

Linux on iSeries



*Linux Can Do It! - Infrastructure solutions for
Linux for iSeries*

Hosted by Mike Martin and Robin Clark

Agenda

Linux in the marketplace

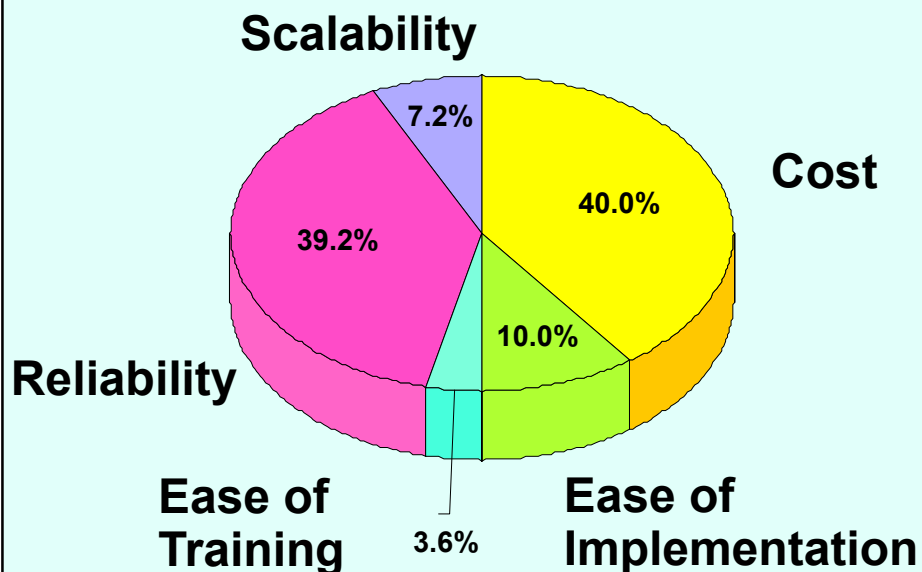
Why Linux on iSeries

Key Solutions on Linux

- SuSE
 - Jay Migliaccio, Product Manager
- Bynari
 - Hyun Kim, President

Why Move to Linux

Most Influential Factors in Moving to Linux



Source: TechRepublic survey, 2001

"Linux Has Gone Mainstream: Are You Up to It?"

Linux server revenues

- ▶ \$1.5 billion in 2000
- ▶ \$2.5 billion in 2002
- ▶ Grow to a \$15 billion by 2007

Today

- ▶ 20 million+ Linux users
- ▶ 30% of the Web server market

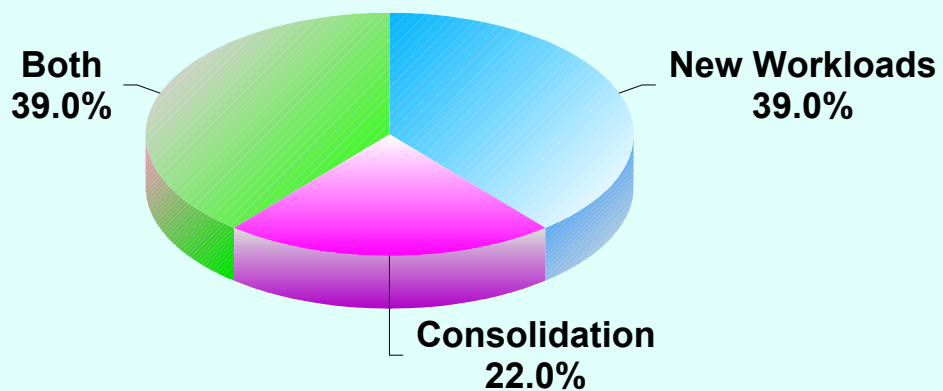
Forces Driving Linux Acceptance

- ▶ Flexibility
- ▶ Open standards
- ▶ Distributed development / collaboration
- ▶ Price/performance
- ▶ Lack of license fees
- ▶ Lack of vendor lock-in

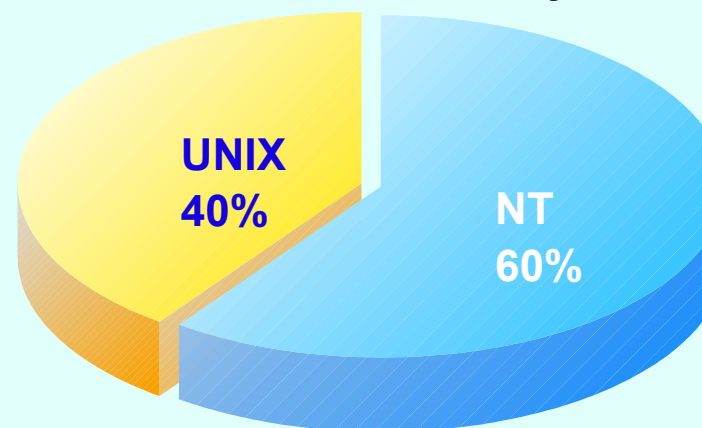
Source: Giga Information Group June 2002

Linux Server Usage

Linux Server Usage



Linux Consolidation by OS



- Multiple workloads on a single server
- Workload migration
- Virtualization capabilities

Source: IBM IT Trends Survey

Linux Marketplace

Linux shipments projected to show the highest growth rate of any operating system in the next three years*

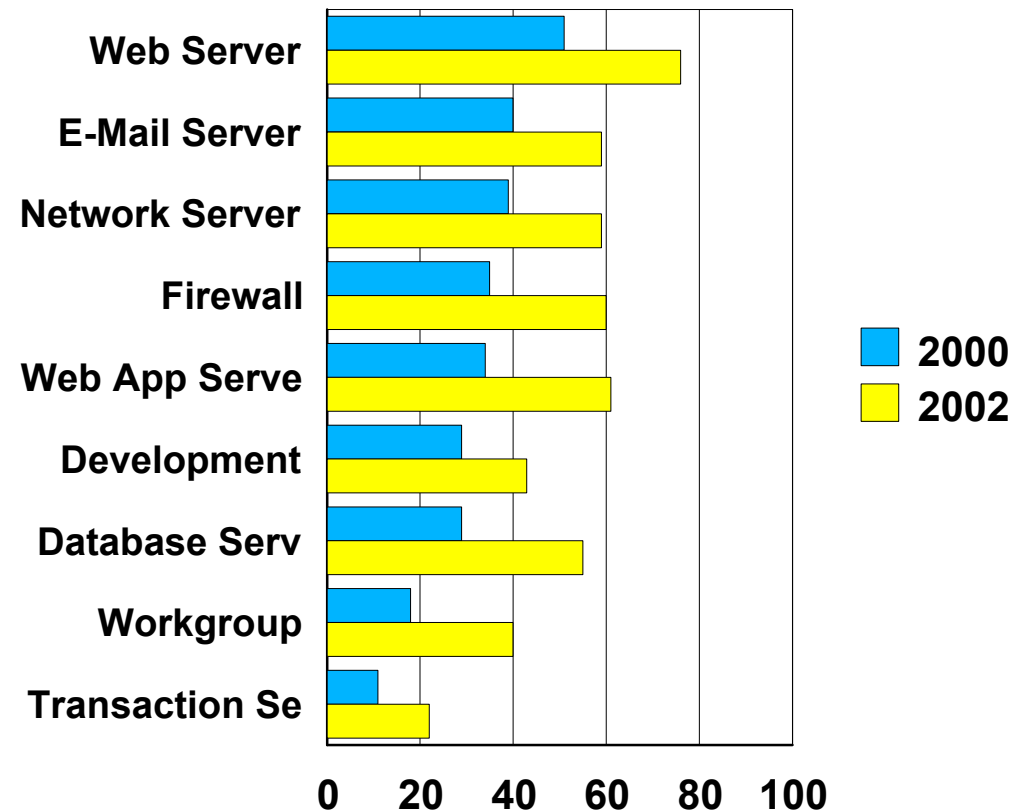
- ▶ Driving Cross Industry Support: Hardware, Software, Services

