IBM GLOBAL SERVICES

O16

Linux Overview for non-IT Managers

Pete Davis, Sr. Instructor, Linux/AIX/Grid

IBM eserver xSeries
Technical Conference

Aug. 9 - 13, 2004

Chicago, IL

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Linux Overview for non-IT Managers

Pete Davis

Sr. Instructor, Linux/AIX/GRID

Introduction

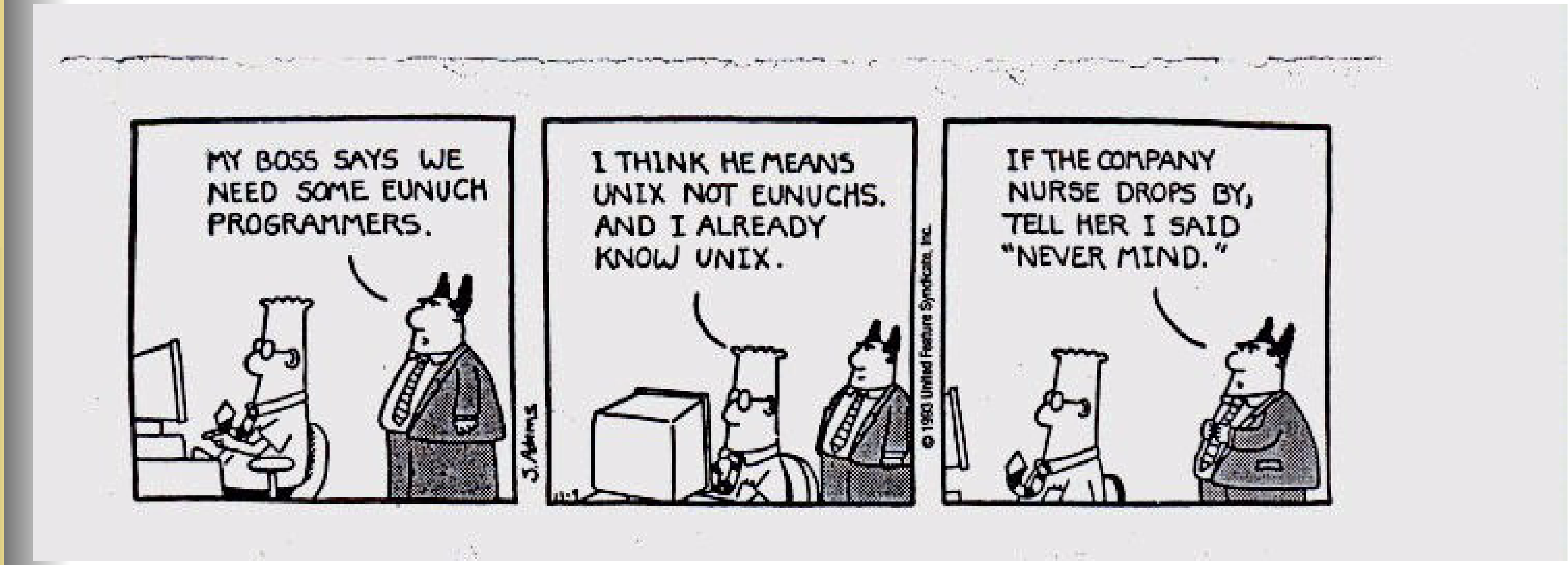
- ✓ Linux – Past and Future
- ✓ Open Source Software
- ✓ Linux in Industry
- ✓ What Linux Really Is
- ✓ Why do YOU want to know?
- ✓ Linux Environment
  - Linux Structure
  - Linux User Security
  - ISV support of Linux
  - Embedded Linux and Linux Appliances
  - Linux System Security

Linux – Past and Future

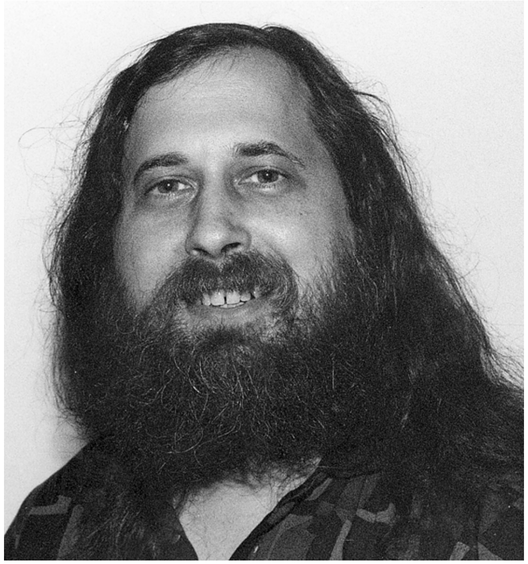
- What is Linux?
- Where did it come from?
- Who is responsible?
- How is it packaged?

What is Linux?

A UNIX-like OS


MY BOSS SAYS WE NEED SOME EUNUCH PROGRAMMERS.
S. Adams
11-9
I THINK HE MEANS UNIX NOT EUNUCHS. AND I ALREADY KNOW UNIX.
© 1993 United Feature Syndicate, Inc.
IF THE COMPANY NURSE DROPS BY, TELL HER I SAID "NEVER MIND."

First, There Was Freedom



- Richard Stallman
- 1984: begins GNU project
- Purpose: Free UNIX

  http://www.gnu.org

- First step: re-implementation of utilities

  C compiler C library
  emacs bash

- To fund the GNU project, the Free Software Foundation is founded

  http://www.fsf.org

Richard Stallman

“From that day forward, I decided this was something I could never participate in," says Stallman, alluding to the practice of trading personal liberty for the sake of convenience ... as well as the overall culture that encouraged such ethically suspect deal making in the first place. “ I decided never to make other people victims just like I had been a victim."

Richard Stallman, “Free as in Freedom:

Richard Stallman's Crusade for Free Software”

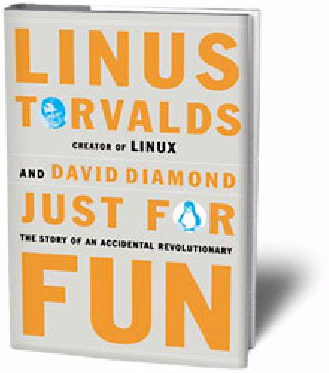
Then came Linux

- 1991: Linus Torvalds writes 1st version of Linux kernel

- Initially a research project about the 386 protected mode

- Combined with the GNU and other tools forms a complete UNIX system

- The rest is history..



The 1st announcement

From: torvalds@klaava.Helsinki.FI (Linus Benedict Torvalds)
Newsgroups: comp.os.minix
Subject: What would you like to see most in minix?
Summary: small poll for my new operating system
Message-ID: <1991Aug25.205708.9541@klaava.Helsinki.FI>
Date: 25 Aug 91 20:57:08 GMT
Organization: University of Helsinki

Hello everybody out there using minix - I'm doing a (free) operating system (just a hobby, won't be big and professional like gnu) for 386(486) AT clones. This has been brewing since april, and is starting to get ready. I'd like any feedback on things people like/dislike in minix, as my OS resembles it somewhat (same physical layout of the file-system (due to practical reasons) among other things). I've currently ported bash(1.08) and gcc(1.40), and things seem to work. This implies that I'll get something practical within a few months, and I'd like to know what features most people would want. Any suggestions are welcome, but I won't promise I'll implement them :-)

PS. Yes - it's free of any minix code, and it has a multi-threaded fs. It is NOT protable (uses 386 task switching etc), and it probably never will support anything other than AT-harddisks, as that's all I have :-(.

Distributions-a-plenty

- Debian GNU/Linux
- Gentoo Linux
- LindowsOS
- Lycoris Dekstop/LX
- Knoppix
- Mandrake Linux
- Fedora Project
- Slackware Linux
- SUSE Linux
- Xandros OS
- Gentoo
- Lunar
- Onebase
- ROCK
- Sorcerer
- SourceMage
- ADIOS
- Arabbix
- Augustux
- Blin Linux
- ByzantineOS
- CDlinux
- ClusterKnoppix
- Cool Linux
- Damn Small Linux
- DemoLinux
- Devil-Linux
- Dynebolic GNU/Linux
- Eagle Linux
- eLearnix
- FIRE
- Flonix

- Freeduc
- GeeXboX
- Gentoo Linux
- GNOPPIX
- Hakin9 Live
- JUSIX
- Knoppix
- Kurumin Linux
- LindowsCD
- LinuxConsole
- LNX-BBC
- Morphix
- MoviX
- Oralux
- PCLinuxOS
- Plan-B
- RPM Live Linux CD
- Sentry Firewall CD
- Slackware Live CD
- SULIX
- SUSE Live-Eval
- TrX Live Firewall
- Astaro Security Linux
- CensorNet
- ClarkConnect Broadband Getaway
- Devil-Linux
- Immunix Secured OS
- IPCop Firewall
- Luinux
- Mandrake Security MNF
- Securepoint
- Sentry Firewall
- SmoothWall GPL
- TrX Live Firewall

- Antomic GNU/Linux
- Beehive Linux
- Blue Point Linux
- BYO Linux
- Corel Linux
- Dynasoft Linux
- Eridani Linux
- Happy Linux
- HP Secure Linux
- JBLinux
- Kondara MNU/Linux
- LinuxInstall.org
- LinuxPPC
- Luminux
- Madeinlinux
- Merdeka Trustix
- Neat GNU/Linux
- Progeny Debian
- Red Office Linux
- SCO/Caldera Linux
- Spectra Linux
- Stampede Linux
- Storm Linux
- SuperRescue
- TrX Live Firewall
- United Linux
- Ututo
- Virtual-Linux

Themes-a-plenty

Rabid Squirrel
Dragon
Elx
Eagle
Webfish
Pingwin
Red Hawk
Black Cat
Black Lab
Coyote
Zoolinux
Mastadon
ManDrake

Fried Chicken
Beehive
Bambi
Bear Ops
Bad Penguin
WareWulf
Black Rhino
Blue Cat
Yellow Dog
Debian Ham
Monkey
Runt

Red Hat
Red Flag
Red Ice
Red Hawk
Red Blue
Blue
Bluepaint
Bluepoint
Blue Flops

White Dwarf
Black Cat
Black Rhino
Black Lab
Yelow Dog
Orange Linux
Think Blue
Blue Socks (BS)

Macaw
Peacock

Themes-a-plenty …

PeeWee
minilinux
small
DamnSmall
tiny
Pygmy
Phat

Effort
Familiar
Intimate
Ultra
Definite
Happy
Diet-PC

Miracle
WOWlinux
GrandLinux
BYO Linux

Devil
EvilEntity
Banshee

Fire
Fire Gate
Fire Cast

DarkStar
Icepack

Rock
Gibraltar

LSD
Linux Society Dist.

Krud
Kevin’s RedHat Uber Distro

LEAF
Linux Embedded
Application Firewall

LOAF
Linux on a Floppy

Open Source Software

Can it really work?

Open Source Software

- **Everybody has access to the source**
- **Volunteer software development on the Internet, with central coordination**
- **Linus Torvalds coordinates kernel development**
- **Others coordinate other pieces of the OS**
- **License cannot change**
- **Your changes (and name) will stay forever**

What's So Special About Linux?

