



IBM Systems & Technology Group

What's new with Linux on zSeries?



Klaus Goebel
Linux Technical Support Marketing Mgr.
IBM Boeblingen



WAVV 2005

© 2005 IBM Corporation



IBM Systems & Technology Group

Agenda

- q The Scope
- q Linux Update
- q Linux Distribution Partners
- q IBM Middleware
- q ISV Products

- q z/VM
- q Customer Uses
- q Appendix: Additional Reading



2

WAVV 2005



Agenda

- ▶ **q** The Scope
- q** Linux Update
- q** Linux Distribution Partners
- q** IBM Middleware
- q** ISV Products
- q** z/VM
- q** Customer Uses
- q** Appendix: Additional Reading

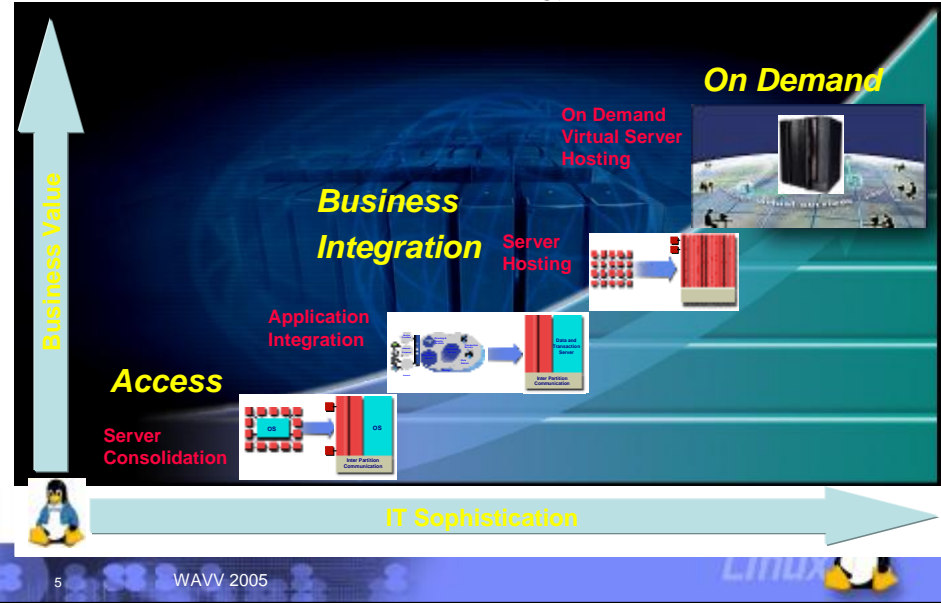


Mainframe Charter '04 – Delivering on demand Capabilities

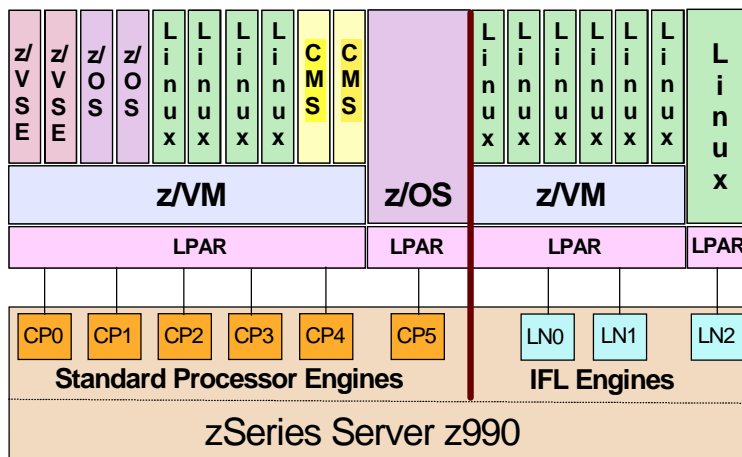
It is our intention to continue to

	<p>Innovation</p>	<p>§ Provide leadership in innovation to enhance the use of IBM eServer zSeries to support increasingly integrated and flexible business processes for the on demand business.</p> <p>Proof Points</p> <ul style="list-style-type: none"> z890 <ul style="list-style-type: none"> - New Lower IBM zSeries entry point. - One model with 28 capacity settings. z990 <ul style="list-style-type: none"> - Up to 1,024 channels in z/Architecture. - Enhanced virtualization with up to 30 LPARS and 4 LCSS's. <p>Integrated Facility for Linux (IFL) and zSeries Application Assist Processor (zAAP). Operating Systems and Middleware enhancements. z/OS 1.6, z/VM 5.1, Linux Kernel 2.6, VSE enh. DB2 V8, WebSphere V5.1, WBISF V5.1, Communications Server for Linux on zSeries</p>
	<p>Value</p>	<p>§ Enhance the value proposition and lower the cost of computing of zSeries solutions in a way that is compelling, clear, and consistent.</p> <p>Proof Points</p> <ul style="list-style-type: none"> Improvements to Subcapacity pricing for WLC product and key IPLA middleware. SW price performance improvements on z990 and z890. WLC price improvement for zOS customer below 215 MSUs. Price reduction on NALC for new workloads. Standardized pricing for IFL, IPLA pricing for Linux software Introduction of zAAP for Java workloads. Lower memory costs. On/Off Capacity on Demand enhancements (z890 and z990). Lower entry point and improved granularity with z890.
	<p>Community</p>	<p>§ Support programs designed to foster vitality in the zSeries community, helping to promote a strong application portfolio and world-class support services.</p> <p>Proof Points</p> <ul style="list-style-type: none"> zSeries application solutions - Ex: Linux for zSeries ISVs. Infrastructure Simplification for Industry based reference Architectures. Deployment of IBM skills to support new solutions on platform. Increased external skills focus. Involvement with open source community.

zSeries Linux & Virtualization Strategy Roadmap



Linux on zSeries Typical Architecture for an On Demand Business



Agenda

- ▶ **q** The Scope
- q** Linux Update
- q** Linux Distribution Partners
- q** IBM Middleware
- q** ISV Products
- q** z/VM
- q** Customer Uses
- q** Appendix: Additional Reading



