

# Migrating UNIX Workloads to Linux on xSeries Intel-based Servers and Blades

## OBJECTIVES:

- Describe the advantages of Linux in a current Unix environment
- Identify target workloads and migration planning
- Describe the migration services options
- Discuss porting considerations and resources
- Identify the IBM hardware strengths and server offerings
- Cover customer successes with migration to Linux on xSeries

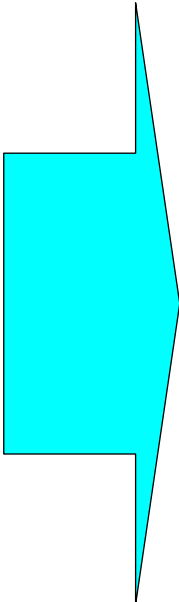
## SPEAKERS:

**Carol Carson, Program Director, xSeries Linux**  
**Sam Docknevich, Linux National Practice Leader**  
**Mark Murphy, Linux Solutions Specialist**



● Why Move to Linux?

# Tux goes to Work: Linux makes “News”



## Linux took on Microsoft and won big in Munich

Victory could be a huge step in climb by up-and-comer

**Cover Story**

By Brian Achard  
USA Today

On the brink of losing a pivotal account to an ascending rival, Microsoft last March dispatched CEO Steve Ballmer to the rescue.

The German city of Munich was balking at a \$36.6 million proposal from Microsoft to upgrade 14,000 desktop PCs to the latest versions of Windows and Office.



## LINUX EVERYWHERE *The operating system is finding its way into a wide variety of devices and uses*



### CORPORATE COMPUTING

Linux is gaining ground in corporate data centers, where buyers use it for running everything from Web sites to stock-trading systems. It held a 13.7% market share in servers last year.

### DESKTOP COMPUTING

Linux has 2% of the market, but it's making converts. Wal-Mart sells \$200 Linux-based PCs. In Spain, the region of Extremadura is giving away 10,000-plus Linux-based PCs to residents.



### SIMULATION

DaimlerChrysler is using Linux machines to simulate car crashes. With Linux, it can do the simulations 20% faster and 40% cheaper than on more traditional computing systems.

### DIGITAL ANIMATION

Pixar Animation Studios, creator of hit films *Monsters Inc.* and *Toy Story*, is switching from Sun servers to Linux for the painstaking rendering of digital characters.



### NUMBER-CRUNCHING

Oil explorer Amerada Hess is using a Linux-based supercomputer to help it find pockets of oil and gas.

### CONSUMER ELECTRONICS

Linux is the digital brains inside TiVo television-recording devices. Consumer-electronics companies are using Linux to build everything from game consoles to TVs with Internet connections.



- Why Move to Linux?

Why move to Linux? Because it makes sense. Listen to what this customer had to say...

*“The xSeries systems running Linux enable us to meet and exceed our SLAs with 99.9 percent availability, providing an unbeatable value that will continue to drive down our costs.”*

And –

*“The scalable architecture of the xSeries has really helped us stretch our IT dollars. Plus, in a hosted environment like ours, you must have flexibility and the ability to expand--with the xSeries, we have a clear growth path.”*



*DETERMINE worked closely with IBM to develop a solution that has the potential to help control costs.*

--Jamie Taylor, CTO, DETERMINE Software



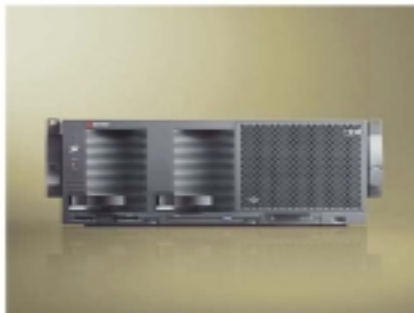
## Migrating from Unix to Linux on xSeries

# IT'S PAYBACK TIME.

Want a server with an impressively high return on investment? Try a Linux-ready IBM eServer<sup>®</sup> xSeries system with powerful Intel<sup>®</sup> Xeon<sup>™</sup> processors. An IDC study of several companies running Linux on xSeries servers revealed that these companies realized a high average ROI of 504% over three years. And, in most cases, they achieved payback of their initial investment in less than three months. That's ROI in a jiffy. For an IDC white paper on Linux and On Demand, visit [ibm.com/eserver/advantage](http://ibm.com/eserver/advantage).

It reveals more and more businesses are turning to IBM eServer<sup>™</sup> xSeries<sup>®</sup> systems with Intel Xeon processors.

Scale 1-18 way with select models. Pay as you grow.	IBM Director systems management.	Broadest line of servers that run Linux in the industry.	Midrange-inspired feature sets.	24/7/365 optional on-site hardware support <sup>1</sup>
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eServer<sup>®</sup>

Recently and IBM eServer xSeries systems powered by Intel Xeon processors. They raise the question, how high can you make your ROI?

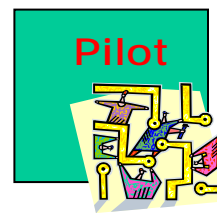
Do you want a server with an impressively high return on investment? Not only are IBM eServer xSeries systems powered by Intel Xeon processors, they raise the question, **how high can you make your ROI?**

Try a Linux-ready IBM eServer xSeries system with powerful Intel<sup>®</sup> Xeon<sup>™</sup> processors. An IDC study of several companies running Linux on xSeries servers revealed that these companies realized a high average ROI of 504% over three years. And, in most cases, they achieved payback of their initial investment in less than three months.<sup>1</sup>

1. See [www.ibm.com/eserver/advantage](http://www.ibm.com/eserver/advantage) for more information. © 2005 International Business Machines Corporation. All rights reserved. IBM, the IBM logo, eServer, and Xeon are trademarks of International Business Machines Corporation. Intel and Xeon are trademarks of Intel Corporation. IDC is a registered trademark of International Data Corporation. All other trademarks are the property of their respective owners.

**Experience shows that successful Linux migrations incorporate a planned approach to conversion, support, and operational issues**

- How do I get started
- What are good workloads to migrate?
- How do I secure my Linux systems?
- How do I manage my Linux systems?
- What applications should I convert and how do I do it?
- How do I deliver improved response time and availability with Linux?
- How do I select a Linux distribution and get the support I need?
- What are the options to remaining with my current desktop strategy?
- How do I maintain 5 Nines uptime with Linux as I do with other OSs now?
- What else do I need to consider?



**The Linux Adoption Cycle**



# Experience shows that successful Linux migrations incorporate a planned approach to code conversion and testing



**Preliminary Assessment**

- Determine feasibility of porting application code

**Detailed Assessment**

- Using a static copy of the source code to be converted, perform a detailed assessment required for the porting

**Code Conversion**

- Tools-based approach to complete code conversion to Linux on xSeries

**Testing**

- Perform regression tests against customer baselines to ensure ported application performs identically under Linux as it did in source environment

