



| Linux @ IBM

Linux and Open Source: An Introductory View From IBM



Jim Elliott, Linux Advocate
Strategic Growth Initiatives
IBM Canada Ltd.

Linux



SHARE Session 9200

August 18, 2004

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Linux and Open Source: An Introductory View From IBM

SHARE Session 9200

- **Linux Overview, Value and Marketplace**

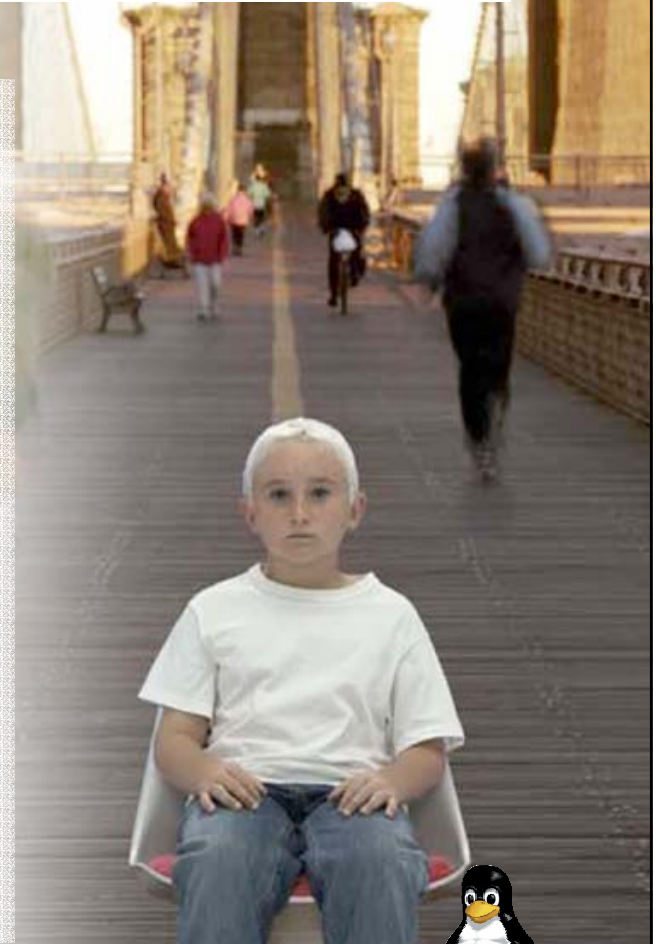
- A brief update on Linux and Open Source and the value to customers

- **Linux Usage**

- How Linux is being used by customers today and our view of the future

- **IBM and Linux**

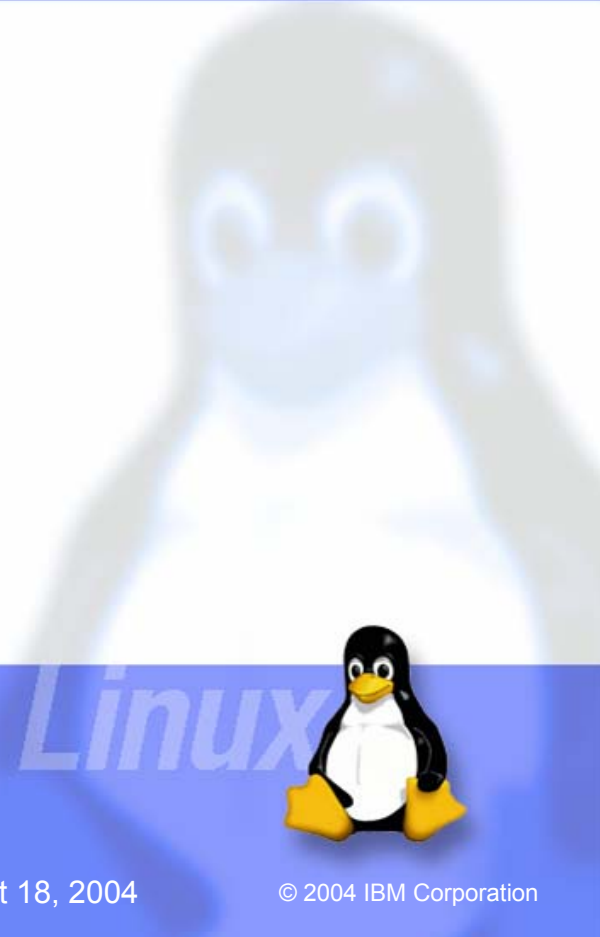
- How IBM is using Linux internally and IBM involvement in the Open Source community





| Linux @ IBM

Linux Overview, Value, and Marketplace



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Linux and Open Source

*“It is not about Free. It's about Freedom.
The freedom to collaborate.
The freedom to innovate.”*

Nick Donofrio, IBM

*“Free software” is a matter of liberty,
not price. To understand the concept,
you should think of “free” as in “free
speech,” not as in “free beer.”*

Richard M. Stallman



What is Linux?

- **UNIX-like operating system**
 - Supported by a global community
 - Unprecedented flexibility
- **Why Linux?**
 - Single operating system; desktop to mainframe
 - Attracting the best technical talent
 - Basis for innovation
- **Packaged and shipped by distributors**
 - World-wide distributors such as Novell, Red Hat
 - Linux Standards Base providing binary-compatible Linux across distributions

“Hello everybody... I’m doing a (free) operating system (just a hobby, won’t be big and professional...)”

Linus Torvalds, creator of Linux, from the first Internet announcement on August 25, 1991



Open Source Software (OSS)

www.opensource.org



- **What is Open Source?**
 - Community develops, debugs, maintains
 - “Survival of the fittest” – peer review
 - Generally high quality, high performance software
 - Superior security – on par with other UNIXes
 - Novell SLES 8 certified at Common Criteria EAL3 and COE
 - Red Hat RHEL3 certified at CC EAL2 and COE
- **Why does IBM consider OSS important?**
 - Customers are asking for it
 - OSS is a good approach to developing open standards
 - OSS can be a source of innovation – e.g. SourceForge
 - Decision to use OSS is just another business decision



Apache has become the standard Web server

news.netcraft.com

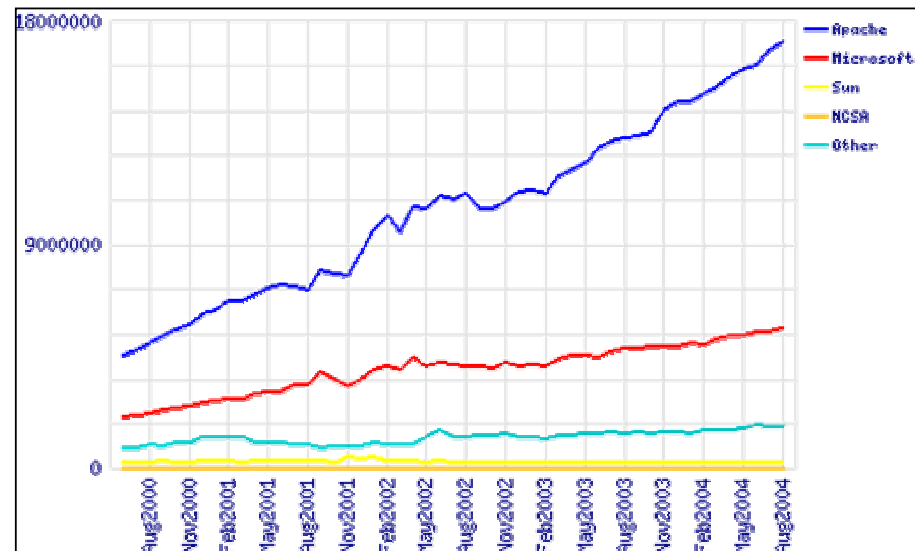
■ Totals for active servers across all domains

