

Linux for zSeries

The Value and the Price

March 26, 2002

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Linux Sales
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**Next Generation
e-business**

**Marketplace
Innovation**

Integration

Interoperability

**Application
Portability**

Linux

**Technology
Innovation**

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Multiprise*
MQSeries*
OS/390*
PartnerWorld*
S/390*
Tivoli*
Tivoli Storage Manager

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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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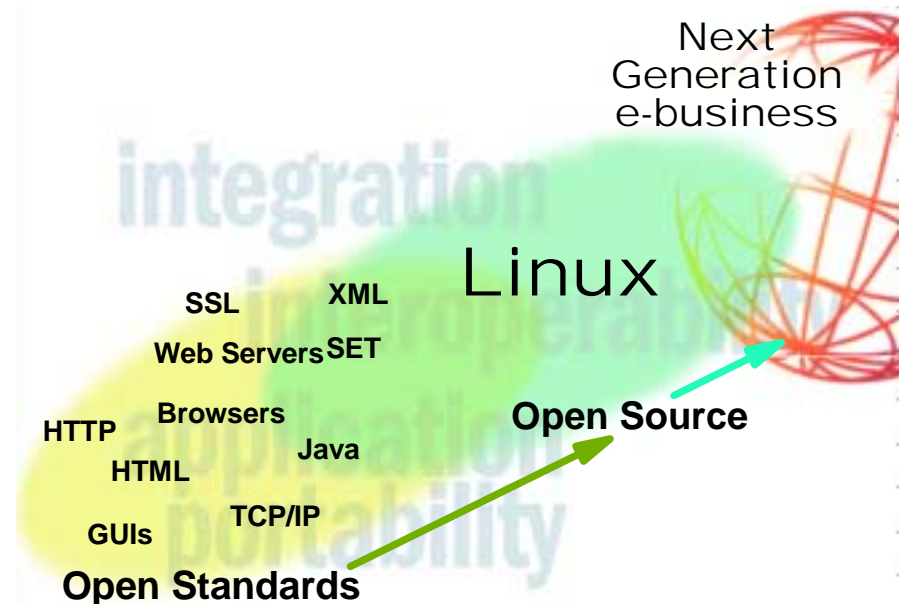
Next Generation e-business

More connectivity, more devices

- Data transaction servers
- Web application servers
- Appliance servers
- Pervasive devices

Next generation e-business

- Technology advances
- Increased integration
- Business innovation
- Standards and open source



***“Linux will do for applications
what the Internet did for
networks”***

Dr. Irving Wladawsky-Berger

Outlook for Linux

- Linux will have a "**breakout year**" in 2002. Now it seems clear that Linux has become a viable **alternative for enterprise use**.
IDC, January 2002
- Linux will definitely have the **fastest growth** in 2002, at almost 50% over 2001.
Gartner Group, December 2001
- Exploring Linux - especially on the server side - **should be part of an organization's IT investment** portfolio. ...viewed as an insurance policy to **hedge against future Microsoft incursions into your wallet**.
META Group, August 2001
- The development of **Linux is moving faster than any other commercial operating system (OS)** to date - so fast, in fact, that it will leapfrog Windows to replace Unix on the high end within the next seven or eight years. That means **Linux, z/OS and Windows** will be the primary OSs before the end of the decade.
Aberdeen Group, July 2001

Linux is ubiquitous

Manufacturing Industry

- Grede Foundries, Inc.
- Newell Rubbermaid
- Motorola
- Winnebago
- Elektro-Material AG
- FERMAX Electronica, S.A.E.
- POSDATA
- Yamaha Canada
- Ford Werke
- Hero-Honda Motors, Ltd

Wholesale/Distribution

- NaITO & Co., Ltd.
- Petroleo Ipiranga
- Lawson Products
- Konica Business Technology

Retail

- Amazon.com
- Burlington Coat Factory
- GreetingGifts
- DeoDeo
- Lawson
- Price Chopper
- Boscov's
- L.L. Bean
- Tommy Hilfiger
- Devoto-Grupo Casino
- Confirm.com
- Mosca Hermanos S.A.
- Perfumerias San Roque S.A.

Public

- Consejo Generale del Notariado
- Procergs - Processamento do Estado do Rio Grande do Sul
- City of Orem, UT
- Massachusetts Trial Courts
- Consejeria Sanidad Murcia
- New South Wales Dept of Ag

Financial / Insurance

- Instituto Federal Electoral
- Hill House Hammond
- Millennium Partners
- Banco Mercantil
- Banco de la Provincia de B. Aires
- GAD
- NYSE/SIAC
- The Credit Index
- Northern Trust
- Credit Union of Central Alberta
- Guide One Insurance
- HSBC Trinkaus & Brurkhardt

Education

- Kyoto Sangyo University
- Manchester Inst. of Information Delivery
- University of New Mexico
- Boston University
- Marist College
- Arizona State University
- University of Nebraska
- Colorado State University
- Beijing University
- Tamkang University
- Daito Bunka University
- University of Geneva
- Advanced School for Cmptg & Img
- Trinity College Dublin

Service

- Cendant Corporation
- Wimbledon
- Weather
- 123 Immo
- Akamai
- Aso Humaney Center
- BizAid Technologies

Technology

- Lineo
- Royal Dutch Shell International
- Structural Bioinformatics
- Comp. Generale de Geophysique
- Gene Formatics
- Brookhaven National Lab
- Chevron

ISPs/ASPs

- WorldGate Private Networks
- Vasnet Comm. Pvt. Ltd.
- Jindal Information Sys.
- Narmada Commun.
- Intelnet
- InterServ
- Infocom Technologies, Inc.
- Infocrossing/ACTS
- TeliaNet
- ASP Movers
- Dimension Enterprises
- Sonera Entrum
- Dreamball
- Oni Way
- CLS ARGOS
- BRFree
- Exxcom
- FileFlow
- iMobile Computing, Inc.
- SERCON
- COMSAT Venezuela
- Mazu Networks
- Qnet Infosystem
- Verizon