Linux on zSeries Open Source Code Drop 06/2003

- q** Kernel (kernel 2.4.21, gcc 3.3)
 - ∅ Support for z990 features
 - ∅ QETH driver in open source
 - ∅ VIPA load-balancing
 - ∅ Linux router enhancements for fast path routing under z/VM
- q** Hardware Exploitation
 - ∅ z990 Architecture
 - Superscalar scheduling
 - Long displacements
 - Architecture I/O adaptations (STIDP)
 - ∅ OSA-Express Enhancements
 - DHCP and broadcast support
 - Checksum offload
 - ∅ HiperSockets™ Enhancements
 - VLAN (IEEE 802.1q) support
- q** Usability
 - ∅ Fullscreen ANSI/ASCII Terminal for SE/HMC supported systems (G5, G6, z800, z900, z990)
- q** RAS and High Availability
 - ∅ Linux Image Control
 - API for VM and LPAR remote image management like STONITH, (re)IPL, quiesce, shutdown, etc.
- q** Security
 - ∅ Symmetric Encryption
 - HW acceleration for SHA-1, DES and Triple-DES encryption
- q** Virtual Servers
 - ∅ Virtual Network Enhancements
 - VM/Linux handshaking
- q** SCSI
 - ∅ FCP IPL and Dump
 - ∅ Platform Loader
- q** Compiler Enhancements



Linux on zSeries Open Source Code Drop 01/2004

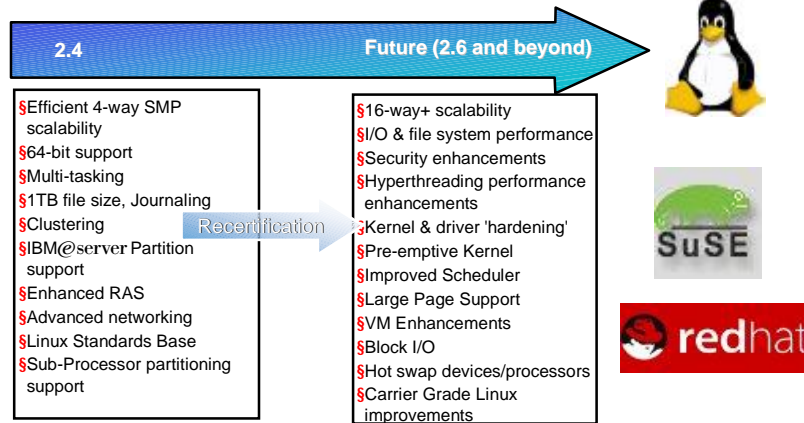
- q Networking
 - Ø Enhanced Development Driver Packaging
- q Virtual Server
 - Ø Collaborative Memory Management Stage 1
 - Ø Timer Tick Accounting: System Tick Misaccounting
 - Ø Linux - z/VM Monitor Stream Stage 1
 - Ø Linux Infrastructure for DCSS support
- q Storage
 - Ø PAV (Parallel Access Volume) Support under z/VM
 - Ø Storage Network Mgmt. Enablement (HBA API)
 - Ø Data Channel for FCP Access Control
- q General I/O
 - Ø Channel Measurement Block Infrastructure
- q Crypto
 - Ø Exploitation of PCIXCC



How to Improve the Performance of Linux on z/VM with Execute-in-Place Technology, March 1, 2004
How to Improve Performance with PAV, January 30, 2004



Linux Technology Evolution



This represents a combination of current open source community priorities and IBM LTC project plans. Open source communities do not publish schedules or commit to specific dates or functions.



Linux on zSeries – Kernel 2.6 Technology

- q O(1) Scheduler
 - Ø Allows faster and more processes
 - Ø Response time improvements: linear complexity in 2.6 vs square complexity with 2.4
- q Block I/O
 - Ø Allows customizable I/O priorities
 - Ø Asynchronous I/O layer improvements
 - Ø Big improvement for Web servers and DB
- q Memory Management enhancements
 - Ø Provides more capacity for swapping systems
- q SMP scalability enhancements and per-CPU optimizations
 - Ø Performance improvement by lock contention reduction
 - Ø Improved memory consumption
- q New POSIX compliant threading model
 - Ø Kernel assisted threading
 - Ø Speedup for Java multi-threaded apps
- q IPv6 and IPsec additional features
 - Ø Allows for cryptographic security at network protocol level
 - Ø Enables stage I for z990 crypto exploitation
- q New file system and volume manager features
 - Ø XA (extended attributes)
 - Ø Mgmt and security improvements for Samba servers
 - Ø ext3 with ACL support
- q Constraint relief
 - Ø Support for disks larger than 2 TB
 - Ø Support for > 32 CPUs



Kernel 2.6 – Support for Large Configurations

- q 255 CPUs
- q 64 GB Memory
- q 16 TB File Size
- q 4095 major / 1 million minor numbers
- q 4 billion UIDs / GIDs
- q 16 TB Large block device size
- q 1 billion PID size



Linux on zSeries Open Source Code Drop 04/2004



q zSeries Kernel 2.6 Support

- ∅ Core zSeries architecture changes:
 - Kernel pre-emption support
 - New system calls support
 - 31-bit system calls emulation in 64-bit environment
 - New kernel module loader support
- ∅ Common I/O and device infrastructure rewrite:
 - Driver model integration (adaptation of S/390 paths for kernel 2.6)
 - Dynamic device detection and configuration
 - Asynchronous device detection
- ∅ Device driver adaptations:
 - SCLP console, 3215 console, QDIO/QETH, lcs, CTC, IUCV, NetIUCV, DASD, Tape, XPRAM, zFCP, z90crypt, lkcdutils

q New Functions

- ∅ Vary on/off for devices, MCSS/MSS device names, 3270 console, In-Kernel crypto support, DASD tool - tunedasd

q Key zSeries Kernel 2.4 Functions on 2.6

- ∅ All of "June 2003 stream" features
- Plus the following items:
 - ∅ Kernel:
 - Timer Tick Accounting, System Tick Misaccounting
 - ∅ Common I/O:
 - Channel Measurement Block infrastructure (DB2 requirement), Boxed DASD support rework
 - ∅ Virtual Server:
 - Collaborative Memory Management stage 1, z/VM Monitor Stream stage 1, Virtual timer interface, Linux Infrastructure for DCSS support
 - ∅ Console:
 - VT220
 - ∅ Networking:
 - Direct SNMP, HiperSockets Network Concentrator (= Cross-CEC HiperSockets)
 - ∅ Storage:
 - Multi-pathing solution for kernel 2.6: Multipath failover with EVMS, PAV support under z/VM
 - FCP Access Control Infrastructure: Data Channel



