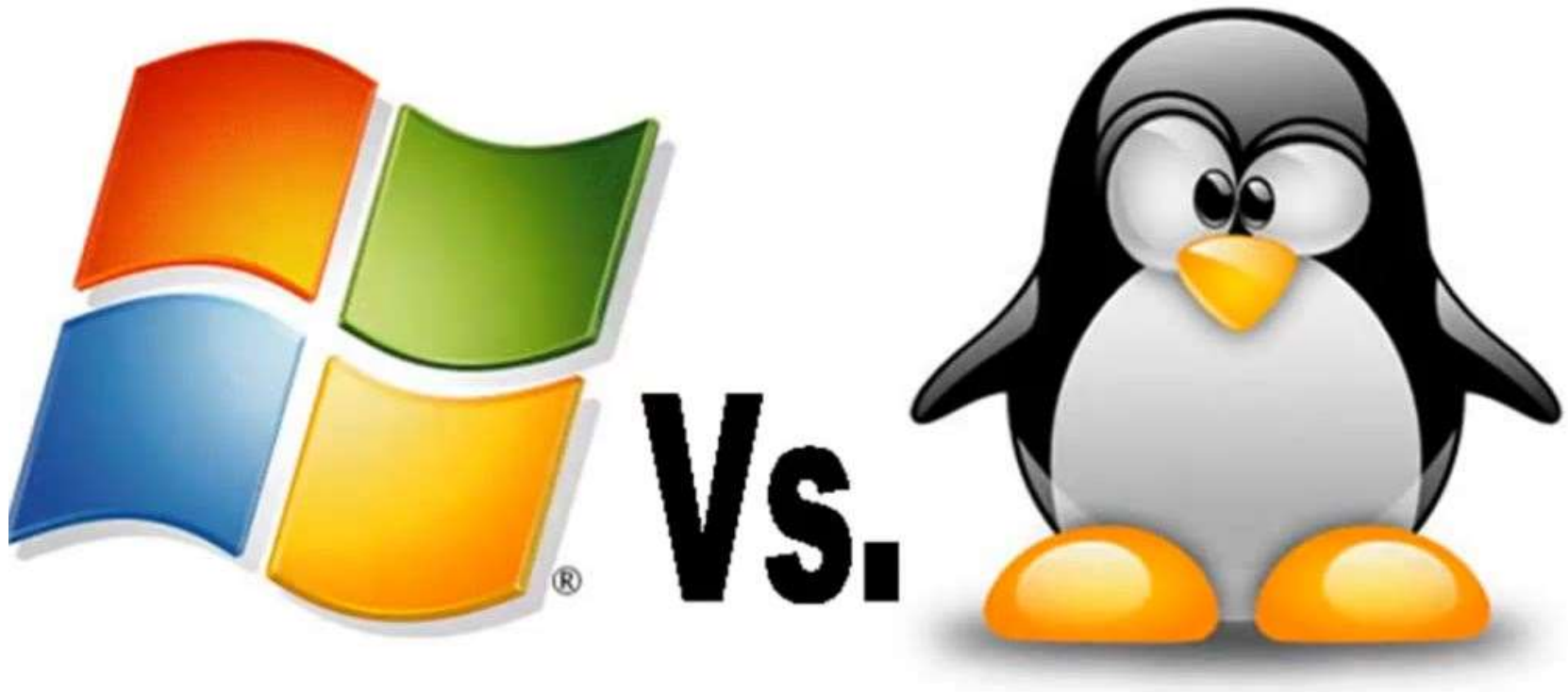
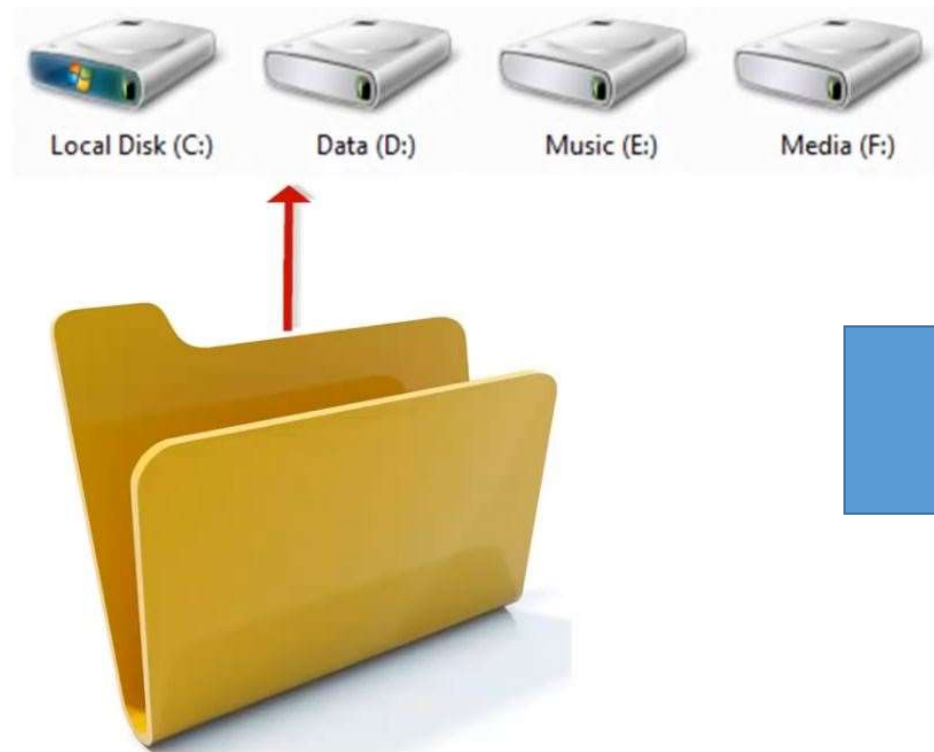