**Deployment**

- Deploy converted code in customer environment

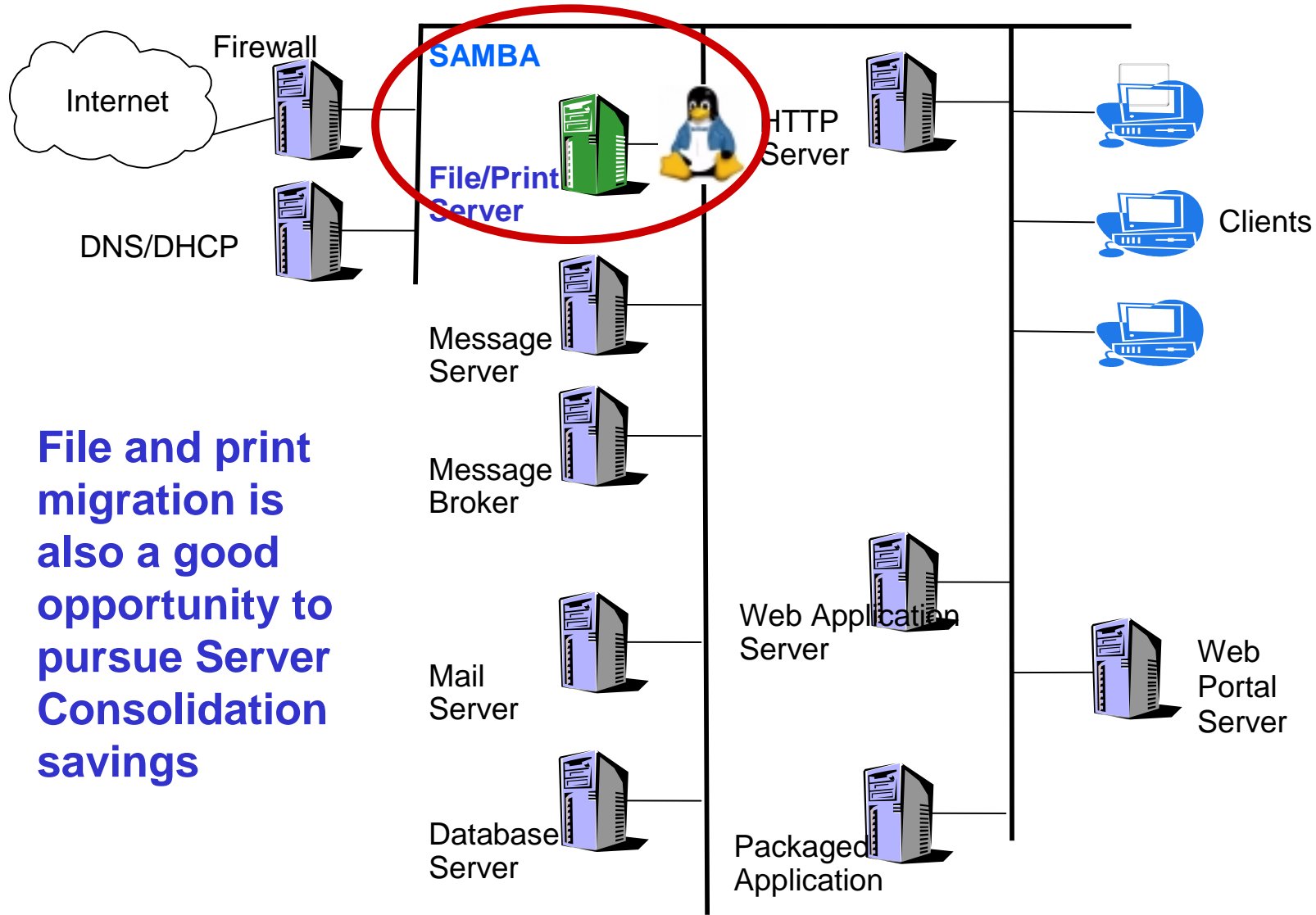
## Migration Workloads



From simplest to more complex (in general):

- File/print infrastructure
- Security/directory infrastructure
- Mail server
- Database serving
- Web serving and applications
- Messaging
- Enterprise Resource Planning (ERP)
- Business Intelligence

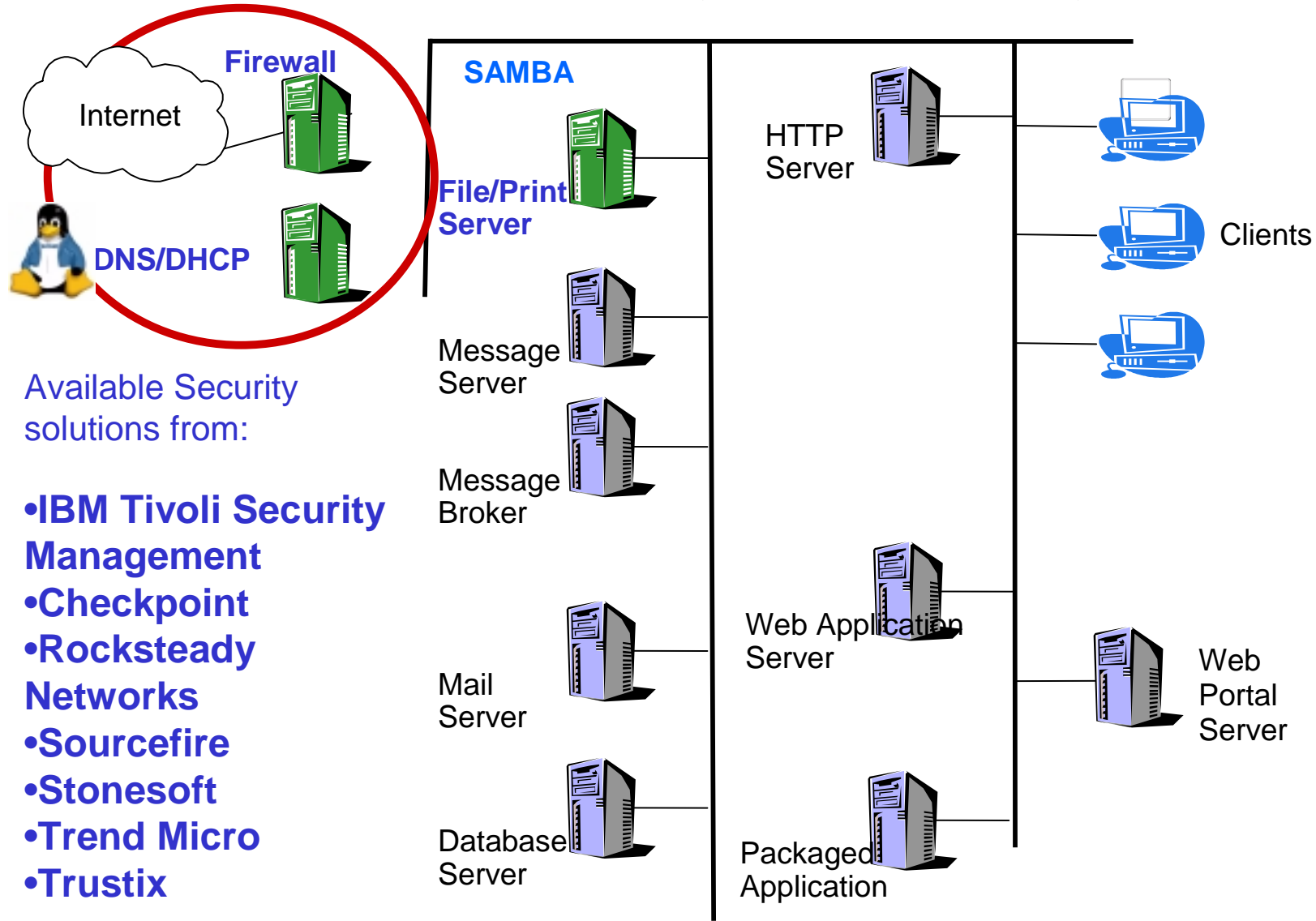
# Start with something simple: File and print