* International Data Corporation (IDC)
 "Server Operating Environments
 Market Forecasts & Analysis" January
 2001

Linux Usage Intentions

	Today	In 12 Months
HTML Server	45%	68%
E-Mail Server	50%	66%
Web Application Server	43%	65%
Intranet Server	49%	64%
Firewall	48%	63%
File and Print	50%	62%
Software Development	43%	58%
Database Server	38%	50%
Non-Internet, non-Web	33%	49%

Zona Research Market Survey of IT and ISP customers with buying authority: 10/2000



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



Linux and iSeries

What does Linux Bring to iSeries

- ▶ Applications
 - ebusiness infrastructure
 - New generation of web-based applications
 - Provides flexibility and choice of environment
 - Ease delivery of open source components
- ▶ Resources and Skills
 - Leverage virtual world-wide development team
 - Broad skill base to deliver iSeries solutions
 - Leverage other IBM investments in Linux



What does iSeries Bring to Linux

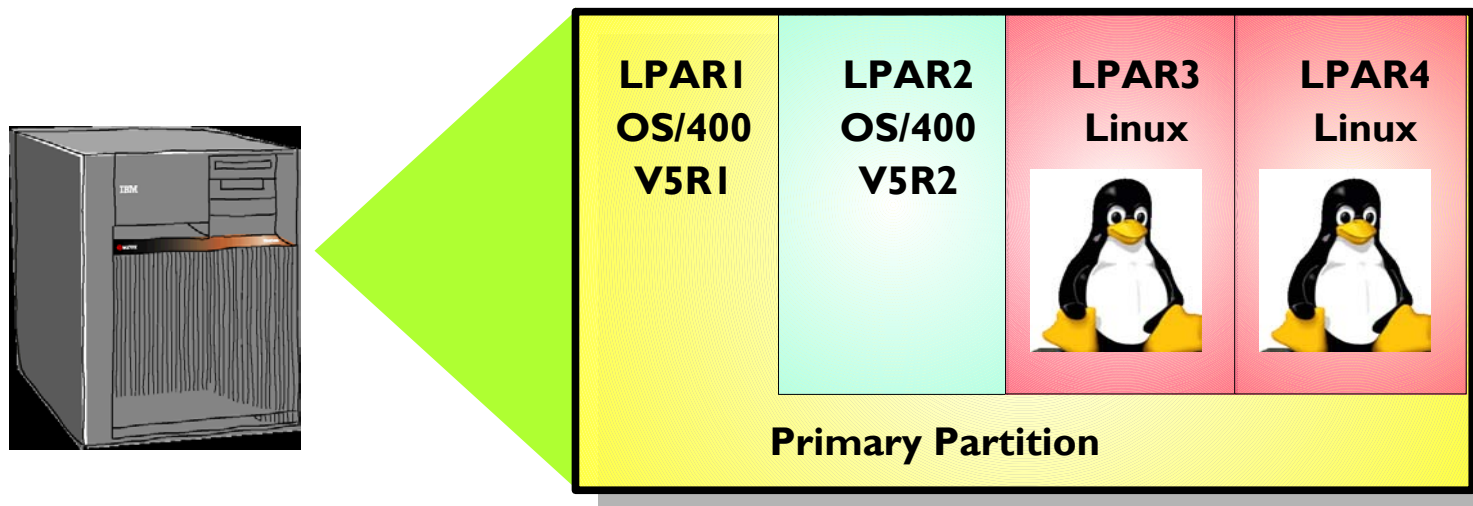
- ▶ Ability to consolidate multiple Linux servers
- ▶ A reliable, scalable server to run Linux
- ▶ Resource sharing and management
- ▶ Integration with OS/400
- ▶ Low Cost of Ownership

IBM eServer iSeries Wins "Best of Show"

LinuxWorld

San Francisco, CA August 28-30

Linux on iSeries



Consolidate up to 31 Linux servers on one iSeries server

- ▶ Linux runs in iSeries logical partition
- ▶ Move processor, memory, and I/O resources between partitions
- ▶ Supported with V5R1 or V5R2 on iSeries Model 270, 820, 830, 840, 890

I/O Flexibility

- ▶ Virtual - Linux shares OS/400 managed disk, tape, CD-ROM, and LAN resources
- ▶ Direct - Linux owns I/O resources

Standard Linux from Leading Distributors: SuSE, Turbolinux, and Red Hat

- ▶ Based on a 2.4, 64 and 32-bit PowerPC kernel



Linux and LPAR V5R1

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

- ▶ Processor, 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 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 processors. Servers with IStar processors require a dedicated processor for Linux

Linux LPAR Enhancements with V5R2

Dynamic Resource Movement

- ▶ Virtual Processor Units moved to/from Linux or OS/400 V5R2 partitions dynamically
Immediate, scheduled, or under program control

Increase number of Linux partitions on 1, 2, and 4 processor servers

- ▶ Requires OS/400 V5R2 Primary Partition
- ▶ Requires iSeries with SStar or Power4 processors

# of Processors in Server	Total Maximum # of Partitions	Maximum # of OS/400 Partitions	V5R1 Maximum # of Linux Partitions	V5R2 Maximum # of Linux Partitions
1	10	4	3	9
2	20	8	7	19
4	32	16	15	31
8 and >	32	32	31	31

