



Linux on zSeries: What, Why, Where

Session 9300

Share 99 - Summer 2002

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Linux Advocate

@server Strategic Initiatives

IBM Canada Ltd.



Linux on zSeries: What, Why, Where

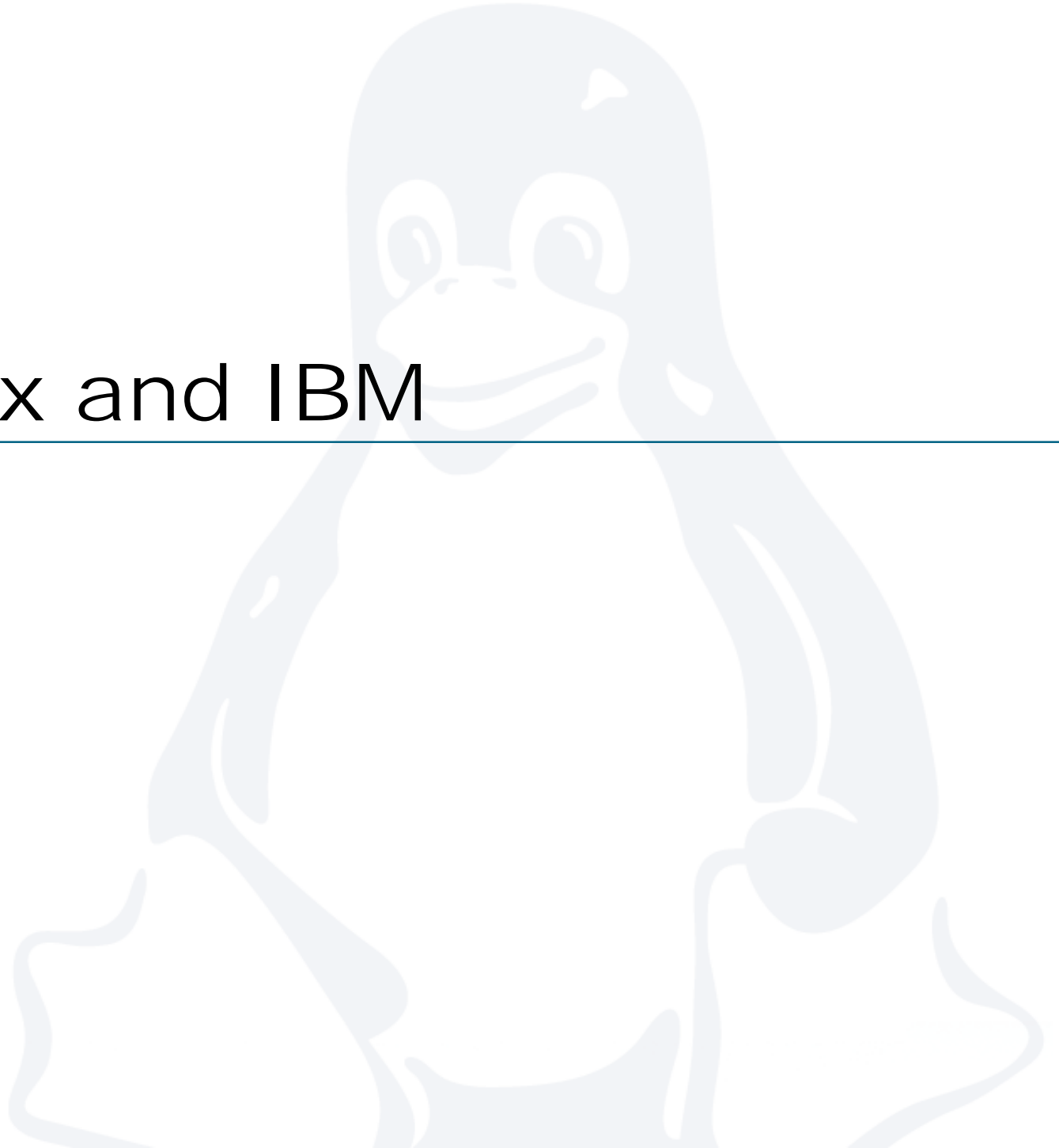
Abstract

- **IBM believes Linux to be game changing technology; as the Internet was to networking, IBM believes Linux will be to application programming. The speaker will cover the Why, What and Where of Linux on zSeries:**
 - ▶ **Why IBM is so committed to Linux in general, and on zSeries specifically**
 - ▶ **What IBM means by Linux for zSeries (and Linux for S/390) and the zSeries virtualization technology provided by z/VM**
 - ▶ **Where Linux on zSeries has come from, where it is now and where IBM sees it going in the future**
 - ▶ **IBM and ISV applications available for Linux on zSeries**
- **This session qualifies for the Linux for S/390 certificate track.**





Linux and IBM



What is Linux?

- **UNIX-like operating system originally developed by Linus Torvalds**
- **Developed / tested by the Open Source community**
 - ▶ **Highly disciplined / structured process**
 - ▶ **High quality code**
 - ▶ **More secure code, more stable systems**
- **Packaged and shipped by distributors**
 - ▶ **Caldera, Red Hat, SuSE, Turbolinux**
 - ▶ **Other regional distributors (Conectiva, ESware, Mandrake, Red Flag, ...)**
- **UnitedLinux is a standards-based Linux operating system targeted at the business user**
 - ▶ **Developed, marketed and sold by Caldera, Conectiva, SuSE and Turbolinux**
 - ▶ **Worldwide language support, standards based (e.g. LSB 1.1, LI18NUX)**



IBM Linux Strategy: Executive Overview

Session 9303

- **Tue, 9:30am, San Francisco Hilton & Towers, Ballroom Level, Continental Ballroom 5**
- **Wondering where IBM is going with their Linux strategy? Funny you should ask. Come listen to John Sarsgard, IBM's Vice President of Worldwide Linux Sales, provide an overview of that very topic. John will cover:**
 - ▶ **Linux Overview, Value and Marketplace**
 - ▶ **Linux Misconceptions**
 - ▶ **IBM Strategy and Linux Opportunities**
 - ▶ **IBM Products and Services Overview**



Linux for Developers

- **developerWorks**
 - ▶ Dedicated "Linux Zone"
 - ▶ ibm.com/developerworks/linux
- **Linux Application Tools**
 - ▶ ibm.com/zseries/os/linux/ldt/
- **zSeries Linux Community Development System**
 - ▶ ibm.com/zseries/os/linux/lcds
- **Speed-start your Linux application**
 - ▶ Linux Software Evaluation Kit
 - ▶ No charge for development use
 - ▶ Full function, market-available products
 - ▶ ibm.com/developerworks/offers/linux-speed-start

