# 3. Linux File Systems

## Extended File system `ext`

Some of its characteristics:

- Volumes up to 1EB
- Files up to 16TB
- Unlimited subdirectories
- Journaling

| Pros | Cons |
| --- | --- |
| Best Compatibility | Not recommended with handling big files |

Journaling: When we write in a file, we actually don't write directly in the file but actually somewhere else on the disk and then to the original file. it happens because there may be an power outage or interruptions in the middle of the process so journaling will avoid damaging the original file.

## Extents File System `xfs`

- Developed by SGI (Silicon Graphics)
- Volumes up to 8EB
- Files up to 1PB
- Extents (Block Ranges)
- Journaling

Extent:
It is a feature for handling large files. in `ext` each file has its own residency in multiple sectors and their addresses will be in a table
and when you want to access them `ext` handles it for you by gathering every bit of the data from multiple addresses but in large files
`ext`'s fragmentation can slow down the process. (Extended)
In `xfs` large files will be in a range of sectors without any other file data in-between them and in this way `xfs` will just use that range
to access the files and their data. (Extent)

## B-Tree File System `btfrs`

- Developed by Sun
- Volumes up to 8EP
- Files up to 8EP
- Snapshots
- Journaling
- Newer and rich with features

| Pros | Cons |
| --- | --- |
| Rich with new features | More bugs |

## Use cases:

| File system | Primary Characteristics | Use Case |
| --- | --- | --- |
| EXT | Maximum compatibility | General Purpose |
| XFS | High performance with large files | Graphics/Database |
| BTRFS | Rich and advanced features | Network storage |