Linux System Administration

Access the Command Line

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Pushpendra Kumar Pateriya

Lovely Professional University

pushpendra.mnnit@gmail.com pushpendrapateriya @ppsgsits

Objective(s)

- Understanding of Shell Basics
- Proficiency in Interacting with the Shell Prompt
- Command Structure and Functionality
- Log-in Procedures for Local Systems
- Remote System Access
- Knowledge of Graphical Desktop Environment
- Shell Interaction within the Desktop Environment

Shell

- A command line is a text-based interface that is used to input instructions to a computer system. The Linux command line is provided by a program called the shell.
- Many shell program variants have been developed over the years. Every user can use a different shell, but the Red Hat recommends using the default shell for system administration.
- The default user shell in Red Hat Enterprise Linux (RHEL) is the GNU Bourne-Again Shell (bash).
- The bash shell is an improved version of the original Bourne Shell (sh) on UNIX systems.

Shell Prompt

Definition

The shell displays a string when it is waiting for user input, called the shell prompt.

When a regular user starts a shell, the prompt includes an ending dollar ($) character:

Command Line Prompt
`[user@host ~]$`

A hash (#) character replaces the dollar ($) character when the shell is running as the superuser, root. This character indicates that it is a superuser shell, which helps to avoid mistakes that can affect the whole system.

Command Line Prompt
`[user@host ~]#`

Shell Basics

Commands that are entered at the shell prompt have three basic parts:

- Command to run.
  - The command is the name of the program to run. It might be followed by one or more options.
- Options to adjust the behavior of the command.
  - Options normally start with one or two dashes (-a or –all, for example) to distinguish them from arguments.
- Arguments, which are typically targets of the command.
  - Commands might also be followed by one or more arguments, which often indicate a target that the command should operate on.

> ***Example***
>
> For example, in the usermod -L user01 string, usermod is the command, -L is the option, and user01 is the argument. This command locks the password of the user01 user account.

Log in to a Local System

A terminal is a text-based interface to enter commands into and print output from a computer system. To run the shell, you must log in to the computer on a terminal.

- The physical console of a Linux machine connects directly to a hardware keyboard and display. It supports multiple virtual consoles, each enabling an independent login session. Switching between these consoles is possible by pressing Ctrl+Alt and a function key (F1 through F6). Typically, virtual consoles present a text login prompt, and upon successful login, users access a shell prompt.
- The computer may offer a graphical login prompt on a virtual console, granting access to a graphical environment. This environment operates on a virtual console as well. To access a shell prompt, users must initiate a terminal program within the graphical environment, which presents the shell prompt within an application window.

Log in to a Local System (Continued)

- System administrators often avoid running a graphical environment on servers because servers aren't used as desktop workspaces. This helps optimize resources for the server's workload.
- In Red Hat Enterprise Linux 9, the login screen appears on the first virtual console, tty1. Additionally, five text login prompts are available on virtual consoles tty2 through tty6.
- The graphical environment begins on the first available virtual console not in use by a login session. Typically, it replaces the login prompt on tty2, but if a text login session is active on tty2, the next free virtual console is used instead.
- The graphical login screen remains on tty1. If you switch users in the graphical environment without logging out, a new graphical environment starts for the new user on the next available virtual console.

Log in to a Local System (Continued)

- Logging out of a graphical environment closes the virtual console and returns the physical console to the graphical login screen on the first virtual console.
- In Red Hat Enterprise Linux 6 and 7, the graphical login screen appears on the first virtual console. Upon login, the initial graphical environment replaces the login screen on the same console. This behavior differs from Red Hat Enterprise Linux 8 and 9, where the graphical environment starts on the first available virtual console after login.
- A headless server lacks a permanently connected keyboard and display. In data centers, racks of headless servers save space and costs. Administrators access them via a serial console connected to a networked console server, providing remote login prompts.
- The serial console is typically utilized if the server's network card malfunctions, preventing conventional network access.

Log in to a Remote System

In Linux, the most common way to get a shell prompt on a remote system is to use Secure Shell (SSH). Most Linux systems (including Red Hat Enterprise Linux) and macOS provide the OpenSSH command-line program `ssh` for this purpose.

