WINDOWS V LINUX

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History of Linux

Linux's History begins with Bell Labs. Linux is based on Bell Lab's UNIX operating system which arguably the most stable operating system ever created. Three main people caused Linux to exist and inspired its creation.

The first of these people is Andrew S. Tanenbaum. Tanenbaum was a Dutch college computer science professor. He wanted to teach his students about the inner workings of a computer but could not do what he wanted with the operating systems available at the time. To remedy this Tanenbaum wrote his own operating system based on UNIX using C and assembly. He called this operating system MINIX. MINIX was not a very stable or efficient operating system but there was something unique about it, the source code wad made available. Tanenbaum released the source code in his book entitled Operating Systems. His book became a huge success with computer science students, professors, and hackers alike who studied his operating system to learn how it worked.

The next person who contributed to Linux didn't do so directly, but he made perhaps the most significant contribution. This person is Richard Stallman. Stallman is the creator of the GNU project and the GNU license, which state that software should be open source and free to download, use, modify, and redistribute. Without the GNU license Linux would not be the free, open source operating system it is today and it would not have spawned the immense community and following that exists for it today. He also created the GNU C Compiler (GCC) which is still the most widely used compiler by Linux programmers today.

The final contributor to Linux is the father of Linux, Linux Travolds. Travolds was a 21 year old student attending the University of Helsinki. Travolds wanted an operating system that would do what he wanted but did not like MINIX because it was created for study not for serious use. He examined MINIX's source code and used it and UNIX to create his own operating system called Linux. In September 1991, Travolds released Linux version 0.01, with releases 0.02 and 0.03 soon to follow. These releases contained very little software and practically no hardware support. Subsequent releases greatly improved the operating system and added much better hardware support and additional software. The most significant decision Travolds made regarding Linux was to put it under the GNU license, making it free and open source.

The rest of Linux's History can not be linked to any one person. Linus Travolds continued to oversee Linux for a while, the actual developing and programming was done by hundreds of thousands of GNU programmers from around the world. They enhanced Linux and created new and more powerful software for it, all under the GNU License. At some point in this groups of Linux programmers began to create their own versions of Linux called distributions or distros for short. These distros include Red Hat, Mandrake, and Debian. This is

where modern Linux is. It is still being developed buy thousands of GNU programmers and new distros are provided almost daily.

Linux Today

Linux today is a very unique thing. It is not a unified group like it was in it origin. Linux today is a collection of hundreds of different distros created by thousands of programmers. Linux is still under the GNU license and thus open source and free. Linux is typically used by programmers, server administrators who cannot afford UNIX, and home users who do not like Microsoft. Today's Linux distros fill a wide variety of needs. Red Hat and Mandrake are middle road distros. They are user friendly enough and offer a solid stable environment for home users. Distros like Debian, Gentoo, and Slackware are super-stable, fast distros, but they can be difficult to install and use. Distros like Lindows and Lycoris are designed to allow Windows users to painlessly move to Linux. These distros offer all of Linux's strengths in a more Windows-like environment. There are still many other distros out there that offer different functionality.

Future of Linux

Linux's future is much like its present, unpredictable and completely reliant on the GNU community. There are a number of different directions the future of Linux may hold. If support for Linux continues to grow like it is now, then Linux users will account for a sizable percentage of home users. This would result in popular software being developed for Linux as well as Windows. The growth of the GNU community would also result in additional software being created and vast improvements for the software that already exists. The future of Linux could also take a turn for the worse. Many of the major Linux distros, especially Mandrake and Red Hat, are suffering from financial difficulties, which could cause them to fold. This would seriously impede the progress of Linux and hurt it chances of going mainstream. Whatever the future of Linux holds, Linux advocates will continue to provide it freely under the GNU license.

Advantages of Linux

Server Capability
Linux is naturally geared towards being a server. It is based of the UNIX operating system which is the standard for server operating systems. By design, UNIX was meant to have multiple users sign in over a network and run applications remotely. Linux inheirited all of this from UNIX. There are also very solid GNU software packages, such as Apache Web Server and Samba networking protocol that make Linux a powerful server platform. Linux's strict permissions structure also makes it very difficult for a hacker to break into a web server and cause damage.

