



Linux vs. Windows NT

I. Introduction

Linux as well as most of its associated programs were designed by people for themselves. They had a particular need and developed something to solve the need for themselves. There was no "marketing strategy" behind the products, just solving a problem. Things were made simple to use, as compared to looking "pretty", because the developers wanted *functionality* and were not trying to sell it. In addition, since the programs are designed and programmed by the actual users, there is a very strong motivation to get it right and correct problems.

Linux works to standards that are established by groups of companies. Although they are competitors, they realize the need for standards. Microsoft does not have standards in the true sense, they are generally proprietary. They even do not follow well-defined standards that they agreed to. Even their own standards, such as NBT, vary between NT and Win9x. Not really a standard is it?

This paper will explore the contrasts between Linux and Windows NT. All the following statements are presented based on facts obtained by Universities and computer scientists across the globe. At MCCT we don't discriminate any O/S (operating system); we simply use the O/S that has the least errors with the most benefits for our customers' needs. **NOTE: Windows NT includes Windows 2000 And Windows XP**

II. Applications

Linux

- Basically all programs and applications that are not developed by commercial software companies are **FREE**.
- Linux has a scheduler (cron) to run executables at a predetermined time.
- Can run remote executables via telnet.

Windows NT

- Basically all programs and applications that are not developed by commercial software companies are shareware, demo versions, or require you to pay in some fashion.
- NT does not have a scheduler to run executables at a predetermined time.
- Cannot run remote executables.

- Multiple copies of applications can run on the same machine, serving multiple users.
- Linux applications run on other UNIX platforms, this eliminates the need to learn new products on a different O/S.
- Using the X windowing Protocol, applications can be shared across platforms.
- NT is a single user system, each application needs to run on a separate machine.
- Applications only run on Microsoft operating systems. Sometimes they run on a specific O/S (i.e. Win 95/98 but not Win NT).
- Applications cannot be shared across platforms.

III. Compatibility

Linux can access DOS/Windows/NT file systems, and it's compatible with any version of UNIX (many windows programs run **under** UNIX, however **no** UNIX programs run **under** NT.). Scripts written on Linux will run almost always unchanged on another version and vice-versa. Backups are compatible between different distributions of Linux and versions of UNIX, as well as other Systems (except NT). With Windows NT, access to any UNIX file systems is extremely limited. NT GUI is closed, proprietary. NTBACKUP only operates on NT and often the tapes cannot be moved from one machine to another, especially if the manufacturers are different.

IV. Configurability

With Linux, files are easily changed to suit your needs. If a configuration file is damaged, you only need to replace that one file, this is often not the story with NT O/S. Many times several files need to be replaced to fix one. Lingo is easily modified with Linux, information is in text format and easily identified. Linux Root has permissions to edit what it needs to. Linux has a wide range of tools to configure your system. Configuration information on NT O/S is not easily changed or ever found. Linux allows you to pick an interface that suits your needs (GUI or many shells). All shells within Linux have the ability to create complex program structures. With Windows NT O/S you are stuck with a single interface(the GUI) and you cannot use the shell because not all of the functions are available. Linux has run levels (which can be changed without rebooting) which allow you to decide what programs, services or daemons are started and when. With Windows NT O/S, there is no such thing as run levels. When changes are made to NT O/S, you must reboot the machine. With a client/ server base, it is vital to have the server machine running 24/7. If and when changes are made to NT O/S machines the system will need to be rebooted, and that can lead to delay and disconnects, which may result in unsatisfied clients.

V. Stability

When running IVR's it is vital that the machines stay running to respond to the clients' demands. NT O/S has been known to crash after only a few hours of run time. Linux on the other hand is extremely stable, and is very difficult to crash. With NT O/S the GUI hides the lines of code, making it more complex and easier for errors to occur.

VII. Network and Communication

With Linux, using telnet & NFS together a new O/S can be installed on the system; the next time the system is booted, it has the new system. /usr/src could be NFS mounted to a machine with the most current version of the kernel when you re-link (via telnet) you get the new O/S on the local system. This is not possible with NT O/S. With NT O/S there is no remote installation. Files on network drives are often stored under the UNC (Universal Naming Convention) name, which means they are no longer accessible if moved to a different server. So with NT O/S the files on network must remain on the same server machine.

