

Red Hat

Red Hat Enterprise Linux 8

Managing systems using the RHEL 8 web console

A guide to using the web console for managing systems in Red Hat Enterprise Linux 8

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Abstract

This document describes how to manage physical and virtual Linux-based systems using the RHEL 8 web console. The instructions assume that the server used for management is running in Red Hat Enterprise Linux 8.

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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](#).

PROVIDING FEEDBACK ON RED HAT DOCUMENTATION

We appreciate your input on our documentation. Please let us know how we could make it better. To do so:

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 2. Use your mouse cursor to highlight the part of text that you want to comment on.
 3. Click the **Add Feedback** pop-up that appears below the highlighted text.
 4. Follow the displayed instructions.
- For submitting more complex feedback, create a Bugzilla ticket:
 1. Go to the [Bugzilla](#) website.
 2. As the Component, use **Documentation**.
 3. Fill in the **Description** field with your suggestion for improvement. Include a link to the relevant part(s) of documentation.
 4. Click **Submit Bug**.

CHAPTER 1. GETTING STARTED USING THE RHEL WEB CONSOLE

Install the web console in Red Hat Enterprise Linux 8 and learn how to [add remote hosts](#) and monitor them in the RHEL 8 web console.

Prerequisites

- Installed Red Hat Enterprise Linux 8.
- Enabled networking.
- Registered system with appropriate subscription attached.
To obtain a subscription, see [Managing subscriptions in the web console](#).

1.1. WHAT IS THE RHEL WEB CONSOLE

The RHEL web console is a Red Hat Enterprise Linux 8 web-based interface designed for managing and monitoring your local system, as well as Linux servers located in your network environment.

The screenshot shows the Red Hat Enterprise Linux 8 Web Console dashboard. At the top, it displays the system name "localhost.localdomain" and its status as "running Red Hat Enterprise Linux 8.2 Beta (Ootpa)". Below this, there are four main sections: "Health" (warning: Not Registered, Not connected to Insights), "Usage" (CPU: 8% of 1CPU core, Memory: 1.4 GiB / 1.8 GiB), "System information" (Model: QEMU Standard PC (Q35 + ICH9, 2009), Machine ID: 6c75e029993047eba776378d550f2676), and "Configuration" (Hostname: localhost.localdomain, System time: 2020-01-20 12:59, Domain: Join Domain).

The RHEL web console enables you a wide range of administration tasks, including:

- Managing services
- Managing user accounts
- Managing and monitoring system services
- Configuring network interfaces and firewall

- Reviewing system logs
- Managing virtual machines
- Creating diagnostic reports
- Setting kernel dump configuration
- Configuring SELinux
- Updating software
- Managing system subscriptions

The RHEL web console uses the same system APIs as you would in a terminal, and actions performed in a terminal are immediately reflected in the RHEL web console.

You can monitor the logs of systems in the network environment, as well as their performance, displayed as graphs. In addition, you can change the settings directly in the web console or through the terminal.

1.2. INSTALLING AND ENABLING THE WEB CONSOLE

To access the RHEL 8 web console, first enable the **cockpit.socket** service.

Red Hat Enterprise Linux 8 includes the RHEL 8 web console installed by default in many installation variants. If this is not the case on your system, install the **cockpit** package before enabling the **cockpit.socket** service.

Procedure

1. If the web console is not installed by default on your installation variant, manually install the **cockpit** package:

```
# yum install cockpit
```

2. Enable and start the **cockpit.socket** service, which runs a web server:

```
# systemctl enable --now cockpit.socket
```

3. If the web console was not installed by default on your installation variant and you are using a custom firewall profile, add the **cockpit** service to **firewalld** to open port 9090 in the firewall:

```
# firewall-cmd --add-service=cockpit --permanent  
# firewall-cmd --reload
```

Verification steps

1. To verify the previous installation and configuration, [open the web console](#).

1.3. LOGGING IN TO THE WEB CONSOLE

Use the steps in this procedure for the first login to the RHEL web console using a system user name and password.

Prerequisites

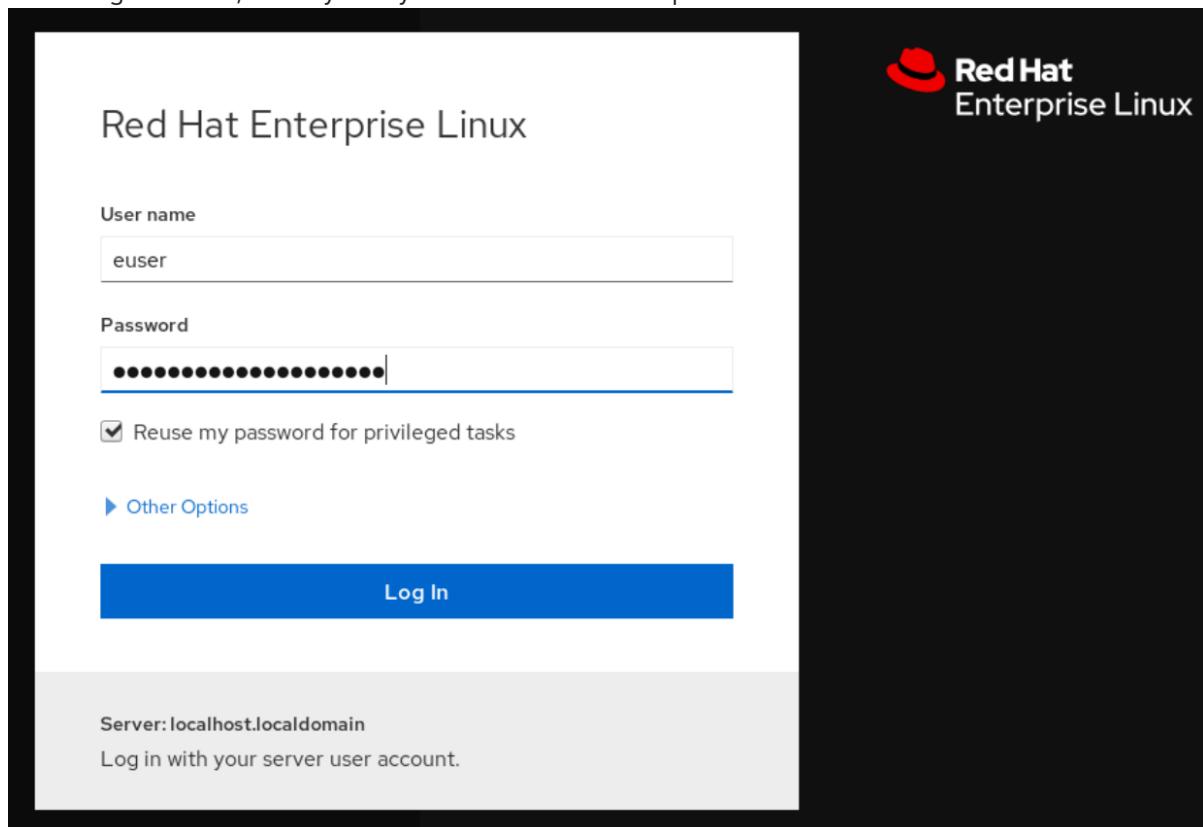
- Use one of the following browsers for opening the web console:
 - Mozilla Firefox 52 and later
 - Google Chrome 57 and later
 - Microsoft Edge 16 and later
- System user account credentials

The RHEL web console uses a specific PAM stack located at **/etc/pam.d/cockpit**. Authentication with PAM allows you to log in with the user name and password of any local account on the system.

Procedure

1. Open the web console in your web browser:
 - Locally: **https://localhost:9090**
 - Remotely with the server's hostname: **https://example.com:9090**
 - Remotely with the server's IP address: **https://192.0.2.2:9090**
If you use a self-signed certificate, the browser issues a warning. Check the certificate and accept the security exception to proceed with the login.

The console loads a certificate from the **/etc/cockpit/ws-certs.d** directory and uses the last file with a **.cert** extension in alphabetical order. To avoid having to grant security exceptions, install a certificate signed by a certificate authority (CA).
2. In the login screen, enter your system user name and password.



3. Optionally, click the **Reuse my password for privileged tasks** option.

If the user account you are using to log in has sudo privileges, this makes it possible to perform privileged tasks in the web console, such as installing software or configuring SELinux.

4. Click **Log In**.

After successful authentication, the RHEL web console interface opens.

1.4. CONNECTING TO THE WEB CONSOLE FROM A REMOTE MACHINE

It is possible to connect to your web console interface from any client operating system and also from mobile phones or tablets.

Prerequisites

- Device with a supported internet browser, such as:
 - Mozilla Firefox 52 and later
 - Google Chrome 57 and later
 - Microsoft Edge 16 and later
- RHEL 8 server you want to access with an installed and accessible web console. For more information about the installation of the web console see [Installing the web console](#).

Procedure

1. Open your web browser.
2. Type the remote server's address in one of the following formats:
 - a. With the server's host name: **server.hostname.example.com:port_number**
 - b. With the server's IP address: **server.IP_address:port_number**
3. After the login interface opens, log in with your RHEL machine credentials.

1.5. LOGGING IN TO THE WEB CONSOLE USING A ONE-TIME PASSWORD

If your system is part of an Identity Management (IdM) domain with enabled one-time password (OTP) configuration, you can use an OTP to log in to the RHEL web console.



IMPORTANT

It is possible to log in using a one-time password only if your system is part of an Identity Management (IdM) domain with enabled OTP configuration. For more information about OTP in IdM, see [One-time password in Identity Management](#).

Prerequisites

- The RHEL web console has been installed.
For details, see [Installing the web console](#).
- An Identity Management server with enabled OTP configuration.

For details, see [One-time password in Identity Management](#).

- A configured hardware or software device generating OTP tokens.

Procedure

1. Open the RHEL web console in your browser:
 - Locally: **https://localhost:PORT_NUMBER**
 - Remotely with the server hostname: **https://example.com:PORT_NUMBER**
 - Remotely with the server IP address:
https://EXAMPLE.SERVER.IP.ADDR:PORT_NUMBER
If you use a self-signed certificate, the browser issues a warning. Check the certificate and accept the security exception to proceed with the login.The console loads a certificate from the **/etc/cockpit/ws-certs.d** directory and uses the last file with a **.cert** extension in alphabetical order. To avoid having to grant security exceptions, install a certificate signed by a certificate authority (CA).
2. The Login window opens. In the Login window, enter your system user name and password.
3. Generate a one-time password on your device.
4. Enter the one-time password into a new field that appears in the web console interface after you confirm your password.
5. Click **Log in**.
6. Successful login takes you to the **Overview** page of the web console interface.

1.6. RESTARTING THE SYSTEM USING THE WEB CONSOLE

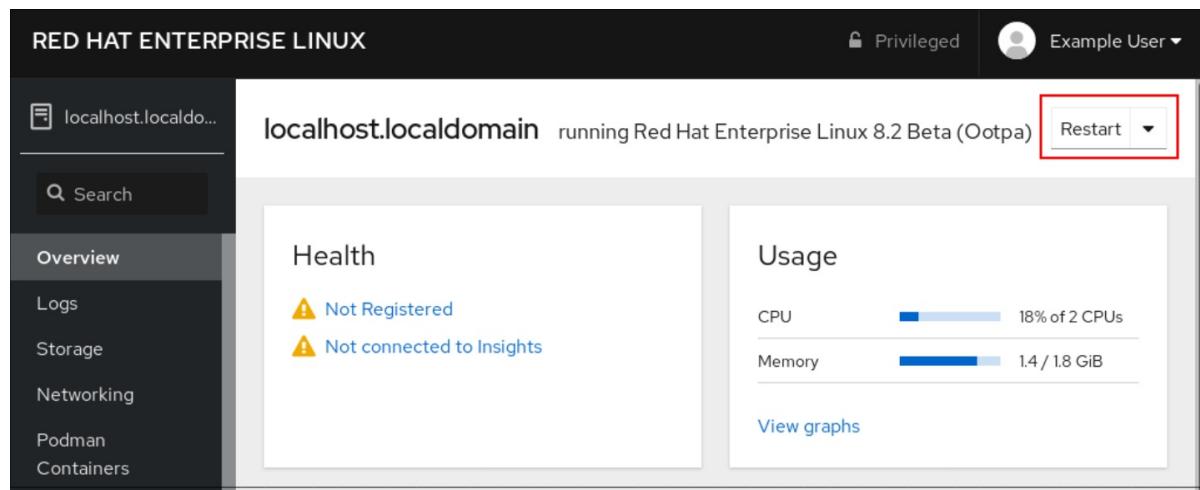
You can use the web console to restart a RHEL system that the web console is attached to.

Prerequisites

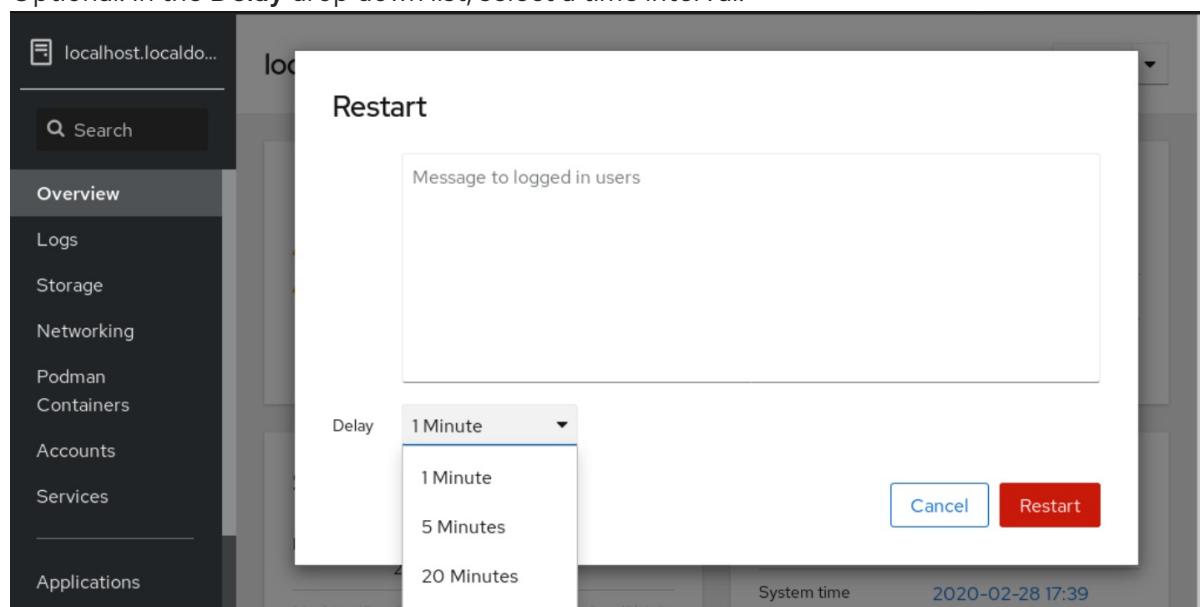
- The web console is installed and accessible.
For details, see [Installing the web console](#).

Procedure

1. Log into the RHEL 8 web console.
For details, see [Logging in to the web console](#).
2. Click **Overview**.
3. Click the **Restart** restart button.



4. If any users are logged into the system, write a reason for the restart in the **Restart** dialog box.
5. Optional: In the **Delay** drop down list, select a time interval.



6. Click **Restart**.

1.7. SHUTTING DOWN THE SYSTEM USING THE WEB CONSOLE

You can use the web console to shut down a RHEL system that the web console is attached to.

Prerequisites

- The web console is installed and accessible.
For details, see [Installing the web console](#).

Procedure

1. Log into the RHEL 8 web console.
For details, see [Logging in to the web console](#).
2. Click **Overview**.
3. In the **Restart** drop down list, select **Shut Down**.

The screenshot shows the Red Hat Enterprise Linux 8 web console interface. At the top, it displays the system name `localhost.localdomain` and its status as "running Red Hat Enterprise Linux 8.2 Beta (Ootpa)". On the right, there are buttons for "Restart" and "Shutdown". A red box highlights the "Shutdown" button. Below the header, there are two main sections: "Health" and "Usage". The "Health" section contains two warning messages: "Not Registered" and "Not connected to Insights". The "Usage" section provides a summary of CPU and Memory usage.

4. If any users are logged in to the system, write a reason for the shutdown in the **Shut Down** dialog box.
5. Optional: In the **Delay** drop down list, select a time interval.
6. Click **Shut Down**.

1.8. CONFIGURING TIME SETTINGS USING THE WEB CONSOLE

You can set a time zone and synchronize the system time with a Network Time Protocol (NTP) server.

Prerequisites

- The web console is installed and accessible.
For details, see [Installing the web console](#).

Procedure

1. Log in to the RHEL 8 web console.
For details, see [Logging in to the web console](#).
2. Click the current system time in **Overview**.

The screenshot shows the Red Hat Enterprise Linux 8 web console interface on the "Overview" page. It displays system information such as the model (QEMU Standard PC (Q35 + ICH9, 2009)) and machine ID (9fa031b4e58948b09d13e6ecd3b1c9de). In the "Configuration" section, it shows the hostname (mymachine) and system time (2020-03-23 21:44), which is highlighted with a red box. There is also a link to "edit" the configuration.

3. In the **Change System Time** dialog box, change the time zone if necessary.
4. In the **Set Time** drop down menu, select one of the following:

Manually

Use this option if you need to set the time manually, without an NTP server.

Automatically using NTP server

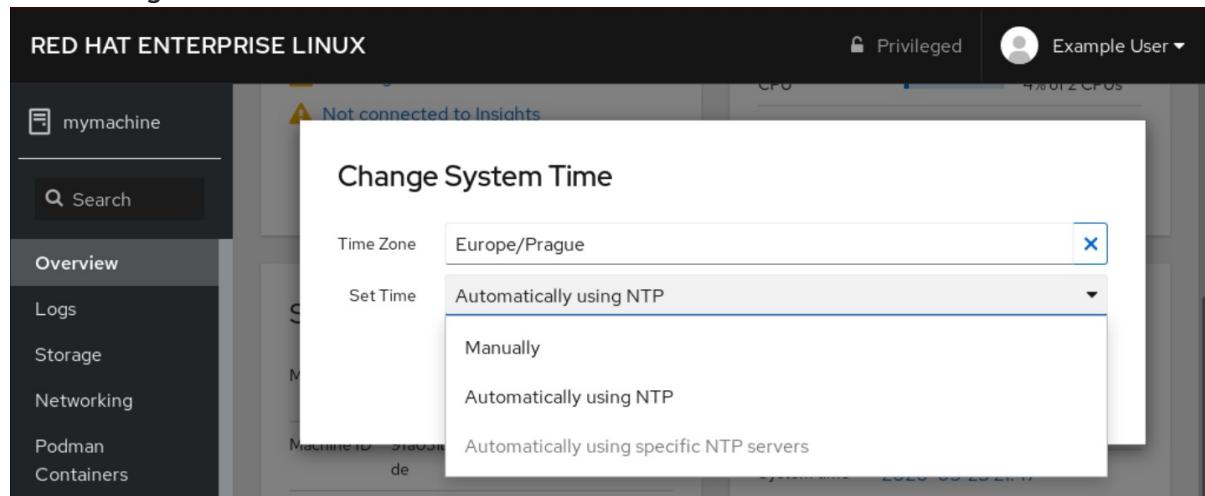
This is a default option, which synchronizes time automatically with the preset NTP servers.

Automatically using specific NTP servers

Use this option only if you need to synchronize the system with a specific NTP server.

Specify the DNS name or the IP address of the server.

5. Click **Change**.



Verification steps

- Check the system time displayed in the **System** tab.

Additional resources

- [Using the Chrony suite to configure NTP](#) .

1.9. JOINING A RHEL 8 SYSTEM TO AN IDM DOMAIN USING THE WEB CONSOLE

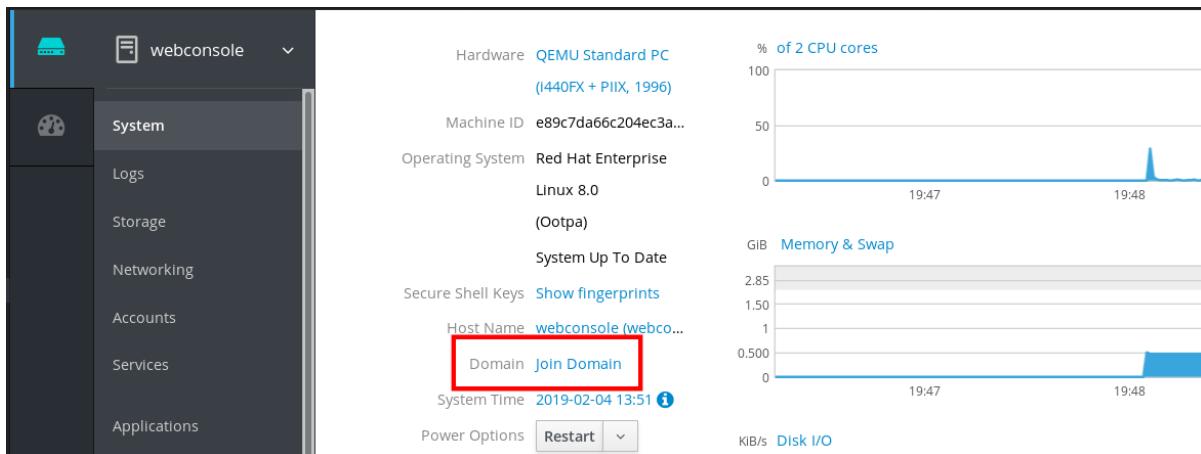
You can use the web console to join the Red Hat Enterprise Linux 8 system to the Identity Management (IdM) domain.

Prerequisites

- The IdM domain is running and reachable from the client you want to join.
- You have the IdM domain administrator credentials.

Procedure

1. Log into the RHEL web console.
For details, see [Logging in to the web console](#) .
2. Open the **System** tab.
3. Click **Join Domain**.



4. In the **Join a Domain** dialog box, enter the host name of the IdM server in the **Domain Address** field.
5. In the **Authentication** drop down list, select if you want to use a password or a one-time password for authentication.

The dialog box has a title 'Join a Domain'. It contains two main sections: 'Domain Address' with a text input field containing 'server.idm.example.com', and 'Authentication' with a dropdown menu currently set to 'One Time Password'. Below the dropdown are two options: 'Administrator Password' and 'One Time Password'. At the bottom right are 'Cancel' and 'Join' buttons, with 'Join' being blue and bold.

6. In the **Domain Administrator Name** field, enter the user name of the IdM administration account.
7. In the password field, add the password or one-time password according to what you selected in the **Authentication** drop down list earlier.
8. Click **Join**.

Join a Domain

Domain Address	server.idm.example.com
Authentication	Administrator Password
Domain Administrator Name	admin
Domain Administrator Password	*****

Cancel **Join**

Verification steps

1. If the RHEL 8 web console did not display an error, the system has been joined to the IdM domain and you can see the domain name in the **System** screen.
2. To verify that the user is a member of the domain, click the Terminal page and type the **id** command:

```
$ id
euid=548800004(example_user) gid=548800004(example_user)
groups=548800004(example_user) context=unconfined_u:unconfined_r:unconfined_t:s0-
s0:c0.c1023
```

Additional resources

- [Planning Identity Management](#)
- [Installing Identity Management](#)
- [Configuring and managing Identity Management](#)

1.10. DISABLING SMT TO PREVENT CPU SECURITY ISSUES USING THE WEB CONSOLE

Disable Simultaneous Multi Threading (SMT) in case of attacks that misuse CPU SMT. Disabling SMT can mitigate security vulnerabilities, such as L1TF or MDS.



IMPORTANT

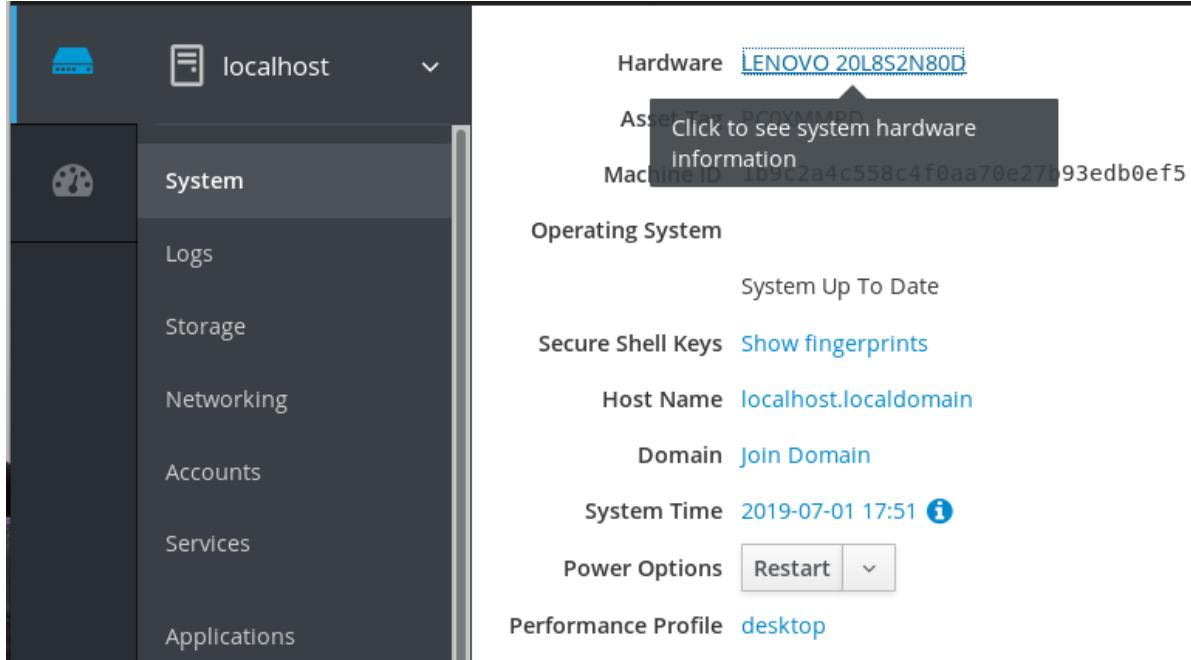
Disabling SMT might lower the system performance.

Prerequisites

- The web console must be installed and accessible.
For details, see [Installing the web console](#).

Procedure

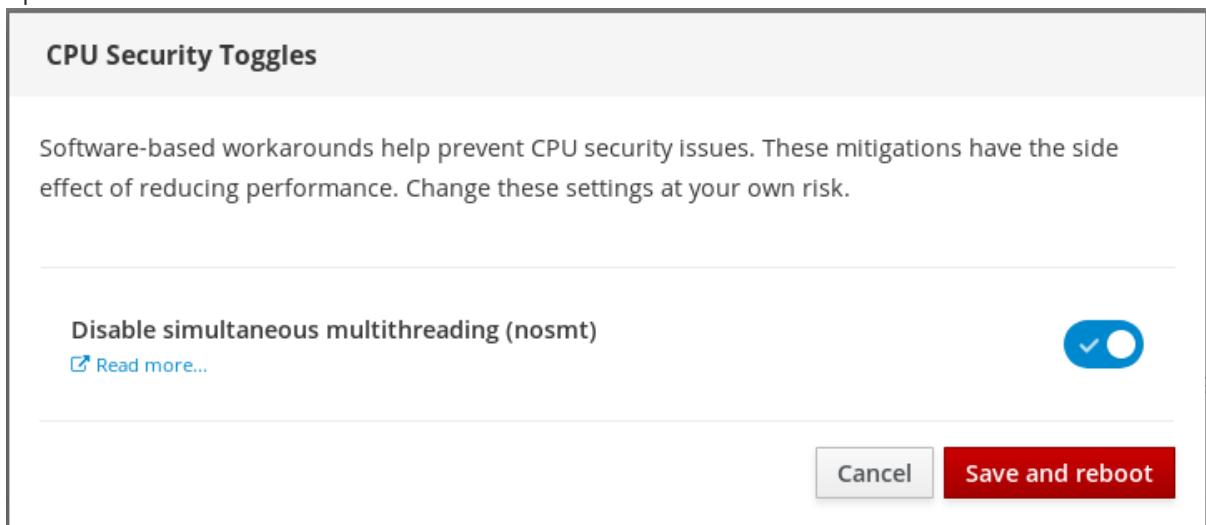
1. Log in to the RHEL 8 web console.
For details, see [Logging in to the web console](#).
2. Click **System**.
3. In the **Hardware** item, click the hardware information.



The screenshot shows the RHEL 8 web console interface. On the left, there's a sidebar with icons for Home, System, Logs, Storage, Networking, Accounts, Services, and Applications. The 'System' icon is highlighted. The main content area has a header 'localhost' with a dropdown arrow. Below the header, the 'Hardware' section is selected, indicated by a blue underline. A tooltip over the 'Hardware' link says 'Click to see system hardware information'. Other sections visible include 'Logs', 'Storage', 'Networking', 'Accounts', 'Services', and 'Applications'. To the right of the hardware section, there's a summary of system details:

- Hardware:** LENOVO 20L8S2N80D
- Asset Tag:** PC0XMMRD
- Machine ID:** 30012a4c558c4f0aa70e27b93edb0ef5
- Operating System:**
- System Up To Date:**
- Secure Shell Keys:** [Show fingerprints](#)
- Host Name:** localhost.localdomain
- Domain:** [Join Domain](#)
- System Time:** 2019-07-01 17:51 ⓘ
- Power Options:** [Restart](#) ▾
- Performance Profile:** desktop

4. In the **CPU Security** item, click **Mitigations**.
If this link is not present, it means that your system does not support SMT, and therefore is not vulnerable.
5. In the **CPU Security Toggles**, switch on the **Disable simultaneous multithreading (nosmt)** option.



The screenshot shows a dialog box titled 'CPU Security Toggles'. It contains a paragraph about software-based workarounds for CPU security issues, noting they reduce performance. Below this is a toggle switch for 'Disable simultaneous multithreading (nosmt)'. The switch is currently turned on, indicated by a blue circle with a white checkmark. At the bottom of the dialog are two buttons: 'Cancel' and 'Save and reboot'.

6. Click on the **Save and reboot** button.

After the system restart, the CPU no longer uses SMT.

Additional resources

- [L1TF - L1 Terminal Fault Attack - CVE-2018-3620 & CVE-2018-3646](#)

- MDS – Microarchitectural Data Sampling – CVE-2018-12130, CVE-2018-12126, CVE-2018-12127, and CVE-2019-11091

1.11. ADDING A BANNER TO THE LOGIN PAGE

Companies or agencies sometimes need to show a warning that usage of the computer is for lawful purposes, the user is subject to surveillance, and anyone trespassing will be prosecuted. The warning must be visible before login. Similarly to SSH, the web console can optionally show the content of a banner file on the login screen. To enable banners in your web console sessions, you need to modify the **/etc/cockpit/cockpit.conf** file. Note that the file is not required and you may need to create it manually.

Prerequisites

- The web console is installed and accessible. For details, see [Installing the web console](#).
- You must have sudo privileges.

Procedure

1. Create the **/etc/issue.cockpit** file in a text editor of your preference if you do not have it yet. Add the content you want to display as the banner to the file. Do not include any macros in the file as there is no re-formatting done between the file content and the displayed content. Use intended line breaks. It is possible to use ASCII art.
2. Save the file.
3. Open or create the **cockpit.conf** file in the **/etc/cockpit/** directory in a text editor of your preference.

```
$ sudo vi cockpit.conf
```

4. Add the following text to the file:

```
[Session]
Banner=/etc/issue.cockpit
```

5. Save the file.
6. Restart the web console for changes to take effect.

```
# systemctl try-restart cockpit
```

Verification steps

- Open the web console login screen again to verify that the banner is now visible.

Example 1.1. Adding an example banner to the login page

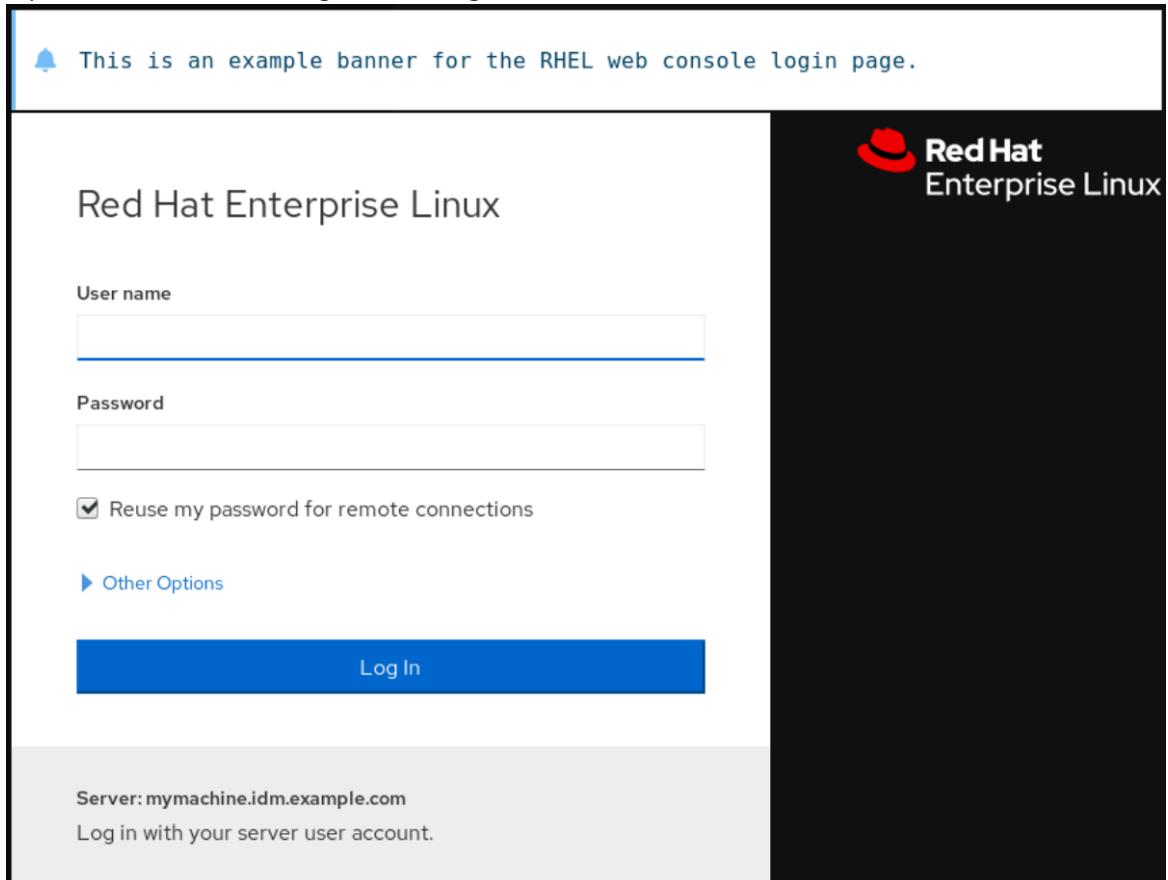
1. Create an **/etc/issue.cockpit** file with a desired text using a text editor:

```
This is an example banner for the RHEL web console login page.
```

2. Open or create the **/etc/cockpit/cockpit.conf** file and add the following text:

[Session]
Banner=/etc/issue.cockpit

3. Restart the web console.
4. Open the web console login screen again.



1.12. CONFIGURING AUTOMATIC IDLE LOCK IN THE WEB CONSOLE

By default, there is no idle timeout set in the web console interface. If you wish to enable an idle timeout on your system, you can do so by modifying the `/etc/cockpit/cockpit.conf` configuration file. Note that the file is not required and you may need to create it manually.

Prerequisites

- The web console must be installed and accessible.
For details, see [Installing the web console](#).
- You must have sudo privileges.

Procedure

1. Open or create the `cockpit.conf` file in the `/etc/cockpit/` directory in a text editor of your preference.

```
$ sudo vi cockpit.conf
```
2. Add the following text to the file:

```
[Session]
IdleTimeout=X
```

Substitute **X** with a number for a time period of your choice in minutes.

3. Save the file.
4. Restart the web console for changes to take effect.

```
# systemctl try-restart cockpit
```

Verification steps

- Check if the session logs you out after a set period of time.

CHAPTER 2. CONFIGURING THE HOST NAME IN THE WEB CONSOLE

Learn how to use the RHEL 8 web console to configure different forms of the host name on the system that the web console is attached to.

2.1. HOST NAME

The host name identifies the system. By default, the host name is set to **localhost**, but you can change it.

A host name consists of two parts:

Host name

It is a unique name which identifies a system.

Domain

Add the domain as a suffix behind the host name when using a system in a network and when using names instead of just IP addresses.

A host name with an attached domain name is called a fully qualified domain name (FQDN). For example: **mymachine.example.com**.

Host names are stored in the **/etc/hostname** file.

2.2. PRETTY HOST NAME IN THE WEB CONSOLE

You can configure a pretty host name in the RHEL web console. The pretty host name is a host name with capital letters, spaces, and so on.

The pretty host name displays in the web console, but it does not have to correspond with the host name.

Example 2.1. Host name formats in the web console

Pretty host name

My Machine

Host name

mymachine

Real host name - fully qualified domain name (FQDN)

mymachine.idm.company.com

2.3. SETTING THE HOST NAME USING THE WEB CONSOLE

This procedure sets the real host name or the pretty host name in the web console.

Prerequisites

- The web console is installed and accessible.
For details, see [Installing the web console](#).

