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Linux / UNIX: Device files

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Q. Can you explain me what is device files and how do I access or see device files? Why UNIX / Linux has device files?

A. Under Linux and UNIX each and every hardware device treated as a file. A device file allows to accesses hardware devices so that end users do not need to get technical details about hardware.

In short, a device file (also called as a special file) is an interface for a device driver that appears in a file system as if it were an ordinary file. This allows software to interact with the device driver using standard input/output system calls, which simplifies many tasks.

Device file two types

There are two types of device files based upon how data written to them and read from them is processed by the operating system and hardware:

- Character special files or Character devices
- Block special files or Block devices

Understanding Character special files or Character devices

- Talks to devices in a character by character (1 byte at a time)
- Examples: Virtual terminals, terminals and serial modems etc

Understanding Block special files or Block devices

- Talks to devices 1 block at a time (1 block = 512 bytes to 32KB)
- Examples: Hard disk, DVD/CD ROM, and memory regions etc

Why use device files?

Device file allows transparent communication between user space applications and computer hardware.

Device file location

All device files are stored in /dev directory. Use cd and ls command to browse the directory:

```
cd /dev/
ls -l
```

How do I find out the device file type?

Simply use ls -l command:

```
ls -l /dev
```

Look for file's type in the first column output.

A character device is marked with a c as the first letter of the permissions strings.

```
$ ls -l /dev/console
```

A block device is marked with a b as the first letter of the permissions strings:

```
$ ls -l /dev/sdb1
```