



Red Hat System Administration I

Dr. Eng. Gamal Selim

Lecture 01



Course Overview

- Red Hat System Administration I (RH124) course is designed for IT professionals without previous Linux system administration experience
- The course provides students with Linux administration competence by focusing on core administration tasks
- This course will build the foundation for new Linux system administrators to efficiently and securely resolve configuration issues, integrate Red Hat Enterprise Linux with other existing systems, manage user and group administration, and use available storage solutions

COURSE OBJECTIVES

- Gain sufficient skill to perform core system administration tasks on Red Hat Enterprise Linux.
- Build foundational skills needed by an RHCSA-certified Red Hat Enterprise Linux system administrator.

AUDIENCE

- IT professionals across a broad range of disciplines who need to perform essential Linux administration tasks, including installation, establishing network connectivity, managing physical storage and basic security administration.

PREREQUISITES

- There are no formal prerequisites for this course; however, previous system administration experience on other operating systems will be very beneficial.

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Chapter 1: Get Started with Red Hat Enterprise Linux

History of UNIX

- The UNIX operating system found its beginnings in MULTICS, which stands for Multiplexed Operating and Computing System
- In 1969 Ken Thompson wrote the first version of UNIX, called UNICS
- Although the operating system has changed, the name stuck and was eventually shortened to UNIX

What is GNU?

- GNU Project: Richard Stallman on September 27th 1983
- The GNU Project was launched in 1984 to develop a complete Unix-like operating system which is free software: the GNU system
- GNU's kernel isn't finished, so GNU is used with the kernel Linux. The combination of GNU and Linux is the GNU/Linux operating system, now used by millions



What is Linux?

- Linux began in 1991 as a personal project by student called **Linus Torvalds**
- Linux is a free and open-source operating system
- It is based on the UNIX operating system



Why use Linux?

- Linux is free and open source
- Linux is very stable and reliable
- Linux is secure
- Linux is customizable
- Linux is powerful

Linux Distributions

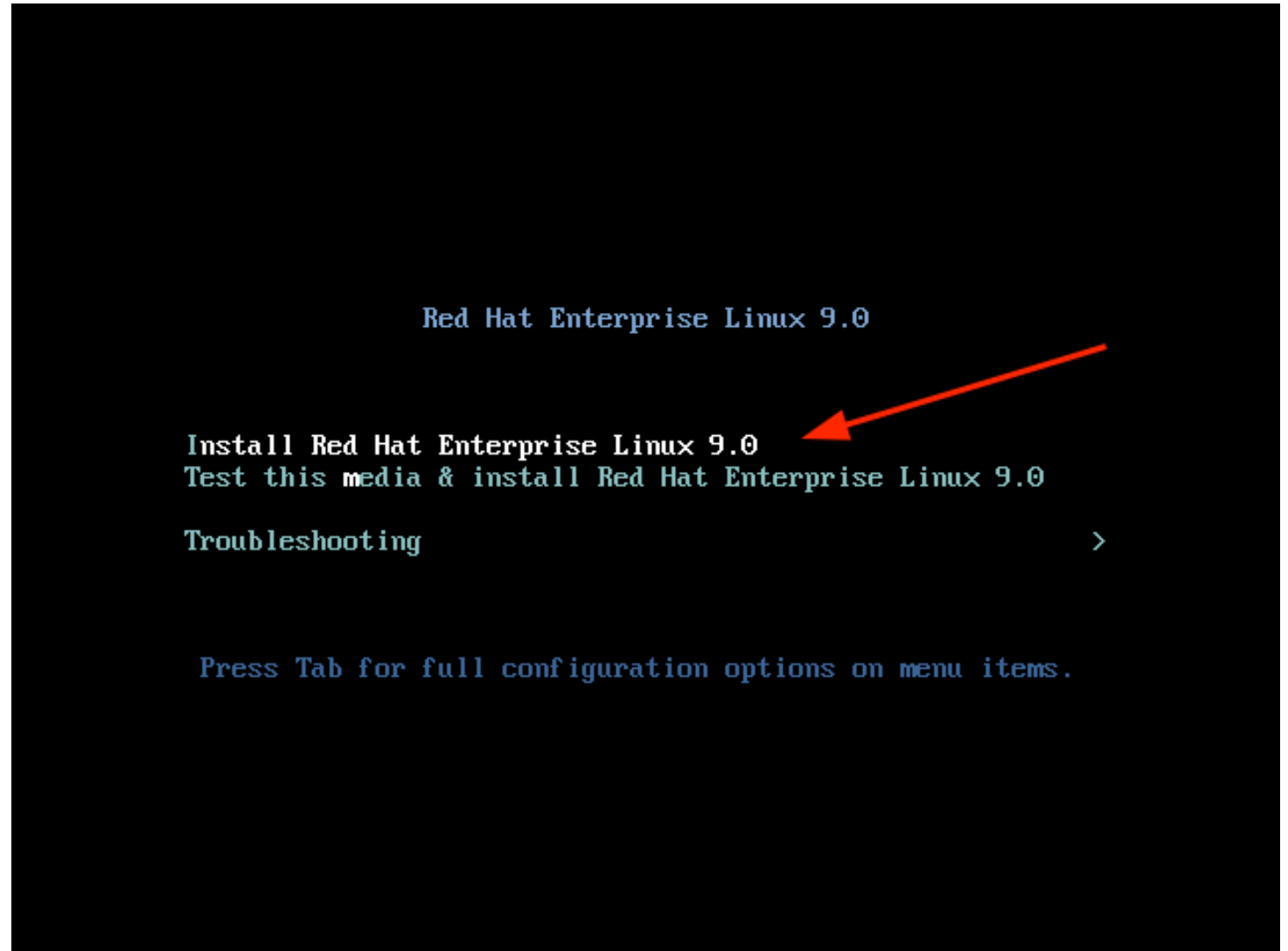
 redhat	 MEPIS	 turbolinux	 LUNAR	 EvilEntity	 debian	 Vine Linux	 cAos/CentOS	 MiniKazit	 UTUTO
 archlinux	 m0n0wall	 iand Linux	 Knoppix STD	 gentoo linux	 DeLi Linux	 Hiweed	 amlug	 slackware	 yellow dog linux
 Fedora	 LPG	 PLD	 SLAX	 COREL LINUX	 Progeny	 GEEBOX	 BIGLINUX	 FREEDUC	 Lycoris
 EnGarde	 Mandrakelinux	 BeatrIX	 Linspire	 suse	 中文延伸套件 Extension & more	 YOPER	 BearOps	 ASPLINUX	 kalango
 Slackintosh	 Frugalware	 Foresight	 Mint	 PCLinuxOS	 Haydar Linux	 sabayon	 ubuntu	 JULEX	 blag