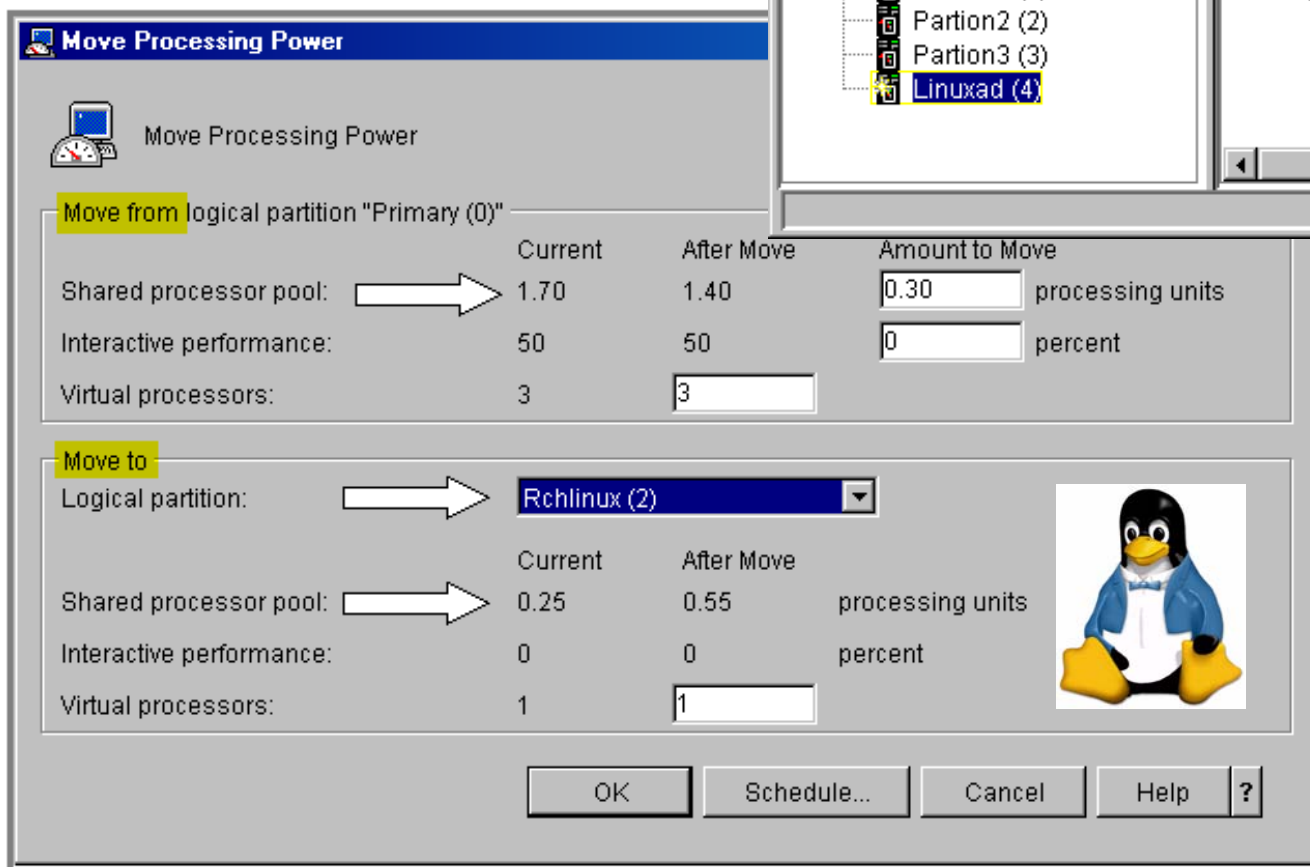
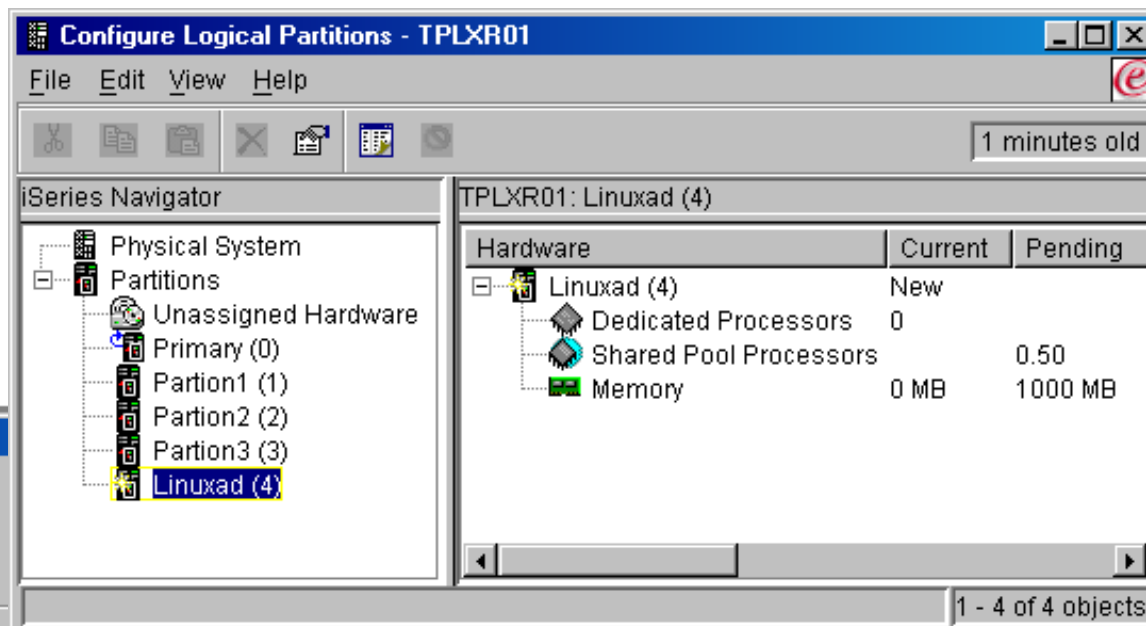
Enables Consolidation of more workloads on iSeries servers



Linux Partition Management

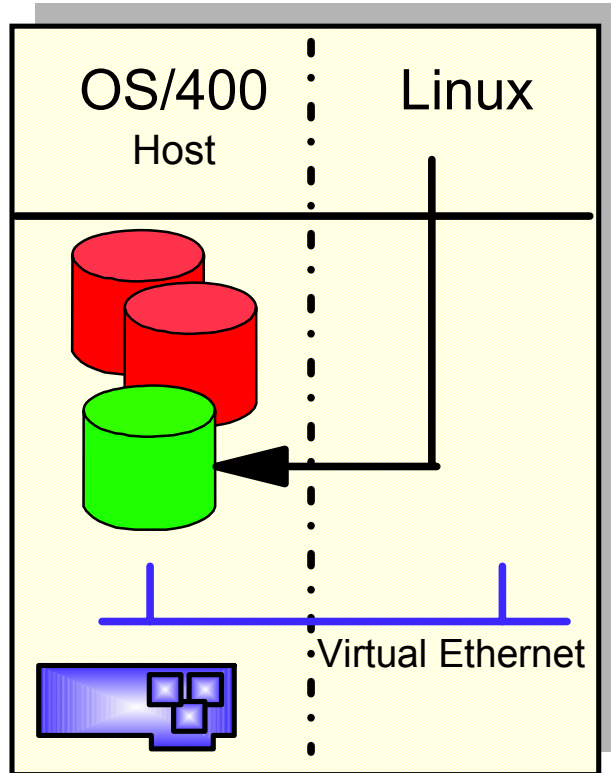
V5R2 iSeries Navigator

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



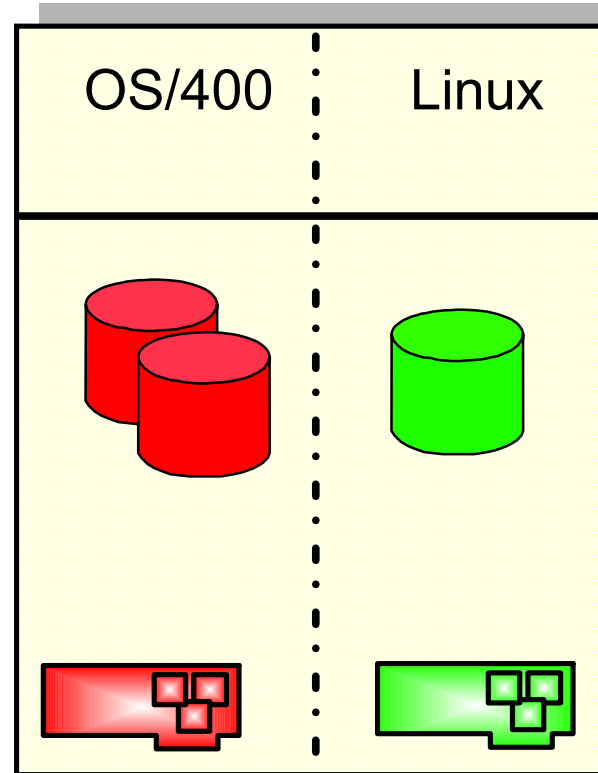
Linux I/O Flexibility

Virtual I/O



- ▶ Leverage iSeries resources
- ▶ OS/400 management

Direct I/O



- ▶ Dedicated resources
- ▶ Linux management

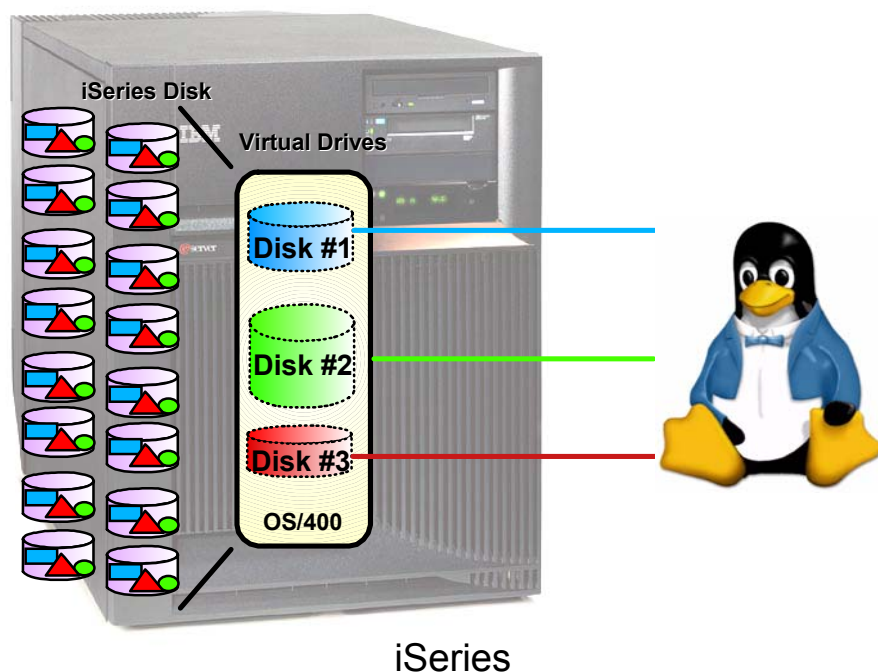
- ▶ SCSI Disk
- ▶ Fibre ESS
- ▶ Tape
- ▶ LAN
- ▶ WAN
- ▶ CD, DVD

