Linux File Systems: Ext2 vs Ext3 vs Ext4 vs XFS

ext2, ext3, ext4 and XFS are all filesystems created for Linux.

Ext2

- Ext2 stands for second extended file system.
- It was introduced in 1993. Developed by Rémy Card.
- This was developed to overcome the limitation of the original ext file system.
- Ext2 does not have journaling feature.
- On flash drives, usb drives, ext2 is recommended, as it doesn't need to do the over head of journaling.
- Maximum individual file size can be from 16 GB to 2 TB
- Overall ext2 file system size can be from 2 TB to 32 TB

Ext3

- Ext3 stands for third extended file system.
- It was introduced in 2001. Developed by Stephen Tweedie.
- Starting from Linux Kernel 2.4.15 ext3 was available.
- The main benefit of ext3 is that it allows journaling.
- Journaling has a dedicated area in the file system, where all the changes are tracked. When the system crashes, the possibility of file system corruption is less because of journaling.
- Maximum individual file size can be from 16 GB to 2 TB
- Overall ext3 file system size can be from 2 TB to 32 TB
- There are three types of journaling available in ext3 file system.
    - Journal – Metadata and content are saved in the journal.
    - Ordered – Only metadata is saved in the journal. Metadata are journaled only after writing the content to disk. This is the default.
    - Writeback – Only metadata is saved in the journal. Metadata might be journaled either before or after the content is written to the disk.
- You can convert a ext2 file system to ext3 file system directly (without backup/restore).

Ext4

- Ext4 stands for fourth extended file system.
- It was introduced in 2008.
- Starting from Linux Kernel 2.6.19 ext4 was available.
- Supports huge individual file size and overall file system size.
- Maximum individual file size can be from 16 GB to 16 TB
- Overall maximum ext4 file system size is 1 EB (exabyte). 1 EB = 1024 PB (petabyte). 1 PB = 1024 TB (terabyte).
- Directory can contain a maximum of 64,000 subdirectories (as opposed to 32,000 in ext3)
- You can also mount an existing ext3 fs as ext4 fs (without having to upgrade it).

- Several other new features are introduced in ext4: multiblock allocation, delayed allocation, journal checksum. fast fsck, etc. All you need to know is that these new features have improved the performance and reliability of the filesystem when compared to ext3.
- In ext4, you also have the option of turning the journaling feature “off”.

XFS File System

- The XFS file system is an extension of the extent file system.
- The XFS is a high-performance 64-bit journaling file system.
- The support of the XFS was merged into Linux kernel in around 2002 and In 2009 Red Hat Enterprise Linux version 5.4 usage of the XFS file system.
- XFS supports maximum file system size of 8 exbibytes for the 64-bit file system.
- There is some comparison of XFS file system is XFS file system can’t be shrunk and poor performance with deletions of the large numbers of files.
- Now, the RHEL 7.0 uses XFS as the default filesystem.