

Introduction to Linux Commands

Starting in 2015 the CompTIA A+ examination includes basic Linux commands. Simply learning the commands will not be sufficient for the exam or for real life scenarios. You must first have a basic understanding of Linux and the Linux desktop user interface. There are many different versions of Linux to choose from but for this introduction I have chosen the Open SUSE Linux version for screen captures presentations as well as the descriptions of how to explore the command Linux commands. There will be more commands presented than are required for the current certification. I am sure the additional commands will soon appear as part of the list of basic commands required for the certification examination.

What is Linux?

To better understand what Linux operating system we must look at its beginning. The Linux operating was designed and developed by a Finnish computer science student Linus Torvalds in 1991. At that period in time computer science majors used UNIX main frame computers for their studies and assigned programming problems. Individual students did not have costly UNIX main frame computers. They would have to sign up for time at the campus to have access to the UNIX system. Torvalds designed Linux as a free to everyone to use computer operating system that simulated the UNIX operating system. The Linux operating system could be installed on a simple desktop or laptop computer. Today most Linux operating systems have similar functions and features as Windows operating system. What is very different is the terminology associated with the Linux technology. For example Windows user have a “home directory” represented by “C:”. Linux has the equivalent home directory but is called “root” and is represented by “/”. Linux popularity grew because it was free to use and free to modify. Early computer science students readily accepted and expanded the Linux operating system. As a result it rapidly grew in the tech community and is the major operating system used in many European countries and the throughout the world.

Today Linux can be found on all types of computer devices including servers, desktops, laptops, tablets, cell phones, network devices and industrial control systems used for manufacturing, automobiles, home security system and more. Another aspect of Linux that makes it so different from Windows operating systems is the fact that no one single company owns Linux. For example, Windows operating system is owned by Microsoft Corporation. Linux is developed by many different companies and no one single company owns the exclusive rights to the Linux operating system.

Variations of the Linux operating systems are referred to as *distributions*. Some common Linux operating system distributions are Linux Mint, Ubuntu, Debian, Fedora, FreeBSD, Red Hat, Mageia, Slackware, Steam OS, and SUSE. The two largest enterprise Linux versions used for network support and network servers are SUSE and Red Hat.

Note Linux is typically no cost. Cost is associated with systems that are prepackaged as a suite of applications. For example the two major distributions “Red Hat and SUSE” have a free open source version for desktops but they also have a costly version for server operating systems which incorporate many applications and tech support for the purchaser.

Linux and Microsoft Operating System Comparison.

	Microsoft	Linux
Ownership	Proprietary	Open Source
Program code	Program code is secrete and controlled by Microsoft Corp. Limited access is granted to some of the code for developers.	Programing code is freely distributed.
Cost	Requires purchase	Free
Distributions	3 or more variations	100+ variations

Android

The Android operating system is based upon Linux. Android was first developed specifically for the smart phone industry and has since been developed for tablet and personal computer applications as well as other electronic devices such as televisions, cars electronics, and wearable electronic devices.

Android also includes a browser based on the Web kit open source software which is the same open source browser used for Apple Safari browser. As you can see open source software can be used by many different organizations which results in systems looking and functioning very similar to each other.

Android was developed by a group of representatives from the mobile phone and related electronic device manufactures who first organized the group identified as the Open Handset Alliance. The leader of the group originally was Google.

Android is open source software and the software development kit (SDK) can be downloaded for free. If you have basic programming skills you can develop your own Android applications.

Android applications are often written in the Java programming language and run on the Linux kernel. You can download and install the development kit on to a Windows operating system or

MAC OSX or any number of Linux systems. After downloading and installing the SDK you can write the code for the Android applications.