■ Apache

- Sites: 17,149,526
- Share: 69.74%

■ Microsoft IIS

- Sites: 5,587,093
- Share: 22.72%



The **Apache Software Foundation**

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

Source: Netcraft – August 2004



Linux is an industry-wide initiative

www.osdl.org



Key OSS/Linux accelerators and benefits

- **Linux dependability and economics are superior**
- **Major ISVs shipping key applications on Linux**
- **Open source permits independent validation**
- **Open standards enable interoperation**
- **Major end users adopting Linux for mission critical operations**
- **Customers re-gain flexibility and control over IT systems**
- **Positive first Linux experience**



Linux Entered the Mainstream

*45% of mid-size businesses
using or experimenting with
Linux*

Gartner

*December 2003:
Linux in use at
nearly 80% of
sites surveyed*

SG Cowan

*Linux server shipments will
grow by 28.5% CAGR 2002-
2007*

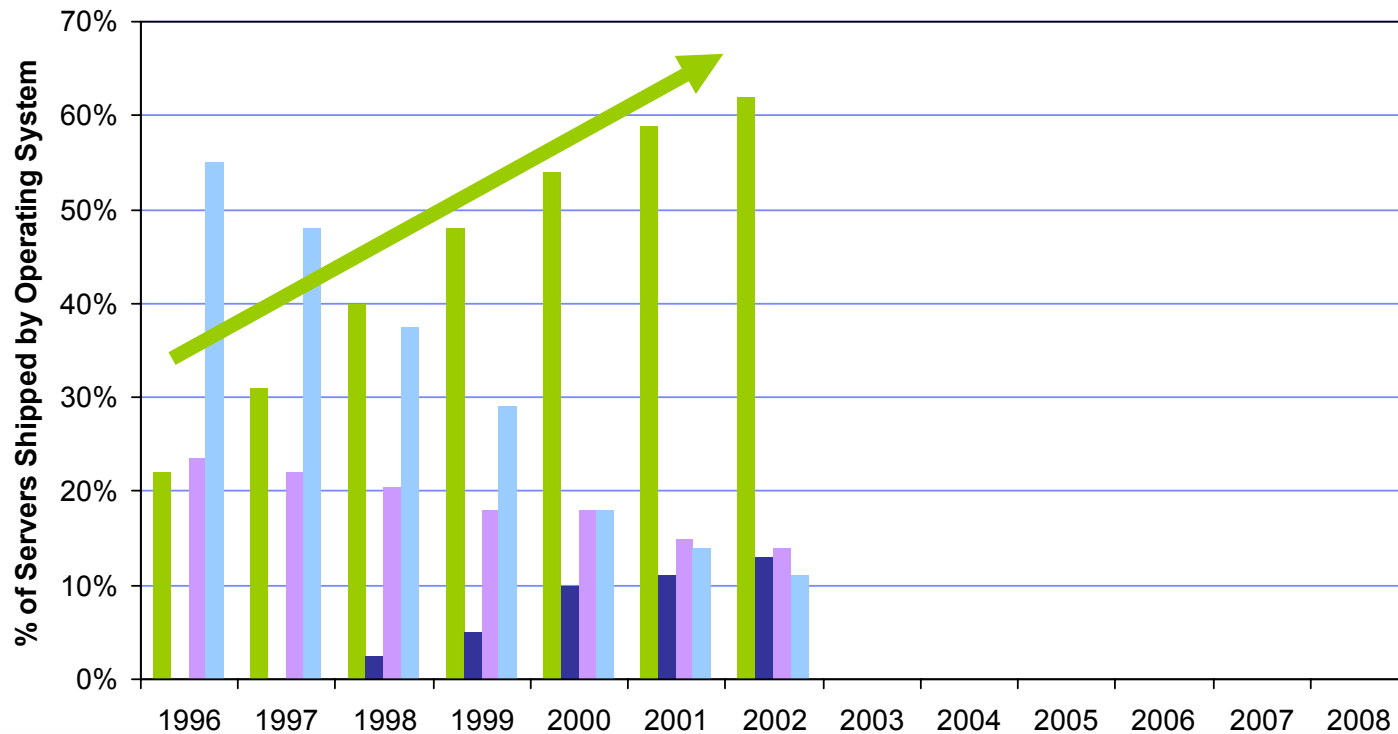
IDC

The fastest growing operating system on the planet



Server unit shipments 1996-2002

Windows was winning the server units war



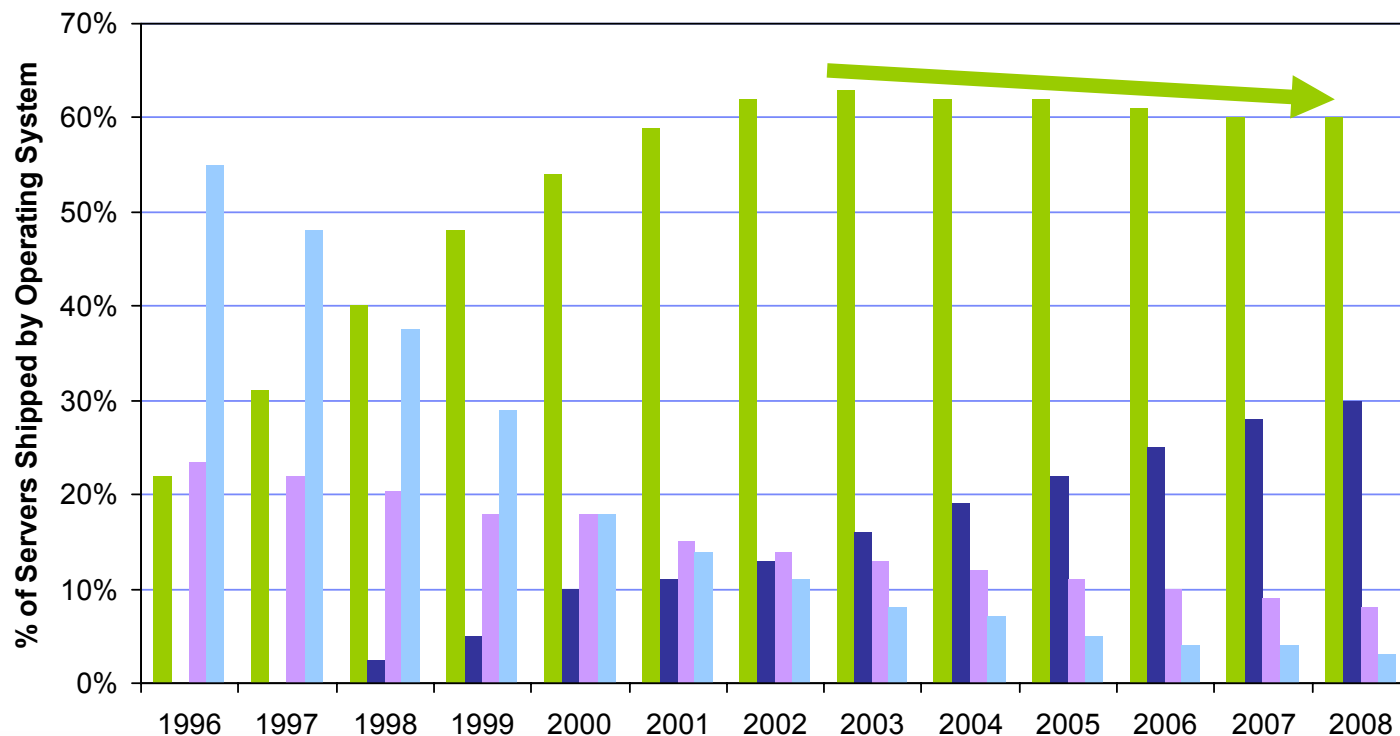
Source: IDC Server Market Forecast, 1Q2004