Linux on zSeries Open Source Code Drop 03/2005



q Kernel:

- ∅ CPU hotplug support
- ∅ oprofile support (supersedes the experimental patch of 2004-04-27)
- ∅ Improved memory detection logic

q dasd:

- ∅ Preferred path support
- ∅ Enhanced debug-messages
- ∅ DS8000/DS6000 control unit recognition

q Networking:

- ∅ OSA-Express Layer 2 Switching - previously added to kernel 2.4
- ∅ 10 Gigabit Ethernet support - previously added to kernel 2.4
- ∅ Support for OSA card feature to have up to 1920 devices
- ∅ TCP Segmentation Offload support / Enhanced Device Drivers Packing
- ∅ BLKT tuning support (supports OSA inbound blocking or packing algorithm)
- ∅ CLAW device driver
- ∅ CTC and IUCV: Instrumentation of device drivers with s390dbf calls for debug purposes

q z90crypt:

- ∅ Exploitation of Zero Pad function in PCIXCC - previously added to kernel 2.4
- ∅ Support for Crypto Express2 Coprocessor (CEX2C) - previously added to kernel 2.4

q zfcps:

- ∅ FCP read-only LUN sharing support
- ∅ Point-to-point topology support
- ∅ HBA API support to enable Storage Network Management - previously added to kernel 2.4

q Other:

- ∅ z/VM recording device driver (vmlogdr) - previously added to kernel 2.4
- ∅ z/VM watchdog (DIAG288) support
- ∅ Linux API for access to z/VM Monitor Records

q Upgrades:

- ∅ s390 tools 1.4.0 with new functionality replaces 1.3.4



DS8000/DS6000 support

q DS8000

- Ø ESCON, FICON
 - SuSE SLES8 SP4
 - SuSE SLES9 SP1
- Ø Open FCP
 - SuSE SLES8 SP4
 - Multi-path support is available with LVM



q DS6000

- Ø Open FCP
 - SuSE SLES8 SP4
 - Multi-path support is available with LVM



<http://www-1.ibm.com/servers/storage/disk/ds8000/pdf/ds8000-matrix.pdf>

<http://www-1.ibm.com/servers/storage/disk/ds6000/pdf/ds6000-matrix.pdf>



Agenda

- q The Scope
- q Linux Update
- ▶ q Linux Distribution Partners
- q IBM Middleware
- q ISV Products
- q z/VM
- q Customer Uses
- q Appendix: Additional Reading



Linux Distribution Partners



Distribution	GA	EoMaint	EoService	Comments
SUSE SLES 7 31bit, K 2.4.7 2004 Midsummer Upd.	10/31/2001 06/30/2004	06/30/2004	06/30/2006	05/2002: major refresh for IBM middleware 06/2004: final SW update before EoMaint, incl. IBM memory mgmt fix (dirty bit)
SUSE SLES 7 64bit, K 2.4.17 2004 Midsummer Upd.	04/30/2002 06/30/2004	06/30/2004	06/30/2006	same as above
SUSE SLES 8 31/64bit, K 2.4.19 SP3: K 2.4.21 SP3 Upd: K 2.4.21 SP3+ SecUpd: K 2.4.21 SP4: K 2.4.21	11/18/2002 11/14/2003 04/30/2004 08/03/2004 03/14/2005	11/30/2005	11/30/2007	UnitedLinux (SUSE, Turbolinux, Conectiva), 6/2003 code drop: z990 exploitation SP3 includes latest IBM fixes 1/2004 code drop: z890 & z990 GA3 supp. SP3+Sec Upd: CAPP/EAL3+ certified SP4: 10/2004 code drop incl. OSA Layer2 Switch, Crypto Express2
SUSE SLES 9 31/64bit, K 2.6.5 SP1: K 2.6.5	08/03/2004 01/27/2005	08/2007	08/2009	4/2004 code drop: 2.6 exploitation items, incl. glibc 2.3.3, gcc 3.3, binutils 2.15.90.0.1, strace 4.5.2, gdb 6.1, ltrace not supported, CAPP/EAL4 certified SP1: selected items from 3/2005 code drop



Novell's SuSE SLES9 SP1

Selected Items from Code Drop 3/2005

- q Service Pack 1 contains all bugfixes released via the maintenance Web since the GA version (August 2004)
- q Service Pack 1 contains all security fixes released via the maintenance Web since the GA version.
- q SLES9 with SP1 now supports the newest generation of server hardware for all supported hardware architectures (x86, AMD64, EMT64, Intel® Itanium® 2 Processor Family, IBM POWER and IBM zSeries). In addition, many existing hardware drivers have been refreshed with the latest updates.
- q Improved performance for reading files from harddisks

S/390 and zSeries Features**q CPU hotplug is now supported for S/390 and IBM zSeries**

- q Enabled new DASD CCW IDs
- q Allow memory holes
- q Fixed sys_stime() in 31-bit compatibility mode on S/390

- q For complete information on SLES9 SP1, consult the official readme document.



