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CHAPTER 1  Before You Begin

Before you begin to explore using scratch orgs or second-generation packages, you must set up your environment.

1. [Admin for Dev Hub org] Enable the Developer Hub (Dev Hub) in your Developer Edition, trial, or production org (if you’re a customer), or your business org (if you’re an AppExchange partner).
   To explore the new tooling, sign up for a Developer Edition org on Salesforce Developers.
   
   **Note:** You don’t need to enable Dev Hub if you plan to use Salesforce CLI with only sandboxes unless you plan to create second-generation (2GP) packages. 2GP packages use a scratch org during the package generation process.

2. [Admin for Dev Hub org] (Optional) In the Dev Hub, enable Second-Generation Packaging in your org so you can develop 2GP packages.

3. [Admin for Dev Hub org] If you want to include your team, you can add users to your Dev Hub org.

4. [Developer] Ensure that your computers meet all system requirements.

5. [Developer] If you want to evaluate Salesforce Extensions for VS Code, download and install the extension pack.

6. [Developer] Download the sample projects from GitHub.
System Requirements

Use this list of system requirements to get the most out of Salesforce CLI and developer tools.

Operating Systems

Salesforce CLI supports the following operating systems.

- Windows—Windows 7 (64-bit and 32-bit) or later
- Mac—macOS 10.11 or later
- Linux—Ubuntu 14.0.4

Code Editor or IDE

You can use any code editor, including Salesforce Extensions for VS Code, a set of Visual Studio Code extensions that is designed for development on the Lightning Platform.

**Note:** If you’re using Salesforce Extensions for VS Code, keep in mind that many of the installation commands are unavailable in the command palette. If you can’t find a command in VS Code, run it in the integrated terminal.

Version Control System

You can use any version control system (VCS). We recommend that you use GitHub to take advantage of the samples in our GitHub repository.

SEE ALSO:

GitHub
CHAPTER 3  CLI and Plug-In Versions

Salesforce supports only the most current versions of the Salesforce CLI and the salesforcedx plug-in.

To upgrade to the current version, run `sfdx update`.

By default, the CLI periodically checks for and installs updates. To disable auto-update, set the `SFDX_AUTOUPDATE_DISABLE` environment variable to `true`.

To check the version of the Salesforce CLI installed on your computer, run `sfdx version`. To check the version of the installed salesforcedx plug-in, run `sfdx plugins --core`.

SEE ALSO:
- Update the CLI
- Disable Automatic Update of the CLI and Plug-In
Enable Dev Hub in your org so you can create and manage scratch orgs. Scratch orgs are disposable Salesforce orgs to support development and testing.

**Note:** You don’t need to enable Dev Hub if you plan to use Salesforce CLI with only sandboxes unless you plan to create second-generation (2GP) packages. 2GP packages use a scratch org during the package generation process.

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

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

- You can create up to 6 scratch orgs and package versions per day, with a maximum of 3 active scratch orgs.
- Trial orgs expire on their expiration date.
- Developer Edition orgs that are inactive for 365 days are deactivated.
- You can define a namespace in a Developer Edition org that isn’t your Dev Hub, and you can enable Dev Hub in a Developer Edition org that doesn’t contain a namespace.
- If you plan to create package versions or run continuous integration jobs, it’s better to use a production or business org as your Dev Hub because of higher scratch org and package version limits. Package versions are associated with your Dev Hub org. When a trial or Developer Edition org expires, you lose access to the package versions.

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

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

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

To enable Dev Hub in an org:

1. Log in as System Administrator to your Developer Edition, trial, or production org (if you’re a customer), or your business org (if you’re an ISV).
Enable Dev Hub in Your Org

2. From Setup, enter Dev Hub in the Quick Find box and select Dev Hub. If you don’t see Dev Hub in the Setup menu, make sure your org is one of the supported editions.

3. To enable Dev Hub, click Enable. After you enable Dev Hub, you can’t disable it.

SEE ALSO:
Salesforce Help: Deactivate an Org
CHAPTER 5  Enable Unlocked and Second-Generation Managed Packaging

Enable packaging in your org so you can develop unlocked packages or second-generation managed packages. You can work with the packages in scratch orgs, sandbox orgs, and target subscriber orgs.

Enable Dev Hub in your org.