Transportation

- Korean Airlines
- Thrifty Car

IBM Focus Areas

Hardware	Software	Services	Alliances	Open Source
				
<p>Servers Desktops</p>	<p>All Major Applications</p>	<p>Support And Training Consulting</p>	<p>Distributor Partnerships</p>	<p>Code Contributions Techical Resources</p>
<p>zSeries, pSeries, iSeries, xSeries, ThinkPads, NetVista</p>	<p>WebSphere, Domino, DB2, Tivoli, VisualAge Java, MQ Series, ViaVoice</p>	<p>Learning Services, Redbooks, Supportline, Consulting Services</p>	<p>Major 4 Distributors Caldera, Red Hat, SuSE, Turbolinux</p>	<p>Manpower, Knowledge, Technology</p>

Project eLiza: Building upon the foundation

- **IBM's blueprint for self-managing systems**

- **IBM ^ platforms provide end-to-end availability and security, and lower costs for maintaining / deploying systems**
 - ▶ **Self-configuring** - System designed to define itself "on the fly"
 - ▶ **Self-healing** - Autonomic problem determination and resolution
 - ▶ **Self-protecting** - System designed to protect itself from unauthorized access anywhere
 - ▶ **Self-optimizing** - System designed to automatically manage resources in order to meet enterprise needs in the most efficient fashion



Cost of skills:

- Using existing technology, for every US \$1 spent on server HW, US \$10 will be spent on people to manage the HW by 2004

Cost of downtime:

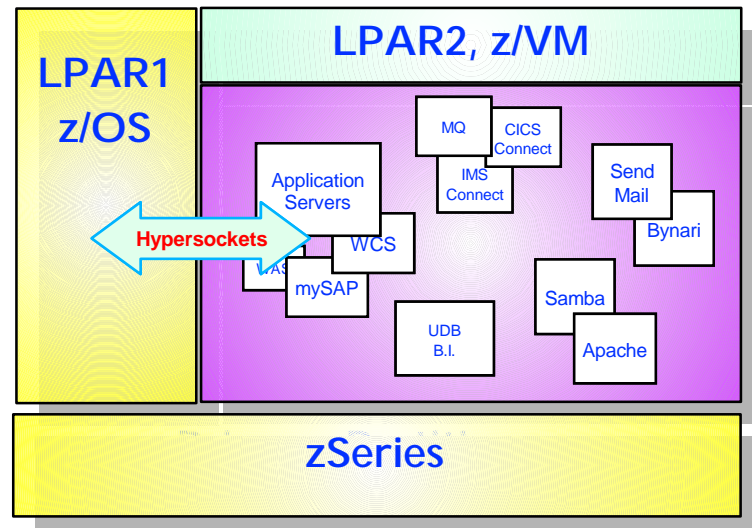
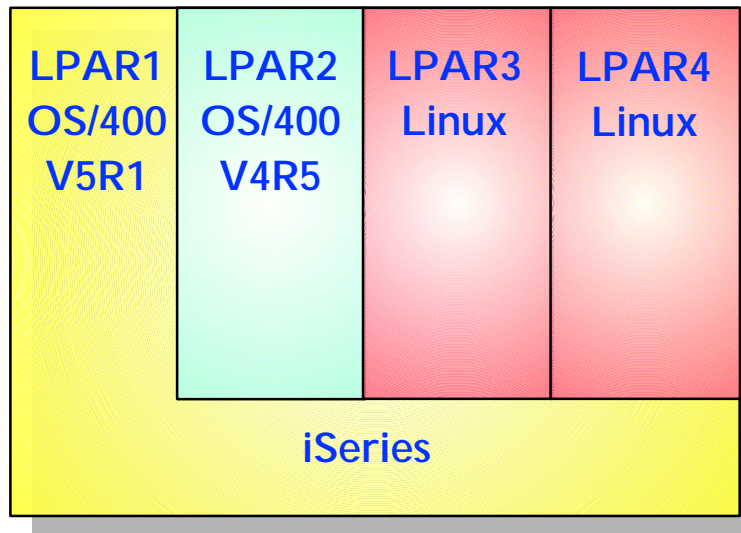
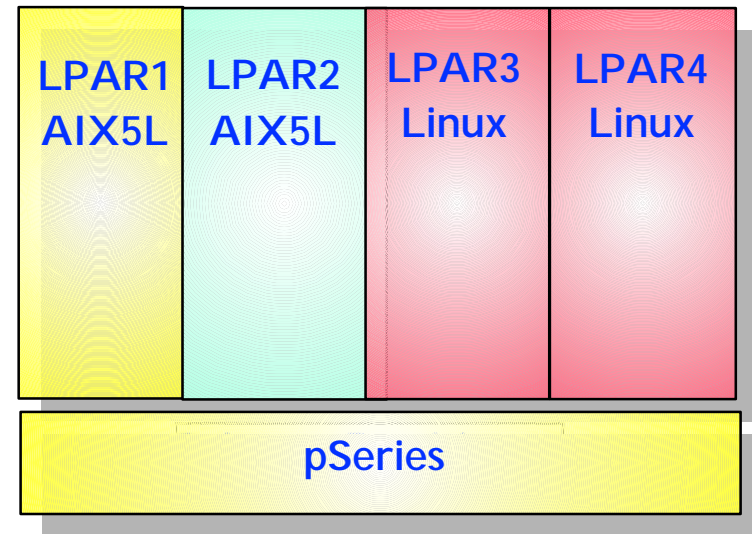
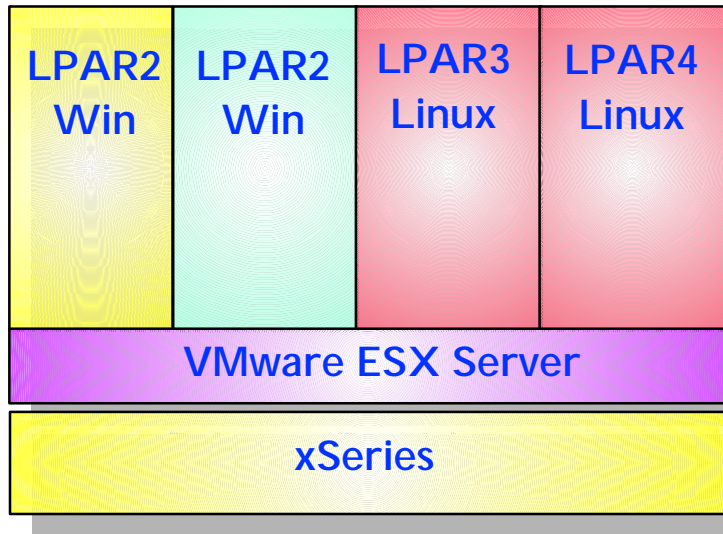
- US \$10,000 per minute for e-commerce