Novell's SuSE SLES Support Programs



- q Novell Upgrade Protection Program
 - o (= former "Maintenance Program")
 - q Access to bug fixes and functional enhancements together with detailed documentation for all maintained versions of the respective product.
 - q Access to the SUSE Linux Maintenance Web at <http://www.suse.de/maintenance>
 - q Prompt notifications regarding any changes and product innovations
 - q Provided with the next product versions
 - q Web-based support
 - q email-based support for installation of product, patches, feature enhancements or new versions
- http://www.suse.co.uk/en/business/products/server/sles/sles_datasheet.pdf

q Novell Premium Support Offerings

o (= former "Support Program")

Package	Access	Maximum Response Time	Assigned Support Resources	Service Account Manager	Incidents
Premium 1000	12x5	4 hrs			10
Premium 2000	24x7	2 hrs			25
Premium 3000	24x7	1 hr		x	50
			Assigned Support Engineer 1:6	x	50 AS ASE
Premium 3000 ASE	24x7	1 hr	Primary Support Engineer 1:3	x	50 AS PSE
Premium 4000 PSE	24x7	30 min	Dedicated Support 1:1	x	50 AS DSE
Premium 5000 PSE	24x7	15 min		x	50 AS DSE



Linux Distribution Partners



Distribution	GA	EoMaint	EoService	Comments
Red Hat 7.2 31bit, K 2.4.9	12/17/2001	n/a	12/31/2003	IBM certified since 06/28/2002 with Errata Level 2.4.9.37
Red Hat 7.1 64bit, K 2.4.9	06/12/2002	n/a	12/31/2003	same as above
Red Hat RHEL 3 31/64bit, K 2.4.21	10/21/2003	n/a	10/31/2008	Selected parts of 6/2003 code drop
Upd1: K 2.4.21	01/15/2004		plan to extend to 10/2010	Upd1: SCSI multipathing, zFCP, HW crypto
Upd2: K 2.4.21	04/30/2004			Upd2: Sev 1 fixes, CAPP/EAL3+ certified
Upd3: K 2.4.21	09/03/2004			Upd3: Support for Power5 + selected fixes
Upd4: K 2.4.21	12/20/2004			Upd4: Driver and package updates
Upd5: K 2.4.21	05/18/2005			Upd5: Bug fixes only
Red Hat RHEL 4 31/64bit, K 2.6.9	02/15/2005	n/a	02/2012	4/2004 code drop: 2.6 exploitation items
Upd1: K 2.6.9	06/30/2005			Upd1: Bug fixes, Support for IBM Communication Controller R1

Brand-new announcement from May 11, 2005:
http://www.marketwire.com/mw/release_html_b1?release_id=86351



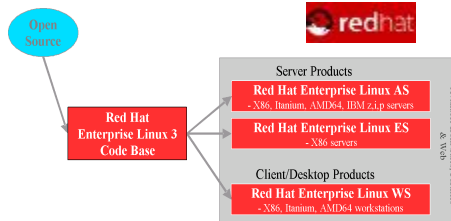
Red Hat Enterprise Linux 4

q The Red Hat Enterprise Linux 4 product family was announced in February 2005 with these core technologies:

- Ø Kernel with feature selection for maturity, scalability and performance
- Ø Updated runtime/development environment
- Ø Enhanced security
- Ø Enhanced desktop technology
- Ø Enhanced system/storage management features

q Major new features include:

- Ø Linux 2.6.9 kernel
- Ø GCC 3.4
- Ø Improved C/C++ standards compliance
- Ø Optimized code generation for improved application performance
- Ø Security Enhanced Linux (SELinux)
- Ø Block I/O subsystem provides numerous I/O subsystem optimizations
- Ø Read Copy Update kernel structures reduce spinlock contention
- Ø All architectures built from a common source RPM (as with RHEL3)



Focus on performance, scalability, security, availability, application development, systems management & standards support.

q Major new features include:

- Ø Ext3 performance enhancements
- Ø Logical Volume Manager 2 (LVM2)
- Ø NFSv4
- Ø Multiple 2.6 kernel performance/scalability features from RHEL3
- Ø NPTL – AIO – HugeTLBs – O(1) scheduler – O_Direct – Large Block I/O
- Ø Sys_epoll() for high volume (typically, network) event handling

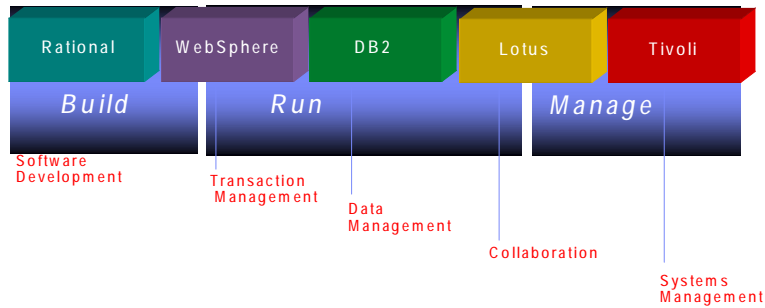


Agenda

- q The Scope
- q Linux Update
- q Linux Distribution Partners
- ▶ q IBM Middleware
- q ISV Products
- q z/VM
- q Customer Uses
- q Appendix: Additional Reading



IBM Middleware - Foundation for on demand business



5 IBM brands with 102 Linux on zSeries applications!

Evaluation copies of IBM middleware can be downloaded from:

ibm.com/developerworks/offers/linux-speed-start/download-z.html

Linux Product Matrix can be downloaded from:

ibm.com/software/os/linux/software/index.jsp



IBM Middleware for Linux on zSeries (Status 1Q 2005)

Java, DB2, WebSphere, Rational and Lotus
Product Availability

	Red Hat RHEL 3 (10/03)		Red Hat RHEL 4 (2/05)		SUSE SLES 8 (11/02)		SUSE SLES 9 (08/04)	
	Z (31 bit)		Z (64 bit)		Z (31 bit)		Z (64 bit)	
Java SDK	V1.3.1 Avail	V1.4.1 Avail	V1.4.2 Avail		V1.3 Avail	V1.4 Avail	V1.3.1 Avail	V1.4.2 Avail
WAS Base, ND	V5.1 Avail				V5.0 Avail	V6.0 Avail	V5.1.1 Avail	V6.0 Avail
MQ Base	V5.3 Avail				V5.3 Avail	V5.3 Avail		
Portal Enable	V5.1 Avail				V5.0.2 Avail			
Commerce BE	V5.6 Avail				V5.5 Avail		V5.6.0.2 Avail	
Clear Case					V2003 Avail		V2003 Avail	
Clear Quest	V2003 Avail				V2003 Avail			
Domino					V6.5 Avail			
DB2 UDB	V8.1.4 Avail				V8.2.1 Avail		V8.2.1 Avail	

