

Linux on iSeries:

Leveraging Linux with Open Source
Solutions to Reduce your IT Cost

Mike Martin
America's Linux for iSeries
Sales Manager



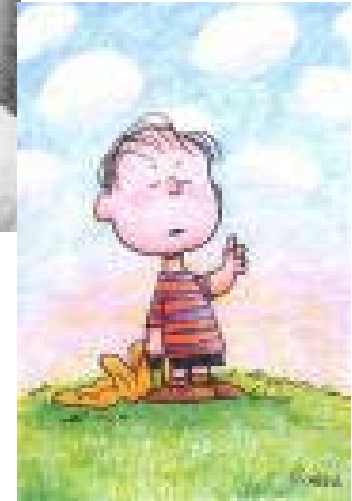
The History of Linux



linux

It all started as a school project...

- Linus Torvalds
 - ▶ 1991, University of Helsinki
- Goal -- Create a Universal Operating System
 - ▶ Runs on all major platforms
 - ▶ Supplanting most flavors of UNIX
- POSIX-compliant
 - ▶ Runs all the grand and glory of UNIX
 - ▶ Apache, sendmail, BIND, ftp, nfs, etc



History of Open Source

- 1969 -- Multics
 - ▶ AT&T Bell Labs' Dennis Ritchie and Ken Thompson
- Tompson developed a portable Operating System
 - ▶ Called Unics
- Ritchie developed C
 - ▶ Platform independent language
- UNIX was written in C
 - ▶ Platform independent Operating System

The Unix Wars

- AT&T made UNIX "freely" available
 - ▶ Berkley Systems Division UNIX (BSD)
 - ▶ Sun Microsystems's SunOS
 - ▶ AT&T's System V
- AT&T Breakup caused legal hassles
 - ▶ UNIX considered a commercial asset
- Vendor lock-in
- Regardless, UNIX programmers built the Internet



Free Software Foundation

Richard Stallman, MIT scientist

- ▶ Missed the spirit of source code sharing
- ▶ GNU (GNU Not UNIX) project
 - Mission: To create a Free UNIX-like Operating system
- ▶ Open Source Movement
 - Promote "free" software
 - Free, as in free speech not free beer
 - Eliminate restrictions on:
 - Copying, redistribution, understanding, and modification of software
 - Essentially you can't restrict other's use and modification of software
- ▶ GNU Public License
 - Don't rip off the tag - new code gets the label

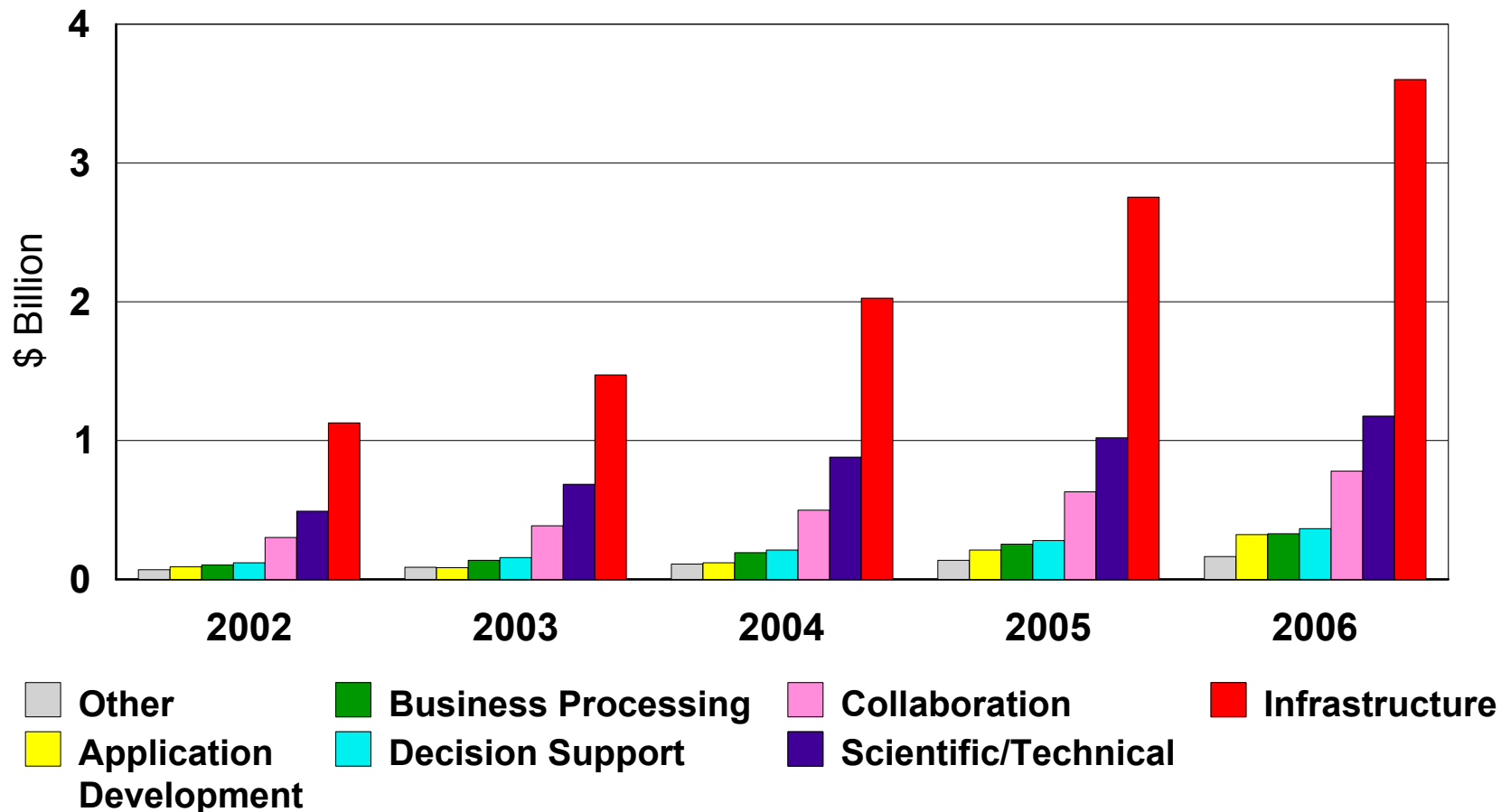


Why Does Linux "Work"?

