

RedHat Adminstration

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Course Overview

- **Course Description**
- **Assessment**
- **Course Text**

Red Hat

Red Hat Academy

- Red Hat is recognized leader of Linux in the IT industry
- Offer curriculum in Linux, cloud, and development technologies
- Prepare students with the foundational skills necessary to embark on other technology topics
- Take advantage of no-cost membership for qualifying institutions

Red Hat Academy Review

BETTER PREPARED

95%

Of students say they are better prepared to maximize the value of Red Hat products after training ^[1]

MORE INDEPENDENT

92%

Of students are able to work more independently and rely less on coworkers after Red Hat training ^[1]

BETTER OPPORTUNITIES

94%

Of instructors and administrators say Red Hat Academy students who graduate with a Red Hat certification have increased job opportunities ^[2]

Featured academic partners



Red Hat Agreement



RED HAT ACADEMY

Bridge the gap between
education and industry

Red Hat® Academy turns academic institutions into centers for enterprise-ready talent by outfitting them with Red Hat training and certification.



Red Hat Curriculum



Core system administration

Learn to deploy, administer, manage, and secure Red Hat Enterprise Linux.



Cloud computing

Acquire the skills needed to support your organization's movement to the cloud.



Middleware development

Embrace modern infrastructure by mastering middleware applications.



Curriculum

High-demand, diverse
course content

Red Hat Training

- Class Room (2,125 USD - 5 days)
- Video Classroom (1,807 USD - 90 days)



Training

Instructor enablement
and preparation

Red Hat Certificates

Preliminary Exam (90 \$)

Certification (450 \$)



Validation

Performance-based
certification exams

Our Target

**Red Hat System
Administration I RH124**

**Red Hat System
Administration II RH134**

RHCSA skills path



RH024 - Free course
Red Hat Enterprise Linux Technical Overview



RH124 - Recommended course
Red Hat System Administration I



PE124 - Recommended preliminary exam
Preliminary Exam in Red Hat System Administration I

RH135 bundle

Save time and money by combining course and exam offerings



RH134 - Recommended course - currently viewing
Red Hat System Administration II



EX200 - Required exam
Red Hat Certified Administrator (RHCSA) exam



Certification - Passing EX200
Red Hat Certified System Administrator (RHCSA)



Core system administration

Learn to deploy, administer, manage, and secure Red Hat Enterprise Linux.

- [Red Hat System Administration I \(RH124\)](#)
- [Red Hat System Administration II \(RH134\)](#)
- [Red Hat System Administration III: Linux Automation \(RH294\)](#)



Middleware development

Embrace modern infrastructure by mastering middleware applications.

- [Red Hat Application Development I: Programming in Java EE \(AD183\)](#)
- [Red Hat Application Development: Implementing Microservices Architectures \(DO283\)](#)



Cloud computing

Acquire the skills needed to support your organization's movement to the cloud.

- [Red Hat OpenStack Administration I \(CL110\)](#)
- [Introduction to OpenShift Applications \(DO101\)](#)
- [Red Hat OpenShift I: Containers & Kubernetes \(DO180\)](#)

Tentative Course Outline

- **Get started with Red Hat Enterprise Linux**
- **Introduction to the command line**
- Managing physical storage
- Install and configure software components and services
- Establish network connections and control firewall restrictions
- Monitor and manage running processes
- Manage and secure files and file systems
- Administer users and groups
- Review the system log files and journal for issues
- Troubleshoot problems and analyze systems with Red Hat Insights
- Remotely manage systems with SSH and the Web Console



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Course Evaluation

- Lab Tasks (*Every Lab*)
- MidTerm
- Practical Exam
- Final Exam (*practical perspective*)

Course Enrollment

Blackboard

Course Enrollment Key:

SLB361

Course Material

- **Blackboard**
- **Red Hat Learning Portal
(online access- 6 month)**

Lab 1 Topic

- **The purpose of Linux**
- **Open source**
- **Linux distributions**
- **Red Hat Enterprise Linux**
- **Accessing the Command Line**
- **Accessing the Command Line Using the Desktop**
- **Executing Commands Using the Bash Shell**

Linux

Linux provides the foundational technologies powering the cloud revolution and the tools used to build:

- the next generation of container-based
- microservices applications
- software-based storage technologies
- big data solutions.

Why Linux?

