

xSeries and Windows Workloads:

Migrating Windows workloads to Linux on xSeries Intel based servers and blades

June 22, 2004

Speakers:

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Business Justification for Linux: Total Cost of Ownership

- Robert Francis Group study of 14 mid to large sized companies
- Determine TCO for Linux, Solaris and Windows deployments over three year span

Case	Year 1	Year 2	Year 3
Linux	\$49,931	\$62,203	\$74,475
Solaris	\$421,718	\$491,619	\$561,520
Windows	\$91,724	\$141,193	\$190,662

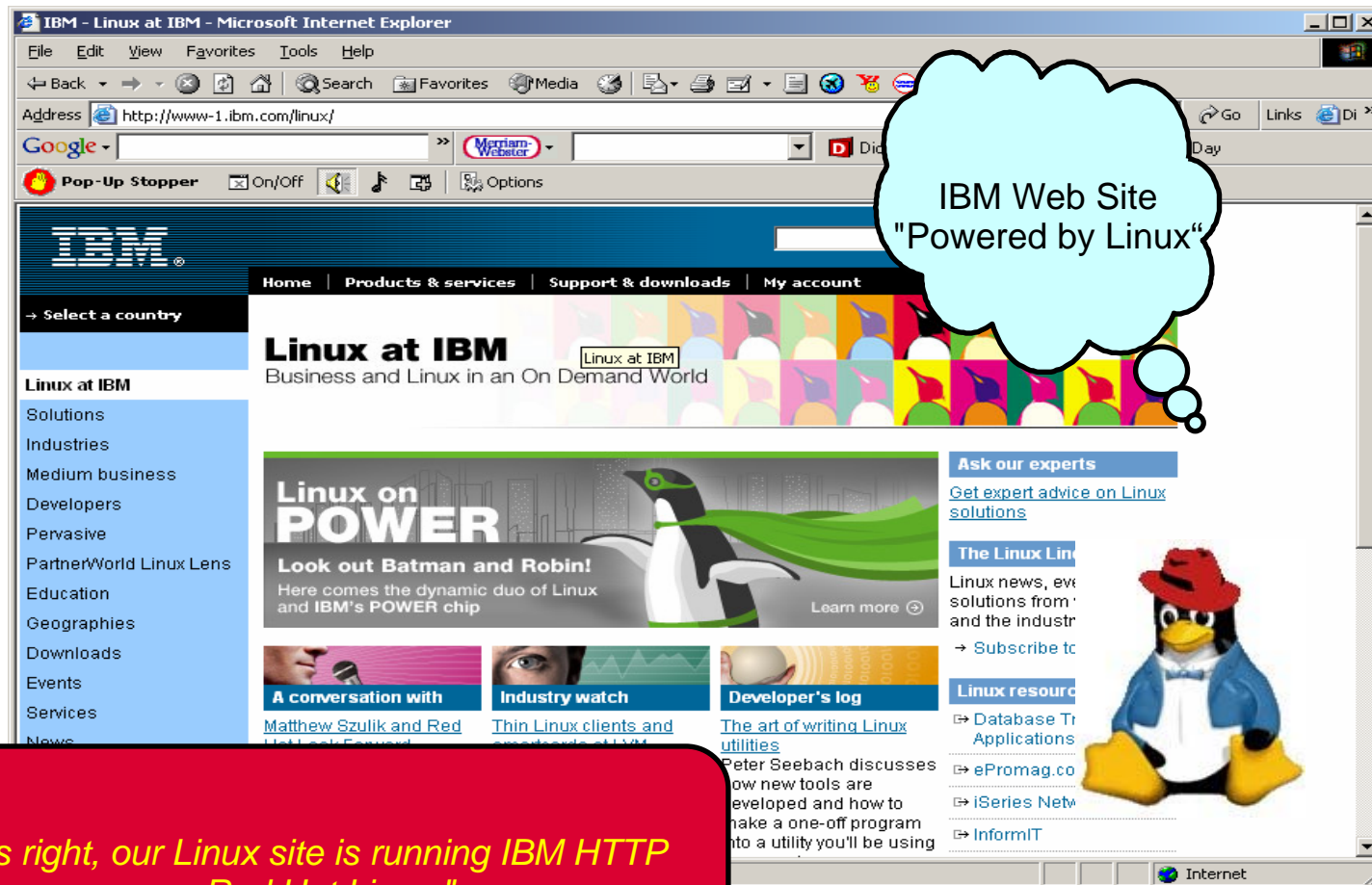
Source: Total Cost of Ownership for Linux in the Enterprise,
Robert Francis Group, July 2002
<http://www.rfgonline.com>

- Key cost saving benefit of Linux
 - ▶ Ability to massively scale without paying additional licensing fees

Business Justification for Linux

- Linux is Architected for Security
 - ▶ Linux closely resembles Unix and provides Unix-like security
 - ▶ User authentication required to access Linux services and resources
 - ▶ Logging, monitoring, and audit capabilities to trace system and user activity
 - ▶ Provides secure shells, secure sockets, transport-level security and encryption capabilities to prevent security breaches
- Open Source Development Enhances It
 - ▶ Openness speeds up problem identification and resolution
 - ▶ No “hidden trap doors”
 - ▶ Linux developers can build their own layers of security directly on the Linux kernel – and such proprietary extensions are extremely difficult to break

www.ibm.com/linux Runs on Linux



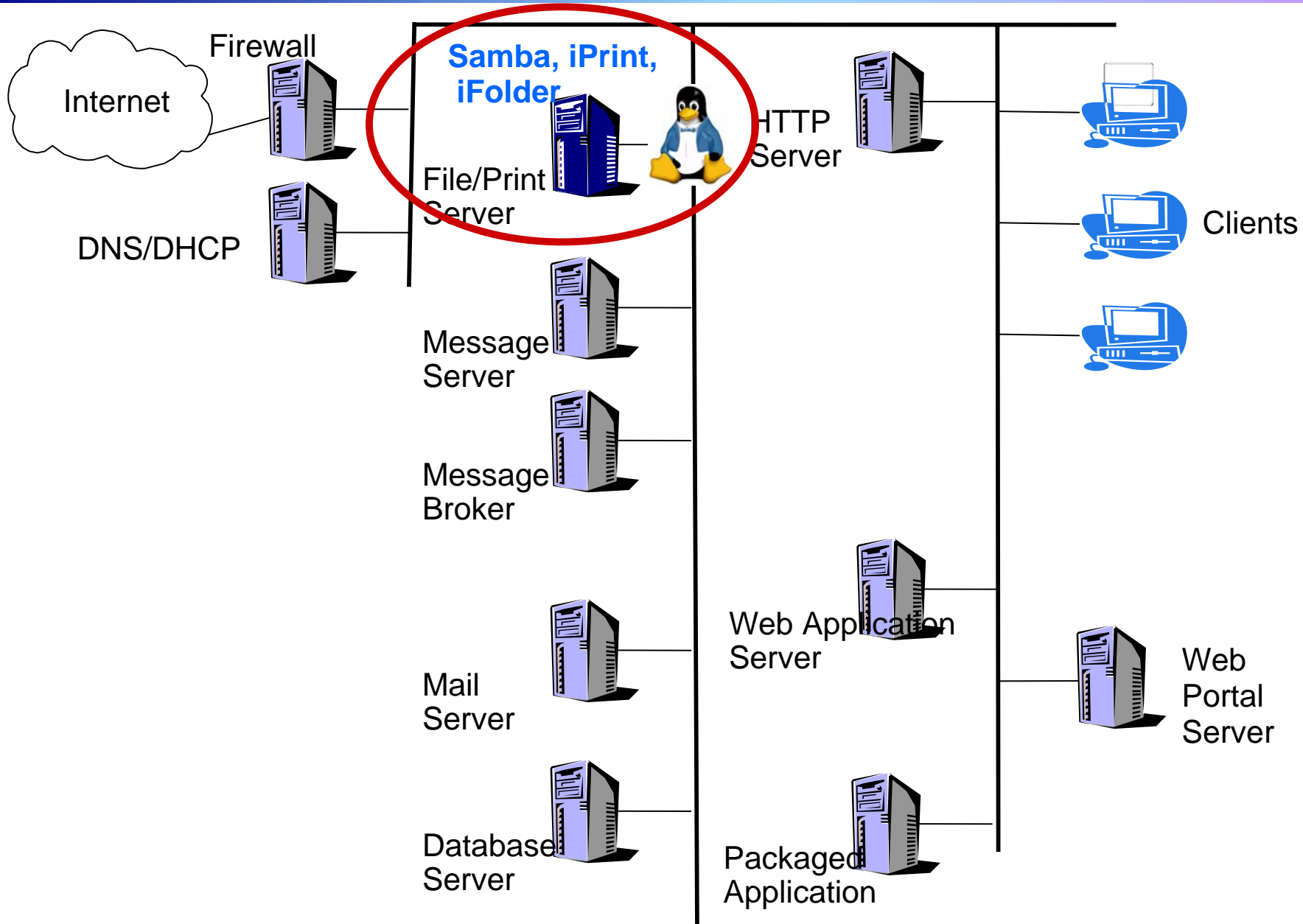
IBM Web Site
"Powered by Linux"

"Yes, that's right, our Linux site is running IBM HTTP server on Red Hat Linux."

IBM Runs 1800 Linux Servers Internally

- File and Print Serving
 - ▶ E.g. Linux file servers store client images for IBM Standard Client
- Web Infrastructure
 - ▶ Portals, Content Management Systems, Development Environment, Search Engines, Intranet forums, Special events hosting
- Security
 - ▶ Anti-spam, Anti-Virus scanners, Virus detection, security assessment scanning, security directory
- System Monitoring
 - ▶ Network, performance, asset and operations monitoring

Start with Something Easy

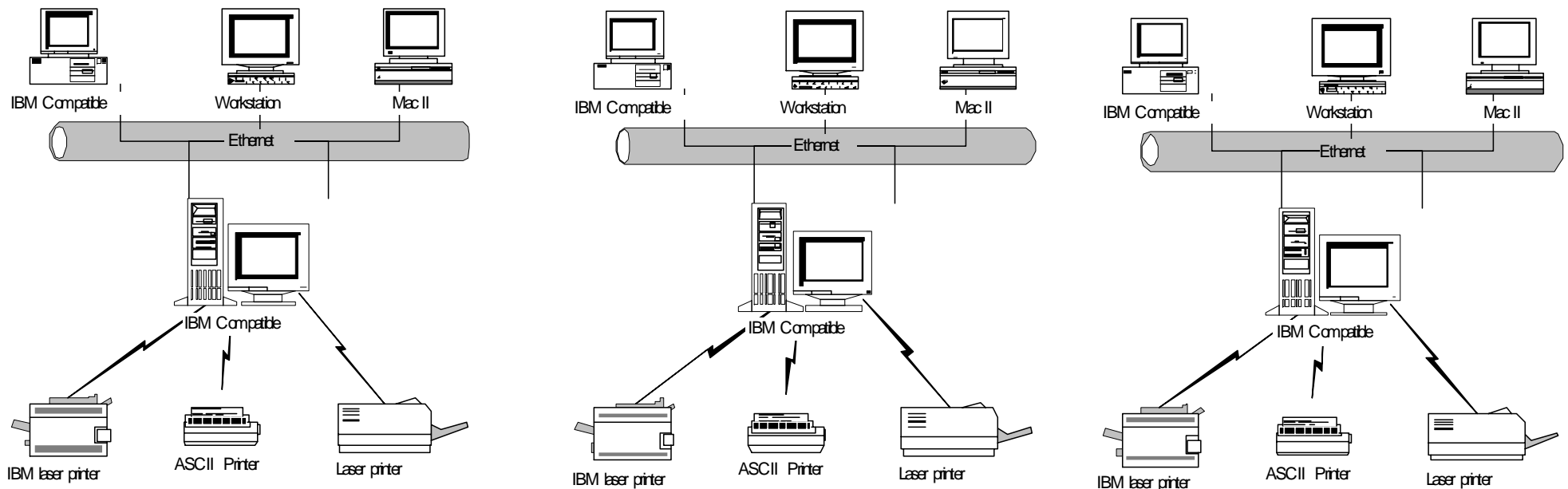


File/Print Serving using SAMBA

- Windows File/Print Serving
 - ▶ SMB (Server Message Block) Protocol based
 - ▶ SMB allows access to Shared disk and printers
- What is SAMBA?
 - ▶ Open Source software
 - ▶ Allows access to shared disk and printers
 - ▶ Can be freely downloaded from www.samba.org
 - ▶ SAMBA provides
 - SMB Server
 - NetBIOS name server
 - FTP like SMB client
 - Command line tools

