Linux File System Management Summary

1. Overview

Linux supports various file systems: `ext2`, `ext3`, `ext4`, `Btrfs`, `XFS`, `NTFS`.

- **ext2**: No journaling, useful for USBs.
- **ext3/ext4**: Journaling; ext4 is default on modern distros.
- **Btrfs**: Snapshots, data integrity.
- **XFS**: High-performance, great for large files.
- **NTFS**: Windows compatibility.

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2. Inodes and Hierarchical Structure

- **Inodes** store metadata (not filenames).
- Think of inodes as catalog cards in a library.
- The **inode table** helps the system track files/directories.

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3. File Types

- **Regular Files**: Text or binary data.
- **Directories**: Containers for other files/directories.
- **Symbolic Links (symlinks)**: Pointers to other files/dirs.

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4. Permissions

Users are divided into:

- **Owner**
- **Group**
- **Others**

Permissions: Read (r), Write (w), Execute (x)

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5. Disk Management with `fdisk`

```
sudo fdisk -l
```

Used to list and manage partitions.

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6. Mounting & Unmounting

Manual Mount

```
sudo mount /dev/sdb1 /mnt/usb
```

Auto-Mount via `/etc/fstab`

```
UUID=... /mnt/usb ext4 rw,noauto,user 0 0
```

View Mounted

```
mount
```

Unmount

```
sudo umount /mnt/usb
```

Check if in use

```
lsof | grep /mnt/usb
```

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7. Swap Space

- Used when RAM is full.
- Helps with **memory extension** and **hibernation**.
- Commands:
  - `mkswap`: Format device/file as swap.
  - `swapon`: Enable swap.
- Should be encrypted for security.

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8. Summary Commands

Command	Description
`fdisk`	Manage disk partitions
`mount`	Mount filesystem
`umount`	Unmount filesystem

Command	Description
`lsof`	List open files
`cat /etc/fstab`	Auto-mount config at boot
`mkswap`	Create swap area
`swapon`	Enable swap

Stay organized. Use the right file system for your workload.