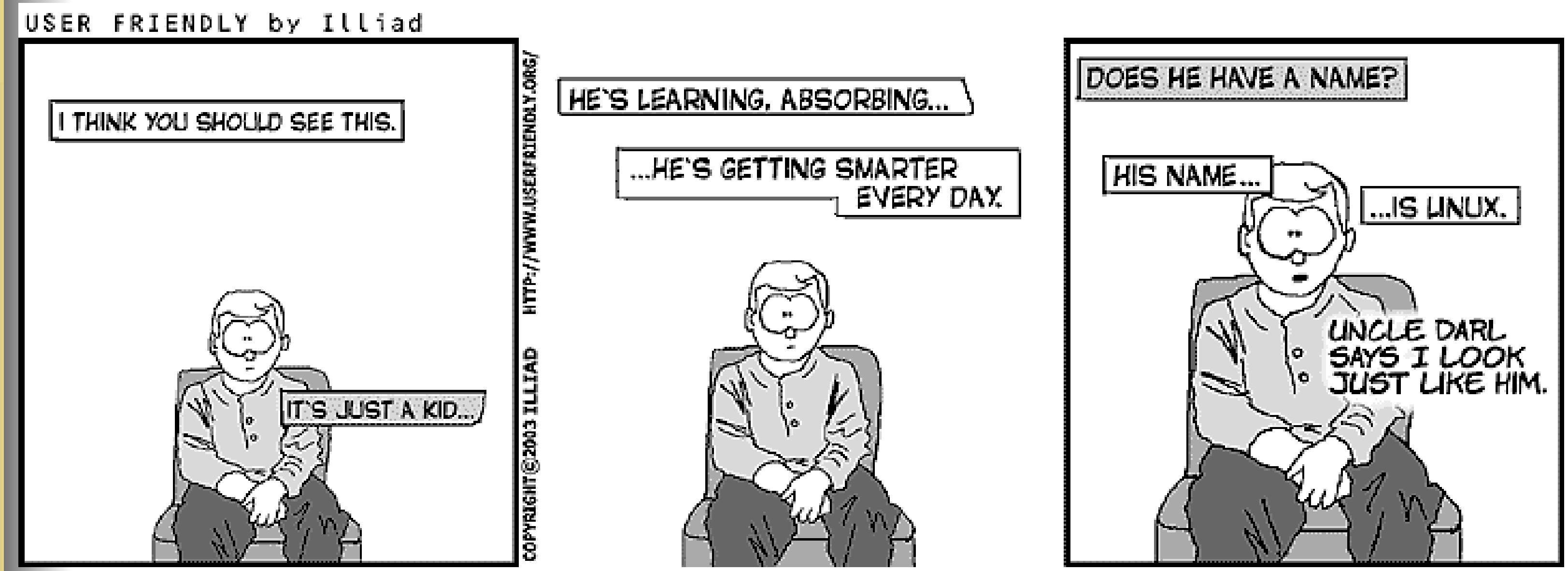
- Most software (including the Linux kernel) is GPL'ed (GNU General Public License)

http://www.gnu.org/copyleft/gpl.html

- 3 Rules of GPL
  - You may use the software for any purpose
  - You may change the software for your purpose
  - You may re-distribute the software

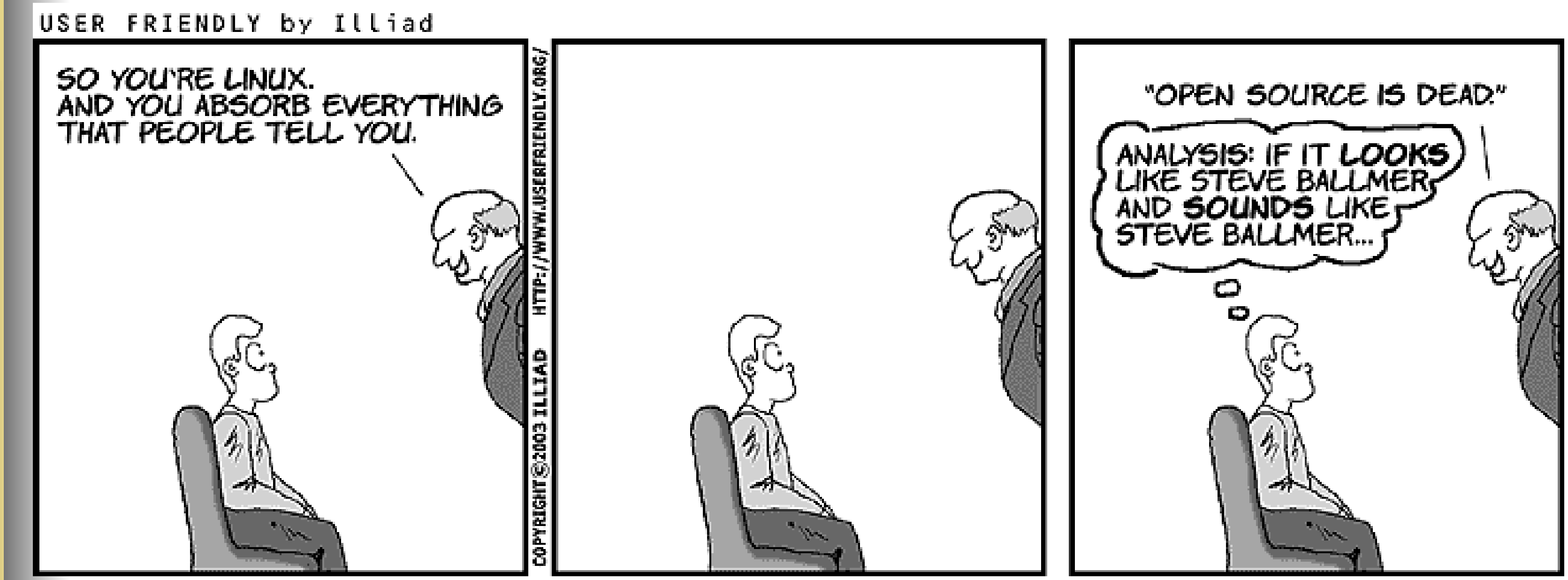
Linux has become a Way of Life

- News and User Groups
- Celebrities
- Humor


USER FRIENDLY by Illiad
I THINK YOU SHOULD SEE THIS.
IT'S JUST A KID...
COPYRIGHT©2003 ILLIAD HTTP://WWW.USERFRIENDLY.ORG/
HE'S LEARNING, ABSORBING...
...HE'S GETTING SMARTER EVERY DAY.
DOES HE HAVE A NAME?
HIS NAME...
...IS LINUX.
UNCLE DARL SAYS I LOOK JUST LIKE HIM.

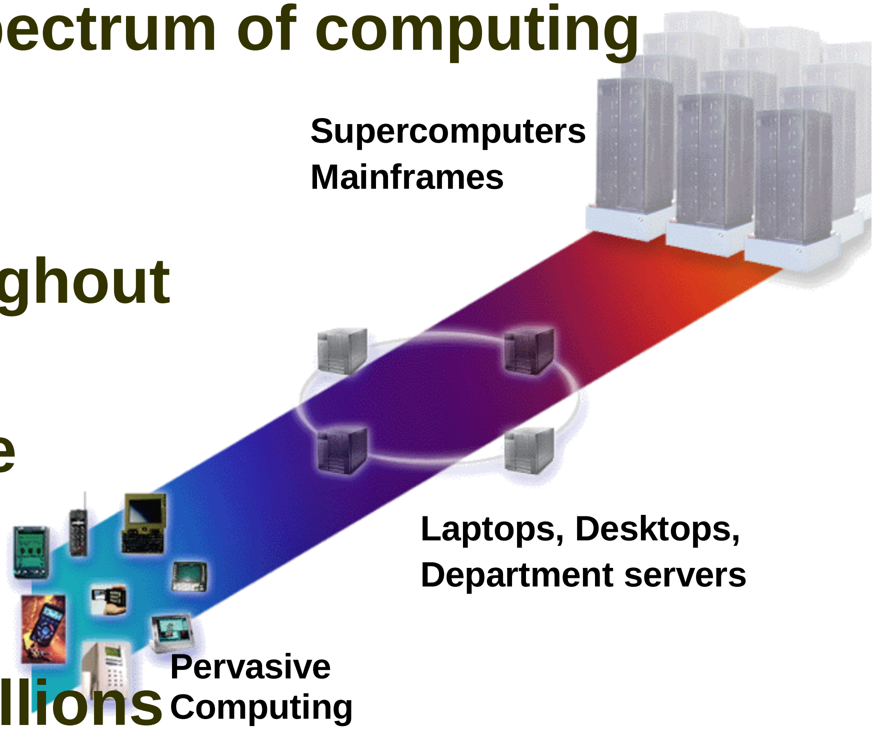
… as will Open Source

… even at IBM’s expense


USER FRIENDLY by Illiad
SO YOU'RE LINUX. AND YOU ABSORB EVERYTHING THAT PEOPLE TELL YOU.
COPYRIGHT © 2003 ILLIAD HTTP://WWW.USERFRIENDLY.ORG/
"OPEN SOURCE IS DEAD."
ANALYSIS: IF IT LOOKS LIKE STEVE BALLMER AND SOUNDS LIKE STEVE BALLMER...

Linux Today

- Linux covers the spectrum of computing



Supercomputers
Mainframes

Laptops, Desktops,
Department servers

Pervasive
Computing

- Linux is used throughout the world

  ... and in space

- Linux is used by millions of home users

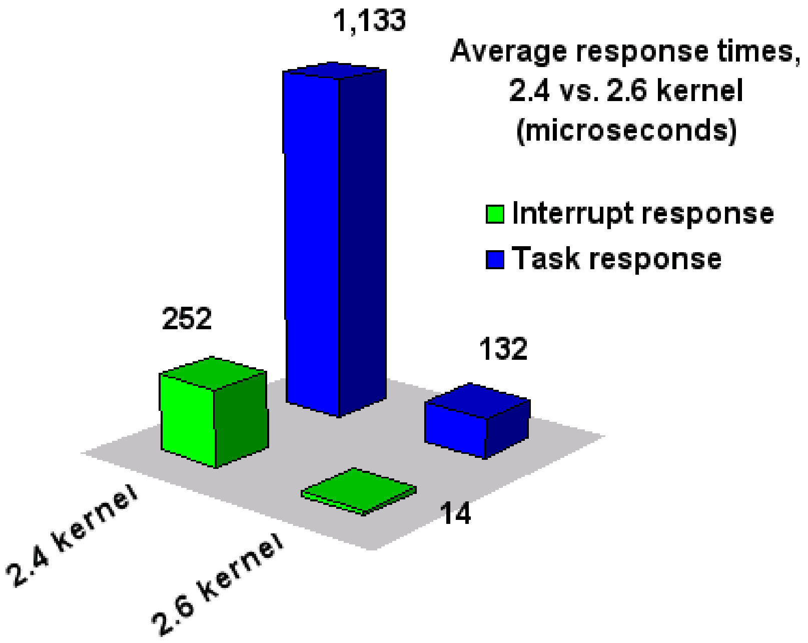
  ... and by some of the largest and well known companies in the world

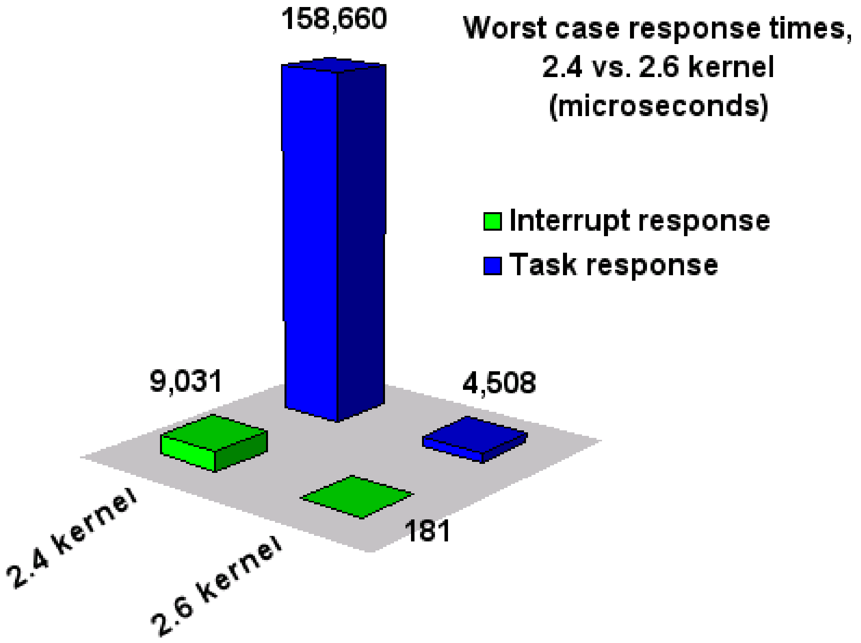
Recent (?) News

- United Linux: open industry consortium of Linux Distributors
- German Department of Interior chooses Linux
- Walmart selling $199 Linux PCs
- City of Beijing and IBM working on Digital Beijing project

