RHSA1
Red Hat System Administration I
Day5

Day 5 Contents

- Inode table.
- Archiving.
- Compression.
- Yum.
- Search.

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Listing Directory Contents

- ls -l dir1

-rwxr-xr-x 2 root root 20 512 May 21 16:06 file1

drwxr-xr-x 2 fatma fatma 20 512 May 21 16:06 dir2

Permission — Number of links — Owner — Group

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Inode

- Linux stores administrative data about files in inodes.
- 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.

Inode

- The information stored in this table for each entry includes the following:
  1. The type of file.
  2. The file's permissions.
  3. The number of links.
  4. The file owner's user ID.
  5. The group owner's GID.
  6. When the file was last changed.
  7. When the file was last accessed.
  8. Where the file is on the media.

Inode

- But It does not contain the file name or file content.
- Names are stored in the directory.
- Each file name knows which inode it has to address to access further file information.
- An inode does not know which name it has; It just know how many names are associated with the inode,These names are referred to as hard links.

Inode

- To view inode number of a file:

  ls -i /etc/passwd

  1971109 /etc/passwd

- To view inode number of a directory:

  ls -id /etc

  1966081 /etc

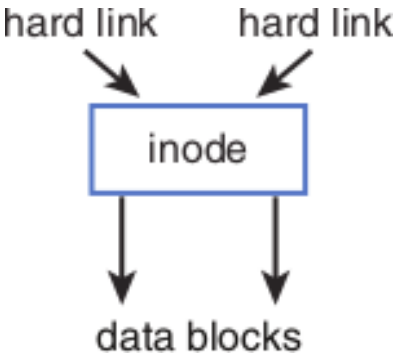
Hard Link

- When you create a file, you give it a name. Basically, this name is a hard link.
- On a Linux file system, multiple hard links can be created to a file. This can be useful, because it enables you to access the file from multiple different locations.
- If the first hard link that ever existed for a file is removed, that does not impact the other hard links that still exist.
- Some restrictions apply to hard links, though:
  - Hard links must exist all on the same device (partition, logical volume, etc).
  - You cannot create hard links to directories.
  - When the last name (hard link) to a file is removed, access to the file's data is also removed.

Hard Links

- To create hard link(Pointer):
  - ln source-file targetfile or directory
  - ln /home/fatma/myfile hardlinkfile
  - ls -i /home/fatma/myfile hardlinkfile

    11272876 myfile 11272876
- hardlinkfile



To be able to create hard links, you must be the owner of the item that you want to link to .

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File Manipulation

- The cp command:
- Allocates a new inode number for the copy, placing a new entry in the inode table.
- Creates a directory entry, referencing the file name to the inode number within that directory.

File Manipulation

- Example:
  - ls -i f1

    1196100 f1
  - cp f1 f2
  - ls -i f1 f2

    1196100 f1

    1196463

    f2

File Manipulation

- The mv command:
- If the destination is on the same file system as the source:
- mv creates a new directory entry with the new file name.
- Example:
  - ls -i f1

    1196100 f1
  - mv f1 f2
  - ls -i f2

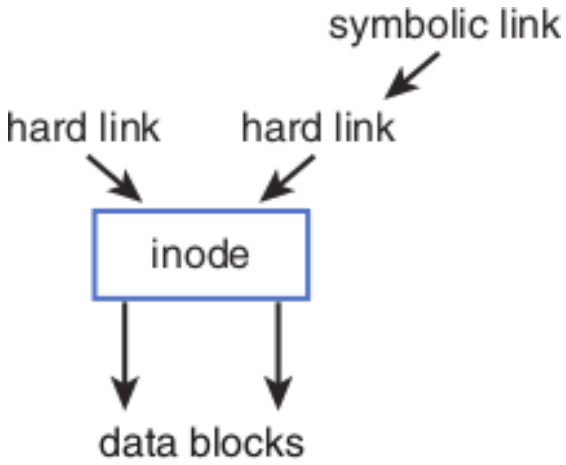
    1196100 f2

Symbolic Links

- New entry is made to the inode table for the link The content of this entry is the path to the original file.
- This allows you to use symbolic links across partition boundaries.
- The advantage of symbolic links is that they can link to files on other devices, as well as on directories.
- But when the original file is removed, the symbolic link becomes invalid and does not work any longer.