- UNIX was a pre-write of Linux
- Reduce costs and increase efficiencies
- Greater security and stability
- Pursuit of a commodity-based approach to hardware
- Access to a large, creative development community
- Supported on 70 different system architectures
- Straight forward code design, freely available
- Quick response to design problems
- Brutal design and code reviews
- Implement solutions today that will take advantage of tomorrow's technology



Linux Server Opportunity by Workload



Infrastructure Continues to be the largest opportunity - \$2B in 2004

Source IBM GMI 2Q06



Linux on iSeries



Linux on iSeries

On Demand Virtualization

- Up to 10 partitions per processor
- On Demand Capacity
- Virtual Storage, Ethernet, I/O
- Independent Resource Movement

Integration

- Linux and OS/400 Applications
- Server Management
- Consolidated Storage Management

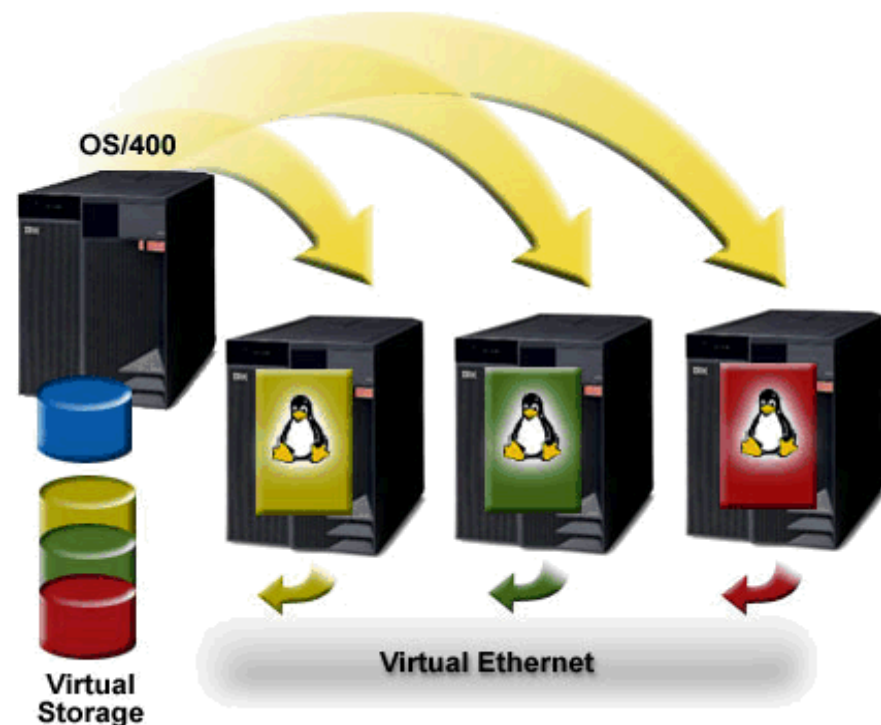
64-bit powerPC

✓ *Quick consolidations*

✓ *Maximize IT investment*

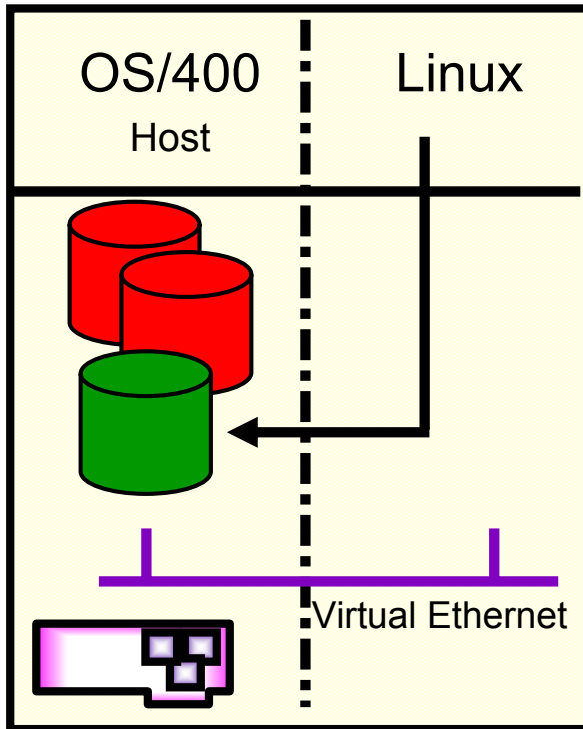
✓ *Run multiple, yet independent workloads*

✓ *Extend iSeries advantages to Linux*



Linux I/O Flexibility

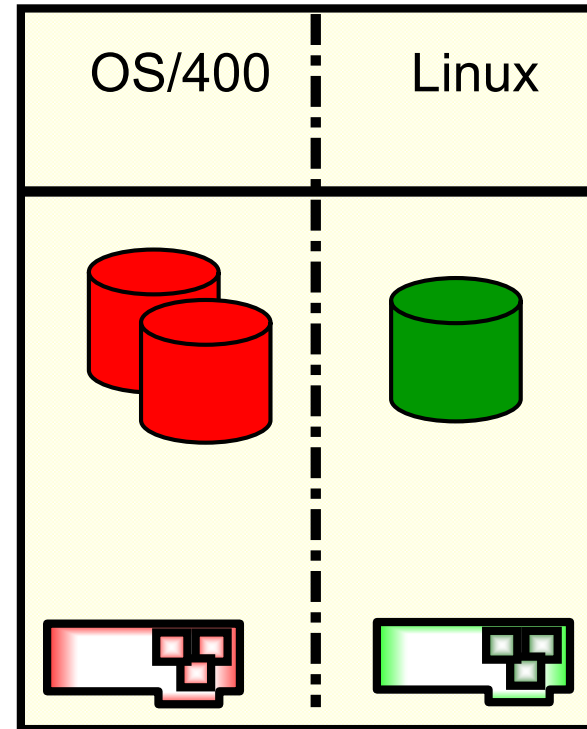
Virtual I/O



SCSI Disk
Fiber ESS
Tape
LAN
WAN
CD, DVD

- Leverage iSeries resources
- OS/400 management

Direct I/O



▶ SCSI Disk
▶ Fiber ESS
▶ Tape
▶ LAN
▶ WAN
▶ CD, DVD

- Dedicated resources
- Linux management

Storage Virtualization

Storage spaces created from OS/400

- ▶ 1 MB to 64 GB each
- ▶ Up to 20 per Linux partition

Dynamically added to Linux

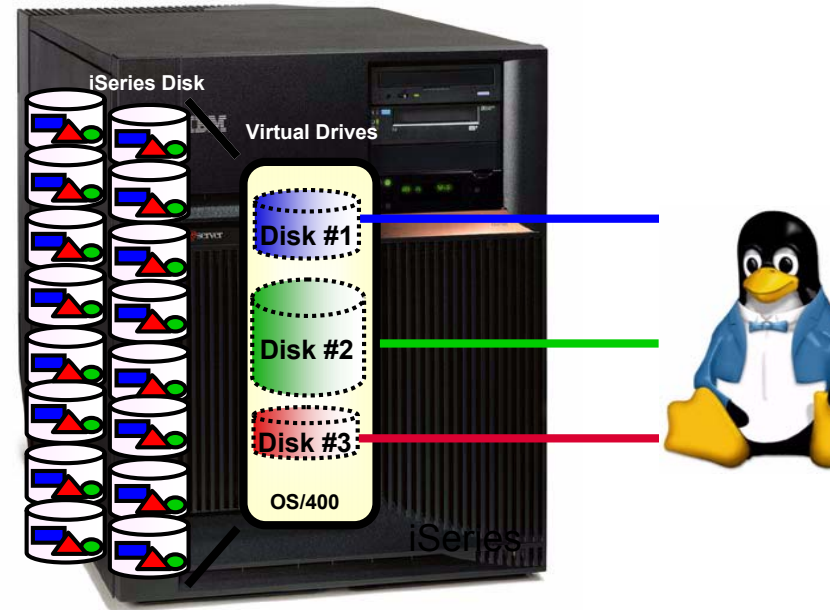
- ▶ Requires V5R2 Primary and Host

Shared Storage

- ▶ Storage spaces can be read from multiple partitions

Enables Linux to Leverage Advanced iSeries Storage Architecture

- ▶ Data automatically spread and protected
- ▶ More disk arms for better performance
- ▶ Consolidated Backup of OS/400 and Linux
- ▶ Flexible Storage Management
- ▶ Easy setup of multiple Linux environments