Command Line Prompt

```
[user@host ~]$ ssh remoteuser@remotehost
remoteuser@remotehost's password:  password
[remoteuser@remotehost ~]$
```

Log in to a Remote System (Continued)

- The ssh command encrypts the connection to protect against eavesdropping and hijacking of passwords and content. Some systems, such as new cloud instances, require public key authentication for tighter security.
- In public key authentication, users have a private key file kept secret, while the server is configured with a matching public key. When logging in, ssh uses the private key to authenticate if the corresponding public key is set up on the server.

Command Line Prompt

```
[user@host ~]$ ssh -i mylab.pem remoteuser@remotehost
[remoteuser@remotehost ~]
```

To ensure the connection works, only the file owner should have read access to the private key file. For a private key stored in mylab.pem, use the command chmod 600 mylab.pem to set the file permissions so that only the owner can read it.

Log Out from a Remote System

When you are finished with the shell and want to quit, you can choose one of several ways to end the session.

- You can enter the exit command to terminate the current shell session.
- Alternatively, finish a session by pressing Ctrl+D.

Command Line Prompt

```
[remoteuser@remotehost ~]$ exit
logout
Connection to remotehost closed.
[user@host ~]$
```

Question 1

Question

Which term describes the interpreter that executes commands that are typed as strings?

(A) Command
(B) Console
(C) Shell
(D) Terminal

Answer

Answer: C

Question

Question

Which term describes the visual cue that indicates that an interactive shell is waiting for the user to type a command?

(A) Argument
(B) Command
(C) Option
(D) Prompt

Answer

Answer: D

Question

Question

Which term describes the part of the command line that adjusts the behavior of a command?

(A) Argument

(B) Command

(C) Option

(D) Prompt

Answer

Answer: C

Question

Question

Which term describes the part of the command line that specifies the target that the command should operate on?

(A) Argument

(B) Command

(C) Option

(D) Prompt

Answer

Answer: A

Question

Question

Which term describes the hardware display and keyboard to interact with a system?

(A) Physical Console

(B) Virtual Console

(C) Shell

(D) Terminal

Answer

Answer: A

Question

Question

Which term describes one of multiple logical consoles that can each support an independent login session?

(A) Physical Console

(B) Virtual Console

(C) Shell

(D) Terminal

Answer

Answer: B

Question

Question

Which term describes an interface that provides a display for output and a keyboard for input to a shell session?

