



# Introduction



stan reichardt

*GNU/Linux for Beginners*

*Brought to you by the*

**Hazelwood Linux Users Group**

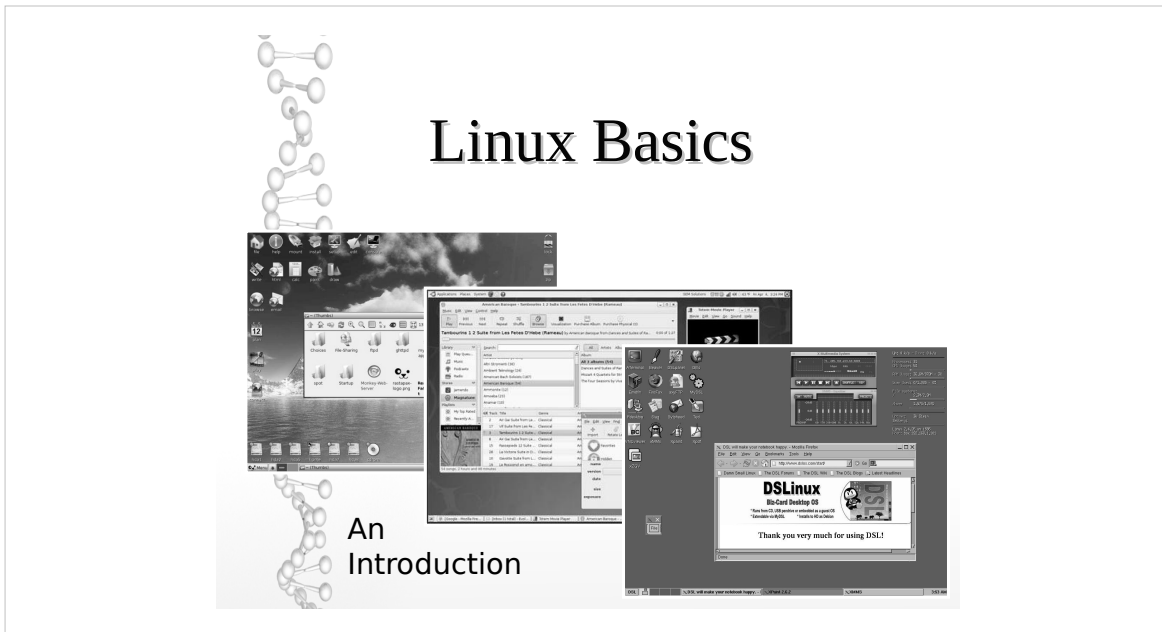
<http://hzwlug.sluug.org/>

*A Special Interest Group of the*

**St. Louis Unix Users Group (SLUUG)**

<http://www.sluug.org/>

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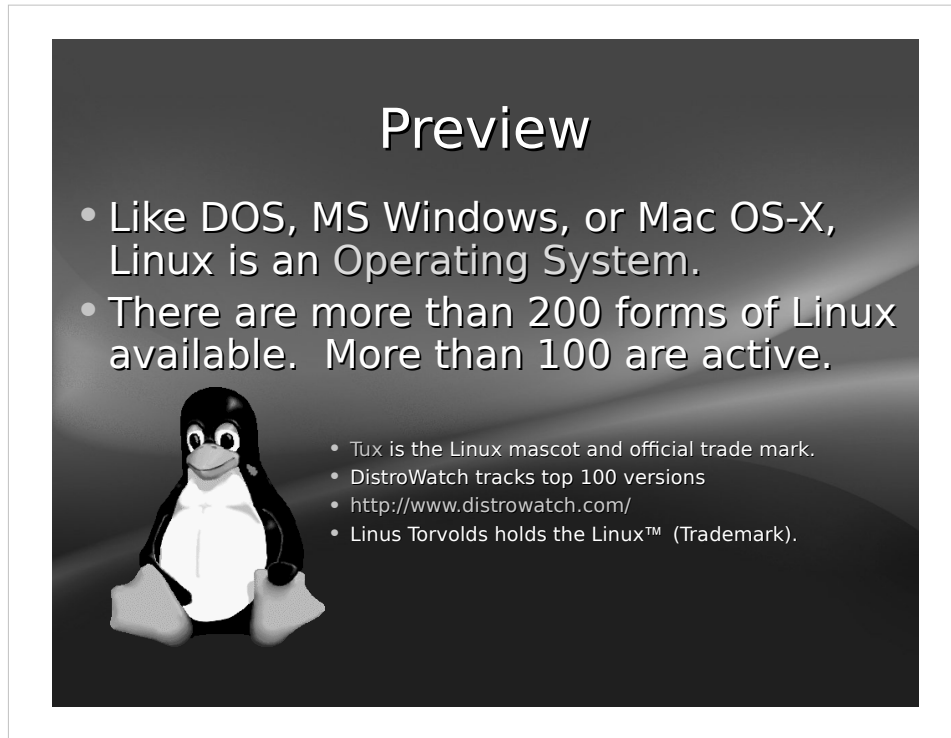
## Section I

The name of the operating system is usually pronounced “Lin-” as in “Fin”, and “-ux” as in “Trucks”, with the emphasis on the first syllable.

Linux is a Unix-like and mostly standards compliant (POSIX) computer operating system assembled under the model of free and open-source software development and distribution. The defining component of Linux is the Linux kernel, an operating system kernel first released on 5 October 1991 by Finnish software developer **Linus Torvalds**.

Linux was originally developed as a free operating system for Intel x86-based personal computers, but has since been ported to more computer hardware platforms than any other operating system.

Linux is the leading operating system on servers and other big iron systems such as mainframe computers and supercomputers, **but is used on only around 1% of desktop computers**. Linux also runs on embedded systems, which are devices whose operating system is typically built into the firmware and is highly tailored to the system; this includes mobile phones, tablet computers, network routers, facility automation controls, televisions and video game consoles. Android,



