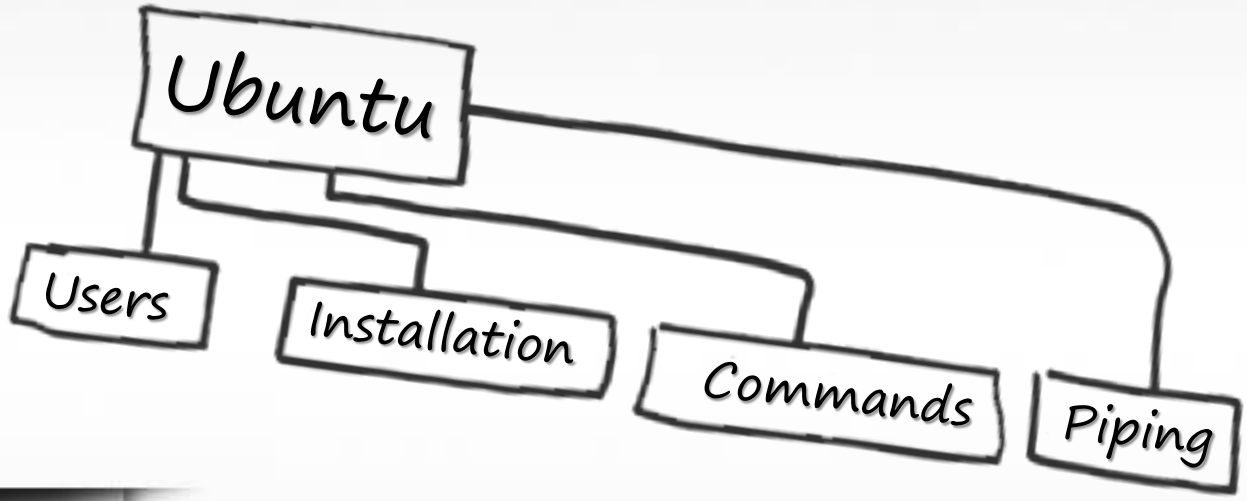
NOW

Ubuntu Fundamentals

ubuntu



OPEN SOURCE
DEPARTMENT

Information Technology Institute

Course Materials

You can access the course materials via this link

http://goo.gl/MZqU4b

Day 5 Contents

- Inode table
- Apt-get utility
- Search
- Archiving
- Compression

Inode

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

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

Inode Cont'd

- 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 Cont'd

- To view inode number of a file
  - `ls -i fname`
    - 10978 fname

File Manipulation and Inodes

- 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 and Inodes

Cont'd

- Example
  - `ls -i f1`

    1196100 f1

  - `cp f1 f2`
  - `ls -i f1 f2`

    1196100 f1

    1196463 f2

File Manipulation and Inodes

Cont'd

- Inodes and 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

Utilizing Links

- Soft Link (Symbolic Link)
  - 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.
  - If you delete the original file, you end up with an “orphaned link”

Utilizing links to make shortcuts

Cont'd

- Example

```
ls -li testfile
```

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

```
ln -s testfile testlink
```

```
ls -li testfile testlink
```

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

1127999 lrwxrwxrwx 1 user user 8 Mar 12 09:50 testlink → testfile

Utilizing links to make shortcuts

Cont'd

- Hard Links
  - 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 inode as the original file. Thus, the file only exists once, but in two places.
  - In the inode table, 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.

Utilizing links to make shortcuts

Cont'd

- Example
  - `ls -li testfile`

    1127996 -rw-rw-r-- 1 user user 12 Mar 12 03:50 testfile
  - `ln testfile testlink`
  - `ls -li testfile testlink`

    1127996 -rw-rw-r-- 2 user user 12 Mar 12 03:50 testfile

    1127996 -rw-rw-r-- 2 user user 12 Mar 12 09:50 testlink

Introduction to apt-get

- Ubuntu's package management system is derived from the same system used by the Debian GNU/Linux distribution.
- The package files contain all of the necessary files, meta-data, and instructions to implement a particular functionality or software application on your Ubuntu computer.
- The software management tools in Ubuntu will check dependencies automatically.

