# Linux

An Introduction.

Linux

- Phase I (Why Linux?)

- Phase II (Introduction to Linux World!)

- Phase III (Linux Kernel Specifics)

- Phase IV (Filesystem Structure)

- Phase V (How to Switch?)

- Phase VI (How to Program in Linux?)

- Phase VII (Open Source Programs...)

Phase 1 - Why Linux?

- Completely Free, Yay!

- Less Resource Intensive, can install even on flash drives.

- Almost No Malware

- Helps understand functioning of an OS better!

- Supports loads of Hardwares/Softwares

Phase II - Introduction

- What is Kernel?

- Type of Kernels - Monolithic, Layered, Microkernel, Hybrid et al.

- Linux Kernel

    - Free and Open Source

    - Written by Linus Torvalds in 1991

- Free Software Foundation

    - founded by Richard Stallman

    - Copyleft.

    - GNU Project.
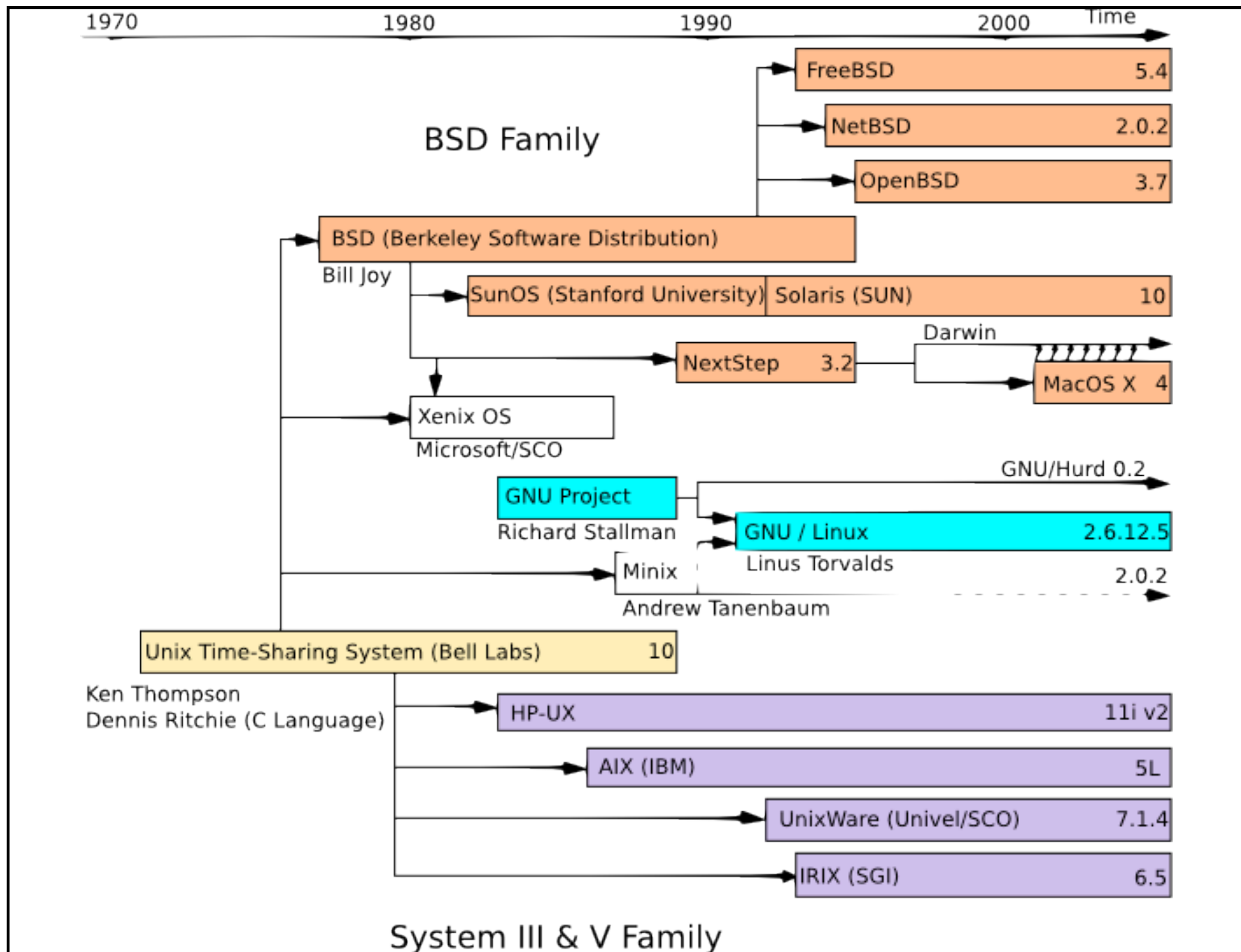
Unix Timeline

Phase II - Introduction

- GNU Operating System. (1983 by Richard Stallman)

  - Recursive Acronym for GNU's Not Unix.