**You have to understand that Linux is a computer Operating System and that there are many forms of Linux available.**

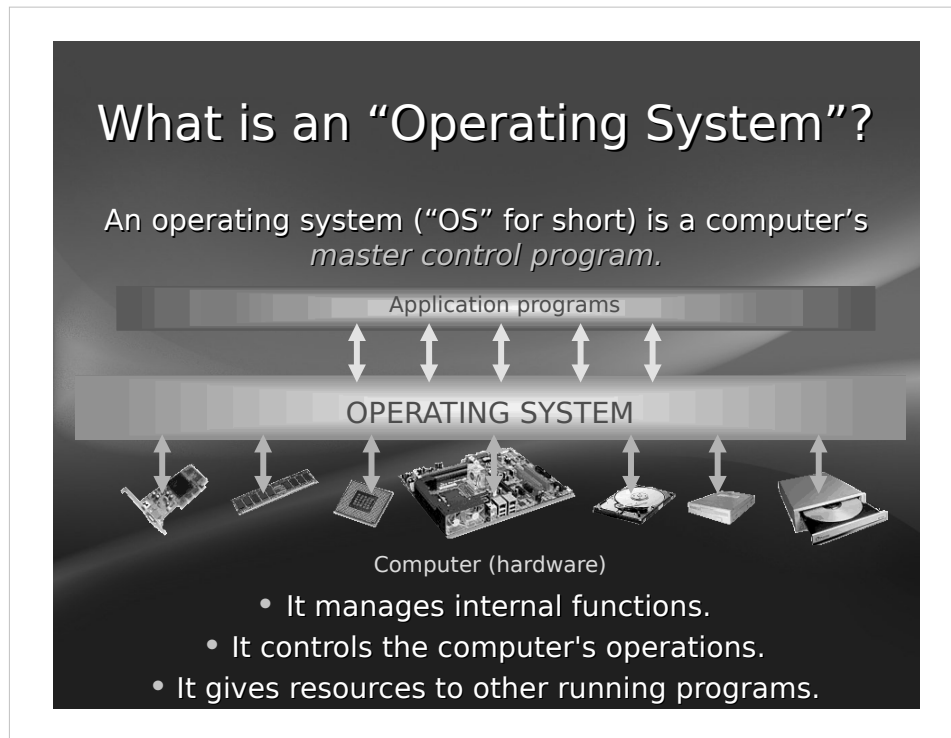
*In 2011, the “Distrowatch.com” database of active Linux distributions peaked at 323. Currently, however, it lists only 285. Distros have always come and gone. In fact, Distrowatch lists 791 distributions that have existed since it was founded in 2001, although less than forty percent have ever been in active development at any given time..*

<http://www.datamation.com/open-source/why-is-the-number-of-linux-distros-declining.html>

<http://http://distrowatch.com/search.php?ostype=All&category=All&origin=All&basedon=All&notbasedon=None&desktop=All&architecture=All&status=Active>

**The Linux form is a complete package that includes the Linux kernel, software tools and applications. It is known as a distribution. They are as varied as automobile makes and models.**

|                |                         |                       |
|----------------|-------------------------|-----------------------|
| Ford ~ Lincoln | Ford ~ F150 pickup      | Chevy ~ Volt electric |
| Ford ~ Mustang | Ford ~ E350 utility van | Chevy ~ Capri         |
| Ford ~ Focus   | Chevy ~ Blazer SUV      | Chevy ~ Blazer SUV    |



The earliest operating systems simply provided a standardized way for software developers to write application programs, which did not require a specific version of the program for each hardware configuration.

## Why do we need an OS?

- Without an operating system, each program installed in a computer would have to control all of the computer's hardware on its own.

All Other Application Programs BLOCKED

---

ONE Application Program Running

Computer (hardware)

- Programs would fight one another for hardware control, making "multi-tasking" impossible.

Multi-tasking is made possible by building and assigning "Application Programming Interfaces" (API's) for each installed program.



## How would we pick an OS?

- OS Compatibility
  - with your computer hardware
  - with other systems (i.e. networking)
  - with specific application software
- OS Features
  - Standard Features
  - Special Features
- OS Cost
  - Purchase price, availability of updates
  - License issues

We usually see computers coming with an Operating System already installed. Users seldom install an Operating System.

One **key factor** in selecting an operating system is the availability of application software to make a computer perform a user's desired tasks. For those users who wish to buy application software "over the counter", commercial operating systems such as MacOS X and Windows Vista are more appropriate than Linux.

A presentation slide with a dark background and white text. The title "Open Source Software" is at the top. Below it is a list of key points. A small penguin icon is in the bottom right corner of the slide.

## Open Source Software

- <http://www.opensource.org/>
- Key Points of Open Source:
  - Free Acquisition & Redistribution
  - Source Code (must be included or available)
  - Derived Works (must allow modifications)
  - Integrity of Source Code (credit to authors)
  - No Discrimination (of persons, groups or use)
  - Distribution of License (can not be restricted)



Usually Open Source Software is free of cost.

Linux is Free Open Source Software (FOSS).

The biggest difference in the development of Open Source Software is the way in which *communities of developers* pool their resources to create and distribute the software source code. Since no one entity controls the creation and distribution, no one entity *licenses and sells* the software.



## How do we use an OS?

- An operating system has a “user interface” to accept commands.
- It can be *text-based*...

```

C:\>dir /w
Volume in drive C has no label.
Volume Serial Number is XXXX-XXXX

Directory of C:\

[ACON]                [All]                AUTOEXEC.BAT
[Backup]              COM10.SYS            Documents and Settings
[Downloads]           [Drivers]            hp5ac566.log
[Program Files]       [Program Files]     [SETUP]
[Program Files]       [temp]              [WINDOWS]
                    4 File(s)           13 412 bytes
                    11 Dir(s)  464 581 514 248 bytes free

```

- ...or *graphics-based*.

Most operating systems can be controlled either graphically or by textual commands. The “command line” user interface in Linux is usually accessed through a Terminal window.

***You don't have to use a text based interface. There is a graphical user interface that has icons selectable with the mouse pointer.***



## Section II

There are many distributions. We will just look at a **very small set** of examples.

To my mind asking if we have too many distributions is akin to asking if we have too many novels or too many paintings. – Jesse Smith, Distrowatch

## Variety Is The Spice Of Linux

- There are more than 200 different forms of Linux.
- Linux distributions, known as “distros” are based on one of several “core” versions.
- Compare distros at <http://www.distrowatch.com/>
- Special features and more applications may be added to distros.



Think of a distribution as a package. The package will have the Linux kernel, a selection of useful applications, tools to install everything and tools to manage using it, after it is installed.