It is extremely difficult with NT O/S to have system files on a remote drive; you must have the physical space locally to boot *plus* space for the swap file. With Windows NT you have to pay extra for Exchange client. Linux uses NFS to mount all of the directories, so that there is a single location for all of the shared files, for example, all of /usr. By having just the programs in /bin and /sbin that are needed to boot, these too could be NFS mounted.

Using NFS in Linux, you can even have a complete NFS root file system. Therefore, your hard disk can be very small, maybe even just enough to swap on. Although drives under a few hundred MB are no longer available new, you can buy an older machine, and save money. Linux can run well on less RAM than NT. You could even boot from a *floppy*. Linux can provide shared resources for windows machines, and with Linux you have the capabilities of *free* mail readers.

A contrast of the network protocols both Linux and NT O/S.

Protocol	Linux	NT
TCP/IP	Y	Y
SMB	Y	Y
NFS	Y	N
NetBEUI	Y	Y
AppleTalk	Y	Y
IPX/SPX	Y	Y
ISDN	Y	Y
PPP	Y	Y
PPTP	Y	Y
SLIP	Y	N
TOKEN-Ring	Y	Y
Ethernet	Y	Y
FDDI	Y	Y
DHCP	Y	Y
bootp	Y	N
ATM	Y	N
DLC	Y	Y
IP-Masquerading	Y	N
X.25	Y	N
IP-Firewalling	Y	N
IPV6	Y	N
PLIP	Y	N

Price comparison for a network of 10 workstations

Item	Linux	NT
Server OS	\$30	\$700
10 Workstations OS	0	\$2700
10 Client access	0	\$370
E-mail	0	\$1880
Office Suite	\$1690	\$4080
Total	\$1720	\$9730

VII. Security

Linux security has had years to be tested and verified. With Linux the security is tied to the file. You can reinstall without fear of having to replace security information manually with Linux. Using Linux you can easily tell if a file has been changed on your system, this includes mundane things like the permissions, but also includes more important things like the checksum. With Linux you are able to merge systems and domains. The firewall functionality on Linux is built in to the server. With Linux it is easy to check if a new user has logged in and changed the default password.

With NT O/S, security is still in its infancy. Infantile mistakes are still being made in regard to security. Security is bound to the name of the machine and domain, and if you reinstall all security information is gone with NT O/S. With NT O/S you have to check by hand to see if any changes have been made to any files. NT Systems have to be reinstalled when merging domains (Security ID is dependant on the currently installed copy of the system). Microsoft sells their firewall product and with Linux it is FREE. With NT O/S there is no easy way to see if a user has logged on and changed the default settings. There are literally hundreds of holes that allow anyone to create a Trojan horse without any special programming skills.

“Windows has a ‘bug’ that allows Microsoft to read your hardware and software configuration across the Internet. One of Microsoft's managers, Robert Bennet, said ‘If it's really so, we would have to fix it.’ Although a press release which denies any improper behavior has been available for some time on Microsoft's site, there is still no patch. Added to that a unique identifier is stored in MS-Office documents. The claim by Microsoft is that these are unrelated and ‘it is impossible to use this unique identifier to determine which PC user created any given document.’”

Excerpts on Security:

Linux vs. Windows Viruses

To mess up a Linux box, you need to work at it; to mess up your Windows box, you just need to work on it.

By [Scott Granneman](#) Oct 02 2003 10:59AM PT

"There are about 60,000 viruses known for Windows, 40 or so for the Macintosh, about 5 for commercial Unix versions, and perhaps 5 for Linux. Most of the Windows viruses are not important, but many hundreds have caused widespread damage. Two or three of the Macintosh viruses were widespread enough to be of importance. None of the Unix or Linux viruses became widespread - most were confined to the laboratory."

