iSeries Server Consolidation Solutions for Windows 2000

www.ibm.com/eserver/iseries/windowslinux

George Gaylord
Craig Johnson
iSeries Product Marketing

Customers are moving to Windows 2000 Servers

NT Server™ support starts ending Jan 1, 2003

- Customers should upgrade to Windows 2000 Server™
  - http://www.microsoft.com/ntserver/ProductInfo/Availability/Retiring.asp on 4/24/02

Upgrade Advantage Program ends July 31, 2002

- Customers that purchase Upgrade Advantage contract receive Windows 2000 Server for no additional charge - prices go up significantly after July
  - http://www.microsoft.com/windows2000/server/howtobuy/pricing/saua/overview.asp on 4/24/02

Differences in Windows 2000 Server Licensing can be costly

- More users need Client Access Licenses
  - http://www.microsoft.com/windows2000/server/howtobuy/pricing/model.asp on 4/24/02

New servers may be required with new Microsoft™ Operating Systems

- Each application typically require its own server

Growing people costs to manage server farm

- Numerous Windows security exposures reported
- Servers are often not the same
- Capacity may be in the wrong place

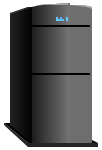
Poor availability record

- Is something always broken?
- Are servers coming off warranty ?

Current Customer Environment Example

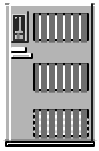
Windows
Application Server

Windows
Application Server

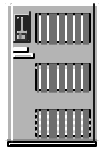


- Multiple Windows servers
- Moving to Windows 2000
- Growing operations costs and limited staff
- Poor availability
- Storage management is out of control
- Multiple, inconsistent backups
- Aging capacity in a variety of places
- Servers coming off maintenance
- No test environment
- Cuts to IT Budget

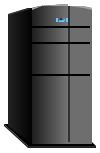
File Server



DNS/DHCP Server



File Server



iSeries Servers Offer Choices to Consolidate Intel Servers

iSeries Windows Integration Offerings Can Provide a Better Windows Environment

- Choice of servers to meet workload requirements
- Advanced Storage, User, and Server Management
- Standard Windows 2000 Server software

Linux offers an Alternative

- Open Source Solutions
- Partitioning support with virtual storage
- Linux from Leading Distributors

OS/400

- Supports standards: TCP/IP servers, File and Print Server, Apache
- Expand with DB2, Java™, or Domino

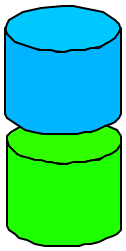
Application Alternatives

Windows Application	Linux Alternative	OS/400 Alternative
Windows File and Print Server	Samba	OS/400 NetServer
Microsoft IIS	Apache	Apache
DNS/DHCP	DNS/DHCP	DNS/DHCP
Exchange	Bynari	Domino iNotes
SQL Server	MySQL	DB2 UDB
Citrix Metaframe		
ISA Server (Proxy)	Squid	OS/400
Firewall from 3rd Party	Netfilter	

iSeries Windows Server Management

Reduce server farm administration and storage management costs

iSeries



HSL (RIO)

xSeries

Integrated xSeries Adapter

Attaches:

x360 and x440*

x255*

NEW!

Integrated xSeries Server

1 GHz Intel Server

iSeries Support

- iSeries Models 270, 820, 830, 840, and 890
- OS/400 V5R1 and V5R2

Windows Logo Support

- IXS - NT Server and Windows 2000 Server
- IXA - Windows 2000 Server and Advanced Server

Share iSeries resources

- Disk, tape, DVD, CD-ROM

* Selected x255, x360, and x440 servers

xSeries Servers Supported with IXA

x360

- 1-4 way server
- 1.4 to 1.6 GHz
- 3U Rack server

x255

- 1-4 way server
- 1.4 to 1.6 GHz
- Tower or 7U Rack server

Enterprise X-Architecture

- First servers with new Intel Xeon™ MP™ Processors
- Active™ Memory (hot-swap and hot-add)
- Active™ PCI-X
- XpandOnDemand™ Scalability
- RXE-100 Remote Expansion Enclosure
- XceL4™ Server Accelerator Cache

X-Architecture Technology

- Chipkill™ memory
- Active™ PCI & PCI-X
- Light Path Diagnostics™
- Extensive Predictive Failure Analysis
- Redundant Components
- IBM Director

x440

- 1-8 way server
- 1.4 to 1.6 GHz
- 4U Rack server

www.ibm.com/eserver/xseries

User Administration

Problem

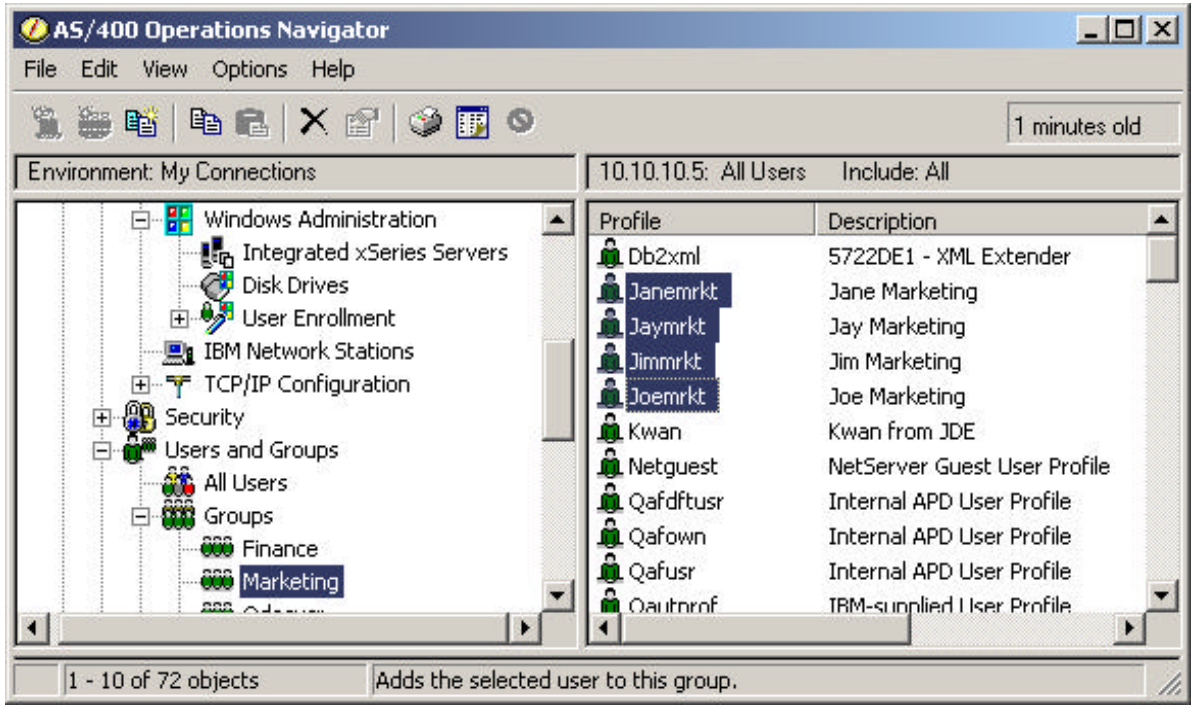
- Multiple system user management

iSeries Solution

- Adding OS/400 Users and Groups to Windows 2000 Server Domains and Synchronizing Passwords