Open Source

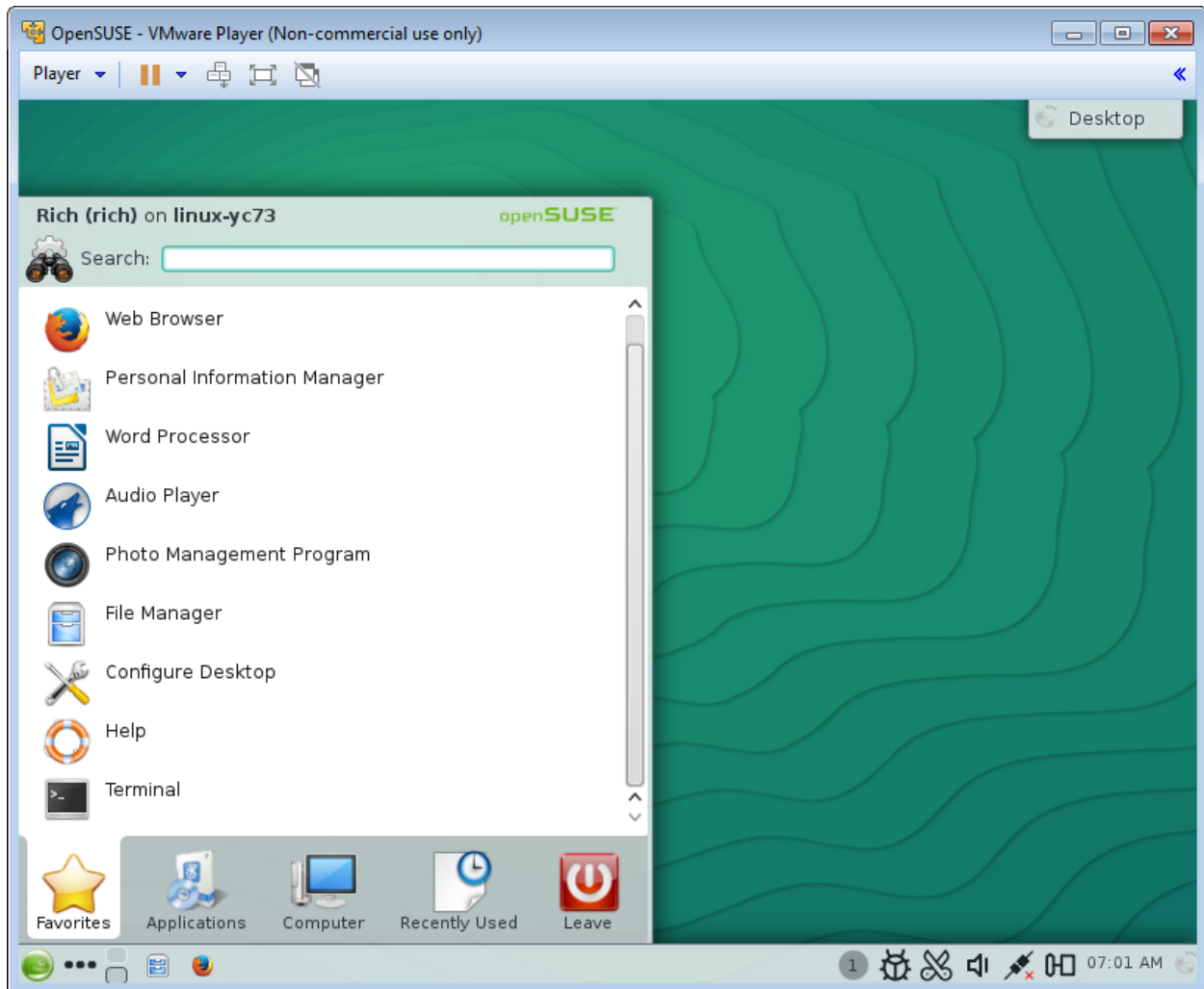
In brief the term open source applies to any software that has been developed with the intent to be freely distributed to anyone to use. The software can be modified and distributed for free without any type of royalty charge. Not only the software application can be distributed for free but also a complete copy of the program code known as the source code. A programmer can use the source code to create their own version of the software and then distribute it again for free. You will see some Open Source software being sold. Looking closer you will see that you are not actually being sold the open source software but being charge for other things such as the packaging, a manual, and such items. For example, many open source operating system such as SuSE and Red Hat sell copies of their operating system but they also maintain a website for downloading a free copy of the operating system as well as the source code.