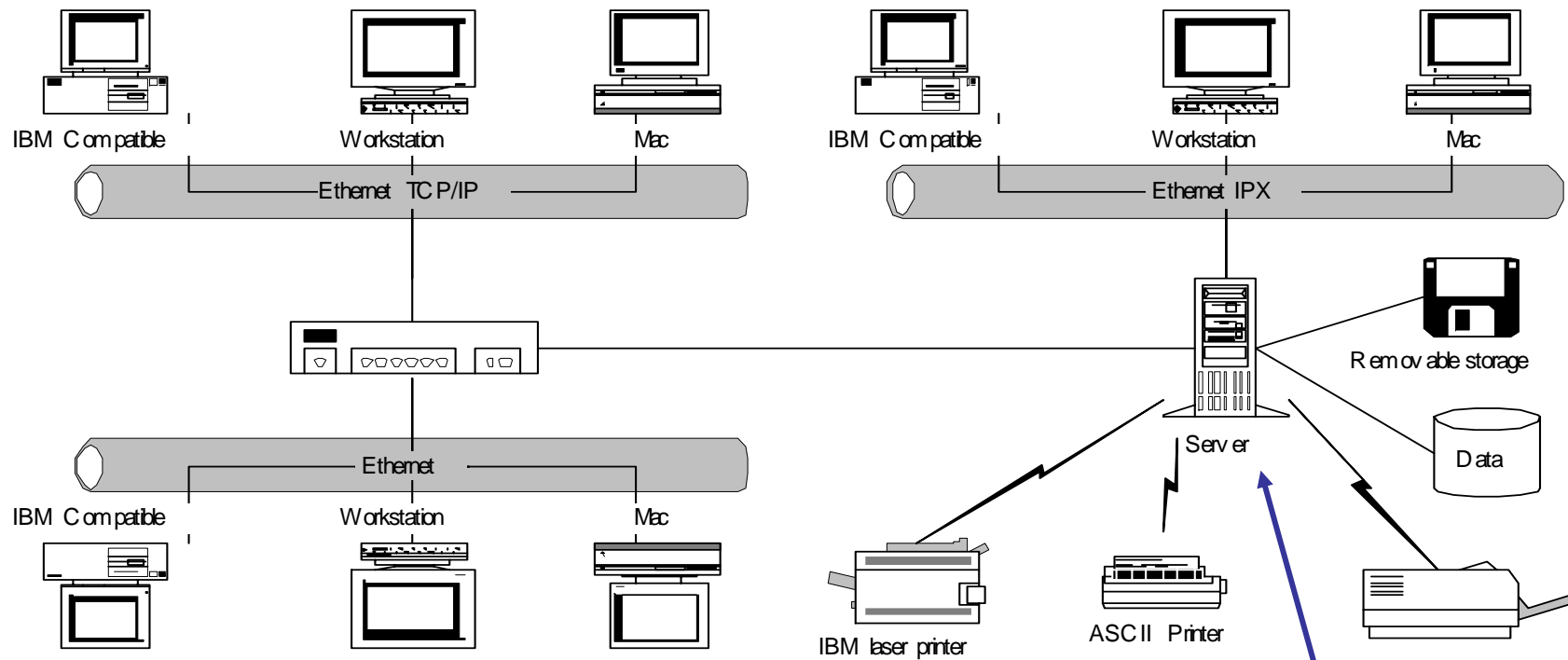


Windows File/Print Serving



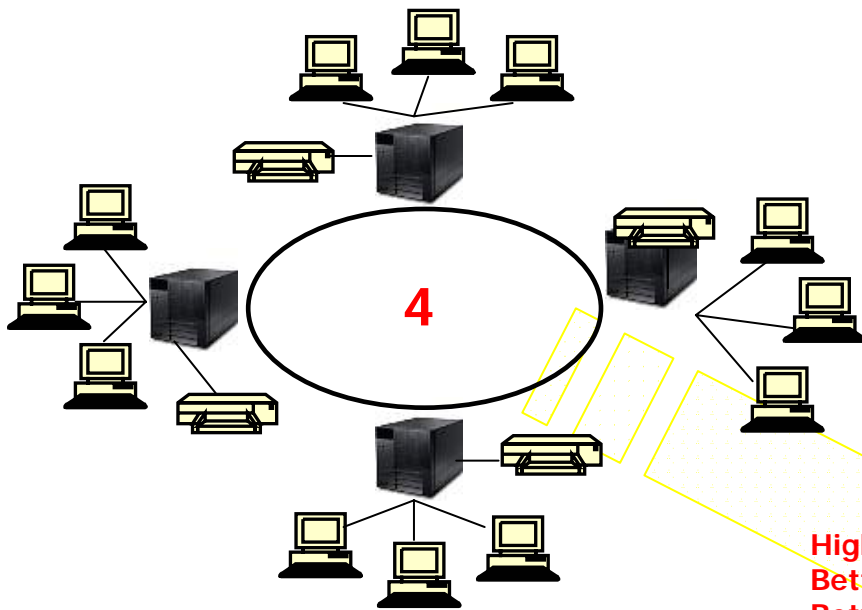
Typical windows File/Print Serving

SAMBA based File/Print Serving



SAMBA Based File/Print Server on Linux

File and Print Example



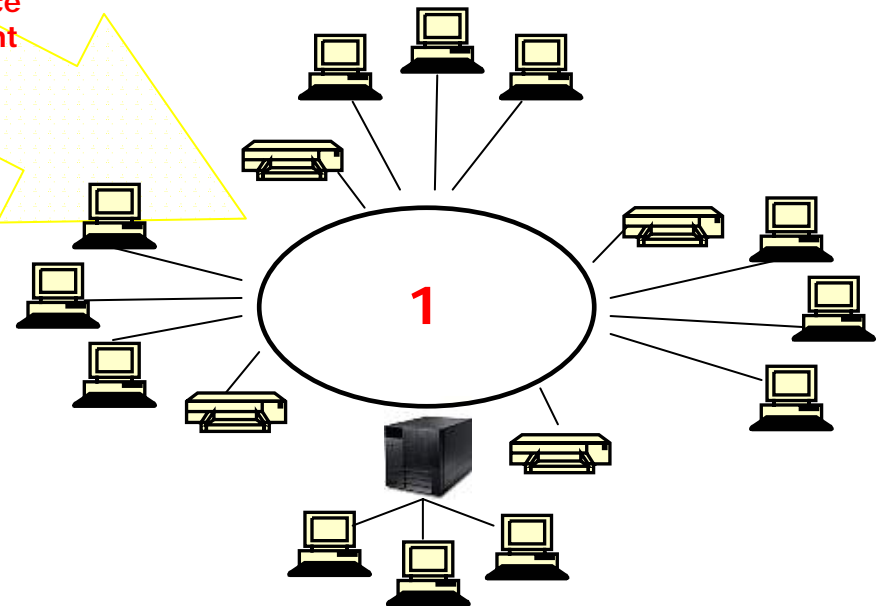
Higher Performance
Better Management
Better Reliability

A typical NT server supports 50 printers where a typical Novell iPrint server supports 250 printers.

Novell iFolder supports unlimited users. Capacity is determined by storage space. This makes it an ideal solution for migration and consolidation.

Some NT environments are still server centric – everything is attached through the servers to the network

They can be migrated to a more network centric approach – the old NT servers are consolidated onto one larger new server and the printers are replaced with network attached devices



File/Print Solutions on Linux

■ Samba

- ▶ Greater Application Performance
- ▶ Lower Licensing costs
- ▶ Placement for NT

■ Novell NLS iPrint

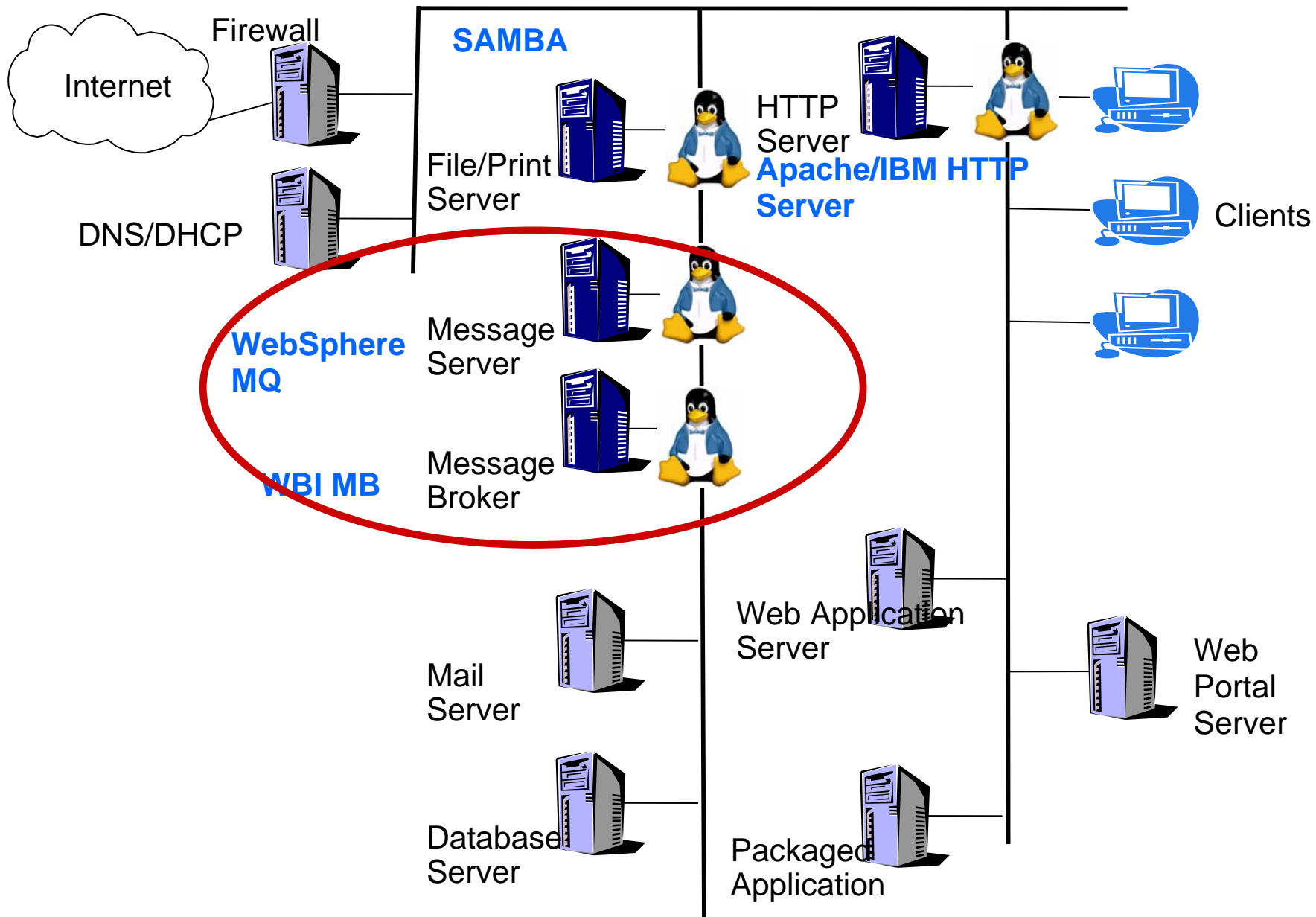
- ▶ Support IPP standards-based printing
 - ➡ For Windows, Mac and Linux clients
- ▶ Web-based maps help users to quickly find and install printers
- ▶ Can replace NT or Netware pre5.1

■ Novell NLS iFolder

- ▶ Personal File management
 - ➡ Anywhere, anytime access
- ▶ Automatically synchronize files between your PCs
 - ➡ Backup you data; internet security
 - ➡ Uses existing Linux file systems
- ▶ Can replace NT and NetWare pre 5.1

Customer Requirement	Samba	iPrint	iFolder
Access and share files			X
Ensure that the personal files of users are backed up and securely available to them from anywhere at any time, day or night			X
Discover and install printers from web browser		X	
Reduce print related costs by enabling users easy access to all the printers across the network	X	X	
Support for mixed environments – Linux, Windows , Unix	X	X	X
Integration with Windows Security tools	X		
Scalable printing	X		
Single sign-on for Linux customer in Active Directory environment	X		
Free to customer	X		
Powerful Configuration Tools	X	X	X
Print spooling occurs on local appliance		x	