Speed-start your Linux app

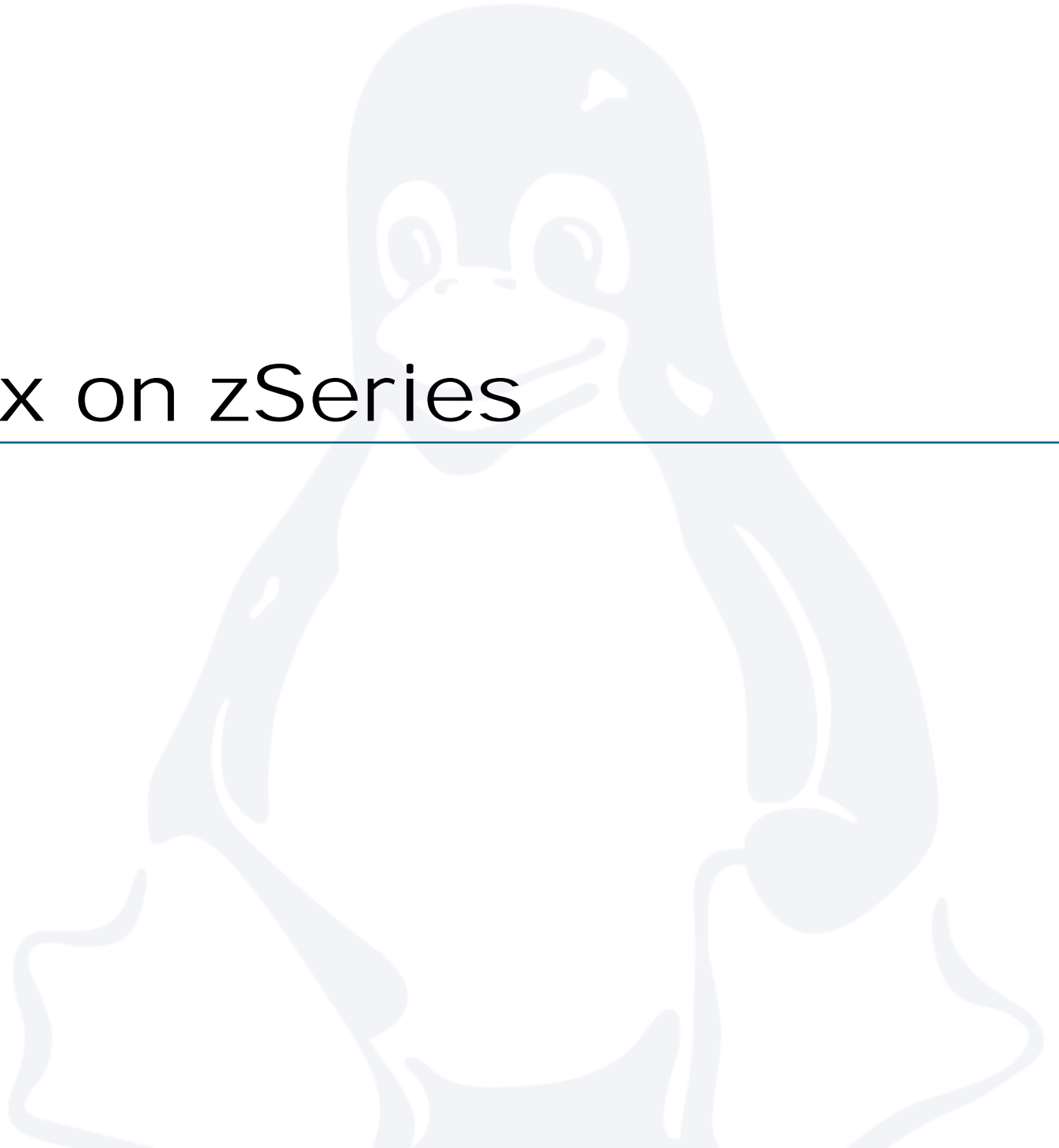


IBM





Linux on zSeries



What is Linux on zSeries?

- **A native zSeries operating environment**
 - ▶ **Pure Linux, an ASCII environment**
 - ▶ **Exploits IBM zSeries hardware**
 - ▶ **Linux for S/390 - 32-bit**
 - ▶ **Linux for zSeries - 64-bit**
- **Not a unique version of Linux or other operating system**
- **Not a replacement for other IBM zSeries operating systems**



Why Linux on zSeries?

- 1. Increased solutions through Linux application portfolio**
- 2. Large number of highly skilled programmers familiar with Linux**
- 3. Integrated business solutions**
 - ▶ **Data richness from zSeries**
 - ▶ **Wide range of Linux applications**
- 4. Industrial strength environment**
 - ▶ **Flexibility and openness of Linux**
 - ▶ **Qualities of service of zSeries**
- 5. Unique ability to easily consolidate large number of servers**



zSeries Application Sourcing Strategy

- **The IBM commitment to z/OS and VSE/ESA is not affected by this Linux strategy**
- **zSeries customers are offered additional opportunities to leverage their investments through Linux**
- **New doors are opening for zSeries customers to bring Linux-centric workloads to the platform**
- **Application sources**
 - ▶ **z/OS and VSE/ESA - Traditional**
 - ▶ **z/OS - UNIX System Services**
 - ▶ **Linux on zSeries**
 - ▶ **WebSphere - Java, Enterprise Java Beans, CORBA**



What zSeries Brings to Linux

- **The most reliable hardware platform available**
 - ▶ Redundant processors and memory
 - ▶ Error detection and correction
 - ▶ Remote Support Facility (RSF)
- **Centralized Linux systems are easier to manage**
- **Scalability**
 - ▶ Physical - scale to 16 application processors and up to 3 dedicated I/O processors
 - ▶ Logical - scale to hundreds of Linux images
 - ▶ Non-disruptive capacity upgrade on demand
- **Designed to support mixed work loads**
 - ▶ Allows consolidation while maintaining one server per application
 - ▶ Complete work load isolation
 - ▶ High speed inter-server connectivity



Value of Linux on zSeries

- **Reduced Total Cost of Ownership (TCO)**
 - ▶ **Environmental savings - single footprint vs. hundreds of servers**
 - ▶ **Consolidation savings - less storage, less servers, less software licenses, less server management/support**

- **Improved service level**
 - ▶ **Systems management (single point of control)**
 - ▶ **Reliability, availability, security of zSeries hardware**

- **Speed to market**
 - ▶ **Capacity-on-demand capability on zSeries**
 - ▶ **Dynamic allocation of on-line users, less than 60 Seconds to add a new Linux server image using z/VM**