Windows vs. Linux Comparisons

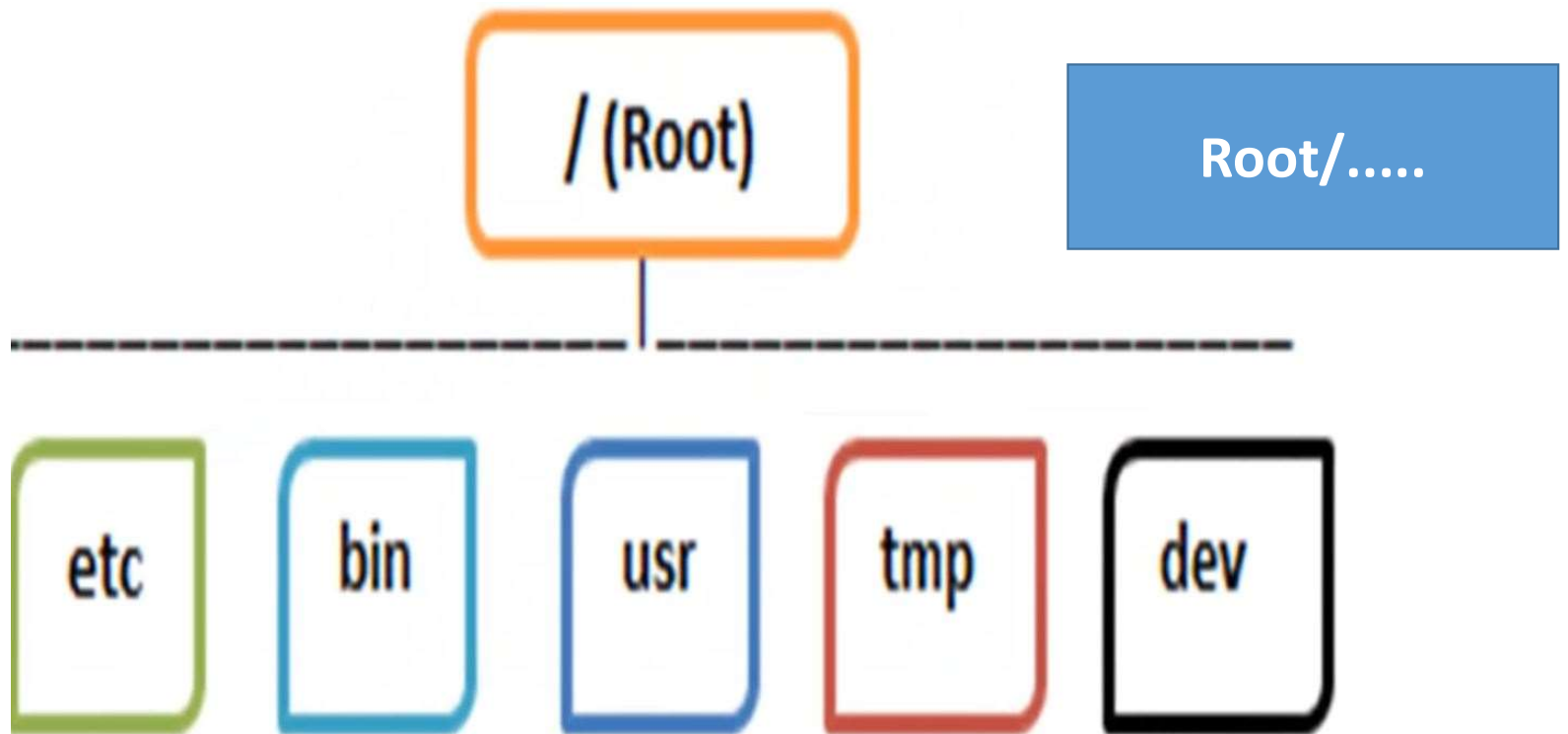


Windows - Files are stored in “Folders”
residing on logical volumes



C:\.....

Linux – Files are stored in a “Directory Tree” file system starting with the Root directory



In Linux and Unix EVERYTHING is a File

- Directories are files
- Files are files
- Devices are files (printer, mouse, keyboard, etc)

General Files

- Also called *Ordinary files*
- Contain image, video, program or simply text
- **ASCII** or a **Binary** format
- Most commonly used files



Lorem ipsum
dolor sit amet,
consectetur
adipiscing elit

Data



11011011

Directory Files

- A warehouse for other file types
- Directory file within a directory

This similar to the concept of folders found in Windows operating system.

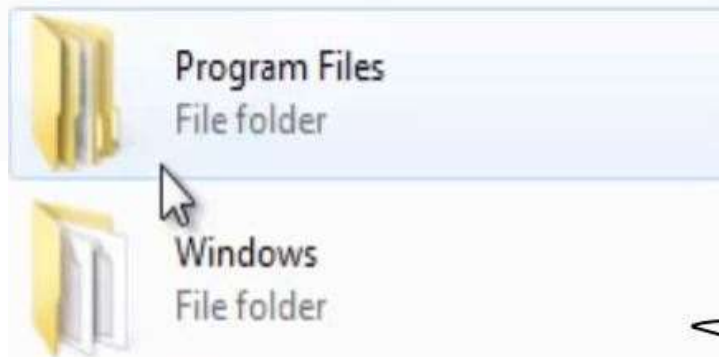
From this point is where the difference between Linux and Windows becomes significant. →

Windows – System and Program files are generally saved in drive C

Hard Disk Drives (4)

