developer Preview)
- *Salesforce Help:* Permission Sets
- *Salesforce Help:* Permission Set Groups

Review Your Structure (Developer Preview)

Review your design to ensure that your licensing and permissions are structured as you need for your feature pricing and licensing strategy.

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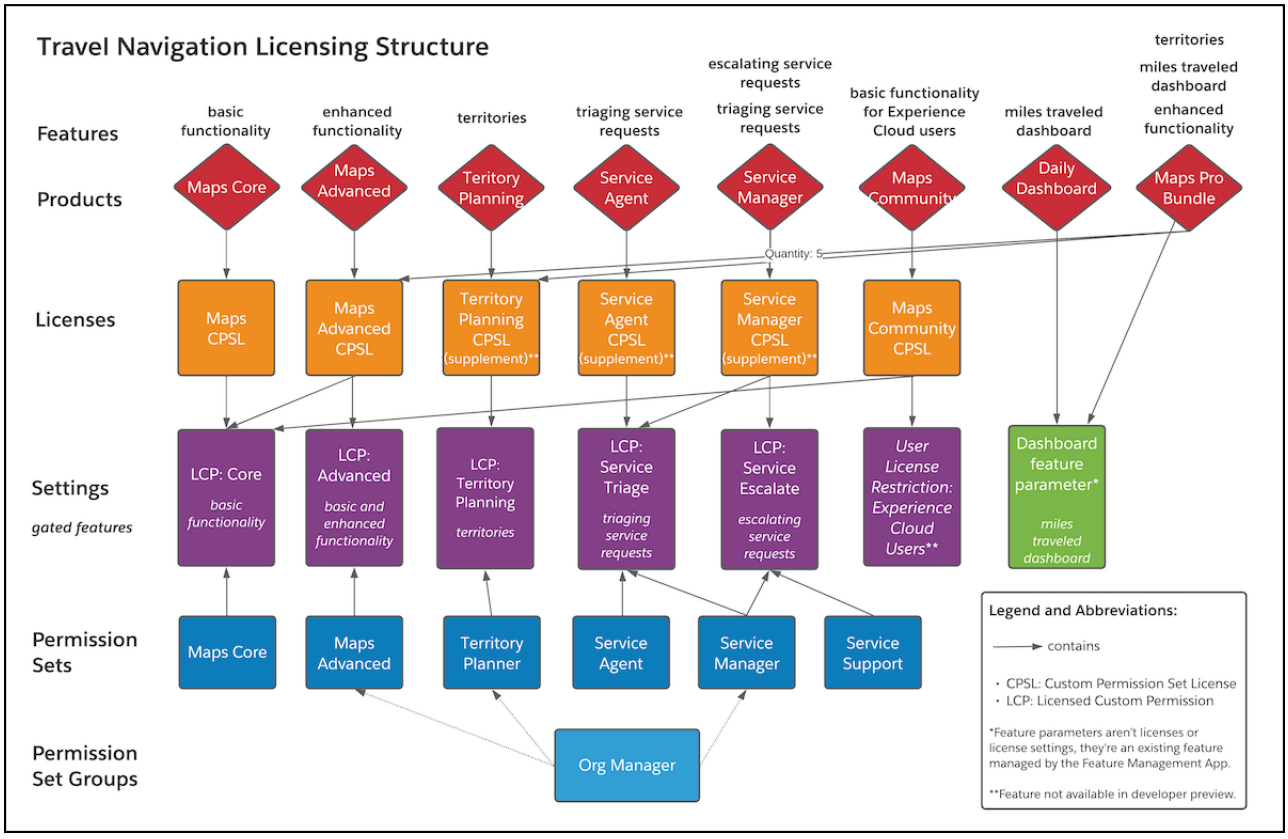
Our forward-looking statement applies to custom supplement permission set licenses and user license restrictions. Make your purchasing decisions based on currently available technology.

What a journey! By this point, you've designed your whole feature pricing and licensing structure. You first designed products, licenses, and licensed settings. Next, you mapped settings to licenses, and finally designed the permission sets for your personas.

Here's the final result of this exercise for the Travel Navigation example again.



Before you implement your design, we encourage you to review it thoroughly. While feedback from the implementation and testing phases can inform your design via iteration, it's harder to restructure your design later on.

During the design process, it's common to think of new scenarios and change your design. Make sure to think through various use cases for your customers. Also consider potentially faulty licensing structures, such as over-permissioning or under-permissioning, which can allow your subscriber to get more access without paying or receive less access than they expect. After your implementation phase, you'll want to establish a thorough test plan to ensure that everything works as expected.

In this design guide, we walked you through a "top-down" approach, starting from main features and overall pricing strategy, and working through to the individual components. This exercise can also be performed the other way around, or "bottom-up": starting with the individual license settings and mapping them through permission sets, licenses, products, and then your overall pricing strategy. It may be helpful to think through your design this way to surface additional considerations.

Implement Your Package Licensing (Developer Preview)

After completing your licensing and permissioning design, you're ready to create your licensing components using point-and-click tools and Apex.

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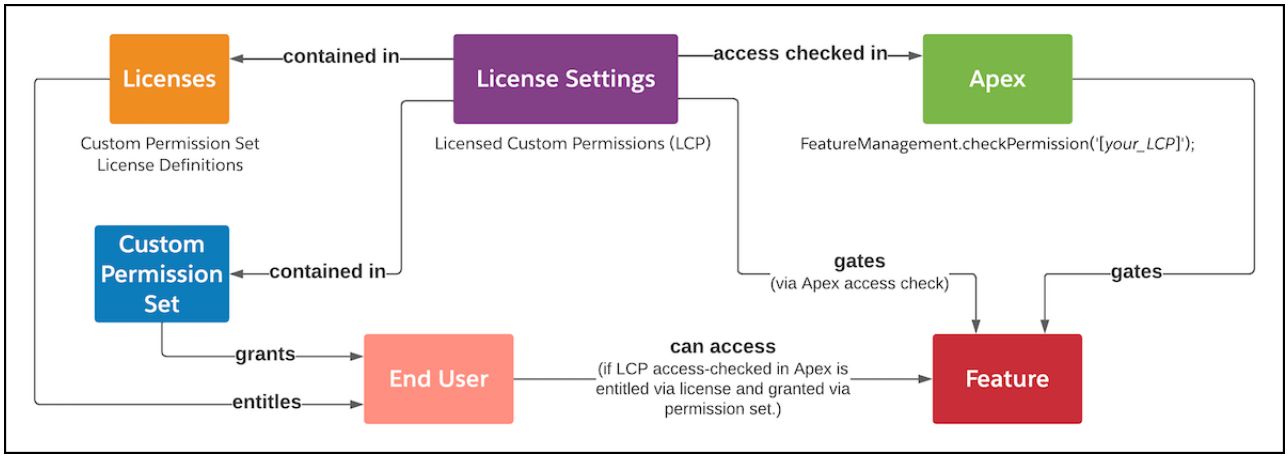
In addition to this guidance, we prepared a demo application that you can reference as you implement your package licensing, or simply use to deploy and test the new functionality.

Create your licensing components in a development scratch org created from your new Dev Hub that is enabled with the Partner Licensing Platform. To enable the Partner Licensing Platform in this org, make sure that you have the `PartnerLicensingPlatform` feature in your scratch org definition file.



You first create licensed custom permissions in your development scratch org, then put these custom permissions into custom permission set license definitions, which entitle the custom permissions. Next, you put the custom permissions into custom permission sets, which grant the custom permissions. Finally, you put access checks for the licensed custom permissions in your Apex code for specific features. The access checks gate access to the features. From there, you're ready to deploy and create your new package.

Create Licensed Custom Permissions (Developer Preview)
Licensed custom permissions gate access to your package features.

Define Custom Permission Set Licenses (Developer Preview)
The custom permission set license contains your package's licensed custom permissions and provides the entitlement for the features gated by those settings.

Create Custom Permission Sets (Developer Preview)
The permission set provides the grant to access the package features already entitled by a license.

Create Custom Permission Set Groups (Developer Preview)
Permission set groups bundle permission sets together based on user job functions. Create permission set groups if your licensing structure requires a persona to have permissions from multiple custom permission set licenses.

Create Access Checks in Apex (Developer Preview)
Create access checks for your licensed custom permissions in your Apex code to gate access to your features.

Deploy Your Licensing Structure and Create Your Package (Developer Preview)
After you implement your new licenses and settings, you're ready to create a new package with this metadata.

Create Licensed Custom Permissions (Developer Preview)

Licensed custom permissions gate access to your package features.

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Create your licensed custom permissions in a scratch org created from your new Dev Hub.

1. From Setup, in the Quick Find Box, enter `Custom Permissions`.
2. Select **Custom Permissions**.
3. Click **New**.
4. Enter a label. The Name field is generated automatically.
5. Enter a description.
6. Select **License Required**. This setting indicates that this permission can be granted to a user only if that user also has a custom permission set license containing this licensed custom permission.

   Note: After a custom permission is packaged and released, you can't edit this setting.

7. Click **Save**.

SEE ALSO:

Salesforce Help: Custom Permissions

Partner Licensing Platform Components and Concepts (Developer Preview)

Identify Licenses (Developer Preview)

Define Custom Permission Set Licenses (Developer Preview)

The custom permission set license contains your package's licensed custom permissions and provides the entitlement for the features gated by those settings.

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Create your custom permission set license definitions in a scratch org created from your new Dev Hub.

1. In your scratch org, from Setup, in the Quick Find Box, enter `Custom Permission Set License Definitions`.
2. Select **Custom Permission Set Licenses Definitions**.
3. Click **New**.
4. Enter a label. The Name field is generated automatically.
5. Enter a description.
6. Click **Save.**
7. Under Licensed Custom Permissions, click **Add Licensed Custom Permission**.
8. Select the permission you created previously and click **Save**.

Note: You can edit the permissions that you include in your license and upload a new version. However, if you remove permissions, this change only affects new customers. Existing customers retain the same entitlements as before.

SEE ALSO:

Partner Licensing Platform Components and Concepts (Developer Preview)

Identify Licenses (Developer Preview)

Entitlements and Grants (Developer Preview)

Create Custom Permission Sets (Developer Preview)

The permission set provides the grant to access the package features already entitled by a license.

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Create your permission sets in a scratch org created from your new Dev Hub.

1. In your scratch org, from Setup, in the Quick Find Box, enter `Permission Sets`.
2. Select **Permission Sets**.
3. Click **New**.
4. Enter a label. The API Name field is generated automatically.
5. Enter a description.
6. For Select the type of users who will use this permission set, select **None**.

   Note: Packaging permission sets constrained to custom permission set licenses isn't currently supported.

7. Select the permissions to include in your permission set. When selecting the permissions, include your licensed custom permission.

SEE ALSO:

Salesforce Help: Permission Sets

Partner Licensing Platform Components and Concepts (Developer Preview)

Design Permission Sets (Developer Preview)

Create Custom Permission Set Groups (Developer Preview)

Permission set groups bundle permission sets together based on user job functions. Create permission set groups if your licensing structure requires a persona to have permissions from multiple custom permission set licenses.

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Create your permission set groups in a scratch org created from your new Dev Hub.

1. In your scratch org, from Setup, in the Quick Find Box, enter `Permission Set Groups`.

2. Select **Permission Set Groups**.
3. Click **New**.
4. Enter a label. The API Name field is generated automatically.
5. Enter a description.
6. In the Permission Sets section, click **Permission Sets in Group**.
7. Click **Add Permission Set**.
8. Add all the permission sets related to the custom permission set license.

SEE ALSO:

Salesforce Help: Permission Set Groups

Partner Licensing Platform Components and Concepts (Developer Preview)

Design Permission Sets (Developer Preview)

Create Access Checks in Apex (Developer Preview)

Create access checks for your licensed custom permissions in your Apex code to gate access to your features.

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Create your access checks in a scratch org created from your new Dev Hub.

Use the FeatureManagementClass Apex class to gate your feature via the licensed custom permission. For example:

```
Boolean userHasCustomPermission =
FeatureManagement.checkPermission('{Licensed_Custom_Permission}');

if (userHasCustomPermission) {
 // your gated feature
}
```

For a more robust mechanism for doing licensing access checks, check out the LicensingUtil class in our demo application.

Note: Your new licensing can only be tested via an installed package, as a subscriber of your package. Testing your new licensing directly in a developer scratch org with deployed unmanaged metadata and code isn't currently supported, since assignable and provisioned custom permission set license seats aren't available in the developer org. For testing in the developer preview, the subscriber org where the managed package is installed is provisioned a default count of 10 seats for each custom permission set license in the package.

For this reason, the LicensingUtil class in our demo app bypasses the access check in certain developer orgs, while maintaining the access check in a subscriber context where the package is installed. This configuration allows all users to access the licensed functionality in those developer contexts as well as in automated Apex tests.

SEE ALSO:

Partner Licensing Platform Components and Concepts (Developer Preview)

Entitlements and Grants (Developer Preview)

Deploy Your Licensing Structure and Create Your Package (Developer Preview)

After you implement your new licenses and settings, you're ready to create a new package with this metadata.

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1. When creating your new package, make sure to include all necessary components, including your licensed custom permissions, custom permission set license definitions, permission sets, and permission set groups.
2. For 1GP, deploy the metadata to your packaging org and create a new managed package.
3. For 2GP, add the metadata source to your package directory's source and create a new managed package using SFDX.

Test Your Licensing Structure (Developer Preview)

After creating your new package, you can test your new licensing structure end-to-end.

Note: The Partner Licensing Platform is available as a developer preview. The Partner Licensing Platform isn't generally available unless or until Salesforce announces its general availability in documentation or in press releases or public statements. All commands, parameters, and other features are subject to change or deprecation at any time, with or without notice. Don't implement functionality developed with these commands or tools in your production package.

Test your new licensing structure in a testing scratch org created from your new Dev Hub that is enabled with the Partner Licensing Platform. To enable the Partner Licensing Platform in this org, make sure that you have the `PartnerLicensingPlatform` feature in your scratch org definition file.

In this scratch org, install your newly created package to begin testing. Your new licensing can only be tested via an installed package, as a subscriber of your package. Testing your new licensing directly in a developer scratch org with deployed unmanaged metadata and code isn't currently supported, since assignable and provisioned custom permission set license seats aren't available in the developer org. For testing in the developer preview, the subscriber org where the managed package is installed is provisioned a default count of 10 seats for each custom permission set license in the package.

Best Practices for Testing Your Package Licensing (Developer Preview)
Verify your new licensing structure and whether your existing package works as expected with the new components.

Example: Test Plan for Validating License Design (Developer Preview)
Review this sample licensing test plan. You can adapt it to fit your package's needs.

SEE ALSO:

Salesforce Architects Blog: Find Bugs Earlier with Second-Generation Packaging

Best Practices for Testing Your Package Licensing (Developer Preview)

Verify your new licensing structure and whether your existing package works as expected with the new components.

Note: The Partner Licensing Platform is available as a developer preview. The Partner Licensing Platform isn't generally available unless or until Salesforce announces its general availability in documentation or in press releases or public statements. All commands,

parameters, and other features are subject to change or deprecation at any time, with or without notice. Don't implement functionality developed with these commands or tools in your production package.

At minimum, we recommend that you test these categories.

- Perform regression tests to make sure product functionality is working as before.
- Manually validate your licensing structure and ensure your new licenses and permission sets are authorizing access to features appropriately.
  - Check for under-permissioning, or if users have less access than expected when assigned permission sets and custom permission set licenses.
  - Check for over-permissioning, or if users have more access than expected when assigned permission sets and custom permission set licenses.

Since testing your new licensing directly in a developer scratch org isn't currently supported, the LicensingUtil class in our demo app bypasses the access check in certain developer orgs, while maintaining the access check in a subscriber context where the package is installed. This configuration allows all users to access the licensed functionality in those developer contexts.

Your current automated Apex tests may begin to fail with the new licensing access checks and may need refactoring. Currently, automated testing of licensed functionality via license and permission set assignment to a user isn't supported, and may only work on the subscriber side where the package is installed. You may need to bypass your new access checks during automated testing, as shown in the LicensingUtil class example.

Note: Scratch orgs always operate with "site-wide" package licensing. As a result, all users in your subscriber scratch org are entitled to your foundation package features, such as Visualforce pages, without a managed package license or a custom (foundation) permission set license. Real subscribers of your package will need either a managed package license or custom permission set license to access your package's foundation features.

Example: Test Plan for Validating License Design (Developer Preview)

Review this sample licensing test plan. You can adapt it to fit your package's needs.

Note: The Partner Licensing Platform is available as a developer preview. The Partner Licensing Platform isn't generally available unless or until Salesforce announces its general availability in documentation or in press releases or public statements. All commands, parameters, and other features are subject to change or deprecation at any time, with or without notice. Don't implement functionality developed with these commands or tools in your production package.

Our forward-looking statement applies to custom supplement permission set licenses. Make your purchasing decisions based on currently available technology.

This test plan continues the Travel Navigation example from the Design Your Package Licensing Structure section of this guide.