Discrete vs. Consolidated

Driving workload consolidation

Discrete servers	Consolidated solution
Larger support staffs are required to maintain servers and network gear	Smaller support staffs are required to maintain 1 or 2 servers
Disaster recovery very difficult for large / complex server farms	Disaster recovery very easy for virtual server farms
Lower hardware reliability	Higher hardware reliability
Software resource must be duplicated for each server	Software resource shared among virtual servers
Higher software application cost due to more hardware processors	Lower software application cost due to fewer hardware processors
Failover is provided by additional server hardware in "hot standby mode"	Failover is provided by virtual server in "hot standby mode"
Discrete servers may require significant amounts of power and floor space	Server and disk storage subsystem require minimal power and floor space



Operating Environments

- **Logical Partitions (LPAR)**

- ▶ **Hardware partitioning enabling up to 15 "logical partitions" each of which runs a separate operating system, traditional operating system and Linux**

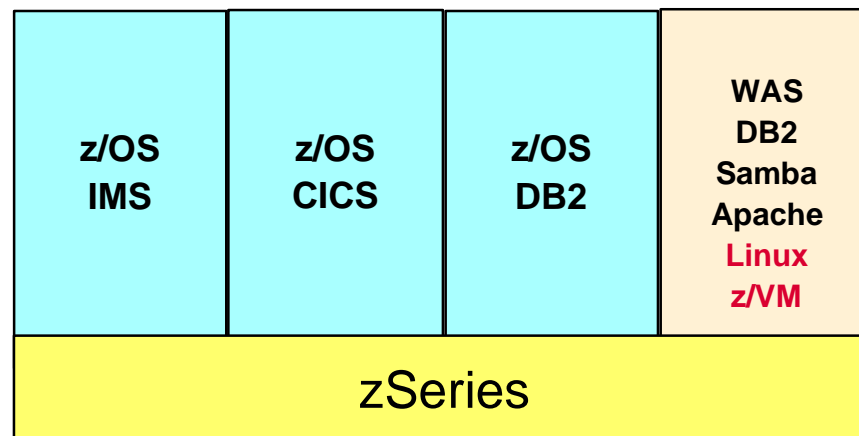
- **Virtual Partitions (z/VM)**

- ▶ **zSeries virtualization technology**
- ▶ **Support for large numbers of Linux images with rich system management capabilities**
- ▶ **Very flexible, great for server consolidation**



Integrated Facility for Linux

- **Additional engines dedicated to Linux workloads**
 - ▶ Supports z/VM, Linux for S/390 and Linux for zSeries
 - ▶ Available on 9672 G5/G6, Multiprise 3000 and zSeries
- **Lower price than for standard engines**
- **Begin deployment or consolidation of Linux, UNIX and NT workloads to zSeries immediately**
- **Traditional zSeries software charges unaffected**
 - ▶ IBM zSeries S/390 software and middleware
 - ▶ Independent Software Vendor products



IBM zSeries Virtualization Technology

z/VM Version 4

- **Combination of hardware, firmware and software**
 - ▶ **Over 30 years of development experience**
- **Supports ten to thousands of images, depending on workload**
- **Supports Linux for S/390 and Linux for zSeries guests**
- **Complements the zSeries Integrated Facility for Linux with attractive pricing terms and conditions**
- **z/Architecture exploitation**
 - ▶ **64-bit real storage support - real storage constraint relief**
 - ▶ **64-bit virtual support - run 64-bit guest systems on zSeries**
- **Extensive systems management software from IBM and ISVs**



z/VM in 2001

- **z/VM V3.1 - February 2001**
 - ▶ **New processor architecture support**
 - **Exploitation of larger real/virtual storage - 64 bit**
 - ▶ **TCP/IP enhancements including stack security**
- **z/VM V4.1 - July 2001**
 - ▶ **New terms and conditions**
 - ▶ **Support for Integrated Facility for Linux processors**
 - ▶ **Guest support enhancements for Linux**
 - ▶ **Installation and service enhancements**
- **z/VM V4.2 - October 2001**
 - ▶ **Cryptography enhancements**
 - ▶ **Performance improvements**
 - ▶ **HiperSockets**
 - ▶ **Guest LAN**
 - ▶ **TCP/IP - IMAP and stack improvements**
 - ▶ **Systems administration enhancements**



- **z/VM V4.3 - May 2002**

- ▶ **Networking enhancements**

- Multicast support for HiperSockets
- Guest LAN support of GbE, including broadcast
- Improved TCP/IP stack security, performance, and configurability

- ▶ **Performance enhancements**

- z/VM self-management to achieve guest performance goals
- Enhanced timer management for improved performance