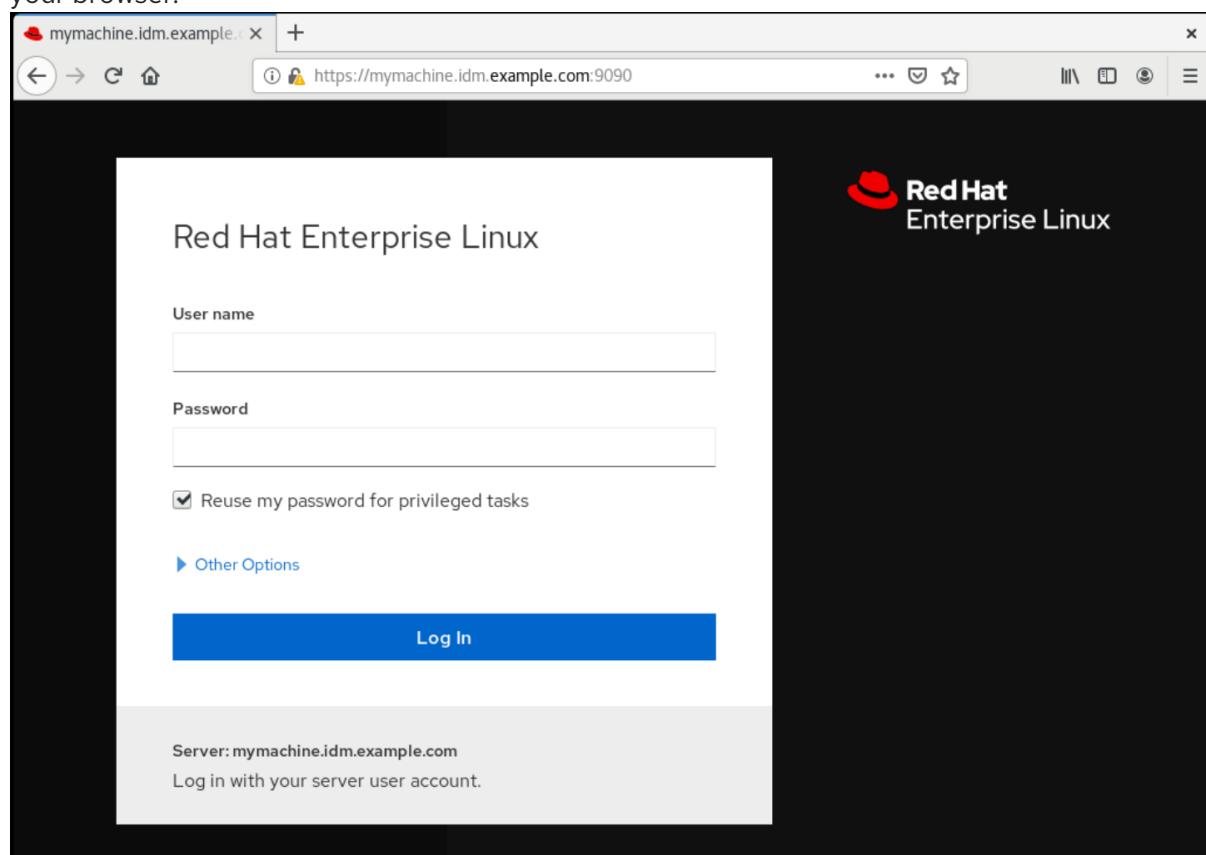
Procedure

1. Log into the RHEL 8 web console.
For details, see [Logging in to the web console](#).
2. Click **Overview**.
3. Click **edit** next to the current host name.

4. In the **Change Host Name** dialog box, enter the host name in the **Pretty Host Name** field.
5. The **Real Host Name** field attaches a domain name to the pretty name.
You can change the real host name manually if it does not correspond with the pretty host name.
6. Click **Change**.

Verification steps

1. Log out from the web console.
2. Reopen the web console by entering an address with the new host name in the address bar of your browser.



CHAPTER 3. RED HAT WEB CONSOLE ADD-ONS

Install add-ons in the RHEL 8 web console and learn what add-on applications are available for you.

3.1. INSTALLING ADD-ONS

The **cockpit** package is a part of Red Hat Enterprise Linux 8 by default. To be able to use add-on applications you must install them separately.

Prerequisites

- Installed and enabled **cockpit** package. If you need to install web console first, check the [installation](#) section.

Procedure

- Install an add-on.

```
# yum install <add-on>
```

3.2. ADD-ONS FOR THE RHEL 8 WEB CONSOLE

The following table lists available add-on applications for the RHEL 8 web console.

Feature name	Package name	Usage
Composer	cockpit-composer	Building custom OS images
Dashboard	cockpit-dashboard	Managing multiple servers in one UI
Machines	cockpit-machines	Managing libvirt virtual machines
PackageKit	cockpit-packagekit	Software updates and application installation (usually installed by default)
PCP	cockpit-pcp	Persistent and more fine-grained performance data (installed on demand from the UI)
podman	cockpit-podman	Managing podman containers (available from RHEL 8.1)
Session Recording	cockpit-session-recording	Recording and managing user sessions

CHAPTER 4. OPTIMIZING THE SYSTEM PERFORMANCE USING THE WEB CONSOLE

Learn how to set a performance profile in the RHEL 8 web console to optimize the performance of the system for a selected task.

4.1. PERFORMANCE TUNING OPTIONS IN THE WEB CONSOLE

Red Hat Enterprise Linux 8 provides several performance profiles that optimize the system for the following tasks:

- Systems using the desktop
- Throughput performance
- Latency performance
- Network performance
- Low power consumption
- Virtual machines

The **tuned** service optimizes system options to match the selected profile.

In the web console, you can set which performance profile your system uses.

Additional resources

- [Getting started with Tuned](#)

4.2. SETTING A PERFORMANCE PROFILE IN THE WEB CONSOLE

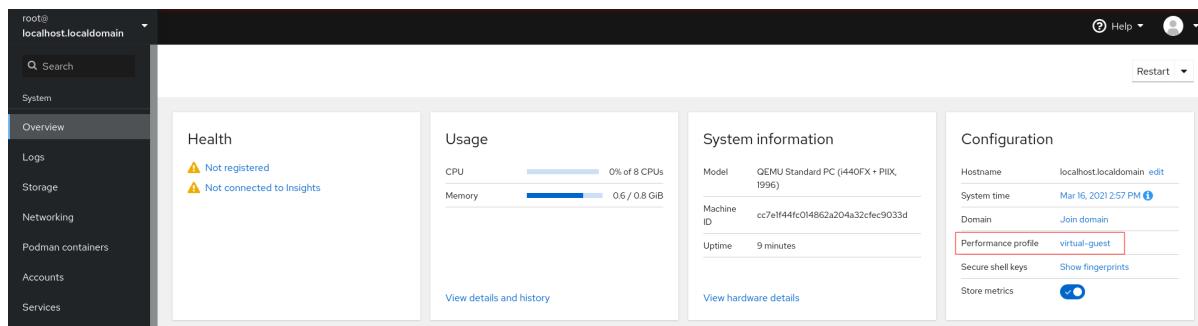
This procedure uses the web console to optimize the system performance for a selected task.

Prerequisites

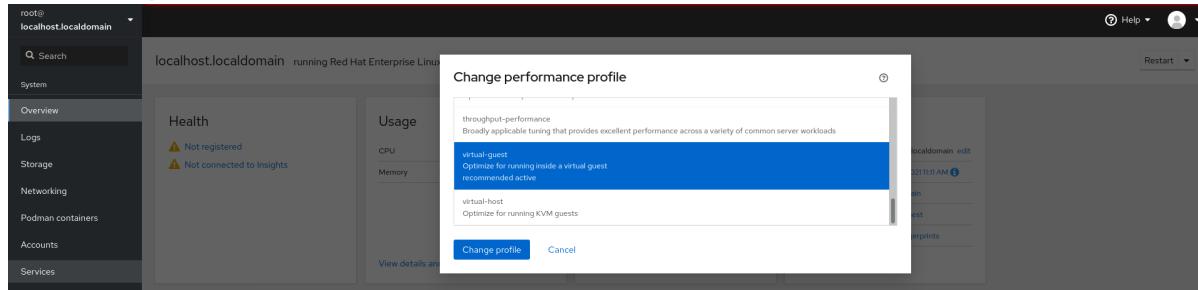
- Make sure the web console is installed and accessible. For details, see [Installing the web console](#).

Procedure

1. Log into the RHEL 8 web console. For details, see [Logging in to the web console](#).
2. Click **Overview**.
3. In the **Performance Profile** field, click the current performance profile.



4. In the **Change Performance Profile** dialog box, change the profile if necessary.
5. Click **Change Profile**.



Verification steps

- The **Overview** tab now shows the selected performance profile.

4.3. MONITORING PERFORMANCE USING THE WEB CONSOLE

Red Hat's web console uses the Utilization Saturation and Errors (USE) Method for troubleshooting. The new performance metrics page has a historical view of your data organized chronologically with the newest data at the top.

Here, you can view the events, errors, and graphical representation for resource utilization and saturation.

Prerequisites

1. Make sure the web console is installed and accessible. For details, see [Installing the web console](#).
2. Install the **cockpit-pcp** package, which enables collecting the performance metrics:

```
# yum install cockpit-pcp
```

Procedure

1. Log into the RHEL 8 web console. For details, see [Logging in to the web console](#).
2. Click **Overview**.

The screenshot shows the RHEL 8 web console's Overview page. On the left is a dark sidebar with navigation links: System, Overview (selected), Logs, Storage, Networking, Podman containers, Accounts, Services, and Tools. The main area is divided into four panels: Health (warning: Not registered, Not connected to Insights), Usage (CPU 0% of 8 CPUs, Memory 0.6 / 0.8 GiB), System information (Model QEMU Standard PC (i440FX + PIIX, 1996), Machine ID cc7eff4fc014862a204a32cfec9033d, Uptime 9 minutes), and Configuration (Hostname localhost.localdomain, System time Mar 16, 2021 2:57 PM, Domain Join domain, Performance profile virtual-guest, Secure shell keys Show fingerprints, Store metrics). A 'Restart' button is at the top right.

3. Click **View details and history** to view the **Performance Metrics**.

The screenshot shows the Performance Metrics page. The sidebar includes Overview, Logs, Storage, Networking, Podman containers, Accounts, Services, and Tools. The main content displays real-time resource usage: CPU (8 CPUs, 1%), Memory (RAM 0.1 GiB available, Swap 0.0 GiB available), Disks (Read 43.4 KiB/s, Write 1.86 B/s), and Network (Interface in/out rates: virbr0 0/0, ens3 0/0, lo 118 KiB/s/118 KiB/s, virbr0-nic 0/0). Below these are four line charts for CPU, Memory, Disks, and Network usage over time.

The screenshot shows the Performance Metrics page with a different view. The sidebar includes Overview, Logs, Storage, Networking, Podman containers, Accounts (selected), Services, Tools, Applications, Diagnostic Reports, Kernel Dump, SELinux, Software Updates (with a warning icon), Subscriptions, and Terminal. The main area shows a table of historical spikes and a large chart on the right showing CPU, Memory, Disks, and Network usage over time. The table lists events like Swap spikes, Memory spikes, Disk I/O spikes, and Network I/O spikes, each with a timestamp from 2:48 PM to 2:58 PM.

CHAPTER 5. REVIEWING LOGS IN THE WEB CONSOLE

Learn how to access, review and filter logs in the RHEL 8 web console.

5.1. REVIEWING LOGS IN THE WEB CONSOLE

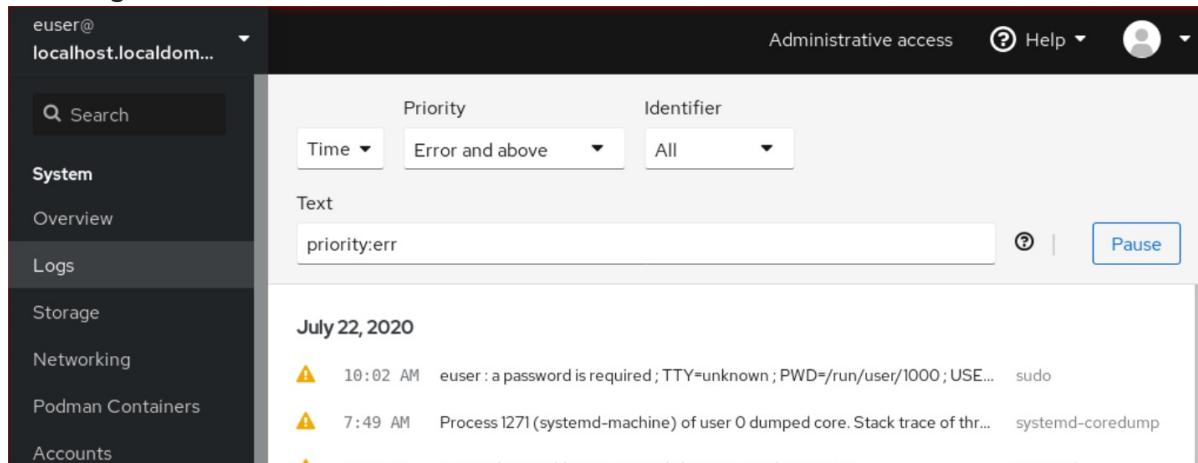
The RHEL 8 web console Logs section is a UI for the **journalctl** utility. This section describes how to access system logs in the web console interface.

Prerequisites

- The RHEL 8 web console has been installed.
For details, see [Installing the web console](#).

Procedure

1. Log in to the RHEL web console.
For details, see [Logging in to the web console](#).
2. Click **Logs**.



3. Open log entry details by clicking on your selected log entry in the list.



NOTE

You can use the **Pause** button to pause new log entries from appearing. Once you resume new log entries, the web console will load all log entries that were reported after you used the **Pause** button.

You can filter the logs by time, priority or identifier. For more information, see [Section 5.2, "Filtering logs in the web console"](#).

5.2. FILTERING LOGS IN THE WEB CONSOLE

This section shows how to filter log entries in the web console.

Prerequisites

- The web console interface must be installed and accessible.
For details, see [Installing the web console](#).

Procedure

1. Log in to the RHEL 8 web console.

For details, see [Logging in to the web console](#).

2. Click **Logs**.

3. By default, web console shows the latest log entries. To filter by a specific time range, click the **Time** drop-down menu and choose a preferred option.

The screenshot shows the RHEL 8 web console interface. On the left, there's a sidebar with navigation links: Overview, Logs (which is selected), Storage, Networking, Podman Containers, Accounts, Services (with a red exclamation mark icon), Tools, and Applications. At the top right, there are links for Administrative access, Help, and a user profile. In the center, there's a search bar with placeholder text 'Search logs' and a 'Clear' button. Below the search bar is a table header with columns for Priority and Identifier. A dropdown menu for 'Time' is open, showing four options: 'Current boot', 'Previous boot', 'Last 24 hours', and 'Last 7 days'. The 'Last 7 days' option is highlighted with a blue border. The main table body contains log entries. One entry from 'systemd' is visible: 'dnf makecache.'.

4. Error and above severity logs list is shown by default. To filter by different priority, click the **Error and above** drop-down menu and choose a preferred priority.

This screenshot is similar to the previous one, but the 'Priority' dropdown in the center is now open. It lists several log levels: Only Emergency, Alert and above, Critical and above, Error and above (which is highlighted with a blue border), Warning and above, Notice and above, Info and above, and Debug and above. Below the dropdown, the main table displays log entries. One entry from 'systemd' is visible: 'Process 1271 (systemd-mach...'.

5. By default, web console shows logs for all identifiers. To filter logs for a particular identifier, click the **All** drop-down menu and select an identifier.

This screenshot shows the 'Identifier' dropdown menu open. It lists several system identifiers: All (which is highlighted with a blue border), kernel, smartd, sudo, systemd, and systemd-coredump. Below the dropdown, the main table displays log entries. One entry from 'systemd' is visible: 'n/user/1000 ; USER... sudo'.

6. To open a log entry, click on a selected log.

5.3. TEXT SEARCH OPTIONS FOR FILTERING LOGS IN THE WEB CONSOLE

The text search option functionality provides a big variety of options for filtering logs. If you decide to filter logs by using the text search, you can use the predefined options that are defined in the three drop-down menus, or you can type the whole search yourself.

Drop-down menus

There are three drop-down menus that you can use to specify the main parameters of your search:

- **Time:** This drop-down menu contains predefined searches for different time ranges of your search.
- **Priority:** This drop-down menu provides options for different priority levels. It corresponds to the **journalctl --priority** option. The default priority value is **Error and above**. It is set every time you do not specify any other priority.
- **Identifier:** In this drop-down menu, you can select an identifier that you want to filter. Corresponds to the **journalctl --identifier** option.

Quantifiers

There are six quantifiers that you can use to specify your search. They are covered in the Options for filtering logs table.

Log fields

If you want to search for a specific log field, it is possible to specify the field together with its content.

Free-form text search in logs messages

You can filter any text string of your choice in the logs messages. The string can also be in the form of a regular expressions.

Advanced logs filtering I

Filter all log messages identified by 'systemd' that happened since October 22, 2020 midnight and journal field 'JOB_TYPE' is either 'start' or 'restart'.

1. Type **identifier:systemd since:2020-10-22 JOB_TYPE=start,restart** to search field.
2. Check the results.

October 2, 2020

11:13 AM cockpit-tls: gnutls_handshake failed: Error in the push function.
11:13 AM cockpit-tls: gnutls_handshake failed: The TLS connection was non-properly terminated.
8:33 AM cockpit-tls: gnutls_handshake failed: A TLS fatal alert has been received.
8:03 AM cockpit-tls: gnutls_handshake failed: Error in the push function.

Advanced logs filtering II

Filter all log messages that come from 'cockpit.service' systemd unit that happened in the boot before last and the message body contains either "error" or "fail".

1. Type **service:cockpit boot:-1 error|fail** to the search field.
2. Check the results.

5.4. USING A TEXT SEARCH BOX TO FILTER LOGS IN THE WEB CONSOLE

Using the text search box allows you to filter logs according to different parameters. The search combines usage of the filtering drop-down menus, quantifiers, log fields and free-form string search.

Prerequisites

- The web console interface must be installed and accessible.
For details, see [Installing the web console](#).

Procedure

- Log in to the RHEL 8 web console.
For details, see [Logging in to the web console](#).
- Click **Logs**.
- Use the drop-down menus to specify the three main quantifiers - time range, priority, and identifier(s) - you want to filter.
The **Priority** quantifier always has to have a value. If you do not specify it, it automatically filters the **Error and above** priority. Notice that the options you set reflect in the text search box.
- Specify the log field you want to filter.
It is possible to add several log fields.
- You can use a free-form string to search for anything else. The search box also accepts regular expressions.

5.5. OPTIONS FOR LOGS FILTERING

There are several **journalctl** options, which you can use for filtering logs in the web console, that may be useful. Some of these are already covered as part of the drop-down menus in the web console interface.

Table 5.1. Table

Option name	Usage	Notes
-------------	-------	-------

Option name	Usage	Notes
priority	Filter output by message priorities. Takes a single numeric or textual log level. The log levels are the usual syslog log levels. If a single log level is specified, all messages with this log level or a lower (hence more important) log level are shown.	Covered in the Priority drop-down menu.
identifier	Show messages for the specified syslog identifier SYSLOG_IDENTIFIER. Can be specified multiple times.	Covered in the Identifier drop-down menu.
follow	Shows only the most recent journal entries, and continuously prints new entries as they are appended to the journal.	Not covered in a drop-down.
service	Show messages for the specified systemd unit. Can be specified multiple times.	Is not covered in a drop-down. Corresponds to the journalctl --unit parameter.
boot	Show messages from a specific boot. A positive integer will look up the boots starting from the beginning of the journal, and an equal-or-less-than zero integer will look up boots starting from the end of the journal. Thus, 1 means the first boot found in the journal in chronological order, 2 the second and so on; while -0 is the last boot, -1 the boot before last, and so on.	Covered only as Current boot or Previous boot in the Time drop-down menu. Other options need to be written manually.

Option name	Usage	Notes
since	<p>Start showing entries on or newer than the specified date, or on or older than the specified date, respectively. Date specifications should be of the format "2012-10-30 18:17:16". If the time part is omitted, "00:00:00" is assumed. If only the seconds component is omitted, ":00" is assumed. If the date component is omitted, the current day is assumed.</p> <p>Alternatively the strings "yesterday", "today", "tomorrow" are understood, which refer to 00:00:00 of the day before the current day, the current day, or the day after the current day, respectively. "now" refers to the current time. Finally, relative times may be specified, prefixed with "-" or "+", referring to times before or after the current time, respectively.</p>	Not covered in a drop-down.

CHAPTER 6. MANAGING USER ACCOUNTS IN THE WEB CONSOLE

The RHEL web console offers an interface for adding, editing, and removing system user accounts.

After reading this section, you will know:

- From where the existing accounts come from.
- How to add new accounts.
- How to set password expiration.
- How and when to terminate user sessions.

Prerequisites

- Being logged into the RHEL web console with an account that has administrator permissions assigned. For details, see [Logging in to the RHEL web console](#).

6.1. SYSTEM USER ACCOUNTS MANAGED IN THE WEB CONSOLE

With user accounts displayed in the RHEL web console you can:

- Authenticate users when accessing the system.
- Set the access rights to the system.

The RHEL web console displays all user accounts located in the system. Therefore, you can see at least one user account just after the first login to the web console.

After logging into the RHEL web console, you can perform the following operations:

- Create new users accounts.
- Change their parameters.
- Lock accounts.
- Terminate user sessions.

6.2. ADDING NEW ACCOUNTS USING THE WEB CONSOLE

Use the following steps for adding user accounts to the system and setting administration rights to the accounts through the RHEL web console.

Prerequisites

- The RHEL web console must be installed and accessible. For details, see [Installing the web console](#).

Procedure

1. Log in to the RHEL web console.

2. Click **Accounts**.
3. Click **Create New Account**.
 1. In the **Full Name** field, enter the full name of the user.
The RHEL web console automatically suggests a user name from the full name and fills it in the **User Name** field. If you do not want to use the original naming convention consisting of the first letter of the first name and the whole surname, update the suggestion.
 2. In the **Password/Confirm** fields, enter the password and retype it for verification that your password is correct.
The color bar placed below the fields shows you security level of the entered password, which does not allow you to create a user with a weak password.
1. Click **Create** to save the settings and close the dialog box.
2. Select the newly created account.
3. Select **Server Administrator** in the **Roles** item.

The screenshot shows the RHEL 8 web console interface. On the left, there's a sidebar with options like Overview, Logs, Storage, Networking, Podman, Containers, Accounts (which is currently selected), and Services. The main area shows the 'Example User' account details. The 'Roles' field is checked for 'Server Administrator'. Under 'Access', there are two options: 'Lock Account' (unchecked) and 'Never lock account'. Below that, under 'Password', there are two buttons: 'Set Password' and 'Force Change'. To the right of these buttons are two checkboxes: 'Never expire password' (checked) and 'Never lock account'.

Now you can see the new account in the **Accounts** settings and you can use the credentials to connect to the system.

6.3. ENFORCING PASSWORD EXPIRATION IN THE WEB CONSOLE

By default, user accounts have set passwords to never expire. You can set system passwords to expire after a defined number of days. When the password expires, the next login attempt will prompt for a password change.

Procedure

1. Log in to the RHEL 8 web console.
2. Click **Accounts**.
3. Select the user account for which to enforce password expiration.
4. In the user account settings, click **Never expire password**.

5. In the **Password Expiration** dialog box, select **Require password change every ... days** and enter a positive whole number representing the number of days when the password expires.
1. Click **Change**.

Verification steps

- To verify that the password expiration is set, open the account settings. The RHEL 8 web console displays a link with the date of expiration.

The screenshot shows the RHEL 8 Web Console interface. On the left, a dark sidebar menu includes 'mymachine' at the top, followed by 'Search', 'Overview', 'Logs', 'Storage', 'Networking', 'Podman Containers', 'Accounts' (which is highlighted in blue), and 'Services'. The main content area has a header 'Accounts > Example User'. Below the header, the 'Example User' account details are listed: 'Full Name: Example User', 'User Name: euser', 'Roles: Server Administrator' (with a checked checkbox), 'Last Login: Logged In', 'Access: Lock Account' (with an unchecked checkbox), and 'Password' options ('Set Password' and 'Force Change'). A note at the bottom right states 'Require password change on Oct 20, 2020'. At the top right of the main content area, there are 'Terminate Session' and 'Delete' buttons.

6.4. TERMINATING USER SESSIONS IN THE WEB CONSOLE

A user creates user sessions when logging into the system. Terminating user sessions means to log the user out from the system. It can be helpful if you need to perform administrative tasks sensitive to configuration changes, for example, system upgrades.

In each user account in the RHEL 8 web console, you can terminate all sessions for the account except for the web console session you are currently using. This prevents you from losing access to your system.

Procedure

1. Log in to the RHEL 8 web console.
2. Click **Accounts**.
3. Click the user account for which you want to terminate the session.
4. Click **Terminate Session**.
If the **Terminate Session** button is inactive, the user is not logged in to the system.

The RHEL web console terminates the sessions.

CHAPTER 7. MANAGING SERVICES IN THE WEB CONSOLE

Learn how to manage system services in the RHEL 8 web console interface. You can activate or deactivate services, restart or reload them, or manage their automatic startup.

7.1. ACTIVATING OR DEACTIVATING SYSTEM SERVICES IN THE WEB CONSOLE

This procedure activates or deactivates system services using the web console interface.

Prerequisites

- The RHEL 8 web console has been installed.
For details, see [Installing the web console](#).



PROCEDURE

You can filter the services by name or description and also by Enabled, Disabled, or Static automatic startup. The interface shows the current state of the service and its recent logs.

- Log in to the RHEL web console with administrator privileges.
For details, see [Logging in to the web console](#).
- Click **Services** in the web console menu on the left.
- The default tab for **Services** is **System Services**. If you want to manage targets, sockets, timers, or paths, switch to the respective tab in the menu on top.

Name	Description	State	Automatic Startup
accounts-daemon	Accounts Service	active (running)	Enabled
alsa-restore	Save/Restore Sound Card State	inactive (dead)	Static
alsa-state	Manage Sound Card State (restore and store)	active (running)	Static
anaconda-direct	the anaconda installation program	inactive (dead)	Static
anaconda-nm-config	Anaconda NetworkManager configuration	inactive (dead)	Static
anaconda-noshell	Restrict Anaconda Text Console	inactive (dead)	Static

- To open service settings, click on a selected service from the list. You can tell which services are active or inactive by checking the **State** column.
- Activate or deactivate a service:
 - To activate an inactive service, click the **Start** button.

Services > anaconda.service

Anaconda :

Status	⌚ Static	Start
	 ⓘ Not	
Path	/usr/lib/	Disallow running (mask)

- To deactivate an active service, click the **Stop** button.

Services > cockpit.service

Cockpit Web Service :

Status	⌚ Static	Restart
	⚡ Running	Stop
Path	/usr/lib/systemd/system/c	Disallow running (mask)

7.2. RESTARTING SYSTEM SERVICES IN THE WEB CONSOLE

This procedure restarts system services using the web console interface.

Prerequisites

- The RHEL 8 web console has been installed.
For details, see [Installing the web console](#).



PROCEDURE

You can filter the services by name or description and also by Enabled, Disabled, or Static automatic startup. The interface shows the current state of the service and its recent logs.

- Log in to the RHEL web console with administrator privileges.
For details, see [Logging in to the web console](#).

2. Click **Services** in the web console menu on the left.
3. The default tab for **Services** is **System Services**. If you want to manage targets, sockets, timers, or paths, switch to the respective tab in the menu on top.

Name	Description	State	Automatic Startup
accounts-daemon	Accounts Service	active (running)	Enabled
alsa-restore	Save/Restore Sound Card State	inactive (dead)	Static
alsa-state	Manage Sound Card State (restore and store)	active (running)	Static
anaconda-direct	the anaconda installation program	inactive (dead)	Static
anaconda-nm-config	Anaconda NetworkManager configuration	inactive (dead)	Static
anaconda-noshell	Restrict Anaconda Text Console	inactive (dead)	Static

4. To open service settings, click on a selected service from the list.
5. To restart a service, click the **Restart** button.

Services > cockpit.service

Cockpit Web Service

Status ⚡ Static
⚡ Running Active since May

Path /usr/lib/systemd/system/cockpit.socket

⋮

Restart
Stop
Disallow running (mask)

CHAPTER 8. CONFIGURING NETWORK BONDS USING THE WEB CONSOLE

Learn how network bonding works and configure network bonds in the RHEL 8 web console.



NOTE

The RHEL 8 web console is build on top of the NetworkManager service.

For details, see [Getting started with NetworkManager for managing networking](#).

Prerequisites

- The RHEL 8 web console installed and enabled.
For details, see [Installing the web console](#).

8.1. UNDERSTANDING NETWORK BONDING

Network bonding is a method to combine or aggregate network interfaces to provide a logical interface with higher throughput or redundancy.

The **active-backup**, **balance-tlb**, and **balance-alb** modes do not require any specific configuration of the network switch. However, other bonding modes require configuring the switch to aggregate the links. For example, Cisco switches requires **EtherChannel** for modes 0, 2, and 3, but for mode 4, the Link Aggregation Control Protocol (LACP) and **EtherChannel** are required.

For further details, see the documentation of your switch and [Linux Ethernet Bonding Driver HOWTO](#).



IMPORTANT

Certain network bonding features, such as the fail-over mechanism, do not support direct cable connections without a network switch. For further details, see the [Is bonding supported with direct connection using crossover cables? KCS solution](#).

8.2. BOND MODES

In RHEL 8 there are several mode options. Each mode option is characterized by specific load balancing and fault tolerance. The behavior of the bonded interfaces depends upon the mode. The bonding modes provide fault tolerance, load balancing or both.

Load balancing modes

- **Round Robin:** Sequentially transmit packets from the first available interface to the last one.

Fault tolerance modes

- **Active Backup:** Only when the primary interface fails, one of a backup interfaces replaces it. Only a MAC address used by active interface is visible.
- **Broadcast:** All transmissions are sent on all interfaces.

**NOTE**

Broadcasting significantly increases network traffic on all the bonded interfaces.

Fault tolerance and load balancing modes

- **XOR:** The destination MAC addresses are distributed equally between interfaces with a modulo hash. Each interface then serves the same group of MAC addresses.
- **802.3ad:** Sets an IEEE 802.3ad dynamic link aggregation policy. Creates aggregation groups that share the same speed and duplex settings. Transmits and receives on all interfaces in the active aggregator.

**NOTE**

This mode requires a switch that is 802.3ad compliant.

- **Adaptive transmit load balancing:** The outgoing traffic is distributed according to the current load on each interface. Incoming traffic is received by the current interface. If the receiving interface fails, another interface takes over the MAC address of the failed one.
- **Adaptive load balancing:** Includes transmit and receive load balancing for IPv4 traffic. Receive load balancing is achieved through Address Resolution Protocol (ARP) negotiation, therefore, it is necessary to set **Link Monitoring** to **ARP** in the bond's configuration.

8.3. ADDING A NEW BOND USING THE WEB CONSOLE

Configure an active-backup bond on two or more network interfaces using the web console.

Other [network bond modes](#) can be configured similarly.

Prerequisites

- Two or more network cards are installed in the server.
- The network cards are connected to a switch.

Procedure

1. Log in to the web console.
For details, see [Logging in to the web console](#).
2. Open **Networking**.
3. Click the **Add Bond** button.
4. In the **Bond Settings** dialog box, enter a name for the new bond.
5. In the **Members** field, select interfaces which should be a member of the bond.
6. [Optional] In the **MAC** drop down list, select a MAC address which will be used for this interface. If you leave the **MAC** field empty, the bond will get one of the addresses that are listed in the drop down list.
7. In the **Mode** drop down list, select the mode.

For details, see [network bond modes](#)

- If you select **Active Backup**, select the primary interface.

MAC	E8:6A:64:04:9A:C2	▼
Mode	Active Backup	▼
Primary	enp0s31f6	▼

- In the **Link Monitoring** drop down menu, leave here the **MII** option.
Only the adaptive load balancing mode requires to switch this option to **ARP**.
- The **Monitoring Interval**, **Link up delay**, and **Link down delay** fields, which contain values in milliseconds, leave as they are. Change it only for a troubleshooting purpose.
- Click **Apply**.

Bond Settings

Name	mybond
Interfaces	<input checked="" type="checkbox"/> enp0s31f6 <input checked="" type="checkbox"/> enp0p25b1 <input type="checkbox"/> virbr0 <input type="checkbox"/> vnet1 <input type="checkbox"/> vnet2
MAC	E8:6A:64:04:9A:C2
Mode	Active Backup
Primary	enp0s31f6
Link Monitoring	MII (Recommended)
Monitoring Interval	100
Link up delay	0
Link down delay	0
<input type="button" value="Cancel"/> <input type="button" value="Apply"/>	

To verify that the bond works correctly, go to the **Networking** section and check if the **Sending** and **Receiving** columns in the **Interfaces** table display a network activity.

Interfaces		Add Bond	Add Team	Add Bridge	Add VLAN
Name	IP Address	Sending	Receiving		
mybond	10.253.16.25/24	46.6 Kbps	16.2 Kbps		
tun0	10.40.204.83/22	1.46 Kbps	2.59 Kbps		
virbr0	192.168.122.1/24	No carrier			

8.4. ADDING INTERFACES TO THE BOND USING THE WEB CONSOLE

Network bonds can include multiple interfaces and you can add or remove any of them at any time.

Learn how to add a network interface to an existing bond.

Prerequisites

- Having a bond with multiple interfaces configured as described in [Section 8.3, “Adding a new bond using the web console”](#).

Procedure

- Log in to the web console.
For details, see [Logging in to the web console](#).
- Open **Networking**.
- In the **Interfaces** table, click on the bond you want to configure.
- In the bond settings screen, scroll down to the table of members (interfaces).
- Click the + icon.
- Select the interface in the drop down list and click it.

Members	Sending	Receiving	
enp0s31f6	561 bps	1000 bps	<input checked="" type="button"/> ON
ens12	0 bps	0 bps	<input checked="" type="button"/> ON

+

- tun0
- virbr0
- vnet1
- vnet2
- wlp61s0

The RHEL 8 web console adds the interface to the bond.

8.5. REMOVING OR DISABLING AN INTERFACE FROM THE BOND USING THE WEB CONSOLE

Network bonds can include multiple interfaces. If you need to change a device, you can remove or disable particular interfaces from the bond, which will work with the rest of the active interfaces.

To stop using an interface included in a bond, you can:

- Remove the interface from the bond.

- Disable the interface temporarily. The interface stays a part of the bond, but the bond will not use it until you enable it again.

Prerequisites

- Having a bond with multiple interfaces configured as described in [Section 8.3, “Adding a new bond using the web console”](#).

Procedure

1. Log in to the RHEL web console.
For details, see [Logging in to the web console](#).
2. Open **Networking**.
3. Click the bond you want to configure.
4. In the bond settings screen, scroll down to the table of ports (interfaces).
5. Select the interface and and remove or disable it:
 - Click the - icon to remove the interface.
 - Switch the **ON/OFF** button to Off.

Members	Sending	Receiving	
enp0s31f6	101 Kbps	3.63 Mbps	ON <input type="button" value="-"/>
ens12	0 bps	0 bps	ON <input type="button" value="-"/>

Based on your choice, the web console either removes or disables the interface from the bond and you can see it back in the **Networking** section as standalone interface.

8.6. REMOVING OR DISABLING A BOND USING THE WEB CONSOLE

Remove or disable a network bond using the web console. If you disable the bond, the interfaces stay in the bond, but the bond will not be used for network traffic.

Prerequisites

- There is an existing bond in the web console.

Procedure

1. Log in to the web console.
For details, see [Logging in to the web console](#).
2. Open **Networking**.
3. Click the bond you want to remove.
4. In the bond settings screen, you can disable the bond with the **ON/OFF** button or click the **Delete** button to remove the bond permanently.

mybond	Bond	E8:6A:64:04:9A:C2	Delete	ON	
Status 10.253.16.25/24, fe80:0:0:0:de45:c6f6:8ddd:ef21/64					
Carrier Yes					
General <input checked="" type="checkbox"/> Connect automatically					
IPv4 Automatic (DHCP)					
IPv6 Automatic					
MTU Automatic					
Bond Round Robin					

You can go back to **Networking** and verify that all the interfaces from the bond are now standalone interfaces.

CHAPTER 9. CONFIGURING NETWORK TEAMS USING THE WEB CONSOLE

Learn how network bonding works, what are the differences between network teams and network bonds, and what are the possibilities of configuration in the web console.

Additionally you can find guidelines for:

- Adding a new network team
- Adding new interfaces to an existing network team
- Removing interfaces from an existing network team
- Removing a network team

Prerequisites

- The RHEL 8 web console installed and enabled.
For details, see [Installing the web console](#).

9.1. UNDERSTANDING NETWORK TEAMING

Network teaming is a feature that combines or aggregates network interfaces to provide a logical interface with higher throughput or redundancy.

Network teaming uses a kernel driver to implement fast handling of packet flows, as well as user-space libraries and services for other tasks. This way, network teaming is an easily extensible and scalable solution for load-balancing and redundancy requirements.



IMPORTANT

Certain network teaming features, such as the fail-over mechanism, do not support direct cable connections without a network switch. For further details, see [Is bonding supported with direct connection using crossover cables?](#)

9.2. COMPARISON OF NETWORK TEAMING AND BONDING FEATURES

Learn about the features supported in network teams and network bonds:

Feature	Network bond	Network team
Broadcast Tx policy	Yes	Yes
Round-robin Tx policy	Yes	Yes
Active-backup Tx policy	Yes	Yes
LACP (802.3ad) support	Yes (active only)	Yes
Hash-based Tx policy	Yes	Yes

Feature	Network bond	Network team
User can set hash function	No	Yes
Tx load-balancing support (TLB)	Yes	Yes
LACP hash port select	Yes	Yes
Load-balancing for LACP support	No	Yes
Ethtool link monitoring	Yes	Yes
ARP link monitoring	Yes	Yes
NS/NA (IPv6) link monitoring	No	Yes
Ports up/down delays	Yes	Yes
Port priorities and stickiness ("primary" option enhancement)	No	Yes
Separate per-port link monitoring setup	No	Yes
Multiple link monitoring setup	Limited	Yes
Lockless Tx/Rx path	No (rwlock)	Yes (RCU)
VLAN support	Yes	Yes
User-space runtime control	Limited	Yes
Logic in user-space	No	Yes
Extensibility	Hard	Easy
Modular design	No	Yes
Performance overhead	Low	Very low
D-Bus interface	No	Yes
Multiple device stacking	Yes	Yes
Zero config using LLDP	No	(in planning)
NetworkManager support	Yes	Yes

9.3. ADDING A NEW TEAM USING THE WEB CONSOLE

Configure a new active backup network team on two or more network interfaces using the web console.

Prerequisites

- Two or more network cards installed on the server.
- The network cards are connected to a switch.

