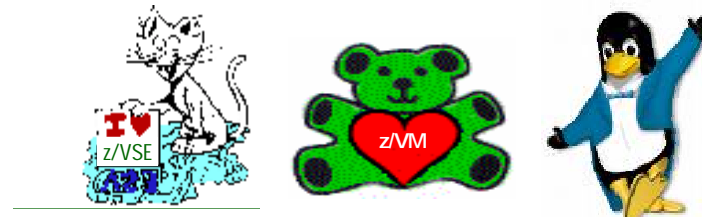Dr. Klaus Goebel

IBM Research & Development, Boeblingen, Germany, kgoebel@de.ibm.com

IBM

z/VM, z/VSE, Linux on System z News
incl. recent IBM hardware announcements

7th European GSE / IBM Technical University, Hamburg, Germany, Sep/Oct 2013

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DS6000	IBM eServer	System z10	zSeries*
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Notes:

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www.ibm.com/systems/support/machine_warranties/machine_code/aut.html ("AUT").

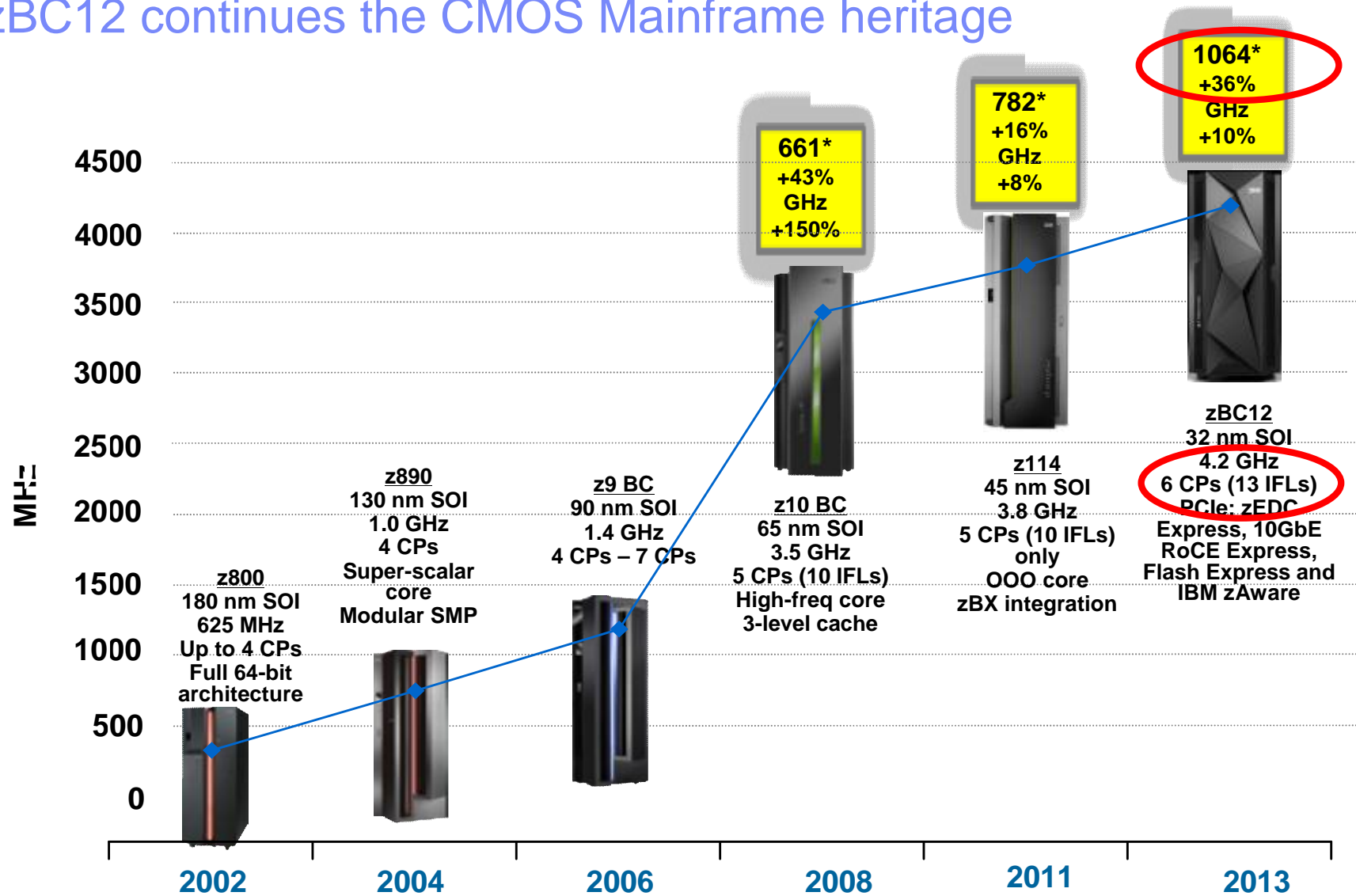No other workload processing is authorized for execution on an SE.