Virtual Ethernet - "Hipersockets"

For fast, secure, reliable application communication between partitions

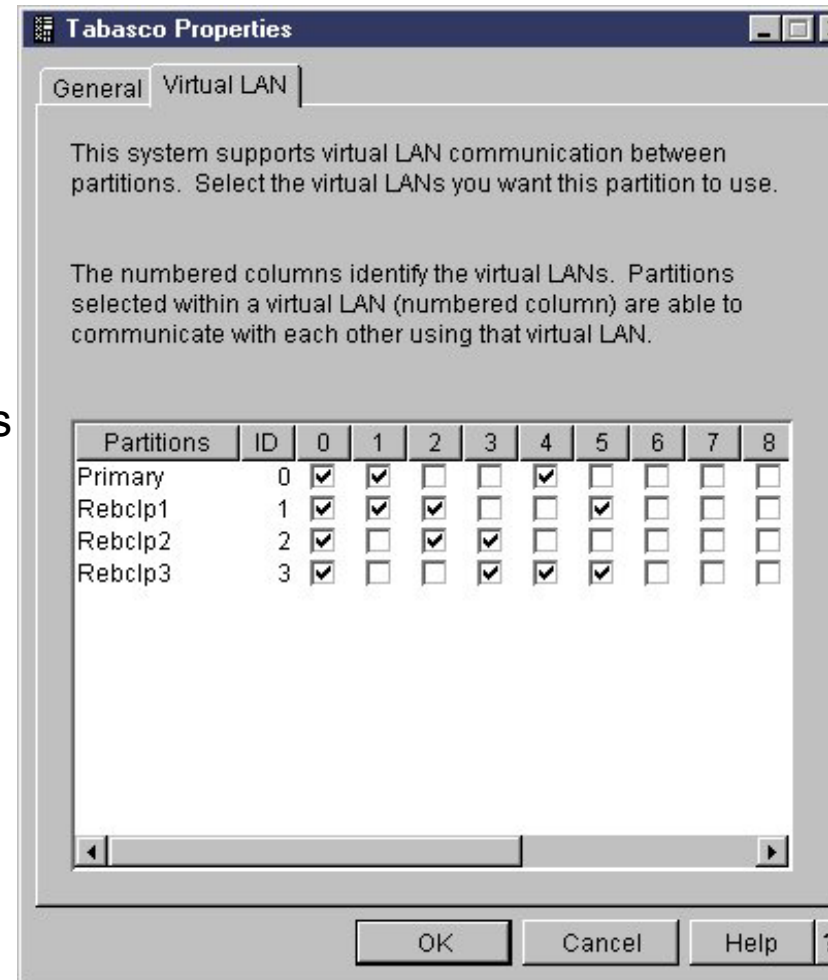
Up to 16 high speed TCP/IP connections between partitions

- ▶ Emulates 1 Gb Ethernet Adapters
- ▶ Selective communications paths between partitions
- ▶ Utilizes iSeries memory bus
- ▶ No additional hardware required

Supports communications between

- ▶ OS/400 to OS/400
- ▶ Linux to OS/400
- ▶ Linux to Linux
- ▶ Linux to Windows

Included with OS/400 V5R1 and V5R2



Linux for iSeries Opportunities

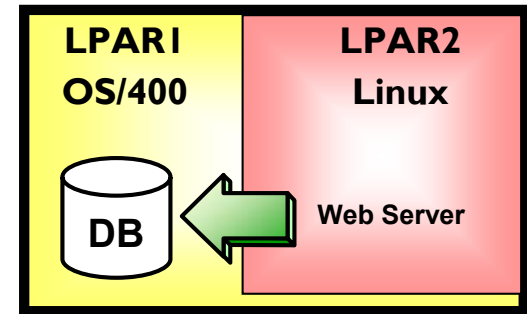
Infrastructure Consolidation

- ▶ Replace Windows or Linux Infrastructure servers



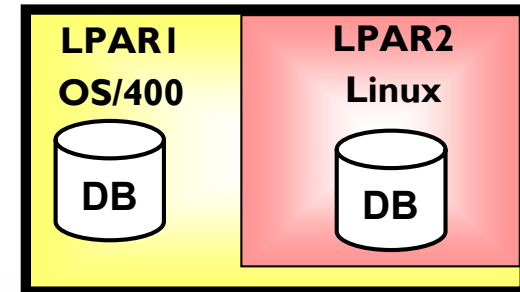
Application Integration

- ▶ Extend iSeries applications with Linux solution to leverage iSeries assets
- ▶ Modernization of legacy applications



Application Alternatives

- ▶ Leverage Linux solution portfolio for installed/older technology applications that are no longer viable



Solution Providers

300+ Available Now

Infrastructure	e-Business	Industry
        	     	     

300+ More in the Pipeline

More<http://www-1.ibm.com/servers/eserver/iseries/linux/apps.html>



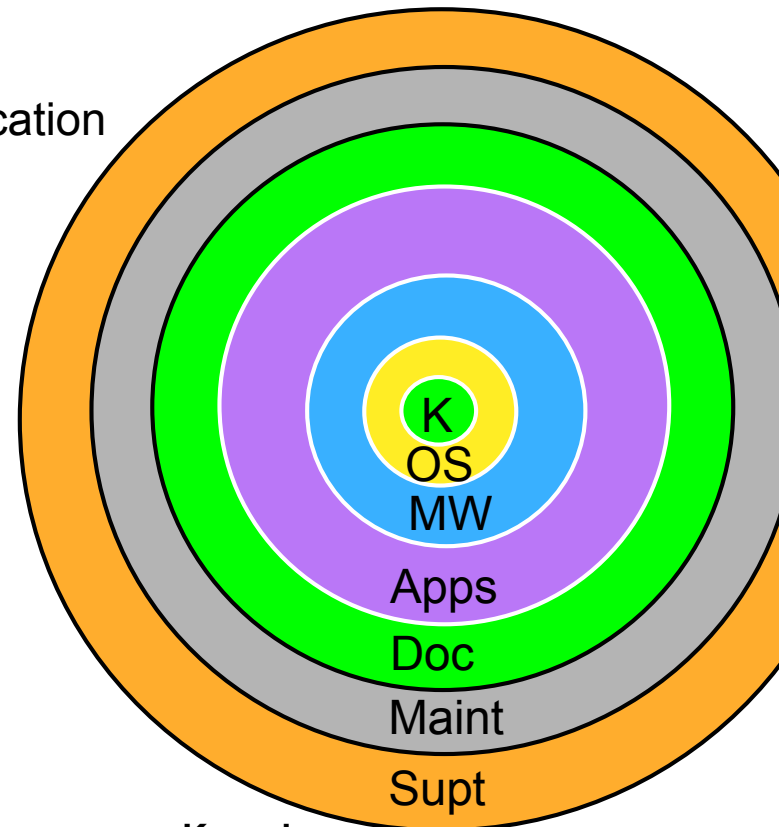
Linux Distributors

- Use PowerPC Linux kernel
 - Add 100s of Operating System, Middleware, and Application components
 - Add iSeries integration features
 - Create Installation Documentation
 - Offer maintenance and support
- Functions included in Typical Distribution