Benefit

- Can reduce costs with integrated user management



Disk Management

Problem

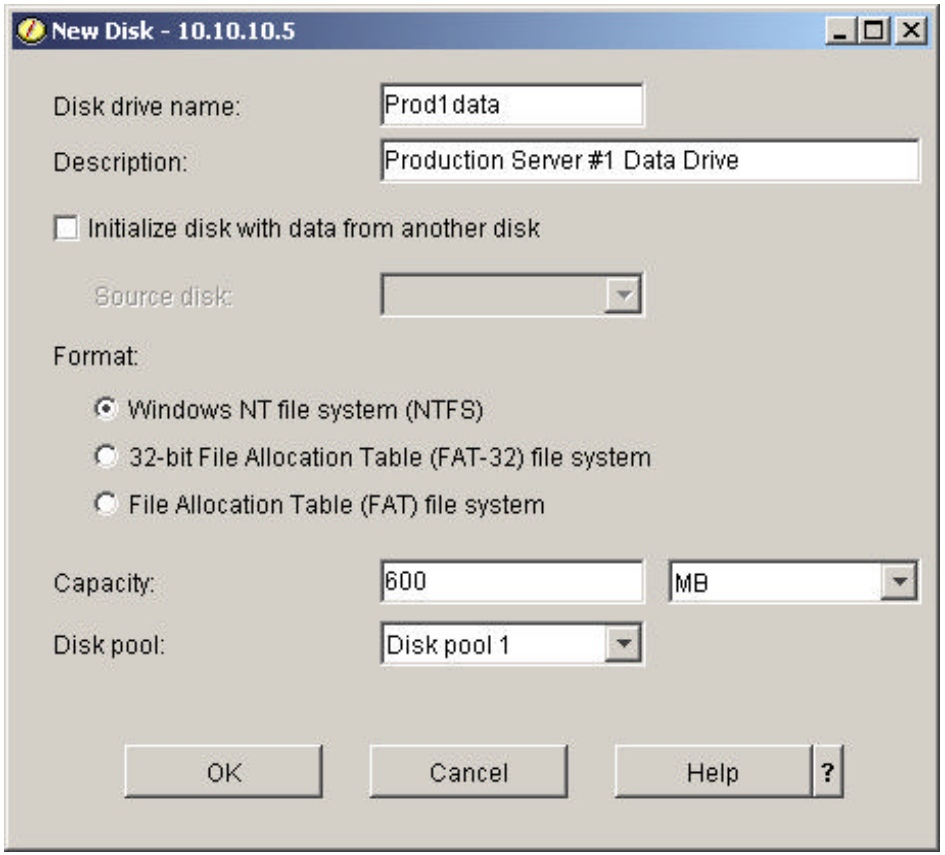
- Storage management across the server farm

iSeries Solution

- Flexible Virtual Disks from 1 MB to 64 GB.
- Up to 2 TB per Windows server
- Hot add of iSeries Storage Space to Windows 2000 Server