IBM offers SEs at a lower price than General Processors/Central Processors because customers are authorized to use SEs only to process certain types and/or amounts of workloads as specified by IBM in the AUT.

Agenda

§ **IBM zEnterprise BC12**

§ **z/VM**

§ **Linux on System z**

§ **z/VSE**

§ **System z Cloud Ecosystem**

§ **Software Pricing**

zBC12 continues the CMOS Mainframe heritage

MHz (y-axis): 0, 500, 1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500

x-axis: 2002, 2004, 2006, 2008, 2011, 2013

661*
+43%
GHz
+150%

782*
+16%
GHz
+8%

1064*
+36%
GHz
+10%

z800
180 nm SOI
625 MHz
Up to 4 CPs
Full 64-bit
architecture

z890
130 nm SOI
1.0 GHz
4 CPs
Super-scalar core
Modular SMP

z9 BC
90 nm SOI
1.4 GHz
4 CPs – 7 CPs

z10 BC
65 nm SOI
3.5 GHz
5 CPs (10 IFLs)
High-freq core
3-level cache

z114
45 nm SOI
3.8 GHz
5 CPs (10 IFLs) only
OOO core
zBX integration

zBC12
32 nm SOI
4.2 GHz
6 CPs (13 IFLs)
PCIe: zEDC
Express, 10GbE
RoCE Express,
Flash Express and
IBM zAware

* MIPS Tables are NOT adequate for making comparisons of System z processors.

IBM System z Business Class Configuration Comparisons

	z10 BC™ E10	z114 M05	z114 M10	zBC12 H06	zBC12 H13
Uniprocessor Performance	673 MIPS	782 MIPS		1064 MIPS	
z/OS Capacity	26-2760 MIPS	26 - 3139 MIPS		50 – 4958 MIPS	
Total System Memory	248 GB	120 GB	248 GB	240 GB	496 GB
Configurable Engines	10	5	10	6	13
Configurable CPs	0-5	0-5		0 – 6	
LPARS/LCSS	30/2	30/2		30/2	
HiperSockets	16	32		32	
I/O drawers/ PCIe I/O drawers	Up to 4	Up to 4	Up to 3	Up to 3 [1]	Up to 3 [1]
I/O slots per I/O drawer/ PCIe I/O drawer	8	8/32		8/32 [2]	
FICON® Channels	128	128		128 [3]	
OSA Ports	96	96		96	
ESCON® Channels	480	240		0 [4]	
IFB host bus Bandwidth PCIe Gen2 Bandwidth	6.0 GB/sec(IFB)	6.0 GB/sec (IFB) 8.0 GB/sec (PCIe)		6.0 GB/sec (IFB) 8.0 GB/sec (PCIe)	
ICB-4/ISC-3[8]/PSIFB	12/48/12	0/48/8 -16	0/48/16 - 32	0[5]/32/8 -16[6]	0[5]/32/16 - 32[7]
zIIP/zAAP Maximum Qty	5	2	5	4 (with Max of 2 CPs)	8 (with Max of 4/5 CPs)
IFL Maximum Qty	10	5 (3139 MIPS)	10 (5390 MIPS)	6 (4958 MIPS)	13 (8733 MIPS)
ICF Maximum Qty	10	5	10	6	13
Capacity Settings	130	130	130	156	156
Upgradeable	Upgrade to z114 or zBC12	Upgrade to zBC12 H06, H13	Upgrade to zBC12 H06, H13	Upgrade H06 to H13, H13 to zEC12 Model H20 (Radiator-based air cooled only)	