You Can Also Switch Your Messaging Infrastructure

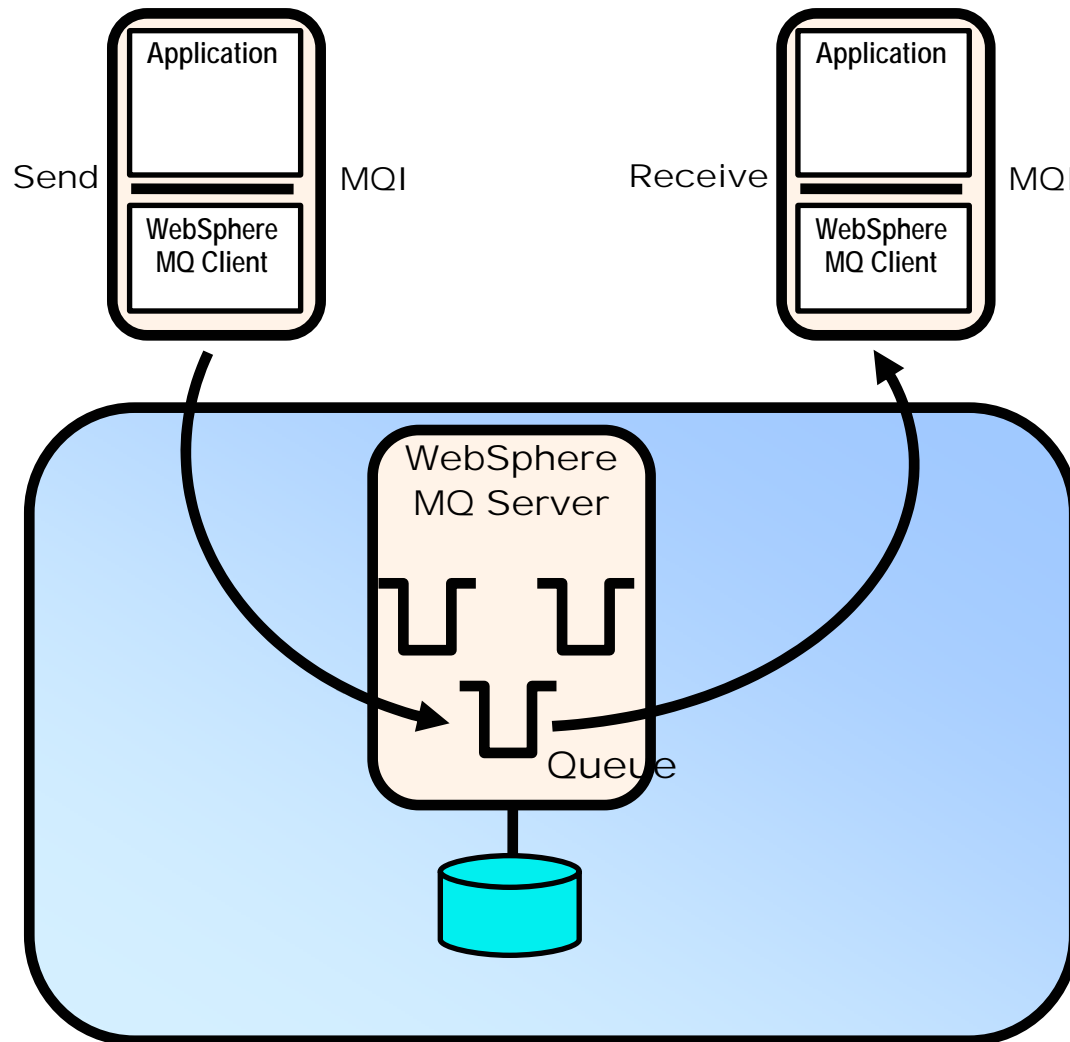


What is a Message Server?



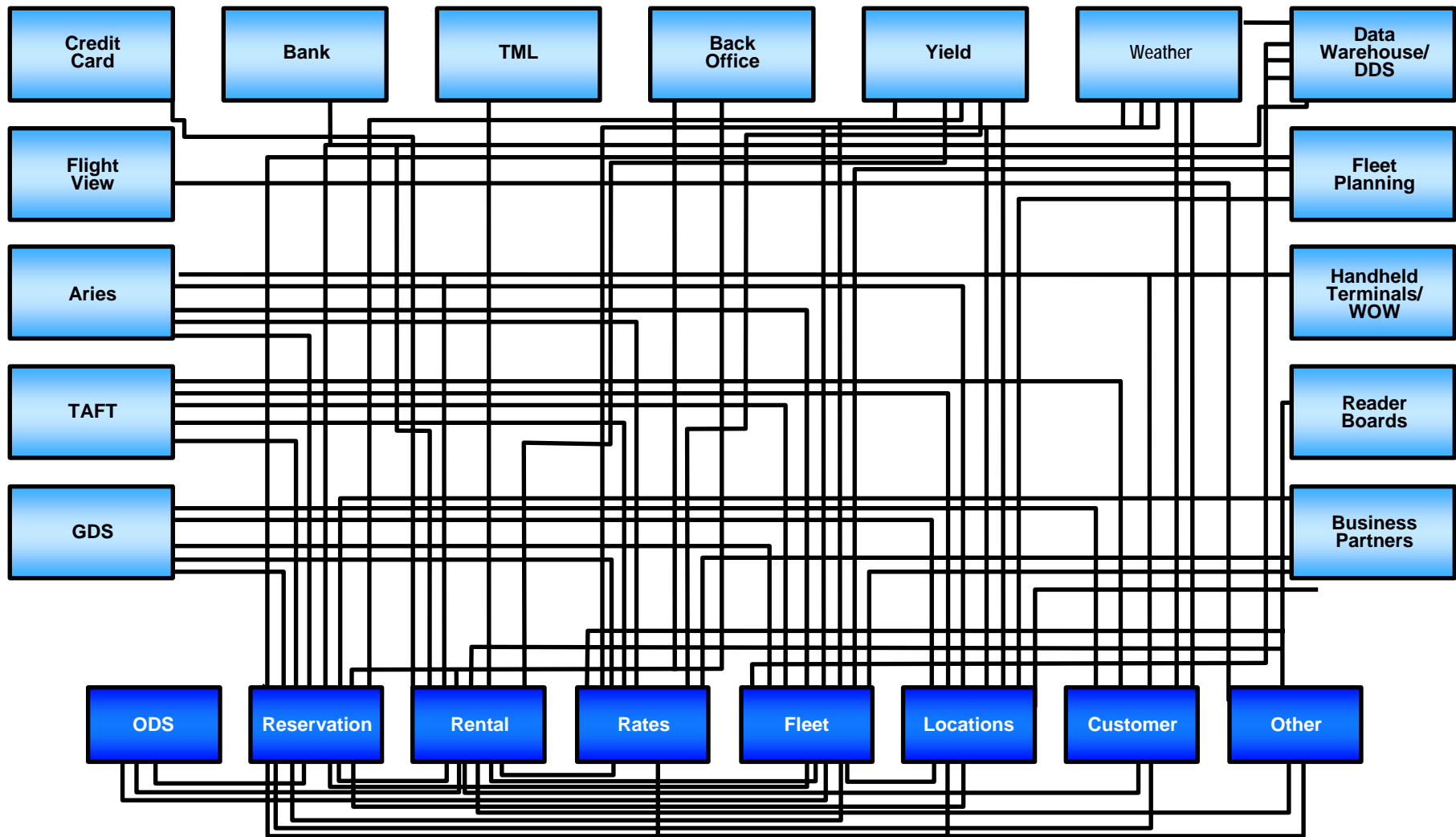
Messaging supported by WebSphere MQ

WebSphere MQ – Message Server



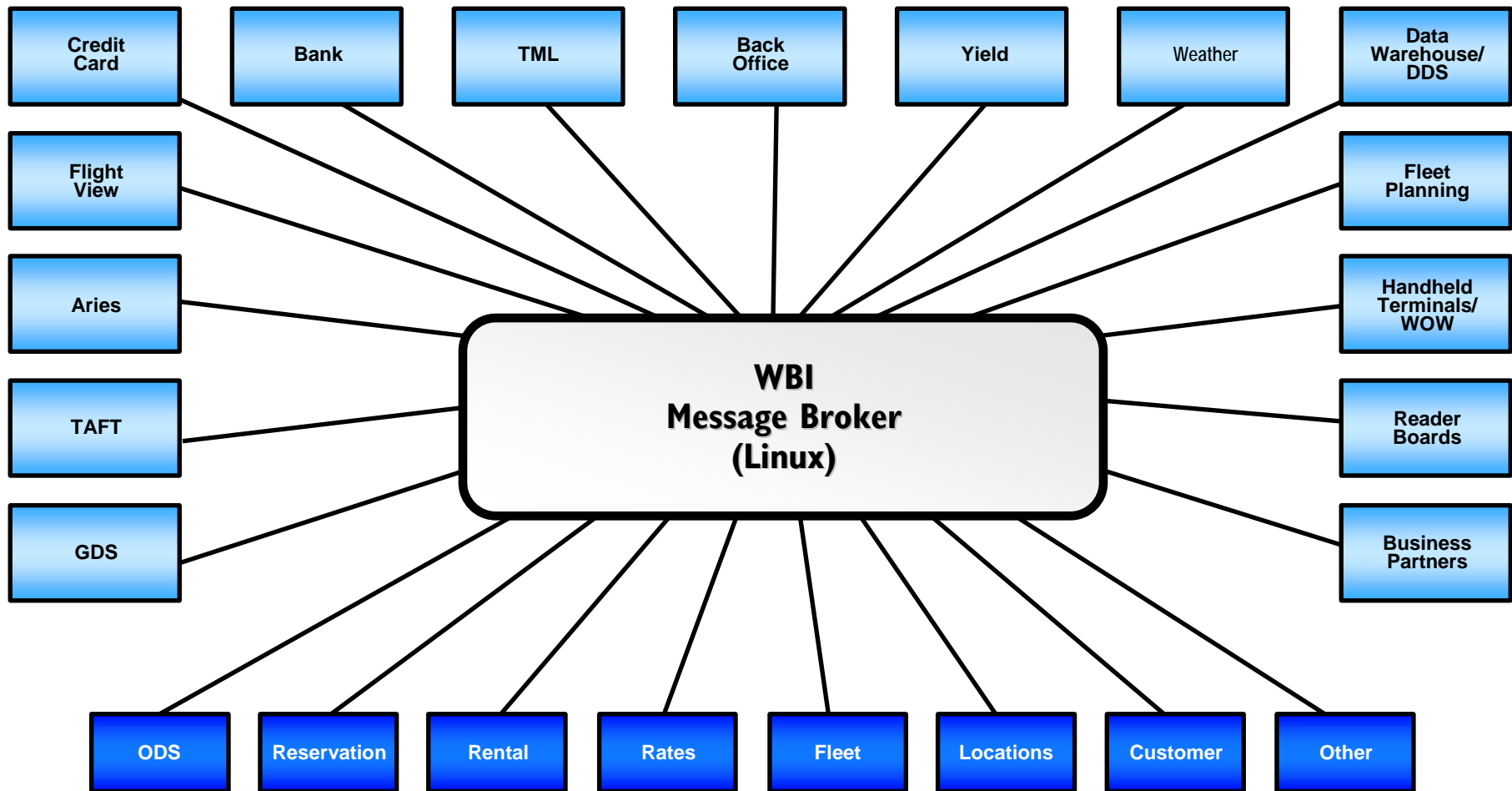
- ✓ Assured Delivery
- ✓ Sender & Receiver need not be running at the same time
- ✓ Message flow control
- ✓ Clustering and failover

This Situation Needs a Message Broker

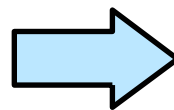


- Modifying one system may mean change to all the ones it connects to

WBI Message Broker

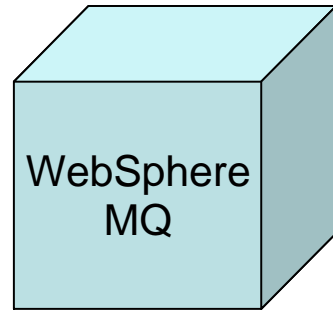


- Concentrate transformation and routing logic
- Each system can be changed independently



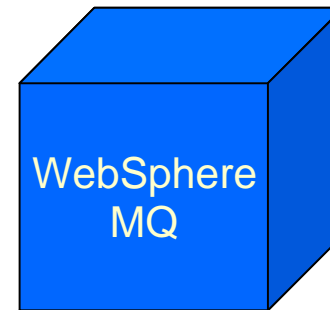
- Easier application maintenance and management

