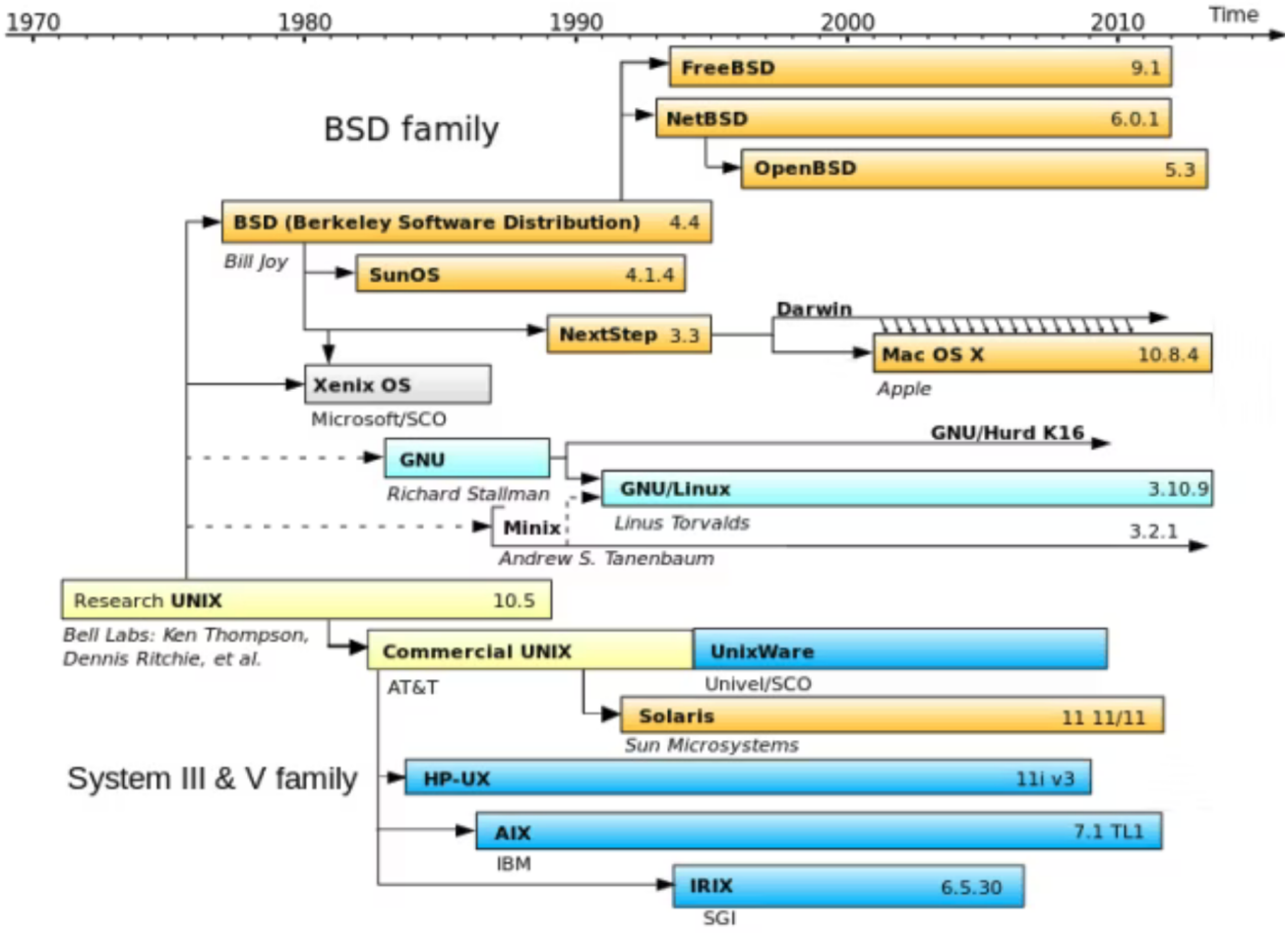
Linux Time

History

BSD (Berkeley Software Distribution) --> FreeBSD, NetBSD, OpenBSD

Unix

multitasking, multi-user operating system derived from the original AT&T Unix
Minix is an OS created for Educational purposes



File Systems

Methods and structures that the OS uses to manage how data is stored, organized and accessed. Includes file naming, metadata, directories, folders, access rules, and privileges.