- ▶ SCSI Disk
- ▶ Fibre ESS
- ▶ Tape
- ▶ LAN
- ▶ CD, DVD
- ▶ Dynamic Storage Adding
 - ▶ OS/400 V5R2
- ▶ Shared, read only virtual disk
 - ▶ OS/400 V5R2

Linux Storage Virtualization Enhancements with V5R2

Dynamically add virtual disk storage spaces to Linux partition

- ▶ Requires OS/400 V5R2 Primary Partition
- ▶ Details
 - Storage Spaces are 1MB to 64 GB each
 - Up to 20 Storage spaces per Linux partition



Linux can Benefit From:

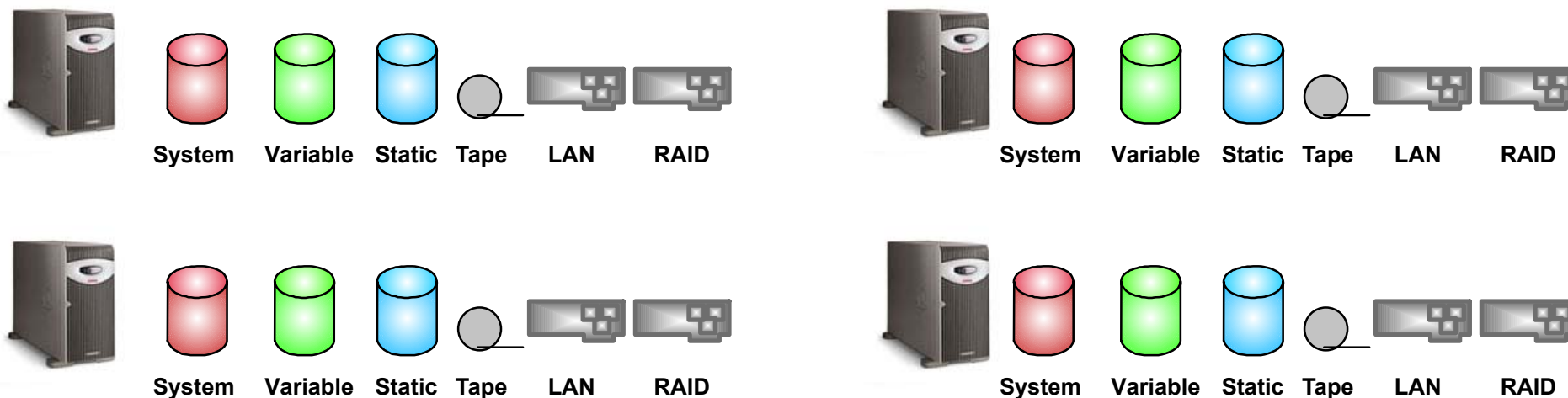
- ▶ iSeries Storage Management
- ▶ Improve performance with more disk arms
- ▶ Consolidated Backup of OS/400 and Linux
- ▶ Flexible Storage Management
- ▶ Easy setup of multiple Linux environments

Storage virtualization enables Linux to leverage the advanced iSeries storage architecture

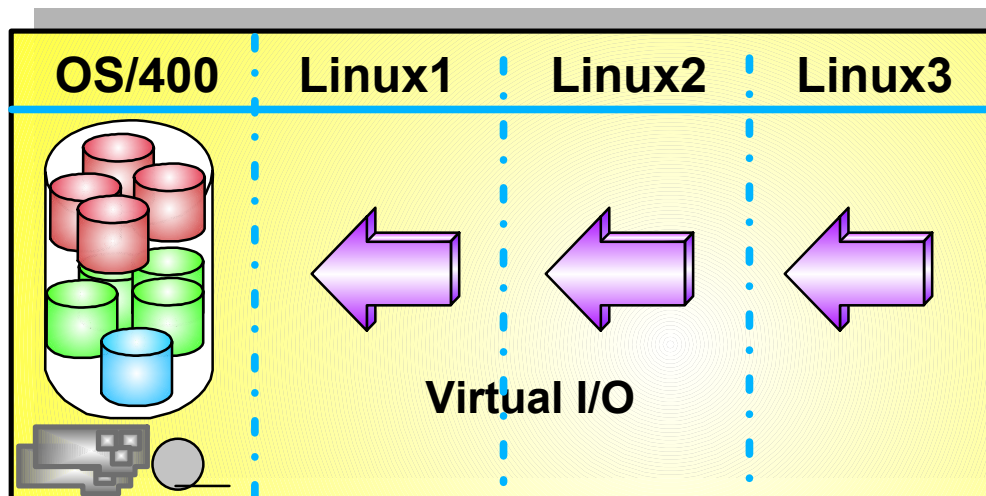


Virtual I/O and Shared Storage Spaces

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

Linux for iSeries

Available from distributors

▶ **SuSE Linux Enterprise Server 7**

- 64-bit kernel
- Available January, 2002
- http://www.suse.com/us/products/suse_business/sles/sles_iSeries_pSeries/index.html



▶ **Turbolinux Server 7 for iSeries**

- 64-bit kernel
- Available, April 2002
- <http://www.turbolinux.com/products/series/index.html>



▶ **Red Hat 7.1 for iSeries**

- 32-bit kernel
- Available February 2002
- <http://www.redhat.com/software/linux/ibmseries/>



Linux on iSeries: Key Solutions

Included with Distributions

- ▶ Samba - file server
- ▶ Apache - web server
- ▶ Squid - proxy server
- ▶ DNS/DHCP
- ▶ MySQL - database
- ▶ ...

Open Source

- ▶ Tomcat - web application server
- ▶ OpenOffice - office suite
- ▶ ...

