

Lecture 2 Introduction to Linux Notes

1. What is an Operating System?

- An operating system is software that manages both hardware and software.

2. What is a kernel?

- A kernel is a program that has direct contact with hardware.

3. Which other parts aside from the kernel identify an OS?

- Process management - determines how much resources a process is allocated. Enables multiple processes to take place at once, without overlap
- Memory management - allocates portions of memory to processes.
- File system - governs file organization and access. A data storage system that allows for mass storage.

4. What is linux and linux distribution?

- Linux is a monolithic, Unix-like kernel initially developed by Linus Torvalds.
- Distributions are operating systems built around the linux kernel, bundling package managers, desktop environments, and userland tools.

5. List at least 4 linux characteristics:

1. Linux kernel - Monolithic, open source kernel, efficient at managing the interactions between hardware and software
2. Free and open source - available for anyone regardless of circumstance. The code is also open source, which means anyone can make edits and contributions.
3. Unix standardization - must be POSIX (portable operating system interface) compliant, a set of standards by the IEEE to ensure compatibility between operating systems, primarily Unix systems. Ensures software portability between systems.
4. Modular design - Every piece of the system is modular, allowing users to build onto the OS with files or processes for additional functionality.

6. What is Debian?

- **Debian** is one of the oldest distributions of linux, which many popular distributions are based on, most notably **Ubuntu**.
- One of the first distributions that championed free and open source licensing.
- Thorough testing, stability focused as opposed to being cutting edge.
- **apt** package management - dependency resolution, allowing for dependency chains to be resolved without headache.
- Strong documentation and community support. Democratic maintenance, rigorous developer process, based on the philosophy set forth in the Debian constitution.

7. List and define the different types of licensing agreements

- Open-source - Source code that is made available for modification and distribution. Collaboration is encouraged, allowing for distributed development
- Shareware - Trial-based with the agreement that the user may need to pay after the trial period is over. Allows for testing software before purchase.
- Freeware - software is freely available, yet proprietary. User is typically not allowed to distribute or modify it. Source code usually not available.
- Proprietary - Closed source, the code is not visible to the user. Requires the purchase of a license in order to run the software

8. What is Free Software? Define the 4 freedoms.

1. Freedom to run the program for any purposes
2. Freedom to study and change the code at will
3. Freedom of redistribution - no restrictions on usage, access, or distribution of software
4. Freedom to distribute modified versions

9. What is virtualization?

- Hardware abstraction layer that allows software to host virtual computers
- Hypervisor manages resource allocation between guest virtual machines
- Allows for testing, compartmentalization, and utilization of resources