News with z/VSE, z/VM and Linux on System z

Optica PRIZM Basics

§ A purpose-built appliance designed exclusively for IBM System z; enables ESCON devices to be connected to FICON channels or fabrics

§ Allows ESCON devices to connect to FICON channels and FICON fabrics/networks
  – Prizm also supports attachment of parallel (bus/tag) devices to FICON channels via ESBT module

§ Converts FICON channels (CHPID type FC) into ESCON channels:
  § Available configurations: 1:2 (new), 1:4, and 2:8 [FICON : ESCON]
  § 1:2 configuration available for customers with 1-4 legacy device ports (in single or dual Prizm design)
  § Replace aging ESCON Directors with PRIZM (maintenance savings, and ESCD's announced as EOS)

§ Qualified by the IBM Vendor Solutions Lab in POK for all ESCON devices; qualified for connectivity to Brocade and Cisco FICON switching solutions
  – Refer to: http://www.ibm.com/systems/z/hardware/connectivity/index.html
    • Products -- > FICON / FCP Connectivity -- > Other supported devices

§ PRIZM is available via IBM Global Technology Services: ESCON to FICON Migration offering (#6948-97D)

FICON Ports:
LC Duplex

ESCON Ports:
MT-RJ

2U

Front View

Rear View
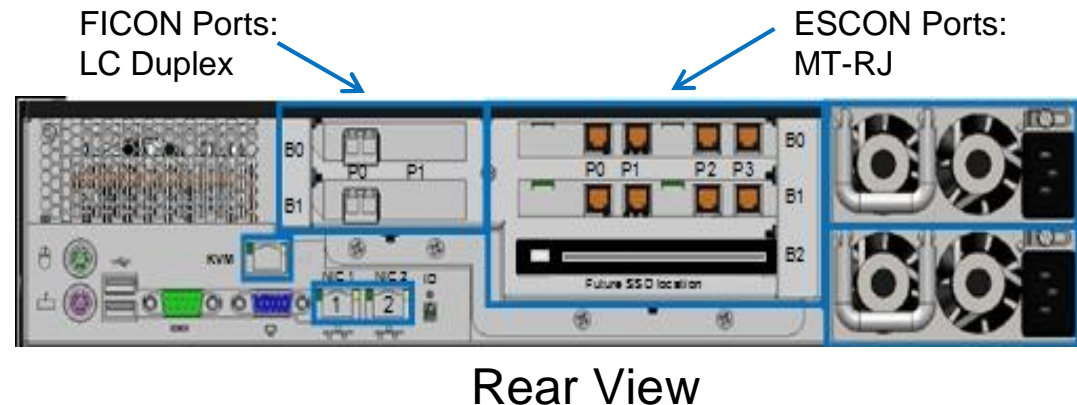
New Innovations available on zBC12 (and zEC12)

SoD for z/VM   SoD for z/VM   Contained in Linux distros, but unsupported by IBM

zEDC and zEDC Express	SMC-R and 10GbE RoCE Express	Flash Express	IBM zAware	Hybrid Computing
Compress your data *4X** *(efficient system data compression)* *Up to 118X reduction in CPU and up to 24X throughput improvement when zlib uses zEDC ****	*Network latency reduced up to 80% to improve service levels on web based claims and payment systems workloads**** *Up to 50% CPU savings for FTP file transfers across z/OS systems versus standard TCP/IP ***** *Up to 48% reduction in response time and 10% CPU savings for a sample CICS workload exploiting IPIC using SMC-R versus TCP/IP ****** *Up to 40% reduction in overall transaction response time for WAS workload accessing z/OS DB2 *******	*19% Reduction in total dump time for 36 GB standalone dump 10x Faster response time and 37% increase in throughput compared to disk for morning transition 28% Improvement in DB2™ throughput leveraging Flash Express with Pageable Large Pages (PLP)*	*Difficult or unusual problems can be found in 2 clicks not hours*	*240 Hybrid units shipped since inception 84% Lower TCA with fit for purpose cloud architectures 35% Lower infrastructure management costs*