ISVs

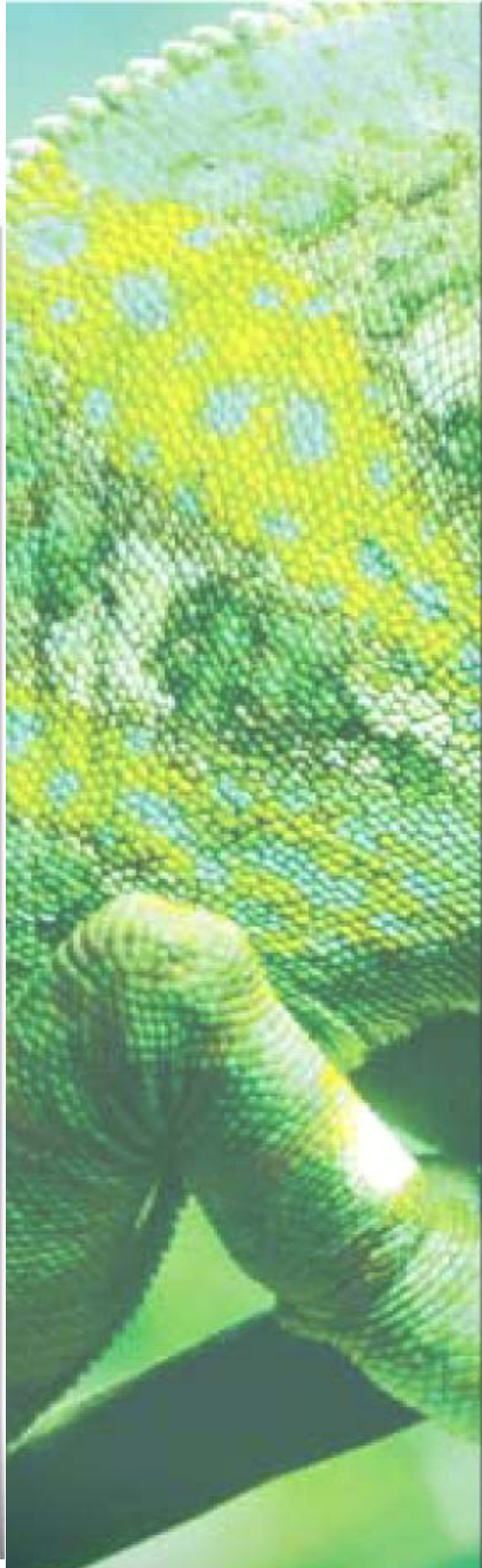
- ▶ Symantec - Enterprise Firewall
- ▶ eOne - Commerce
- ▶ Sage - business applications
- ▶ Bynari - mail server
- ▶ MAPICS - ERP
- ▶ Dimensional Insight - BI
- ▶ Vision Solutions - HA
- ▶ Cybozu - workgroup

IBM Software SODs

- ▶ DB2 UDB
- ▶ WebSphere Application Server



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



SuSE LINUX AG

THE LINUX EXPERTS

Jay Migliaccio,
Product Manager

jam@suse.com

510-628-3380



SuSE - The Background

- SuSE is developing, marketing and supporting leading edge **Linux Operating System technology and products** and **business software products** for private users and enterprises.
- SuSE's **Professional Services, Training and Support**, delivered by the most experienced Linux experts in the industry are designed to help Customers maximize the benefits of using Linux.
- SuSE is the Number 1 **Engineering Partner** for all major IHV's and ISV's performing certification services for all leading Hardware and Software platforms.
- SuSE is an active member of the **Open Source Community** and supports all relevant Linux standards.
- SuSE is a **European Company with global reach**.



SuSE - The Background

- Founded as Software und Systems Entwicklung in Nürnberg, Germany, 1992, Selling Linux solutions since March 1993

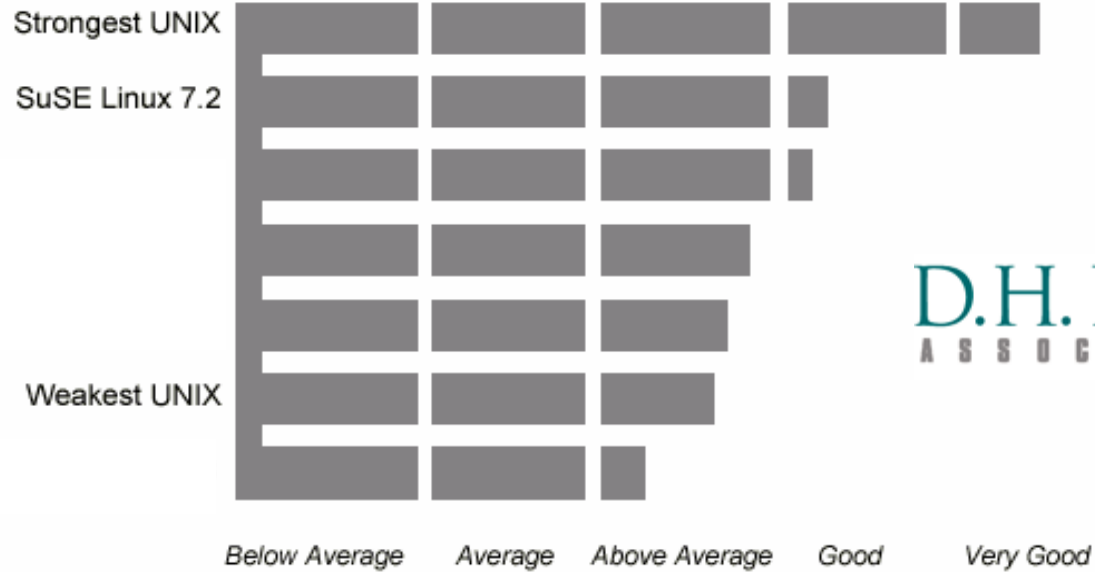
- Privately funded by a variety of investors
 - eMillenium – Deutsche Bank, La Caixa, Accenture, Apax
 - Compaq, Intel, and IBM, AdAstra

- Number 1 Europe, Number 2 Worldwide

- New Structure for 2002
 - **Qualified User** - targets individual user with Operating System products for desktop and smaller server applications
 - **Business User** - targets SME with integrated Linux application solutions and runs channel sales
 - **Corporate User** - targets Enterprise customers with cross platform, server solutions : focused on finance, manufacturing, telco and education.
 - **Technology Partners** - developing industry relationships



SuSE - The Technology



D.H. BROWN
ASSOCIATES, INC.



Product of the Year
SuSE 7.3

" SuSE 7.2 has the overall functional lead among the studied Linux distributions, taking top place in the categories of RAS (Reliability, Availability and Serviceability), Systems Management and Directory and Security Services "

2001 Linux Function Review



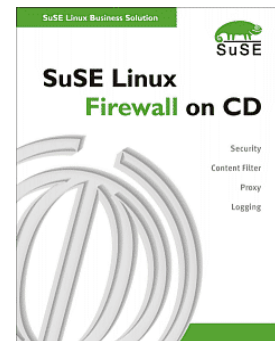
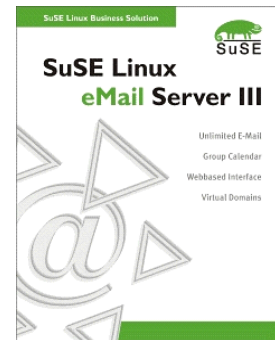
SuSE uniques

- **Linux OS products**
 - Professional and Personal Editions
 - The SuSE Linux Enterprise Server
- **Linux Solution Software**
 - Groupware, Database Firewall and eMail Servers, etc.
- **3rd party software**
 - Arkeia, IBM middleware etc.
- **Professional Services and Consultancy**
 - We make Open Source Technology the success factor in Enterprises of all sizes
- **Publishing**
 - Manuals, books etc. through the SuSE Press
- **Merchandising**
 - T-shirts. toys etc. available online
- **Training**
 - Customer education tailored to their needs and all LPI compliant



SuSE Business Solutions

- **SuSE eMail Server III**
Low entry price, Postfix based mail servers.
III includes Skyrix groupware
- **SuSE Linux Database Server**
The only DB2 integrated solution and in a
single low entry priced package that's easy
to install
- **SuSE Firewall on CD**
Another unique solution, boots and runs off
CD. Ultimate security for all sizes of
business. Now with VPN support
- **SuSE Connectivity Server**
Everything for a small business server to
connect to the web, manage printers, files
and security.