Functions	Key Middleware and Applications
Web Serving	Apache, Tomcat
Mail Server	SMTP(postfix), POP3, IMAP, Sendmail MTA
Print Server	Samba
File Server	Samba, NFS
Proxy Server	Squid
Security	NetFilter firewall, VPN, OpenSSL
Name server	DNS, DHCP, WINS, FTP
Directory	OpenLDAP
Database	MySQL, Postgres
Languages	C, C++, PHP, Pearl
Desktop	KDE, Gnome

The things that most people are using Linux for come with the distribution

Distribution



- Kernel +
- Operating System +
- Middleware +
- Applications +
- Documentation +
- Maintenance +
- Support =
- Distribution



Open Source Solutions



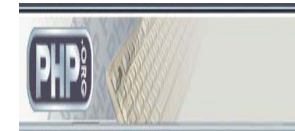
linux

Open Source

1000+ Available Now

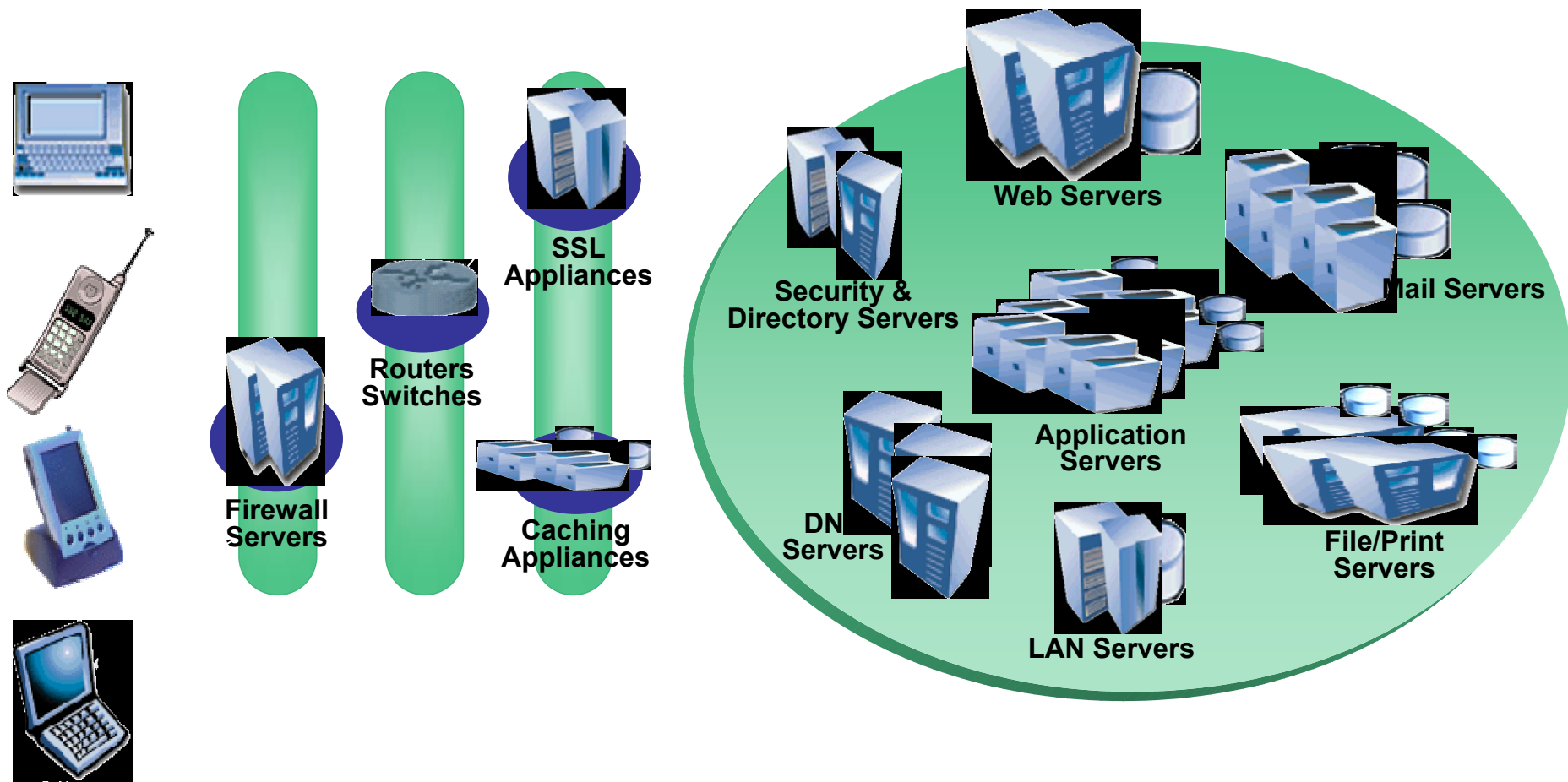
<http://www.osdir.com>

BLAST



linux

Infrastructure Workloads



Infrastructure Workloads



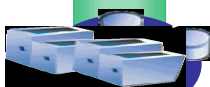
Firewall Servers



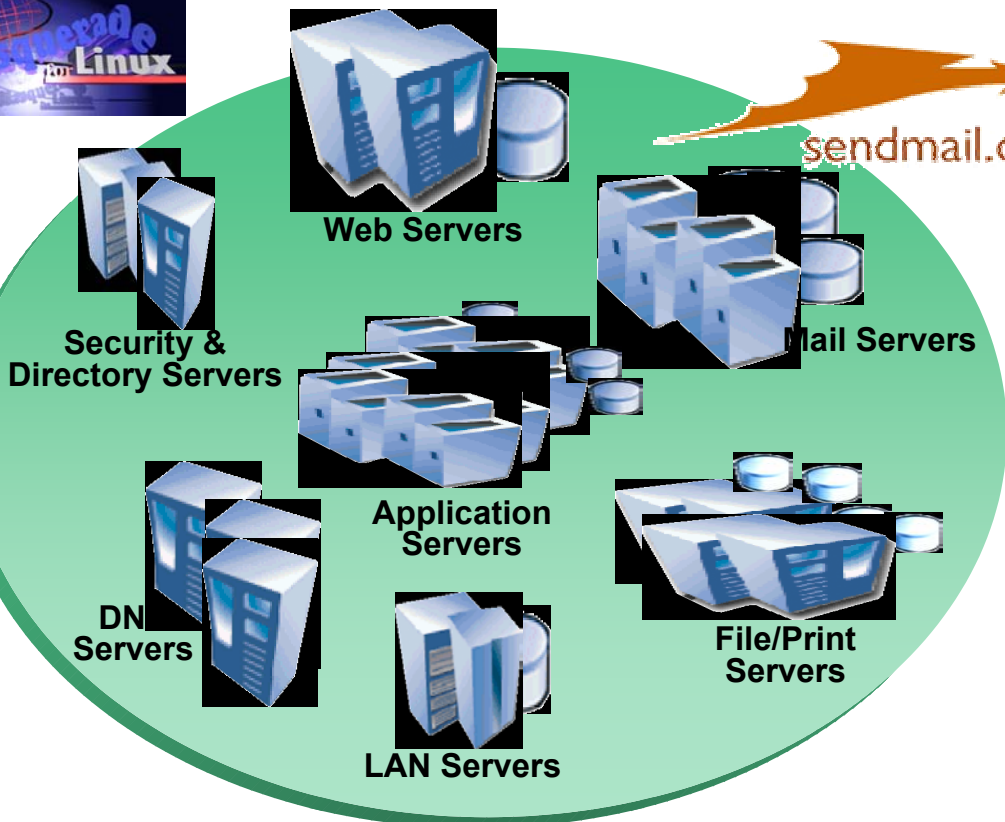
Routers Switches



SSL Appliances



Caching Appliances



Customer Success



GHY International

Background:

- ▶ International customs and trade services group

Objectives:

- ▶ Handle application growth with current staff
- ▶ Solve reliability issues with 2 Intel Servers running Linux infrastructure applications
 - Samba, Netfilter, Squid, MySQL, Apache and Tomcat, Sendmail, VPN, DNS/DHCP, PHP

Options

- ▶ One iSeries or grow Intel servers from 7 to 16































Solution

- ▶ Implemented iSeries 820 with 9 Red Hat Linux partitions

"We selected Linux on the iSeries because it was such a compelling alternative to the cost and complexity of managing nine separate Intel-based servers."

