Linux: The Game Changer

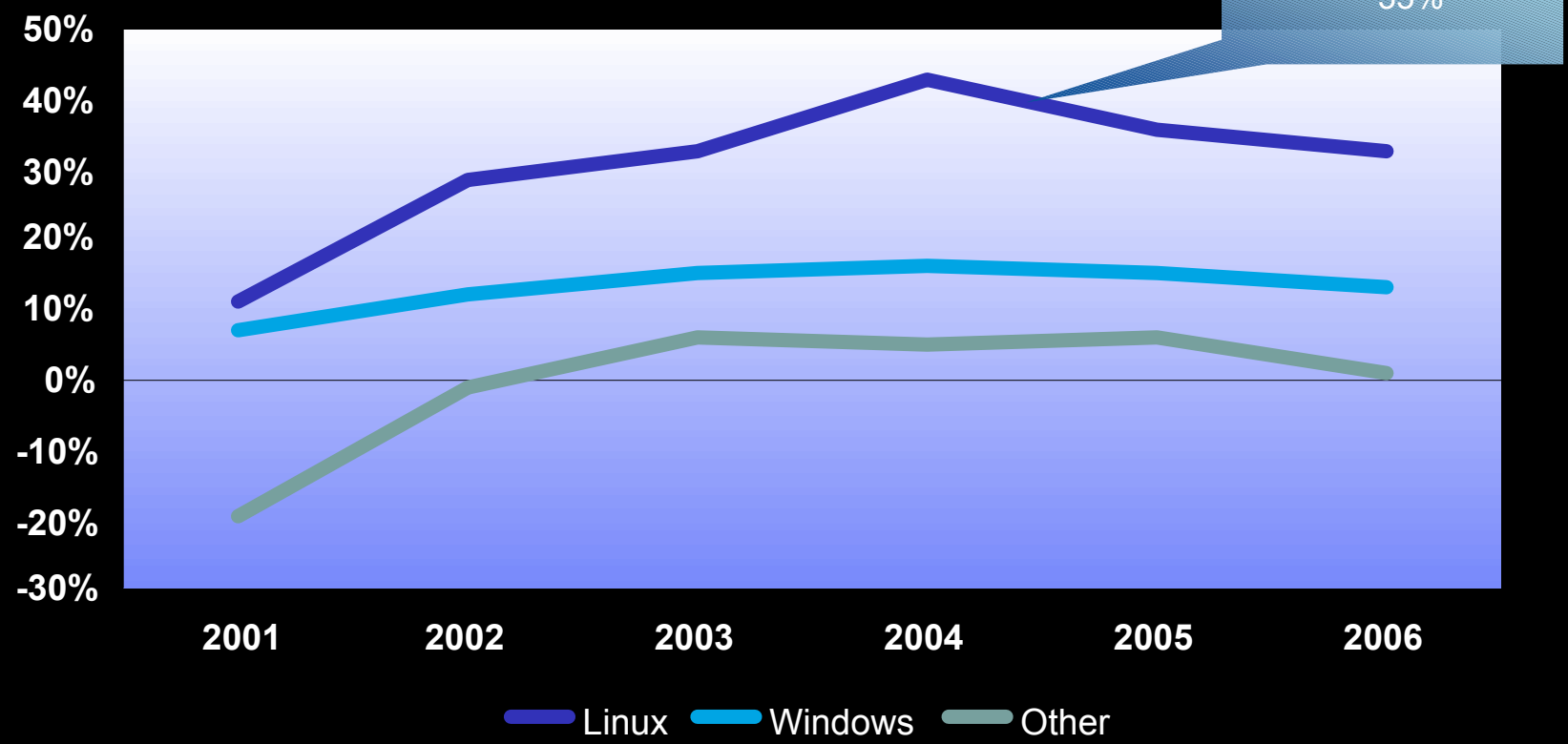*SCALE - Southern CaliforniA Linux Expo* - USC - 2002