- A Windows user needs to interoperate with Linux.
- In application development, Linux hosts the application or its runtime.
- In cloud computing, the cloud instances in the private or public cloud environment use Linux as the operating system.
- With mobile applications or the Internet of Things (IoT), the chances are high that the operating system of your device uses Linux.
- If you are looking for new opportunities in IT, Linux skills are in high demand.

Why use Linux?

- Linux is open source software.
- Linux provides easy access to a powerful and scriptable command-line interface (CLI).
- Linux is a modular operating system that allows you to easily replace or remove components

Open Source

Open source software is software with source code that anyone can use, study, modify, and share.

- Control: See what the code does and change it to improve it.
- Training: Learn from real-world code and develop more useful applications.
- Security: Inspect sensitive code, fix with or without the original developers' help.
- Stability: Code can survive the loss of the original developer or distributor.

The bottom line is that open source allows the creation of better software with a higher return on

Open Source License Types

- ***Copyleft*** licenses that are designed to encourage keeping code open source.
 - GNU General Public License (GPL)
- ***Permissive*** licenses that are designed to maximize code reusability.

Red Hat Enterprise Linux

- Creating better technology the open source way.
- Red Hat's role is to help customers connect with the open source community and their partners to effectively use open source software solutions.
- Red Hat is also very active in other open source communities, including middleware projects centered on the JBoss developer community, virtualization solutions, cloud technologies such as OpenStack and OpenShift, and the Ceph and Gluster software-based storage projects, among others.

Linux Distribution

- Distributions consist of a Linux kernel and supporting user space programs.
- Distributions can be small and single-purpose or include thousands of open source programs.
- Distributions must provide a means of installing and updating the distribution and its components.
- The provider of the distribution must support that software, and ideally, be participating directly in the community developing that software.

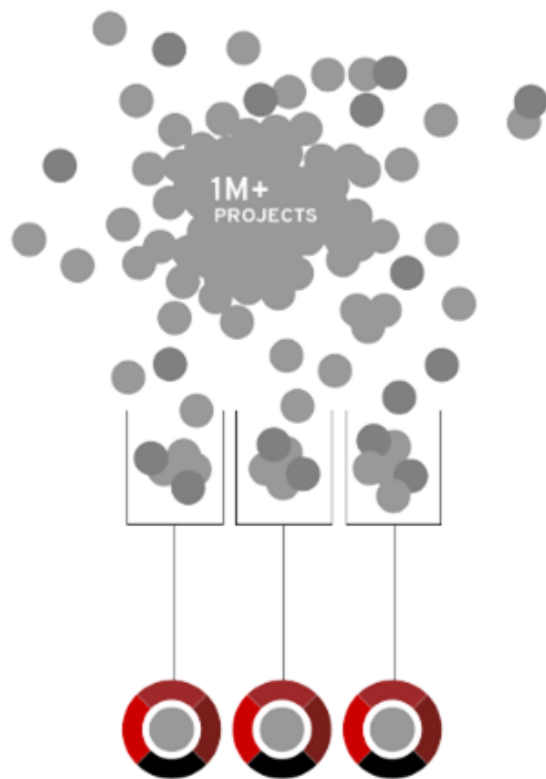
Red Hat Enterprise Linux is Red Hat's commercialized Linux distribution.

Linux Distribution

- 1991, a young computer science student named Linus Torvalds developed a Unix-like kernel.
- MIT's X Window System, Build a complete open source Unix-like operating system.
- **Fedora:** However, Fedora focuses on innovation and excellence, not long-term stability.
- **Red Hat Enterprise Linux:** Red Hat's enterprise-ready, commercially-supported Linux distribution.
- **CentOS:**

Red Hat Enterprise Linux Objectives

- It helps to **improve the general quality of software for everyone**. Red Hat develops and integrates open source software into RHEL through a multistage process.
- Red Hat sponsors and integrates open source projects into a community-driven Linux distribution, **Fedora**.
- Red Hat stabilizes the software to ensure that it is ready for long term support and standardization, and integrates it into their enterprise-ready distribution, RHEL.



PARTICIPATE
(upstream projects)

We participate in and create community-powered upstream projects.