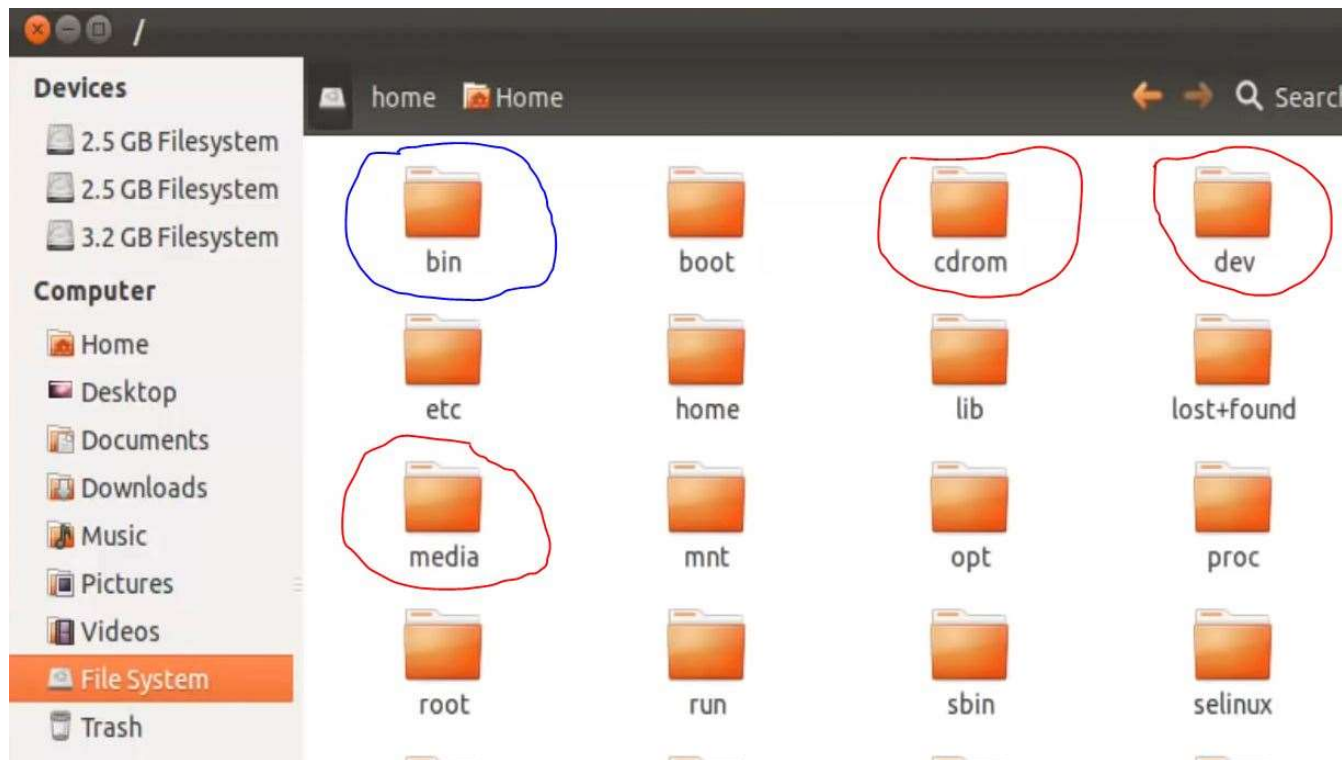


Devices with Removable Storage (2)



Linux Directories - Programs are in /bin. Removable media devices are in /media. Cdroms are in /cdrom. Printers, peripherals, disks, mouse, keyboard, e.t.c and mounted volumes are in /dev. Mounted volumes are in /mnt.

Remember, these identities are files as everything in Linux and Unix is a file.



Directories are found under "File System" or "Computer" when using the GUI.

Windows – Mounted logical volumes using assigned drive letters. (Drive letters are a must in order for users, GUI functions or any applications to gain access the volume).

When you assign a drive letter, the drive is **mounted**.

When you completely remove a drive letter, the drive is then **unmounted**.

eg: chkdks /f

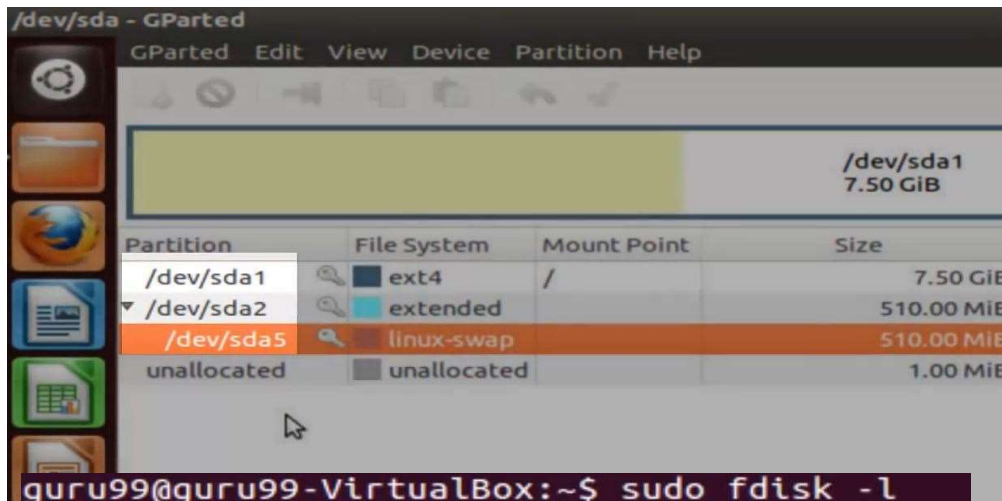
File Action View Help

Volume	Layout	Type	File System	Status	Capacity	Free Spa...	% Free
	Simple	Basic		Healthy (Active, Recovery Partition)	450 MB	450 MB	100 %
	Simple	Basic	NTFS	Healthy (Primary Partition)	350 MB	334 MB	95 %
Disk0-P1 Win 10 Ent Boot (C:)	Simple	Basic	NTFS	Healthy (Boot, Page File, Crash Du...	67.58 GB	10.73 GB	16 %
Disk0-P2 Data and Files (D:)	Simple	Basic	NTFS	Healthy (Primary Partition)	527.81 GB	466.80 GB	88 %
Disk1-P1 Instances (E:)	Simple	Basic	NTFS	Healthy (Primary Partition)	1464.84 GB	422.36 GB	29 %
Disk1-P2 Enterprise Server (H:)	Simple	Basic	NTFS	Healthy (Primary Partition)	3192.56 GB	555.90 GB	17 %
Disk2-P1 Backups (F:)	Simple	Basic	NTFS	Healthy (Primary Partition)	1862.89 GB	654.29 GB	35 %

Disk	Layout	Type	File System	Status	Capacity	Free Space	% Free
Disk 0	Basic	596.17 GB	Online				
	350 MB NTFS	Healthy (Primary F					
	Disk0-P1 Win 10 Ent Boot (C:)	67.58 GB NTFS	Healthy (Boot, Page File, Crash Dump				
	450 MB	Healthy (Active, Re					
	Disk0-P2 Data and Files (D:)	527.81 GB NTFS	Healthy (Primary Partition)				
Disk 1	Basic	4657.40 GB	Online				
	Disk1-P1 Instances (E:)	1464.84 GB NTFS	Healthy (Primary Partition)				
	Disk1-P2 Enterprise Server (H:)	3192.56 GB NTFS	Healthy (Primary Partition)				
Disk 2	Basic	1862.89 GB	Online				
	Disk2-P1 Backups (F:)	1862.89 GB NTFS	Healthy (Primary Partition)				
Disk 3	Removable (M:)						

UEFI

Linux – Disks in /dev. (Linux does NOT use drive letters to designate the volumes).