Billl Hilf
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WW Linux Technical Lead, GMB
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Established and Growing
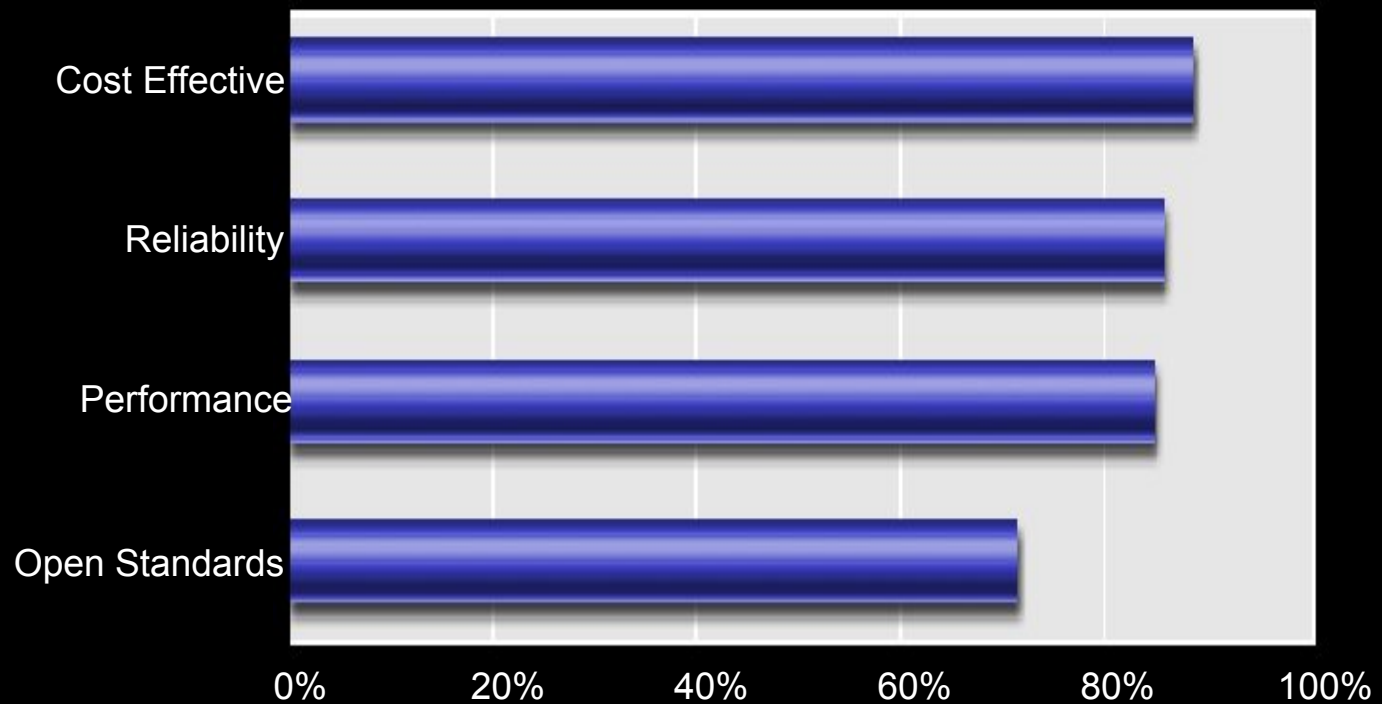
Server Shipments by OS
% Growth

