AINUX

— TASTE OF LINUX —

WELCOME TO THE WORLD OF LINUX

DAY - 8

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Adding Disks, Partitions and File Systems to a Linux System

Disk Partitioning

Disk partitioning allows a hard drive to be divided into multiple logical storage units, referred as partitions. To organized hard-disk we can use two basic mechanism.

1. Partitions
2. LVM (Logical Volume Management)

Partitions : Partitions use the fixed amount of disk space.
LVM : In LVM we can extended the volume size into the volume group.

Disk Partitioning Scheme

MBR (Master Boot Record): - Since 1982, the MBR partitioning scheme decide how disk should be partitioned. This scheme supports a maximum of 4 primary partition. On Linux system we can create maximum 15 partitions with using extended and logical partitions. MBR scheme can support maximum 2TB size partition.

GPT (GUID Partitioning Table): - GPT is the part of **UEFI** (**Unified Extensible Firmware Interface**). UEFI standard resolve limitations of MBR, like GPT support up to 128 partitions in single hard-disk. MBR uses 32 bits for storing logical block addresses where as GPT uses 64bits. GPT supports maximum 8ZB (zeta byte).

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The **proc/partitions** file contains a table with major and minor number of partitioned devices. The **major** number corresponds to the device type. In this case 3 corresponds to **ide** and 8 to **sd**. The **major** number determines the **device driver** to be used with this device. The **minor** number is a unique identification of an instance of this device type. All the hard-disks are stored into '**/dev**' directories.

To display your add hard-disk

ls /dev

To display partitions list

#cat /proc/partitions

To create partitions [MBR based]

# fdisk /dev/sdb	['sdb' is the newly added hard-disk]
#m	[List Manu]
#p	[to display partition table]
#n	[to create new partition]
#p	[to create primary partition]
#1	[to create 1st primary partition]
#press enter	[to select first sector as default]
# +10G	[to create 10GB partition]

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#p [to display partition table]
#w [to write the changes]

To delete the partitions

#fdisk /dev/sdb ['sdb' is the hard-disk]
#m [List Manu]
#p [to display partition table]
#d [to delete new partition]
#2 [select the partition number to delete, here I'm deleting 2nd partition]
#p [to display partition table]
#w [to write the changes]

To change the partition type

#fdisk /dev/sdb ['sdb' is the hard-disk]
#m [List Manu]
#p [to display partition table]
#t [to change the partition type]
#2 [select the partition number, here I'm selecting 2nd partition]
#l [to display the partition type]
#82 [select the Hex value, here I'm selecting 82 as 'swap' partition]
#p [to display partition table]
#w [to write the changes]

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Linux Supported File System

Specifications	EXT2	EXT3	EXT4	XFS
Stands for	Second Extended file system.	Third Extended file system.	Forth Extended file system.	X-File System
Introduced	1993	2001	2008	2009
Journaling feature	Does not support	It Supports	It Supports	It Supports
Max file size supports	2TB	2TB	16TB	100TB
Max support size	8TB	16TB	16TB	100TB

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Other File system supported by Linux distributions

- ❑ Btrfs [It will be used in future Linux distributions]
- ❑ vfat [For Compatibility with other Operating System]
- ❑ GFS2 [It is used in cluster environment]
- ❑ Gluster [It is useful for cloud environment]

To apply a file system on a partition

#mkfs –t file-system-type partition-name
i.e, #mkfs –t xfs /dev/sdb2
Or
#mkfs.xfs partition-name
i.e, #mkfs.xfs /dev/sdb2
i.e, #mkfs.xfs -L mydata /dev/sdb2 [You can specify label for a volume]

To mount a partition under a folder

mount device-name folder-name
i.e, #mount /dev/sdb1 /mnt
i.e, #mount LABEL=mydata /mnt [You also can mount a partition with it's volume label]

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To permanently mount a partition under a folder

#vim /etc/fstab

Type the following [Here I'm going to mount 'sdb1' partition under '/iant-data' folder]

/dev/sdb1 /iant-data xfs defaults 1 2

Then save and exit.

[1st Column shows = *device-specification*
2nd Column shows = *mountpoint*
3rd Column shows = *fs-type*
4th Column shows = *options/parameters*
5th Column shows = "dump" utility will make a backup of the file system. "0" indicates disable backup and "1" indicates enable backup.
6th Column shows = The last field indicates when the "fsck" program should check the file system for errors. "0" means disable checking, "1" is for the root (main) file system, and "2" indicates the file system is checked after the root file system.

To check your fstab status

#mount -a [If is there any fault in script, it will shows you]

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To create partitions [GPT based]

```
# gdisk  /dev/sdc          ['sdc'  is the newly added hard-disk]
#?                         [List Manu]
#p                         [to display partition table]
#n                         [to create new partition]
#1                         [to create 1st primary partition]
#press enter               [to select  first sector as default as "2048"]
# +10G                     [to create 10GB partition]
# 8300                     [put hex value to create Linux Partition]
# w                        [to save your settings]
# y                        [to proceed to save your settings]
# q                        [to exit]
```

[Note: - if you put + value as partition size, then it takes from beginning from first sector. And if you put '-' value, then it indicates the partition size will end before that end sector.]

To initiate the kernel to re-read the new partition

```
# partprobe /dev/sdc
```

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To delete partitions [GPT based]

```
# gdisk  /dev/sdc          ['sdc'  is the newly added hard-disk]
#?                         [List Manu]
#p                         [to display partition table]
#d                         [to create new partition]
# w                        [to save your settings]
# y                        [to proceed to save your settings]
```

To verify the connected device

```
# blkid   /dev/sdc
```

Adding and Enabling Swap Space

To add a swap partition

```
#fdisk /dev/sdb        ['sdb'  is the hard-disk]
#m                     [List Manu]
#p                     [to display partition table]
#t                     [to change the partition type]
#2                     [select the partition number, here I'm selecting 2nd partition]
#l                     [to display the partition type]
#82                    [select the Hex value, here I'm selecting 82 as 'swap' partition
```

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#p [to display partition table]
#w [to save the changes]

To activate the swap partition
#mkswap /dev/sdb2

To enable the swap partition
#swapon /dev/sdb2

To check the memory information
#swapon /dev/sdb2

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THANK YOU

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