Package Access

Testing Scenario	Expected Behavior
User is assigned Territory Planning CPSL	User can't access Travel Navigation package
User is assigned Maps CPSL	User can access Travel Navigation package
User is assigned Maps Advanced CPSL	User can access Travel Navigation package
User is assigned Territory Planning CPSL and Maps CPSL	User can access Travel Navigation package

Feature Access

Testing Scenario	Expected Behavior
User is assigned: • Maps CPSL • Territory Planning CPSL • Service Agent CPSL • Service Manager CPSL • Org Manager permission set group	User can access: • Travel Navigation package • Territory planning • Triaging service requests • Escalating service requests
User is assigned: • Maps CPSL • Territory Planning CPSL • Service Agent CPSL • Service Manager CPSL User isn't assigned: • Org Manager permission set group	User can access: • Travel Navigation package User can't access: • Territory planning • Triaging service requests • Escalating service requests
User is assigned: • Maps CPSL • Territory Planning CPSL • Territory Planner permission set	User can access: • Travel Navigation package • Territory planning User can't access: • Triaging service requests • Escalating service requests
User is assigned: • Maps CPSL • Territory Planning CPSL User isn't assigned: • Territory Planner permission set	User can access: • Travel Navigation package User can't access: • Territory planning • Triaging service requests • Escalating service requests
User is assigned: • Maps CPSL • Territory Planner permission set User isn't assigned: • Territory Planning CPSL	Territory Planner permission set assignment fails, because Territory Planning CPSL isn't assigned. User can access: • Travel Navigation package

Manage Migrations to the Partner Licensing Platform (Developer Preview)

If you have existing customers for your product, you can take steps to ensure that both your new and existing license settings work while you transition to your new licensing design.

Note: The Partner Licensing Platform is available as a developer preview. The Partner Licensing Platform isn't generally available unless or until Salesforce announces its general availability in documentation or in press releases or public statements. All commands, parameters, and other features are subject to change or deprecation at any time, with or without notice. Don't implement functionality developed with these commands or tools in your production package.

When you're ready, communicate the changes to your licensing structure and your timeline for migrating to the new licensing design to your existing customers.

Manage a Hybrid Licensing Model During Migrations (Developer Preview)
Set up your access checks so that your new custom permission set licenses work alongside your existing managed package licenses, and both new and existing customers can use your features without disruption.

Licensing for Existing Custom Permissions (Developer Preview)
Set up your existing custom permissions and new licensed custom permissions so that both new and existing customers can access your features as you migrate to your new licensing design.

Manage a Hybrid Licensing Model During Migrations (Developer Preview)

Set up your access checks so that your new custom permission set licenses work alongside your existing managed package licenses, and both new and existing customers can use your features without disruption.

Note: The Partner Licensing Platform is available as a developer preview. The Partner Licensing Platform isn't generally available unless or until Salesforce announces its general availability in documentation or in press releases or public statements. All commands, parameters, and other features are subject to change or deprecation at any time, with or without notice. Don't implement functionality developed with these commands or tools in your production package.

New customers will use your new licensing structure and settings from the beginning. However, if you upgrade your package code with your new access checks and settings, this change can cause your existing customers to lose access to those newly gated existing features, because users may not have the necessary licenses and permissions assigned for your new license settings at the time of upgrade. By setting up conditional behavior, both new and existing customers can access features without disruption.

Wherever you have access checks for your new licensed custom permissions, add an OR condition that also checks whether the user has the original managed package license for the package. Use the hasPackageLicense method, which returns true if the context user has a license to the managed package via a package license only.

For example:

```
Boolean hasCustomPermission =
FeatureManagement.checkPermission('{Licensed_Custom_Permission}');
if (hasCustomPermission ||
UserInfo.hasPackageLicense([Your_Package_Id]) {
//your gated feature}
```

Note: For a more robust mechanism for doing licensing access checks, including this hybrid licensing model, check out the LicensingUtil class in our demo application. However, because scratch orgs always operate with "site-wide" package licensing, the hasPackageLicense method always returns `true` in this context. Currently, this hybrid licensing access check will only be applicable

for real subscribers of your package, who will need either a managed package license or custom (foundation) permission set license to access your package.

To break down how both new and existing customers interact with this access check:

- All new users or customers start with your new licenses. If they have the appropriate licensed custom permission, they pass the access check.
- All existing customers' users with managed package licenses retain their original access by passing the hasPackageLicense access check.
- As users migrate onto your new licenses, their original managed package licenses should also be removed. At this point, users can only access the feature if they have the appropriate licensed custom permission.

With this approach, your customers have time to understand and migrate onto your new licenses without losing access.

Licensing for Existing Custom Permissions (Developer Preview)

Set up your existing custom permissions and new licensed custom permissions so that both new and existing customers can access your features as you migrate to your new licensing design.

Note: The Partner Licensing Platform is available as a developer preview. The Partner Licensing Platform isn't generally available unless or until Salesforce announces its general availability in documentation or in press releases or public statements. All commands, parameters, and other features are subject to change or deprecation at any time, with or without notice. Don't implement functionality developed with these commands or tools in your production package.

After a licensed custom permission is packaged and released, you can't edit the **License Required** attribute, which means that existing custom permissions can't be converted to a licensed custom permission. This behavior is because users who already have the custom permission may not have the necessary license assigned when the custom permission becomes licensed at the time of upgrade.

Because you can't directly convert existing custom permissions to licensed ones, set up your access checks to support both existing custom permissions and new licensed custom permissions. First, create your licensed custom permission. Then, locate in your access checks where you currently check for the original custom permission. Instead of replacing the original custom permission with your new licensed custom permission, put an `OR` clause between the two custom permissions. As a result, existing customers and users can continue to get uninterrupted access to the gated feature, although without a license. New customers and users get access to the gated feature via the new licensed custom permission and new license.

After you communicate the change and migration expectation to your existing customers and give them time to adopt the new licensed custom permission, you can remove the old custom permission from your Apex access checks to enforce the migration and license assignment.

CHAPTER 13 Manage Features in First-Generation Managed Packages

In this chapter ...

- Feature Parameter Metadata Types and Custom Objects
- Set Up Feature Parameters
- Use LMO-to-Subscriber Feature Parameters to Enable and Disable Features
- Track Preferences and Activation Metrics with Subscriber-to-LMO Feature Parameters
- Hide Custom Objects and Custom Permissions in Your Subscribers' Orgs
- Best Practices for Feature Management
- Considerations for Feature Management

Take the License Management App (LMA) a step further by extending it with the Feature Management App (FMA).

Here at Salesforce, we sometimes run pilot programs, like the one we ran when we introduced Feature Management. Sometimes we dark-launch features to see how they work in production before sharing them with you. Sometimes we make features available to select orgs for limited-time trials. And sometimes we want to track activation metrics for those features.

With feature parameters, we're extending this functionality to you. Install the FMA in your License Management Org (LMO). The FMA extends the License Management App, and like the LMA, it's a managed package.

Feature Parameter Metadata Types and Custom Objects

Feature parameters are represented as Metadata API types in your packaging org, as records of custom objects in your License Management Org, and as hidden records in your subscriber's org.

Feature Parameter Fields

Feature parameters are represented as Metadata API types and store boolean, integer, or date values.

The first time a subscriber installs your package, a `FeatureParameter__c` record is created in your License Management Org (LMO) for each feature parameter. The feature parameter records include these fields:

- `FullName__c`
- `DataType__c` (`Boolean`, `Integer`, or `Date`)
- `DataFlowDirection__c`
- `Package__c`
- `IntroducedInPackageVersion__c`
- `Namespace_Prefix__c`

Lifecycle of a Feature Parameter

Set Up the Feature Parameter

Start by defining your feature parameter in the packaging org using the Feature Parameters tab on the Package detail page.

Depending on how you're using the feature parameter, you'll also write code that enables you to check access rights or collect usage information after the parameter is set up.

Subscriber Installs Your Managed Package

When a subscriber installs or upgrades your package in their org, a `FeatureParameter__c` record for each feature parameter is created in the LMO. If these records were created during a previous installation or upgrade, this step is skipped.

During package installation, junction object records are created in both the subscriber org and your LMO. A junction object is a custom object with two master-detail relationships. In this case, the relationships are between `FeatureParameter__c` and `License__c` in the LMO. These records store the value of their associated feature parameter for that subscriber org.

Utilize Your Feature Parameters

Use the junction objects to override the feature parameters' default values or to collect data. Depending on the value of each feature parameter's `DataFlowDirection__c` field, data flows to the subscriber org (from the LMO) or to the LMO (from the subscriber org). That data is stored in the junction object records.

Set Up Feature Parameters

Set up the Feature Management App in your License Management Org, define feature parameters, and add them to your package.

Install and Set Up the Feature Management App in Your License Management Org

Install the FMA in your LMO. Then add the Feature Parameters tab to your default view, and adjust your page layout for licenses to display related lists for your feature parameters.

Create Feature Parameters in Your Packaging Org

Create a feature parameter in your packaging org, and set its type, default value, and data flow direction.

Add Feature Parameters to Your Managed Package

After you've created some feature parameters, you can add them to a managed package as components and reference them in your code. Feature parameters aren't available in unmanaged packages.

Install and Set Up the Feature Management App in Your License Management Org

Install the FMA in your LMO. Then add the Feature Parameters tab to your default view, and adjust your page layout for licenses to display related lists for your feature parameters.

1. To request access to the FMA, log a support case in the Salesforce Partner Community. For product, specify **Partner Programs & Benefits**. For topic, specify **ISV Technology Request**. The FMA extends the License Management App, so be sure to install the LMA before requesting access to the FMA.
2. To install the FMA, follow the instructions in your welcome email.
3. Add the Feature Parameters tab to your default view. For details, see Customize My Tabs in Salesforce Help.
4. Update your page layout for licenses.
   a. Navigate to a license record's detail page.
   b. Click **Edit Layout**.
   c. In the Related Lists section of the License Page Layout Editor, add these lists.
      - Feature Parameter Booleans
      - Feature Parameter Dates
      - Feature Parameter Integers
   d. For each related list, add these columns.
      - Data Flow Direction
      - Feature Parameter Name
      - Full Name
      - Master Label
      - Value

Create Feature Parameters in Your Packaging Org

Create a feature parameter in your packaging org, and set its type, default value, and data flow direction.

1. From Setup, enter `Packages` in the Quick Find box, then select **Packages**.
2. In the Packages section, in the Package Name column, select your managed package.
3. On the Feature Parameters tab, click **New Boolean**, **New Integer**, or **New Date**.
4. Give your feature parameter a developer name that meets the standard criteria for developer names. The name must be unique in your org. It can contain only alphanumeric characters and underscores, and must begin with a letter. It can't include spaces, end with an underscore, nor contain two consecutive underscores.
5. Give the feature parameter a label.
6. Set a default value for the feature parameter. If you're creating a Feature Parameter Boolean, you see only a checkbox for Default Value. If you want your default value to be `true`, select this checkbox.

7. Set a data flow direction. To use this feature parameter to control behavior in your subscriber's org, select **LMO to Subscriber**. To collect activation metrics from your subscriber, select **Subscriber to LMO**. Note: After the feature parameter is included in a promoted and released package version, the data flow direction can't be changed.
8. Click **Save**.

Add Feature Parameters to Your Managed Package

After you've created some feature parameters, you can add them to a managed package as components and reference them in your code. Feature parameters aren't available in unmanaged packages.

Complete these steps in your packaging org.

1. From Setup, enter `Packages` in the Quick Find box, then select **Packages**.
2. In the Packages section, in the Package Name column, select your managed package.
3. On the Components tab, click **Add**.
4. From the Component Type dropdown, select **Feature Parameter Boolean**, **Feature Parameter Date**, or **Feature Parameter Integer**.
5. Select your feature parameter, and then click **Add to Package**.

Use LMO-to-Subscriber Feature Parameters to Enable and Disable Features

Feature parameters with a data flow direction value of `LMO to Subscriber` are writable at your end and read-only in your subscriber's org. These feature parameters serve as permissions or limits. Use LMO-to-subscriber feature parameters to enable or disable new features or to control how many of a given resource your subscriber can use. Or, enable features for a limited trial period. Assign values to LMO-to-subscriber feature parameters by updating junction object records in your LMO, and then check those values in your code.

Assign Override Values in Your LMO
To override the default value of a feature parameter in a subscriber's org, update the appropriate junction object record in your LMO.

Check LMO-to-Subscriber Values in Your Code
You can reference feature parameters in your code, just like you'd reference any other custom object.

Assign Override Values in Your LMO

To override the default value of a feature parameter in a subscriber's org, update the appropriate junction object record in your LMO.

1. Open the license record for a subscriber's installation of your package.
2. In the related list for Feature Parameter Booleans, Feature Parameter Integers, or Feature Parameter Dates, select the feature parameter whose value you want to update.
3. Click **Edit**.
4. Set a value.
5. Click **Save**.

Check LMO-to-Subscriber Values in Your Code

You can reference feature parameters in your code, just like you'd reference any other custom object.

Use these Apex methods with LMO-to-subscriber feature parameters to check values in your subscriber's org.

- `System.FeatureManagement.checkPackageBooleanValue('YourBooleanFeatureParameter');`
- `System.FeatureManagement.checkPackageDateValue('YourDateFeatureParameter');`
- `System.FeatureManagement.checkPackageIntegerValue('YourIntegerFeatureParameter');`

SEE ALSO:

Apex Developer Guide: FeatureManagement Class

Track Preferences and Activation Metrics with Subscriber-to-LMO Feature Parameters

Use subscriber-to-LMO feature parameters to track feature activation in your subscriber's org. Parameter values are assigned on the subscriber's end and then sent to your LMO. To collect the values, update the feature parameters in your subscriber's org using Apex code. Check with your legal team before obtaining activation metrics from your customers. Use activation metrics to collect only aggregated data regarding feature activation.

- `System.FeatureManagement.setPackageBooleanValue('YourBooleanFeatureParameter', booleanValue);`
- `System.FeatureManagement.setPackageDateValue('YourDateFeatureParameter', datetimeValue);`
- `System.FeatureManagement.setPackageIntegerValue('YourIntegerFeatureParameter', integerValue);`

Warning: The `Value__c` field on subscriber-to-LMO feature parameters is editable in your LMO. But don't change it. The changes don't propagate to your subscriber's org, so your values will be out of sync.

SEE ALSO:

Apex Developer Guide: FeatureManagement Class

Hide Custom Objects and Custom Permissions in Your Subscribers' Orgs

Occasionally, you want to include custom permissions or custom objects in a package but not show them to your subscribers. For example, if you're piloting a feature for a few select orgs, and want to hide custom permissions and custom objects related to the pilot feature.

Note: Check with your company's legal team before releasing hidden functionality.

To hide custom objects when creating your package, set the value of their Visibility field to `Protected`.

To hide custom permissions when creating your package, from Setup, enter *Custom Permissions* in the Quick Find box. Select **Custom Permissions** > *Your Custom Permission* > **Edit**. Enable **Protected Component**, and then click **Save**. After your

package is installed, use the `System.FeatureManagement.changeProtection()` Apex method to hide and unhide custom objects and permissions.

Warning: After you've released unprotected objects to subscribers, you can't change the visibility to `Protected`.

To hide custom permissions in released packages:

- `System.FeatureManagement.changeProtection('YourCustomPermissionName', 'CustomPermission', 'Protected');`

To unhide custom permissions and custom objects in released packages:

- `System.FeatureManagement.changeProtection('YourCustomPermissionName', 'CustomPermission', 'Unprotected');`
- `System.FeatureManagement.changeProtection('YourCustomObjectName__c', 'CustomObject', 'Unprotected');`

SEE ALSO:

Apex Developer Guide: FeatureManagement Class

Best Practices for Feature Management

Here are some best practices when working with feature parameters.

- We recommend that you use this feature set in a test package and a test LMO before using it with your production package. Apply changes to your production package only after fully understanding the product's behavior.
- Limit the number of feature parameters in your package. Each package can include up to 25 feature parameters. To request more than 25 feature parameters, log a case in Salesforce Partner Community.
- Create LMO-to-subscriber feature parameters to enable features from your LMO for individual subscriber orgs. Don't use the Apex code in your managed package to modify LMO-to-subscriber feature parameters' values in subscriber orgs. You can't send the modified values back to your LMO, and your records will be out of sync.

  Use LMO-to-subscriber feature parameters as read-only fields to manage app behavior. For example, use LMO-to-subscriber feature parameters to track the maximum number of permitted e-signatures or to make enhanced reporting available.
- Create subscriber-to-LMO feature parameters to manage activation metrics. Set these feature parameters' values in subscriber orgs using the Apex code in your managed package. For example, use subscriber-to-LMO feature parameters to track the number of e-signatures consumed or to check whether a customer has activated enhanced reporting.

Considerations for Feature Management

Keep these considerations in mind when working with feature parameters.

- After a feature parameter is included in a promoted and released package version, we recommend that you only edit the value field located in LMO-to-subscriber junction objects.

  Modifying or deleting other fields or records related to feature parameters, including the data flow direction, may cause the FMA to stop operating correctly.
- Don't use the LMO to create or delete feature parameters.
- When you update LMO-to-subscriber values in your LMO, the values in your subscribers' orgs are updated asynchronously. This process can take several minutes.