SuSE in the Development Community

- **Memory management design**
SuSE is a lead, now in kernel from 2.5
- **Journaling File System - Reiser FS**
Funded by SuSE and included since 6.4, in the Kernel from 2.4.1
- **Large File System**
Leading contributor to the technology
- **Crypto File System**
From 7.2, you can encrypt all files
- **Logical Volume Manager**
First included in our 6.4 distribution
- **Leading KDE developers**
Integrating YaST, SuSE's management and configuration tool
- **ALSA (Advanced Linux Sound Architecture)**
SuSE drives this : now accepted into the kernel as standard
- **Multi-platform strategy**
10 hardware platforms now supported



YaST Control Center



Software



Hardware



Network/Basic



Network/Advanced



Security and Users



System



Misc

Bootloader
configuration

Choose language

Create a boot, rescue
or module floppy

LVM



Runlevel editor



Select keyboard layout



Select time zone



Sysconfig Editor

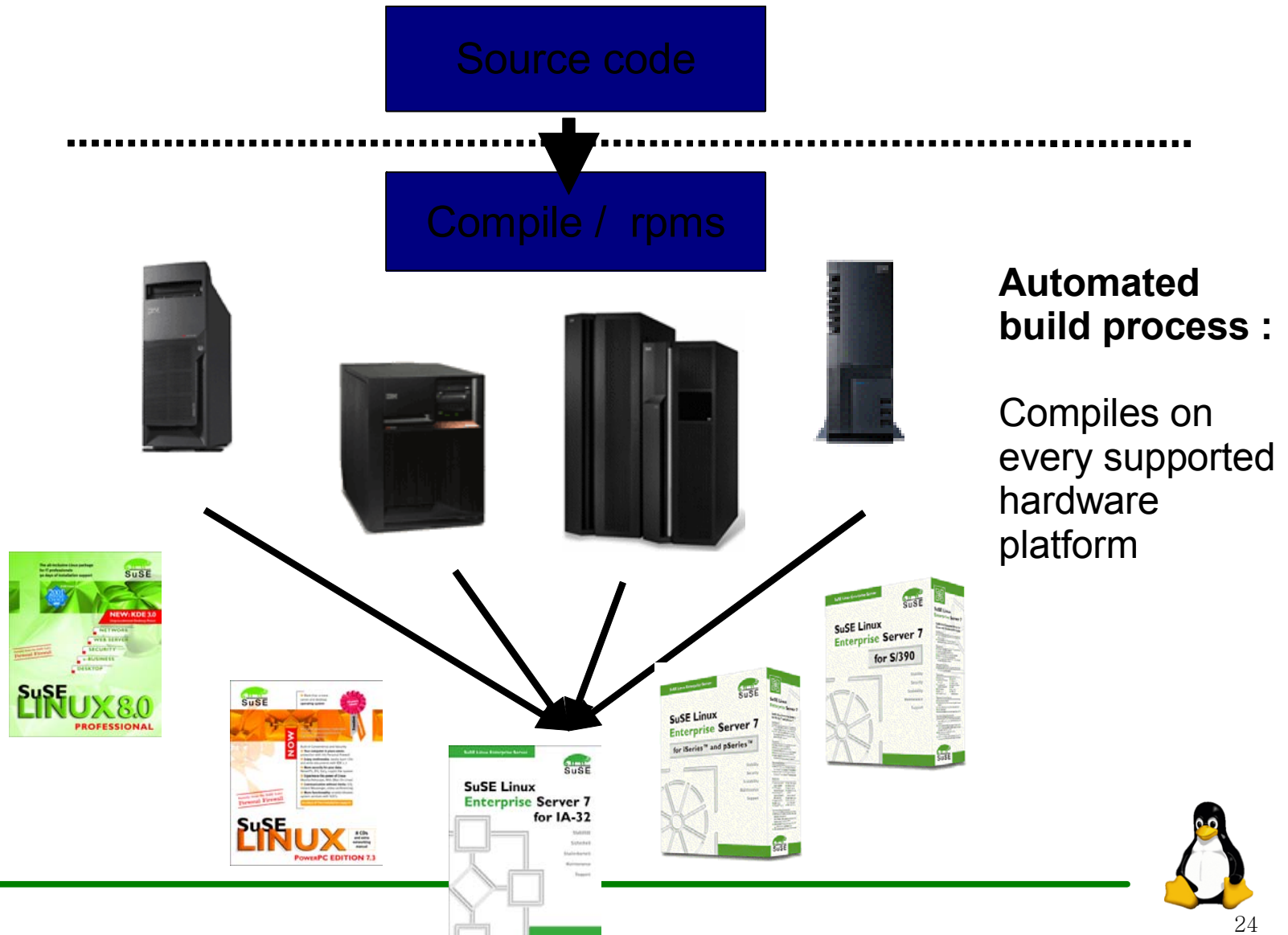
Help

Search

Close


SuSE uniques

Source, patches, documentation from single package maintainer within SuSE



SuSE Linux Enterprise Server

SuSE Unique proposal :-

- We reduce the number of applications to those more suited to a business platform
 - Only major applications are included
- We release a new Enterprise Server once a year
 - Based on a proven "standard" distribution
- We provide maintenance for a year within the contract
 - Patches, fixes - think of PTFs
- We guarantee that this platform is supported for two years - but ask if want more as we are flexible
 - We may consider 5 years, for instance
- We deliver a stable, business oriented Linux system for all platforms
 - IA32, IPF, PPC, 39 IBM 
- We price according to the hardware platform
 - From \$600 to \$150,000 per year, and usually per processor

SuSE Linux Enterprise Server

- Open Source Infrastructure components:-
 - File Sharing with SAMBA
 - ? Fits neatly into a Windows Domain
 - Directory Services with Open LDAP
 - ? Directory Server, Authentication Server
 - ? Firewall with IPTools
 - ? Packet filtering, traffic shaping
 - Proxy Server with SQUID
 - ? Content control, Caching Proxy etc...
 - Print Server with CUPS
 - Mail Server with Sendmail
 - Web Server with Apache