* The amount of data sent to an SMF logstream can be reduced by up to 75% using zEDC compression – reducing logger overhead
** These results are based on projections and measurements completed in a controlled environment. Results may vary by customer based on individual workload, configuration and software levels
*** Based on internal IBM benchmarks of modeled z/OS TCP sockets-based workloads with request/response traffic patterns using SMC-R vs TCP/IP. The actual throughput that any user will experience will vary
**** Based on internal IBM benchmarks in a controlled environment using z/OS V2R1 Communications Server FTP client and FTP server, transferring a 1.2GB binary file using SMC-R (10GbE RoCE Express feature) vs standard TCP/IP (10GbE OSA Express4 feature). The actual CPU savings any user will experience may vary.
***** Based on internal IBM benchmarks using a modeled CICS workload driving a CICS transaction that performs 5 DPL (Distributed Program Link) calls to a CICS region on a remote z/OS system via CICS IP interconnectivity (IPIC), using 32K input/output containers. Response times and CPU savings measured on z/OS system initiating the DPL calls. The actual response times and CPU savings any user will experience will vary.
****** Based on projections and measurements completed in a controlled environment. Results may vary by customer based on individual workload, configuration and software levels.

Operating System Support for zBC12 and zBX Model 003

§ Currency is key to operating system support and exploitation of future servers
§ The following releases of operating systems are supported on zBC12
  (refer to PSP buckets for any required maintenance):

Operating System	Supported levels
z/OS	§ z/OS V2.1 with PTFs (Exploitation plus zEDC Express and 10GbE RoCE Express Support) § z/OS V1.13 and V1.12 with PTFs (Exploitation) § z/OS V1.11 with PTFs (Toleration, Lifecycle extension required) § z/OS V1.10 (Toleration, Lifecycle Extension and after September 30, 2013, an extended support contract required)
Linux on System z	§ SUSE SLES 10 and SLES 11 § Red Hat RHEL 5 and RHEL 6
z/VM	§ z/VM V6.3 with PTFs for guest exploitation support (zManager does not support z/VM V6.3 as a member of an ensemble) § z/VM V5.4 and V6.2 with PTFs for toleration support. (z/VM V6.1 EoS and will not be supported on zEC12 at GA2 and/or zBC12).
z/VSE	§ z/VSE V5.1 with PTFs (Exploitation) § z/VSE V4.3 with PTFs (Toleration)
z/TPF	§ z/TPF V1.1

§ Support for p Blades in zBX Model 003
  – AIX 5.3 Technology Level 12 or higher, AIX 6.1 Technology Level 5 or higher, AIX 7.. All with PowerVM™ Enterprise Edition
§ Support for Linux and Windows* environments on select System x blades in zBX Model 003
  – 64 bit version support only
  – Red Hat RHEL 5.5 and higher, 6.0 and higher and SLES 10 (SP4), 11 SP1 and higher
  – Microsoft Windows Server 2012, Microsoft Windows Server 2008 R2 and Microsoft Windows Server 2008 (SP2) (Datacenter Edition recommended)—64-bit only
  – For details on latest hypervisor levels and supported Operating systems on the zBX Model 003, refer to:
    http://www.ibm.com/systems/z/hardware/zenterprise/zbx_specs.html

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§ **IBM zEnterprise BC12**

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§ **System z Cloud Ecosystem**

§ **Software Pricing**

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z/VM Version 6 Release 3
Making Room to Grow Your Business