- When you publish a push upgrade to your managed package, feature parameters in your LMO and your subscribers' orgs are updated asynchronously. Creating and updating the junction object records can take several minutes.
- When the Apex code in your package updates subscriber-to-LMO values in your subscriber's org, the changes can take up to 24 hours to reach your LMO.

CHAPTER 14 Provide a Free Trial of Your Solution

In this chapter ...

- Why Use Trialforce?
- Trialforce
- Set Up Trialforce
- Provide a Free Trial on the AppExchange
- Provide Free Trials on Your Website
- Update Your Trial
- Trialforce Best Practices
- Trialforce FAQ

Maximize customer adoption by offering free trials of your solution on AppExchange. Explore the types of trials available and determine the best type for your solution.

Note: This feature is available to eligible partners. For more information on the Partner Program, including eligibility requirements, visit https://partners.salesforce.com.

Why Use Trialforce?

Trialforce lets you provision a free trial of your offering quickly and easily. Each time a trial is provisioned, Trialforce creates a lead in the License Management App, which helps you track usage and convert prospects into paying customers. With Trialforce, you can:

- Run your own marketing campaign to maximize customer reach and adoption.
- Customize your offering, including branding, functionality, design, data, and trial experience.
- Manage trials for multiple offerings, versions, and editions from one convenient place.
- Let customers, including non-admin users, try your app or component without logging in to their production environment.

Trialforce

A Trialforce setup has several parts: the Trialforce management org, Trialforce source orgs, and Trialforce templates. Before you set up Trialforce, learn how these parts work together to deliver a trial of your AppExchange solution.

Trialforce Management Organization (TMO)

The TMO is the starting point for setting up Trialforce, and it's the central location for managing Trialforce after setup. To request a TMO, log a support case in the Salesforce Partner Community. For product, specify **Partner Programs & Benefits**. For topic, specify **ISV Technology Request**. You can perform two tasks in the TMO.

- Create Trialforce source orgs.
- Define templates for custom branding.

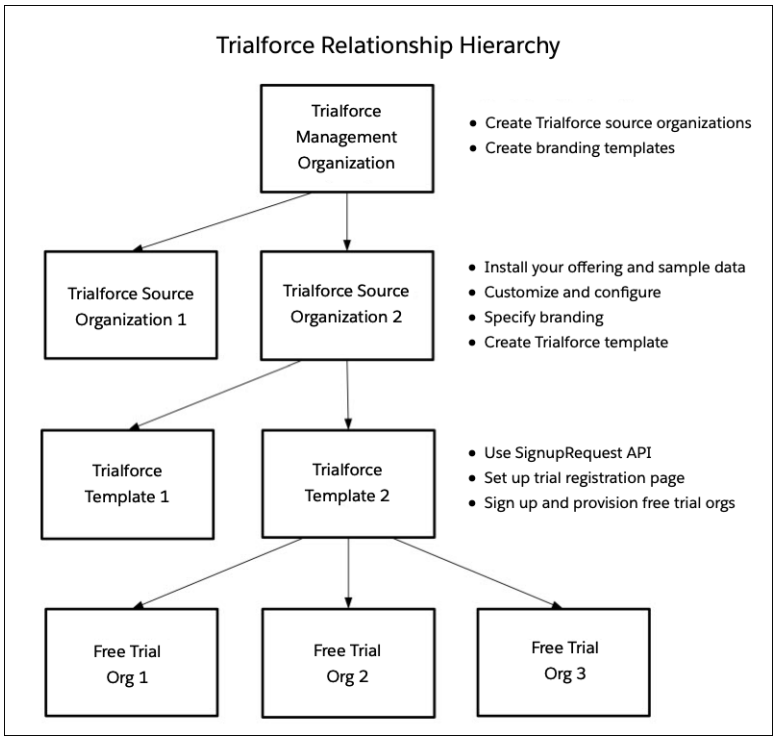
Trialforce Source Organization (TSO)

You use the TSO to create a template for the trial orgs received by your customers. You create the TSO from your TMO. You can perform these tasks in a TSO.

- Install your offering, along with any sample data.
- Configure the TSO to be exactly as you want your customers to experience it.
- Specify branding by selecting from the templates that you created in the TMO.
- Create a Trialforce template, which becomes the basis for all trial orgs.

Trialforce Template

The template is a snapshot or exact copy of your TSO at a specific time. You create it from a TSO after you install your offering and make configuration changes. You specify a Trialforce template when you generate a trial org using the SignupRequest API and when you create a demo org from the Environment Hub. The template defines the trial org that's provisioned each time that a customer signs up for a trial of your offering.



The TMO, TSOs, and Trialforce templates have a hierarchical relationship.

- You can create multiple TSOs from a TMO. For example, to offer trials for two different apps, you generate two TSOs from the same TMO, one for each app. You can use the TMO as a central hub to manage the trials for all the Lightning Platform apps or components that your company produces.
- You can create multiple Trialforce templates from the same TSO. For example, you release a new version of your component after you start using Trialforce. You can install the updated version into the previous TSO and generate a new Trialforce template from it. To request a trial for the new version, use the SignupRequest API with the new Trialforce template ID. All trial orgs created using the new template ID have the new version of the package.

We recommend that you have one unique TMO for your company, one TSO for each offering, and one Trialforce template for each version or edition of your offering. Splitting up the configuration process across these levels makes it easier to maintain and update your trials. Each time you change something, such as the version, its branding, or a configuration detail of the trial org, you must change only one level in the hierarchy. Minimizing the configuration steps makes it easier to concurrently manage trials for multiple offerings, versions, and editions.

After you configure a TMO, TSO, and Trialforce template, choose how to provide trials to prospective customers.

- **Use AppExchange**—Customers begin a trial of your offering directly from an AppExchange listing. This approach is the quickest, easiest way to make a trial available because it requires only a few steps to configure.
- **Use the API**—You provision a trial of your offering programmatically using the SignupRequest API. This approach is ideal if you want full control of the sign-up process because it allows for advanced customization.

Set Up Trialforce

After you've built your offering and passed the AppExchange security review, follow these steps to set up Trialforce.

Note: To enable Trialforce, you must first sign the ISVforce/OEM agreement.

1. Create your managed package.
2. Configure a License Management Organization (LMO) to manage customers' access to apps and components. If you're an existing Salesforce user, install the License Management Application (LMA) in your CRM organization (Enterprise Edition is required). If you're new to the Partner Program, the LMA is preinstalled in your partner business org.
3. Link a version with the LMO and set the license defaults. This step ensures that each time a prospect creates a trial, the LMO receives a new lead and license record.
4. Request a Trialforce Management Organization (TMO).
5. Optionally, create a customized branded login page and branded emails in your TMO.
6. Create a Trialforce Source Organization (TSO) from your TMO.
7. Install your managed package in the TSO, and customize it as you want your prospects to experience it. You can apply custom branding, load sample data, create custom profiles, and so on.
8. Create a new Trialforce template from the TSO.
9. Link the Trialforce template to the AppExchange.
10. Submit the Trialforce template for security review and get it approved.

You can now use this template to create free trials. For more information, see:

- Providing a free trial on AppExchange
- Providing a free trial on your website
- Providing a free trial using the API

EDITIONS

Available in: Salesforce Classic

Available in: **Developer** Edition

USER PERMISSIONS

To manage Trialforce:
- Modify All Data

Link a Package with Your License Management Organization

To receive lead and license records from customer installs, link a managed package to your License Management Organization (LMO), the organization where the License Management App (LMA) is installed. You also specify default license settings for your offering during this process. Default license values are used to set the Status, Expiration Date, and Seats fields on the license record in the LMA and in the installer's organization.

Note: When you link a package with an LMO, that package's leads and licenses must be permanently managed out of the LMO. You can't migrate licenses to another organization.

1. Log in to the Partner Community.
2. On the Publishing page, click the **Packages** tab.
3. Find the package that you want to link, and click **Manage Licenses**.
4. Click **Register**.
5. Enter the login credentials for your LMO, and click **Submit**.
6. Select whether your default license is a free trial or active.
7. Enter the license length in number of days. If your license is free or doesn't expire, select **License does not expire**.

8. Enter the number of seats associated with your default license, or select **License is site-wide** to offer the license to all users in the installer's organization.
9. Click **Save**.

To verify that you linked the package successfully, log in to the LMO and click the **Package Versions** tab. After you link a package to your LMO, all versions of that package are associated.

Request a Trialforce Management Org

A Trialforce Management Org (TMO) lets you create and manage Trialforce Source Orgs (TSO) and specify custom branding for your login page and emails. To receive a TMO, you must be a qualified ISV partner, and your offering must have passed the AppExchange security review.

Note: The TMO is separate from your Partner Business Org and the Developer Edition org where you built your offering.

1. Log in to the Salesforce Partner Community.
2. Click the question icon and then click **Log a Case for Help**.
3. Select **Salesforce Partner Program Support**.

   Tip: If you don't see the Salesforce Partner Program Support tile, use the org picker to select the org that's associated with your Salesforce partnership account.
4. For product, enter and select **Partner Programs & Benefits**.
5. For topic, enter and select **ISV Technology Request**.
6. Provide any other required details, and then click **Create Case**.

EDITIONS

Available in: Salesforce Classic

Available in: **Developer** Edition

USER PERMISSIONS

To manage Trialforce:
- Customize Application

Setting Up Custom Branding for Trialforce

App developers using Trialforce to create trials of their product can optionally set up a branded login site and system emails. By branding these areas with your company's look and feel, users of your application are immersed in your brand from sign-up to log in. Use custom branding for non-CRM apps, not for apps that extend Salesforce CRM and require Salesforce standard objects, such as Leads, Opportunities, and Cases.

A branded login page enables you to specify your login domain and login site.

- A login domain ends with `.cloudforce.com`, so if your company name is "mycompany," your login domain is `mycompany.cloudforce.com`.
- Your custom login site includes your text and company logo and mobile-friendly versions of your login site.

Branded emails allow you to specify fields in system-generated emails so that your company name, address, and other pertinent details are used in email correspondence. You can create multiple branded email sets for different campaigns or customer segments.

EDITIONS

Available in: Salesforce Classic

Available in: **Developer** Edition

USER PERMISSIONS

To manage Trialforce:
- Customize Application

Note: To configure branding, you must be logged in to a Trialforce Management Organization (TMO). To get your TMO, log a support case in the Salesforce Partner Community. For product, specify **Partner Programs & Benefits**. For topic, specify **ISV Technology Request**. Branding isn't available for Trialforce Source Orgs created in the Environment Hub.

Creating Branded Emails

You can customize the branding of the emails sent to subscribers of new trial organizations.

To create a branded email set:

1. Log in to your Trialforce Management Organization.
2. From Setup, enter *Branding* in the Quick Find box, select **Branding**, then click **Email Sets**.
3. Click **New Email Set** or **Edit** next to an existing email set.
4. Enter a name for the email set and your company information.
5. In the Preview Emails area, click through the different types of generated emails and make sure they read correctly.

   Note: The login URL displayed in the preview will always be https://login.salesforce.com even if you use a branded login page. These two processes are distinct.

6. Click **Save**.
7. If you're ready to make these emails available to your Trialforce Source Organization (TSO), click **Publish**. Otherwise your changes are saved and you can publish later.

EDITIONS

Available in: Salesforce Classic

Available in: **Developer** Edition

USER PERMISSIONS

To manage Trialforce:
- Customize Application

To assign a branded email set to your TSO:

1. From Setup, enter *Source Organizations* in the Quick Find box, then select **Source Organizations**.
2. Click **Edit** next to your TSO.
3. Select the email set.
4. Click **Save**.
5. Click **Login** if you want to see your branded login page in action.

Creating a Branded Login Page

Customers typically log in to your app using the traditional login.salesforce.com site. A branded login page enables you to customize this domain and parts of this login page so you can provide a branded experience for your customers. Your custom login site includes your text and company logo, and mobile-friendly versions of your login site as well.

To create a branded login page:

1. Log in to your Trialforce Management Organization.
2. From Setup, enter *Login Site* in the Quick Find box, then select **Login Site**.
3. Click **Set Up Login Site**.
4. Select a subdomain for your login site by providing a name in the field provided. Usually this is the name of your company.

   Note: A login domain ends with .cloudforce.com, so if your company name is "mycompany," your login domain is mycompany.cloudforce.com.

5. Check the availability of the domain and then accept the terms of use.
6. Click **Save and Launch Editor**.
7. Use the Login Brand Editor to change how your login page looks. For additional help using the editor, click **Help for this Page**.

EDITIONS

Available in: Salesforce Classic

Available in: **Developer** Edition

USER PERMISSIONS

To manage Trialforce:
- Customize Application

8. Click **Save and Close**.
9. If you're ready to make these changes available to your TSO, click **Publish**. Otherwise your changes are saved and you can publish later.

Create a Trialforce Source Organization

A Trialforce Source Organization (TSO) acts as the basis for a new trial org. After you create a TSO, you install your package there. You then add data to give your prospects something to explore when they first log in to the trial org.

You have two options for creating a TSO: You can use a Trialforce Management Organization (TMO) or the Environment Hub. If you plan to brand your emails or login page, use a TMO. When you create the TSO in a TMO, you also get a company-specific My Domain name. Here's how to create a TSO (Enterprise Edition) from a TMO.

Note: If you create a TSO from a TMO, it's always an Enterprise Edition. To create a Professional Edition TSO, create the TSO from the Environment Hub.

EDITIONS

Available in: Salesforce Classic

Available in: **Developer** Edition

USER PERMISSIONS

To manage Trialforce:
- Customize Application

1. Log in to your TMO.
2. From Setup, in the Quick Find box, enter `Source Organizations`, and then select **Source Organizations**.
3. Click **New**.
4. Enter a new username and email address for the administrator account.
5. Enter a name for the TSO. Optionally, specify the custom branding by choosing a branded email set or login site.
6. Click **Create**.

You can also create a TSO from the Environment Hub. When you use the Environment Hub, you can create an Enterprise Edition TSO or a Professional Edition TSO.

1. Log in to the Environment Hub.
2. Click **Create Org**.
3. Keep the default, **Purpose as Trialforce**.
4. Keep the default for Create Using, **Standard Edition**.
5. Select **Professional TSO** or **Enterprise TSO**.
6. Enter the org name.
7. (Optional) Enter a unique name for your My Domain.
8. Enter a username and email address for the admin account.
9. Enter a name for the TSO.
10. Acknowledge that you've read the Main Services Agreement.
11. Click **Create**.

The TSO now appears in the Environment Hub.

You receive an email with the login details for your TSO. You can then log in to the TSO and install your package, along with sample data and configurations. Optionally, you can also create:

- Custom profiles
- New users

- Sample records

The goal is to configure the TSO exactly as you want your customers to experience it. You can then create a Trialforce template, which is a snapshot of your TSO at a specific point in time.

Note: Here are some considerations when working with a TSO.

- Always associate a managed package with the License Management Organization (LMO) before installing the offering in your TSO. If you don't follow that order, trial orgs provisioned from the TSO don't generate leads or licenses in the LMO.
- Before creating a Trialforce template, ensure that the TSO admin has a license for the offering installed in the TSO.
- You can create multiple TSOs from your TMO, so you can set up trials for different products, each with its own configuration and branding.
- All TSOs expire after one year. If you want to use the TSO for a longer period, log a support case in the Salesforce Partner Community to request an extension. For product, specify **Partner Programs & Benefits**. For topic, specify **ISV Technology Request**.

SEE ALSO:

How do I configure who can use Lightning Experience in my trial org?

Create a Trialforce Template

Create a Trialforce Template

A Trialforce template is a snapshot of your Trialforce Source Organization (TSO) at a given instance in time. For security reasons, however, Personally Identifiable Information (PII) on the User Object, such as that in the address fields, is scrubbed from templates. PII in custom objects and fields is not modified. Before you create the template, make sure that you've installed your package into the TSO. Then, configure it exactly as you want your customers to experience it, with the appropriate sample data, profiles, users, and records.

Note: You can create a template only if your TSO is less than or equal to 1 GB.

1. Log in to your TSO.
2. From Setup, enter *Trialforce* in the Quick Find box, then select **Trialforce**.
3. Click **New Trialforce Template**.
4. Describe the template and any optional features.

   By default, templates are public. To create a private template, select **Mark this template as private so that only authorized orgs can sign up**. You can then indicate which orgs are authorized to sign up new orgs using this template.

   If the template isn't private, the default options are fine for most cases.
5. Click **Save**.
6. (Optional) If you created a private template, enter the org ID of the orgs that can sign up using this template, then click **Save**.

   You can enter up to 51 org IDs, each on a separate line.

You receive an email with the ID of the new template after it's generated. Submit the template for review before you can use it to sign up trial organizations. Remember to generate a new template each time you make updates to your TSO so that your trials always reflect the most recent state.

EDITIONS

Available in: Salesforce Classic (not available in all orgs) and Lightning Experience

Available in: **Developer**, **Professional**, and **Enterprise** Edition

USER PERMISSIONS

To manage Trialforce:
- Modify All Data

Each template has a status with one of the following values.

In Progress
When a template is first created, it always has this status. It then moves to either Success or Error status.

Success
The template can be used to create trial organizations.