■ Windows ■ Linux ■ UNIX ■ Other



Linux changes the server shipment trend

Linux is fastest growing server operating system since 1999



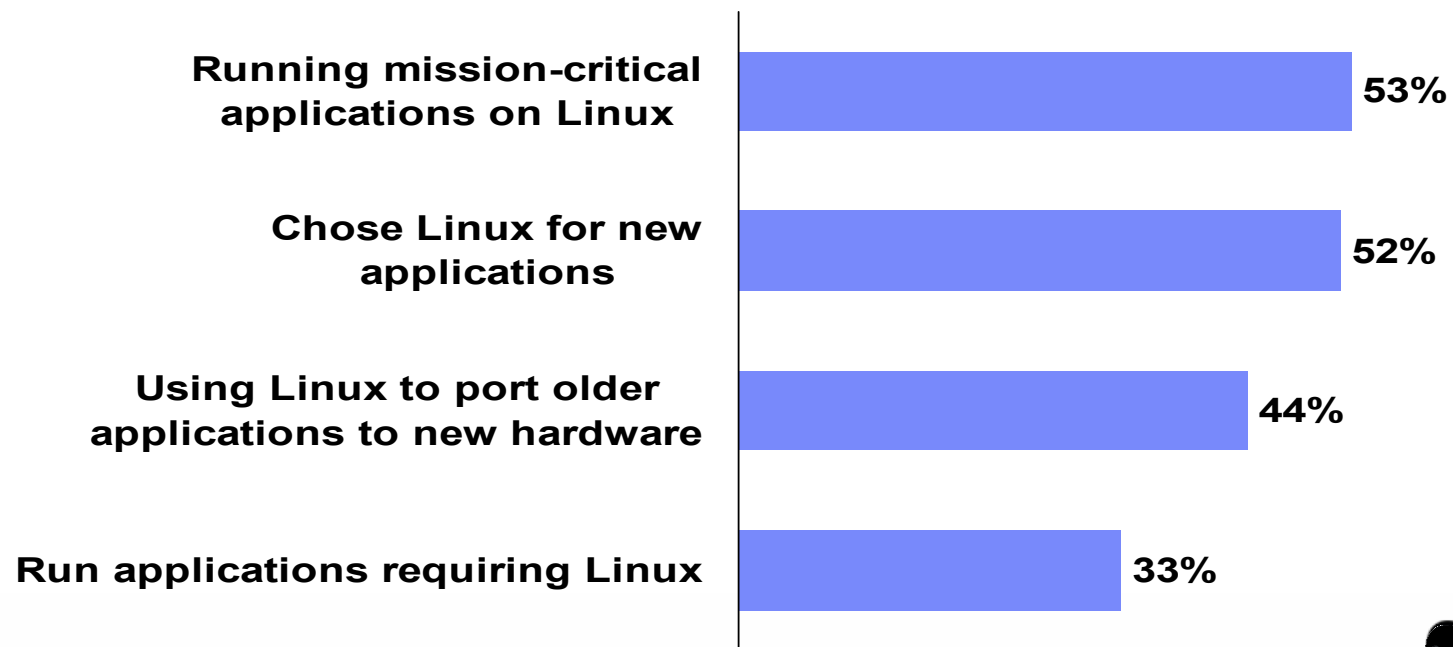
Source: IDC Server Market Forecast, 1Q2004
 Note: 2004-2008 data is forecast

■ Windows ■ Linux ■ UNIX ■ Other



Linux adoption is accelerating

- **Gartner – Linux server shipments saw 57% growth in 1Q2004**
- **Forester – “Linux Crosses Into Mission-Critical Apps.”, 4/2004**