WebSphere MQ and WBI Message Broker Run on Linux

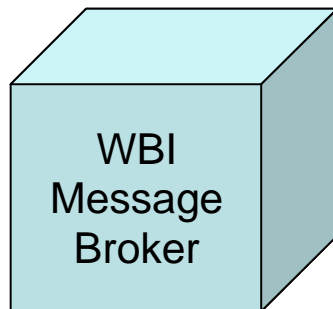


Windows or others

Move

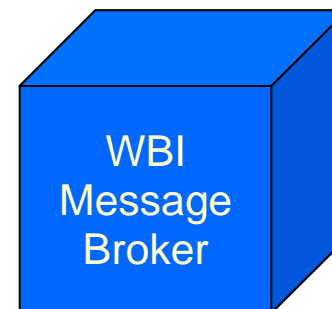


Linux



Windows or others

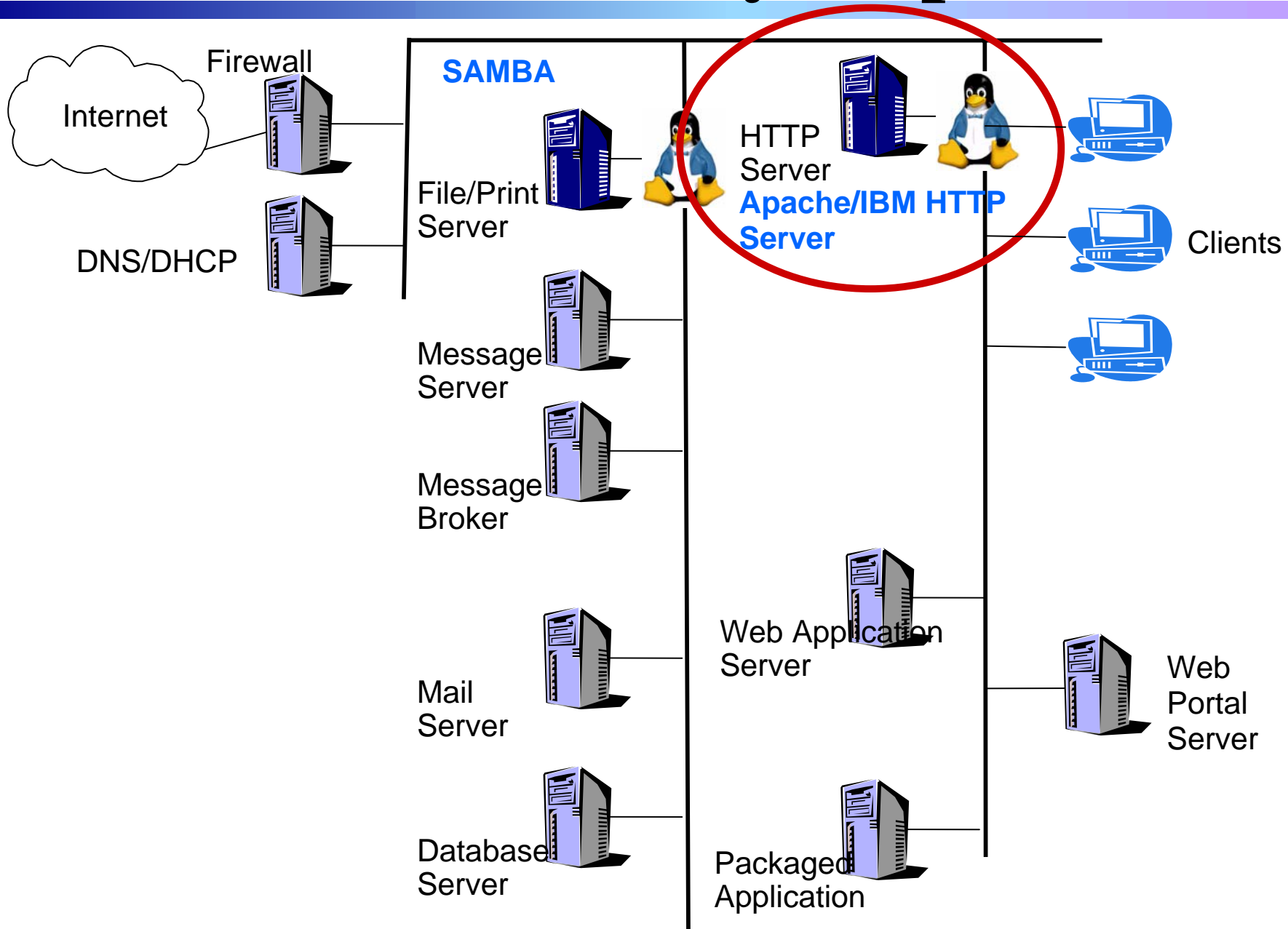
Move



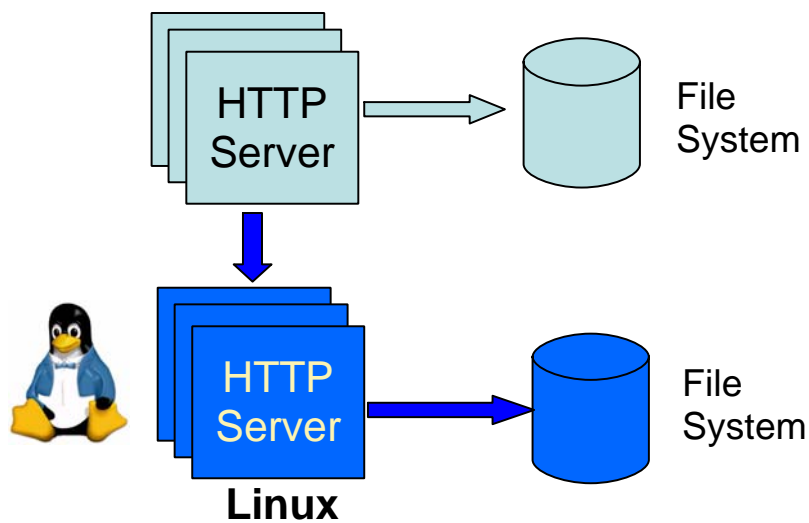
Linux



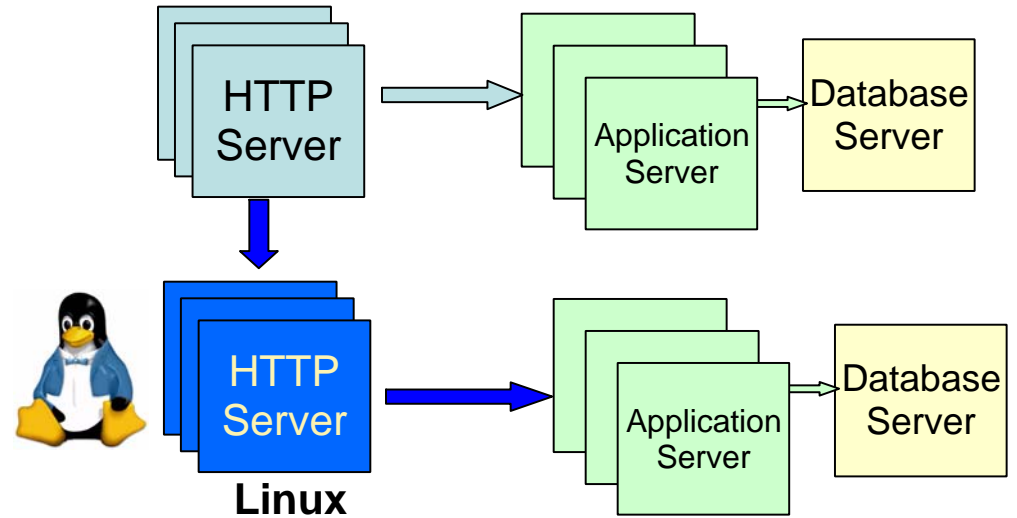
Here's Another Easy Step



Switch HTTP Servers to Linux



Simple HTTP Server
(Static Content)



HTTP front ends to Web Applications Servers
(Dynamic Content)

Apache and IBM HTTP Server

■ What is Apache?

- ▶ Open source Web Server
- ▶ Freely available for download from www.apache.org
- ▶ Flexibility – runs on several platforms

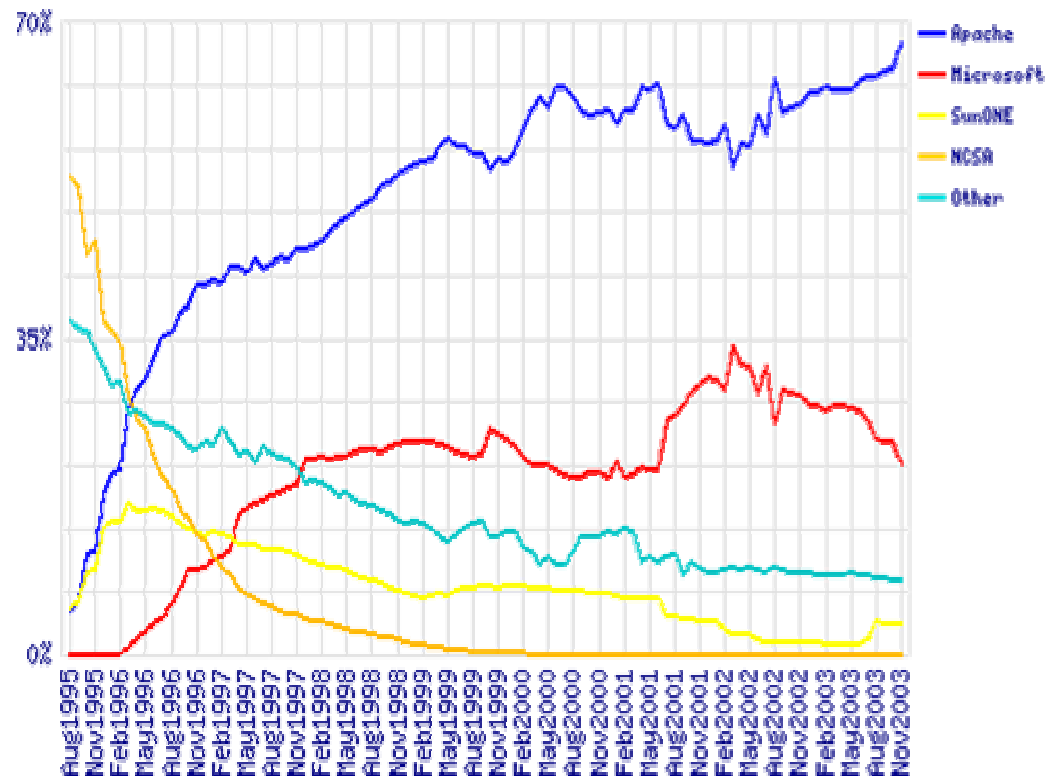


■ What is IBM HTTP Server?

- ▶ Based on the Apache Open source core
- ▶ Freely available for download from IBM
 - www.ibm.com/software/webservers/htpservers/
- ▶ Supported by IBM
- ▶ Advantages
 - Support for SSL Secure connections
 - Hardware crypto support
 - Fast Response Cache Accelerator