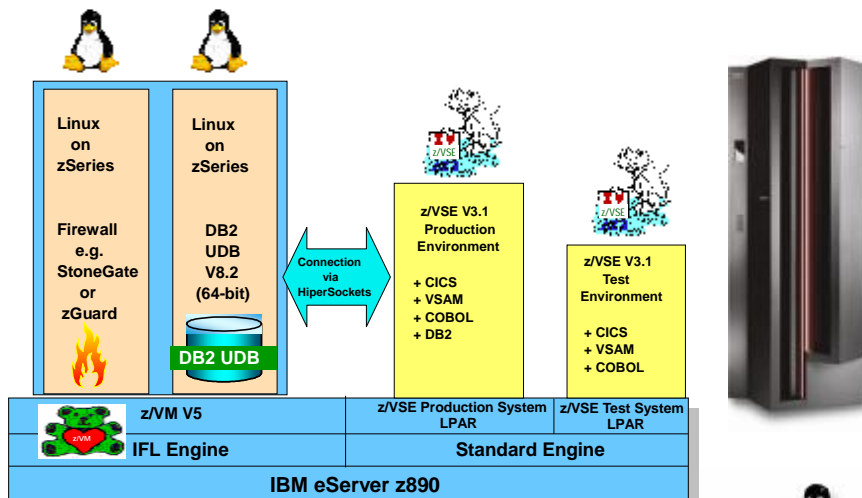


DB2 UDB V8.2 aka "Stinger" aka DB2 V8.1 + FP7

- ❑ More than 200 new features
- ❑ High Availability Disaster Recovery (HADR) and client reroute
 - ⊖ enable 24x7 information availability and resilience required by on demand enterprises
- ❑ Design Advisor
 - ⊖ assists database administrators in making optimal and comprehensive database design decisions
- ❑ Autonomic Object Maintenance
 - ⊖ feature automatically performs policy-based administration and maintenance functions, such as table reorganization, statistics collection, and database backup
- ❑ DB2's Linux leadership
 - ⊖ is extended by supporting the distributions based on the new 2.6 kernel. Exploitation of new I/O and memory management features found in the latest Linux distributions is provided. 64-bit Linux versions of DB2 servers are provided for Linux on Intel EM64T, Linux on POWER (pSeries and iSeries), and Linux on zSeries hardware architectures
- ❑ Availability dates:
 - ⊖ September 17, 2004 (electronic software delivery)
 - ⊖ October 29, 2004 (media and documentation)



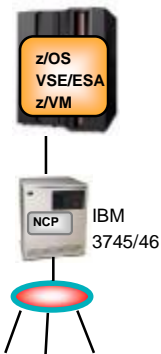
Scenario: z/VSE V3 connected to DB2 UDB V8



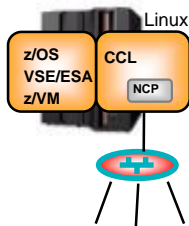
IBM Communications Controller for Linux on zSeries

Replaces many 3745/46 functions

Today



Tomorrow



- q CCL is a software emulation of the 37xx Communication Controller
 - Ø It allows you to run NCP on Linux on zSeries
 - Ø Supports many of the NCP functions
 - §SNI
 - §Boundary function
 - §Availability functions (XRF, SSCP takeover, duplicate MAC addressing)
 - §Management (NTuneMON and NPA LU)
- q You can move your NCP from a 37xx to CCL with no, or few changes to VTAM definitions and operations.
- q In most cases no changes to NetView definitions and operations.

A beta user's perspective on CCL:

"CCL will give us the capability to continue our SNI connectivity to strategic trading partners, without the sacrifice of major cycle increases on the z/OS mainframe for network connectivity."



Agenda

- q The Scope
- q Linux Update
- q Linux Distribution Partners
- q IBM Middleware
- ▶ q ISV Products
- q z/VM
- q Customer Uses
- q Appendix: Additional Reading



ISV's supporting Linux on zSeries



Now listing 259 ISV's with 674 applications!
<http://ibm.com/servers/eserver/zseries/solutions/s390da/linuxproduct.html>



StoneGate IBM eServer Offerings



§ StoneGate firewall and VPN for zSeries

- Security solution for the mainframe
- Supports server consolidation and virtual networking & DMZ
- Runs on both z/VM and native LPAR environments
- Available through IBM Global Services, IBM VARs and Stonesoft
- Only IBM certified commercial solution
- ServerProven

§ StoneGate firewall and VPN for iSeries

- Security solution for the midrange
- Supports server consolidation and virtual networking & DMZ
- Runs in LPAR on i5 and POWER4 systems
- Available through IBM Global Services, IBM VARs and Stonesoft
- Only IBM certified commercial solution
- ServerProven

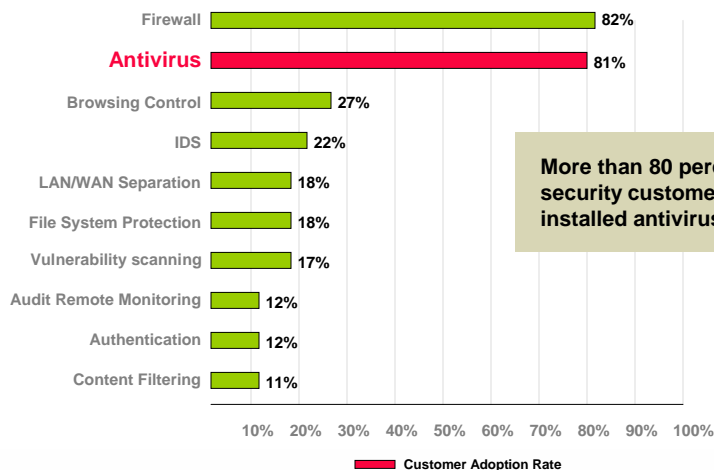
§ StoneGate firewall and VPN for xSeries

- Tested and certified solution bundles
- Easy to deploy, one stop support available (IGS, Stonesoft)
- Available through Stonesoft VARs, IBM VARs and security integrators

Copyright © 2001-2005 Stonesoft Corp. All rights reserved.



Customer Adoption of Security Solutions



More than 80 percent of security customers have installed antivirus solutions

Copyright © 2005 Trend Micro Incorporated



Trend Micro's Comprehensive Solutions (cntd.)



