Fundamentals - 1.2 Viewing & Navigating

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Goal of the Module

Unix Filesystem

- Common paths
  Filesystem Hierarchy Standard
- Retrieving information on
  shell (bash) commands
- Viewing & navigating the file system
- Relative and absolute paths

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Topics

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Viewing & Navigating

- Filesystem Hierarchy Standard
  - Introduction
  - Important directories
- Information on commands
  - Man pages (man)
  - Help builtin in commands (--help/-h)
- Filesystem
  - Relative and absolute paths
  - Navigating: Changing directories
  - Viewing: Listing directory content
    - Interpreting detailed information on files
      - Type
      - Permissions
      - Link count
      - Ownership: user and group
      - Filesize
      - Modification date
      - Filename

Information on Commands

Retrieving Information on Commands

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Man Pages

“A **man page** (short for **manual page**) is a form of software documentation usually found on a **Unix** or **Unix-like operating system**. Topics covered include **computer programs** (including **library** and **system calls**), formal standards and conventions, and even abstract concepts. A user may invoke a man page by issuing the **man command**.” [WIKIPEDIA]

[WIKIPEDIA]: https://en.wikipedia.org/wiki/Man_page

Retrieving Information on Commands - Structure of a Man Page

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Man Pages often contain the following sections:

- **NAME**
  Command's name and short description
- **SYNOPSIS**
  Describes the way to call the program on the commandline
- **DESCRIPTION**
  available parameters and their description
- AUTHOR
- REPORTING BUGS
  Where and how to report bugs.
- COPYRIGHT
  Licensing information
- **SEE ALSO**
  References to additional and related sources of information

A man page can be searched by hitting "/" and entering the text to search, navigating to the next occurrence is achieved by hitting "p". The man page can be left (exited) by hitting "q".

[WIKIPEDIA]: https://en.wikipedia.org/wiki/Man_page

Retrieving Information on Commands

A lot of shell commands/programs implement an inbuilt function that outputs information on the program.
That help-function can often be called via:

```
$> COMMAND -h
```

or

```
$> COMMAND --help
```

Retrieving Information on Commands

The shell also offers the tools **info** and **apropos**.

An Internet search may also yield the required information.

Viewing & Navigating

Filesystem Hierarchy Standard (FHS)

“The **Filesystem Hierarchy Standard** (FHS) defines the **directory structure and directory contents** in Unix-like operating systems.”
[WIKIPEDIA]

It is still somewhat similar but not identical with the macOS directory structure.

[WIKIPEDIA]: https://en.wikipedia.org/wiki/Filesystem_Hierarchy_Standard

macOS - Important Directories

`/Applications`
This directory is where you install apps intended for use by all users of a computer. The App Store installs apps purchased by the user in this directory automatically.

`/Network`
This directory contains the list of computers in the local area network.

There is no guarantee that files located on network file servers will have the `/Network` directory at the beginning of their path. Path names vary depending on several factors, including how the network volume was mounted

`/System`
This directory contains the system resources required by macOS to run. These resources are provided by Apple and must not be modified.

`/Users`
This directory contains one or more user home directories. The user home directory is where user-related files are stored. A typical user's home directory includes the following subdirectories:

- `Applications`—Contains user-specific apps.
- `Desktop`—Contains the items on the user's desktop.
- `Documents`—Contains user documents and files.
- `Downloads`—Contains files downloaded from the Internet.
- `Library`—Contains user-specific app files (hidden in macOS 10.7 and later).
- `Movies`—Contains the user's video files.
- `Music`—Contains the user's music files.
- `Pictures`—Contains the user's photos.
- `Public`—Contains content the user wants to share.
- `Sites`—Contains web pages used by the user's personal site. (Web Sharing must be enabled to display these pages.)

macOS - Important Directories

Unix specific folders, usually hidden.

`/bin`—Contains essential command-line binaries. Typically, you execute these binaries from command-line scripts.

`/dev`—Contains essential device files, such as mount points for attached hardware.

`/etc`—Contains host-specific configuration files.

`/sbin`—Contains essential system binaries.

`/tmp`—Contains temporary files created by apps and the system.

`/usr`—Contains non-essential command-line binaries, libraries, header files, and other data.

`/var`—Contains log files and other files whose content is variable. (Log files are typically viewed using the Console app.)

Filesystem

“A path is a string of characters used to uniquely identify a location in a directory structure.” It is composed by the directories from the current directory to the root of the directory tree (in reverse order). On Linux systems the different directories are separated by “/” as delimiter. [WIKIPEDIA]

Absolute and Relative Paths

“An **absolute** or **full** path points to the same location in a file system, regardless of the current working directory.”

“[...] a relative path starts from some given working directory.” [WIKIPEDIA-ABS-REL]

On Linux the “.” refers to the current directory and the “..” to the parent directory.

[WIKIPEDIA]: https://en.wikipedia.org/wiki/Path_(computing)
[WIKIPEDIA-ABS-REL]: https://en.wikipedia.org/wiki/Path_(computing)#Absolute_and_relative_paths

Filesystem - cd

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Current Working Directory

The current working directory can be determined with the pwd command.