February 5

Preview
announcement

July 23

Product
announcement

July 26

Product
General
Availability

Continued Evolution

- Improved TCO
- Scaling and efficiency
  improvements
- Ease of usability

See
http://www.vm.**ibm.com**/zvm630/

2013

z/VM 6.1

z/VM 6.2

z/VM 6.3
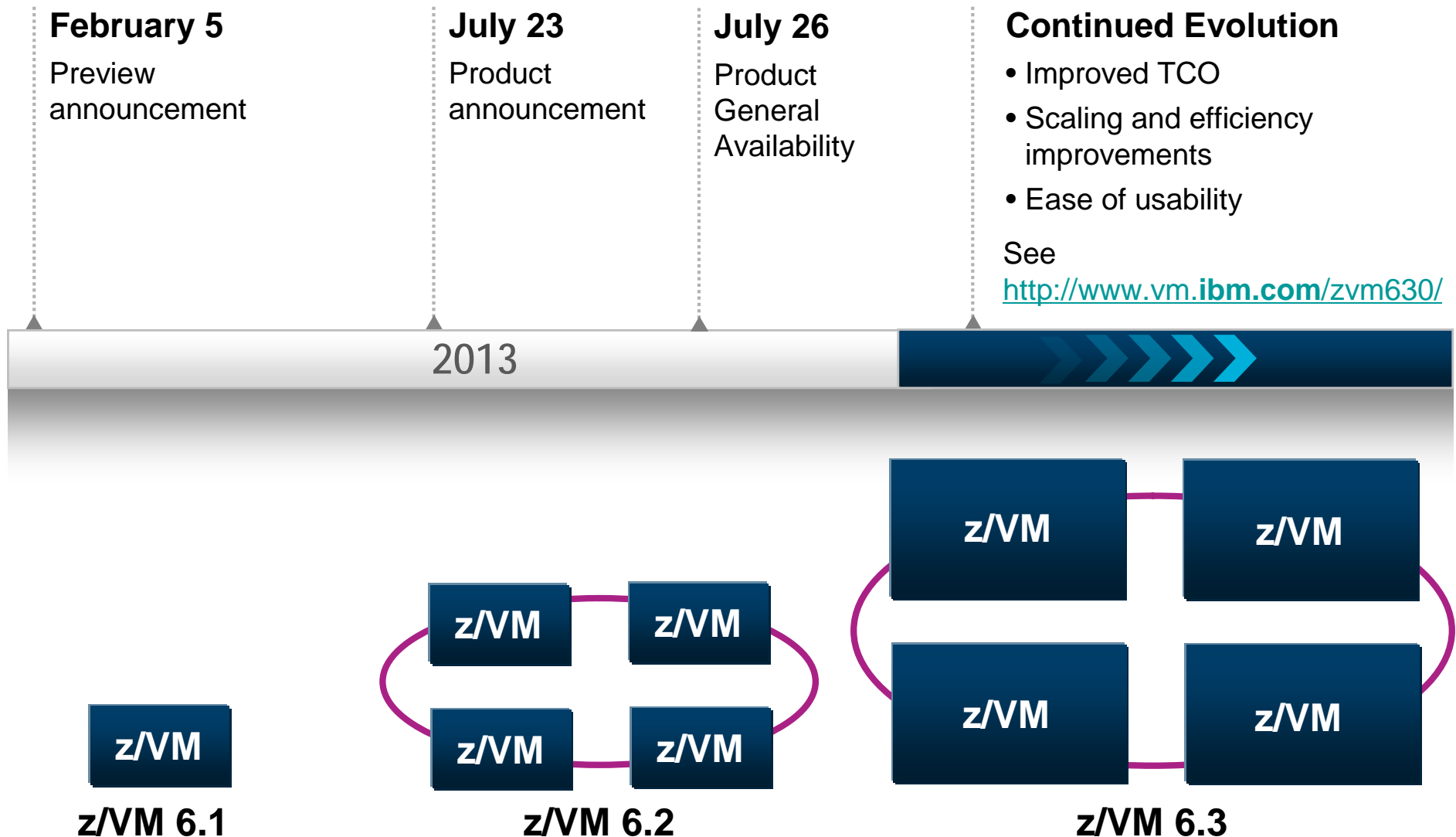
z/VM V6.3 – Large Memory Support

§ **Increases the real memory limit from 256 GB to 1 TB**
 – Proportionately increases total virtual memory based on tolerable over-commitment levels and workload dependencies

§ **Individual virtual machine memory limit remains unchanged at 1 TB**

§ **Paging DASD utilization and requirements change**
 – Proactive writing of pages to DASD increases need to have properly configured paging subsystem
 – Removed the need to double the paging space on DASD