GNU License

As we have discussed ealier, the GNU Project was started by Richard Stallman. Under the GNU license Linux and its software are open source and free. Free means much more than just not having to pay for it. Under the GNU license free means users are free to download, compile, install, use, share, modify, and redistribute software and its source code. The only catch is that any modified code must also abide by the GNU license. The GNU license promotes software progress. Open source code allows programmers who have found a bug in a program's operation to download the code and fix it so that it does what the it should. This takes a lot of the workload off of the programmers who develop the software and allows them to focus on advancing their software rather than nitpicking all the small bugs in it. Open souce code also promotes programming efficiency. Programmers do not need to write a module for something if someone else in the GNU community already has. The programmer can use the other's code in his program and not have to waste his time creating his own code to accomplish the same thing. The GNU license is a powerful asset of Linux that allows for complex software to be created and still be offered for free. Often times this GNU software is better than or even exceeds their closed source counterparts which are usually expensive.

Stability

Linux inheirits its stabilty from UNIX much the same way it does it server abilites. Bell Labs designed UNIX to run servers so if it was not stable, nobody would buy it. UNIX is a very expensive operating system. Linux offers much of the same stability for free. Another reason for Linux's stability has less to do with Linux itself and more to do with the computing world. Because it is not very poplular there are very few viruses and worms written to attack Linux. Linux antivirus programs can easily handle these threats.

Availability

Linux is one of the only operating systems that is available on many different hardware platforms, giving users a different operating system choice if they do not like the common one. Linux distros are available for Apple's PowerPC architecture. This gives people who use Macintosh computers a different choice if they do not like Mac OS 10 or 9.x. It is also available for the Intel x86 architecture (regular PCs) if users do not wish to use Microsoft Windows. It is even available for the Sun Sparc Station for users who opt not to use Sun's operating system.

Customizable GUI

A GUI or graphical user interface is a user interface based on graphics (icons, menus, windows, etc) that uses lots of input devices such as the keyboard, mouse, microphone, and others. A GUI allows users to interact with hardware, run programs, and navigate the file structure in a simple, easy to use interface. Linux's GUI variety is one of the most rewarding and most difficult to learn aspects of linux. Windows XP offers a single GUI with only two basic looks. Linux has a great number of GUIs though there is a growing trend towards two

man GUIs, GNOME and K Desktop Environment or KDE. Linux GUIs, especially KDE, are easily customized to look like other things. For example a Linux user can change his GUI to look like Mac OS X or to look like Windows 98. The GUIs usually come with several different looks, but users are free to download and install their own if they don't like the packaged ones. This customizability is one of the major draws to Linux.

Disadvantages of Linux

Multiple Distros

It is a good thing to have more than one distro to provide a competitive market but there are too many in the linux market. Often it can be difficult for a user to select a distro to use. Many distros do not survive very long and still others do not update as quickly as other ones. The multitude of distros also makes it difficult to have universal software. Programmers must make sure their programs can run on at least all the major distros. In the Windows world programmers only need to ensure XP compatibility and sometimes 98 compatibility. The plethora of distros also makes it difficult for any one of them to gain momentum and become a serious challenger to Microsoft.

No Universal Software Installation

The only way to universally install something on Linux is to download and compile the code yourself. Every distro uses different or unique ways to install software. For example Red Hat uses RPM installers while Mandrake uses drake installer. The lack of a universal installer like Microsoft's Windows Installer or InstallShield makes software installation on Linux a difficult task and hurts Linux's user friendliness.

Steep Learning Curve

Since most people grew up using a Windows operating system the switch over to Linux is extremely difficult. There are dozens of GUI's, all of which are different. The distros themselves are different which can cause other problems. Some Linux GUI and distro programmers are trying to make a beginner Linux operating system and GUI for new users such as Lindows and XPde. These still do not offer a windows environment and are more difficult for a beginner to pick up than windows. When a user sits down to use a Windows PC, he experiences basically the same thing every time. Also the concept of a root user with supreme authority can be confusing to Windows users.   In Windows XP a user is either and Administrator or a Limited account. The limited accounts are not very limited as their name implies, they can do almost all of the same things and administrator can. An administrator has total control over the system. In Linux only the root user has this control. When a user creates their login name, they cannot do everything from this name, this could be confusing for many Windows users and will take time to get used to.

