Comprehensive, hands-on training that solves real-world problems

Red Hat System Administration I

RH124-RHEL7-en-1-20140606

redhat.

DAY ONE	DAY TWO	DAY THREE	DAY FOUR	DAY FIVE
Introduction	Working with Text Files	Processes (continued)	Networking	File System
Command Line	Local Users and Groups	Services	Archiving Files	Virtualizing Systems
Managing Files	Permissions	OpenSSH	Software Packages	Review
Getting Help	Processes	Logs		

DAY ONE

Introduction

Command Line

Managing Files

Getting Help

Introduction

- Welcome to Class
- Course Objectives and Structure
- Orientation to Classroom Network
- Internationalization

Welcome to Class

redhat.

Course Objectives and Structure

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DAY ONE	DAY TWO	DAY THREE	DAY FOUR	DAY FIVE
Introduction	Working with Text Files	Processes (continued)	Networking	File System
Command Line	Local Users and Groups	Services	Archiving Files	Virtualizing Systems
Managing Files	Permissions	OpenSSH	Software Packages	Review
Getting Help	Processes	Logs		

Orientation to Classroom Network

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Internationalization

DAY ONE

Introduction

Command Line

Managing Files

Getting Help

Chapter 1: Accessing the Command Line

- Using the Local Console
- Using the Desktop
- Using the BASH Shell

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Goal:

To login to a Linux system and run simple commands using the shell.

Objectives:

- Use Bash shell syntax to enter commands at a Linux console.
- Launch applications in a GNOME desktop environment.
- Use Bash features to run commands from a shell prompt using fewer keystrokes.

Accessing the Command-Line Using the Local Console

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Quiz:
Local Console Access Terms

Accessing the Command-Line Using the Desktop

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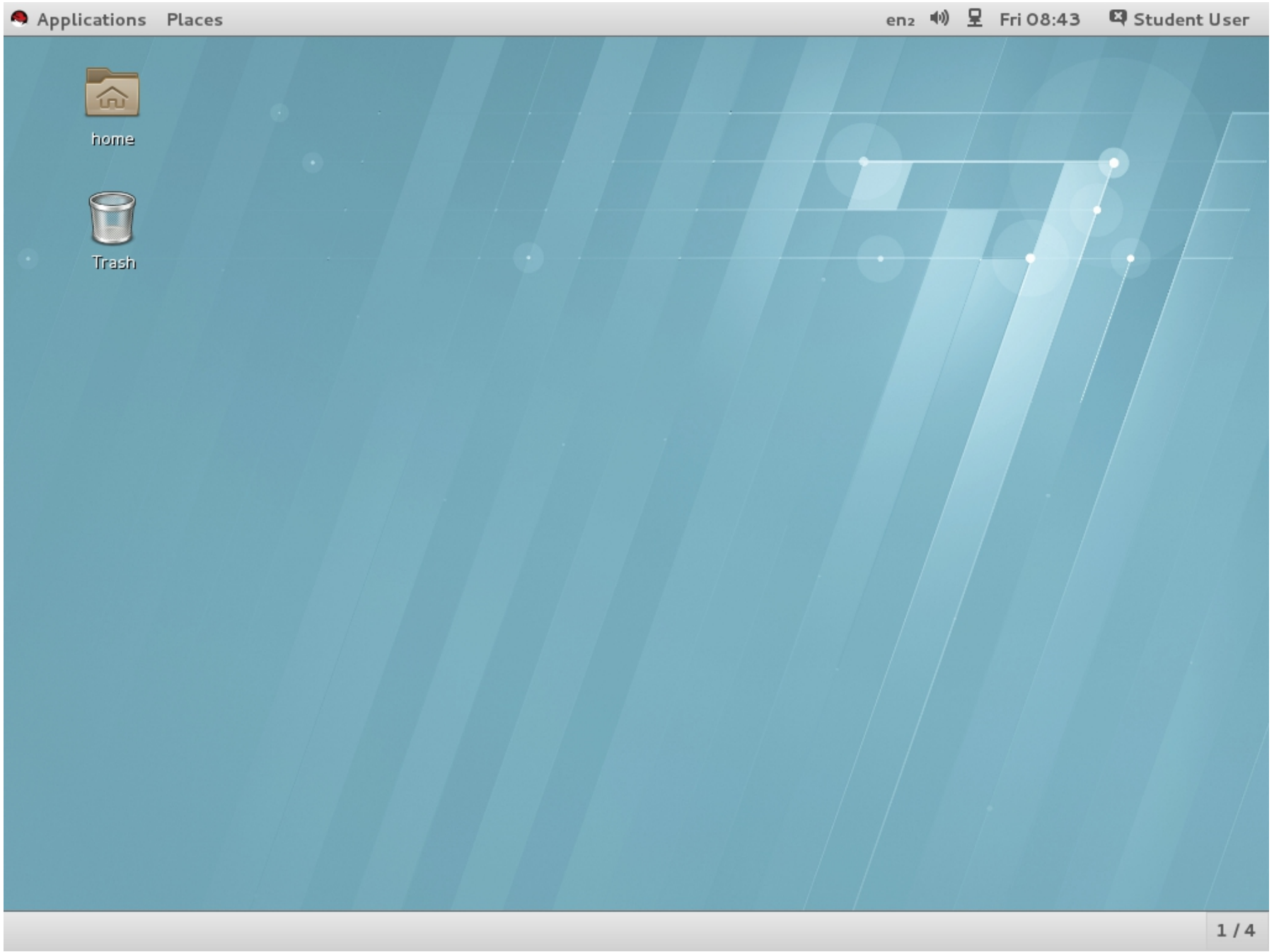

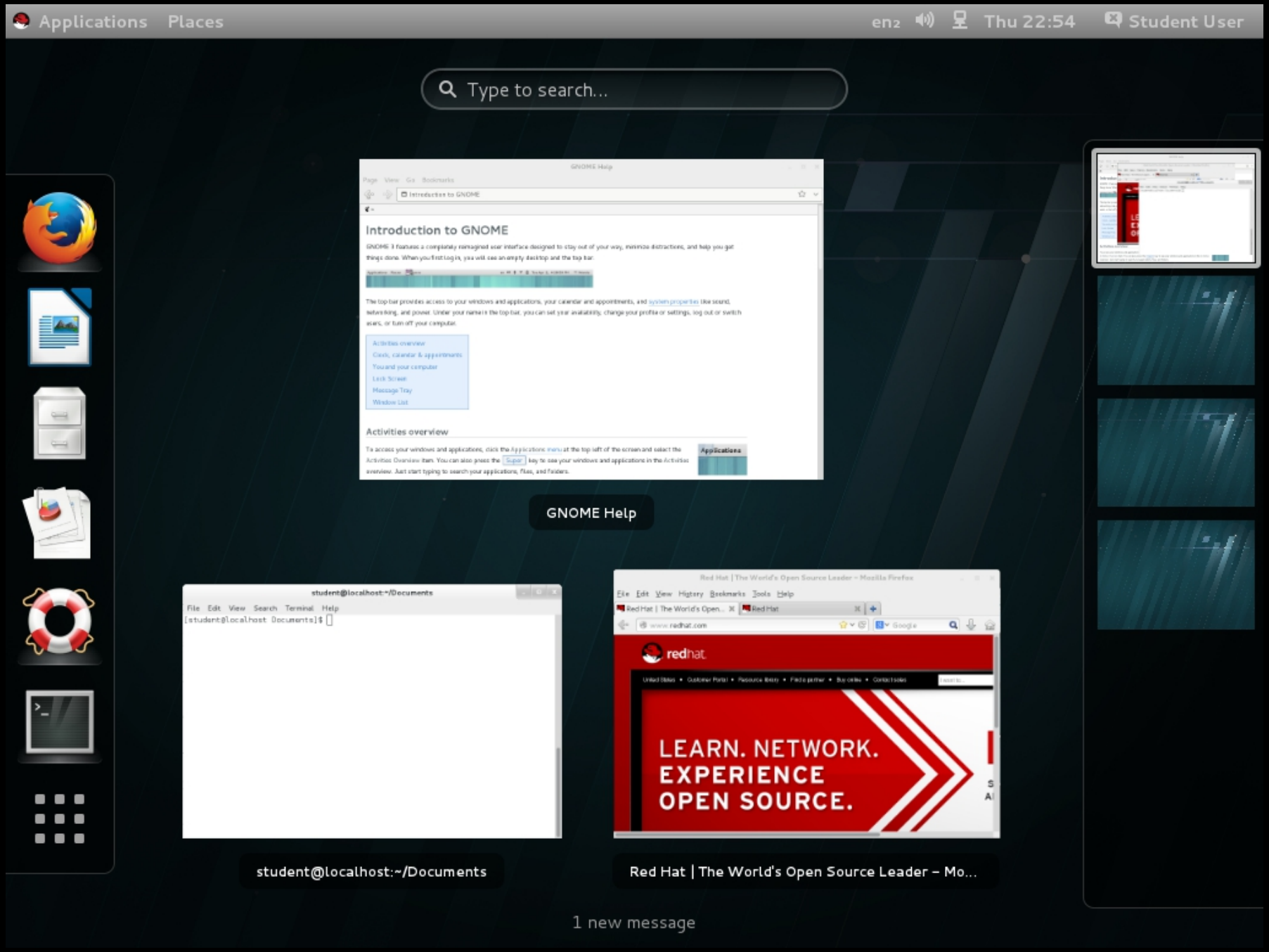

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Executing Commands Using the BASH Shell

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Quiz:
BASH Commands and Keyboard Shortcuts

Lab:
Accessing the Command Line

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DAY ONE

Introduction

Command Line

Managing Files

Getting Help

Chapter 2:
Managing Files From the Command Line

- **The Linux File System Hierarchy**
- **Locating Files by Name**
- **Managing Files Using Command-Line Tools**
- **Matching File Names Using Path Name Expansion**

redhat.

Goal:

To copy, move, create, delete, and organize files while working from the Bash shell prompt.

Objectives:

- Identify the purpose for important directories on a Linux system.
- Specify files using absolute and relative path names.
- Create, copy, move, and remove files and directories using command-line utilities.
- Match one or more file names using shell expansion as arguments to shell commands.

The Linux File System Hierarchy

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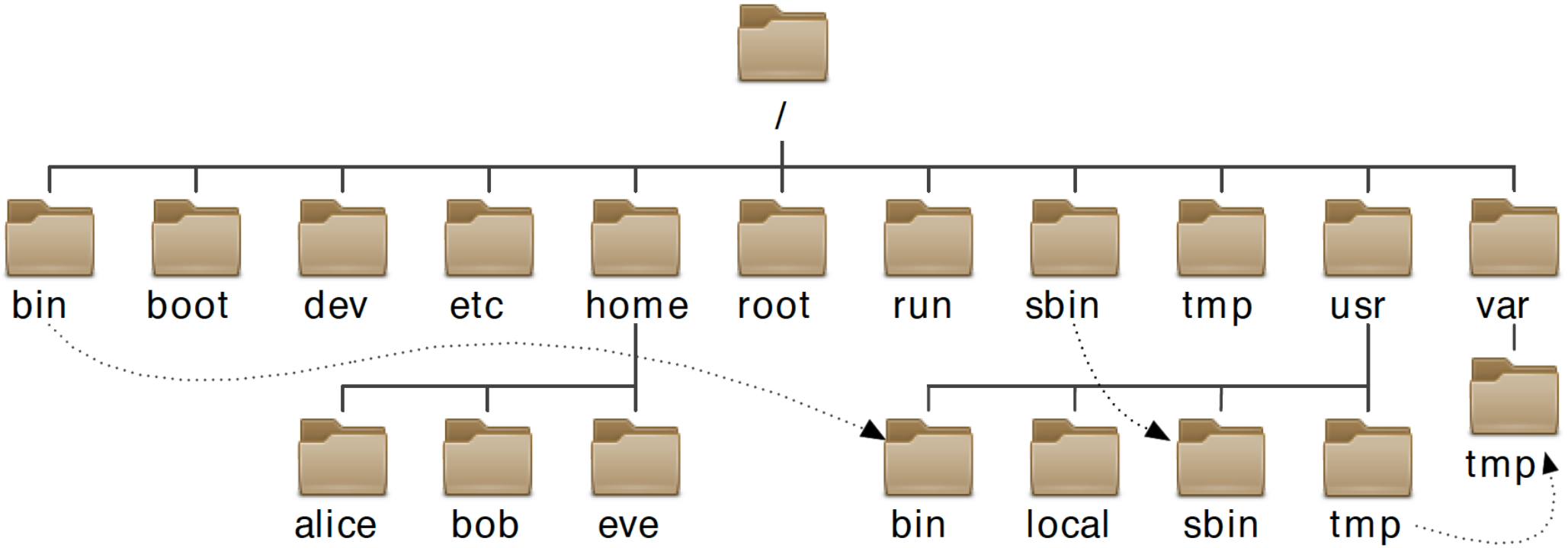

Quiz:
File System Hierarchy

Locating Files by Name

Quiz:
Locating Files and Directories

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Managing Files Using Command-Line Tools

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Practice:
Command-Line File Management

Matching File Names Using Path Name Expansion

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Quiz:
Path Name Expansion

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Lab:
Managing Files with Shell Expansion

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DAY ONE

Introduction

Command Line

Managing Files

Getting Help

Chapter 3: Getting Help in Red Hat Enterprise Linux

- Reading Documentation Using man Command
- Reading Documentation Using pinfo Command
- Reading Documentation in /usr/share/doc
- Getting Help From Red Hat

redhat.

Goal:

To resolve problems by using on-line help systems and Red Hat support utilities.

Objectives:

- Use the man Linux manual reader.
- Use the pinfo GNU Info reader.
- Use the Red Hat Package Manager (RPM) package documentation.
- Use the redhat-support-tool command.

Reading Documentation Using man Command

redhat.