§ **Expanded Storage continues to be supported with limit of 128 GB**

§ **Page selection algorithms rewritten**
 – Reorder processing removed
 – Greater separation from the scheduler lists
 – Better handling of Linux guests that do not go truly idle

§ **Improved effectiveness of the CP SET RESERVE command**
 – Pages protected better than previously
 – Support for reserving pages of NSS or DCSS space
 – Ability to limit the overall number of reserved pages for a system

z/VM V6.3 − HiperDispatch

§ **Improves processor efficiency**

– Better n-way curves: supported processor limit of 32 remains unchanged

– Better use of processor cache to take advantage of cache-rich system design of more recent machines

§ **Two components:**

(1) **Dispatching Affinity:** dispatch virtual CPU near where its data may be in cache based on where the virtual CPU was last dispatched

(2) **Vertical CPU Management:** cooperation with PR/SM to distribute physical processor resources to logical processors more efficiently for some configurations
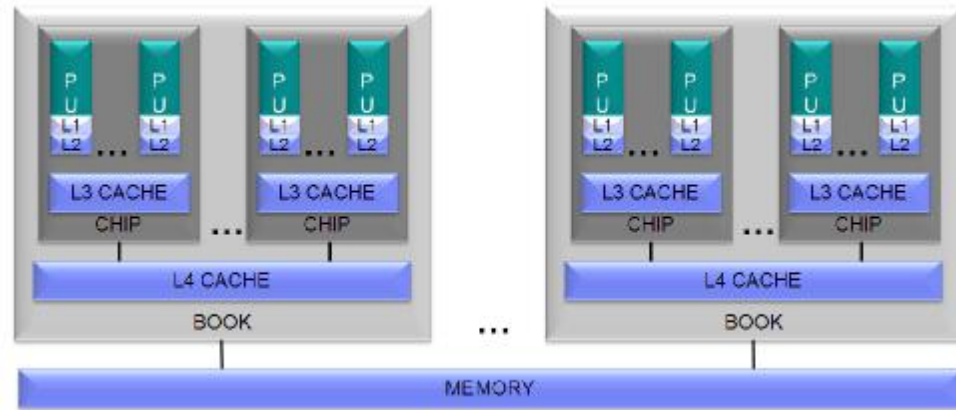
Horizontal:
• The logical processors are all created/treated equally.
• z/VM dispatches work evenly across the logical processors.

Vertical:
• The logical processors are skewed to where some get greater share of the weight.
• z/VM dispatches work accordingly to the heavier weighted workload.

z/VM Statements of Direction (SODs)

§ **Security Evaluation of z/VM V6.3:** IBM intends to evaluate z/VM V6.3 with the RACF Security Server feature, including labeled security, for conformance to the Operating System Protection Profile (OSPP) of the Common Criteria standard for IT security, ISO/IEC 15408, at Evaluation Assurance Level 4 (EAL4+).
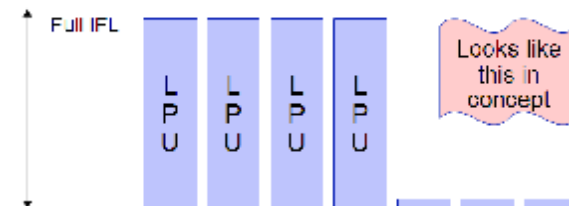
§ **FIPS Certification of z/VM V6.3:** IBM intends to pursue an evaluation of the Federal Information Processing Standard (FIPS) 140-2 using National Institute of Standards and Technology's (NIST) Cryptographic Module Validation Program (CMVP) for the System SSL implementation utilized by z/VM V6.3.

§ **z/VM support of 10GbE RoCE Express:** In a future z/VM deliverable IBM plans to offer support for guest exploitation of the 10GbE RoCE Express feature (#0411) on the IBM zEnterprise EC12 and IBM zEnterprise BC12 systems. This support is designed to allow guests to utilize Remote Direct Memory Access over Converged Ethernet (RoCE) for optimized networking.

§ **z/VM guest exploitation of zEDC Express feature:** In a future z/VM deliverable IBM plans to offer z/VM support for guest exploitation of the zEDC Express feature (#0420) on the IBM zEnterprise EC12 and BC12 systems.