(A) Console

(B) Virtual Console

(C) Shell

(D) Terminal

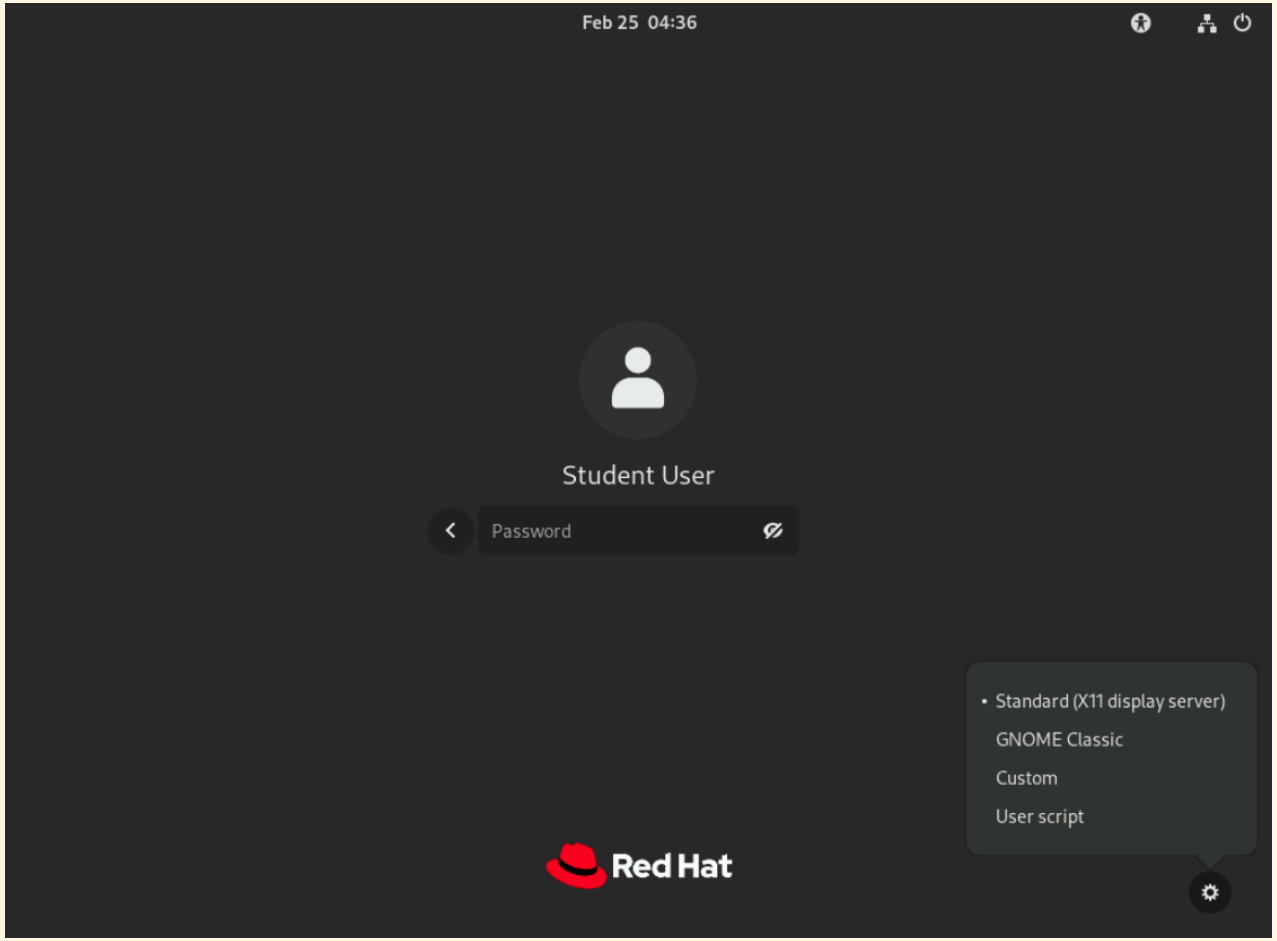
Answer

Answer: D

Access the Command Line with the Desktop

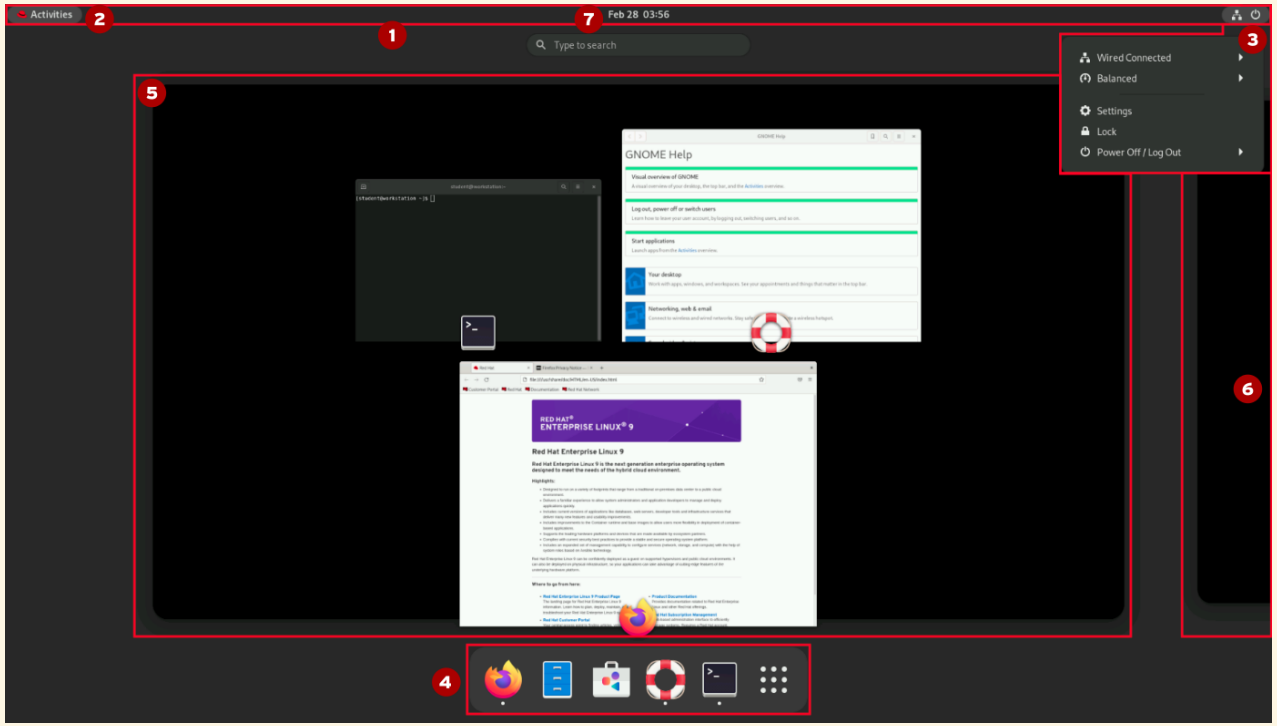
- The desktop environment in Red Hat Enterprise Linux 9 is GNOME 40, providing a unified interface and development platform atop a graphical framework like Wayland or X Window System.
- GNOME Shell, the core interface, is highly customizable.
- RHEL 9 defaults to the "Standard" theme but offers the option to switch to the "Classic" theme, resembling older GNOME versions.
- Theme selection is persistent at login, accessible by clicking the gear icon next to the Sign In button after selecting your account.