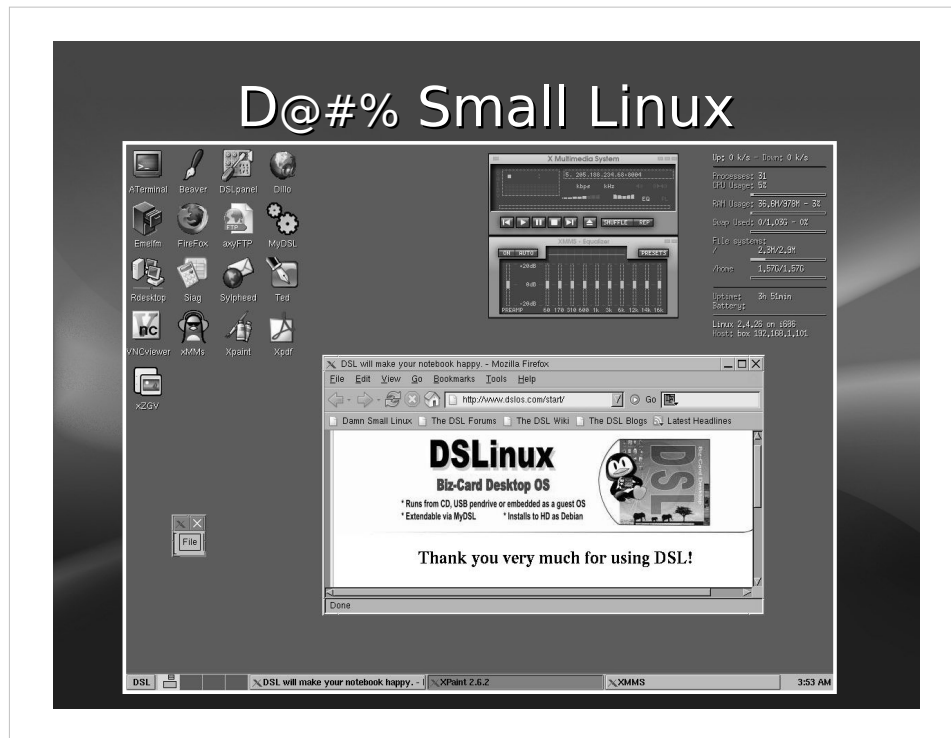
Linux distributions usually differ in their graphical user interfaces, and for which hardware platforms (Windows, Macintosh, hand-held systems, etc.) the distributor has produced them.

**Some** distributions functionally designate separate “flavors”:

- Cloud
- Server
- Desktop (workstations)

**Desktops** are often differentiated by their **graphical** Desktop Environments:

- Gnome ~ GNU Network Object Model Environment
- MATE
- KDE ~ K Desktop Environment
- XFCE
- and a multitude of others.



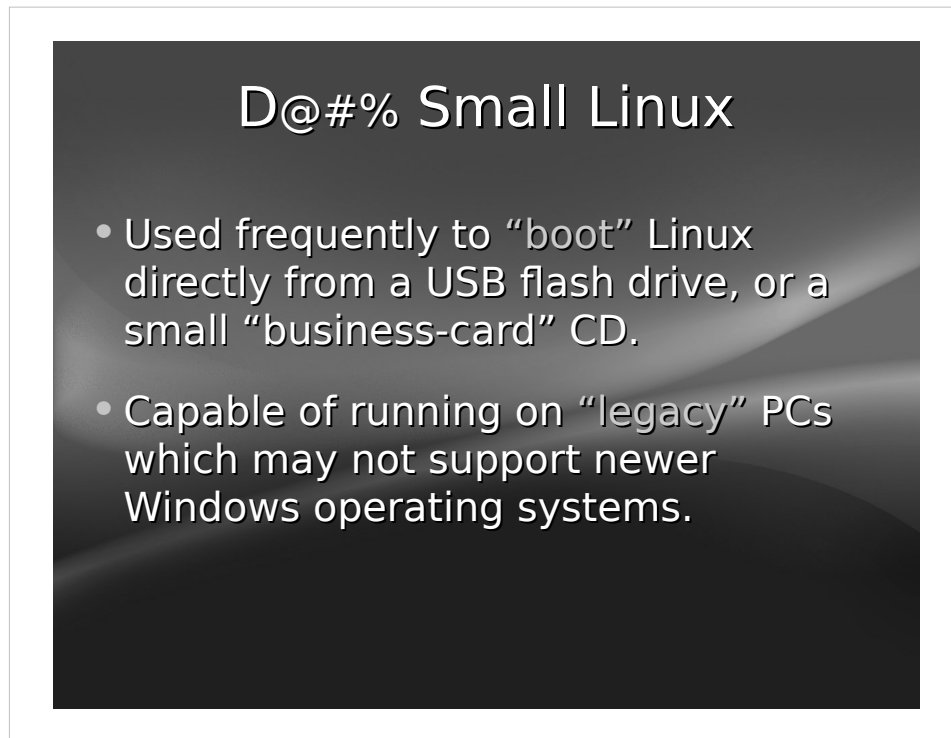
### ***OUR FIRST EXAMPLE DISTRO:***

**Damn Small Linux** started out as a business card size (50MB) live CD Linux distribution. Despite its minuscule size it strives to have a functional and easy to use desktop. **Damn Small Linux** has a nearly complete desktop, including XMMS (MP3, and MPEG), FTP client, links-hacked web browser, spreadsheet, email, spellcheck (US English), a word-processor, three editors (Nedit, nVi, Zile [emacs clone]), Xpdf, Worker (file manager), and more.

Some of the “richness” of the graphical user interface has been left out of **Damn Small Linux**, in favor of a wider range of system compatibility and faster system performance.

### ***REMEMBER:***

***You don't have to use a text based inteface. There is a graphical user inteface that has icons selectable with the mouse pointer.***



As described in its online documentation, **Damn Small Linux** is claimed to load and execute on as early as an 80486 system with 64 megabytes of system memory.

If you like **Damn Small Linux** you can install it on your hard drive. Because all the applications are small and light it makes a very good choice for older hardware.

**OPTIONAL TEXT:**

*\* Naim (AIM, ICQ, IRC), VNCviewer, SSH/SCP server and client, DHCP client, PPP, PPPoE, a web server, calculator, Fluxbox window manager, system monitoring apps, USB support, and soon it will have PCMCIA support as well.*



### ***OUR SECOND EXAMPLE DISTRO:***

**Puppy Linux** is yet another Linux distribution. What's different here is that Puppy is extraordinarily small, yet quite full-featured. Puppy boots into a ramdisk and, unlike live CD distributions that have to keep pulling stuff off the CD, it loads into RAM. This means that all applications start in the blink of an eye and respond to user input instantly. Puppy Linux has the ability to boot off a flash card or any USB memory device, CDROM, Zip disk or LS/120/240 Superdisk, floppy disks, internal hard drive. It can even use a multisession formatted CD-RW/DVD-RW to save everything back to the CD/DVD with no hard drive required at all.