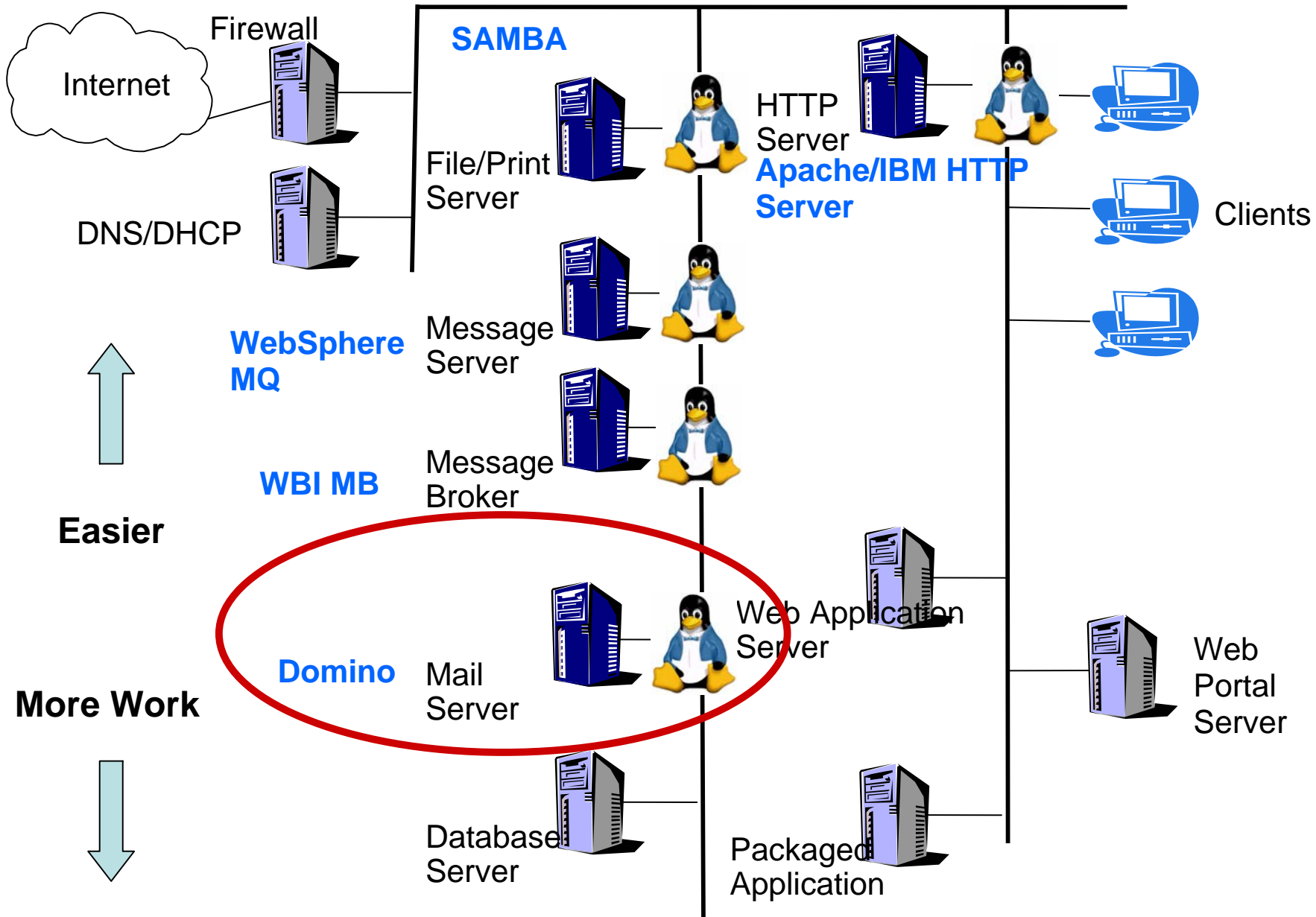
Apache/IBM HTTP Server Benefits

- Freedom from IIS security vulnerabilities
- Extend the use of existing hardware
- Based on Open standards
 - ▶ Start with Open Source Application servers (Tomcat)
 - ▶ Move the application to WebSphere as demands increase
- Consolidate with other infrastructure reducing costs

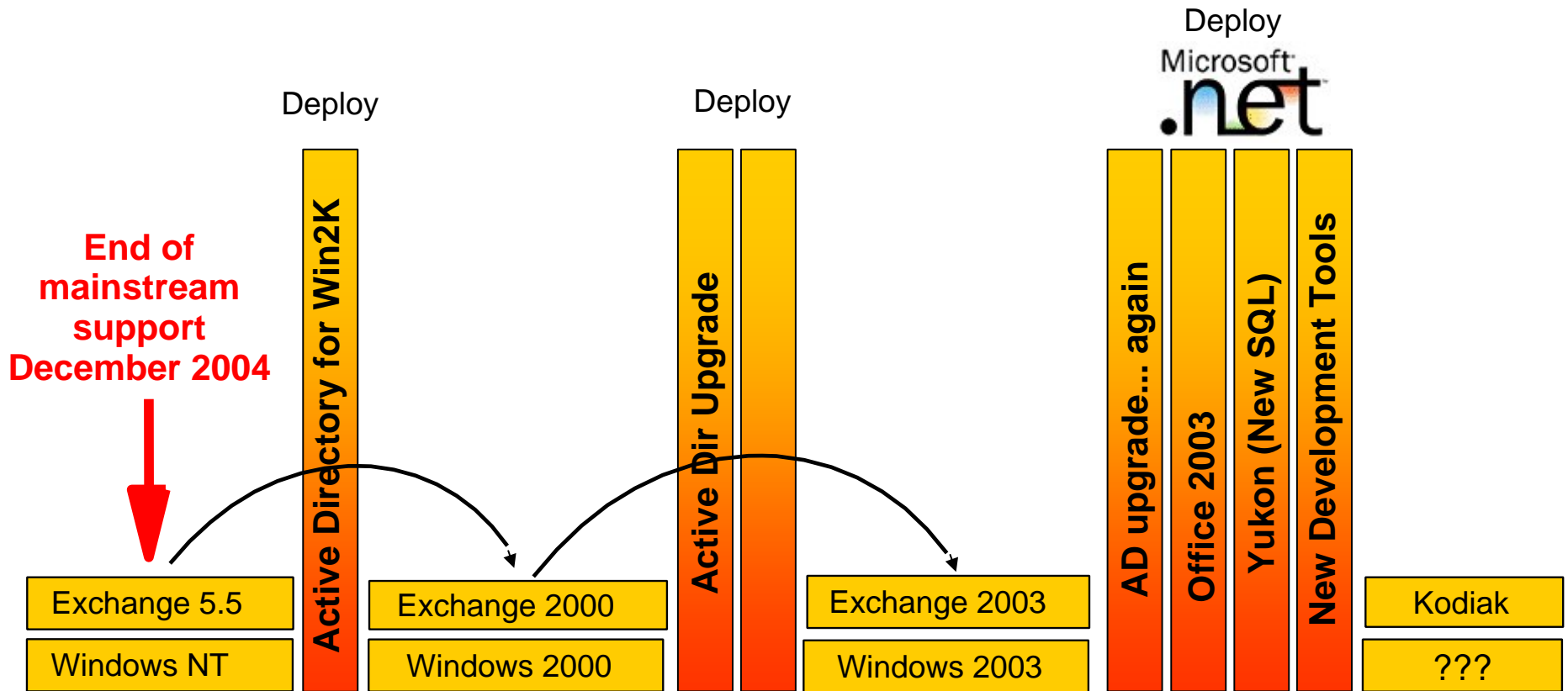


From 1995 to 2003 Apache has the largest installed base

Mail Migration



Exchange Upgrade Path



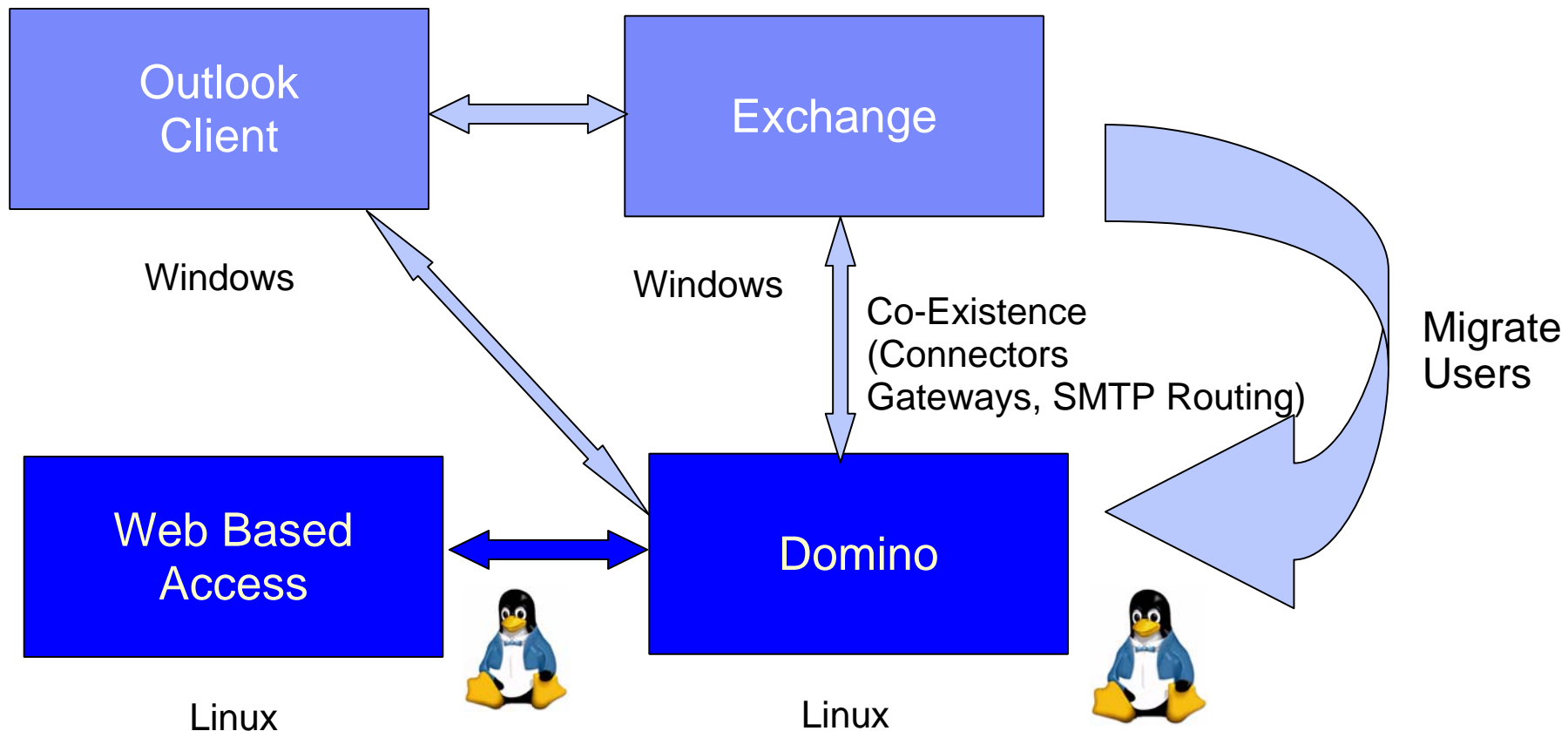
86% of current Exchange install base is on Exchange 5.5 (5+ year old technology)

End-of-support dates are forcing customers to migrate

Exchange to Domino Migration

- Why Migrate?
 - ▶ Exchange Server 5.5
 - *86% of current Exchange install base is on Exchange 5.5*
 - ▶ Microsoft upgrade path pricing
 - ▶ Domino has 46% lower TCO over Exchange¹
 - ▶ Messaging architecture impacts all IT plans
 - Messaging no longer a “point” solution
 - ▶ Domino runs on Linux