Nigel Fortlage, Vice President of IT

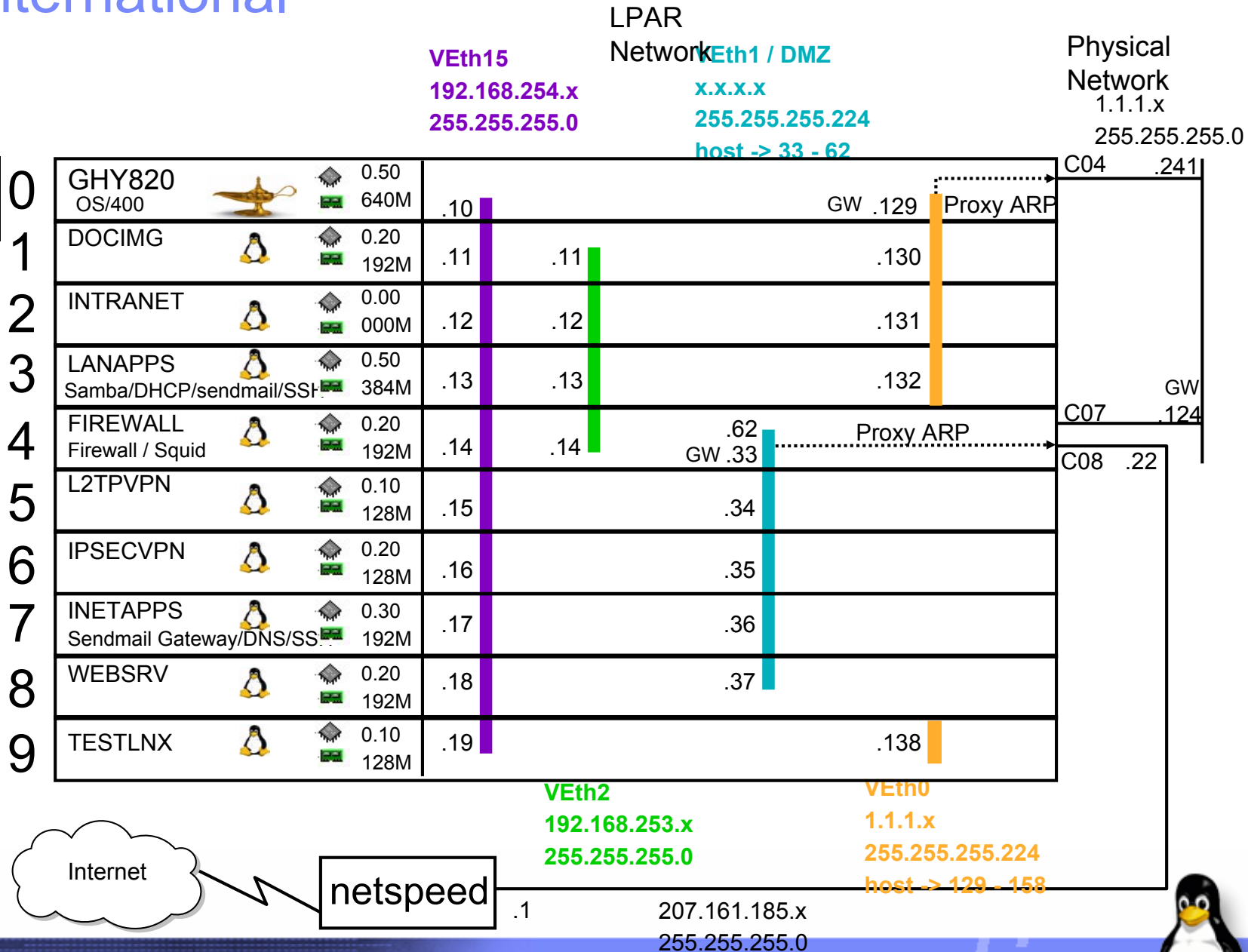
iSeries ---

0	GHY820 OS/400		 	0.50 768M
1	DOCIMG		 	0.20 256M
2	INTRANET		 	0.10 256M
3	LANAPPS Samba/DHCP/sendmail/SSH		 	0.50 256M
4	FIREWALL Firewall / Squid		 	0.20 256M
5	L2TPVPN		 	0.10 256M
6	IPSECVPN		 	0.10 256M
7	INETAPPS Sendmail Gateway/DNS/SSH		 	0.30 256M
8	WEBSRV		 	0.20 256M
9	TESTLNX		 	0.1 256M



linux

GHY International



Brenntag Nordic

Background

- ▶ Brenntag Nordic is part of Brenntag, a leading global player in the distribution of chemicals and raw materials

Objective

- ▶ Consolidate 49 server Windows-based network
- ▶ Prepare IT infrastructure for future growth
- ▶ Increase server reliability
- ▶ Reduce costs

Solution

- ▶ iSeries 870, iSeries 825, xSeries
- ▶ Linux-based infrastructure applications
 - File, print & domain controller services for Windows clients
- ▶ Domino on OS/400

“The iSeries has enabled Brenntag Nordic to replace our Windows servers with Linux. The partitioning flexibility and the storage consolidation provided by the iSeries, has provided a more stable and manageable solution. We calculated that over five years, total cost of ownership of Linux on iSeries would be 35% lower than an Intel-based option.”

Michael S. Langborg, Financial Director



Memory Experts

Background

Memory Experts International, is a leading-edge multinational provider of Memory and Hard Drive Subsystems

Objectives

- ▶ Modernization of architecture, with the goal of cost reduction and improvements in security and service levels
- ▶ Consolidation of 13 Intel servers
- ▶ Bring email back in house
- ▶ Reduce administrative burden on their highly over worked IT administrator, and enable implementation of new functionality

























Solution

- ▶ i825 - 4 processors
- ▶ 10 Linux Partitions
- ▶ 8 Integrated xSeries Servers
 - 4 - Terminal Server Clusters
 - 1 - Accpac CRM application
 - 1 - Test/Development/Hot spare
 - 2 - Growth



looked at rack mount, blade and VMWare Intel solutions, but found the ones to be a proven architecture that delivered both a technical leap over competition and a more compelling financial case in our cost of ownership calculation."