Error
The template cannot be used because something has gone wrong and debugging is required.

Deleted
The template is no longer available for use. Deleted templates are removed during system updates.

Link a Trialforce Template to the AppExchange

To offer a free trial with your app or component listing, link a Trialforce template to the AppExchange.

1. Log in to the Partner Community.
2. On the Publishing page, click the **Organizations** tab.
3. Click **Connect Organization**.
4. Enter the login credentials for the organization that contains the trial template. If you developed multiple trial templates in this organization, they are all linked to the AppExchange.
5. Click **Submit**.
6. Optionally, click the **Trial Templates** tab to view the linked template and create a listing.

Submit a Trialforce Template for Security Review

To offer a trial on the AppExchange using Trialforce, your template must pass a security review. Before requesting a review, link the organization containing your Trialforce template to the AppExchange.

Note: You can only request a review on a Trialforce template that has at least one package installed. You must own or license the installed packages in the template and it should have already passed the security review.

1. Log in to the Partner Community.
2. On the Publishing page, click the **Trial Templates** tab.
3. Next to the template that you want reviewed, click **Start Review**.

You receive an email confirmation after you initiate the review and another email when the review is completed. The review is free for partners and typically takes 2–3 days.

Provide a Free Trial on the AppExchange

To create trials on the AppExchange, your app or component must:

- Be a managed package
- Be managed via the License Management Application
- Autoprovision—that is, the user must not need to interact with you at any point to get the app or component up and running
- Have passed the security review
- Have passed the Trialforce template review

You can provide a free trial on the AppExchange in three ways.

- Using Trialforce
- By configuring a test drive
- By installing your app or component into an existing organization

Provide a Free Trial on the AppExchange Using Trialforce

Providing a free trial lets potential customers experience your offering before purchasing or subscribing.

Note: You must be an eligible partner to provide free trials. For more information on the Partner Program, including eligibility requirements, visit www.salesforce.com/partners.

1. Create a Trialforce template with your offering installed and configured as you want your prospects to experience it. For details, see Setting up Trialforce.
2. Submit the Trialforce template for security review. This review is free and takes less time than the initial review of your app or component.
3. Link the Trialforce template to your AppExchange listing.
   a. Log in to the Partner Community.
   b. On the Publishing page, click the **Listings** tab.
   c. Find the listing where you want to offer a trial, and click it to open the AppExchange publishing console.
   d. Click the **Trials** tab, and select **Offer a free trial organization**.
   e. Follow the on-screen prompts to add a trial template to the listing.
4. Click **Save**.

Now, when customers visit your listing, they can start a free trial with your offering preinstalled, even if they don't have a Salesforce account. If they decide to start a trial, we collect their contact information and ask them to agree to your terms and conditions and our MSA. After they provide this information, prospects receive an email prompting them to log in to a trial organization.

Note: When a new org is created from a Trialforce template, any packages that are present in the template, are installed in the newly created org. However, the package license settings such as license count, and expiration date are based on the license defaults set by the package owner in AppExchange. Any changes made to the package license in the Trialforce template aren't copied over when the new org is created.

Offer a Test Drive on AppExchange

A test drive lets customers try your product in a Developer Edition org that's preconfigured with sample data. The test drive org has two types of users: an admin and a read-only evaluator. The admin user configures the org for the test drive. The evaluation role lets customers log in to the org and experience your product.

Use the Publishing Console to create test drive orgs. Otherwise, customers can experience issues when logging in as evaluators.

Note: Salesforce doesn't support test drive orgs created outside of the Publishing Console. However, if you create a test drive using another method and your customers experience login issues, try setting profile-level IP login ranges from `0.0.0.0` to `255.255.255.255`. For more information, see Restrict Login IP Ranges in the Enhanced Profile User Interface.

1. Log in to the Salesforce Partner Community.
2. Click **Publishing**.
3. Click **Listings** and then select the product for which you want to offer a test drive.

4. On the Trials tab, select **Offer a Test Drive**.
5. Click **Create Test Drive**.
6. Give the test drive a customer-friendly name, and associate a package.
7. Click **Submit**. Salesforce creates an org and emails you login credentials for the admin and evaluation users.
8. Log in to the test drive org as the admin user and add sample data.
9. Log out of the org and then log in again as the evaluation user to set a password.
10. In the Publishing Console, go to the Trials tab and click **Connect Organization**.
11. Enter the login credentials for the evaluation user and then click **Submit**.

    To ensure the test drive user is granted read-only access, enter credentials for the *evaluation* user. Don't enter admin credentials as this gives the user read-write access.
12. Click **Save**.

Provide a Free Trial on the AppExchange When Your Offering Is Installed

You can provide a free trial of your offering by setting the default license settings on your package. When a customer installs the app or component in an existing Salesforce organization, they can use it for the specified trial period.

Provide Free Trials on Your Website

Use HTML forms to drive traffic to your business and show off your solutions to prospective customers. After a prospect submits your form, Salesforce provisions a trial based on your Trialforce template.

To provide a free trial on your website, first set up Trialforce. Then, complete the following tasks and you're ready to go live.

Enable the SignupRequest API
Log a support case in the Salesforce Partner Community to enable the SignupRequest API in your org.

Choose a Sign-Up Form Hosting Option
The sign-up form serves as the registration page that prospective customers use to sign up for trials. Review and choose a hosting option for your sign-up form.

Create Sign-Ups Using the API
Use API calls to the SignupRequest object to create sign-ups for prospective customers.

Creating Proxy Signups for OAuth and API Access

Provision Trial Orgs
Use Trialforce to provision a free trial of your solution for prospective customers.

Enable the SignupRequest API

Log a support case in the Salesforce Partner Community to enable the SignupRequest API in your org.

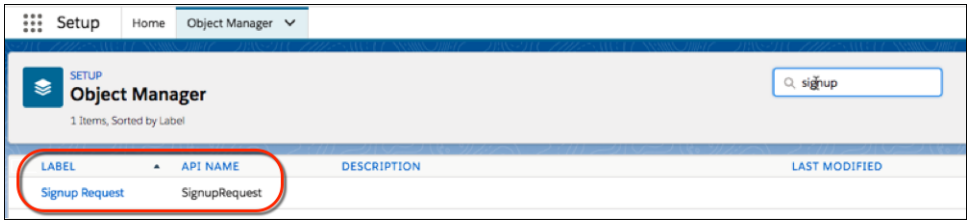
Tip: Enable the SignupRequest API in your business org. Then you can easily integrate sign-up data with your existing business processes. For example, create a workflow rule to convert sign-up requests into leads and run reports to track the number of sign-ups in a given period.

1. Check to see if the SignupRequest API is enabled in your business org.

a. Log in to your business org.

b. From Setup, in the Quick Find box, enter `Object Manager`, and then select **Object Manager**.

c. Verify that the Signup Request object appears. If you don't see this object, log a case to enable the SignupRequest API.



2. To enable SignupRequest API, log a support case.

a. Log in to the Salesforce Partner Community.

b. Click the question icon and then click **Log a Case for Help**.

c. Select **Salesforce Partner Program Support**.

Tip: If you don't see the Salesforce Partner Program Support tile, use the org picker to select the org that's associated with your Salesforce partnership account.

d. For product, enter and select **Partner Programs & Benefits**.

e. For topic, enter and select **ISV Technology Request**.

f. Provide any other required details, and then click **Create Case**.

Choose a Sign-Up Form Hosting Option

The sign-up form serves as the registration page that prospective customers use to sign up for trials. Review and choose a hosting option for your sign-up form.

The SignupRequest API supports several HTML form hosting options. Choose one of the following:

- Node.js and React app hosted on Heroku
- Lightning component hosted on Experience Cloud site
- Visualforce page hosted on Sites
- Web-to-Lead form with Process Builder

Make Unauthenticated Calls to the SignupRequest API

By default, the SignupRequest API is available only to authenticated calls. If you have a use case that requires unauthenticated calls, for example, making your sign-up form available to unauthenticated users, follow the pattern in the code sample.

```
public with sharing class newTrialSignupController {
@auraEnabled
public static void getNewLead(Lead newLead, String templateId, String username, Boolean
createLead, String domain) { }
// SignupCreation is an inner class without sharing. It runs in the system context
// and is used to handle SignupRequest calls for unauthenticated users.
public without sharing class SignupCreation {
```

```
public void createNewTrial(Lead newLead, String templateId, String username, String domain)
  {
}}}
```

Create Sign-Ups Using the API

Use API calls to the SignupRequest object to create sign-ups for prospective customers.

Using API calls to the SignupRequest object, you can collect and analyze detailed information on all sign-ups from your business organization. You have control over the sign-up process and enhanced visibility into your prospective customers. For example, you can:

- Run reports and collect metrics, such as the number of sign-ups per day or the number of sign-ups in different countries.
- Customize the SignupRequest object to add fields of special interest to your company.
- Create triggers to initiate specific actions, such as send an email notification when a new sign-up request is made.
- Enable sign-ups from a wide range of client applications and devices, so you have more channels for customer acquisition.

USER PERMISSIONS

To create or view sign-up requests:
- SignupRequest API

For more information on working with objects, see the Object Reference for Salesforce and Lightning Platform.

SEE ALSO:

Provide Free Trials on Your Website
SignupRequest API
Make it Easy for Your Customers to Provision Trials Part 1
Make it Easy for Your Customers to Provision Trials Part 2
Web Form Replacement Code in Nodejs and React
Demo App to Create Trial Orgs Using the SignupRequest API

Creating Proxy Signups for OAuth and API Access

Using the SignupRequest object, you can programmatically create an org without any system-generated emails being sent to the user. You can then obtain an OAuth access token to log in to the org and make API requests from it, without any action by the user. This proxy signup lets you create and operate the org on the user's behalf, without their knowledge that you're using Salesforce behind the scenes.

USER PERMISSIONS

To create or view signup requests:
- Signup Request API

In the traditional signup process, when you create an org, the user receives a system-generated email containing the login URL and initial password. The user then has to log in and explicitly grant you API access to make calls into the org on their behalf. With proxy signup, you get API access without those traditional steps.

The ability to create and manage orgs by proxy expands your options for integrating Salesforce with external applications on other platforms. It enables you to incorporate any feature of the Lightning Platform into your own application, without exposing the Salesforce user interface (UI). All Salesforce features can be decoupled from the UI and are available to integrate into any other application runtime or UI in a seamless and invisible way.

For example, suppose that an ISV has a web application, built on the .NET platform, that helps companies manage travel expense reporting and reimbursement for employees. Let's say the ISV wants to integrate Chatter into its application, so all employees of a company can share feedback and tips about their travel experiences. The ISV can use the appropriate Salesforce APIs to implement the following solution.

1. Use proxy signup to create a Salesforce org for each of its customers.

2. Create users in each customer org for all employees of that company.
3. Set up and maintain a Chatter group for sharing travel information.
4. Monitor each user's Chatter feed and extract information from individual posts.
5. Insert the information into its application, and display it in the existing UI.

The ISV can provide its customers access to Chatter functionality, without having to develop it from scratch. The ISV's customers experience Chatter as a natural extension of the existing application, in an interface they're familiar with. They don't have to know about or log in to Salesforce. The same approach can be extended to any other feature of Salesforce, including standard and custom objects, Apex, and Visualforce. Proxy signup gives ISVs the ability to consume Salesforce as a service, integrating its features into applications on any platform, without exposing the Salesforce UI. The potential applications are limited only by the ISV's imagination.

Here are the steps for creating a proxy signup.

1. Log in to a Developer Edition org (which has the Connected Apps user permission enabled by default).
2. Create a connected app.
   - In Salesforce Classic, from **Setup**, enter *Apps* in the Quick Find box. Under Build. select**Apps**. Under Connected Apps, click **New**.
   - In Lightning Experience, from **Setup**, enter *App Manager* in the Quick Find box, then click **New Connected App**.
3. Enter values for the required fields. Specify an X.509 certificate and grant full and refresh token access for the OAuth scopes in the "Selected OAuth Scopes" selector. The callback URL is required but can initially be set to any valid URL as it's not used. Click **Save** when you're done.
4. Record the value of Consumer Key on the same page. Also, click **Click to reveal** and record the value of Consumer Secret.
5. Package the Connected App by adding it as a component to a new package. Record the Installation URL value for the package.
6. Log in to your Trialforce Management org and create a Trialforce Source org from it.
7. Log in to your Trialforce Source org and install the package containing the Connected App, using the installation URL from step 5.
8. After the Connected App is installed in the Trialforce Source org, you can customize it from Setup by entering *Manage Applications* in the Quick Find box, then selecting **Manage Applications**. You can see the Connected App and can edit its attributes. Specify the appropriate profiles and permission sets. Choose the option **Admin approved users are pre-authorized** in the OAuth policies section to ensure you can authenticate into the org on behalf of users with these criteria.
9. Once you've configured the Trialforce Source org to your requirements, create a Trialforce template from it. Select the **All Setup and Data** radio button when creating the Trialforce template.
10. File a case in the Partner Community to get approval for creating signups using the template.
11. Once the template is approved, you can sign up a new org using the SignupRequest object. Specify the OAuth values necessary to connect to the org, that is: Consumer Key and Callback URL.

```
POST https://mycompany-tmo.salesforce.com/services/data/v27.0/sobjects/SignupRequest/
Authorization Bearer
  00Dxx0000001gR6!ARoAQAS3Uc6brlY8q8TWrrI_u1THuUGmSAp
    XrksSniyjom9kXfDac4UP.m9FApjTw9ukJfKqWuD8pA9meeLaltRmNFvPqUn7
Content-Type application/json Body:
{    "TemplateId":"0TT000000000001",
     "SignupEmail":"john.smith@mycompany.com",
     "Username":"gm@trial1212.org",
     "Country":"US",
     "Company":"salesforce.com",
     "LastName":"Smith",
     "ConnectedAppConsumerKey":
```

```
 "3MVG9AOp4kbriZOLfSVjG2Pxa3cJ_nOkwhxL1J1AuV22u8bm82FtDtWFVV__
    Vs6mvqoVbAnwsChp9YT4bfrYu",
"ConnectedAppCallbackUrl":
  "https%3A%2F%2Fwww.mysite.com%2Fcode_callback.jsp" }
```

When the ConnectedAppConsumerKey and ConnectedAppCallbackUrl fields are specified in the SignupRequest object, a proxy signup flow is triggered to automatically approve an existing Connected App for use in this org. In that flow, no signup-related emails are sent to the user. With knowledge of the admin username, consumer key and consumer secret, you now have all the information required to:

- make API requests to the org as an admin user of that org.
- request an updated access token at any time in the future.

Provision Trial Orgs

Use Trialforce to provision a free trial of your solution for prospective customers.

Once you've configured Trialforce, you can provision trial orgs two ways.

- Push—You provision a trial on behalf of a prospective customer by filling out the registration form with your prospect's information.
- Pull—A prospect requests a trial on their own by filling out a registration form on your public website.

1. Upload the HTML registration form to your public web servers.
2. Edit and publish the appropriate HTML pages on your company website where you want to include a link to the Trialforce registration form.
3. Navigate to the registration page from your company website.
4. Fill in the required fields and submit the form.

Anyone with access to the form can create a trial on behalf of a prospect without the need to expose the form on the company website. Just launch the registration form HTML file in a browser, fill in the fields on behalf of the customer, and submit the form. Your prospect receives an email, optionally branded with your company information, indicating the new trial is available.

Update Your Trial

If you update your offering or change custom branding, update your trials to reflect the changes.

To update a trial, you must first:

- Create and publish a new version of your managed package or an extension package.
- Have a Trialforce Source Organization (TSO) where you can upload the new package version. You can reuse the TSO that you used to create your original Trialforce template or use a new one. If you use a new TSO, be sure to link it to AppExchange.

Then complete these steps.

1. Install your updated managed package or extension package into your TSO.
2. Make any other desired changes in the TSO, such as loading sample data or changing custom branding.
3. Create a Trialforce template for your trial.
4. Submit the template for review.
5. Get the template approved for SignupRequest API use.
   a. Log in to the Salesforce Partner Community.
   b. Click the question icon and then click **Log a Case for Help**.

c. Select **Salesforce Partner Program Support**.

Tip: If you don't see the Salesforce Partner Program Support tile, use the org picker to select the org that's associated with your Salesforce partnership account.

d. For product, enter and select **Partner Programs & Benefits**.

e. For topic, enter and select **ISV Technology Request**.

f. Provide the TSO ID, the new Trialforce template ID, and the org to use for creating sign-ups.

g. Provide any other required details, and then click **Create Case**.

Trialforce Best Practices

Here are some guidelines for using Trialforce.

- Create several Trialforce Source Organizations (TSOs) for customized trial experiences, for example, one for each managed package, industry vertical solution, country.
- Load sample data into the TSO.
- Apply custom branding to your trial signup form, log-in page, and emails.
- Update your Trialforce template each time you release a new version of your app.
- Once you've set up Trialforce, go through the signup flow to confirm that everything is working as you expect it to. This testing can help you identify areas to where you can improve the signup process.

Although Trialforce was primarily designed for enabling free trials, it's also useful in other contexts. For example, you can use it to:

- Create trial organizations for sales demos.
- Create test organizations with sample data for internal QA.