Benefit

- Can reduce costs with flexible, centralized storage management



Backup

Problem

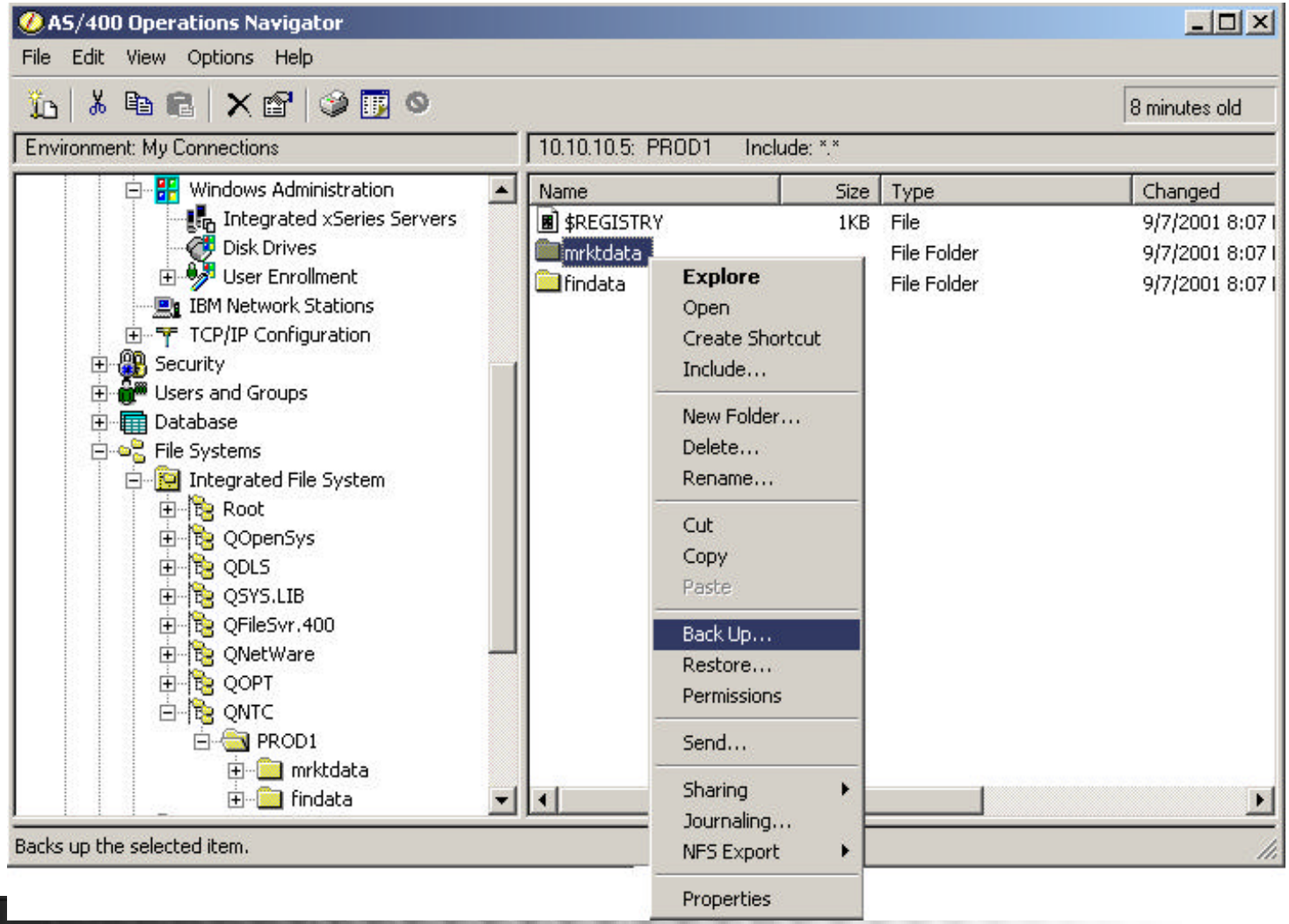
- Managing heterogeneous backups

iSeries Solution

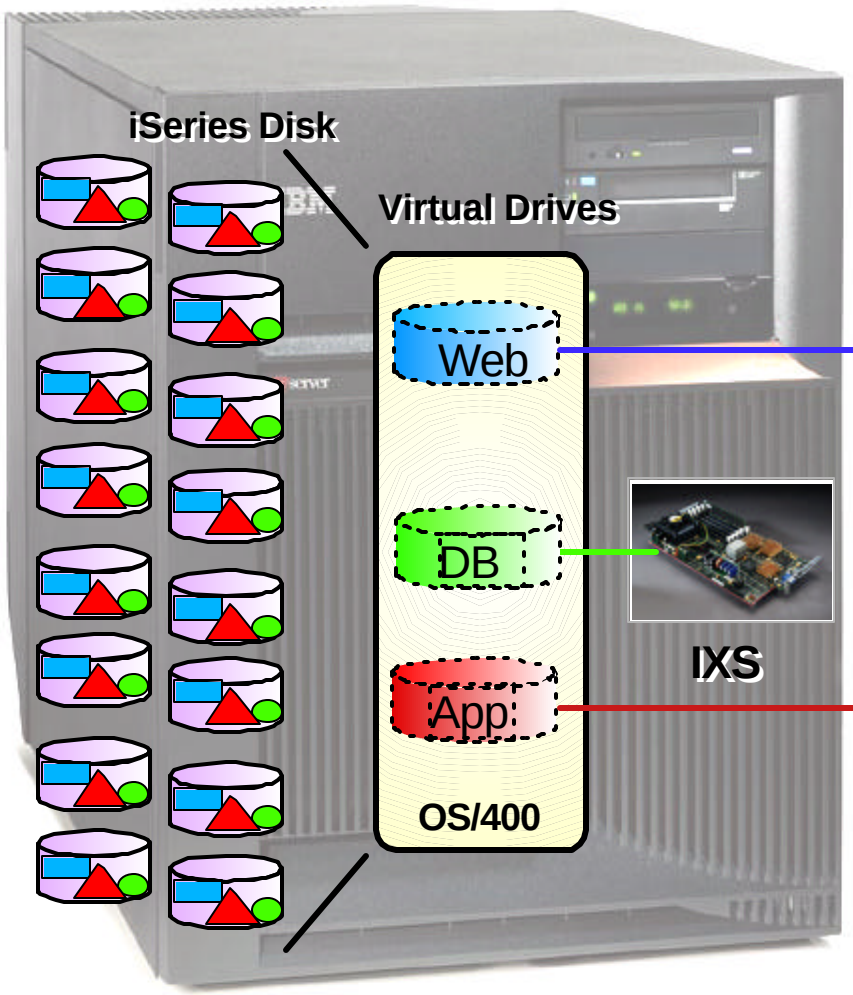
- Save OS/400 and Windows storage spaces to iSeries tape drives

Benefit

- Can reduce costs by leveraging iSeries resources and skills



iSeries Storage Management for Windows



iSeries

IXA

xSeries

IXA

xSeries

- Performance with more disk arms
- Consolidated Backup
- Flexible Storage Management

Indiana University Medical Group

IU MEDICAL GROUP

Background

- A practice of 100 faculty physicians at the Indiana University (IU) School of Medicine, IU Medical Group-Primary Care offers health care packages for corporations as well as services for individual patients.

Objectives

- Growing server demands
- Growing storage demands for data warehousing, file serving, e-mail and Web applications
- Consolidate 8 PC servers

Solution

- iSeries
- 4 Integrated xSeries Servers
- 2 xSeries attached to iSeries with IXA

Benefits

- Much faster backups - days to 1 hour
- Consolidated systems management
- Simplified adding capacity

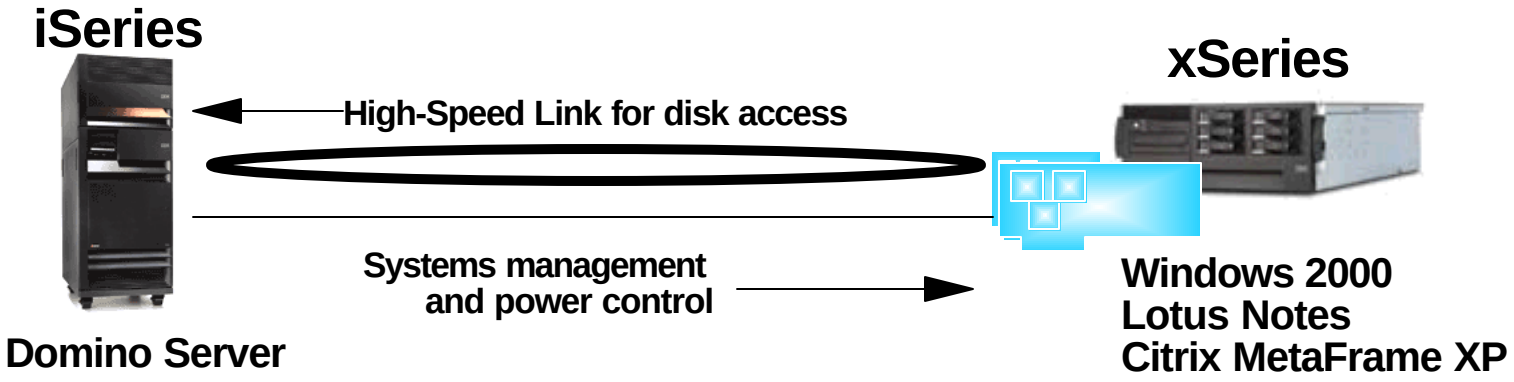
Sea Island

iSeries and xSeries Solution

Citrix used to deliver Lotus Notes Network Stations

iSeries IXA Value*

- **75%** Typical resource utilization on a dual processor server with SCSI storage and 2 GB of RAM with 50 users
- **35%** Sea Island resource utilization on a dual processor IXA server using iSeries for storage and 1 GB of RAM with 50 users



*Source: CHOICE! Computer, Sea Island Briefing 11/6/01.
2000 Citrix Solutions Network Gold Partner of the Year for US

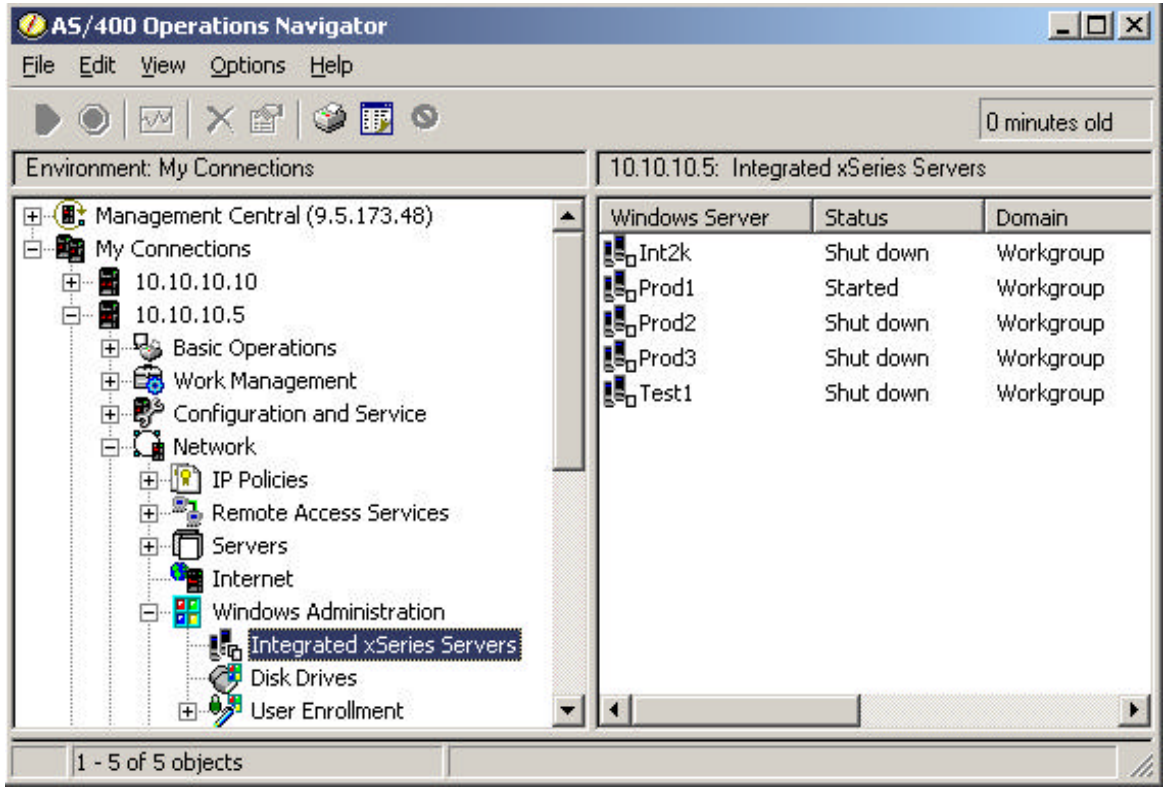
Reliability & Testing

Problem

- Different hardware and device drivers can cause server instability
- Adequately testing Microsoft Service Packs, Application Fixes, device drivers before they are placed in production

iSeries Solution

- IBM provides a consistent set of disk, tape, CD, and LAN hardware and device drivers that are tested to work together
- Logical Servers allows testing with the production image and hardware