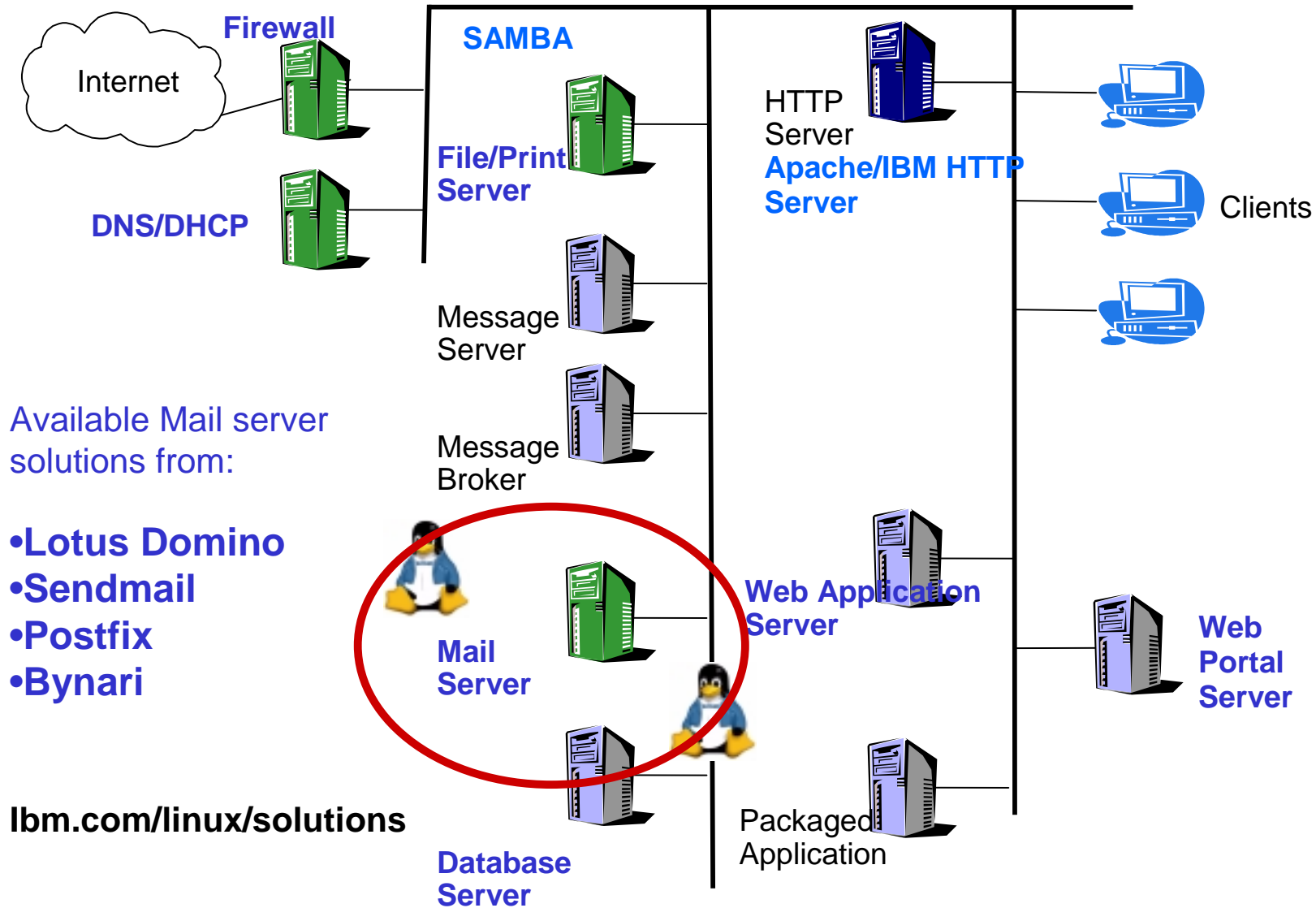
**File and print migration is also a good opportunity to pursue Server Consolidation savings**



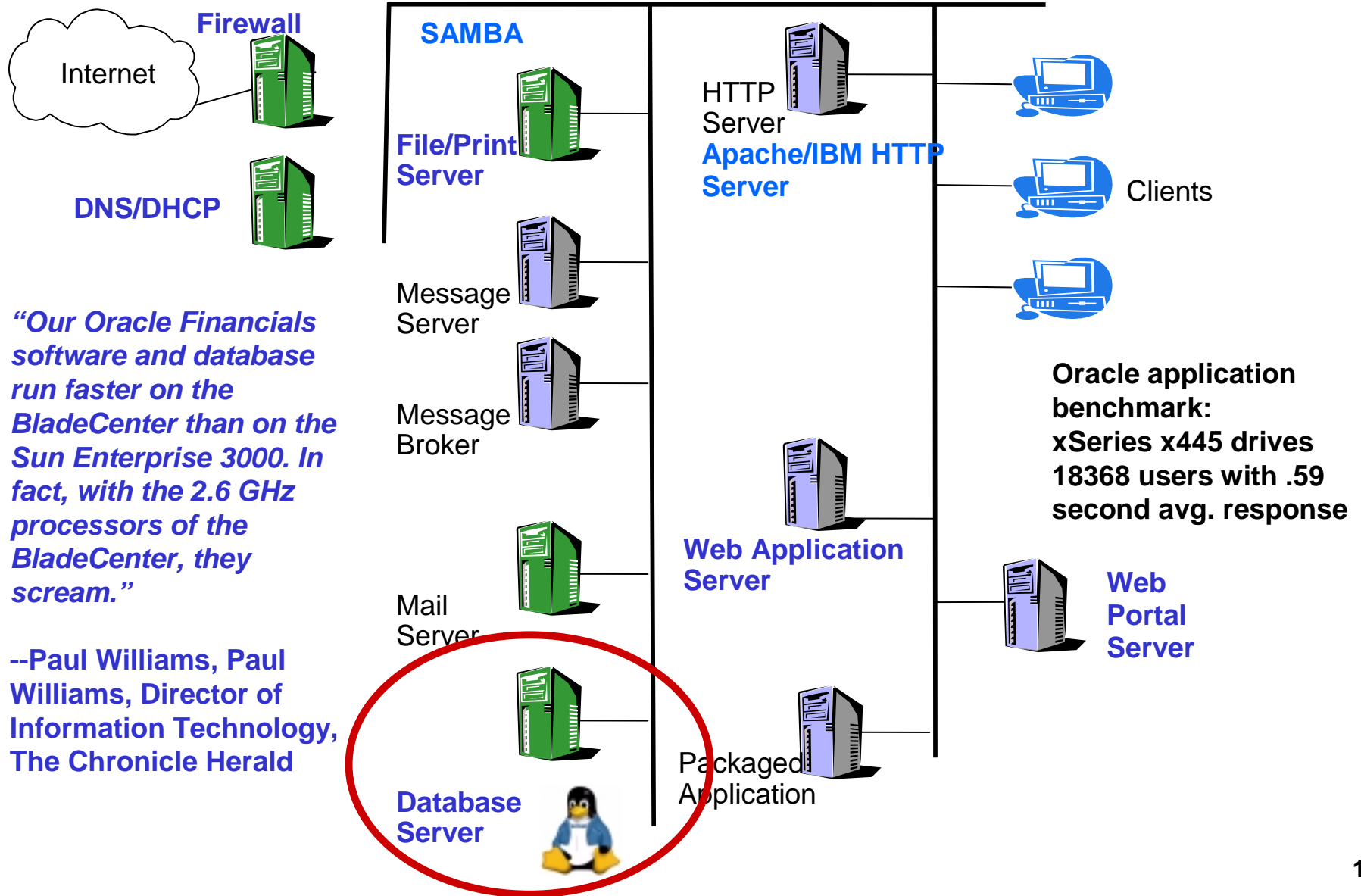
# More infrastructure: Security and/or directory services