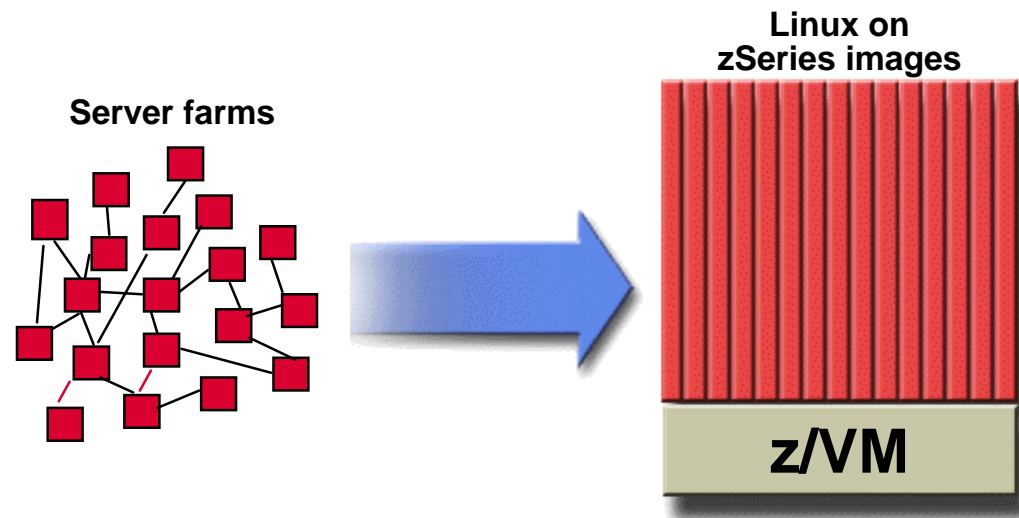
- ▶ **Fibre Channel Protocol support**

- ▶ **RACF for VM as an optional IPLA feature**

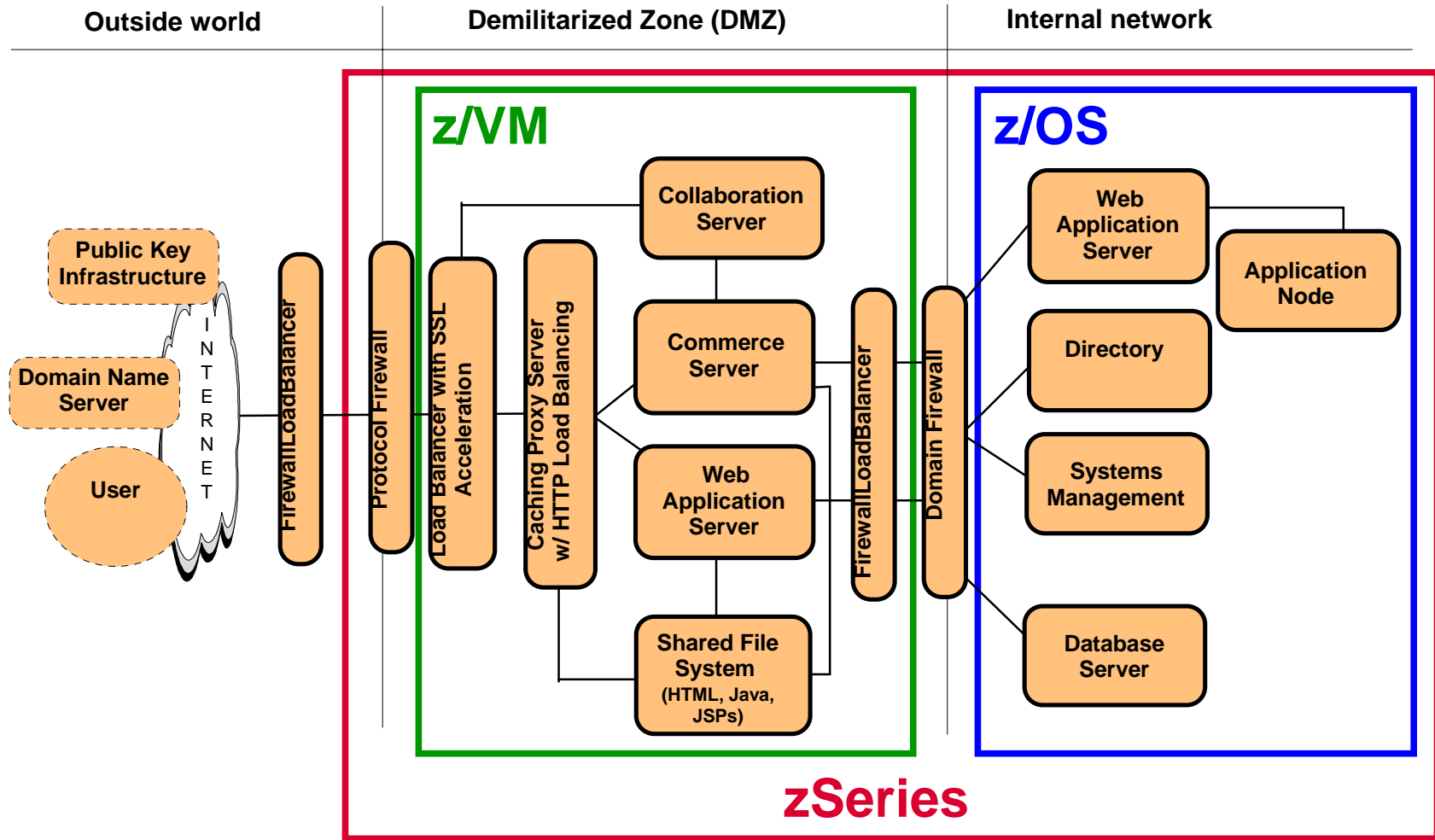


The Value of z/VM for Linux

- **Increased performance, growth and scalability**
 - ▶ Server consolidation enables horizontal growth
 - ▶ Three-tier architecture on two tiers of hardware
 - ▶ Extensive support for sharing resources
 - ▶ Virtual networking
 - ▶ Complete isolation of Linux images if required
- **Increased productivity**
 - ▶ Development and testing
 - ▶ Production support
- **Improved operations**
 - ▶ Backup and recovery
 - ▶ Command and control