Benefit

- Greater consistency can lead to better reliability
- Can reduce the outages caused by change

Availability - One iSeries Server

Problem

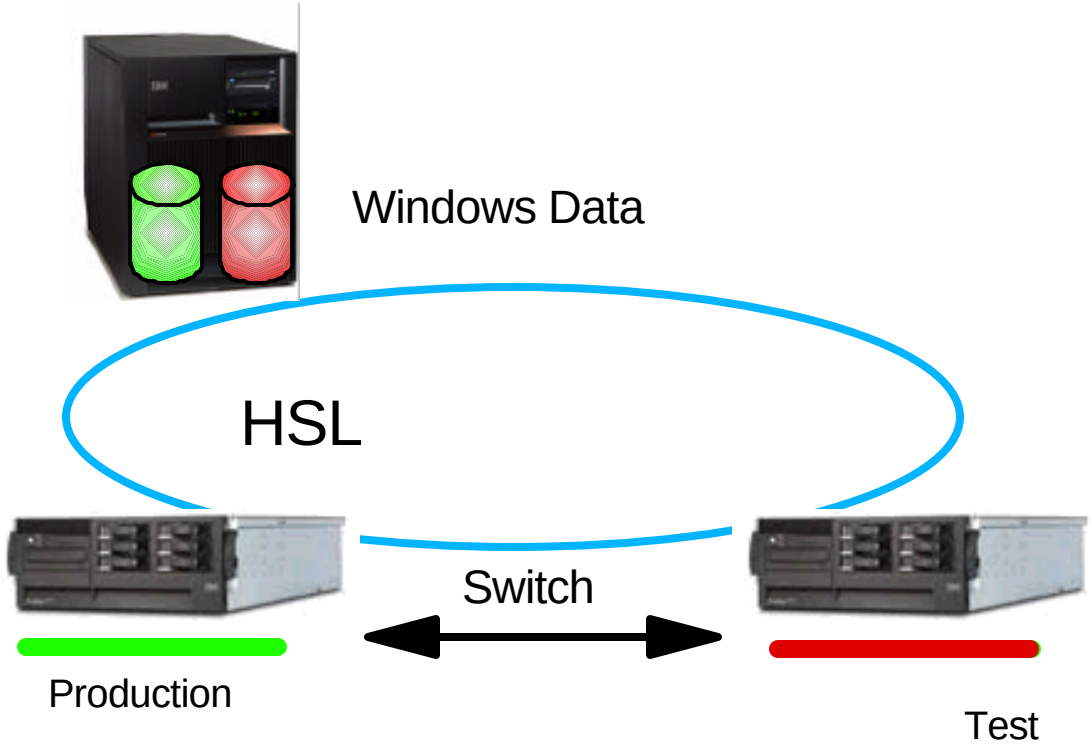
- Providing an effective and efficient availability solution

iSeries Solution

- Hot Spare allows one xSeries server to provide a backup to several production servers

Benefit

- Efficient availability solution for planned or unplanned server outages



Coleman Cable

Background

- Coleman Cable is a leading manufacturer and innovator of wire and cable products, servicing the electrical, electronic and automotive markets.

Objectives

- Improve network response time
- Decrease back-up time for Windows
- Achieve an ultimate 99.9% system availability
- Consolidate AS/400 and 7 PC servers

Solution

- iSeries with LPAR
- 5 Integrated xSeries Servers
- 1 xSeries attached to iSeries with IXA

Benefits

- Backup & recovery time improved by 50%
- Network access speeds improved by 75%
- System availability increased by 20%

Wesco Aircraft

Background

- Wesco Aircraft is one of the largest distributors of aerospace fasteners, bearings, fittings, and installation tooling

Objectives

- Improve management for Exchange, SQL Server and File servers
- Reduce costs for PC server farm
- Improve availability
- Consolidate AS/400 JD Edwards servers and 31 PC servers

Solution

- 2 iSeries with LPAR and Clustering
- 8 xSeries attached to iSeries with IXA
- Switch disk clustering

Benefits

- Total cost of server administration is down over 50%
- Windows server storage is much easier to manage
- Testing of new applications is more flexible
- Better utilization rates compared to their stand-alone servers

Virtual Ethernet - V5R2

Fast, More Secure, Flexible Communications Inside the iSeries

Virtual Ethernet Communication

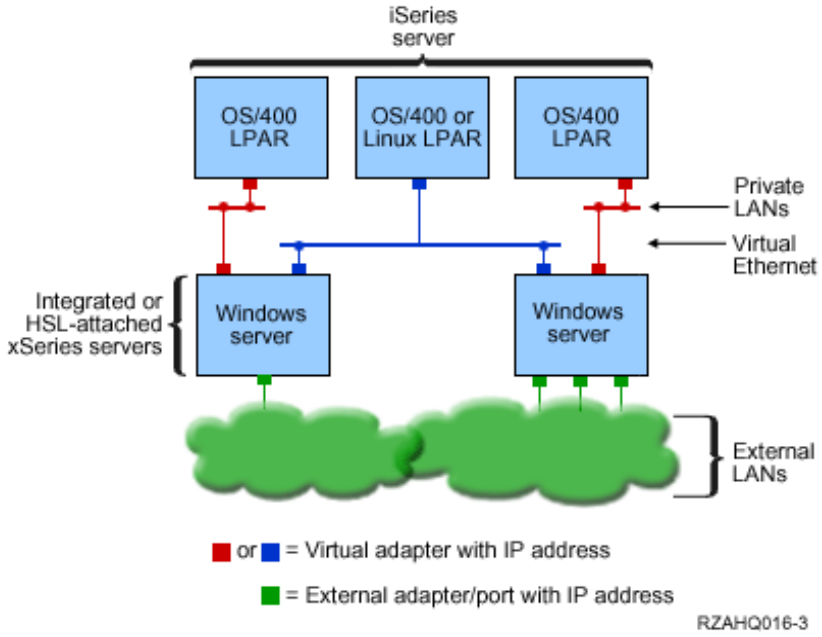
- 1Gb Connections with no LAN Adapters/Switches
- Windows to Windows to OS/400 to Linux
- Up to 5 Connections per IXS / IXA

Performance Improvements

- Windows App to OS/400 App
- Windows File Level Back Up to OS/400 Tape
- Windows to Windows Communication