Chapter 2: Access the Command Line

Installation of RHEL 9

- **Step 1: Start RHEL 9 Installation**

- When the system reboots, you will get a black screen with the following options. To begin the installation, press **ENTER** on the first option 'Install Red Hat Enterprise Linux 9.0'.





RED HAT ENTERPRISE LINUX 9.0 INSTALLATION

us

Help!

WELCOME TO RED HAT ENTERPRISE LINUX 9.0.

What language would you like to use during the installation process?

English	English >	English (United States)
Français	French	English (United Kingdom)
Deutsch	German	English (India)
日本語	Japanese	English (Australia)
中文	Mandarin Chin...	English (Canada)
Русский	Russian	English (Denmark)
Español	Spanish	English (Ireland)
Afrikaans	Afrikaans	English (New Zealand)
অসমীয়া	Assamese	English (Nigeria)
		English (Hong Kong SAR China)
		English (Philippines)

Type here to search. ✕

Quit

Continue



• Step 2: Configure Partitioning

The next step presents you with an installation summary that is segmented into four sections:

- LOCALIZATION
- SOFTWARE
- SYSTEM
- USER SETTINGS
- We will only focus on three items that are mandatory before proceeding with the installation – **Installation Destination**, **Root Account**, and **Regular Account** creation.



INSTALLATION SUMMARY

RED HAT ENTERPRISE LINUX 9.0 INSTALLATION

us [Help!](#)

LOCALIZATION	SOFTWARE	SYSTEM
 Keyboard English (US)	 Connect to Red Hat Not registered.	 Installation Destination Automatic partitioning
 Language Support English (United States)	 Installation Source Local media	 KDUMP Kdump is enabled
 Time & Date Africa/Nairobi timezone	 Software Selection Server with GUI	 Network & Host Name Wired (enp0s3) connected
USER SETTINGS		 Security Profile No profile selected
 Root Password Root account is disabled		

[Quit](#) [Begin Installation](#)

We won't touch your disks until you click 'Begin Installation'.

 Please complete items marked with this icon before continuing to the next step.

INSTALLATION DESTINATION

RED HAT ENTERPRISE LINUX 9.0 INSTALLATION

Done

us

Help!