VIII. Cost Comparison

A common argument *against* the cost of Linux is that the initial price of the operating system software is so negligible, that it does not matter when the total cost of the system is considered. While this is true to some extent, when you start adding up the cost of all of copies, then you will see that the difference in price *does* matter. When you

add the extra costs in administering an NT system, the NT price tag can be shocking. Another thing to keep in mind with this comparison is that it is common knowledge that the initial costs of the operating system software form just a small fraction of the total cost of ownership (TCO) for each system. Administration is just one additional aspect, but the purchase of updates also needs to be included. Upgrades for Windows NT are typically half the price of a new copy. However, even if you just upgrade the server, you **must** still upgrade the client access licenses for *every* workstation. With each new version of Windows NT more and more expensive hardware is required. Although HW prices have dropped dramatically in recent years, having to buy more hardware just to upgrade the operating system (or apps) means real money out of your pocket. Linux does not require hardware upgrades when a new version is released and many Internet sites are working successfully on 486/33 machines with as little as 16MB of RAM. With no additional programs running, Windows NT needs over 20 MB of RAM.

Excerpts on Cost:

Mike O'Donnell of AMD, Dirk Coetzee of Didata of South Africa, Rodd Clarkson of Redfish, Bluefish Creative of Australia,

Do most businesses and their IT shops really track TCO (Total Cost of Ownership)? Or do they focus mostly on return on investment and the up-front cost of hardware and software? Do you find that it is too time consuming to do a thorough TCO analysis?

O'Donnell: Here, they track what the hardware and software licenses cost. Very little is done beyond that. There is a great difference in the human support efforts required to keep a Unix or Linux environment going versus a Windows environment.

Coetzee: TCO analysis is not tracked or focused on -- and [it is] time consuming.

Clarkson: Good question. I know where I work we don't have the resources to do any formal TCO studies, and I don't know of many businesses that would. Even given they've got the time and resources, I wonder how many businesses would have a good enough mix to actually compare.

For us, Linux is a no-brainer as a first choice. The cost and the fact that it works well on older hardware mean that we can trial ideas without a huge outlay in money. This is great, especially when the ideas don't pan out, as we're not left with costly licenses and no chance of returning them.

Circumstantially (and this is where I think there's a definite trend), businesses that have used Windows (including ours) seem to find that Linux, once running, involves far less work to maintain. You'd never get away with calling these stories a TCO study, but the simple fact remains that these places (places like Boscov's, Amazon and Suisse Credit First Boston) are happier using Linux than what they used to use, and they know they are getting value for money.

Where I work, we used to spend a lot of time just keeping the servers running (either Windows NT or MacOS). Since switching to Linux, they just run. I only have to make changes to configuration files, instead of having to nurse the server along. Windows NT is fairly old these days and Windows may have improved, but Linux is still doing what we want from it, and we're thrilled with the value for money we're getting.

As Linux and OSS solutions continue to grow and improve, won't many of the issues such as management and support costs diminish and give it a TCO advantage? Or will there never be a TCO winner, since TCO is highly subjective and dependent upon the unique requirements of each IT environment?

O'Donnell: TCO can be manipulated like any statistic. But I see Windows administrators spending a lot of time just keeping things going, constantly configuring, etc. Linux, once understood and in place, lends itself to easier management.

Coetzee: The change of skills is the most subjective thing in TCO. Also, nothing comes close to challenging the Active Directory (deployment of applications, desktop policies, service packs, etc.).

Clarkson: TCO is subjective, but I think you'll start to see some pretty clear evidence that Microsoft's TCO studies have had to be heavily manipulated to get the sort of figures they want. For example, their recent TCO study that shows Windows to be better than Linux had some obvious stretching. The study was based on five years, when the industry standard seems to be three for these things. More interestingly, Microsoft's new license seems to be all about upgrading often, and if you add an upgrade to this five-year study, I think you'll see a dramatically different set of figures.

VI. Conclusion

At MCCT we strive to service our customers to the best of our abilities. We also equip our machines with nothing but the finest hardware and software available. That's why MCCT supports Linux as apposed to Windows NT. It's not an individual preference, rather it's the raw facts that have been stated above in contrasting both Linux and NT O/S that have convinced MCCT to support Linux in our IVR technology. Linux has proven to be more stable, less expensive and more secure in both applications and networking.