APT-Get

- The apt-get command is a powerful command-line tool used to work with Ubuntu's Advanced Packaging Tool (APT) performing such functions as
  - Installation of new software packages
  - Upgrade of existing software packages
  - Updating of the package list index
  - And even upgrading the entire Ubuntu system.

APT-Get Cont'd

- Install a Package

```
sudo apt-get install ksh
```

- Remove a Package

```
sudo apt-get remove ksh
sudo apt-get purge nmap
```

- * You may specify multiple packages to be installed or removed, separated by spaces.

APT-Get Cont'd

- Update the Package Index
  - Update is used to resynchronize the package index files from their sources.
  - The indexes of available packages are fetched from the specifies location(s) in /etc/apt/sources.list.
  - An update should always be performed before upgrade.

```
sudo apt-get update
```

APT-Get Cont'd

- Upgrade package
  - Install the newest versions of all packages currently installed on the system from the sources found in /etc/apt/sources.list.
  - An update must be performed first so that apt-get knows the new versions of packages available.

```
sudo apt-get upgrade
```

- Install Source code ???

Finding Files with locate

- The locate command searches through a pre-built database containing the contents of your filesystem at the time the database was last updated.
- The locate database is built by using the `updatedb` command.
- Example
  - `locate passwd`

Locating Files with find

- The find command searches the live filesystem.
- find is slower than locate, causes more of a load on the system, but more powerful than locate.
- You are also limited by your own permissions.

Locating Files with find Cont'd

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

Introduction To 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.

Archiving Files

- `tar` command archives files to and extracts files from a single file called a tar file.
- The default device for a tar file is a magnetic tape device.
- tar functions archivefile filenames
  - Function
    - 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
    - file3

Archiving Files

- Example
- `tar cvf file.tar file1 file2 file3`

  file1

  file2

Archiving Files Cont'd

- Viewing an archive
  - tar tf file.tar
    - file1
    - file2
    - file3
- Extracting files from archive
  - tar xvf file.tar
    - file1
    - file2
    - file3

Compress Command

- Compression reduces a text file by 50 percent to 60 percent.
- compress [-v] filename
- Compress command replaces the original file with a new file that has a .Z extension.
- Example
  - compress -v files.tar
    - files.tar: Compression: 70.20% --
    - replaced with files.tar.Z

zcat Command

- zcat filename

- Example
  - zcat file1

uncompress Command

- uncompress options filename
- Example
  - uncompress -v files.tar.Z
    - files.tar.Z:-- replaced with files.tar

gzip Command

- The gzip command reduces the size of files.
- The original file is replaced by a file with the same name and a .gz extension.

- gzip [-v] filenames

- Examples:
  - gzip file1 file2 file3 file4
  - ls *.gz
    - file1.gz file2.gz file3.gz file4.gz

gzip Command Cont'd

- Restoring gzip file using the gunzip command

- Example
  - gunzip file1.gz

zcat Command

- gzcat command display the content of files compressed by gzip
  - gzcat filename

bzip2 Command

- The bzip2 command reduces the size of files.
- The original file is replaced by a file with the same name and a .bz2 extension.

- bzip2 [-v] filenames

- Examples:
  - bzip2 file1 file2 file3 file4
  - ls *.bz2
    - file1.bz2 file2.bz2 file3.bz2 file4.bz2

bzip2 Command Cont'd

- Restoring bzip2 file using the bunzip2 command
- Example
  - bunzip2 file1.bz2

bzcat Command

- bzcat command display the content of files compressed by bzip2
  - bzcat filename

zip Command

- zip command compresses multiple files into a single archive file.
- zip command adds the .zip extension to the file name of the compressed archive file if you do not assign a new file name with an extension.

zip Command cont'd

- zip target_filename source_filenames
- Examples:
  - zip file.zip file2 file3
    - adding: file2 (deflated 16%)
    - adding: file3 (deflated 26%)
  - ls
    - file.zip file2 file3
- To list the files in a zip archive
  - unzip –l file.zip
- To restore a zip file
  - unzip file.zip