Linux Interface

There are many different user interfaces or desktops incorporated into the Linux operating system. Some of the more popular ones are GNOME, KDE, Unity, Cinnamon, MATE, KDE, Xfce, and LXDE. The two most the most commonly used desktop interfaces are KDE and GNOME. The acronym KDE represents K Desktop Environment and the GNOME acronym represents GNU Network Object Model. In addition to the desktop environment is a large assortment of software applications or packages that are available for download or are included as part of the installation. Many of the software packages are designed for both of the two desktop environments and some are not.

Note: The really unique thing about Linux desktop environments is the fact that you can pick and choose from many different desktops available. Microsoft operating systems integrate the desktop environment into the operating system as well as many standard software applications. The operating system cannot be separated from the software application and function together as a unit. With Linux, you can separate the desktop environment from the operating system and choose a different desktop environment entirely different. This is the main reason there are so many variations. Some Linux systems are designed for a specific function such as video or photo editing or scientific calculation and graphing. Most Linux distributions are designed for general purpose use such as email, Internet and business applications. Many computer programmers prefer a Linux operating system for developing software application rather than a Microsoft operating system environment. Microsoft operating systems restrict access to many of the hardware and software features. Linux is much more liberal when it comes to accessing hardware and software. In fact, you can easily obtain a complete copy of the Linux program and made modifications to the system to suit your own purpose if you know how to program.

Below is a screen capture of Open SUSE user interface with the launch menu open.

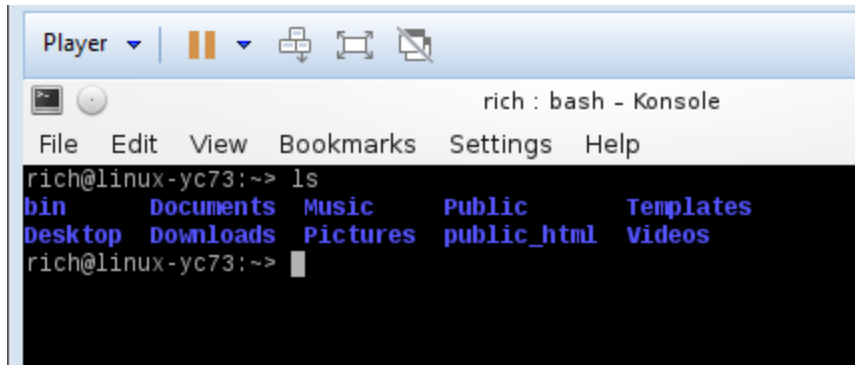


Open SUSE User Interface Menu

The user interface has similar features but do not match each other exactly. This is similar to the way Windows 7 and Windows 8 and Windows 10 are all Microsoft operating systems that have many of the same features but do not look or feel the same. Linux operating systems have similar features but do not have the same exact user interface look or feel.

Linux Terminal Emulator or Shell

Linux operating system use a terminal emulator also referred to as a shell to enter and execute text commands to the Linux operating system. Below is a screen capture of SuSE Linux Konsole which is a terminal emulator for the K Desktop Environment.



LS Command

The terminal emulator is similar to the Windows command prompt environment. Commands are entered at the command prompt which results in information being displayed on the screen or changes are made to the system configuration. For example you can change file permissions for a specific file using the terminal emulator.

In the screen capture the “**ls**” command has been entered which resulted in a list of directories has been presented in blue.

Partial list of Linux commands are listed below in the chart. These commands are similar for operating system based on Linux such as Android or Apple OSX.

ls	List files or directories
cp	Copy file
cd	Change directory
lp	Print from the command line.
Shutdown	Shut down the Linux system.
passwd	Change user password also the name of the password file where passwords are stored.
pwd	Print working directory
grep	Grep is used to search for a string of text in a file.
chmod	Sets the permission for a file or directory such as read only, or write.

chown	Change the owner of a file or directory
dd	Copies a file and changes the format of the file in the process.
ifconfig	Used to view the internet configuration of the network device
iwconfig	Similar to ifconfig but used for wireless devices.
su	Switch to another user such as super user or root. Password is required.
sudo	Switch to “substitute user” or “super user do”. Not a true root or super user.
ps	Display processes running on the device.
mv	Move or rename files.
apt-get	Command line tool for installing applications.
vi	Linux text editor.
dir	Display the current user directory
mkdir	Make a new directory
rm	Remove or delete a file.
rmdir	Remove or delete a directory.
clear	Clear the display area
Man	Access the manual pages
Finger	Display information about the current user.halt
halt	Shut down the system.
reboot	Reboots the system.
who	Displays all users currently logged on.
whoami	Displays who the current user is.