Procedure

1. Log in to the web console.
For details, see [Logging in to the web console](#)
2. Go to the **Networking** tab.
3. Click the **Add Team** button.
4. In the **Team Settings** area, configure parameters for the new team:
 - a. Add a name for your team device to the **Name** field.
 - b. In the **Ports** field, select all network interfaces you want to add to the team.
 - c. In the **Runner** drop down menu, select the runner.
 - d. In the **Link Watch** drop down menu select a link watcher.
 - i. If you select **Ethtool**, additionally, set a link up delay and a link down delay.
 - ii. If you select **ARP Ping** or **NSNA Ping**, additionally, set a ping interval and ping target.
5. Click **Apply**

Team Settings

Name	myteam
Ports	<input type="checkbox"/> enp1s0 <input checked="" type="checkbox"/> enp7s0 <input checked="" type="checkbox"/> enp8s0 <input type="checkbox"/> enp9s0
Runner	Active Backup
Link Watch	Ethtool
Link up delay	0
Link down delay	0

Verification steps

1. Go to the **Networking** tab and check if the **Sending** and **Receiving** columns in the Interfaces table display a network activity.

The screenshot shows the RHEL 8 web console interface. On the left, a sidebar menu includes options like Storage, Networking (which is currently selected), Podman, Containers, Accounts, Services, Applications, Diagnostic Reports, and Help. The main content area is titled 'Networking'. It contains a 'Firewall' section with a status indicator showing '1 Active Zone'. Below this is a table titled 'Interfaces' with the following data:

Name	IP Address	Sending	Receiving
enp1s0	192.168.122.222/24	0.00938 bps	3.95 bps
enp9s0			Inactive
myteam	192.168.122.250/24	3.52 bps	3.29 bps

Additional resources

- [Network team runners](#)

9.4. ADDING NEW INTERFACES TO THE TEAM USING THE WEB CONSOLE

Network teams can include multiple interfaces and it is possible to add or remove any of them at any time. The following section describes how to add a new network interface to an existing team.

Prerequisites

Prerequisites

- A network team with is configured.

Procedure

1. Log in to the web console.
For details, see [Logging in to the web console](#).
2. Switch to the **Networking** tab.
3. In the **Interfaces** table, click on the team you want to configure.
4. In the team settings window, scroll down to the **Ports** table.
5. Click on the **+** icon.
6. Select the interface you wish to add from the drop down list.

Ports	Sending	Receiving
enp7s0	0 bps	0 bps
enp8s0	0 bps	0 bps

The RHEL 8 web console adds the interface to the team.

9.5. REMOVING OR DISABLING AN INTERFACE FROM THE TEAM USING THE WEB CONSOLE

Network teams can include multiple interfaces. If you need to change a device, you can remove or disable particular interfaces from the network team, which will work together with the rest of active interfaces.

There are two options how to stop using an interface included in a team:

- Removing the interface from the team
- Temporarily disabling the interface. The interface then stays a part of the team, but the team will not use it until you enable it again.

Prerequisites

- A network team with multiple interfaces exists on the host.

Procedure

1. Log in to the RHEL web console.
For details, see [Logging in to the web console](#).
2. Switch to the **Networking** tab.
3. Click the team you want to configure.
4. In the team settings window, scroll down to the table of ports (interfaces).

5. Select an interface and remove or disable it.
 - a. Switch the **ON/OFF** button to Off to disable the interface.
 - b. Click the - icon to remove the interface.

Ports	Sending	Receiving	
enp7s0	0 bps	0 bps	<input checked="" type="checkbox"/>
enp8s0	0 bps	0 bps	<input checked="" type="checkbox"/>
enp9s0	0 bps	0 bps	<input checked="" type="checkbox"/>

Based on your choice, the web console either removes or disables the interface. If you remove the interface, it will be available in **Networking** as a standalone interface.

9.6. REMOVING OR DISABLING A TEAM USING THE WEB CONSOLE

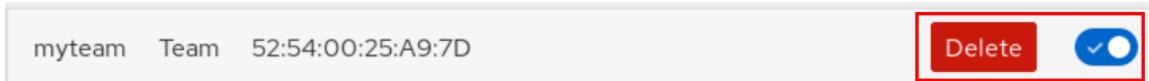
Remove or disable a network team using the web console. If you only disable the team, interfaces in the team will stay in it but the team will not be used for network traffic.

Prerequisites

- A network team is configured on the host.

Procedure

1. Log in to the web console.
For details, see [Logging in to the web console](#).
2. Switch to the **Networking** tab.
3. Click the team you wish to remove or disable.
4. Remove or disable the selected team.
 - a. You can remove the team by clicking the **Delete** button.
 - b. You can disable the team by moving the **ON/OFF** switch to a disabled position.



Verification steps

- If you removed the team, go to **Networking**, and verify that all the interfaces from your team are now listed as standalone interfaces.

CHAPTER 10. CONFIGURING NETWORK BRIDGES IN THE WEB CONSOLE

Network bridges are used to connect multiple interfaces to the one subnet with the same range of IP addresses.

Prerequisites

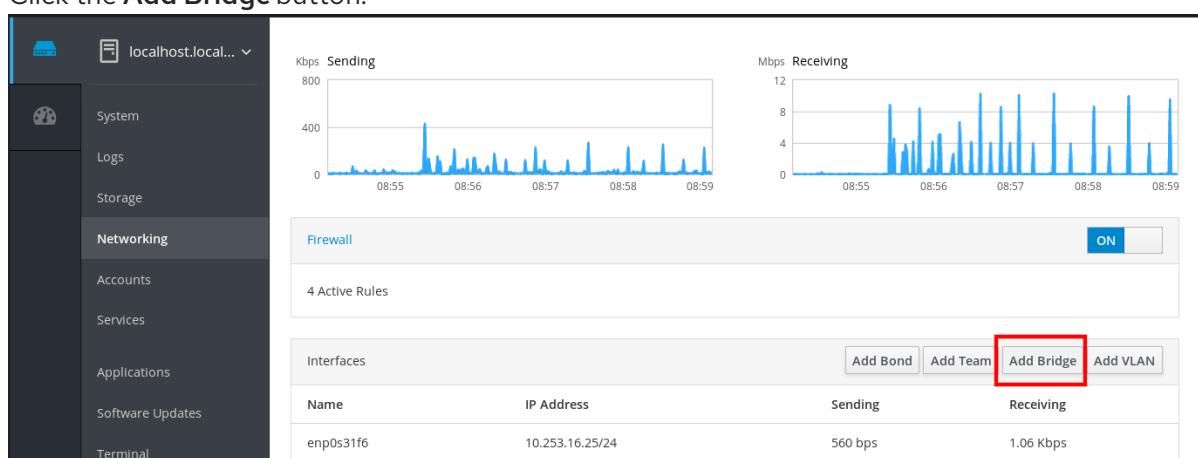
- The RHEL 8 web console installed and enabled.
For details, see [Installing the web console](#).

10.1. ADDING BRIDGES IN THE WEB CONSOLE

Create a software bridge on multiple network interfaces using the web console.

Procedure

1. Log in to the RHEL web console.
For details, see [Logging in to the web console](#).
2. Open **Networking**.
3. Click the **Add Bridge** button.



4. In the **Bridge Settings** dialog box, enter a name for the new bridge.
5. In the **Port** field, select interfaces which you want to put to the one subnet.
6. Optionally, you can select the **Spanning Tree protocol (STP)** to avoid bridge loops and broadcast radiation.
If you do not have a strong preference, leave the predefined values as they are.

Bridge Settings

Name	bridge0
Ports	<input checked="" type="checkbox"/> enp0s31f6 <input type="checkbox"/> tun0 <input type="checkbox"/> virbr0 <input checked="" type="checkbox"/> vnet0 <input checked="" type="checkbox"/> vnet1 <input type="checkbox"/> wlp61s0
Spanning Tree Protocol (STP)	<input checked="" type="checkbox"/>
STP Priority	32768
STP Forward delay	15
STP Hello time	2
STP Maximum message age	20
<input type="button" value="Cancel"/> <input type="button" value="Apply"/>	

7. Click **Create**.

If the bridge is successfully created, the web console displays the new bridge in the **Networking** section. Check values in the **Sending** and **Receiving** columns in the new bridge row.

Interfaces		Add Bond	Add Team	Add Bridge	Add VLAN
Name	IP Address	Sending	Receiving		
bridge0	10.253.16.25/24	1.22 Kbps	609 bps		
virbr0	192.168.122.1/24	No carrier			
wlp61s0	10.253.16.39/24	0 bps	0 bps		

If you can see that zero bytes are sent and received through the bridge, the connection does not work correctly and you need to adjust the network settings.

10.2. CONFIGURING A STATIC IP ADDRESS IN THE WEB CONSOLE

IP address for your system can be assigned from the pool automatically by the DHCP server or you can configure the IP address manually. The IP address will not be influenced by the DHCP server settings.

Learn how to configure static IPv4 addresses of a network bridge using the RHEL web console.

Procedure

1. Log in to the RHEL web console.
For details, see [Logging in to the web console](#).
2. Open the **Networking** section.
3. Click the interface where you want to set the static IP address.

The screenshot shows the RHEL Web Console interface. The left sidebar has a 'Networking' section selected. The main area displays network traffic graphs for 'Sending' and 'Receiving' Kbps over time (10:29 to 10:32). Below the graphs is a 'Firewall' section with an 'ON' toggle switch and '4 Active Rules'. The central part of the screen is a table titled 'Interfaces' with columns for Name, IP Address, Sending, and Receiving. The table contains three rows: 'bridge0' (IP 10.253.16.25/24, 336 bps, 2.24 Kbps), 'virbr0' (IP 192.168.122.1/24, No carrier), and 'wlp6s0' (IP 10.253.16.39/24, 0 bps, 0 bps). Buttons for 'Add Bond', 'Add Team', 'Add Bridge', and 'Add VLAN' are at the top right of the table. A red box highlights the 'Interfaces' table.

Name	IP Address	Sending	Receiving
bridge0	10.253.16.25/24	336 bps	2.24 Kbps
virbr0	192.168.122.1/24	No carrier	
wlp6s0	10.253.16.39/24	0 bps	0 bps

4. In the interface details screen, click the **IPv4** configuration.

The screenshot shows the interface details screen for 'bridge0'. It displays the current status as 'Status 10.253.16.25/24, fe80:0:0:0:7813:2486:f2d0:92ad/64'. Under 'General', there is a checked checkbox for 'Connect automatically'. The 'IPv4' configuration is highlighted with a red box and shows 'Automatic (DHCP)'. Other options shown are 'IPv6 Automatic' and 'MTU Automatic'.

Status 10.253.16.25/24, fe80:0:0:0:7813:2486:f2d0:92ad/64

Carrier Yes

General Connect automatically

IPv4 Automatic (DHCP)

IPv6 Automatic

MTU Automatic

5. In the **IPv4 Settings** dialog box, select **Manual** in the **Addresses** drop down list.

IPv4 Settings

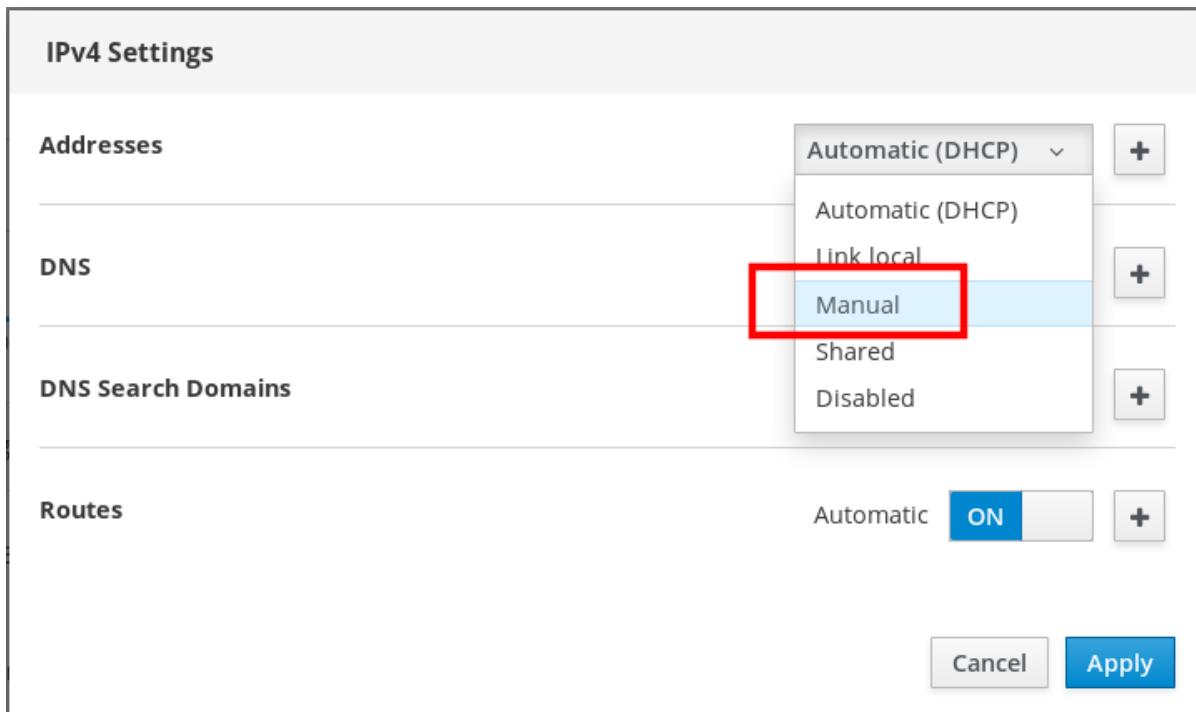
Addresses Automatic (DHCP)

DNS Link local

DNS Search Domains Manual

Routes Shared

Automatic ON



6. Click **Apply**.
7. In the **Addresses** field, enter the desired IP address, netmask and gateway.

IPv4 Settings

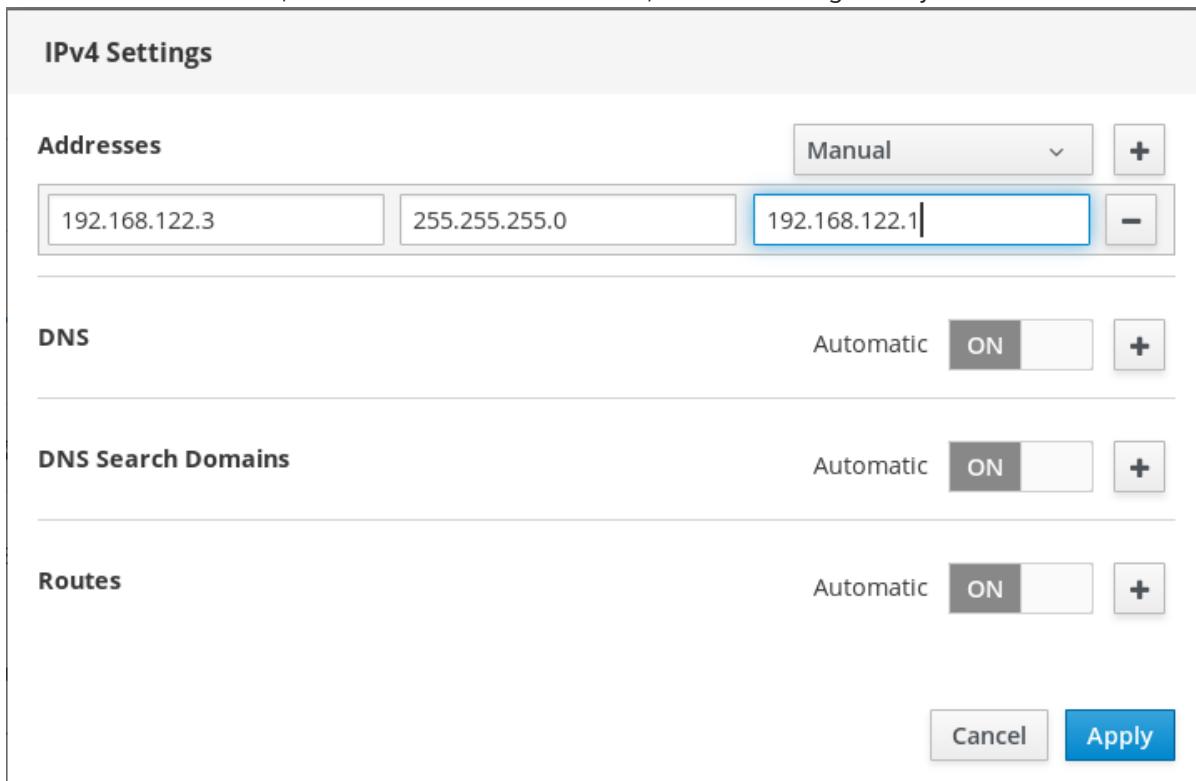
Addresses Manual

192.168.122.3 255.255.255.0 192.168.122.1

DNS Automatic ON

DNS Search Domains Automatic ON

Routes Automatic ON



8. Click **Apply**.

At this point, the IP address has been configured and the interface uses the new static IP address.

IPv4 Address 192.168.122.3/24 via 192.168.122.1
 IPv6 Automatic
 MTU Automatic

10.3. REMOVING INTERFACES FROM THE BRIDGE USING THE WEB CONSOLE

Network bridges can include multiple interfaces. You can remove them from the bridge. Each removed interface will be automatically changed to the standalone interface.

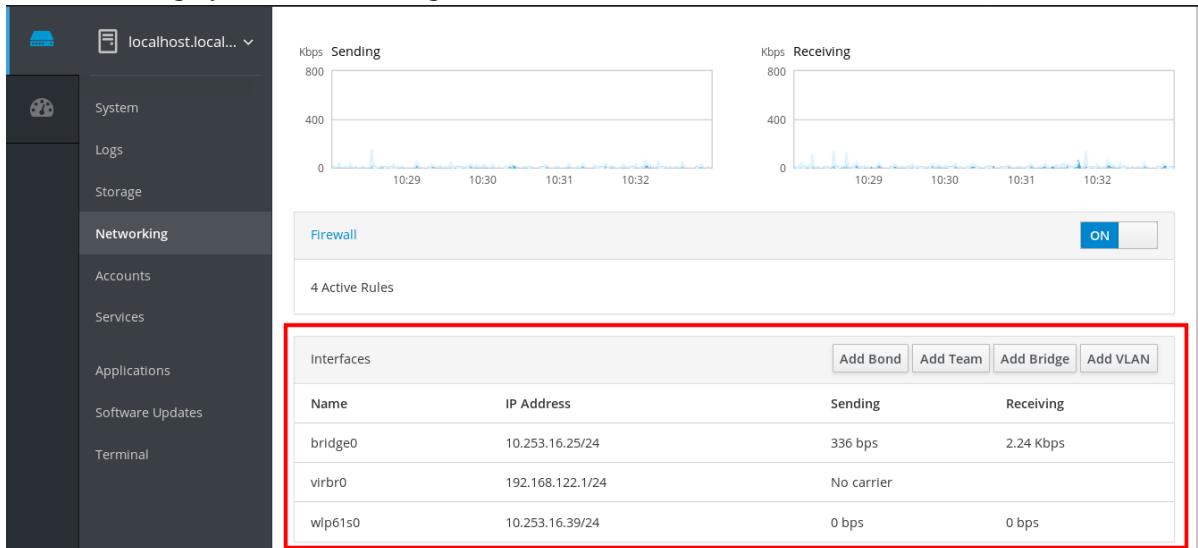
Learn how to remove a network interface from a software bridge created in the RHEL 8 system.

Prerequisites

- Having a bridge with multiple interfaces in your system.

Procedure

- Log in to the RHEL web console.
 For details, see [Logging in to the web console](#).
- Open **Networking**.
- Click the bridge you want to configure.



The screenshot shows the RHEL Web Console interface. The left sidebar has a dark theme with categories: System, Logs, Storage, **Networking** (which is selected), Accounts, Services, Applications, Software Updates, and Terminal. The main area has two graphs at the top: "Sending" and "Receiving" Kbps over time (10:29 to 10:32). Below the graphs is a "Firewall" section with a status switch set to "ON" and "4 Active Rules". The main content area is titled "Interfaces" and contains a table with the following data:

Name	IP Address	Sending	Receiving
bridge0	10.253.16.25/24	336 bps	2.24 Kbps
virbr0	192.168.122.1/24	No carrier	
wlp6s0	10.253.16.39/24	0 bps	0 bps

- In the bridge settings screen, scroll down to the table of ports (interfaces).

Ports	Sending	Receiving	+
enp0s31f6	0 bps	0 bps	ON <input type="checkbox"/> <input type="checkbox"/>
vnet0	0 bps	0 bps	ON <input type="checkbox"/> <input type="checkbox"/>
vnet1	0 bps	0 bps	ON <input type="checkbox"/> <input type="checkbox"/>

5. Select the interface and click the - icon.

The RHEL 8 web console removes the interface from the bridge and you can see it back in the **Networking** section as standalone interface.

10.4. DELETING BRIDGES IN THE WEB CONSOLE

You can delete a software network bridge in the RHEL web console. All network interfaces included in the bridge will be changed automatically to standalone interfaces.

Prerequisites

- Having a bridge in your system.

Procedure

1. Log in to the RHEL web console.
For details, see [Logging in to the web console](#).
2. Open the **Networking** section.
3. Click the bridge you want to configure.

The screenshot shows the RHEL 8 Web Console interface. The left sidebar has a 'Networking' section selected. The main area displays network monitoring graphs for 'Sending' and 'Receiving' traffic over time. Below that is a 'Firewall' section with an 'ON' toggle switch. The central part of the screen is a table titled 'Interfaces' showing the following data:

Name	IP Address	Sending	Receiving
bridge0	10.253.16.25/24	336 bps	2.24 Kbps
virbr0	192.168.122.1/24	No carrier	
wlp61s0	10.253.16.39/24	0 bps	0 bps

4. In the bridge settings screen, scroll down to the table of ports.

Ports	Sending	Receiving	<input type="button" value="+"/>
enp0s31f6	0 bps	0 bps	<input checked="" type="button" value="ON"/> <input type="button" value="-"/>
vnet0	0 bps	0 bps	<input checked="" type="button" value="ON"/> <input type="button" value="-"/>
vnet1	0 bps	0 bps	<input checked="" type="button" value="ON"/> <input type="button" value="-"/>

5. Click **Delete**.

At this stage, go back to **Networking** and verify that all the network interfaces are displayed on the **Interfaces** tab. Interfaces which were part of the bridge can be inactive now. Therefore, you may need to activate them and set network parameters manually.

Interfaces		Add Bond	Add Team	Add Bridge	Add VLAN
Name	IP Address	Sending	Receiving		
enp0s31f6	10.253.16.25/24	1.12 Kbps	1.60 Kbps		
tun0	10.40.205.17/22	0 bps	0 bps		
virbr0	192.168.122.1/24	No carrier			
vnet0		Inactive			
vnet1		Inactive			

CHAPTER 11. CONFIGURING VLANS IN THE WEB CONSOLE

VLANs (Virtual LANs) are virtual networks created on a single physical Ethernet interface. Each VLAN is defined by an ID which represents a unique positive integer and works as a standalone interface.

Learn how to create VLANs in the RHEL web console.

Prerequisites

- The RHEL 8 web console installed and enabled.
For details, see [Installing the web console](#).
- Having a network interface in your system.

Procedure

- Log in to the RHEL web console.
For details, see [Logging in to the web console](#).
- Open **Networking**.
- Click **Add VLAN** button.

- In the **VLAN Settings** dialog box, select the physical interface for which you want to create a VLAN.
- Enter the VLAN Id or just use the predefined number.
- In the **Name** field, you can see a predefined name consisted of the parent interface and VLAN Id. If it is not necessary, leave the name as it is.

VLAN Settings	
Parent	enp0s31f6
VLAN Id	1
Name	enp0s31f6.1

7. Click **Apply**.

The new VLAN has been created and you need to click at the VLAN and configure the network settings.

Interfaces		Add Bond	Add Team	Add Bridge	Add VLAN
Name	IP Address	Sending	Receiving		
enp0s31f6	10.253.16.25/24	7.66 Kbps	5.47 Kbps		
enp0s31f6.1		Configuring IP			
tun0	10.40.204.27/22	0 bps	0 bps		
virbr0	192.168.122.1/24	0 bps	0 bps		
wlp6s0	10.253.16.39/24	0 bps	0 bps		

CHAPTER 12. CONFIGURING THE WEB CONSOLE LISTENING PORT

Learn how to allow new ports or change the existing ports using the RHEL web console.

Prerequisites

- The RHEL 8 web console installed and enabled.
For details, see [Installing the web console](#).

12.1. ALLOWING A NEW PORT ON A SYSTEM WITH ACTIVE SELINUX

Enable the web console to listen on a selected port.

Prerequisites

- The web console must be installed and accessible. For details, see [Installing the web console](#).

Procedure

- For ports that are not defined by any other part of SELinux, run:

```
$ sudo semanage port -a -t websm_port_t -p tcp PORT_NUMBER
```

- For ports that already are defined by other part of SELinux, run:

```
$ sudo semanage port -m -t websm_port_t -p tcp PORT_NUMBER
```

The changes should take effect immediately.

12.2. ALLOWING A NEW PORT ON A SYSTEM WITH FIREWALLD

Enable the web console to receive connections on a new port.

Prerequisites

- The web console must be installed and accessible. For details, see [Installing the web console](#).
- The **firewalld** service must be running.

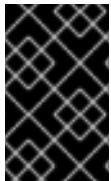
Procedure

1. To add a new port number, run the following command:

```
$ sudo firewall-cmd --permanent --service cockpit --add-port=PORT_NUMBER/tcp
```

2. To remove the old port number from the **cockpit** service, run:

```
$ sudo firewall-cmd --permanent --service cockpit --remove-port=OLD_PORT_NUMBER/tcp
```



IMPORTANT

If you only run the **firewall-cmd --service cockpit --add-port=PORT_NUMBER/tcp** without the **--permanent** option, your change will be canceled with the next reload of **firewalld** or a system reboot.

12.3. CHANGING THE WEB CONSOLE PORT

Change default transmission control protocol (TCP) on port **9090** to a different one.

Prerequisites

- The web console must be installed and accessible. For details, see [Installing the web console](#).
- If you have SELinux protecting your system, you need to set it to allow Cockpit to listen on a new port. For more information, see [Allowing a new port on a system with active SELinux](#).
- If you have **firewalld** configured as your firewall, you need to set it to allow Cockpit receive connections on a new port, for more information, see [Allowing a new port on a system with firewalld](#).

Procedure

1. Change the listening port with one of the following methods:

- a. Using the **systemctl edit cockpit.socket** command:

- i. Run the following command:

```
$ sudo systemctl edit cockpit.socket
```

This will open the **/etc/systemd/system/cockpit.socket.d/override.conf** file.

- ii. Modify the content of **override.conf** or add a new content in the following format:

```
[Socket]
ListenStream=
ListenStream=PORT_NUMBER
```

- b. Alternatively, add the above mentioned content to the **/etc/systemd/system/cockpit.socket.d/listen.conf** file.

Create the **cockpit.socket.d** directory and the **listen.conf** file if they do not exist yet.

2. Run the following commands for changes to take effect:

```
$ sudo systemctl daemon-reload
$ sudo systemctl restart cockpit.socket
```

If you used **systemctl edit cockpit.socket** in the previous step, running **systemctl daemon-reload** is not necessary.

Verification steps

- To verify that the change was successful, try to connect to the web console with the new port.

CHAPTER 13. MANAGING FIREWALL USING THE WEB CONSOLE

A firewall is a way to protect machines from any unwanted traffic from outside. It enables users to control incoming network traffic on host machines by defining a set of firewall rules. These rules are used to sort the incoming traffic and either block it or allow through.

Prerequisites

- The RHEL 8 web console configures the **firewalld** service.
For details about the **firewalld** service, see [Getting started with firewalld](#).

13.1. RUNNING FIREWALL USING THE WEB CONSOLE

This section describes where and how to run the RHEL 8 system firewall in the web console.

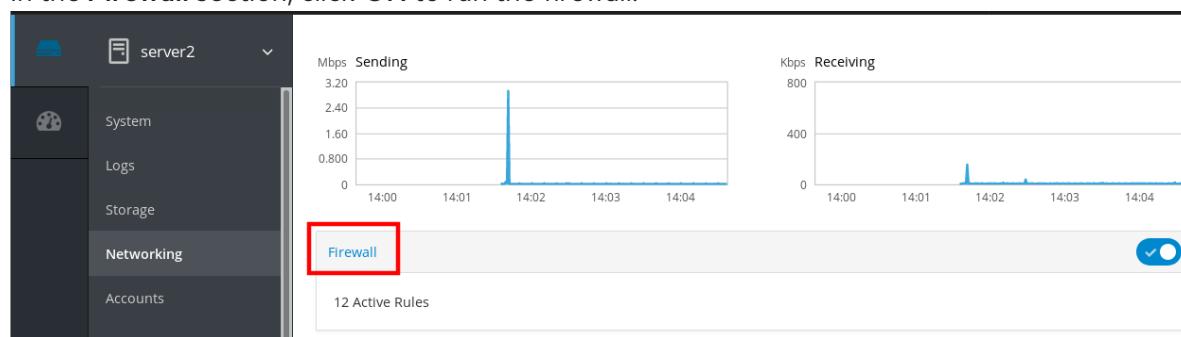


NOTE

The RHEL 8 web console configures the **firewalld** service.

Procedure

- Log in to the RHEL 8 web console.
For details, see [Logging in to the web console](#).
- Open the **Networking** section.
- In the **Firewall** section, click **ON** to run the firewall.



If you do not see the **Firewall** box, log in to the web console with the administration privileges.

At this stage, your firewall is running.

To configure firewall rules, see [Section 13.6, “Enabling services on the firewall using the web console”](#).

13.2. STOPPING FIREWALL USING THE WEB CONSOLE

This section describes where and how to stop the RHEL 8 system firewall in the web console.

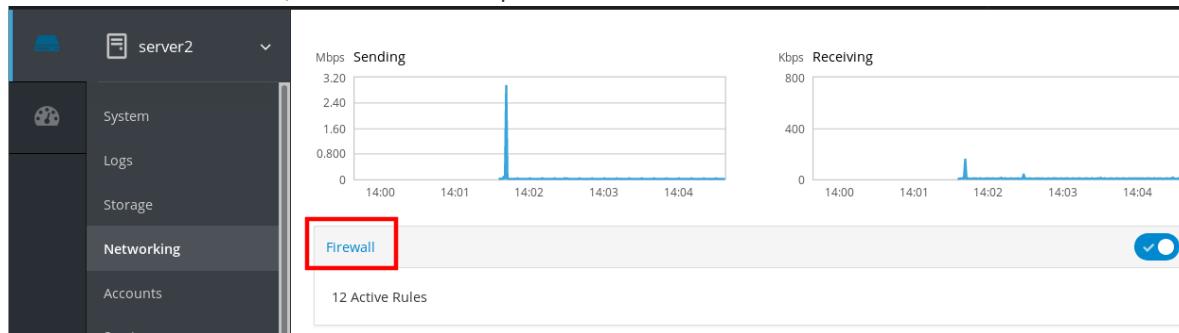


NOTE

The RHEL 8 web console configures the **firewalld** service.

Procedure

1. Log in to the RHEL 8 web console.
For details, see [Logging in to the web console](#).
2. Open the **Networking** section.
3. In the **Firewall** section, click **OFF** to stop it.



If you do not see the **Firewall** box, log in to the web console with the administration privileges.

At this stage, the firewall has been stopped and does not secure your system.

13.3. ZONES

firewalld can be used to separate networks into different zones according to the level of trust that the user has decided to place on the interfaces and traffic within that network. A connection can only be part of one zone, but a zone can be used for many network connections.

NetworkManager notifies **firewalld** of the zone of an interface. You can assign zones to interfaces with:

- **NetworkManager**
- **firewall-config** tool
- **firewall-cmd** command-line tool
- The RHEL web console

The latter three can only edit the appropriate **NetworkManager** configuration files. If you change the zone of the interface using the web console, **firewall-cmd** or **firewall-config**, the request is forwarded to **NetworkManager** and is not handled by **firewalld**.

The predefined zones are stored in the **/usr/lib/firewall/zones/** directory and can be instantly applied to any available network interface. These files are copied to the **/etc/firewall/zones/** directory only after they are modified. The default settings of the predefined zones are as follows:

block

Any incoming network connections are rejected with an icmp-host-prohibited message for **IPv4** and icmp6-adm-prohibited for **IPv6**. Only network connections initiated from within the system are possible.

dmz

For computers in your demilitarized zone that are publicly-accessible with limited access to your internal network. Only selected incoming connections are accepted.

drop

Any incoming network packets are dropped without any notification. Only outgoing network connections are possible.

external

For use on external networks with masquerading enabled, especially for routers. You do not trust the other computers on the network to not harm your computer. Only selected incoming connections are accepted.

home

For use at home when you mostly trust the other computers on the network. Only selected incoming connections are accepted.

internal

For use on internal networks when you mostly trust the other computers on the network. Only selected incoming connections are accepted.

public

For use in public areas where you do not trust other computers on the network. Only selected incoming connections are accepted.

trusted

All network connections are accepted.

work

For use at work where you mostly trust the other computers on the network. Only selected incoming connections are accepted.

One of these zones is set as the *default* zone. When interface connections are added to **NetworkManager**, they are assigned to the default zone. On installation, the default zone in **firewalld** is set to be the **public** zone. The default zone can be changed.



NOTE

The network zone names should be self-explanatory and to allow users to quickly make a reasonable decision. To avoid any security problems, review the default zone configuration and disable any unnecessary services according to your needs and risk assessments.

Additional resources

- The **firewalld.zone(5)** man page.

13.4. ZONES IN THE WEB CONSOLE



IMPORTANT

Firewall zones are new in the RHEL 8.1.0 Beta.

The Red Hat Enterprise Linux web console implements major features of the firewalld service and enables you to:

- Add predefined firewall zones to a particular interface or range of IP addresses
- Configure zones with selecting services into the list of enabled services
- Disable a service by removing this service from the list of enabled service

- Remove a zone from an interface

13.5. ENABLING ZONES USING THE WEB CONSOLE

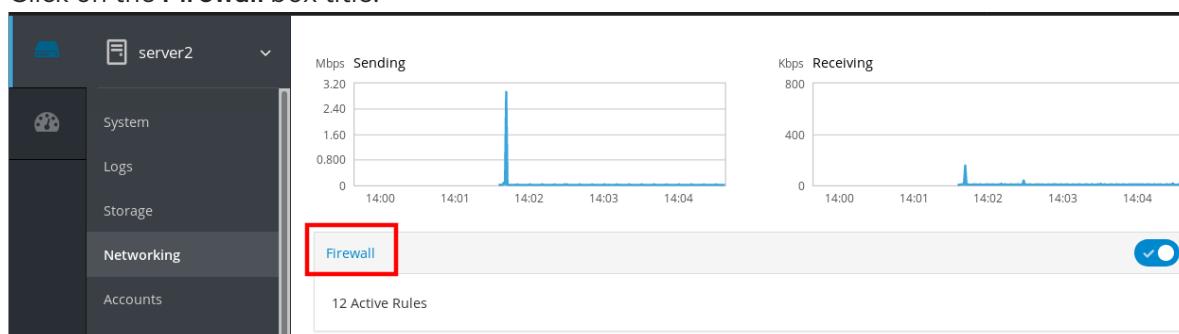
The web console enables you to apply predefined and existing firewall zones on a particular interface or a range of IP addresses. This section describes how to enable a zone on an interface.

Prerequisites

- The RHEL 8 web console has been installed.
For details, see [Installing the web console](#).
- The firewall must be enabled.
For details, see [Section 13.1, “Running firewall using the web console”](#).

Procedure

1. Log in to the RHEL web console with administration privileges.
For details, see [Logging in to the web console](#).
2. Click **Networking**.
3. Click on the **Firewall** box title.



If you do not see the **Firewall** box, log in to the web console with the administrator privileges.

4. In the **Firewall** section, click **Add Services**.
5. Click on the **Add Zone** button.
6. In the **Add Zone** dialog box, select a zone from the **Trust level** scale.
You can see here all zones predefined in the **firewalld** service.
7. In the **Interfaces** part, select an interface or interfaces on which the selected zone is applied.
8. In the **Allowed Addresses** part, you can select whether the zone is applied on:
 - the whole subnet
 - or a range of IP addresses in the following format:
 - 192.168.1.0
 - 192.168.1.0/24
 - 192.168.1.0/24, 192.168.1.0

9. Click on the **Add zone** button.

Verify the configuration in **Active zones**.

Active zones			
Zone	Interfaces	IP Range	
libvirt	virbr0	*	
Public	ens3	*	

13.6. ENABLING SERVICES ON THE FIREWALL USING THE WEB CONSOLE

By default, services are added to the default firewall zone. If you use more firewall zones or more network interfaces, you must select a zone first and then add the service with port.

The RHEL 8 web console displays predefined **firewalld** services and you can add them to active firewall zones.



IMPORTANT

The RHEL 8 web console configures the **firewalld** service.

The web console does not allow generic **firewalld** rules which are not listed in the web console.

Prerequisites

- The RHEL 8 web console has been installed.
For details, see [Installing the web console](#).

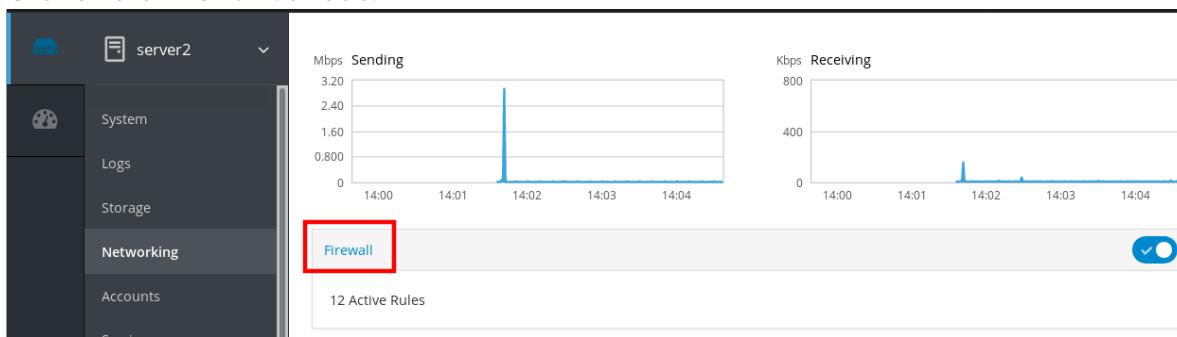
- The firewall must be enabled.
For details, see [Section 13.1, “Running firewall using the web console”](#).

Procedure

- Log in to the RHEL web console with administrator privileges.
For details, see [Logging in to the web console](#).