Weak Official Technical Support

Linux does not make the massive amounts of money that Microsoft does (due to the fact that Linux is provided freely) so most distros do not have very good, if any, technical support. Users often have to rely upon forums and other Linux users for help in their troubles. These forums can be and often are helpful for users but they are not guaranteed to provide help. When a user calls Microsoft tech support that are given a professional support specialist and they offer official Microsoft-backed support. With Linux, users must rely on third party support if they cannot get an answer from the distro FAQ or email support. The developers of each distro do not usually have the time to deal with technical support issues. This also hurts the user friendliness of Linux. Inexperienced users often need to call tech support to solve problems and Linux cannot offer then the same quality support Windows XP can. Red Hat Linux is an exception to this, they offer very good Technical Support for businesses, but it is not provided freely; Red Hat charges for its tech support.

No 64-Bit Support

Some of the distros currently available support 64-bit processors and others do not. In the future it will be crucial for Linux distros to run on 64-bit chips as they will gradually phase out the current 32-bit chips.

Different GUIs

For users who are used to it, the varied Linux GUIs are great, but for a new users some kind of consistency is required. When a user sits down to use Windows XP, it looks basically the same every time. This is not so on any given linux distro. When a user sits down the computer may look completely different then another computer running the exact same distro. There is a trend towards GNOME and KDE as the standard GUIs but others still exist and are still used.

History of Windows

Windows wouldn't exist if it were not for Microsoft founder Bill Gates. Bill Gates and his friend Paul Allen developed the first BASIC compiler for an Altair computer, which was a microprocessor alternative to commercial computers. They did this all without ever touching the Altair itself. When the program ran flawlessly and Altair's makers bought it from Gates and Allen, Gates dropped out of Harvard and started Microsoft, where he and other programmers began to develop other software for personal computers. Microsoft today still does the same thing, developing operating systems and software for personal computers.

The history of Microsoft Windows began on November 10, 1983. On this date Microsoft announced its new operating system that would provide multi-tasking support and a GUI (graphical user interface). The operating system was originally going to be called Interface Manager, but Bill Gates was convinced to call it Windows. There was a demand for a multi-taking operating system with a GUI and Windows was not the only contender. Other competitors included VisiCorp's VisiOn (first PC based GUI OS), IBM's Top View, and Digital Research's GEM (graphics environment manager). GEM and VisiOn lacked

support from 3rd party software developers and this lead to their quick downfall. The IBM Top View project was discontinued two years after its initial release. Microsoft released Windows 1.0 on November 20,1985, a date two years later Microsoft initially promised. Windows 1.0 was plagued with bugs and was slow and primitive. To make matters worse Apple threatened Microsoft with legal action, claiming that certain elements of Windows were stolen from Apple's Mac OS. Bill Gates entered into an agreement with Apple to license these things from them. Windows 1.0 was a start, but it badly needed work.

On December 9, 1987 Microsoft answered the problems of Windows 1.0 with Windows 2.0. This release was far superior to Windows 1.0. Windows 2.0 introduced overlapping windows, icons, and keyboard shortcuts to Windows. Apple again saw a similarity to their Mac OS and once again took legal action against Microsoft. This time, Microsoft won the lawsuit and this marked the last time Apple had dominance over Microsoft. Among other progress made, Windows 2.03 was the first Windows version to utilize the Intel protected mode.

Windows 3.0 was released in 1990. This release was the most significant Windows release to date and forever defined the look of modern GUIs. It originally offered 256 color graphical support and full support of the Intel 386 processor. Three million copies of Windows 3.0 sold in its first year of existence. In 1991 the famous Windows 3.1 was released, which sold over three million copies in its first month on the market. Windows 3.x had widespread 3rd party support and was generally accepted as the best operating system available at the time. Windows for Workgroups 3.11 networking support to Windows. Windows 3.1 marked the beginning of Microsoft's operating system dominance in the home computing market and set the standard for operating systems of the future. On a side note, Windows 3.0 was the first version of Windows to include the infamous Solitaire software.