Application Serving with Linux

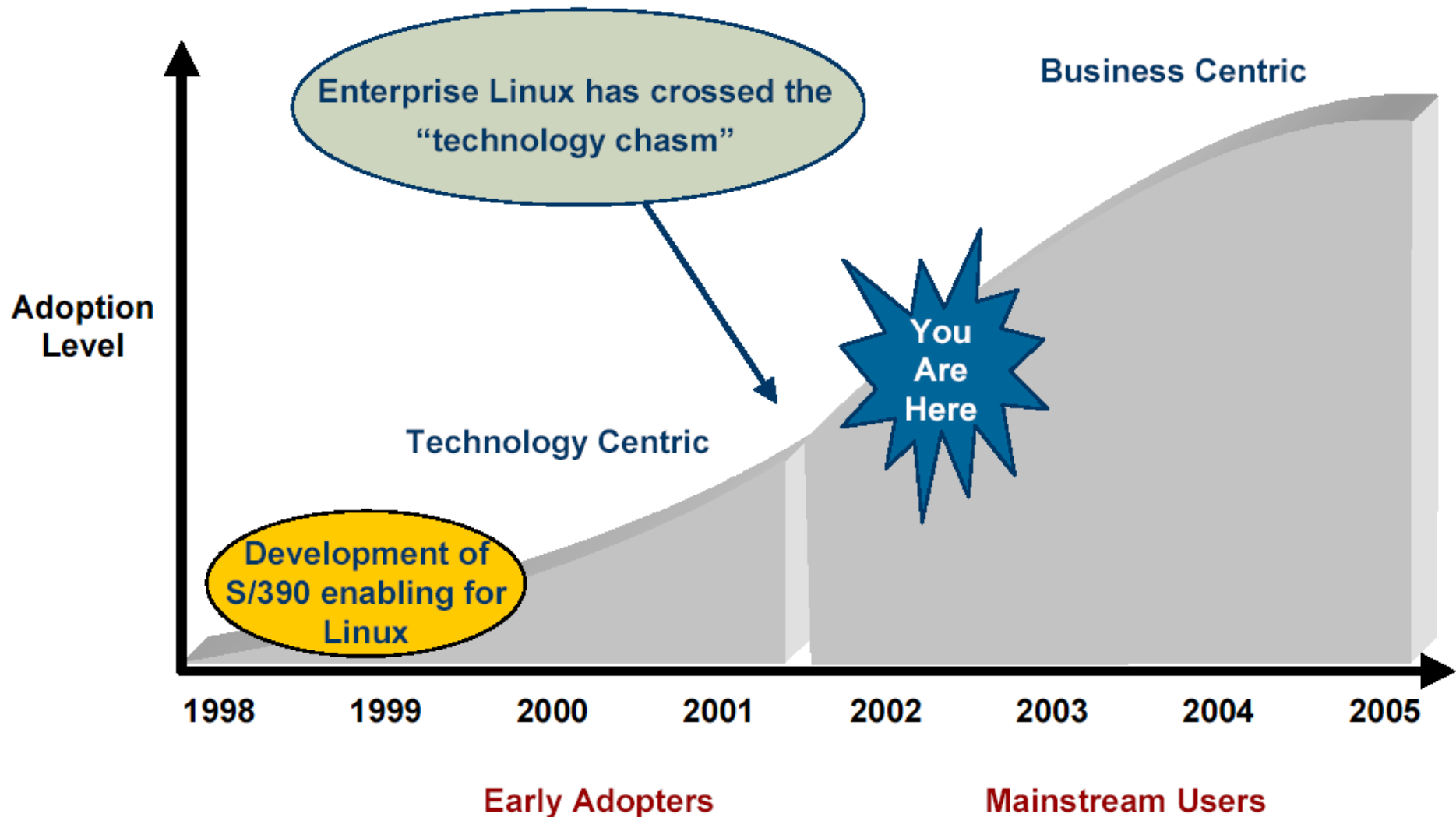




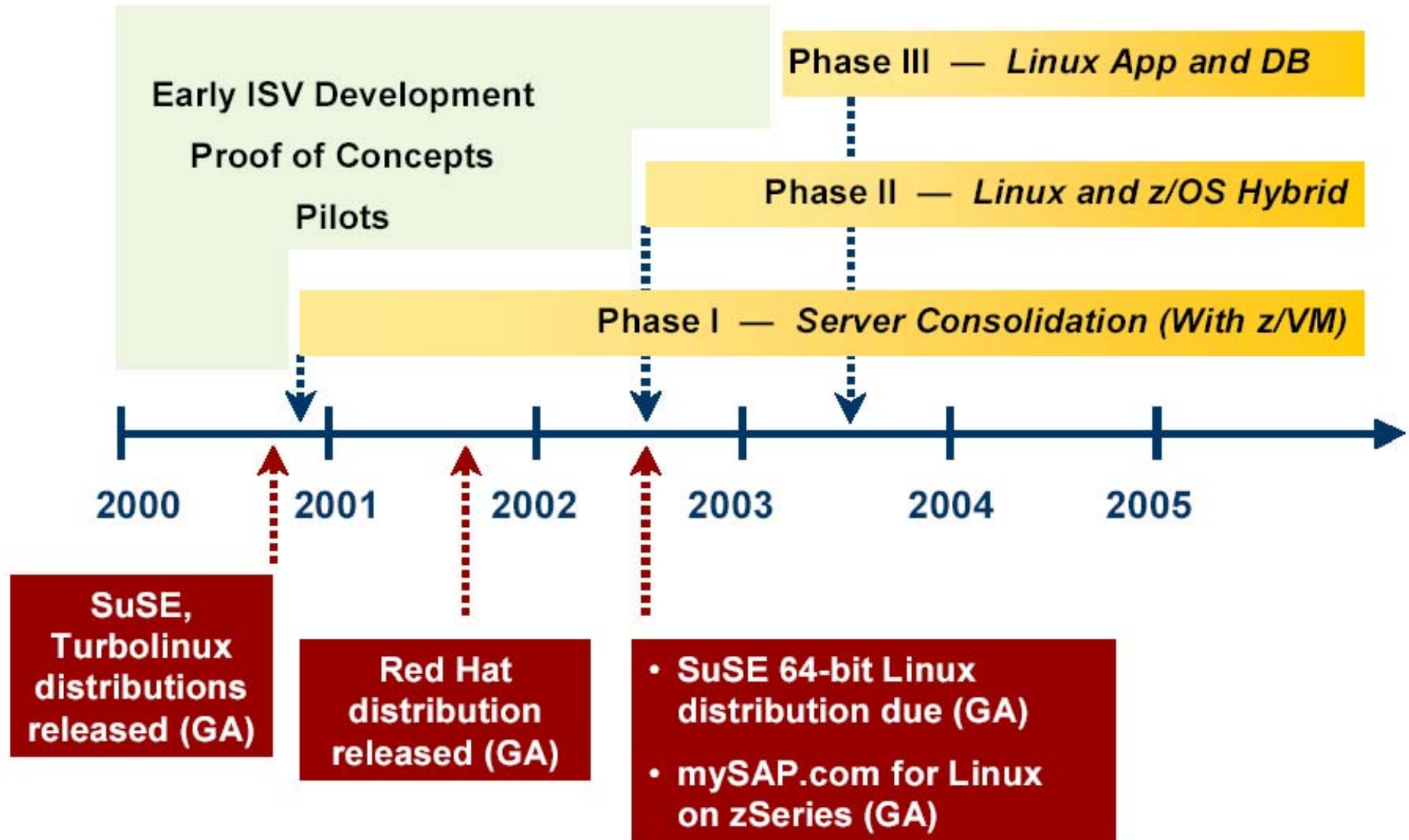
Linux on zSeries: Past, Present and Future

Charts in this section from "Mainframe Linux: What's Now, What's Next, Where To" by David Mastrobattista, Giga Information Group, Inc.