The Standish Group, 2001

Self-managing systems reduce downtime, operating costs and administrative requirements

IBM @server. For the next generation of e-business.

Partitioning ^ for Linux



What Is Linux for ^ ?

Runs native, in an LPAR and/or as a virtual guest

Pure Linux, an ASCII environment

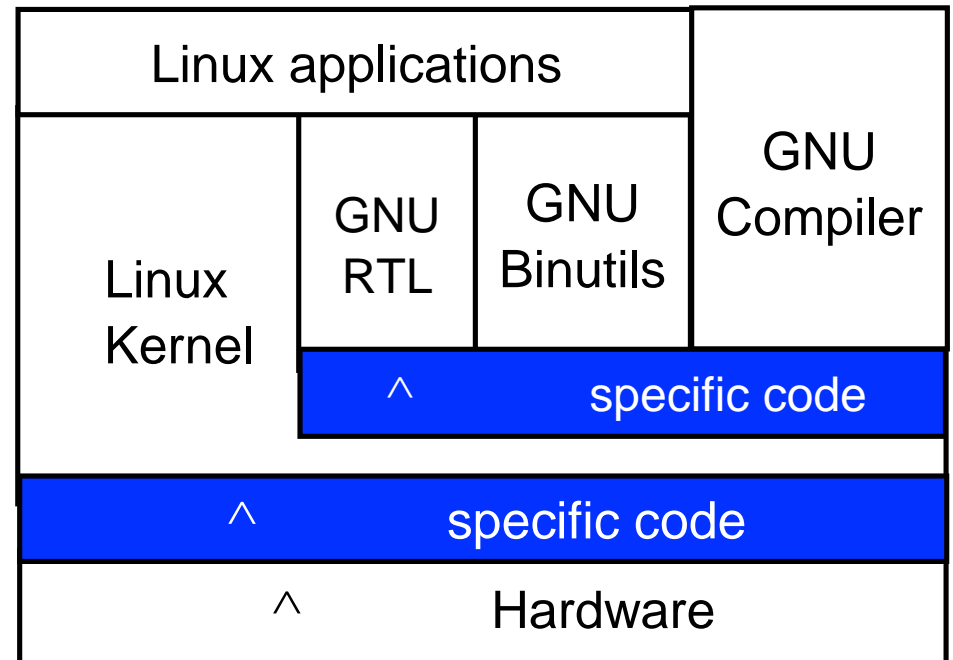
Exploits IBM ^ hardware

- 32 and 64 bit
- Floating Point
- Cryptography
- High Speed transport to traditional applications and data

High performance clusters with pSeries and xSeries

Flexible virtualization on z

Not a replacement for but Inter-operates with traditional ^ same or separate footprint