INTEGRATE
(community platforms)

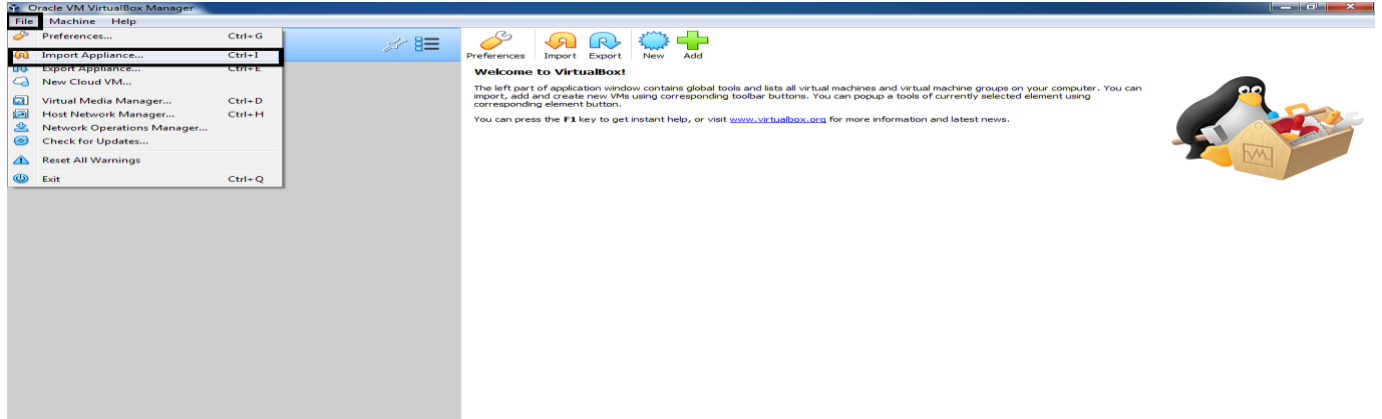
We integrate upstream projects, fostering open community platforms.

STABILIZE
(supported products
platforms, and solutions)

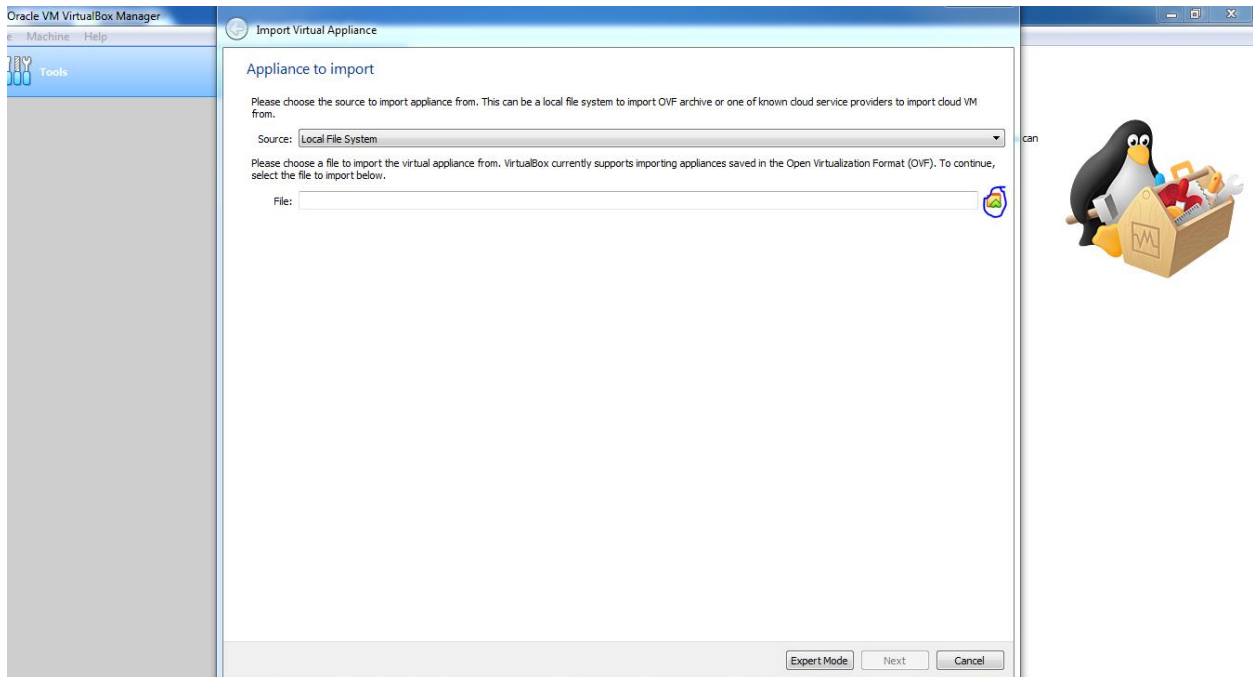
We commercialize these platforms together with a rich ecosystem of services and certifications.