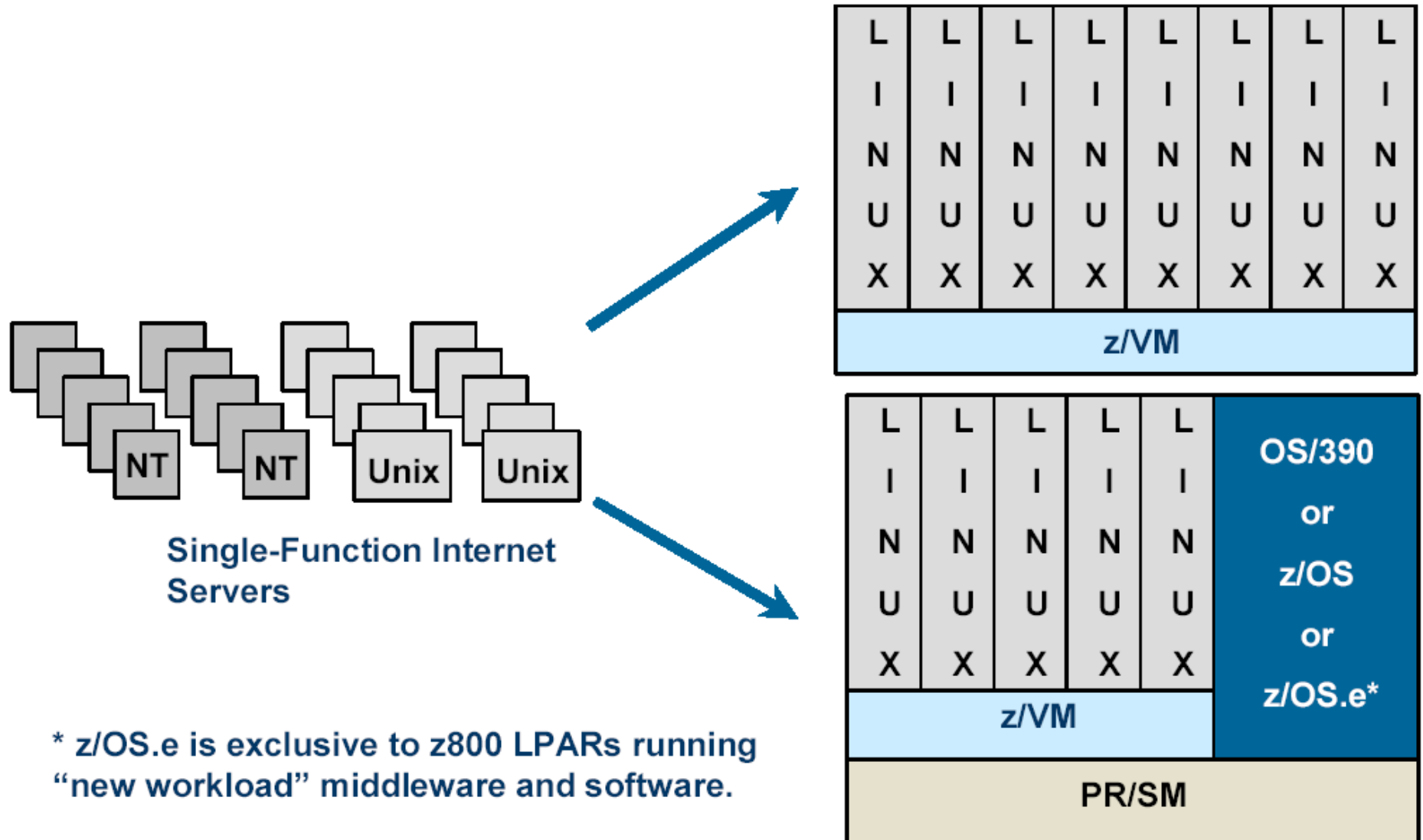
Linux Technology Adoption Curve



Three Solution Phases



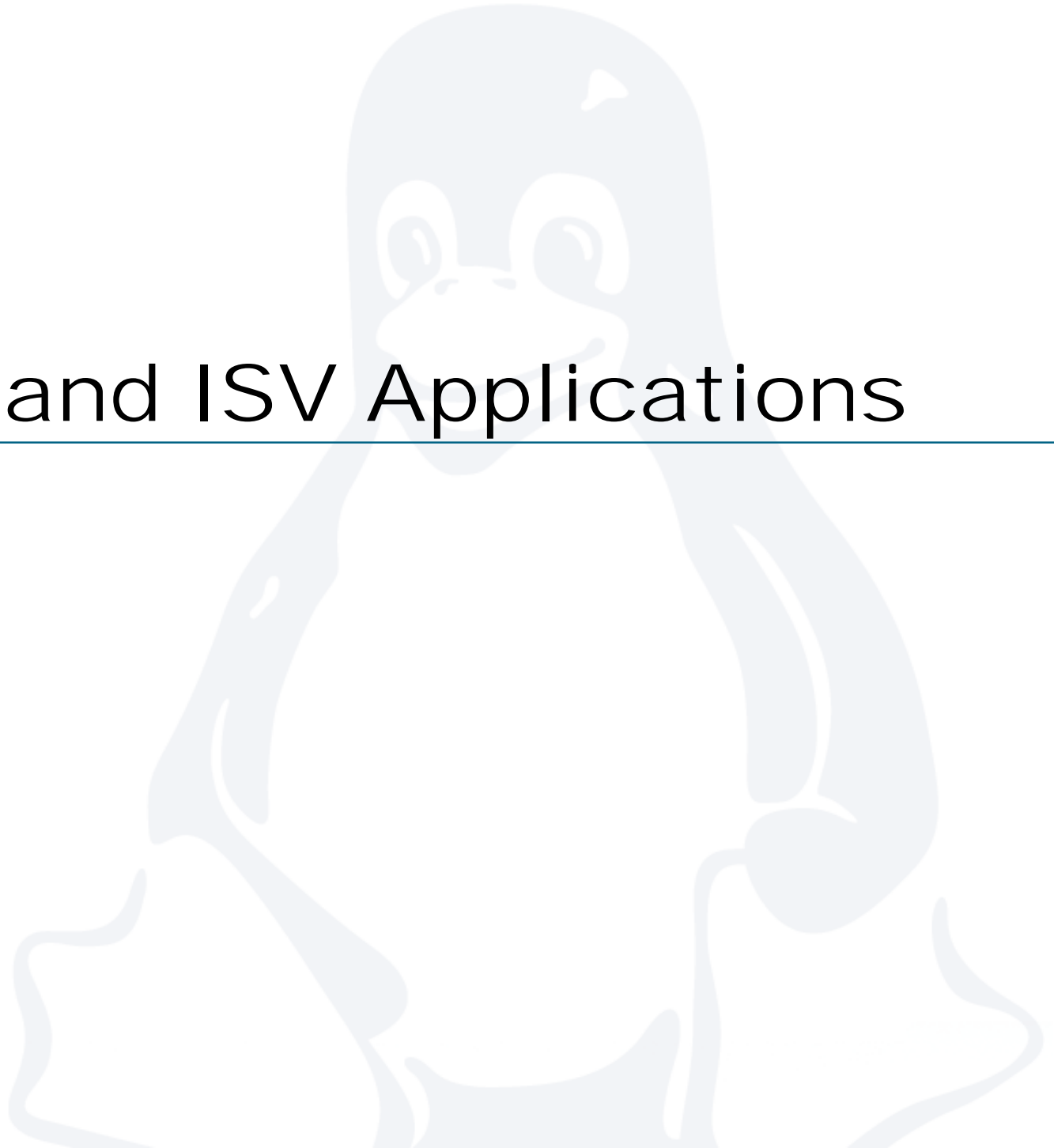
Server Consolidation



* z/OS.e is exclusive to z800 LPARs running "new workload" middleware and software.