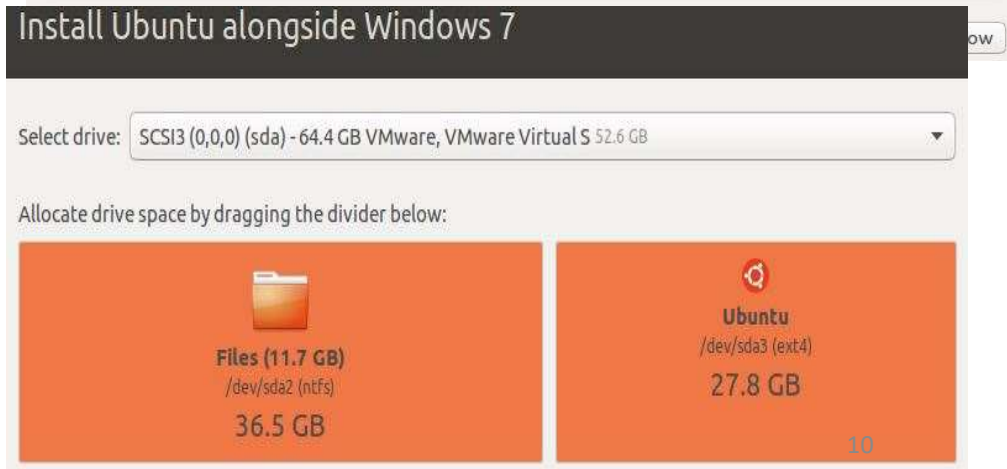
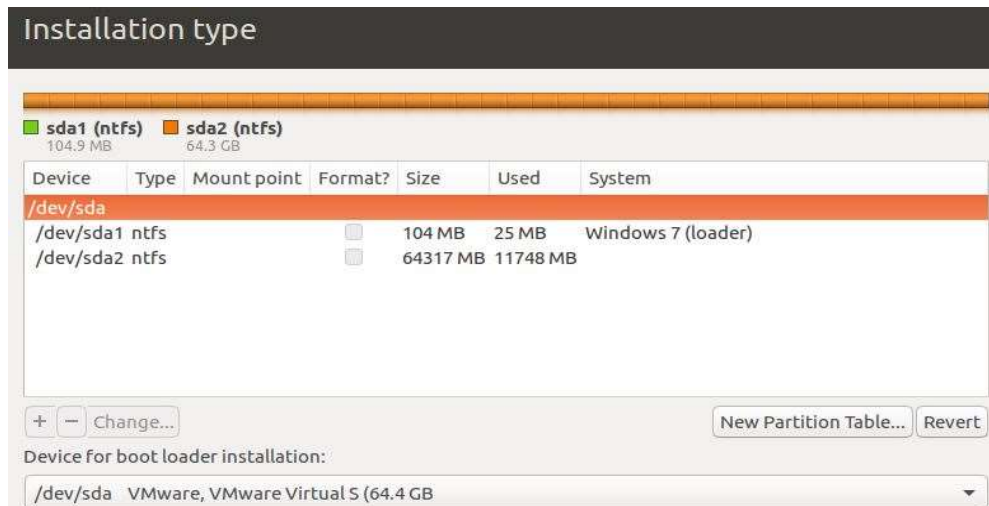


```
guru99@guru99-VirtualBox:~$ sudo fdisk -l
[sudo] password for guru99:

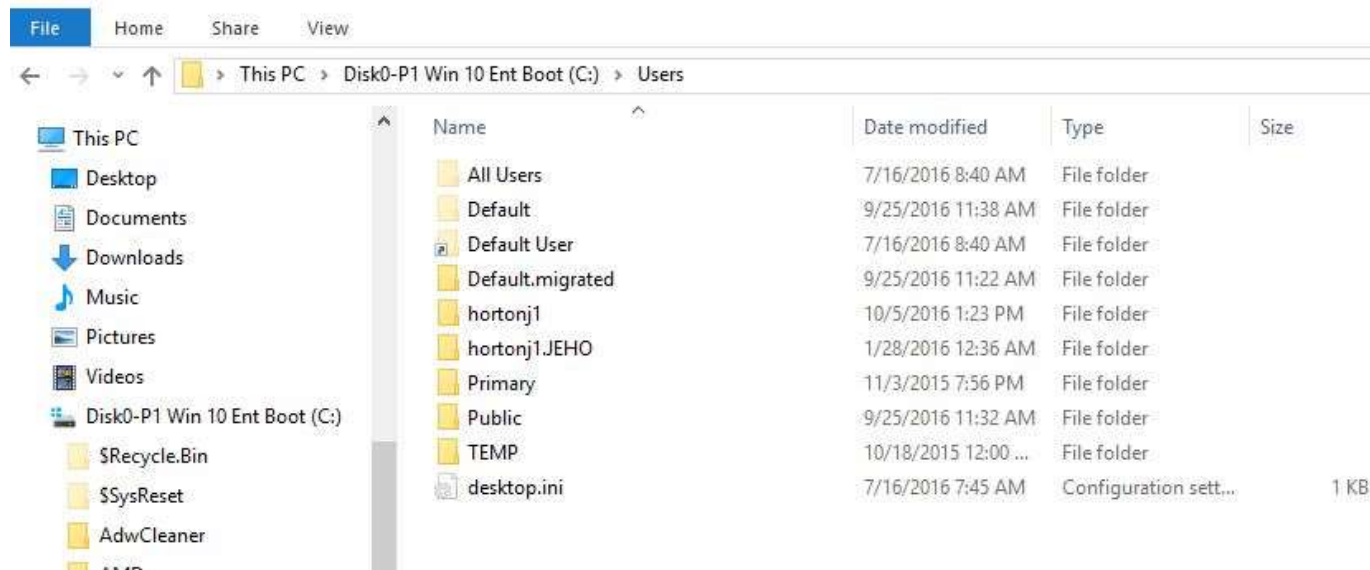
Disk /dev/sda: 8589 MB, 8589934592 bytes
255 heads, 63 sectors/track, 1044 cylinders,
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x000ac29b

   Device Boot      Start         End      Size   File System  Mount Point
  /dev/sda1  *        2048     15728639   7860 MB ext4          /
  /dev/sda2                15730686   16775167    510 MB extended
  /dev/sda5                15730688   16775167    510 MB linux-swap

```



Windows – User Accounts (Profiles)



Linux – Regular (Standard) User. Note: your user account is accessible via /home, as it is a regular user so you do not have access to other user accounts, nor any visual aspect of any possibly existing accounts, on the system unless you are logged on as “root”. (similar to Windows but more security due to reduced attack surface)





Root User

- Can access restricted files, install software and has administrative privileges



The SUDO Command

Typical/Ordinary users *do not* have administrative privileges. If a specific command requires administrative root permissions in order to run, these users *must* elevate to that level via `sudo <command>`.

Of course, with all elevation of this type, password authentication will be required.

Note: this elevation is only temporary during the execution of that specific command. Immediately after the command is completed, elevation and administrative access will end automatically.

Note: For security reasons, the typed password is not displayed. You do not need to enter your password again for the next five minutes.

- Can access restricted files, install software and has administrative privileges

Information about the Root Account

The Root account has full administrative rights, similar to Administrator Group account members in Windows. But with Windows, you can add as many administrative accounts as you like to the Administrator Group.