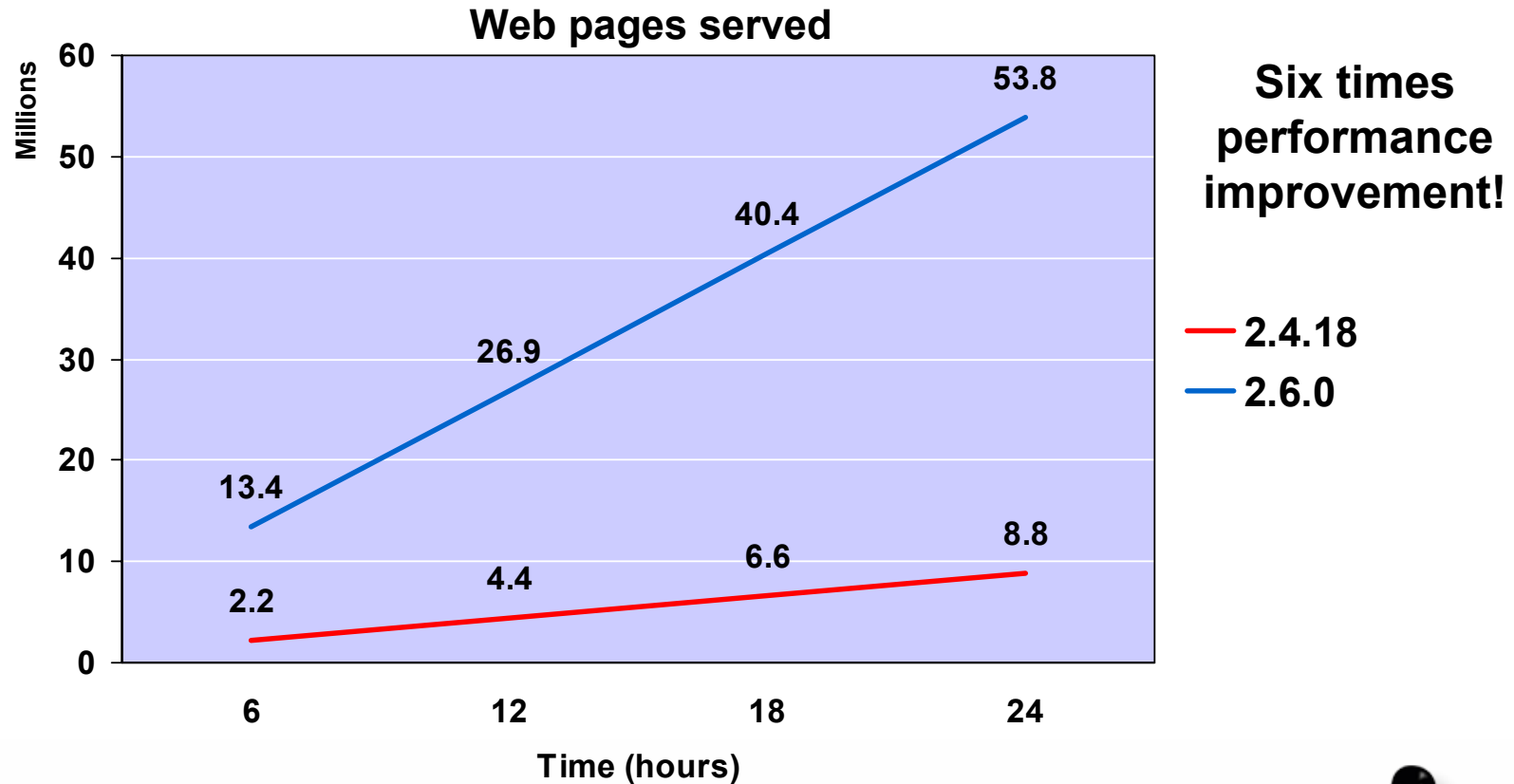
Linux 2.6 Kernel

- **Integrates many performance enhancements for data center workloads into a new kernel base that:**
 - Removes many size and scaling barriers
 - Has proven performance improvements on datacenter workloads
- **Received an unprecedented variety and level of testing throughout its development cycle**
- **Availability**
 - SUSE SLES 9 to be available late 3Q2004 (in beta now)
 - Red Hat RHEL 4 to be available late 4Q2004
 - IBM Software Group product support in 1Q2005



Performance improvements

Web serving on 2.4 and 2.6



IBM xSeries Netfinity 8500R 8681-7RY with 8 Pentium III-700MHz



Legal issues?

- **“Since day one, the IBM strategy in the SCO Group lawsuit has been to defend against the SCO Group's unfounded claims vigorously in court. Our belief is that the best way to deal with the SCO Group campaign is where it can truly be resolved – in court.”**
 - Bob Samson – Vice President System Sales IBM
- **Novell and Red Hat provide coverage**
 - Novell: <http://www.novell.com/licensing/indemnity/>
 - Red Hat: <http://www.redhat.com/software/rhel/assurance/>
- **OSDL Linux Legal Defense Fund to protect end-users**
 - http://www.osdl.org/about_osdl/legal/lldf/
- **Discussion and analysis of the “legal” issues around Linux**
 - <http://www.groklaw.net>

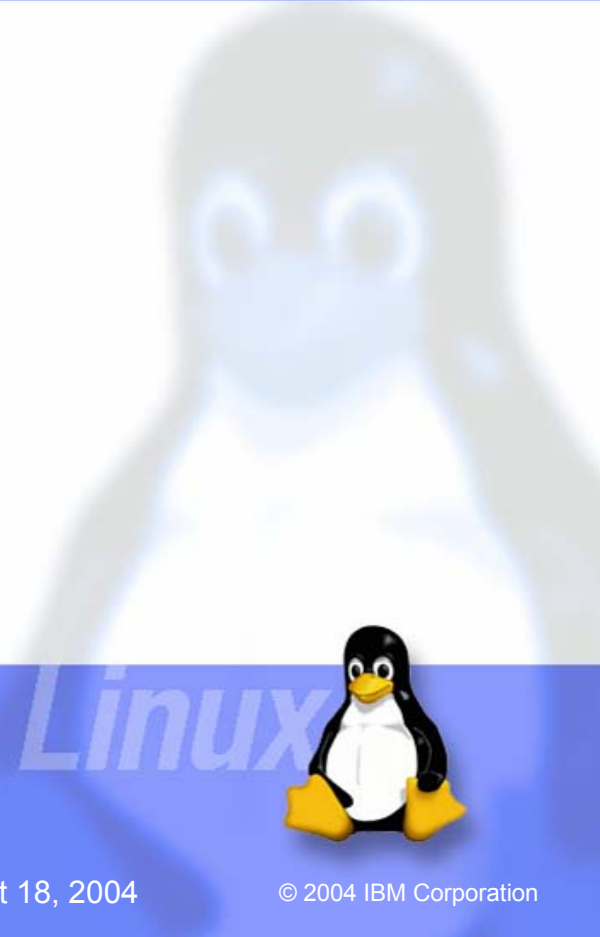
Reference to non-IBM Web sites here does not constitute a recommendation by IBM of those sites.