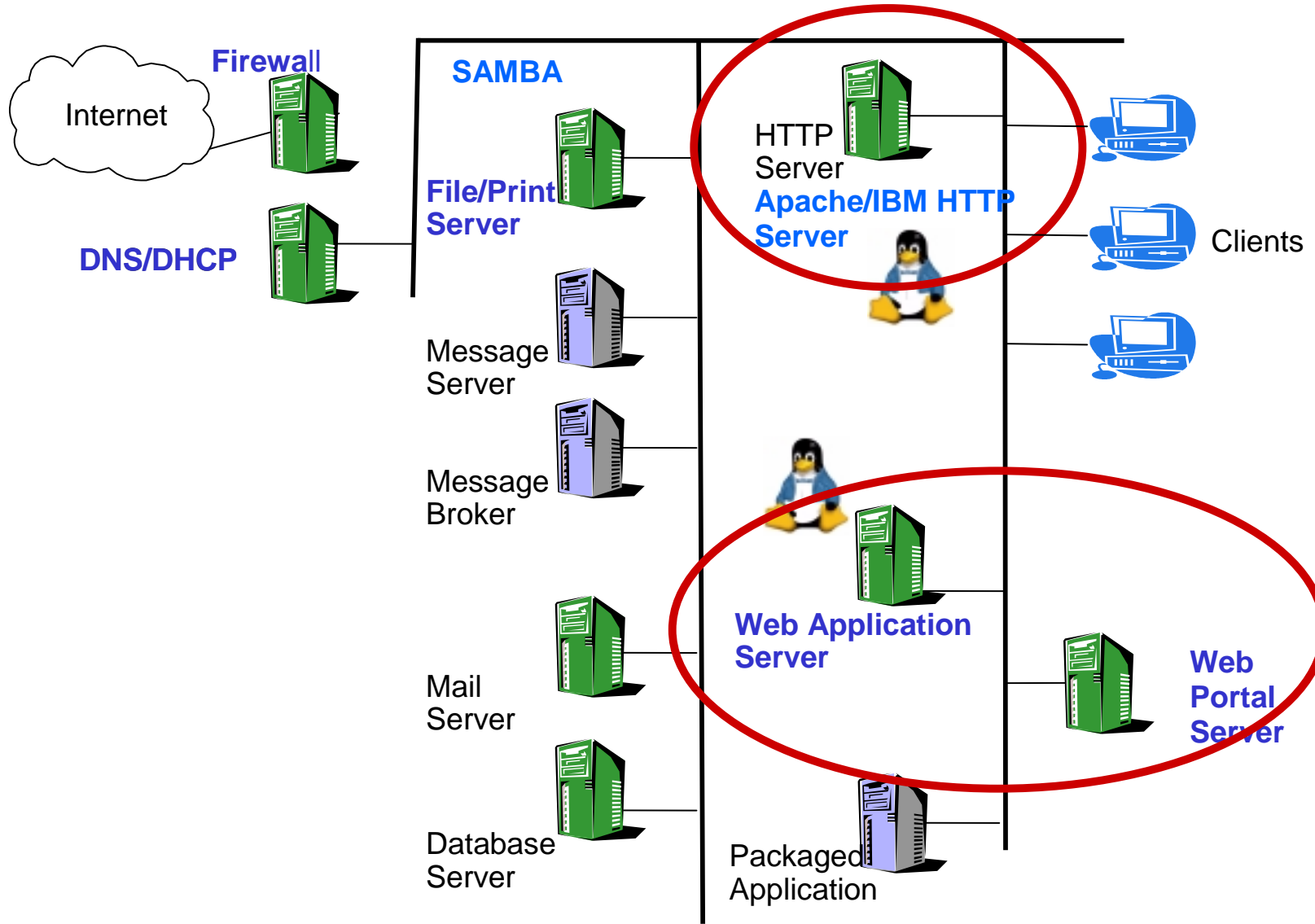
# Target workload: Mail server



# Target workload: Database serving



# Take the next step with Web Infrastructure



## E\*TRADE

### Business Objectives

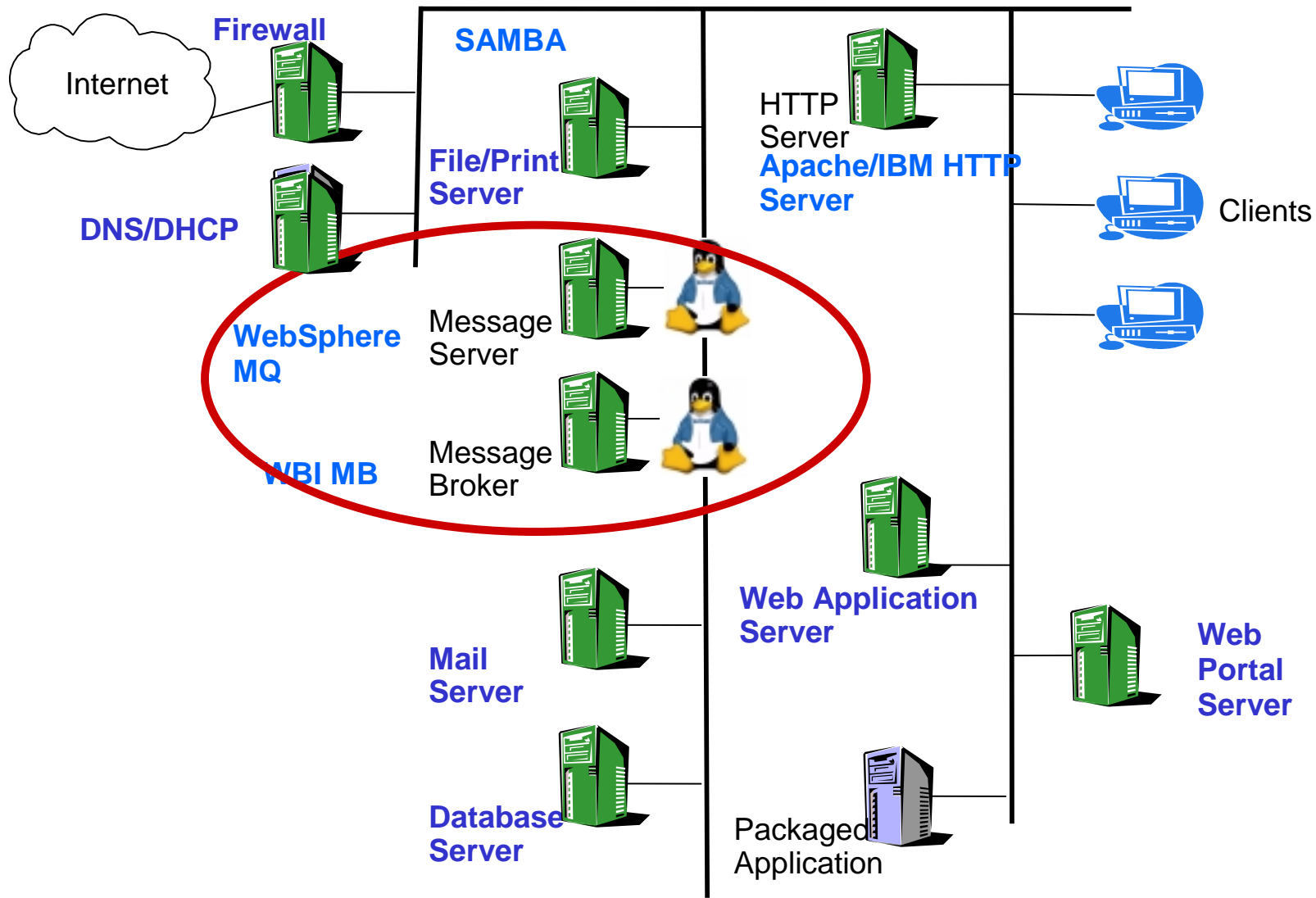
- Reduce cost, improve performance, guarantee scalability
- With 10,000 concurrent users and four million accounts, E\*Trade's success depends on its ability to provide superb customer service

### Solution/Benefits

- Replaced UNIX servers with IBM xSeries 330 servers running Linux
  - Tier 1 - Web Application Server
  - Tier 2 - Tuxedo Servers Tier
- IBM Global Services for prototyping, porting and support services
- Millions of dollars in savings