Linux CAGR
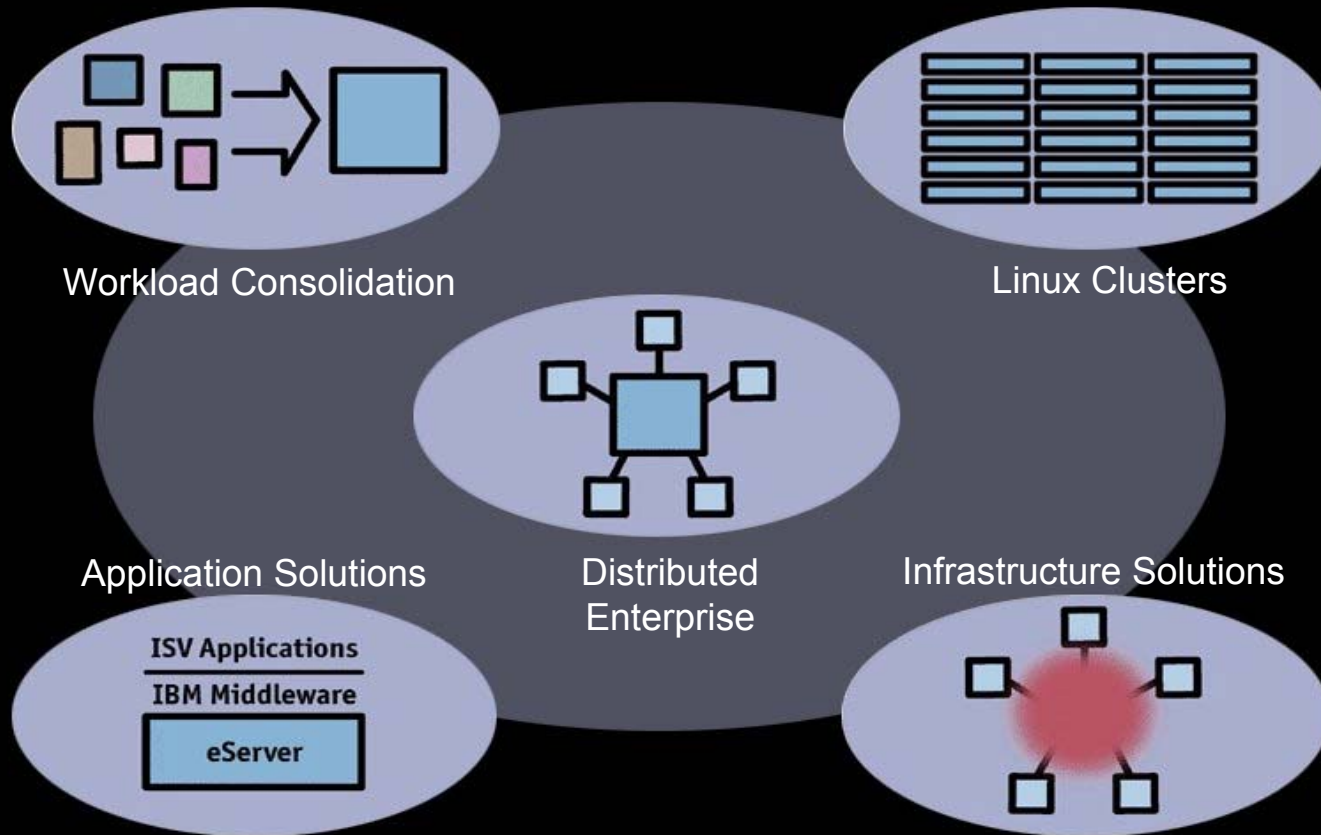35%

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |

Linux ━━━ **Windows** ━━━ **Other**

Linux Value

Cost Effective

Reliability

Performance

Open Standards

0%   20%   40%   60%   80%   100%

Source: IBM Market Research

How Customers are Using Linux

Workload Consolidation

Linux Clusters

Application Solutions

Distributed Enterprise

Infrastructure Solutions

ISV Applications
IBM Middleware
eServer

Linux in the Marketplace

New Industries   **New Workloads**   **New Customers**

New Zealand Special Effects Company

- Challenge
    - Improve system performance/reliability without increasing costs for special effects company producing effects for the Lord of the Rings movies

- Solution and Benefits
    - IntelliStation and Linux systems operating as standalone units linked by Gigabit Ethernet network
    - Dual Xeon IBM IntelliStation MPro workstations running Red Hat Linux
    - IBM Linux Supportline
    - Lower hardware acquisition cost and much higher system performance

Workload Consolidation

- Challenge

  - Consolidate core-business applications (Flight Schedule Inquiry System and Daily Revenue Accounting) running on a variety of different servers

  - Reduce operation costs, improve performance and efficiency

- Solution

  - Internet and Intranet-based Inquiry System running on Linux in 4 partitions of IBM z900 server using IBM Software and Services

  - Daily Accounting System using Java/WebSphere Application Server.

  - Asset Management System running DB2 for Linux, DB2 Connect and IMS Connect

Linux Clusters

- Challenge
  - Insight into subsurface, increasing hit rate in the quest for new oil fields.
  - Reduce the risk of drilling dry holes
  - More accurate tera-scale seismic processing with outstanding price/performance
  - Grow processing power by an order of magnitude
  - Cost pressures

- Solution and Benefits
  - 1024 IBM xSeries servers for +Tflop capability
  - IBM Global Services to design, build, and implement
  - Improved modeling accuracy -- critical in deciding where to invest in oil/gas exploration

"With this Linux cluster, we find a cost-effective solution to apply the algorithms we've already developed in-house to run them faster than was possible before."
Jack Buur,
Principal Research Physicist Shell Exploration and Production B.V.