ServerProtect for Linux on zSeries

- § **Real-Time Virus Scanning**
 - Provides protection immediately.
 - Scans occur in memory
- § **Web User Interface**
 - The only solution that provides a graphical User Interface
 - Easy to learn and manage
 - Supports major browsers: IE and Mozilla
- § **Desktop User Interface**
 - Easy to use KDE quick access menu
- § **Easy and Secure Updating**
 - Automatically provides incremental updates for virus pattern files
 - Fast kernel update support
 - SSL based updating
- § **Built-in Scan Technology**
 - Worm Trap, a behavioral monitoring capability
 - Trojan System Cleaner, a process monitoring program

ScanMail for Lotus Notes 2.6

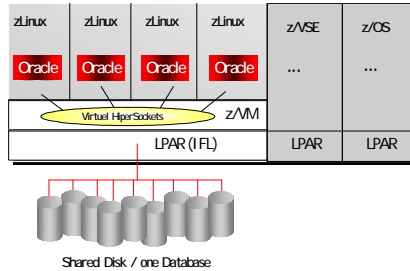
- § **Virus Elimination and Alerts**
 - ScanMail for Lotus Notes combines pattern-recognition, virus behavior analysis, and rules-based technologies to detect and remove viruses hidden within databases in real-time. It also includes customizable virus alert capabilities, providing prompt notification of security dangers to administrators
- § **Efficient Database and Replication Scanning**
 - ScanMail vigilantly monitors new and modified content within the Lotus database. It even scans during replication periods and can be configured to scan document clusters. ScanMail for Lotus Notes' adaptability is promoted through on-demand and scheduled scanning abilities.
- § **High-Performance Scanning and Scalability**
 - ScanMail offers multi-threading, maximizing its efficiency and minimizing impact upon Lotus Domino servers. Its broad platform support and extensibility makes it the ideal choice for growing enterprises.
- § **Flexible Configuration and Management**
 - Designed specifically for the Domino server, ScanMail for Lotus Notes offers a familiar interface to administrators. Configuration choices may be shared between servers and server groups, reducing administrative effort. Remote management features further the flexibility of ScanMail for Lotus Notes.

Copyright © 2005 Trend Micro Incorporated



Oracle9i for Linux on zSeries – What's available?

- q Oracle9i R2 Database Server
 - Ø Same as for any other major Unix
 - Ø Not available on Linux on zSeries:
 - App. Server, eBusiness Suite, Collaboration Suite
- q Oracle9i R2 Database for Linux for S/390 (31-bit)
 - Ø Built on SLES 7 for IBM S/390 (31-bit)
 - Ø 31-bit database implementation
 - Ø Runs on S/390 (31-bit) and zSeries (64-bit) HW
- q Oracle9i R2 Database (Developer's Release) for Linux for zSeries (64-bit)
 - Ø Built on SLES 7 for IBM zSeries (64-bit)
 - Ø 64-bit database implementation
 - Ø Runs on zSeries (64-bit) HW
- q Certified for:
 - Ø Red Hat 7.2 (31-bit)
 - Ø SUSE SLES 8 + SP3 (31-bit, 64-bit) incl. Real Application Clusters (RAC)
 - Ø No further certifications planned



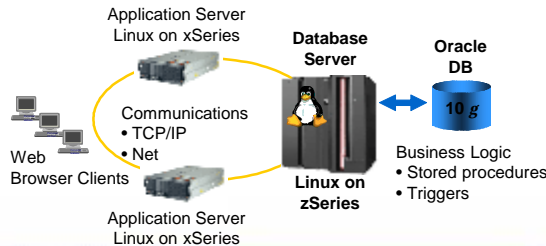
Announced at LinuxWorld, August 2004:

The Oracle Database Solution for Siebel is available and supported on Linux on zSeries



Oracle10g for Linux on zSeries – What's available?

- q Oracle Database 10g for Linux on zSeries
 - Ø 64-bit implementation only
 - Ø Built & certified on SUSE SLES 8 (SP3) and SUSE SLES 9 (64-bit only)
 - Ø Planned to be certified on RHEL 4 for IBM zSeries (64-bit only)
 - Ø GA since Oct 19, 2004
- q Split Tier Configurations
 - Ø DB on Linux for zSeries, application on AIX, Windows, or Linux on xSeries
 - Ø Oracle Collaboration Suite (OCS) is certified for split tier configurations
 - Ø Oracle eBusiness Suite (EBS) 11i is planned for certification



Summary: Infrastructure Simplification with Linux on zSeries

Moving beyond server consolidation to support on demand business



- q High performance transaction processing
- q I/O Intensive workloads
- q High resiliency and security
- q Unpredictable and highly variable workload spikes
- q Light to moderately loaded servers sharing resources
- q Rapid provisioning and re-provisioning
- q Advanced virtualization function for management and control

Sharing resources can help boost efficiency and responsiveness

Reducing IT complexity can help businesses achieve greater cost effectiveness

IBM zSeries, Linux, middleware, and services can help streamline IT infrastructures

Agenda

- q The Scope
- q Linux Update
- q Linux Distribution Partners
- q IBM Middleware
- q ISV Products
- ▶ q z/VM
- q Customer Uses
- q Appendix: Additional Reading



z/VM V5

- q Engine-based Value Unit pricing and a reduced entry price
- q Support for z990 and z890 enhancements including:
 - Ø support for OSA-Express Layer 2 switching
 - Ø support for FCP LUN access control when available on the z990 and z890
- q Virtualization technology and Linux enablement:
 - Ø Deployment of a Linux server farm on z/VM using only SCSI disks
 - Ø Reduced dependence on tape with installation from DVD
 - Ø Ability to swap from faulty disks using the new HyperSwap command
 - Ø Improved cryptographic performance with guest support for PCIXCC
 - Ø SET TIMEBOMB
- q Network virtualization and security:
 - Ø Enhanced network recovery with virtual switch failover support
 - Ø Improved authorization for z/VM guest LANs and virtual switches
- q Systems management:
 - Ø New Performance Toolkit reports for Linux and for SCSI disks



Agenda

- q The Scope
- q Linux Update
- q Linux Distribution Partners
- q IBM Middleware
- q ISV Products
- q z/VM
- ▶ q Customer Uses
- q Appendix: Additional Reading