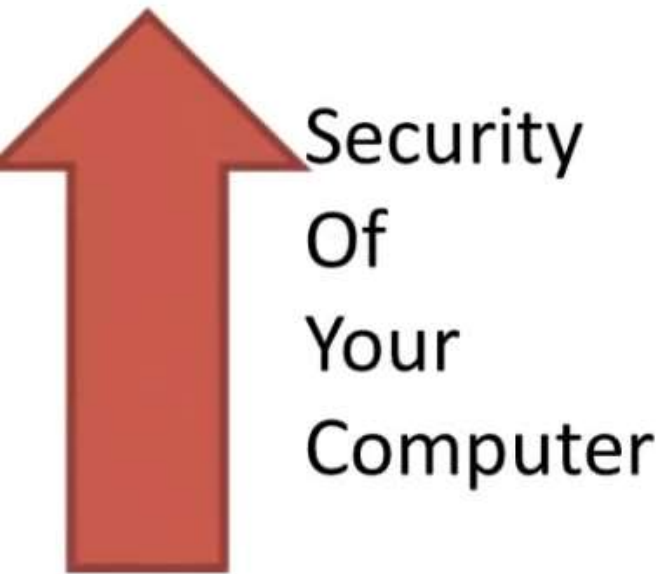
And unlike Windows, in Linux “there can be only one”, the Root account. There is no Linux Administrator Group that you can add members to. Root stands alone. Also unlike Windows, the Root account has complete UNRESTRICTED access to absolutely ALL levels of the OS.

The Root account in Linux Desktops is default “disabled”, simply by not having a password assigned to it (note: the Administrator account on Windows Desktops is also disabled by default). **“Enabling” the Root account in Linux Desktops is not recommended.**

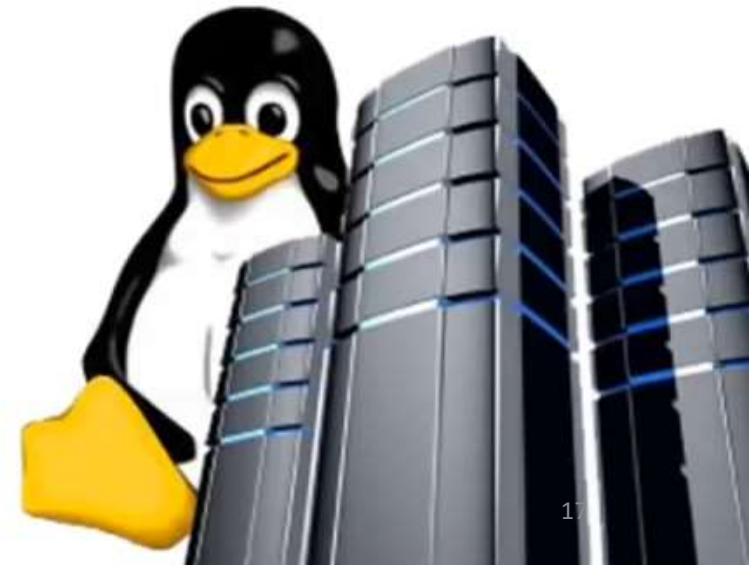
Note: Windows Servers and Linux Servers both have their Administrator Account and their Root Account enabled out of the box.

Oh boy, here we go. You could enable the Desktop Root account (i.e. set a password). This process is described via CLI command “man sudo_root”