3

Device Selection

Select the device(s) you'd like to install to. They will be left untouched until you click on the main menu's "Begin Installation" button.

Local Standard Disks

40.95 GiB



ATA VBOX HARDDISK

sda / 40.95 GiB free

2

Disks left unselected here will not be touched.

Specialized & Network Disks



Add a disk...

Disks left unselected here will not be touched.

Storage Configuration

☐ Automatic

☒ Custom

1

[Full disk summary and boot loader...](#)

1 disk selected; 40.95 GiB capacity; 40.95 GiB free [Refresh...](#)

MANUAL PARTITIONING

RED HAT ENTERPRISE LINUX 9.0 INSTALLATION

Done

us

Help!

New Red Hat Enterprise Linux 9.0 Installation

You haven't created any mount points for your Red Hat Enterprise Linux 9.0 installation yet. You can:

- [Click here to create them automatically.](#)
- Create new mount points by clicking the '+' button.

New mount points will use the following partitioning scheme:

LVM

Automatically created mount points can be encrypted by default:

☐ Encrypt my data.

+

-

↺

AVAILABLE SPACE
40.95 GiB

TOTAL SPACE
40.95 GiB

[1 storage device selected](#)

Discard All Changes

When you create mount points for your Red Hat Enterprise Linux 9.0 installation, you'll be able to view their details here.

any mount points for your Red
x 9.0 installation yet. You can:

[create them automatically.](#)

t points by cl

will use the fo

ed mount po

data.

ADD A NEW MOUNT POINT

More customization options are available
after creating the mount point below.

Mount Point:

/boot

Desired Capacity:

500MB

Cancel

Add mount point

MANUAL PARTITIONING

RED HAT ENTERPRISE LINUX 9.0 INSTALLATION

Done

us

Help!

New Red Hat Enterprise Linux 9.0 Installation

SYSTEM

/boot

sda1

476 MiB

>

+ - ↺

AVAILABLE SPACE
40.48 GiB

TOTAL SPACE
40.95 GiB

[1 storage device selected](#)

sda1

Mount Point:
/boot

Desired Capacity:
476 MiB

Device Type:
Standar...
☐ Encrypt

File System:
xfs
☒ Reformat

Label:

Device(s):
ATA VBOX HARDDISK (sda)
Modify...

Name:
sda1

Discard All Changes

MANUAL PARTITIONING

RED HAT ENTERPRISE LINUX 9.0 INSTALLATION

Done

us

Help!

New Red Hat Enterprise Linux 9.0

Installation

DATA

/home 18.63 GiB
rhel-home

SYSTEM

/ 13.97 GiB
rhel-root

/boot 476 MiB
sda1

swap 7.45 GiB >
rhel-swap

+

-

↻

AVAILABLE SPACE
428.94 MiB

TOTAL SPACE
40.95 GiB

[1 storage device selected](#)

rhel-swap

Mount Point:

Device(s):

ATA VBOX HARDDISK (sda)

Modify...

Desired Capacity:

7.45 GiB

Device Type:

LVM

☐ Encrypt

Volume Group:

rhel (4 MiB free)

Modify...

File System:

swap

☒ Reformat

Label:

Name:

swap

Discard All Changes

SUMMARY OF CHANGES

Your customizations will result in the following changes taking effect after you return to the main menu and begin installation:

Order	Action	Type	Device	Mount point
1	destroy format	Unknown	ATA VBOX HARDDISK (sda)	
2	create format	partition table (MSDOS)	ATA VBOX HARDDISK (sda)	
3	create device	partition	sda1 on ATA VBOX HARDDISK	
4	create format	xfs	sda1 on ATA VBOX HARDDISK	/boot
5	create device	partition	sda2 on ATA VBOX HARDDISK	
6	create format	physical volume (LVM)	sda2 on ATA VBOX HARDDISK	
7	create device	lvmvg	rhel	
8	create device	lvmlv	rhel-root	
9	create format	xfs	rhel-root	/
10	create device	lvmlv	rhel-home	
11	create format	xfs	rhel-home	/home
12	create device	lvmlv	rhel-swap	
13	create format	swap	rhel-swap	

Cancel & Return to Custom Partitioning

Accept Changes

[1 storage device selected](#)

Discard All Changes

Wired (enp0s3) connected



Security Profile

No profile selected

USER SETTINGS



Root Password

Root account is disabled



User Creation

No user will be created

Quit

Begin Installation

We won't touch your disks until you click 'Begin Installation'.