Requirements

- iSeries 270, 820, 830, 840, 890
- OS/400 V5R2 in IXS or IXA owning partition



Microsoft Cluster Service - V5R2

Switch Disk Cluster

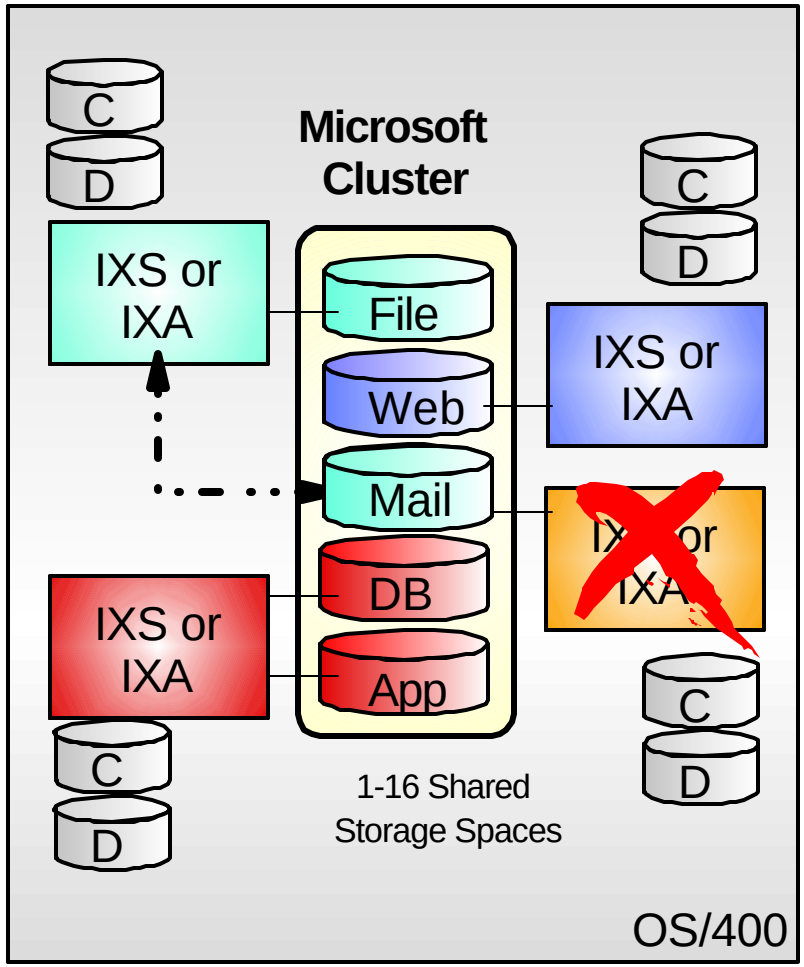
- Dynamically Switch Storage Spaces Between Windows Servers
- Up to 4 IXS or IXA Server Nodes per Cluster
- 16 New 1 MB to 64 GB Shared Storage Spaces

Availability Improvements

- Planned or unplanned outages

Requirements

- iSeries 270, 820, 830, 840, or 890
- OS/400 V5R2
- Windows 2000 Advanced Server for 2 Node Support
- Microsoft .Net Enterprise for 4 Node Support*



* Planned for 4th quarter 2002, dependent on Microsoft delivery

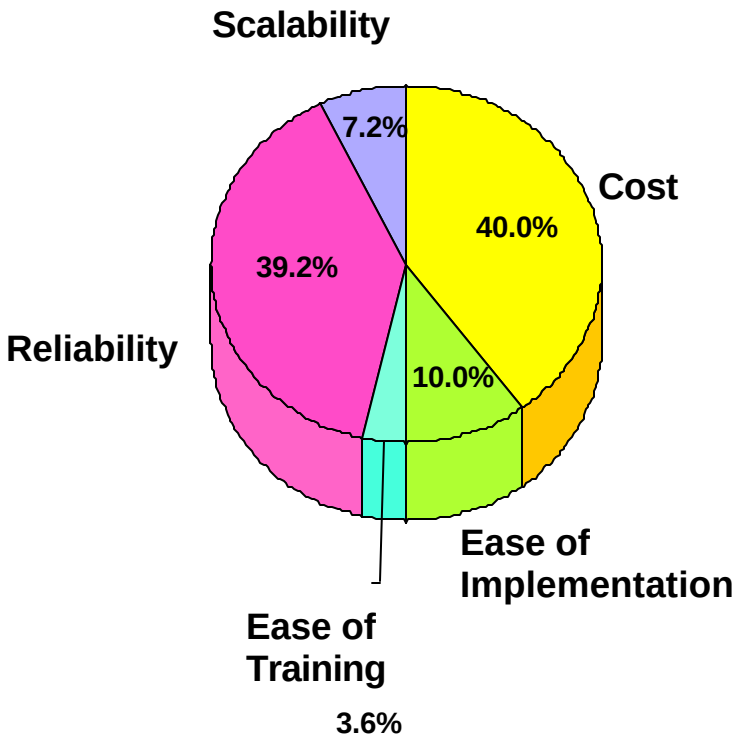
Why use an iSeries Server to Manage Windows Servers

What if IXS/IXA could:

- ✓ **Save one Windows server outage a year**
  - Customers implement a standard configuration that has been thoroughly tested
  - With virtual disk support, customers can test changes on exact copies of their production servers, reducing the impact of change
  - Storage space can be dynamically added to Windows 2000 Servers
- ✓ **Save one from doubling the numbers of servers to implement Clustering**
  - With hot spare support, one additional server can efficiently provide backup for multiple production servers
- ✓ **Save a user from spending the time changing, managing, finding two passwords**
  - Users added to OS/400 can be automatically added to Windows 2000 Server
  - OS/400 password changes can automatically be synchronized with Windows 2000 Server passwords
- ✓ **Save one from buying "extra" disk space on each standalone PC server**
  - All the disk resources are centralized on the iSeries. Each Windows server is given what they need.
- ✓ **Save one from buying tape drives for each standalone PC server**
  - Each of the Windows servers can utilize the high speed iSeries tape
  - Windows backups can be consolidated with OS/400 backups and policies
- ✓ **Save one from losing a file due to inconsistent backup policies**
  - OS/400 backup procedures can be extended to Windows servers
- ✓ **Save one from traveling to the Windows server to reboot it**
  - Operations Navigator can be used to restart the Windows server from any PC
- ✓ **Save one from rebuilding a server from scratch due to a virus hit**
  - Backup of Windows image can be restored and booted in minutes

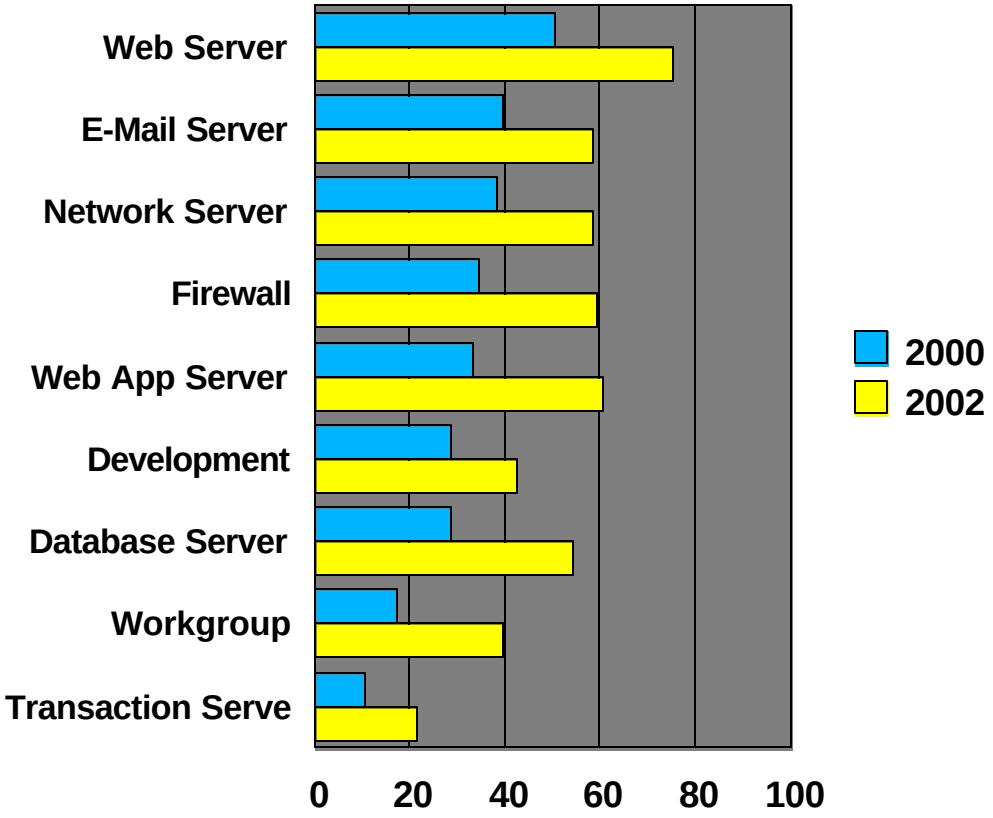
Why Move to Linux

Most Influential Factors in Moving to Linux



Source: TechRepublic survey, 2001

Linux Usage Intentions



Functions for Which Linux is being used (2000 vs 2002) - IBM Worldwide Linux Study 3/01 - 1704 Responses

