System Administration

Session 5 CONTENT

- File system management
- tar utility
- Compressing utilities
- Checking free space
- Inode
- Soft link
- Hard link
- Regular Expressions
- Cron jobs

Adding a new disk

fdisk /dev/sda

To show the menu of command options, type m.

Delete a partition -> d
Lists known partition types -> l
Adds a new partition -> n
Prints the partition table -> p
Quits without saving changes -> q
Writes table to disk and exit -> w

Mounting disks

If you cat /proc/partitions

the new partition is not available, so for the kernel to feel the changes use **partprobe** command.

The format utility is generally known as mkfs

```
mkfs -t ext3 /dev/sdc1
```

Create a mount point for this partition

```
mkdir /test
```

Mount a partition to a directory

```
mount /dev/sdc1 /test
```

Disconnect a filesystem from mount point with umount

```
umount /dev/sdc1
```

Notes

- We can't umount a busy file system.
- Removable media, get automatically mounted under /run/media/<user>/<label>
- Removing a USB storage device without unmounting the file system on it can result in data loss

Quiz

How can you make the previous steps permanent?

Archiving Files

tar command archives files to and extracts files from a single file called a tar file.

```
tar [functions] archive-file filenames
```

Options:

- c: create a new tar file
- t: list table of content
- x: extracts files from the tar command
- f: specify the archive file
- v: verbose mode

- Before creating a tar archive, verify that there is no other archive in the directory with the same name as the new archive to be created. The tar command will overwrite an existing archive without any feedback.

- For tar to be able to archive the selected files, it is mandatory that the user executing the tar command is able to read the files.

Compressing Files

Files can be compressed using different commands.

- z for **gzip** compression (filename.tar.gz or filename.tgz)
- j for **bzip2** compression (filename.tar.bz2)
- J for **xz** compression (filename.tar.xz)

CHECKING FREE SPACE

The df command displays number of free disk blocks and files.

```
df [-h] [block_device| directory|file]
```

The du command display the total sum of space allocated to all files hierarchy rooted in the directory specified.

```
du [-sh] [dir…]
```

Quiz

How can I create a compressed file without deleting the original?

Inode

Linux see all files as numbers called “inodes”, or index nodes.

Within each filesystem is an inode table, in which all of the used inodes are mapped to particular files.

The information stored in this table for each entry includes the following:

- The type of file
- The file's permissions
- The number of links
- The file owner's user ID
- The file owner's GID
- When the file was last changed
- When the file was last accessed
- Where the file is on the media

Soft Link (Symbolic Link)

New entry is made to the inodetable for the link

When creating the symbolic link, the full path should be used.

The content of this entry is the path to the original file. This allows you to use symbolic links across partition boundaries.

If you delete the original file, you end up with an “orphaned link”

```
ln -s  filepath linkpath
```

Hard Link

Instead of creating a new file, the new link (a new directory entry) is added to the appropriate directory file name listing, referencing the exact inodeas the original file. Thus, the file only exists once, but in two places.

After a new hard link is created, there is no way to tell which of the existing hard links is the original one.

Hard link is not allowed for a directory.

In the inodetable, the link count is incremented.

Every filesystem has inodes that start counting from zero.

A hard link cannot reach across partition boundaries. It can only exist within a single partition or media.

```
ln file hardlink
```

Regular Expressions

Regular expressions are special characters which help search data, matching complex patterns. Regular expressions are shortened as 'regexp' or 'regex'.

Symbol	Descriptions
.	replaces any character
^	matches start of string
$	matches end of string
*	matches up zero or more times the preceding character
?	Matches up exactly one character

Regular Expressions

Expression	Description
{n}	Matches the preceding character appearing 'n' times exactly
{n,m}	Matches the preceding character appearing 'n' times but not more than m
{n, }	Matches the preceding character only when it appears 'n' times or more
\+	Matches one or more occurrence of the previous character
\?	Matches zero or one occurrence of the previous character

Brace expansion

The syntax for brace expansion is either a sequence or a comma separated list of items inside curly braces "{}". The starting and ending items in a sequence are separated by two periods "..".

```
echo {1..20}
touch file{1..100}
```

Cronjobs

a system process that will automatically perform tasks as per the specific schedule. It is a set of commands that are used for running regular scheduling tasks. Crontab stands for "cron table". It allows to use job scheduler, which is known as cron to execute tasks.

Here are the reasons for using cronjobs in Linux:

- Helps OS to take a scheduled backup of log files or database.
- Delete old log files
- Send out any notification email such as Newsletters, Password expiration email
- Crontab is an ideal option to automate Unix jobs.
- It is used to automate system maintenance

Cronjobs

Linux Crontab format

Crontab of Linux has six fields. The first five fields define the time and date of execution, and the 6'th field is used for command execution.

[Minute] [hour] [Day_of_the_Month] [Month_of_the_Year] [Day_of_the_Week] [command/script]

Questions?!

Thank YOU!

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