IBM and ISV Applications



IBM Software for Linux

■ Solutions available across all product lines

WebSphere® - Transaction Integration

DB2® - Leverage Information

Lotus® - Leverage Collaboration

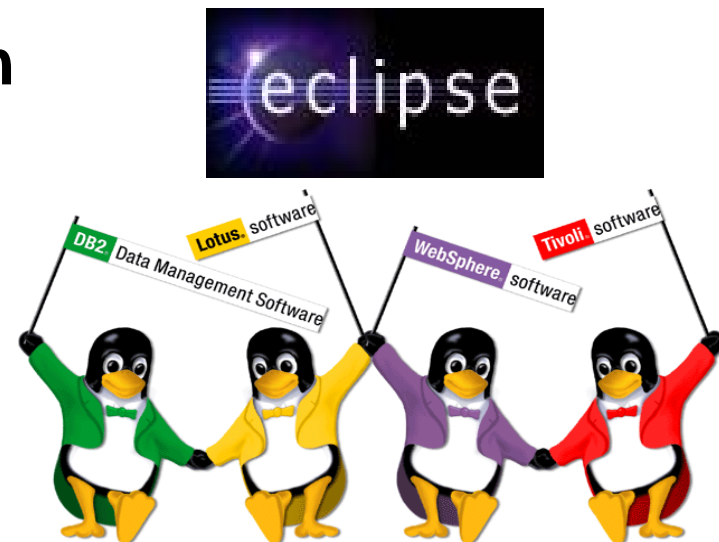
Tivoli® - Systems Management

- ▶ Scalable
- ▶ Modular
- ▶ Flexible
- ▶ Standards based
- ▶ Reliable

■ Open is the world's new direction

- ▶ Eclipse: An open tool platform contributed by IBM to an independent open source organization

■ Solutions at lowest TCO



IBM®



Data Management for Linux

DB2®

IBM Software for Linux for S/390

- **DB2 Universal Database products**
 - ▶ **DB2 Universal Database Enterprise Edition**
- **Connectors**
 - ▶ **DB2 Connect**
 - ▶ **IMS Connect**
 - ▶ **CICS Transaction Gateway**
- **DB2 application development**
 - ▶ **DB2 Net Search Extender**
 - ▶ **DB2 Intelligent Miner Scoring**
- **Informix**
 - ▶ **C-ISAM**
 - ▶ **UniData**
 - ▶ **UniVerse**

IBM®

WebSphere for Linux

The WebSphere logo consists of the word "WebSphere" in a white, sans-serif font, set against a purple rectangular background.

IBM Software for Linux for S/390

- **Foundation products**
 - ▶ **WebSphere Application Server Advanced Edition**
 - ▶ **WebSphere MQ**
 - ▶ **WebSphere MQ Everyplace**
- **Foundation extension products**
 - ▶ **WebSphere Personalization**
 - ▶ **WebSphere Host On-Demand**
- **Application accelerators**
 - ▶ **WebSphere Commerce Suite Pro Edition**
- **Other**
 - ▶ **IBM Developer Kit for Linux, Java 2 Technology Edition**
 - ▶ **IBM Directory Server**
 - ▶ **IBM Object REXX**
 - ▶ **IBM Screen Customizer**

The IBM logo, featuring the word "IBM" in a white, bold, sans-serif font, set against a dark blue background.

Tivoli for Linux



IBM Software for Linux for S/390

- **Security**
 - ▶ Tivoli Access Manager for e-business
 - ▶ Tivoli Identity Manager (client)
 - ▶ Tivoli Risk Manager (client)
 - ▶ *Tivoli Access Manager for Operating Systems*
- **Storage**
 - ▶ Tivoli Storage Manager (client)
- **Performance and availability**
 - ▶ Tivoli Enterprise Console
 - ▶ Tivoli Monitoring
- **Configuration and operations**
 - ▶ Tivoli Workload Scheduler (client)
 - ▶ Tivoli User Admin (client)
 - ▶ Tivoli Configuration Manager
 - ▶ Tivoli Software Distribution



ISVs for Linux on zSeries

- **End of 2001 - 59 ISVs with 114 applications**
- **End of 2Q2002 - 96 ISVs with 191 applications**
- **An increase of 63% in ISVs and 68% in applications**
- **Currently 105 ISVs with 202 applications**
- **Resources for ISVs**
 - ▶ **Portal for Linux at ibm.com/servers/enable/linux**
 - ▶ **IBM Solution Partnership Centers at www.developer.ibm.com/spc**
 - ▶ **Linux on zSeries Developer Relations at www.developer.ibm.com/welcome/s390/eslinux.html**

Data current as of August 5, 2002



ISVs for Linux on zSeries

ibm.com/zseries/solutions/s390da/linuxproduct.html

ABAS Software	DataDirect Technologies	Linux Business Accounting Systems	Saimaan Tietotekno
ABK-System	Dignus	Linuxcare	Sanchez Computer Associates
ACTS	Dimensional Insight	linuxlink	SAP
Acucorp	Dinkumware	Logics Software	SecureAgent
AdminUX	e-Business Exchange	Macro4	SEFAS
Aduva	Easysoft	Merant	Sendmail
Aeonware	eOneGroup	Micro Focus	Serena Software
Alabanza	Eontec	Micro Software Designs	SlickEdit
ASDIS Software	FinerEdge Software	MigraTEC	Software
AT&T Laboratories	Frank Bernard	NEON Systems	Soliton Associates
BEA Systems	Informationstechnik	Network Associates	Stalker Software
Beans	freiheit.com technologies	NeuVis Software	Stellent
becom Informationssysteme	GeCAD Software	Online Insight	Sterling Commerce
Beta Systems Software	gedas deutschland	OpenConnect Systems	Stonebranch
BMC Software	GlassHouse Systems	Oracle Corporation	StorageTek
Bunker Hill	GMx Solutions	OwnMail	Stryon
Bynari	Grey Zone	Pentaprise	Tachyon Software
Caldera International	GT Software	Presence Online	The Workstation Group
Candle	H.A. Technical Solutions	Proventum Solutions	TIBCO Software
CIB software	HNC Software	Q-Link Technologies	Trinidad
Columbia University	Innovation Data Processing	Quadbase Systems	Trustix AS
CommNav	INTERCOPE	RAE Internet	Uneclipse Software Systems
Compuflex International	IONA Technologies	Rational	UTS Global
Computer Associates International	Lattwein	Ready-to-Run Software	Velocity Software
Critical Path	LegacyJ	Redwood Software	View22
Cybermation	Legato Systems	Roguewave	VIPcom
Dalian Haihui Sci-Tech	Libelle Informatik	RTS Realtime	
	limes datentechnik		




Oracle9i on Linux for S/390

www.oracle.com

ORACLE®

- **Oracle9i Database for Linux for S/390 and Oracle9i Database for Linux on zSeries are already available for free download from Oracle's Technology Network**
- **Production release of Oracle9i Database for Linux for S/390 will be available soon**
- **Oracle sessions at this SHARE**
 - ▶ **Oracle9i in your Mainframe Environment (z/OS and Linux)**
 - Session 0960, Wed, 8:00am, 4th Floor, Union Square 1 & 2
 - ▶ **Installing and Managing Oracle9i on Linux for S/390**
 - Session 0961, Wed, 9:30am, 4th Floor, Union Square 1 & 2
 - ▶ **Experiences Using Real Applications Clusters with Oracle 9i on the Mainframe**
 - Session 0962, Wed, 11:00am, 4th Floor, Union Square 1 & 2

IBM®



Systems Management

- **AdminUX**
 - ▶ www.adminux.com
 - ▶ Remote Synchronous Server Shutdown
 - ▶ Enterprise Management Console Option
 - ▶ DataArchiver

- **BMC Software**
 - ▶ www.bmc.com
 - ▶ Server Management for Linux
 - MAINVIEW for Linux Servers
 - PATROL for Linux Enterprise Server
 - ▶ Patrol for BEA WebLogic
 - ▶ Patrol for WebSphere
 - ▶ Patrol for Internet Server Manager
 - ▶ Control M
 - ▶ Deployment Manager for Linux



Systems Management ...