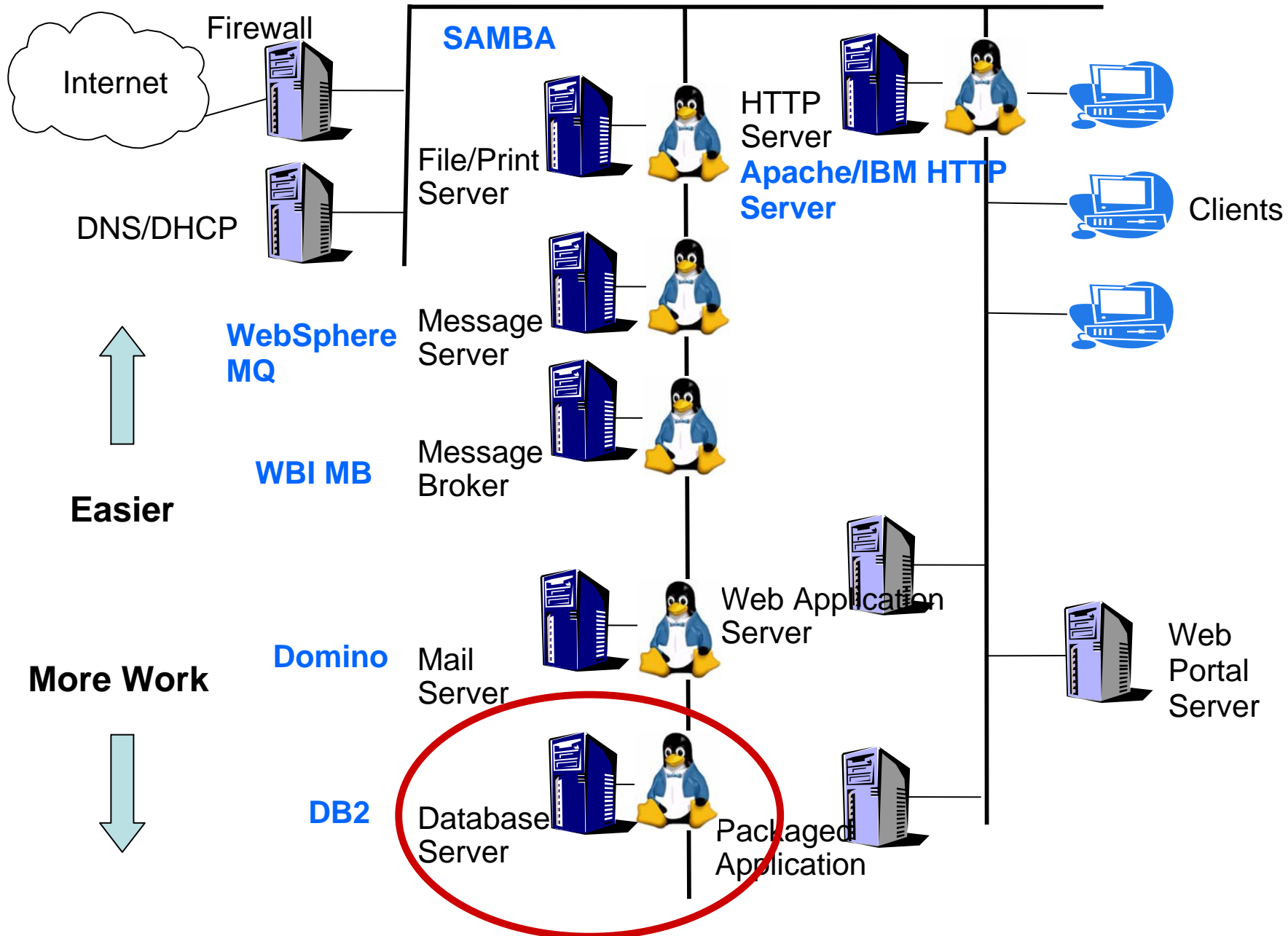
Migration Strategy – Step by Step



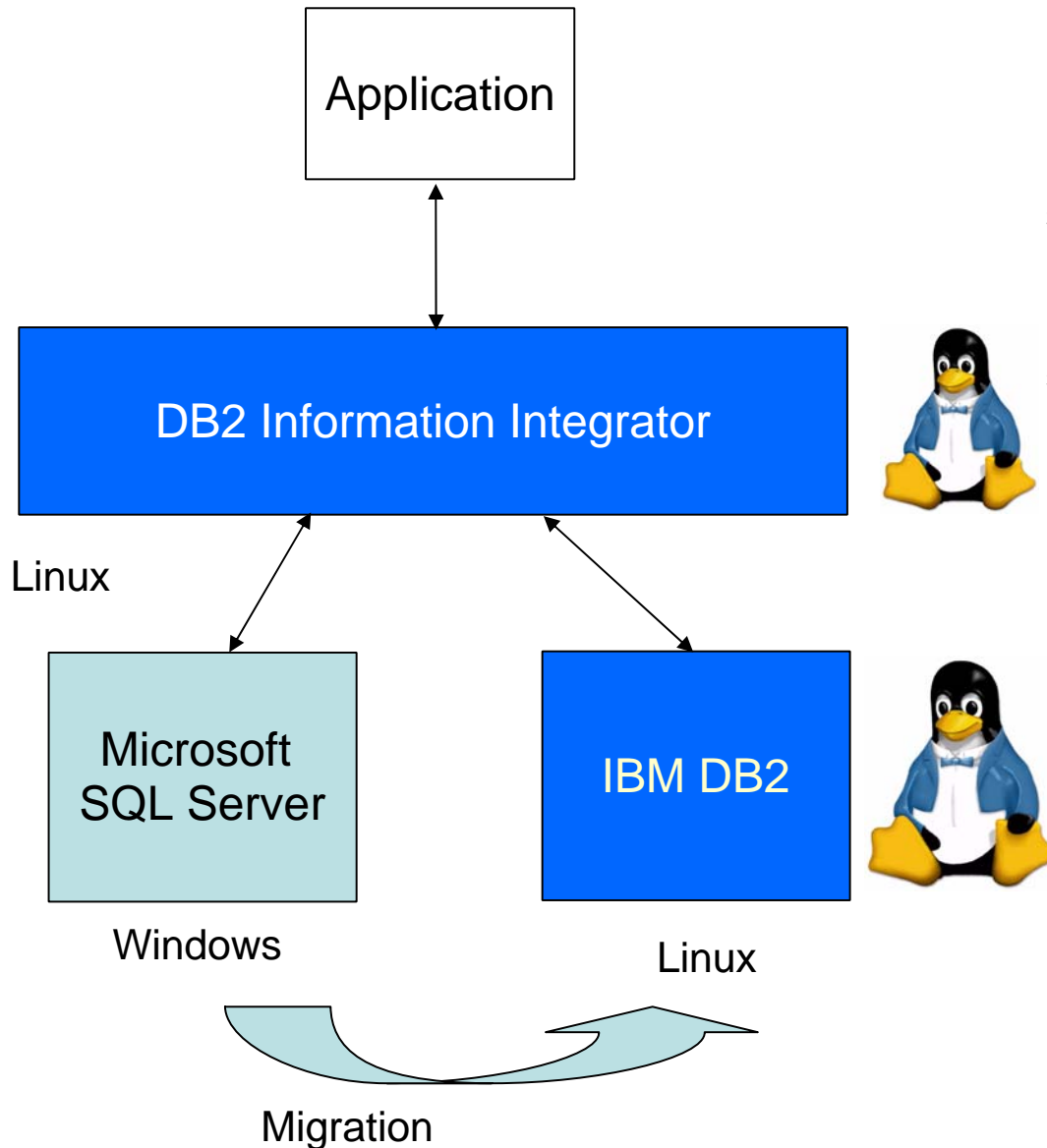
Migration Steps

- 1 Install Domino on Linux
- 2 Co-Exist and Migrate User Accounts
- 3 Switch Exchange server with Domino
- 4 Migrate from Outlook Client to Web Access via Browser
- 5 Uninstall Exchange and Outlook

Database Migration

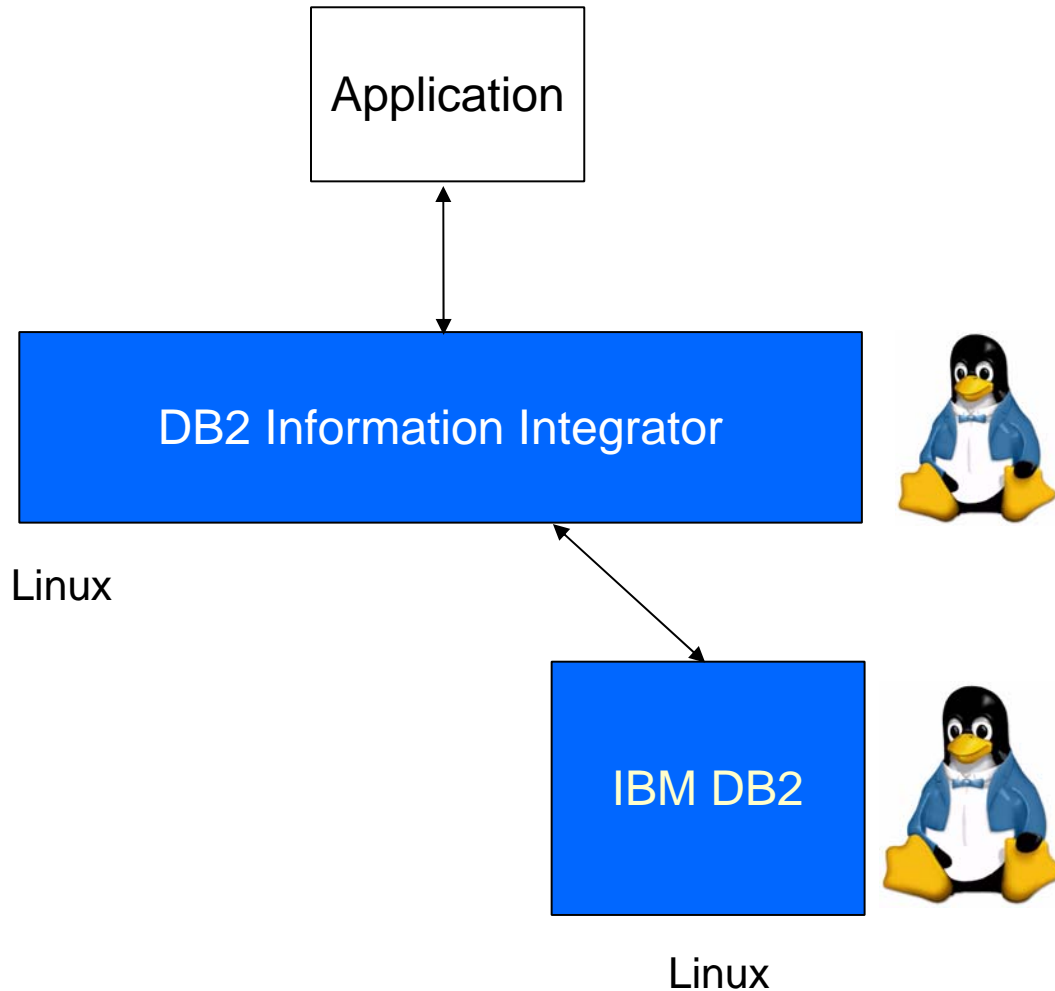


Database Migration – Step by Step Approach



- ### Step by Step Approach to Migration
- 1 Deploy IBM DB2 on Linux
 - 2 Co-Exist with Microsoft SQL Server using IBM DB2 Information Integrator running on Linux
 - 3 Migrate Data from Microsoft SQL server to IBM DB2 on Linux

Database Migration – Step by Step Approach



- ### Step by Step Approach to Migration
- 1 Deploy IBM DB2 on Linux
 - 2 Co-Exist with Microsoft SQL Server using IBM DB2 Information Integrator running on Linux
 - 3 Migrate Data from Microsoft SQL server to IBM DB2 on Linux
 - 4 Remove Dependency on MS SQL Server

Benefits of Database Migration

- Performance
 - ▶ DB2 is 1.5x faster than Microsoft SQL server in TPC-C benchmarks

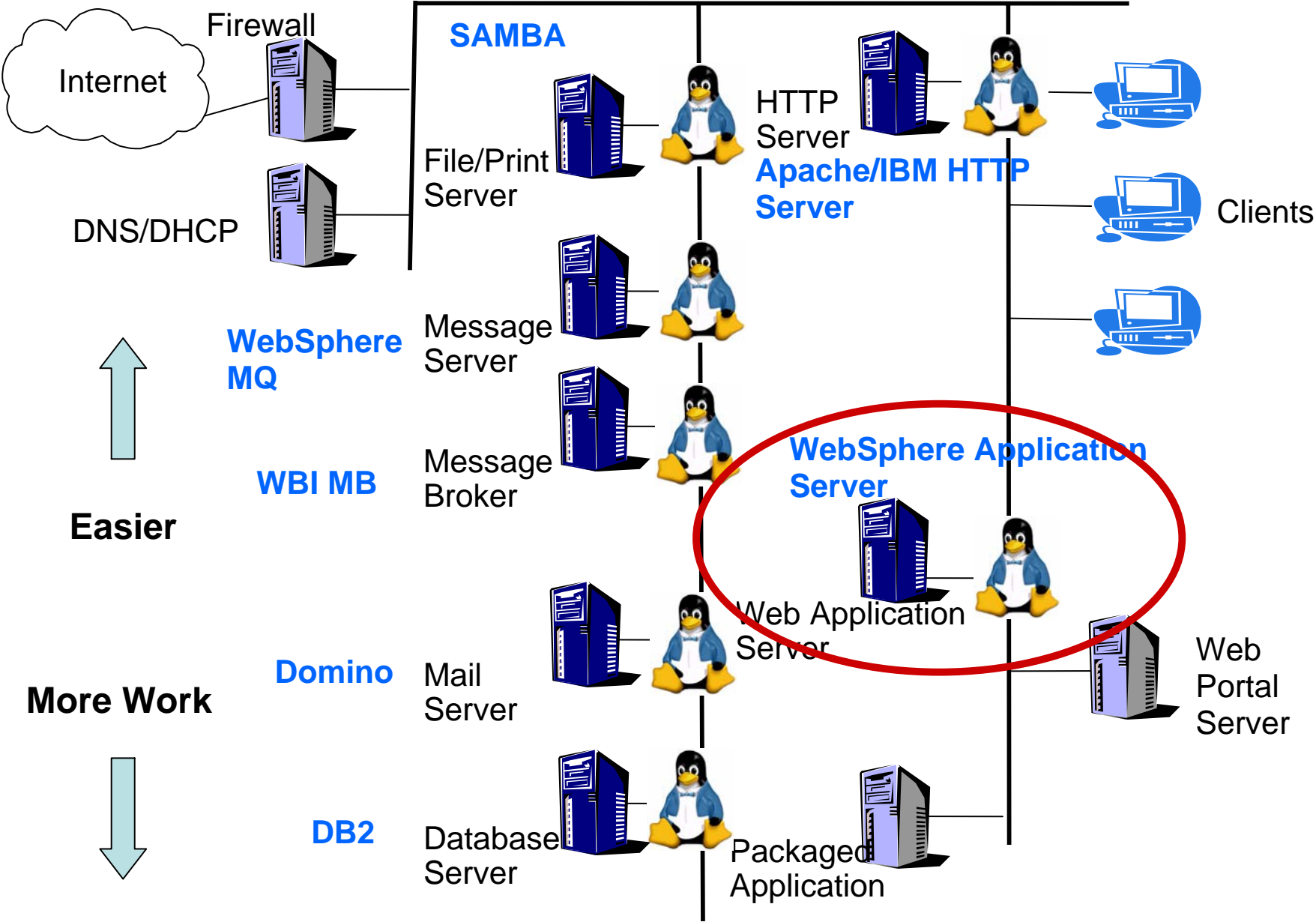
- Scalability
 - ▶ DB2 runs from PC's to Mainframes