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Linux Usage

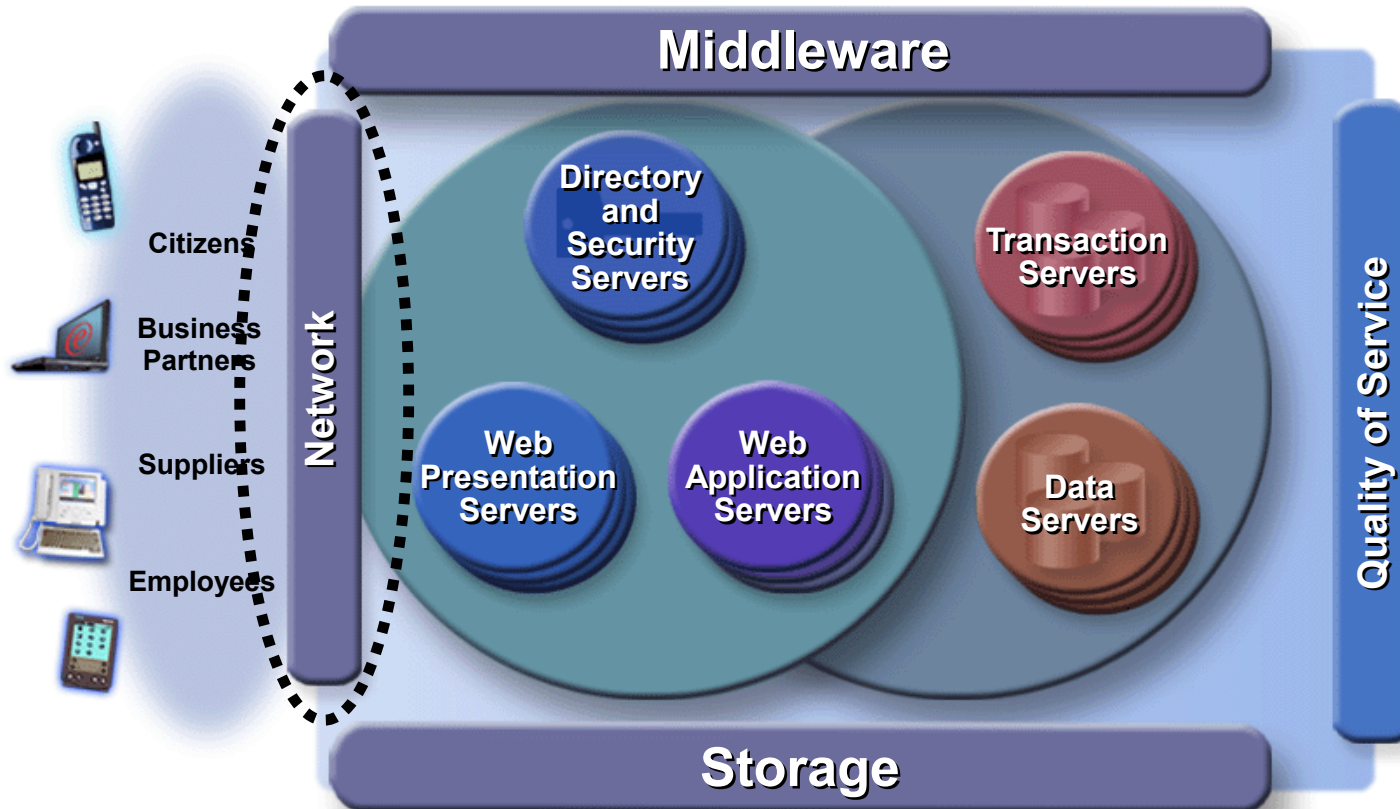


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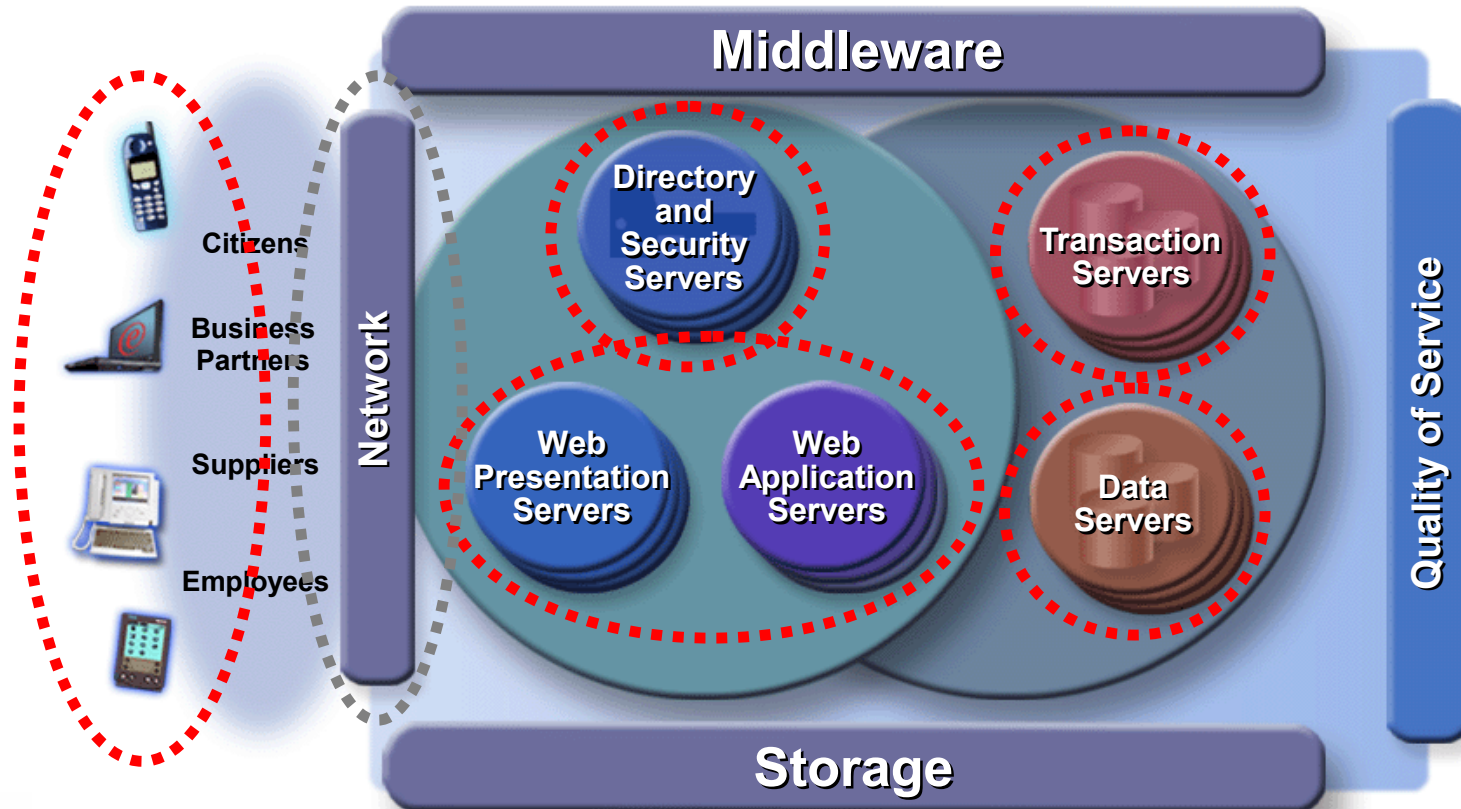
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“Traditional” view of Linux fit



Linux fits everywhere!