Service User



Apache

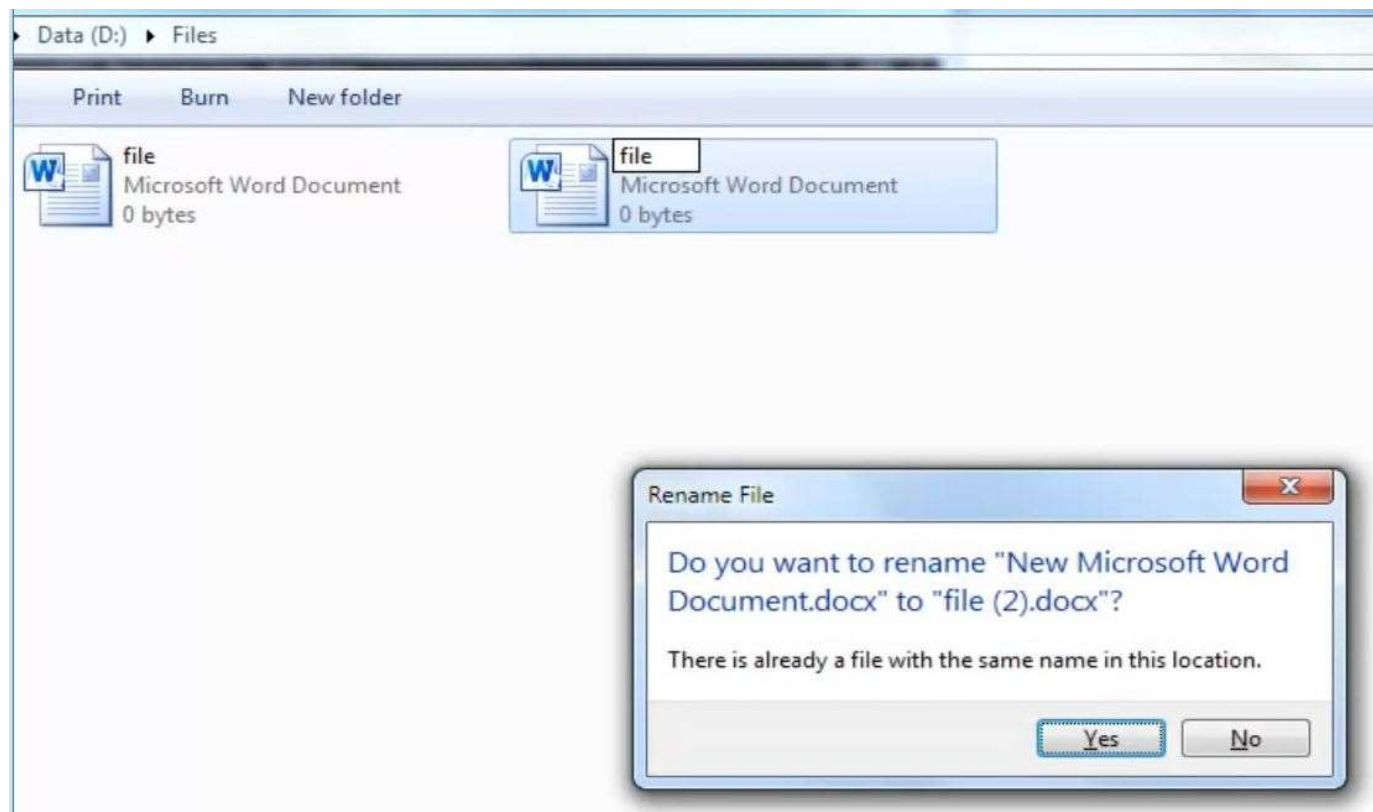


NOTE

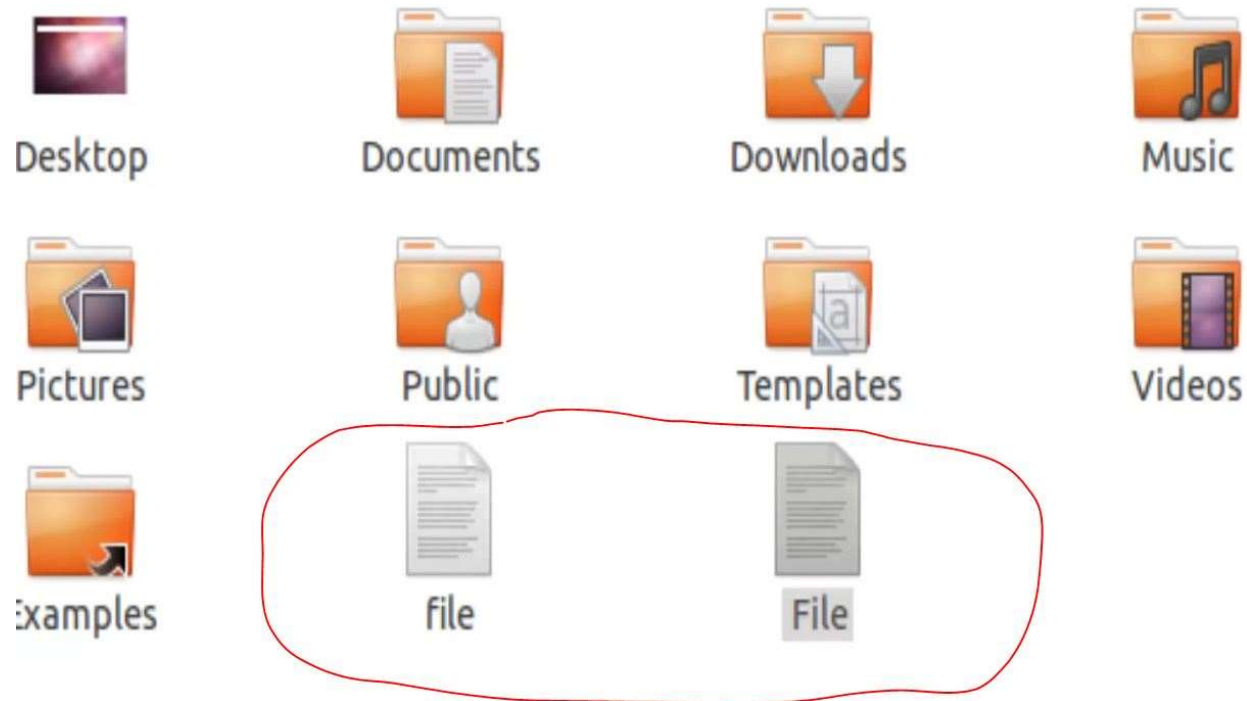
You will **not** see service accounts in Linux Desktop version but Linux Server editions will have them.

This is exactly the same principle when talking about Windows Server and Window workstations (Win7, Win8, Win10)

Windows – file name convention, you **cannot** have 2 files with the same name in the same folder.



Linux – file name convention, you **can** have 2 files with the same name in the same directory providing the name use different cases (**once again, Linux is case-sensitive**).



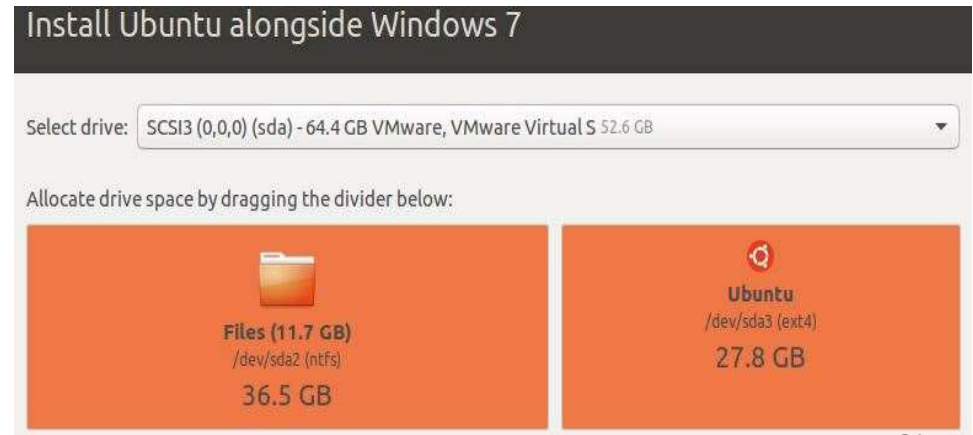
Technical Comparisons – *File System*

Microsoft Windows

- FAT16 (used in DOS and Windows 3.x)
- **FAT32** (used in Win95, Win98)
- ExFAT (for flash-based storage)
- **NTFS** (used in XP until present)
- ReFS (optional use in Server 2012, Server 2016)

Linux Distros

- Ext2
- Ext3
- **Ext4**



FEATURE	FAT32	NTFS
Max. Partition Size	2TB	2TB
Max. File Name	8.3 Characters	255 Characters
Max. File Size	4GB	16TB
File/Folder Encryption	No	Yes
Fault Tolerance	No	Auto Repair
Security	Only Network	Local and Network
Compression	No	Yes
Conversion	Possible	Not Allowed
Compatibility	Win 95/98/2K/2K3/XP	Win NT/2K/XP/Vista/7

Some of the many reasons why more admins are beginning to implement Linux into their infrastructures for File Servers and Web Servers.

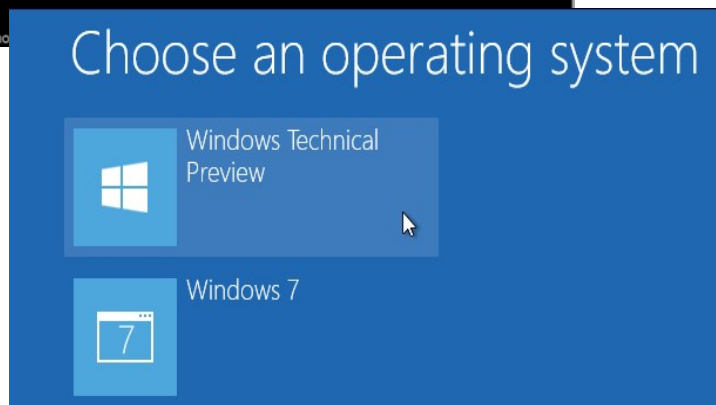
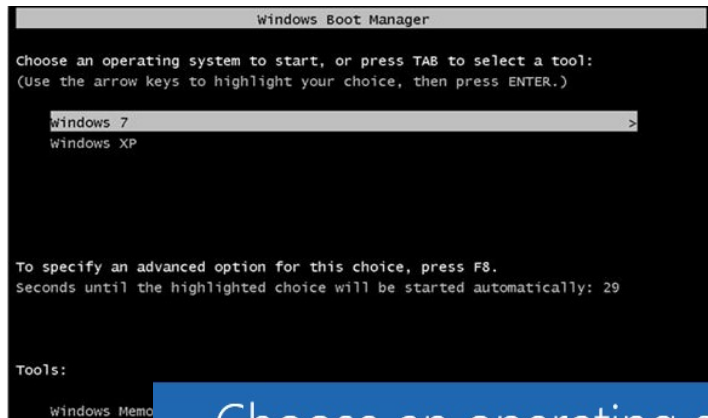
Windows NTFS has a practical maximum partition limit of 2TB (*ACL is limited if higher*). But, unlike Windows, Linux Ext4 has a fully applicable maximum partition size 16TB.