John McGuinness, VP Finance

0	PRIMARY	 
1	FIREWALL (External)	 
2	EXTRANET WWW, FTP, DNS (ext.)	 
3	FIREWALL (Internal) FW, VPN, Proxy (WWW/FTP)	 
4	UTILITIES DHCP, DNS (int.)	 
5	BYNARI MAIL	 
6	FILE/PRINT (Eng)	 
7	FILE/PRINT (General)	 
8	INTRANET	 
9	DB2/ACCPAC	 
10	FUTURE	 
11	BACKUP	 



Old National Bancorp



Background

- ▶ Largest independent banking company based in Indiana

Requirements

- ▶ Capacity for growing business
- ▶ Consolidation of servers coming off lease
- ▶ New Web-based Loan Application
- ▶ Network Backup and Disaster Plan
- ▶ Extend applications to Browsers



Solution

- ▶ iSeries Model 870
- ▶ 5 Logical Partitions
- ▶ WebSphere Application Server
- ▶ Linux
- ▶ IBM WebFacing

"Thanks to the impressive price performance of the iSeries 870 and the dynamic logical partitioning, we are able to delay our nightly processing window. This coupled with Capacity Upgrade on Demand, we are positioned to meet our future business requirements with much more assuredness."

Gary McDowell, Sr VP of Data Processing

Benefits

- ▶ Extend daily collection processing time by dynamically moving resources
- ▶ Double processing power with Capacity on Demand



Black Hills Corporation

Background

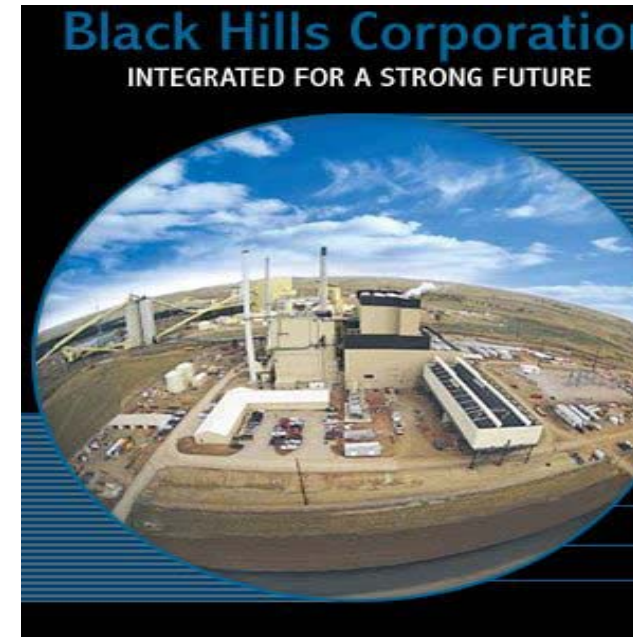
- ▶ Black Hills is a diversified energy company including power generation, fuel production, electric utility, and broadband services

Objectives

- ▶ Improve the physical security of their facilities
- ▶ Manage facilities without onsite people
- ▶ Provide an audit trail

Solution

- ▶ 2 i825s in HA Configuration
- ▶ 5 OS/400 Partitions
 - Customer care, billing, financials and Domino
- ▶ 1 Linux Partition
 - Motion: a software motion detector, keeps images that change
 - Apache: web site to see live camera feeds
- ▶ 7 Security Cameras
- ▶ IGS for LPAR implementation



We continue to choose to run more applications on the iSeries due to its outstanding reliability and scalability. iSeries enables Black Hills to move resources between environments in minutes and consolidate backups, while providing a standard Linux environment.



Solution

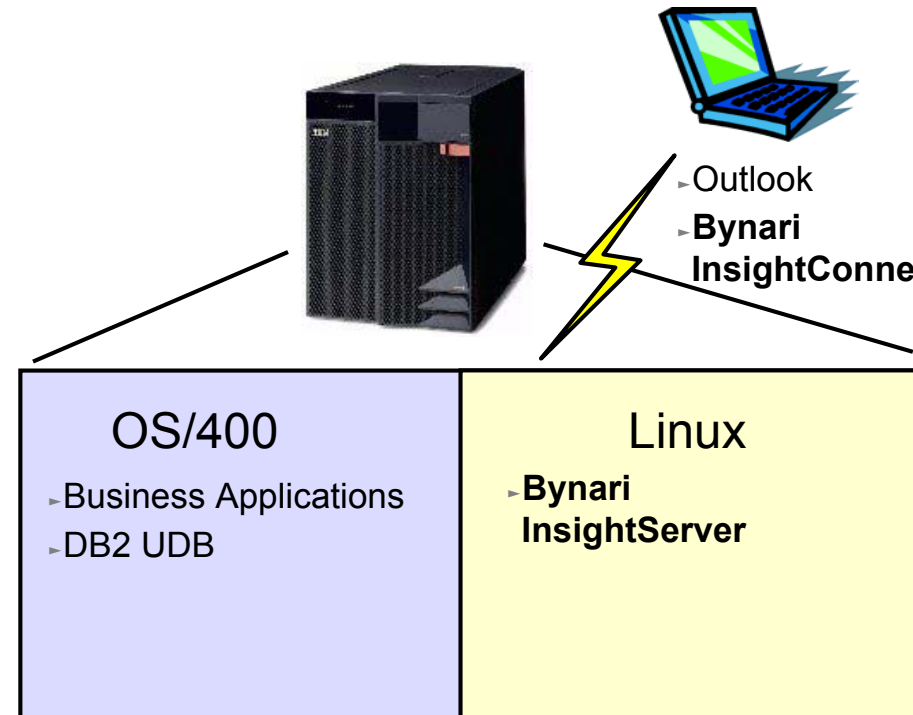
- ▶ Reduce costs with Linux based email server for Outlook and other clients

Bynari

- ▶ InsightServer
 - Mail services product that provides an alternative to Microsoft Exchange
- ▶ Insight Connector
 - Is a Microsoft Outlook plug-in that allows full Outlook groupware capabilities without the need for an Exchange server.

Series

- ▶ On Demand Virtualization
 - Combine multiple environments on one server
 - Share resources between partitions
 - Leverage OS/400 I/O investments



More information

<http://www.bynari.net/index.php?id=504>



Solution

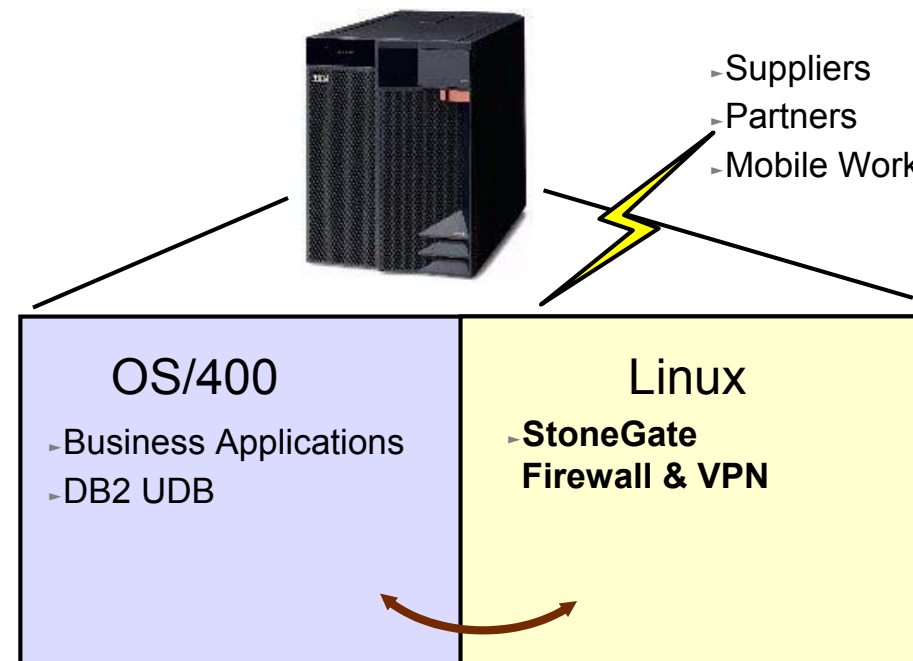
- ▶ Protect applications and data in an ebusiness world with an enterprise firewall