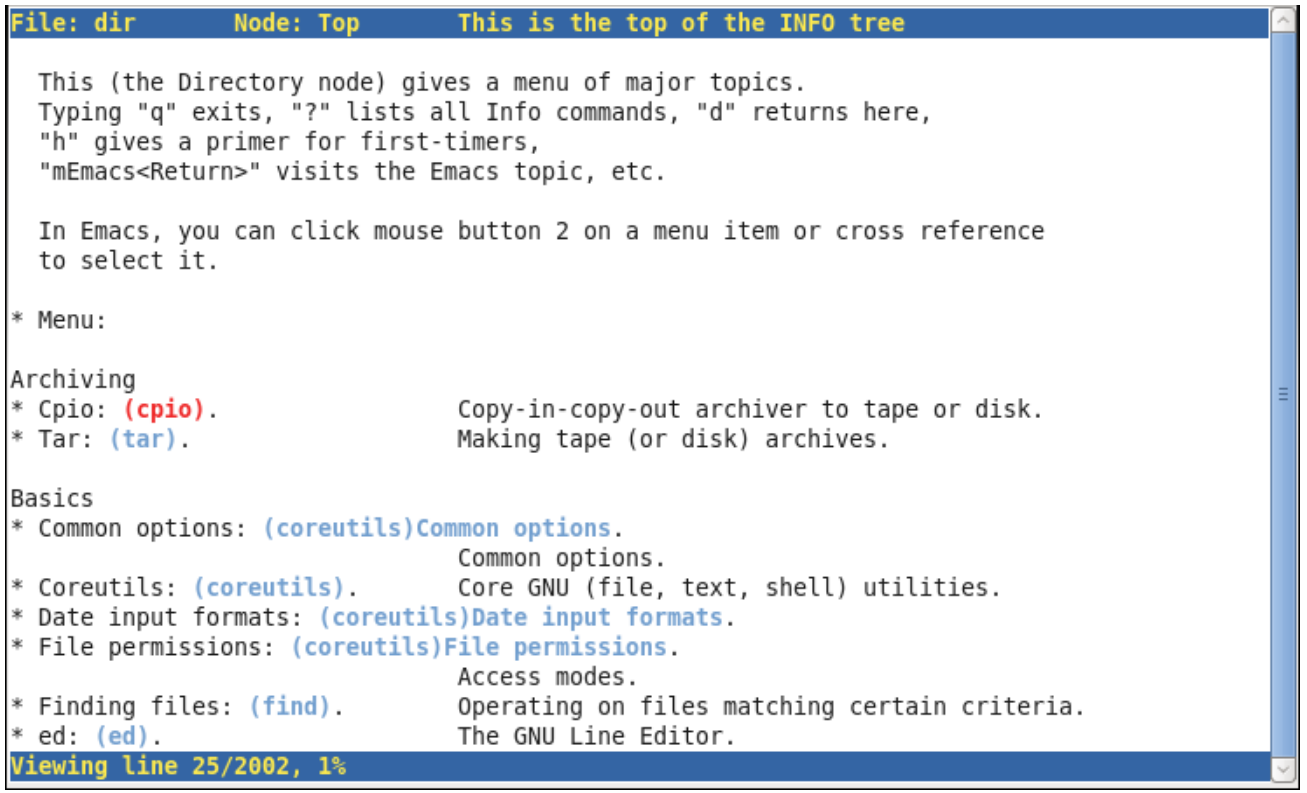
Practice:
Using the man Command

Reading Documentation Using pinfo Command

redhat.

Reading Documentation Using pinfo Command

redhat.



Practice:
Using the pinfo Command

Reading Documentation in /usr/share/doc

Practice:
Viewing Package Documentation

Getting Help From Red Hat

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Practice:
Creating and Viewing an SoS Report

Knowledgebase

SOLUTIONS

Find answers to questions or issues you may experience

ARTICLES

Read technical articles and best practices for your Red Hat products

DOCUMENTATION

Learn how to install, configure and use your Red Hat products

VIDEOS

Watch short tutorials and presentations for Red Hat products and events

Lab:
Viewing and Printing Help Documentation

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DAY TWO

Working with Text Files

Local Users and Groups

Permissions

Processes

Chapter 4: Creating, Viewing, and Editing Text Files

- Redirecting Output to a File or Program
- Editing Text Files from the Shell Prompt
- Editing Text Files with a Graphical Editor

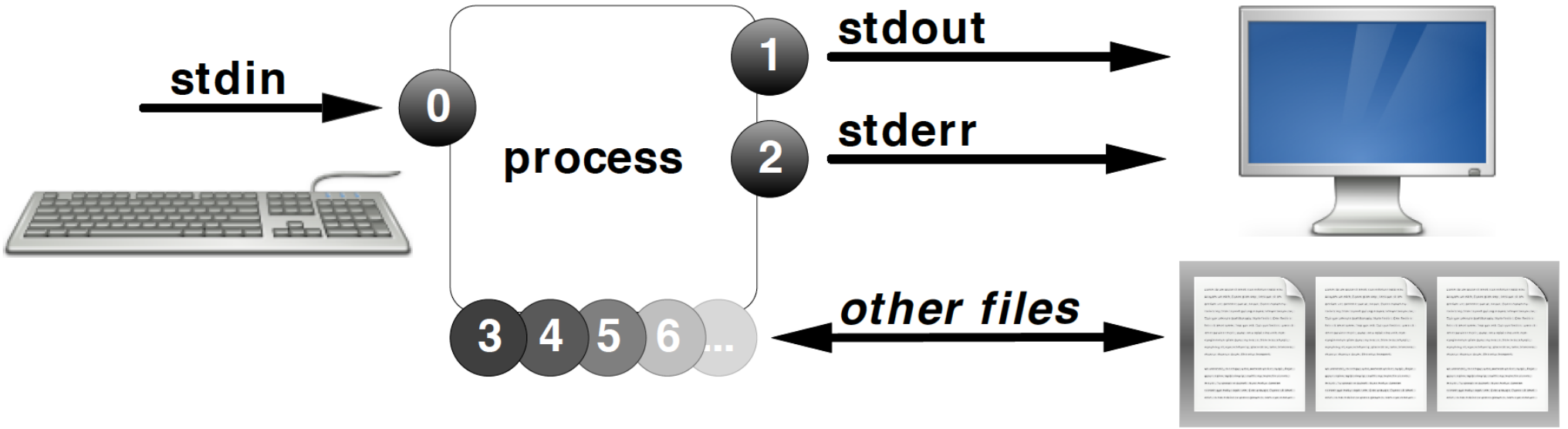
Goal:

To create, view, and edit text files from command output or in an editor.

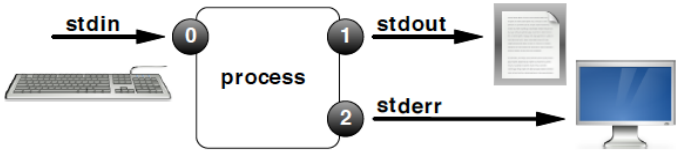
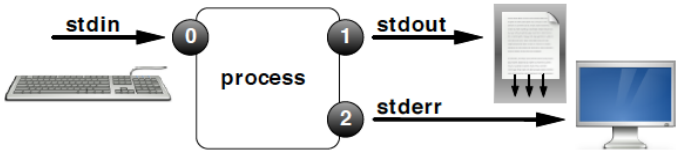
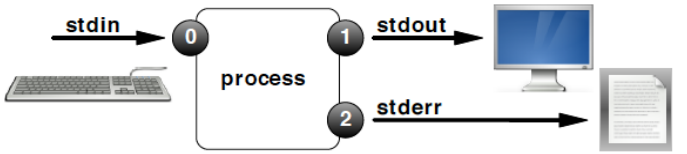
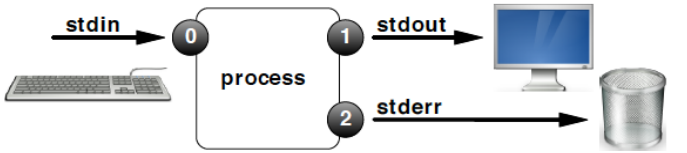
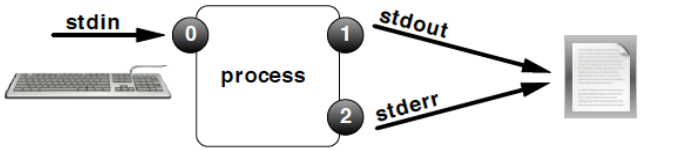
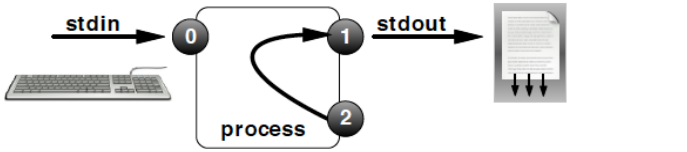
Objectives:

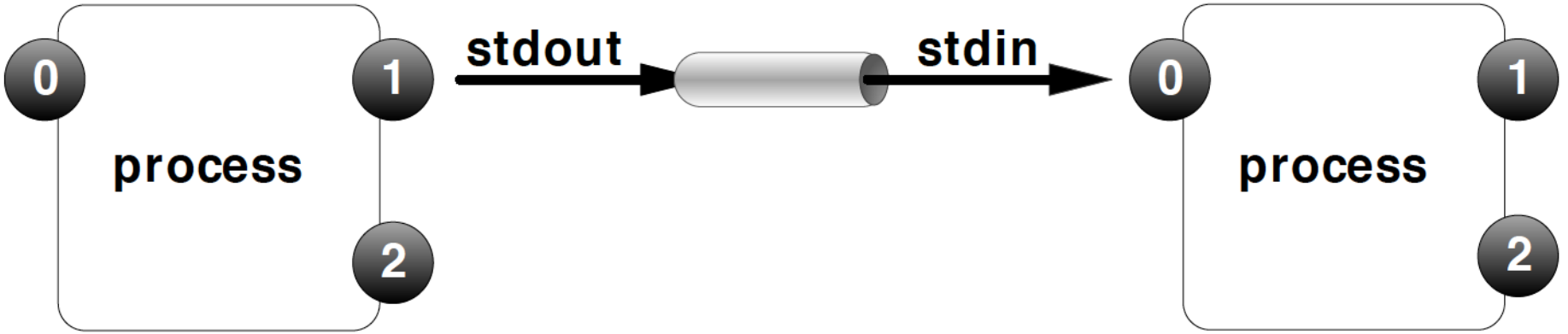
- Redirect the text output of a program to a file or to another program.
- Edit existing text files and create new files from the shell prompt with a text editor.
- Copy text from a graphical window to a text file using a text editor running in the graphical environment.