- Lower Cost

40 Users on 1 CPU

	DB2 Linux	DB2 Windows	SQL Windows
Database	500	500	4999
CALs	3960 (99*40)	3960 (99*40)	
OS		999	999
OS Cals		1400 (35*40)	1400 (35*40)
Total \$	4,460	6,859	7,398

Web Applications



Comparison of WebSphere/J2EE + Linux and .NET

WebSphere/J2EE + Linux

Open Standards

Applications can also run on non-Linux platforms

Strong Distributed processing environment

Container concept makes programming easier

Customer driven upgrades

Better performance in real-world workloads

Better Scalability

Tighter security

Lower cost

.NET

Proprietary architecture

Limited to Windows

More manual coding

Upgrades not customer driven

Limited Scalability

Security Exposures

Migrate From .NET to J2EE

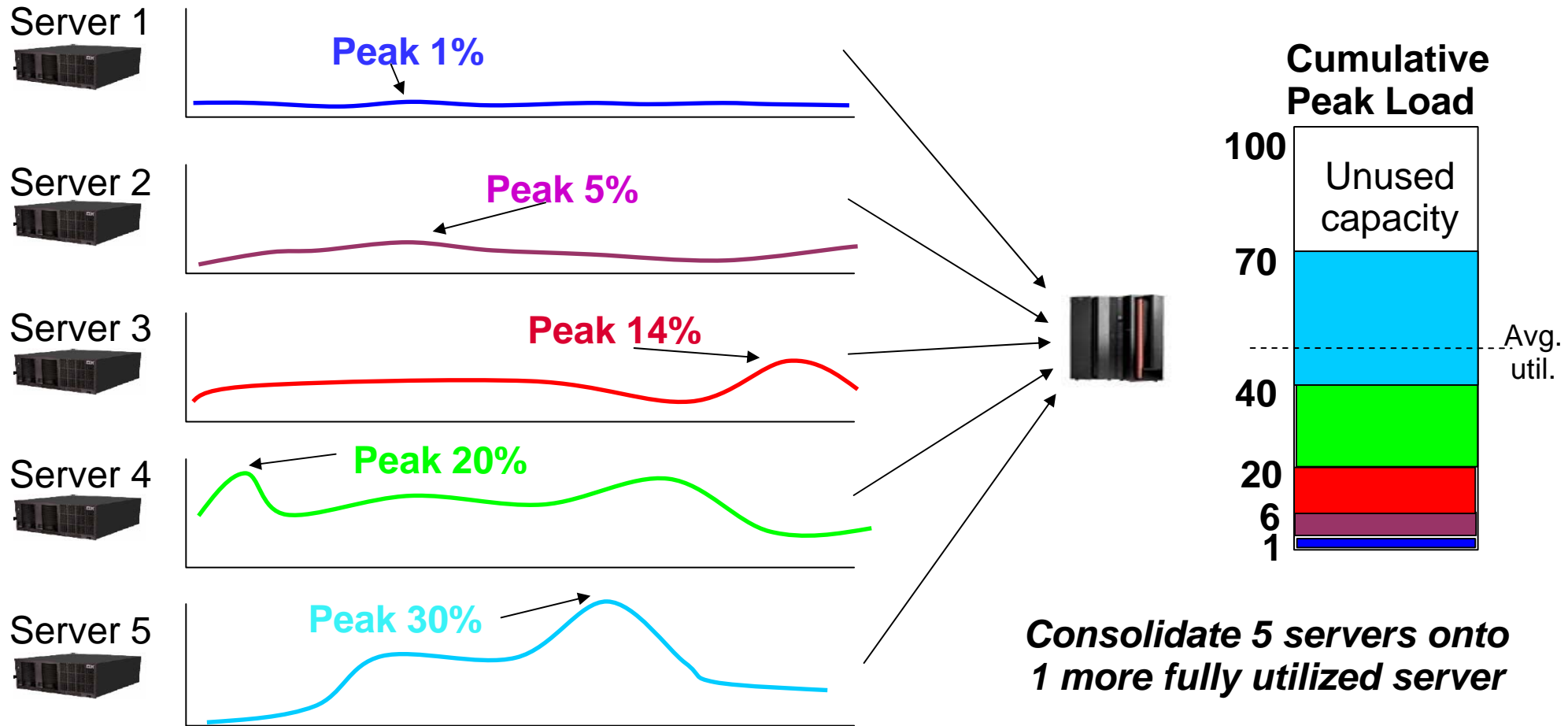
■ Migration Options

- ▶ Leave applications as is
 - Create web services that access the existing applications
 - Use software “bridge” that allows Java components to interact with COM components as if they are Java components and vice versa
 - IBM's Bridge2Java
 - Available for download from <http://www.ibm.com/alphaworks>
 - Most 3rd party products are bridges
- ▶ Convert applications to Java/J2EE
 - Automatically with tooling
 - Through service engagements
 - Combination of both

Other Considerations

- Infrastructure Simplification / Server Consolidation
 - ▶ Improve Utilization of Servers and Storage
 - ▶ Save costs: Lower CPU license cost
 - ▶ Simplify management
- Clustering
- Why IBM xSeries servers?
 - ▶ Investment in innovation
 - Technology leverage, on demand, 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
- Why IBM FAStT Storage?
 - ▶ Low-cost, easy to set up, easy to expand, SAN-attached fibre disk, works with Windows and Linux, handles Clusters, Server consolidation, Simplified Management
 - ▶ Modular design allows pay-as-you-grow upgrades to keep pace with your application environment as it evolves
- Why IBM Management software?
 - ▶ IBM IT Director: can save you time and money by increasing availability, tracking assets, optimizing performance and enabling remote maintenance.
 - ▶ Tivoli Storage Manager: scales up to manage, administer, and automate data protection for any size organization

Server Consolidation Example - Do More with Less



Consolidation also simplifies management tasks, and reduces system downtime.

Partitioning Technologies

Hardware Partitioning

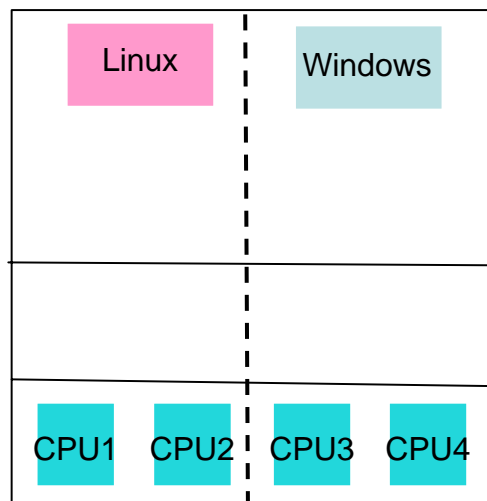
- xSeries
- Partitions are electrically isolated
- Partitions rely on structure of underlying system hardware
- Least overhead
- Best fault isolation
- Partition can only be altered when OS offline

Logical Partitioning

- LPAR on zSeries, pSeries, iSeries
- Resource partitioning via hardware microcode/firmware
- Platform specific
- Efficient
- Better fault isolation
- Resources can be partitioned dynamically

Software Partitioning

- z/VM on zSeries, VMware on xSeries
- Resource partitioning via software
- Can support wide range of operating systems
- Easy to implement
- More overhead on the system
- Complete fault isolation not possible
- Resources are allocated dynamically

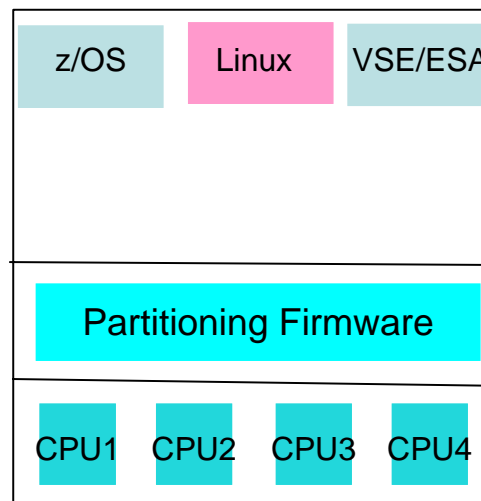


xSeries example

Software

Firmware

Hardware

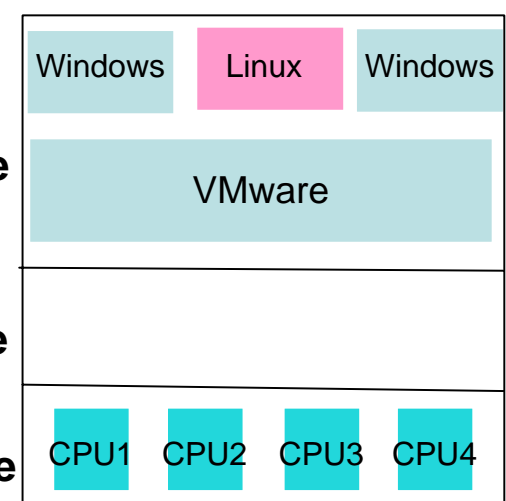


zSeries example

Software

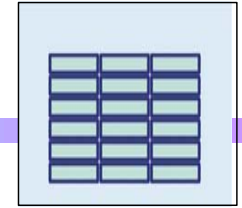
Firmware

Hardware



xSeries example

High Performance Clusters



- Value Proposition:
 - ▶ Improve performance & speed - Network/networked applications
 - ▶ Improve uptime/availability - systems, networks or applications
 - ▶ Streamline management
 - ▶ Pre-built/ tested/integrated configurations
 - ▶ Scalability & availability - Parallel environments
 - ▶ Compelling price/performance
- Applicability across Industries and Application Segments:
 - ▶ Supercomputing
 - ▶ Seismic processing
 - ▶ Life Sciences
 - ▶ Digital Media
 - ▶ Financial (Quantitative Analytics, Risk Management)



Summary of Steps

- Switch to Linux infrastructure on servers to derive immediate benefits
 - ▶ Samba, Web Server, Messaging infrastructure
- Migrate to Linux to save further costs
 - ▶ Exchange to Domino migration
 - ▶ SQL Server to DB2 migration
 - ▶ Migrate your ASP.NET to WebSphere/J2EE
- Consolidate your workloads onto Linux servers to gain bigger cost savings on server, storage, and management, and licensing

