



# Red Hat Enterprise Linux 9

## Customizing the GNOME desktop environment

Customizing the GNOME desktop environment on Red Hat Enterprise Linux 9



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## Abstract

This document describes how to customize GNOME, which is the only desktop environment available in RHEL 9. It covers the instructions for users and system administrators for configuring GNOME to meet various use cases.

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## PREFACE



### IMPORTANT

To function properly, GNOME requires your system to support **3D acceleration**. This includes bare metal systems, as well as hypervisor solutions such as **VMWare**.

If GNOME does not start or performs poorly on your VMWare virtual machine (VM), see the following solution: [Why does the GUI fail to start on my VMware virtual machine?](#)



## MAKING OPEN SOURCE MORE INCLUSIVE

Red Hat is committed to replacing problematic language in our code, documentation, and web properties. We are beginning with these four terms: master, slave, blacklist, and whitelist. Because of the enormity of this endeavor, these changes will be implemented gradually over several upcoming releases. For more details, see [our CTO Chris Wright's message](#).

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2. Click **Create** in the top navigation bar
3. Enter a descriptive title in the **Summary** field.
4. Enter your suggestion for improvement in the **Description** field. Include links to the relevant parts of the documentation.
5. Click **Create** at the bottom of the dialogue.

# CHAPTER 1. ENABLING DESKTOP ICONS

You can enable the desktop icons functionality and move files to the desktop.

## 1.1. DESKTOP ICONS IN RHEL 9

Desktop icons are provided by the **Desktop icons** GNOME Shell extension, which is available from the **gnome-shell-extension-desktop-icons** package.

### Desktop icons in GNOME Classic

The GNOME Classic environment includes the **gnome-shell-extension-desktop-icons** package by default. Desktop icons are always on, and you cannot turn them off.

### Desktop icons in GNOME Standard

In GNOME Standard, desktop icons are disabled by default.

To enable desktop icons in the GNOME Standard environment, you must install the **gnome-shell-extension-desktop-icons** package.

## 1.2. ENABLING DESKTOP ICONS IN GNOME STANDARD

This procedure enables the desktop icons functionality in the GNOME Standard environment.

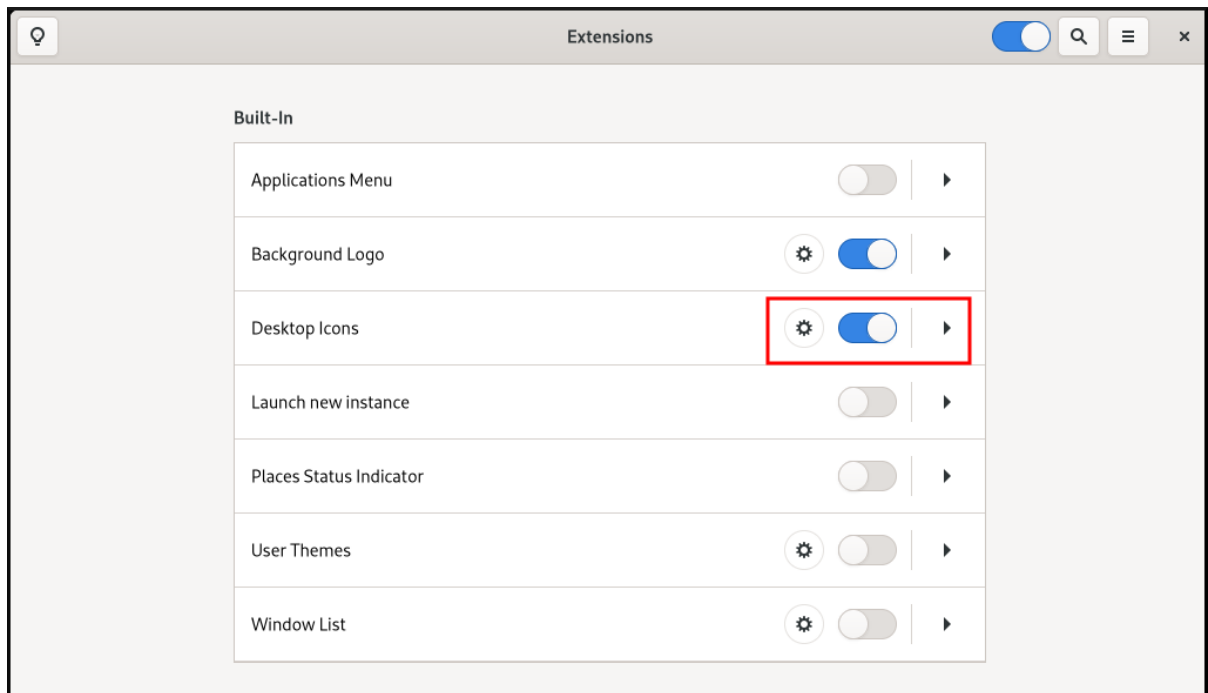
### Prerequisites

- The **Extensions** application is installed on the system:

```
# dnf install gnome-shell-extension-desktop-icons
```

### Procedure

1. Open the **Extensions** application.
2. Enable the **Desktop Icons** extension.



### 1.3. CREATING A DESKTOP ICON FOR A FILE

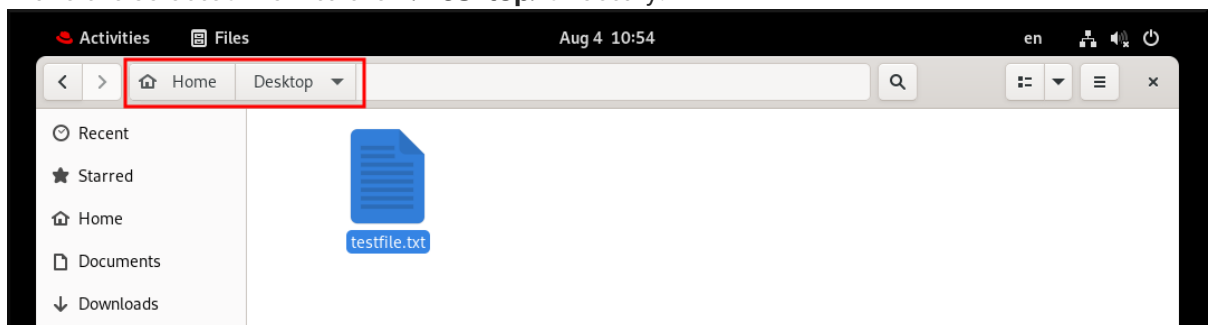
This procedure creates a desktop icon for an existing file.

#### Prerequisites

- The **Desktop icons** extension is enabled.

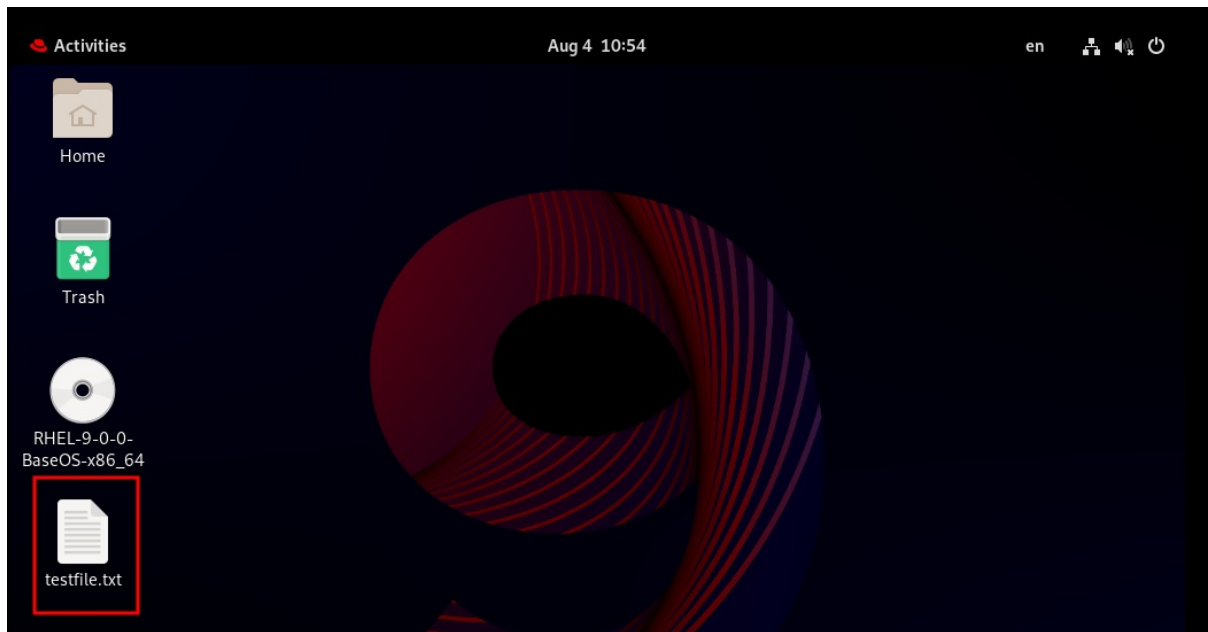
#### Procedure

- Move the selected file into the `~/Desktop/` directory.



#### Verification steps

- Check that the icon for the file appears on the desktop.



## CHAPTER 2. SETTING UP STARTUP APPLICATIONS IN GNOME

In the GNOME desktop environment, you can add applications to start automatically upon logging in, meaning that the application launches automatically every time you log into your GNOME desktop session.

### 2.1. LAUNCHING AN APPLICATION AUTOMATICALLY ON LOGIN

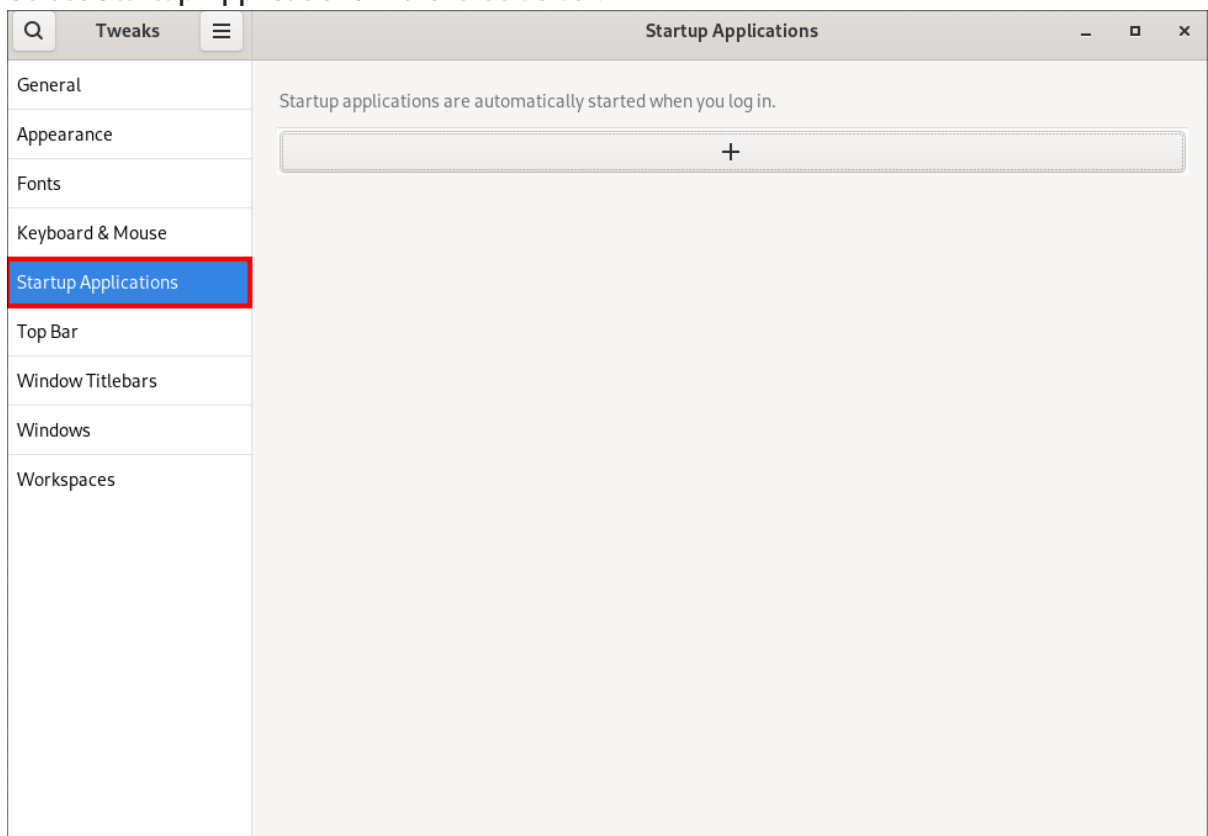
You can set applications to launch automatically on login using the **Tweaks** tool. **Tweaks** is a tool to customize the GNOME Shell environment for a particular user.