Please complete items marked with this icon before continuing to the next step

ROOT PASSWORD

RED HAT ENTERPRISE LINUX 9.0 INSTALLATION

Done



 us

Help!

The root account is used for administering the system. Enter a password for the root user.

Root Password:

●●●●●●●●●●●●●●●●



Strong

Confirm:

●●●●●●●●●●●●●●●●



☐ Lock root account

☐ Allow root SSH login with password

USER SETTINGS



Root Password

Root password is set



User Creation

No user will be created



Security Profile

No profile selected

Quit

Begin Installation

We won't touch your disks until you click 'Begin Installation'.

CREATE USER

RED HAT ENTERPRISE LINUX 9.0 INSTALLATION

Done



us

Help!

Full name

tecmin

User name

tecmin

☐ Make this user administrator

☒ Require a password to use this account

Password

●●●●●●●●●●●●●●



Strong

Confirm password

●●●●●●●●●●●●●●



Advanced...



Time & Date

Africa/Nairobi timezone



Software Selection

Server with GUI



Network & Host Name

Wired (enp0s3) connected



Security Profile

No profile selected

USER SETTINGS



Root Password

Root password is set



User Creation

User tecmint will be created

Quit

Begin Installation

We won't touch your disks until you click 'Begin Installation'.



Red Hat

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INSTALLATION PROGRESS

RED HAT ENTERPRISE LINUX 9.0 INSTALLATION

 us

 Downloading packages

Quit

Reboot System



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INSTALLATION PROGRESS

RED HAT ENTERPRISE LINUX 9.0 INSTALLATION

 us

Complete!

Red Hat Enterprise Linux is now successfully installed and ready for you to use!
Go ahead and reboot your system to start using it!

 [Reboot System](#)