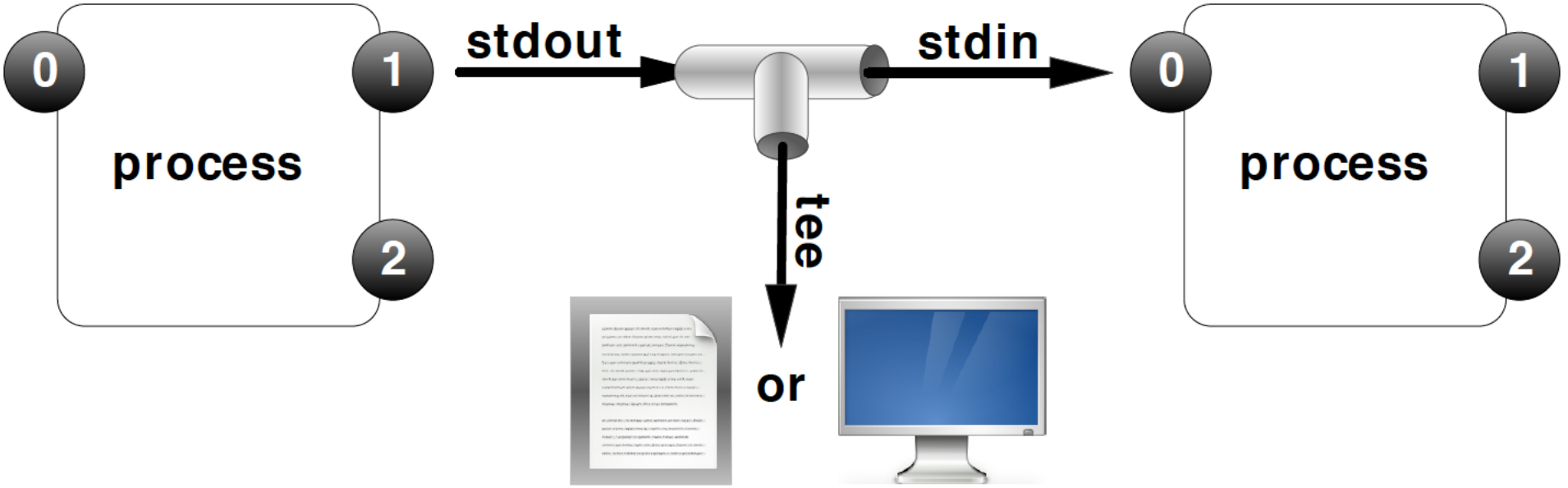
Redirecting Output to a File or Program



Output Redirection Operators

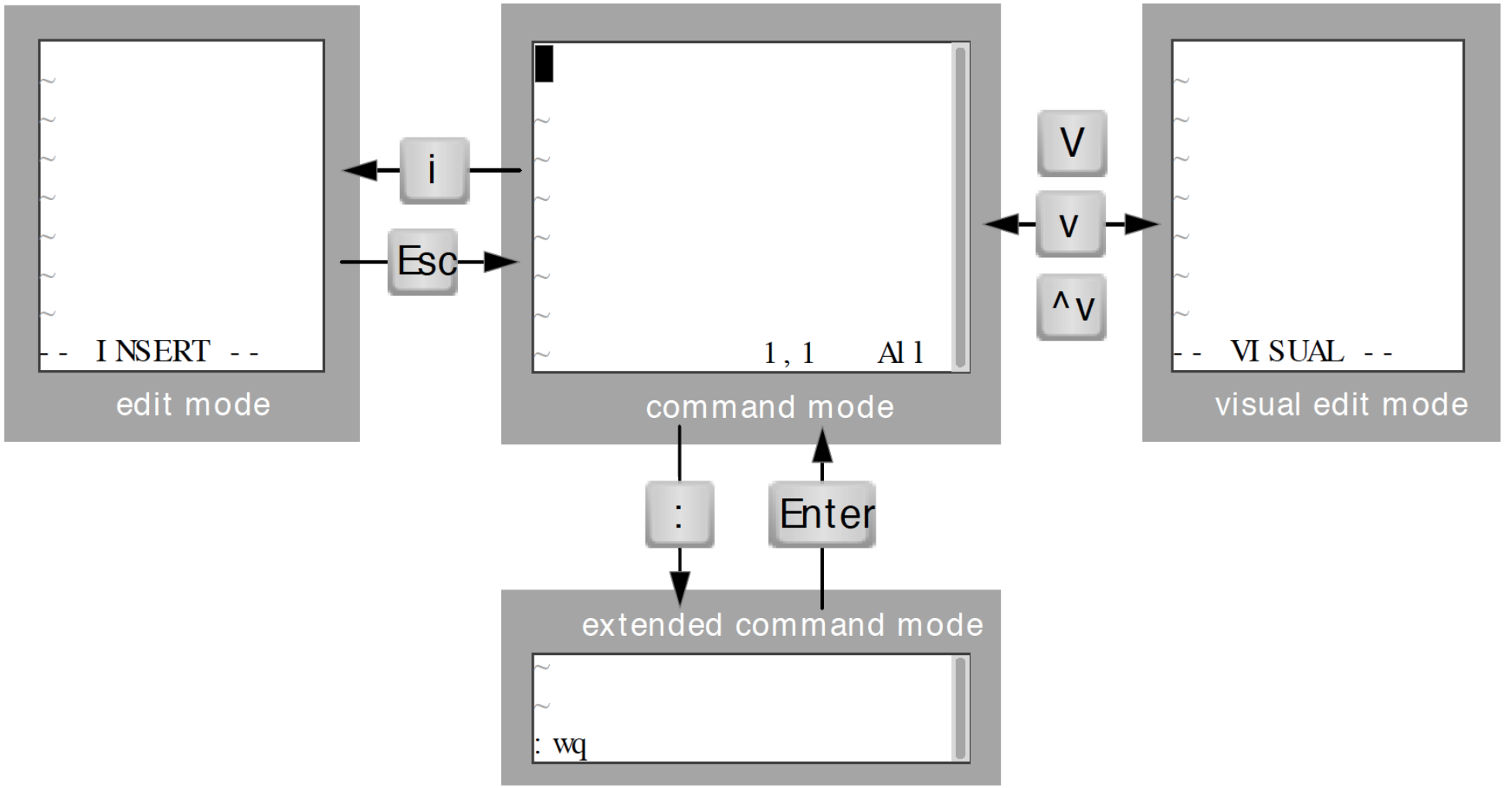
Usage	Explanation (note)	Visual aid
`>file`	redirect **stdout** to a file [1]	
`>>file`	redirect **stdout** to a file, append to current file content [2]	
`2>file`	redirect **stderr** to a file [1]	
2>/dev/null	discard **stderr** error messages by redirecting to **/dev/null**	
`&>file`	combine **stdout** and **stderr** to one file [1]	
`>>file 2>&1`	combine **stdout** and **stderr**, append to current file content [2] [3]	





Quiz:
I/O Redirection and Pipelines

Editing Text Files from the Shell Prompt



Practice:
Editing Files with Vim

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Editing Text Files with a Graphical Editor

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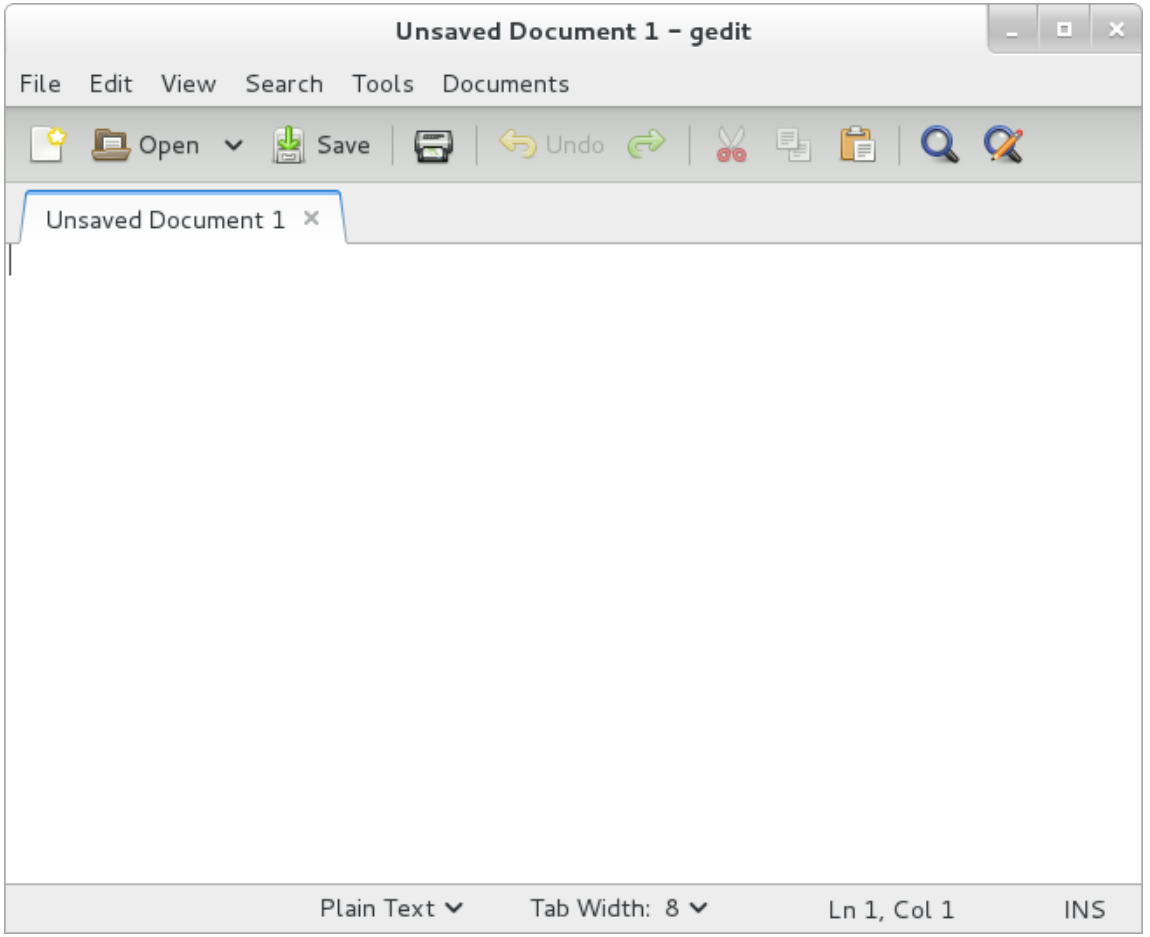

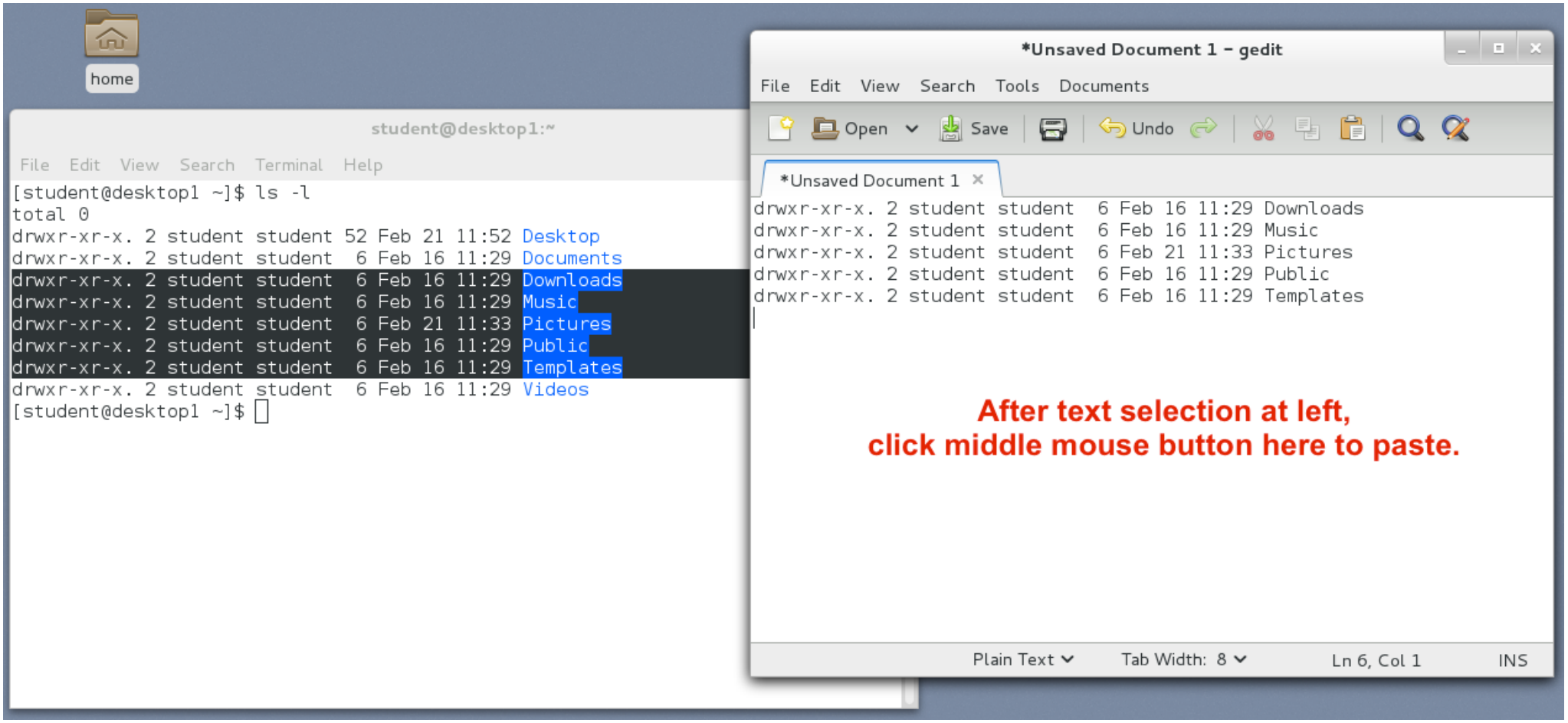

Practice:
Copying Text Between Windows

Lab:
Creating, Viewing, and, Editing Text Files

redhat.

DAY TWO

Working with Text Files

Local Users and Groups

Permissions

Processes

Chapter 5: Managing Local Linux Users and Groups

- Users and Groups
- Gaining Superuser Access
- Managing Local User Accounts
- Managing Local Group Accounts
- Managing User Passwords

Goal:

To manage local Linux users and groups and administer local password policies.

Objectives:

- Explain the role of users and groups on a Linux system and how they are understood by the computer.
- Run commands as the superuser to administer a Linux system.
- Create, modify, lock, and delete locally defined user accounts.
- Create, modify, and delete locally defined group accounts.
- Lock accounts manually or by setting a password-aging policy in the shadow password file.

Users and Groups

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Quiz:
User and Group Concepts

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Gaining Superuser Access

Practice:
Running Commands as root

Managing Local User Accounts

redhat.

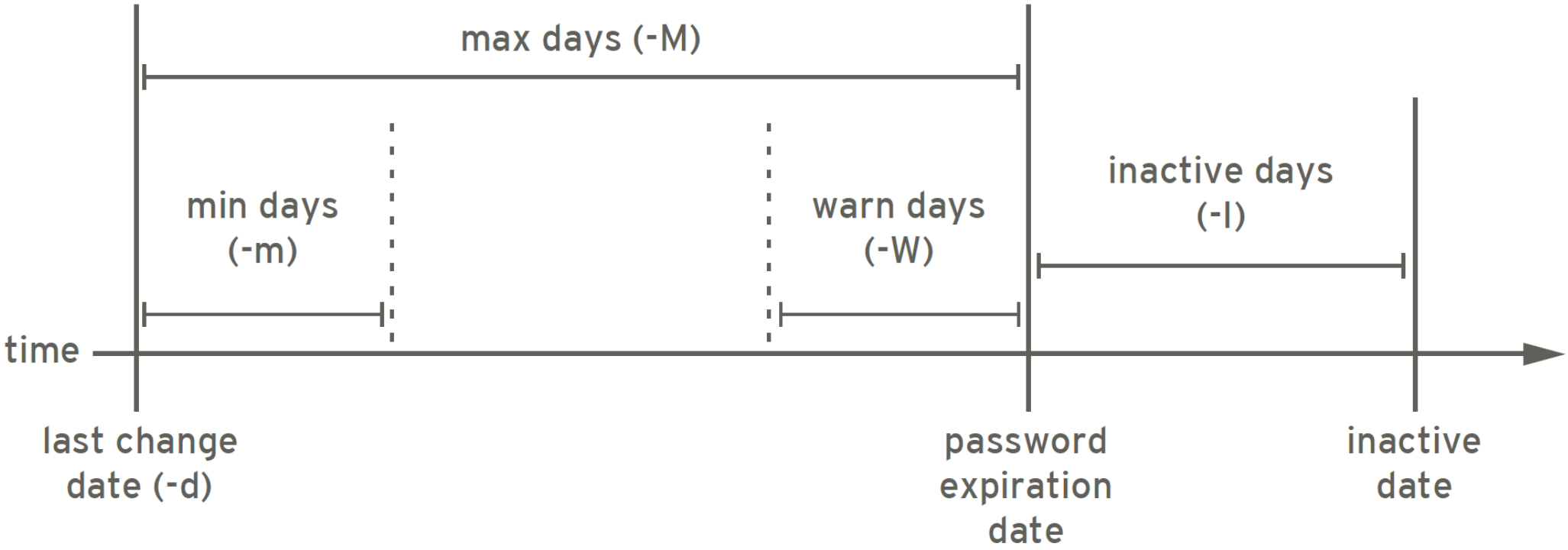
Practice: Creating Users Using Command-line Tools

redhat.