Stonesoft

- ▶ StoneGate Firewall & VPN for IBM iSeries
 - Announce 1/19/04
 - Available 2Q/04
 - available on x and zSeries today
 - FW and VPN engine is based on hardened and performance optimized Linux which is bundled in the product
 - Firewall Engine Implements access control, NAT, VPN, authentication, monitoring and logging
 - VPN Engine Implements VPN, authentication, monitoring and logging

Series

- ▶ On Demand Virtualization
 - Combine multiple environments on one server
 - Share resources between partitions
 - Leverage OS/400 I/O investments



More information

<http://www.stonesoft.com/>



IBM Offers



1Q Linux Processor Activation Initiative

- **Offer includes:**

- 1) 60 day activation of Processor for Linux pilot

- **2) Red Hat No Charge Evaluation Copies Now Available on Web site**

 - <http://www.redhat.com/trial/ibm>

- 3) Contract detailing IBM's processor activation commitment as well as customer commitment to pilot

- 4) Free Linux setup services (performed by local FTSS)

 - LPAR setup

 - Samba installation and configuration

 - Basic administration skills transfer including backup and recovery setup



004 iSeries Product Line

Support for new servers

- ▶ Shared processor, Dynamic movement
- ▶ Virtual Storage and Ethernet

Capacity Upgrade on Demand

- ▶ Permanent and Temporary
- ▶ i825, i870, i890

Linux Processor Activation

- ▶ Included in Enterprise Edition for i870 and i890
- ▶ Extra Processor Activation for Linux

Education Vouchers

- ▶ Included in Enterprise Edition for i825, i870, i890
- ▶ Valid for Linux on iSeries Implementation Class

Service Vouchers

- ▶ Included in Enterprise Edition for i825, i870, i890
- ▶ Valid for iSeries Linux Integration QuickStart

IBM Software

- ▶ DB2 UDB Workgroup Edition, WebSphere Application Server, Tivoli Storage Manager included with Enterprise Edition

iSeries 800



- ▶ 1 Processor
- ▶ Up to 9 Linux Partitions

iSeries 810



- ▶ 1-2 Processors
- ▶ Up to 19 Linux Partitions

iSeries 825



- ▶ 3-6 Processors
- ▶ Up to 31 Linux Partitions

iSeries 870



- ▶ 5-16 Processors
- ▶ Up to 31 Linux Partitions

iSeries 890



- ▶ 16-32 Processors
- ▶ Up to 31 Linux Partitions







Linux Distributions for iSeries



iSeries 800, 810, 825, 870, 890



iSeries 270, 820, 830, 840

Distributor	Distribution	Retail Pricing - Annual
	RHEL 3	<ul style="list-style-type: none"> ▸ \$1992 with Standard Support (5 Days, 9-5 EST) ▸ \$2988 with Premium Support (7 Days, 24 hours) <p>Media, Maintenance, Upgrades, Support</p>
	SLES 8	<ul style="list-style-type: none"> ▸ \$399 Evaluation version including 3 months Maintenance ▸ \$1488 Installation Kit with 1 year maintenance ▸ \$1169 1 Year Standard Support (5 Days, 9-18:00 CET) ▸ \$2069 1 Year Premium Support (7 Days, 24 hours) <p>1 server (up to 8 CPUs for Linux)</p>
	TLES 8	▸ China and Japan
	CLEE 8	▸ South America



Deliverables

■ Papers

- ▶ Linux on iSeries
- ▶ Linux Security at GHY International

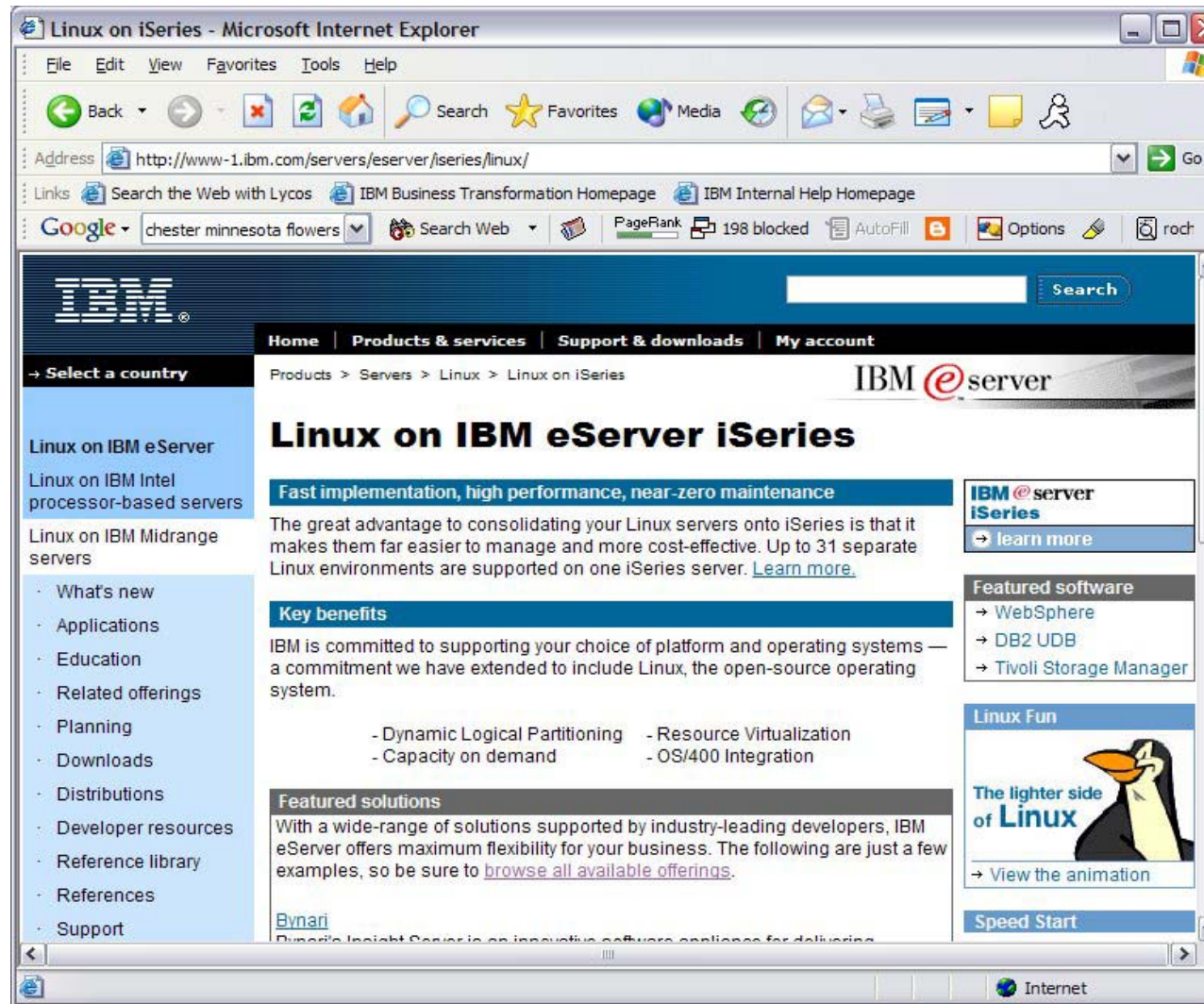
▶ ...