Trialforce FAQ

This section contains a list of frequently asked questions about Trialforce.

- How do I upgrade my trial with a new version of my offering?
- Can I distribute my app or component using both Trialforce and the AppExchange?
- How are trials different from Trialforce?
- Is it possible to install another app in a trial organization?
- How do I configure who can use Lightning Experience in my trial org?

How do I upgrade my trial with a new version of my offering?

Install the new version of the package into your Trialforce source organization. After upgrading, create a new Trialforce template and use the template as the basis for your trial.

Can I distribute my app or component using both Trialforce and the AppExchange?

Of course! The most effective way to distribute your offering is by using Trialforce and the AppExchange together. You can even advertise your Trialforce page on your AppExchange listing and vice versa. Generally, the AppExchange is best for engaging existing Salesforce customers, while Trialforce works great with new customers.

How are trials different from Trialforce?

Trials are administered from the AppExchange whereas Trialforce is administered from your own website.

Is it possible to install another app in a trial organization?

Yes. Trial orgs are a fully functioning Salesforce organization. Your customer will have your app installed and can later install other apps into the same organization as they see fit. It's just like any other free trial of Salesforce.

How do I configure who can use Lightning Experience in my trial org?

The future of the Salesforce user experience and Salesforce platform is Lightning Experience. With Lightning Experience, you can move faster, do more, and be more productive. Going forward, all our new features and innovations will be in Lightning Experience.

You can remove the ability for users with a specific profile to switch back to Salesforce Classic.

1. From Setup, enter *Profiles* in the Quick Find box, then select **Profiles**.
2. Select the profile you want to keep using Lightning Experience.
3. On the profile detail page, click **Edit**.
4. Deselect the **Hide Option to Switch to Salesforce Classic** permission.

By default, new orgs are configured to switch Salesforce Classic users to Lightning Experience once a week. Only users with the Lightning Experience User permission are affected. You can configure or disable automatically switching users to Lightning Experience.

1. From Setup, enter *Lightning* in the Quick Find box, then select **Lightning Experience**.
2. On the Set Up Users tab in the Migration Assistant, turn off **Encourage Users to Stay in Lightning Experience**, or specify how often users are switched to Lightning Experience.

You can disable Lightning Experience for some profiles.

1. From Setup, enter *Profiles* in the Quick Find box, then select **Profiles**.
2. Select the profile you want to change.
3. On the profile detail page, click **Edit**.
4. Deselect the **Lightning Experience User** permission.

You can disable Lightning Experience in a new Trialforce Source org so that new users default to Salesforce Classic.

1. From Setup, enter *Lightning* in the Quick Find box, then select **Lightning Experience**.
2. On the Turn It On tab in the Migration Assistant, click the button to switch it to **Disabled**.

CHAPTER 15 Support Your AppExchange Customers

In this chapter ...

- Usage Metrics

After you publish a solution on AppExchange, you're responsible for the end user support. Even when you've built the best solution the world has ever seen, customers need your help from time to time. Learn about the tools that you can use to attend to your customers' needs, grow your business, and affirm your reputation on AppExchange.

Note: When customers contact Salesforce Customer Support with questions about your solution, we direct them to your AppExchange listing. Make sure the contact information on your listing is accurate and complete.

Usage Metrics

Note: Usage Metrics is now unavailable. For more information, see Usage Metrics Retirement. Enable AppExchange App Analytics in your security-reviewed managed packages to retrieve usage data about how subscribers interact with your AppExchange solutions. You can use these details to identify attrition risks, inform feature development decisions, and improve user experience. To enable App Analytics, follow the instructions in Request AppExchange App Analytics.

EDITIONS

Available in: **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

You can collect detailed usage metrics from each organization that your managed package is installed in. By analyzing this information, you can gain valuable insights into the use and performance of your app across your customer base. For example, you can identify:

- The features most and least used — helps you prioritize your development efforts when planning the next version of your app.
- The customers using your app most intensively — your most valuable customers.
- The customers whose usage of your app is minimal or declining — the customers most at risk of attrition.

You can collect these daily metrics on two types of components in a managed package.

- **Custom objects** — the total records per organization in each custom object. You can track usage increase for that custom object in any subscriber organization, which is a reliable indicator of how much it's used.
- **Visualforce pages** — the number of times per organization each Visualforce page was accessed, the number of unique users who accessed it, and the average loading time (in milliseconds). By comparing the metrics for different Visualforce pages, you can determine the relative popularity of different parts of your app in a specific customer organization and trends across all customers.

The custom objects data is a snapshot that reflects the state of the organization at the time the database was sampled, while the Visualforce data covers usage over a 24-hour period.

The usage metrics data for all production organizations in a given instance is merged and written into a text file, in a specified format, one time each day. Currently, no data is collected on packages installed in sandbox organizations or on managed beta packages.

This feature is intended for API access only. Write a custom process to collect the metrics data from the reporting organization, and export it to a system of your choice for analysis. You get maximum flexibility to monitor and analyze the usage trends most relevant for your app.

Your customers' consent isn't required for usage data to be collected, and there's no way for them to opt out. You receive complete data for your customer base. Excluding some users can skew the results, making the data less useful.

Note: If any of your customers have concerns about privacy, reassure them any data collected is limited to usage statistics. No customer data is ever exposed to the ISV under any circumstances. Salesforce emphasizes trust as a core value.

Setting up Usage Metrics

To set up Usage Metrics for any package, two organizations have special importance.

- **Release organization** — the Development Edition organization used to upload the package.
- **Reporting organization** — the organization to which the usage data is delivered, on a daily basis.

The release organization and reporting organization must be members of the same Environment Hub. This is a security feature, to ensure usage data is only delivered to an organization controlled by the developer of the package. We recommend using the Environment Hub as your reporting organization.

To set up Usage Metrics for a package:

1. Set up Environment Hub, if you haven't already done so.

2. Connect the release organization to the Environment Hub.
3. Connect the reporting organization to the Environment Hub (if they're different).
4. Log a case in the Partner Community to activate Usage Metrics. You'll need to provide the package ID for your app.

Once the feature is activated, you'll receive a confirmation email. From that point on, usage data will automatically be collected from all organizations in which your package is installed, and delivered to the reporting organization on a daily basis. There is no way to get usage data retroactively, that is, for any period prior to the activation of Usage Metrics.

Accessing Usage Metrics Data

The usage data for a package is stored in `MetricsDataFile` records in your reporting organization. Once you activate the Usage Metrics feature, one new record is created for all custom objects and one for all Visualforce pages, per Salesforce instance per day.

Note: To see the number of Salesforce instances currently in use, visit trust.salesforce.com.

The usage data for each day and instance is stored as a text file, encoded in Base 64, in the `MetricsDataFile` field of the record. Other fields in the record identify these properties.

- Namespace prefix of the package
- Salesforce instance
- Start time and date of data collection
- End time and date of data collection
- Size of the data file in bytes
- Type of data, which is either `CustomObject` or `Visualforce`

The custom objects data is a snapshot that reflects the state of the organization at the time the database was sampled, while the Visualforce data covers usage over a 24-hour period.

The custom object count is a snapshot captured one time each day. Here's a section of a sample data file for custom objects. It shows there were 3500 and 1500 records in the `Alpha` and `Beta` custom objects, respectively, in the specified customer organization on the specified day.

```
"00Dxx0000001gbk","org1","Enterprise Edition","TRIAL","Alpha", "3500"
"00Dxx0000001gbk","org1","Enterprise Edition","TRIAL","Beta", "1500"
```

In a record for Visualforce pages, each row of the text file contains usage data in the following order.

- Organization ID
- Organization name
- Organization edition
- Organization status
- Package version number
- Name of the Visualforce page
- Number of times the page was accessed
- Number of unique users who accessed the page
- Average loading time of the page, in milliseconds

The Visualforce counts for each organization measure the number of times the page was viewed in the duration between the start and end times. Here's a section of a sample data file for Visualforce pages.

```
"00Dxx0000001gbk","org1","Enterprise Edition","TRIAL","1.0","/apex/gm12__f1","1","1","66.0"
"00Dxx0000001gbk","org1","Enterprise Edition","TRIAL","1.0","/apex/gm12__f2","1","1","128.0"
"00Dxx0000001gbk","org1","Enterprise Edition","TRIAL","1.0","/apex/gm12__f3","1","1","107.0"
"00Dxx0000001gbf","org1","Enterprise Edition","TRIAL","1.0","/apex/gm12__f1","5","1","73.6"
"00Dxx0000001gbf","org1","Enterprise Edition","TRIAL","1.0","/apex/gm12__f2","1","1","72.0"
"00Dxx0000001gbf","org1","Enterprise Edition","TRIAL","1.0","/apex/gm12__f3","7","1","50.8"
```

You must write a custom process to query the reporting organization to collect the metrics data, and export it to a system of your choice for analysis. This gives you the maximum flexibility to monitor and analyze the usage trends most relevant for your app.

MetricsDataFile

Represents a data file containing usage metrics on all installations of a managed package in a Salesforce instance.

Supported Calls

`query()`, `delete()`

Fields

Field Name	Details
`MetricsDataFile`	**Type** base64 **Properties** Filter, Query, Sort **Description** A text file containing the usage data encoded in Base 64.
`MetricsDataFileContentType`	**Type** string **Properties** Filter, Query, Sort **Description** The format of the data file. Currently, the only allowed value is `text/csv`.
`MetricsDataFileLength`	**Type** int **Properties** Filter, Query, Sort **Description** The size of the data file in bytes.

Field Name	Details
`MetricsRunDate`	**Type** dateTime **Properties** Filter, Query, Sort **Description** The date when the usage metrics collection job was run.
`MetricsEndDate`	**Type** dateTime **Properties** Filter, Query, Sort **Description** The end time and date for the data collection.
`MetricsStartDate`	**Type** dateTime **Properties** Filter, Query, Sort **Description** The start time and date for the data collection.
`MetricsType`	**Type** picklist **Properties** Filter, Query, Sort **Description** The type of data being collected. The possible values are `CustomObject` and `Visualforce`.
`NamespacePrefix`	**Type** string **Properties** Filter, Query, Sort **Description** The namespace prefix of the package for which data is being collected.
`SendingInstance`	**Type** string **Properties** Filter, Query, Sort

Field Name	Details
	Description The server instance from which this data was collected, for example, “na8.”

Usage

Use this object to access customer usage metrics for a managed package. Each record contains one day’s data, on either custom objects or Visualforce pages, for all organizations in a Salesforce instance that have the package installed. The following data is collected each day.

- **Custom objects** — the number of records stored in each custom object.
- **Visualforce pages** — the number of times each Visualforce page was accessed, the number of unique users who accessed it, and the average loading time (in milliseconds).

Usage Metrics Visualization

The Usage Metrics Visualization app, available from Salesforce Labs on the AppExchange, enables you to visualize trends in usage metrics data for your app. You can use the Usage Metrics Visualization app to generate charts showing changes in various app metrics, over a specified duration, for one or more customer organizations.

The app must be installed in your Usage Metrics reporting organization and requires Usage Metrics to be enabled in advance, so some data is available for analysis. You can analyze data going back a maximum of 30 days. If Usage Metrics wasn’t enabled for the entire time period that you specify, only partial data is plotted.

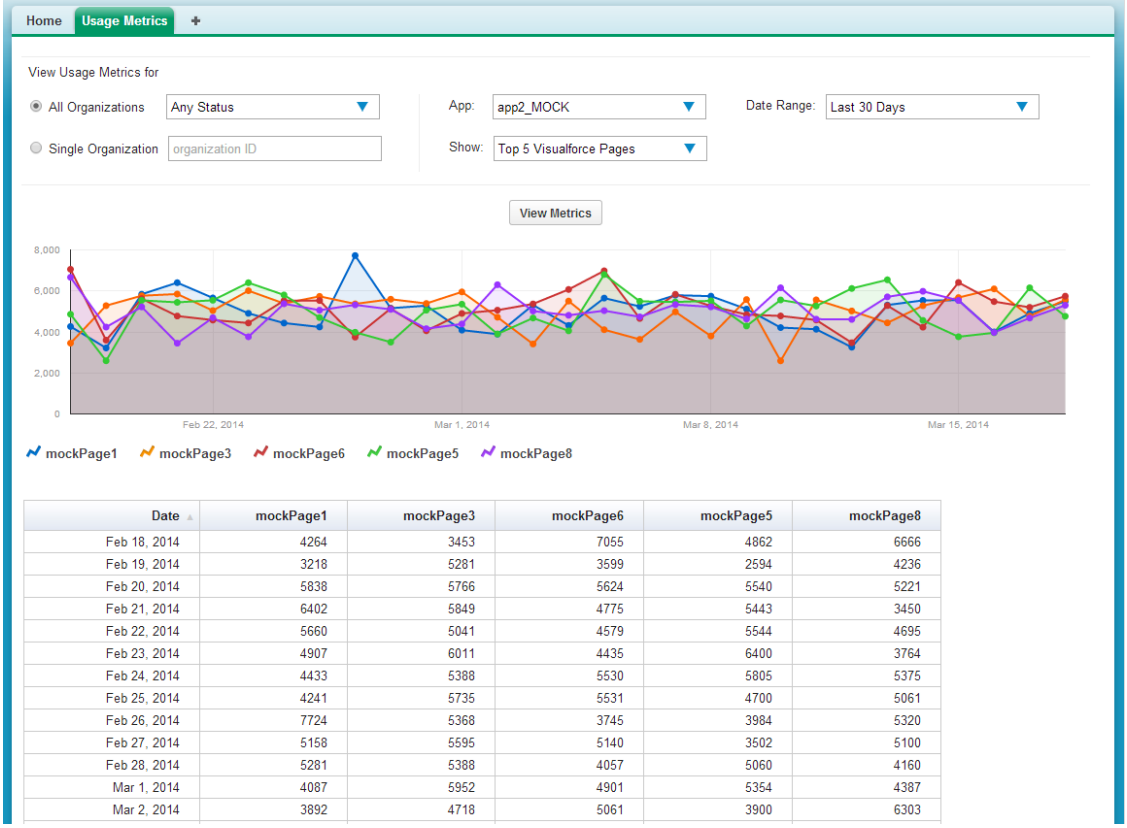
The app is intended as a reference implementation, for illustration purposes only. It’s distributed as an unmanaged package, so you can review its components and extend or customize it to meet your requirements. If your visualization needs are more complex, you can export the raw metrics data from the reporting organization and analyze it by using custom code or a third-party tool .

To install the Usage Metrics Visualization app:

1. Go to the AppExchange and search for the Usage Metrics Visualization app.
2. Click **Get It Now**.
3. Enter the credentials for your reporting organization, and then click the login button.
4. Click **Install**.

You’ll see a message describing the progress and a confirmation message after the installation is complete.

The Usage Metrics Visualization app showing data for the top five Visualforce pages.



Date	mockPage1	mockPage3	mockPage6	mockPage5	mockPage8
Feb 18, 2014	4264	3453	7055	4862	6666
Feb 19, 2014	3218	5281	3599	2594	4236
Feb 20, 2014	5838	5766	5624	5540	5221
Feb 21, 2014	6402	5849	4775	5443	3450
Feb 22, 2014	5660	5041	4579	5544	4695
Feb 23, 2014	4907	6011	4435	6400	3764
Feb 24, 2014	4433	5388	5530	5805	5375
Feb 25, 2014	4241	5735	5531	4700	5061
Feb 26, 2014	7724	5368	3745	3984	5320
Feb 27, 2014	5158	5595	5140	3502	5100
Feb 28, 2014	5281	5388	4057	5060	4160
Mar 1, 2014	4087	5952	4901	5354	4387
Mar 2, 2014	3892	4718	5061	3900	6303

To visualize the usage metrics data:

1. Specify the app whose metrics you want to view by selecting it from the App menu.

   Note: You should have enabled Usage Metrics for your app at least a few days before, so some usage data is available to analyze.

2. Specify the organization(s) that you want to view metrics for by choosing one of these options.
   - For a single organization, enter its Organization ID in the Single Organization field.
   - For a group of organizations, select one of the following from the All Organizations menu.
     - Any Status
     - All Active: These are organizations used by paying customers.
     - All Free: These are Developer Edition (DE) organizations.
     - All Trial: These are trial organizations, which expire after a specified period.

3. Specify the type of metric that you want to visualize by selecting one of these values from the Show menu.
   - Total Visualforce Page Views
   - Top 5 Visualforce Pages
   - Total Record Count
   - Top 5 Objects by Record Count

4. Specify the time period to cover by selecting one of these values from the Date Range menu.

- Last 30 Days
- Last 7 Days
- Last 2 Days

Note: If the volume of usage data is too large, you might get an error message. In that case, choose a smaller date range and try again.

5. Click **View Metrics**.

The data you specified is displayed on the page as a chart and as a table. To visualize a different data set, change the parameters, and then click **View Metrics** again.

CHAPTER 16 Update Your Solution

In this chapter ...

- About Package Versions
- Create and Upload Patches
- Working with Patch Versions
- Publish Upgrades to Managed Packages
- Push Package Upgrades to Subscribers

Your packaged solution is ready for an update. Learn how to fix small issues with patches and make major changes with upgrades.