Managing Local Group Accounts

Practice: Managing Groups Using Command-line Tools

Managing User Passwords



Practice:
Managing User Password Aging

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Lab:
Managing Local Linux Users and Groups

redhat.

DAY TWO

Working with Text Files

Local Users and Groups

Permissions

Processes

Chapter 6: Controlling Access to Files with Linux File System Permissions

- Linux File System Permissions
- Managing File System Permissions from the Command Line
- Managing Default Permissions and File Access

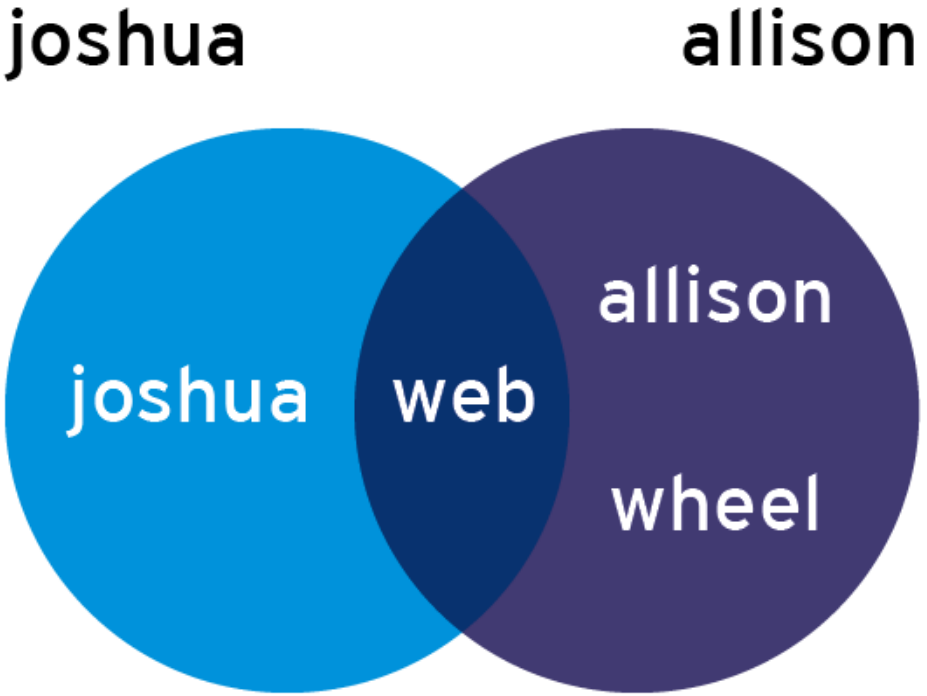
Goal:

- To set Linux file system permissions on files and interpret the security effects of different permission settings.

Objectives:

- Explain how the Linux file permissions model works.
- Change the permissions and ownership of files using command-line tools.
- Configure a directory in which newly created files are automatically writable by members of the group which owns the directory, using special permissions and default umask settings.

Linux File System Permissions



Quiz:
Interpreting File and Directory Permissions

Managing File System Permissions from the Command Line

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Practice: Managing File Security from the Command Line

redhat.

Managing Default Permissions and File Access

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Practice: Controlling New File Permissions and Ownership

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Lab:
Controlling Access to Files with Linux File System Permissions

redhat.

DAY TWO

Working with Text Files

Local Users and Groups

Permissions

Processes

Chapter 7: Monitoring and Managing Linux Processes

- Processes
- Controlling Jobs
- Killing Processes
- Monitoring Process Activity

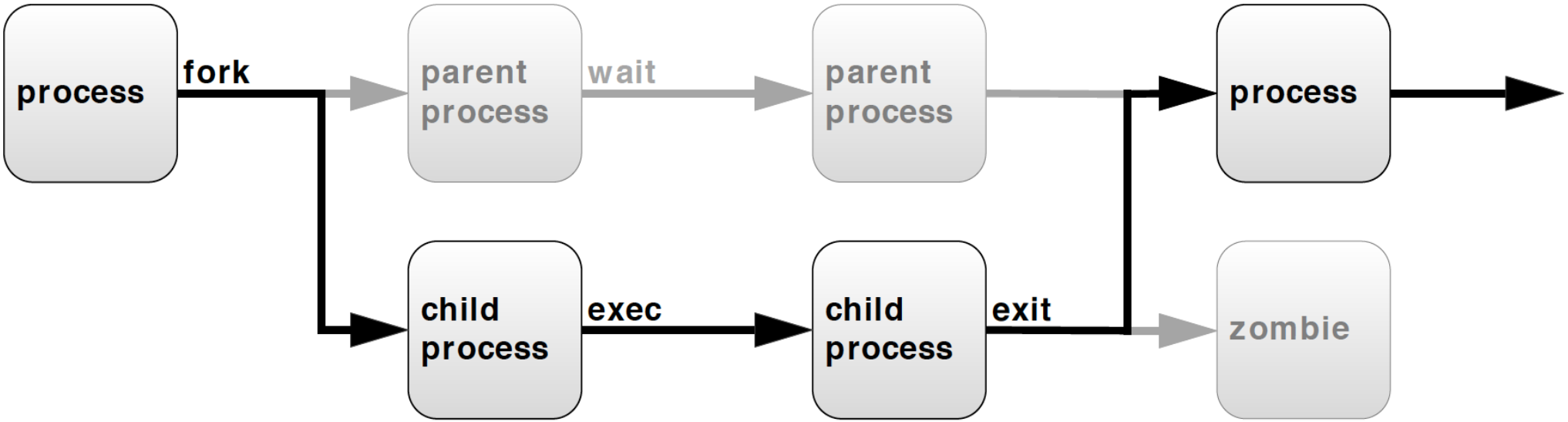
Goal:

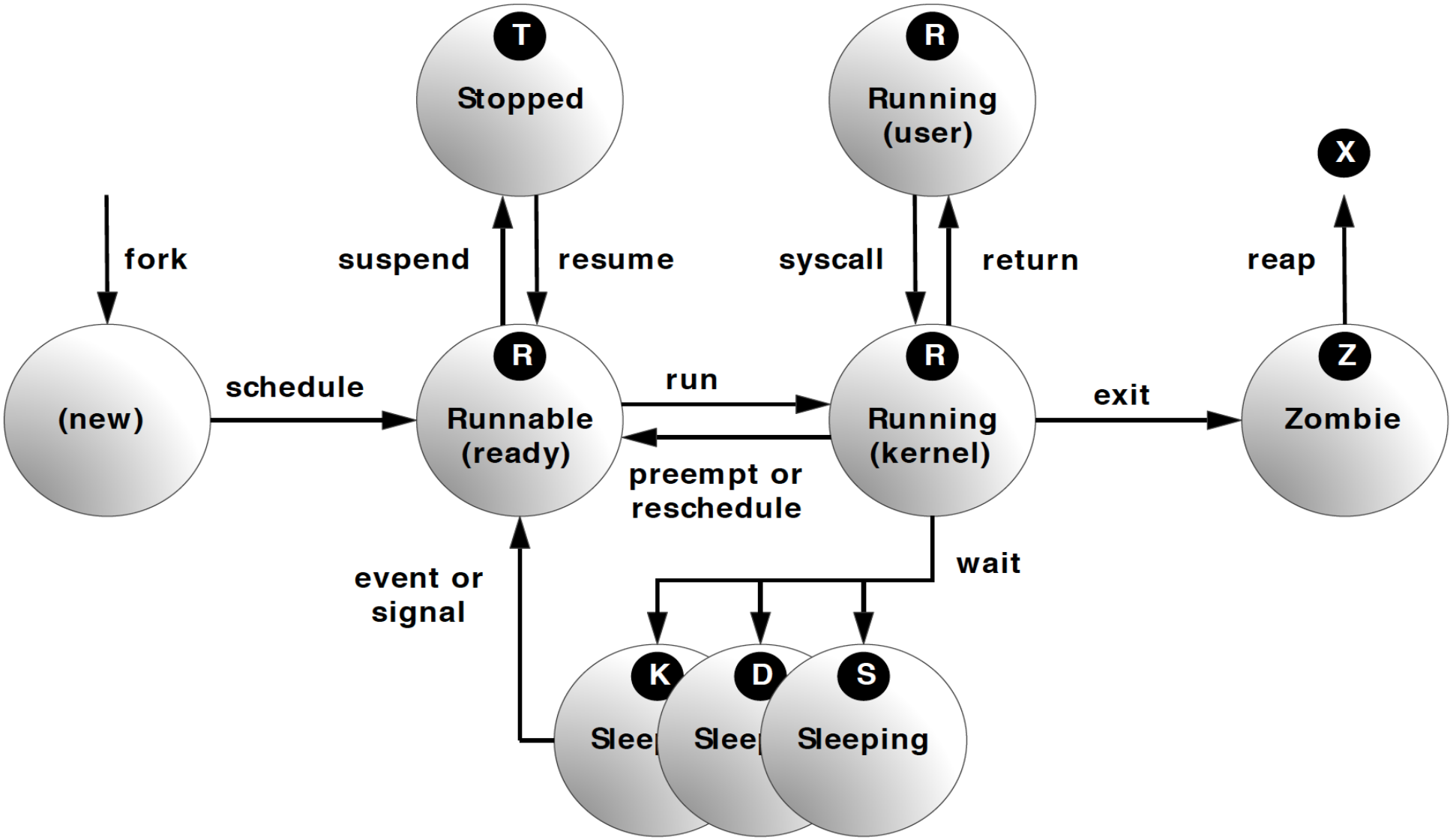
To evaluate and control processes running on a Red Hat Enterprise Linux system.

Objectives:

- List and interpret basic information about processes running on the system.
- Control processes in the shell's session using bash job control.
- Terminate and control processes using signals.
- Monitor resource usage and system load due to process activity.

Processes





Quiz:
Processes

Controlling Jobs

Practice: Background and Foreground Processes

redhat.

Killing Processes

Practice: Killing Processes

Monitoring Process Activity

Practice:
Monitoring Process Activity

Lab:
Monitoring and Managing Linux Processes

redhat.

DAY THREE

Processes

Services

OpenSSH

Logs

Chapter 8: Controlling Services and Daemons

- Identifying Automatically Started System Processes
- Controlling System Services

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Goal:

To control and monitor network services and system daemons using systemd.

Objectives:

- List system daemons and network services started by systemd service and socket units.
- Control system daemons and network services using systemctl.

Identifying Automatically Started System Processes

Practice:
Identify the status of systemd units

Controlling System Services

Practice: Using systemctl to Manage Services

Lab:
Controlling Services and Daemons

DAY THREE

Processes

Services

OpenSSH

Logs

Chapter 9: Configuring and Securing OpenSSH Service

- Accessing the Remote Command Line with SSH
- Configuring SSH Key-based Authentication
- Customizing SSH Service Configuration

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Goal:

To configure secure command-line access on remote systems using OpenSSH.

Objectives:

- Log into a remote system using ssh to run commands from a shell prompt.
- Set up ssh to allow secure password-free logins by using a private authentication key file.
- Customize sshd configuration to restrict direct logins as root or to disable password-based authentication.

Accessing the Remote Command Line with SSH

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Practice: Accessing the Remote Command-Line

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Configuring SSH Key-based Authentication

redhat.

Practice:
Using SSH Key-based Authentication

Customizing SSH Service Configuration

Practice:
Restricting SSH Logins

Lab:
Configuring and Securing OpenSSH Service

redhat.

DAY THREE

Processes

Services

OpenSSH

Logs

Chapter 10:
Analyzing and Storing Logs

- **System Log Architecture**
- **Reviewing Syslog Files**
- **Reviewing systemd Journal Entries**
- **Preserving the systemd Journal**
- **Maintaining Accurate Time**

Goal:

To locate and accurately interpret relevant system log files for troubleshooting purposes.

Objectives:

- Describe the basic syslog architecture in Red Hat Enterprise Linux 7.
- Interpret entries in relevant syslog files to troubleshoot problems or review system status.
- Find and interpret log entries in the systemd journal to troubleshoot problems or review system status.
- Configure systemd-journald to store its journal on disk rather than in memory.
- Maintain accurate time synchronization and time zone configuration to ensure correct timestamps in system logs.

System Log Architecture

Quiz:
System Logging Components

Reviewing Syslog Files

Practice:
Finding Log Entries

Reviewing systemd Journal Entries

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Practice:
Finding Events with journalctl

Preserving the systemd Journal

Practice: Configure a Persistent systemd Journal

Maintaining Accurate Time

Quiz:
Adjusting System Time

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Lab:
Analyzing and Storing Logs

redhat.

DAY FOUR

Networking

Archiving Files

Software Packages

Chapter 11:
Managing Red Hat Linux Enterprise Networking

Networking Concepts

Validating Network Configuration

Configuring Networking with nmcli

Editing Network Configuration Files

Configuring hostnames and Name Resolution

redhat.

Goal:

To configure basic IPv4 networking on Red Hat Enterprise Linux systems.