- **Computer Associates International**
 - ▶ www.ca.com
 - ▶ **CA's Complete Suite for Linux for zSeries and S/390**
 - ▶ **CA's VM Management Suite**
 - ▶ **Unicenter Network and Systems Management**
 - ▶ **Unicenter Management for Web Servers (Apache Agent)**
 - ▶ **Unicenter Universal Job Management Agent**
 - ▶ **eTrust Access Control**
 - ▶ **BrightStor Enterprise Backup**
 - ▶ **Advantage EDBC**
 - ▶ **Advantage Ingres Enterprise Relational Database**

- **GeCAD Software and RAE Internet**
 - ▶ www.ravantivirus.com
 - ▶ **RAV AntiVirus for Mail Servers**



Systems Management ...

- **Network Associates**
 - ▶ www.mcafeesecurity.com
 - ▶ McAfee E-Business Server 7
 - ▶ McAfee scan engine API for SuSE Linux on S/390
- **Legato Systems**
 - ▶ www.legato.com
 - ▶ NetWorker Server
 - ▶ NetWorker Client
- **Linuxcare**
 - ▶ www.linuxcare.com
 - ▶ Levanta



Systems Management ...

- **StorageTek**
 - ▶ www.storagetek.com
 - ▶ **SnapVantage**

- **UTS Global**
 - ▶ www.utsglobal.com
 - ▶ **TSS-TMS tape management system**
 - ▶ **TSS-BAR backup and restore**
 - ▶ **TSS-TSF tape silo feature**
 - ▶ **TSS-DTS distributed tape system**
 - ▶ **Enhanced CLAW Driver**
 - ▶ **NED full screen text editor**



Web Applications

- **BEA Systems**

- ▶ www.bea.com
- ▶ **BEA WebLogic Server**
- ▶ **BEA WebLogic Integration for Linux on S/390 and zSeries**

- **Ready-to-Run Software**

- ▶ www.rtr.com
- ▶ **Microsoft FrontPage 2002 Server Extensions for Linux on IBM zSeries**

- **Stryon**

- ▶ www.stryon.com
- ▶ **iASP - Java-based implementation of the Microsoft Active Server Pages framework**
- ▶ **iNET - Java-based implementation of the Microsoft .NET framework**
- ▶ **iHUB - enables remote objects on disparate frameworks to interact with each other**



Linux Distribution Partners

- **Red Hat**
 - ▶ **Red Hat Linux 7.2 for S/390**
 - www.redhat.com/software/linux/s390
 - ▶ **Red Hat Linux 7.1 for zSeries**
 - www.redhat.com/software/linux/ibmseries/z.html
- **SuSE**
 - ▶ **SuSE Linux Enterprise Server 7 for S/390 and zSeries**
 - www.suse.com/us/products/suse_business/sles/sles_s390
 - ▶ **SuSE Linux Enterprise Server 7 for IBM zSeries**
 - www.suse.com/us/products/suse_business/sles/sles_zseries
- **Turbolinux**
 - ▶ **Turbolinux Server 6.5 for zSeries and S/390**
 - www.turbolinux.com/products/s390/



Linux on zSeries

The point of consolidation - where Linux ascends to the mainframe

- Flexible design
- IBM support and services
- Distribution Alliances
- IBM middleware
- ISV applications
- Open Source applications



Contact Information

Jim Elliott

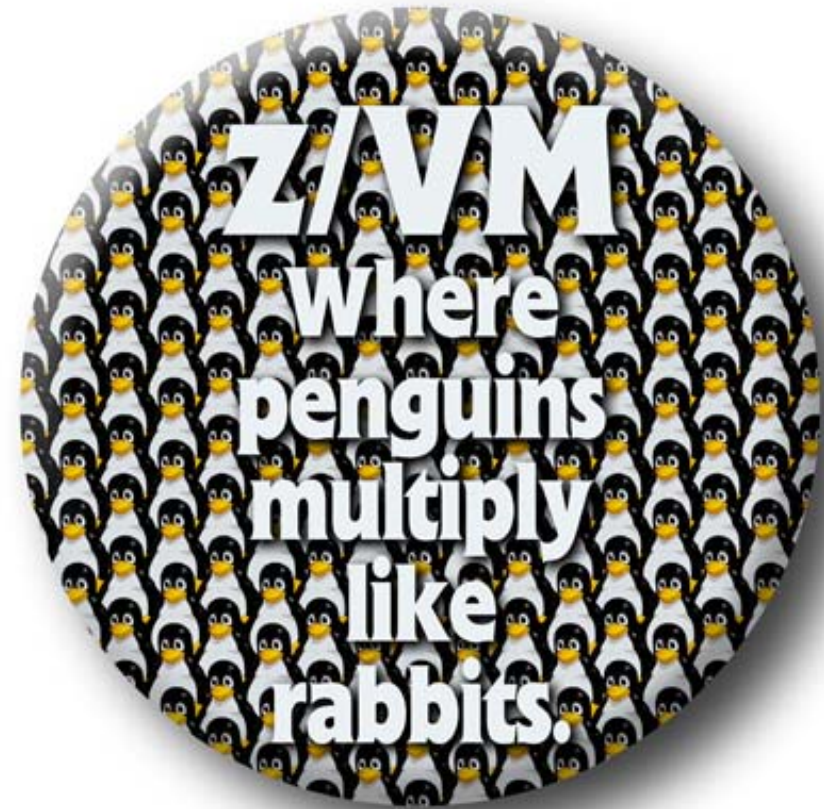
Linux Advocate

@server Strategic Initiatives

IBM Canada Ltd.

jelliott@ca.ibm.com

ibm.com/vm/devpages/jelliott/



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DFSMS/VM*	Multiprise*	RACF*	z/Architecture
e-business logo*	MVS	RAMAC*	z/OS
Enterprise Storage Server	NetRexx	S/390*	z/VM
ESCON*	OpenEdition*	S/390 Parallel Enterprise Server	zSeries
FICON	OpenExtensions	VisualAge*	
GDDM*	OS/390*	VisualGen*	

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