About Package Versions

A package version is a number that identifies the set of components uploaded in a package. The version number has the format *majorNumber.minorNumber.patchNumber* (for example, 2.1.3). The major and minor numbers increase to a chosen value during every major release. The *patchNumber* is generated and updated only for a patch release. Unmanaged packages are not upgradeable, so each package version is simply a set of components for distribution. A package version has more significance for managed packages. Packages can exhibit different behavior for different versions. Publishers can use package versions to evolve the components in their managed packages gracefully by releasing subsequent package versions without breaking existing customer integrations using the package.

Version numbers depend on the package release type, which identifies the way packages are distributed. There are two kinds:

Major Release

A major release denotes a Managed - Released package. During these releases, the major and minor numbers of a package version increase to a chosen value.

Patch Release

A patch release is only for patch versions of a package. During these releases, the patch number of a package version increments.

The following table shows a sequence of version numbers for a series of uploads:

Upload Sequence	Type	Version Number	Notes
First upload	Managed - Beta	1.0	The first Managed - Beta upload.
Second upload	Managed - Released	1.0	A Managed - Released upload. Note that the version number does not change.
Third upload	Managed - Released	1.1	Note the change of the minor release number for this Managed - Released upload. If you are uploading a new patch version, you can't change the patch number.
Fourth upload	Managed - Beta	2.0	The first Managed - Beta upload for version number 2.0. Note the major version number update.
Fifth upload	Managed - Released	2.0	A Managed - Released upload. Note that the version number does not change.

When an existing subscriber installs a new package version, there is still only one instance of each component in the package, but the components can emulate older versions. For example, a subscriber may be using a managed package that contains an Apex class. If the publisher decides to deprecate a method in the Apex class and release a new package version, the subscriber still sees only one instance of the Apex class after installing the new version. However, this Apex class can still emulate the previous version for any code that references the deprecated method in the older version.

Package developers can use conditional logic in Apex classes and triggers to exhibit different behavior for different versions. This allows the package developer to continue to support existing behavior in classes and triggers in previous package versions while continuing to evolve the code.

When you are developing client applications using the API, you can specify the version of each package that you use in your integrations.

EDITIONS

Available in: Salesforce Classic (not available in all orgs) and Lightning Experience

Available in: **Developer** Edition

Package uploads and installs are available in **Group**, **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Create and Upload Patches

Patch versions are developed and maintained in a patch development org. .

To create a patch version:

1. From Setup, enter `Packages` in the Quick Find box, then select **Packages**.
2. Click the name of your managed package.
3. On the Patch Organization tab, click **New**.
4. Select the package version that you want to create a patch for in the Patching Major Release dropdown. The release type must be Managed - Released.
5. Enter a username for a login to your patch org.
6. Enter an email address associated with your login.
7. Click **Save**.

   Note: If you ever lose your login information, click **Reset** on the package detail page under Patch Development Organizations to reset the login to your patch development org.

EDITIONS

Available in: **Developer** Edition

USER PERMISSIONS

To push an upgrade or create a patch development org
- Upload AppExchange Packages

The name of the patch development org's My Domain name is randomly generated.

After you receive an email that Salesforce has created your patch development org, you can click **Login** to begin developing your patch version.

Development in a patch development org is restricted.

- You can't add package components.
- You can't delete existing package components.
- API and dynamic Apex access controls can't change for the package.
- No deprecation of any Apex code.
- You can't add new Apex class relationships, such as `extends`.
- You can't add Apex access modifiers, such as `virtual` or `global`.
- You can't add new web services.
- You can't add feature dependencies.

When you finish developing your patch, upload it through the UI in your patch development org. You can also upload a package using the Tooling API. For sample code and more details, see the PackageUploadRequest object in the *Tooling API Developer Guide*.

Note: When you upload a new package in your patch development org, the upload process is asynchronous. Because the time to process the request varies, the package might not be available immediately after the upload. While waiting, you can run SOQL queries on the PackageUploadRequest status field to monitor the request.

1. From Setup, enter `Packages` in the Quick Find box, then select **Packages**.
2. Click the name of the package.
3. On the Upload Package page, click **Upload**.
4. Enter a `Version Name`. As a best practice, it's useful to have a short description and the date.
5. Notice that the `Version Number` has had its `patchNumber` incremented.
6. For managed packages, select a `Release Type`:

- Choose Managed - Released to upload an upgradeable version. After upload, some attributes of Salesforce components are locked.
- Choose Managed - Beta if you want to upload a version of your package to a small sampling of your audience for testing purposes. You can still change the components and upload other beta versions.

  Note: Beta packages can only be installed in Developer Edition or sandbox organizations, and thus can't be pushed to customer organizations.

7. Change the `Description`, if necessary.
8. Optionally, enter and confirm a password to share the package privately with anyone who has the password. Don't enter a password if you want to make the package available to anyone on AppExchange and share your package publicly.
9. Salesforce automatically selects the requirements it finds. In addition, select any other required components from the `Package Requirements` and `Object Requirements` sections to notify installers of any requirements for this package.
10. Click **Upload**.

To distribute your patch, you can either share the upload link or schedule a push upgrade.

Working with Patch Versions

A *patch version* enables a developer to change the functionality of existing components in a managed package. Subscribers experience no visible changes to the package. Patches are minor upgrades to a Managed - Released package and only used for fixing bugs or other errors.

Patch versions can only be created for Major Releases. Subscribers can receive patch upgrades just like any other package version. However, you can also distribute a patch by using push upgrades.

When you create a patch, the *`patchNumber`* on a package's `Version Number` increments by one. For example, suppose that you release a package with the version number 2.0. When you release a patch, the number changes to 2.0.1. This value can't be changed manually.

Patch Development Organizations

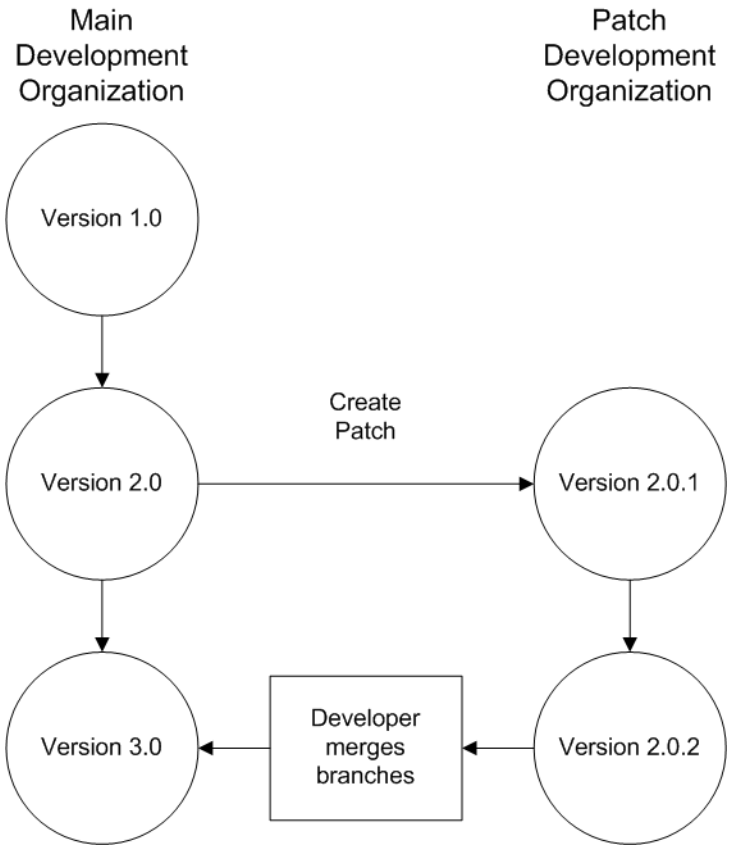
Every patch is developed in a *patch development organization*, which is the organization where patch versions are developed, maintained, and uploaded. To start developing a patch, create a patch development organization. See Create and Upload Patches. Patch development organizations are necessary to permit developers to change existing components without causing incompatibilities between existing subscriber installations.

A patch development organization can upload an unlimited number of patches. Only one patch development organization can exist per major release of your package. A patch development organization for a package with a version number of 4.2 can only work on patches such as 4.2.1, 4.2.2, 4.2.3, and so on. It won't work on version 4.1 or 4.3.

Integrating Patch Development

The following diagram illustrates the workflow of creating a patch and integrating any work into future versions:

Patch Development Workflow



After version 2.0 is released, the developer creates a patch. The package version number in the patch development organization starts at 2.0.1. As the main development organization moves towards a released version of 3.0, a second patch is created for 2.0.2. Finally, the developer merges the changes between the main development organization, and the patch development organization, and releases the package as version 3.0.

The best way to keep track of your package versions with Git source control. Learn about Git from this trail: https://trailhead.salesforce.com/en/content/learn/modules/git-and-git-hub-basics.

Version control is integrated into Visual Studio Code. See Salesforce Extensions for Visual Studio Code and Version Control in Visual Studio Code for details.

Versioning Apex Code

Package developers can use conditional logic in Apex classes and triggers to exhibit different behavior for different versions. This allows the package developer to continue to support existing behavior in classes and triggers in previous package versions while continuing to evolve the code.

When subscribers install multiple versions of your package and write code that references Apex classes or triggers in your package, they must specify the version that they are referencing. Within the Apex code that is being referenced in your package, you can conditionally execute different code paths based on the version setting of the calling Apex code that is making the reference. The package version setting of the calling code can be determined within the package code by calling the `System.requestVersion` method. In this way, package developers can determine the request context and specify different behavior for different versions of the package.

The following sample shows different behavior in a trigger for different package versions:

```
trigger oppValidation on Opportunity (before insert, before update) {

    for (Opportunity o : Trigger.new){

        // Add a new validation to the package
        // Applies to versions of the managed package greater than 1.0
        if (System.requestVersion().compareTo(new Version(1,0)) > 0) {
            if (o.Probability >= 50 && o.Description == null) {
                o.addError('All deals over 50% require a description');
            }
        }

        // Validation applies to all versions of the managed package.
        if (o.IsWon == true && o.LeadSource == null) {
            o.addError('A lead source must be provided for all Closed Won deals');
        }
    }
}
```

To compare different versions of your Apex classes, click the **Class Definition** tab when viewing the class details.

For more information about the `System.requestVersion` method, see the *Apex Developer Guide*.

Apex Deprecation Effects for Subscribers

This section demonstrates how deprecation of an Apex method affects subscribers that install the managed package. The table shows a typical sequence of actions by a package developer in the first column and actions by a subscriber in the second column. Each row in the table denotes either a package developer or subscriber action.

Package Developer Action	Subscriber Action	Notes
Create a global Apex class, `PackageDevClass`, containing a global method `m1`.		
Upload as Managed - Released version 1.0 of a package that contains `PackageDevClass`.		
	Install version 1.0 of the package.	The `Version Number` for the package is 1.0. The `First Installed Version Number` is 1.0.
	Create an Apex class, `SubscriberClass`, that references `m1` in `PackageDevClass`.	
Deprecate `m1` and create a new method, `m2`.		
Upload as Managed - Released version 2.0 of the package.		
	Install version 2.0 of the package.	The `Version Number` for the package is 2.0. The `First`

Package Developer Action	Subscriber Action	Notes
		`Installed Version Number` is still 1.0. `SubscriberClass` still references version 1.0 of the package and continues to function, as before.
	Edit the version settings for `SubscriberClass` to reference version 2.0 of the package. Save the class. Note an error message indicating that `m1` cannot be referenced in version 2.0 of the package.	
	Change `SubscriberClass` to reference `m2` instead of `m1`. Successfully save the class.	

Publish Upgrades to Managed Packages

As a publisher, first ensure that your app is upgradeable by converting it to a managed package.

Any changes you make to the components in a managed package are automatically included in subsequent uploads of that package, with one exception. When you upgrade a package, changes to the API access are ignored even if the developer specified them. This ensures that the administrator installing the upgrade has full control. Installers should carefully examine the changes in package access in each upgrade during installation and note all acceptable changes. Then, because those changes are ignored, the admin should manually apply any acceptable changes after installing an upgrade.

1. From Setup, enter *`Package Manager`* in the `Quick Find` box, then select **Package Manager**.
2. Select the package from the list of available packages.
3. View the list of package components. Changes you have made to components in this package are automatically included in this list. If the changes reference additional components, those components are automatically included as well. To add new components, click **Add** to add them to the package manually.
4. Click **Upload** and upload it as usual.

   After you upload a new version of your Managed - Released package, you can click **Deprecate** so installers cannot install an older version. Deprecation prevents new installations of older versions without affecting existing installations.

   You cannot deprecate the most recent version of a managed package upload.
5. When you receive an email with the link to the upload on AppExchange, notify your installed users that the new version is ready. Use the list of installed users from the License Management Application (LMA) to distribute this information. The License Management Application (LMA) automatically stores the version number that your installers have in their organizations.

EDITIONS

Available in: Salesforce Classic (not available in all orgs) and Lightning Experience

Available in: **Developer** Edition

Package uploads and installs are available in **Group**, **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To configure namespace settings:
- Customize Application

To create packages:
- Create AppExchange Packages

To upload packages:
- Upload AppExchange Packages

Remove Components from First-Generation Managed Packages

Remove metadata components such as Apex classes that you no longer want in your first-generation managed packages.

After a managed package has been promoted to the Managed-Released state, only certain components can be removed. To confirm whether a specific component can be removed, see Components Available in Managed Packages in the Salesforce DX Developer Guide.

Impact of Component Removal in Subscriber Orgs

During package upgrade only certain component types are hard deleted and removed from the subscriber org. Most metadata components that were removed in a package version, will remain in the subscriber org after package upgrade, and marked as deprecated. When a package is upgraded in the subscriber org, the Setup Audit Trail logs which components were removed. Admins of a subscriber org can delete deprecated metadata.

To enable component deletion in your packaging org, log a support case in the Salesforce Partner Community. For product, specify **Platform**. For topic, specify **AppExchange & Managed Packages**.

Before you remove a component, ensure that there aren't any dependencies on the metadata you plan to remove. If any component in the package depends on or references the component you're removing, the package version creation operation fails. After you remove a component or field, you can't access the component, or any customizations that depend on the removed component.

When you delete a component, you also permanently delete the data that exists in that component. Delete tracked history data is also deleted, and integrations that rely on the component, such as assignment or escalation rules, are changed. After you delete a component in a managed package, you can't restore it or create another component with the same name.

Note: In a managed package, the API names of fields must be unique and can't be reused even after you delete the component. This restriction prevents conflicts during package installation and upgrade.

Data and metadata are never deleted in a subscriber org without specific action by the customer. When a subscriber upgrades to the new package version, the deleted components are still available in the subscriber's org. The components are displayed in the Unused Components section of the Package Details page. This section ensures that subscribers have the opportunity to export data and modify custom integrations involving those components before explicitly deleting them. For example, before deleting custom objects or fields, customers can preserve a record of their data from Setup by entering `Data Export` in the Quick Find box and then selecting **Data Export**.

Note: Educate your customers about the potential impact of deleted components. Consider listing all custom components that you've deleted and specifying any actions needed in the Release Notes for your upgraded package.

These restrictions apply when deleting managed components.

- If a component is referenced by any other metadata, such as workflow rules, validation rules, or Apex classes, you can't delete it.
- You can't delete a custom object if it includes Apex Sharing Reason, Apex Sharing Recalculation, Related Lookup Filter, Compact Layout, or Action.
- Salesforce doesn't recommend deleting a custom field that is referenced by a custom report type in the same package. This type of deletion causes an error when installing the upgraded package.
- When you delete a field that is used for bucketing or grouping in a custom report type that is part of a managed package, you receive an error message.
- When you remove a connected app that is a component of a package, the app remains available until you update the package with a new version. But if you delete the connected app, it's permanently deleted. Any version of the package that contains the deleted connected app is invalidated and can't be installed. You can update a version of the package that *doesn't* contain the connected app as a component. Never delete a connected app that Salesforce distributes, such as the Salesforce app.

You can delete managed components either declaratively from the user interface or programmatically using Metadata API. With Metadata API, specify the components that you want to delete in a `destructiveChanges.xml` manifest file and then use the standard `deploy()` call. The process is identical to deleting components that aren't managed. For more information, see the *Metadata API Developer Guide*.

Removing Public Apex Classes and Public Visualforce Components

Because the behavior of managed package components differs from public Apex classes and public Visualforce components, you use a two-stage process to delete Visualforce pages, global Visualforce components, and global Lightning components from a managed package. When you upgrade a package in a subscriber org, the Visualforce pages, global Visualforce components, and Lightning components that you deleted aren't removed. Although a Delete button or link is available to org administrators, many orgs continue using the obsolete pages and components. However, public Apex classes and public Visualforce components are deleted as part of the upgrade process. If you delete pages and components without performing this two-stage procedure, Salesforce can't warn you when later deletions of public classes and components break your subscribers' obsolete pages and components.

If you're deleting these types of components, perform this two-stage process in the order presented.