Evolution in workloads

Linux 2.2

1999 1-2 way

- Firewall
- Print/File
- Web servers
- e-mail

Linux 2.4

2001 4-8 way

- Firewall
- Print/File
- Web Server
- e-mail

Linux 2.6

2004 8-16 way

- Firewall
- Print/File
- Web Server
- e-mail

- Large scale clusters
- Software development
- e-commerce
- Embedded devices
- Web hosting
- Branch automation

- Large Scale Clusters
- SW Development
- e-commerce
- Embedded devices
- Web Hosting
- Branch Automation

- Database server
- ERP, CRM, SCM
- Vertical industry applications



How organizations are using Linux

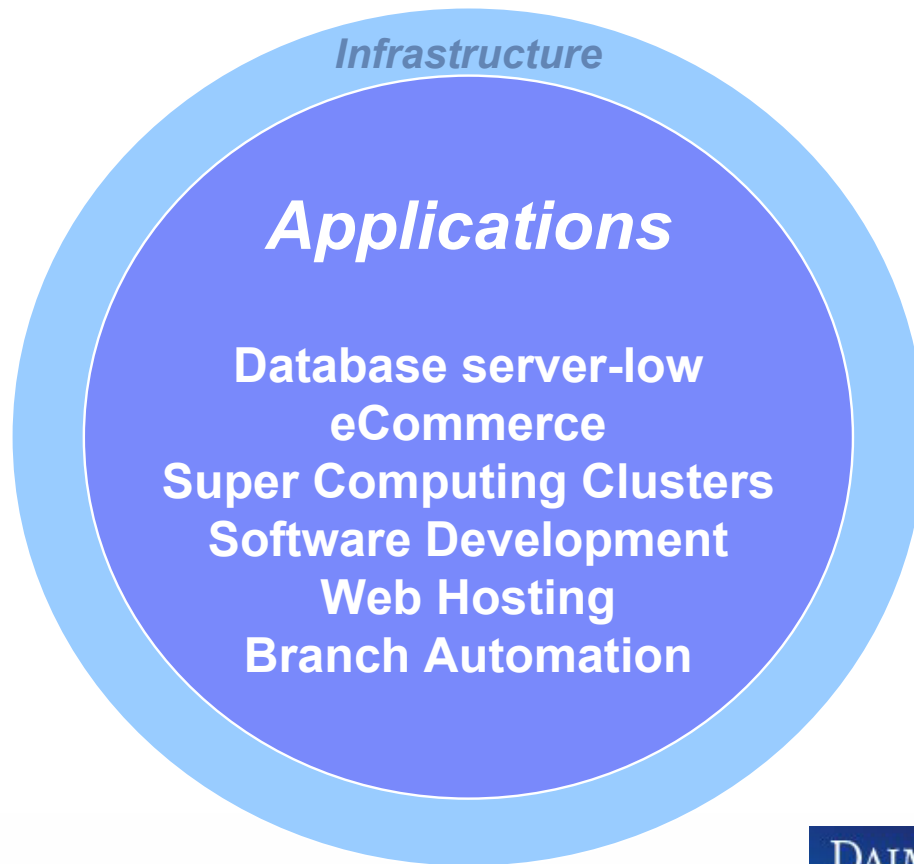
Infrastructure

Firewall
File and Print
Web Server
e-mail

- **Inexpensive, internally developed solutions**
- **Basic network infrastructure**
- **Common first Linux experience**
- **Business hardened solutions since 1996**



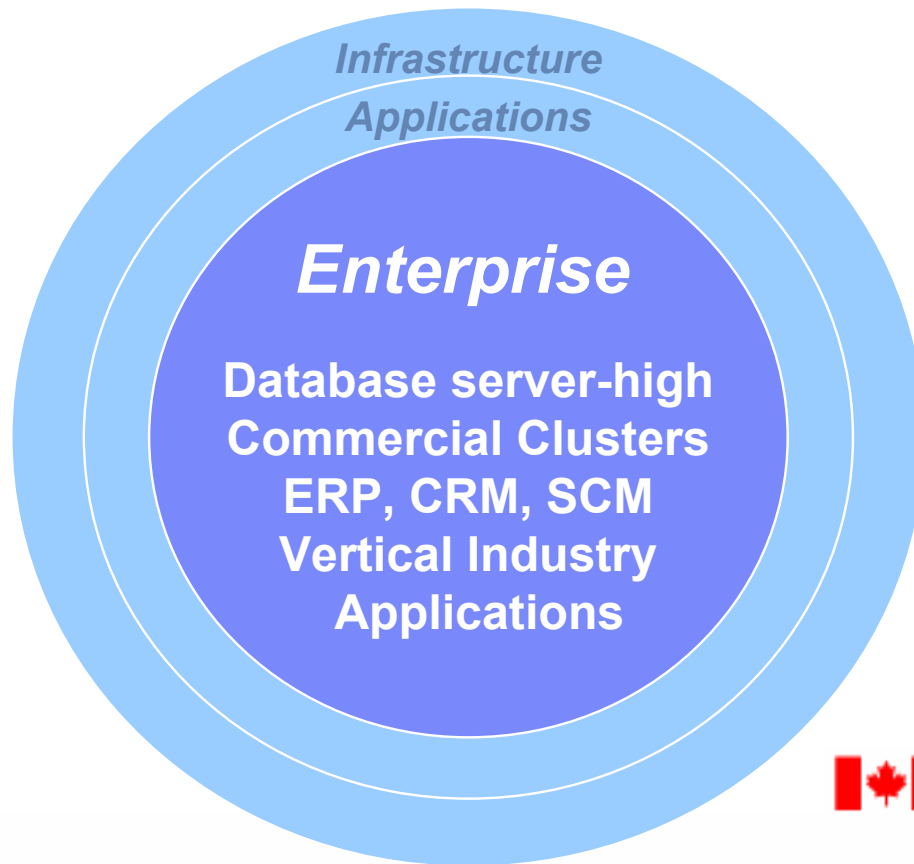
How organizations are using Linux



- **Basic IT services**
- **Common next-step in Linux strategy roll out**
- **Business hardened solutions since 2001**



How organizations are using Linux



- **Line-of-business enterprise IT services**
- **Advanced stage of Linux strategy deployment**
- **Business hardening currently on-going**