#### Prerequisites

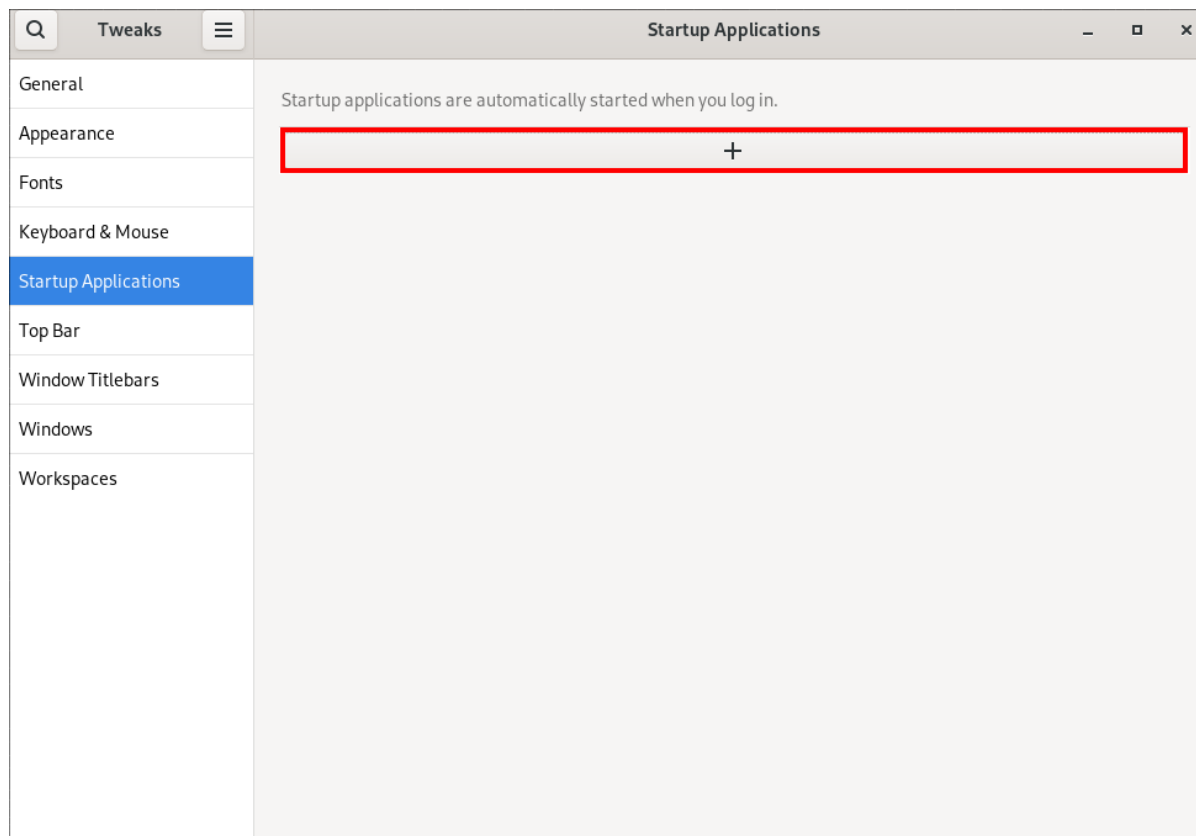
- You have installed **gnome-tweaks** on your system. For more details, see [Installing software in GNOME](#)
- You have installed the application that you want to launch at login.

#### Procedure

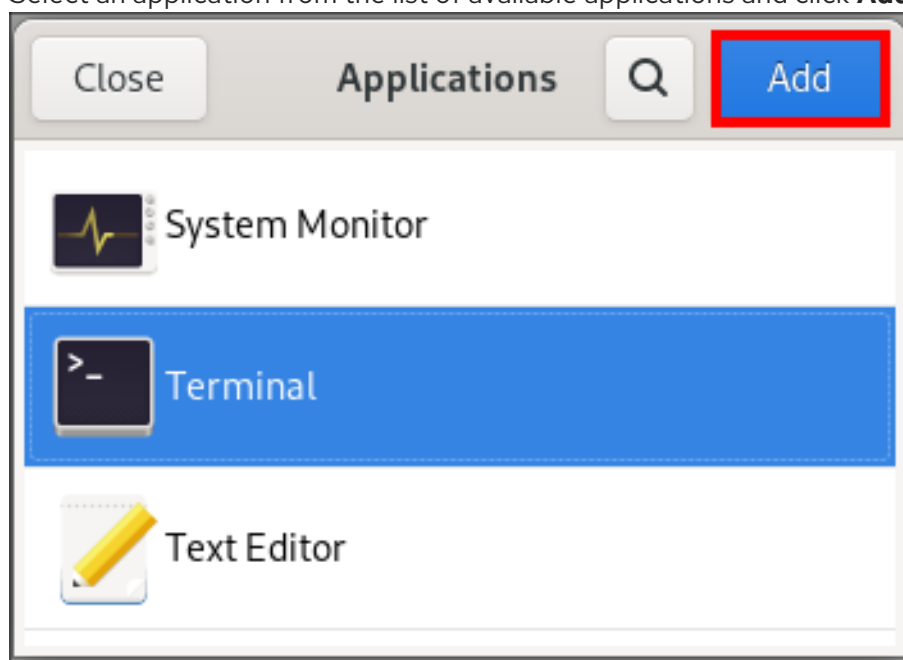
1. Open **Tweaks**. For more details see [Launching applications in GNOME](#).
2. Select **Startup Applications** in the left side bar.



3. Click the plus sign button (+).

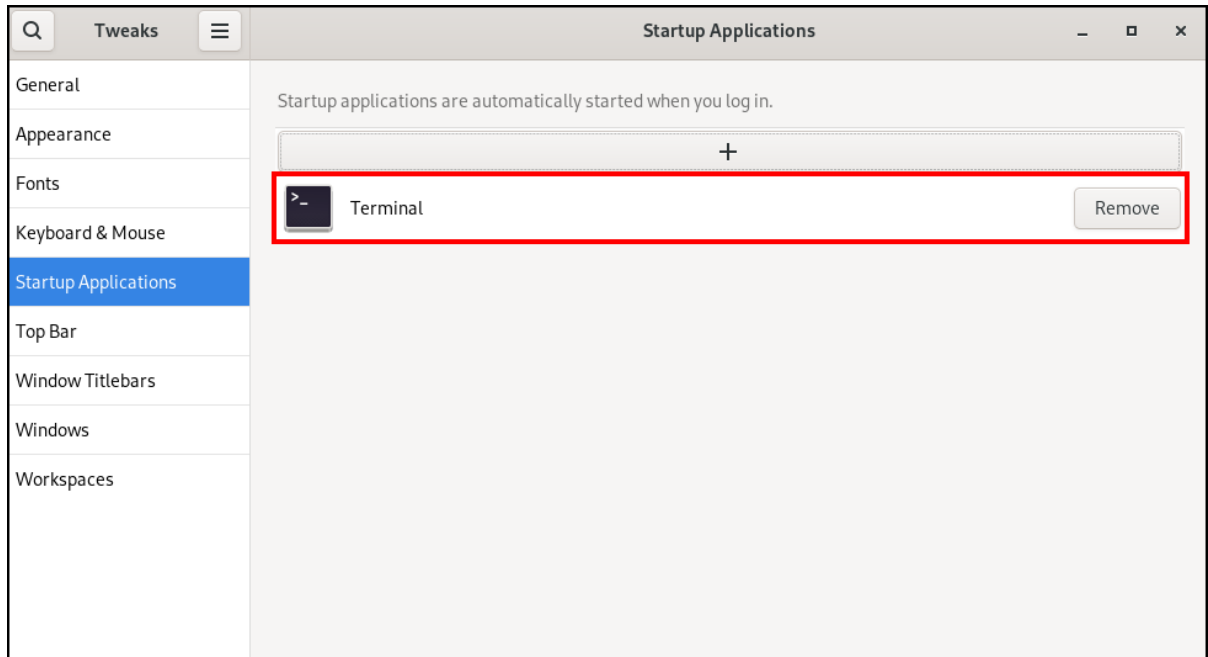


4. Select an application from the list of available applications and click **Add**.



### Verification

1. Open **Tweaks**.
2. Select **Startup Applications** in the left side bar.
3. List of applications launched at start will be present in the center section.



### Additional resources

- For more information about launching applications, see [Launching applications in GNOME](#)

## 2.2. ENABLING STARTUP APPLICATIONS FOR ANOTHER USER IN GNOME

You can set up a startup application to run for specific users on a system. This will automatically start the specified application for the target user when they log in.

### Prerequisites

- Administrative access.

### Procedure

1. Locate the **.desktop** file in the **/usr/share/applications/** directory that corresponds to the application you want to start automatically.
2. As the **root** user, copy the **.desktop** file to the **/home/<targetuser>/.config/autostart/** directory:

```
# cp /usr/share/applications/<yourapp>.desktop /home/<targetuser>/.config/autostart/
```

Replace **<yourapp>** with the name of your application. Replace **<targetuser>** with the username.

3. Ensure that the **.desktop** file is owned by the target user and has the correct permissions:

```
# chown <targetuser>:<targetuser> /home/<targetuser>/.config/autostart/<yourapp>.desktop
# chmod 644 /home/<targetuser>/.config/autostart/<yourapp>.desktop
```

Replace **<targetuser>** with the username. Replace **<yourapp>.desktop** with the **.desktop** file you copied.



## Verification

- The target user should log out of their GNOME session and log back in. The application specified in the **.desktop** file should start automatically.

## 2.3. ENABLING SYSTEM-WIDE STARTUP APPLICATIONS FOR ALL USERS IN GNOME

You can set up a startup application to run for all users on a system by placing the **.desktop** file in a system-wide directory that is accessible to all users. This will automatically start the specified application for every user who logs in.