Access the Command Line with the Desktop



Parts of the GNOME Shell

The elements of the GNOME Shell include the following parts, as shown in this screen capture of the GNOME Shell in Activities overview mode:



Parts of the GNOME Shell

1. Top bar: Controls volume, networking, and keyboard input methods. Provides Activities button.
2. Activities overview: Organizes windows and starts applications. Accessed via Activities button or Super key.
3. System menu: Adjusts brightness, network connections, user settings, and system controls.
4. Dash: Shows favorite and running applications. Also called the dock.
5. Windows overview: Displays thumbnails of active windows for workspace management.
6. Workspace selector: Displays active workspaces and allows window movement.
7. Message tray: Reviews notifications and calendar events. Accessed via clock or Super+M.

Start a Terminal

To get a shell prompt in GNOME, start a graphical terminal application such as GNOME Terminal. Use one of the following methods to start a terminal:

- From the Activities overview, select Terminal from the dash, either in Favorites or with the Show Applications button.
- Search for terminal in the search field at the top of the windows overview.
- Press the Alt+F2 key combination to open the Enter a Command and enter gnome-terminal.

Lock the Screen and Log Out

- Lock the screen or log out from the system menu on the far right of the top bar.
- To lock the screen, click the lock button in the system menu or press Super+L (Windows+L).
- The lock screen curtain appears showing the system time and user name. Unlock by pressing Enter, Space, or clicking the mouse, then entering the user's password.
- To log out, select Power Off/Log Out → Log Out from the system menu. Confirm the action in the displayed window.

Power Off or Reboot the System

- To shut down, select Power Off/Log out → Power Off from the system menu or press Ctrl+Alt+Del. Confirm in the displayed window or wait 60 seconds for automatic shutdown.
- To reboot, select Power Off/Log out → Restart from the system menu. Confirm in the displayed window or wait 60 seconds for automatic restart.

Question

Question

What is the function of the Top bar in the GNOME Shell?

(A) Displays favorite applications

(B) Provides access to system settings

(C) Manages active workspaces

(D) Shows thumbnails of active windows

Answer

Answer: (B) Provides access to system settings

Question

Question

What is the primary function of the Dash in the GNOME Shell?

(A) Adjust brightness and network connections

(B) Start applications

(C) Lock the screen

(D) Log out of the system

Answer

Answer: (B) Start applications

Question

Question

What does the Workspace selector in the GNOME Shell allow you to do?

(A) Lock the screen

(B) Review notifications

(C) Select active workspaces

(D) Shut down the system

Answer

Answer: (C) Select active workspaces

Question

Question

What is the purpose of the Message tray in the GNOME Shell?

(A) Start applications

(B) Review notifications and calendar events

(C) Adjust system settings

(D) Display favorite applications

Answer

Answer: (B) Review notifications and calendar events

Question

Question

Which menu in the GNOME Shell provides control to adjust brightness and network connections?

(A) Top bar

(B) Dash

(C) System menu

(D) Activities overview

Answer

Answer: (C) System menu

Thanks!

Thank you
for your attention.