1. Log in to the org where you’ve enabled Dev Hub.
2. From Setup, enter Dev Hub in the Quick Find box and select Dev Hub.
3. In the section for Second-Generation Packaging, click Non-GA Service Agreement to read the service agreement.
4. Click Enable Unlocked Packages and Second-Generation Managed Packages.
   After you enable Second-Generation Packaging, you can’t disable it.
5. (Optional) Allow non-admin users to access the Dev Hub to create packages.
   Assign non-admin users the Create and Update Second Generation Packages user permission. See Add Salesforce DX Users for details.
CHAPTER 6  Enable Einstein Features

Turn on Einstein Features in your Dev Hub to eliminate the manual steps for enabling the Chatbot feature in scratch orgs. When you accept the Terms of Service for Einstein, a separate acceptance is not required in each scratch org created from this Dev Hub org. If you previously accepted the Terms of Service for Einstein to turn on an Einstein-related feature, this setting is already enabled.

Complete this task before attempting to create a scratch org with the Chatbot feature.

1. Log in to your Dev Hub org.
2. From Setup, enter Dev Hub in the Quick Find box and select Dev Hub.
CHAPTER 7  Add Salesforce DX Users

System administrators can access the Dev Hub org by default. You can enable more users to access the Dev Hub org so that they can also create scratch orgs.

You can use Salesforce DX with these Standard user licenses: Salesforce, Salesforce Platform, and Salesforce Limited Access - Free.

You can add a user with the System Administrator profile. You can also add a user with a Standard User profile as long as you apply the set of permissions required for Salesforce DX. Because you’re adding users to a Dev Hub org, avoid adding them as system administrators unless their work requires that level of authority.

1. Add the user to your Dev Hub org, if necessary.

   a. In Setup, enter Users in the Quick Find box, then select Users.
   
   b. Click New User.
   
   c. Fill out the form, and assign the System Administrator or Standard User profile.
   
   d. Click Save.

   If you’re adding a System Administrator user, you can stop here.

2. If you’re adding a Standard User, create a permission set for Salesforce DX users if you don’t have one.

   a. From Setup, enter Permission Sets in the Quick Find box, then select Permission Sets.
   
   b. Click New.
   
   c. Enter a label, API name, and description. The API name is a unique name used by the API and managed packages.
   
   d. Select a user license option. If you plan to assign this permission set to multiple users with different licenses, select None.
   
   e. Click Save. The permission set overview page appears. From here, you can navigate to the permissions you want to add or change for Salesforce DX. For the required permissions, see Permission Set for Salesforce DX Users on page 9.

3. Apply the Salesforce DX permission set to the Standard User.

   a. From Setup, enter Permission Sets in the Quick Find box, then select Permission Sets.
   
   b. Select the Salesforce DX permission set.
   
   c. In the permission set toolbar, click Manage Assignments.
   
   d. Click Add Assignments.
   
   e. Select the user to assign the permission set to.
   
   f. Click Assign.
g. Click Done.

You can limit a user’s access by modifying the permissions.

**Permission Set for Salesforce DX Users**

To give full access to the Dev Hub org, the permission set must contain these permissions.

- Object Settings > Scratch Org Infos > Read, Create, Edit, and Delete
- Object Settings > Active Scratch Orgs > Read, Edit, and Delete
- Object Settings > Namespace Registries > Read

To work with second-generation packages in the Dev Hub org, the permission set must also contain:

- System Permissions > Create and Update Second-Generation Packages

This permission provides access to:

<table>
<thead>
<tr>
<th>Salesforce CLI Command</th>
<th>Tooling API Object (Create and Edit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>force:package:create</td>
<td>Package2</td>
</tr>
<tr>
<td>force:package:version:create</td>
<td>Package2VersionCreateRequest</td>
</tr>
<tr>
<td>force:package:version:update</td>
<td>Package2Version</td>
</tr>
</tbody>
</table>

**SEE ALSO:**

- Permission Sets ([Salesforce Help](https://help.salesforce.com/
- *Salesforce DX Developer Guide*)
CHAPTER 8 Install the Salesforce CLI

In this chapter ...

- Install the CLI on macOS
- Install the CLI on Windows
- Install the CLI on Linux
- Install the CLI with npm
- Verify Your Installation
- Install a Specific Version of the salesforcedx Plug-In

Use the CLI commands to create environments for development and testing, synchronize source code between your scratch orgs and version control system, and execute test suites.
Install the CLI on macOS

You install the Salesforce CLI on macOS with a .pkg file.