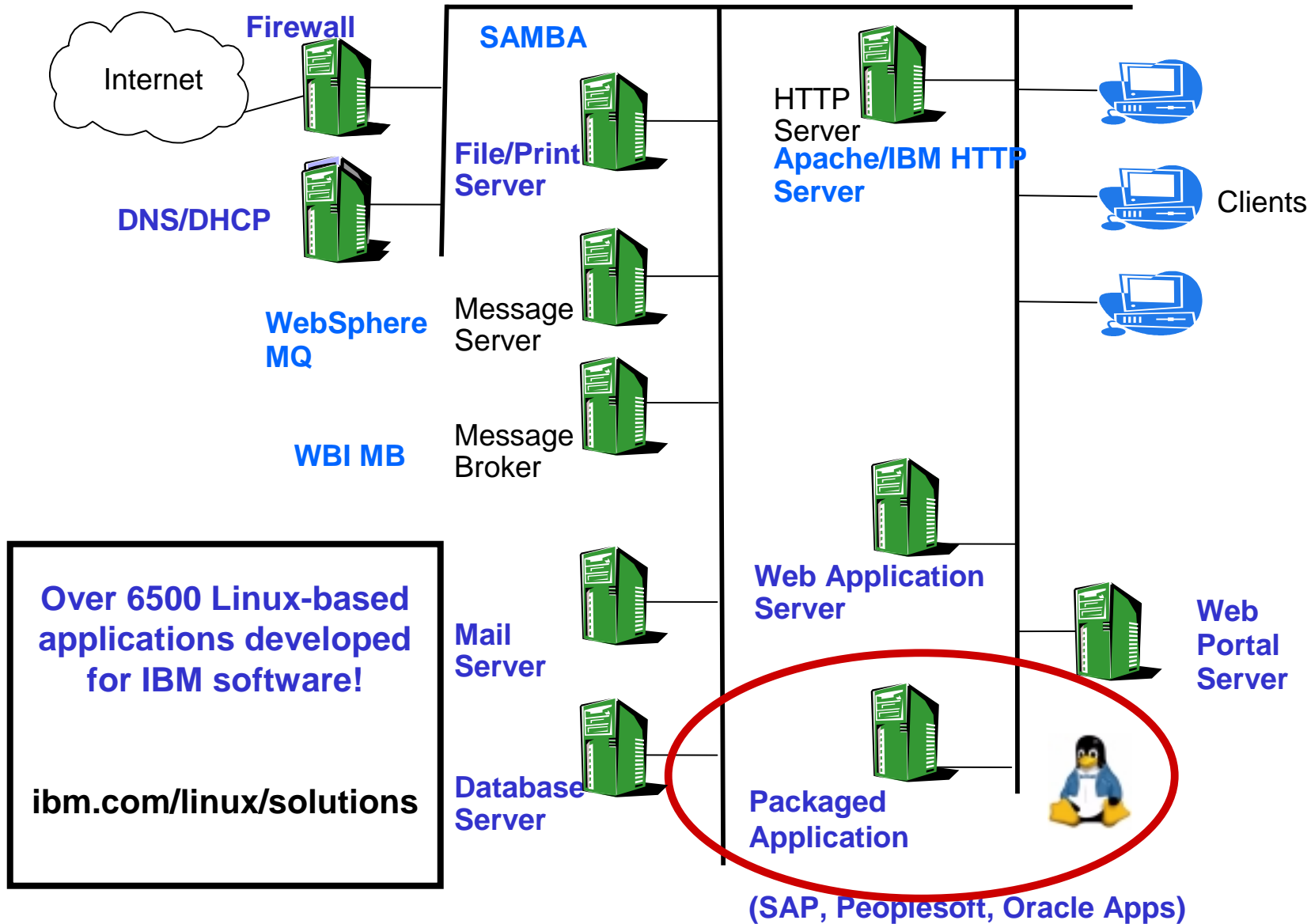


# You Can Also Switch Your Messaging Infrastructure





# Target workload: Enterprise Resource Planning (ERP)



## Lehman Brothers

- **Business Objectives**

- Reduce costs
- Optimize IT environment for business critical e-trading, derivative and risk applications

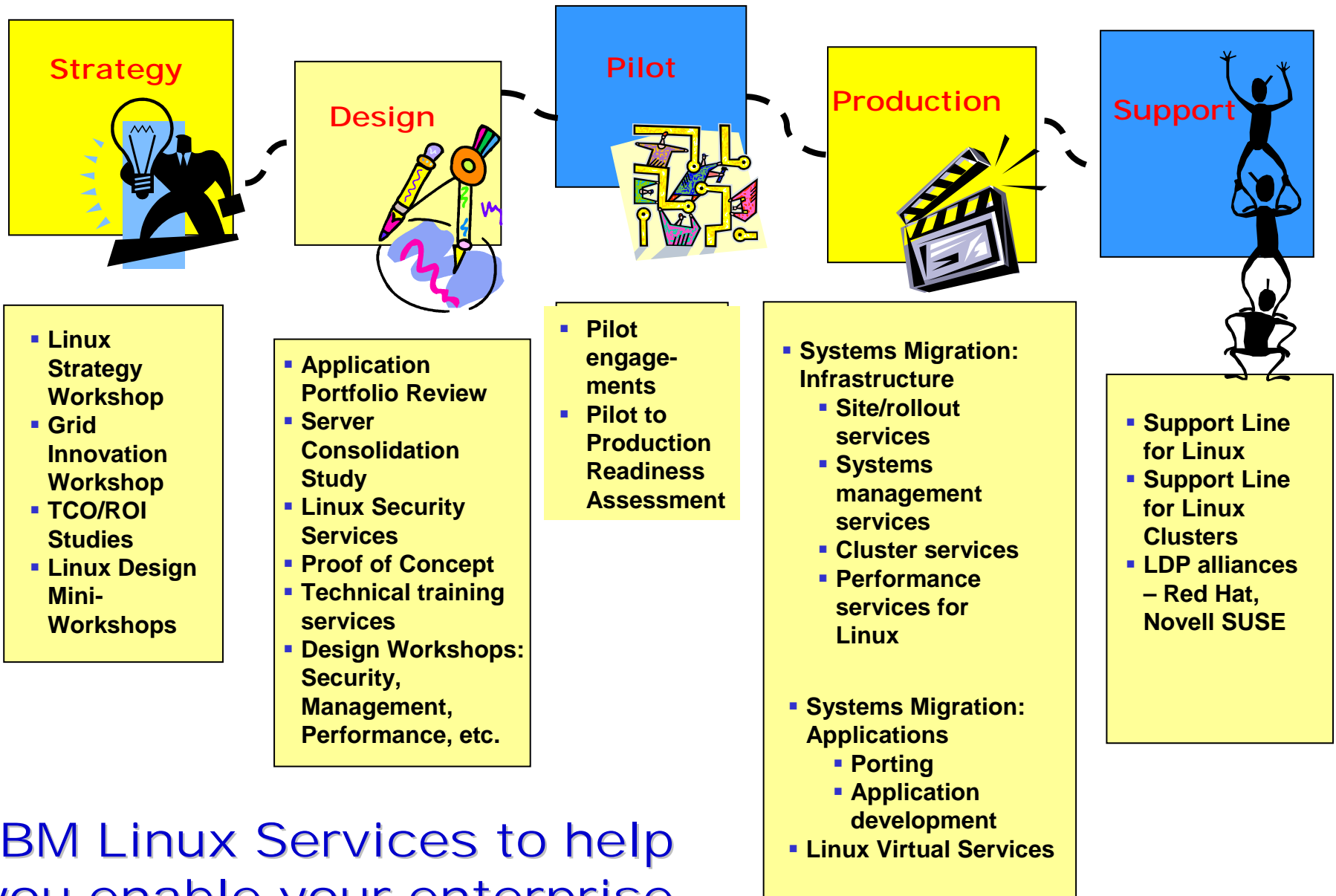
- **Solution/Benefits**

- Utilized IBM services to port from UNIX to Linux
- Replaced UNIX servers with IBM xSeries 335 servers
- 20-30% reduction in UNIX servers, resulting in \$7-10 million savings
- xSeries scalability allows growth at a lower cost than other vendors
- 25% performance increase allows faster customer service



● Migration Services

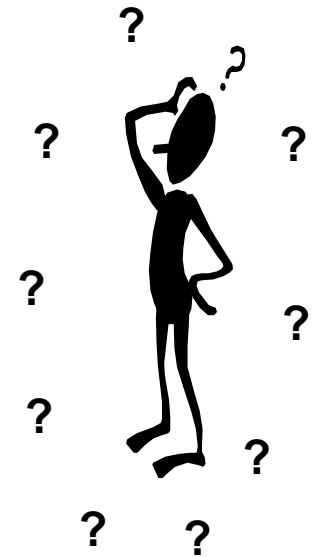
Migrating from Unix to Linux on xSeries



IBM Linux Services to help you enable your enterprise

Companies in all industries are implementing Linux...  
not just thinking about it – so how can you gain  
YOUR share of the benefits of Linux implementation?

- **If you are new to Linux...**
  - A Linux briefing, customized to the specific business issues of your industry, can help explain the benefits of Linux to your key stakeholders and build a consensus to support its implementation
- **If you are just getting started with the implementation of Linux...**
  - A Linux Strategy Workshop will assist you in developing a high level Linux implementation plan and help build consensus in both IT and the business
- **If you have specific Linux technical issues to resolve...**
  - A series of Linux Design Mini-Workshops focused on key IT and business issues such as security, performance, and systems management will help you accelerate your Linux deployment



Working together, a Linux Strategy Workshop can help you develop an integrated strategy for implementing Linux and Open Source

- 1** **High-level Linux Strategy**  
... with recommendations that may be used right away

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- 2** **Linux Initiatives**  
... defined and agreed upon based on business & IT goals

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- 3** **Action Plan**  
... provides phases with supported milestones and timelines

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- 4** **Linux Knowledge**  
... increases awareness and mindset

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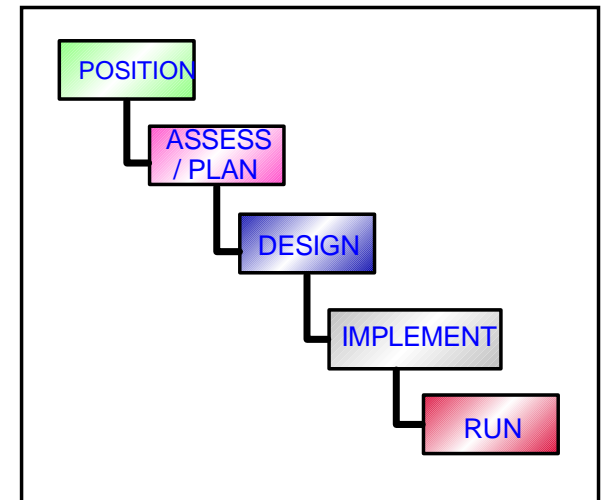
- 5** **Validation**  
... demonstrates the advantages of Open Source solutions

✓ If you are just getting started with the implementation of Linux...