Installing RH on Virtual Box

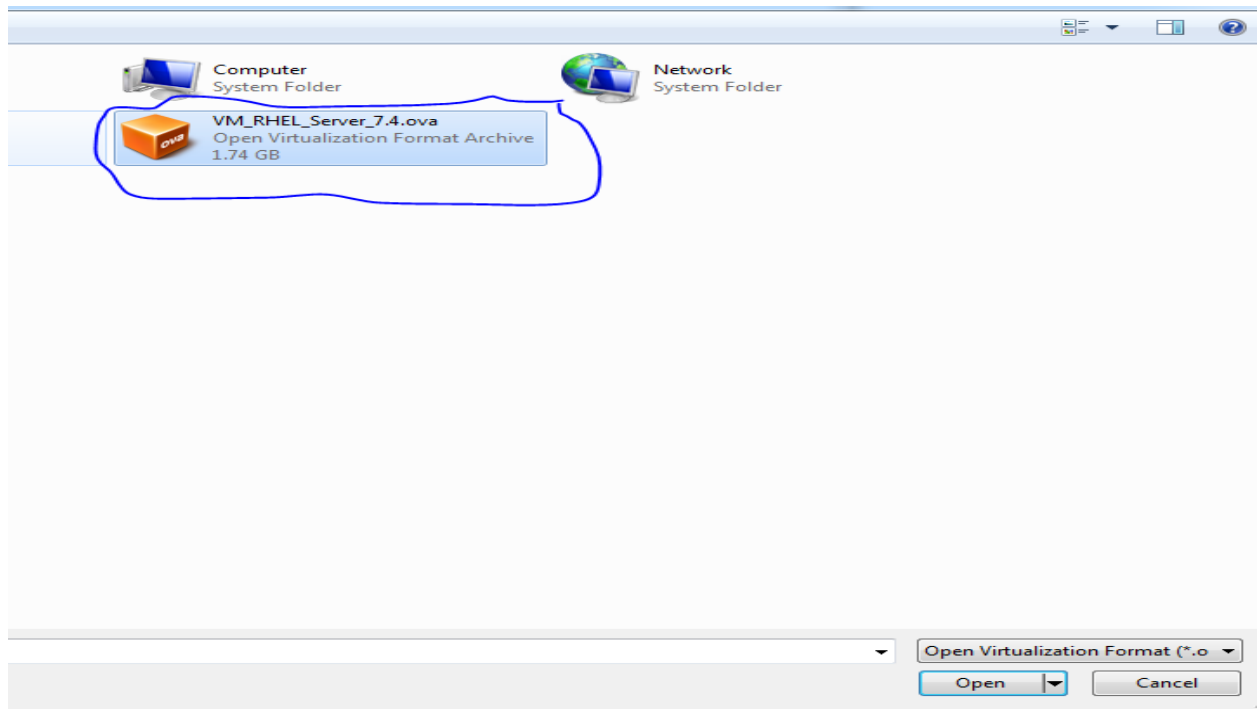
- Download and Install Virtual Box from this URL <https://www.virtualbox.org/wiki/Downloads> (Virtual Box is free software)
- Open VirtualBox => File => Import Appliance