Linux uses mount points whereas Windows uses Drive Letters as their mounting parameter. (C:\ vs /)

Types of File Systems

ext4

Great flash memory lifespan (utilizes `delayed allocation` like xfs to prevent data fragmentation, however could potentially trigger some data loss).
Unallocated blocks are marked as such, and are skipped during disk checks wowow
Journal checksumming!
Unfortunately it is difficult to detect data corruption.

xfs

64bit
Performs well on large files and high degrees of concurrency (parallel I/O operations; designed based off allocation groups).
Also utilizes delayed allocation
Written in B+ trees, which is a lot more efficient.

btrfs

Based on the copy-on-write mechanism. (File system won't overwrite existing information as you're writing - new data is written elsewhere.)
Has volume management built in (ext4 doesn't have this! it's just a filesystem.)

NTFS

This is the Windows file system. Allows users to apply compression.
Uses compact OS to compress the entire system partition and writes in continuously allocated chunks

Commands

Command	Action
`$ findmnt`	lists all mounted file systems
`umount /dev/sda2`	unmounts a file system
`mount /dev/sda1 /mnt`	mounts a file system (mounts sda1 at /mnt
`dir_index`	speeds up name lookups in large directories

Partitioning

Creating one or more separate regions on secondary memory so each region can be managed separately.
Any block device (usually a disk, partition or array) is called a **volume**.

Partition Tables

Describes how the storage is divided. Also called a partition map.

Master Boot Record

Contains the OS bootloader and the partition table, located in first 512 bytes. Usually used under BIOS systems.
It's not actually in a partition - precedes it.
Partition table usually consists of:

- **Primary** - limited to 4 per disk, bootable.
- **Extended** - replaces a primary partition if you need more than 4 partitions.
  - Logical (named sda5, sda6 etc.)
  Required if you want to dual boot using BIOS.

GPT (GUID Partition Table)

Typically used by Linux; utilizes GUID (Globally unique identifiers) to name and organize partitions.
At the start of the GUID, there is a little bit of Protected MBR for GPT-unaware software.
Required if you want to dual boot using UEFI mode.

Discrete Partitions

Separates out the path of the partition and can be shared between operating systems.

Systemd

System and service manager and starts the rest of the system. Systems include: daemon, mount points, devices and sockets.

Unit files

`unit` refers to any resource that the system knows how to operate on and manage.
When a new unit is downloaded, it is typically installed onto `/lib/systemd/system`. Unit files in this directory should not be edited, but instead overridden.

`.service` is a service. lol.
`.socket` is a socket... will always have a service associated with it.
`.device` is a device determined to need systemd.
`.mount` is a mountpoint. Named after the mountpath with / instead of -.
`.target` used to provide synchronization states when booting up or changing states.
`.snapshot` are not permanent and used for temporary rollbacks.

`systemctl` if you do not specify things, it will assume that you are looking for a service.

Power management

`polkit` used for power management as an unprivileged user.

Command	Action
`systemctl reboot`	shut down and reboot the system
`systemctl poweroff`	shut down and power off the system

Command	Action
`systemctl suspend`	suspend the system
`systemctl hibernate`	hibernates the system lol

Commands

System Checks

`fsck` command used to conduct **file system checks** (check the consistency of a file system).
Only on **ext4** or ext3.
Can be used to repair corrupted file systems in situations where system fails to boot or partitions cannot be mounted.

```
fsck [OPTIONS] [FILESYSTEM]
```

Only users with root or `sudo` access can clear the buffer.
Never run `fsck` on a mounted partition, make sure to unmount it first.

File Systems