### **REMEMBER:**

**You don't have to use a text based interface. There is a graphical user interface that has icons selectable with the mouse pointer.**

### **OPTIONAL TEXT:**

*Note the minimalist image of a dog's face in the primary menu button on the taskbar, and in the icon for the "rastapax-logo.png" file in the Thumbs folder view (bottom center of open window.)*

## Puppy Linux

- Puppy Linux uses a traditional “graphical user interface” desktop like many popular Linux distros, such as antiX, Knoppix, MEPHIS, openSUSE, PCLinuxOS, or Zorin.
- Users moving from MS Windows to these Linux distros will easily recognize many similarities to the MS Windows “desktop”.

One of the primary Linux distributions to introduce this user interface was *Debian Linux*, which in turn was an outgrowth of the X Window System, as previously applied to the Unix operating system.



### ***OUR THIRD EXAMPLE DISTO “FAMILY”:***

***Ubuntu*** claims to be the most popular Linux.

In May 2014 ***Ubuntu*** claimed to have 22 million users.

The **Ubuntu** Web site includes 32- and 64-bit versions for Windows Intel, Windows AMD, Macintosh PowerPC and Macintosh Intel microprocessor platforms.

**Ubuntu** has functionally separate “flavors”:

- Cloud ~ combines server with a focus on remote backups.
- Server
- Desktop (Workstation)
- Phone
- Tablet

Note the top-of-screen menu with its circular **Ubuntu** logo, organized much the same way as the MacOS X menu bar.


### ***REMEMBER:***

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## Ubuntu Linux

- An early Linux variant for both Macintosh or Windows systems.
- Claims to be most popular Linux.
- Once used the traditional GNOME version 2 graphical user interface. It is now fairly similar to that of MacOS X, and shares some of its features, such as selectable "desktop panes".
- Now uses the Unity desktop environment that is geared to newer touch screen hardware.



**Ubuntu** made changes to their Desktop Environment that were very non-traditional. Changes were away from the traditional Gnome Desktop Environment to using something they named Unity. The next version of Gnome, Gnome 3 was making the same kind of changes; but, that's a whole nother story.

Compare these changes with buying a new car from your favored manufacture and finding the latest model has the steering wheel on the opposite side, luggage is in the front, and the engine is now in the rear. Oh, and no rear window! Those are changes that you could get used to using. But, would you want to do it?

**Ubuntu** is an ancient African word, meaning "humanity to others".



Additionally, the **Ubuntu** distribution is available in a family of different **Desktop Environments**. Here are **three** of them:

- Edubuntu ~
- Kubuntu ~
- Xubuntu ~

There are more:

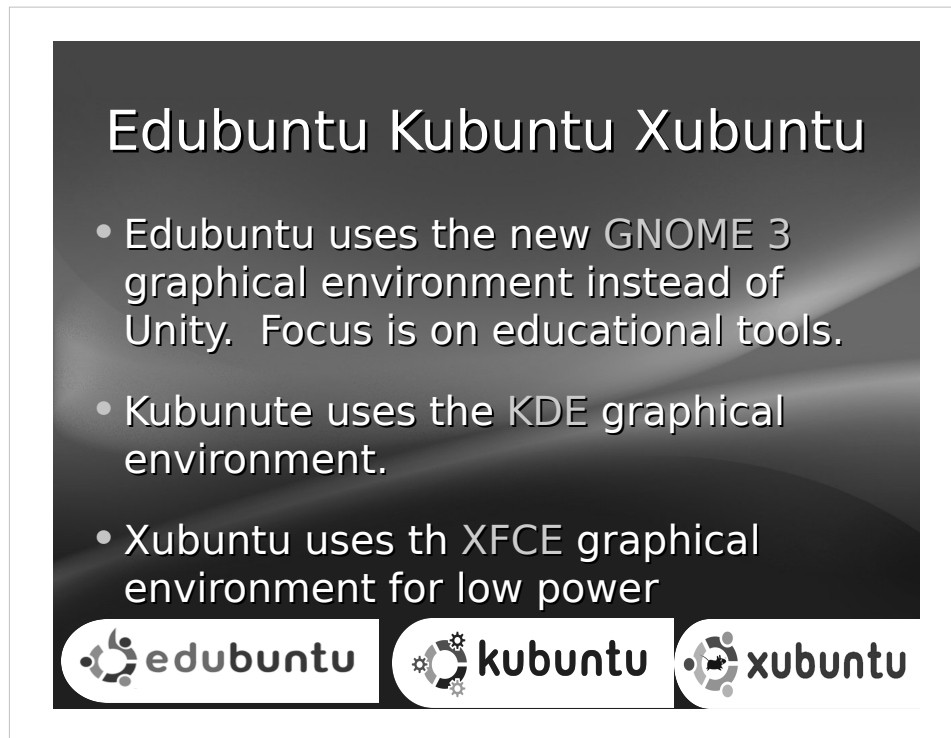
- Ubuntu-Kalie ~
- Ubuntu-Gnome ~

Possible future **Desktop Environments** ~ Ubuntu MATE, a return to a “Classic” or traditional Desktop Environment style.

- <https://ubuntu-mate.org/>
- <http://www.dedoimedo.com/computers/ubuntu-utopic-mate.html>

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**Edubuntu** is a partner project of Ubuntu, a distribution suitable for classroom use. The aim is that an educator with limited technical knowledge and skill will be able to set up a computer lab, or establish an on-line learning environment, in an hour or less, and then administer that environment without having to become a fully-fledged Linux geek. Its objective is to create an integrated and usable experience for educational users by enhancing Ubuntu with educational applications, tools, content, and themes.

**Kubuntu** is a free, user-friendly Linux distribution based on KDE's desktop software and on the Ubuntu Linux operating system. It has a biannual release cycle. Besides providing an up-to-date version of the KDE desktop at the time of the release, the project also releases updated KDE packages throughout the lifetime of each release.

**Xubuntu** is a Linux distribution based on Ubuntu Linux. Unlike its parent, however, Xubuntu uses the light-weight Xfce desktop environment and is optimised for lower-end machines. It is perfect for laptops, desktops and servers. It contains all the applications you need - a web browser, document and spreadsheet editing software, instant messaging and much more. The distribution includes only GTK+ applications where possible.



### ***OUR FOURTH EXAMPLE DISTRO “FAMILY”:***

**Linux Mint** Linux distribution has the goal to provide a more complete out-of-the-box working experience by including additional browser plugins, media codecs, support for DVD playback, Java and other components. It also adds a custom desktop and menus, several unique configuration tools, and a web-based package installation interface.

### ***REMEMBER:***

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**Linux Mint** starts out using the **Ubuntu** software repositories. A *repository* is a special file server where finished software packages are made available for downloading.

**LinuxMint** documentation suggests starting out with the MATE desktop environment.

**Linux Mint** is highly recommended for newcomers to Linux.



## Section III

Most people don't install Microsoft Windows or Apple Mac OS-X themselves, they buy a computer and it has the Operating System pre-installed.