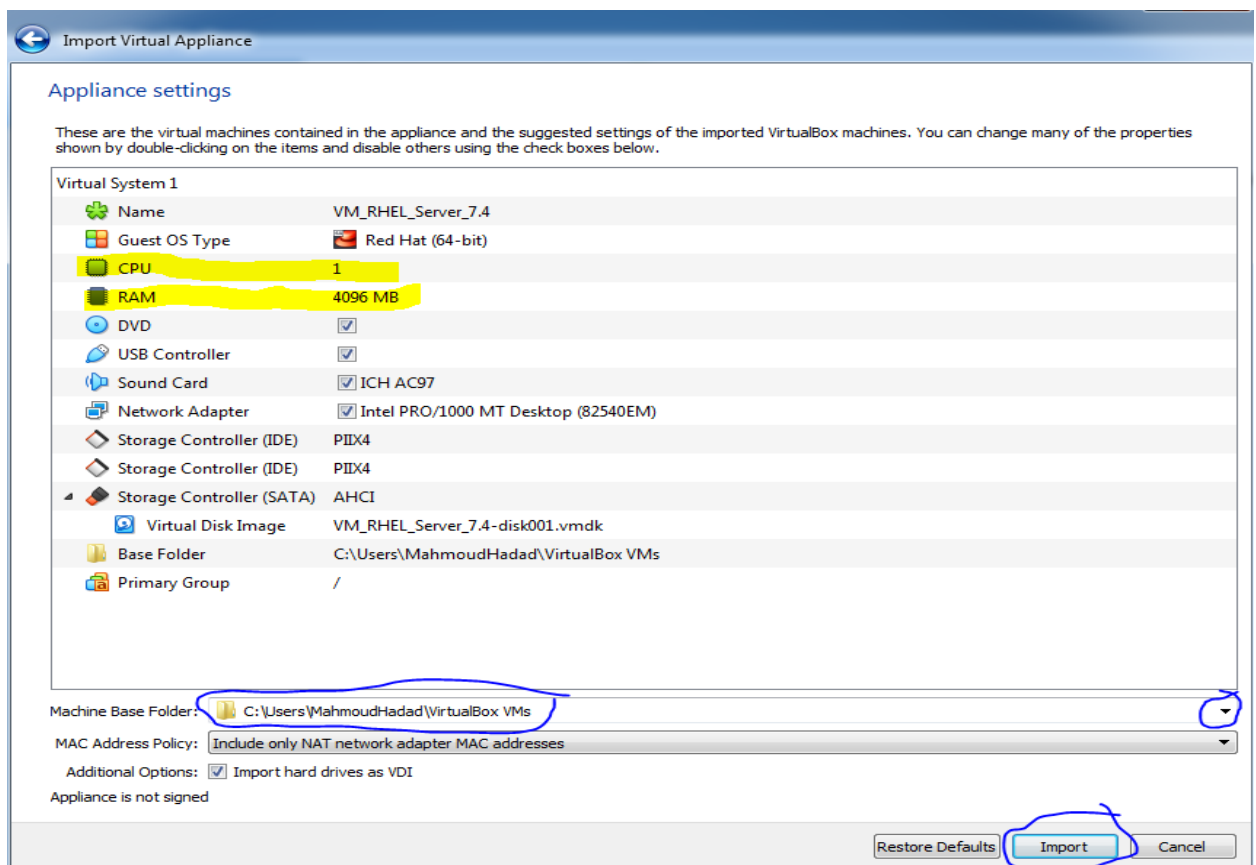
- Click on the folder icon to select the image path



- Select RH Image



- Select path to store your virtual image, CPU and Memory.



- Now you can start your RH image

Username: student

Password: rh_2020

Admin: root

Password: su_2020

Accessing the Command Line

Goal Log in to a Linux system and run simple commands using the shell

Introduction to the Bash Shell:

- A command line is a text-based interface which can be used to input instructions to a computer system.
- The default prompt ends with a \$ character, and is replaced by a # character if the shell is running as the superuser "root".
- The shell has additional capabilities that can simplify or make possible operations that are hard to accomplish efficiently with graphical tools.

Shell Basics

- Commands entered at the shell prompt have three basic parts:
 - Command to run
 - Options to adjust the behavior of the command
 - Arguments, which are typically targets of the command

ie. `ls --all fci/sw`

Logging in to a Local Computer

- Physical console and virtual console (tty1.. tty6)
- Why we have multiple ttys
- switch between them by pressing Ctrl+Alt and a function key (F1 through F6) at the same time

Logging in over the Network

- Access to a remote system by connecting to it over the network
- Many servers are actually virtual machines not physical and do not have real hardware consoles
- Secure Shell (SSH).
`[user@host ~]$ ssh remoteuser@remotehost`
`remoteuser@remotehost's password: password`

The ssh command encrypts the connection to secure the communication against eavesdropping or hijacking.

- You can also connect to server using public and private keys without sending a password (to be covered later in the course).

Logging Out

- You can enter the exit command or Ctrl+D to terminate the current shell session.