IBM  server

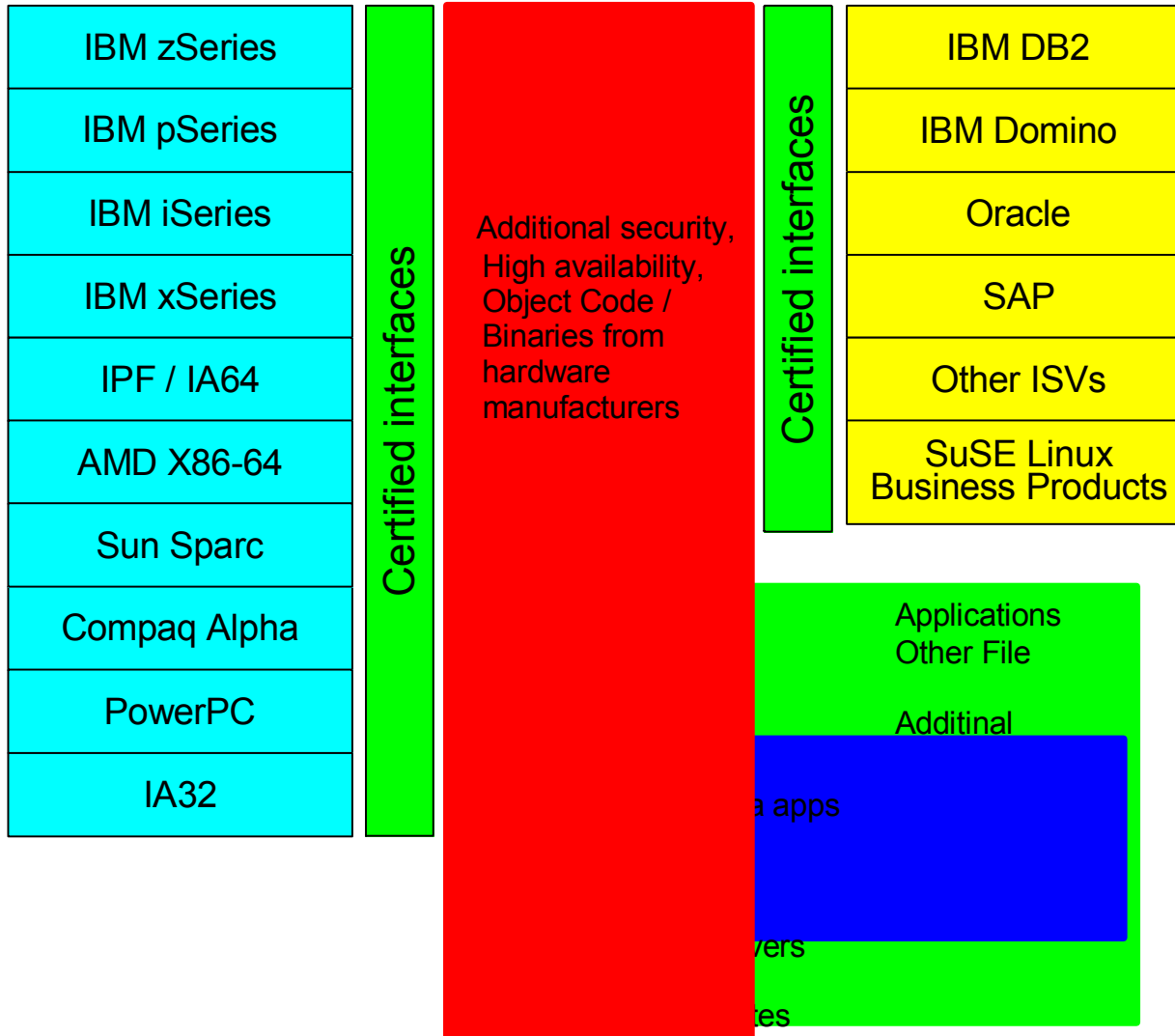


SuSE Linux Enterprise Server

Hardware
Platforms
supported

SuSE Linux Enterprise Server

Industry
Partner
Applications



SuSE Professional

SuSE Personal

YaST
Databases



SuSE Linux Enterprise Server

Performance, support, maintenance

SuSE Linux Enterprise Server 7
for IBM zSeries™

SuSE Linux Enterprise Server 7
for iSeries™ and pSeries™

SuSE Linux Enterprise Server 7
for Itanium Processor Family

SuSE LINUX 8.0 PERSONAL

SuSE LINUX 8.0 PROFESSIONAL

SuSE LINUX PowerPC EDITION 7.3



SuSE Linux - The Customers



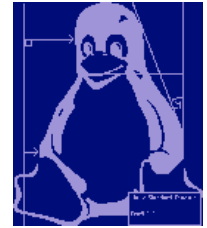
Some of SuSE's Partners




Computer Associates™



An IBM Company



SuSE and IBM

- SuSE committed to support all of the current IBM platforms, and has delivered on that commitment
- We will continue to jointly develop and deliver Open Source programs and products, with a particular eye on the IBM  server range
- SuSE is working with IBM software to deliver integrated business solutions to meet a variety of customer needs
- SuSE and IGS are working very closely to deliver some of the most complex and far reaching Linux based solutions around the world



SuSE and IBM

- SuSE was the **FIRST** to announce, and at the moment, the only Linux available as a fully developed product to support the full range of eServer platforms in all variations.
 - SuSE has already **delivered** :-
 - Intel 32 bit port for xSeries
 - Intel IPF - 64 bit of course
 - PPC port for the pSeries and iSeries 32 and 64 bit
 - S/390 zSeries 31 bit port
 - 64 Bit zSeries port - beta available if you ask
 - Includes ALL of IBM OCO (binary) modules for e.g. HyperSockets**
- SuSE is currently working with IBM on :-
 - 64 user space for pSeries and iSeries



SuSE and IBM

Many **joint projects**, including :

- Developing Journaling File System
- Developing the Logical Volume Manager
- Redbooks for Netfinity, Samba and S/390
- S/390 and zSeries porting work
- PPC porting work for i and pSeries
- xSeries Driver development
- Clustering technologies
- ServerProven / Certification



And **services** and **support** too

- Problem management and TT passing between us
- Level 3 support for IBM customers
- Joint services bids and Proof of concepts etc.



UNITED LINUX

UnitedLinux is a **standards-based** Linux operating system targeted at the **business user**. It is developed, marketed and sold by an experienced partnership of Linux companies.

- ? High quality business Linux
 - ? Based on LSB (1.2), FHS (2.2+) Li18Nux (1.0+) standards
 - ? Best practices from four industry leaders
 - ? IA32/64 server focused, plus support of IBM eServer product line
- ? IT industry commitment
 - ? Global certification on Hardware and Software from major industry players
- ? A global partnership
 - ? Support and services in local languages





Bynari Insight Server on ISeries

Hyun J. Kim
President
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(214) 350-5772 X59



Who is Bynari

- **Utilize Open Standards for Digital Convergence**
- **Development firm**
- **OEM, joint development, utility partners, and resell channels**
- **Linux based full-function mail server**
- **Current principal products**
 - **InsightServer**
 - **InsightConnector**
 - **LDAP Client (Global Address List)**
- **Open architecture & standard protocols**



Bynari Insight Family of Products (server, connector, & LDAP client)

Services provider to Outlook...