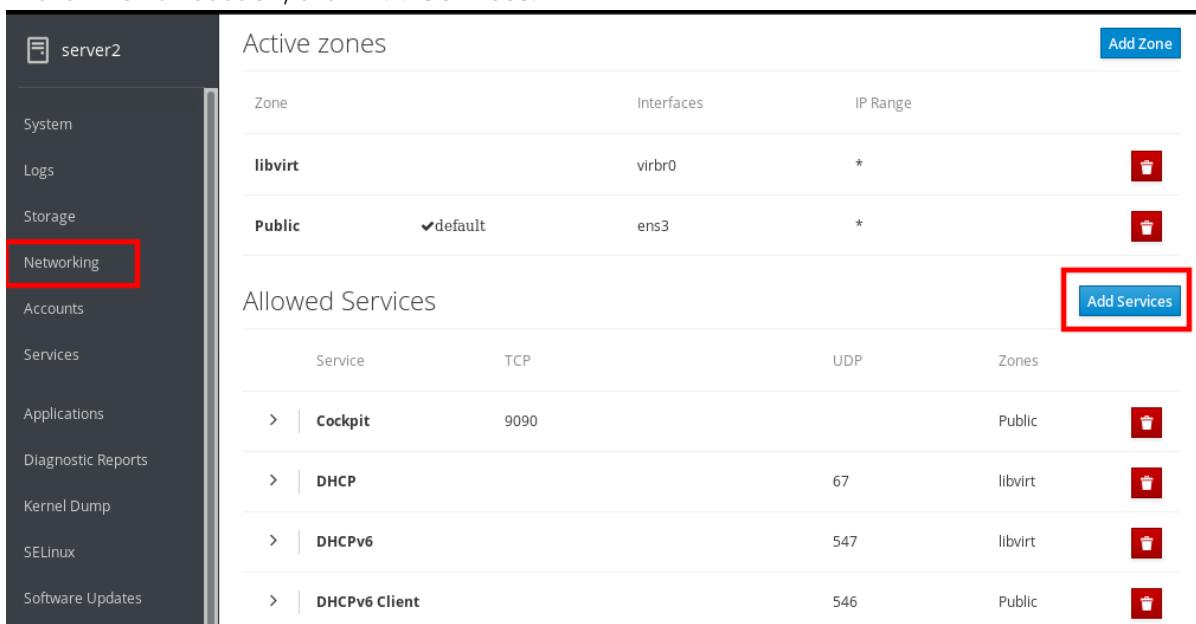
- Click **Networking**.

- Click on the **Firewall** box title.



If you do not see the **Firewall** box, log in to the web console with the administrator privileges.

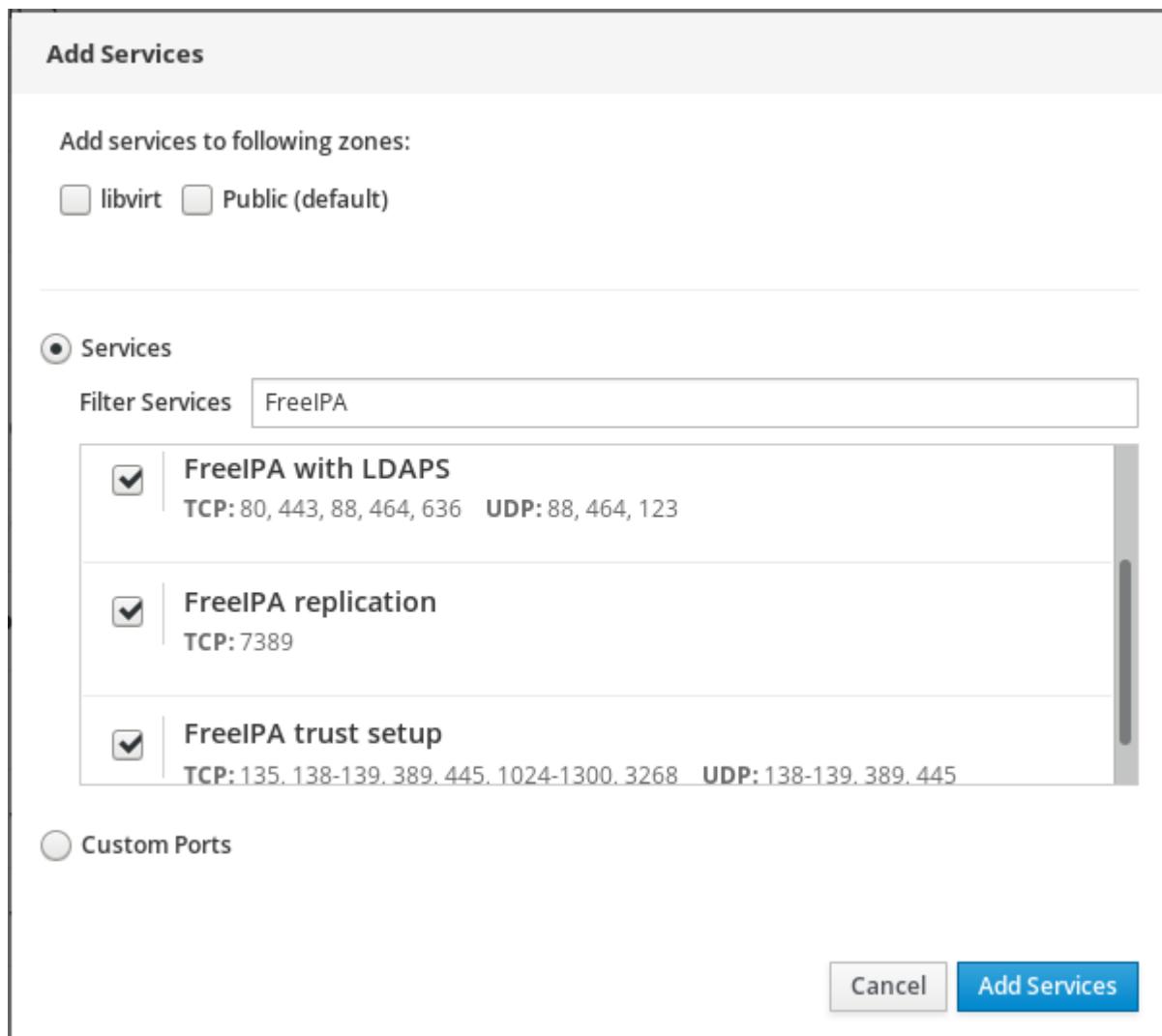
- In the **Firewall** section, click **Add Services**.



- In the **Add Services** dialog box, select a zone for which you want to add the service.
The **Add Services** dialog box includes a list of active firewall zones only if the system includes multiple active zones.

If the system uses just one (the default) zone, the dialog does not include zone settings.

- In the **Add Services** dialog box, find the service you want to enable on the firewall.
- Enable desired services.



8. Click **Add Services**.

At this point, the RHEL 8 web console displays the service in the list of **Allowed Services**.

13.7. CONFIGURING CUSTOM PORTS USING THE WEB CONSOLE

The web console allows you to add:

- Services listening on standard ports: [Section 13.6, “Enabling services on the firewall using the web console”](#)
- Services listening on custom ports.

This section describes how to add services with custom ports configured.

Prerequisites

- The RHEL 8 web console has been installed.
For details, see [Installing the web console](#).
- The firewall must be enabled.
For details, see [Section 13.1, “Running firewall using the web console”](#).

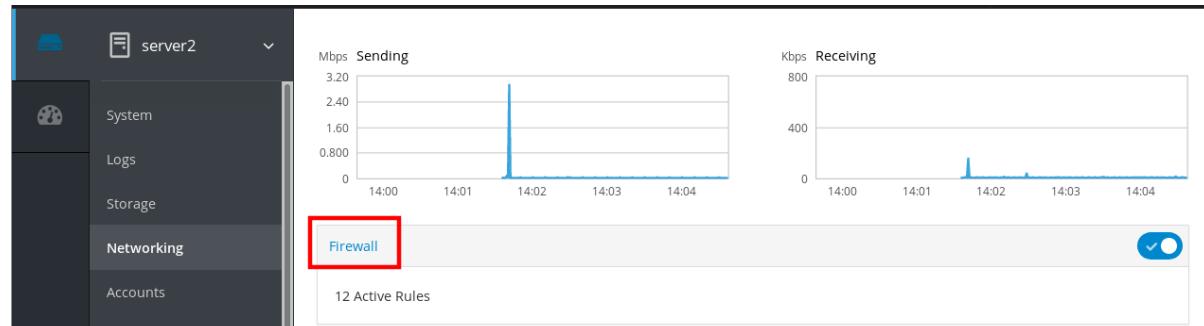
Procedure

1. Log in to the RHEL web console with administrator privileges.

For details, see [Logging in to the web console](#).

2. Click **Networking**.

3. Click on the **Firewall** box title.



If you do not see the **Firewall** box, log in to the web console with the administration privileges.

4. In the **Firewall** section, click **Add Services**.

Active zones			
Zone	Interfaces	IP Range	
libvirt	virbr0	*	Delete
Public	ens3	*	Delete

Allowed Services				
	Service	TCP	UDP	Zones
>	Cockpit	9090		Public
>	DHCP		67	libvirt
>	DHCPv6		547	libvirt
>	DHCPv6 Client		546	Public

5. In the **Add Services** dialog box, select a zone for which you want to add the service.

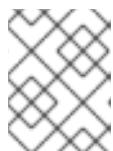
The **Add Services** dialog box includes a list of active firewall zones only if the system includes multiple active zones.

If the system uses just one (the default) zone, the dialog does not include zone settings.

6. In the **Add Ports** dialog box, click on the **Custom Ports** radio button.

7. In the TCP and UDP fields, add ports according to examples. You can add ports in the following formats:

- Port numbers such as 22
- Range of port numbers such as 5900–5910
- Aliases such as nfs, rsync

**NOTE**

You can add multiple values into each field. Values must be separated with the comma and without the space, for example: 8080,8081,http

8. After adding the port number in the **TCP** and/or **UDP** fields, verify the service name in the **Name** field.

The **Name** field displays the name of the service for which is this port reserved. You can rewrite the name if you are sure that this port is free to use and no server needs to communicate on this port.

9. In the **Name** field, add a name for the service including defined ports.
10. Click on the **Add Ports** button.

Add Ports

Add ports to the following zones:

libvirt Public (default)

Services

Custom Ports

Comma-separated ports, ranges, and aliases are accepted

TCP	8081
UDP	Example: 88,2019,nfs,rsync
Name	My Web Server

Cancel
Add Ports

To verify the settings, go to the **Firewall** page and find the service in the list of **Allowed Services**.

Allowed Services				Add Services
Service	TCP	UDP	Zones	
> DHCP		67	libvirt	
> DHCPv6		547	libvirt	
> DNS	53	53	libvirt	
My Web Server	8081		public	
> SSH	22		libvirt	

13.8. DISABLING ZONES USING THE WEB CONSOLE

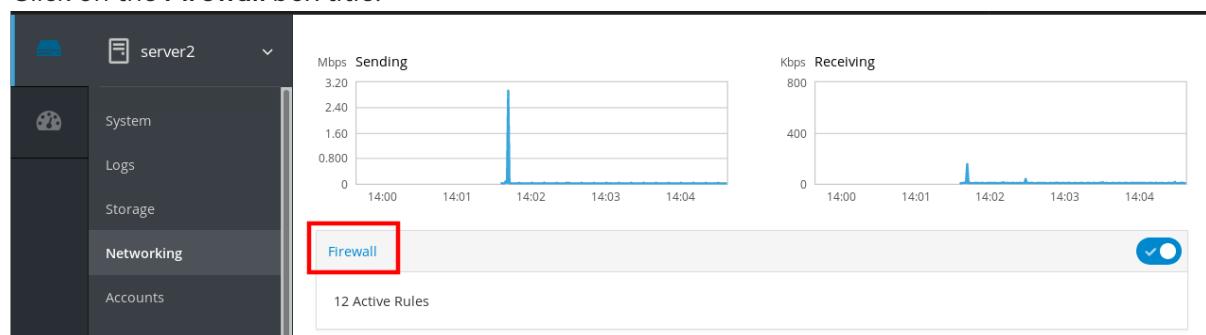
This section describes how to disable a firewall zone in your firewall configuration using the web console.

Prerequisites

- The RHEL 8 web console has been installed.
For details, see [Installing the web console](#).

Procedure

- Log in to the RHEL web console with administrator privileges.
For details, see [Logging in to the web console](#).
- Click **Networking**.
- Click on the **Firewall** box title.



If you do not see the **Firewall** box, log in to the web console with the administrator privileges.

- On the **Active zones** table, click on the **Delete** icon at the zone you want to remove.

Active zones			Add Zone
Zone	Interfaces	IP Range	
libvirt	virbr0	*	
Public	default	ens3	

The zone is now disabled and the interface does not include opened services and ports which were configured in the zone.

CHAPTER 14. APPLYING A GENERATED ANSIBLE PLAYBOOK

When troubleshooting issues with SELinux, the web console is able to generate a shell script or an Ansible playbook that you can then export and apply for more machines.

Prerequisites

- The web console interface needs to be installed and accessible.
For details, see [Installing the web console](#).

Procedure

1. Click **SELinux**.
2. Click "View the automation script" on the upper right side.
A window with the generated script opens. You can navigate between a shell script and an Ansible playbook generation options tab.

Automation Script

Shell Script Ansible

```
- name: Allow virt to sandbox use all caps
  seboolean:
    name: virt_sandbox_use_all_caps
    state: yes
    persistent: yes

- name: Allow virt to use nfs
  seboolean:
    name: virt_use_nfs
    state: yes
    persistent: yes
```

ⓘ Create new task file with this content. [Ansible roles documentation](#)

3. Click the **Copy to clipboard** button to select the script or playbook and apply it.

As a result, you have an automation script that you can apply to more machines.

Additional resources

- [Troubleshooting problems related to SELinux](#)
- [Deploying the same SELinux configuration on multiple systems](#)
- For details about the **ansible-playbook** command, see the **ansible-playbook(1)** man page.

CHAPTER 15. MANAGING PARTITIONS USING THE WEB CONSOLE

Learn how to manage file systems on RHEL 8 using the web console.

For details about the available file systems, see the [Overview of available file systems](#).

15.1. DISPLAYING PARTITIONS FORMATTED WITH FILE SYSTEMS IN THE WEB CONSOLE

The **Storage** section in the web console displays all available file systems in the **Filesystems** table.

This section navigates you to get to the list of partitions formatted with file systems displayed in the web console.

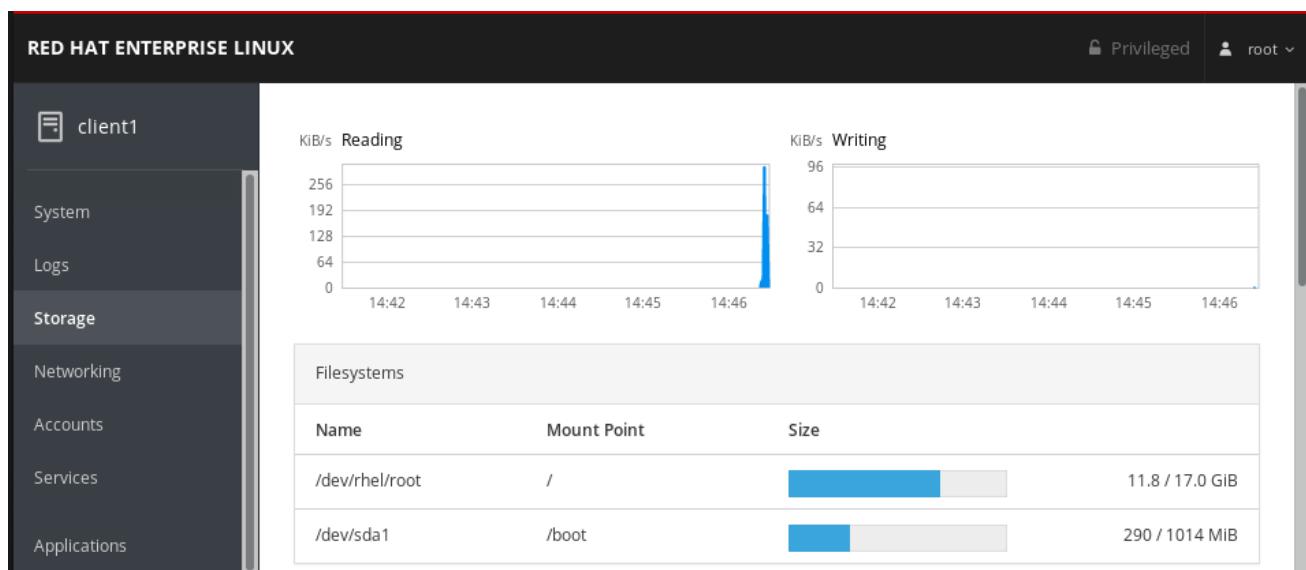
Prerequisites

- The **cockpit-storaged** package is installed on your system.
- The web console must be installed and accessible.
For details, see [Installing the web console](#).

Procedure

1. Log in to the RHEL web console.
For details, see [Logging in to the web console](#).
2. Click on the **Storage** tab.

In the **Filesystems** table, you can see all available partitions formatted with file systems, its name, size and how much space is available on each partition.



15.2. CREATING PARTITIONS IN THE WEB CONSOLE

To create a new partition:

- Use an existing partition table

- Create a partition

The screenshot shows the 'Storage' tab for the volume '/dev/sdb'. In the 'Content' section, it displays '500 GiB Free Space'. To the right of this section are two buttons: 'Create partition table' and 'Create Partition', both of which are enclosed in a red rectangular box.

Prerequisites

- The **cockpit-storaged** package is installed on your system.
- The web console must be installed and accessible.
For details, see [Installing the web console](#).
- An unformatted volume connected to the system visible in the **Other Devices** table of the **Storage** tab.

Procedure

1. Log in to the RHEL web console.
For details, see [Logging in to the web console](#).
2. Click the **Storage** tab.
3. In the **Other Devices** table, click a volume in which you want to create the partition.
4. In the **Content** section, click the **Create Partition** button.
5. In the **Create partition** dialog box, select the size of the new partition.
6. In the **Erase** drop down menu, select:
 - **Don't overwrite existing data** – the RHEL web console rewrites only the disk header. Advantage of this option is speed of formatting.
 - **Overwrite existing data with zeros** – the RHEL web console rewrites the whole disk with zeros. This option is slower because the program has to go through the whole disk, but it is more secure. Use this option if the disk includes any data and you need to overwrite it.
7. In the **Type** drop down menu, select a file system:
 - **XFS** file system supports large logical volumes, switching physical drives online without outage, and growing an existing file system. Leave this file system selected if you do not have a different strong preference.
 - **ext4** file system supports:

- Logical volumes
- Switching physical drives online without outage
- Growing a file system
- Shrinking a file system

Additional option is to enable encryption of partition done by LUKS (Linux Unified Key Setup), which allows you to encrypt the volume with a passphrase.

8. In the **Name** field, enter the logical volume name.
9. In the **Mounting** drop down menu, select **Custom**.
The **Default** option does not ensure that the file system will be mounted on the next boot.
10. In the **Mount Point** field, add the mount path.
11. Select **Mount at boot**.
12. Click the **Create partition** button.

Create partition on /dev/sdb

Size	500	GiB
Erase	Don't overwrite existing data	
Type	XFS - Red Hat Enterprise Linux 7 default	
Name	Partition 1	
Mounting	Custom	
Mount Point	/media	
Mount options	<input checked="" type="checkbox"/> Mount at boot <input type="checkbox"/> Mount read only <input type="checkbox"/> Custom mount options	
<input type="button" value="Cancel"/> <input type="button" value="Create partition"/>		

Formatting can take several minutes depending on the volume size and which formatting options are selected.

After the formatting has completed successfully, you can see the details of the formatted logical volume on the **Filesystem** tab.

To verify that the partition has been successfully added, switch to the **Storage** tab and check the **Filesystems** table.

Filesystems			
Name	Mount Point	Size	
/dev/rhel/root	/	12.1 / 17.0 GiB	
/dev/sda1	/boot	290 / 1014 MiB	
Partition 1	/media	500 GiB	

15.3. DELETING PARTITIONS IN THE WEB CONSOLE

This paragraph is the procedure module introduction: a short description of the procedure.

Prerequisites

- The **cockpit-storaged** package is installed on your system.
- The web console must be installed and accessible.
For details, see [Installing the web console](#).
- Unmount the partition's file system.
For details about mounting and unmounting partitions, see [Section 15.4, "Mounting and unmounting file systems in the web console"](#).

Procedure

1. Log in to the RHEL web console.
For details, see [Logging in to the web console](#).
2. Click on the **Storage** tab.
3. In the **Filesystems** table, select a volume in which you want to delete the partition.
4. In the **Content** section, click on the partition you want to delete.

Content

>	512 MiB ext4 File System	/dev/nvme0n1p1
>	32 GiB Encrypted data	/dev/nvme0n1p2
>	32.0 GiB ext4 File System	/dev/mapper/luks-20bca9d6-0fb1-4bb8-8643-5f915415dea8
>	8.00 GiB Encrypted data	/dev/nvme0n1p3
>	8 GiB Swap Space	/dev/mapper/luks-01afed46-ab21-4037-8927-6c01a7ae1dc0
>	198 GiB Extended Partition	/dev/nvme0n1p4
>	198 GiB Encrypted data	/dev/nvme0n1p5
>	198 GiB ext4 File System	/dev/mapper/luks-913540eb-284e-4e56-8f58-572e6f4e8cf8

5. The partition rolls down and you can click on the **Delete** button.

The screenshot shows a partition management interface. At the top, it displays '198 GiB Extended Partition' and the device path '/dev/nvme0n1p4'. Below this, there are two tabs: 'Partition' (which is selected) and 'Unrecognized Data'. On the right side, there is a 'Delete' button, which is highlighted with a red box. Under the 'Partition' tab, detailed information about the partition is shown: Name (empty), Size (198 GiB), UUID (a98632eb-04), and Type (0x05).

The partition must not be mounted and used.

To verify that the partition has been successfully removed, switch to the **Storage** tab and check the **Content** table.

15.4. MOUNTING AND UNMOUNTING FILE SYSTEMS IN THE WEB CONSOLE

To be able to use partitions on RHEL systems, you need to mount a filesystem on the partition as a device.



NOTE

You also can unmount a file system and the RHEL system will stop using it. Unmounting the file system enables you to delete, remove, or re-format devices.

Prerequisites

- The **cockpit-storaged** package is installed on your system.
- The web console must be installed and accessible.
For details, see [Installing the web console](#).
- If you want to unmount a file system, ensure that the system does not use any file, service, or application stored in the partition.

Procedure

1. Log in to the RHEL web console.
For details, see [Logging in to the web console](#).
2. Click on the **Storage** tab.
3. In the **Filesystems** table, select a volume in which you want to delete the partition.
4. In the **Content** section, click on the partition whose file system you want to mount or unmount.
5. Click on the **Mount** or **Unmount** button.

198 GiB ext4 File System `/dev/mapper/luks-913540eb-284e-4e56-8f58-572e6f4e8cfe`

Filesystem

Name `FormattedPartition`

Mount Point `/FormattedPartition`

Mount Options `defaults,x-systemd.device-timeout=0`

Mounted At `/FormattedPartition` Mount

Used 115 GiB of 194 GiB

Format

At this point, the file system has been mounted or unmounted according to your action.

CHAPTER 16. MANAGING NFS MOUNTS IN THE WEB CONSOLE

The RHEL 8 web console enables you to mount remote directories using the Network File System (NFS) protocol.

NFS makes it possible to reach and mount remote directories located on the network and work with the files as if the directory was located on your physical drive.

Prerequisites

- The RHEL 8 web console has been installed.
For details, see [Installing the web console](#).
- The **cockpit-storaged** package is installed on your system.
- NFS server name or IP address.
- Path to the directory on the remote server.

16.1. CONNECTING NFS MOUNTS IN THE WEB CONSOLE

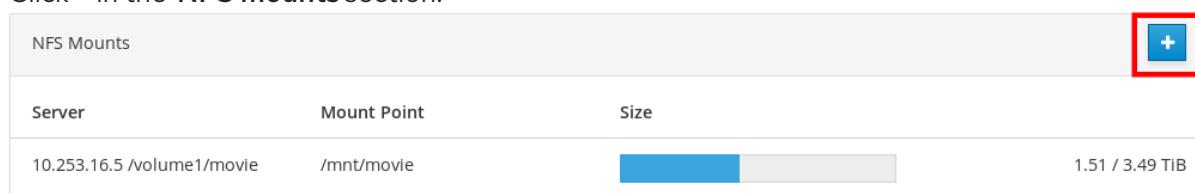
Connect a remote directory to your file system using NFS.

Prerequisites

- NFS server name or IP address.
- Path to the directory on the remote server.

Procedure

1. Log in to the RHEL 8 web console.
For details, see [Logging in to the web console](#).
2. Click **Storage**.
3. Click **+** in the **NFS mounts** section.



NFS Mounts		
Server	Mount Point	Size
10.253.16.5 /volume1/movie	/mnt/movie	<div style="width: 25%; background-color: #0070C0;"></div> 1.51 / 3.49 TiB

4. In the **New NFS Mount** dialog box, enter the server or IP address of the remote server.
5. In the **Path on Server** field, enter the path to the directory you want to mount.
6. In the **Local Mount Point** field, enter the path where you want to find the directory in your local system.
7. Select **Mount at boot**. This ensures that the directory will be reachable also after the restart of the local system.

8. Optionally, select **Mount read only** if you do not want to change the content.

New NFS Mount

Server Address	fileserver.example.com
Path on Server	/volume1/videotutorials
Local Mount Point	/mnt/tutorials
Mount Options	<input checked="" type="checkbox"/> Mount at boot <input checked="" type="checkbox"/> Mount read only <input type="checkbox"/> Custom mount option
<input type="button" value="Cancel"/> <input type="button" value="Add"/>	

9. Click **Add**.

At this point, you can open the mounted directory and verify that the content is accessible.

NFS Mounts			+
Server	Mount Point	Size	
10.253.16.5 /volume1/videotutorials	/mnt/tutorials	<div style="width: 50%;"> </div> 1.51 / 3.49 TiB	

To troubleshoot the connection, you can adjust it with the [Custom Mount Options](#).

16.2. CUSTOMIZING NFS MOUNT OPTIONS IN THE WEB CONSOLE

Edit an existing NFS mount and add custom mount options.

Custom mount options can help you to troubleshoot the connection or change parameters of the NFS mount such as changing timeout limits or configuring authentication.

Prerequisites

- NFS mount added.

Procedure

1. Log in to the RHEL 8 web console.
For details, see [Logging in to the web console](#).
2. Click **Storage**.
3. Click on the NFS mount you want to adjust.
4. If the remote directory is mounted, click **Unmount**.
The directory must not be mounted during the custom mount options configuration. Otherwise the web console does not save the configuration and this will cause an error.

10.253.16.5:/volume1/movie

Server 10.253.16.5:/volume1/movie

Mount Point /mnt/movie

Size 1.52 / 3.49 TIB

Unmount Edit Remove

- Click **Edit**.

10.253.16.5:/volume1/movie

Server 10.253.16.5:/volume1/movie

Mount Point /mnt/movie

Size 1.52 / 3.49 TIB

Unmount Edit Remove

- In the **NFS Mount** dialog box, select **Custom mount option**.

- Enter mount options separated by a comma. For example:

- nfsvers=4** – the NFS protocol version number
- soft** – type of recovery after an NFS request times out
- sec=krb5** – files on the NFS server can be secured by Kerberos authentication. Both the NFS client and server have to support Kerberos authentication.

NFS Mount

Server Address	fileserver.example.com
Path on Server	/volume1/movie
Local Mount Point	/mnt/movie
Mount Options	<input checked="" type="checkbox"/> Mount at boot <input checked="" type="checkbox"/> Mount read only <input checked="" type="checkbox"/> Custom mount option nfsvers=4,soft,sec=krb5

Cancel Apply

For a complete list of the NFS mount options, enter **man nfs** in the command line.

- Click **Apply**.
- Click **Mount**.

Now you can open the mounted directory and verify that the content is accessible.

NFS Mounts			
Server	Mount Point	Size	
10.253.16.5 /volume1/vid...	/mnt/tutorial	<div style="width: 30%; background-color: #0070C0; height: 10px;"></div>	1.51 / 3.49 TiB

CHAPTER 17. MANAGING REDUNDANT ARRAYS OF INDEPENDENT DISKS IN THE WEB CONSOLE

Redundant Arrays of Independent Disks (RAID) represents a way how to arrange more disks into one storage. RAID protects data stored in the disks against disk failure.

RAID uses the following data distribution strategies:

- Mirroring – data are copied to two different locations. If one disk fails, you have a copy and your data is not lost.
- Striping – data are evenly distributed among disks.

Level of protection depends on the RAID level.

The RHEL web console supports the following RAID levels:

- RAID 0 (Stripe)
- RAID 1 (Mirror)
- RAID 4 (Dedicated parity)
- RAID 5 (Distributed parity)
- RAID 6 (Double Distributed Parity)
- RAID 10 (Stripe of Mirrors)

Before you can use disks in RAID, you need to:

- Create a RAID.
- Format it with file system.
- Mount the RAID to the server.

Prerequisites

- The RHEL 8 web console has been installed.
For details, see [Installing the web console](#).
- The **cockpit-storaged** package is installed on your system.
- The RHEL 8 web console is running and accessible.
For details, see [Installing the web console](#).

17.1. CREATING RAID IN THE WEB CONSOLE

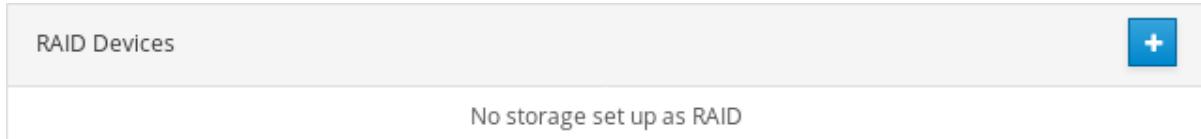
Configure RAID in the RHEL 8 web console.

Prerequisites

- Physical disks connected to the system. Each RAID level requires different amount of disks.

Procedure

1. Open the RHEL 8 web console.
2. Click **Storage**.
3. Click the + icon in the **RAID Devices** box.



4. In the **Create RAID Device** dialog box, enter a name for a new RAID.
5. In the **RAID Level** drop-down list, select a level of RAID you want to use.
6. In the **Chunk Size** drop-down list, leave the predefined value as it is.
The **Chunk Size** value specifies how large is each block for data writing. If the chunk size is 512 KiB, the system writes the first 512 KiB to the first disk, the second 512 KiB is written to the second disk, and the third chunk will be written to the third disk. If you have three disks in your RAID, the fourth 512 KiB will be written to the first disk again.
7. Select disks you want to use for RAID.

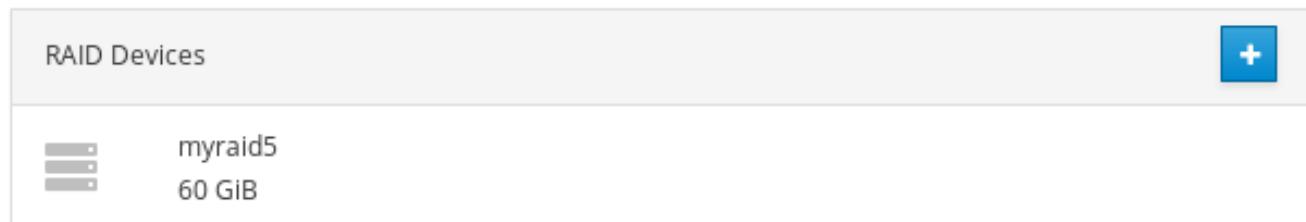
The 'Create RAID Device' dialog box contains the following fields:

- Name:** myraid5
- RAID Level:** RAID 5 (Distributed Parity)
- Chunk Size:** 512 KiB
- Disk Selection:** Three checkboxes are checked, corresponding to '20 MIB QEMU HARDDISK(DISK1)', '20 MIB QEMU HARDDISK(DISK2)', and '20 MIB QEMU HARDDISK(DISK3)'. To the right of each checkbox is its respective path: /dev/sda1, /dev/sdb1, and /dev/sdc1.

At the bottom right of the dialog are two buttons: 'Cancel' and 'Create'.

8. Click **Create**.

In the **Storage** section, you can see the new RAID in the **RAID devices** box and format it.



Now you have the following options how to format and mount the new RAID in the web console:

- [Formatting RAID](#)
- [Creating partitions on partition table](#)

- Creating a volume group on top of RAID

17.2. FORMATTING RAID IN THE WEB CONSOLE

Format the new software RAID device created in the RHEL 8 web interface.

Prerequisites

- Physical disks are connected and visible by RHEL 8.
- RAID is created.
- Consider the file system which will be used for the RAID.
- Consider creating of a partitioning table.

Procedure

1. Open the RHEL 8 web console.
2. Click **Storage**.
3. In the **RAID devices** box, choose the RAID you want to format by clicking on it.
4. In the RAID details screen, scroll down to the **Content** part.
5. Click to the newly created RAID.



6. Click the **Format** button.
7. In the **Erase** drop-down list, select:
 - **Don't overwrite existing data**— the RHEL web console rewrites only the disk header. Advantage of this option is speed of formatting.
 - **Overwrite existing data with zeros**— the RHEL web console rewrites the whole disk with zeros. This option is slower because the program has to go through the whole disk. Use this option if the RAID includes any data and you need to rewrite it.
8. In the **Type** drop-down list, select a XFS file system, if you do not have another strong preference.
9. Enter a name of the file system.
10. In the **Mounting** drop down list, select **Custom**.
The **Default** option does not ensure that the file system will be mounted on the next boot.

11. In the **Mount Point** field, add the mount path.

12. Select **Mount at boot**.

Format /dev/md/myraid5

Erase	Don't overwrite existing data
Type	XFS - Red Hat Enterprise Linux 7 default
Name	myraids
Mounting	Custom
Mount Point	/media

Mount options

- Mount at boot
- Mount read only
- Custom mount options

Formatting a storage device will erase all data on it.

Cancel **Format**

13. Click the **Format** button.

Formatting can take several minutes depending on the used formatting options and size of RAID.

After successful finish, you can see the details of the formatted RAID on the **Filesystem** tab.

Content

Create partition table

▼	59 GiB xfs File System	/dev/md/myraid5
---	------------------------	-----------------

Filesystem

Name	myraids	Format
Mount Point	/media	Mount
Mount Options	defaults	
Used	-	

14. To use the RAID, click **Mount**.

At this point, the system uses mounted and formatted RAID.

17.3. USING THE WEB CONSOLE FOR CREATING A PARTITION TABLE ON RAID

Format RAID with the partition table on the new software RAID device created in the RHEL 8 web interface.

RAID requires formatting as any other storage device. You have two options:

- Format the RAID device without partitions
- Create a partition table with partitions

Prerequisites

- Physical disks are connected and visible by RHEL 8.
- RAID is created.
- Consider the file system used for the RAID.
- Consider creating a partitioning table.

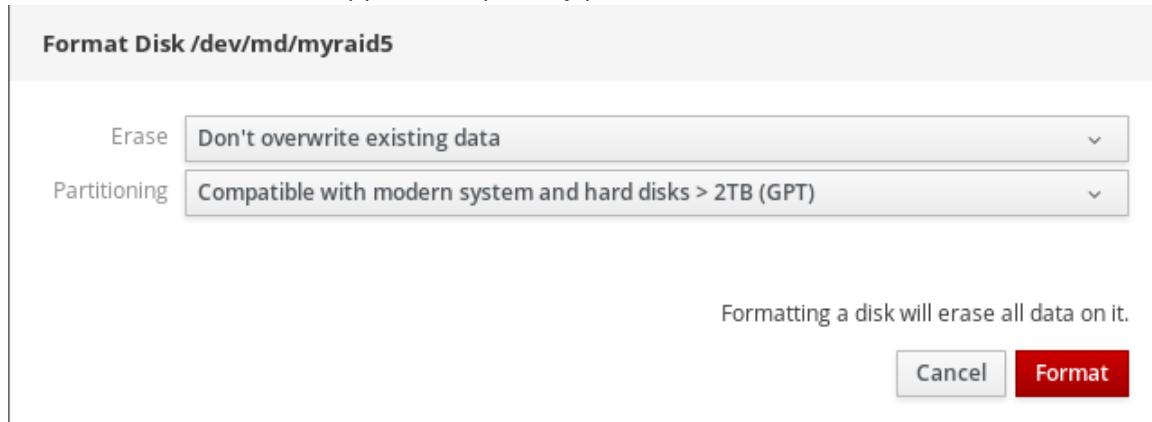
Procedure

1. Open the RHEL 8 web console.
2. Click **Storage**.
3. In the **RAID devices** box, select the RAID you want to edit.
4. In the RAID details screen, scroll down to the **Content** part.
5. Click to the newly created RAID.

Content		Create partition table
▼	120 GiB Unrecognized Data	/dev/md/myraid5
Unrecognized Data		
Usage	-	Format
Type	-	

6. Click the **Create partition table** button.
7. In the **Erase** drop-down list, select:
 - **Don't overwrite existing data** – the RHEL web console rewrites only the disk header. Advantage of this option is speed of formatting.
 - **Overwrite existing data with zeros** – the RHEL web console rewrites the whole RAID with zeros. This option is slower because the program has to go through the whole RAID. Use this option if RAID includes any data and you need to rewrite it.
8. In the **Partitioning** drop-down list, select:
 - Compatible with modern system and hard disks > 2TB (GPT) – GUID Partition Table is a modern recommended partitioning system for large RAIDs with more than four partitions.

- Compatible with all systems and devices (MBR) – Master Boot Record works with disks up to 2 TB in size. MBR also support four primary partitions max.



9. Click **Format**.

At this point, the partitioning table has been created and you can create partitions.

For creating partitions, see [Using the web console for creating partitions on RAID](#).

17.4. USING THE WEB CONSOLE FOR CREATING PARTITIONS ON RAID

Create a partition in the existing partition table.