Quiz

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

- a. Command
- b. Console
- c. Shell
- d. Terminal

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

- a. Argument
- b. Command
- c. Option
- d. Prompt

3. Which term describes the name of a program to run?

- a. Argument
- b. Command
- c. Option
- d. Prompt

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

- a. Argument
- b. Command
- c. Option
- d. Prompt

5. 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

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

- a. Physical Console
- b. Virtual Console
- c. Shell
- d. Terminal

7. 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

8. 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

-
- terminal = text input/output environment
 - console = physical terminal
 - shell = command line interpreter
 - prompt = is a short text message at the start of the command line on a command line interface

Accessing the Command Line Using the Desktop

Introduction to the GNOME Desktop Environment

The desktop environment is the graphical user interface on a Linux system. The default desktop environment in Red Hat Enterprise Linux 8 is provided by GNOME 3. It provides an integrated desktop for users and a unified development platform on top of a graphical framework

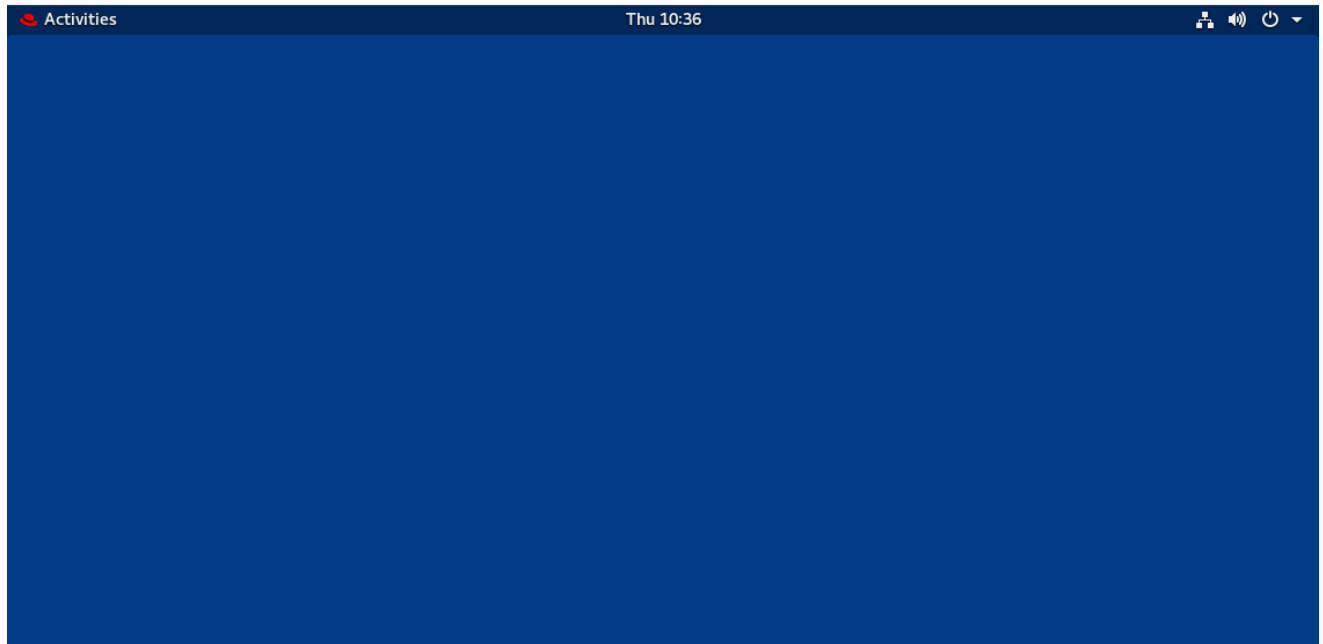
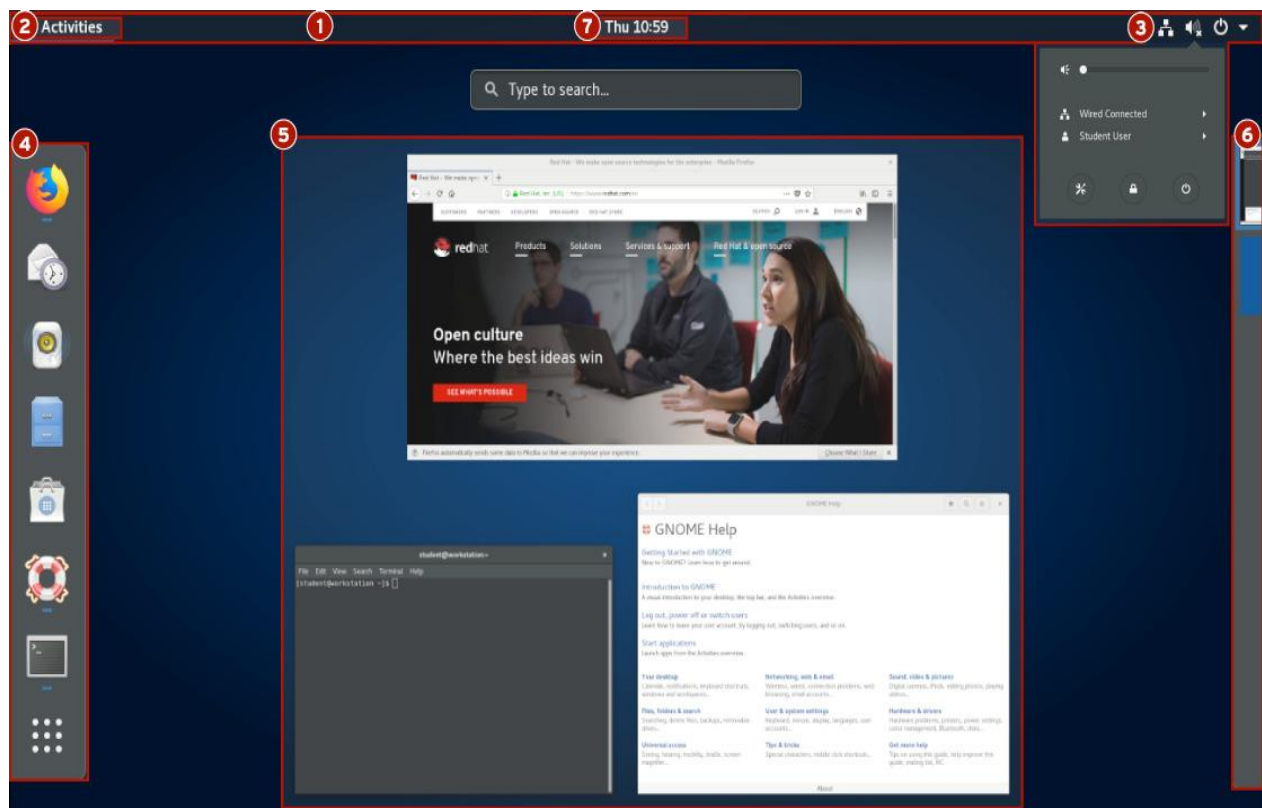