SITA

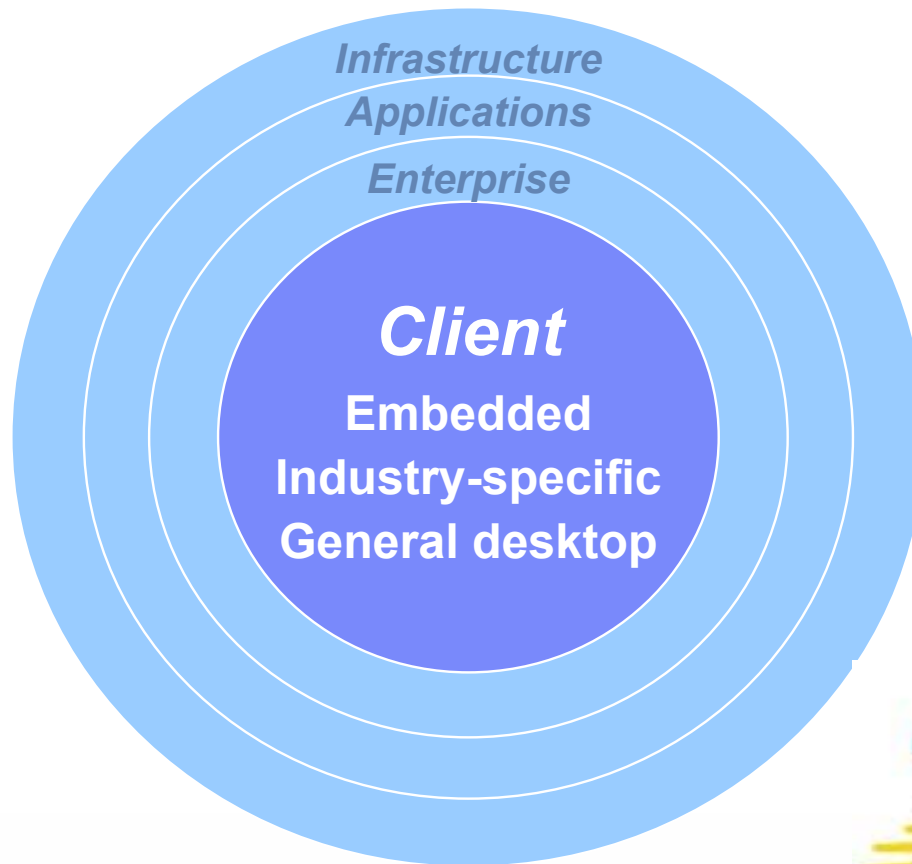


National Research
Council Canada

HERZBERG INSTITUTE
OF ASTROPHYSICS



How organizations are using Linux



- **Selected use in IT – industry specific**
 - Kiosks, POS, Desktop, Embedded systems
- **Business hardening currently on-going**





IBM and Linux

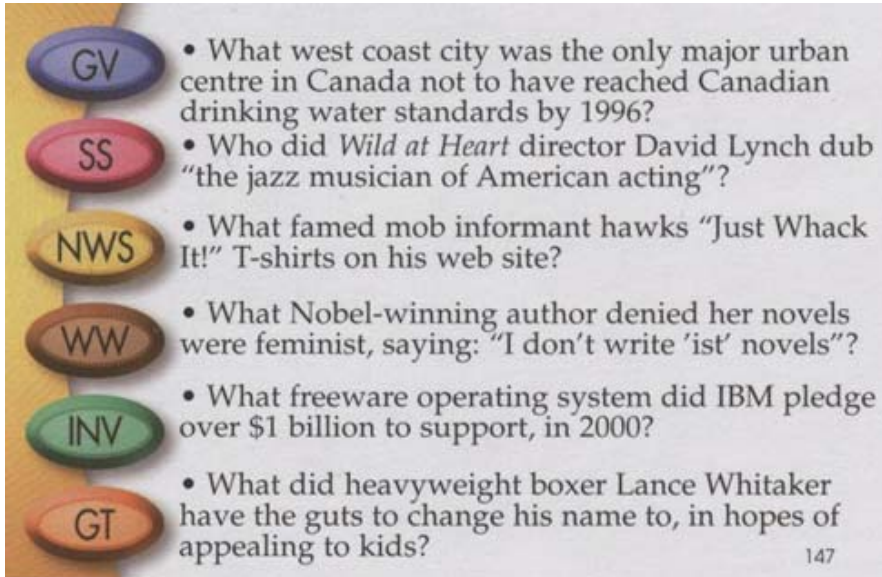


IBM and Linux

- **IBM supported platform since 1998**
 - 7,000+ employees working on Linux worldwide
- **IBMLinux initiatives spans entire company**
 - Powers our own enterprise including our web site
- **Linux runs / manages our customers' mission critical systems – thousands worldwide**
- **Linux runs on all of our product lines**
- **Linux Centers located worldwide**
 - Linux Technology Center
 - Linux Integration Centers
 - Linux Porting Centers
 - Linux Centers of Competency



We're even part of popular culture!



- What west coast city was the only major urban centre in Canada not to have reached Canadian drinking water standards by 1996?
- Who did *Wild at Heart* director David Lynch dub "the jazz musician of American acting"?
- What famed mob informant hawked "Just Whack It!" T-shirts on his web site?
- What Nobel-winning author denied her novels were feminist, saying: "I don't write 'ist' novels"?
- What freeware operating system did IBM pledge over \$1 billion to support, in 2000?
- What did heavyweight boxer Lance Whitaker have the guts to change his name to, in hopes of appealing to kids?

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- GV Vancouver
- SS Nicolas Cage
- NWS Henry Hill
- WW Toni Morrison
- INV Linux
- GT Goofi

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Trivial Pursuit® - © Copyright 2003 Horn Abbot Ltd. and Horn Abbot International Limited.



Linux Technology Center

ibm.com/linux/ltc

- **IBM well accepted by the Linux community**
 - 600+ developers world-wide
 - 90+ active Open Source projects
- **IBM engineers leading enterprise Linux focus**
 - Deeply involved in Linux kernel development
 - Linux on POWER and zSeries
 - Motivated community to focus on addressing scalability and threading issues
 - Defect support for a set of core Linux packages
 - Key participant and contributor to the OSDL



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IBM Linux portal

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Linux at IBM

Business and Linux in an On Demand World

Linux: A POWERful Commitment from IBM

People in Linux

Stacey Quandt, Quandt Analytics
"Some people were saying it was System V all over again. And some thought the community was just some a bunch of losers."
→ [More](#)

Industry watch

In good shape with Linux on xSeries
"With the xSeries servers and Linux as a secure and reliable operating system, our emphasis is on stability at manageable cost."
→ [More](#)

Developer's log

Stress-testing the Linux kernel
Automating software testing allows you to run the same tests over a period of time, ensuring that you are really comparing apples to apples and oranges to oranges.

Wimbledon
Wimbledon 2004
IBM REPORT TIME

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Reduce compile time with distcc: If you compile large source files -- or if you compile small files often -- distcc, a distributed C compiler based on gcc, can give you significant productivity gains. (Articles)

Weave a neural net with Python: Learn to program one of the simplest neural nets, the Hopfield net, and explore its ability to reconstruct distorted patterns through a working Python application. (Articles)

Spotlight

- [Webcast: Linux Standards Base -- Develop once, deploy anywhere \(27 Jul 2004\)](#)
- [Power Architecture community newsletter](#)
- [Linux on Power developer resources](#)
- [IBM middleware for Linux](#)

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[Embedded Voice Toolkit Preview](#) - An Eclipse-based tool designed to speed development of speech applications on embedded devices.