Innovative Point of Sale Solution

- Challenge
  - Major manufacturer with over 2,600 outlets
  - Needed to upgrade point of sale system plus provide e-mail, intranet and Internet capabilities
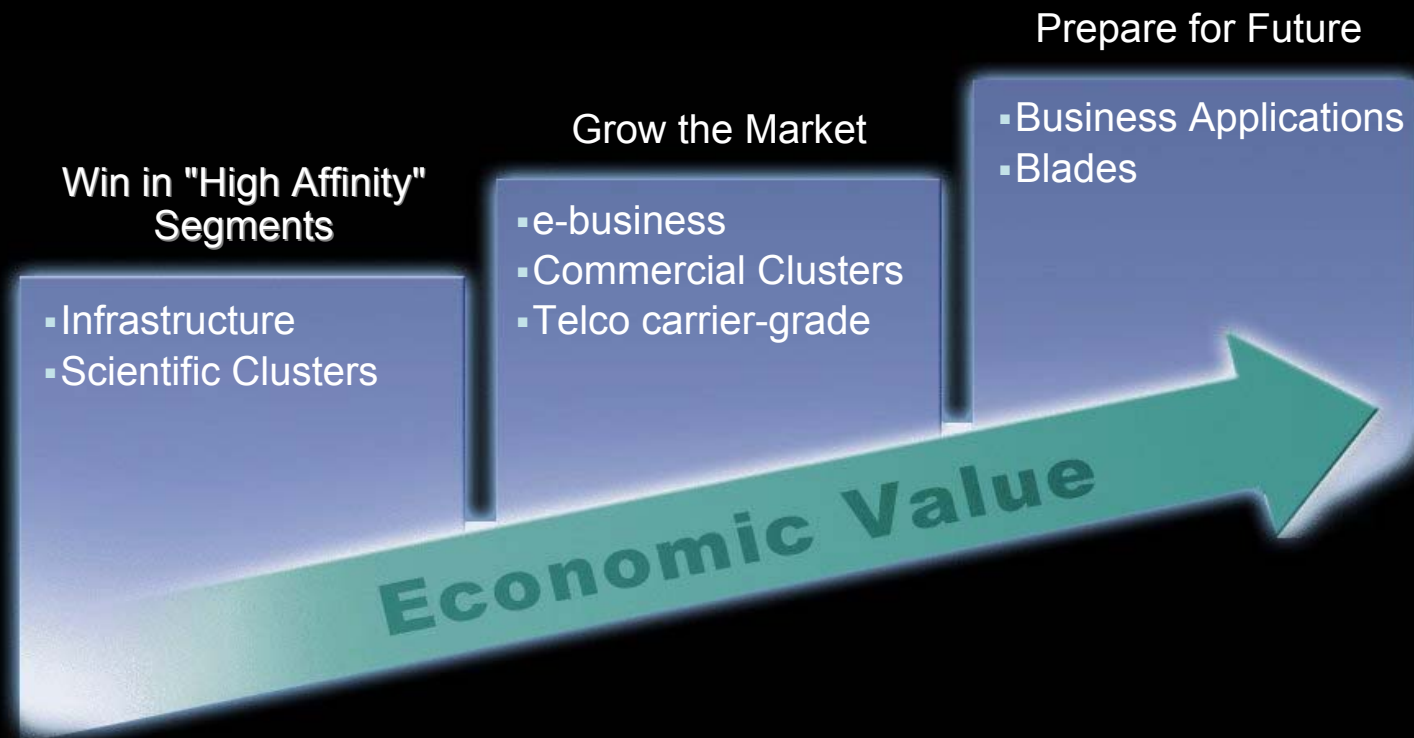
- Solution
  - Custom IGS Services for Point of Sale
  - NetVista for in-store processing

- Benefits
  - New functionality provided for the stores for POS, e-mail and Web
    - Web browser and StarOffice as new capabilities
  - Reduced administrative support
  - Higher availability
    - Redundant servers and diskless POS PCs
  - Improved price/performance

THE SHERWIN-WILLIAMS COMPANY

IBM's Linux Strategy

Win in "High Affinity" Segments
- Infrastructure
- Scientific Clusters

Grow the Market
- e-business
- Commercial Clusters
- Telco carrier-grade

Prepare for Future
- Business Applications
- Blades

Economic Value

Linux@IBM

IBM has already recouped its US$1B investment in Linux

IBM is now engaged with more than 2,500 Linux customers worldwide

120,000 competitive servers displaced by Linux in 2001

IBM has over 1000 Linux servers in production internally

11% of mainframe MIPS shipped in 2001 were Linux

IBM has over 70 Linux software products

Over 4,700 IBM Business Partners supporting Linux-enabled IBM software

Over 5,000 employees working on Linux development, research, services, and sales

Linux@IBM

Internal Linux Projects: w3.ibm.com, www.ibm.com/linux

Intranet search engine

IGS Internet Vulnerability Security Scanning

  54 xSeries scanning 30k IP addresses/ week

Performance monitoring

  24 xSeries servers

  75% fewer Linux servers than NT servers for
  same workload

IBM Global e-Mail Anti-virus Management

300mm Wafer Manufacturing Equip. Control

  Much more reliable than Win2000

  190 xSeries; 300-400 by year end

Linux@IBM

- Linux Technology Center
  - Enterprise enable Linux through development / contribution of utilities, tools, and code. 250+ WW developers in 21 sites working within the open source community