A Kernel Comparison

Comparison of real-time performance





Linux Environment

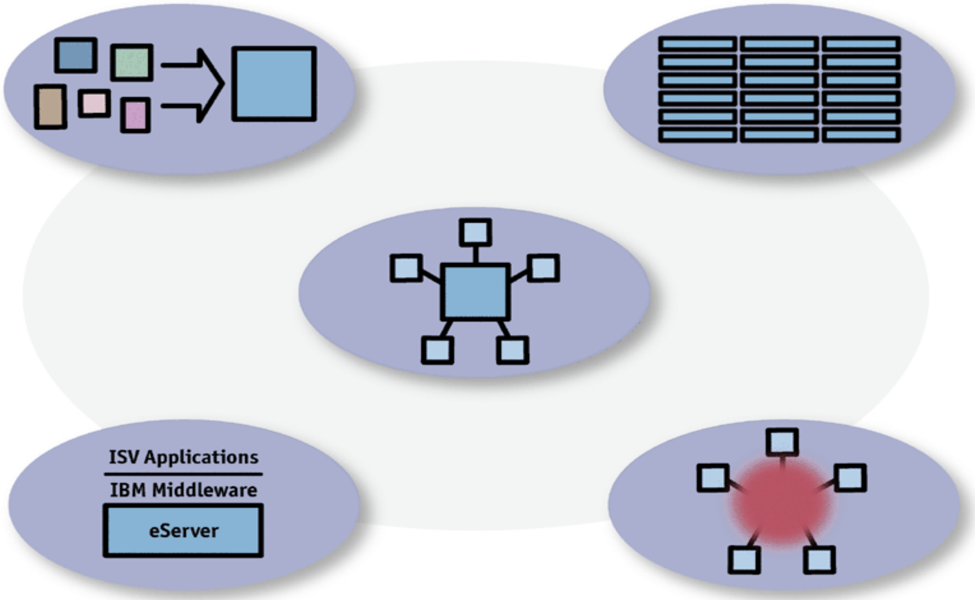
Why Do YOU Need To Know About this?

IBM and Linux

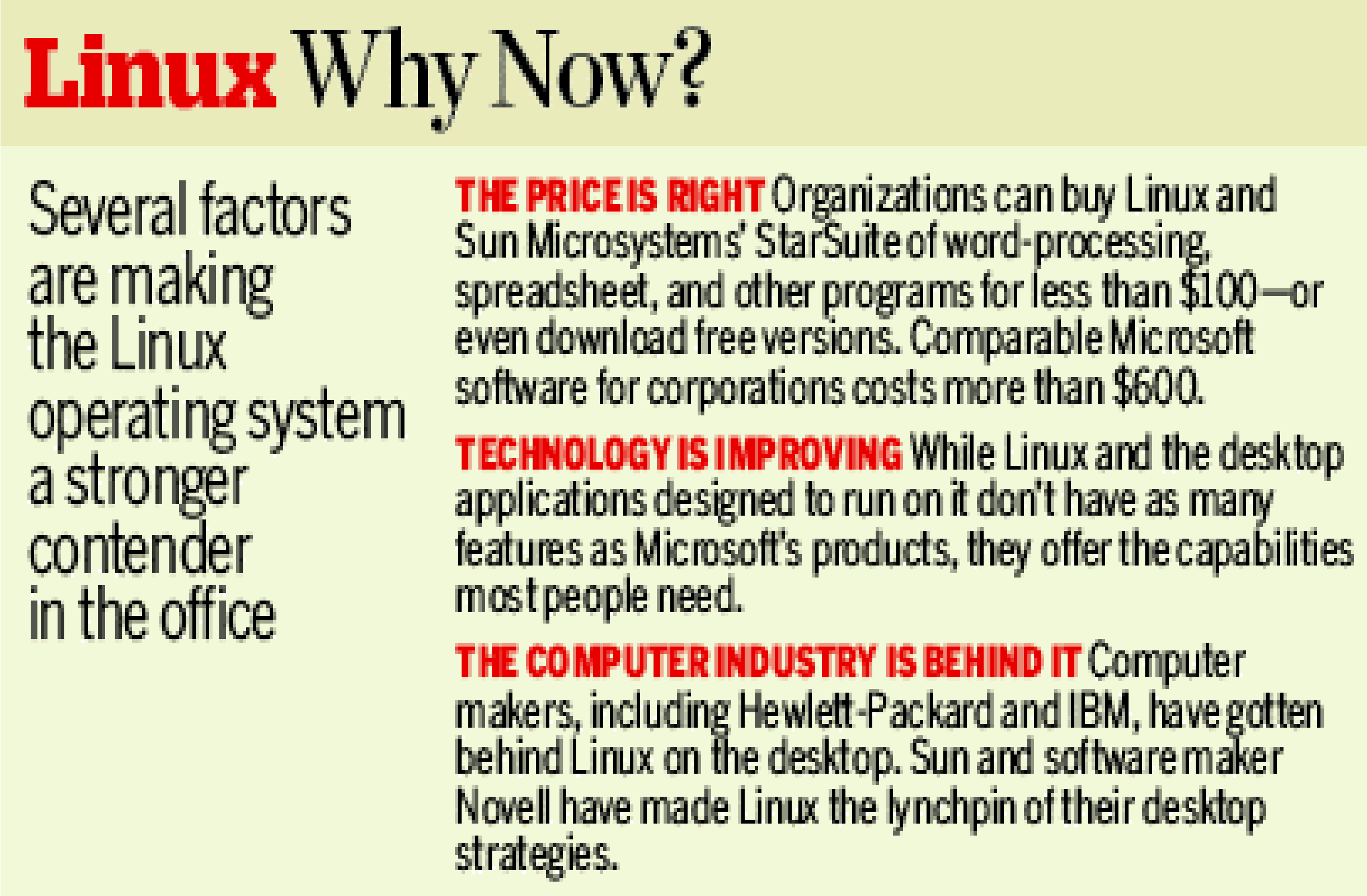
- IBM servers, storage and software enabled for Linux
- Skilled professionals (sales, technical support, and consulting)
- Customer evaluation centers/implementation labs
- IBM internal operations use Linux - over 1000 production servers

How Customers are Deploying

- **Infrastructure Solutions**
- **Workload Consolidation**
- **Linux Clusters**
- **Application Solutions**
- **Distributed Enterprise**



So Why Now?



Linux Why Now?

Several factors are making the Linux operating system a stronger contender in the office

THE PRICE IS RIGHT Organizations can buy Linux and Sun Microsystems' StarSuite of word-processing, spreadsheet, and other programs for less than $100—or even download free versions. Comparable Microsoft software for corporations costs more than $600.

TECHNOLOGY IS IMPROVING While Linux and the desktop applications designed to run on it don't have as many features as Microsoft's products, they offer the capabilities most people need.

THE COMPUTER INDUSTRY IS BEHIND IT Computer makers, including Hewlett-Packard and IBM, have gotten behind Linux on the desktop. Sun and software maker Novell have made Linux the lynchpin of their desktop strategies.

Linux Environment

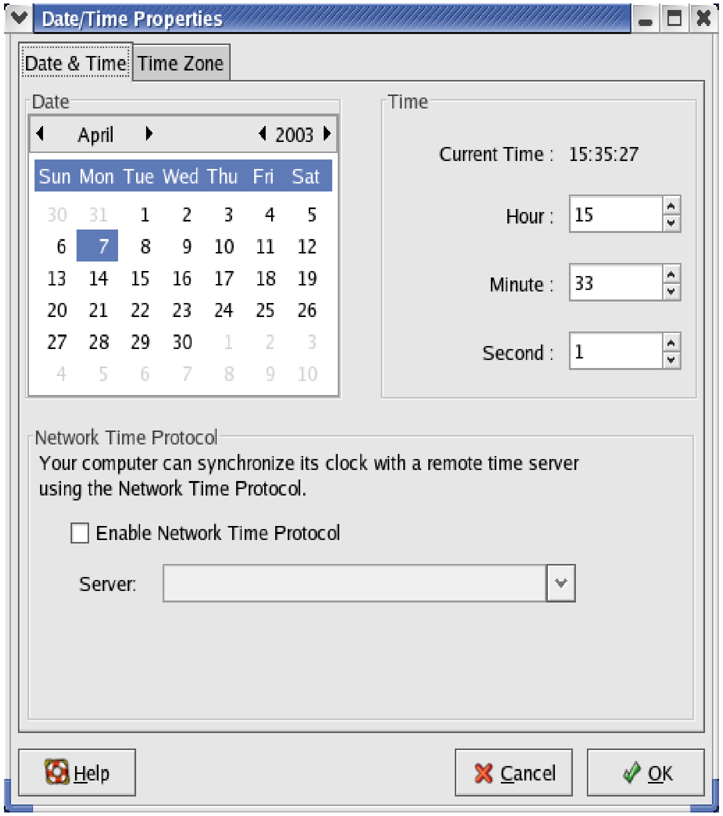
Linux File Systems And Structure

Linux Structure –
Kernel & Systems

- **UNIX/Linux is command-line driven**
- **GUIs are trying to take over**
- **May aid in transition from Windows OS’s**

RedHat’s System Administration

redhat-config-*



April 2003

Sun	Mon	Tue	Wed	Thu	Fri	Sat
30	31	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	1	2	3
4	5	6	7	8	9	10

Current Time : 15:35:27

Hour : 15

Minute : 33

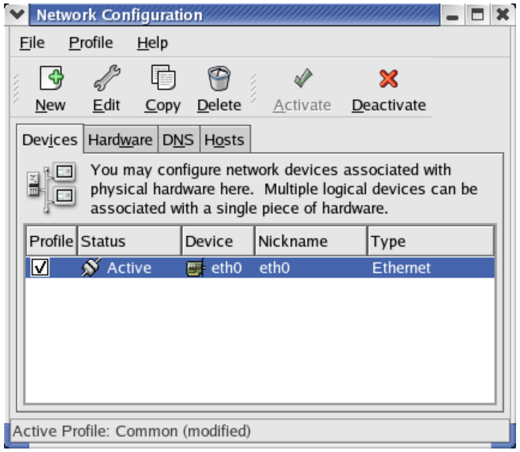
Second : 1

Your computer can synchronize its clock with a remote time server using the Network Time Protocol.

☐ Enable Network Time Protocol

Server:

redhat-config-time

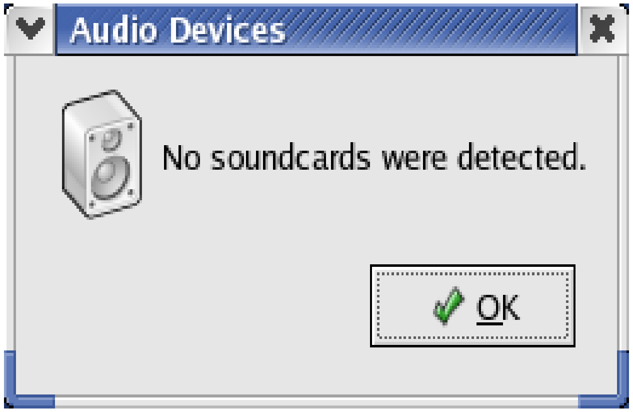


You may configure network devices associated with physical hardware here. Multiple logical devices can be associated with a single piece of hardware.