Objectives:

- Explain fundamental concepts of computer networking.
- Test and review current network configuration with basic utilities.
- Manage network settings and devices with nmcli and NetworkManager.
- Modify network settings by editing the configuration files.
- Configure and test system hostname and name resolution.

Networking Concepts

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IP Address:

172.17.5.3 = 10101100.00010001.00000101.00000011

Netmask:

255.255.0.0 = 11111111.11111111.00000000.00000000

10101100.00010001.00000101.00000011

Network Host

IP Address:

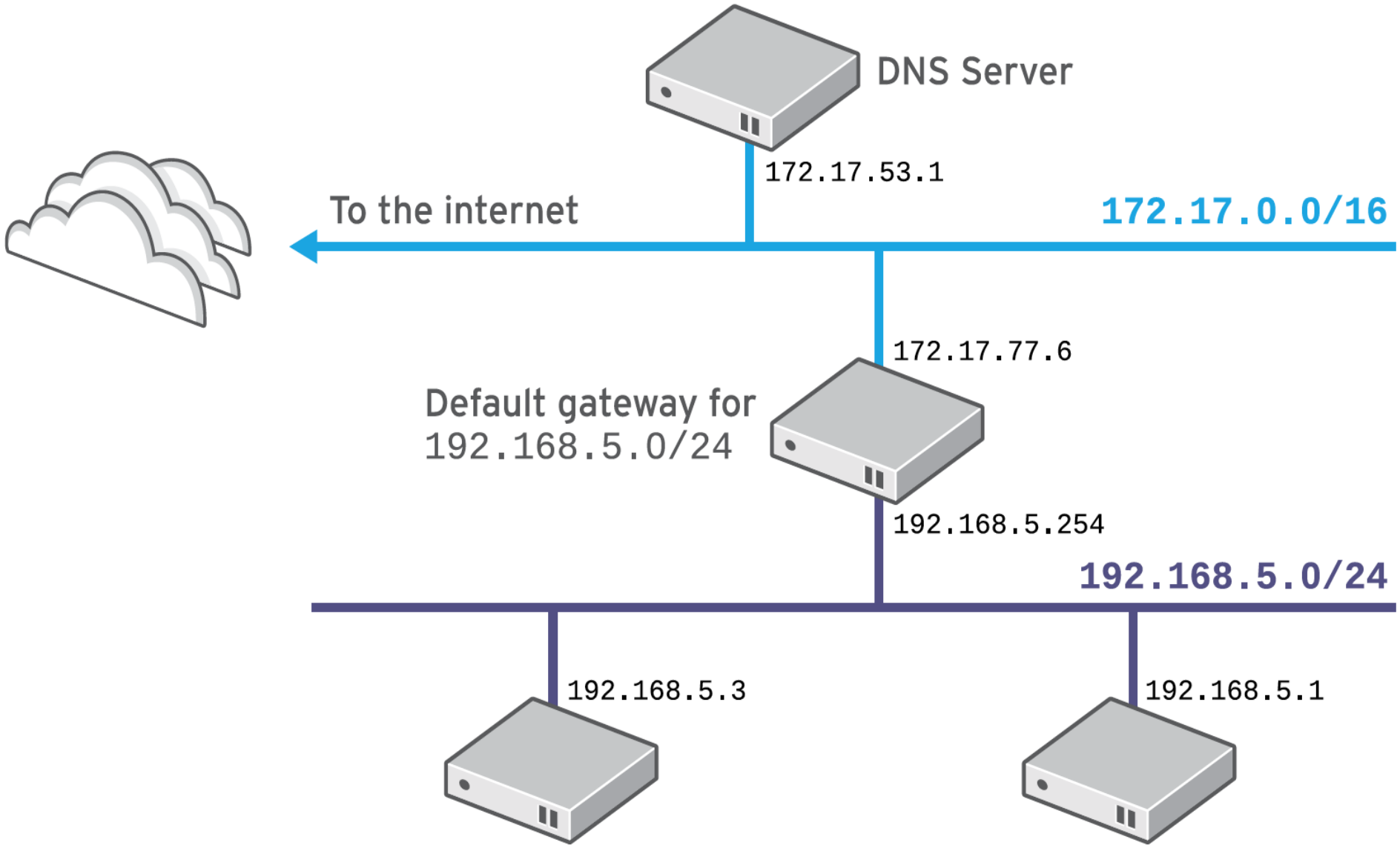
192.168.5.3 = 11000000.10101000.00000101.00000011

Netmask:

255.255.255.0 = 11111111.11111111.11111111.00000000

11000000.10101000.00000101.00000011

Network Host



Quiz:
Networking Concepts

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Validating Network Configuration

Practice:
Examining Network Configuration

Configuring Networking with nmcli

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Practice:
Configuring Networking with nmcli

Editing Network Configuration Files

Practice:
Editing Network Configuration Files

Configuring hostnames and Name Resolution

Practice: Configuring hostnames and Name Resolution

Lab:
Managing Red Hat Enterprise Linux Networking

DAY FOUR

Networking

Archiving Files

Software Packages

Chapter 12: Archiving and Copying Files Between Systems

- Managing Compressed tar Archives
- Copying Files Between Systems Securely
- Synchronizing Files Between Systems Securely

redhat.

Goal:

To archive and copy files from one system to another.

Objectives:

- Use tar to create new compressed archive files and extract files from existing archive files.
- Copy files securely to or from a remote system running sshd.
- Securely synchronize the contents of a local file or directory with a remote copy.

Managing Compressed tar Archives

Practice: Backing Up and Restoring Files From a tar Archive

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Copying Files Between Systems Securely

redhat.

Practice:
Copying Files Over the Network
With scp

Synchronizing Files Between Systems Securely

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Practice: Synchronizing Two Directories Securely with rsync

Lab:
Archiving and Copying Files Between Systems

redhat.

DAY FOUR

Networking

Archiving Files

Software Packages

Chapter 13: Installing and Updating Software Packages

- Attaching Systems to Subscriptions for Software Updates
- RPM Software Packages and YUM
- Managing Software Updates with yum
- Enabling yum Software Repositories
- Examining RPM Package Files

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Goal:

To download, install, update, and manage software packages from Red Hat and YUM package repositories.

Objectives:

- Register systems with your Red Hat account and entitle them to software updates for installed products.
- Explain what an RPM package is and how RPM packages are used to manage software on a Red Hat Enterprise Linux system.
- Find, install, and update software packages using the yum command.
- Enable and disable use of Red Hat or third-party YUM repositories.
- Examine and install downloaded software package files.

Attaching Systems to Subscriptions for Software Updates

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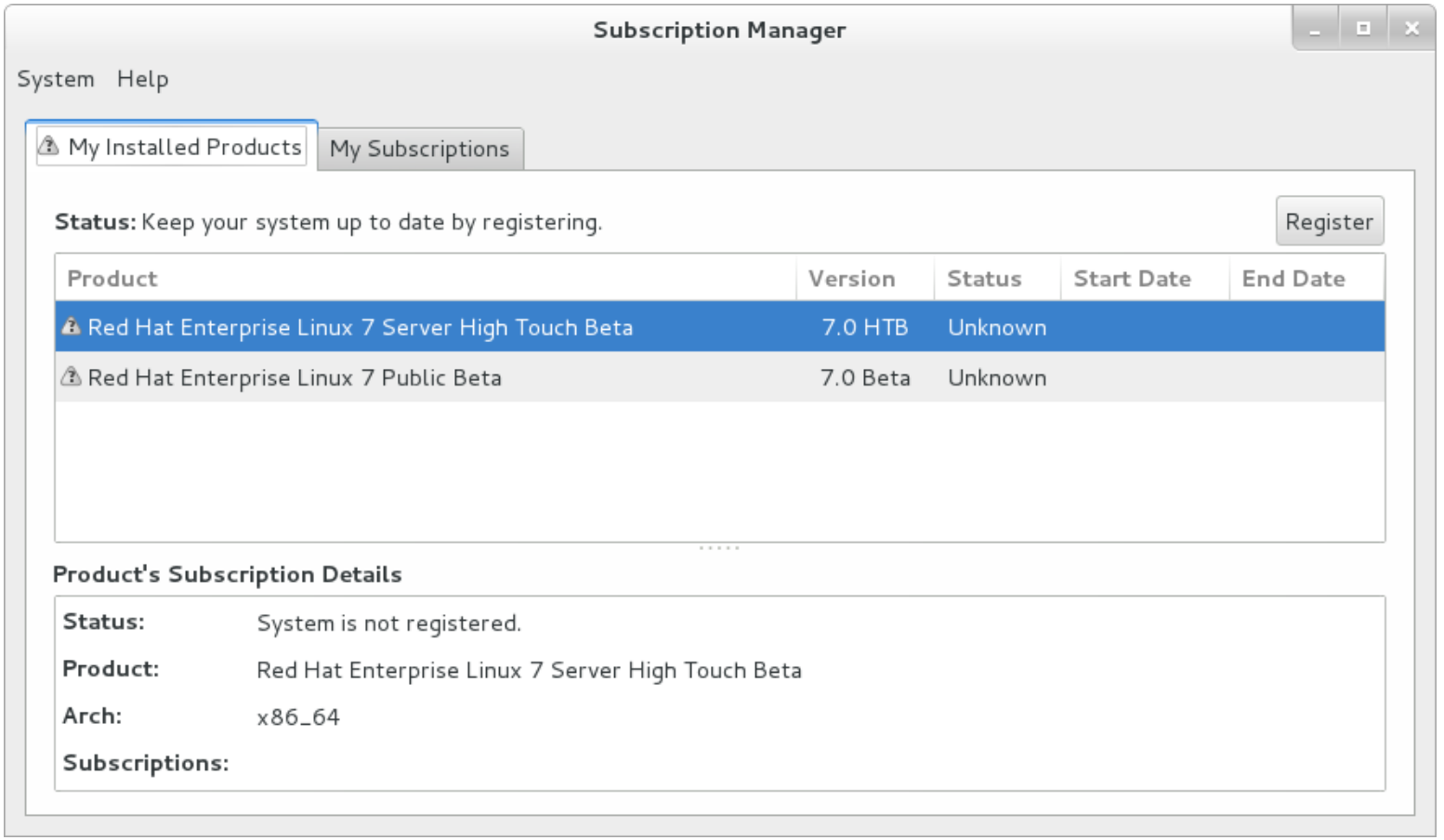