- Linux Integration Center
  - Assist customers with Linux-based applications
  - Technical consulting, proof of concepts, benchmarks

- Open Source Development Lab
  - Enabling Linux and Linux-based applications for data center and carrier-class deployment

- Linux Porting Centers
  - 11 worldwide centers to assist in porting ISV applications

- Linux CoC for Finance - NYC

- 2,000+ Linux-skilled IGS professionals

Linux@IBM - *Linux Technology Center – ibm.com/linux/ltc*

Kernel
- Distributed Lock Manager
- Event Logging for the Enterprise
- IA-64 Linux Project
- Linux Scalability Effort- *Gerrit Huizenga, many others*
- LTC Kernel Performance
- Multithreaded Core Dumps
- NUMA – *Martin Bligh, Matthew Dobson*
- PPC32; PPC64 - *David Engebretsen, maintainer*
- Linux for S/390 and zSeries

Clustering
- HA Linux, Open Cluster Framework - *Alan Robertson*
- General Parallel File System (GPFS) Linux Kernel Patches
- Open Source Cluster Application Resources (OSCAR) - *Richard Ferri*

Device Drivers
- USB – *Greg Kroah-Hartman*
- PCI Hotplug for Linux
- Hotplug Project
- 4758 PCI Cryptographic Coprocessor Device Driver

File Systems / Storage
- JFS - *Steve Best, project lead*
- Enterprise Volume Management System
- General Parallel File System (GPFS) Linux Kernel Patches
- Ext2fs progs – *Ted Tso, author / kernel leader*
- iSCSI
- OpenAFS
- Samba - *Jim McDonough, Steve French, core team*

Internationalization
- Glibc Test Tool
- International Components for Unicode for C/C++, Java
- Linux Internationalization Initiative
- Internationalized Terminal Emulator - *Jiro Sekiba*
- Universal Locales for Linux

Security / Encryption
- Iptables/Netfilter – *Rusty Russell, author*
- 758 PCI Cryptographic Coprocessor Device Driver
- Cryptographic Accelerator Device Driver, Library
- openCryptoki (PKCS#11)

Linux@IBM - *Linux Technology Center – ibm.com/linux/ltc*

Networking
  ACP Modem driver
  Channel Bonding
  ATM on Linux – *Paul Schroeder*
  BlueDrekar Middleware Transport Drivers
  Inbound Connection Controls
  Stream Control Transmission Protocol
  IPv6 - *Venkata Jagana, technical lead*
RAS
  Linux RAS - *Richard Moore, project lead*
  HA Linux - *Alan Robertson*
  First Failure System Technology
  Flexible Dump Project
  Linux On-Line Diagnostics
Software Development
  Dynamic Probe Class Library - *Richard Moore*
  Eclipse
  Jikes
  Mini-libc Builder
  Next Generation POSIX Threading - *Bill Abt*
  SashXB for Linux
  Bean Scripting Framework
  UDDI for Java
  BlueHoc: Bluetooth Performance Evaluation Tool

Standards
  Free Standards Group
  Linux Internationalization Initiative
  Linux Standards Base
Systems Management
  Enterprise Volume Management System – *Ben Rafanello, John Stiles, Cuong H. Tran, Ted Tso, others*
  Standards Based Linux Instrumentation for Manageability
  System Configurator - *Sean Dague*
  System Installation Suite
Quality Assurance
  Software Testing Automation Framework
  Content Query System
  Linux Test Project
Other OSS Project Contributions
  Postfix –*Wietse Venema, author / network security expert*
  OpenLDAP - *Kurt Zeilenga, project lead*
  Apache – *Four ASF core members*

Find much more at:
www.ibm.com/developerworks/opensource/linux

IBM's Linux Portfolio

IBM eServer

Personal Systems

WebSphere

Clusters

Lotus Domino

Blades

Tivoli Storage Manager

Storage Systems

IBM Java Virtual Machine

Consulting and Services

DB2

Linux Ecosystem

Linux in Sum

Reduces customer costs

Increases freedom of choice

Fosters innovation

Promotes a culture of open standards

Rewrites the rules for operating systems