## Linux Design Mini-Workshops can accelerate your Linux implementation and business advantage...

Select from topics where IBM can bring it's "best practices" Linux experience to help you reduce risk and accelerate implementation

- Linux TCO/ROI Analysis
- Linux Distribution Selection and Support
- Linux Security
- Linux Systems Management
- Application and Platform Selection
- Application Porting and Migration
- Alternative desktops, clients and workstations
- Linux High Availability
- Linux Mail Options: Server
- Special Topics: Point of Sale, Embedded Linux, High Performance Computing



✓ If you have specific Linux technical issues to resolve



Where do you want to start?

**To learn more about how IBM can assist you  
in determining your future directions with Linux,  
please contact:**

**Sam Docknevich**

**Linux National Practice Leader  
ITS US, IBM Global Services  
(781) 895-2569 (office and fax)  
(508) 380-6803 (cell and pager)**

**US West/Central**

**US NE/SE**

**Clusters**

**Jeff Gibbs**

**Peter Kastrinelis**

**Tim Strickland**

**(O) 602-357-4360**

**(O) 781-895-2357**

**(O) 316-266-7049**

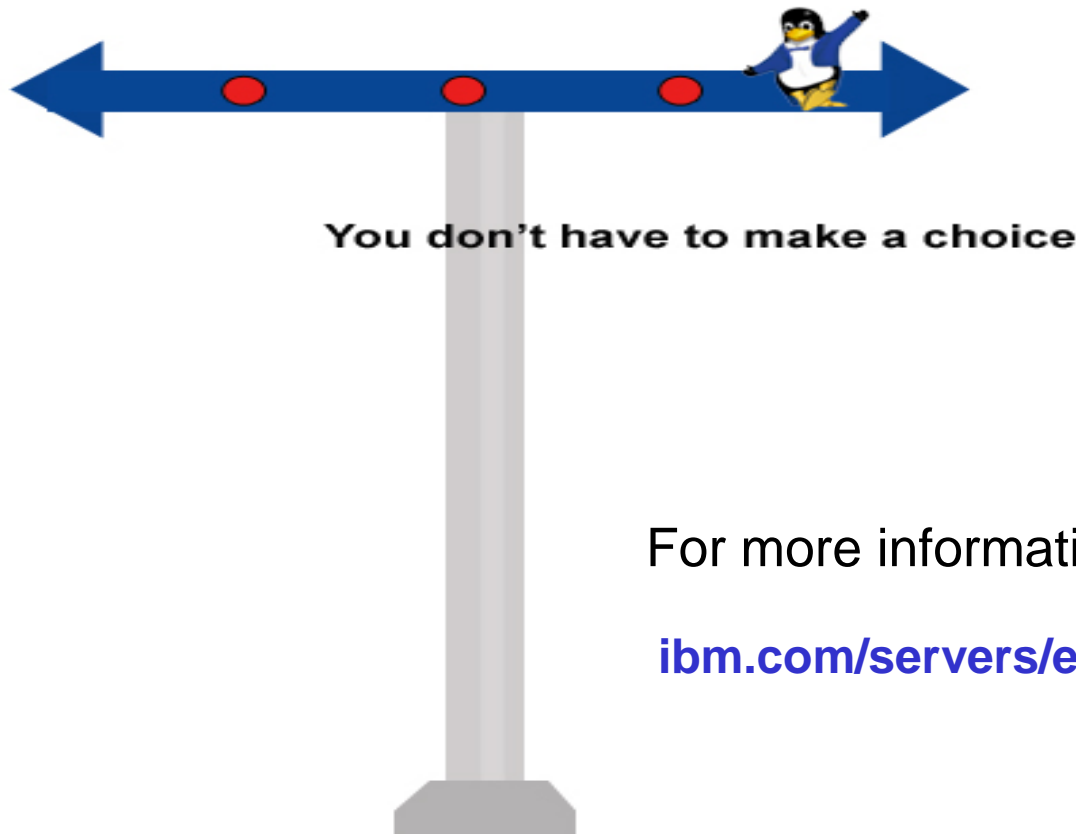
**(C) 623-910-6514**

**(C) 617-974-8999**

**(C) 620-629-5247**

## What about applications I've developed and ported? Will my application continue to work on Unix?

- You don't have to make a choice between Linux and Unix
- You will likely be replacing non-portable practices with more portable ones



For more information:

[ibm.com/servers/esdd/articles/porting\\_linux](http://ibm.com/servers/esdd/articles/porting_linux)

## General Unix to Linux Application Migration Rules

- Unix to Linux migration is easier than Windows to Linux
- Business applications designed to run on UNIX make a fairly simple port – particularly Java-based applications
- C/C++ applications are also a fairly simple port
  - Require standard development tool chain – libraries, compiler/build/debugger
  - Need to manage data handling from UNIX to x86-based server
- Scripts are simple if they use objects, files and devices that are common for UNIX and Linux


### Additional resources for developers:

- [Migrating from Solaris to Linux on Intel](#), an online course
- “Technical guide for porting applications from Solaris to Linux, version 1.0” at [ibm.com/servers/esdd/articles/porting\\_linux](http://ibm.com/servers/esdd/articles/porting_linux)
- “Unix-to-Linux Migration: An Introduction”, Nathan Thomas, Red Hat, <http://www.redhat.com/solutions/info/whitepapers/#LinuxMigration>

## Build and test your application on Linux for xSeries

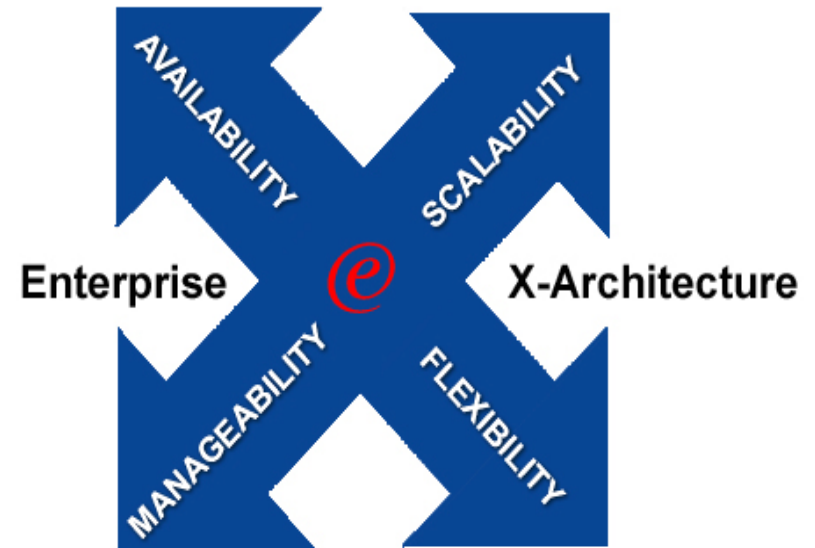
- Porting UNIX applications to Linux can be a simple task
- IBM provides Linux-ready servers



Linux is readily available 

## xSeries Value Proposition

- **Investment in innovation**
  - Technology leverage
  - On demand
  - Driving industry standards
  - Power of choice
- **Mainframe inspired technologies deliver lower TCO**
  - Leadership price/performance due to Enterprise X-Architecture
  - Pay as you grow modular computing strategy
- **Reduced IT costs via award-winning systems management capabilities**



● **IBM eServer xSeries and BladeCenter**

Migrating from Unix to Linux on xSeries

**Enterprise Scale Up Servers**  
2-way to 16-way SMP

- xSeries 445
- xSeries 455

**Scale Out Rack Optimized Servers**  
Uni to 4-way SMP

- xSeries 306
- xSeries 335
- xSeries 345
- xSeries 382
- xSeries 365
- xSeries 343 NEBs Solution