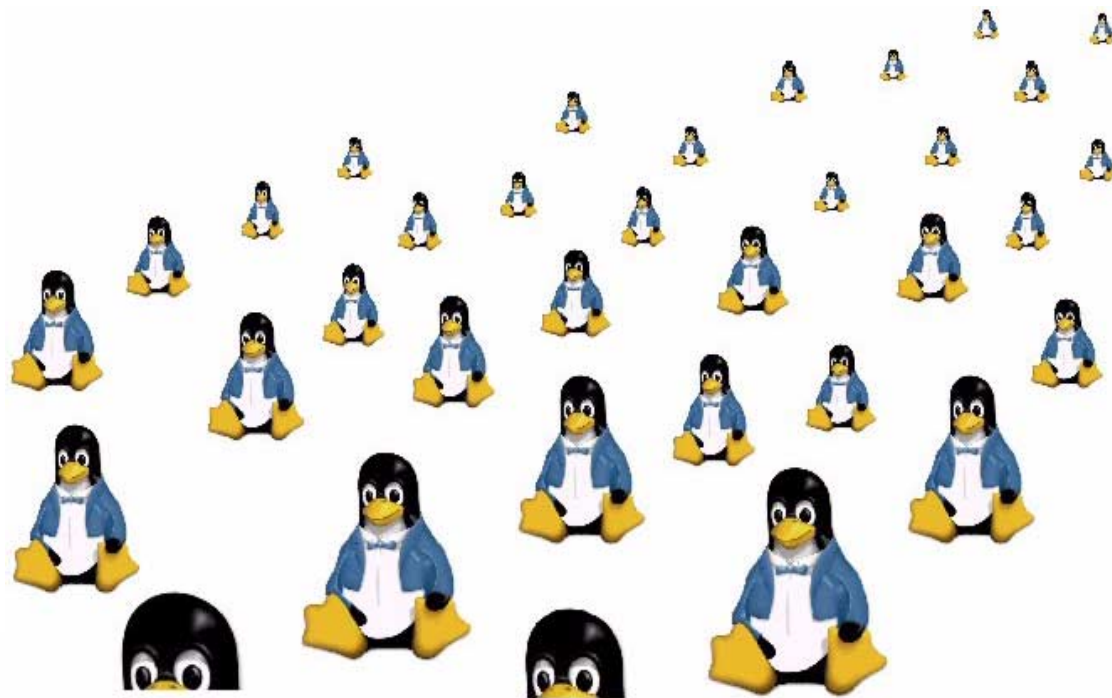


operating systems on

^

Consolidation

- Pure, ASCII Linux on high availability servers
- Cost effective, flexible virtual servers
 - Augment traditional IBM servers with Linux partitions
 - Blended ^ solutions for new applications
 - Stand-alone, virtual server farms



IBM @server. For the next generation of e-business.

New opportunity for consolidation

Any or all of the following characteristics:

- Growing population of low utilization servers
- Workload with high I/O content
- Servers that demand tight integration to traditional ^ applications and data
- Large scale centralized hosting

Software

- Open source applications
- Written and maintained by the customer
- Websphere, DB2, MQ and IBM connectors
- Growing number of products from independent software vendors

Working with IBM Partners

- Distributors: Redhat, SuSe, TurboLinux
- IBM Solution Providers

IBM Middleware for Linux on zSeries

Connectors

- DB2 Connect™, Version 7.1; MQSeries® client, Version 5.2
- CICS® Transaction Gateway, Version 4.0; IMS™ Connect, Version 7

WebSphere Family

- WebSphere® Application Server Advanced Edition, Version 4.02
- Including Java™ Development Kit, Version 1.3.0 & JIT
- WebSphere Personalization, Version 3.5
- WebSphere Commerce Suite, Version 5.1
- WebSphere Host on-Demand, Version 5.0.3
- Websphere MQ Server 5.2

Data Management

- DB2 Universal Database™, Version 7.2
- DB2® Intelligent Miner™ Scoring, Version 7.1
- DB2 Net Search Extender, Version 7.2

Tivoli

- Tivoli Storage Manager Client 4.2
- Tivoli Enterprise Console 3.7.1
- Tivoli Software Distribution 4.0
- Tivoli Distributed Monitoring 4.1
- Tivoli Workload Scheduler 8.1

www.ibm.com/software/linux/

Software solutions for Linux

ERP, Production Planning, Logistics

- ABAS Software AG
- mySAP

Database

- Oracle 9i
- Software AG Tamino (XML Database)

Application & e-business Integration

- Tibco
- Iona
- BEA WebLogics
- Aeonware (B2B/B2C)
- CONNECT:Direct

Systems Management

- BMC Patrol and Knowledge Agents
- Computer Associates
- GreenLight AdminUx
- Legato

Firewall

- zGuard

Stock tracking

- RTS Realtime Systems

Core Banking Applications

- Sanchez

Mail & Calendaring server

- Sendmail
- Bynari

Print server

- Macro4

Development & Testing Tools

- Logics Software
- Rational Software
- Rogue Wave Software
- Dignus
- Micro Focus COBOL
- ACTS (testing)