Profile	Status	Device	Nickname	Type
☑	Active	eth0	eth0	Ethernet

Active Profile: Common (modified)

redhat-config-network

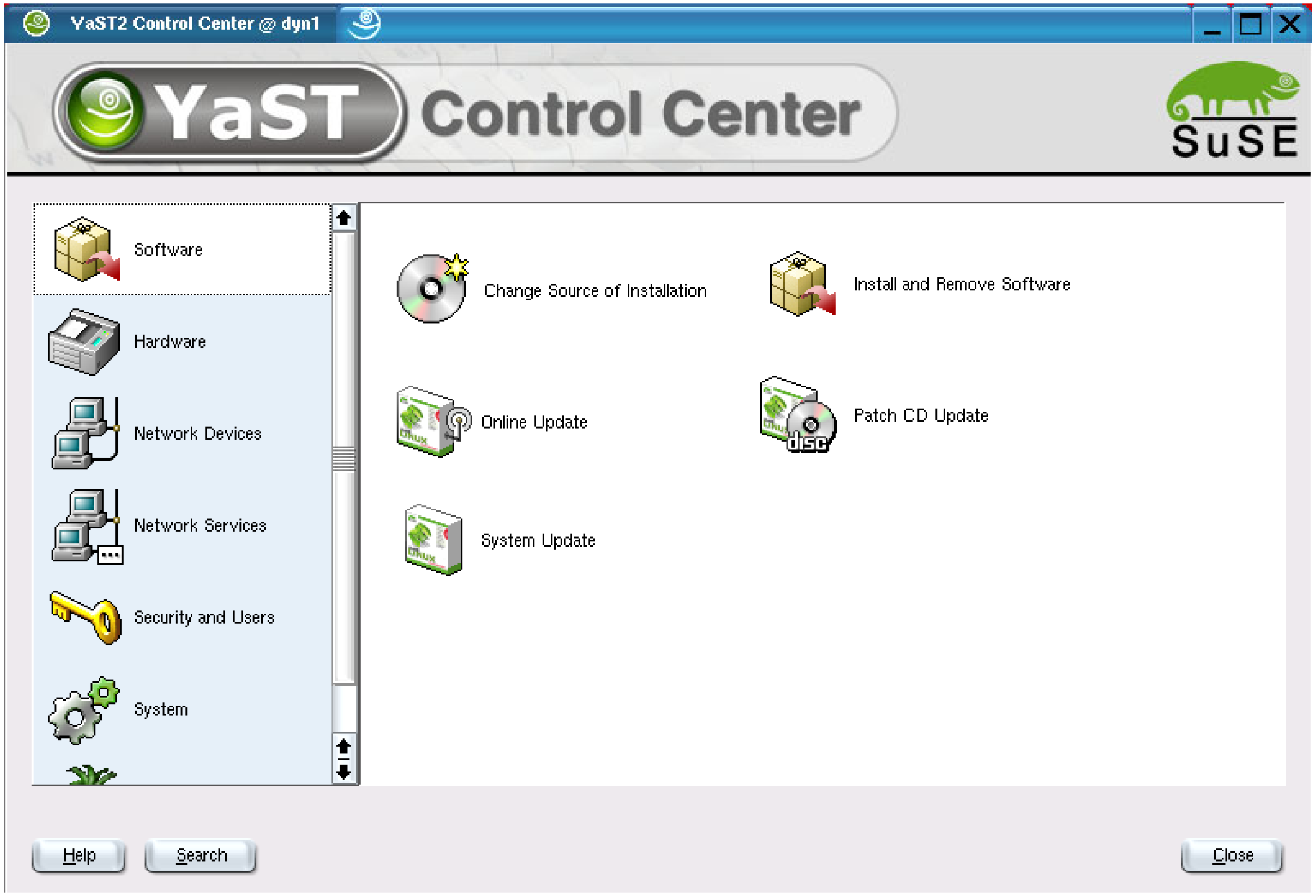


No soundcards were detected.

redhat-config-soundcard

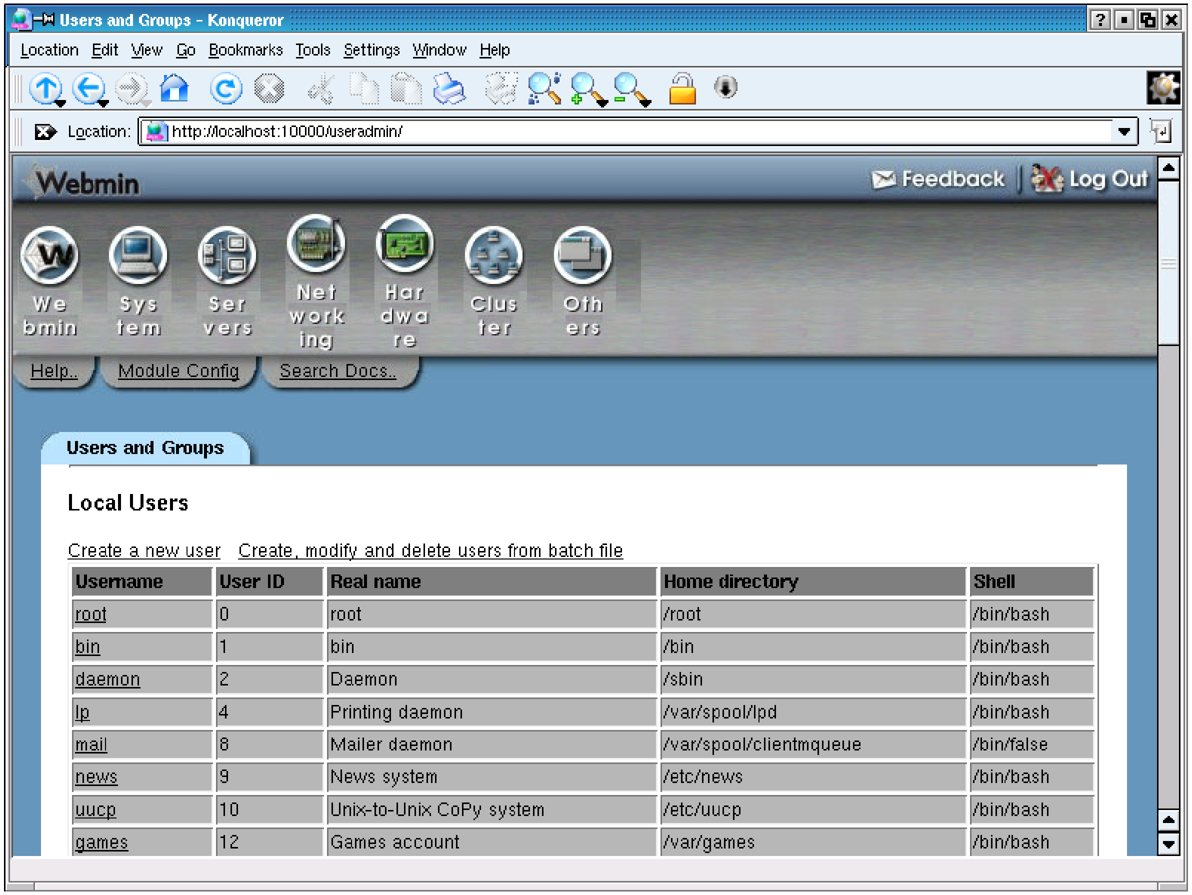
SuSE’s "YaST"

Yet Another Setup Tool



Webmin SysAdmin Tool

3rd Party tools are available, too


Users and Groups - Konqueror
Location Edit View Go Bookmarks Tools Settings Window Help
Location: http://localhost:10000/useradmin/
Webmin
Feedback
Log Out
Webmin
System
Servers
Networking
Hardware
Cluster
Others
Help..
Module Config
Search Docs..
Users and Groups

Local Users

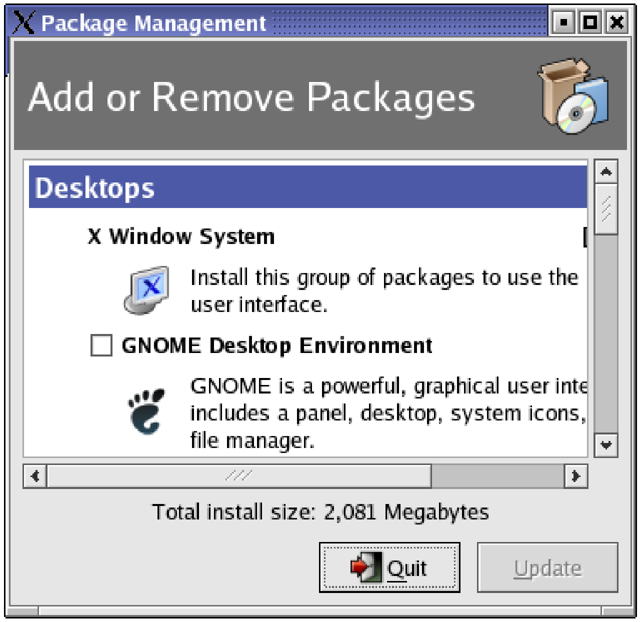
Create a new user Create, modify and delete users from batch file

Username	User ID	Real name	Home directory	Shell
root	0	root	/root	/bin/bash
bin	1	bin	/bin	/bin/bash
daemon	2	Daemon	/sbin	/bin/bash
lp	4	Printing daemon	/var/spool/lpd	/bin/bash
mail	8	Mailer daemon	/var/spool/clientmqueue	/bin/false
news	9	News system	/etc/news	/bin/bash
uucp	10	Unix-to-Unix CoPy system	/etc/uucp	/bin/bash
games	12	Games account	/var/games	/bin/bash

RedHat Package Management

- Developed by Red Hat Software Inc, but GPL'ed used by most Linux distros
- Requirement of LSB
- Can use PGP/GPG for package signing

Integrated Package Management



Desktops

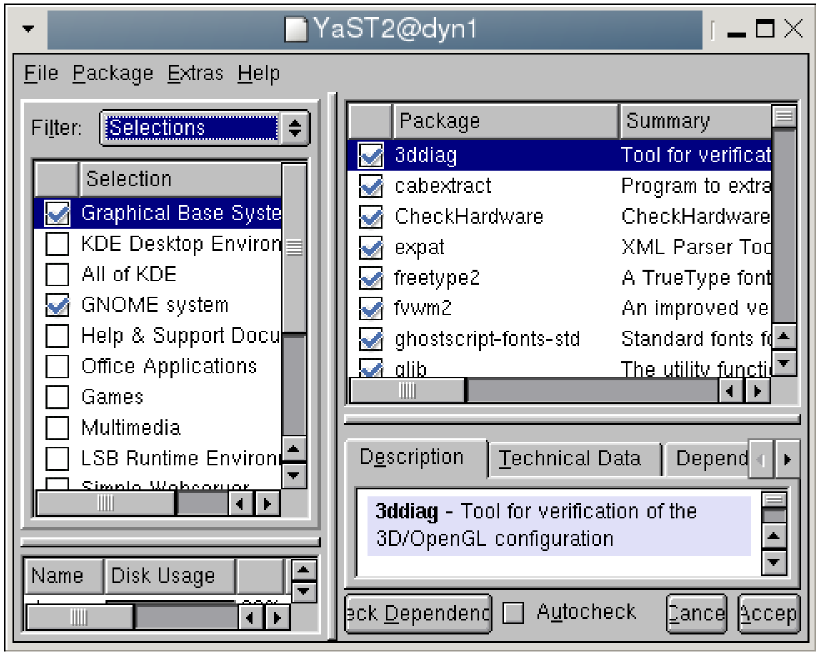
X Window System

Install this group of packages to use the user interface.

□ **GNOME Desktop Environment**

GNOME is a powerful, graphical user inte includes a panel, desktop, system icons, file manager.