xSeries Value Proposition

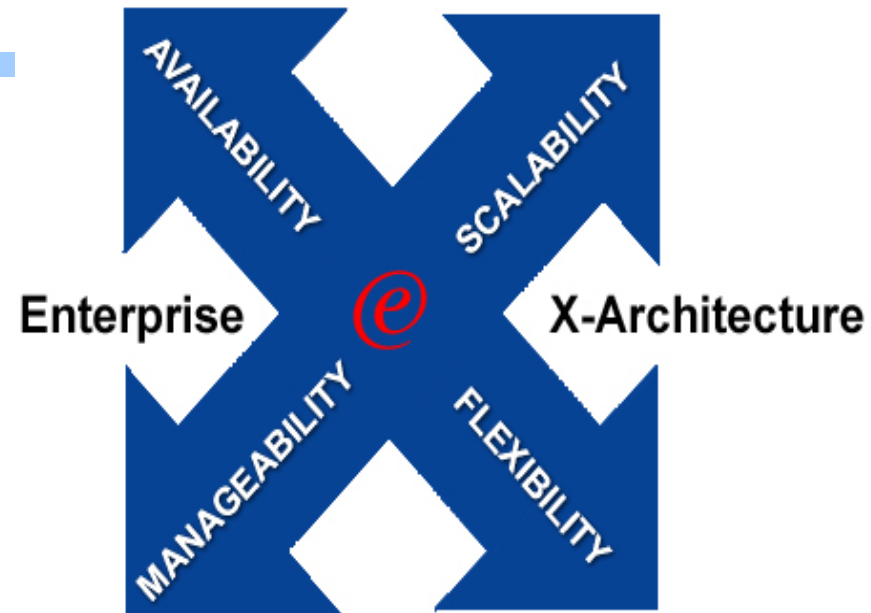
■ Investment in innovation

- ▶ 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

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 335



xSeries 382



xSeries 365



xSeries 306



xSeries 345



xSeries 343
NEBs Solution

Distributed Tower Servers

Uni to 4-way SMP



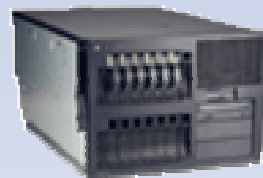
xSeries 206



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

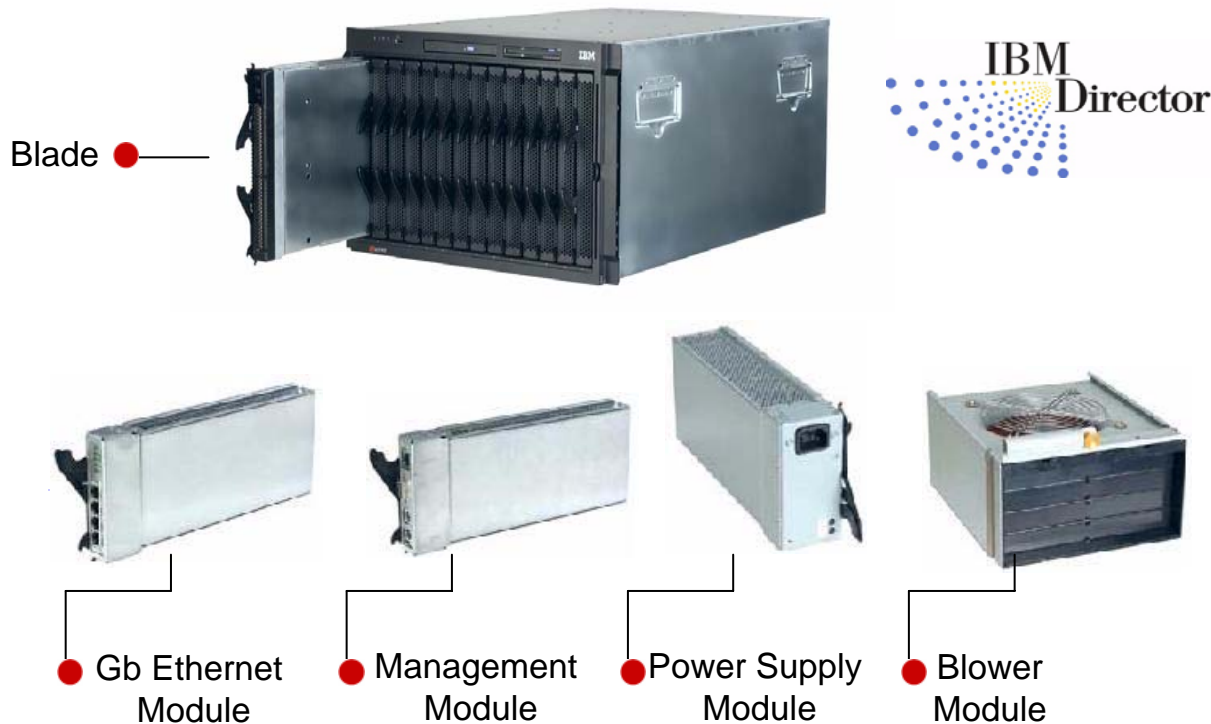
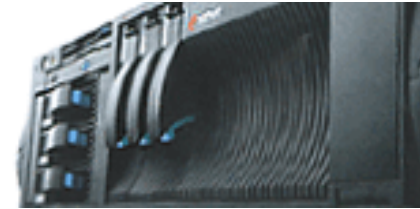


Z Pro

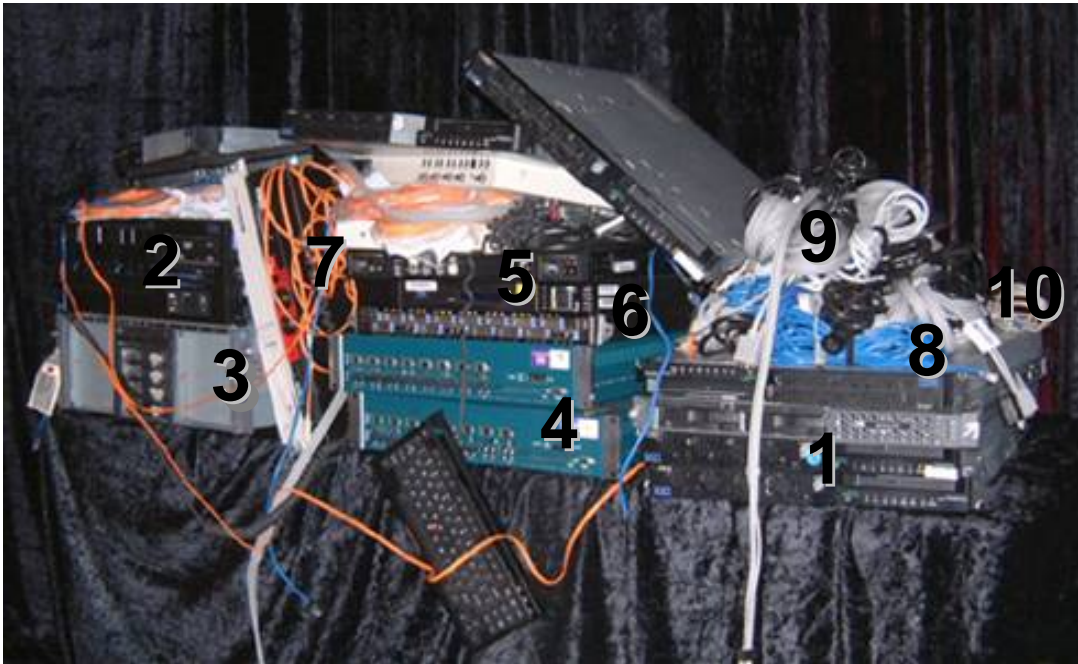
BladeCenter Solutions

Industry-leading highly dense server form factor

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



Reintegration of the Datacenter



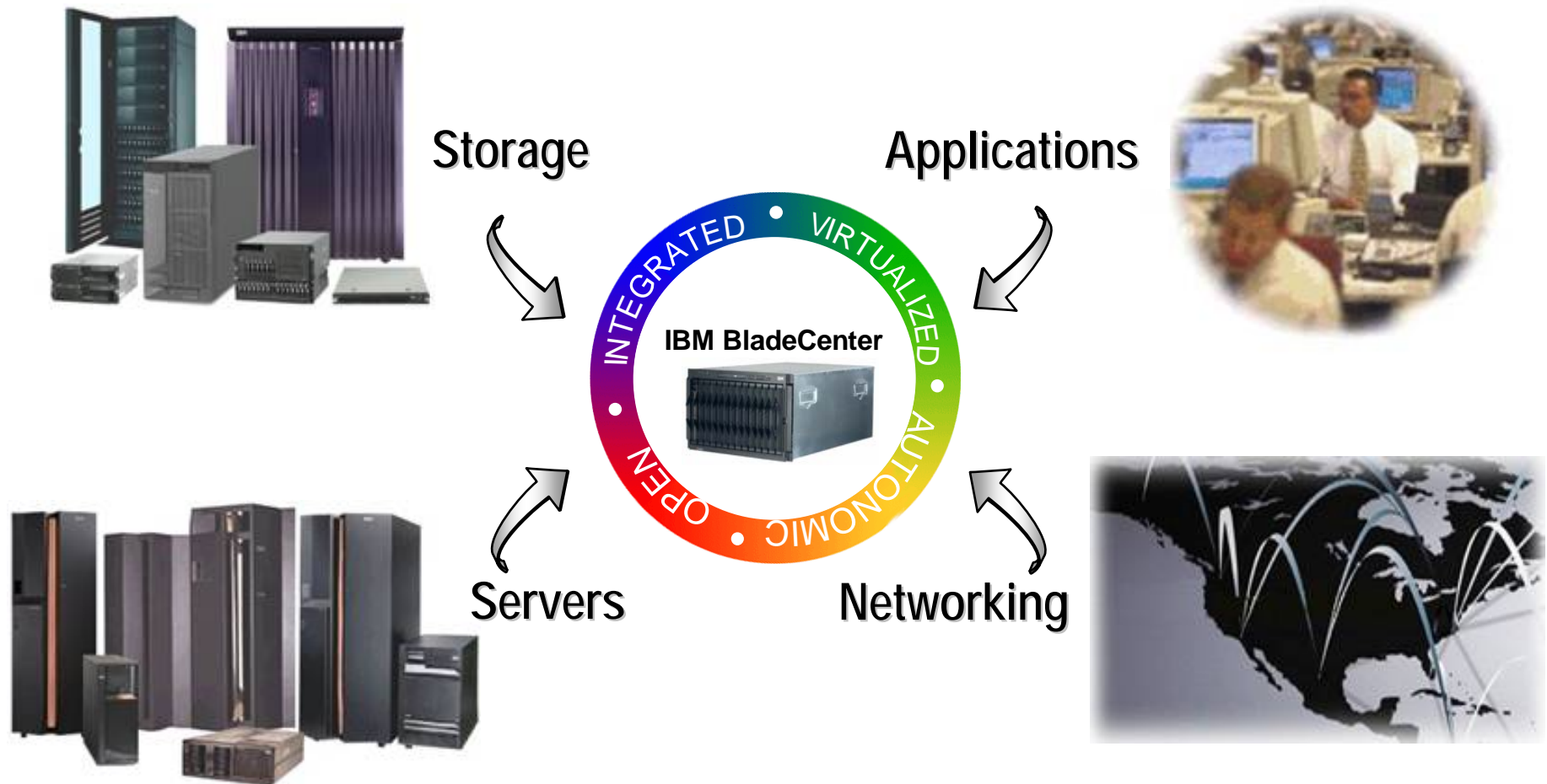
Typical Datacenter Configuration

- | | |
|-----------------------------|-------------------------|
| 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/

IBM Linux Value

- Technical Support
- WW Competence Centers

Worldwide
Porting Centers

Linux
Technology Center

Linux Sales
Specialists

Linux
Integration
Center

Products

Linux Enabled
Business Partners

Linux
Services

www.ibm.com/linux

Linux
Whitepapers
and
Redbooks

OSDL

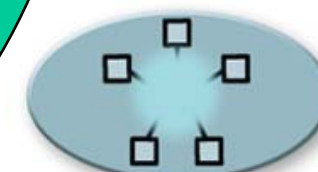


xSeries Linux Customer References

2004



Industry Applications



Infrastructure Solutions

Shainin

VISION

- Quality control consulting and training firm wanted to grow its business using nationwide e-mail system to connect remote employees.

CHALLENGE

- Security of existing Microsoft Windows-based e-mail system was vulnerable to hackers and had been compromised, causing costly errors in logistics.



SOLUTION

- Sytek Services, a division of IBM Premier Business Partner DSG, migrated the e-mail system and other applications on six Windows servers onto one IBM eServer xSeries system running ESX Server software from IBM Business Partner VMware. Shainin plans to run Linux operating system on xSeries virtual servers and leverage SUSE LINUX Openexchange server for groupware and collaboration.

BENEFITS

- **More secure operating environment for mission-critical e-mail system**
- **Savings in operating system upgrade and maintenance costs**
- **Ability to scale to rapid growth in users**

Vedes AG

VISION

- German toy retailer needed to expand market share in Europe to compensate for slow growth in home market.

CHALLENGE

- Overcome poor performance problems in existing SAP infrastructure based on Microsoft Windows.



SOLUTION

- Vedes migrated its SAP R/3 system to two clustered IBM eServer xSeries 445 servers running SUSE LINUX Enterprise Server. IBM TotalStorage FAStT600 Storage Server, IBM Ultrium Scalable Tape Library, Tivoli software from IBM and SteelEye LifeKeeper for Linux now help keep availability high. IBM Business Partner CC Computer Concept provides SteelEye and Linux support.

BENEFITS

- **Lower operating costs with Linux operating system**
- **Scalability to expand the system as needed and grow economically with xSeries servers**

American Society for the Prevention of Cruelty to Animals

VISION

- Animal welfare organization needed reliable, secure e-mail system to keep employees connected with organization's life-saving information resources.

CHALLENGE

- Mission-critical Windows e-mail server crashed repeatedly, stalling ASPCA operations and threatening organization's ability to fulfill its mission to help animals.

SOLUTION

- ASPCA chose to migrate from Windows to Red Hat Linux running on xSeries servers. IBM Business Partner Siwel Consulting developed a new Lotus Notes e-mail infrastructure based on IBM Lotus Domino Web Access on two clustered IBM eServer xSeries 225 servers running Red Hat Linux, and IBM Lotus Domino. IBM WebSphere Edge Server prevents security breaches.

BENEFITS

- **100% availability since the new e-mail system was installed**
- **30% reduction in TCO**
- **Ability to focus on core mission of saving lives of animals**



Get Started Today!



- Many companies are migrating 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



IBM