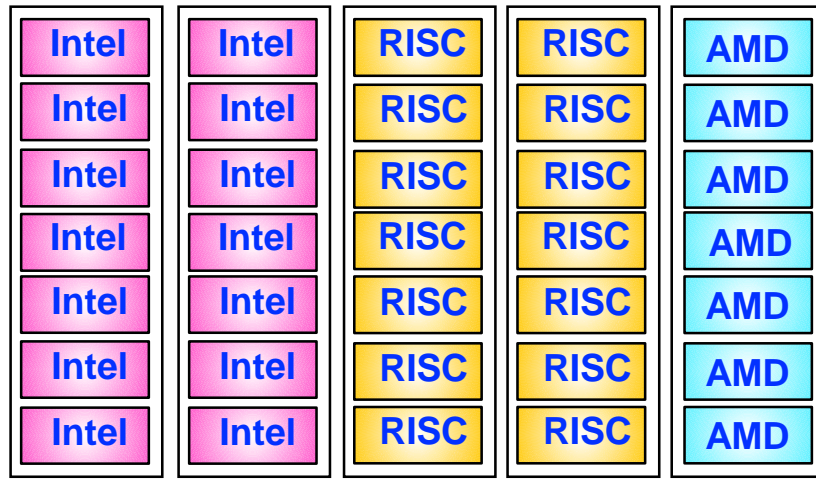
Windows migration

- Halcyon Software
- Ready-to-Run

<http://ibm.com/zseries/solutions/s390da/linuxproduct.html>

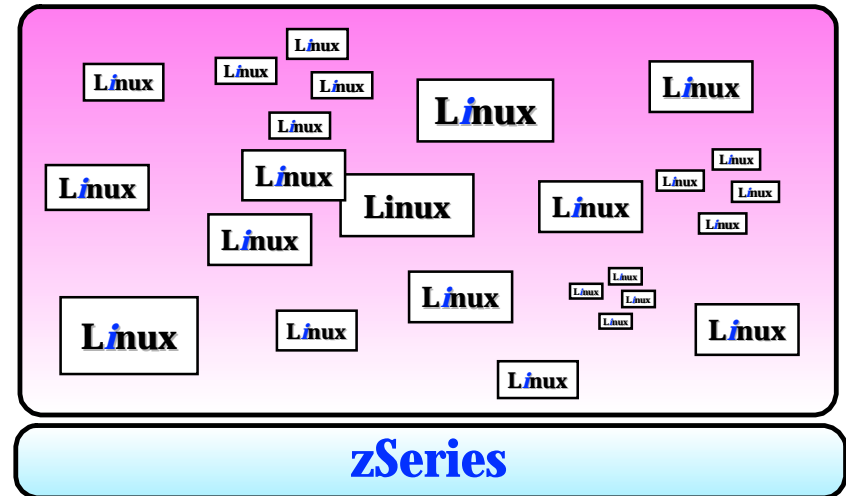
A dramatic impact to the bottom line

Traditional Server Farm



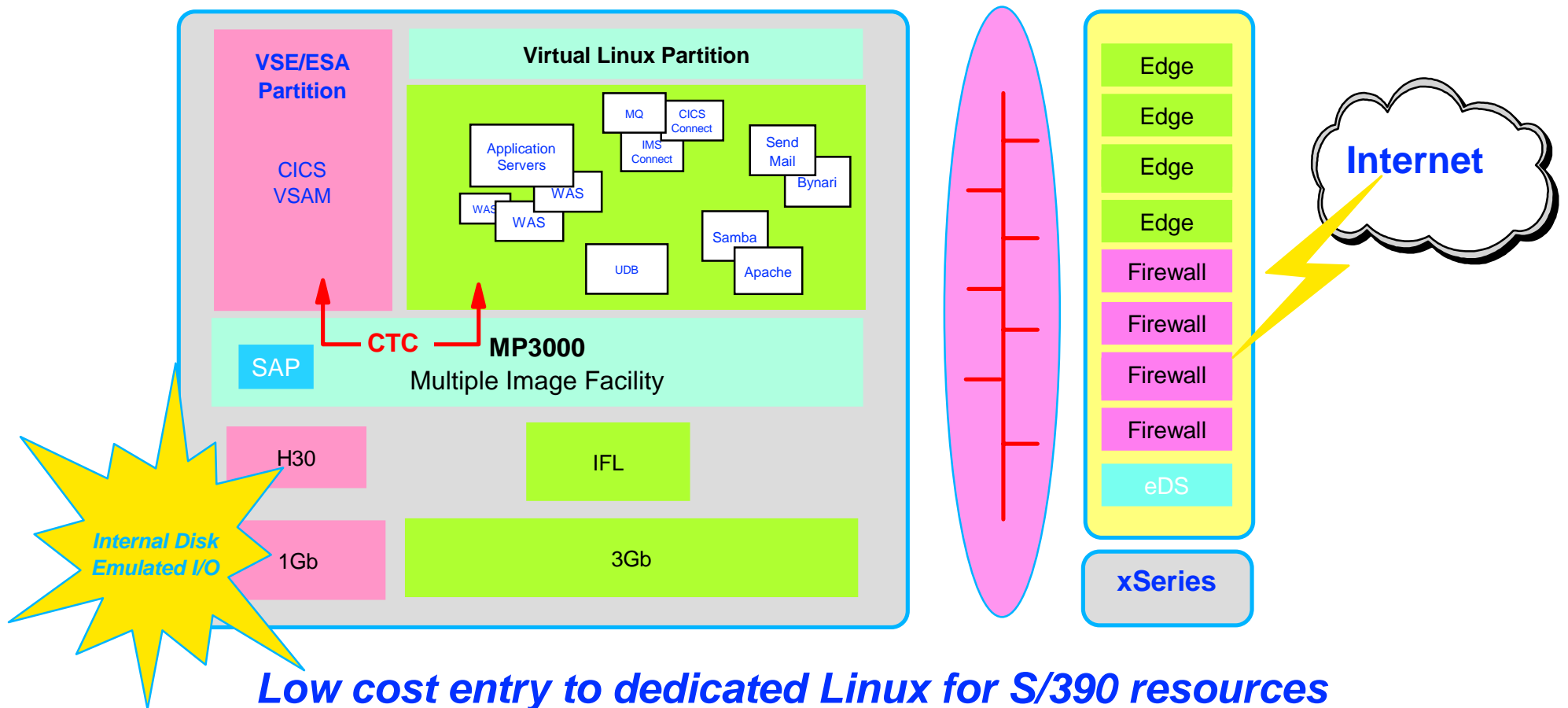
- Discrete servers incur incremental expense for hardware, maintenance, power, cooling, floor space
- Connectivity requires kilometers of cables
- Time to deploy new servers requires days at best
- High availability ensured by spares and re-boots
- 100% continuous availability is cost prohibitive

Server Farm in a Box



- Reduce costs without sacrificing server autonomy
- Pooled physical resources
- Virtual, high-speed, inter-server connectivity
- Deploy new servers on-demand
- Architecture designed for high availability
- Mainframe infrastructure & practices, i.e. comprehensive disaster recovery, continuous availability