In 1993 Microsoft released Windows NT 3.1. Windows 3.1 and earlier versions were all DOS based 16-bit operating systems. Windows NT was a project started by Microsoft in 1980 to write a new operating system from scratch. The name NT itself stands for "new technology". NT was a 32-bit OS from its beginning. NT boasted far superior security and file management compared to the DOS based windows versions. NT became widely used in the business world while the other windows versions were still commonly used by home PC users. Windows NT Workstation 3.5 offered OpenGL graphics support standard and the greatest file security and protection yet.

In 1995 Windows 95 was released. Windows 95 added integrated TCP/IP support, dial-up networking, and plug and play capability. Windows 95 was a 32-bit operating system and was able to do many of the things Windows NT 3.5 was able to. Windows 95 was also the first Windows version to feature today's Windows GUI, which has influenced many Linux GUI designs. In 1996 Windows NT Workstation 4.0 was released. This version of NT added the Windows 95 GUI and was again targeted at a business clientele.

In 1998 Microsoft released Windows 98. Windows 98 was the first Windows OS designed specifically for the home PC user. It added support for reading DVDs and USB devices. In 1999 Windows released Windows 98 SE (second edition). SE offered the new Internet Explorer 5.0, NetMeeting 3.0, and the DirectX 6.1 graphics API. Windows 98 SE was able to share drivers with the

NT business OS.

In 2000 Microsoft released two operating systems: Windows Me (Millennium Edition) and Windows 2000. Windows Me was the follow-up operating system to Windows 98 SE. Me introduced the system restore feature which allowed users to reset their PC's to a previous day's state should they encounter a problem. Windows Me marked the end of the DOS based line of Windows operating systems. All subsequent operating systems would be NT based. Windows 2000 was intended to replace NT 4.0, 95, and 98 as the primary business operating system. It featured a more user friendly interface and plug and play support.

In 2001 Microsoft combined their home user and business operating system strategies into Windows XP. XP is essentially a blending of Windows Me with Windows 2000. XP added a new look to the GUI, file encryption, system restore, remote desktop support, and many other improvements. XP represents the current state of affairs for Windows and is the wave of the future in Windows operating systems.

Windows Today

Windows today is not quite as unified as people tend to believe. Even though it is outdated and obslete, Windows 98 SE is still the most commonly used operating system in the world. Many Windows 98 and 2000 users have not upgraded to Windows XP because they do not see enough benefits to outweigh the steep cost. Almost all new computers purchased today come with Windows XP installed. Microsoft has firmly established their line of operating systems as the world leaders, but they haven't succeeded in getting all of their users to upgrade to XP. Microsoft's hold in the server market is not as strong. UNIX is a serious competitor and is used more often than Windows products on critical servers. Microsoft also receives server competition from Novell NetWare and Linux.

Future of Windows

The future of Windows is more secure than that of Linux. To most users the term "Windows" is synonymous with "computer". Most users aren't even aware that an alternative to Windows exists, much less interested in trying it. Microsoft has two major new Windows versions coming up. The first of these is Windows XP 64-Bit, which is designed to run on the new 64-bit architecture and take full advantage of its increased power and processing capability. The second is Windows Longhorn. Longhorn is the codename for the next version of Windows. Longhorn will be a 32-bit and 64-bit operating system again based on the NT code. Longhorn will correct many of Window XP's flaws, add greater security, and an additional look and customization options to the GUI. Windows is gradually falling out of favor with many more dedicated computer users, who turn to Linux or Macintosh computers, but this is a very small percentage and will

most likely not affect Microsoft's operating system dominance.