For Windows NTFS, this is also the maximum path length. But, unlike Windows, Linux Ext4 has a maximum path length of 4096.

Technical Comparisons – *Boot Loaders*

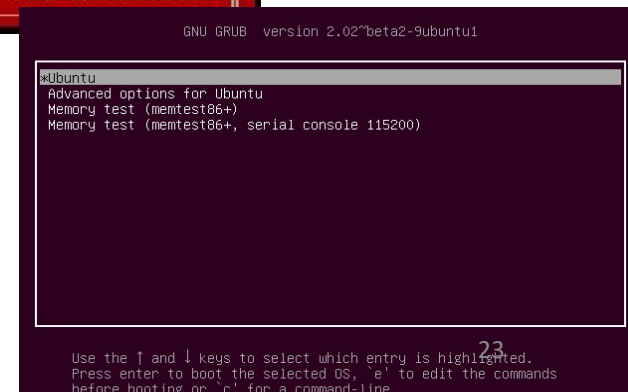
Microsoft Windows

- NTLDR



Linux Distro

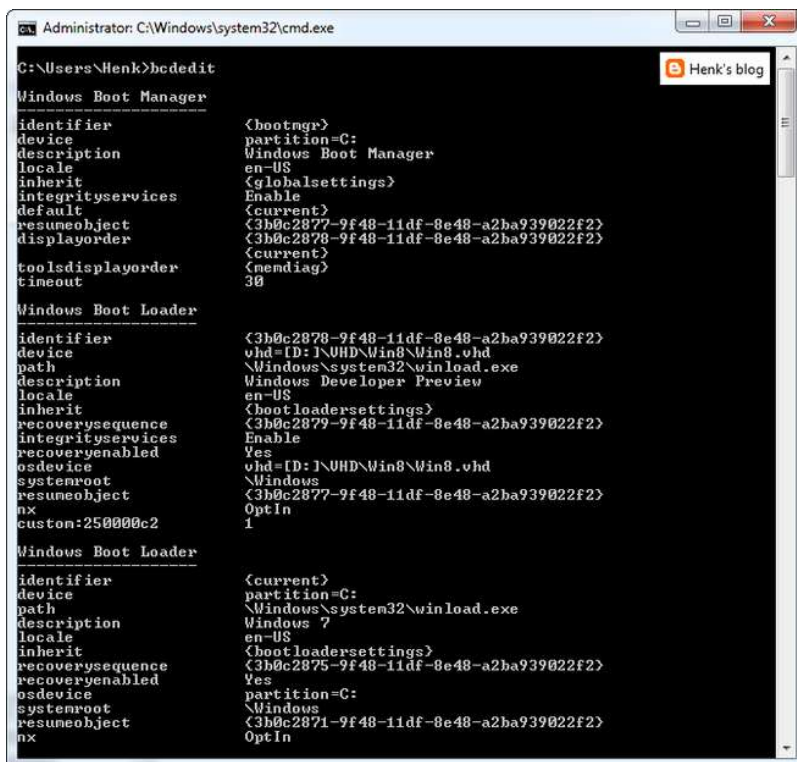
- LILO
- GRUB, GRUB2



Technical Comparisons - *Bootloader Configurations*

Microsoft NTDLR editor

- Bcdedit



```
Administrator: C:\Windows\system32\cmd.exe
C:\Users\Henk>bcdedit

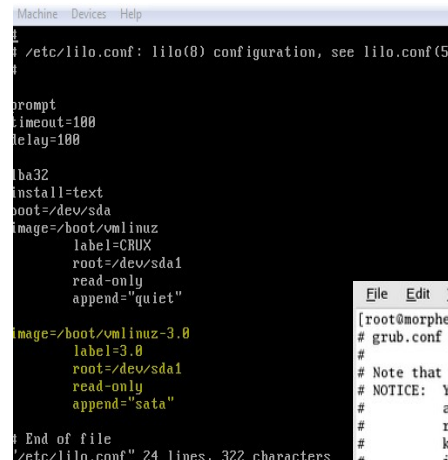
Windows Boot Manager
-----
identifier              <bootmgr>
device                  partition=C:
description              Windows Boot Manager
locale                  en-US
inherit                  <globalsettings>
integrityservices        Enable
default                  <current>
resumeobject             <3b0c2877-9f48-11df-8e48-a2ba939022f2>
displayorder             <3b0c2878-9f48-11df-8e48-a2ba939022f2>
toolsdisplayorder        <current>
timeout                  30

Windows Boot Loader
-----
identifier              <3b0c2878-9f48-11df-8e48-a2ba939022f2>
device                  vhd=ID: \UHD\Win8\Win8.vhd
path                    \Windows\system32\winload.exe
description              Windows Developer Preview
locale                  en-US
inherit                  <bootloadersettings>
recoverysequence         <3b0c2879-9f48-11df-8e48-a2ba939022f2>
integrityservices        Enable
recoveryenabled          Yes
osdevice                 vhd=ID: \UHD\Win8\Win8.vhd
systemroot               \Windows
resumeobject             <3b0c2877-9f48-11df-8e48-a2ba939022f2>
nx                        OptIn
custon:250000c2          1

Windows Boot Loader
-----
identifier              <current>
device                  partition=C:
path                    \Windows\system32\winload.exe
description              Windows 7
locale                  en-US
inherit                  <bootloadersettings>
recoverysequence         <3b0c2875-9f48-11df-8e48-a2ba939022f2>
recoveryenabled          Yes
osdevice                 partition=C:
systemroot               \Windows
resumeobject             <3b0c2871-9f48-11df-8e48-a2ba939022f2>
nx                        OptIn
```