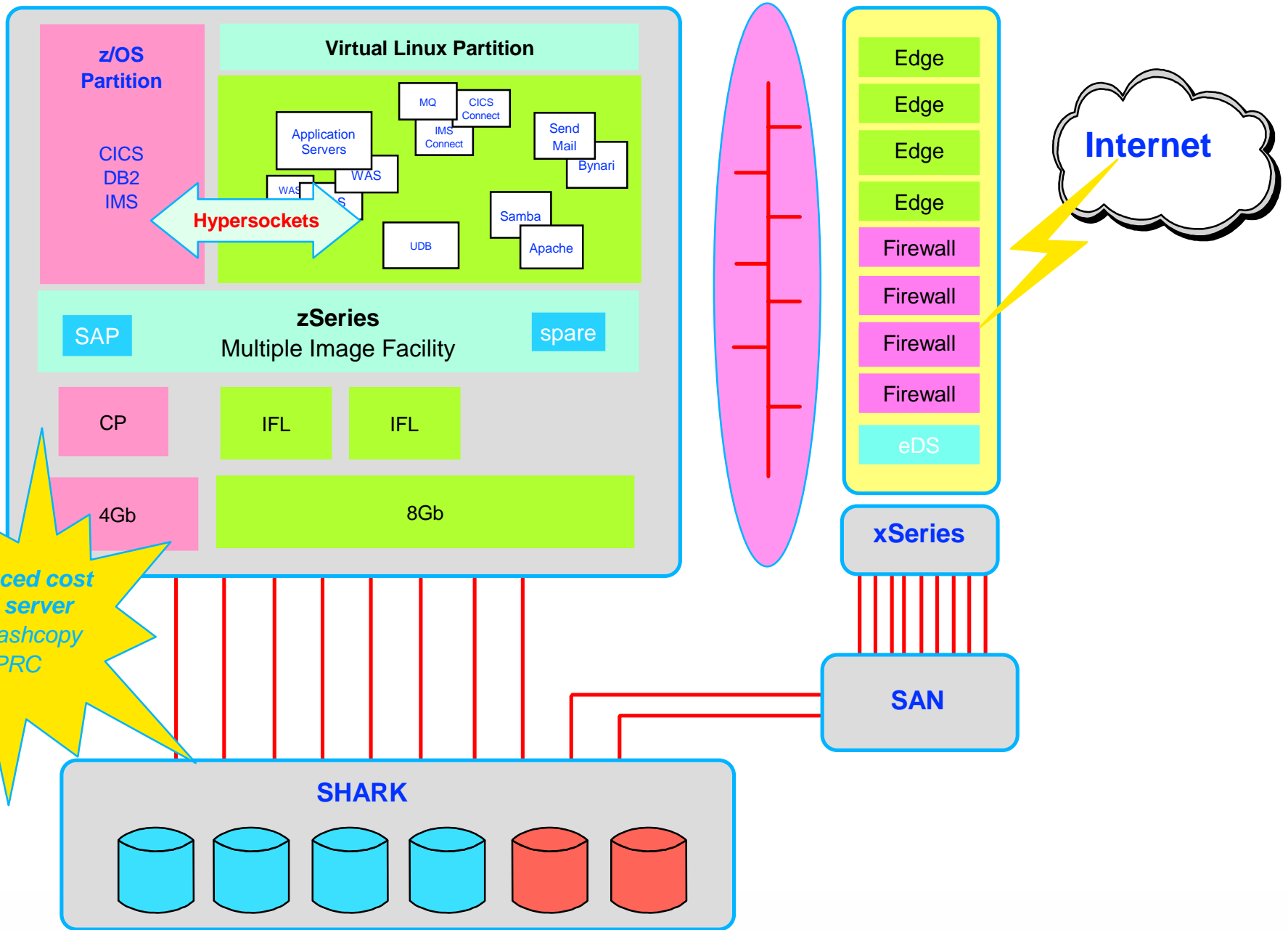
Linux for Multiprise 3000



Low cost entry to dedicated Linux for S/390 resources

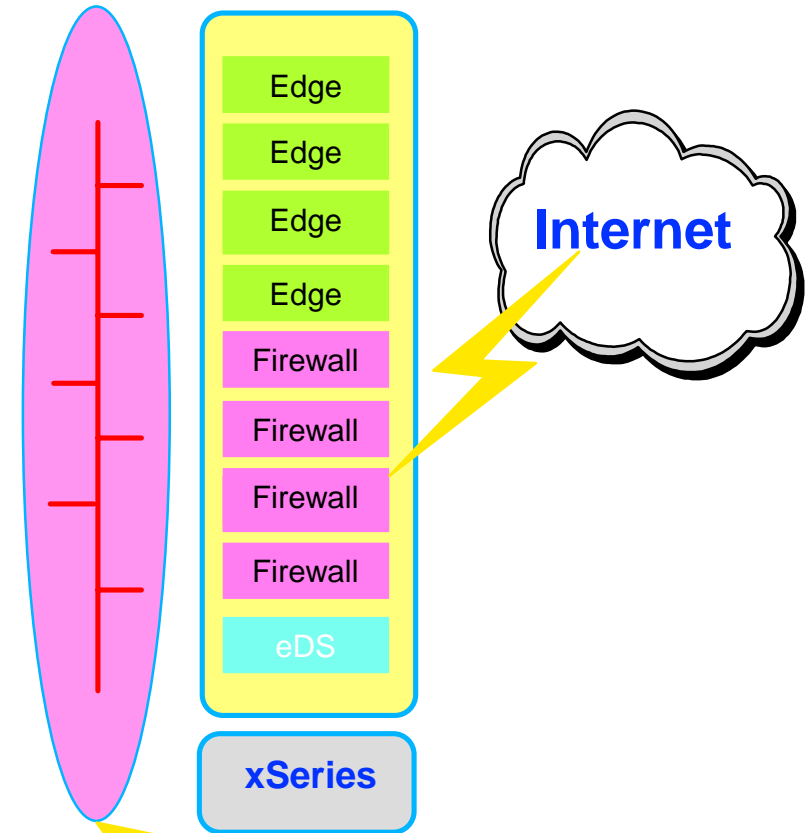
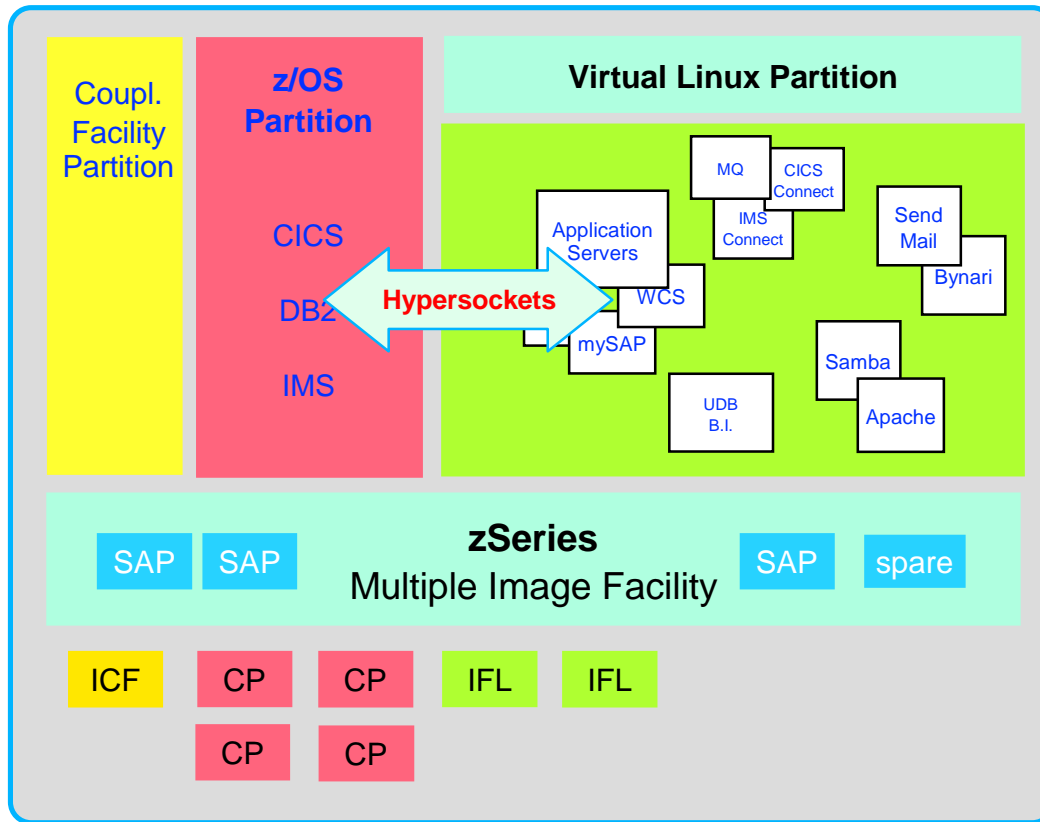
- Integrated Facility for Linux (IFL) can be added to H30 and H50
- Linux-only engine, full powered, even on sub-uni H30
- IFL includes balance of memory to 4Gb
- Cannot mix IFL in same LPAR with general purpose CP
- **No impact** to traditional S/390 software licenses
 - neither IBM Growth Option License Charge
 - nor ISVs

Inherent SAN with Linux on z800



Reduced cost per server
 ✓ Flashcopy
 ✓ PPRC

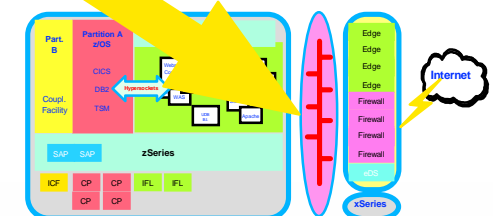
Linux for z900



Blending the right ^ technologies

- ▶ to deliver high availability e-biz solutions
- ▶ while containing infrastructure costs

IP Connections
Sysplex Coupling
Tape Library Connections
Disk Connections



zSeries Offering for Linux

Specially Priced Packaged Offering

- z800 Linux only 64 bit capable engines
- One, two, three or four way complex
- Three years hardware warranty/maintenance
- z/VM license
- Three years software subscription

Optional:

- Hardware: PCI Cryptographic Accelerator, additional memory and connectivity features, 2074 Controller
- Software: IBM Middleware and z/VM features
- Services: Supportline, Cabling Services, IGS Professional Services, Classroom Training
- Total Solution Financing from IGF



z800-0LF Standard Configuration	Memory	ESCON Channels*	OSA Express Ports**	FICON Express Ports**
1 IFL	8 GB	28	4	4
2 IFL	8GB	28	4	4
3 IFL	16GB	28	4	4