Linux on iSeries

Distributors

- SuSE Linux Enterprise Server 7 (64/32)
- Turbolinux Server 7 (64/32)
- Red Hat 7.1 (32)

Applications

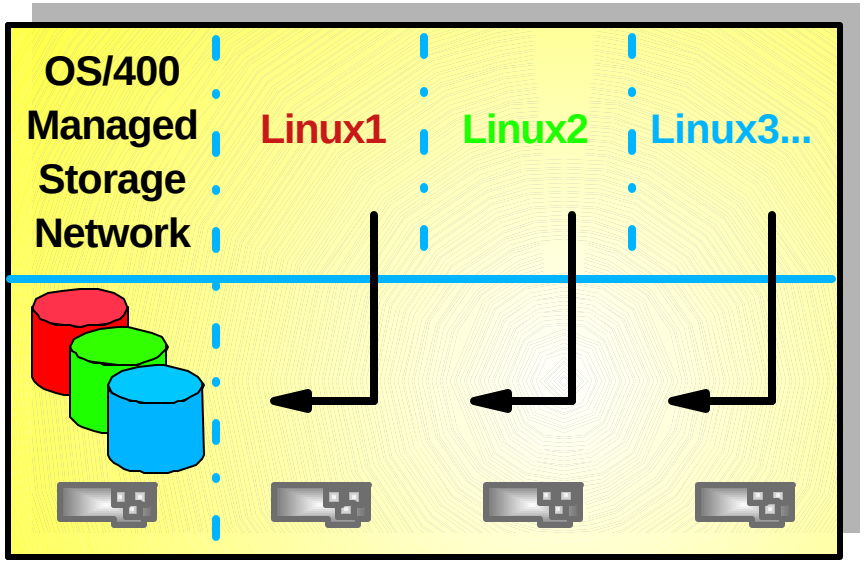
- Included with Distributions
  - Apache, Samba, Sendmail MTA, MySQL, Netfilter, DNS, DHCP
- Open Source
  - Tomcat, OpenOffice
- New ISVs
  - Symantec, Sage, Mapics

Supported

- iSeries Models 270, 820, 830, 840, 890
- OS/400 V5R1 and V5R2

iSeries Offering for Linux

- 1-4 processor 820
- Includes Linux Setup Wizard



SuSE redhat turbolinux

OPEN SOURCE PRODUCT EXCELLENCE AWARDS
LINUXWORLD CONFERENCE & EXPO

Best of Show: iSeries

Linux and LPAR

Shared Processor Support*

- Linux shares processors with other OS/400 and Linux partitions
- Up to 4 partitions per processor
- Minimum 0.10 processor in a partition
- Minimum processor movement: 0.01

Resource Movement

- Virtual Processor Units moved to/from Linux or OS/400 V5R2 partitions dynamically
  - Requires OS/400 V5R2 primary partition
- Memory and I/O resource movement requires the Linux partition to be stopped and restarted
  - Minimum memory movement: 1 MB
- Processor, Memory, and I/O can be moved independently

Linux runs in a secondary partition

- OS/400 V5R1 or V5R2 Primary Partition

Maximum Number of Linux Partitions

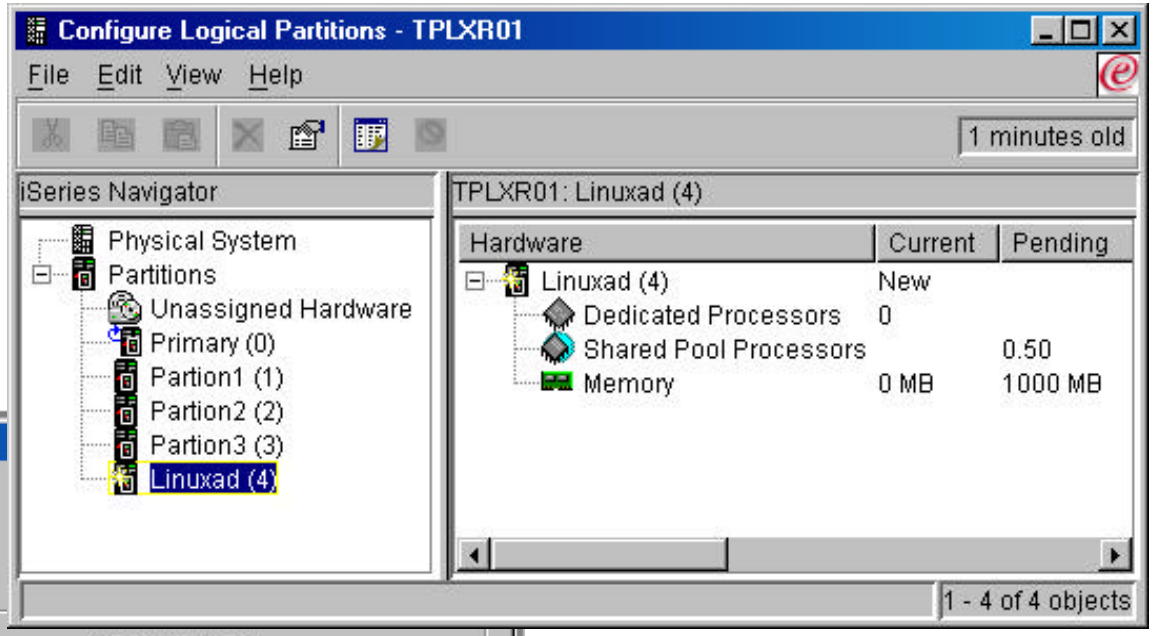
# of Processors in Server	Maximum # of Linux Partitions*
1	3
2	7
4	15
8	31
12	31
24	31
32	31