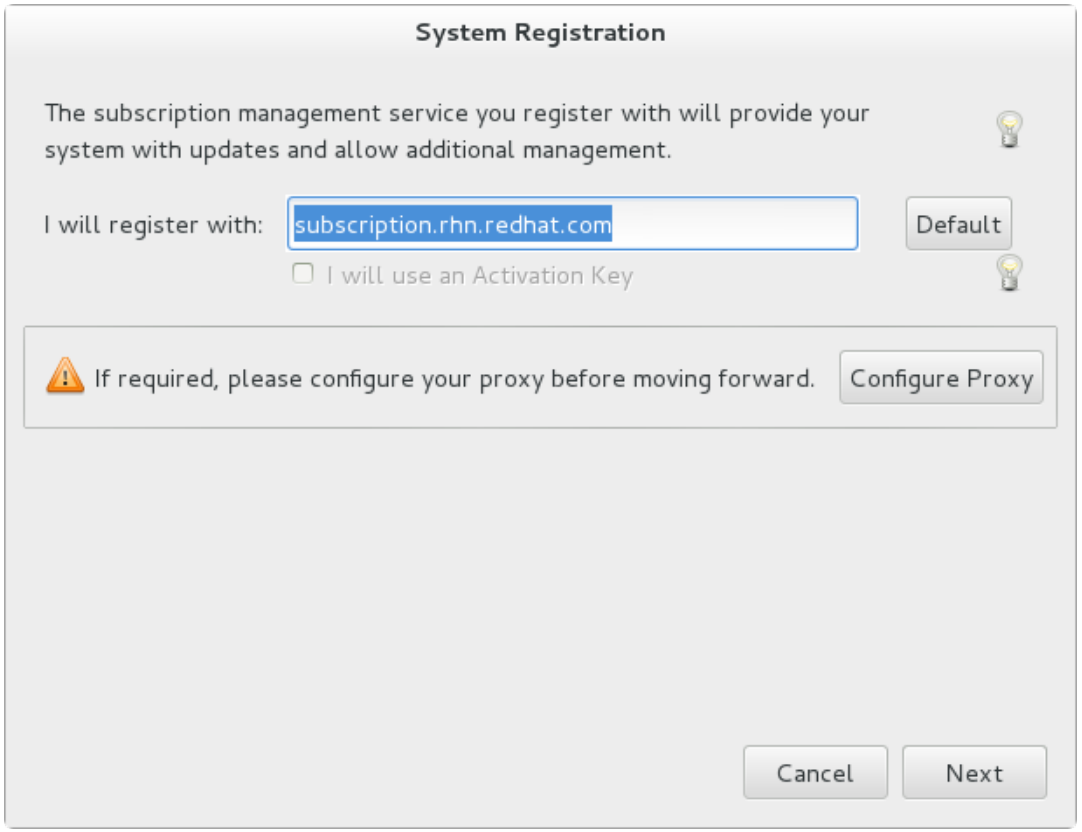

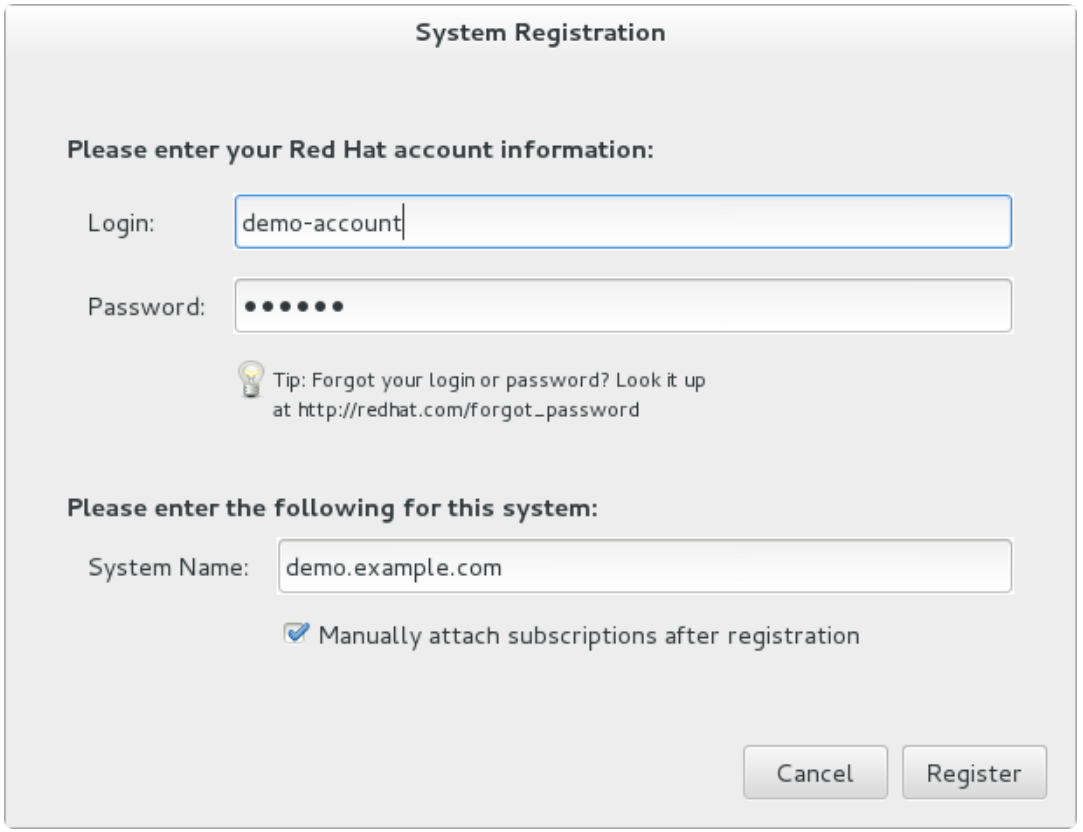

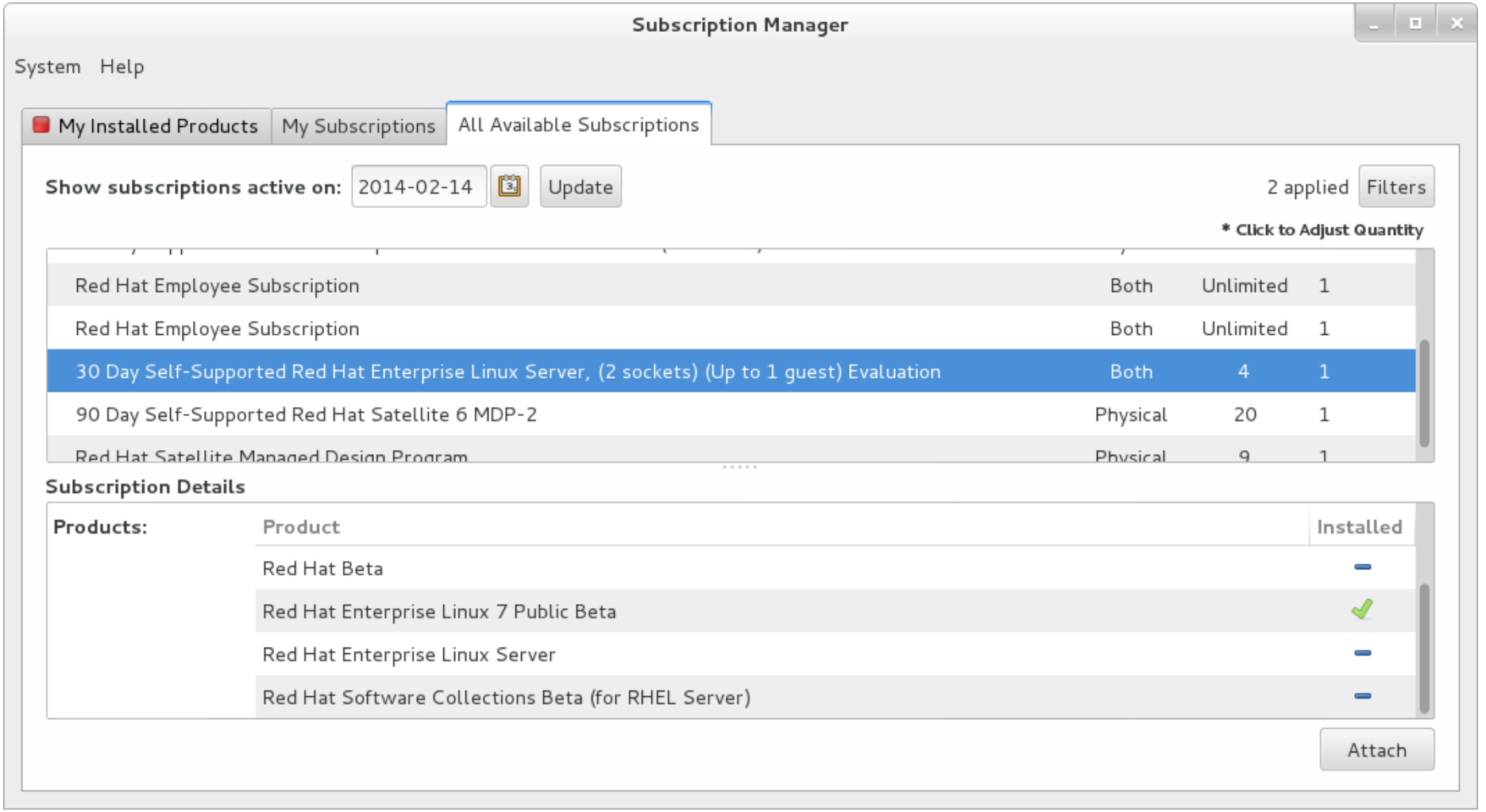

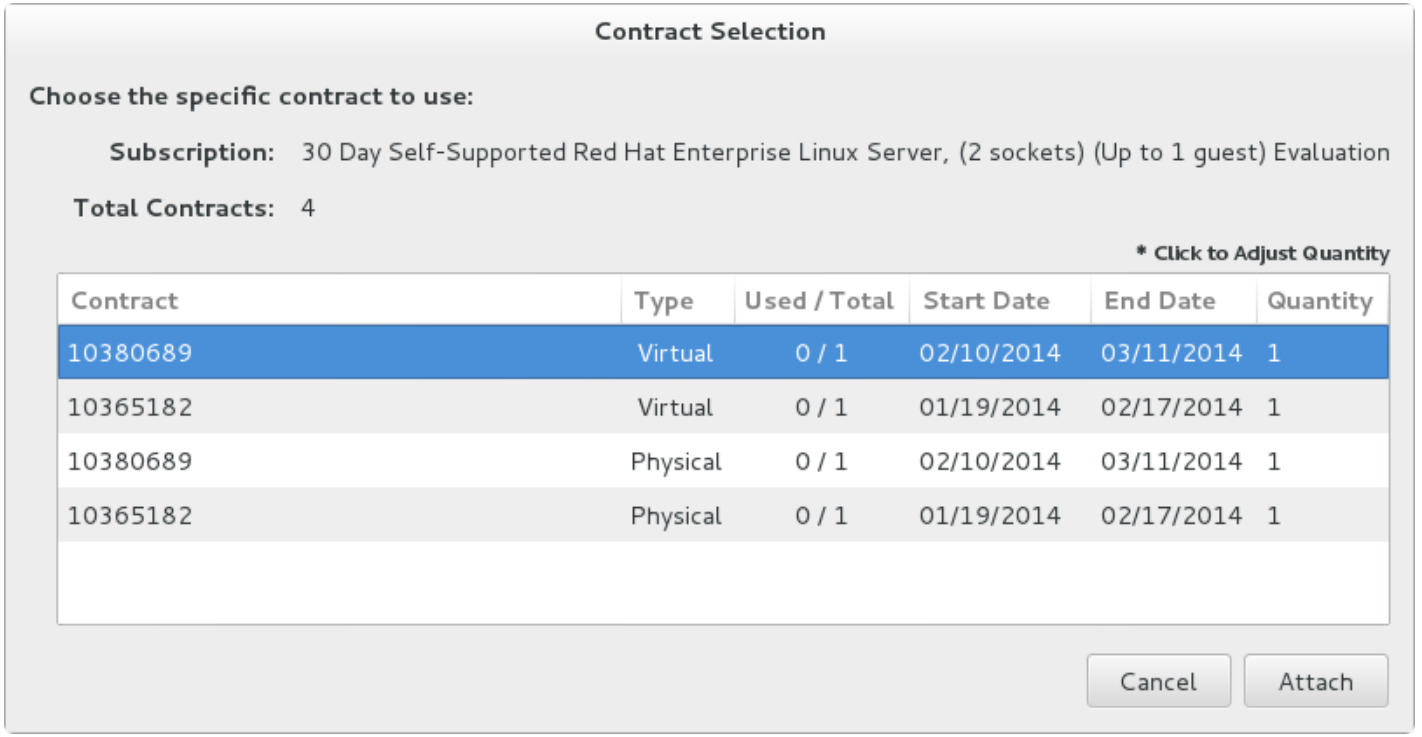

Quiz:
Red Hat Subscription Management

RPM Software Packages and Yum

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Quiz:
RPM Software Packages

Managing Software Updates with yum

redhat.

Practice: Installing and Updating Software with yum

Enabling yum Software Repositories

Practice:
Enabling Software Repositories

Examining RPM Package Files

Practice:
Working with RPM Package Files

Lab:
Installing and Updating Software Packages

redhat.

DAY FIVE

File System

Virtualized Systems

Review

Chapter 14: Accessing Linux File Systems

- Identifying File Systems and Devices
- Mounting and Unmounting File Systems
- Making Links between Files
- Locating Files on the System

Goal:

To access and inspect existing file systems on a Red Hat Enterprise Linux system.

Objectives:

- Identify the file system hierarchy.
- Access the contents of file systems.
- Use hard links and symlinks to make multiple names.
- Search for files on mounted file systems.

Identifying File Systems and Devices

Quiz:
Identifying File Systems and Devices

Mounting and Unmounting File Systems

Practice: Mounting and Unmounting File Systems

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Making Links Between Files

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Practice:
Making Links Between Files

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Locating Files on the System

Practice:
Locating Files on the System

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Lab:
Accessing Linux File Systems

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DAY FIVE

File System

Virtualized Systems

Review

Chapter 15:
Using Virtualized Systems

- Managing a Local Virtualization Host
- Installing a New Virtual Machine

Goal:

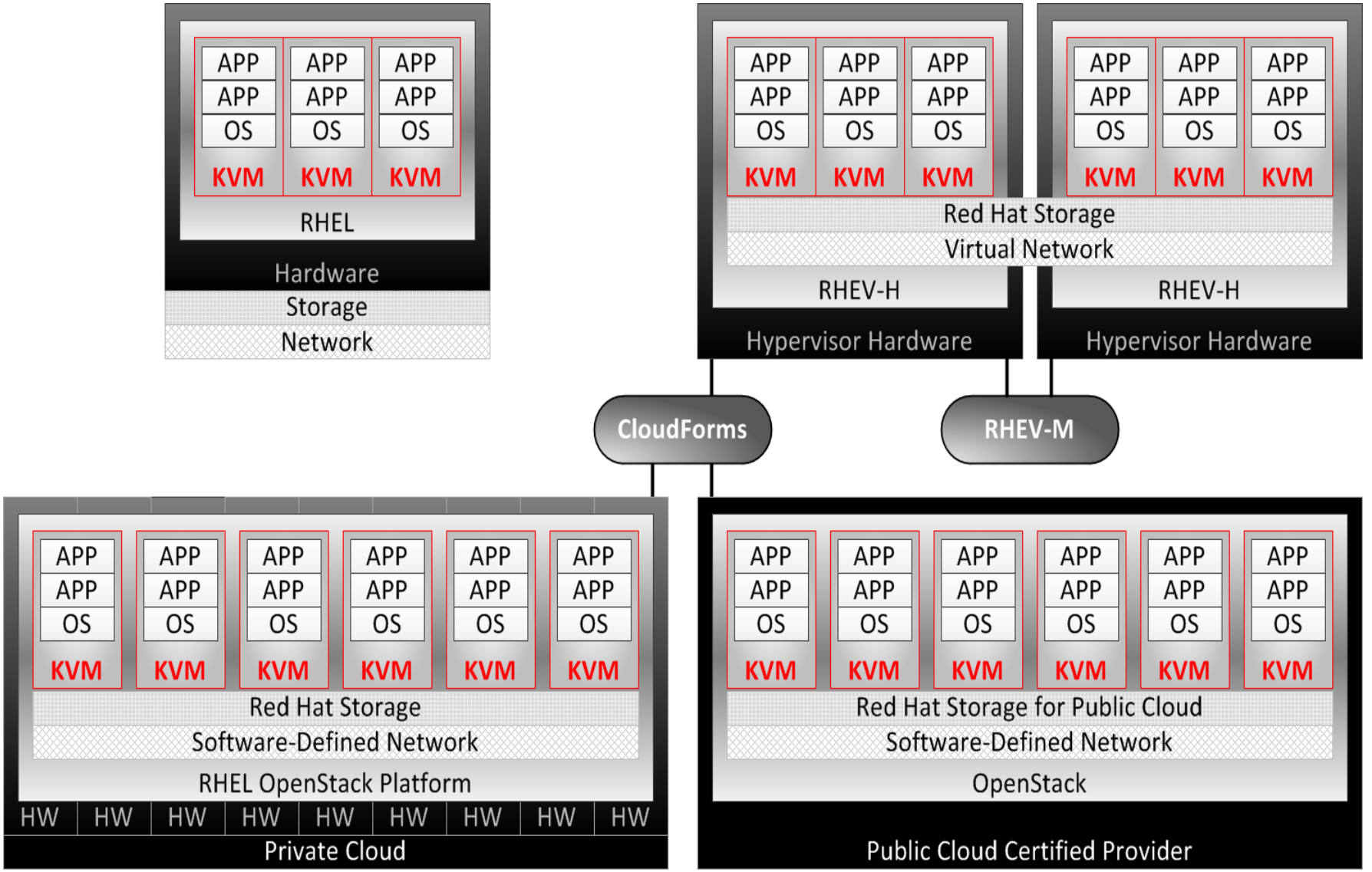
To create and use Red Hat Enterprise Linux virtual machines with Kernel-based Virtual Machine (KVM) and libvirt.