How Customers start to implement Linux



Infrastructure

- Print/File
- Web Server
- e-mail
- Network
- Firewall

- NT to Linux on zSeries Migration
- File/print to Samba migration
- IIS to Apache/WebSphere migration
- Simple eMail to Open source/Stalker migration
- eMail, Calendaring & Scheduling (Domino/CommuniGatePro/SamsungContact)
- IBM Communications Server - optimize current dual SNA & IP network infrastructure
- Antivirus with Trend Micro's ServerProtect
 - www.trendmicro.com/
- Firewall/Security with Stonesoft's StoneGate
 - www.stonesoft.com/

How Customers continue to implement Linux



Infrastructure

Applications

- § Database servers
- § eCommerce
- § Web Hosting
- § Store & Branch Automation

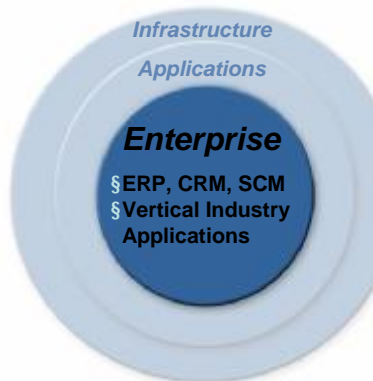
Database servers

- SQL Server to MySQL/DB2 migration
- DB2 UDB V8.2
- Informix V9.4
- Oracle 9i and 10g

eCommerce

- IBM WebSphere Commerce Business Edition 5.6
- eOneGroup eOneCommerce

How Customers may exploit Linux



ERP, CRM, SCM

- § IBM WebSphere Portal Enable 5.0.2
 - www.ibm.com/software/genservers/portal
- § WebSphere based applications, e.g.:
 - [Aprix Domino Platform Edition](#) – Content management
 - [Foedero's DocumentZone](#) – Content management, CRM
 - [GenaWare's Geospatial Solution](#) – Spatial data mgmt
- § mySAP Business Suite

Vertical Industry Applications

- § S2 Systems OpeN/2 – Authorization and payment transactions
- § Fair Isaac's Blaze Advisor – business rules mgmt software
- § MarCole's Gift RegistryWorks – gift registry solution
- § Information Mosaic's converge – investment services

Agenda

- q The Scope
- q Linux Update
- q Linux Distribution Partners
- q IBM Middleware
- q ISV Products
- q z/VM
- q Customer Uses
- ▶ q Appendix: Additional Reading



ITSO Redbooks (sorted by latest publish date - 1 of 2)

ibm.com/zseries/os/linux/support_documentation.html#4



- q [z/VM and Linux on zSeries: From LPAR to Virtual Servers in Two Days](#), SG24-6695-00
- q [IBM Lotus Domino 6.5 for zSeries on Linux Implementation](#), SG24-7021-00
- q [Linux on zSeries: Fibre Channel Protocol Implementation Guide](#), SG24-6344-00
- q [Linux on IBM eServer zSeries and S/390: Performance Toolkit for VM](#), SG24-6059-00
- q [WebSphere V5 for Linux on zSeries Connectivity Handbook](#), SG24-7042-00
- q [Linux on IBM eServer zSeries and S/390: Best Security Practices](#), SG24-7023-00
- q [z/VM on an EFS Base: Getting Started](#), SG24-7009-00
- q [On demand Operating Environment: Managing the Infrastructure](#), SG24-6634-00
- q [IBM Lotus Domino 6.5 for Linux on zSeries Implementation](#), SG24-7021-00
- q [Linux with zSeries and ESS: Essentials](#), SG24-7025-00
- q [WebSphere Portal Installation on Linux for zSeries](#), REDP-3699-00
- q [Linux on zSeries and S/390: Performance Measurement and Tuning](#), SG24-6926-00
- q [Patterns: Self-Service Application Solutions Using WebSphere V5.0](#), SG24-6591-00
- q [Linux Handbook: A Guide to IBM Linux Solutions and Resources](#), SG24-7000-00

publib-b.boulder.ibm.com/cgi-bin/searchsite.cgi?Query=Linux AND zSeries AND Redbook



ITSO Redbooks (sorted by latest publish date - 2 of 2)

ibm.com/zseries/os/linux/support_documentation.html#4



- q [Experiences with Oracle for Linux on zSeries](#), SG24-6552-00
- q [Linux on IBM eServer zSeries and S/390: System Management](#), SG24-6820-00
- q [Linux on IBM eServer zSeries and S/390: Large Scale Linux Deployment](#), SG24-6824-00
- q [SAP on DB2 UDB for OS/390 and z/OS: Implementing Application Servers on Linux for zSeries](#), SG24-6847-00
- q [Linux on IBM eServer zSeries and S/390: Application Development](#), SG24-6807-00
- q [zSeries HiperSockets](#), SG24-6816-00
- q [e-Business Intelligence: Data Mart Solutions with DB2 for Linux on zSeries](#), SG24-6294-00
- q [Linux on IBM eServer zSeries and S/390: ISP/ASP Solutions](#), SG24-6299-00
- q [Linux for IBM eServer zSeries and S/390: Distributions](#), SG24-6264-00
- q [e-Business Intelligence: Leveraging DB2 for Linux on S/390](#), SG24-5687-00
- q [Linux for S/390](#), SG24-4987-00

publib-b.boulder.ibm.com/cgi-bin/searchsite.cgi?Query=Linux AND zSeries AND Redbook



ITSO Redpapers (sorted by latest publish date - 1 of 2)

ibm.com/zseries/os/linux/support_documentation.html#4



- q [Linux on zSeries: Samba-3 Performance Observations](#), REDP-3988-00
- q [Experiences with Oracle 10g Database on Linux for zSeries](#), REDP-3859-00
- q [Networking Overview for Linux on zSeries](#), REDP-3901-00
- q [Cloning FCP-attached SCSI disks on SLES9 Linux for zSeries Systems](#), REDP-3871-00
- q [Systems Management APIs for z/VM](#), REDP-3882-00
- q [Running Linux Guest in less than CP Privilege Class G](#), REDP-3870-00
- q [Printing with Linux on zSeries Using CUPS and Samba](#), REDP-3864-00
- q [Accounting and Monitoring for z/VM Linux guest machines](#), REDP-3818-00
- q [Linux on IBM eServer zSeries and S/390: VSWITCH and VLAN Features of z/VM 4.4](#), REDP-3719-00
- q [Linux on IBM eServer zSeries and S/390: Building SuSE SLES8 Systems under z/VM](#), REDP-3687-00
- q [WebSphere Portal Installation on Linux for zSeries](#), REDP-3699-00
- q [Using IBM Tivoli System Automation for Linux](#), REDP-3716-00
- q [mySAP Business Suite Managed by IBM Tivoli System Automation for Linux](#), REDP-3717-00
- q [Linux on IBM eServer zSeries and S/390: Virtual Router Redundancy Protocol on VM Guest LANs](#), REDP-3657-00