Total install size: 2,081 Megabytes



Filter: Selections

	Selection
☑	Graphical Base Syste
□	KDE Desktop Environ
□	All of KDE
☑	GNOME system
□	Help & Support Docu
□	Office Applications
□	Games
□	Multimedia
□	LSB Runtime Environ
□	Simple Webserver

	Package	Summary
☑	3ddiag	Tool for verificat
☑	cabextract	Program to extra
☑	CheckHardware	CheckHardware
☑	expat	XML Parser Too
☑	freetype2	A TrueType font
☑	fvwm2	An improved ve
☑	ghostscript-fonts-std	Standard fonts fo
☑	glib	The utility functi

3ddiag - Tool for verification of the 3D/OpenGL configuration

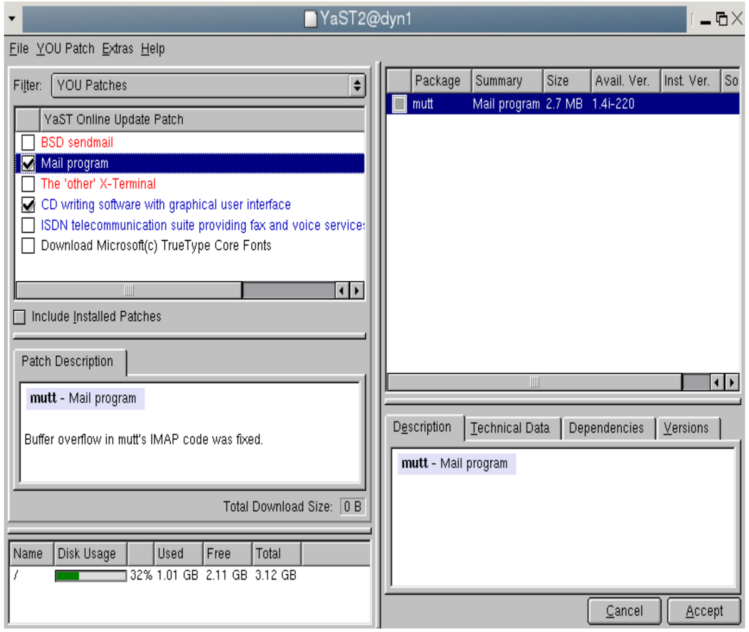
□ Autocheck

redhat-config-packages yast (install and remove software)

Keeping Up To Date

Keeping your systems up2date

- **you** (Yast Online Update): Program that downloads/installs patches from any SuSE mirror



Filter: YOU Patches

YaST Online Update Patch

- □ BSD sendmail
- ☑ Mail program
- □ The 'other' X-Terminal
- ☑ CD writing software with graphical user interface
- □ ISDN telecommunication suite providing fax and voice service:
- □ Download Microsoft(c) TrueType Core Fonts

□ Include Installed Patches

Patch Description

mutt - Mail program

Buffer overflow in mutt's IMAP code was fixed.

Total Download Size: 0 B

Name	Disk Usage	Used	Free	Total
/	32%	1.01 GB	2.11 GB	3.12 GB

	Package	Summary	Size	Avail. Ver.	Inst. Ver.	So
□	mutt	Mail program	2.7 MB	1.4i-220		

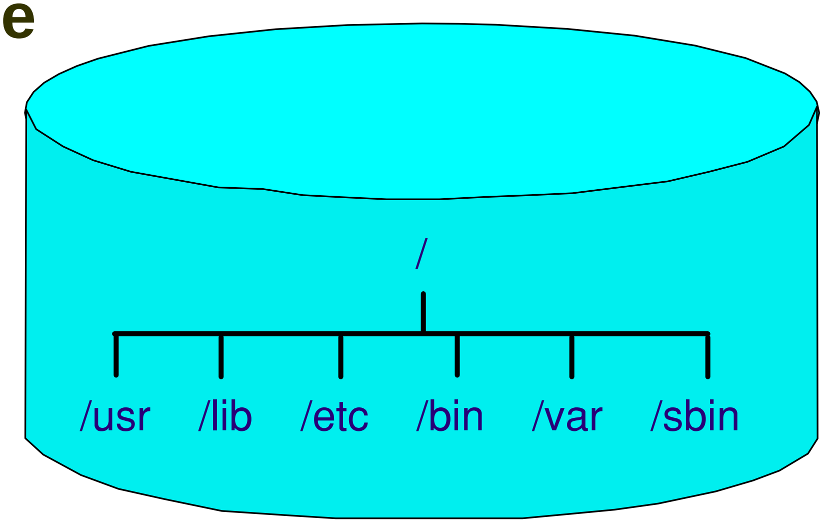
mutt - Mail program

Debian Package Management

	Red Hat	Debian
Filenames	hello-1.0-1.src.rpm hello-1.0-1.i386.rpm	hello_1.0-1.tar.gz hello_1.0-1.deb
Install	rpm -i	dpkg -i
Upgrade	rpm -U, rpm -F	dpkg -i
Deinstall	rpm -e	dpkg -r
Query	rpm -q	dpkg -p
Front-ends	redhat-config-packages yast, up2date, you	apt-get dselect
Package descriptor file	hello.spec	hello/debian/control hello/debian/rules
Build a package	{rpm|rpmbuild} -b	dpkg -b, dpkg-buildpackage

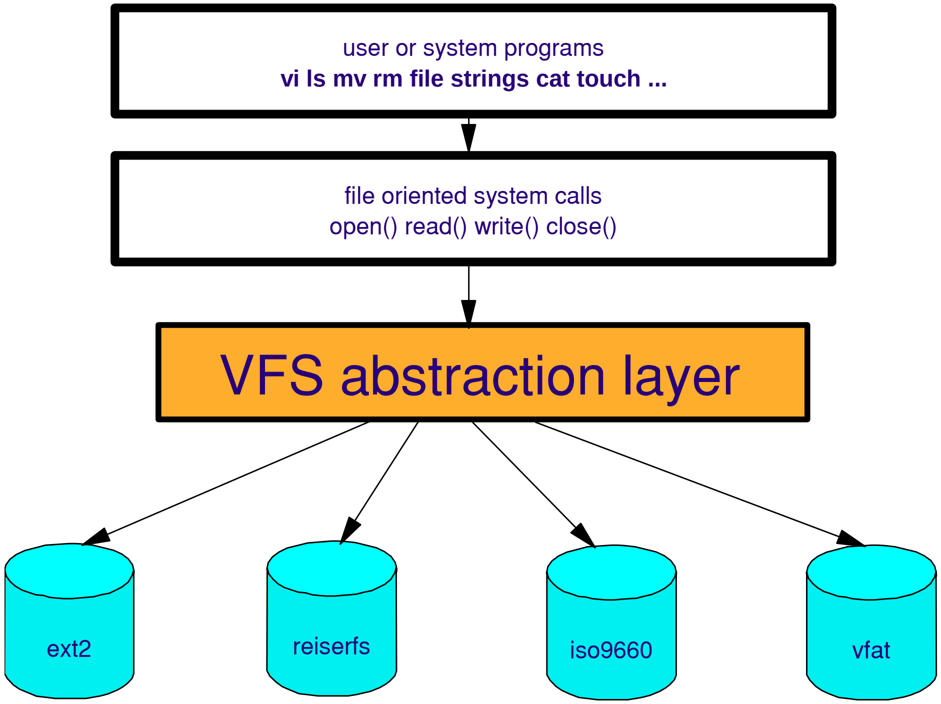
What is a Filesystem?

- A place to store files and refer to them
- Hierarchical structure through use of directories
- A filesystem can be stored on any block device



The Virtual Filesystem Switch

Any mounted filesystem “attaches” to the directory system


user or system programs
vi ls mv rm file strings cat touch ...
file oriented system calls
open() read() write() close()
VFS abstraction layer
ext2
reiserfs
iso9660
vfat

Comparing Filesystems

Linux grows up

	ext2	**ext3**	**jfs**	**reiser**	**xfs**
Journal	no	yes (10 MB default)	yes (auto resized)	yes (32 MB default)	yes
resizeable	yes, but only when unmounted	yes, but only when unmounted	yes	yes	yes - only when mounted
maximum size	File: 2TB FS: 16TB	File: 2TB FS: 16TB	File: 4PB FS: 32PB	File: 16TB FS: 1EB	File: 2TB FS: 8EB
type	I-Nodes (completely block oriented)	I-Nodes (completely block oriented)	I-Nodes (allocated in a b-tree)	B-Tree	I-Nodes (allocated in a b-tree)

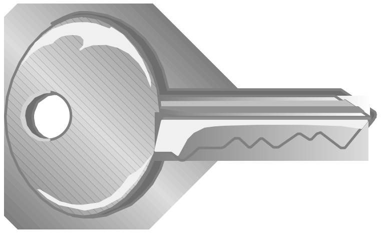
Linux Environment

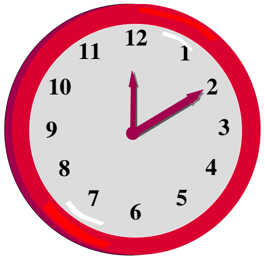
Linux User Security

User-Level Security Overview

Authentication:

Verifying that you are who you say you are





File Permissions

Authorization in Linux based on file permissions

Perm.	File	Directory
r	User can read contents of file	User can list the contents of a directory
w	User can change contents of file	User can change the contents of directory
x	User can execute file as a command	User can cd to directory and can use it in PATH
SUID	Program runs with effective user ID of owner	
SGID	Program runs with effective group ID of owner	Files created in directory inherit the same group ID as the directory
Sticky bit		Only the owner of the file and the owner of the directory may delete files in this directory

Principles of Authorization

Once logged in, users cannot change their identity, except through a SUID program, which allows them to run a command as someone else (most often root)

- **passwd**
- **su**
- **sudo**

Logfiles and Useful Commands

- **/var/log/lastlog**
- **/var/log/messages**
- **/var/log/secure**
- **/var/log/wtmp**
- **/var/run/utmp**

- **lastlog**
- **last**
- **id**
- **who**
- **w**

www.kernel.org

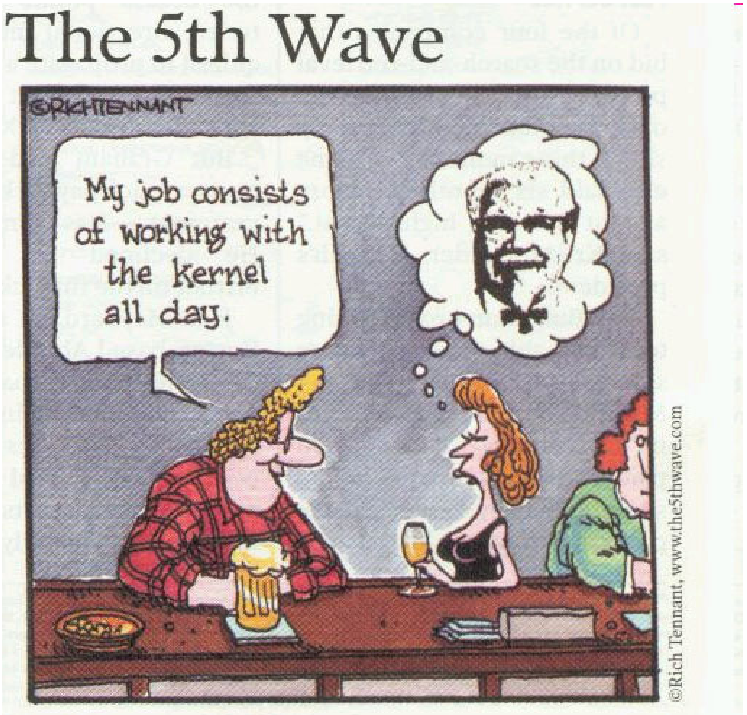
- Protocol Location
  - HTTP http://www.kernel.org/pub/
  - FTP ftp://ftp.kernel.org/pub/
  - RSYNC rsync://rsync.kernel.org/pub/
- Reporting Linux Kernel bugs
  - Bugzilla at www.bugzilla.kernel.org
- Mailing lists
  - http://www.kernel.org/pub/linux/docs/lkml/
  - http://marc.theaimsgroup.com/?l=linux-kernel
  - http://www.ussg.iu.edu/hypermail/linux/kernel/

Linux Environment

ISV Support

ISV support of Linux

Linux at IBM
Developers



The 5th Wave
©RICHTENNANT
My job consists of working with the kernel all day.
©Rich Tennant, www.the5thwave.com