## Systems Pre-Loaded with Linux

- Major vendors infrequently provide Linux pre-loaded
- Examples, such as the ASUS EeePC and the PowerSpec N108, used different Linux distributions as their default operating system
- Some computer vendors that pre-load Linux
  - System76
  - EmperorLinux
  - ZaReason
  - LinuxCertified
  - Los Alamos Computers
  - InaTeX Computers

### Examples shown:

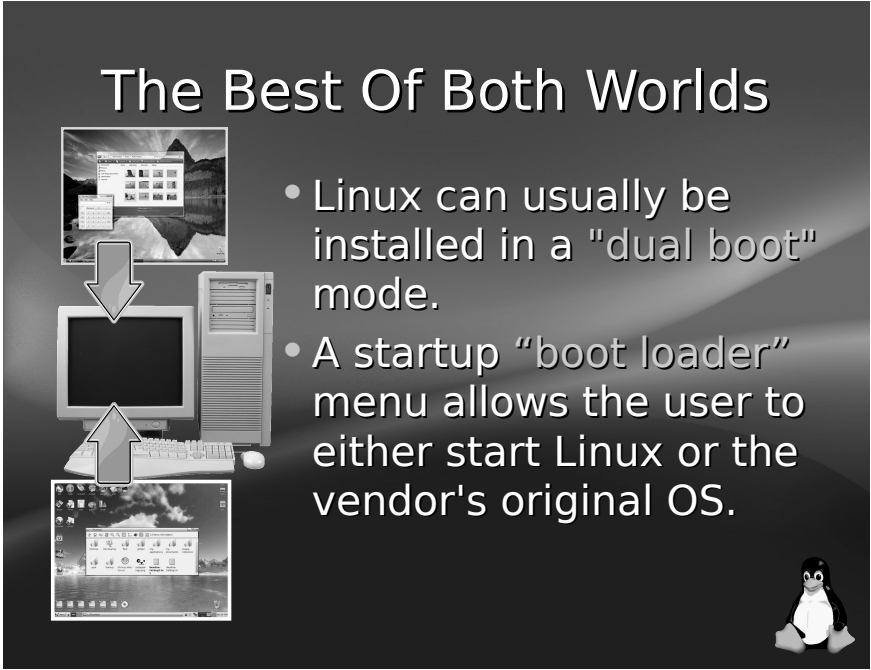
The “no longer available” EeePC used Xandros Linux (configured to work effectively with the EeePC's diminutive 7-inch diagonal screen), while the PowerSpec N108 system uses Ubuntu Linux.

- ASUS <http://asus.com/> EeePC no longer available
- PowerSpec <http://powerspec.com/>

### Vendors that pre-load Linux:

- System76 <https://system76.com/>
- EmperorLinux <http://www.EmperorLinux.com>
  - **also** does after purchase installs
- ZaReason <http://zareason.com/>
- LinuxCertified <http://www.linuxcertified.com/>
- Los Alamos Computers <http://laclinux.com/>
- InaTex Computers <http://inatux.com/>
- Dell <http://www.dell.com/> pricey ~ On again, off again.
-

## The Best Of Both Worlds




- Linux can usually be installed in a "dual boot" mode.
- A startup "boot loader" menu allows the user to either start Linux or the vendor's original OS.

One exception to this scenario is when an "overlay" program is used to mediate between the hard disc drive, BIOS and the operating system during the setup of the drive.



## Disc Or Download

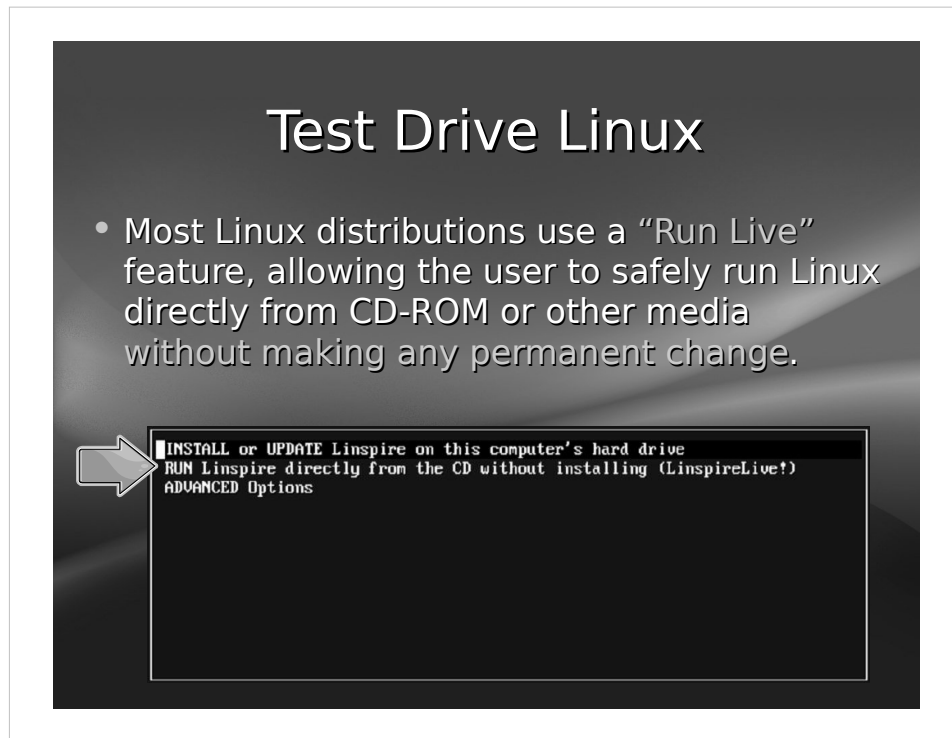


- Now Available at Micro Center: Distributions of Linux can be purchased as low-cost “stand-alone” CDs or DVDs.
- Or, order from <http://www.osdisc.com/>

- Linux can also be downloaded via a “broadband” Internet service as an ISO disc-image file, and burned as a bootable CD, DVD or USBstick.