ITSO Redpapers (sorted by latest publish date – 2 of 2)

ibm.com/zseries/os/linux/support_documentation.html#4



- q [Linux on IBM eServer zSeries and S/390: z/VM Configuration for WebSphere Deployments](#), REDP-3661-00
- q [Linux on IBM eServer zSeries and S/390: Managing a Samba Server from z/VM](#), REDP-3604-00
- q [Linux on IBM eServer zSeries and S/390: TCP/IP Broadcast on z/VM Guest LAN](#), REDP-3596-00
- q [Linux on IBM eServer zSeries and S/390: Porting LEAF to Linux on zSeries](#), REDP-3627-00
- q [Linux on IBM eServer zSeries and S/390: Cloning Linux Images in z/VM](#), REDP-0301-00
- q [Linux on IBM zSeries and S/390: Server Consolidation with Linux for zSeries](#), REDP-0222-00
- q [Linux on IBM zSeries and S/390: High Availability for z/VM and Linux](#), REDP-0220-00
- q [Linux on IBM zSeries and S/390: Securing Linux for zSeries with a Central z/OS LDAP Server \(RACF\)](#), REDP-0221-00
- q [Getting Started with zSeries Fibre Channel Protocol](#), REDP-0205-00
- q [Dimensional Insight Business Intelligence Tool for Linux on zSeries](#), REDP-0171-00
- q [e-commerce Patterns for Linux on zSeries Using WebSphere Commerce Suite V5.1](#), REDP-0411-00
- q [Building Linux Systems Under IBM VM](#), REDP-0120-00



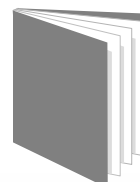
Other good Sources of Information (1 of 2)

- q Large Scale Web Serving Consolidation with zSeries servers running Linux and z/VM
ibm.com/servers/eserver/zseries/library/whitepapers/large_scale_web_serving.html
- q Mainframe Linux solutions mature with mySAP.com for IBM eServer zSeries
ibm.com/servers/eserver/zseries/library/whitepapers/gigamar19mysaplinuxonz.html
- q Porting UNIX Applications to Linux - Hints and Tips
ibm.com/servers/eserver/zseries/library/techpapers/pdf/gm130115.pdf
- q Linux for S/390 and zSeries porting hints and tips
ibm.com/servers/esdd/articles/linux_s390/index.html
- q Linux for zSeries Performance Hints and Tips
[Link from developerWorks home page for Linux on zSeries](#)
- q Implementing Linux on zSeries: Best Practices
ibm.com/servers/eserver/zseries/library/whitepapers/pdf/gm130647.pdf
- q zSeries Linux 2.4 to 2.6 Transition Guide
ibm.com/servers/eserver/zseries/library/techpapers/pdf/lnux-14mg.pdf
- q Providing Linux 2.6 support for the zSeries platform
www.research.ibm.com/journal/sj/442/borntraeger.pdf
- q Linux on the Mainframe
[Prentice Hall, published in May 2003, ISBN: 0-13-101415-3](#)



Other good Sources of Information (2 of 2)

- q zSeries Server Consolidation and Application Integration
ibm.com/servers/eserver/zseries/library/whitepapers/pdf/gm130254.pdf
- q How to Architect VM and Linux for WebSphere on zSeries
ibm.com/servers/eserver/zseries/os/linux/pdf/avmlinux.pdf
- q Linux for zSeries Porting and Application Migration
ibm.com/servers/enable/linux/pdfs/linuxz_migration.pdf
- q Resiliency with Linux and zSeries
ibm.com/servers/eserver/zseries/library/whitepapers/pdf/gm130618.pdf
- q Positioning z/OS and Linux for zSeries
ibm.com/servers/eserver/zseries/library/whitepapers/pdf/gm130521.pdf
- q IBM Linux on zSeries home page
ibm.com/zseries/linux
- q IBM developerWorks pages for Linux on zSeries
ibm.com/developerworks/linux/linux390/



Trademarks

The following are trademarks of the International Business Machines Corporation in the United States and/or other countries. For a complete list of IBM Trademarks, see www.ibm.com/legal/copytrade.shtml: AS/400, DBE, e-business logo, ESCO, eServer, FICON, IBM, IBM Logo, iSeries, MVS, OS/390, pSeries, RS/6000, S/390, VM/ESA, VSE/ESA, WebSphere, xSeries, z/OS, zSeries, z/VM

The following are trademarks or registered trademarks of other companies

Lotus, Notes, and Domino are trademarks or registered trademarks of Lotus Development Corporation
Java and all Java-related trademarks and logos are trademarks of Sun Microsystems, Inc., in the United States and other countries
Linux is a registered trademark of Linus Torvalds
UNIX is a registered trademark of The Open Group in the United States and other countries.
Microsoft, Windows and Windows NT are registered trademarks of Microsoft Corporation.
SET and Secure Electronic Transaction are trademarks owned by SET Secure Electronic Transaction LLC.
Intel is a registered trademark of Intel Corporation
*All other products may be trademarks or registered trademarks of their respective companies.

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.

IBM hardware products are manufactured from new parts, or new and serviceable used parts. Regardless, our warranty terms apply.

All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions.

This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Information about non-IBM products is obtained from the manufacturers of those products or their published announcements. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

Prices subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.

References in this document to IBM products or services do not imply that IBM intends to make them available in every country.

Any proposed use of claims in this presentation outside of the United States must be reviewed by local IBM country counsel prior to such use.

The information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