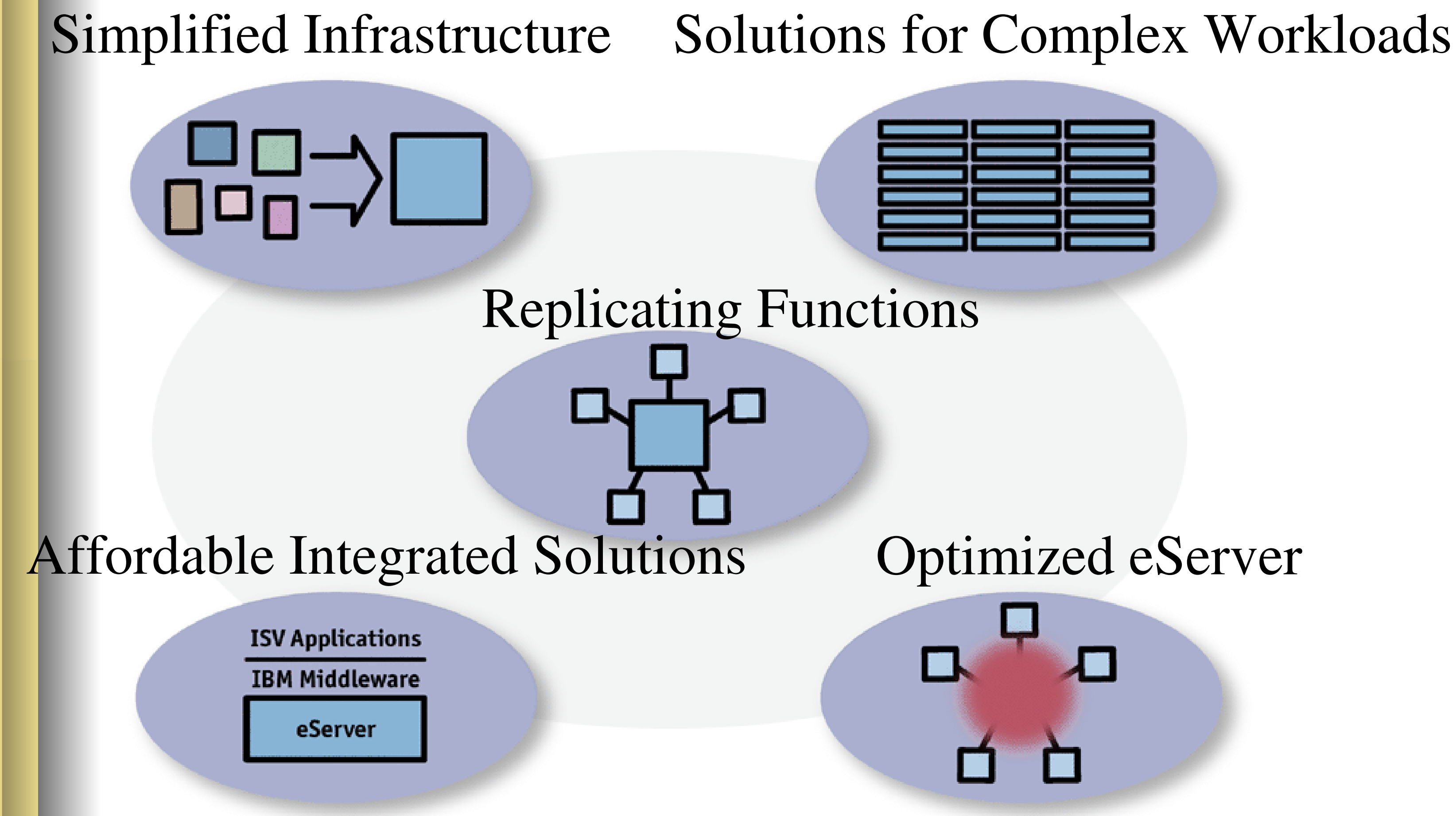
Powered by

IBM's Contributions to Linux

“ There’s no doubt in our minds that Linux is certainly a disruptive technology that has the potential to change the game in information technology – forever. ”

Sam Palmisano, IBM President and CEO, LinuxWorld 2001

How Customers are Deploying



Simplified Infrastructure

Solutions for Complex Workloads

Replicating Functions

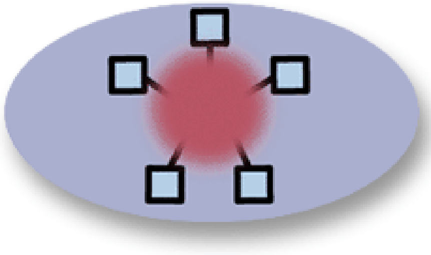
Affordable Integrated Solutions

Optimized eServer

Infrastructure Solutions

Optimized eServer and IBM Software for Linux

- Infrastructure Servers
  - File/Print
  - Web/Application
  - Application dev.
  - Content/Caching
  - Security



- Advantages:
  - Low cost
  - Highly reliable
  - Turnkey
  - Rapid setup
  - Innovative packaging

- **Infrastructure Software**
  - **DB2 Universal Database**
  - **Domino collaboration**
  - **Tivoli Systems Management**
  - **MQSeries messaging**
  - **WebSphere Family for application development**

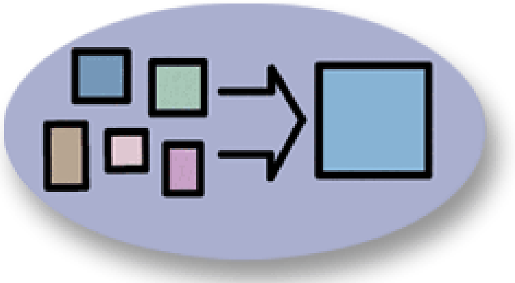
- **Advantages:**
  - **Scalable**
  - **Open standards**
  - **Industry proven**

Consolidate Org. Workloads

Simplified Infrastructure with IBM and Linux

Workload Consolidation

- Replace many with few
- Optimize assets



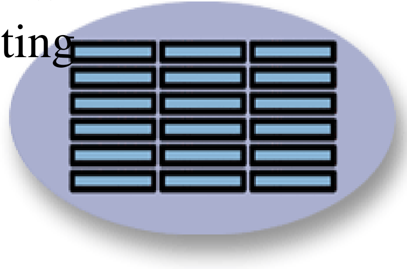
Advantages:

- Reduce costs
- eServer proven reliability
- Virtualize servers
- Dynamically manage workloads
- Enabled across all eServer products

Linux Clusters

IBM Solutions for Complex Workloads

Clusters with Linux:
- Computationally intensive workloads
- High performance computing
- Horizontal scalability



Advantages:
- Supercomputing performance at "mass market" prices

Industry leading IBM cluster software:
- GPFS - General Parallel File System
- CSM - Cluster Systems Manager
- IBM factory installed and delivered

Choice of eServer architecture:
- IA 32, IA 64, or PowerPC

Distributed Applications

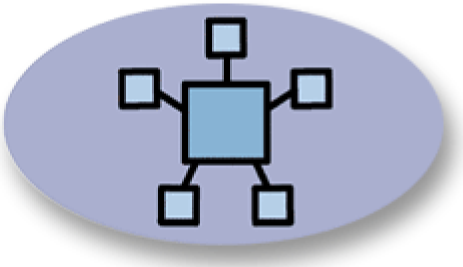
Replicate Functions Across the Enterprise

Distributed solutions with Linux:

- Geographically dispersed
- Serve more customers or employees

Advantages:

- Low cost, small footprint eServer
- High reliability and stability
- Secure
- Easily replicated
- Centrally managed
- IBM worldwide support and implementation



Application Solutions

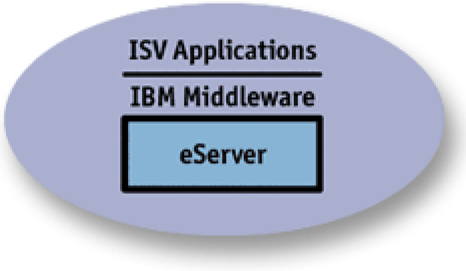
Affordable Integrated Solutions for Linux

IBM Business Partner and ISV Solutions:

- Enable e-business initiatives
- Deliver industry vertical applications
- Leverage Business Partner and ISV expertise

Advantages:

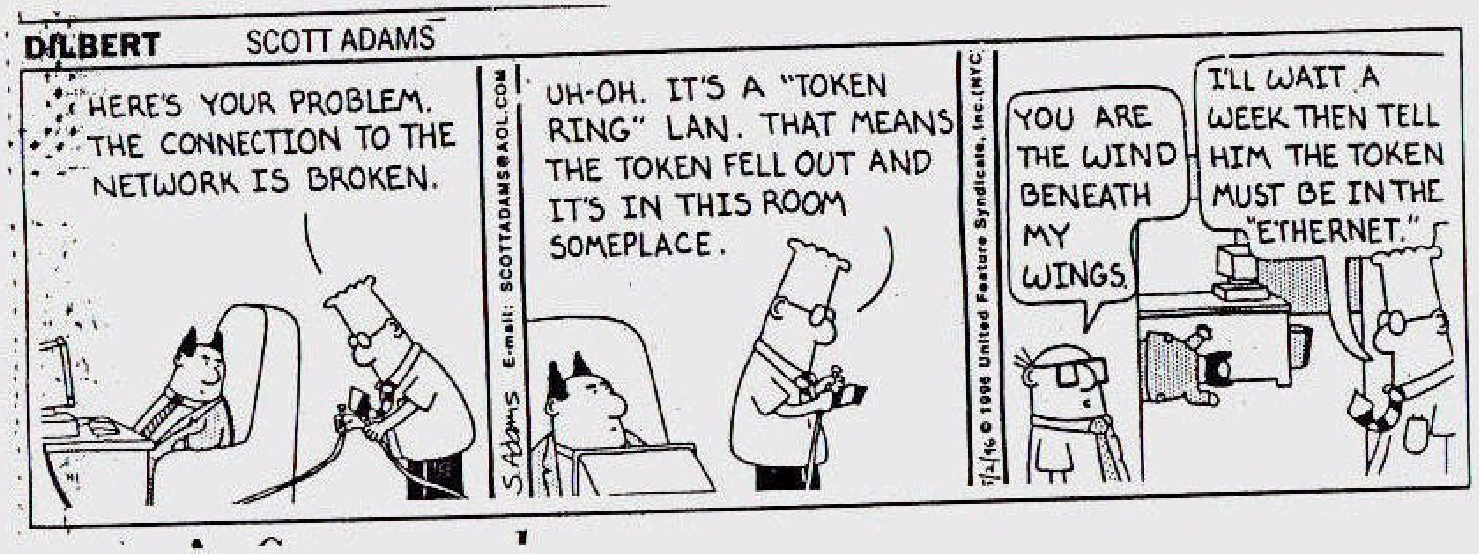
- Bundled eServer / IBM middleware / ISV application
- Low cost
- Optimized solutions
- Reduced implementation time



Linux Environment

Embedded Linux and Linux Appliances

Embedded Linux


DILBERT
SCOTT ADAMS
HERE'S YOUR PROBLEM. THE CONNECTION TO THE NETWORK IS BROKEN.
E-mail: SCOTTADAMS@AOL.COM
S.Adams
UH-OH. IT'S A "TOKEN RING" LAN. THAT MEANS THE TOKEN FELL OUT AND IT'S IN THIS ROOM SOMEPLACE.
5/2/96 © 1996 United Feature Syndicate, Inc.(NYC)
YOU ARE THE WIND BENEATH MY WINGS.
I'LL WAIT A WEEK THEN TELL HIM THE TOKEN MUST BE IN THE "ETHERNET."

