Why Start with Linux?

- Linux quickly became a standard server OS
- Is free (as in free beer)
  - Students can easily and economically have their own lab
- Good for learning
  - Lessons apply to all Unices
  - More Unix than Unix
  - Concepts apply to any multi-user OS

Installing (RedHat) Linux

- RedHat installation process was developed to be easier than what was available at the time
- Was criticized as “dumbing down” Linux for the masses
- Actually is a nice environment for all levels of users for initial install
- Gets a system up and running with a minimum of “fuss”, leaves it up to the admin to customize post install
Installing (RedHat) Linux

How it works

- Starts by booting machine with a small kernel, minimal Linux image, includes RPM (RedHat package manager)
  - Floppy
  - CD
  - Can also do PXE/TFTP/BOOTP
- Purpose is to bootstrap the rest of the installation
- Allows for detection/selection/setup of hardware
- Allows for selection of software to install
- Runs a post installation script for setting up users, networking, firewalls, etc.

Installing (RedHat) Linux

Several decisions need to be made prior to or during an installation

- Coexistence with other OS(s)
- Partitioning and partition sizes
- Software load
- Networking
- Services
- Initial users

Installing (RedHat) Linux

First decision is multiple OS

- Best answer is almost always no
  - Complicated to set up
  - Can cause performance issues
  - Linux likely to be used on older “hand me down computers”
- If decision is yes
  - Consider using commercial software like partition magic/boot magic to make the job easier

Installing (RedHat) Linux

Rule of thumb 1: Keep it simple, workstations should have a minimum of partitions

- /boot
  - The partition the OS boots from (cannot span disk track 1024)
- /var
  - All Linux machines should have a separate /var partition to avoid being vulnerable to Denial of Service attack from filling the partition the log file is written to
- /
  - This is the root partition. Every Linux machine needs to have a root partition
  - Swap – Every Linux machine needs a swap partition – a place for OS to use to swap out memory not currently being used

Installing (RedHat) Linux

Partition Sizes:

- Single User Machines vs. Servers
  - Servers require more log space
  - Servers should not die periodically
  - Servers may have more disk devices

Sizes for workstation:

- /boot: 155 Mb
- /var: 50-350 Mb
- Swap – Generally at least equal to real memory installed and preferably twice real memory
- / : the rest of the available space should be allocated here
Installing (RedHat) Linux

Rule of Thumb 2: Keep it simple, but realize a typical server will have many uses - Partitions

- /boot - same as workstation
- /var - Servers in particular must have a separate /var partition
- /home
  - A directory where all user files will be stored - separate to allow OS to be reinstalled without deleting user files
  - /usr
    - A directory where application software is installed
- / - The root partition.
- /opt -
  - Another directory where optional application software can be installed, ex. Apache web server

Sizes for server:

- /boot: 155 Mb
- /var: 500-2000 Mb
- Swap - Twice memory size
- /home: Average user need x number of users
- /usr: 1-4 Gb, depending upon load
- /opt depends upon what you will be loading

A word about FHS (Filesystem Hierarchy Standard)

- FHS is goodness: Learn it, love it, live it
- Defines what goes where, and why
- A Systems Administrator should follow the FHS, or be able to defend the reason why they did not
- Can be found at:
  - http://www.pathname.com/fhs/2.2/

Package Selection

- Can take the defaults
  - Server
  - Workstation
  - Laptop
  - Custom
- My recommendation: Never, ever select the defaults, always select custom

Next step is the actual partitioning

- Options are automatic - never select
- Disk Druid - my favorite
- Fdisk – complicated to use, but offers more options for partition types

Next the system asks information about the boot loader and boot image location.

- Generally the defaults are good on this screen
  - Use Grub as the boot loader
  - Put the boot loader to the master boot record
  - Put the boot image on the boot partition and give it a boot label
Installing (RedHat) Linux

- Grub password? Maybe.
- This is a password that would allow someone to pass options to the kernel, defeating security during a reboot process.
- Having a Grub password WILL NOT prevent a remote reboot, i.e. someone with console access compromising the machine.
- Having a bios password, not allowing boot from removable media will help

Installing (RedHat) Linux

- Network configuration:
  - DHCP? Do you have a DHCP server available?
  - DHCP is dynamic host configuration protocol, allows for server to provide networking information to a client on boot – makes administrating pools of IP addresses easier
  - Static – for servers and for machines on a very small network

Installing (RedHat) Linux

- Static IP addresses require you to know:
  - Network address and class (or CIDR mask)
  - Netmask
  - Gateway address
  - DNS servers

Installing (RedHat) Linux

- Firewall configuration
  - Big subject
  - Can accept the defaults for most workstation installs
  - More on this later in the course
  - For now, allow ssh, dhcp and http (or www)

Installing (RedHat) Linux

- Choose keyboard
- Choose time zone and UTC offset
- Add a root password
  - Make it a good one
  - Make it one you can remember
- Add a non-root account for yourself

Installing (RedHat) Linux

- Enable MD5 (default)
- Enable shadow passwords (default)
- LDAP, Kerberos, and SMB just accept the defaults
Installing (RedHat) Linux

- RedHat then asks you to do a package group selection
- Pick the ones you think you need and then STOP!
- Decide if you really need package. Every package introduces potential security problems
- Then check ON the select individual packages box

Installing (RedHat) Linux

- Assuming a graphical installation mode, you will get a screen with a tree view of the packages on the left side, and a list of packages on the right.
- One the bottom of the screen is an explanation of the package highlighted on the right side screen – it is a good idea to read about each and every package you plan to install.

Installing (RedHat) Linux

- Should I install a package?
  - Do you need it?
  - If the answer is not an emphatic yes, then don't install.
  - Why?
    - Easy to add later in most cases.
    - Each package installed potentially introduces a security risk to your system.

Installing (RedHat) Linux

- After packages are selected, the RedHat installer checks for dependencies, and gives you a list of prerequisite packages to install.
  - Choices here are really two:
    - Go back and reselect
    - Go ahead and install prerequisite packages
    - The third option, which is to ignore dependencies. This breaks things, so is an experts only option

Installing (RedHat) Linux

- RedHat next asks for video card information, and usually guesses correctly
- Click on next and the installation begins!
- First, formatting of the filesystems starts
- Next the system transfers the installation image
- Finally the system starts installing packages

Installing (RedHat) Linux

- Post install processing
  - probes the monitor,
  - asks you to produce a boot disk (used for emergencies),
  - congratulates you your installation,
  - ejects your CD, and,
  - reboots your computer
Installing (RedHat) Linux

- For those of you who have the interest, I can provide you with CDs