4 IFL	16GB	28	4	4

* (16) Ports per card; Purchase increments of four

** (2) Ports per card; Purchase increments of one

Example: Linux vs Linux Cost Comparison

	zSeries z800	xSeries x135	xSeries x330	xSeries x330
Websphere Scenario				
Units, including redundancy	2	10	50	100
Per Server Costs				
Server Hardware	378,000	2,180	3,744	3,731
SAN Attachment	n/a	n/a	3,450	3,375
Network Attachment	1000	1000	800	750
Racks/PDU	n/a	576	130	131
Websphere	10,000	10,000	10,000	10,000
Sub-Total per Server	389,000	13,756	18,124	17,987
Total Acquisition	778,000	137,563	860,881	1,654,795
Acquisition Lease, 36 mos.	24,507	4,333	27,118	52,126
On-going costs				
IBM SupportLine	2,400	1,200	1,300	1,600
Linux Distr. Maintenance	1,760			
Hardware Maintenance			860	1,600
Total Comparative Payments	28,667	5,533	29,278	55,326

But there is much more to consider than hardware, software and maintenance . . .

... more value with zSeries



Intangible, inherent values

- 💰 Mainframe serviceability
- 💰 Mainframe reliability
- 💰 Productivity: ease of management of a large population of servers based on a common logical image
- 💰 Maintain one application per server; business reqmnt, ISV reqmnt
- 💰 Speed to deploy new servers for development, test and production
- 💰 Integrated, high speed connection to legacy S/390 applications
- 💰 Integrated, high speed connection to z/OS
- 💰 Practiced, proven disaster recovery

Environmental considerations

- 💰 Floor space
- 💰 Power and cooling costs
- 💰 UPS - Back up power

CIOView can help to build a complete picture!