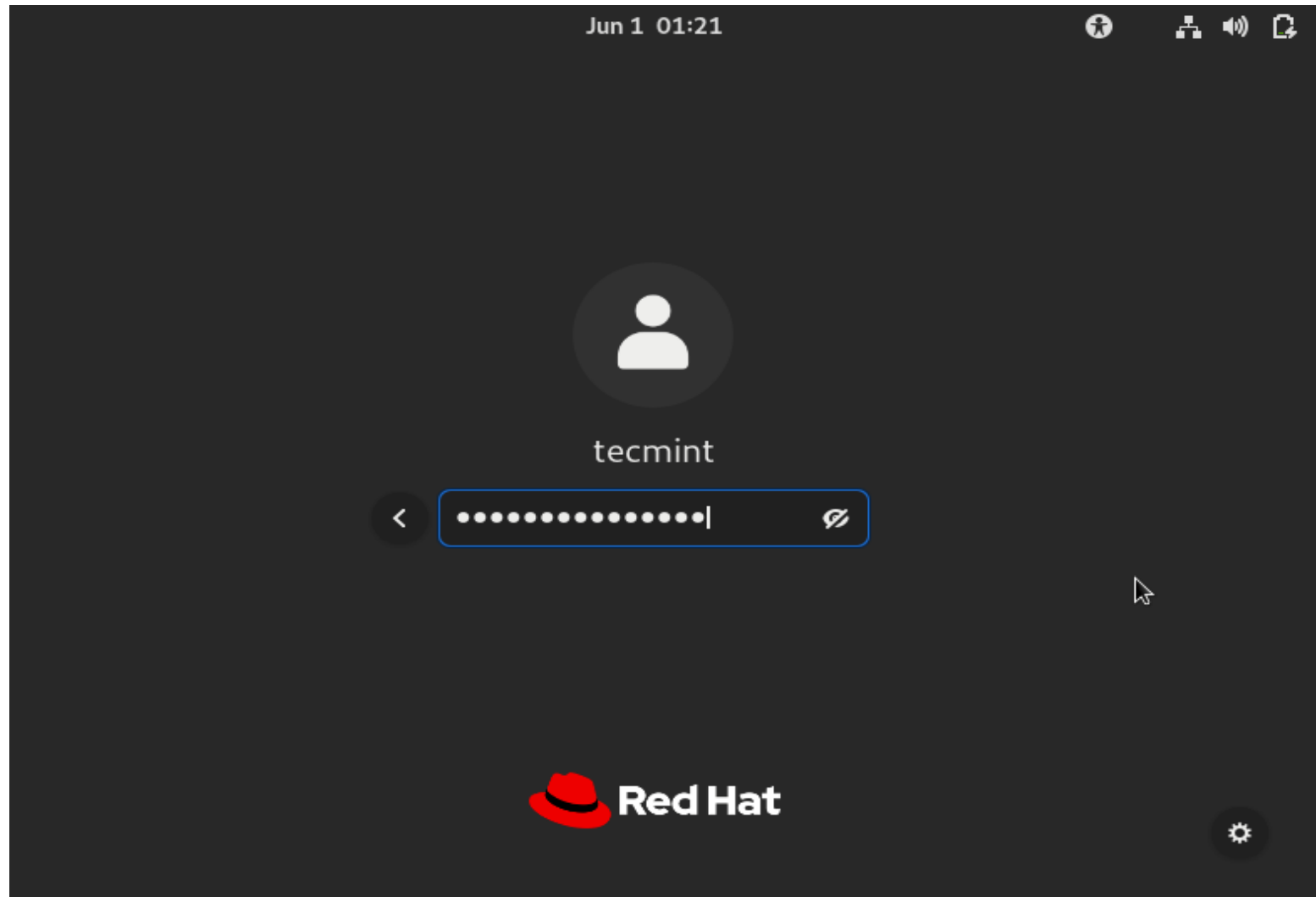


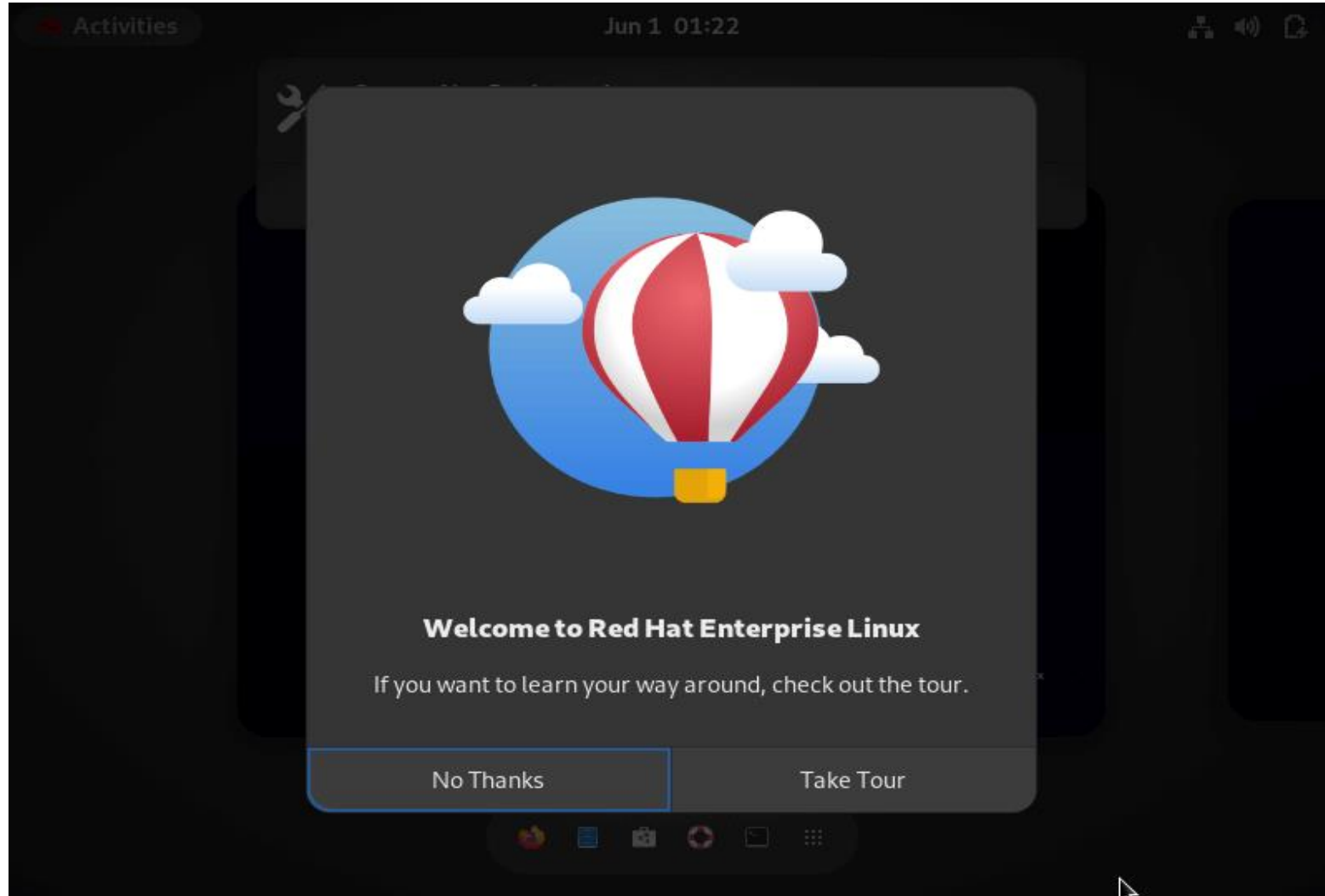
Use of this product is subject to the license agreement found at </usr/share/redhat-release/EULA>



```
Red Hat Enterprise Linux (5.14.0-70.13.1.el9_0.x86_64) 9.0 (Plow)
Red Hat Enterprise Linux (0-rescue-15f5356aa37041bab5822a7a85a4b6a5) 9.0→
```

```
Use the ↑ and ↓ keys to change the selection.
Press 'e' to edit the selected item, or 'c' for a command prompt.
```