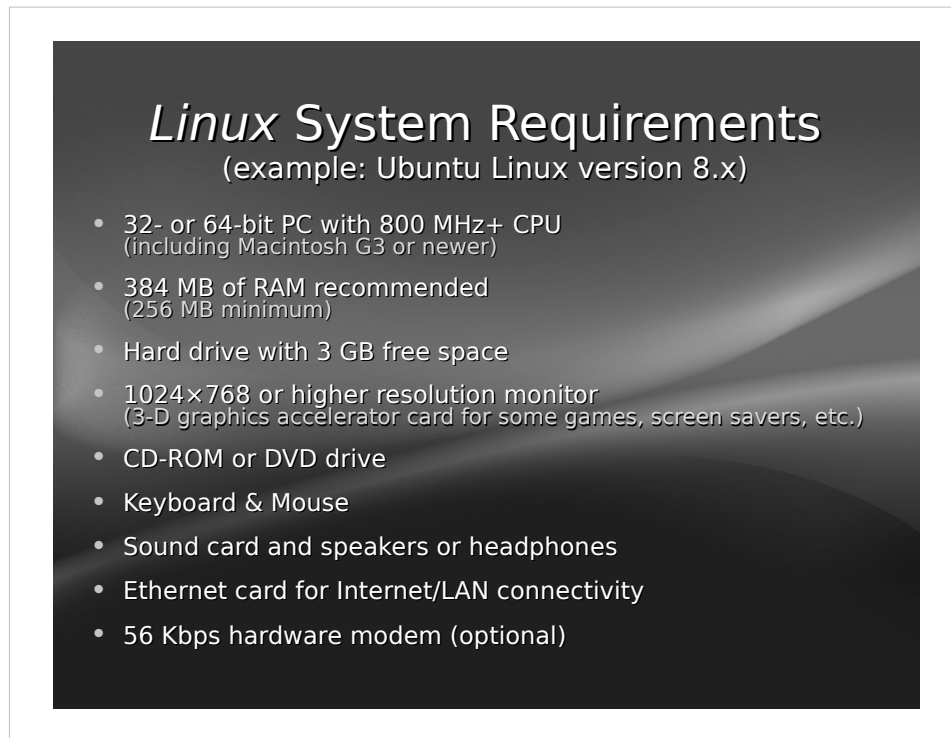
ISO (International Standards Organization) disc-image files of Linux distributions can be more than a gigabyte in size: therefore, it is important to obtain them only through a “broadband” Internet connection. A dial-up telephone-line connection will take more than a day for the download.



In some Linux distributions, the “Run Live” files and the “Installation” files are on different media.

**REMEMBER:**

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System hardware requirements vary with each Linux distribution.

**Ubuntu Linux version 8.x** came out in 2008. The RAM requirements for newer Linux distros may have increased, depending on the Desktop Environment.

## PC Management

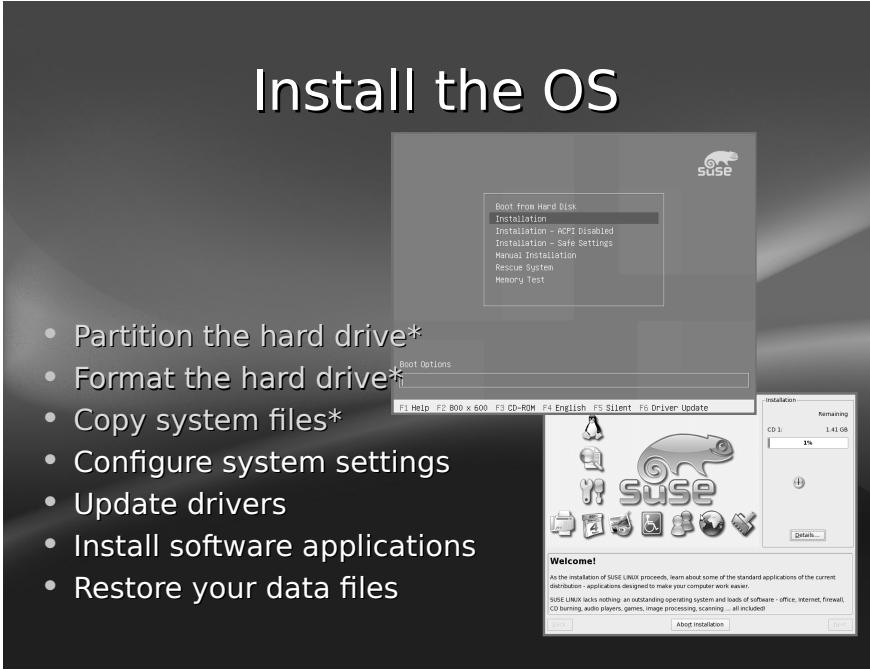
Most Linux distributions are “Plug and Play” Ready. Test “Run Live”.

- New hardware detection
- Wired & wireless networking
- USB and Firewire detection
- Device support includes:
  - Digital Cameras
  - Scanners
  - MP3 Players
  - Flash drives, memory card readers



As computer-industry standards have become more unified, setup and installation of Linux and Linux applications have become more intuitive and fluid.

# Install the OS



The screenshot shows the SUSE Linux installation boot menu with the following options:

- Boot from Hard Disk
- Installation
- Installation - ACPI Disabled
- Installation - Safe Settings
- Manual Installation
- Rescue System
- Memory Test

Below the menu, a 'Boot Options' window is visible with the following text:

F1 Help F2 800 x 600 F3 CD-ROM F4 English F5 Silent F6 Driver Update

In the bottom right, an 'Installation' progress window shows 'Remaining' space and a progress bar at 3%. Below it, a 'Welcome!' message reads:

As the installation of SUSE LINUX proceeds, learn about some of the standard applications of the current distribution - applications designed to make your computer work easier. SUSE LINUX lacks nothing: an outstanding operating system and loads of software - office, internet, firewall, CD burning, audio players, games, image processing, scanning... all included!

Buttons for 'About Installation' and 'Next' are visible at the bottom of the progress window.

- Partition the hard drive\*
- Format the hard drive\*
- Copy system files\*
- Configure system settings
- Update drivers
- Install software applications
- Restore your data files

**NOTE \*** Partitioning, Formatting and file copying is usually (but not always) performed by booting the system from the Linux distribution disc.



The graphical user interface (“GUI”) setup may require the user to specify the resolution(s) of the display adapter and monitor during the setup process.

The sound volume is often muted with a new installation, causing some users to believe sound is broken.

Wireless cards on laptops can be a problem. So, it is a good idea to test first.



## Section IV

## Free Open Source



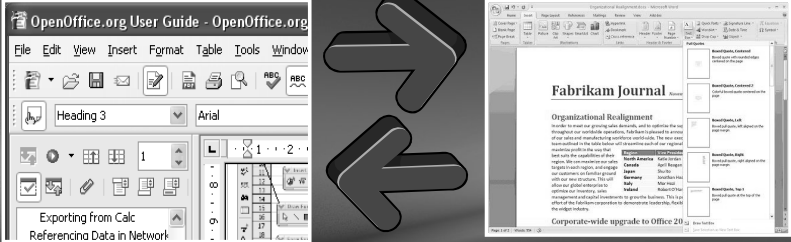
- The same community development model used to create distributions of Linux is also used to make application software to run on Linux systems.