Getting Started with Linux

The IBM Software Evaluation Kit for Linux

- IBM WebSphere Application Server, Advanced Single Server Edition V4.0 for Linux
- IBM DB2 Universal Database Enterprise Edition V7.2 for Linux
- Lotus Domino Server Release 5.0.7a for Linux
- IBM MQSeries V5.2 for Linux
- VisualAge for Java, Professional Edition Version 4
- Web Services tools
- Java and XML tools
- e-business documentation and roadmaps
- IBM ViaVoice



<http://www.ibm.com/software/is/mp/linux/sek/>

Getting Started on zSeries

Create a logical partition

- G5/G6, Multiprise or zSeries
- Integrated Facility for Linux, optional
- Sufficient memory

Install z/VM

Install your preferred Linux distribution

- Redhat
- SuSE
- Turbolinux

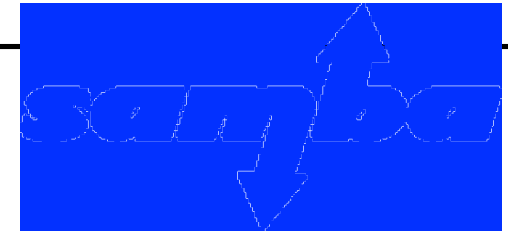
Samba is part of the Linux distributions

- Easy to enable
- Migrate files for a pilot server first
- Test
- Test back up and recovery

Clone and deploy another server

- IBM Connectors
- Database Servers

Try another Distribution



Project official web site
www.samba.org

ibm.com/redbooks

- ▶ [SG24-4987 - Linux for S/390](#)
- ▶ [REDP0023 - Implementing Linux in your Network using Samba](#)
- ▶ [SG24-6004 - Samba Installation, Configuration, and Sizing Guide](#)

Resources for zSeries

IBM Redbooks/pieces

- **ibm.com/redbooks**
 - Linux for S/390, SG24-4987
 - Linux for IBM e-server zSeries and S/390: Distributions, SG24-6264
 - e-Business Intelligence: Leveraging DB2 for Linux on S/390, SG24-5687
 - Implementing Linux with IBM Disk Storage, SG24-6261
 - Linux on IBM e(logo)server zSeries and S/390: ISP/ASP Solutions, SG24-6299
 - e-Business Intelligence: Data Mart Solutions with DB2 for Linux on zSeries, SG24-6294
 - WebSphere Application Server V4 for Linux, Implementation and Deployment Guide, REDP0405
 - Implementing Linux in your Network using Samba, REDP0023
 - Samba Installation, Configuration, and Sizing Guide, SG24-6004
 - Building Linux Systems Under IBM VM, REDP0120
 - Dimensional Insight Business Intelligence Tool for Linux on zSeries, REDP0171
 - Linux for WebSphere and DB2 Servers, SG24-5850
 - e-commerce Patterns for z/Linux Using WebSphere Commerce Suite V5.1 Patterns for e-business series, REDP0411
 - Technical Introduction: IBM [^] zSeries 800, SG24-6515
 - zSeries HiperSockets, REDP0160

IBM Learning Services

- **ibm.com/training/spotlight/zseries**
 - QLX18 - Linux on zSeries for Solaris Administrators
 - HLX13 - Linux Basics - An S/390 Perspective
 - ZV050 - VM Basics for Linux
 - ZL100 - Linux Implementation for S/390
- **ibm.com/services/learning/conf/**
 - zSeries Technical Conference

Web Enablement Workshops

- **ibm.com/zseries/ebusiness/workshops.html**
 - "No-charge" hands-on Web-enablement workshops for qualified zSeries and S/390 customers
 - A great way to jump-start your projects; IBM customers rate them highly for content, delivery, and impact on their projects
 - Gain Practical experience in implementing webserving solutions using WebSphere on Linux for zSeries and S/390

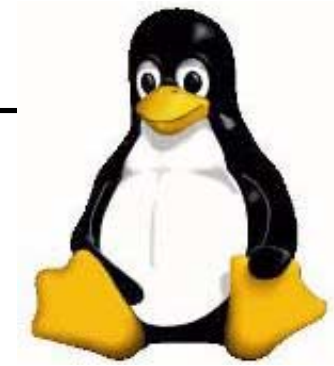
Linux Community Development System

- **http://ibm.com/eserver/zseries/os/linux/lcds/**
 - *Get your own root directory!*

Some Important Web Sites

IBM Linux	www.ibm.com/linux
IBM ^	www.ibm.com/eserver
IBM developerWorks	www.ibm.com/developerworks
Red Hat	www.redhat.com
SuSE	www.suse.com
TurboLinux	www.turbolinux.com
Free Software Foundation	www.gnu.org
General Linux	www.linux.org
New era development tools	www.eclipse.org
IBM Linux for zSeries	www.ibm.com/eserver/zseries/os/linux
zSeries Technical Pages	www.developer.ibm.com/welcome/s390/linuxinfo
zSeries Porting Tips	www.ibm.com/servers/esdd/articles/linux_s390/index
Linux for S/390 discussion group	Send note to listserv@marist.edu , in the body: SUBSCRIBE LINUX-390 your name, organization

Summary



Linux and Open source is growing, *fast*

Linux gives more choice

IBM is participating and collaborating

IBM offers comprehensive Linux solutions that include hardware, software and services

- ▶ Linux for zSeries delivers exclusive value
- ▶ Linux implementations on zSeries can make a dramatic impact on the bottom line, *today*.

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