Introduction to the Bash 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

Regular users:

```
[user@host ~]$
```

root user:

```
[root@host ~]#
```

Basic Command Syntax

- **Commands that are 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.

EXAMPLES OF SIMPLE COMMANDS

The **date** command is used to display the current date and time. It can also be used by the superuser to set the system clock. An argument that begins with a plus sign (+) specifies a format string for the date command.

```
[student@desktopX ~]$ date
Sat Apr  5 08:13:50 PDT 2014
[student@desktopX ~]$ date +%R
08:13
[student@desktopX ~]$ date +%x
04/05/2014
```

The **passwd** command changes a user's own password. The original password for the account must be specified before a change will be allowed. By default, **passwd** is configured to require a strong password, consisting of lowercase letters, uppercase letters, numbers, and symbols, and is not based on a dictionary word. The superuser can use the **passwd** command to change other users' passwords.

```
[student@desktopX ~]$ passwd
Changing password for user student.
Changing password for student.
(current) UNIX password: old_password
New password: new_password
Retype new password: new_password
```

```
[student@desktopX ~]$ file /etc/passwd
/etc/passwd: ASCII text
[student@desktopX ~]$ file /bin/passwd
/bin/passwd: setuid ELF 64-bit LSB shared object, x86-64, version 1
(SYSV), dynamically linked (uses shared libs), for GNU/Linux 2.6.32,
BuildID[sha1]=0x91a7160a019b7f5f754264d920e257522c5bce67, stripped
[student@desktopX ~]$ file /home
/home: directory
```

The **head** and **tail** commands display the beginning and end of a file respectively. By default, these commands display 10 lines, but they both have a **-n** option that allows a different number of lines to be specified. The file to display is passed as an argument to these commands.

```
[student@desktopX ~]$ head /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
[student@desktopX ~]$ tail -n 3 /etc/passwd
gdm:x:42:42::/var/lib/gdm:/sbin/nologin
```

The **wc** command counts lines, words, and characters in a file. It can take a **-l**, **-w**, or **-c** option to display only the lines, words, or characters, respectively.

```
[student@desktopX ~]$ wc /etc/passwd
 39   70 2005 /etc/passwd
[student@desktopX ~]$ wc -l /etc/passwd ; wc -l /etc/group
 39 /etc/passwd
 63 /etc/group
[student@desktopX ~]$ wc -c /etc/group /etc/hosts
 843 /etc/group
 227 /etc/hosts
1070 total
```

COMMAND HISTORY

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

The exclamation point character, **!**, is a metacharacter that is used to expand previous commands without having to retype them. **!number** expands to the command matching the number specified. **!string** expands to the most recent command that begins with the string specified.

```
[student@desktopX ~]$ history
...Output omitted...
 23  clear
 24  who
 25  pwd
 26  ls /etc
 27  uptime
 28  ls -l
 29  date
 30  history
[student@desktopX ~]$ !ls
ls -l
total 0
drwxr-xr-x. 2 student student 6 Mar 29 21:16 Desktop
...Output omitted...
```

Useful command line-editing shortcuts

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+Left Arrow	Jump to the beginning of the previous word on the command line.
Ctrl+Right Arrow	Jump to the end of the next word on the command line.
Ctrl+r	Search the history list of commands for a pattern.

There are several other command line-editing commands available, but these are the most useful commands for beginning users. The other commands can be found in the **bash(1)** man page.

*Thank
you*