Some Linux distributors offer large, comprehensive “on-line stores” from which Linux applications for one or more distributions can be downloaded, at little or no cost. Usually free of cost.

We have a **FOSS – Free Open Source Software** brochure handout.



## Works Well With Others



- Many open-source programs create and edit documents which are “cross-compatible” with their MacOS or Windows counterparts.
- Many have “cross-platform” versions.

Part of the cross-compatibility between open-source and commercial office suites was the adoption by Microsoft of the Open Source Extensible Markup Language (Open XML) and the Open Document Format for word-processing, spreadsheet and presentation files.

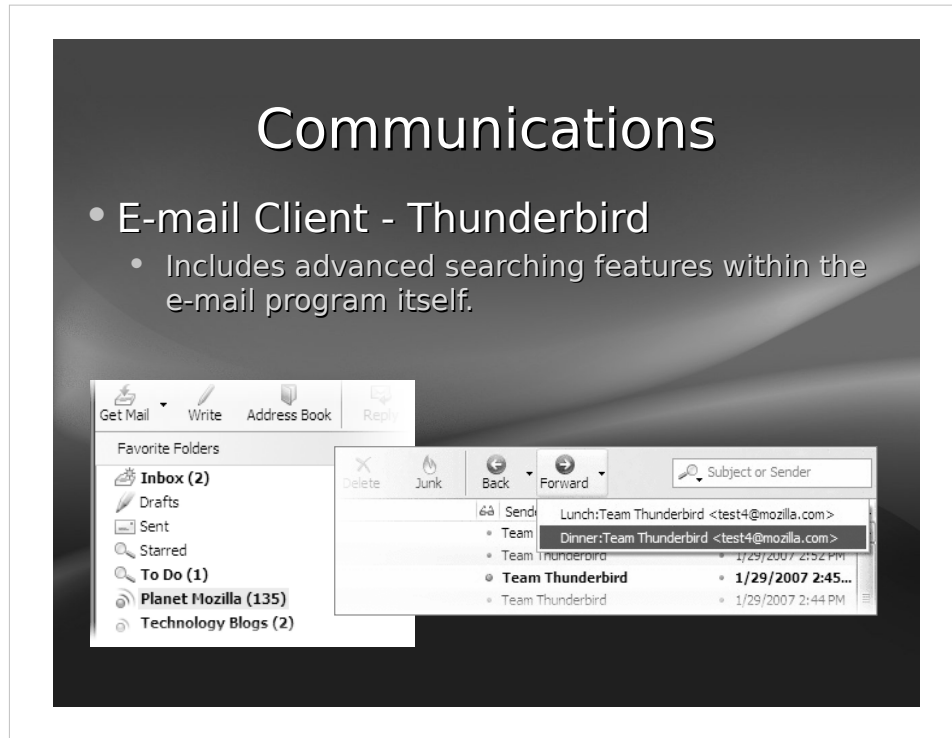


## A PRIME EXAMPLE OF FOSS

Firefox includes most of the features found in other Web browsers, such as tabbed browsing.

Other browsers:

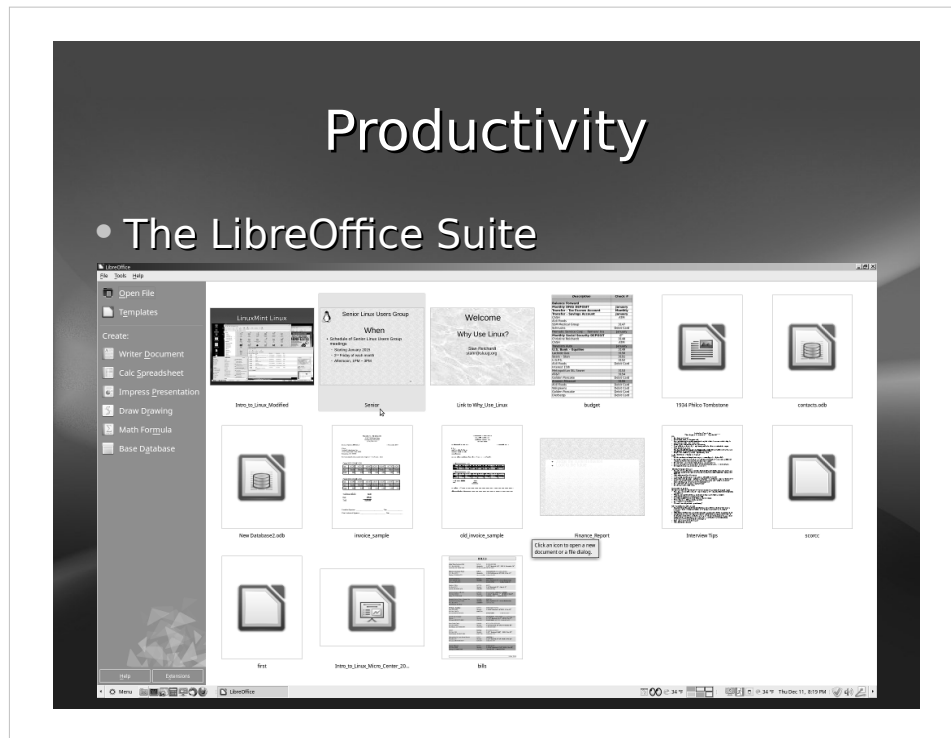
- IE ~ Internet Explorer (only on Microsoft Windows)
- Chrome (from Google)
- Konqueror (from KDE)
- Iceweasle
- Links and Lynx (text only)
- Many more...



### **ANOTHER EXAMPLE OF FOSS:**

Most e-mail client applications can handle multiple e-mail addresses for a given user, sending and receiving e-mail for all entered addresses in one operation.

If you use Google Mail, Yahoo Mail, HotMail or a similar Internet mail package, you just use the browser to get to that application. You don't have to “re-install” or “configure” anything on Linux.



## YET ANOTHER EXAMPLE OF FOSS:

**LibreOffice** is a powerful office suite of applications. It contains:

- **Writer**, the word processor,
- **Calc**, the spreadsheet application,
- **Impress**, the presentation engine,
- **Draw**, our drawing and flowcharting application,
- **Math** for editing mathematics, and
- **Base**, our database and database frontend.