**Distributed Tower Servers**  
Uni to 4-way SMP

- xSeries 206
- xSeries 225
- xSeries 235
- xSeries 255

**Enterprise Scale Out Offerings**  
Uni to 4-way nodes, scalable clustering

- eServer BladeCenter
- eServer 325
- 1350 Linux Cluster

**IntelliStation Workstations**  
Uni to 2-way SMP 2D - 3D Graphics

- A Pro
- M Pro
- Z Pro

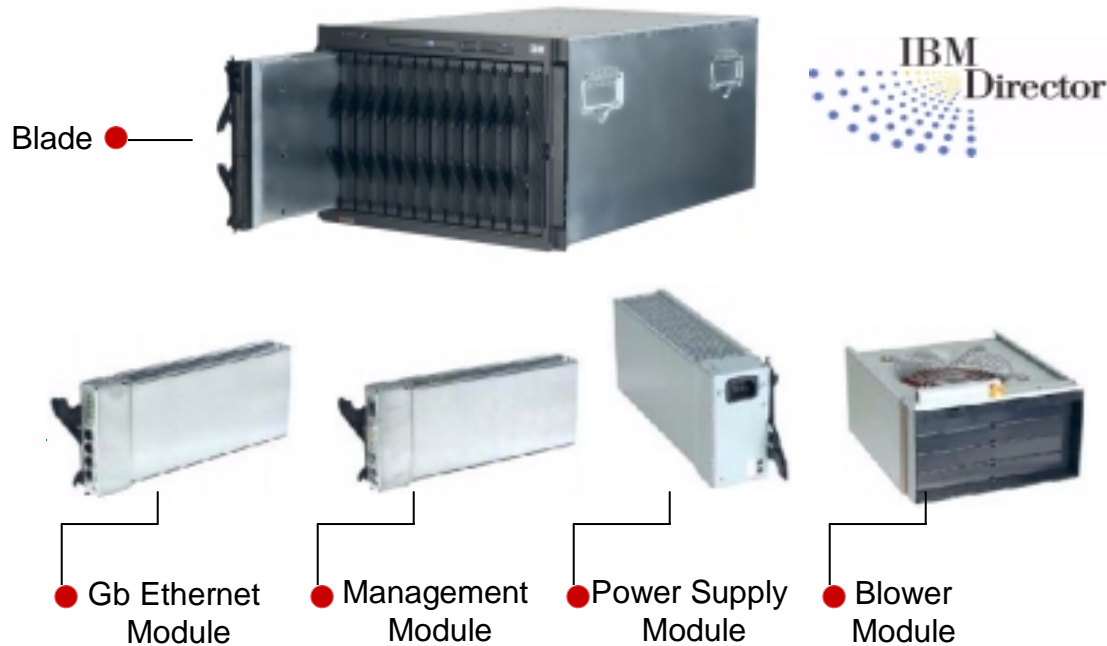


● IBM eServer Offerings

# BladeCenter Solutions

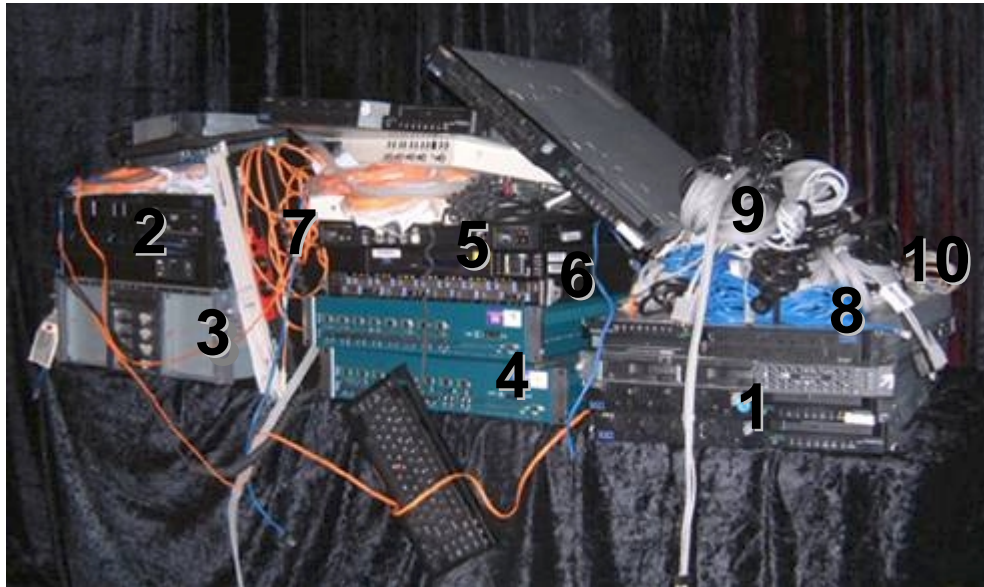
## Industry-leading highly dense server form factor

- Intelligent management tools
- Innovative modular technology
- Open application architecture and simplified deployment



● IBM eServer Offerings

## Reintegration of the Datacenter



### Typical Datacenter Configuration

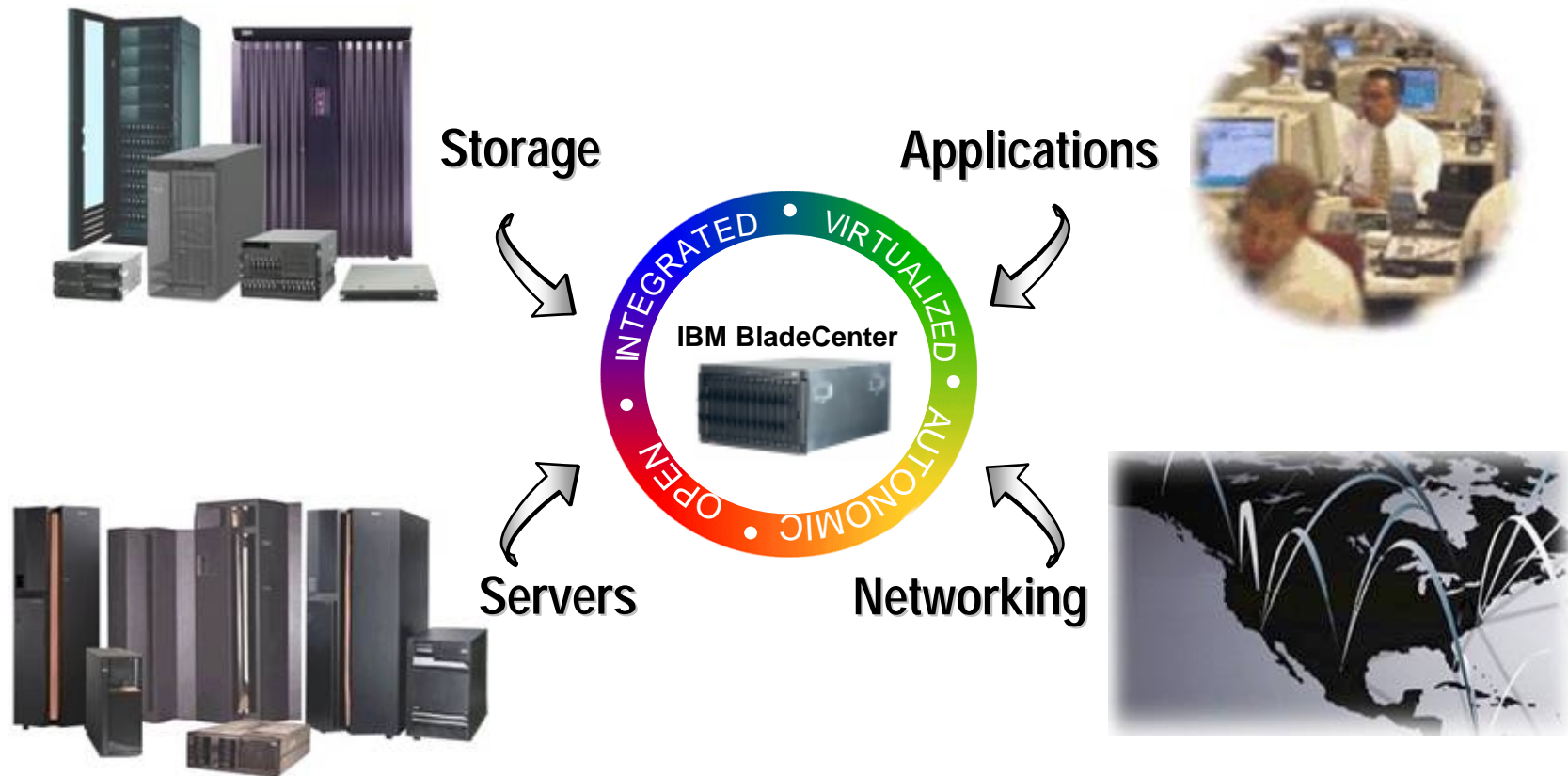
- |                             |                         |
|-----------------------------|-------------------------|
| 1. Ten x86 1U 2-way servers | 6. Layer 2 GbE switches |
| 2. RISC-based 2-way server  | 7. KVM switches         |
| 3. HPQ 4-way server         | 8. Ethernet cables      |
| 4. Alteon L7 E'net switches | 9. KVM cables           |
| 5. FC SAN switches / Cables | 10. Power cables        |