■ Trifolds

- ▶ Overview Guide
- ▶ Success Stories
- ▶ Solutions
- ▶ Security Solutions
- ▶

■ Case Studies

- ▶ Brenntag Nordic
- ▶ GHY International
- ▶ Bandia
- ▶ GHY
- ▶ Memory Experts

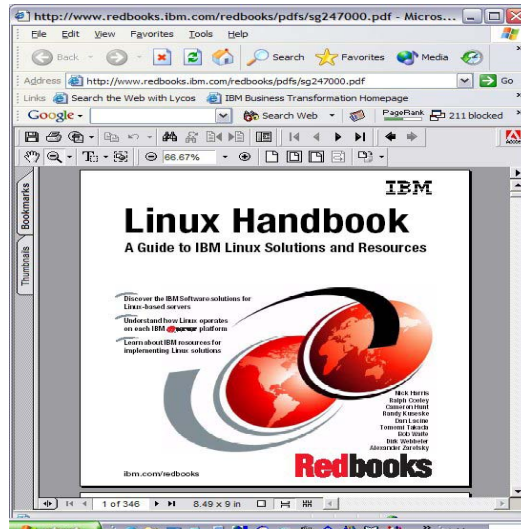


The screenshot shows a Microsoft Internet Explorer browser window displaying the IBM website page for Linux on iSeries. The browser's address bar shows the URL <http://www-1.ibm.com/servers/eserver/series/linux/>. The page features the IBM logo at the top left, a search bar, and navigation links for Home, Products & services, Support & downloads, and My account. The main heading is "Linux on IBM eServer iSeries". Below this, there is a section titled "Fast implementation, high performance, near-zero maintenance" with a sub-heading "Key benefits" and a list of benefits: Dynamic Logical Partitioning, Resource Virtualization, Capacity on demand, and OS/400 Integration. There is also a "Featured solutions" section. The left sidebar contains a "Select a country" dropdown and a list of links including "Linux on IBM eServer", "Linux on IBM Intel processor-based servers", "Linux on IBM Midrange servers", and "What's new". The right sidebar includes "IBM eServer iSeries learn more", "Featured software" (WebSphere, DB2 UDB, Tivoli Storage Manager), "Linux Fun" (The lighter side of Linux animation), and "Speed Start".

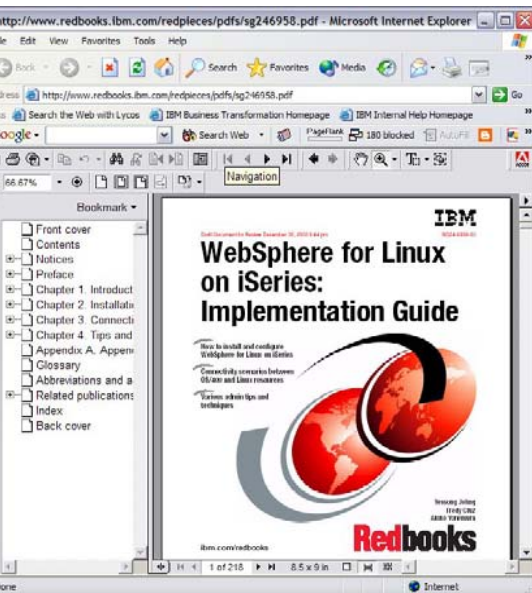
<http://www.ibm.com/series/linux>



Redbooks

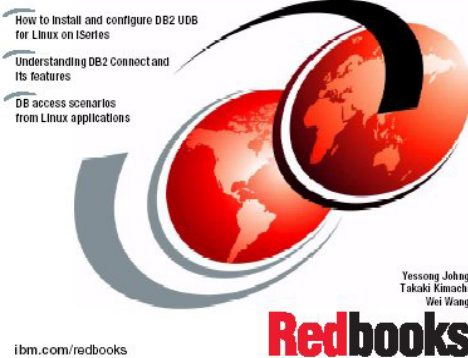


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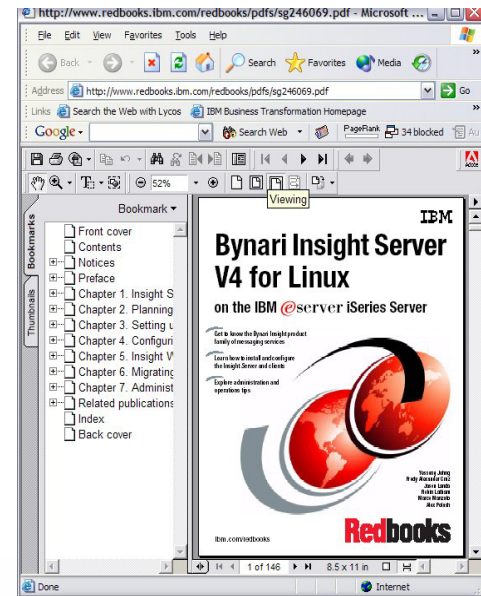


SG24-6958

Draft Document for Review January 16, 2004 12:54 am SG24-6081-00 DB2 UDB for Linux on iSeries: Implementation Guide



SG24-6081



SG24-6069



Linux on iSeries Competency Center

Getting Started with Linux for iSeries

- ▶ Installation & Configuration
 - Configure required Logical Partition (LPAR)
 - Install & Configure Linux for iSeries distribution
- ▶ Configuration of File or Web Services
- ▶ Linux Solution Readiness Review

rchlinux@us.ibm.com

Integrated Education

- ▶ i825 - 1 voucher / 870 - 3 vouchers / i890 - 5 vouchers
- ▶ AS36G/S6226 - Linux on iSeries - 3 days
 - Learn how to plan, implement, and provide basic management for a Linux partition on an iSeries system. Learn about all aspects of Linux on iSeries in this hands-on course. Load multiple distributions of Linux in the different operating systems supported by the environments on the iSeries system: hosted, non-hosted, and a mixture of both.
- ▶ AS46G/S6236 - Implementing Solutions with Linux on iSeries - 3 days
- ▶ Learn the basic skills to implement new infrastructure solutions and/or migrate existing infrastructure to Linux on iSeries. Topics include setting up file serving, web serving, name serving, firewall, and others.

Customized service offerings

- ▶ Assistance with a wide variety of efforts including migrating of existing infrastructure services, establishment of new Linux servers/services, and delivery of customized education/training.

For more information:

- ▶ www-1.ibm.com/servers/eserver/series/service/itc



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NOTES:

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput 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 improvements equivalent to the performance ratios stated here.

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Solutions to Reduce your IT Cost

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America's Linux for iSeries
Sales Manager