Prerequisites

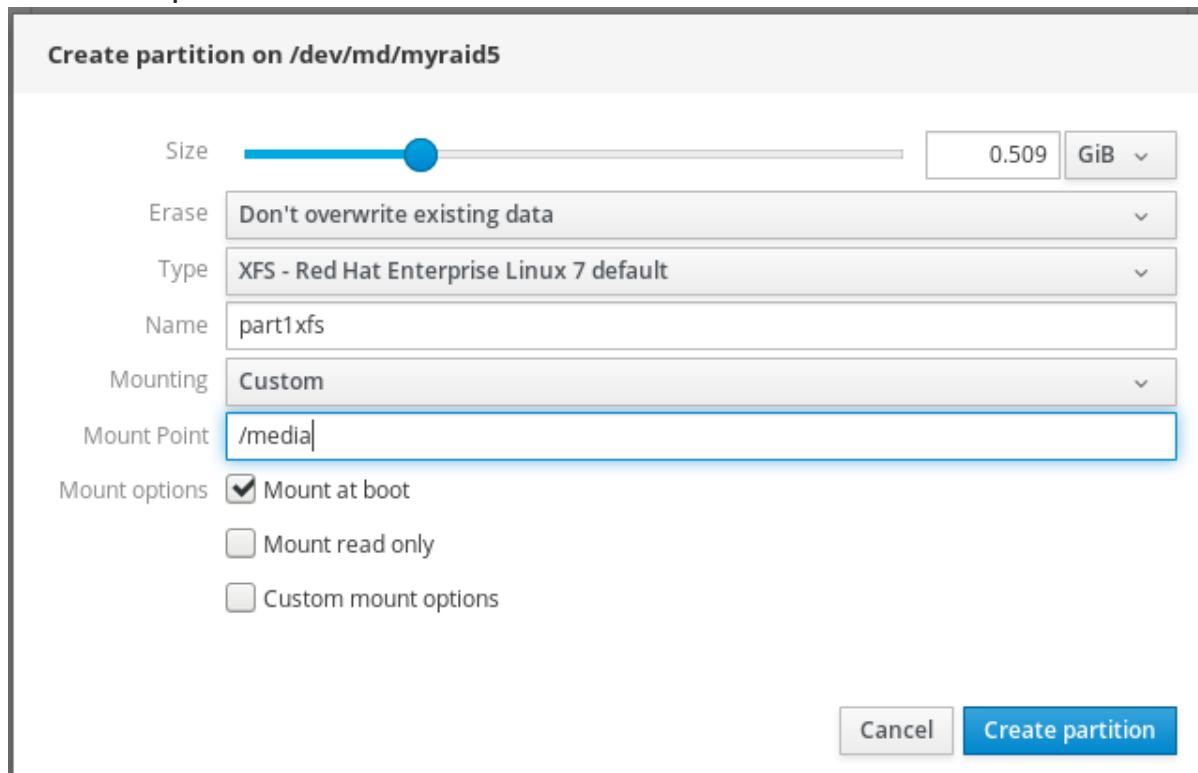
- Partition table is created.

For details, see [Section 17.3, “Using the web console for creating a partition table on RAID”](#)

Procedure

1. Open the RHEL 8 web console.
2. Click **Storage**.
3. In the **RAID devices** box, click to the RAID you want to edit.
4. In the RAID details screen, scroll down to the **Content** part.
5. Click to the newly created RAID.
6. Click **Create Partition**.
7. In the **Create partition** dialog box, set up the size of the first partition.
8. In the **Erase** drop-down list, select:
 - **Don't overwrite existing data** – the RHEL web console rewrites only the disk header. Advantage of this option is speed of formatting.
 - **Overwrite existing data with zeros** – the RHEL web console rewrites the whole RAID with zeros. This option is slower because the program have to go through the whole RAID. Use this option if RAID includes any data and you need to rewrite it.

9. In the **Type** drop-down list, select a XFS file system, if you do not have another strong preference.
10. Enter any name for the file system. Do not use spaces in the name.
11. In the **Mounting** drop down list, select **Custom**.
The **Default** option does not ensure that the file system will be mounted on the next boot.
12. In the **Mount Point** field, add the mount path.
13. Select **Mount at boot**.
14. Click **Create partition**.



Formatting can take several minutes depending on used formatting options and size of RAID.

After successful finish, you can continue with creating other partitions.

At this point, the system uses mounted and formatted RAID.

17.5. USING THE WEB CONSOLE FOR CREATING A VOLUME GROUP ON TOP OF RAID

Build a volume group from software RAID.

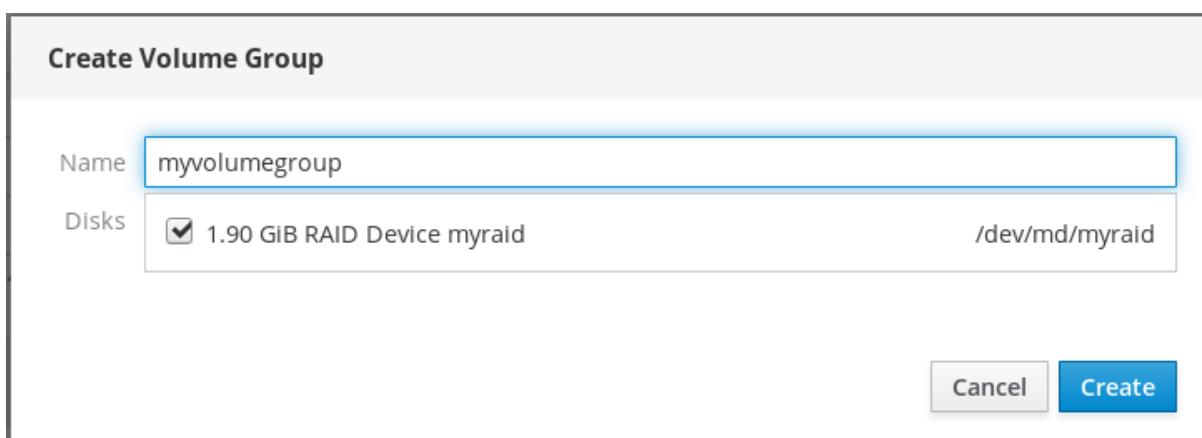
Prerequisites

- RAID device, which is not formatted and mounted.

Procedure

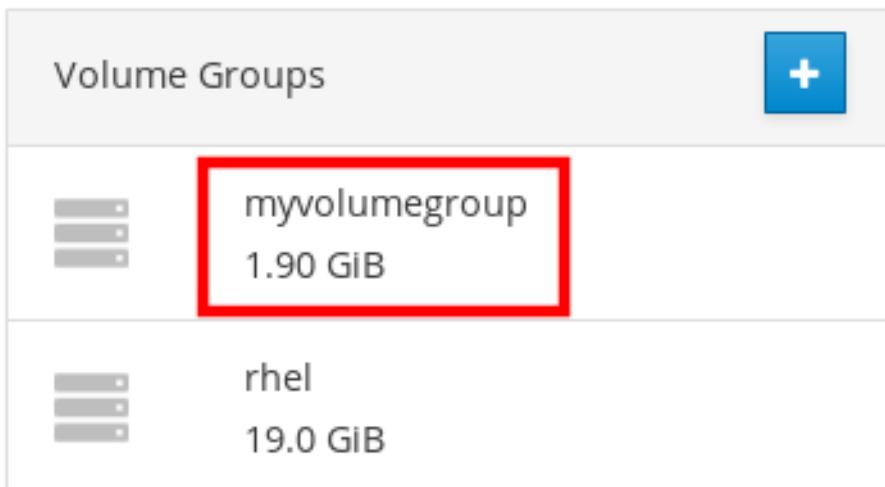
1. Open the RHEL 8 web console.

2. Click **Storage**.
3. Click the + icon in the **Volume Groups** box.
4. In the **Create Volume Group** dialog box, enter a name for the new volume group.
5. In the **Disk**s list, select a RAID device.
If you do not see the RAID in the list, unmount the RAID from the system. The RAID device must not be used by the RHEL 8 system.



6. Click **Create**.

The new volume group has been created and you can continue with creating a logical volume.



Additional resources

- To learn more about soft corruption and how you can protect your data when configuring a RAID LV, see [Using DM integrity with RAID LV](#).

CHAPTER 18. USING THE WEB CONSOLE FOR CONFIGURING LVM LOGICAL VOLUMES

Red Hat Enterprise Linux 8 supports the LVM logical volume manager. When you install a Red Hat Enterprise Linux 8, it will be installed on LVM automatically created during the installation.

The screenshot shows the RHEL 8 Web Console interface for managing LVM logical volumes. At the top, there is a breadcrumb navigation: Storage > rhel. Below this, a Volume Group named 'rhel' is listed with its UUID (m19oY9-aL1C-LkSS-3uez-n8S9-DdO1-MZt96A) and Capacity (9.00 GiB, 9.66 GB, 9659482112 bytes). There are 'Rename' and 'Delete' buttons next to the volume group name. Below the volume group, the Physical Volumes section shows a single entry: 'Partition of QEMU HARDDISK (QM00001)' with a capacity of 9.00 GiB, 0 free. In the Logical Volumes section, two logical volumes are listed: one for the root file system ('8.00 GiB xfs File System' at '/dev/rhel/root') and another for swap space ('1 GiB Swap Space' at '/dev/rhel/swap'). A blue link '+ Create new Logical Volume' is visible above the logical volume list. The entire interface has a clean, modern design with light colors and clear typography.

The screenshot shows you a clean installation of the RHEL 8 system with two logical volumes in the RHEL 8 web console automatically created during the installation.

To find out more about logical volumes, follow the sections describing:

- [What is logical volume manager and when to use it.](#)
- [What are volume groups and how to create them.](#)
- [What are logical volumes and how to create them.](#)
- [How to format logical volumes.](#)
- [How to resize logical volumes.](#)

Prerequisites

- The RHEL 8 web console has been installed.
For details, see [Installing the web console](#).
- The **cockpit-storaged** package is installed on your system.
- Physical drives, RAID devices, or any other type of block device from which you can create the logical volume.

18.1. LOGICAL VOLUME MANAGER IN THE WEB CONSOLE

The RHEL 8 web console provides a graphical interface to create LVM volume groups and logical volumes.

Volume groups create a layer between physical and logical volumes. It makes you possible to add or remove physical volumes without influencing logical volume itself. Volume groups appear as one drive with capacity consisting of capacities of all physical drives included in the group.

You can join physical drives into volume groups in the web console.

Logical volumes act as a single physical drive and it is built on top of a volume group in your system.

Main advantages of logical volumes are:

- Better flexibility than the partitioning system used on your physical drive.
- Ability to connect more physical drives into one volume.
- Possibility of expanding (growing) or reducing (shrinking) capacity of the volume on-line, without restart.
- Ability to create snapshots.

Additional resources

- For details, see [Configuring and managing logical volumes](#).

18.2. CREATING VOLUME GROUPS IN THE WEB CONSOLE

Create volume groups from one or more physical drives or other storage devices.

Logical volumes are created from volume groups. Each volume group can include multiple logical volumes.

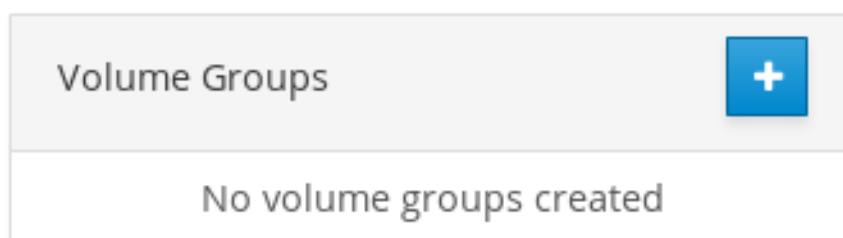
For details, see [Volume groups](#).

Prerequisites

- Physical drives or other types of storage devices from which you want to create volume groups.

Procedure

1. Log in to the RHEL 8 web console.
2. Click **Storage**.
3. Click the + icon in the **Volume Groups** box.



4. In the **Name** field, enter a name of a group without spaces.

- Select the drives you want to combine to create the volume group.

Create Volume Group

Name	myvolumegroup
Disks	<input checked="" type="checkbox"/> 10.0 GiB Partition of QEMU QEMU HARDDISK (DISK1) /dev/sda1 <input checked="" type="checkbox"/> 20.0 GiB RAID Device 127 /dev/md/127

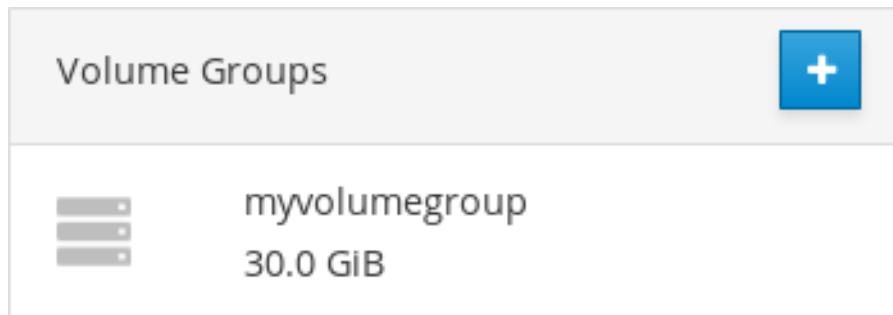
Cancel **Create**

It might happen that you cannot see devices as you expected. The RHEL web console displays only unused block devices. Used devices means, for example:

- Devices formatted with a file system
 - Physical volumes in another volume group
 - Physical volumes being a member of another software RAID device
- If you do not see the device, format it to be empty and unused.

- Click **Create**.

The web console adds the volume group in the **Volume Groups** section. After clicking the group, you can create logical volumes that are allocated from that volume group.



18.3. CREATING LOGICAL VOLUMES IN THE WEB CONSOLE

Create LVM logical volumes.

Prerequisites

- The **cockpit-storaged** package is installed on your system.
- Volume group created. For details, see [Creating volume groups in the web console](#).

Procedure

- Log in to the RHEL 8 web console.

2. Click **Storage**.
3. Click the volume group in which you want to create logical volumes.
4. Click **Create new Logical Volume**
5. In the **Name** field, enter a name for the new logical volume without spaces.
6. In the **Purpose** drop down menu, select **Block device for filesystems**.
This configuration enables you to create a logical volume with the maximum volume size which is equal to the sum of the capacities of all drives included in the volume group.

Create Logical Volume

Name	mylogicalvolume
Purpose	Block device for filesystems
Size	Block device for filesystems Pool for thinly provisioned volumes

Create

7. Define the size of the logical volume. Consider:
 - How much space the system using this logical volume will need.
 - How many logical volumes you want to create.

You do not have to use the whole space. If necessary, you can grow the logical volume later.

Create Logical Volume

Name	mylogicalvolume
Purpose	Block device for filesystems
Size	20 GiB

Create

8. Click **Create**.

To verify the settings, click your logical volume and check the details.

Logical Volumes

[Create new Logical Volume](#)

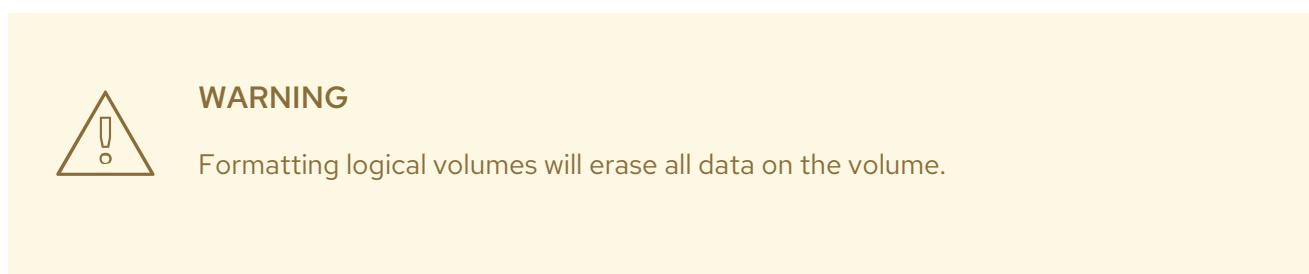
30.0 GiB Unrecognized Data /dev/myvolumegroup/mylogicalvolume

Volume	Unrecognized Data	Deactivate	Delete
Usage	-		Format
Type	-		

At this stage, the logical volume has been created and you need to create and mount a file system with the formatting process.

18.4. FORMATTING LOGICAL VOLUMES IN THE WEB CONSOLE

Logical volumes act as physical drives. To use them, you need to format them with a file system.



The file system you select determines the configuration parameters you can use for logical volumes. For example, some the XFS file system does not support shrinking volumes. For details, see [Resizing logical volumes in the web console](#).

The following steps describe the procedure to format logical volumes.

Prerequisites

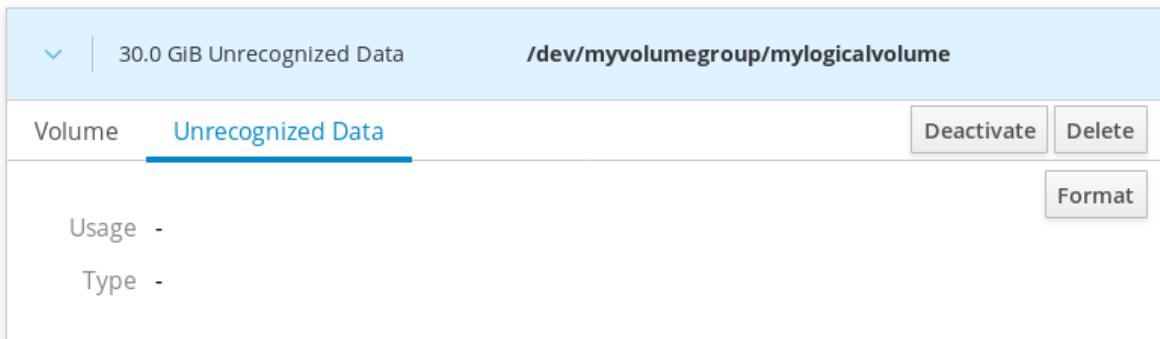
- The **cockpit-storaged** package is installed on your system.
- Logical volume created. For details, see [Creating volume groups in the web console](#) .

Procedure

1. Log in to the RHEL web console.
2. Click **Storage**.
3. Click the volume group in which the logical volume is placed.
4. Click the logical volume.
5. Click on the **Unrecognized Data** tab.

Logical Volumes

 Create new Logical Volume



The screenshot shows the 'Logical Volumes' section of the RHEL 8 web console. A logical volume named 'mylogicalvolume' is selected. The volume has 30.0 GiB of 'Unrecognized Data'. The path is listed as '/dev/myvolumegroup/mylogicalvolume'. Below the volume name, there are buttons for 'Deactivate' and 'Delete'. Further down, there are 'Usage' and 'Type' dropdown menus, and a prominent 'Format' button.

6. Click **Format**.

7. In the **Erase** drop down menu, select:

- **Don't overwrite existing data** – the RHEL web console rewrites only the disk header. Advantage of this option is speed of formatting.
- **Overwrite existing data with zeros** – the RHEL web console rewrites the whole disk with zeros. This option is slower because the program have to go through the whole disk. Use this option if the disk includes any data and you need to overwrite it.

8. In the **Type** drop down menu, select a file system:

- **XFS** file system supports large logical volumes, switching physical drives online without outage, and growing an existing file system. Leave this file system selected if you do not have a different strong preference.
- XFS does not support reducing the size of a volume formatted with an XFS file system

- **ext4** file system supports:

- Logical volumes
- Switching physical drives online without outage
- Growing a file system
- Shrinking a file system

You can also select a version with the LUKS (Linux Unified Key Setup) encryption, which allows you to encrypt the volume with a passphrase.

9. In the **Name** field, enter the logical volume name.

10. In the **Mounting** drop down menu, select **Custom**.

The **Default** option does not ensure that the file system will be mounted on the next boot.

11. In the **Mount Point** field, add the mount path.

12. Select **Mount at boot**.

Format /dev/volumegroup1/thinvolume1

Erase	Don't overwrite existing data
Type	XFS - Red Hat Enterprise Linux 7 default
Name	myfilesystem
Mounting	Custom
Mount Point	/media
Mount options	<input checked="" type="checkbox"/> Mount at boot <input type="checkbox"/> Mount read only <input type="checkbox"/> Custom mount options
Formatting a storage device will erase all data on it.	
Cancel Format	

13. Click **Format**.

Formatting can take several minutes depending on the volume size and which formatting options are selected.

After the formatting has completed successfully, you can see the details of the formatted logical volume on the **Filesystem** tab.

20 GiB xfs File System		/dev/myvolumegroup/mylogicalvolume
Volume	Filesystem	
		Deactivate Delete
		Format
Name	myfilesystem	
Mount Point	(default)	Mount
Used	-	

14. To use the logical volume, click **Mount**.

At this point, the system can use mounted and formatted logical volume.

18.5. RESIZING LOGICAL VOLUMES IN THE WEB CONSOLE

Learn how to extend or reduce logical volumes in the RHEL 8 web console.

Whether you can resize a logical volume depends on which file system you are using. Most file systems enable you to extend (grow) the volume online (without outage).

You can also reduce (shrink) the size of logical volumes, if the logical volume contains a file system which supports shrinking. It should be available, for example, in the ext3/ext4 file systems.

**WARNING**

You cannot reduce volumes that contains GFS2 or XFS filesystem.

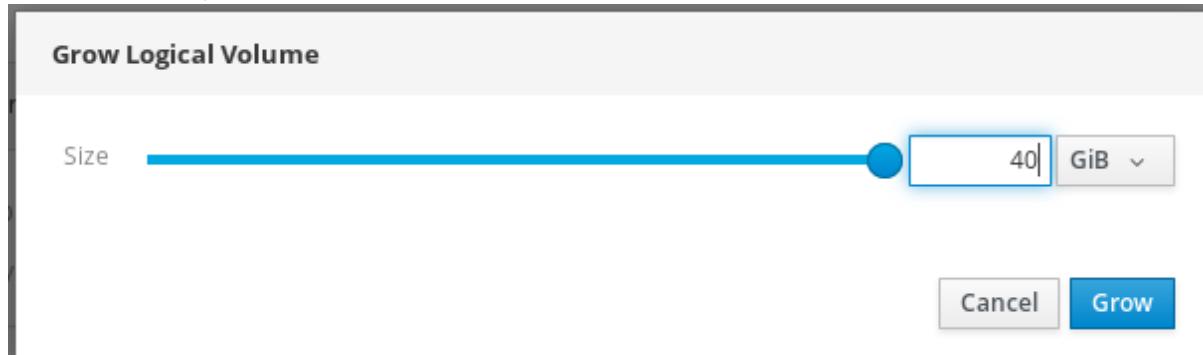
Prerequisites

- Existing logical volume containing a file system which supports resizing logical volumes.

Procedure

The following steps provide the procedure for growing a logical volume without taking the volume offline:

1. Log in to the RHEL web console.
2. Click **Storage**.
3. Click the volume group in which the logical volume is placed.
4. Click the logical volume.
5. On the **Volume** tab, click **Grow**.
6. In the **Grow Logical Volume** dialog box, adjust volume space.



7. Click **Grow**.

LVM grows the logical volume without system outage.

18.6. ADDITIONAL RESOURCES

- For more details on creating logical volumes, see [Configuring and managing logical volumes](#).

CHAPTER 19. USING THE WEB CONSOLE FOR CONFIGURING THIN LOGICAL VOLUMES

Thinly-provisioned logical volumes enable you to allocate more space for designated applications or servers than how much space logical volumes actually contain.

For details, see [Thinly-provisioned logical volumes \(thin volumes\)](#).

The following sections describe:

- [Creating pools for the thinly provisioned logical volumes](#).
- [Creating thin logical volumes](#).
- [Formatting thin logical volumes](#).

Prerequisites

- The RHEL 8 web console has been installed.
For details, see [Installing the web console](#).
- The **cockpit-storaged** package is installed on your system.
- Physical drives or other types of storage devices from which you want to create volume groups.

19.1. CREATING POOLS FOR THIN LOGICAL VOLUMES IN THE WEB CONSOLE

Create a pool for thinly provisioned volumes.

Prerequisites

- [Volume group created](#).

Procedure

1. Log in to the RHEL 8 web console.
2. Click **Storage**.
3. Click the volume group in which you want to create thin volumes.
4. Click **Create new Logical Volume**
5. In the **Name** field, enter a name for the new pool of thin volumes without spaces.
6. In the **Purpose** drop down menu, select **Pool for thinly provisioned volumes** This configuration enables you to create the thin volume.

Create Logical Volume

Name	mypoolforthinvolumes
Purpose	Pool for thinly provisioned volumes
Size	Block device for filesystems Pool for thinly provisioned volumes

Cancel **Create**

7. Define the size of the pool of thin volumes. Consider:

- How many thin volumes you will need in this pool?
- What is the expected size of each thin volume?

You do not have to use the whole space. If necessary, you can grow the pool later.

Create Logical Volume

Name	mypoolforthinvolumes
Purpose	Pool for thinly provisioned volumes
Size	 60 GiB

Cancel **Create**

8. Click **Create**.

The pool for thin volumes has been created and you can add thin volumes.

19.2. CREATING THIN LOGICAL VOLUMES IN THE WEB CONSOLE

Create a thin logical volume in the pool. The pool can include multiple thin volumes and each thin volume can be as large as the pool for thin volumes itself.



IMPORTANT

Using thin volumes requires regular checkup of actual free physical space of the logical volume.

Prerequisites

- Pool for thin volumes created.
For details, see [Section 19.1, “Creating pools for thin logical volumes in the web console”](#).

Procedure

1. Log in to the RHEL 8 web console.
2. Click **Storage**.
3. Click the volume group in which you want to create thin volumes.
4. Click the desired pool.
5. Click **Create Thin Volume**.

The screenshot shows the 'Logical Volumes' page. At the top, there's a header with a '+' icon and the text 'Create new Logical Volume'. Below the header is a table with a single row. The row contains the text '60 GiB Pool for Thin Volumes', the name 'thinlogicalvolume', and two buttons: 'Create Thin Volume' (which is circled in red) and 'Delete'. Underneath the table, there's a section labeled 'Pool' with the following details: Name 'thinlogicalvolume', Size '60 GiB' with a 'Grow' button, Data Used '0%', and Metadata Used '10%'.

6. In the **Create Thin Volume** dialog box, enter a name for the thin volume without spaces.
7. Define the size of the thin volume.

The screenshot shows the 'Create Thin Volume' dialog box. It has fields for 'Name' (set to 'thinvolume1') and 'Size' (set to 20 GiB). There are 'Cancel' and 'Create' buttons at the bottom, with 'Create' being the active button.

8. Click **Create**.

At this stage, the thin logical volume has been created and you need to format it.

19.3. FORMATTING LOGICAL VOLUMES IN THE WEB CONSOLE

Logical volumes act as physical drives. To use them, you need to format them with a file system.



WARNING

Formatting logical volumes will erase all data on the volume.

The file system you select determines the configuration parameters you can use for logical volumes. For example, some the XFS file system does not support shrinking volumes. For details, see [Resizing logical volumes in the web console](#).

The following steps describe the procedure to format logical volumes.

Prerequisites

- The **cockpit-storaged** package is installed on your system.
- Logical volume created. For details, see [Creating volume groups in the web console](#).

Procedure

1. Log in to the RHEL web console.
2. Click **Storage**.
3. Click the volume group in which the logical volume is placed.
4. Click the logical volume.
5. Click on the **Unrecognized Data** tab.

The screenshot shows the 'Logical Volumes' page in the RHEL 8 web console. At the top, there's a 'Create new Logical Volume' button. Below it, a table lists a single logical volume entry:

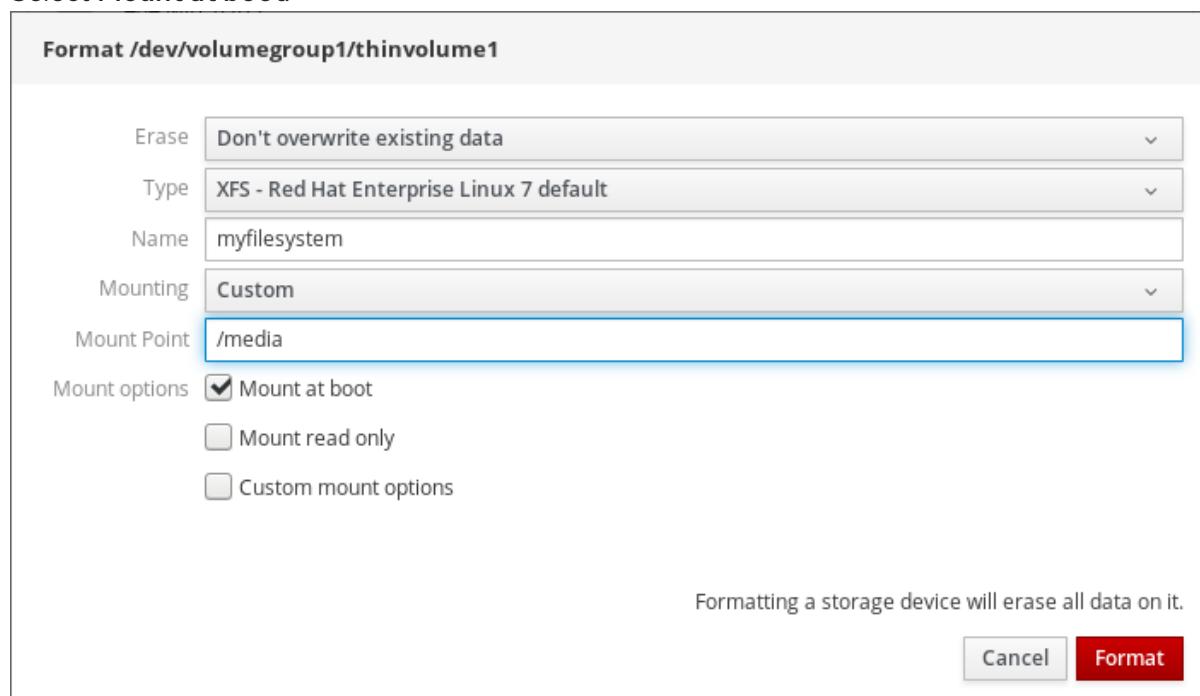
Volume	30.0 GiB Unrecognized Data	/dev/myvolumegroup/mylogicalvolume
Volume	Unrecognized Data	Deactivate Delete
Usage	-	Format
Type	-	

6. Click **Format**.
7. In the **Erase** drop down menu, select:
 - **Don't overwrite existing data** – the RHEL web console rewrites only the disk header. Advantage of this option is speed of formatting.
 - **Overwrite existing data with zeros** – the RHEL web console rewrites the whole disk with zeros. This option is slower because the program have to go through the whole disk. Use this option if the disk includes any data and you need to overwrite it.
8. In the **Type** drop down menu, select a file system:
 - **XFS** file system supports large logical volumes, switching physical drives online without outage, and growing an existing file system. Leave this file system selected if you do not have a different strong preference.
XFS does not support reducing the size of a volume formatted with an XFS file system
 - **ext4** file system supports:

- Logical volumes
- Switching physical drives online without outage
- Growing a file system
- Shrinking a file system

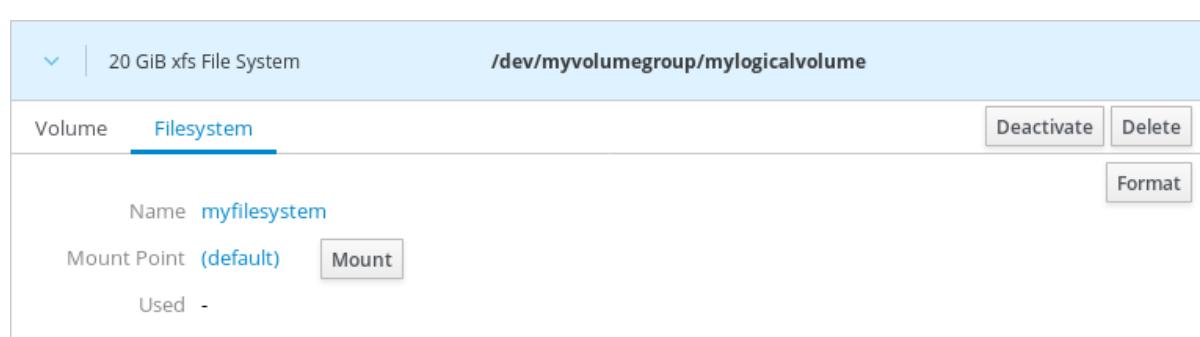
You can also select a version with the LUKS (Linux Unified Key Setup) encryption, which allows you to encrypt the volume with a passphrase.

9. In the **Name** field, enter the logical volume name.
10. In the **Mounting** drop down menu, select **Custom**.
The **Default** option does not ensure that the file system will be mounted on the next boot.
11. In the **Mount Point** field, add the mount path.
12. Select **Mount at boot**.



13. Click **Format**.
Formatting can take several minutes depending on the volume size and which formatting options are selected.

After the formatting has completed successfully, you can see the details of the formatted logical volume on the **Filesystem** tab.



14. To use the logical volume, click **Mount**.

At this point, the system can use mounted and formatted logical volume.

CHAPTER 20. USING THE WEB CONSOLE FOR CHANGING PHYSICAL DRIVES IN VOLUME GROUPS

Change the drive in a volume group using the RHEL 8 web console.

The change of physical drives consists of the following procedures:

- [Adding physical drives from logical volumes.](#)
- [Removing physical drives from logical volumes.](#)

Prerequisites

- The RHEL 8 web console has been installed.
For details, see [Installing the web console](#).
- The **cockpit-storaged** package is installed on your system.
- A new physical drive for replacing the old or broken one.
- The configuration expects that physical drives are organized in a volume group.

20.1. ADDING PHYSICAL DRIVES TO VOLUME GROUPS IN THE WEB CONSOLE

The RHEL 8 web console enables you to add a new physical drive or other type of volume to the existing logical volume.

Prerequisites

- A volume group must be created.
- A new drive connected to the machine.

Procedure

1. Log in to the RHEL 8 web console.
2. Click **Storage**.
3. In the **Volume Groups** box, click the volume group in which you want to add a physical volume.
4. In the **Physical Volumes** box, click the + icon.



5. In the **Add Disks** dialog box, select the preferred drive and click **Add**.



As a result, the RHEL 8 web console adds the physical volume. You can see it in the **Physical Volumes** section, and the logical volume can immediately start to write on the drive.

20.2. REMOVING PHYSICAL DRIVES FROM VOLUME GROUPS IN THE WEB CONSOLE

If a logical volume includes multiple physical drives, you can remove one of the physical drives online.

The system moves automatically all data from the drive to be removed to other drives during the removal process. Notice that it can take some time.

The web console also verifies, if there is enough space for removing the physical drive.

Prerequisites

- A volume group with more than one physical drive connected.

Procedure

The following steps describe how to remove a drive from the volume group without causing outage in the RHEL web console.

1. Log in to the RHEL 8 web console.
2. Click **Storage**.
3. Click the volume group in which you have the logical volume.
4. In the **Physical Volumes** section, locate the preferred volume.
5. Click the - icon.

The RHEL 8 web console verifies, if the logical volume has enough free space for removing the disk. If not, you cannot remove the disk and it is necessary to add another disk first. For details, see [Adding physical drives to logical volumes in the web console](#) .

Physical Volumes	
	QEMU HARDDISK(DISK1) 20 GiB, 0 free
	QEMU HARDDISK(DISK2) 20 GiB, 20 GiB free
	QEMU HARDDISK(DISK3) 20 GiB, 20 GiB free

As results, the RHEL 8 web console removes the physical volume from the created logical volume without causing an outage.

CHAPTER 21. USING THE WEB CONSOLE FOR MANAGING VIRTUAL DATA OPTIMIZER VOLUMES

Configure the Virtual Data Optimizer (VDO) using the RHEL 8 web console.

You will learn how to:

- Create VDO volumes
- Format VDO volumes
- Extend VDO volumes

Prerequisites

- The RHEL 8 web console is installed and accessible.
For details, see [Installing the web console](#).
- The **cockpit-storaged** package is installed on your system.

21.1. VDO VOLUMES IN THE WEB CONSOLE

Red Hat Enterprise Linux 8 supports Virtual Data Optimizer (VDO).

VDO is a block virtualization technology that combines:

Compression

For details, see [Enabling or disabling compression in VDO](#).

Deduplication

For details, see [Enabling or disabling deduplication in VDO](#).

Thin provisioning

For details, see [Thinly-provisioned logical volumes \(thin volumes\)](#).

Using these technologies, VDO:

- Saves storage space inline
- Compresses files
- Eliminates duplications
- Enables you to allocate more virtual space than how much the physical or logical storage provides
- Enables you to extend the virtual storage by growing

VDO can be created on top of many types of storage. In the RHEL 8 web console, you can configure VDO on top of:

- LVM

**NOTE**

It is not possible to configure VDO on top of thinly-provisioned volumes.

- Physical volume
- Software RAID

For details about placement of VDO in the Storage Stack, see [System Requirements](#).

Additional resources

- For details about VDO, see [Deduplicating and compressing storage](#).

21.2. CREATING VDO VOLUMES IN THE WEB CONSOLE

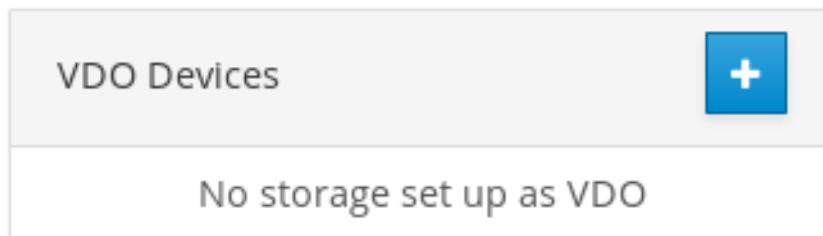
Create a VDO volume in the RHEL web console.

Prerequisites

- Physical drives, LVMs, or RAID from which you want to create VDO.

Procedure

1. Log in to the RHEL 8 web console.
For details, see [Logging in to the web console](#).
2. Click **Storage**.
3. Click the + icon in the **VDO Devices** box.



4. In the **Name** field, enter a name of a VDO volume without spaces.
5. Select the drive that you want to use.
6. In the **Logical Size** bar, set up the size of the VDO volume. You can extend it more than ten times, but consider for what purpose you are creating the VDO volume:
 - For active VMs or container storage, use logical size that is ten times the physical size of the volume.
 - For object storage, use logical size that is three times the physical size of the volume.
 For details, see [Deploying VDO](#).
7. In the **Index Memory** bar, allocate memory for the VDO volume.
For details about VDO system requirements, see [System Requirements](#).
8. Select the **Compression** option. This option can efficiently reduce various file formats.

For details, see [Enabling or disabling compression in VDO](#).

9. Select the **Deduplication** option.

This option reduces the consumption of storage resources by eliminating multiple copies of duplicate blocks. For details, see [Enabling or disabling deduplication in VDO](#).