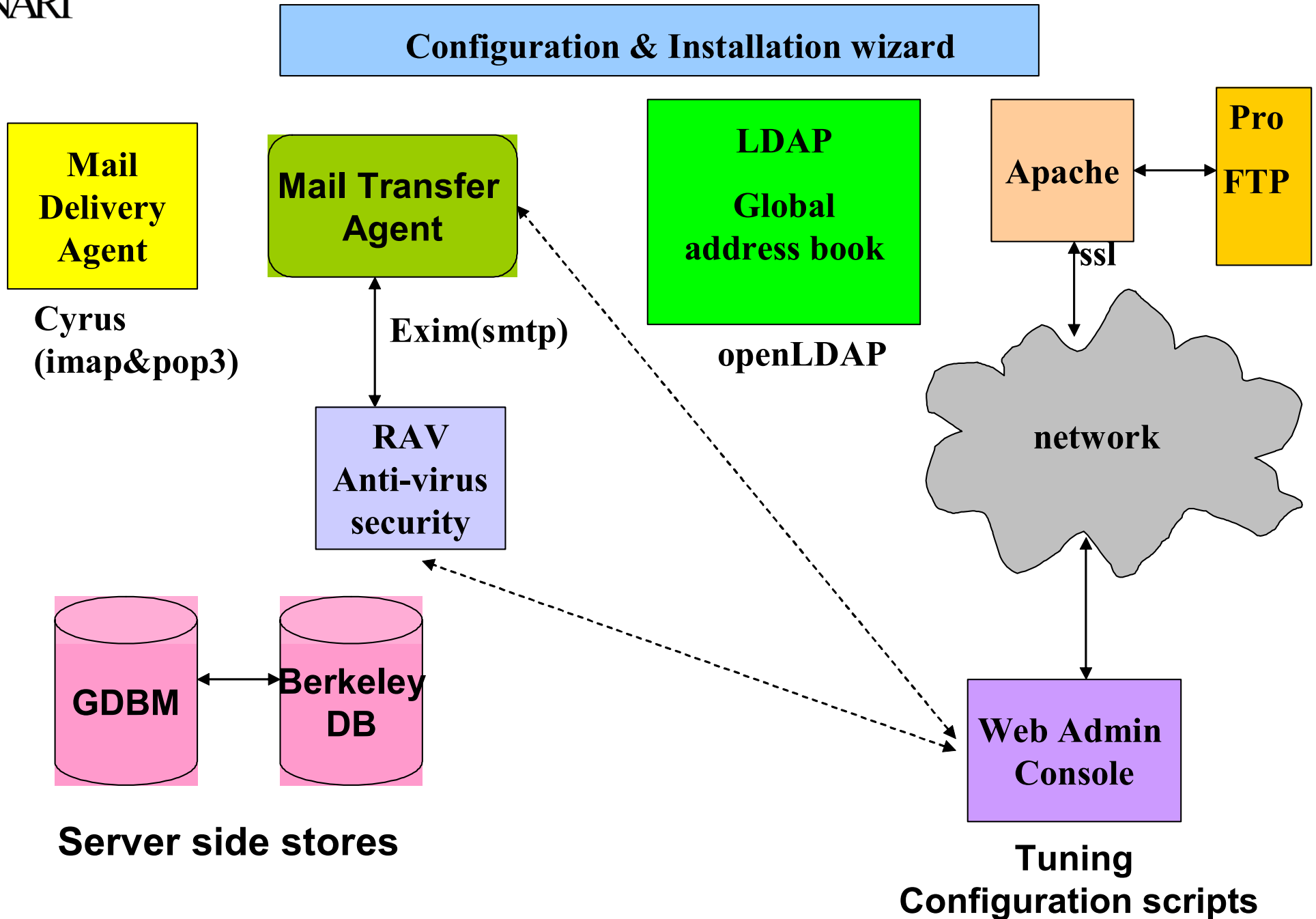


What is Bynari's Insight Server

- **Messaging, Collaboration, and Web Server**
 - **Directory Services, Calendaring, Collaboration**
- **Linux distribution agnostic**
- **Internet Mail Server (SMTP, IMAP, POP3) & MAPI**
 - **Internet Mail Spec Compliant**
 - **Based on open standards**
 - **Interoperable with all versions of Microsoft Outlook(97-2002), Netscape, Unix and other leading Linux mail clients**
- **Runs on IBM eServer platforms...xSeries, iSeries, & zSeries**
- **Based on Enterprise model architecture**



Insight Server Components





Bynari Insight Connector

- **Provides services to Outlook client calendar and folder sharing, and much more...**
- **Microsoft DLLs**
- **Exchange Client Extension lets Outlook clients perform in “Corporate Groupmode”**
- **Supports other IMAP 4 server which employs with ACLs**
- **Enables server-side sharing of calendars and mailboxes, and access control lists**
- **Supports all versions of Microsoft Outlook facilitates for transparent migration for the desktop user**
 - **Maintains the Microsoft objects, MAPI properties and Outlook components**
- **Supports localization of over 130 languages**



Connector: features/functions...

- Native Outlook calendar sharing
- Publish free/busy
- Meeting room scheduling
- Contact Manager
- Global Contact Lists
- Task List
- Auto Archiving
- Outlook free-form notes
- Activity Journal
- Advanced Outlook searching
- Preview Pane
- Send/Receive Group requests
- Send/Receive meeting request response (accept/decline messages)
- Advanced Outlook message search
- Wordmail
- Reminder Window
- MSN Messenger Integration
- LDAP/Contact Address book
- Group scheduling
- Etc...



Top 6 Reasons To Use Bynari LDAP Client

by Shawn Walker, LDAP developer

- 1) It enables a global address list from an LDAP server**
- 2) Schema can be changed to work with different servers**
- 3) Check (resolve) names on LDAP server**
- 4) Local caching can be enabled to support large LDAP servers**
- 5) Same Look and feel of GAL**
- 6) Performs searches for very large Directories, within seconds**



InsightServer's Architecture



Server deployment Models: Single or Distributed

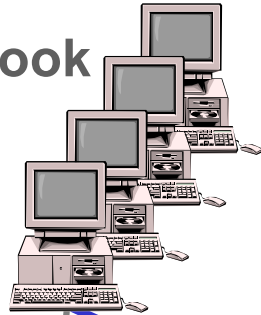
- **All users in a central location (all users can access the same server)**
- **Users are sparse or distributed (users must access different servers)**
- **Larger number of users**
- **Serves more than one organization**



Bynari's Product Line "Interoperability"

Windows Desktops

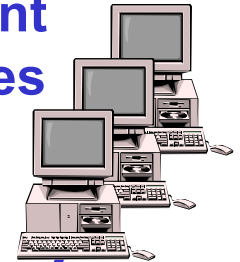
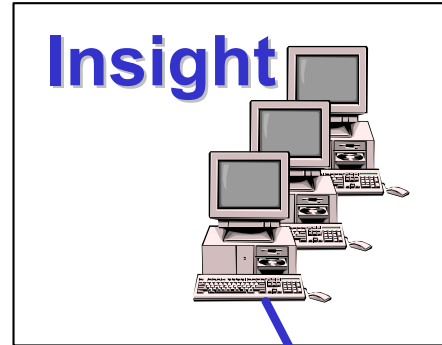
Microsoft Outlook
97/98/2000



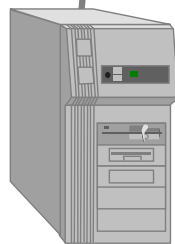
Unix/Linux Desktops

Insight

Web client
services



MS
Exchange
Server



Insight
Server

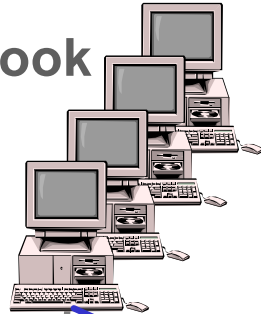




Bynari's Product Line "Server Consolidation"

Windows Desktops

Microsoft Outlook
97/98/2000



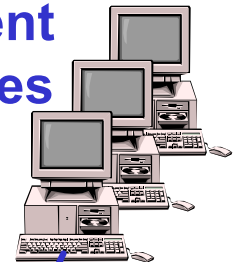
Microsoft Exchange
"Server Consolidation"

Unix/Linux Desktops

Insight



Web Client
Services



Insight
Server for
IBM iSeries





Scaling/Capacity

The limitations of the operating system determine the number of mail users that operating system can support:

- **Number of simultaneous open connections**
- **Amount of RAM and Disk**
- **Sizing guide available for Bynari Insight Server on iSeries**

<http://www-912.ibm.com/servlet/EstimatorServlet>



Backup and Restore

- **Standard Unix backup and restore facilities can be used**
- **Supports multi-file system to manage each user's mail individually.**
- **Standard Unix archival and storage management systems such as Tivoli (TSM), Amanda and Legato perform user level mail archive & retrieval**
- **Additional disaster recovery options on eServers**
- **Mirroring/Hot-Site**
- **Less than a minute fail-over capability**
- **OS400 disk mage backup (DR)**



Migration

- **minimal downtime for users**
- **robust uncomplicated processes for administrators**
- **ability to switch back to the old system at any time**
- **Customer can either switch all-at-once or switch gradually, Standard Migration by Groups**
- **Scripts for migrating data**
- **Mail Store migration can happen as often as the customer likes (usually once only).**
- **Automated migration tool**



Security

- **Configurations using Exim MTA**
- **Integrated anti-virus, anti-spamming, filtering product**
- **Integrated management of security features in mgt console**
- **SSL/TLS for web console, po3/imap, smtp, & LDAP directory**
- **No OS level user defined IDs**
- **Centralized DB for directory information**
- **Authentication using ACLs on IMAP**



Administration

- **Web mgt console for**
 - **User Admin**
 - **Resource Mgt.**
 - **MTA Configuration**
 - **RAV Configuration**
- **Can be administered remotely**
- **Installation of Server completed within minutes**
- **Configuration & Installation scripts**
- **System log access via web console**
- **Server side filtering rules**
- **Quotas set under user administration**



V3.5.5 additional Functions

- **Creation of usernames containing ‘.’**
- **Special folder creation outside of INBOX level**
- **Extended character sets supported**
- **Localization for over 130 languages**
- **Distribution lists (both server-wide & personal lists)**
- **Change userids without losing or migrating mail**
- **Improved ACL (for deletion functions)**
- **Server side filtering rules**



InsightServer's Benefits



Customer Benefits of a Bynari/iSeries Implementation

- **Cost reduction**
 - Email license costs
 - Server costs
 - Transaction costs
- **Increased Efficiency**
 - Easily scaleable
 - Single or multi-platform deployment
 - Simplified administration and support
- **Increased Security**
 - Limits propagation and spread of Viruses
- **Other Attributes**
 - Highly Available
 - Reliable OS & Mail server



Future attractions..

- **Web Client Mail services for integration w/Outlook**
- **Seamless migration w/automated migration tool**
- **Additional features/functions**
- **Integrated FaxServer**
- **Much more...**

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