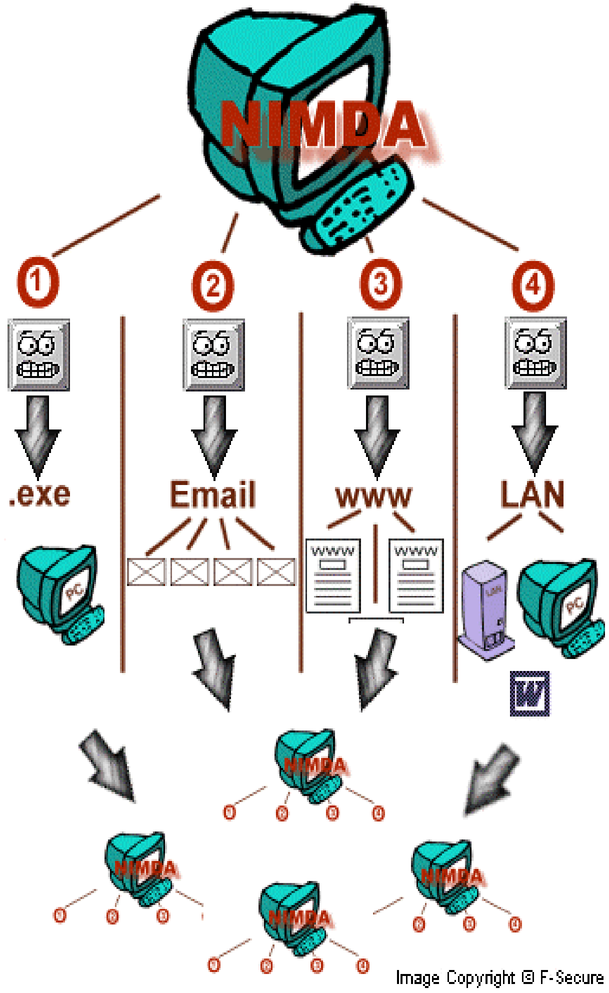
A Sampling of Linux Devices

Linux Environment

viruses, worms, and CERT

A virus is

A virus is code that is capable of self-replication from one system to another.



A worm is

A worm is a totally self-contained, replicatable payload

from a news group ...

A Linux news group discussion about worms:

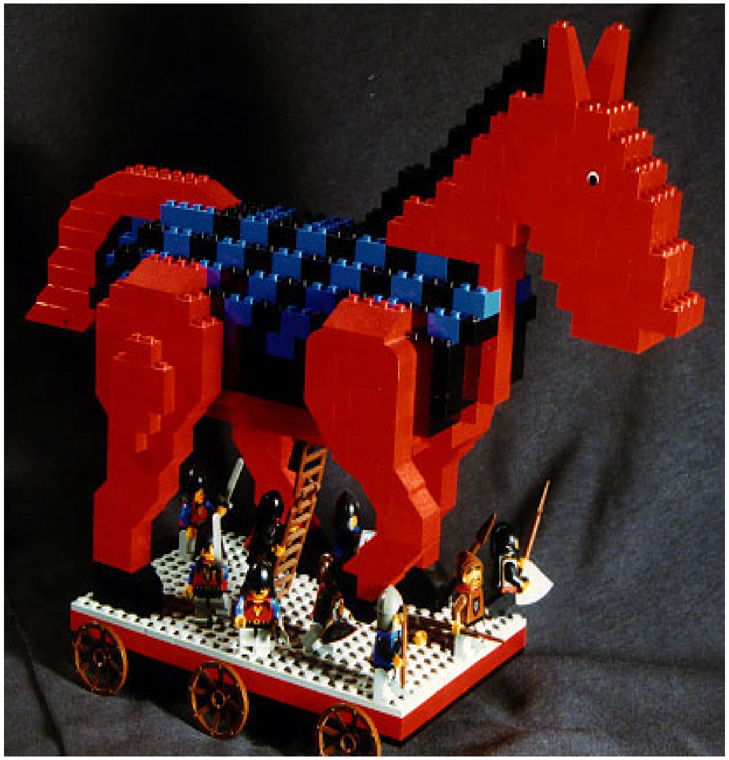
- **Worms are a different thing, however worms on Linux aren't like worms on Windows, and can all be solved by keeping your software up to date with security packages from your distro.**

- **Actually, in that respect they are *exactly* like Windows –**

Please listen to the rest …

A Trojan is

A Trojan is code that usually carries a malicious payload that will destroy data

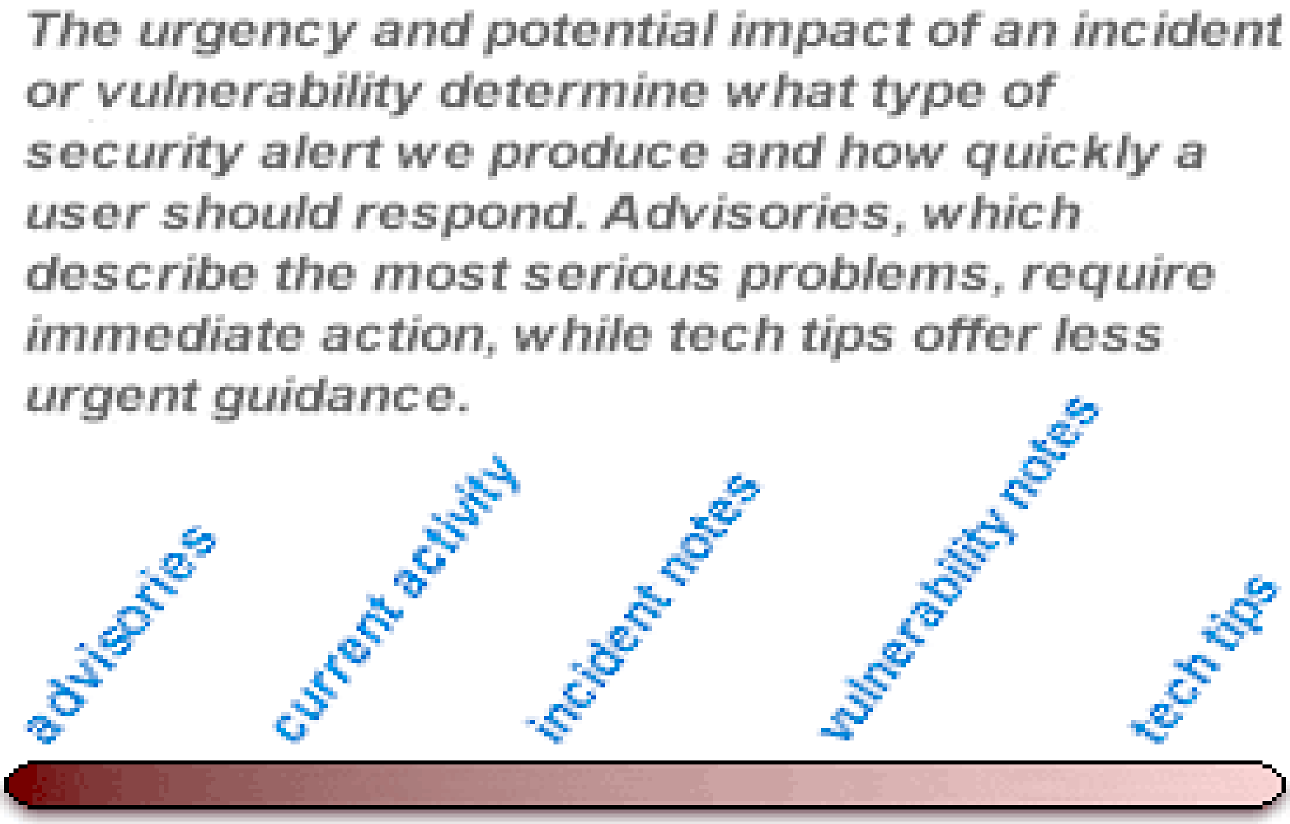


Do Linux Viruses Really Exist?

- **Linux is not “bulletproof”**
- **Most viruses attack ports or processes**

CERT

Computer Emergency Response Team

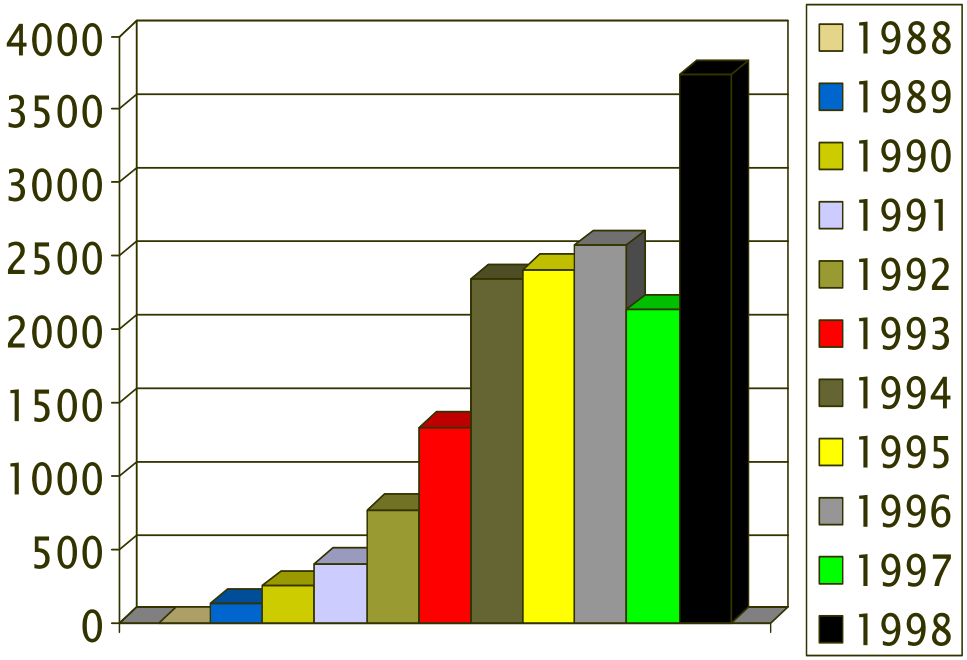


The urgency and potential impact of an incident or vulnerability determine what type of security alert we produce and how quickly a user should respond. Advisories, which describe the most serious problems, require immediate action, while tech tips offer less urgent guidance.