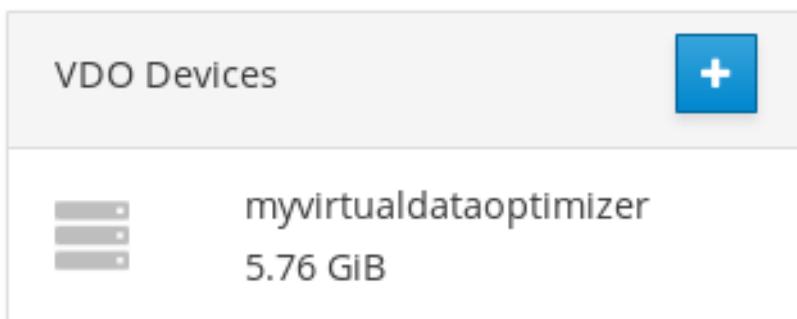
10. [Optional] If you want to use the VDO volume with applications that need a 512 bytes block size, select **Use 512 Byte emulation**. This reduces the performance of the VDO volume, but should be very rarely needed. If in doubt, leave it off.

11. Click **Create**.

Create VDO Device

Name	myvirtualdataoptimizer
Disk	<input checked="" type="radio"/> 5.72 GiB RAID Device 127 /dev/md/127
Logical Size	5.76 GiB
Index Memory	256 MiB
Options	<input checked="" type="checkbox"/> Compression <input checked="" type="checkbox"/> Deduplication <input type="checkbox"/> Use 512 Byte emulation
<input type="button" value="Cancel"/> <input type="button" value="Create"/>	

If the process of creating the VDO volume succeeds, you can see the new VDO volume in the **Storage** section and format it with a file system.



21.3. FORMATTING VDO VOLUMES IN THE WEB CONSOLE

VDO volumes act as physical drives. To use them, you need to format them with a file system.

**WARNING**

Formatting VDO will erase all data on the volume.

The following steps describe the procedure to format VDO volumes.

Prerequisites

- A VDO volume is created. For details, see [Section 21.2, “Creating VDO volumes in the web console”](#).

Procedure

1. Log in to the RHEL 8 web console.
For details, see [Logging in to the web console](#).
2. Click **Storage**.
3. Click the VDO volume.
4. Click on the **Unrecognized Data** tab.
5. Click **Format**.

The screenshot shows a web-based storage management interface. At the top, there's a header bar with a dropdown arrow, the text "14.2 GiB Unrecognized Data", and the path "/dev/mapper/myvirtualdeviceoptimizer". Below this, a blue header bar says "Unrecognized Data". Underneath, there are two sections: "Usage" and "Type", both currently set to "-". In the bottom right corner of the main content area, there is a button labeled "Format" which is enclosed in a red rectangular box, indicating it is the next step to be taken.

6. In the **Erase** drop down menu, select:

Don't overwrite existing data

The RHEL web console rewrites only the disk header. The advantage of this option is the speed of formatting.

Overwrite existing data with zeros

The RHEL web console rewrites the whole disk with zeros. This option is slower because the program has to go through the whole disk. Use this option if the disk includes any data and you need to rewrite them.

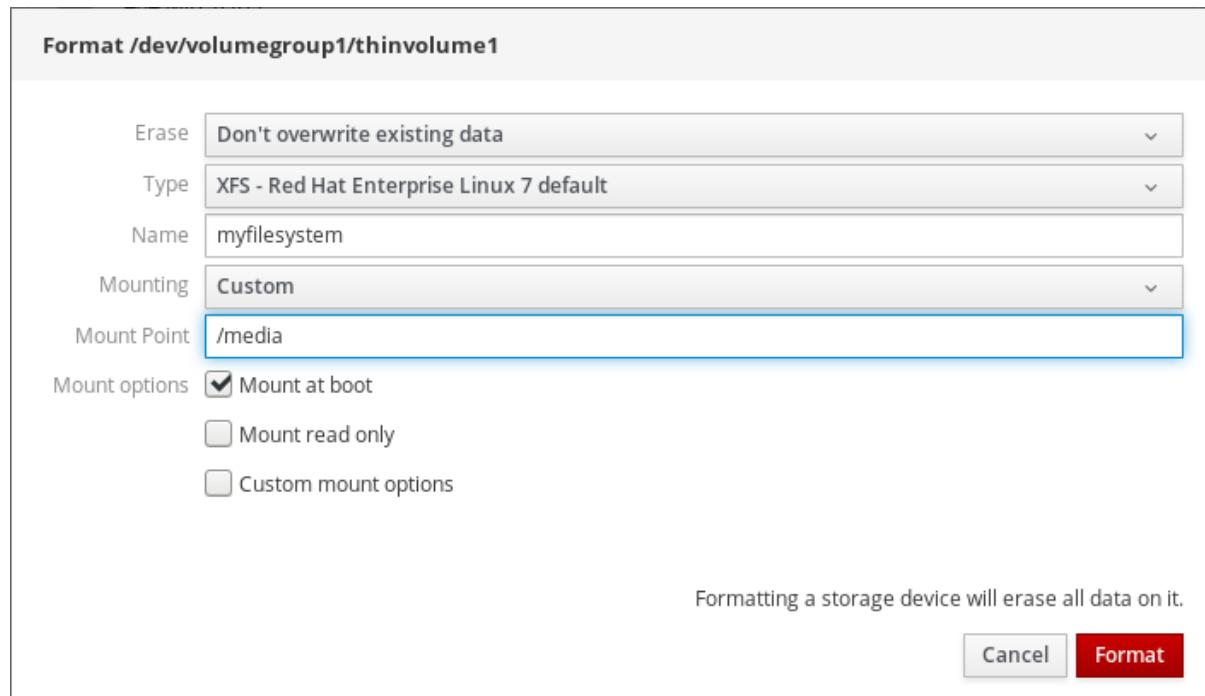
7. In the **Type** drop down menu, select a filesystem:

- The **XFS** file system supports large logical volumes, switching physical drives online without outage, and growing. Leave this file system selected if you do not have a different strong preference.
XFS does not support shrinking volumes. Therefore, you will not be able to reduce volume formatted with XFS.

- The **ext4** file system supports logical volumes, switching physical drives online without outage, growing, and shrinking.

You can also select a version with the LUKS (Linux Unified Key Setup) encryption, which allows you to encrypt the volume with a passphrase.

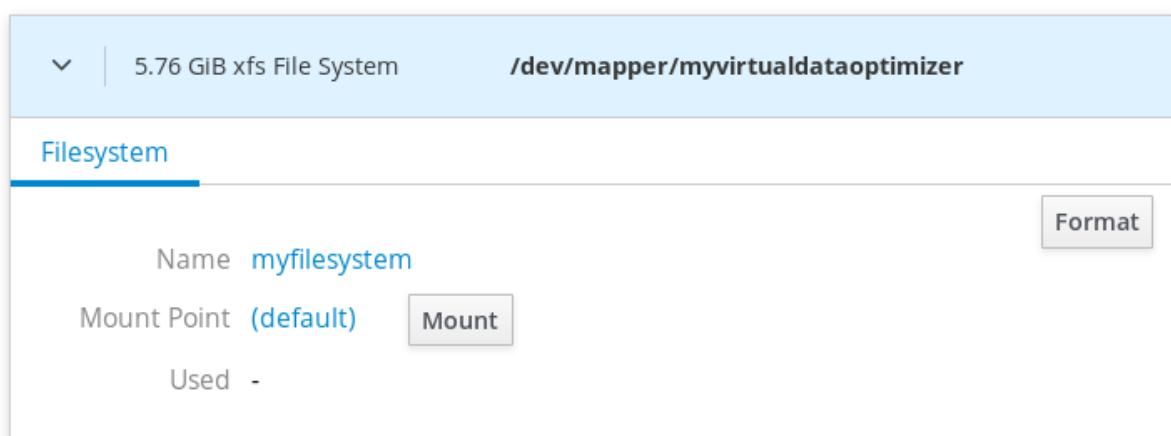
- In the **Name** field, enter the logical volume name.
- In the **Mounting** drop down menu, select **Custom**.
The **Default** option does not ensure that the file system will be mounted on the next boot.
- In the **Mount Point** field, add the mount path.
- Select **Mount at boot**.



- Click **Format**.

Formatting can take several minutes depending on the used formatting options and the volume size.

After a successful finish, you can see the details of the formatted VDO volume on the **Filesystem** tab.



- To use the VDO volume, click **Mount**.

At this point, the system uses the mounted and formatted VDO volume.

21.4. EXTENDING VDO VOLUMES IN THE WEB CONSOLE

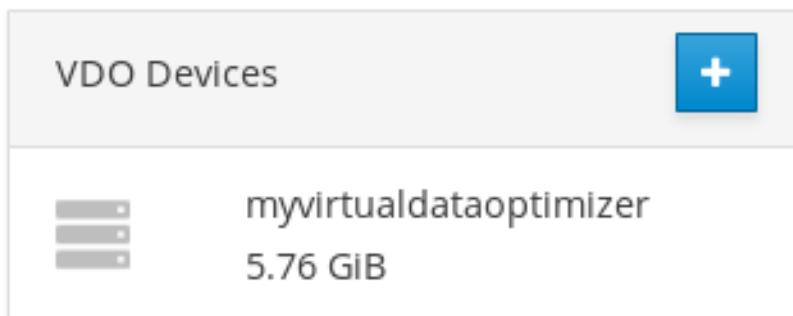
Extend VDO volumes in the RHEL 8 web console.

Prerequisites

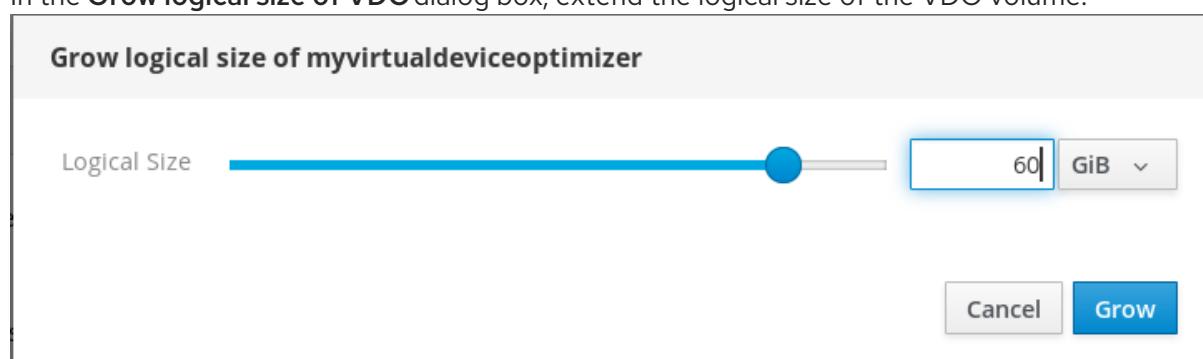
- The **cockpit-storaged** package is installed on your system.
- The VDO volume created.

Procedure

1. Log in to the RHEL 8 web console.
For details, see [Logging in to the web console](#).
2. Click **Storage**.
3. Click your VDO volume in the **VDO Devices** box.



4. In the VDO volume details, click the **Grow** button.
5. In the **Grow logical size of VDO** dialog box, extend the logical size of the VDO volume.



Original size of the logical volume from the screenshot was 6 GB. As you can see, the RHEL web console enables you to grow the volume to more than ten times the size and it works correctly because of the compression and deduplication.

6. Click **Grow**.

If the process of growing VDO succeeds, you can see the new size in the VDO volume details.

VDO Device myvirtualdataoptimizer

Device File [/dev/mapper/myvirtualdataoptimizer](#)

Backing Device [/dev/md/127](#)

Physical 1.11 MiB data + 3.72 GiB overhead used of 5.72 GiB (65%)

Logical 11.7 MiB used of 60 GiB (90% saved) [Grow](#)

Index Memory 256 MiB

Compression [ON](#)

Deduplication [ON](#)

[Stop](#) [Delete](#)

CHAPTER 22. LOCKING DATA WITH LUKS PASSWORD IN THE RHEL WEB CONSOLE

In the web console's **Storage** tab, you can now create, lock, unlock, resize, and otherwise configure encrypted devices using the LUKS (Linux Unified Key Setup) version 2 format.

This new version of LUKS offers:

- More flexible unlocking policies
- Stronger cryptography
- Better compatibility with future changes

Prerequisites

- The RHEL 8 web console has been installed.
For details, see [Installing the web console](#).
- The **cockpit-storaged** package is installed on your system.

22.1. LUKS DISK ENCRYPTION

The Linux Unified Key Setup-on-disk-format (LUKS) enables you to encrypt block devices and it provides a set of tools that simplifies managing the encrypted devices. LUKS allows multiple user keys to decrypt a master key, which is used for the bulk encryption of the partition.

RHEL utilizes LUKS to perform block device encryption. By default, the option to encrypt the block device is unchecked during the installation. If you select the option to encrypt your disk, the system prompts you for a passphrase every time you boot the computer. This passphrase "unlocks" the bulk encryption key that decrypts your partition. If you choose to modify the default partition table, you can choose which partitions you want to encrypt. This is set in the partition table settings.

What LUKS does

- LUKS encrypts entire block devices and is therefore well-suited for protecting contents of mobile devices such as removable storage media or laptop disk drives.
- The underlying contents of the encrypted block device are arbitrary, which makes it useful for encrypting swap devices. This can also be useful with certain databases that use specially formatted block devices for data storage.
- LUKS uses the existing device mapper kernel subsystem.
- LUKS provides passphrase strengthening, which protects against dictionary attacks.
- LUKS devices contain multiple key slots, allowing users to add backup keys or passphrases.

What LUKS does not do

- Disk-encryption solutions like LUKS protect the data only when your system is off. Once the system is on and LUKS has decrypted the disk, the files on that disk are available to anyone who would normally have access to them.

- LUKS is not well-suited for scenarios that require many users to have distinct access keys to the same device. The LUKS1 format provides eight key slots, LUKS2 up to 32 key slots.
- LUKS is not well-suited for applications requiring file-level encryption.

Ciphers

The default cipher used for LUKS is **aes-xts-plain64**. The default key size for LUKS is 512 bits. The default key size for LUKS with **Anaconda** (XTS mode) is 512 bits. Ciphers that are available are:

- AES - Advanced Encryption Standard
- Twofish (a 128-bit block cipher)
- Serpent

Additional resources

- [LUKS Project Home Page](#)
- [LUKS On-Disk Format Specification](#)
- [FIPS PUB 197](#)

22.2. CONFIGURING THE LUKS PASSPHRASE IN THE WEB CONSOLE

If you want to add encryption to an existing logical volume on your system, you can only do so through formatting the volume.

Prerequisites

- The web console must be installed and accessible.
For details, see [Installing the web console](#).
- The **cockpit-storaged** package is installed on your system.
- Available existing logical volume without encryption.

Procedure

1. Log in to the RHEL 8 web console.
For details, see [Logging in to the web console](#).
2. Click **Storage**.
3. Select the storage device you want to format.
4. Click the menu icon and select **Format** option.
5. Select the **Encrypt data** box to activate encryption on your storage device.

Encrypt data

Passphrase

Confirm

Store passphrase

Unlock at boot

Unlock read only

Custom encryption options

6. Set and confirm your new passphrase.
7. [Optional] Modify further encryption options.
8. Finalize formatting settings.
9. Click **Format**.

22.3. CHANGING THE LUKS PASSPHRASE IN THE WEB CONSOLE

Change a LUKS passphrase on an encrypted disk or partition in the web console.

Prerequisites

- The web console must be installed and accessible.
For details, see [Installing the web console](#).
- The **cockpit-storaged** package is installed on your system.

Procedure

1. Log in to the web console.
For details, see [Logging in to the web console](#).
2. Click **Storage**
3. In the Drives table, select the disk with encrypted data.
4. In **Content**, select the encrypted partition.
5. Click **Encryption**.
6. In the **Keys** table, click the pen icon.



7. In the **Change passphrase** dialog window:

- a. Enter your current passphrase.
- b. Enter your new passphrase.
- c. Confirm your new passphrase.

Change passphrase

Old passphrase	*****
New passphrase	*****
Repeat passphrase	*****

Cancel Save

8. Click **Save**

CHAPTER 23. CONFIGURING AUTOMATED UNLOCKING USING A TANG KEY IN THE WEB CONSOLE

Configure automated unlocking of a LUKS-encrypted storage device using a key provided by a Tang server.

Prerequisites

- The RHEL 8 web console has been installed.
For details, see [Installing the web console](#).
- The **cockpit-storaged** package is installed on your system.
- The **cockpit.socket** service is running at port 9090.
- The **clevis**, **tang**, and **clevis-dracut** packages are installed.
- A Tang server is running.

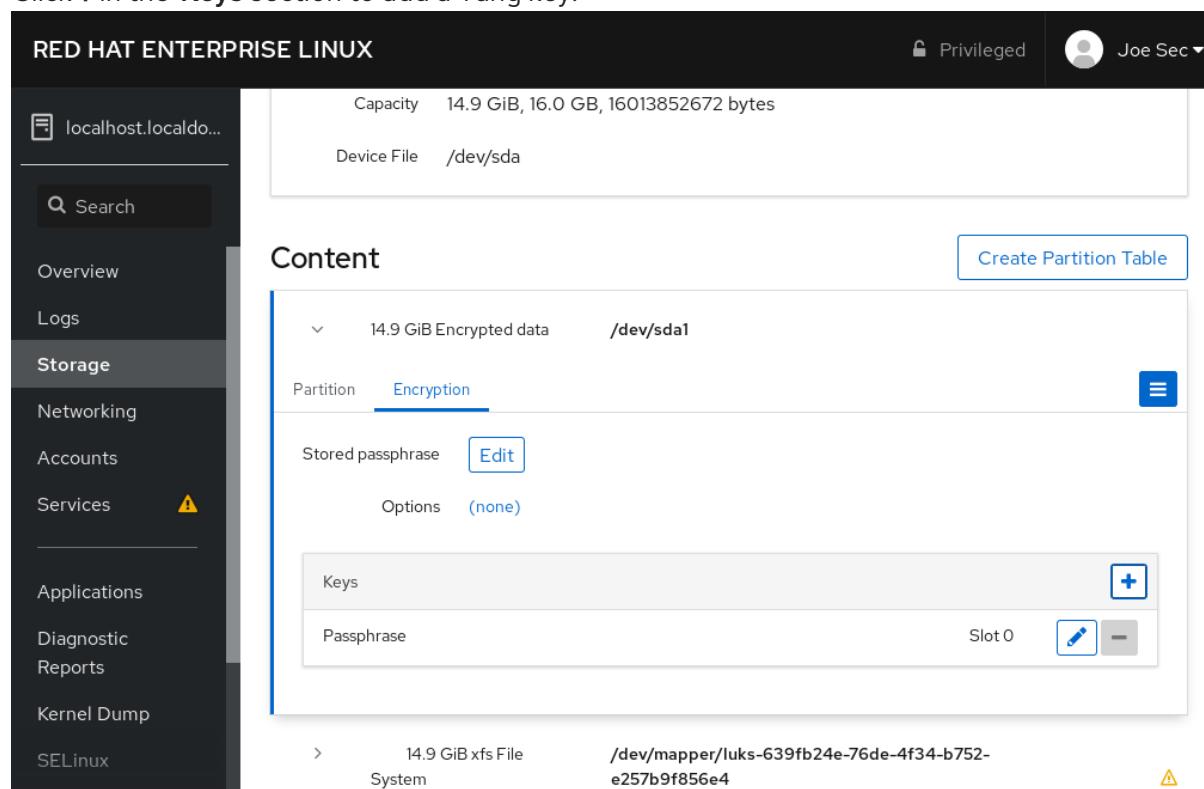
Procedure

1. Open the RHEL web console by entering the following address in a web browser:

`https://localhost:9090`

Replace the */localhost* part by the remote server's host name or IP address when you connect to a remote system.

2. Provide your credentials and click **Storage**. Select an encrypted device and click **Encryption** in the **Content** part:
3. Click **+** in the **Keys** section to add a Tang key:



4. Provide the address of your Tang server and a password that unlocks the LUKS-encrypted device. Click **Add** to confirm:

Add Key

Key source Passphrase Tang keyserver

Keyserver address example.com:80

Disk passphrase **[REDACTED]**

Saving a new passphrase requires unlocking the disk. Please provide a current disk passphrase.

Cancel **Add**

5. The following dialog window provides a command to verify that the key hash matches. RHEL 8.2 introduced the **tang-show-keys** script, and you can obtain the key hash using the following command on the Tang server running on the port 7500:

```
# tang-show-keys 7500  
3ZWS6-cDrCG61UPJS2BMmPU4I54
```

On RHEL 8.1 and earlier, obtain the key hash using the following command:

```
# curl -s localhost:7500/adv | jose fmt -j- -g payload -y -o- | jose jwk use -i- -r -u verify -o- |  
jose jwk thp -i-  
3ZWS6-cDrCG61UPJS2BMmPU4I54
```

6. Click **Trust key** when the key hashes in the web console and in the output of previously listed commands are the same:

Verify key

Make sure the key hash from the Tang server matches:

3ZWS6 - cDrCG61UPJS2BMmPU4I54

Manually check with SSH: `ssh localhost tang-show-keys 7500`

If `tang-show-keys` is not available, run the following:

```
ssh localhost "curl -s localhost:7500/adv |  
jose fmt -j- -g payload -y -o- |  
jose jwk use -i- -r -u verify -o- |  
jose jwk thp -i-"
```

[Cancel](#)

[Trust key](#)

- To enable the early boot system to process the disk binding, click **Terminal** at the bottom of the left navigation bar and enter the following commands:

```
# yum install clevis-dracut  
# dracut -fv --regenerate-all
```

Verification

- Check that the newly added Tang key is now listed in the **Keys** section with the **Keyserver** type:

Keys	
Passphrase	Slot 0 Edit -
Keyserver	localhost:7500 Slot 1 Edit -

- Verify that the bindings are available for the early boot, for example:

```
# lsinitrd | grep clevis  
clevis  
clevis-pin-sss  
clevis-pin-tang  
clevis-pin-tpm2
```

```
-rwxr-xr-x 1 root root 1600 Feb 11 16:30 usr/bin/clevis  
-rwxr-xr-x 1 root root 1654 Feb 11 16:30 usr/bin/clevis-decrypt  
...  
-rwxr-xr-x 2 root root 45 Feb 11 16:30 usr/lib/dracut/hooks/initqueue/settled/60-  
clevis-hook.sh  
-rwxr-xr-x 1 root root 2257 Feb 11 16:30 usr/libexec/clevis-luks-askpass
```

Additional resources

- [Configuring automated unlocking of encrypted volumes using policy-based decryption](#)

CHAPTER 24. MANAGING SOFTWARE UPDATES IN THE WEB CONSOLE

Lear how to manage software updates in the RHEL 8 web console and ways to automate them.

The Software Updates module in the web console is based on the **yum** utility. For more information about updating software with **yum**, see the [Checking for updates and updating packages](#) section.

24.1. MANAGING MANUAL SOFTWARE UPDATES IN THE WEB CONSOLE

This section describes how to manually update your software using the web console.

Prerequisites

- The web console must be installed and accessible.
For details, see [Installing the web console](#).

Procedure

1. Log in to the RHEL 8 web console.
For details, see [Logging in to the web console](#).
2. Click **Software Updates**.
The list of available updates refreshes automatically if the last check happened more than 24 hours ago. To trigger a refresh, click the **Check for Updates** button.
3. Apply updates.
 - a. To install all available updates, click the **Install all updates** button.



Install All Updates

- b. If you have security updates available, you can install them separately by clicking the **Install Security Updates** button.



Install Security Updates

You can watch the update log while the update is running.

4. After the system applies updates, you get a recommendation to restart your system.
We recommend this especially if the update included a new kernel or system services that you do not want to restart individually.
5. Click **Ignore** to cancel the restart, or **Restart Now** to proceed with restarting your system.
After the system restart, log in to the web console and go to the **Software Updates** page to verify that the update has been successful.

24.2. MANAGING AUTOMATIC SOFTWARE UPDATES IN THE WEB CONSOLE

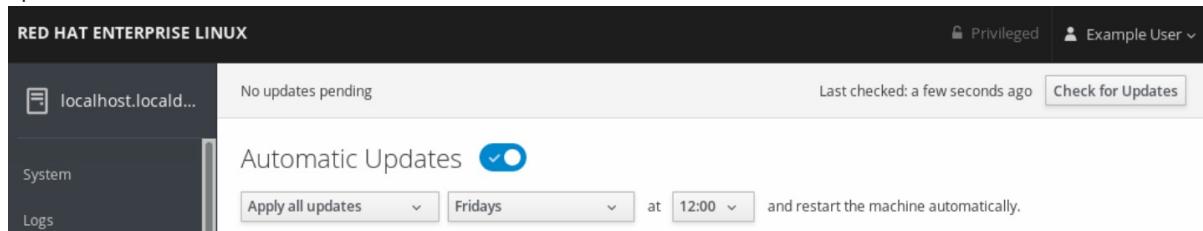
In the web console, you can choose to apply all updates, or security updates and also manage periodicity and time of your automatic updates.

Prerequisites

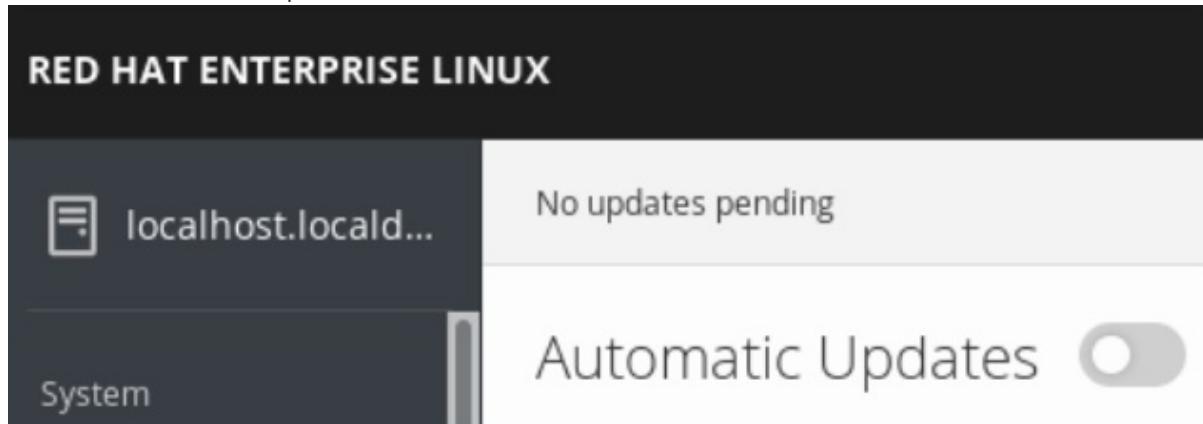
- The web console must be installed and accessible. For details, see [Installing the web console](#).

Procedure

- Log in to RHEL 8 web console.
For details, see [Logging in to the web console](#).
- Click **Software Updates**.
- If you want to automatically apply only security updates, click on the **Apply all updates** drop-down menu and select **Apply security updates**.
- To modify day of the automatic update, click on the **every day** drop-down menu and select a specific day.
- To modify time of the automatic update, click on the **6:00** drop-down menu and select a specific time.



- If you want to disable automatic software updates, click on switch next to **Automatic Updates** to move it to disabled position.



24.3. MANAGING ON-DEMAND RESTARTING AFTER APPLYING SOFTWARE UPDATES IN THE WEB CONSOLE

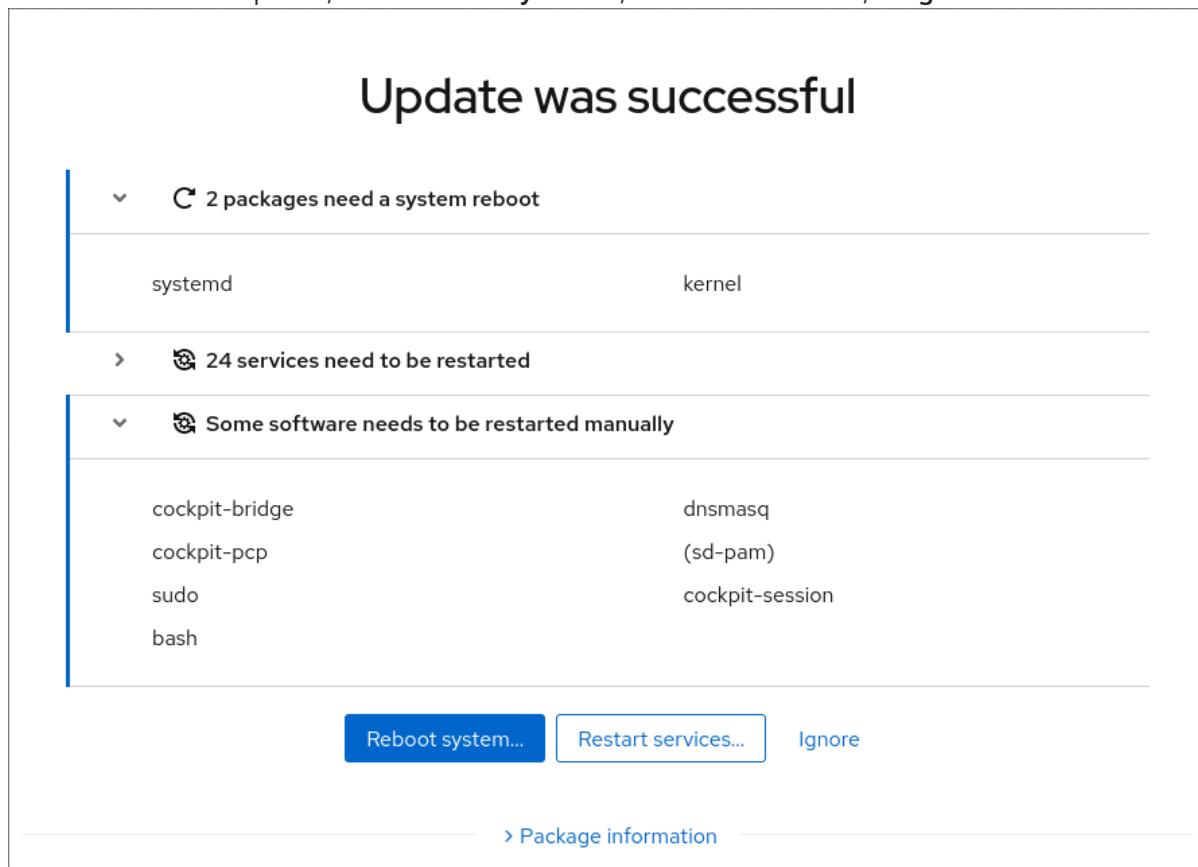
The intelligent restarting feature informs the users whether it is necessary to reboot the whole system after you apply a software update or if it is sufficient to only restart certain services.

Prerequisites

- The web console must be installed and accessible. For details, see [Installing the web console](#).

Procedure

1. Log in to RHEL 8 web console.
For details, see [Logging in to the web console](#).
2. Click **Software Updates**.
3. Apply an update of your system.
4. After a successful update, click **Reboot system...**, **Restart services...**, or **Ignore**



5. If you decide to ignore, you can return to the restart or reboot menu by clicking **Restart services...** in the **Status** field of the **Software Updates** page.

The screenshot shows the 'Software Updates' page. In the 'Status' section, it says '2 services need to be restarted' and has a 'Restart services...' button. In the 'Automatic updates' section, it says 'Automatic updates are not set up'. The 'Edit' button is also visible. Below, the 'Update history' section shows three entries: one from 2021-02-16 06:57 (3 packages), another from 2021-02-16 06:55 (10 packages), and a third from 2021-02-16 06:46 (127 packages).

6. Reboot the system or restart suggested services.

CHAPTER 25. MANAGING SUBSCRIPTIONS IN THE WEB CONSOLE

Manage your subscription for Red Hat Enterprise Linux 8 from the web console.

To get a subscription for your Red Hat Enterprise Linux, you need to have an account in the [Red Hat Customer Portal](#) or an activation key.

This chapter covers:

- Subscription management in the RHEL 8 web console.
- Registering subscriptions for your system in the web console with the Red Hat user name and password.
- Registering subscriptions with the activation key.

Prerequisites

- Purchased subscriptions.
- The system subjected to subscription has to be connected to the Internet because the web console needs to communicate with the Red Hat Customer Portal.

25.1. SUBSCRIPTION MANAGEMENT IN THE WEB CONSOLE

The RHEL 8 web console provides an interface for using Red Hat Subscription Manager installed on your local system.

The Subscription Manager connects to the Red Hat Customer Portal and verifies all available:

- Active subscriptions
- Expired subscriptions
- Renewed subscriptions

If you want to renew the subscription or get a different one in Red Hat Customer Portal, you do not have to update the Subscription Manager data manually. The Subscription Manager synchronizes data with Red Hat Customer Portal automatically.

25.2. REGISTERING SUBSCRIPTIONS WITH CREDENTIALS IN THE WEB CONSOLE

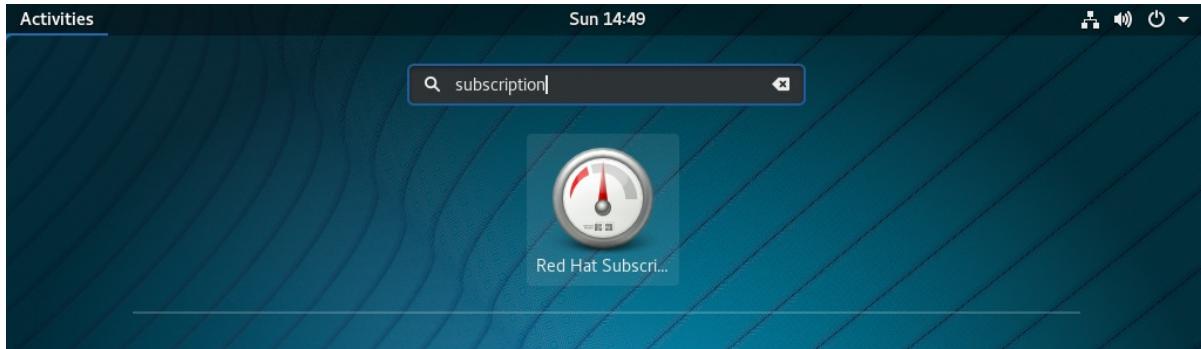
Use the following steps to register a newly installed Red Hat Enterprise Linux using the RHEL 8 web console.

Prerequisites

- A valid user account on the Red Hat Customer Portal.
See the [Create a Red Hat Login](#) page.
- Active subscription for your RHEL system.

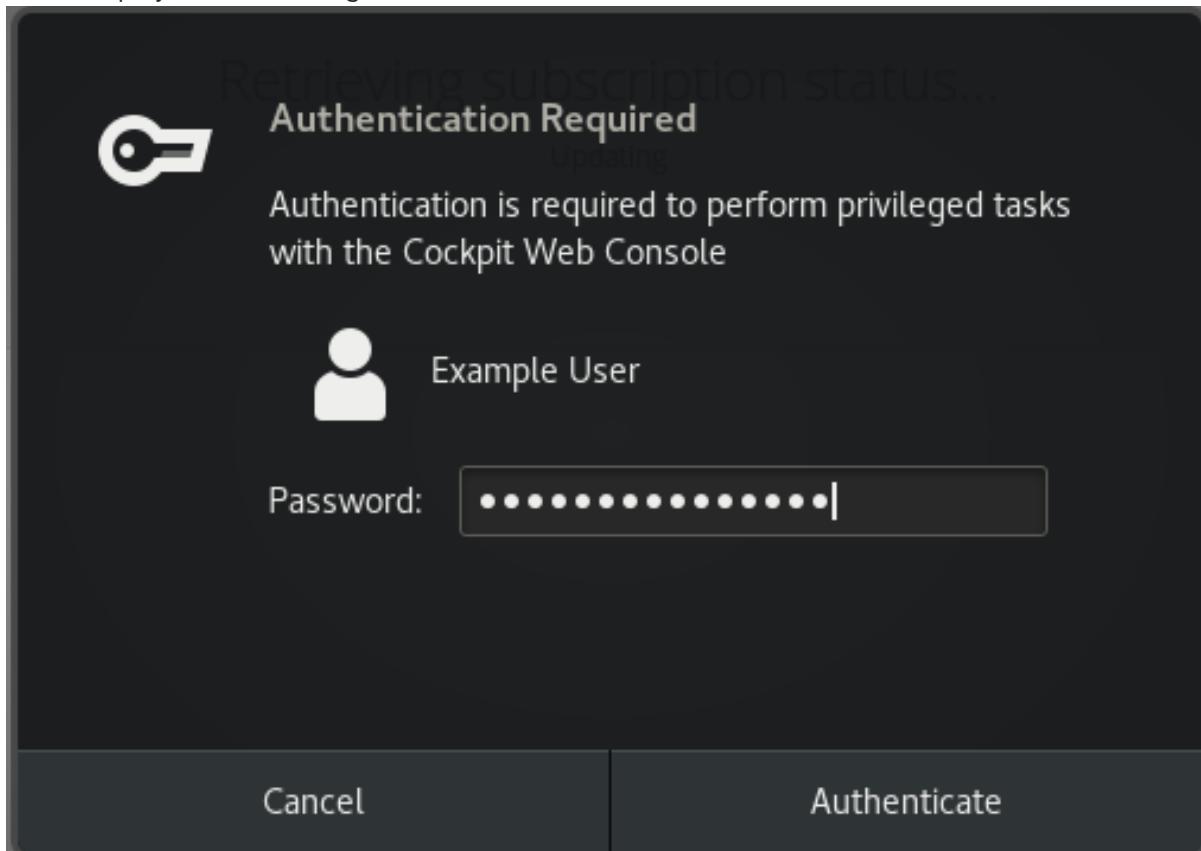
Procedure

1. Type subscription in the search field and press the **Enter** key.



Alternatively, you can log in to the RHEL 8 web console. For details, see [Logging in to the web console](#).

2. In the **polkit** authentication dialog for privileged tasks, add the password belonging to the user name displayed in the dialog.