## Productivity

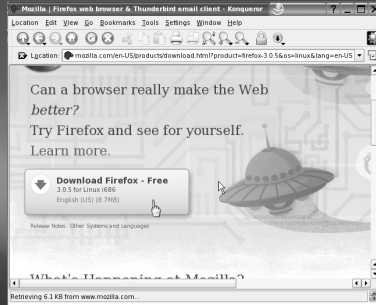
The LibreOffice Suite came from the OpenOffice Suite.

- Developer community took the OpenOffice open source software code and greatly improved it.
- It started as an exact duplicate, added many fixes and continues to improve at a faster rate.



**LibreOffice Suite** is also available for download to use on Windows and Macintosh systems. A good way to become comfortable with FOSS.

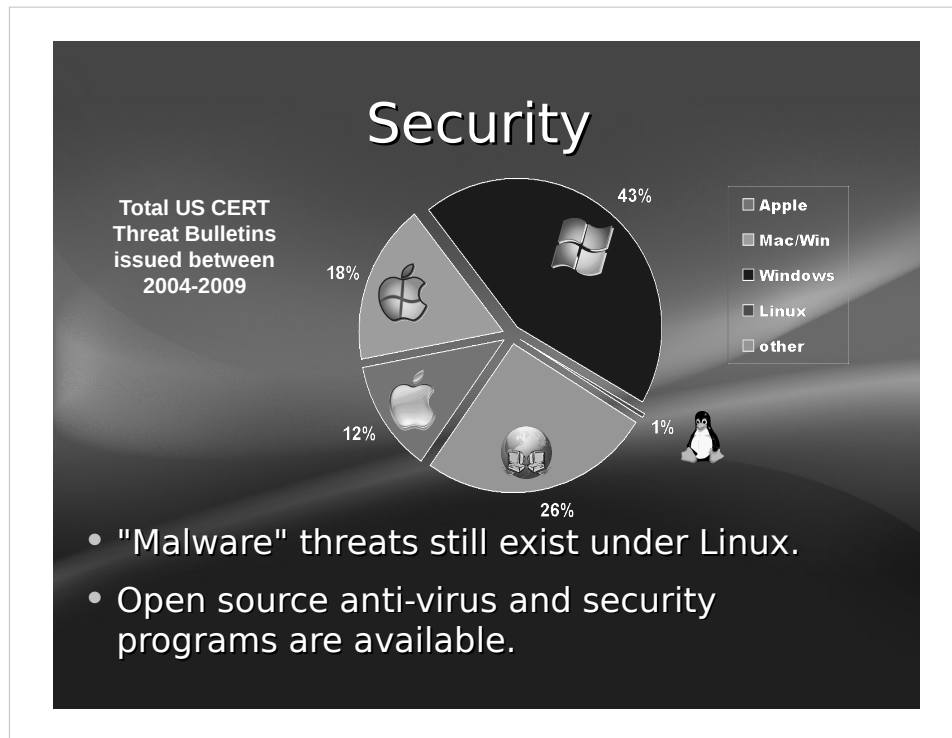
## Program Downloads



- One of the “trade-offs” of using Linux is the relative lack of over-the-counter application software.

- However, Linux users can download and install nearly any kind of application software imaginable from the Internet.

In addition, some open-source software distributors have made Windows and / or Macintosh versions of their open-source applications available for download.



System security also involves downloading *security updates* for the operating system itself. In their first year of release, **Ubuntu** Linux and **SuSE** Linux had more than 300 security issues >> EACH <<, addressed by updates. In its first year of release, **Microsoft Windows Vista** only had 65 security updates released.

Likely skewed numbers because the Linux distros include more applications.

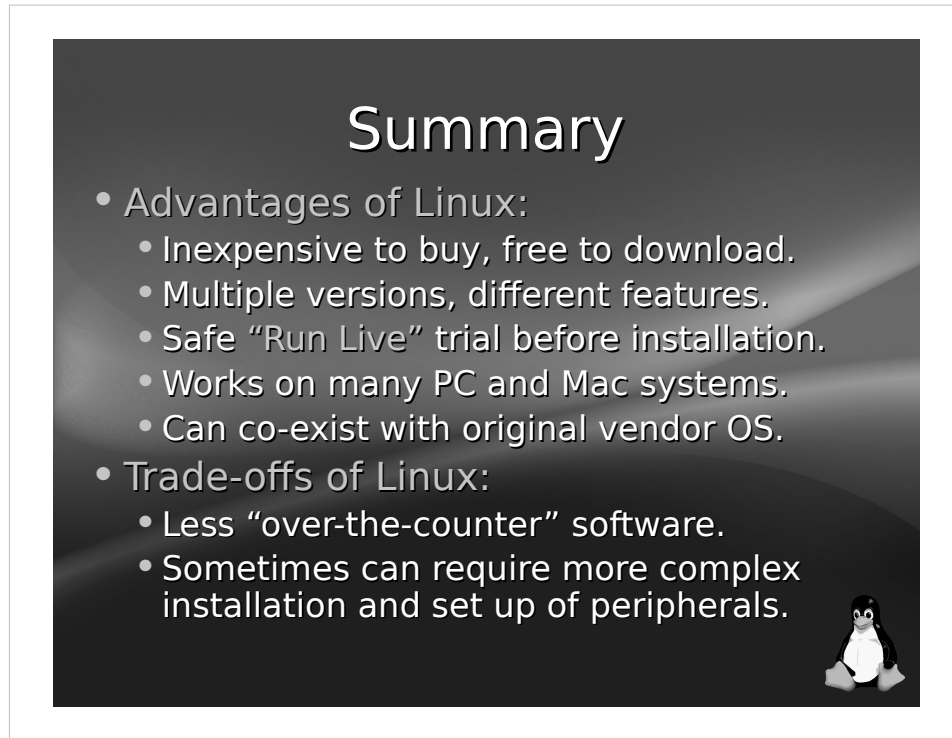
## Resources

- Original presentation from MicroCenter
- <http://en.wikipedia.org/wiki/Linux>
- <http://www.opensource.org/>
- <http://www.distrowatch.com/>
- <http://www.linuxscreenshots.org/>
- <http://images.google.com/>
- <http://www.osdisc.com/>
- <http://www.linuxmint.com/>
- <http://www.dedoimedo.com/computers/ubuntu-utopic-mate.html>
- <http://hzwlug.sluug.org/>



Resources:





Although often first to be mentioned, the initial dollar (\$) cost is the least important advantage!

We have a **Why Use Linux** brochure handout.

We have a **Why Use Linux** slide-show presentation.

***REMEMBER:***

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Intro to Linux

# Questions

What are your questions?

stan reichardt  
stanr@sluug.org

07/28/15 17:33 43

**END CLINIC** – Thank the attendees, open the floor for any final questions, and then proceed to any applicable demonstrations.