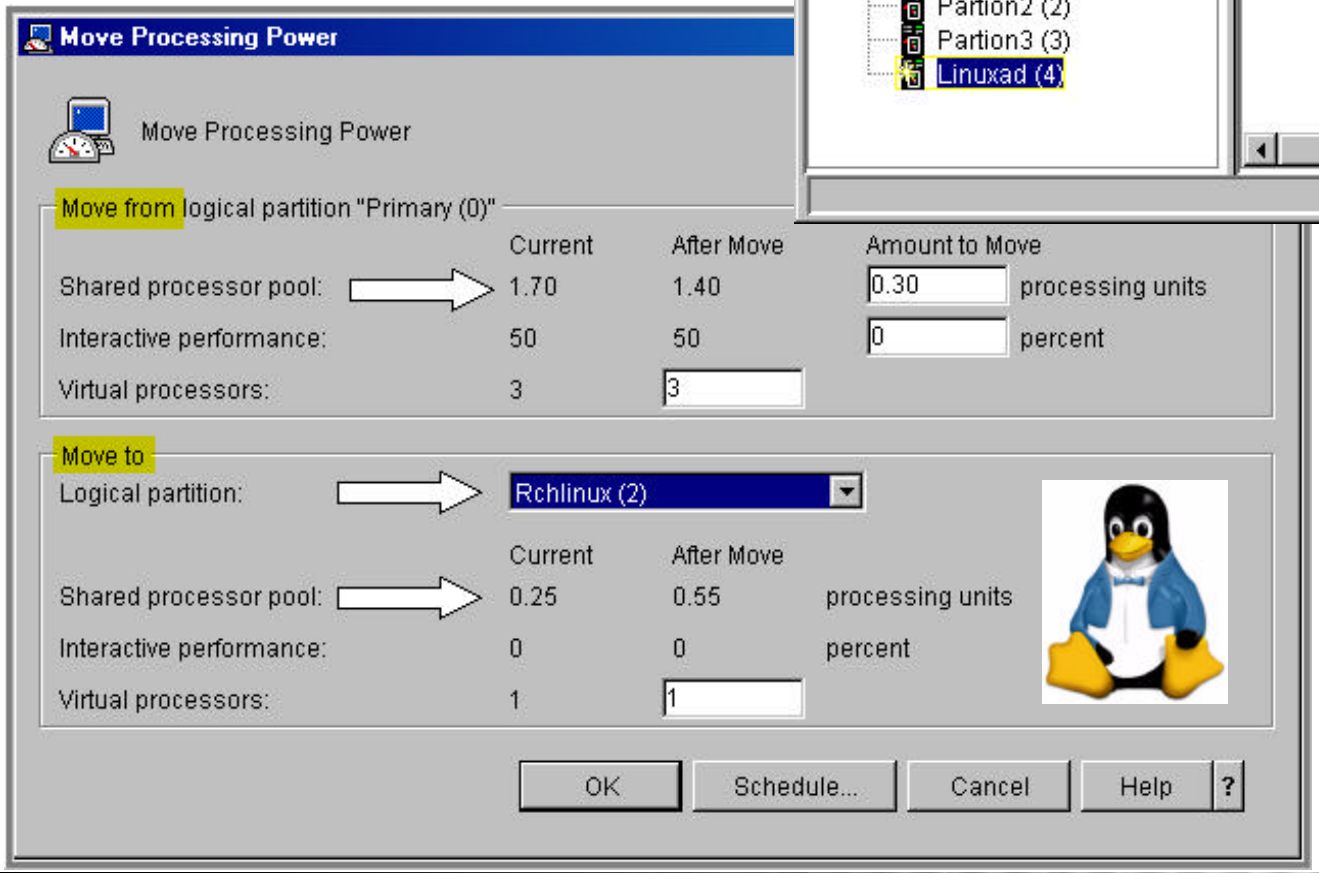
* Shared processor is supported on iSeries servers with SStar or Power4 processors. Servers with IStar processors require a dedicated processor for Linux

Linux Partition Management

V5R2 iSeries Navigator

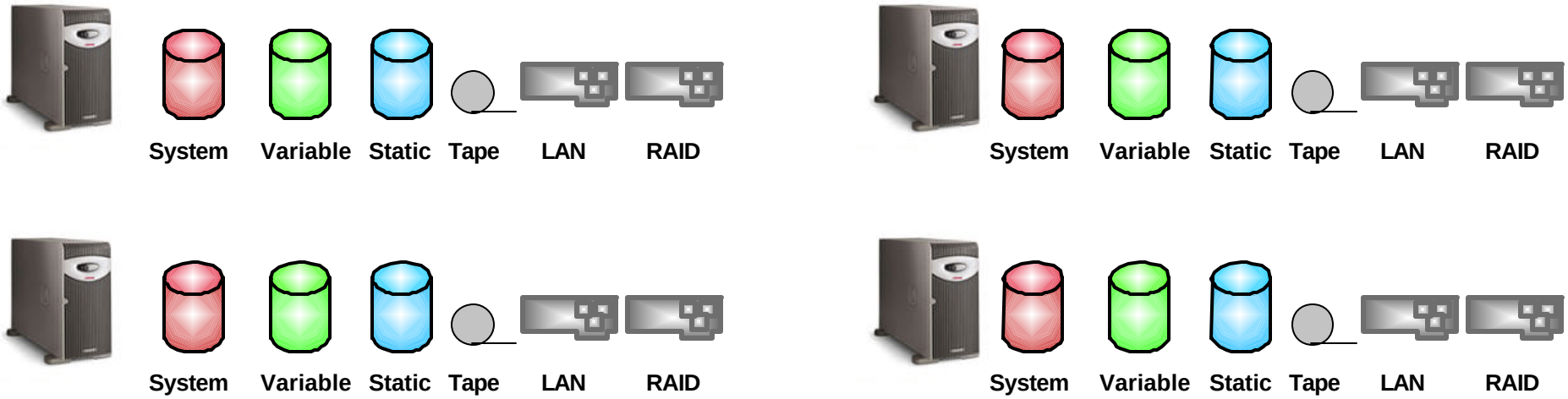
- Create Partition Wizard
- Create, Delete Partitions
- Move Processor Resources



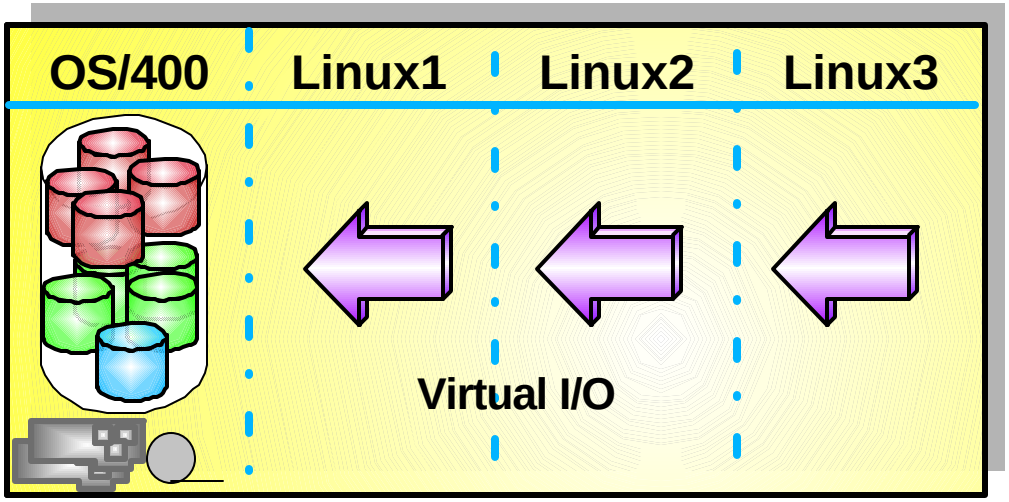


Virtual I/O and Shared Storage Spaces

Before: Server Farm



After: iSeries



With a Single Pool of Resources

- Fewer disk drives, tape drives and LAN adapters can be used
- Resources can be shared
- Resources can easily be moved to where they are needed

Why use an iSeries Server to Consolidate to Linux

What if Linux on iSeries could:

- ✓ **Save one server outage a year**
  - With virtual disk support, customers can test changes on exact copies of their production servers, reducing the impact of change
- ✓ **Save one from buying "extra" disk space and RAID adapters on each standalone PC server**
  - All the disk resources are centralized on the iSeries. Each Linux partition is given what they need.
- ✓ **Save one from buying tape drives for each standalone PC server**
  - Each of the Linux partitions can utilize the high speed iSeries tape
  - Linux backups can be consolidated with OS/400 backups and policies
- ✓ **Save one from losing a file due to inconsistent backup policies**
  - OS/400 backup procedures can be extended to Linux servers
- ✓ **Save one from traveling to the server to reboot it**
  - OS/400 can be used to restart the Linux server from any PC
- ✓ **Save one from buying too much capacity**
  - Processor, memory, and I/O resources can be independently moved between partitions
- ✓ **Save one money by using Open Source software**
  - Many popular infrastructure applications and middleware are available via open source

YKK

Background

- YKK (U.S.A.) Inc., the world's largest zipper manufacturer

Objectives

- New e-business infrastructure that will improve service for its U.S. customers.
- Web portal that allows YKK's U.S. customers to check inventory, securely place orders, track and review order status and history, and access a variety of links including an online product catalog.