3. Click **Authenticate**.
4. In the **Subscriptions** dialog box, click **Register**.

The screenshot shows the 'Subscriptions' page with the following information:

- Status: This system is currently not registered.
- System Purpose:
 - Status: Unknown
 - Usage: Development/Test
 - Role: Red Hat Enterprise Linux Workstation

5. Enter your Customer Portal credentials.

The 'Register System' dialog box contains the following fields:

URL	Default
Proxy	<input type="checkbox"/> I would like to connect via an HTTP proxy.
Login	example.user@redhat.com
Password	*****
Activation Key	key_one,key_two
Organization	

At the bottom right are two buttons: 'Cancel' and 'Register'.

6. Enter the name of your organization.

If you have more than one account on the Red Hat Customer Portal, you have to add the organization name or organization ID. To get the org ID, go to your Red Hat contact point.

7. Click the **Register** button.

At this point, your Red Hat Enterprise Linux 8 system has been successfully registered.

Subscriptions

Status: Current [Unregister](#)

System Purpose

Status: Unknown

Usage: Development/Test

Role: Red Hat Enterprise Linux Workstation

Installed products



Red Hat Enterprise Linux for x86_64 High Touch Beta

Product Name	Red Hat Enterprise Linux for x86_64 High Touch Beta
Product ID	230
Version	8.0 HTB
Arch	x86_64
Status	Subscribed
Starts	10/07/2018
Ends	10/06/2019

25.3. REGISTERING SUBSCRIPTIONS WITH ACTIVATION KEYS IN THE WEB CONSOLE

To register a subscription for Red Hat Enterprise Linux,

Prerequisites

- If you do not have a user account in the portal, your vendor provides you with the activation key.

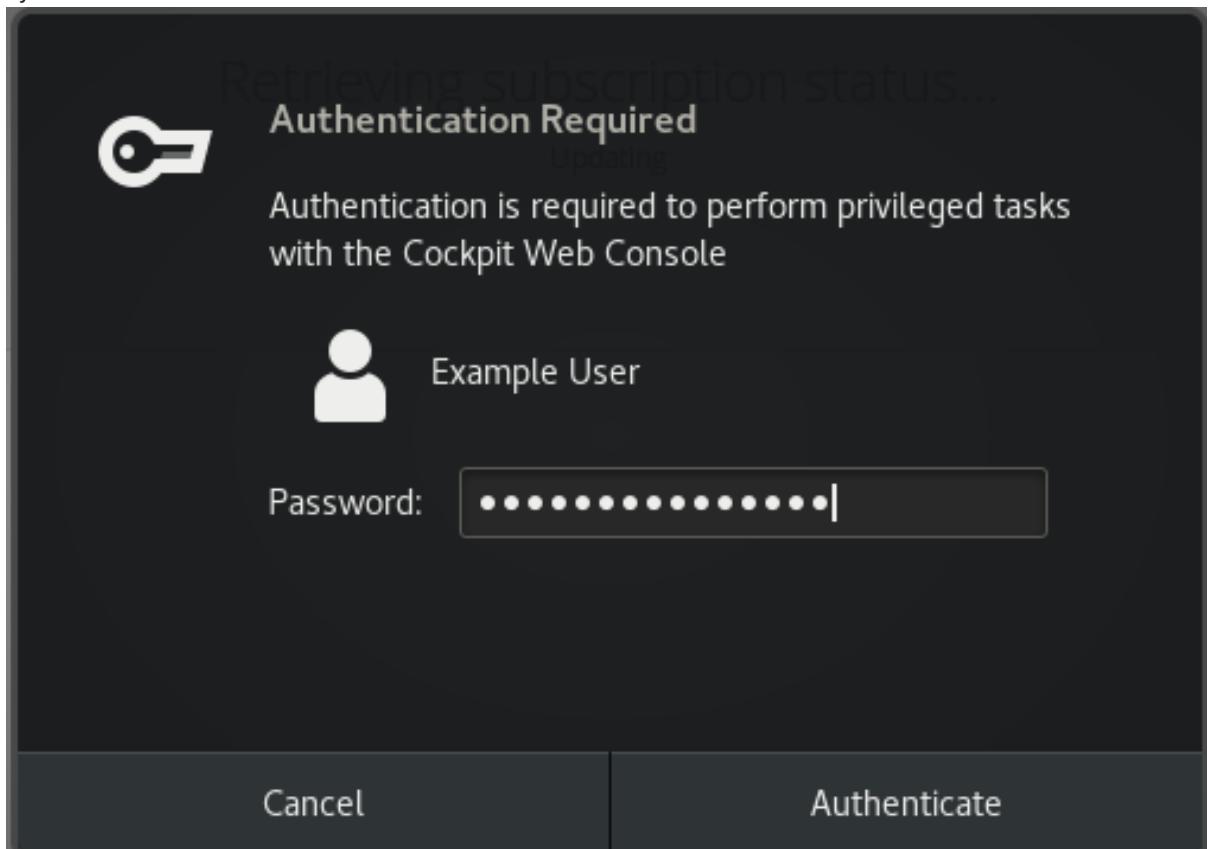
Procedure

1. Type subscription in the search field and press the **Enter** key.

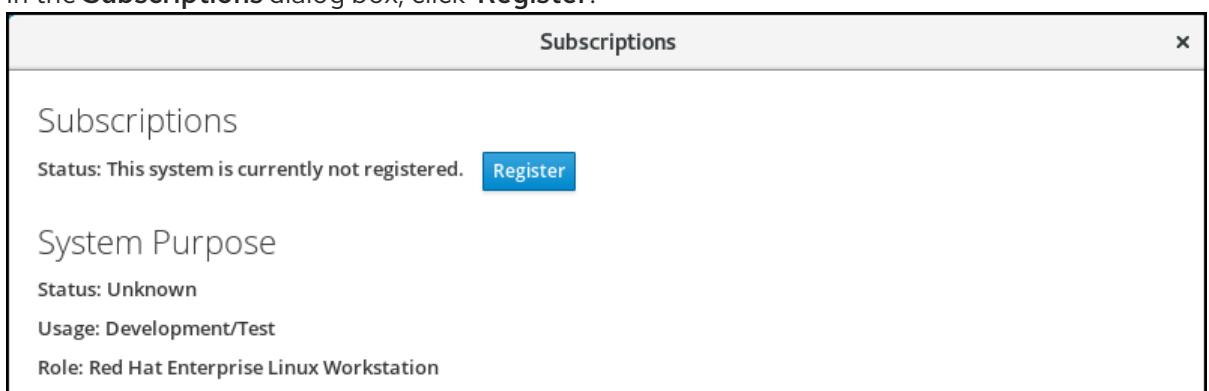


Alternatively, you can log in to the RHEL 8 web console. For details, see [Logging in to the web console](#).

2. In the authentication dialog, add the system username and password you created during the system installation.



3. Click **Authenticate**.
4. In the **Subscriptions** dialog box, click **Register**.



5. Enter the activation key in the registration form.

6. Enter the name of your organization.

You need to add the organization name or organization ID, if you have more than one account in the Red Hat Customer Portal.

To get the org ID, go to your Red Hat contact point.

The screenshot shows a 'Register System' dialog box. It contains the following fields:

- URL: Default
- Proxy: I would like to connect via an HTTP proxy.
- Login: (empty)
- Password: (empty)
- Activation Key: 3b19c539-f8d4-0123-9d91-g1a12345d9cf0
- Organization: 98765432 (highlighted with a blue border)

At the bottom right are two buttons: 'Cancel' and 'Register' (in a blue box).

7. Click the **Register** button.

At this point, your RHEL 8 system has been successfully registered.

Subscriptions

Status: Current [Unregister](#)

System Purpose

Status: Unknown

Usage: Development/Test

Role: Red Hat Enterprise Linux Workstation

Installed products



Red Hat Enterprise Linux for x86_64 High Touch Beta

Product Name	Red Hat Enterprise Linux for x86_64 High Touch Beta
Product ID	230
Version	8.0 HTB
Arch	x86_64
Status	Subscribed
Starts	10/07/2018
Ends	10/06/2019

CHAPTER 26. CONFIGURING KDUMP IN THE WEB CONSOLE

Setup and test the **kdump** configuration in the RHEL 8 web console.

The web console is part of a default installation of Red Hat Enterprise Linux 8 and enables or disables the **kdump** service at boot time. Further, the web console conveniently enables you to configure the reserved memory for **kdump**; or to select the **vmcore** saving location in an uncompressed or compressed format.

26.1. ADDITIONAL RESOURCES

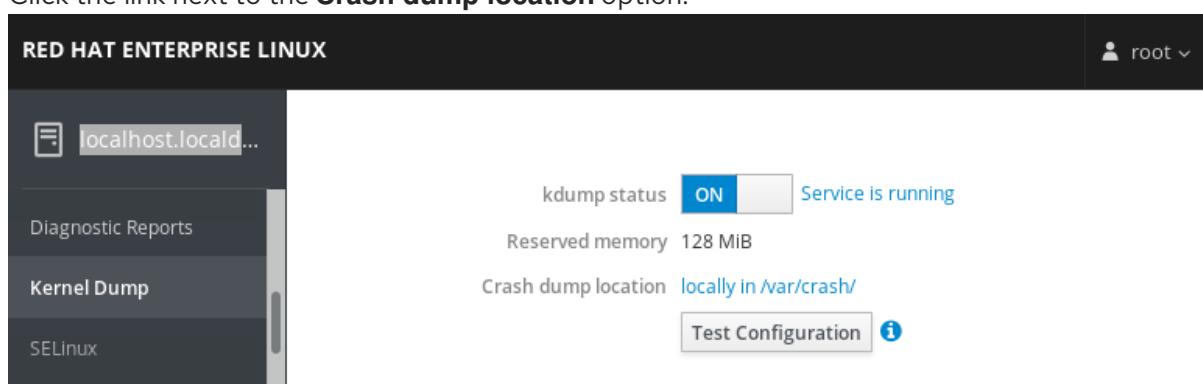
- [Getting started using the RHEL web console](#)

26.2. CONFIGURING KDUMP MEMORY USAGE AND TARGET LOCATION IN WEB CONSOLE

The procedure below shows you how to use the **Kernel Dump** tab in the Red Hat Enterprise Linux web console interface to configure the amount of memory that is reserved for the **kdump** kernel. The procedure also describes how to specify the target location of the **vmcore** dump file and how to test your configuration.

Procedure

1. Open the **Kernel Dump** tab and start the **kdump** service.
2. Configure the **kdump** memory usage using the command line.
3. Click the link next to the **Crash dump location** option.



4. Select the **Local Filesystem** option from the drop-down and specify the directory you want to save the dump in.

Crash dump location

Location	Local Filesystem	▼
Directory	<input type="text" value="/var/crash/"/>	
Compression	<input checked="" type="checkbox"/> Compress crash dumps to save space	
Cancel Apply		

- Alternatively, select the **Remote over SSH** option from the drop-down to send the vmcore to a remote machine using the SSH protocol.
Fill the **Server**, **ssh key**, and **Directory** fields with the remote machine address, ssh key location, and a target directory.
- Another choice is to select the **Remote over NFS** option from the drop-down and fill the **Mount** field to send the vmcore to a remote machine using the NFS protocol.



NOTE

Tick the **Compression** check box to reduce the size of the vmcore file.

- Test your configuration by crashing the kernel.

kdump status	ON	Service is running
Reserved memory	128 MiB	
Crash dump location	locally in /var/crash/	
Test Configuration 		



WARNING

This step disrupts execution of the kernel and results in a system crash and loss of data.

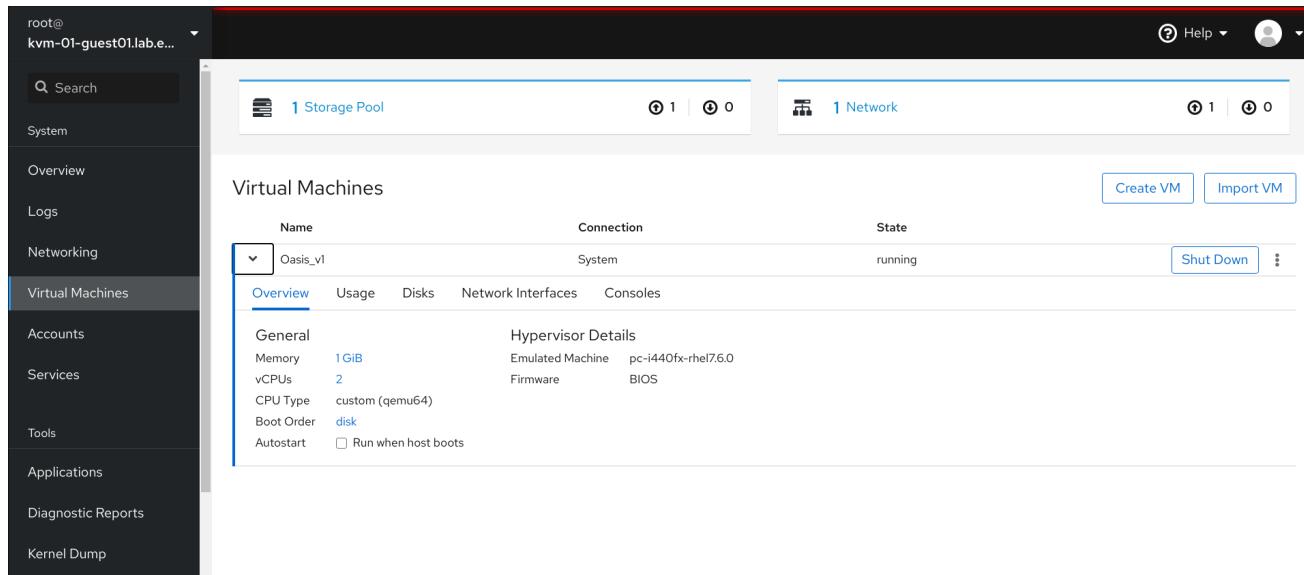
Additional resources

- [Supported kdump targets](#)
- [Using secure communications between two systems with OpenSSH](#)

CHAPTER 27. MANAGING VIRTUAL MACHINES IN THE WEB CONSOLE

Manage your virtual machines in a RHEL 8 web console and learn about the virtualization management capabilities.

To manage virtual machines in a graphical interface on a RHEL 8 host, you can use the **Virtual Machines** pane in the [RHEL 8 web console](#).



27.1. OVERVIEW OF VIRTUAL MACHINE MANAGEMENT USING THE WEB CONSOLE

The RHEL 8 web console is a web-based interface for system administration. As one of its features, the web console provides a graphical view of virtual machines (VMs) on the host system, and makes it possible to create, access, and configure these VMs.

Note that to use the web console to manage your VMs on RHEL 8, you must first install [a web console plug-in](#) for virtualization.

Next steps

- For instructions on enabling VMs management in your web console, see [Section 27.2, “Setting up the web console to manage virtual machines”](#).
- For a comprehensive list of VM management actions that the web console provides, see [Section 27.3, “Virtual machine management features available in the web console”](#).
- For a list of features that are currently not available in the web console but can be used in the `virt-manager` application, see [Section 27.4, “Differences between virtualization features in Virtual Machine Manager and the web console”](#).

27.2. SETTING UP THE WEB CONSOLE TO MANAGE VIRTUAL MACHINES

Before using the RHEL 8 web console to manage virtual machines (VMs), you must install the web console virtual machine plug-in on the host.

Prerequisites

- Ensure that the web console is installed and enabled on your machine.

```
# systemctl status cockpit.socket
cockpit.socket - Cockpit Web Service Socket
Loaded: loaded (/usr/lib/systemd/system/cockpit.socket)
[...]
```

If this command returns **Unit cockpit.socket could not be found**, follow the [Installing the web console](#) document to enable the web console.

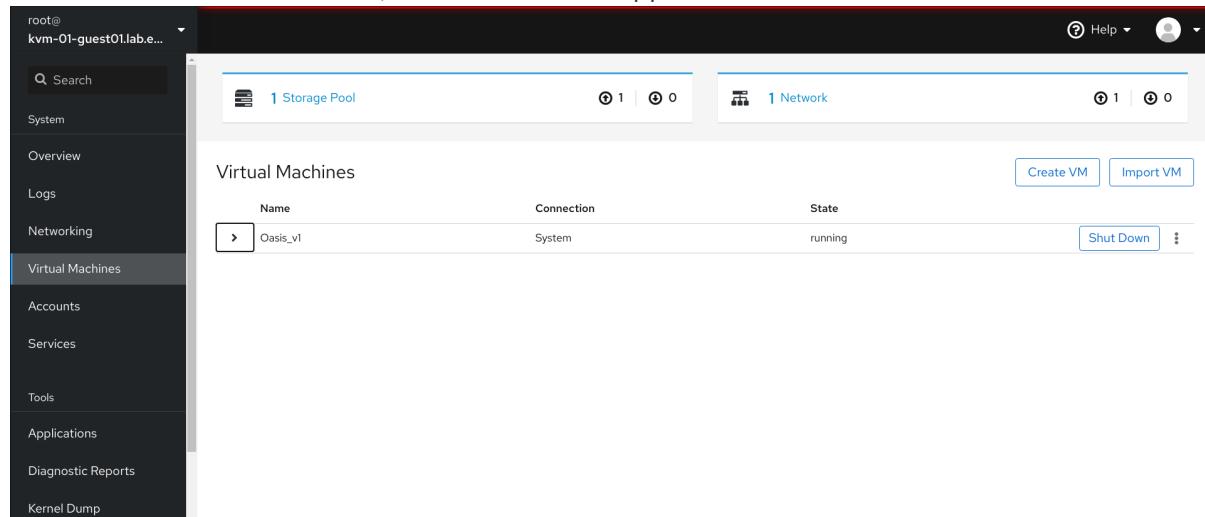
Procedure

- Install the **cockpit-machines** plug-in.

```
# yum install cockpit-machines
```

Verification

- If the installation is successful, **Virtual Machines** appears in the web console side menu.



Additional resources

- For instructions on connecting to the web console, as well as other information on using the web console, see the [Managing systems using the RHEL 8 web console](#) document.

27.3. VIRTUAL MACHINE MANAGEMENT FEATURES AVAILABLE IN THE WEB CONSOLE

Using the RHEL 8 web console, you can perform the following actions to manage the virtual machines (VMs) on your system.

Table 27.1. VM tasks that can be performed in the RHEL 8 web console

Task	For details, see:
Create a VM and install it with a guest operating system	Creating virtual machines and installing guest operating systems using the web console
Delete a VM.	Deleting virtual machines using the web console
Start, shut down, and restart the VM	Starting virtual machines using the web console and Shutting down and restarting virtual machines using the web console
Connect to and interact with a VM using a variety of consoles	Interacting with virtual machines using the web console
View a variety of information about the VM	Viewing virtual machine information using the web console
Adjust the host memory allocated to a VM	Adding and removing virtual machine memory using the web console
Manage network connections for the VM	Using the web console for managing virtual machine network interfaces
Manage the VM storage available on the host and attach virtual disks to the VM	Managing storage for virtual machines using the web console
Configure the virtual CPU settings of the VM	Managing virtual CPUs using the web console

27.4. DIFFERENCES BETWEEN VIRTUALIZATION FEATURES IN VIRTUAL MACHINE MANAGER AND THE WEB CONSOLE

The Virtual Machine Manager (`virt-manager`) application is supported in RHEL 8, but has been deprecated. The web console is intended to become its replacement in a subsequent major release. It is, therefore, recommended that you get familiar with the web console for managing virtualization in a GUI.

However, in RHEL 8, some VM management tasks can only be performed in `virt-manager` or the command line. The following table highlights the features that are available in `virt-manager` but not available in the RHEL 8.0 web console.

If a feature is available in a later minor version of RHEL 8, the minimum RHEL 8 version appears in the *Support in web console introduced* column.

Table 27.2. VM managemennt tasks that cannot be performed using the web console in RHEL 8.0

Task	Support in web console introduced	Alternative method using CLI
Setting a virtual machine to start when the host boots	RHEL 8.1	virsh autostart

Task	Support in web console introduced	Alternative method using CLI
Suspending a virtual machine	RHEL 8.1	virsh suspend
Resuming a suspended virtual machine	RHEL 8.1	virsh resume
Creating file-system directory storage pools	RHEL 8.1	virsh pool-define-as
Creating NFS storage pools	RHEL 8.1	virsh pool-define-as
Creating physical disk device storage pools	RHEL 8.1	virsh pool-define-as
Creating LVM volume group storage pools	RHEL 8.1	virsh pool-define-as
Creating partition-based storage pools	CURRENTLY UNAVAILABLE	virsh pool-define-as
Creating GlusterFS-based storage pools	CURRENTLY UNAVAILABLE	virsh pool-define-as
Creating vHBA-based storage pools with SCSI devices	CURRENTLY UNAVAILABLE	virsh pool-define-as
Creating Multipath-based storage pools	CURRENTLY UNAVAILABLE	virsh pool-define-as
Creating RBD-based storage pools	CURRENTLY UNAVAILABLE	virsh pool-define-as
Creating a new storage volume	RHEL 8.1	virsh vol-create
Adding a new virtual network	RHEL 8.1	virsh net-create or virsh net-define
Deleting a virtual network	RHEL 8.1	virsh net-undefine
Creating a bridge from a host machine's interface to a virtual machine	CURRENTLY UNAVAILABLE	virsh iface-bridge
Creating a snapshot	CURRENTLY UNAVAILABLE	virsh snapshot-create-as
Reverting to a snapshot	CURRENTLY UNAVAILABLE	virsh snapshot-revert

Task	Support in web console introduced	Alternative method using CLI
Deleting a snapshot	<i>CURRENTLY UNAVAILABLE</i>	virsh snapshot-delete
Cloning a virtual machine	<i>CURRENTLY UNAVAILABLE</i>	virt-clone
Migrating a virtual machine to another host machine	<i>CURRENTLY UNAVAILABLE</i>	virsh migrate

Additional resources

- For information on the Virtual Machine Manager, see [RHEL 7 documentation](#).

CHAPTER 28. MANAGING REMOTE SYSTEMS IN THE WEB CONSOLE

Connect to the remote systems and manage them in the RHEL 8 web console.

The following chapter describes:

- The optimal topology of connected systems.
- How to add and remove remote systems.
- When, why, and how to use SSH keys for remote system authentication.

Prerequisites

- Opened the SSH service on remote systems.

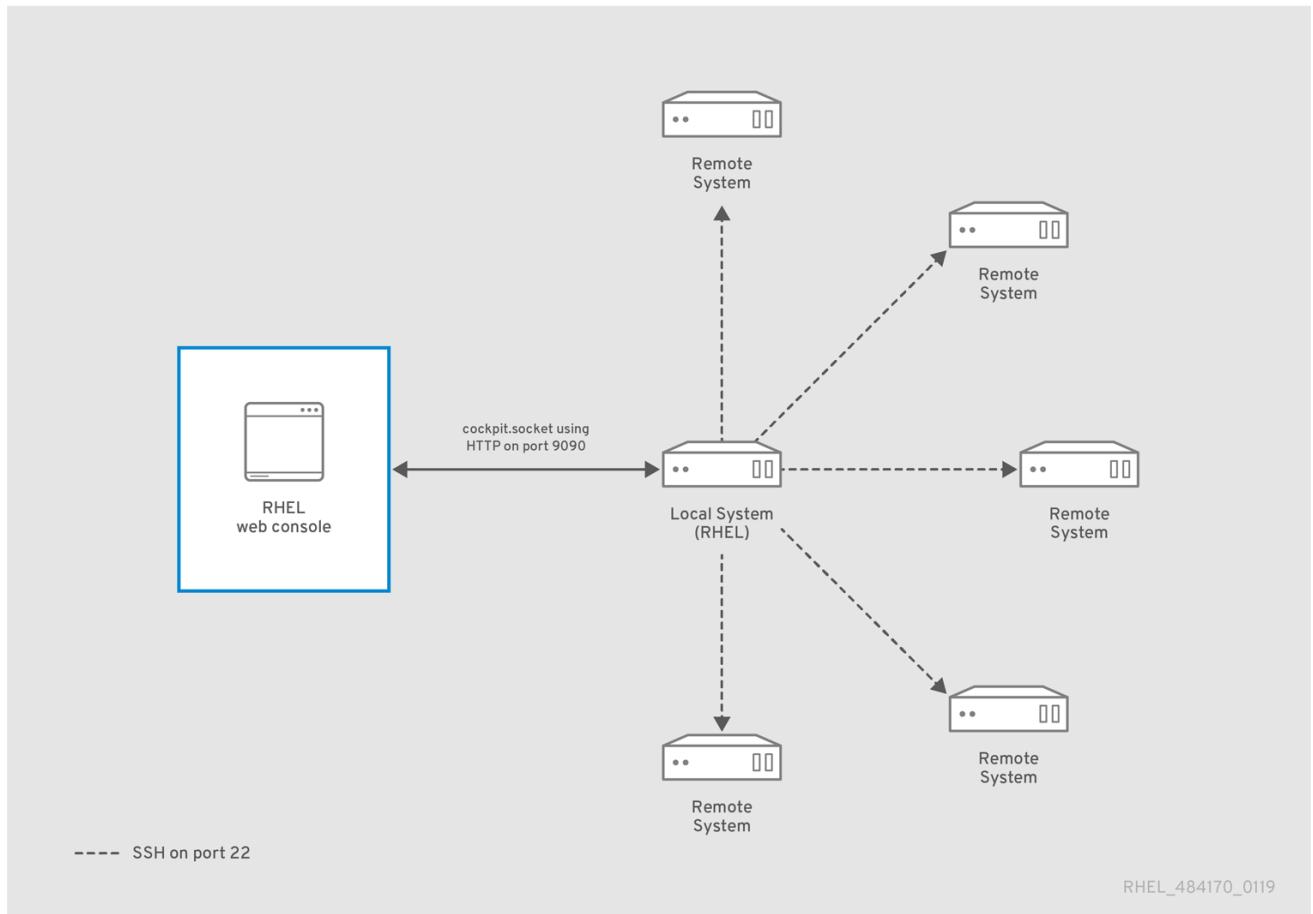
28.1. REMOTE SYSTEM MANAGER IN THE WEB CONSOLE

Using the RHEL 8 web console to manage remote systems in the network requires considering the topology of connected servers.

For optimal security, Red Hat recommends the following connection setup:

- Use one system with the web console as a bastion host. The bastion host is a system with opened HTTPS port.
- All other systems communicate through SSH.

With the web interface running on the bastion host, you can reach all other systems through the SSH protocol using port 22 in the default configuration.



28.2. ADDING REMOTE HOSTS TO THE WEB CONSOLE

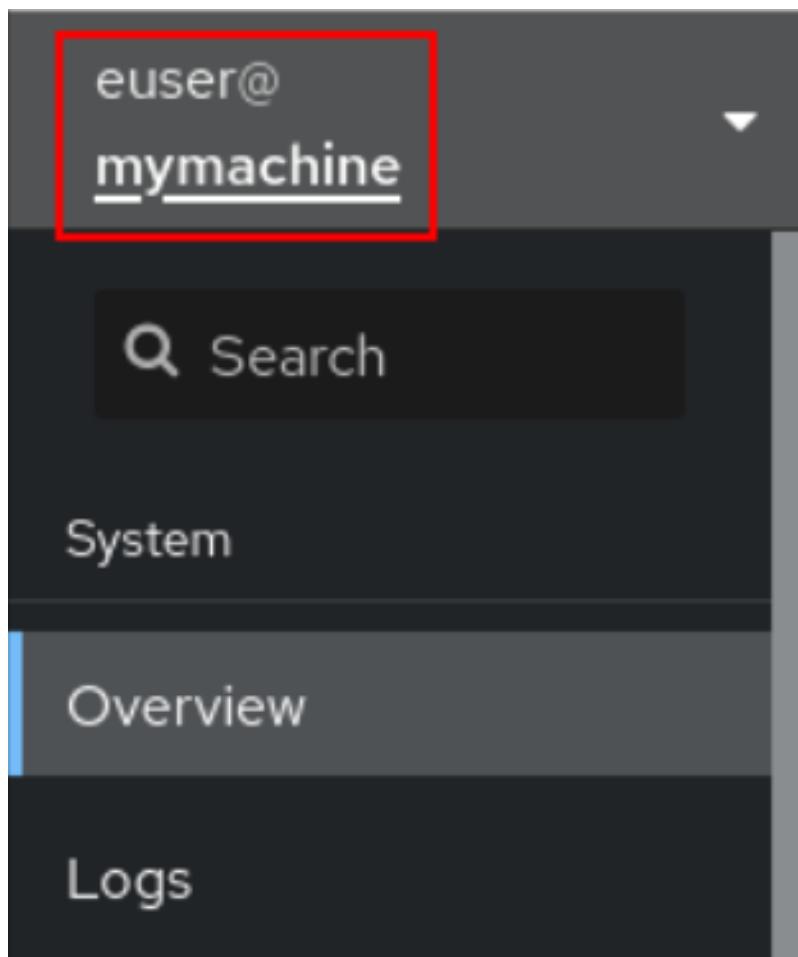
This section helps you to connect other systems with a user name and password.

Prerequisites

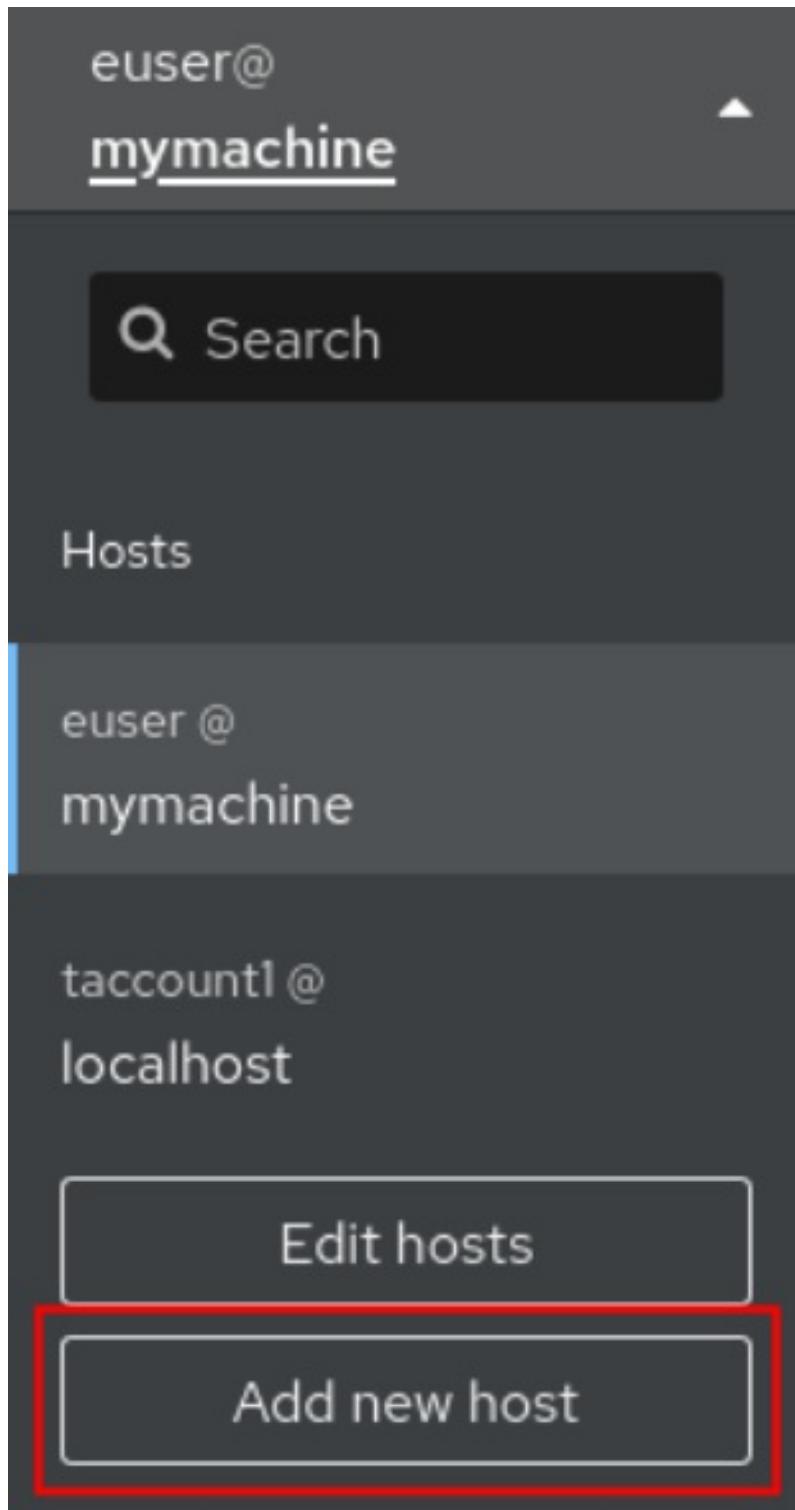
- You need to be logged into the web console with administration privileges.
For details, see [Logging in to the web console](#).

Procedure

1. In the RHEL 8 web console, click on your **username@hostname** in the top left corner of the **Overview** page.



2. In the drop down menu, click the **Add new host** button.



3. In the **Add new host** dialog box, specify the host you want to add.
4. (Optional) Add the user name for the account to which you want to connect.
You can use any user account of the remote system. However, if you use credentials of a user account without administration privileges, you will not be able to perform administration tasks.

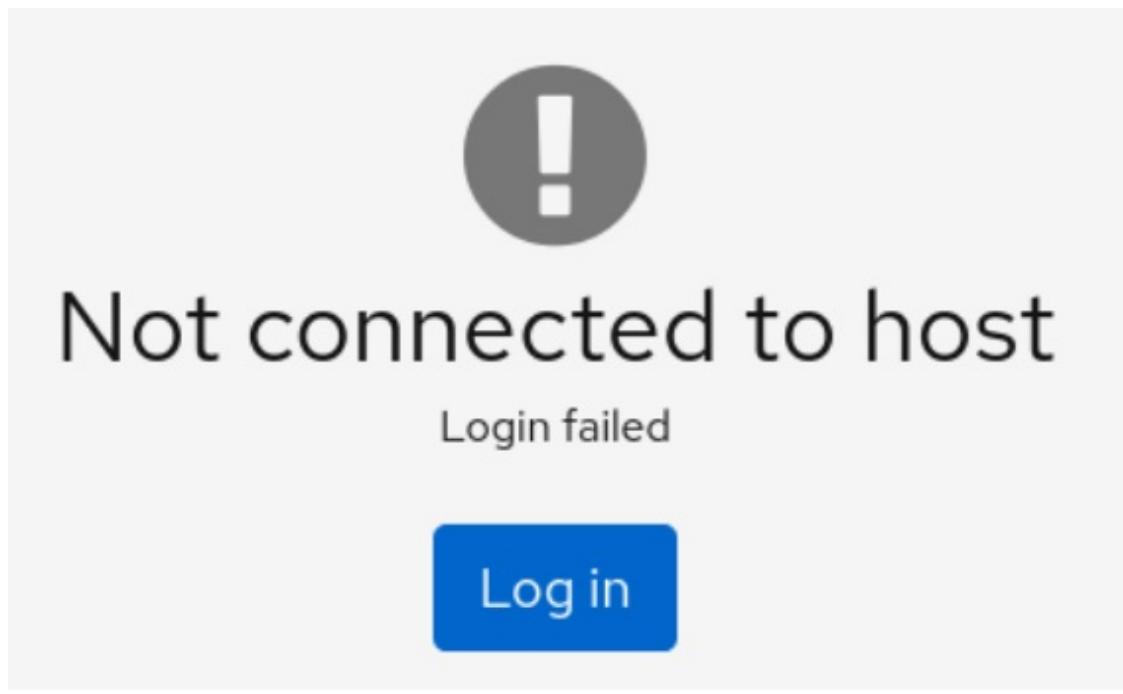
If you use the same credentials as for your local system, the web console will authenticate remote systems automatically every time you log in. However, using the same credentials on more machines could be a potential security risk.
5. (Optional) Click the **Color** field to change the color of the system.
6. Click **Add**.

The new host will appear in the list of hosts in the **username@hostname** drop down menu.



NOTE

The web console does not save passwords used to log in to remote systems which means that you have to log in again after each system restart. Next time you log in, click the **Log in** button placed on the main screen of the disconnected remote system to open the login dialog.



28.3. REMOVING REMOTE HOSTS FROM THE WEB CONSOLE

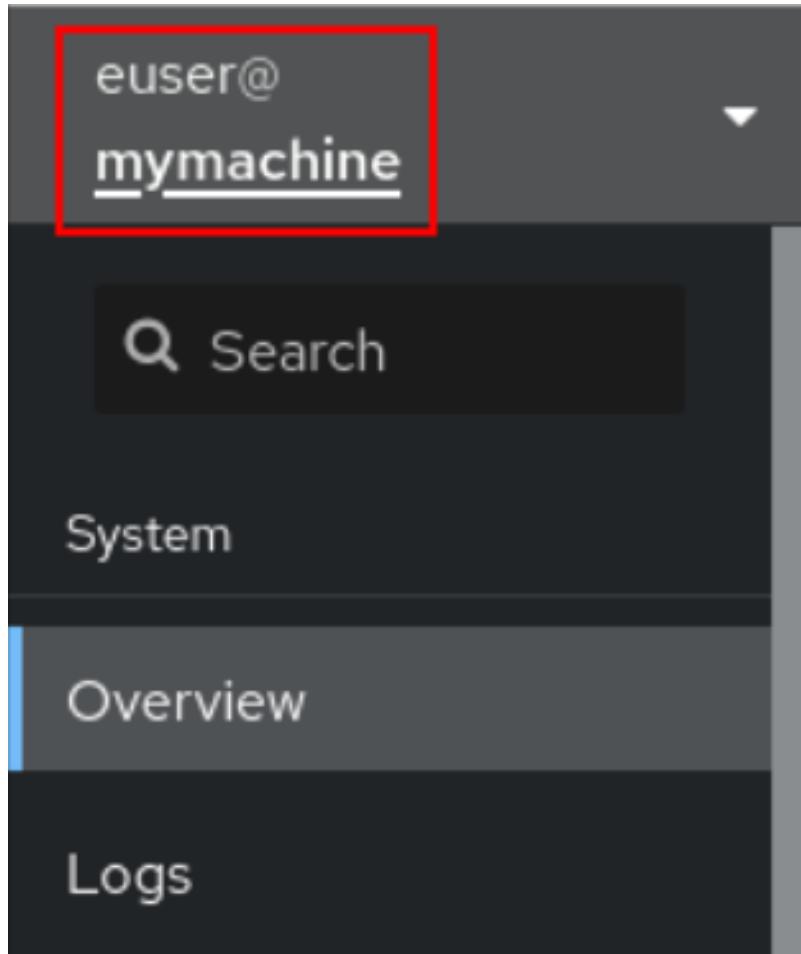
This section guides you on removing other systems from the web console.