§ **IBM SmartCloud support:** IBM currently provides a Cloud Ready for Linux on System z solution. IBM intends to add additional Linux on System z Cloud support built on z/VM V6.3 and OpenStack, including SmartCloud Orchestrator and SmartCloud Provisioning.

§ **Stabilization of z/VM V5.4 support**: The IBM zEnterprise EC12 and IBM zEnterprise BC12 are planned to be the last System z servers supported by z/VM V5.4 and the last System z servers that will support z/VM V5.4 running as a guest (second level). z/VM V5.4 will continue to be supported until December 31, 2014, or until the IBM System z9 EC and IBM System z9 BC are withdrawn from support, whichever is later.

§ **Withdrawal of support for Expanded Storage:** In a future z/VM deliverable IBM plans to withdraw support for expanded storage (XSTOR). With the enhanced memory management support added in z/VM V6.3, expanded storage is no longer recommended as part of the paging configuration. z/VM can now run efficiently in all central storage configurations.

All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice. Any reliance on these Statements of General Direction is at the relying party's sole risk and will not create liability or obligation for IBM.

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§ **IBM zEnterprise BC12**

§ **z/VM**

➡ § **Linux on System z**

§ **z/VSE**

§ **System z Cloud Ecosystem**

§ **Software Pricing**

Linux on System z Features – zEC12/zBC12 Support

§ **Transactional execution (kernel 3.7)**   6.4   11.3

- Also known as hardware transactional memory
- CPU features that allows to execute a group of instructions atomically
- Optimistic execution, if a transaction conflicts a rollback to a saved state is done

§ **Support for Crypto Express4S cards (kernel 3.7)**   6.4   11.3

- New generation of crypto adapters plug-able into the I/O drawer
- New type 10 which uses a bit field to indicate capabilities of the crypto card

§ **Storage Class Memory – Flash Express (kernel 3.7)**   6.4   11.3

- Internal Flash Solid State Disk (SSD)
- Accessed via Extended Asynchronous Data Mover (EADM) sub-channels
- Up to four pairs of cards with a maximum capacity of 4x1.4TB = 5.6TB
- Support for concurrent MCL updates with kernel version 3.8

New IBM FlashSystem Storage extends ELS Offering

The new IBM SAN Volume Controller and IBM FlashSystem bundle offers an economically priced storage solution for our Enterprise Linux Server clients.

Right combination of performance and function:

The extreme performance of IBM FlashSystem with IBM MicroLatency™

- Advanced storage functionality of IBM SVC
    - *Thin Provisioning* – allocate storage "just in time"
    - *Easy Tier* – storage efficiency
    - *FlashCopy* – point in time copies
    - *Mirroring/Copy Services* – data replication and protection
    - *Real-Time Compression* – up to 5X more data in the same physical space
- An ability to cost effectively deploy quickly and realize immediate results

IBM SAN Volume Controller (SVC) and IBM FlashSystem bundle are support 'out of the box' by z/VM and Linux on System z.

Linux on System z Features – Core Kernel

§ Allow to compare dump system with boot system

11.3

– With z/VM 6.2 Single-System-Image it is possible to move active Linux instances between different z/VM instances

– To aid debugging a log of past live-guest-relocations is made available in both the live system and in the dump of a system

§ Fuzzy Live Dump (kernel 3.5)

11.3

– Add the capability to generate a dump of a live system.

– Not all data structures will be consistent but the dump may still be useful.

New Red Book
Set up Linux on System z for Production

IBM

Set up Linux on System z for Production

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Considerations to move from test and
development into production