Figure 2.1: An empty GNOME 3 desktop



- 1- Top bar
- 2- Activities overview
- 3- System menu
- 4- Dash
- 5- Windows overview
- 6- Workspace selector
- 7- Message tray

Workspaces

Workspaces are separate desktop screens that have different application windows. These can be used to organize the working environment by grouping open application windows by task.

Press `Ctrl+Alt+UpArrow` or `Ctrl+Alt+DownArrow` to switch between workspaces sequentially or switch to the Activities overview and click the desired workspace.

Starting a Terminal

From the Activities overview, select Terminal from the dash or Press the `Alt+F2` key combination to open the Enter a Command and enter `gnome terminal`.

Locking the Screen or Logging Out

Locking the screen, or logging out entirely, can be done from the system menu on the far right of the top bar.

Powering off or Rebooting the System

To shut down the system, from the system menu in the upper-right corner, click the power button at the bottom of the menu or press `Ctrl+Alt+Del`. In the dialog box that displays, you can choose to Power Off or Restart the machine, or Cancel the operation. If you do not make a choice, the system automatically shuts down after 60 seconds.

Exercise

- Login as Student user
- Change the password for student from rh_2020 to yourname_2020.
The simplest approach is to open a Terminal window and use the passwd command at the shell prompt.
- Log out and log back in as student with your new password.
- Lock the screen.
- Unlock the screen.
- Determine how to shut down workstation from the graphical interface, but Cancel the operation without shutting down the system.
- Switch between your workstations.