Advantages of Windows

User Friendly

Windows was designed to be easy to learn and use. This is most evident in the latest version Windows XP. Almost anyone can learn the basic functions of Windows in a few hours with little if any help. Windows XP includes and extensive collection of how-to files, help files and even interactive video help tutorials. These things can tell even the most computer illiterate how to do almost everything the average user needs to do on a PC. To supplement these are XP's wizards. Wizards are programs that help users accomplish tasks like updating Windows, installing software, and changing settings. In addition to these there is Microsoft's vast internet knowledgebase. Any problems whose solutions cannot be found within XP's help files can be found on Microsoft's website. In the event that users can't find the answer to their problem, Microsoft has plenty of telephone and e-mail tech support that can take care of them.

Simple Installation

The installation process for Windows is much easier than the one for Linux or Unix. Microsoft made it, for the most part, an autonomous process that requires very little user input for its completion. Even if you are new to Windows there is there is a step by step guide to ease you through the installation process. There are always "Recommended" or "Standard" installation options if you do not know what installation options to choose. Unlike installing Linux, installing Windows does not require an advanced knowledge of computers.

Universal Software

Since Windows is the most popular operating system on the market almost all software is designed to run on it. This includes many of the software projects found in the GNU community. Microsoft's own software often sets industry standards that other software providers try to meet. Because there is only one Windows XP all software written for XP will run on anyone's copy of XP. In the Linux world, sometimes software won't work right on two different distros. This universality allows users to purchase software without fear that it won't be compatible with their operating system.

Small Learning Curve

Since Windows was always designed for home or office use for those who have little or no computer training it has been designed to be user friendly. Windows is well documented, also a wide selection of tutorials are available in the Windows Help Center in Windows XP or online at Microsoft's website. Windows XP makes it easy for users to learn how to do basic things with their computer. When an installation of XP is completed it immediately loads the Windows XP tour which shows users how to perform basic tasks in Windows. Windows makes it simple for a person who has never used a computer before to

pick up simple computing skills, whereas Linux immerses the user in the computer without any idea of what they are doing.

Third Party Support

Not only does Windows have Microsoft's own software, there are countless third party applications. This third party software fills in the gaps where Microsoft has not provided software. They also offer an alternative to using Microsoft's own software, and in some cases are actually better than the software Microsoft puts out. For example, users who want more functionality than MS Paint and Picture It offer can use Adobe Photoshop or Jasac Paintshop Pro. This third party support makes competition amongst programmers higher, with the end result being better software. Third party software also helps to keep pricing competitive. Third party support is essential to the success of any operating system. Without applications, there is going to be no motivation for a user to use an operating system, a problem that has plagued Linux and Apple for years.

Disadvantages of Windows

Susceptible to Attack

Due to Windows's popularity most hackers and virus writers choose to attack Windows instead of other operating systems. The results of all these attacks can range from your desktop wallpaper being changed to vital system files being erased. The most effective way to combat these threats is to run an anti-virus program such as Norton Anti-Virus and a software firewall like Zone Lab's Zone Alarm, or Sygate Personal Firewall. Both of these types of programs programs consume system resources and internet bandwidth, which means they will slow down overall performance.

Unstable

Windows does not have the stability of UNIX as its base like Linux does, so naturally its is not going to be as stable as Linux. Windows has difficulty effectively managing virtual memory. When Windows XP needs to access the hard disk paging file it will often copy more than is needed and perform slowly in the process. Windows tends to become laggy and less usable when left on for long periods of time and requires frequent restarts to run at peak efficiency. Many of these fault were lessened in Windows XP, but there are still other problems. Also the wide range of software available for Windows PCs often is not fully compatible with certain hardware, which can cause the system to lock-up or crash the software. Another reason for Windows instability is because it allows all users full control over their machine rather than just a root user having this authority like in Linux. Often times Windows's instability is cause by users who inadvertently tamper with system data.

Expensive Software

Virtually all software for Windows costs money and some of it is extremely

expensive. Users can pay hundreds of dollars for programs that often do not do what they really want. Most all computers ship with some part of Microsoft office which the purchaser pays for. For example, advanced imaging software such as Photoshop can cost in excess of 400 dollars versus GIMP (GNU Image Manipulation Program), which is free for download for Linux users. Also users often get stuck paying for features they never use and never intend on using. Even Windows itself is extremely expensive. Windows XP Professional can cost around $300. This means that in addition to buying a computer you have to spend around $500 - $600 on software to obtain the usability you desire.