1. Download the .pkg file.
2. Double-click the .pkg file.

SEE ALSO:
- Verify Your Installation
- Disable Automatic Update of the CLI and Plug-In

Install the CLI on Windows

You install the Salesforce CLI on Windows with an .exe file.

Download and run the Windows installer.

⚠️ Warning: The Salesforce CLI works best within the native Windows command prompt (cmd.exe) and the Microsoft Powershell. We do not recommend using the Salesforce CLI with a Linux terminal emulator, such as Windows 10 Subsystem for Linux, cygwin, or MinGW, because support for bugs is limited.

SEE ALSO:
- Verify Your Installation
- Disable Automatic Update of the CLI and Plug-In

Install the CLI on Linux

The Linux version of Salesforce CLI is distributed as a tarball.

Find the download URL for your tarball from this manifest file. The downloads section lists unversioned URLs for the latest installers, which are especially useful for CI use cases. Select the URL based on your target platform.

1. Download or wget one of these tarballs.

```bash
wget https://developer.salesforce.com/media/salesforce-cli/sfdx-linux-amd64.tar.xz
```

2. Create an sfdx directory.

```bash
mkdir sfdx
```

3. Unpack the contents for your tarball version:

```bash
tar xJf sfdx-linux-amd64.tar.xz -C sfdx --strip-components 1
```

- `-C` unpacks the contents in the sfdx directory, while `--strip-components 1` removes the root path component.

4. Run the install script.

```bash
./sfdx/install
```
The Salesforce CLI is installed in /usr/local/bin/sfdx. The installers are designed to provide appropriate permissions to the installation directories. If you receive permission or access errors that you can’t address by using sudo or chmod, try installing the CLI using npm on page 12.

SEE ALSO:
Verify Your Installation
Disable Automatic Update of the CLI and Plug-In

Install the CLI with npm

If you’ve installed Node.js on your computer, you can use npm to install Salesforce CLI. This method lets you install Salesforce CLI from the command line and can be especially useful for continuous integration (CI) use cases.

This installation method is a good option if you don’t have administrator permissions on your workstation, or if group policy blocks CLI installation and updates. Installing the CLI with npm doesn’t require root permissions.

1. Ensure that the long-term support (Active LTS) version of Node.js is installed on your computer. To install the LTS version, go to https://nodejs.org/en/download/. To check your version number, run:

```
node --version
```

2. Run this command.

```
npm install sfdx-cli --global
```

If you receive a permission error when installing the CLI using npm, we recommend not using sudo. See Fixing npm permissions.

SEE ALSO:
Verify Your Installation
npm Documentation

Install a Previous Version of Salesforce CLI

Salesforce CLI (sfdx-cli) v7 or later is required to install v45.8.0 or later of the salesforcedx plug-in. To install an earlier version of Salesforce CLI, run this command, which installs v6:

```
npm install sfdx-cli@6 --global
```

Verify Your Installation

Verify your Salesforce CLI installation and plug-in versions.

Run this command to verify the Salesforce CLI version:

```
sfdx --version
sfdx-cli/6.0.10-3713d7b alpha (darwin-x64) node-v8.6.0
```
Install the Salesforce CLI

Run this command to verify the Salesforce CLI plug-in version:

```
$ sfdx plugins --core
salesforcedx 41.2.0 (core)
```

This command returns a list of the other plug-ins installed in the CLI:

```
$ sfdx plugins
```

The core salesforcedx plug-in is not included in the preceding list unless you've explicitly installed a newer version with the `sfdx plugins:install` command.

Run this command to return a list of the command families in the force topic:

```
$ sfdx force --help
```

This command returns all the force commands:

```
$ sfdx force:doc:commands:list
```

SEE ALSO:

Install a Specific Version of the salesforcedx Plug-In

Install a Specific Version of the salesforcedx Plug-In

By default, the latest version of the salesforcedx plug-in is installed when you install Salesforce CLI for the first time. Sometimes, however, you want to use a specific version of the salesforcedx plug-in.

⚠️ **Important:** The salesforcedx plug-in v45.5.0 or earlier requires Salesforce CLI (sfdx-cli) v6. The salesforcedx plug-in v45.8.0 or later requires Salesforce CLI v7 or later.