### Prerequisites

- Administrative access.

### Procedure

1. Locate the **.desktop** file in the `/usr/share/applications/` directory that corresponds to the application you want to start automatically.
2. As the **root** user, copy the **.desktop** file to the `/etc/xdg/autostart/` directory:

```
# cp /usr/share/applications/<yourapp>.desktop /etc/xdg/autostart/
```

Replace **<yourapp>** with the name of your application.

3. Ensure that the **.desktop** file has the correct permissions to be read by all users:

```
# chmod 644 /etc/xdg/autostart/<yourapp>.desktop
```

Replace **<yourapp>.desktop** with the **.desktop** file you copied.

### Verification

- Users on the system should log out of their sessions and log back in. The application specified in the system-wide **.desktop** file should start automatically.

## CHAPTER 3. ENABLING AUTOMATIC LOGIN

You can enable automatic login in order to streamline your computing experience, avoiding the need to repeatedly enter your password during every session startup. This can be convenient for single-user environments where security risks are minimal, such as on a personal home computer that is not shared with others.



### WARNING

Enabling automatic login poses security risks. It allows direct access to the user account without requiring a password. This might lead to unauthorized use of the system or sensitive data. This risk is significant when the computer is shared, in public spaces, or physically accessible.

Consider whether the login convenience outweighs the potential compromise of security and privacy.

### Procedure

1. Open **Settings**.
2. Click **Users**.
3. Select the **Unlock** button and enter your password.
4. Toggle the switch to enable automatic login.

Once you have enabled automatic login, your computer will automatically log in to the specified user account the next time you start it up.

## CHAPTER 4. ENABLING AUTOMATIC SUSPENSION

Enabling automatic suspension provides benefits in terms of energy conservation by ensuring that your system goes into a lower power state after a period of inactivity. This feature helps reduce power consumption when your computer is not in use, potentially prolonging the battery life of your device.

### Procedure

1. Open **Settings**.
2. Click **Power**.
3. Choose **Automatic Suspend**.
4. Toggle the switch to enable automatic logout.
5. Set the desired time interval for automatic logout after inactivity.  
This interval defines how long your system remains idle before automatically logging you out.

## CHAPTER 5. ENABLING AUTOMATIC SCREEN LOCK

Enabling automatic screen lock is a security measure that helps protect your computer when it is left unattended. This feature ensures that your screen is locked after a specified period of inactivity, requiring a password or authentication to regain access.

### Procedure

1. Open **Settings**.
2. Click **Privacy**.
3. Choose **Screen Lock**.
4. Toggle the switch to enable automatic screen lock.
5. Set the desired time interval for automatic screen lock delay.  
This interval defines how long your screen stays active after itthe screen is automatically locked.

## CHAPTER 6. CHANGING HOW YOUR SYSTEM BEHAVES WHEN YOU CLOSE THE LAPTOP LID

When you close the lid of your laptop, it suspends by default to save battery. You can customize this behavior according to your preferences.

### WARNING

Some laptops can overheat if they are left running with the lid closed, especially in confined spaces. Consider whether changing this setting is safe for your laptop, especially if you intend to keep the laptop running with the lid closed for extended periods of time.

### Prerequisites

- Administrative access.

### Procedure

1. Open the `/etc/systemd/logind.conf` configuration file.
2. Look for the line that says **HandleLidSwitch=suspend**.
3. If the line starts with the **#** symbol, remove it to enable the setting.
4. Replace **suspend** with one of the following options:
  - **poweroff** to shut down the computer.
  - **lock** to lock the screen.
  - **ignore** to do nothing.

For example, to lock the screen upon closing the lid, use this setting:

```
HandleLidSwitch=lock
```

5. Save your changes and close the editor.

# CHAPTER 7. CUSTOMIZING DESKTOP APPEARANCE AND BRANDING

As a system administrator, you can configure the default appearance and branding of the GNOME interface for all users on the system.

## 7.1. CUSTOMIZING DESKTOP BACKGROUNDS

As a system administrator, you can configure the default desktop background, add extra backgrounds, or add multiple backgrounds available to all users of the system.

If the users are not permitted to change background from the defaults, you must lock the settings using the **locks** directory. Otherwise, each user can customize the background according to their preferences.

### 7.1.1. Customizing the default desktop background

You can configure the default desktop background and its appearance by setting the relevant GSettings keys in the **org.gnome.desktop.background** schema.

#### Procedure

1. Create a local database for machine-wide settings in **/etc/dconf/db/local.d/00-background**:

```
[org/gnome/desktop/background]

picture-uri='file:///usr/local/share/backgrounds/wallpaper.jpg' 1
picture-options='scaled' 2
primary-color='000000' 3
secondary-color='FFFFFF' 4
```

- 1 Specify the path to the desktop background image file.
- 2 Specify one of the rendering options for the background image:
  - **none**
  - **wallpaper**
  - **centered**
  - **scaled**
  - **stretched**
  - **zoom**
  - **spanned**
- 3 Specify the left or top color when drawing gradients or the solid color.
- 4 Specify the right or bottom color when drawing gradients.

- Optional: If you want to prevent a user from changing the default background, override the user's setting in the `/etc/dconf/db/local.d/locks/background` file:

```
# List the keys used to configure the desktop background
/org/gnome/desktop/background/picture-uri
/org/gnome/desktop/background/picture-options
/org/gnome/desktop/background/primary-color
/org/gnome/desktop/background/secondary-color
```

- Update the system databases:

```
# dconf update
```

- Users must log out and back in again before the system-wide settings take effect.

## 7.1.2. Adding extra backgrounds

You can make extra backgrounds available to users on your system.

### Procedure

- Create the `/usr/share/gnome-background-properties/extra-backgrounds.xml` file.
- In the new file, specify the extra background files and their appearance in the following format:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE wallpapers SYSTEM "gnome-wp-list.dtd">
<wallpapers>
  <wallpaper deleted="false">
    <name>Background name</name>
    <filename>full-path-to-the-image</filename>
    <options>display-option</options>
    <shade_type>background-shade</shade_type>
    <pcolor>primary-color</pcolor>
    <scolor>secondary-color</scolor>
  </wallpaper>
</wallpapers>
```

- The new backgrounds are now available to all users in the **Background** section of the **Settings** application.

## 7.1.3. Frequently used background schema keys

The following configuration controls the behavior of desktop backgrounds in the GSettings system.

**Table 7.1. Frequently used GSettings and XML background keys**

Key name	XML name	Possible values	Description
----------	----------	-----------------	-------------

Key name	XML name	Possible values	Description
<b>picture-options</b>	<b>options</b>	<ul style="list-style-type: none"> <li>• none</li> <li>• wallpaper</li> <li>• centered</li> <li>• scaled</li> <li>• stretched</li> <li>• zoom</li> <li>• spanned</li> </ul>	Determines how the image set by <b>wallpaper_filename</b> is rendered.
<b>color-shading-type</b>	<b>shade_type</b>	<ul style="list-style-type: none"> <li>• horizontal</li> <li>• vertical</li> <li>• solid</li> </ul>	Determines the shade of the background color.
<b>primary-color</b>	<b>pcolor</b>	default: <b>#023c88</b>	Left or Top color when drawing gradients, or the solid color.
<b>secondary-color</b>	<b>scolor</b>	default: <b>#5789ca</b>	Right or Bottom color when drawing gradients, not used for solid color.

#### Example 7.1. An extra backgrounds file with one<wallpaper> element

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE wallpapers SYSTEM "gnome-wp-list.dtd">
<wallpapers>
  <wallpaper deleted="false">
    <name>Company Background</name>
    <name xml:lang="de">Firmenhintergrund</name>
    <filename>/usr/local/share/backgrounds/company-wallpaper.jpg</filename>
    <options>zoom</options>
    <shade_type>solid</shade_type>
    <pcolor>#ffffff</pcolor>
    <scolor>#000000</scolor>
  </wallpaper>
</wallpapers>
```

#### Example 7.2. An extra backgrounds file with two<wallpaper> elements

In one configuration file, you can specify multiple **<wallpaper>** elements to add more backgrounds as shown in the following example with two **<wallpaper>** elements, adding two different backgrounds.



```

<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE wallpapers SYSTEM "gnome-wp-list.dtd">
<wallpapers>
  <wallpaper deleted="false">
    <name>Company Background</name>
    <name xml:lang="de">Firmenhintergrund</name>
    <filename>/usr/local/share/backgrounds/company-wallpaper.jpg</filename>
    <options>zoom</options>
    <shade_type>solid</shade_type>
    <pcolor>#ffffff</pcolor>
    <scolor>#000000</scolor>
  </wallpaper>
  <wallpaper deleted="false">
    <name>Company Background 2</name>
    <name xml:lang="de">Firmenhintergrund 2</name>
    <filename>/usr/local/share/backgrounds/company-wallpaper-2.jpg</filename>
    <options>zoom</options>
    <shade_type>solid</shade_type>
    <pcolor>#ff0000</pcolor>
    <scolor>#00ffff</scolor>
  </wallpaper>
</wallpapers>

```

#### 7.1.4. Setting the screen shield

Screen shield is the screen that slides down when you lock the system. You can set a default screen shield picture for all users on the system.

##### Procedure

1. Create the `/etc/dconf/db/gdm.d/01-screensaver` file:

```

[org/gnome/desktop/screensaver]
picture-uri='file:///opt/corp/background.jpg'

```

Replace `/opt/corp/background.jpg` with the absolute path to the image file that you want to use as the default screen shield. Supported formats are PNG, JPG, JPEG, and TGA. Note that the screen shield scales your image if necessary to fit the screen.

2. Update the system databases:

```
# dconf update
```

3. Users must log out and back in again before the system-wide settings take effect.

##### Troubleshooting

- If the screen shield does not update:
  - a. Verify that you have updated the system databases:

```
# dconf update
```

- b. Try restarting GDM:

```
# systemctl restart gdm.service
```



### WARNING

Restarting the **gdm** service terminates all currently running GNOME sessions of all desktop users who are logged in. This might result in users losing unsaved data.

## 7.2. CUSTOMIZING THE BRANDING OF THE LOGIN SCREEN

You can change the logo that appears on the GNOME login screen (GDM) using a **dconf** profile.

### Prerequisites

- Prepare an image file in any of the supported formats: ANI, BPM, GIF, GTIFF, ICNS, ICO, JPEG, JPEG 2000, PCX, PNM, PBM, PGM, PPM, RAS, SVG, TGA, TIFF, WBMP, XBM, or XPM.
- The image must be around 48 pixels in height. If it is significantly larger, it will exceed the logo area.
- Store the image file in a location that the **gdm** user can access. For example, select a universally readable system directory such as **/opt/** or **/usr/local/**.

### Procedure

1. Create the **/etc/dconf/db/gdm.d/01-override-logo** configuration file with the following content:

```
[org/gnome/login-screen]
logo='/path/to/logo.png'
```

Replace **/path/to/logo.png** with the full path to the image file that you want to use as the login screen logo.

2. Update the system databases:

```
# dconf update
```

### Verification

1. Log out or otherwise switch to the login screen.
2. Check if it displays the logo that you selected.
3. If the logo does not update, restart GDM:

```
# systemctl restart gdm
```

**WARNING**

Restarting the **gdm** service terminates all currently running GNOME sessions of all desktop users who are logged in. This might result in users losing unsaved data.