- – A Visualforce page or global Visualforce component that refers to or uses public Apex classes or public Visualforce components
  - An Aura component with global access
  - A Lightning web component with an `isExposed` value of `true`

1. Stage one: Remove references.
   i. Edit the global component that you want to delete.
      - For Visualforce, edit your Visualforce page or global Visualforce component to remove all references to public Apex classes or public Visualforce components.
      - For Lightning components, edit the global Lightning component to remove all references to other Lightning components.
   ii. Upload your new package version.
   iii. Push the stage-one upgrade to your subscribers.
2. Stage two: Delete your obsolete pages or components.
   i. Delete your Visualforce page, global Visualforce component, or global Lightning component.
   ii. Optionally, delete other related components and classes.
   iii. Upload your new package version.
   iv. Push the stage-two upgrade to your subscribers.

Delete Components from First-Generation Managed Packages

After you've uploaded a Managed - Released first-generation managed package, you may find that a component needs to be deleted from your packaging org. One of the following situations may occur:

- The component, once added to a package, can't be deleted.
- The component can be deleted, but can only be undeleted from the Deleted Package Components page.
- The component can be deleted, but can be undeleted from either the Deleted Package Components page or through the Recycle Bin

After a package is uploaded with a component marked for deletion, the component is deleted forever.

EDITIONS

Available in: Salesforce Classic (not available in all orgs)

Available in: **Developer** Edition

Warning: When a component is deleted, its **Name** remains within Salesforce, and you can't create a new component that uses the deleted component's name. The Deleted Package Components page lists the names that can no longer be used.

To access the Deleted Package Components page, from Setup, enter `Packages` in the `Quick Find` box, then select **Packages**. Select the package that the component was uploaded to, and then click **View Deleted Components**. You can retrieve components from the Recycle Bin and Deleted Package Components page any time *before* uploading a new version of the package. To do this, click **Undelete** next to the component.

You can retrieve these types of components.

- Apex classes and triggers that don't have `global` access.
- Visualforce components with `public` access. (If the ability to remove components has been enabled for your packaging org then these Visualforce components can't be undeleted. As a result, they don't show up in the Recycle Bin or the Deleted Package Components page after they have been deleted.)
- Protected components, including:
  - Custom labels
  - Custom links (for Home page only)
  - Custom metadata types
  - Custom permissions
  - Custom settings
  - Workflow alerts
  - Workflow field updates
  - Workflow outbound messages
  - Workflow tasks
  - Workflow flow triggers

    The pilot program for flow trigger workflow actions is closed. If you've already enabled the pilot in your org, you can continue to create and edit flow trigger workflow actions. If you didn't enable the pilot in your org, use Flow Builder to create a record-triggered flow, or use Process Builder to launch a flow from a process.

- Data components, such as Documents, Dashboards, and Reports. These components are the only types that can also be undeleted from the Recycle Bin.

You can retrieve components from the Recycle Bin and Deleted Package Components page any time *before* uploading a new version of the package. To do this, click **Undelete** next to the component.

The Deleted Components displays the following information (in alphabetical order):

Attribute	Description
`Action`	If the Managed - Released package hasn't been uploaded with the component deleted, this contains an **Undelete** link that allows you to retrieve the component.
`Available in Versions`	Displays the version number of the package in which a component exists.
`Name`	Displays the name of the component.
`Parent Object`	Displays the name of the parent object a component is associated with. For example, a custom object is the parent of a custom field.
`Type`	Displays the type of the component.

Modifying Custom Fields after a Package is Released

The following changes are allowed to custom fields in a package, after it is released.

- The length of a text field can be increased or decreased.
- The number of digits to the left or right of the decimal point in a number field can be increased or decreased.
- A required field can be made non-required and vice-versa. If a default value was required for a field, that restriction can be removed and vice-versa.

EDITIONS

Available in: Salesforce Classic (not available in all orgs)

Available in: **Developer** Edition

Manage Versions

After you upload a package to the AppExchange, you can still manage it from Salesforce. To manage your versions:

1. From Setup, enter *Packages* in the Quick Find box, then select **Packages**.
2. Select the package that contains the app or components you uploaded.
3. Select the version number listed in the Versions tab.
   - Click **Change Password** link to change the password option.
   - Click **Deprecate** to prevent new installations of this package while allowing existing installations to continue operating.

     Note: You cannot deprecate the most recent version of a managed package.

     When you deprecate a package, remember to remove it from AppExchange as well. See "Removing Apps from AppExchange" in the AppExchange online help.
   - Click **Undeprecate** to make a deprecated version available for installation again.

Note: To create a test drive or choose a License Management Organization (LMO) for what you have uploaded, click **Proceed to AppExchange** from the package upload detail page.

EDITIONS

Available in: Salesforce Classic (not available in all orgs)

Available in: **Group**, **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To upload packages:
- Upload AppExchange Packages

View Unused Components in a Managed Package

This table shows components no longer being used in the current version of a package. Any component shown here that's part of a managed package is safe to delete unless you've used it in custom integrations. After you've deleted an unused component, it appears in this list for 15 days. During that time, you can either undelete it to restore the component and all data stored in it, or delete the component permanently. Note that when you undelete a custom field, some properties on the field will be lost or changed. After 15 days, the field and its data are permanently deleted.

Note: Before deleting a custom field, you can keep a record of its data. From Setup, enter *Data Export* in the Quick Find box, then select **Data Export**.

The following component information is displayed (in alphabetical order):

EDITIONS

Available in: Salesforce Classic

Available in: **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Attribute	Description
`Action`	Can be one of two options: • **Undelete** • **Delete**
`Name`	Displays the name of the component.
`Parent Object`	Displays the name of the parent object a component is associated with. For example, a custom object is the parent of a custom field.
`Type`	Displays the type of the component.

Push Package Upgrades to Subscribers

A *push upgrade* is a method of automatically upgrading your customers to a newer version of your package. This feature can be used to ensure that all your customers are on the same or latest version of your package. You can push an upgrade to any number of organizations that have installed your managed package.

A package subscriber doesn't need to do anything to receive the push upgrade. The only indication a subscriber receives after a successful push upgrade is that the package's `Version Number` on the Package Detail page has a higher value. The developer initiating the push resolves upgrades that fail.

Use the Push Upgrade Exclusion List to exclude specific subscriber orgs from a push upgrade. You can specify up to 500 comma-separated org IDs.

Push upgrades minimize the potential risks and support costs of having multiple subscribers running different versions of your app. You can also automate many post-upgrade configuration steps, further simplifying the upgrade process for your customers.

Push Upgrades

Overview of Push Upgrade Steps

- Upgrade your managed package installed in a customer organization from version X to version Y
- Select one, many, or all customer organizations to upgrade and select a particular version to upgrade to
- Schedule the upgrade to start at a particular date and time
- View progress of upgrades, abort upgrades in progress, or view the result of a push upgrade
- In conjunction with push, you can use a post-install Apex script to automate post-upgrade configurations that your customers have previously performed manually

Warning: When you push an upgrade, you're making changes to a subscriber's org without explicit consent. Therefore, it's important to plan ahead and exercise caution. You can also exclude specific subscriber orgs from a push upgrade by entering the org IDs, separated by a comma, in the Push Upgrade Exclusion List.

Pushing a major upgrade entails a higher degree of risk as it can impact existing functionality in a subscriber's organization. This is because new components in the upgraded package might not be available to existing users of the package, or could overwrite users' customizations. As the app developer, it's your responsibility to protect users from any adverse impact due to upgrading. We strongly recommend you consider all potential consequences of the upgrade and take appropriate steps to prevent any problems.

When pushing a major upgrade, we recommend that you divide changes in your package into two categories:

1. Enhancements to existing features that users already have access to—Use a post install Apex script to automatically assign the relevant components to existing users. This ensures all current users of the package can continue using it without explicit action by administrators.
2. New features you're introducing for the first time—Don't use a post install Apex script to auto-assign components. This ensures your subscribers have the opportunity to decide if and when to use the new features.

Here are some additional guidelines to keep in mind when planning a push upgrade.

- Avoid changes to validation rules, formula fields, and errors thrown from Apex triggers, as they may negatively impact subscribers' integrations.
- Don't make visible changes to a package in a patch. This is because other than a change in the package version number, subscribers aren't notified of push upgrades.
- Test your upgraded package in multiple environments, replicating all relevant features of your customers' organizations, including editions, customizations, other installed packages, and permission sets.
- Schedule push upgrades at your customers' off-peak hours and outside of Salesforce's major release windows, to minimize potential subscriber impact.
- Notify your subscribers in advance about the timing of the upgrade, its potential consequences, and any steps they need to take.

Push Upgrade Best Practices

Push Upgrade is one of the most powerful features we provide to our partners. You have the power to upgrade your customers, but it's imperative that you use that power carefully. Pushing an upgrade without proper planning and preparation can result in significant customer satisfaction issues. Hence, we strongly recommend that you adhere to the best practices documented here.

Plan, Test, and Communicate

- Share an upgrade timeline plan with your customers so they know when you will upgrade, and how often.
- Plan when you want to push upgrades to your customers' organizations. Keep in mind that most customers don't want changes around their month-end, quarter-end, and year-end or audit cycles. Do your customers have other critical time periods when they don't want any changes to their organization? For example, there might be certain times when they don't have staff available to verify changes or perform any required post-installation steps.
- Schedule push upgrades during your customers' off-peak hours, such as late evening and night. Have you considered time zone issues? Do you have customers outside the United States who have different off-peak hours? You can schedule push upgrades to any number of customer organizations at a time. Consider grouping organizations by time zone, if business hours vary widely across your customer base.
- Don't schedule push upgrades close to Salesforce-planned maintenance windows. In most cases, it might be better to wait 3-4 weeks after a major Salesforce release before you push major upgrades.
- Test, test, and test! Since you're pushing changes to the organization instead of the customer pulling in changes, there is a higher bar to ensure the new version of your app works well in all customer configurations.

Stagger the Push

- Don't push changes to all customers at once. It's important to ensure that you have sufficient resources to handle support cases if there are issues. Also, it's important that you discover possible issues before your entire customer base is affected.
- Push to your own test organizations first to confirm that the push happens seamlessly. Log in to your test organization after the push upgrade and test to see that everything works as expected.

- When applicable, push to the sandbox organizations of your customers first before pushing to their production organizations. Give them a week or more to test, validate, and fix in the sandbox environment before you push to their production organizations.
- Push upgrades to small batches of customer production organizations initially. For example, if you have 1,000 customers, push upgrades to 50 or 100 customers at a time, at least the first few times. Once you have confidence in the results, you can upgrade customers in larger batches.

Focus on Customer Trust

- You're responsible for ensuring that your customers' organizations are not adversely affected by your upgrade. Avoid making changes to the package, such as changes to validation rules or formula fields, that might break external integrations made by the customer. If for some reason you do, test and communicate well in advance. Please keep in mind that you can impact customer data, not just metadata, by pushing an upgrade that has bugs.
- Write an Apex test on install to do basic sanity testing to confirm that the upgraded app works as expected.
- If you're enhancing an existing feature, use a post-install script to automatically assign new components to existing users using permission sets.
- If you're adding a new feature, don't auto-assign the feature to existing users. Communicate and work with the administrators of the customer organization so they can determine who should have access to the new feature, and the timing of the roll-out.

Assign Access to New and Changed Features

Determine how to provide existing non-admin users access to new and changed features. By default, any new components included in the push upgrade package version are assigned only to admins.

If the push upgrade includes:	**We recommend you:**
New features	Notify admins about the changes the upgrade introduces, and ask them to assign permissions to all users of the package. This approach allows admins to choose when to make the new features available.
Enhancements to existing features	Include a post-install script in the package that assigns permissions to the new components or new fields automatically. This approach ensures that current users of the package can continue using features without interruption. Note: Post-install scripts aren't available to unlocked packages.

Sample Post Install Script for a Push Upgrade

Note: Post-install scripts can be used with first and second-generation managed packages only.

Automate the assignment of new components to existing users of a package. For more information on writing a post-install Apex script, see Running Apex on Package Install/Upgrade on page 99.

In this sample script, the package upgrade contains new Visualforce pages and a new permission set that grants access to those pages. The script performs the following actions.

- Gets the Id of the Visualforce pages in the old version of the package
- Gets the permission sets that have access to those pages
- Gets the list of profiles associated with those permission sets
- Gets the list of users who have those profiles assigned
- Assigns the permission set in the new package to those users

```
global class PostInstallClass implements InstallHandler {
    global void onInstall(InstallContext context) {

        //Get the Id of the Visualforce pages
        List<ApexPage> pagesList = [SELECT Id FROM ApexPage WHERE NamespacePrefix =
            'TestPackage' AND Name = 'vfpage1'];

        //Get the permission sets that have access to those pages
        List<SetupEntityAccess> setupEntityAccessList = [SELECT Id,
            ParentId, SetupEntityId, SetupEntityType FROM SetupEntityAccess
            WHERE SetupEntityId IN :pagesList];
        Set<ID> PermissionSetList = new Set<ID> ();

        for (SetupEntityAccess sea : setupEntityAccessList) {
            PermissionSetList.add(sea.ParentId);
        }
        List<PermissionSet> PermissionSetWithProfileIdList =
            [SELECT id, Name, IsOwnedByProfile, Profile.Name,
            ProfileId FROM PermissionSet WHERE IsOwnedByProfile = true
            AND Id IN :PermissionSetList];

        //Get the list of profiles associated with those permission sets
        Set<ID> ProfileList = new Set<ID> ();
        for (PermissionSet per : PermissionSetWithProfileIdList) {
            ProfileList.add(per.ProfileId);
        }

        //Get the list of users who have those profiles assigned
        List<User> UserList = [SELECT id FROM User where ProfileId IN :ProfileList];


        //Assign the permission set in the new package to those users
        List<PermissionSet> PermissionSetToAssignList = [SELECT id, Name
            FROM PermissionSet WHERE Name='TestPermSet' AND
            NamespacePrefix = 'TestPackage'];
        PermissionSet PermissionSetToAssign = PermissionSetToAssignList[0];
        List<PermissionSetAssignment> PermissionSetAssignmentList = new
List<PermissionSetAssignment>();
        for (User us : UserList) {
            PermissionSetAssignment psa = new PermissionSetAssignment();
            psa.PermissionSetId = PermissionSetToAssign.id;
            psa.AssigneeId = us.id;
            PermissionSetAssignmentList.add(psa);
        }
        insert PermissionSetAssignmentList;
```

```
    }
}
```

```
// Test for the post install class
@isTest
private class PostInstallClassTest {
    @isTest
    public static void test() {
      PostInstallClass myClass = new PostInstallClass();
      Test.testInstall(myClass, null);
    }
}
```

Scheduling Push Upgrades

After you've created an updated version of your package, you can automatically deploy it to customers using a push upgrade.

USER PERMISSIONS

To push an upgrade:
- Upload AppExchange Packages

1. Push the upgrade to your own organizations so you can run tests and fix any bugs before upgrading subscribers.
2. When you're ready and have coordinated with your customers on their change management process, push to a small number of customer organizations. Try sandbox organizations first, if possible.
3. Once you're comfortable with the initial results, push to your wider customer base, based on your agreements with each customer.
4. Deprecate the previous version of your package in your main development organization. Replace the version on AppExchange if necessary, and update your Trialforce setup.
5. If your upgrade was a patch, after you've successfully distributed the upgrade to subscriber organizations, reintegrate those changes into your main development organization. For more information about combining patches in the main development organization, see Working with Patch Versions on page 392.

Schedule a Push Upgrade Using the UI

Note: Only first-generation managed packages can schedule a push upgrade using the UI. To schedule a push upgrade for unlocked and second-generation managed packages, use the PackagePushRequest object in the SOAP API.

1. Log in to your main development org (not the patch org you used to upload the new version).
2. From Setup, enter *Packages* in the Quick Find box, then select **Packages**.
3. Click the name of the managed package whose upgrade you want to push.
4. On the package detail page, click the **Versions** tab, and then click **Push Upgrades**.
5. Click **Schedule Push Upgrades**.
6. Select a package version to push from the **Patch Version** dropdown list.

   Note: Beta versions aren't eligible for push.

7. For the scheduled start date, enter when you want the push upgrade to begin.
8. In the Select Target Organizations section, select the orgs to receive your push upgrade. If an org already received a push upgrade for the selected package version, it doesn't appear in this list. You can select orgs by:
   - Entering a term that filters based on an org's name or ID. Names can match by partial string, but IDs must match exactly.

- Choosing between production and sandbox orgs from the **Organizations** dropdown list.
- Choosing orgs that have already installed a particular version.
- Clicking on individual orgs or the **Select All** and **Deselect All** checkboxes.

This section lists the following information about the org (in alphabetical order):

Field	Description
`Current Version`	The current package version an organization has installed.
`Organization ID`	The ID of the org.
`Organization Name`	The name of the org. To view the upgrade history for the org, click on the org name.
`Primary Contact`	The name of the user who installed the package.

9. Click **Schedule**. While a push upgrade is in progress, you can click Abort to stop it.

Schedule a Push Upgrade Using the Enterprise API

1. Authenticate to your main development org (not the patch org you used to upload the new version) according to the tool you're using.

   Note: For unlocked and second-generation managed packages, authenticate to your Dev Hub.