To determine which Salesforce CLI (sfdx-cli) and salesforcedx versions you have installed, run:

```
$ sfdx plugins --core
```

Run this command to install a specific version of the plug-in, in this example, version 45.8.0:

```
$ sfdx plugins:install salesforcedx@45.8.0
```

Install Salesforce CLI v6

To install salesforcedx plug-in v45.5.0 or earlier, install Salesforce CLI (sfdx-cli) v6.

Using npm:

```
$ npm install sfdx-cli@6 --global
```

Using the installer:

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Installation Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darwin (Linux)</td>
<td><a href="https://developer.salesforce.com/media/salesforce-cli/sfdx-cli/channels/stable/sfdx-cli-v6.56.0-e3fd846a1f-darwin-x64.tar.xz">https://developer.salesforce.com/media/salesforce-cli/sfdx-cli/channels/stable/sfdx-cli-v6.56.0-e3fd846a1f-darwin-x64.tar.xz</a></td>
</tr>
<tr>
<td>Linux 64 bit</td>
<td><a href="https://developer.salesforce.com/media/salesforce-cli/sfdx-cli/channels/stable/sfdx-cli-v6.56.0-e3fd846a1f-linux-x64.tar.xz">https://developer.salesforce.com/media/salesforce-cli/sfdx-cli/channels/stable/sfdx-cli-v6.56.0-e3fd846a1f-linux-x64.tar.xz</a></td>
</tr>
<tr>
<td>Linux 32 bit</td>
<td><a href="https://developer.salesforce.com/media/salesforce-cli/sfdx-cli/channels/stable/sfdx-cli-v6.56.0-e3fd846a1f-linux-x86.tar.xz">https://developer.salesforce.com/media/salesforce-cli/sfdx-cli/channels/stable/sfdx-cli-v6.56.0-e3fd846a1f-linux-x86.tar.xz</a></td>
</tr>
<tr>
<td>Operating System</td>
<td>Installation Link</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Windows 64 bit</td>
<td><a href="https://developer.salesforce.com/media/salesforce-cli/channels/stable/sfdx-cli-v6.56.0-e3fd846a1f-x64.exe">https://developer.salesforce.com/media/salesforce-cli/channels/stable/sfdx-cli-v6.56.0-e3fd846a1f-x64.exe</a></td>
</tr>
<tr>
<td>Windows 32 bit</td>
<td><a href="https://developer.salesforce.com/media/salesforce-cli/channels/stable/sfdx-cli-v6.56.0-e3fd846a1f-x86.exe">https://developer.salesforce.com/media/salesforce-cli/channels/stable/sfdx-cli-v6.56.0-e3fd846a1f-x86.exe</a></td>
</tr>
</tbody>
</table>
CHAPTER 9  Use the Salesforce CLI from Behind a Company Firewall or Web Proxy

If you install or update the Salesforce CLI on a computer that's behind a company firewall or web proxy, you sometimes receive error messages. In this case, you must further configure your system.

You get an error similar to the following when you run a command after installing the CLI binary behind a firewall or web proxy. This error is from a Linux computer, but Windows and macOS users sometimes see a similar error.

```
sfdx-cli: Updating CLI... !
  'ECONNRESET': tunneling socket could not be established,
  cause=connect EHOSTUNREACH 0.0.23.221:8080 - Local
    (10.126.148.39:53107)
```

To address this issue, run these commands from your terminal or Windows command prompt, replacing `username:pwd` with your web proxy username and password. If your proxy doesn’t require these values, omit them. Also replace `proxy.company.com:8080` with the URL and port of your company proxy.

```
npm config set https-proxy https://username:pwd@proxy.company.com:8080
npm config set proxy https://username:pwd@proxy.company.com:8080
```

Then set the HTTP_PROXY or HTTPS_PROXY environment variable to the full URL of the proxy. For example, on UNIX:

```
export HTTP_PROXY=https://username:pwd@proxy.company.com:8080
export HTTPS_PROXY=https://username:pwd@proxy.company.com:8080
```

On a Windows machine:

```
set HTTP_PROXY=https://username:pwd@proxy.company.com:8080
set HTTPS_PROXY=https://username:pwd@proxy.company.com:8080
```

If You Still See an Error

**Your Proxy Requires an Extra Certificate Authority**

If you set the proxy environment variable, and you still see error messages, it’s possible that your proxy requires an extra certificate authority (CA). Ask your IT department where to find or download the certificates.