## CHAPTER 8. LAUNCHING AN APPLICATION AUTOMATICALLY ON LOGIN

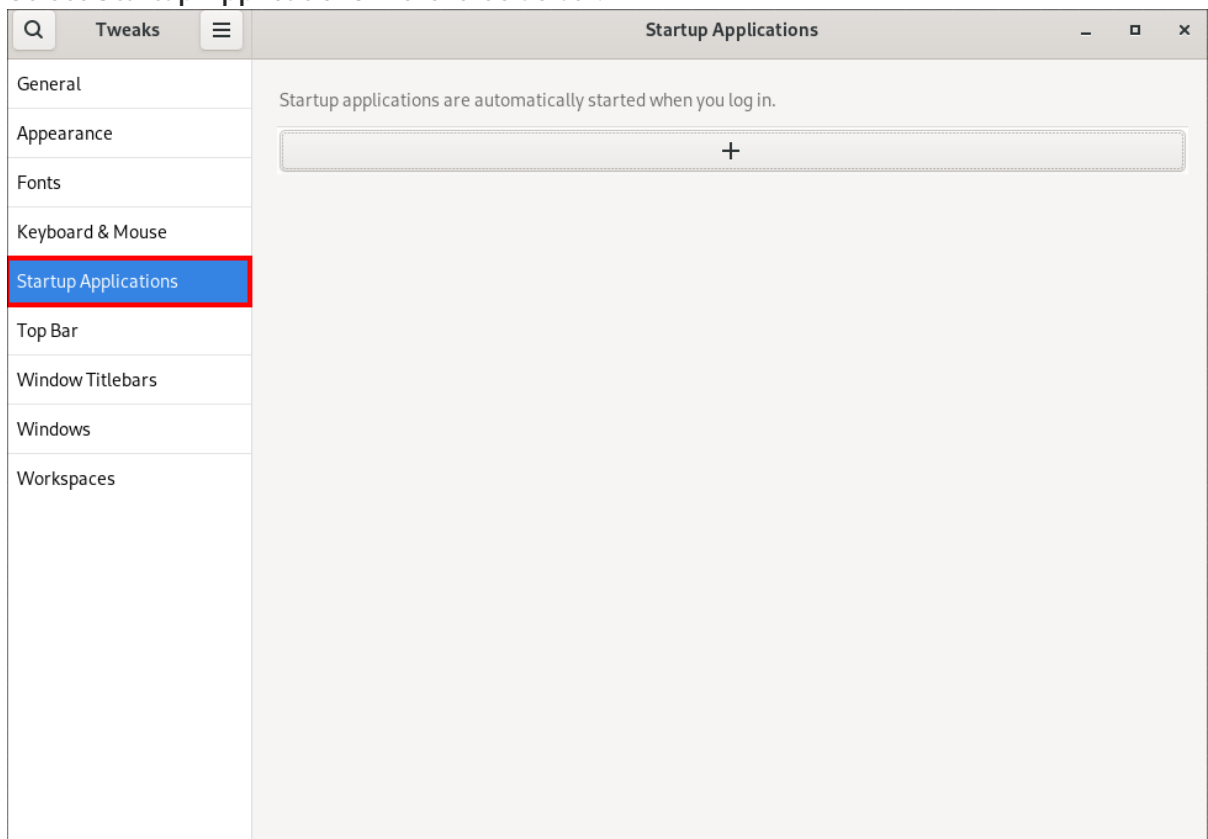
You can set applications to launch automatically on login using the **Tweaks** tool. **Tweaks** is a tool to customize the GNOME Shell environment for a particular user.

### Prerequisites

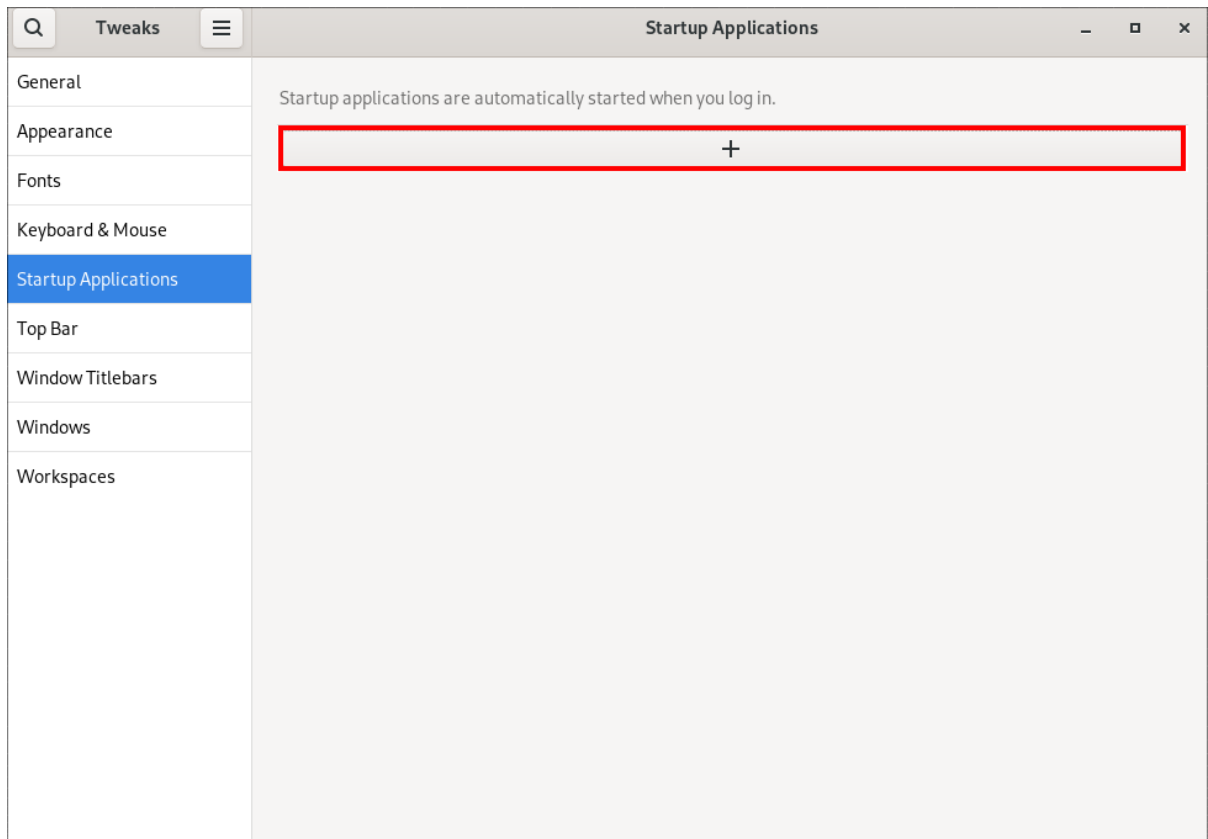
- You have installed **gnome-tweaks** on your system. For more details, see [Installing software in GNOME](#)
- You have installed the application that you want to launch at login.

### Procedure

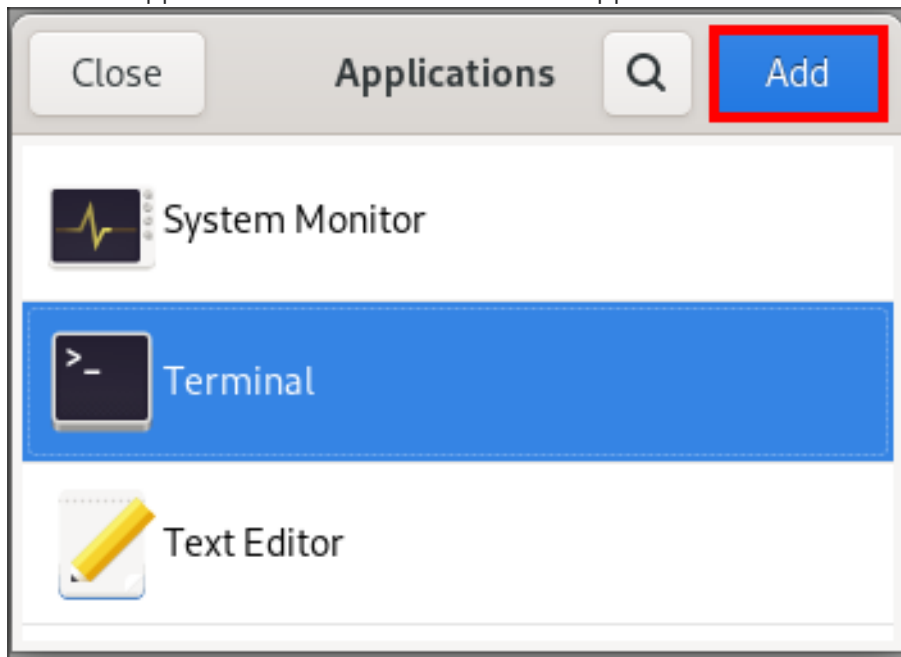
1. Open **Tweaks**. For more details see [Launching applications in GNOME](#).
2. Select **Startup Applications** in the left side bar.



3. Click the plus sign button (+).

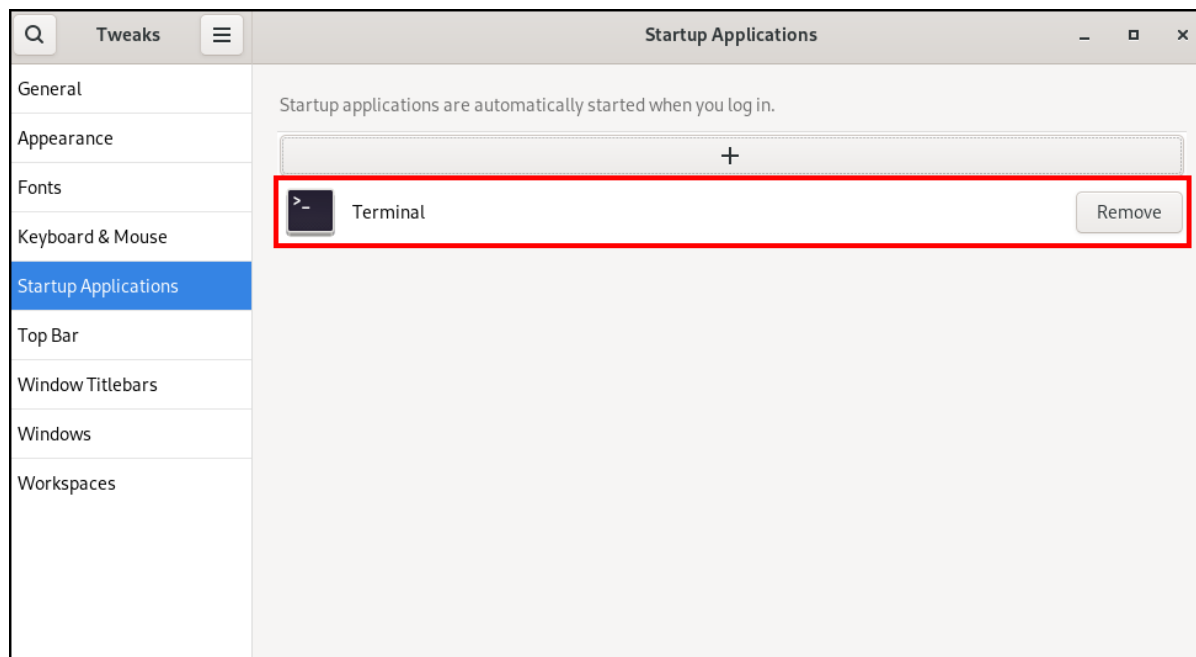


4. Select an application from the list of available applications and click **Add**.



### Verification

1. Open **Tweaks**.
2. Select **Startup Applications** in the left side bar.
3. List of applications launched at start will be present in the center section.