[Installation Verification Utility](#) - A tool that compares two different software installations using MD5 and displays any

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Linux Redbooks Domain

Latest Drafts ... show all

- Tuning Red Hat Enterprise Linux on xSeries Servers
- Tuning SUSE LINUX Enterprise Server on xSeries Servers
- Linux on zSeries Fibre Channel Protocol Implementation Guide

New Redbooks/Redpapers ... show all

- Systems Management APIs for z/VM
- Building an HPC Cluster with Linux, pSeries, Myrinet, and Various Open Source Software
- WebSphere V5 for Linux on zSeries Connectivity Handbook

New Technotes ... show all

Most popular ... show Top 15



IBM uses Linux extensively

- **3500+ production servers world-wide**
 - Excludes Research and Development
- **Some of our internal Linux projects:**
 - IBM Intragrid
 - Linux on xSeries
 - e-mail anti-virus and anti-spam scanners
 - IBM Standard Client Installer (ISCI) and IBM Standard Software Installer (ISSI)
 - Linux on zSeries
 - e-hosting and network management
 - IBMLink
 - Asset monitoring
 - Lotus Domino



IBM Linux Client for e-business

- **A partnership between IBM Research and IBM Global Services**
 - Fully integrated and tested image (C4eb v3.0)
 - Based on Red Hat Linux 9 (kernel 2.4.20-18.9)
- **Available for download on the internal network**
 - Preferred client (4.7GB), Development Image (5.5GB), Full (8.0GB)
- **Full Image includes 1500 packages**
 - KDE, GNOME desktops
 - Office productivity applications
 - e-Mail
 - Browsers
 - News readers
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 - Sametime
 - IBM security compliant
 - Host connectivity
 - Print
 - AT&T Global Dialer
 - Wireless
 - Backup
 - File and disk utilities



IBM's On Demand Workplace

- w3.ibm.com
- Knowledge management
- Content collaboration
- e-Learning
- Employee self service



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w3 home | BluePages | HelpNow | Feedback


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- IBM SiteServ
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- IBM Travel
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The dynamic Asia Pacific region presents IBM with

 **In our own words: Role models can boost tech's allure for girls**
IBM's Nick Donofrio urges IBMers to pave the way for young women to pursue science and technology careers.

 **Taking the pain out of IT**

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BluePages

Name only (smith, jo*)
 Entire profile ("grid computing")

GO

Advanced search

Other searches

w3 intranet
 IBM discussion forums
 IBM news articles
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GO



IBM sports infrastructure



LINUX AT IBM RISES TO THE CHALLENGE
OF THE GRASS COURTS AT WIMBLEDON



- **Secure, available, and affordable**
- **Web serving on demand**
- **Ideal for unpredictable workloads**



US Open: part of a grid with IBM Research

The screenshot displays a web interface for the US Open 2003. On the left, there is a live video feed of a tennis court. In the center, the US Open 2003 logo is shown above the match details: "Day 12, Friday, September 5th, 2003, 3:00PM EST, Roddick / Schalken - Men's Quarter Final". On the right, a scoreboard shows the match between S. SCHALKEN (123) and A. RODDICK (43) in the quarterfinals, with a points table for sets 1 through 5.

Below the match information is a performance monitoring dashboard titled "RealTime I.T.A.M.". It features three large digital counters at the top: "User Requests" (01092911407), "Protein Calculations" (00094955203), and "Page Views" (00090320241). The dashboard includes four gauges: "Server Health", "USOpen.org Web Servers", "IBM Research Protein Folding Servers", and "Cache". The two central gauges show detailed usage percentages: 37%, 50%, 62%, 75%, 87%, and 100%. At the bottom, there are three line graphs: "Historical Bandwidth Usage", "Historical Server Allocation", and "Historical Cache Usage", each showing data trends over time from 18:00 to 12:00.



IBM hardware, software, and services

■ Hardware

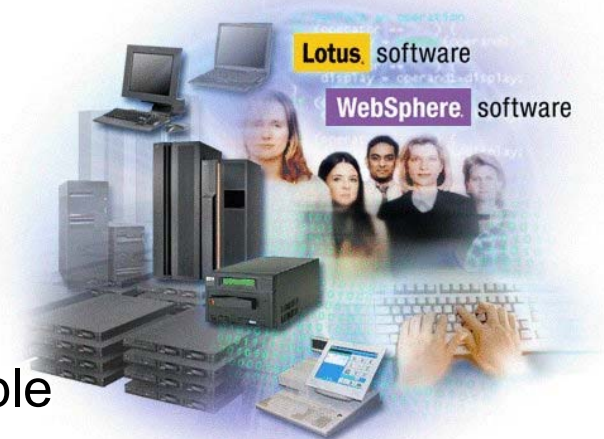
- All IBM eServer platforms
- POS/Kiosk solutions
- IBM workstations
- IBM TotalStorage solutions

■ Software

- Over 200 software products available

■ Services

- Total solution approach
- Single point of contact
- Hardware, software and services
- Defect and usage support for Linux



ON DEMAND BUSINESS



IBM eServer and Linux

ibm.com/eserver/linux

- **IBM eServer zSeries**
 - Hundreds of Linux servers
 - Integration with z/OS
- **IBM eServer iSeries / i5**
 - Up to 254 Linux partitions
 - Integration with OS/400
- **IBM eServer pSeries / p5**
 - Up to 254 Linux partitions
 - Linux affinity in AIX 5L
- **IBM eServer xSeries**
 - X-architecture innovation
 - Freedom of choice
 - IA32, EM64T, IA64
- **IBM eServer 325**
 - AMD Opteron
- **IBM eServer Clusters**
 - Component integration
 - Speed to market
- **IBM eServer Blades**
 - High density servers
 - Integrated components



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 - ThinkCenter
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 - Point-of-sale
 - Kiosk solutions
- **IBM TotalStorage**
 - Enterprise Storage Server
 - FAStT Storage
 - LTO and Magstar tape



IBM software and Linux

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- **Solutions available across all product lines**
 - WebSphere - middleware, application server, e-business, and infrastructure software
 - DB2 - database software
 - Lotus - collaboration and messaging software
 - Tivoli - system and storage management software
 - Rational - software development tools
- **Over 200 IBM software products available today on Linux**
- **Linux editions of software products are available the same day as all other platforms**
- **Primary software solutions to be available on Linux**



IBM Global Services and Linux

ibm.com/linux/services

- **High performance cluster integration services**
- **Enhance your e-business with Linux solutions**
- **SupportLine for Linux - unmatched 24x7 remote support**
 - Fast and accurate problem resolution
 - Helpful, skilled IBM services specialists to supplement your internal staff
 - Electronic support and problem submission that saves you time and allows you to track open support issues
- **Middleware enablement services for Linux**
- **IBM e-business Hosting**
- **IBM Technical Training Services**



IBM alliances with Linux distribution partners

■ Novell

- SUSE Linux Enterprise Server
www.suse.com/us/business/products/server/sles
- Certified at Common Criteria EAL3 and COE



■ Red Hat

- Red Hat Enterprise Linux
www.redhat.com/software/rhel
- Certified at Common Criteria EAL3 and COE



- **Cross-platform support of the IBM eServer family for either Novell or Red Hat**
- **Customers can obtain remote technical support from IBM for Novell SUSE LINUX or Red Hat Linux**





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Summary

Linux



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Recommendations

Jim Elliott, Linux Advocate
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- Familiarize yourself with Linux
- View Linux as a valid alternative for IT systems
- Incorporate open source software development into IT strategies
- Look at Linux to see how it can:
 - Lower costs
 - Increase reliability and security
 - Improve service

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 - Linux is a trademark of Linus Torvalds in the United States, other countries, or both.
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