Linux configuration files

- /etc/lilo.conf
- /boot/grub/grub.conf



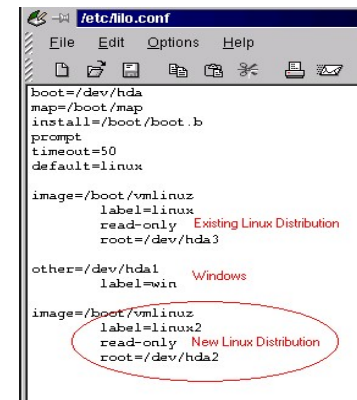
```
Machine: Devices: Help
/etc/lilo.conf: lilo(8) configuration, see lilo.conf(5)

prompt
timeout=100
delay=100

ba32
install=text
boot=/dev/sda
image=/boot/vmlinuz
label=CRUX
root=/dev/sda1
read-only
append="quiet"

image=/boot/vmlinuz-3.8
label=3.8
root=/dev/sda1
read-only
append="sata"

End of file
/etc/lilo.conf" 24 lines, 322 characters
```

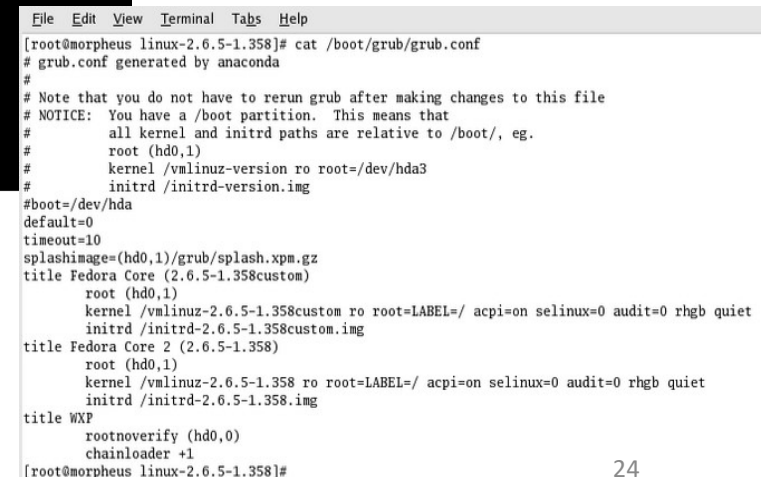


```
File Edit Options Help
boot=/dev/hda
map=/boot/map
install=/boot/boot.b
prompt
timeout=50
default=linux

image=/boot/vmlinuz
label=linux
read-only Existing Linux Distribution
root=/dev/hda3

other=/dev/hda1
label=win Windows

image=/boot/vmlinuz
label=linux2
read-only New Linux Distribution
root=/dev/hda2
```

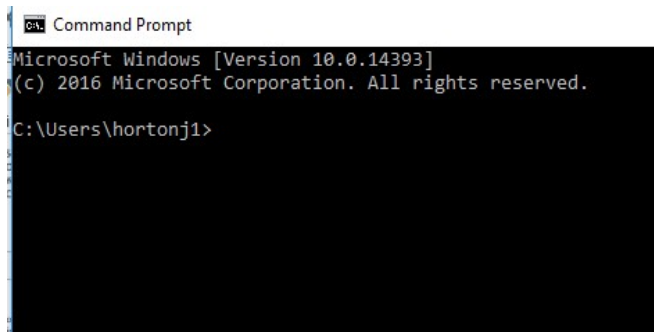


```
File Edit View Terminal Tabs Help
[root@morpheus linux-2.6.5-1.358]# cat /boot/grub/grub.conf
# grub.conf generated by anaconda
#
# Note that you do not have to rerun grub after making changes to this file
# NOTICE: You have a /boot partition. This means that
#           all kernel and initrd paths are relative to /boot/, eg.
#           root (hd0,1)
#           kernel /vmlinuz-version ro root=/dev/hda3
#           initrd /initrd-version.img
#boot=/dev/hda
default=0
timeout=10
splashimage=(hd0,1)/grub/splash.xpm.gz
title Fedora Core (2.6.5-1.358custom)
    root (hd0,1)
    kernel /vmlinuz-2.6.5-1.358custom ro root=LABEL=/ acpi=on selinux=0 audit=0 rhgb quiet
    initrd /initrd-2.6.5-1.358custom.img
title Fedora Core 2 (2.6.5-1.358)
    root (hd0,1)
    kernel /vmlinuz-2.6.5-1.358 ro root=LABEL=/ acpi=on selinux=0 audit=0 rhgb quiet
    initrd /initrd-2.6.5-1.358.img
title WXP
    rootnoverify (hd0,0)
    chainloader +1
[root@morpheus linux-2.6.5-1.358]#
```

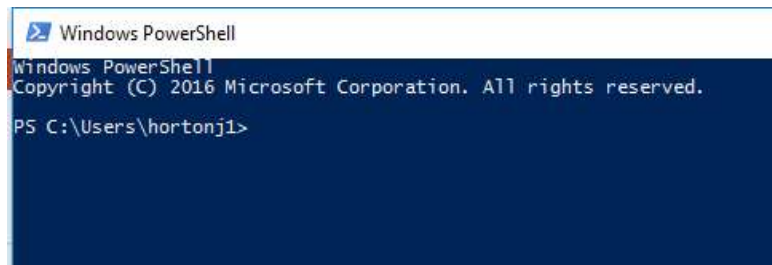

Technical Comparisons – *Command Line Interface (CLI)*

Microsoft Windows

- Command Prompt (cmd)
- PowerShell
- [elevate as administrator]

A screenshot of the Windows Command Prompt window. The title bar reads "Command Prompt". The text inside shows "Microsoft Windows [Version 10.0.14393]" and "(c) 2016 Microsoft Corporation. All rights reserved." followed by the prompt "C:\Users\hortonj1>".

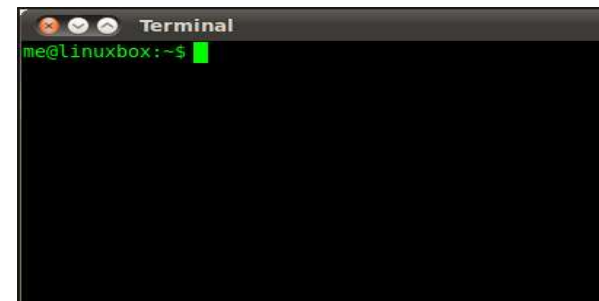
```
Command Prompt
Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.
C:\Users\hortonj1>
```

A screenshot of the Windows PowerShell window. The title bar reads "Windows PowerShell". The text inside shows "Windows PowerShell" and "Copyright (C) 2016 Microsoft Corporation. All rights reserved." followed by the prompt "PS C:\Users\hortonj1>".

```
Windows PowerShell
Copyright (C) 2016 Microsoft Corporation. All rights reserved.
PS C:\Users\hortonj1>
```

Linux Distros

- Terminal
- *Note: there are also a wide variety of optional open source terminal packages available from various repositories.*
- [elevate as root via sudo]

A screenshot of a Linux terminal window. The title bar reads "Terminal". The text inside shows the prompt "me@linuxbox:~\$" followed by a green cursor.

```
Terminal
me@linuxbox:~$
```