Lack of Customizability

Windows XP has two basic visual styles windows classic and luna (the Windows XP default visual style). Microsoft has locked down the ability to modify and create new visual styles. There are third party applications that can provide this functionality such as StyleXP, but they run over the standard style and consume system resources. Users sometimes get sick of their computers looking the exact same every time they sit down to use them. Microsoft doesn't give you much of a choice over how your computer looks.

Software Comparisons

Office Software: Office XP v Open Office

One of the most commonly used programs for Windows is the Microsoft Office XP suite. This allows users to edit word processor documents, spreadsheets, HTML documents, and PowerPoint presentations. Open Office is an open source office program that integrates all of this into a single program. Open Office is a single program, unlike Office XP, which is a suite of several programs. Open Office does what Word, Excel, PowerPoint and FrontPage for free. It also features a drawing ability similar to MS Paint, but with similar functionality. Our presentation PowerPoint and downloadable PDF document were made using Open Office.

Web Browsing: Internet Explorer v Mozilla Firebird

Internet Explorer is the most commonly used web browser in the world, but this does not make it the best. Mozilla Firebird is a browser that is designed primarily for Linux, but will run on Windows and Mac OS X. Firebird offers many improvements over Internet Explorer. It features tabbed browsing, which avoids taskbar clutter when the user is viewing multiple web pages. Firebird has pop-up blocking software built-in, so when a user loads a web page they are not assaulted with pop-up ads. Firebird is a smaller program than Internet Explorer, using far less resources to run. It also has no security holes like Internet Explorer does making it less likely you will be attacked through your internet browser.

E-Mail: Outlook/Pegasus v Mozilla Thunderbird

E-mail is an essential part of the modern lifestyle. For convenience, Windows users use programs like Outlook and Pegasus to check their e-mail.

Mozilla Thunderbird is an e-mail client for Linux (and Windows) that offers the same functionality for free. Thunderbird is also a smaller program, taking up less space in the hard drive and less space in memory when in use. It has the same features that Outlook does and a more simplistic, easy to use interface.

Instant Messaging: AIM/MSN/Yahoo/ICQ v Gaim

Many Windows users make use of either the AIM, MSN, Yahoo, or ICQ messenger clients. On Linux users do not need to give up this functionality. Many of these client providers also offer a Linux version, but it is usually and outdated version that lacks features. Gaim is an open source messenger client for Linux (a Windows port exists) that can connect to AIM, MSN, Yahoo, ICQ and others. It keeps all connections organized in a single window. This means your AIM and ICQ buddies would be in the same list. It also allows for tabbed messaging which again can save taskbar clutter. Gaim makes logs of all the conversations user has. This is useful if a user accidentally closes a window, they can see what was typed by checking the log. It also includes sort routines which will sort the buddy list alphabetically, by status (away, idle), and by log file size. If a you would like a feature not in Gaim, you can check the Gaim website for a plugin that has what you are looking for. If no plugin exists you can just post to the feature request forum and the designers will make a plugin if there is enough support for it. Sometimes other GNU programmers that watch the forum will make a plugin for the Gaim. There is a program for Windows that has similar features as Gaim called Trillian, but Trillian is shareware (you have to pay for it) and is not open source.

Image Editing: Photoshop v The Gimp

A majority of image editing on Windows PCs is done using Adobe Photoshop. Photoshop allows the user to create layered images with many special effects. The Gimp or GNU Image Manipulation Program is a free open source program that does the many of the same things as Photoshop, which is expensive software. The Gimp is available for Linux but a Windows port does exist. The Gimp continues to gain more and more features each release and can more than handle the average user's image editing tasks.