2. Determine the package version you want to upgrade subscribers to by querying the MetadataPackageVersion object.
3. Gather the list of subscriber orgs that are eligible to be upgraded by querying the PackageSubscriber object.

   Note: If you are retrieving more than 2,000 subscribers, use the SOAP API`queryMore()` call.

4. Create a PackagePushRequest object. PackagePushRequest objects take a PackageVersionId and, optionally, a ScheduledStartTime parameter to specify when the push begins. If you omit the ScheduledStartTime, the push begins when you set the PackagePushRequest's status to `Pending`.
5. Create a PackagePushJob for each eligible subscriber and associate it with the PackagePushRequest you created in the previous step.
6. Schedule the push upgrade by changing the status of the PackagePushRequest to `Pending`.
7. Check the status of the PackagePushRequest and PackagePushJob objects by querying the `Status` fields. If the status is either Created or Pending, you can abort the push upgrade by changing the status of the PackagePushRequest to Canceled. You cannot abort a push upgrade that has a status of Canceled, Succeeded, Failed, or In Progress.

   Note: If you are pushing the upgrade to more than 2,000 subscribers, use the Bulk_API to process the job in batches.

For sample code and more details, see *SOAP API Developer Guide*.

APPENDICES

APPENDIX A ISVforce User License Comparison

Introduction

The following tables compare object access, user permissions and features, and organization limits for these license types.

- Lightning Platform Administrator—A standard Salesforce license with complete customization capabilities. It prohibits Create, Read, Update, and Delete on Leads, Opportunities, Products, Cases, Solutions, and Campaigns.
- Lightning Platform—A standard Salesforce Platform license with access to Accounts, Contacts, and custom objects. Used by non-administrators.

Note: For a complete list of license types, see: https://help.salesforce.com/HTViewHelpDoc?id=users_license_types_available.htm

The following symbols are used in the tables.

- ✓ —Included in license
- $—Available as an add-on for an additional fee
- C—Create access to the object
- R—Read access to the object
- U—Update access to the object
- D—Delete access to the object

Object Accessed

Object Accessed	Lightning Platform Administrator		Lightning Platform	
	EE	UE/PXE	EE	UE/PXE
Accounts	CRUD	CRUD	CRUD	CRUD
Activities, Tasks	CRUD	CRUD	CRUD	CRUD
Assets				
Calendar, Events	CRUD	CRUD	CRUD	CRUD
Campaigns				
Cases				
Contacts	CRUD	CRUD	CRUD	CRUD
Content	CRUD	CRUD	CRUD	CRUD

Object Accessed	Lightning Platform Administrator		Lightning Platform	
	EE	UE/PXE	EE	UE/PXE
Contracts				
Documents	CRUD	CRUD	CRUD	CRUD
Entitlements				
Ideas	CRUD	CRUD	CR	CR
Knowledge	R	R		
Leads				
Opportunities				
Products & Price Books				
Questions and Answers	CRUD	CRUD		
Quotes				
Service Contracts				
Solutions				

User Features

User Features	Lightning Platform Administrator		Lightning Platform	
	EE	UE/PXE	EE	UE/PXE
Content	✓	✓	✓	✓
Experience Cloud site	$	$	$	$
Flows	✓	✓	✓	✓
Jigsaw Exports	$	$	$	$
Knowledge	$	$	$	$
Mobile (Full)	$	✓	$	✓
Offline	✓	✓	✓	✓
Send Mass Email	✓	✓	✓	✓
Siteforce Contributor	$	$	$	$
Siteforce Publisher	$	$	$	$

User Permissions

User Permissions	Lightning Platform Administrator		Lightning Platform	
	EE	UE/PXE	EE	UE/PXE
Customize Reports	✓	✓	✓	✓
Customize Dashboards	✓	✓	✓	✓
View Dashboards*	✓	✓	✓	✓
Chatter (Groups, Files, Profiles)	✓	✓	✓	✓
Create Workflow and Approval Process	✓	✓		
Manage Users and Profiles	✓	✓		
Identity	✓	✓	✓	✓
Identity Connect	$	$	$	$
Write Apex Code	✓	✓		
WDC	$	$	$	$
Custom Apps Limit	10	Unlimited	10	Unlimited
Custom Tabs Limit	25	Unlimited	25	Unlimited
Custom Objects Limit**	200	2,000	200	2,000

* The running user of a dashboard must be a Lightning Platform or a Lightning Platform One App user to view the dashboard. Dashboards using the Lightning Platform administrator as the running user are not viewable by other Lightning Platform license types.

** Restricted limit for Lightning Platform One App and Chatter Plus.

Additional Organization Limits

Additional Organization Limits (Added Per User)	Lightning Platform Administrator		Lightning Platform	
	EE	UE/PXE	EE	UE/PXE
Data Storage	20 MB	120 MB	20 MB	120 MB
File Storage	2 GB	2 GB	2 GB	2 GB
API Calls (Per Day Per User)	1,000	5,000	1,000	5,000

For data storage, orgs of all editions are automatically allocated 10 GB. For each user added to an org, an extra 20 MB of storage is allocated, though Unlimited Edition and Performance Edition orgs receive more storage capacity. For each user added to an Unlimited Edition or Performance Edition org, an extra 120 MB of storage is allocated.

For file storage, Enterprise, Performance, and Unlimited Editions are allocated a per-user limit multiplied by the number of users in the organization plus an additional per-organization allocation of 11 GB. For example, an Enterprise Edition organization with 600 users receives 1,211 GB of file storage, or 2 GB per user multiplied by 600 users plus an additional 11 GB.

Note: For a complete list of storage limits for each edition, see: https://help.salesforce.com/HTViewHelpDoc?id=limits_storage_allocation.htm

APPENDIX B OEM User License Guide

Learn about the license types that are available to OEM partners.

License Types and Availability

These licenses are available for resale to new and existing OEM partners.

Internal User Licenses:

- OEM Embedded—A contractually restricted Enterprise Edition Platform license
- OEM Embedded Admin—A contractually restricted Enterprise Edition Salesforce admin license that's required on all initial orders. It's used to configure and administer the OEM application. This license prohibits providing access to or use of any CRM functionality. Prohibitions include, but aren't limited to, create, read, update, and delete (CRUD) on Leads, Opportunities, Cases, Solutions, Forecasts, and Campaigns.

External User Licenses: These licenses can be assigned to external users only.

- Commerce Portal—Custom digital experiences to engage any external stakeholder, including Brand Engagement and Customer Loyalty.
- Customer Community—Business-to-consumer experiences well suited for communities with large numbers of external users who need access to Salesforce Knowledge.
- Customer Community Plus—Similar to the Customer Community license with more storage, access to reports and dashboards, and advanced sharing.
- Partner Community—Business-to-business experiences for users who need access to sales data, where the OEM partner's solution allows access to Sales objects. Partner Community licenses can't be used with person accounts.

Licenses sold by OEM partners can only be used to access the partner solution. To extend the partner solution, end users can create, access, and use up to 10 additional custom objects per solution. These custom objects can only be used with the partner solution.

These tables list object access, user permissions and features, and org limits for the OEM Embedded user license types. For external user licenses limits and CRUD access information, refer to Experience Cloud User Licenses.

The following symbols are used in the tables:

- ✓ —Included in license
- $—Available as an add-on for a fee
- C—Create access to the object
- R—Read access to the object
- U—Update access to the object
- D —Delete access to the object

Objects

Object Accessed	OEM Embedded
Accounts	CRUD
Activities	CRUD
Tasks	CRUD
Calendar, Events	CRUD
Contacts	CRUD
Content	CRUD
Contracts*	CRUD
Documents	CRUD
Ideas	CR
Individual	CRUD
Knowledge	R
Orders*	CRUD
Products & Price Books*	CRUD
ISV Custom Object	CRUD

* With the Orders Platform permission set license (PSL), available to OEM partners only, administrators can give the users who have Salesforce Platform user licenses access to Contracts, Products, Price Books, and Orders. Orders functionality is automatically available to all licenses except the Salesforce Platform licenses, which explicitly require the new PSL to grant access.

User Features

User Feature	OEM Embedded
Console	✓
Analytics (Tableau CRM)	$
Create Knowledge Articles	$
Salesforce Mobile App	✓
Offline	✓
Flows and Process Builder	✓
Approval Process	✓

User Feature	OEM Embedded
Original Territory Management*	—
Enterprise Territory Management	✓

* Original Territory Management was retired for all customers in the Summer '21 release. Users can't access the original territory management feature or its underlying data. We encourage you to migrate to Enterprise Territory Management. For more information, refer to the Original Territory Management Module Retirement article.

User Permissions

User Permission	OEM Embedded
Account Teams	✓
Advanced Sharing	✓
Chatter	✓
Custom Profiles	✓
Custom Permission Sets	✓
Einstein Search	✓
Customize Reports	✓
Customize Dashboards	✓
View Dashboards*	✓
Identity	✓
Org Allows Custom Profiles and Page Layouts	✓
Org Allows Record Types	✓
Send Email	✓
Submit Workflow Approvals	✓
Unlimited Next Best Action Strategy Executions**	✓
Custom Tabs Limit	25
Custom Objects Limit	400***

* To view a dashboard, the running user of a dashboard must be a Salesforce Platform user. Dashboards using the Salesforce Platform administrator as the running user aren't viewable by other Salesforce Platform license types.

** Next Best Action requests made by users with this permission aren't counted against the monthly entitlement.

*** The limit of 400 custom objects applies to the primary solution offering. End users can create and access up to 10 additional custom objects. These custom objects must be within the scope of, and used only with, the partner solution.

Storage Limits

For new accounts, the OEM Embedded Admin license comes with an Enterprise Edition org. If the customer has an Unlimited Edition (UE) org, the partner places the order as usual. The Partner Operations team provisions the appropriate OEM Embedded UE license on behalf of the partner. The partner's OEM Embedded contractual terms apply to the provisioned OEM Embedded, UE license. Per-user storage limits are governed by the UE license allocations.

Additional Org Limits (Added Per User)	OEM Embedded
Data Storage	20 MB
File Storage	2 GB

For data storage, each OEM Embedded org is allocated a minimum of 10 GB. For example, an OEM Embedded org with 20 users at 20 MB per user receives 400 MB plus 10 GB, or 10.4 GB total data storage. An OEM Embedded org with 100 users receives 12 GB because 100 users multiplied by 20 MB per user is 2 GB.

For file storage, each OEM Embedded org is allocated a per-user limit multiplied by the number of users in the org plus a per-org allocation of 11 GB. For example, an OEM Embedded org with 600 users receives 1,211 GB of file storage, or 2 GB per user multiplied by 600 users plus 11 GB.

For data and file storage limits for other Salesforce editions, refer to Data and File Storage Allocations.

API Limits

The OEM Embedded Admin license comes with an Enterprise Edition org, and OEM Embedded provides a Platform license.

Salesforce Edition	API Requests (Calls) Per License Type	Total Requests (Calls) Per 24-Hour Period
OEM Embedded	1,000	100,000 + (number of licenses x calls per license type)

Limits are enforced against the aggregate of all API calls made to the org in a 24-hour period. Limits are not on a per-user basis. When an org exceeds a limit, all users in the org can be temporarily blocked from making additional calls. Calls are blocked until usage for the preceding 24 hours drops below the limit.

For Enterprise Edition org API limits, including API limits with External User licenses, refer to API Request Limits and Allocations.

Legacy License Types

These licenses aren't available to new partners, but can be resold by existing partners who have already contracted to resell them. These licenses can be assigned to external users only.

- ISV Portal—An Authenticated Website license with basic data sharing options. Manual sharing to user and participation in sharing groups aren't permitted. Users can only log in via Salesforce Platform Sites. An ISV Portal license is best used when projected user volumes exceed 100,000.
- ISV Portal with Sharing—A Customer Portal Manage Custom license with full sharing capabilities. Users can log in only via Salesforce Platform Sites. This license is best used when projected user volumes are under 100,000 and granular security access is required.

SEE ALSO:

Experience Cloud User Licenses

Original Territory Management Retirement

Data and File Storage Allocations

API Request Limits and Allocations

GLOSSARY

Terms and definitions that describe key application and packaging concepts and capabilities.

App

Short for "application." A collection of components such as tabs, reports, dashboards, and Visualforce pages that address a specific business need. Salesforce provides standard apps such as Sales and Service. You can customize the standard apps to match the way you work. In addition, you can package an app and upload it to the AppExchange along with related components such as custom fields, custom tabs, and custom objects. Then, you can make the app available to other Salesforce users from the AppExchange.

AppExchange

The AppExchange is a sharing interface from Salesforce that allows you to browse and share apps and services for the Lightning Platform.

Beta, Managed Package

In the context of managed packages, a beta managed package is an early version of a managed package distributed to a sampling of your intended audience to test it.

Deploy

To move functionality from an inactive state to active. For example, when developing new features in the Salesforce user interface, you must select the “Deployed” option to make the functionality visible to other users.

The process by which an application or other functionality is moved from development to production.

To move metadata components from a local file system to a Salesforce organization.

For installed apps, deployment makes any custom objects in the app available to users in your organization. Before a custom object is deployed, it is only available to administrators and any users with the “Customize Application” permission.

License Management Application (LMA)

A free AppExchange app that allows you to track sales leads and accounts for every user who downloads your managed package (app) from the AppExchange.

License Management Organization (LMO)

The Salesforce organization that you use to track all the Salesforce users who install your package. A license management organization must have the License Management Application (LMA) installed. It automatically receives notification every time your package is installed or uninstalled so that you can easily notify users of upgrades. You can specify any Enterprise, Unlimited, Performance, or Developer Edition organization as your license management organization.

Major Release

A significant release of a package. During these releases, the major and minor numbers of a package version increase to any chosen value.

Managed Package

A collection of application components that is posted as a unit on the AppExchange and associated with a namespace and possibly a License Management Organization. To support upgrades, a package must be managed. An organization can create a single managed package that can be downloaded and installed by many different organizations. Managed packages differ from unmanaged packages by having some locked components, allowing the managed package to be upgraded later. Unmanaged packages do not include locked components and cannot be upgraded. In addition, managed packages obfuscate certain components (like Apex) on subscribing organizations to protect the intellectual property of the developer.

Managed Package Extension

Any package, component, or set of components that adds to the functionality of a managed package. You cannot install an extension before installing its managed package.

Namespace Prefix

In a packaging context, a namespace prefix is a one to 15-character alphanumeric identifier that distinguishes your package and its contents from packages of other developers on AppExchange. Namespace prefixes are case-insensitive. For example, ABC and abc are not recognized as unique. Your namespace prefix must be globally unique across all Salesforce organizations. It keeps your managed package under your control exclusively.

Package

A group of Lightning Platform components and applications that are made available to other organizations through the AppExchange. You use packages to bundle an app along with any related components so that you can upload them to AppExchange together.

Package Dependency

This is created when one component references another component, permission, or preference that is required for the component to be valid. Components can include but are not limited to:

- Standard or custom fields
- Standard or custom objects
- Visualforce pages
- Apex code

Permissions and preferences can include but are not limited to:

- Divisions
- Multicurrency
- Record types

Package Installation

Installation incorporates the contents of a package into your Salesforce organization. A package on the AppExchange can include an app, a component, or a combination of the two. After you install a package, you may need to deploy components in the package to make it generally available to the users in your organization.

Package Version

A package version is a number that identifies the set of components uploaded in a package. The version number has the format `majorNumber.minorNumber.patchNumber` (for example, 2.1.3). The major and minor numbers increase to a chosen value during every major release. The `patchNumber` is generated and updated only for a patch release.

Unmanaged packages are not upgradeable, so each package version is simply a set of components for distribution. A package version has more significance for managed packages. Packages can exhibit different behavior for different versions. Publishers can use package versions to evolve the components in their managed packages gracefully by releasing subsequent package versions without breaking existing customer integrations using the package. See also Patch and Patch Development Organization.

Patch

A patch enables a developer to change the functionality of existing components in a managed package, while ensuring subscribing organizations that there are no visible behavior changes to the package. For example, you can add new variables or change the body of an Apex class, but you may not add, deprecate, or remove any of its methods. Patches are tracked by a `patchNumber` appended to every package version. See also Patch Development Organization and Package Version.

Patch Development Organization

The organization where patch versions are developed, maintained, and uploaded. Patch development organizations are created automatically for a developer organization when they request to create a patch. See also Patch and Package Version.

Patch Release

A minor upgrade to a managed package. During these releases, the patch number of a package version increments.

Publisher

The publisher of an AppExchange listing is the Salesforce user or organization that published the listing.

Push Upgrade
A method of delivering updates that sends upgrades of an installed managed package to all organizations that have installed the package.

Subscriber
The subscriber of a package is a Salesforce user with an installed package in their Salesforce organization.

Test Drive
A test drive is a fully functional Salesforce organization that contains an app and any sample records added by the publisher for a particular package. It allows users on AppExchange to experience an app as a read-only user using a familiar Salesforce interface.

Unmanaged Package
A package that cannot be upgraded or controlled by its developer.

Upgrading
Upgrading a package is the process of installing a newer version. Salesforce supports upgrades for managed packages that are not beta.

Uploading
Uploading a package in Salesforce provides an installation URL so other users can install it. Uploading also makes your packaged available to be published on AppExchange.

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