### Additional resources

- For more information about launching applications, see [Launching applications in GNOME](#)

## CHAPTER 9. RESTRICTING THE DESKTOP SESSION

You can restrict and control various functionalities on the GNOME desktop environment. You can enforce specific configurations and restrictions to maintain system integrity and prevent unauthorized access.

### 9.1. DISABLING USER LOGOUT AND USER SWITCHING

Disabling user logout and user switching can improve security, prevent user errors, and enforce a specific workflow. This can mitigate unauthorized access to sensitive data and disruptions to the workflow caused by users accidentally logging out or switching to another user.

#### Prerequisites

- Administrative access.

#### Procedure

1. Create a plain text **/etc/dconf/db/local.d/00-logout** keyfile in the **/etc/dconf/db/local.d/** directory with the following content:

```
[org/gnome/desktop/lockdown]
# Disable user logut
disable-log-out=true

# Disable user switching
disable-user-switching=true
```

2. Create a new file under the **/etc/dconf/db/local.d/locks/** directory and list the keys or subpaths you want to lock down:

```
# Lock user logout
/org/gnome/desktop/lockdown/disable-log-out

# Lock user switching
/org/gnome/desktop/lockdown/disable-user-switching
```

3. Apply the changes to the system databases:

```
# dconf update
```

### 9.2. DISABLING PRINTING

Disabling printing can prevent unauthorized access to sensitive documents and potential breaches and safeguard confidential information.

#### Prerequisites

- Administrative access.

#### Procedure

1. Create a plain text **/etc/dconf/db/local.d/00-printing** keyfile in the **/etc/dconf/db/local.d/** directory with the following content:

```
[org/gnome/desktop/lockdown]
# Disable printing
disable-printing=true
```

2. Create a new file under the **/etc/dconf/db/local.d/locks/** directory and list the keys or subpaths you want to lock down:

```
# Lock printing
/org/gnome/desktop/lockdown/disable-printing
```

3. Apply the changes to the system databases:

```
# dconf update
```

## 9.3. DISABLING FILESAVING

Disabling file saving can help to protect sensitive data from unauthorized access and protect against potential data leaks.

### Prerequisites

- Administrative access.

### Procedure

1. Create a plain text **/etc/dconf/db/local.d/00-filesaving** keyfile in the **/etc/dconf/db/local.d/** directory with the following content:

```
[org/gnome/desktop/lockdown]
# Disable saving files on disk
disable-save-to-disk=true
```

2. Create a new file under the **/etc/dconf/db/local.d/locks/** directory and list the keys or subpaths you want to lock down:

```
# Lock file saving
/org/gnome/desktop/lockdown/disable-save-to-disk
```

3. Apply the changes to the system databases:

```
# dconf update
```

## 9.4. DISABLING THE COMMAND PROMPT

Disabling the command prompt can simplify user interactions with the system, prevent inexperienced users from executing potentially harmful commands that might cause system instability or data loss, and reduce the risk of unauthorized changes to system settings or configurations.

### Prerequisites



- Administrative access.

### Procedure

1. Create a plain text `/etc/dconf/db/local.d/00-lockdown` keyfile in the `/etc/dconf/db/local.d/` directory with the following content:

```
[org/gnome/desktop/lockdown]
# Disable command prompt
disable-command-line=true
```

2. Create a new file under the `/etc/dconf/db/local.d/locks/` directory and list the keys or subpaths you want to lock down:

```
# Lock command prompt
/org/gnome/desktop/lockdown/disable-command-line
```

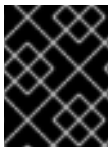
3. Apply the changes to the system databases:

```
# dconf update
```

4. For this settings to take effect, users needs to log out and log back in.

## 9.5. DISABLING REPARTITIONING

You can override the default system settings that control disk management.



### IMPORTANT

Avoid modifying the `/usr/share/polkit-1/actions/org.freedesktop.udisks2.policy` file directly. Any changes you make will be replaced during the next package update.

### Prerequisites

- Administrative access.

### Procedure

1. Copy the `/usr/share/polkit-1/actions/org.freedesktop.udisks2.policy` file under the `/etc/share/polkit-1/actions/` directory:

```
# cp /usr/share/polkit-1/actions/org.freedesktop.udisks2.policy /etc/share/polkit-1/actions/org.freedesktop.udisks2.policy
```

2. In the `/etc/polkit-1/actions/org.freedesktop.udisks2.policy` file, delete any actions that you do not need and add the following lines:

```
<action id="org.freedesktop.udisks2.modify-device">
  <message>Authentication is required to modify the disks settings</message>
  <defaults>
    <allow_any>no</allow_any>
    <allow_inactive>no</allow_inactive>
```

```
<allow_active>yes</allow_active>
</defaults>
</action>
```

If you want to restrict access only to the root user, replace **<allow\_any>no</allow\_any>** with **<allow\_any>auth\_admin</allow\_any>**.

## CHAPTER 10. RESTRICTING THE SESSION TO A SINGLE APPLICATION

You can start the GNOME session in single-application mode, also known as kiosk mode. In this session, GNOME displays only a full-screen window of the application that you have selected.

### 10.1. SINGLE-APPLICATION MODE

Single-application mode is a modified GNOME session that reconfigures the Mutter window manager into an interactive kiosk. This session locks down certain behavior to make the standard desktop more restrictive. The user can interact only with a single application selected by the administrator.

You can set up single-application mode for several use cases, such as:

- In the communication, entertainment, or education fields
- As a self-serve machine
- As an event manager
- As a registration point

The GNOME Kiosk utility provides the single-application mode configuration and sessions.

The following single-application sessions are available:

#### Search Appliance Session

This session always starts the **Mozilla Firefox** web browser at the **www.google.com** website.

#### Kiosk Script Session

This session starts an arbitrary application that you specify in a shell script.

### 10.2. ENABLING SEARCH APPLIANCE MODE

This procedure installs and enables the Search Appliance Session, which restricts the GNOME session to the Google search engine in a web browser.

#### Procedure

1. Install the GNOME Kiosk packages:

```
# dnf install gnome-kiosk gnome-kiosk-search-appliance
```

2. At the GNOME login screen, select **Search Appliance Session** from the gear button menu and log in as the single-application user.
3. The **Mozilla Firefox** browser opens as a full-screen window in its kiosk mode. It shows the Google search page.

#### Additional resources

- The `/usr/share/doc/gnome-kiosk/README.md` file provided by the **gnome-kiosk** package.

## 10.3. ENABLING SINGLE-APPLICATION MODE

This procedure installs and enables the Kiosk Script Session, which restricts the GNOME session to a selected single application.

### Procedure

1. Install the GNOME Kiosk packages:

```
# dnf install gnome-kiosk gnome-kiosk-script-session
```

2. At the GNOME login screen, select **Kiosk Script Session** from the gear button menu and log in as the single-application user.
3. The **gedit** text editor opens as a full-screen window. It shows the shell script that configures which application runs in your single-application session.  
Edit the shell script and enter the application that you want to start in the single-application session.

For example, to start the **Mozilla Firefox** browser, enter the following content:

```
#!/usr/bin/sh  
  
firefox --kiosk https://example.org
```

4. Save the script file.
5. Close the **gedit** window.  
The session terminates and restarts with your selected application.
6. The next time you log into the single-application session, your selected application runs.

### Additional resources

- The `/usr/share/doc/gnome-kiosk/README.md` file provided by the **gnome-kiosk** package.

## CHAPTER 11. CONFIGURING SOUND IN GNOME

You can configure sound volume and other sound options in GNOME.

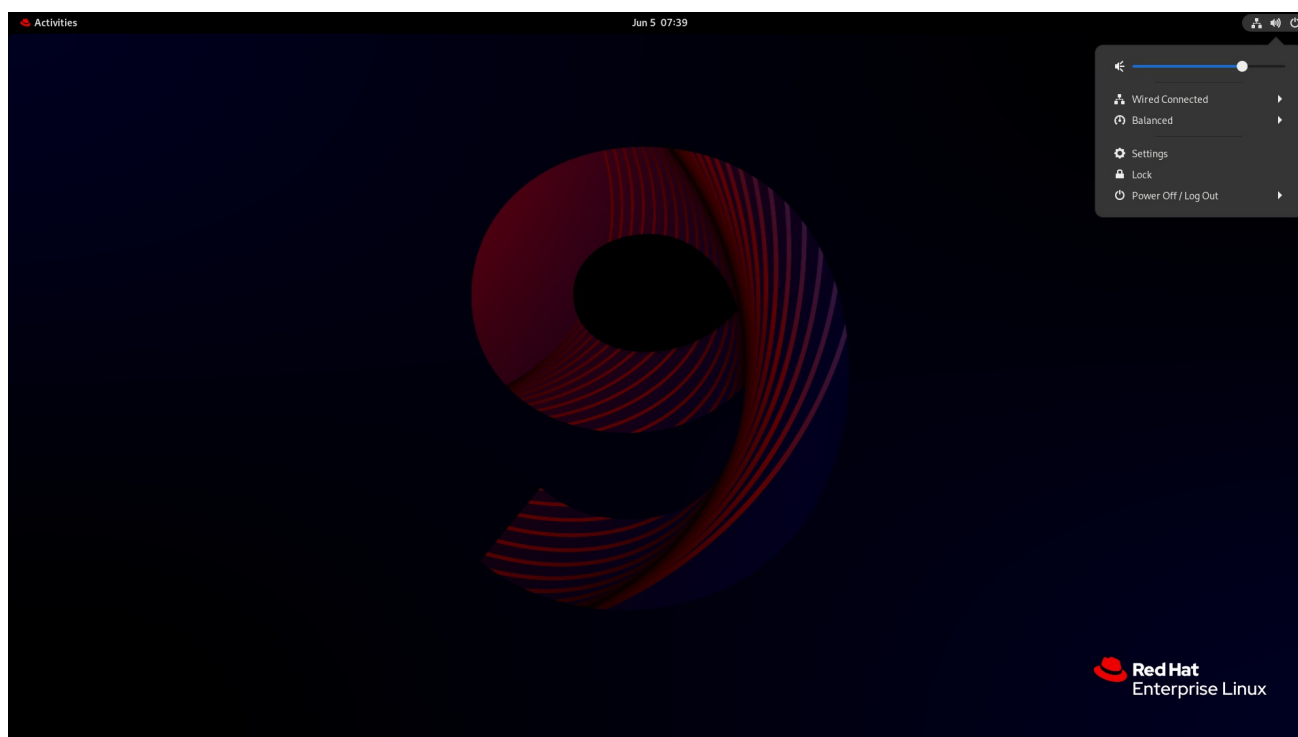
### 11.1. SOUND CONFIGURATION TOOLS IN GNOME

In RHEL 9, the **PipeWire** sound server handles sound output and input. **PipeWire** lets programs output the audio using the **pipewire** daemon.