Programming in Linux

Programming in a Linux or Windows environment is in many ways very similar and in many ways very different. In Linux C++ programming is generally done in the command line using the GNU C++ Compiler. There are an assortment of command line text editors used to program in Linux. Among the most popular editors are VI, Emacs, and Pico.   There are also GUI editors like Kate that highlight key words in the same manner that Visual Studio does. These editors create a source code file which the GNU compiler uses to create an executable file. The GNU compiler is also a linker so it can link various object

files together into an executable. In Windows C++ programming is typically done using Microsoft Visual C++. Visual C++ provides the user with a GUI and combines creating, compiling, and linking code into a single program. It also allows programmer to organize related files into a project for convenience. The same source code can be used for both platforms due to C++ being platform independent. A program written in C++ can be used on any operating system that has a compiler for C++. Assembly programming for Linux and Windows is the same and very different at the same time. When Linux is running on an x86 machine, then the assembly programming is essentially the same as Windows programming. Some commands will not work on one or the other but the basic premise is the same.

Emulation

It is also possible to emulate windows and Linux. One powerful way to do this is with VMware Workstation 4. This program can emulate Windows 3.1, Windows 95, Windows 98, Windows ME, Windows NT, Windows 2000, Windows XP, Red Hat Linux 7.0 – 9.0, Mandrake Linux 8.2 & 9.0 SuSE Linux 7.3 – 8.2 & SLEES 8, Novell NetWare 5.1 & 6, and FreeBSD 4.0 – 4.8. It runs on host operating systems Red Hat Linux, Mandrake Linux, SuSE Linux, and the NT-based Windows versions. VMware allows users to run any of the emulated operating systems in any of the hosts. If a Windows 2000 user wanted to use Linux he could do so with this software. He could also run Windows 95 if he needed to. This software is very useful for computer programmers who need to test their programs in different software environments. For example, a programmer might check to see if his program is compatible with Windows 98 as well as Windows XP. Using the emulation software saves the programmer the cost of purchasing a new system. This software is also useful for a user who needs to use certain applications that are availably only for different operating systems.

Dual Booting

For users who would like to use Linux and Windows there is an alternative to owning two machines or using emulation. This alternative is to dual boot their computer. To dual boot means that two operating systems are installed on a single computer and the user selects the one he wishes to use on startup. Each operating system requires its own hard drive partition. This can be done by giving each operating system a partition on the same hard drive. A much easier way to do this is to give each operating system its own hard drive. The operating system that is run is selected by means of a boot loader. A boot loader is a program that allows the user to select which operating system is to be run. Windows XP comes with a boot loader. There is also a free GNU boot loader call Lilo which is more robust and gives the user more options. Dual booting is cheaper than purchasing a second PC to run the other operating system, nothing

needs to be purchased (except the operating system in the case of Windows). Dual booting is better than emulation because the emulated operating system runs slowly because it all of its hardware requests must go through the host operating system. Dual booting is limited because it only allows one operating system at a time to be run, whereas a second pc and emulation allow the user to use both operating systems simultaneously.

Linux Live-CD

A new trend in Linux development is the Live-CD. A Live-CD is a CD that can boot an Intel x86 or Apple PowerPC computer in a Linux operating system running entirely from the CD and memory, nothing is installed to the hard drive. The Live-CD illustrates the versatility of Linux and is a useful tool for people who would like to try Linux but cannot afford to buy some new hardware or do not want to repartition their Windows hard drive. Most Live-CD's have common applications like web browsers, CD burning software, instant messengers, email clients, and office software installed. This gives a user a chance to experience Linux with nothing more difficult than putting a CD in the CD-ROM drive. The original and most popular Live-CD is Knoppix Linux 3.3, which boots an x86 computer in Linux. Other distros like Gentoo have created Live-CDs that will boot an x86 or ppc machine. The Linux Live-CD has evolved from a fun concept to a very useful tool. The Live-CD can be used to test system compatibility with Linux, recover lost data on a machine that will not boot in its installed operating system, diagnose hardware problems, and win converts over to Linux. Many Distros of Live-CD Linux offer different features. Some are made extremely small in size (40MB) and others have the ability to write system configuration files to floppy so the users data is saved for the next time the Live-CD is used. If you are interested in the Linux Live-CD talk to me after the presentation.