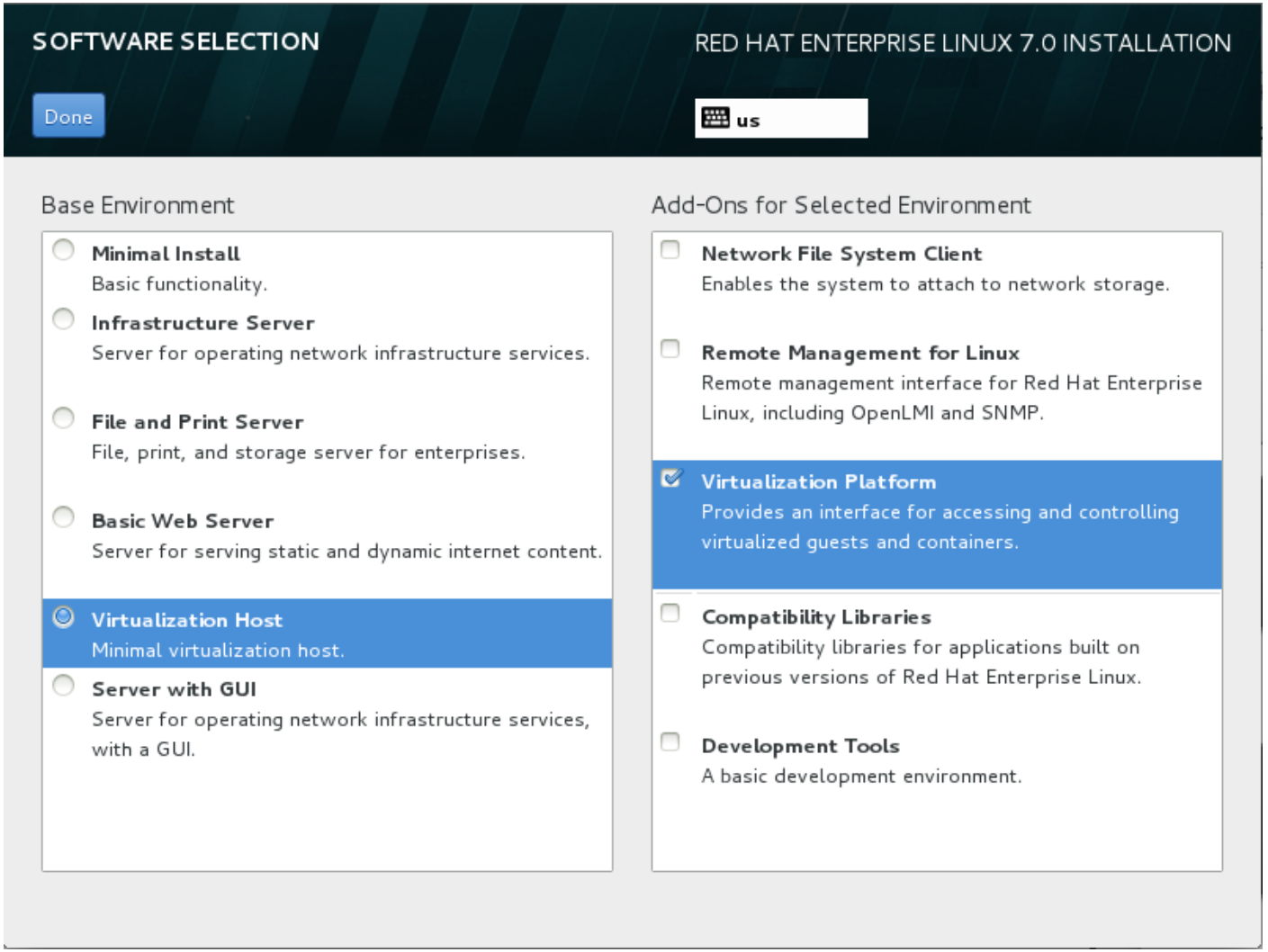
Objectives:

- Install a Red Hat Enterprise Linux system as a host for running virtual machines.
- Perform an interactive install of Red Hat Enterprise Linux on a virtual machine.

Managing a Local Virtualization Host

redhat.

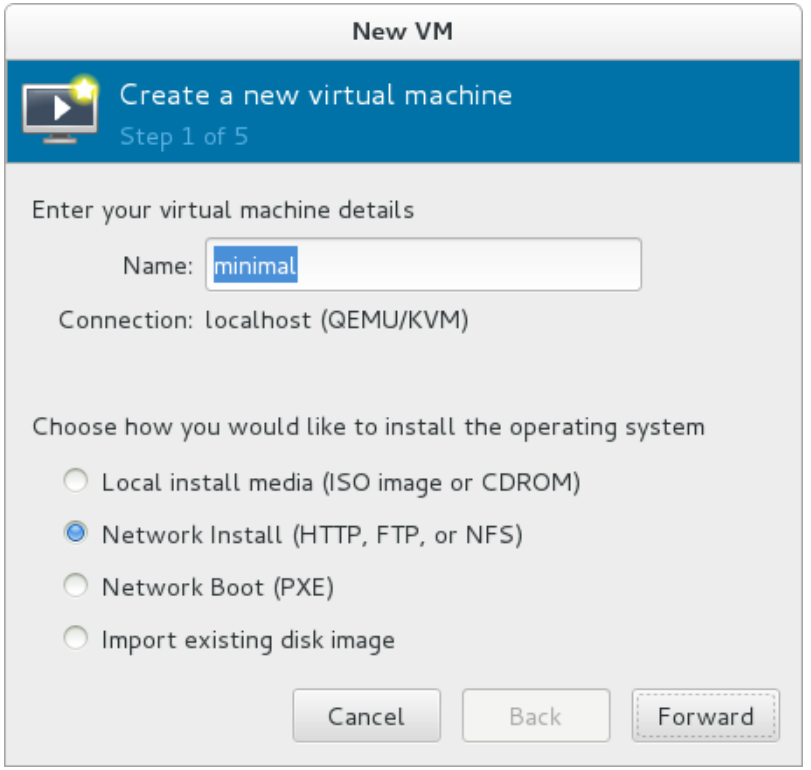


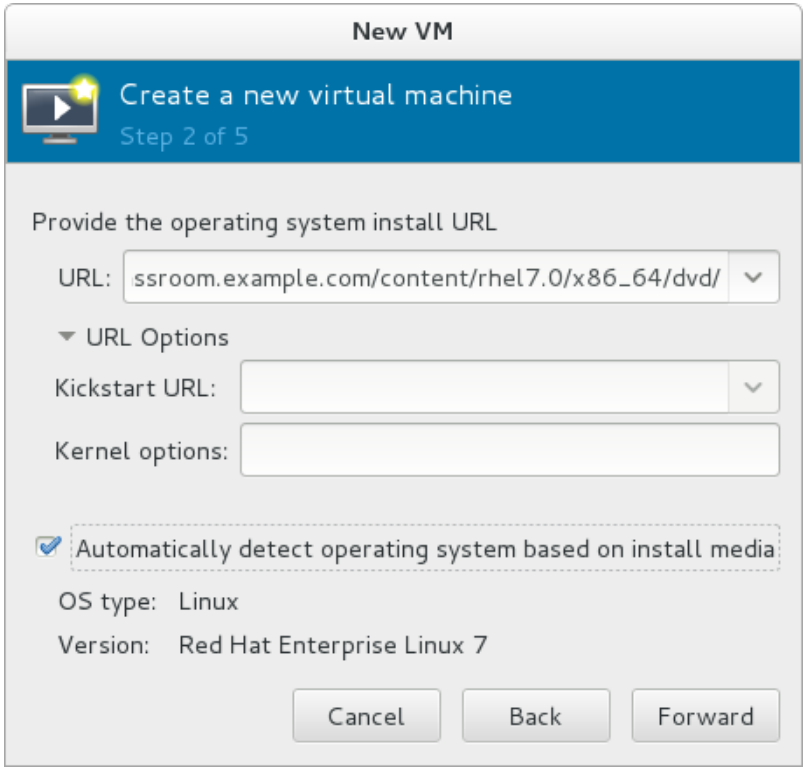


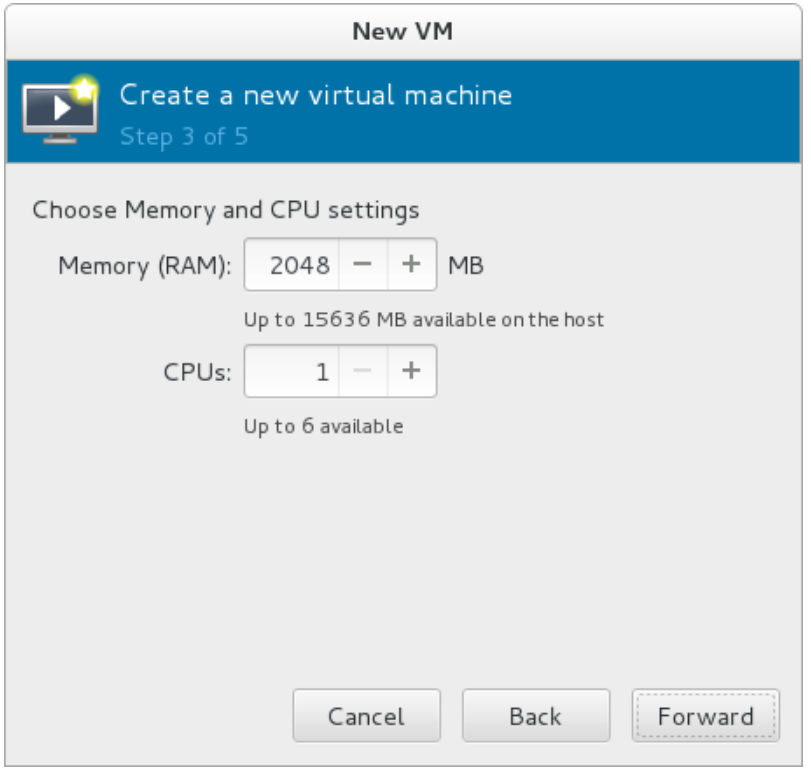
Quiz:
Managing a Local Virtualization Host

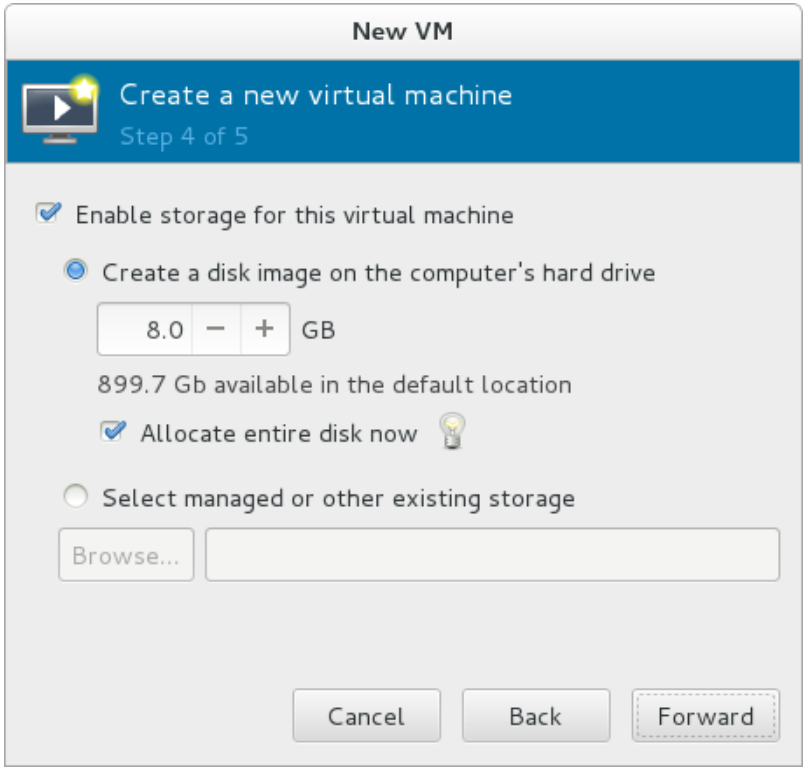
redhat.