To configure sound, you can use one of the following graphical applications in GNOME:

#### System menu

The **system menu** is located in the top-right screen corner. It enables you only to set the intensity of the sound output or sound input through the sound bar. The sound bar for input sound is available only if you are running an application that is using an internal microphone (built-in audio), such as some teleconference tools.

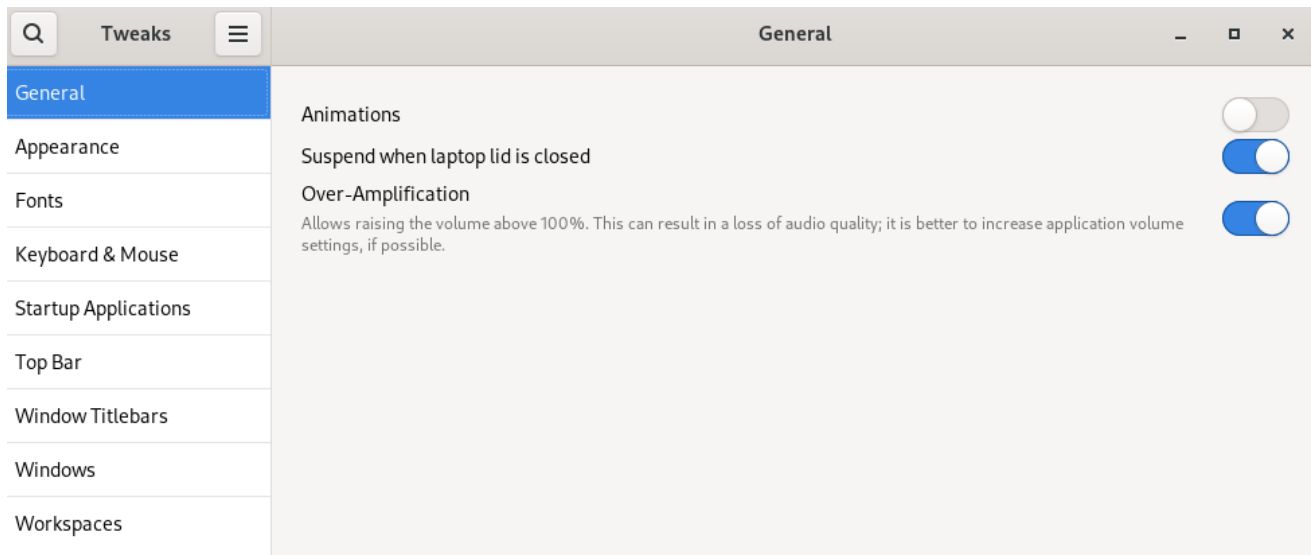


#### Settings

**Settings** provides other general options to configure sound.

#### Tweaks

The **Tweaks** application enables you to configure only volume over-amplification.



### Additional resources

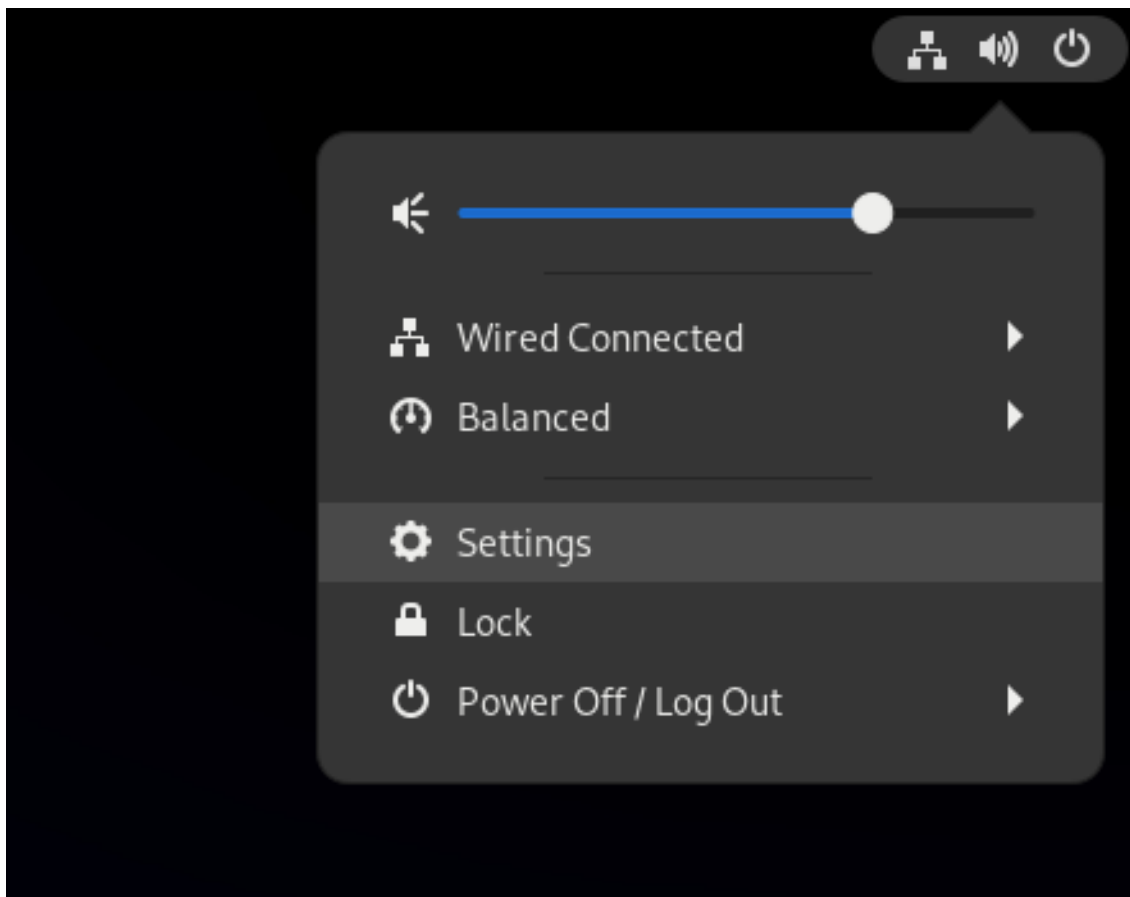
- For more information about **PipeWire**, see the **pipewire** man page.

## 11.2. ACCESSING SOUND CONFIGURATION IN SETTINGS

This procedure opens the sound configuration screen in the **Settings**.

1. Launch **Settings**.

You can use one of the approaches described in [Launching applications in GNOME](#). Alternatively, you can also launch it from the **system menu** by clicking on its icon.



2. In **Settings**, choose **Sound** from the left vertical bar.

## 11.3. SOUND OPTIONS IN SETTINGS

Through the **Sound** menu in **Settings**, you can configure the following sound options:

### Volume Levels

The **Volume levels** section shows all currently running applications that can process sound, and allows you to amplify or lower the sound of a particular application.

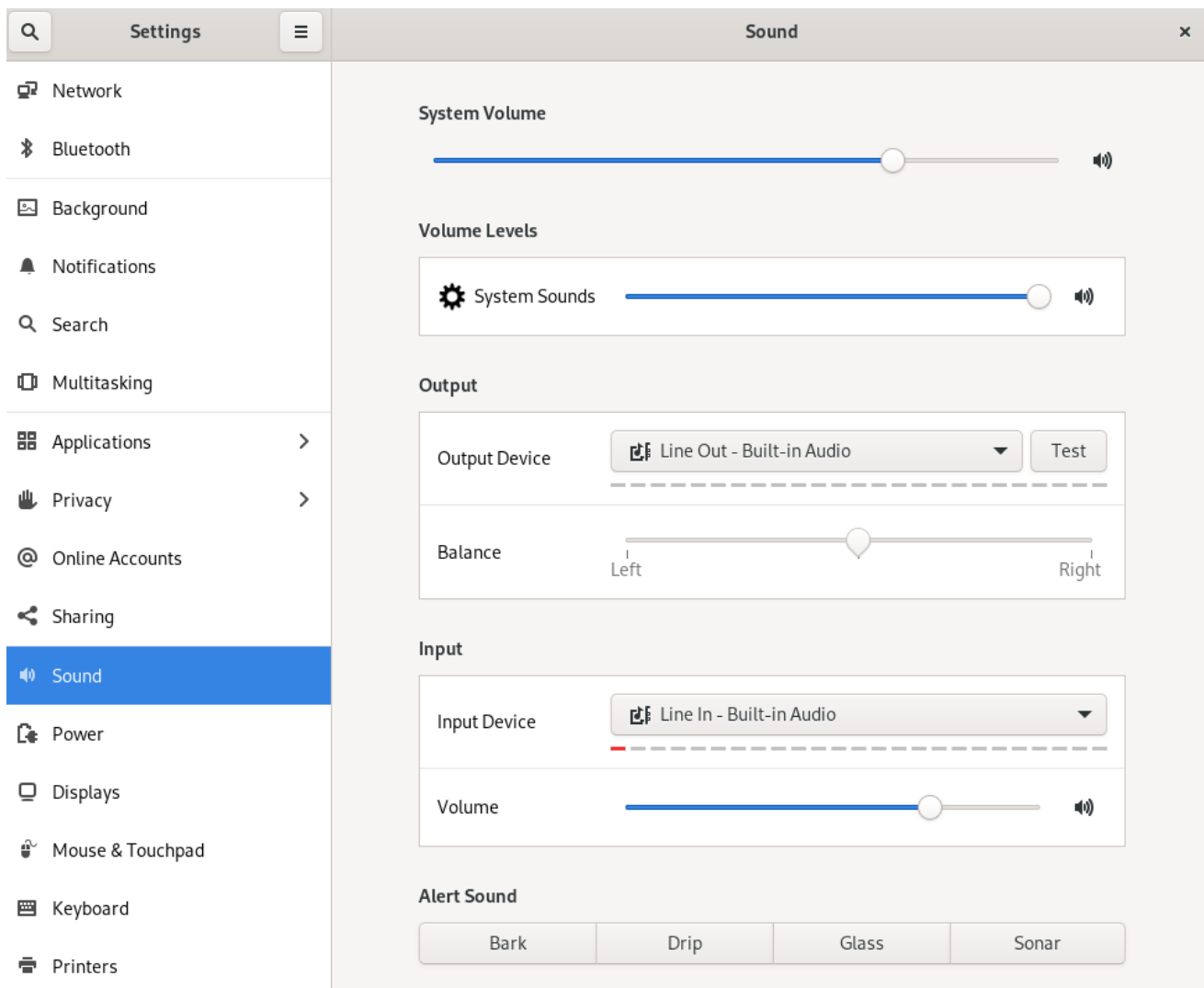
### Output and Input

The **Output** and **Input** sections show all built-in audio devices and external audio devices that are currently connected.

### Alert sound

The **Alert sound** section shows different themes of system audio alerts.

### The Output section on the sound configuration screen



## CHAPTER 12. DISPLAYING THE SYSTEM SECURITY CLASSIFICATION

As an administrator of deployments where the user must be aware of the security classification of the system, you can set up a notification of the security classification. This can be either a permanent banner or a temporary notification, and it can appear on login screen, in the GNOME session, and on the lock screen.

### 12.1. ENABLING SYSTEM SECURITY CLASSIFICATION BANNERS

You can create a permanent classification banner to state the overall security classification level of the system. This is useful for deployments where the user must always be aware of the security classification level of the system that they are logged into.