Number of incidents reported

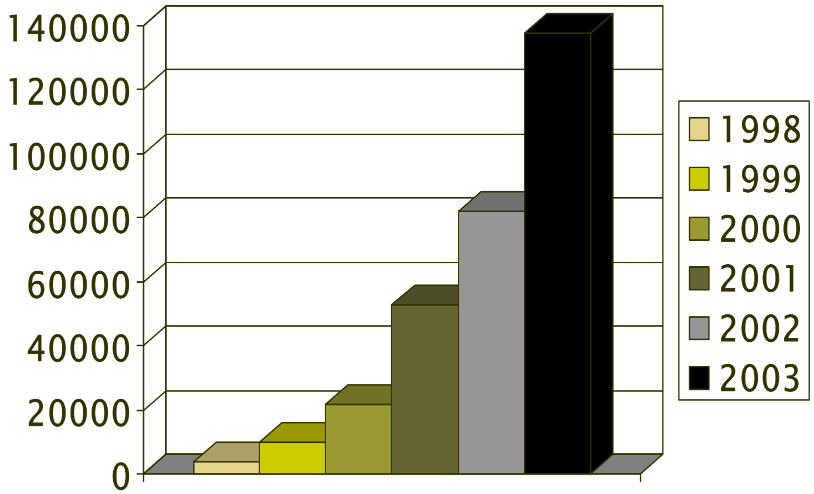
Total incidents reported 1988-2003

319,992



Number of incidents reported

43% of all calls were reported in 2003

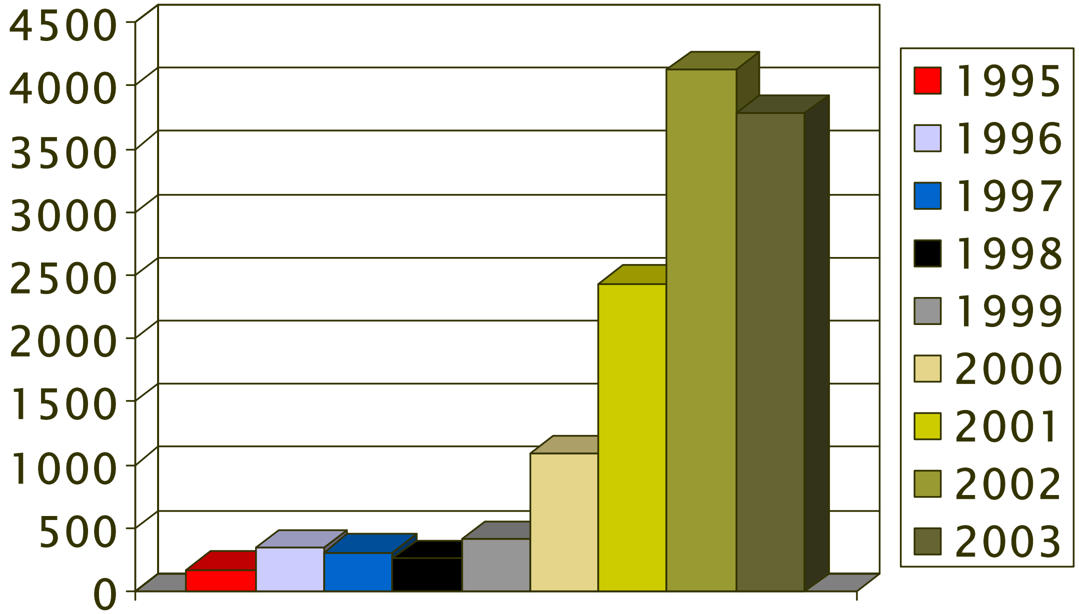


Vulnerabilities reported

Total vulnerabilities reported

1995-2003

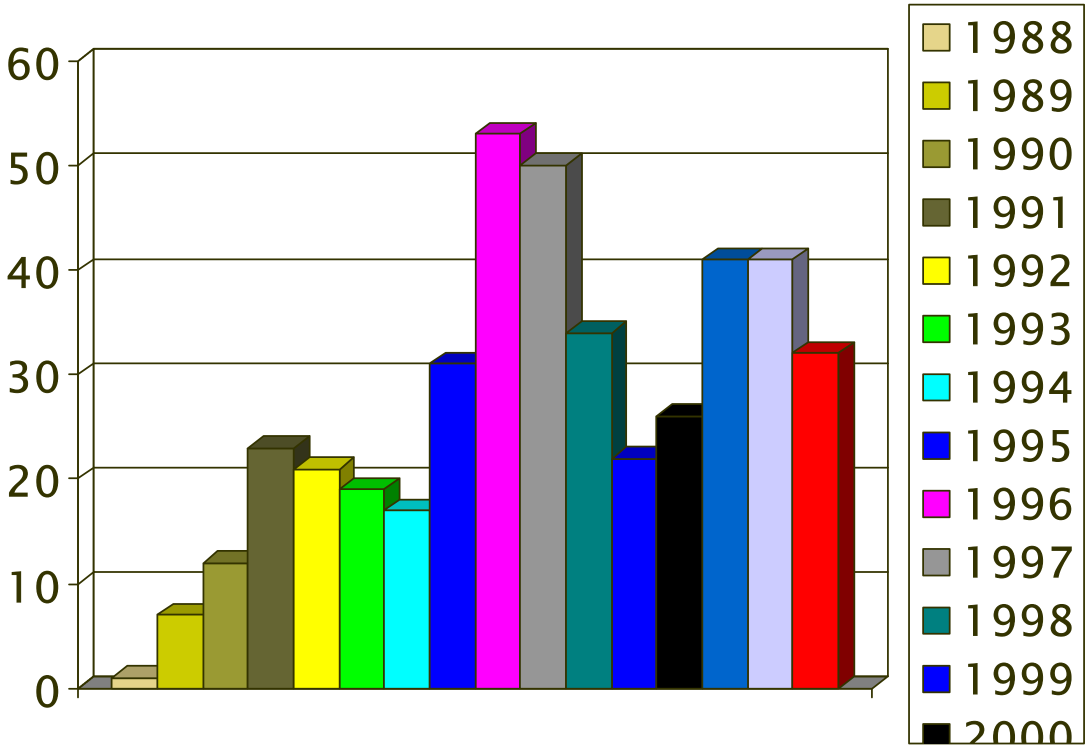
12,946



Security alerts published

Total security alerts published 1988-2003

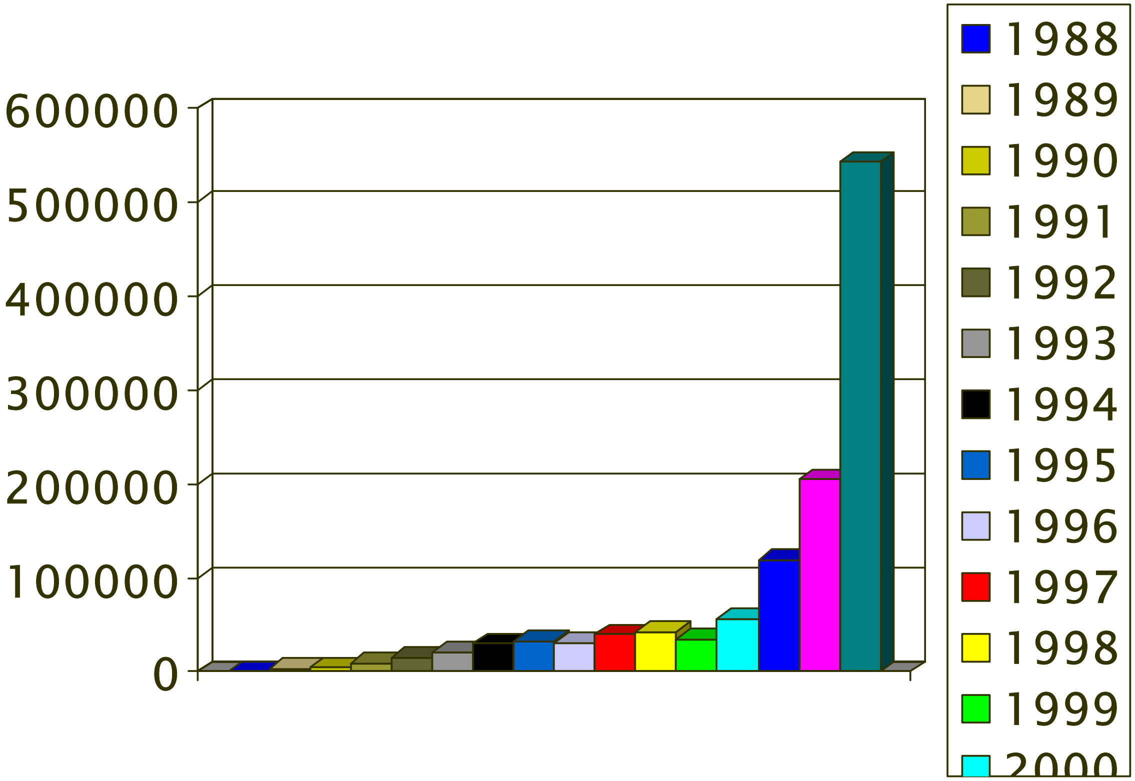
430



Mail messages handled

Total mail messages handled 1988-2003

1,185,123

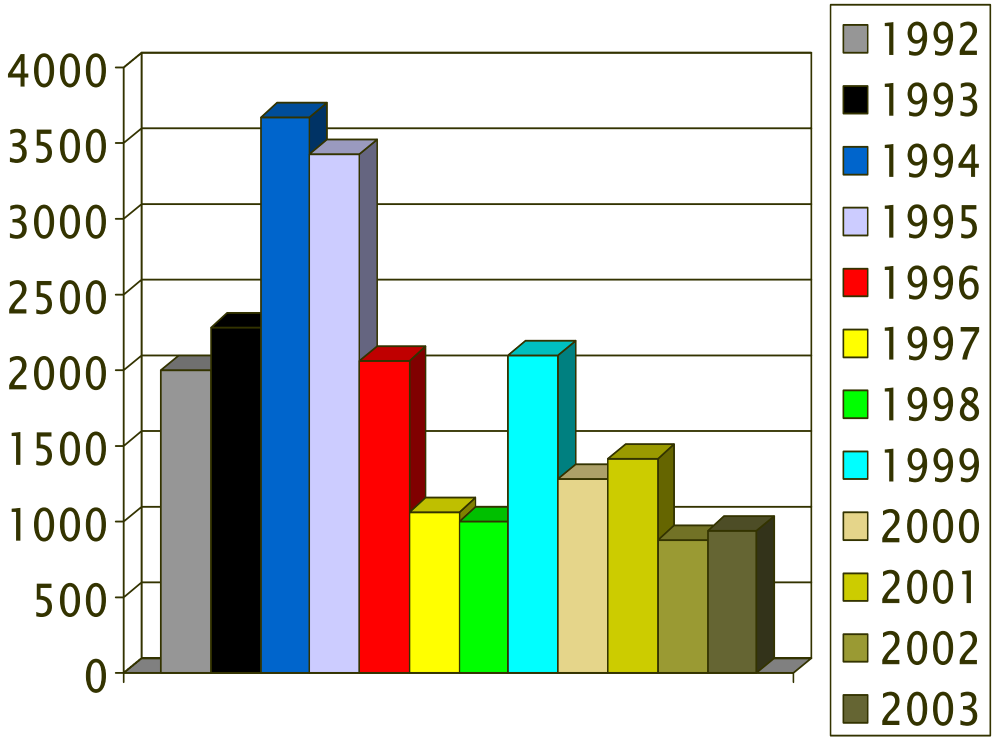


Hotline calls received

Total hotline calls received

1992-2003

22,829+



Why Create a Virus/Worm/Trojan?

When Willie Horton was asked why he robbed banks, his reply was:

"Because that's where the money is."

For Example:

- Linux/Ramen worm
- W32/Lindose virus
- Slapper worm

Growth in use of Trojan horses:

"There are about 60,000 viruses known for Windows, 40 or so for the Macintosh, about 5 for commercial Unix versions, and perhaps 40 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."

Growth in use of Trojan horses:

- Because of the internet, computers are "available" and there will be a growth of Trojan horses
- Boot sector viruses are not extinct because floppy drives are disappearing – CDs, USB keys
- Macro and script viruses are still popular because they are easy to write for "entry-level" users

The Future of Linux Viruses

- **In the future, the prevalence of application-specific worms will continue**
- **Virus checking on a Linux server is necessary because Linux machines acting as file servers for non-Linux client workstations become carriers for non-Linux viruses**

A Linux Format survey found that:

- ✓ 34% don't see viruses as a significant threat to their systems
- ✓ 25% have some concerns, but have taken no precautions
- ✓ 12% have taken some precautions
- ✓ 50-60% of e-mail servers have some type of antivirus protection

And remarkably --

- ✓ 65% of mail servers were running Linux/Unix
- ✓ 29% were running Windows

Open Source Antivirus - Feasible?

- **ScannerDaemon/VirusHammer/PatternFinder**
- **Squid-vscan**
- **Samba-scan**
- **AMaViS - A Mail Virus Scanner**

  (a script that interfaces MTA with virus scanners)

What to Do

- Secure your network antivirus technology
- Linux servers can act as "store-and-forward" mediums for viruses for any platform.
- Keep up to date
- Education on safe computing practices

Oops!

- Commercial applications are susceptible to introducing viruses to a network as well
- HTML e-mail use in corporations also requires antivirus software

Need to Educate Employees

- They are the biggest risk to security
  - Will click on attatchments
  - Will bring floppies,etc, from home
  - Will not verify documents
  - Will follow directions
- Employee training should be established early – prior to turning them lose

Employees Should

- Use the anti-virus software
- Set email filtering
- Stay informed
- Use firewalls
- Back up data
- Disable booting from floppies

Non-antivirus Solutions

- Firewalls
  - Shutdown all unused ports
- Patches
  - OS and applications
- Passwords
  - Change all default passwords

Safe Computing

- **Just because Linux is a non-Windows platform doesn't mean it isn't vulnerable from hackers/viruses/worms, etc.**
- **An open source environment can quickly and effectively provide solutions**
- **Early end-user education is extremely important**

Linux Overview for non-IT Managers

Pete Davis

Sr. Instructor, Linux/AIX/GRID

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