Executing Commands Using the Bash Shell

Basic Command Syntax

- Again Shell (bash) is a program that interprets commands typed in by the user. Each string typed into the shell can have up to three parts: the command, options (which usually begin with a - or --), and arguments.
- Commands are the names of programs that are installed on the system. Each command has its own options and arguments.
- If you want to type more than one command on a single line, use the semicolon (;) as a command separator. `[user@host]$ command1;command2`

Examples of Simple Commands

- `date`: (+) sign argument specifies a format string
 - `date`
 - `date +%R, +%X, +%r, +%W, +%d,`
- `whoami`
- `passwd`
- `file filepath` => displays what type it is.

Viewing the Contents of Files

- `cat filepath` => view the contents of file
- `cat file1 file2` => display the contents of multiple files.
- `less file1` => if file is large this command displays page by page
Use the UpArrow key and the DownArrow key to scroll up and down. Press q to exit the command.
- `head` or `tail file1` try with `-n` option
- `wc` => counts lines, words and characters, try with `-l, -w, -c` options.

Tab Completion

Auto complete the command by pressing tab or tab + tab.

- Try autocomplete with
 - Command ie. passwd
 - File name
 - Options ie. useradd -

Continuing a Long Command on Another Line

Commands with many options can be too large, to make command readable you can type it using more than one line using a backslash \

```
[user@host]$ head -n 3 \  
> /usr/share/dict/words \  
> /usr/share/dict/linux.words
```

Command History

The **history** command displays a list of previously executed commands prefixed with a command number.

- !number
- !string
- Arrow keys for navigation
- Esc+. or Alt+. to insert the last word of the previous command at the cursor's current location

Editing the Command Line

Shortcut	Description
ctrl+A	Jump to the beginning of the command line.
ctrl+E	Jump to the end of the command line.
ctrl+U	Clear from the cursor to the beginning of the command line.
ctrl+K	Clear from the cursor to the end of the command line.
ctrl+LeftArrow	Jump to the beginning of the previous word on the command line.
ctrl+RightArrow	Jump to the end of the next word on the command line.
ctrl+R	Search the history list of commands for a pattern.

Quiz

1. Which Bash shortcut or command jumps to the beginning of the previous word on the command line?

- a. Pressing Ctrl+LeftArrow
- b. Pressing Ctrl+K
- c. Pressing Ctrl+A
- d. !string
- e. !number

a

2. Which Bash shortcut or command separates commands on the same line?

- a. Pressing Tab
- b. history
- c. ;
- d. !string
- e. Pressing Esc+.

c

3. Which Bash shortcut or command is used to clear characters from the cursor to the end of the command line?

- a. Pressing Ctrl+LeftArrow
- b. Pressing Ctrl+K
- c. Pressing Ctrl+A
- d. ;
- e. Pressing Esc+.

b

4. Which Bash shortcut or command is used to re-execute a recent command by matching the command name?

- a. Pressing Tab
- b. !number
- c. !string
- d. history
- e. Pressing Esc+.

c

5. Which Bash shortcut or command is used to complete commands, file names, and options?

- a. ;
- b. !number
- c. history
- d. Pressing Tab
- e. Pressing Esc+.

d

6. Which Bash shortcut or command re-executes a specific command in the history list?

- a. Pressing Tab
- b. !number
- c. !string
- d. history
- e. Pressing Esc+.

b

7. Which Bash shortcut or command jumps to the beginning of the command line?

- a. !number
- b. !string
- c. Pressing Ctrl+LeftArrow
- d. Pressing Ctrl+K
- e. Pressing Ctrl+A

e

8. Which Bash shortcut or command displays the list of previous commands?

- a. Pressing Tab
- b. !string
- c. !number
- d. history
- e. Pressing Esc+.

d

9. Which Bash shortcut or command copies the last argument of previous commands?

- a. Pressing Ctrl+K
- b. Pressing Ctrl+A
- c. !number
- d. Pressing Esc+.

d

Lab

1. Use the date command to display the current time and date.
2. Display the current time in 12-hour clock time (for example, 11:42:11 AM). Hint: The format string that displays that output is %r.
3. Create file /home/student/yourname.txt and write many lines to it (25).
4. What kind of file is /home/student/ yourname.txt? Is it readable by humans?
5. Use the wc command and Bash shortcuts to display the size of file.
6. Display the first 10 lines of file.
7. Display the last 10 lines of the file.
8. Repeat the previous command exactly with three or fewer keystrokes.
9. Use the shell history to run the date +%r command again.