Solution

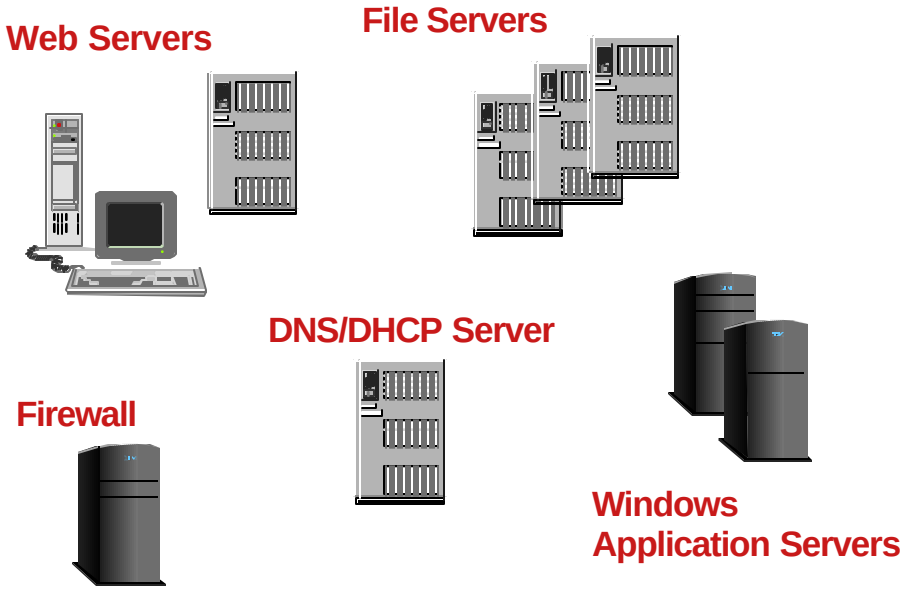
- iSeries Model 820 Offering for Linux
- SuSE SLES 7
- eOne Commerce

Benefits

- "Our new customer service portal is a first for YKK in the U.S., so it was critical that we made the right choice for our customers," said Sara Carnell, director of operations, YKK (U.S.A.) Inc. "We explored several options before going with the e-business solution from IBM and eOne Group. IBM's Linux server running eOneCommerce gives us the scalable, flexible and secure Web site we need, and it also was very affordable."

iSeries Windows Server Consolidation Example

Before



- ✖ **Multiple Windows servers**
- ✖ **Moving to Windows 2000**
- ✖ **Growing operations costs and limited staff**
- ✖ **Poor availability**
- ✖ **Storage management is out of control**
- ✖ **Multiple, inconsistent backups**
- ✖ **Aging capacity in a variety of places**
- ✖ **Servers coming off maintenance**
- ✖ **No test environment**

After

(2) xSeries 360 & Integrated xSeries Adapter (IXA)

- ✓ Operations simplified
  - ★ Flexible, centralized storage management
  - ★ xSeries scalability delivers consolidation
- ✓ Outages reduced
  - ★ xSeries Enterprise X Architecture
  - ★ Test environment reduces impact of change
- ✓ Software costs reduced
  - ★ Linux OpenSource solutions

Resources

Windows Integration

- Spec Sheet
- Case Study: Sea Island, Sanistaal, IUMG
- Redbooks: SF24-6222, SG24-6056
- www.ibm.com/iseries/windowsintegration

Linux

- Solutions Guide
- Apache Sizing Guide
- Samba Sizing Guide
- White Paper
- Linux Edition Spec Sheet
- Case Study: Churchill China
- Redbooks: Linux Implementation and Integration
- www.ibm.com/iseries/linux

www.ibm.com/eserver/iseries/scon

Trademarks and Disclaimers

References in this document to IBM products or services do not imply that IBM intends to make them available in every country.
The following terms are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both:

400	BRMS	Host Integration Series	JustMail	Payment Manager	Stylized e
ADSTAR	Client Series	Host on Demand	MQSeries	Payment Server	SystemView
Advanced Function Printing	ClusterProven	Host Publisher	MQSeries Integrator	PCOM	VisualAge for Java
AFP	CODE/400	HTTP Server for AS/400	Net.Commerce	PowerPC	VisualAge for RPG
AIX	DataGuide	IBM	Net.Data	PowerPC AS	WebSphere
AnyNet	DB2	IBM Logo	Netfinity	Print Service Facility	WebSphere Advanced Edition
Application Development	DB2 Extenders	IBM Network Station	NetView	pSeries	WebSphere Commerce Suite
APPN	DB2 UDB for AS/400	Information Warehouse	NUMA-Q	PSF	WebSphere Development Tools for AS/400
AS/400	DB2 Universal	Integrated Language Environment	OfficeVision	S/390	WebSphere Standard Edition
AS/400e	e-business logo	Intelligent Printer Data Stream	OS/2	SanFrancisco	Workpad
AT	e(logo) Server	IPDS	Operating System/400	Screen Publisher	xSeries
BrioQuery	Enterprise Storage Server	iSeries	OS/400	SmoothStart	

cc:Mail, Domino.Doc, Freelance, LearningSpace, Lotus, Lotus Domino, Lotus Notes, iNotes, QuickPlace, Sametime, and Word Pro are trademarks of Lotus Development Corporation in the United States, other countries, or both.
Tivoli and NetView are trademarks of Tivoli Systems Inc. in the United States, other countries, or both.
C-bus is a trademark of Corollary, Inc. in the United States, other countries, or both.
Java and all Java-based trademarks and logos are trademarks or registered trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.
Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.
PC Direct is a trademark of Ziff Communications Company in the United States, other countries, or both and is used by IBM Corporation under license.
ActionMedia, LANDesk, MMX, Pentium and ProShare are trademarks of Intel Corporation in the United States, other countries, or both.
IBM's VisualAge products and services are not associated with or sponsored by Visual Edge Software, Ltd.
Linux is a registered trademark of Linus Torvalds.
UNIX is a registered trademark of The Open Group in the United States and other countries.
SET and the SET Logo are trademarks owned by SET Secure Electronic Transaction LLC.
Other company, product and service names may be trademarks or service marks of others.

Information is provided "AS IS" without warranty of any kind.

All customer examples described are presented as illustrations of how those customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics may vary by customer.

Information in this presentation concerning non-IBM products was obtained from a supplier of these products, published announcement material, or other publicly available sources and does not constitute an endorsement of such products by IBM. Sources for non-IBM list prices and performance numbers are taken from publicly available information, including vendor announcements and vendor worldwide homepages. IBM has not tested these products and cannot confirm the accuracy of performance, capability, or any other claims related to non-IBM products. Questions on the capability of non-IBM products should be addressed to the supplier of those products.

All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only. Contact your local IBM office or IBM authorized reseller for th full text of the specific Statement of Direction.

Some information in this presentation addresses anticipated future capabilities. Such information is not intended as a definitive statement of a commitment to specific levels of performance, function or delivery schedules with respect to any future products. Such commitments are only made in IBM product announcements. The information is presented here to communicate IBM's current investment and development activities as a good faith effort to help with our customers' future planning.

Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput or performance improvements equivalent to the ratios stated here.

Photographs shown are of engineering prototypes. Changes may be incorporated in production models.