The permanent classification banner can appear within the running session, the lock screen, and login screen, and customize its background color, its font, and its position within the screen.

This procedure creates a red banner with a white text placed on both the top and bottom of the login screen.

#### Procedure

1. Install the **gnome-shell-extension-classification-banner** package:

```
# dnf install gnome-shell-extension-classification-banner
```

2. Create the **99-class-banner** file at either of the following locations:

- To configure a notification at the login screen, create **/etc/dconf/db/gdm.d/99-class-banner**.
- To configure a notification in the user session, create **/etc/dconf/db/local.d/99-class-banner**.

3. Enter the following configuration in the created file:

```
[org/gnome/shell]
enabled-extensions=['classification-banner@gnome-shell-extensions.gcampax.github.com']

[org/gnome/shell/extensions/classification-banner]
background-color='rgba(200,16,46,0.75)'
message='TOP SECRET'
top-banner=true
bottom-banner=true
system-info=true
color='rgb(255,255,255)'
```



**WARNING**

This configuration overrides similar configuration files that also enable an extension, such as [Notifying of the system security classification](#).

To enable multiple extensions, specify all of them in the **enabled-extensions** list. For example:

```
enabled-extensions=['heads-up-display@gnome-shell-
extensions.gcampax.github.com', 'classification-banner@gnome-shell-
extensions.gcampax.github.com']
```

4. Update the **dconf** database:

```
# dconf update
```

5. Reboot the system.

**Troubleshooting**

- If the classification banners are not displayed for an existing user, log in as the user and enable the **Classification banner** extension using the **Extensions** application.

**12.2. NOTIFYING OF THE SYSTEM SECURITY CLASSIFICATION**

You can set up a notification that contains a predefined message in an overlay banner. This is useful for deployments where the user is required to read the security classification of the system before logging in.

Depending on your configuration, the notification can appear at the login screen, after logging in, on the lock screen, or after a longer time with no user activity. You can always dismiss the notification when it appears.

**Procedure**

1. Install the **gnome-shell-extension-heads-up-display** package:

```
# dnf install gnome-shell-extension-heads-up-display
```

2. Create the **99-hud-message** file at either of the following locations:
  - To configure a notification at the login screen, create **/etc/dconf/db/gdm.d/99-hud-message**.
  - To configure a notification in the user session, create **/etc/dconf/db/local.d/99-hud-message**.
3. Enter the following configuration in the created file:

```
[org/gnome/shell]
enabled-extensions=["heads-up-display@gnome-shell-extensions.gcampax.github.com"]

[org/gnome/shell/extensions/heads-up-display]
message-heading="Security classification title"
message-body="Security classification description"
# The following options control when the notification appears:
show-when-locked=true
show-when-unlocking=true
show-when-unlocked=true
```

Replace the following values with text that describes the security classification of your system:

#### **Security classification title**

A short heading that identifies the security classification.

#### **Security classification description**

A longer message that provides additional details, such as references to various guidelines.



#### **WARNING**

This configuration overrides similar configuration files that also enable an extension, such as [Enabling system security classification banners](#).

To enable multiple extensions, specify all of them in the **enabled-extensions** list. For example:

```
enabled-extensions=["heads-up-display@gnome-shell-
extensions.gcampax.github.com", 'classification-banner@gnome-shell-
extensions.gcampax.github.com']
```

4. Update the **dconf** database:

```
# dconf update
```

5. Reboot the system.

### Troubleshooting

- If the notifications are not displayed for an existing user, log in as the user and enable the **Heads-up display message** extension using the **Extensions** application.

## CHAPTER 13. ENABLING ACCESSIBILITY FOR VISUALLY IMPAIRED USERS

As a system administrator, you can configure the desktop environment to support users with a visual impairment.

To enable accessibility, perform the following procedures.

### 13.1. COMPONENTS THAT PROVIDE ACCESSIBILITY FEATURES

On the Red Hat Enterprise Linux 9 desktop, the **Orca** screen reader ensures accessibility for users with a visual impairment. **Orca** is included in the default RHEL installation.

**Orca** reads information from the screen and communicates it to you using the following components:

#### Speech Dispatcher

**Orca** uses **Speech Dispatcher** to communicate with the speech synthesizer. **Speech Dispatcher** supports various speech synthesis backends, ensures that messages from other applications do not to interrupt the messages from **Orca**, and provides other functionality.

#### Speech synthesizer

Provides a speech output. The default speech synthesizer is **eSpeak-NG**.

#### Braille display

Provides a tactile output. The **BRLTTY** service enables this functionality.

#### Additional resources

- [Orca help page](#)

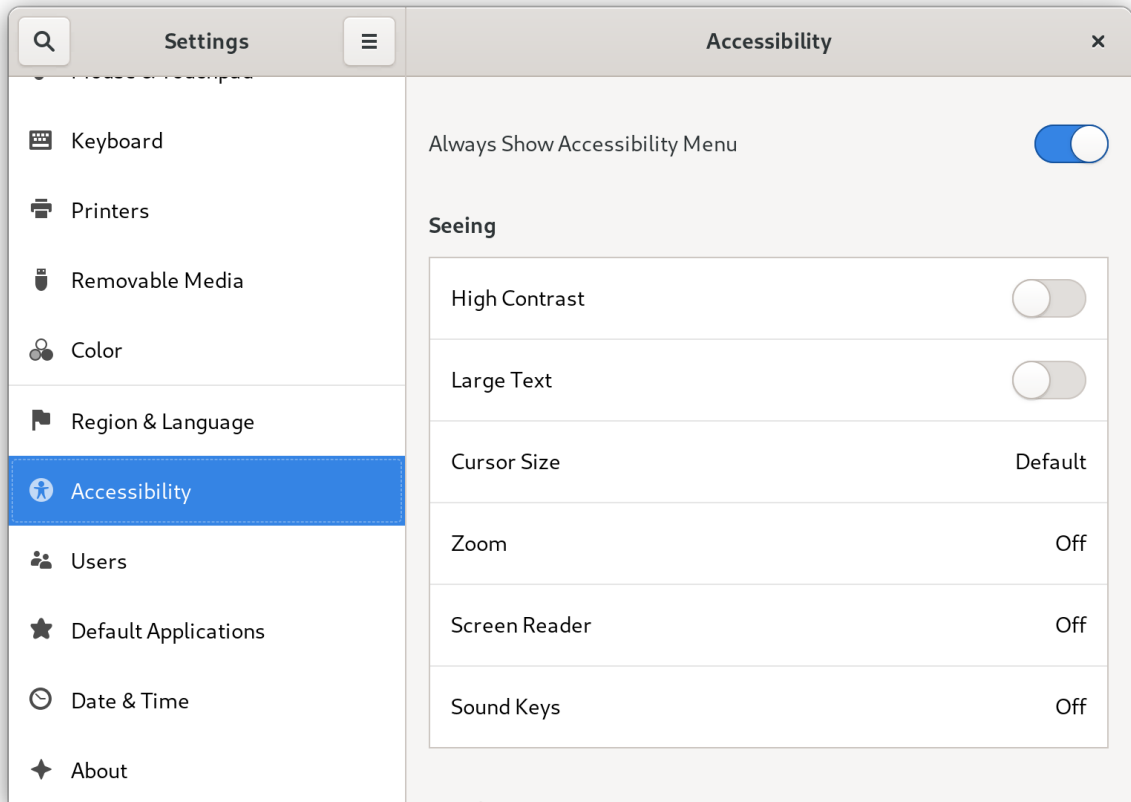
### 13.2. ENABLING THE ACCESSIBILITY MENU

You can enable the **Accessibility menu** icon in the top panel, which provides a menu with several accessibility options.

#### Procedure

1. Open the **Settings** application.
2. Select **Accessibility**.
3. Enable the **Always Show Accessibility Menu** item.

#### Enabling the Accessibility menu in Settings



### Verification

- Check that the **Accessibility menu** icon is displayed on the top bar even when all options from this menu are switched off.



## 13.3. ENABLING THE SCREEN READER

You can enable the **Orca** screen reader in your desktop environment. The screen reader then reads the text displayed on the screen to improve accessibility.

### Procedure

- Enable the screen reader using either of the following ways:
  - Press the **Super+Alt+S** keyboard shortcut.
  - If the top panel shows the **Universal Access** menu, select **Screen Reader** in the menu.

### Verification

1. Open an application with text content.
2. Check that the screen reader reads the text in the application.

## 13.4. ENABLING A BRAILLE DISPLAY DEVICE

The Braille display is a device that uses the **brlty** service to provide tactile output for visually impaired users.

In order for the Braille display to work correctly, perform the following procedures.

### 13.4.1. Supported types of Braille display device

The following types of Braille display devices are supported on Red Hat Enterprise Linux 9.

**Table 13.1. Braille display device types and the corresponding syntax**

Braille device type	Syntax of the type	Note
Serial device	<b>serial:path</b>	Relative paths are at <b>/dev</b> .
USB device	<b>[serial-number]</b>	The brackets ( <b>[]</b> ) here indicate optionality.
Bluetooth device	<b>bluetooth:address</b>	

### 13.4.2. Enabling the brlty service

To enable the Braille display, enable the **brlty** service to start automatically on boot. By default, **brlty** is disabled.

#### Prerequisites

- Ensure that the **brlty** package is installed:

```
# dnf install brlty
```

- Optionally, you can install speech synthesis support for **brlty**:

```
# dnf install brlty-espeak-ng
```

#### Procedure

- Enable the **brlty** service to start on boot:

```
# systemctl enable --now brlty
```

#### Verification steps

1. Reboot the system.
2. Check that the **brlty** service is running:

```
# systemctl status brlty
• brlty.service - Braille display driver for Linux/Unix
```

```

Loaded: loaded (/usr/lib/systemd/system/brltty.service; enabled; vendor pres>
Active: active (running) since Tue 2019-09-10 14:13:02 CEST; 39s ago
Process: 905 ExecStart=/usr/bin/brltty (code=exited, status=0/SUCCESS)
Main PID: 914 (brltty)
Tasks: 3 (limit: 11360)
Memory: 4.6M
CGroup: /system.slice/brltty.service
└─914 /usr/bin/brltty

```

### 13.4.3. Authorizing users of a Braille display device

To use a Braille display device, you must set the users who are authorized to use the Braille display device.

#### Procedure

1. In the `/etc/brltty.conf` file, ensure that **keyfile** is set to `/etc/brlapi.key`:

```
api-parameters Auth=keyfile:/etc/brlapi.key
```

This is the default value. Your organization might have overridden it.

2. Authorize the selected users by adding them to the **brlapi** group:

```
# usermod --append -G brlapi user-name
```

#### Additional resources

- [Editing user groups using the command line](#)

### 13.4.4. Setting the driver for a Braille display device

The **brltty** service automatically chooses a driver for your Braille display device. If the automatic detection fails or takes too long, you can set the driver manually.

#### Prerequisites

- The automatic driver detection has failed or takes too long.

#### Procedure

1. Open the `/etc/brltty.conf` configuration file.
2. Find the **braille-driver** directive, which specifies the driver for your Braille display device.
3. Specify the identification code of the required driver in the **braille-driver** directive. Choose the identification code of required driver from the list provided in `/etc/brltty.conf`. For example, to use the XWindow driver:

```
# XWindow
braille-driver xw
```

To set multiple drivers, list them separated by commas. Automatic detection then chooses from the listed drivers.