Set this environment variable to point to the CA file: `NODE_EXTRA_CA_CERTS`.

**Your Corporate Network Is Blocking Salesforce Hosts**
It's possible that your corporate network is blocking the Salesforce hosts for updating or installing Salesforce CLI. Contact your IT department to whitelist these domains:

- https://developer.salesforce.com/media/salesforce-cli
- https://registry.npmjs.org
CHAPTER 10  Update the CLI

If you want to ensure that you are running the latest version of Salesforce CLI, you can manually update it.

If You Installed Salesforce CLI Using the Installer

To install the latest Salesforce CLI version, run:

```
sfdx update
sfdx-cli: Updating CLI from 6.0.0-0743bea5 to 6.0.0-aebbfd66 (alpha)... done
sfdx-cli: Updating CLI... already on latest version: 6.0.0-aebbfd66
sfdx-cli: Updating plugins... done
```

By default, the CLI periodically checks for and installs updates. To disable auto-update, set the `SFDX_AUTOUPDATE_DISABLE` environment variable to `true`.

If You Installed Salesforce CLI Using npm

The auto-update option is not available. To update Salesforce CLI using npm, run:

```
npm install --global sfdx-cli
```

Windows: Improve CLI Update Speed

Anti-virus software, such as Windows Defender, slows a CLI update because it scans all the files as they are downloaded. To improve the update speed, add the `%LOCALAPPDATA\sfdx` directory to the list of directories that are excluded from the scan. We recommend that you consult your security administrator before making this configuration change.
Disable Automatic Update of the CLI and Plug-In

When you run a command, Salesforce CLI checks to see if you have the latest version. If not, the CLI automatically updates itself and the salesforcedx plug-in. You can disable this automatic update with an environment variable.

To remain on the current version of the CLI and disable automatic updates, set the SFDX_AUTOUPDATE_DISABLE environment variable to true. How you set an environment variable is different for different operating systems. See the operating system vendor’s help for instructions on how to set environment variables.
Uninstall the CLI Binary or Plug-In

Uninstalling the CLI removes it entirely from your computer.

**macOS or Linux**

Enter all these commands in a terminal:

```
sudo rm -rf /usr/local/sfdx
sudo rm -rf /usr/local/lib/sfdx
sudo rm -rf /usr/local/bin/sfdx
sudo rm -rf ~/.local/share/sfdx ~/.config/sfdx ~/.cache/sfdx
sudo rm -rf ~/Library/Caches/sfdx
```

**Windows**

1. Select Start > Control Panel > Programs > Programs and Features.
2. Select SFDX CLI, and click Uninstall.
3. Inside your home directory, delete the `.config\sfdx` directory.

If the CLI is still installed, delete the `%LOCALAPPDATA%\sfdx` directory in Program Files.

**Uninstall the salesforcedx Plug-In**

Enter this command from a terminal or Windows command prompt:

```
sfdx plugins:uninstall salesforcedx
```
CHAPTER 12  Sample Source in GitHub

While you’re exploring Salesforce DX, look at some sample repos we’ve provided on GitHub to help you understand the concepts.

- **sfdx-simple**—A sample with two Visualforce pages, a controller, and Apex tests.
- **dreamhouse-sfdx**—A more complex sample app with multiple Apex classes, configuration items, Aura components, Visualforce components, and custom objects. The `dreamhouse-sfdx` sample is a standalone application.
- **dreamhouse-lwc**—A version of `dreamhouse-sfdx` built with Lightning web components.
- **sfdx-travisci**—A continuous integration (CI) sample that shows how to use Salesforce DX with Travis CI. Travis CI is a cloud-based continuous integration (CI) service for building and testing software projects hosted on GitHub.

SEE ALSO:
- sfdx-simple GitHub Sample
- dreamhouse-sfdx GitHub Sample
- dreamhouse-lwc GitHub Sample
- sfdx-travisci GitHub Sample
Read on to learn what to do after you’ve installed the Salesforce CLI.

For a hands-on exploration of how the Salesforce DX components work together, see the DreamHouse sample app.

To learn more about how to use Salesforce DX, see the Salesforce DX Developer Guide.

For the complete list of CLI commands and how to use them, see the Salesforce CLI Command Reference.

SEE ALSO:
- Salesforce CLI Command Reference
- Salesforce DX Developer Guide