Symbolic Links

- To create soft link:
  - ln -s source-file targetfile or directory
  - ln -s testfile softlinkfile
  - ls -li testfile softlinkfile



1127996 -rw-rw-r-- 1 user user 12 Mar 12 03:50 testfile

1127999 lrwxrwxrwx 1 user user 8 Mar 12 09:50 softlinkfile-> testfile

Archiving

- To safeguard your files and directories, you can create a copy, or archive, of the files and directories on a removable medium, such as a cartridge tape. You can use the archived copies to retrieve lost deleted, or damaged files.

Managing Archives with tar

- The Tape Archiver (tar) utility is used to archive files. It designed to stream files to a backup tape.
- To put files on the directory, you need at least read permissions to the file and execute permissions on the directory the file resides in.
- To create an archive:
  - tar -cvf archivename.tar file1 file2 file3 c: create a new tar file.
    v: verbose mode.
    f: specify the archive file.

Managing Archives with tar

- To add a file to an existing archive or to update an archive:
  - tar -cvf /root/homes.tar /home
  - tar -rvf /root/homes.tar /etc/hosts r: Appends files to an archive.
  - tar -uvf /root/homes.tar /home
    u: updates an archive, only newer files will be written to the archive.

Managing Archives with tar

- To see the contents of the tar archive:
  - tar -tvf /root/homes.tar t: List table of content.
- To extract the contents of an archive:
  - tar -xvf /root/homes.tar
    x: Extracts files from the tar command.
  - tar -xvf

Compression

- Many files contain a lot of redundancy. Compression programs allow you to make files take less disk space by taking out that redundancy.
- If there is no redundancy, you won't gain much by using compression.

Compression

- After creating the archive, it had to be compressed with a separate compression utility, such as gzip or bzip2.
- you can include the -z(gzip) or -j(bzip2) option while creating the archive with tar.This will immediately compress the archive while it is created.
  - gzip homes.tar
  - bzip2 homes.tar
- To decompress:
  - gunzip homes.tar
  - bunzip2 homes.tar

Managing Software

- The default utility used to manage software packages on RHEL is yum (Yellowdog Updater, Modified).
- Yum is designed to work with repositories which are online depots of available software packages.
- In RHEL 8, Yum has been replaced with the dnf utility. Because software in RHEL is based on Fedora software.
- It was expected that, the yum command would be replaced with the dnf command. But Red Hat decided that, with RHEL 8, a new version of yum has been introduced, which is based on the dnf command.
- You'll notice that in many cases, when requesting information about yum, you're redirected to dnf resources.
- So in fact you are using dnf, but RedHat has decide to rename it to yum.

Yum

- **Basic command**
- **yum search somefile (look for the package)**
- **yum list somefile (get installed and available versions)**
- **yum list installed (same as rpm -qa)**
- **yum list available (what's available in repository)**
- **yum grouplist "some search string" (look for like packages to search string)**
- **yum install somefile (install the package and any dependencies)**
- **yum localinstall /path/to/somefile (yum install off local media)**

Yum

- **Basic command**
- yum remove somefile (uninstall the package)
- yum upgrade somefile (upgrade the package removing prior versions)
- yum update somefile (update the package keeping prior version)
- yum provides somefile (what packages are associated with a file)
- yum repolist all (list defined repositories)
- yum clean all (clean yum download directories)

Search

- The find command searches the live filesystem.
- You are limited by your own permissions.

find

Expression	Definition
-name filename	Finds files matching the specified filename. Metacharacters are acceptable if placed inside " ".
-size [+|-]n	Finds files that are larger than +n, smaller than -n, or exactly n. The n represents 512-byte blocks.
-atime [+|-]n	Finds files that have been accessed more than +n days, less than -n days, or exactly n days.
-mtime [+|-]n	Finds files that have been modified more than +n days ago, less than -n days ago, or exactly n days ago.
-user loginID	Finds all files that are owned by the loginID name.
-type	Finds a file type, for example, f (file) or d (directory).
-perm	Finds files that have certain access permission bits

Lab 5 Part 1

- 1. Install Packages called ncompress,ksh.
- 2.Compress a file by gzip, bzip2 commands and decompress it again.
- 3.List the directories that have 777 Permissions in the system.
- 4. Remove package ncompress and ksh.
- 5. Install Vlc , Vscode ,Atom ,Krita, Google Chrome ,Libre office, zoom and teams.