Linux Commands

Linux commands are similar among the various versions of Linux, but they do not match perfectly. This lack of standardization can be frustrating. You can usually type the command

followed by --help (two dashes before the word help) at the shell prompt to obtain help about a particular command. You can also access the manual pages for a particular command by typing man followed by the command. However, even these commands are not universal.

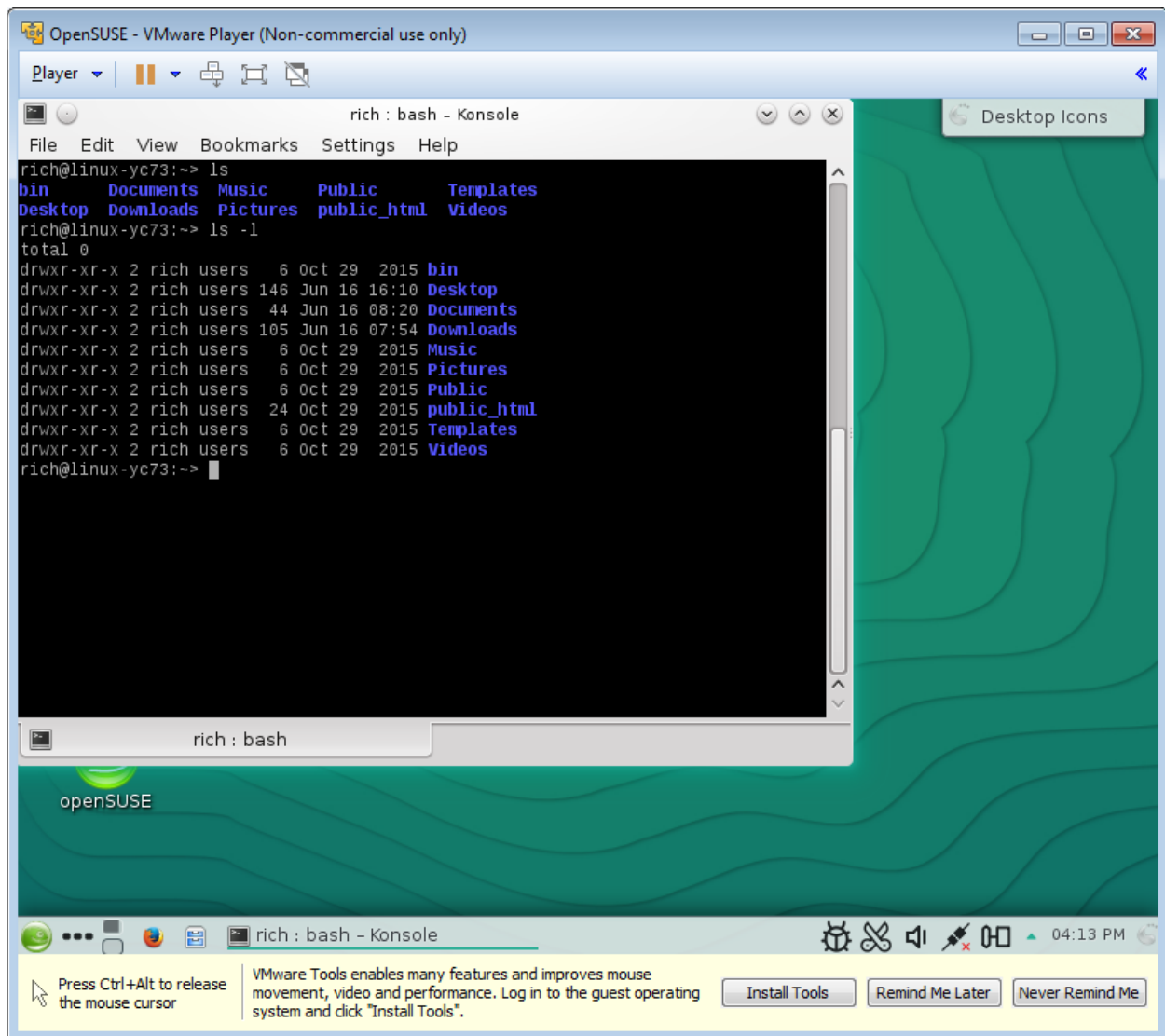
The command syntax is similar to that of commands issued from the command prompt in Windows. The command may stand alone or be followed by options, an argument, or both. The following shows the complete syntax of a Linux command:

command <options> <argument>

An option alters the output of a command. Some options must be preceded with a dash (-) or with two dashes (--). Some options do not need a dash at all. In any case, a space must exist between the command and the option. Options, like commands and file names, are case-sensitive.

An argument is what the command is to act on. It can be a file name, a directory name, wild card characters, such as the asterisk (*) or question mark (?); or other piece of information designated as an argument for a particular command.

Look at the example below. The “ls” command followed by the “-l” command. The “-l” argument modifies the ls command to list the directories in long fashion. The directory names appear in blue.



LS L

Note: Some commands can only be issued by the super user. For example on most modern Linux systems you cannot inspect nor make changes to the system configuration. The ifconfig and iwconfig require elevated to super user to successfully run the commands.

To learn more about OpenSUSE or to download a copy visit the following site.

<http://opensuse-guide.org/>

You can also conduct a search using the key terms Open SUSE.

Also for a list of other guides.

<https://www.suse.com/documentation/sles11/#user>

Review Question Answers

1. Who developed the first Linux operating system?
2. What is the name and symbol of the home directory in Linux?
3. What is a distribution?
4. Name five Linux distributions?
5. Is Microsoft Windows 10 proprietary or open source?.
6. Is Linux proprietary or open source?
7. True or false Linux user interface is standard for all distributions?
8. Name seven variations in Linux user interface.
9. What is another name for the Linux operating system terminal emulator?
10. List the complete syntax of a Linux command. Include the three terms.
11. Android is based upon which operating system?
12. Which Linux command is used to create a directory?
13. Which Linux command changes to a substitute user?
14. Which command is used to switch to another user?
15. Which command list directories or files?
16. Which Linux command provides information about a wired network connection?
17. Which Linux command provides information about a wireless network connection?
18. Which Linux command displays the current directory?
19. Which Linux command will shutdown the Linux operating system?
20. Which Linux command is used to change the user password?

Review Question Answers

1. Who developed the first Linux operating system? **Linus Torvalds**
2. What is the name and symbol of the home directory in Linux? **The home directory but is called "root" and is represented by "/"**.
3. What is a distribution? **Variations of the Linux operating systems are referred to as distributions.**
4. Name five Linux distributions? **Some common Linux operating system distributions are Linux Mint, Ubuntu, Debian, Fedora, FreeBSD, Red Hat, Mageia, Slackware, Steam OS, and SUSE.**
5. Is Microsoft Windows 10 proprietary or open source? **Proprietary.**
6. Is Linux proprietary or open source? **Open source.**
7. True or false Linux user interface is standard for all distributions? **False**
8. Name seven variations in Linux user interface. **GNOME, KDE, Unity, Cinnamon, MATE, KDE, Xfce, and LXDE**
9. What is another name for the Linux operating system terminal emulator? **Linux operating system use a terminal emulator also referred to as a shell.**
10. List the complete syntax of a Linux command. Include the three terms.
command <options> <argument>
11. Android is based upon which operating system? **The Android operating system is based upon Linux.**
12. Which Linux command is used to create a directory? **mkdir**
13. Which Linux command changes to a substitute user? **sudo**
14. Which command is used to switch to another user? **su**
15. Which command list directories or files? **ls**
16. Which Linux command provides information about a wired network connection? **ifconfig**
17. Which Linux command provides information about a wireless network connection? **iwconfig**
18. Which Linux command displays the current directory? **dir**
19. Which Linux command will shutdown the Linux operating system? **shutdown**

20. Which Linux command is used to change the user password? **passwd**