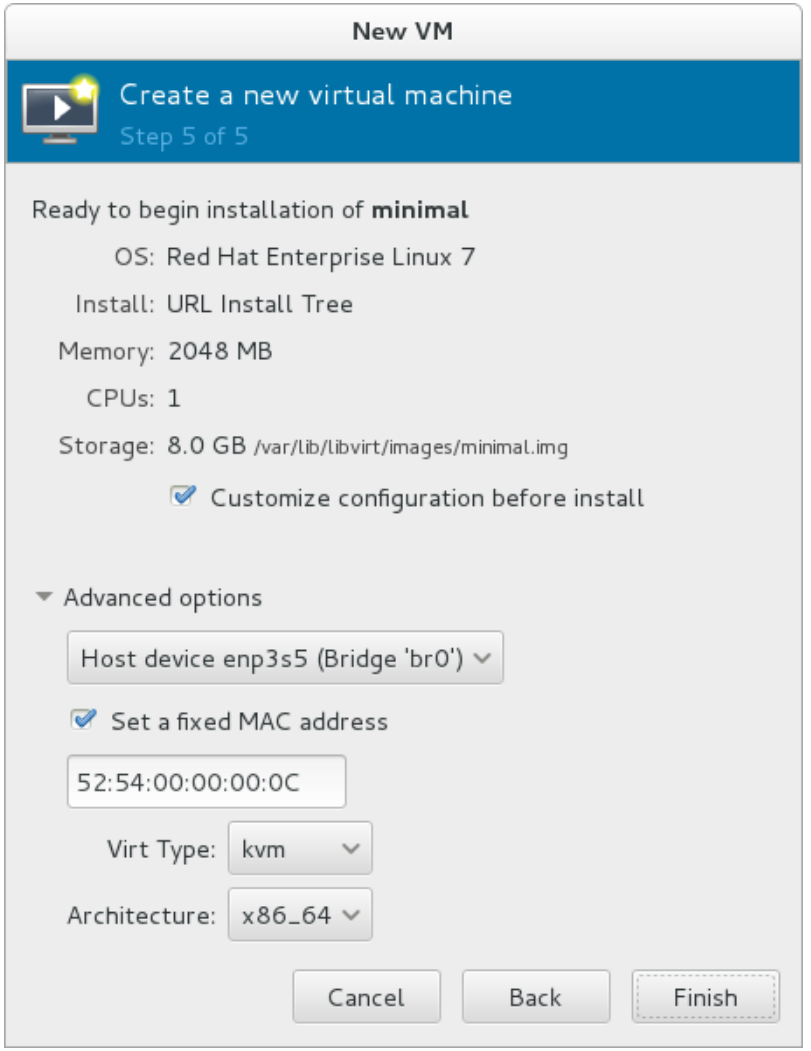
Installing a New Virtual Machine

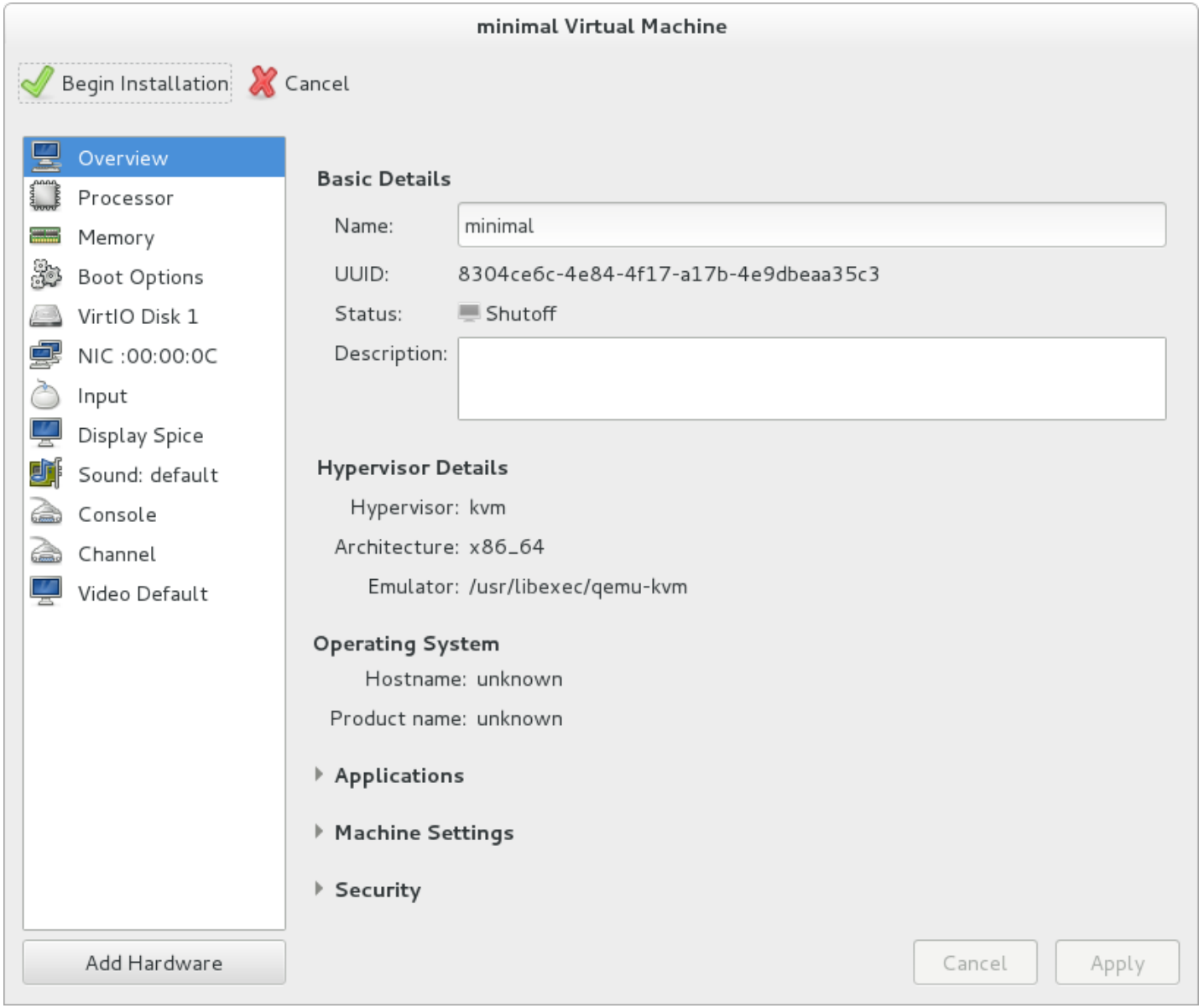


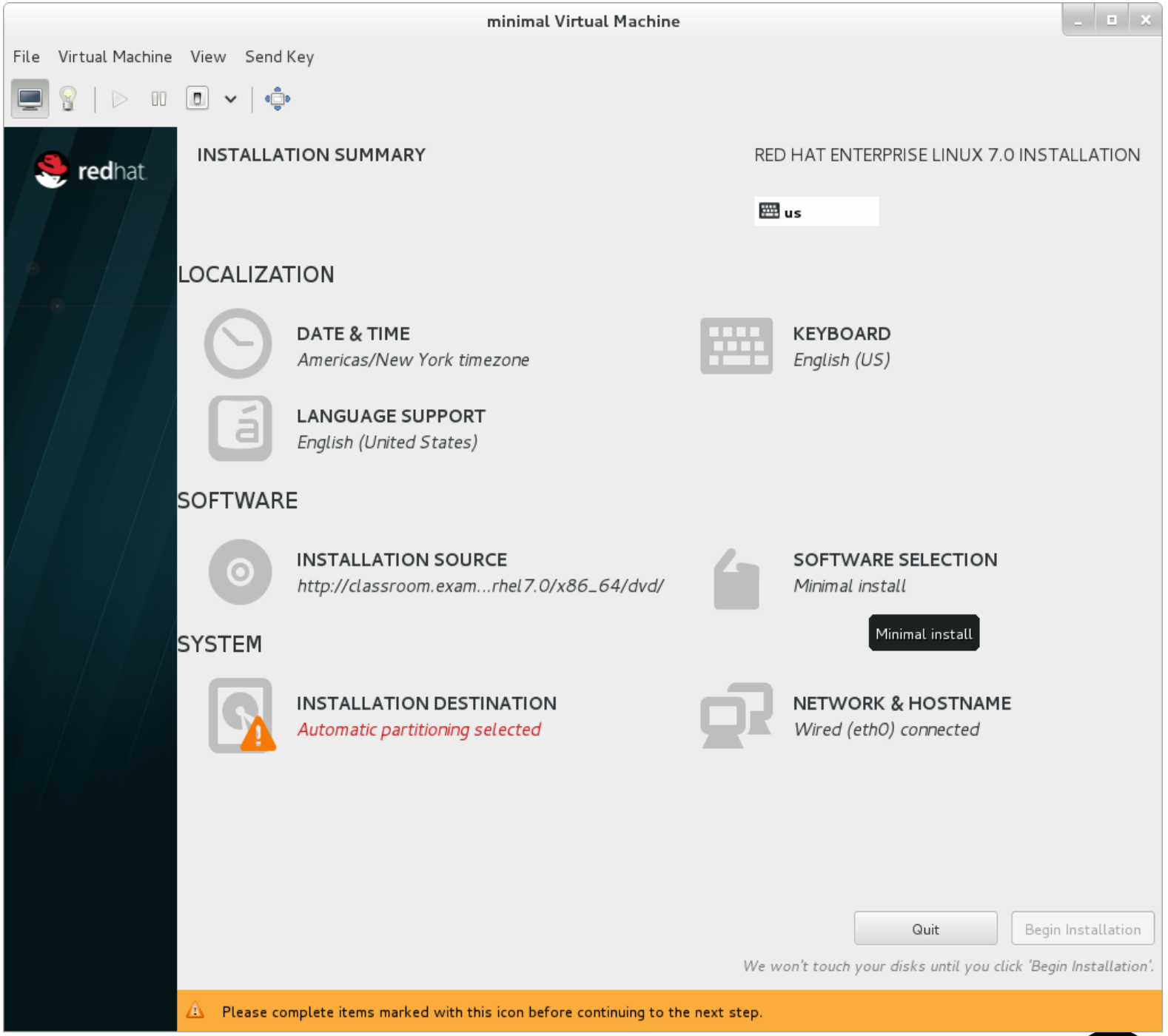


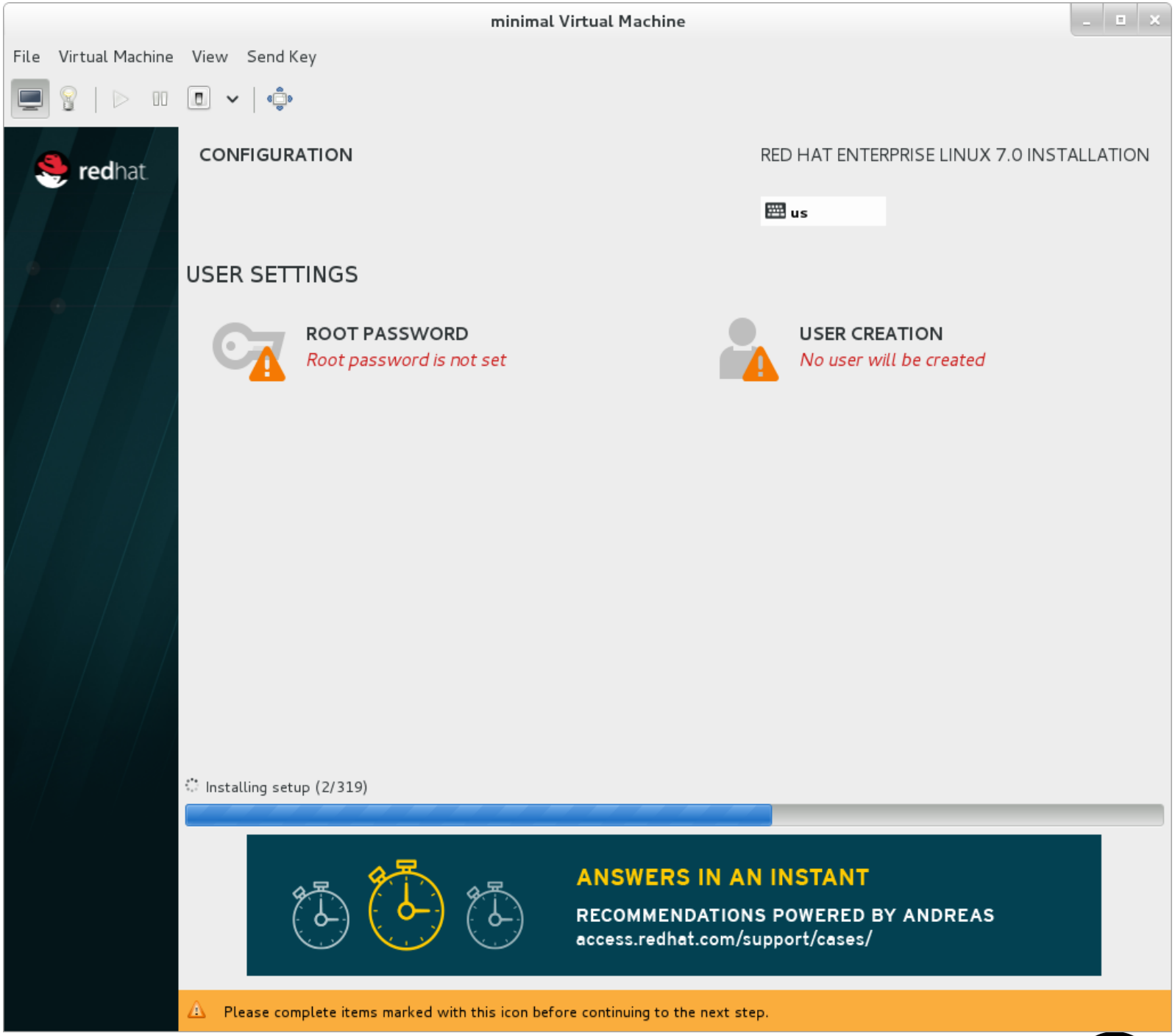












Practice:
Installing a New Virtual Machine

redhat.

Chapter Test:
Using Virtualized Systems

redhat.

DAY FIVE

File System

Virtualized Systems

Review

Chapter 16:
Comprehensive Review

redhat.

Goal:

To practice and demonstrate knowledge and skills learned in Red Hat System Administration I.

Objective:

Review course chapters to reinforce knowledge and skills.

Comprehensive Review of System Administration I

redhat.