Prerequisites

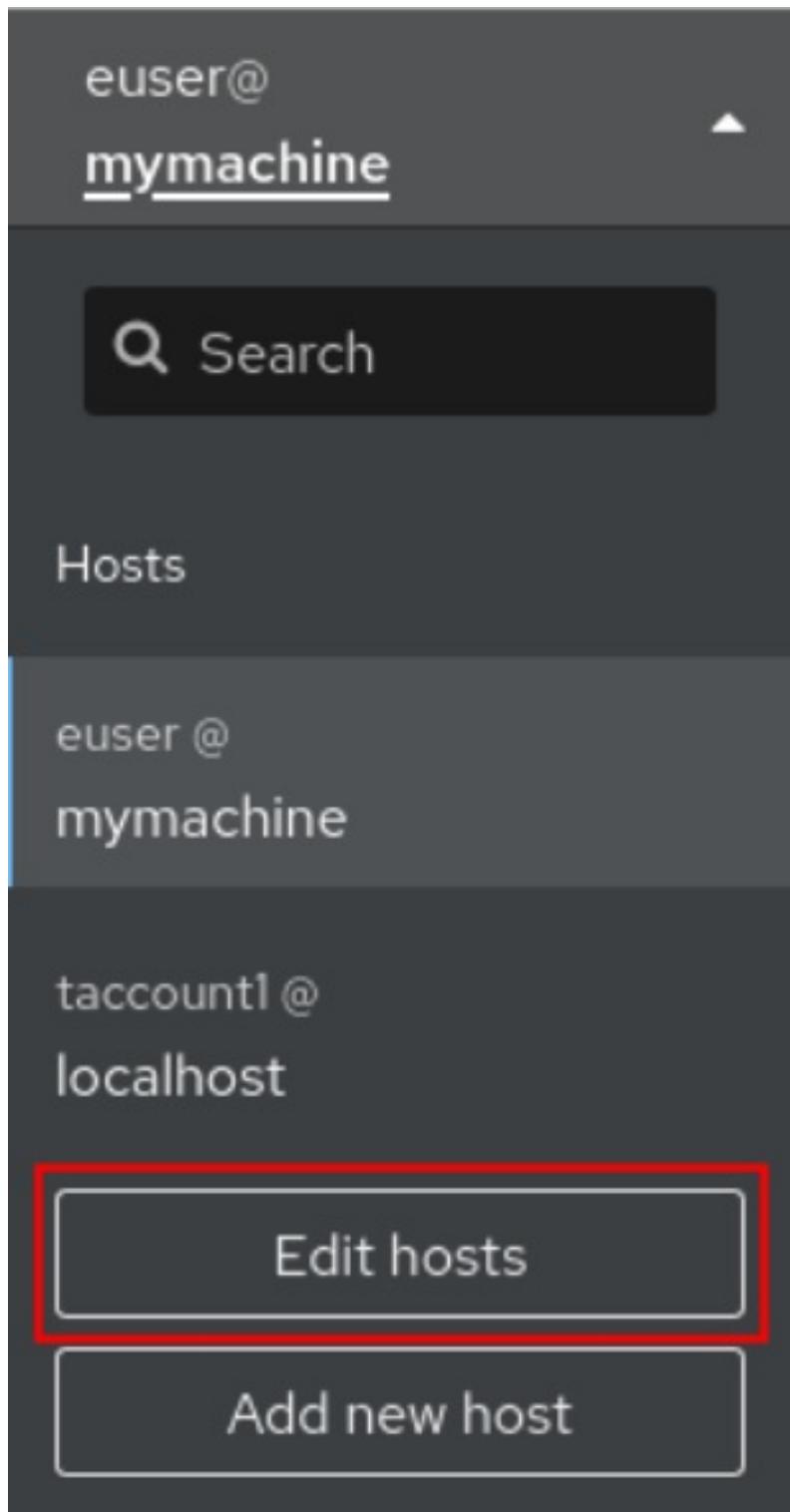
- Remote systems added.
For details, see [Section 28.2, “Adding remote hosts to the web console”](#).
- You must be logged into the web console with administrator privileges.
For details, see [Logging in to the web console](#).

Procedure

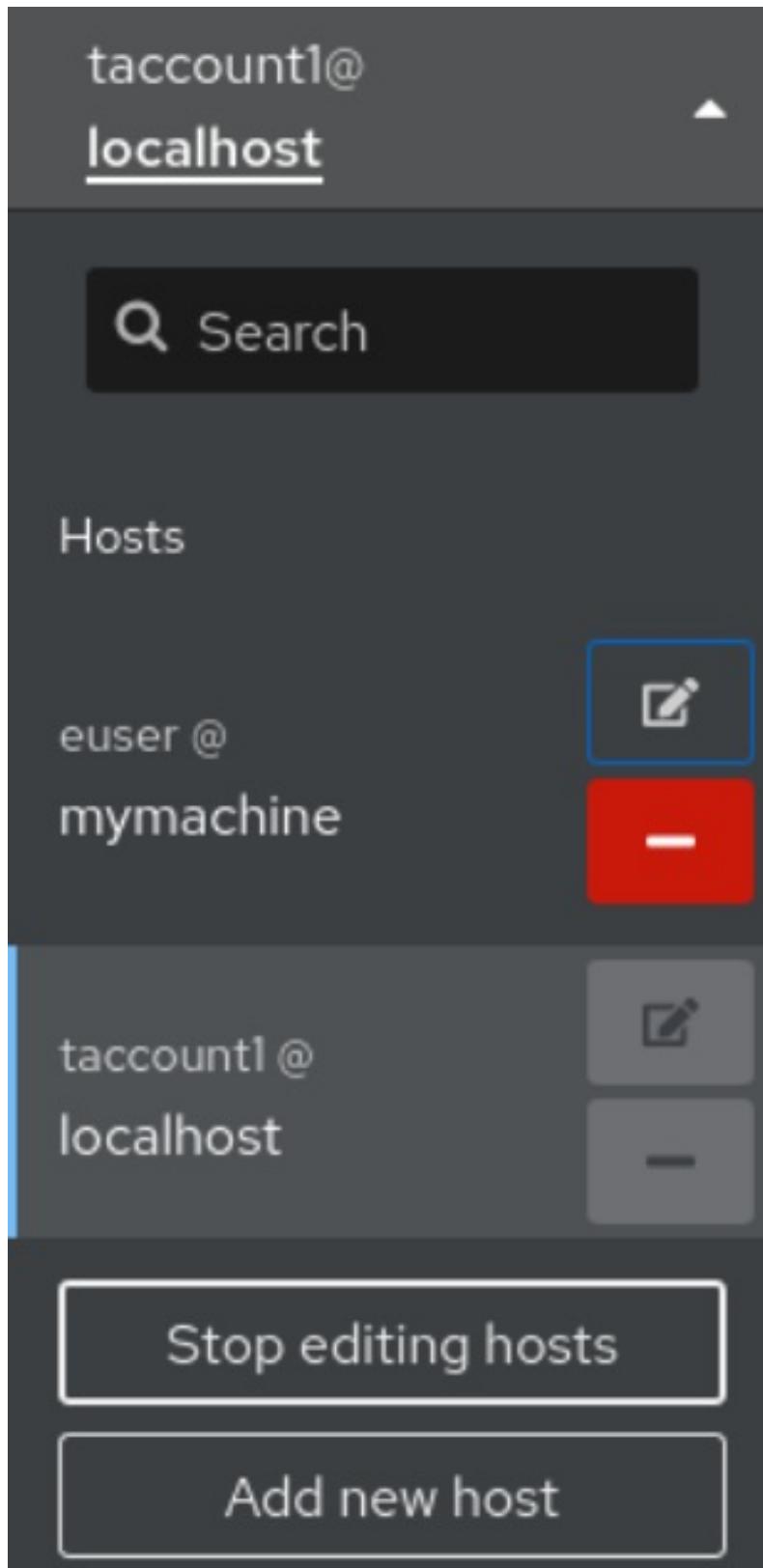
1. Log in to the RHEL 8 web console.
2. Click on your **username@hostname** in the top left corner of the **Overview** page.



3. Click the **Edit Server** icon.



4. To remove a host from web console, click the red minus sign button next to its host name. Note that you cannot remove a host you are currently connected to.



As a result, the server is removed from your web console.

28.4. ENABLING SSH LOGIN FOR A NEW HOST

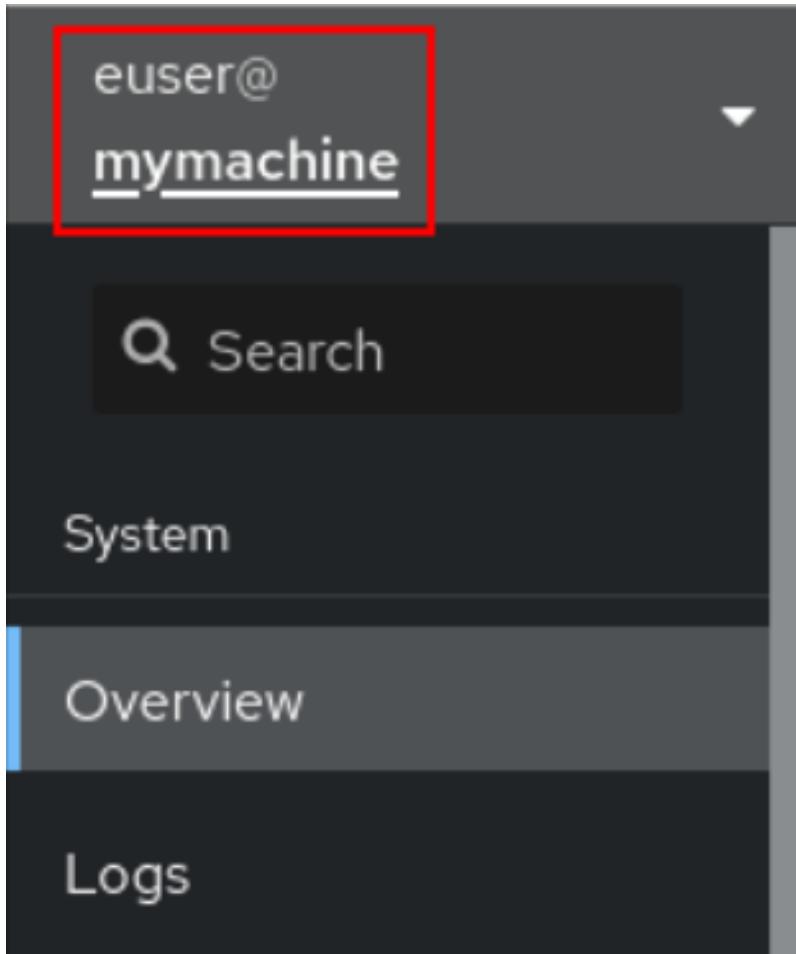
When you add a new host you can also log into it with an ssh key. If you already have an ssh key on your system, the web console will use the existing one; otherwise, the web console can create a key.

Prerequisites

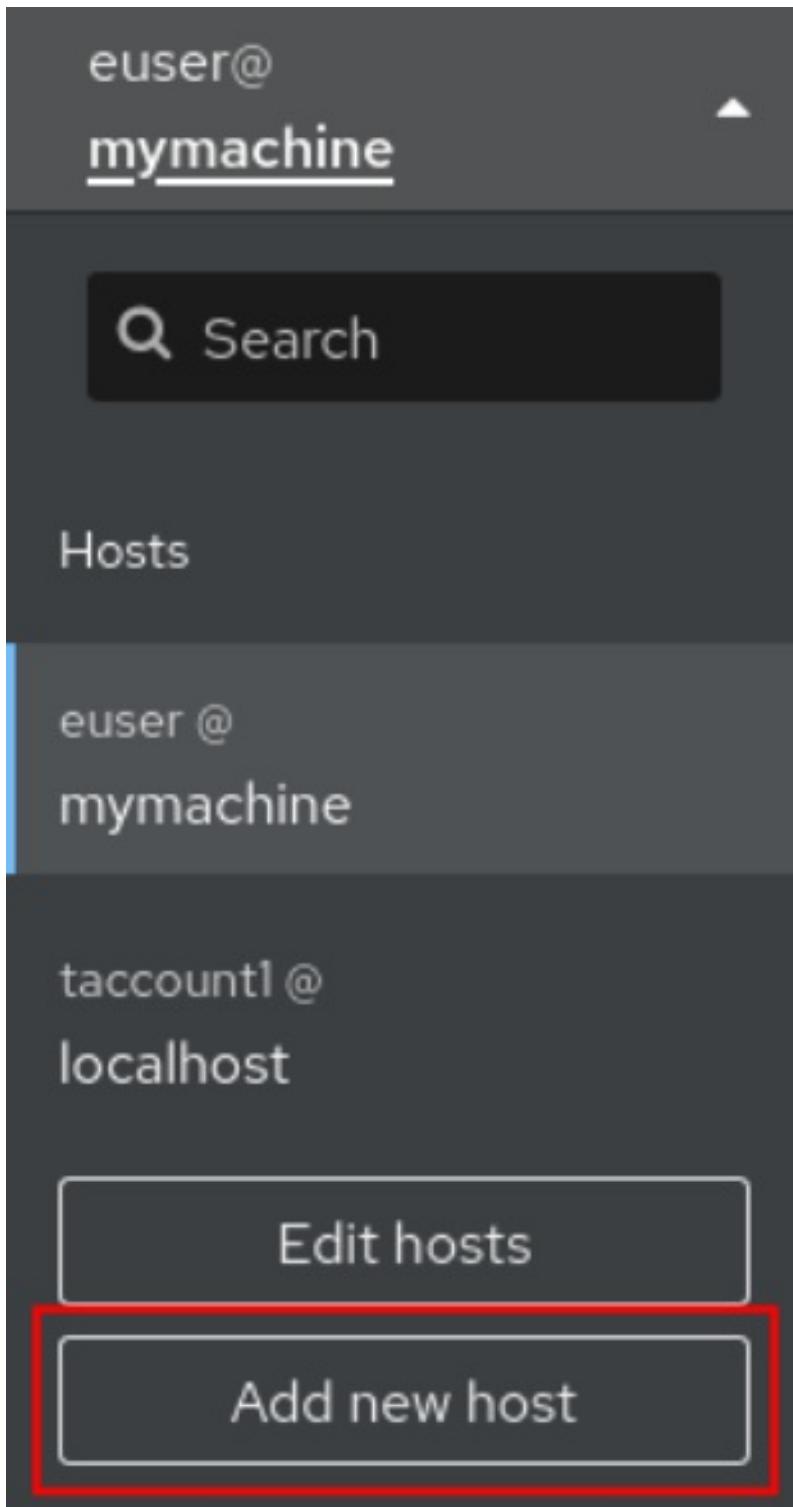
- You need to be logged into the web console with administration privileges.
For details, see [Logging in to the web console](#).

Procedure

1. In the RHEL 8 web console, click on your **username@hostname** in the top left corner of the Overview page.



2. In the drop down menu, click the **Add new host** button.



3. In the **Add new host** dialog box, specify the host you want to add.
4. Add the user name for the account to which you want to connect.
You can use any user account of the remote system. However, if you use credentials of a user account without administration privileges, you will not be able to perform administration tasks.
5. (Optional) Click the **Color** field to change the color of the system.
6. Click **Add**.
A new dialog window will appear asking for a password.
7. Enter the user account password.

8. Check Authorize ssh key if you already have an ssh key.

Log in to mymachine

Unable to log in to **euser@mymachine** using SSH key authentication. Please provide the password. You may want to set up your SSH keys for automatic login.

Password	<input type="password" value="XXXXXXXXXX"/>
Automatic login	<input checked="" type="checkbox"/> Authorize SSH key.

The SSH key `/home/euser/.ssh/id_rsa` of **euser** on **localhost** will be added to the `~/.ssh/authorized_keys` file of **euser** on **mymachine**.
This will allow you to log in without password in the future.

Log in **Cancel**

9. Check Create a new SSH key and authorize it if you do not have an SSH key. The web console will create it for you.

Log in to mymachine

Unable to log in to **euser@mymachine** using SSH key authentication. Please provide the password. You may want to set up your SSH keys for automatic login.

Password	<input type="password"/>
Automatic login	<input checked="" type="checkbox"/> Create a new SSH key and authorize it.

A new SSH key at `/home/euser/.ssh/id_rsa` will be created for **euser** on **localhost** and it will be added to the `~/.ssh/authorized_keys` file of **euser** on **mymachine**.

Key password

Confirm key password

In order to allow log in to **mymachine** as **euser** without password in the future, use the login password of **euser** on **localhost** as the key password, or leave the key password blank.

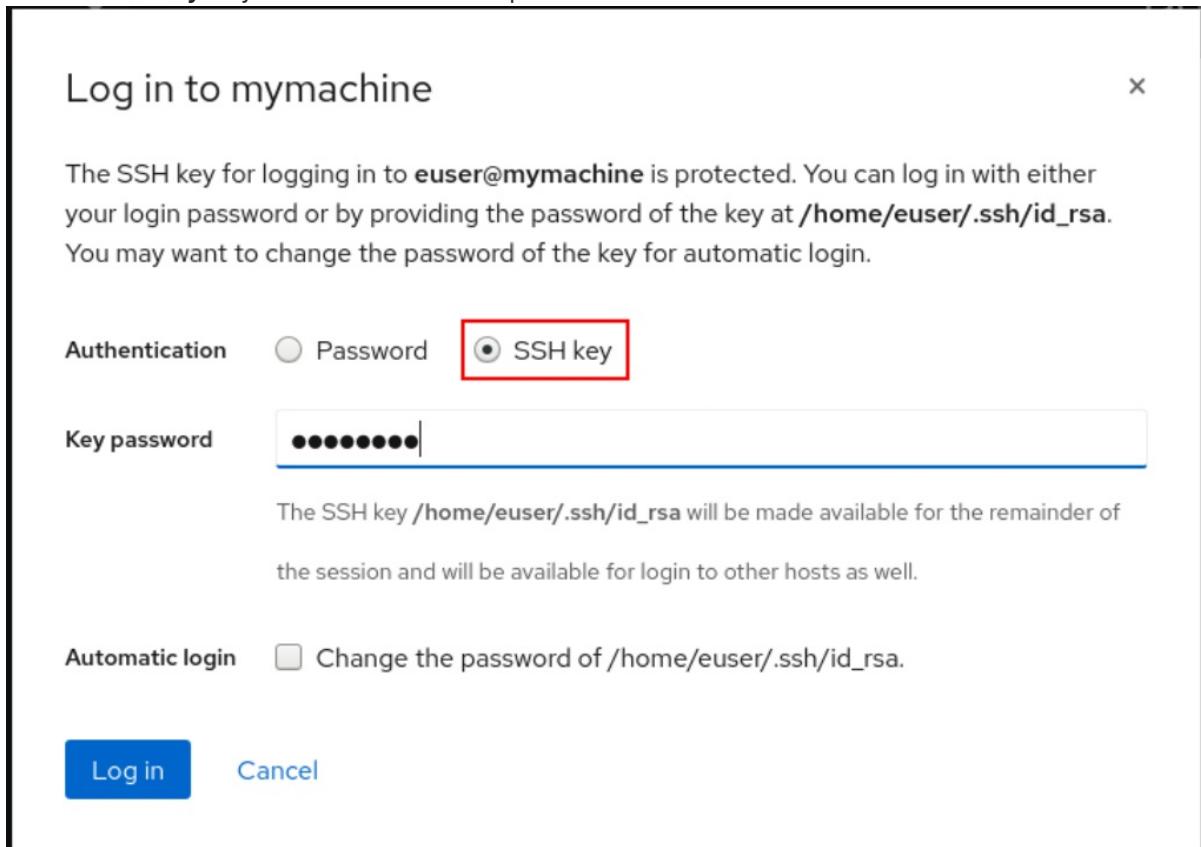
Log in **Cancel**

- a. Add a password for the SSH key.

- b. Confirm the password.
10. Click **Log in**
The new host will appear in the list of hosts in the **username@hostname** drop down menu.

Verification steps

1. Log out.
2. Log back in.
3. Click **Log in** in the **Not connected to host** screen.
4. Select **SSH key** as your authentication option.



5. Enter your key password.
6. Click **Log in**.

Additional resources

- Using secure communications between two systems with OpenSSH

CHAPTER 29. CONFIGURING SINGLE SIGN-ON FOR THE RHEL 8 WEB CONSOLE IN THE IDM DOMAIN

Learn how to use Single Sign-on (SSO) authentication provided by Identity Management (IdM) in the RHEL 8 web console.

Advantages:

- IdM domain administrators can use the RHEL 8 web console to manage local machines.
- Users with a Kerberos ticket in the IdM domain do not need to provide login credentials to access the web console.
- All hosts known to the IdM domain are accessible via SSH from the local instance of the RHEL 8 web console.
- Certificate configuration is not necessary. The console's web server automatically switches to a certificate issued by the IdM certificate authority and accepted by browsers.

This chapter covers the following steps to configure SSO for logging into the the RHEL web console:

1. Add machines to the IdM domain using the RHEL 8 web console.
For details, see [Section 29.1, “Joining a RHEL 8 system to an IdM domain using the web console”](#).
2. If you want to use Kerberos for authentication, you need to obtain a Kerberos ticket on your machine.
For details, see [Section 29.2, “Logging in to the web console using Kerberos authentication”](#).
3. Allow administrators on the IdM server to run any command on any host.
For details, see [Section 29.3, “Enabling admin sudo access to domain administrators on the IdM server”](#).

Prerequisites

- The RHEL web console installed on RHEL 8 systems.
For details, see [Installing the web console](#).
- IdM client installed on systems with the RHEL web console.
For details, see [IdM client installation](#).

29.1. JOINING A RHEL 8 SYSTEM TO AN IDM DOMAIN USING THE WEB CONSOLE

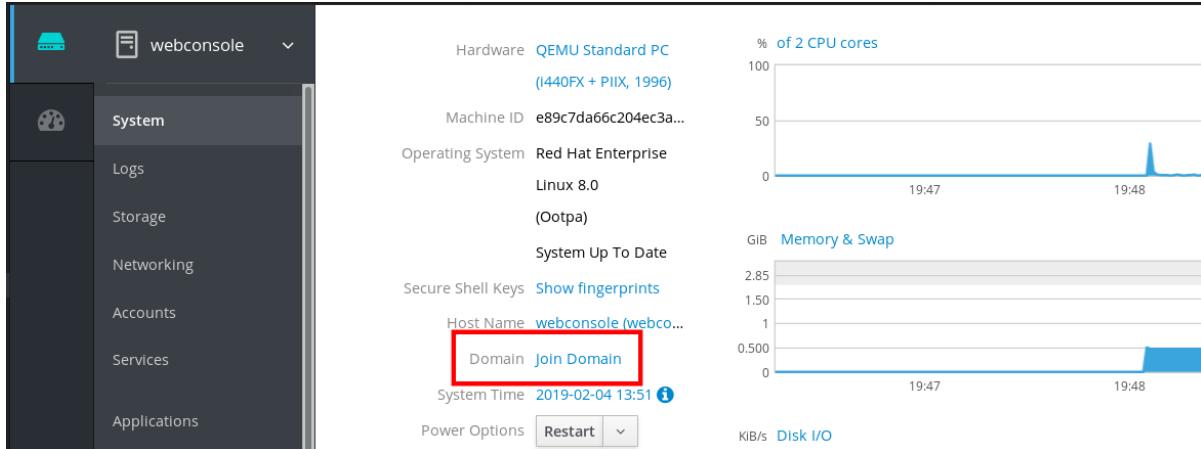
You can use the web console to join the Red Hat Enterprise Linux 8 system to the Identity Management (IdM) domain.

Prerequisites

- The IdM domain is running and reachable from the client you want to join.
- You have the IdM domain administrator credentials.

Procedure

1. Log into the RHEL web console.
For details, see [Logging in to the web console](#).
2. Open the **System** tab.
3. Click **Join Domain**.



4. In the **Join a Domain** dialog box, enter the host name of the IdM server in the **Domain Address** field.
5. In the **Authentication** drop down list, select if you want to use a password or a one-time password for authentication.

The screenshot shows the 'Join a Domain' dialog box. It has a 'Domain Address' field containing 'server.idm.example.com'. Below it is an 'Authentication' dropdown menu with 'One Time Password' selected. There are also other options like 'Administrator Password' and 'One Time Password'. At the bottom right are 'Cancel' and 'Join' buttons, with 'Join' being highlighted in blue.

6. In the **Domain Administrator Name** field, enter the user name of the IdM administration account.
7. In the password field, add the password or one-time password according to what you selected in the **Authentication** drop down list earlier.
8. Click **Join**.

Join a Domain

Domain Address	server.idm.example.com
Authentication	Administrator Password
Domain Administrator Name	admin
Domain Administrator Password	*****

Cancel **Join**

Verification steps

1. If the RHEL 8 web console did not display an error, the system has been joined to the IdM domain and you can see the domain name in the **System** screen.
2. To verify that the user is a member of the domain, click the Terminal page and type the **id** command:

```
$ id
euid=548800004(example_user) gid=548800004(example_user)
groups=548800004(example_user) context=unconfined_u:unconfined_r:unconfined_t:s0-
s0:c0.c1023
```

Additional resources

- [Planning Identity Management](#)
- [Installing Identity Management](#)
- [Configuring and managing Identity Management](#)

29.2. LOGGING IN TO THE WEB CONSOLE USING KERBEROS AUTHENTICATION

The following procedure describes steps on how to set up the RHEL 8 system to use Kerberos authentication.



IMPORTANT

With SSO you usually do not have any administrative privileges in the web console. This only works if you configured passwordless sudo. The web console does not interactively ask for a sudo password.

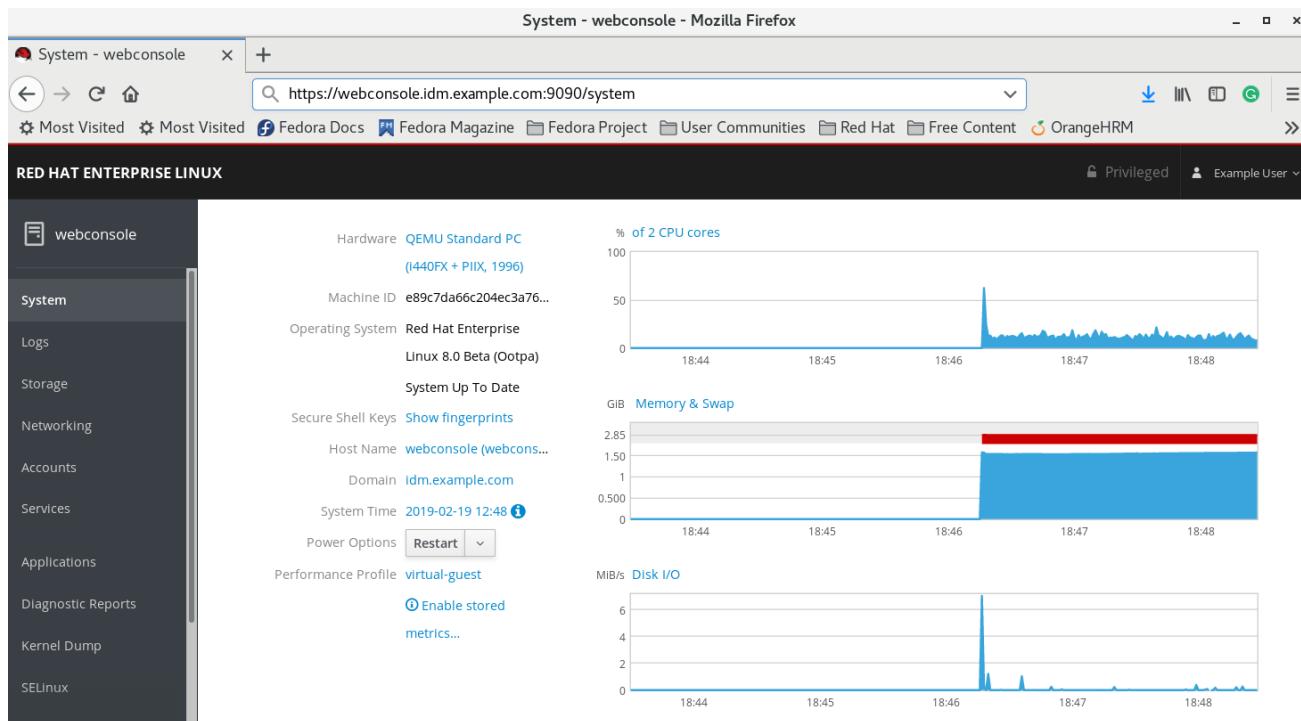
Prerequisites

- IdM domain running and reachable in your company environment.
For details, see [Section 29.1, “Joining a RHEL 8 system to an IdM domain using the web console”](#)
- Enable the **cockpit.socket** service on remote systems to which you want to connect and manage them with the RHEL web console.
For details, see [Installing the web console](#).
- If the system does not use a Kerberos ticket managed by the SSSD client, try to request the ticket with the **kinit** utility manually.

Procedure

Log in to the RHEL web console with the following address: https://dns_name:9090.

At this point, you are successfully connected to the RHEL web console and you can start with configuration.



29.3. ENABLING ADMIN SUDO ACCESS TO DOMAIN ADMINISTRATORS ON THE IDM SERVER

The following procedure describes steps on how to allow domain administrators to run any command on any host in the Identity Management (IdM) domain.

To accomplish this, enable sudo access to the **admins** user group created automatically during the IdM server installation.

All users added to the **admins** group will have sudo access if you run **ipa-advise** script on the group.

Prerequisites

- The server runs IdM 4.7.1 or later.

Procedure

1. Connect to the IdM server.

2. Run the ipa-advise script:

```
$ ipa-advise enable-admins-sudo | sh -ex
```

If the console did not display an error, the **admins** group have admin permissions on all machines in the IdM domain.

CHAPTER 30. CONFIGURING SMART CARD AUTHENTICATION WITH THE WEB CONSOLE FOR CENTRALLY MANAGED USERS

Configure smart card authentication in the RHEL 8 web console for users who are centrally managed by:

- Identity Management
- Active Directory which is connected in the cross-forest trust with Identity Management



IMPORTANT

- Smart card authentication does not elevate administrative privileges yet and the web console opens in the web browser in the read-only mode.
- You can run administrative commands in the built-in terminal with `sudo`.

Prerequisites

- The system for which you want to use the smart card authentication must be a member of an Active Directory or Identity Management domain.
For details about joining the RHEL 8 system into a domain using the web console, see [Joining a RHEL 8 system to an IdM domain using the web console](#).
- The certificate used for the smart card authentication must be associated with a particular user in Identity Management or Active Directory.
For more details about associating a certificate with the user in Identity Management, see [Adding a certificate to a user entry in IdM](#) .

30.1. SMART CARD AUTHENTICATION FOR CENTRALLY MANAGED USERS

A smart card is a physical device, which can provide personal authentication using certificates stored on the card. Personal authentication means that you can use smart cards in the same way as user passwords.

You can store user credentials on the smart card in the form of a private key and a certificate. Special software and hardware is used to access them. You insert the smart card into a reader or a USB socket and supply the PIN code for the smart card instead of providing your password.

Identity Management (IdM) supports smart card authentication with:

- User certificates issued by the IdM certificate authority. For details, see [Configuring Identity Management for smart card authentication](#).
- User certificates issued by the Active Directory Certificate Service (ADCS) certificate authority. For details, see [Configuring certificates issued by ADCS for smart card authentication in IdM](#) .



NOTE

If you want to start to use smart card authentication, see the hardware requirements: [Smart Card support in RHEL8](#).

30.2. INSTALLING TOOLS FOR MANAGING AND USING SMART CARDS

To configure your smart card, you need tools which can generate certificates and store them on a smart card.

You must:

- Install the **gnutls-utils** package which helps you to manage certificates.
- Install the **opensc** package which provides a set of libraries and utilities to work with smart cards.
- Start the **pcscd** service which communicates with the smart card reader.

Procedure

1. Install the **opensc** and **gnutls-utils** packages:

```
# dnf -y install opensc gnutls-utils
```

2. Start the **pcscd** service.

```
# systemctl start pcscd
```

Verify that the **pcscd** service is up and running.

30.3. STORING A CERTIFICATE ON A SMART CARD

This section describes smart card configuration with the **pkcs15-init** tool, which helps you to configure:

- Erasing your smart card
- Setting new PINs and optional PIN Unblocking Keys (PUKs)
- Creating a new slot on the smart card
- Storing the certificate, private key, and public key in the slot
- Locking the smart card settings (some smart cards require this type of finalization)

Prerequisites

- The **opensc** package, which includes the **pkcs15-init** tool is installed.
For details, see [Installing tools for managing and using smart cards](#).
- The card is inserted in the reader and connected to the computer.
- You have the private key, public key, and certificate to store on the smart card. In this procedure, **testuser.key**, **testuserpublic.key**, and **testuser.crt** are the names used for the private key, public key, and the certificate.
- Your current smart card user PIN and Security Officer PIN (SO-PIN)

Procedure

1. Erase your smart card and authenticate yourself with your PIN:

```
$ pkcs15-init --erase-card --use-default-transport-keys  
Using reader with a card: Reader name  
PIN [Security Officer PIN] required.  
Please enter PIN [Security Officer PIN]:
```

The card has been erased.

2. Initialize your smart card, set your user PIN and PUK, and your Security Officer PIN and PUK:

```
$ pkcs15-init --create-pkcs15 --use-default-transport-keys \  
--pin 963214 --puk 321478 --so-pin 65498714 --so-puk 784123  
Using reader with a card: Reader name
```

The **pkcs15-init** tool creates a new slot on the smart card.

3. Set the label and the authentication ID for the slot:

```
$ pkcs15-init --store-pin --label testuser \  
--auth-id 01 --so-pin 65498714 --pin 963214 --puk 321478  
Using reader with a card: Reader name
```

The label is set to a human-readable value, in this case, **testuser**. The **auth-id** must be two hexadecimal values, in this case it is set to **01**.

4. Store and label the private key in the new slot on the smart card:

```
$ pkcs15-init --store-private-key testuser.key --label testuser_key \  
--auth-id 01 --id 01 --pin 963214  
Using reader with a card: Reader name
```



NOTE

The value you specify for **--id** must be the same when storing your private key, and certificate. If you do not specify a value for **--id**, a more complicated value is calculated by the tool and it is therefore easier to define your own value.

5. Store and label the certificate in the new slot on the smart card:

```
$ pkcs15-init --store-certificate testuser.crt --label testuser_crt \  
--auth-id 01 --id 01 --format pem --pin 963214  
Using reader with a card: Reader name
```

6. (Optional) Store and label the public key in the new slot on the smart card:

```
$ pkcs15-init --store-public-key testuserpublic.key  
--label testuserpublic_key --auth-id 01 --id 01 --pin 963214  
Using reader with a card: Reader name
```



NOTE

If the public key corresponds to a private key and/or certificate, you should specify the same ID as that private key and/or certificate.

7. (Optional) Some smart cards require you to finalize the card by locking the settings:

```
$ pkcs15-init -F
```

At this stage, your smart card includes the certificate, private key, and public key in the newly created slot. You have also created your user PIN and PUK and the Security Officer PIN and PUK.

30.4. ENABLING SMART CARD AUTHENTICATION FOR THE WEB CONSOLE

To be able to use smart card authentication in the web console, enable smart card authentication in the **cockpit.conf** file.

Additionally, you can disable password authentication in the same file.

Prerequisites

- The RHEL 8 web console has been installed.
For details, see [Installing the web console](#).

Procedure

1. Log in to the RHEL web console with administrator privileges.
For details, see [Logging in to the web console](#).
2. Click **Terminal**.
3. In the **/etc/cockpit/cockpit.conf**, set the **ClientCertAuthentication** to **yes**:

```
[WebService]
ClientCertAuthentication = yes
```

4. Optionally, disable password based authentication in **cockpit.conf** with:

```
[Basic]
action = none
```

This configuration disables password authentication and you must always use the smart card.

5. Restart the web console to make sure that the **cockpit.service** accepts the change:

```
# systemctl restart cockpit
```

30.5. LOGGING IN TO THE WEB CONSOLE WITH SMART CARDS

You can use smart cards to log in to the web console.

Prerequisites

- A valid certificate stored in your smart card that is associated to a user account created in a Active Directory or Identity Management domain.
- PIN to unlock the smart card.
- The smart card has been put into the reader.

Procedure

1. Open your web browser and add the web console's address in the address bar.
The browser asks you to add the PIN protecting the certificate stored on the smart card.
2. In the **Password Required** dialog box, enter PIN and click **OK**.
3. In the **User Identification Request** dialog box, select the certificate stored in the smart card.
4. Select **Remember this decision**.
The system does not open this window next time.
5. Click **OK**.

You are now connected and the web console displays its content.

30.6. LIMITING USER SESSIONS AND MEMORY TO PREVENT A DOS ATTACK

Certificate authentication is protected by separating and isolating instances of the **cockpit-ws** web server against attackers who wants to impersonate another user. However, this introduces a potential Denial of Service (DoS) attack: A remote attacker could create a large number of certificates and send a large number of HTTPS requests to **cockpit-ws** each using a different certificate.

To prevent this DoS, the collective resources of these web server instances are limited. By default, limits to the number of connections and to memory usage are set to 200 threads and a 75% (soft) / 90% (hard) memory limit.

The following procedure describes resource protection by limiting the number of connections and memory.

Procedure

1. In the terminal, open the **system-cockpithttps.slice** configuration file:

```
# systemctl edit system-cockpithttps.slice
```

2. Limit the **TasksMax** to 100 and **CPUQuota** to 30%:

```
[Slice]
# change existing value
TasksMax=100
# add new restriction
CPUQuota=30%
```

3. To apply the changes, restart the system:

```
# systemctl daemon-reload  
# systemctl stop cockpit
```

Now, the new memory and user session limits protect the **cockpit-ws** web server from DoS attacks.

30.7. ADDITIONAL RESOURCES

- For more details on configuring certificates issued by IdM for smart card authentication, see the [Configuring Identity Management for smart card authentication](#) .
- For more details on configuring certificates issued by ADCS for smart card authentication, see the [Configuring certificates issued by ADCS for smart card authentication in IdM](#) .
- For more details on configuring certificates issued by local CA for smart card authentication, see the [Configuring and importing local certificates to a smart card](#) .:context: system-management-using-the-RHEL-8-web-console