Changing Directories

In order to change directories the command cd is applied. It is usually used with a single parameter designating the target directory.

```
$> cd /absolute/path/to/target/directory

$> cd rel/path

$> cd ./rel/path

$> cd ../../rel/path

#  changing to the current user's home directory:
$> cd
$> cd ~

#  changing to the previous working directory
$> cd -
```

The "." refers to the current directory and the ".." to the parent directory.

[WIKIPEDIA]: https://en.wikipedia.org/wiki/Path_(computing)
[WIKIPEDIA-ABS-REL]: https://en.wikipedia.org/wiki/Path_(computing)#Absolute_and_relative_paths

Filesystem

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ls

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Listing Directory Content

The content of a directory is listed with the ls command. Per default the content of the current working directory is printed. It provides various options, commonly used are (from [MAN-LS]:

-a, --all - do not ignore entries starting with “.”

-l - use a long listing format

-h, --human - file sizes are shown as KB, MB, …

On Linux files starting with a “.” are considered **hidden files**.

[MAN-LS]: Man page of “ls” - $> man ls

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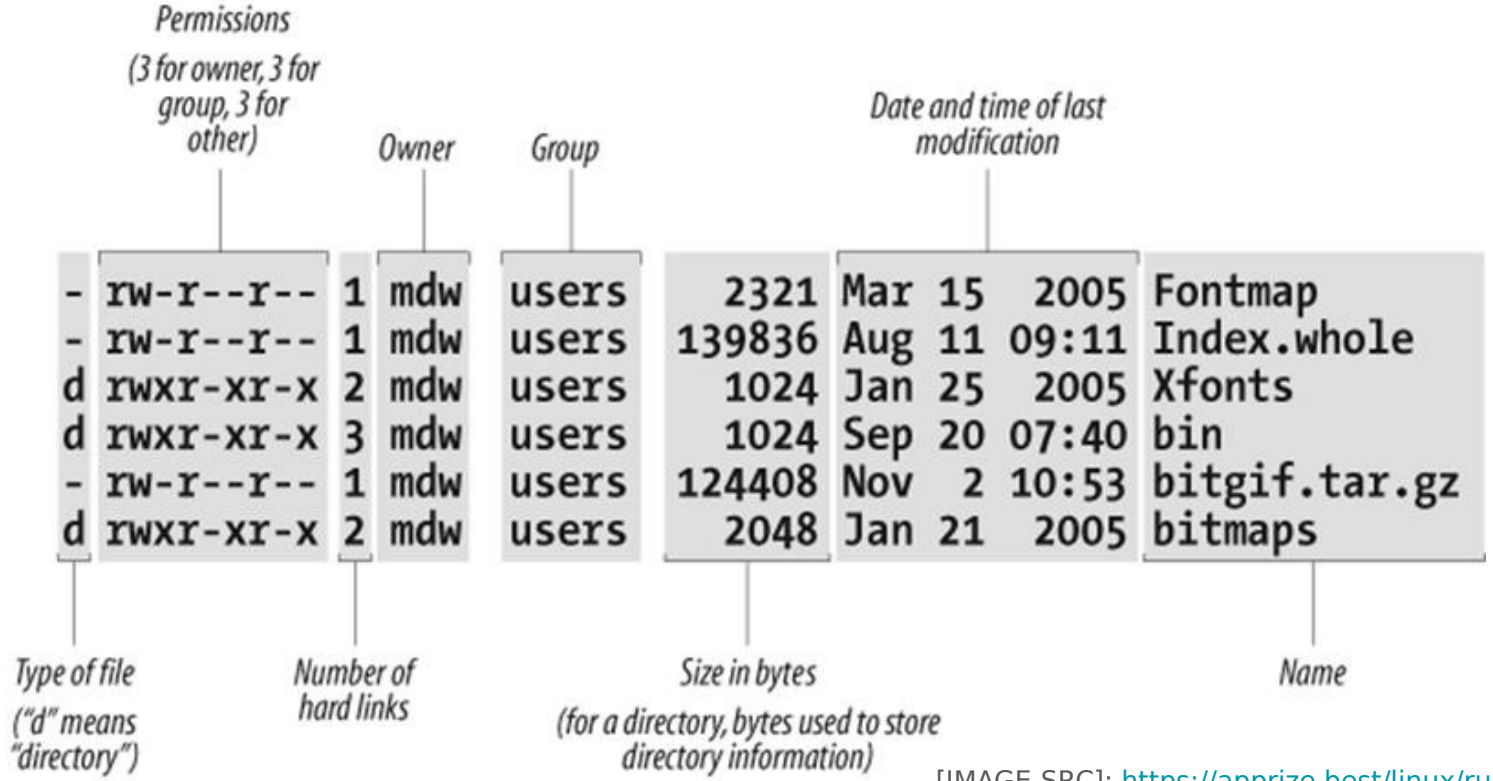
Filesystem - output of “ls -l”



[IMAGE-SRC]: https://apprize.best/linux/running/5.html

Documentation

- Folders on macOS

THANK YOU

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