### 13.4.5. Connecting a Braille display device

The **brlty** service automatically connects to your Braille display device. If the automatic detection fails, you can set the connection method manually.

#### Prerequisites

- The Braille display device is physically connected to your system.
- The automatic connection has failed.

#### Procedure

1. If the device is connected by a serial-to-USB adapter, find the actual device name in the kernel messages on the device plug:

```
# journalctl --dmesg | fgrep ttyUSB
```

2. Open the **/etc/brlty.conf** configuration file.
3. Find the **braille-device** directive.
4. In the **braille-device** directive, specify the connection.  
You can also set multiple devices, separated by commas, and each of them will be probed in turn.

For example:

#### Example 13.1. Settings for the first serial device

```
braille-device serial:tyS0
```

#### Example 13.2. Settings for the first USB device matching Braille driver

```
braille-device usb:
```

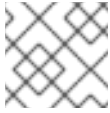
#### Example 13.3. Settings for a specific USB device by serial number

```
braille-device usb:nnnnn
```

#### Example 13.4. Settings for a serial-to-USB adapter

Use the device name that you found earlier in the kernel messages:

```
braille-device serial:tyUSB0
```

**NOTE**

Setting **braille-device** to **usb:** does not work for a serial-to-USB adapter.

**Example 13.5. Settings for a specific Bluetooth device by address**

```
braille-device bluetooth:xx:xx:xx:xx:xx:xx
```

**13.4.6. Setting the text table**

The **brlty** service automatically selects a text table based on your system language. If your system language does not match the language of a document that you want to read, you can set the text table manually.

**Procedure**

1. Edit the **/etc/brlty.conf** file.
2. Identify the code of your selected text table.  
You can find all available text tables in the **/etc/brlty/Text/** directory. The code is the file name of the text table without its file suffix.
3. Specify the code of the selected text table in the **text-table** directive.  
For example, to use the text table for American English:

```
text-table en_US # English (United States)
```

**13.4.7. Setting the contraction table**

You can select which table is used to encode the abbreviations with a Braille display device. Relative paths to particular contraction tables are stored within the **/etc/brlty/Contraction/** directory.

**WARNING**

If no table is specified, the **brlty** service does not use a contraction table.

**Procedure**

- Choose a contraction table from the list in the **/etc/brlty.conf** file.  
For example, to use the contraction table for American English, grade 2:

```
contraction-table en-us-g2 # English (US, grade 2)
```



## CHAPTER 14. USING SPECIAL CHARACTERS IN GNOME

In GNOME, you can use the Compose Key to type special characters from different languages and symbol sets, including those not available on your keyboard. You can enter and view special characters from different languages and symbol sets, making it easy to work with diverse character sets in GNOME.

To input these special characters, you can define one of the existing keys on your keyboard as a Compose Key. Once enabled, the Compose Key allows you to type special characters and symbols by pressing multiple keys in a specific sequence.

### 14.1. ENABLING THE COMPOSE KEY FOR AN INDIVIDUAL USER

You can enable the Compose Key from the Settings menu while logged in as the user.

#### Procedure

1. Click on the **Activities** button in the upper-left corner of the screen.
2. Type **Settings** and click on the **Settings** icon to open the Settings application.
3. In the Settings window, click on **Keyboard** in the left sidebar.
4. Scroll down and select the **Compose Key** option.
5. Toggle the slider to enable the **Compose Key**.
6. Select the key you want to use as the Compose Key.
7. Once you have selected the Compose Key, close the Settings window.

Now the Compose Key is enabled, and you can use it to input special characters and symbols by pressing the Compose Key, followed by the corresponding sequence of keys.

To see available multi-key sequences for composing special characters, use:

```
$ grep "<Multi_key>" /usr/share/X11/locale/en_US.UTF-8/Compose
```

#### Verification

- Press the Compose Key, then type the sequence of keys for the special character you want to input. For example, to type ©, press the **Compose Key**, then press **o** and **c**.

### 14.2. ENABLING THE COMPOSE KEY FOR ANOTHER USER

You can enable the Compose Key for another user with the **gsettings** utility.

#### Prerequisites

- Administrative access.

#### Procedure

1. Allow all clients to connect to the X server:

```
# xhost +
```

2. Run the following command to set the Compose Key:

```
# su - <username> -c "gsettings set org.gnome.desktop.input-sources xkb-options \"
['compose:<compose_key>']\""
```

Replace **<username>** with the username of the user for whom you want to enable the Compose Key. Replace **<compose\_key>** with the key you want to use as the Compose Key. You can use the **right** option to designate the right **Alt** key as the Compose Key.

To see other Compose Key options that you can use to set up a Compose Key on your keyboard, use:

```
$ grep compose /usr/share/X11/xkb/rules/evdev.lst
```

3. Resets the access control:

```
# xhost -
```

## Verification

- To check the Compose Key settings for another user, use:

```
# su - <username> -c "gsettings get org.gnome.desktop.input-sources xkb-options"
```

Replace **<username>** with the username of the user for whom you want to check the Compose Key setting.

## 14.3. ENABLING THE COMPOSE KEY FOR ALL USERS

You can enable the Compose Key for all users by creating a **dconf** configuration file.

### Prerequisites

- Administrative access.

### Procedure

1. Create the **/etc/dconf/db/local.d/00-compose-key** configuration file with the following content:

```
[org/gnome/desktop/input-sources]
xkb-options=['compose:<compose_key>']
```

Replace **<compose\_key>** with the key you want to use as the Compose Key. You can use the **right** option to designate the right **Alt** key as the Compose Key.

To see other Compose Key options that you can use to set up a Compose Key on your keyboard, use:

```
$ grep compose /usr/share/X11/xkb/rules/evdev.lst
```

- Update the **dconf** database with the new configuration:

```
# dconf update
```

- Restart your system or log out and log back in to your GNOME session for the changes to take effect.

Now the Compose Key is enabled for all users on the system and they can use it to input special characters and symbols by pressing the Compose Key, followed by the corresponding sequence of keys.

### Verification

- Press the Compose Key, then type the sequence of keys for the special character you want to input. For example, to type ©, press the **Compose Key**, then press **o** and **c**.

## 14.4. COMPOSE KEY SEQUENCES FOR SPECIAL CHARACTERS

The table showcases Compose Key sequences used to input special characters with diacritics or accents in GNOME. Each row displays a Compose Key sequence alongside its corresponding result

Table 14.1. Compose Key sequences for special characters

Compose Key Sequence	Result
<b>Compose+'+letter</b>	Letter with acute accent (é, á, ñ)
<b>Compose+`+letter</b>	Letter with grave accent (è, ù, ò)
<b>Compose+''+letter</b>	Letter with umlaut or diaeresis (ë, ö, ü)
<b>Compose+--+letter</b>	Letter with macron (ā, ē, ō)
<b>Compose+#+letter</b>	Letter with stroke or diacritic (ø, †, ø)
<b>Compose+=+letter</b>	Letter with double acute accent (ő, ű, à)
<b>Compose+#+letter</b>	Letter with dot above (à, ç, đ)
<b>Compose+,+letter</b>	Letter with cedilla (ç, ş, ñ)
<b>Compose+^+letter</b>	Letter with circumflex accent (â, ê, î)
<b>Compose+~+letter</b>	Letter with tilde accent (ã, ñ, õ)

## CHAPTER 15. MANAGING GNOME SHELL EXTENSIONS VIA COMMAND LINE

The **gnome-extensions** utility is a command-line tool that allows you to manage GNOME Shell extensions from the terminal. It provides various commands to list, install, enable, disable, remove, and get information about extensions.

Each GNOME Shell extension has a UUID (Universally Unique Identifier). You can find the UUID of an extension on its GNOME Shell Extensions website page.

### Procedure

- To list the installed GNOME Shell extensions, use:

```
$ gnome-extensions list
```

- To install a GNOME Shell extension, use:

```
$ gnome-extensions install <UUID>
```

- To enable a GNOME Shell extension, use:

```
$ gnome-extensions enable <UUID>
```

- To show information about a GNOME Shell extension, use:

```
$ gnome-extensions info <UUID>
```

- To disable a GNOME Shell extension, use:

```
$ gnome-extensions disable <UUID>
```

- To remove a GNOME Shell extension, use:

```
$ gnome-extensions uninstall <UUID>
```

Replace the **<UUIDs>** with the unique identifier assigned to the GNOME Shell extension you want to install.

### Additional resources

- The **gnome-extensions --help** page.

# CHAPTER 16. ENABLING AND ENFORCING GNOME SHELL EXTENSIONS

GNOME Shell Extensions are add-ons that enhance the functionality and appearance of the GNOME desktop environment. Users can enable extensions for their own desktop session or for all users on the system.

## 16.1. ENABLING SYSTEM-WIDE GNOME SHELL EXTENSIONS

You can automatically enable GNOME extensions for all users, eliminating the need for individual installations. Existing users with personalized extensions are not affected.

### Prerequisites

- Administrative access

### Procedure

1. Download the extension archive from the GNOME Extensions website.
2. Extract the archive into the `/usr/share/gnome-shell/extensions/` directory:

```
# unzip -q <extension-file.zip> -d /usr/share/gnome-shell/extensions/
```

Replace **<extension-file.zip>** with the name of the extension zip file.

3. Adjust the permissions to ensure that the extension files are readable and executable by everyone:

```
# chmod -R 755 /usr/share/gnome-shell/extensions/<extension-directory>/
```

Replace **<extension-directory>** with the name of the extension directory.

4. Create a new `/etc/dconf/db/local.d/00-extensions` file with the following content:

```
[org/gnome/shell]
enabled-extensions=['myextension1@myname.example.com',
'myextension2@myname.example.com']
```

Replace the UUIDs (**myextension1@myname.example.com**, **myextension2@myname.example.com**) with the ones you want to enable. You can find the UUID of an extension on its GNOME Shell Extensions website page.

5. Apply the changes to the system databases:

```
# dconf update
```

After completing these steps, the specified extensions are enabled by default for all new users on your system.

## 16.2. RESTRICTING GNOME SHELL EXTENSIONS

By locking down specific GNOME Shell extensions, you can ensure that a predefined set of extensions

is consistently available to all users. You can configure a set of mandatory extensions and prevent users from modifying them. The specified extensions are mandatory for all users, and the Looking Glass tool is disabled to ensure compliance with the predefined configuration.

## Prerequisites

- Administrative access

## Procedure

1. Create a new **/etc/dconf/db/local.d/00-extensions** file with the following content:

```
[org/gnome/shell]
enabled-extensions=['myextension1@myname.example.com',
'myextension2@myname.example.com']
development-tools=false
```

Replace the UUIDs (**myextension1@myname.example.com**, **myextension2@myname.example.com**) with the ones you want to enable. You can find the UUID of an extension on its GNOME Shell Extensions website page.

2. To prevent users from changing these settings, create a new **/etc/dconf/db/local.d/locks/extensions** file with the following content:

```
/org/gnome/shell/enabled-extensions
/org/gnome/shell/development-tools
```

3. Apply the changes to the system databases:

```
# dconf update
```

Extensions that are not listed in the **org.gnome.shell.enabled-extensions** file are not loaded by the GNOME Shell, preventing the user from using them.