### Bladed Datacenter Configuration

IBM eServer BladeCenter

## BladeCenter Delivers IT Integration



***Integration can help dramatically reduce infrastructure costs***

## A few last hardware considerations

**Do I need any drivers? How will I know Linux works with my hardware?**

IBM eServer xSeries and BladeCenter are certified for key Linux distributions

- Red Hat Enterprise Linux
- SUSE Enterprise Linux from Novell

<http://www.pc.ibm.com/us/compat/nos/matrix.shtml>

Linux factory preloads are available



Downloads and drivers

BIOS updates, drivers, software updates, and fixes

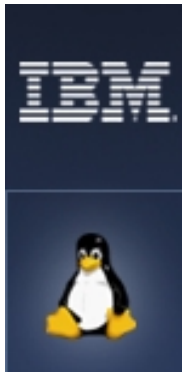


**IBM:** [www.ibm.com/pc/support/site.wss/](http://www.ibm.com/pc/support/site.wss/)

# IBM Linux Value



## Get Started Today!



- Many companies are migrating from Unix to Linux on xSeries and BladeCenter -- for good reason
- Porting to Linux can be extremely straightforward
- The tools you need are readily available
- IBM eServer xSeries and BladeCenter are excellent choices for running Linux

*IT Professionals*



**Next--customer experience migrating from Unix to Linux**







**CENDANT**  
*Travel Distribution Services*



# Cendant's Migration from Unix to Linux



**GALILEO**

**HIGHWIRE**

 **CheapTickets**

**WizCom**  
INNOVATION SOLUTIONS CONNECTIONS

[TRUST]  
trustinternational.com

 **Lodging.com**  
*get a room!*

 **THOR**  
Powering travel.



**CENDANT**  
*Travel Distribution Services*



## Cendant Overview

\$18B Travel and Hospitality Company

Owns such companies as:

- Avis
- Budget
- Century 21
- Coldwell Banker
- ERA
- Sotheby's International Realty
- Days Inn
- Howard Johnson
- Knight's Inn
- Ramada
- Super8
- TraveLodge
- Villager
- Fairfield Resorts
- RCI
- Wright Express
- Galileo
- Thor
- CheapTickets.com



**CENDANT**  
Travel Distribution Services

## Cendant Travel Distribution Services (TDS)

- Challenge
  - Existing proprietary Unix environment was becoming increasingly expensive and difficult to run and maintain
- Solution
  - Port mission critical “Fares” application from proprietary Unix to Linux
  - Red Hat Enterprise Linux AS/ES (2.1 and 3)
  - IBM xSeries: x440, x445, x330, and BladeCenter
- Benefits
  - “We will reduce IT expenditures by 90%”
  - “IBM xSeries and Linux provide us a sustainable 99.999% availability while handling 300-400 transactions per second”
  - “By standardizing the architecture, we have reusable components that allow us to rapidly develop and deploy new services and applications to meet our customers' needs to be competitive in the market place”
    - Robert Wiseman, CTO Cendant Travel Distribution Services

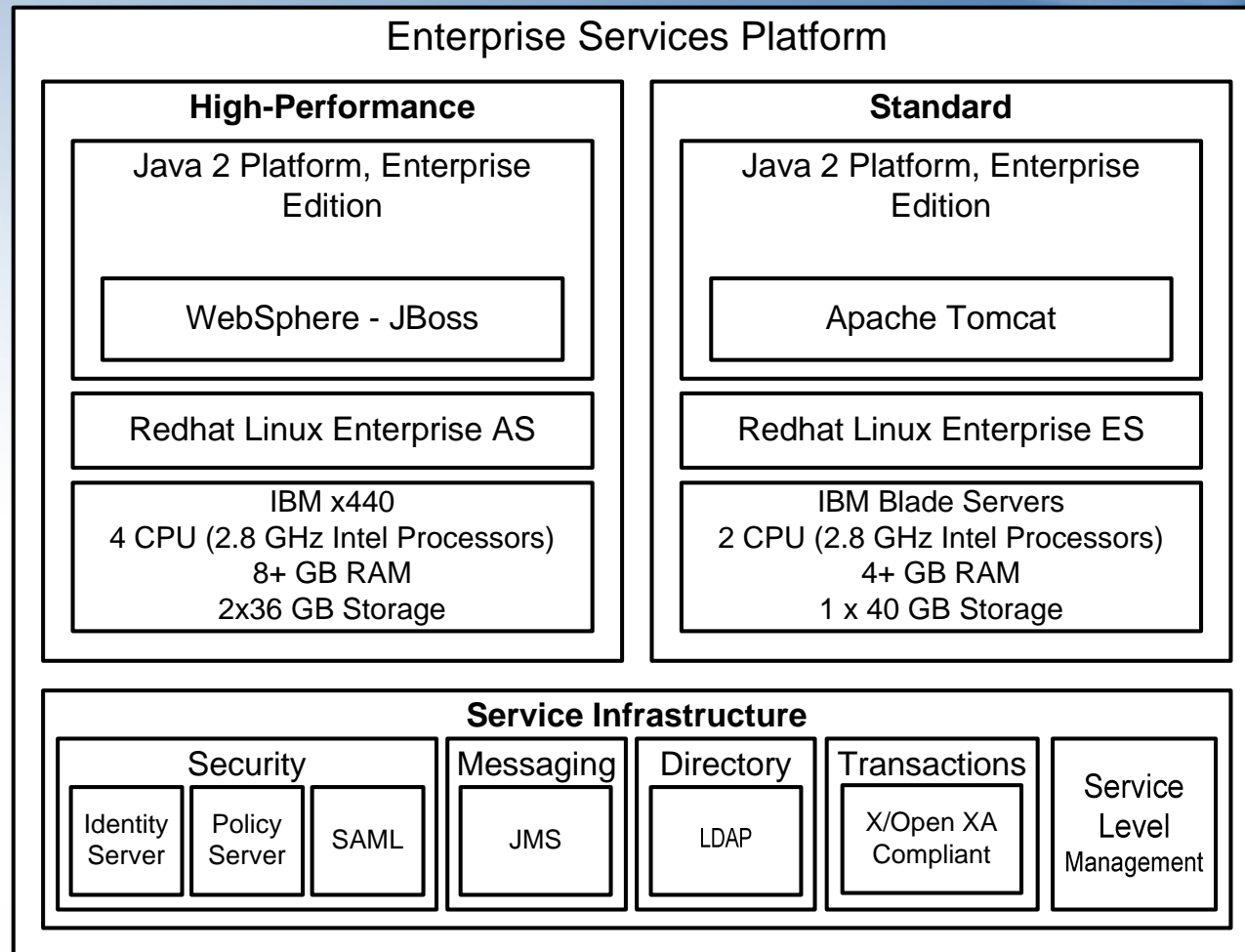


**GALILEO**

**HIGHWIRE**



# Enterprise Services Platform





**CENDANT**  
*Travel Distribution Services*



## Challenges Overcome

- Obtaining “C” Level Buy In
- Hardware Platform Selection
- In 2003, Cendant Pushed the Limits of the 2.2 Kernel
- In 2004, Cendant Continues to Push the Limits of the 2.4 Kernel



**GALILEO**

**HIGHWIRE**







**CENDANT**  
*Travel Distribution Services*



## Why Cendant Chose IBM

- IBM's Complete Commitment to Linux across Hardware, Software and Services
- Responsiveness to Cendant
- Access to Deep Linux Skills
- 24/7 support for RedHat Enterprise AS and ES
- Linux Porting Services
- Linux Training / Education
- Simplified acquisition of Linux subscriptions



**GALILEO**

HIGHWIRE