  - Free Software (no Unix Code)

  - GNU Compiler Collection (GCC)

  - GNU Binary Utilities (binutils)

  - GNU C Library (glibc)

  - GNU Core Utilities (coreutils)

  - Bash

Phase II - Introduction

- GNU's Contribution - GNU/Linux Operating System!

- hence called Unix Like Operating System (*nixes!)

- POSIX

  - IEEE standardized API, utilities and shell for s/w compatible with *nixes.

- GNU Hurd

Phase II - Introduction

- Abstractions on top of GNU/Linux

  - X Window Server

    - Defines interactions with Keyboard/Mouse

    - Does not mandate user-interface.

  - Desktop Environments

    - Visual Shells running X on top of GNU/Linux

    - GNOME, KDE, et al.

  - Window Managers

    - Customizability of appearance.

    - Consumption of Memory

    - Metacity, Compiz, Beryl, Compiz Fusion

Phase II - Introduction

- Linux Distributions!

  - some are proprietary - Redhat, SuSE et al.

  - some are free - Debian, Fedora, OpenSuSE, Mandriva, Slackware, Gentoo.

  - How to choose a distribution?!

    - Popularity (www.distrowatch.com)

    - User base and Community

    - Documentation

    - Upgrade Cycle.

  - Current most popular home based linux distribution? - Ubuntu!

Phase III - Linux Kernel Specifics

- Monolithic Kernel (Tanenbaum vs Linus)

- GPLv2 (why not GPLv3?)

- Loadable Kernel Module

- Kernel Supports

  - Preemptive Multitasking (user + kernel mode)

  - Virtual Memory

  - Shared Libraries

  - Demand Paging

  - Sharing Copy on Write

  - Internet Protocol Suite

  - Threading

  - Symmetric Multiprocessing

Phase III - Linux Kernel Specifics.

- Drivers and Kexts in Kernel Mode.

- Graphical Subsystem in User Mode!

- Customizable Build Options.

- Written in C and Assembly Language (supports Python, Perl, Shell Scripts)

- Highly Portable (Intel x86, PowerPC, Sun Sparc, AMD et al.)

- Vanilla Kernel

- Version Control

- Revision Control (started with Bitkeeper, now uses Git)

Phase IV - FS Structure

- / - root of entire fs hierarchy

- /bin - essential command binaries

- /boot - boot loader files

- /dev - Essential devices

- /etc - configuration files

  - /etc/opt

  - /etc/X11 - config files for X

  - /etc/apt/ - config files for apt

  - /etc/init.d - startup scripts

- /home

Phase IV - FS Structure

- /lib - libraries for /bin files

- /media - mount points

- /mnt - temporary mp

- /opt - optional application softwares

- /root - home directory for root

- /tmp - temporary files

Phase IV - FS Structure

- /usr - secondary hierarchy

- /usr/bin - non essential command binaries

- /usr/lib

- /usr/share - architecture independent shared data

- /usr/src - Kernel Source Code

- /usr/local - nested tertiary hierarchy

- /var - log files, spool files

Phase V - How to Switch?

- Choose a popular Distribution

- Installing/Uninstalling is different (Repositories!)

- Sources vs Binaries.

- Partitioning

- Google!

- Ask in Forums!

Phase VI - How to Program in Linux?

- C/C++

  - Stick to ANSI std. (C99)

  - Sample Hello World

- Java

  - try OpenJDK 6.0

  - why public static "void" main(String args[])

Phase VII - Open Source Counterparts

- Office Suite - Open Office

- IM - Pidgin

- Video Conferencing - Skype

- Browsers - Firefox

- IDE

  - Java - Netbeans/Eclipse

  - C/C++ - Vim/Emacs/Gvim/Gedit/Geany

  - C# - Mono

Phase VII - cont.

- Thinking of any other?

- Contact Me

  - IM/Email

    - Google - vb.bajpai@gmail.com

Thank You!