Capacity planning and
performance

Sample checklists
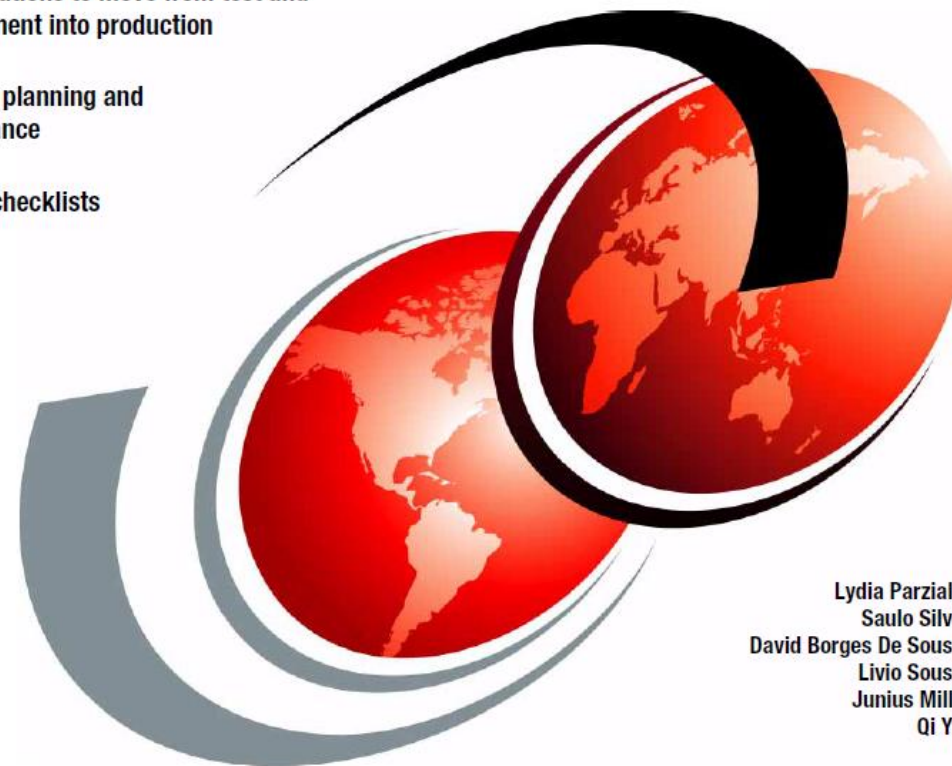
Lydia Parziale
Saulo Silva
David Borges De Sousa
Livio Sousa
Junius Mills
Qi Ye

Draft available since Sep 2013:
http://www.redbooks.ibm.com/redpieces/pdfs/sg248137.pdf

Redbooks

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§ **IBM zEnterprise BC12**

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➡ § **z/VSE**

§ **System z Cloud Ecosystem**

§ **Software Pricing**

z/VSE Support of IBM zEC12 and zBC12

§ z/VSE Release Support

– z/VSE supports the zEC12 and zBC12 with z/VSE V4.3 and V5.1

No PTFs are required

For IOCP, EREP and HLASM PTFs, see PSP (subset 2827/ZVSE of 2827DEVICE, or subset 2828/ZVSE of 2828DEVICE, respectively)

§ OSA-Express5s 1000BASE-T – new with zBC12

– No z/VSE PTF required

1000BASE-T supported with existing z/VSE functionality

Allow to configure OSA-Express5S with OSA/SF in HMC

§ Configurable Crypto Express4s – new with zEC12

– z/VSE toleration PTF required to use Crypto Express4s

Toleration PTF (DY47414) provided for z/VSE V5.1 only

– Crypto Express4s supported with existing z/VSE cryptographic functionality

Supported modes: (CCA) coprocessor and accelerator

PKCS #11 (EP11) coprocessor not supported

z/VSE continues to demonstrate IBM's commitment

Hardware Support
More Capacity
Quality
z/OS Affinity
Interoperability
Protect Integrate Extend

z/VSE V5.1.1 - 2Q2012

- ØCICS Explorer Monitoring
- ØUniversal database connector
- ØLinux Fast Path in LPAR

z/VSE V5.1 - 4Q2011

- ØzEnterprise exploitation
- ØIEDN connection to zBX
- Ø64-bit virtual memory objects
- ØALS to System z9 (+ higher)
- Øz/VSE z/VM IP Assist (VIA)

z/VSE V5.1.2 - 2Q2013

- Ø64-bit I/O for applications
- ØNetworking enhancements
- ØSecurity enhancements

+ SoD: CICS Explorer Update, DVD Install, Price Reduction IPv6/VSE

z/VSE V4.3 - 4Q2010

- Øz196 toleration / exploitation
- Ø4-digit device addresses
- Ø24-bit virtual storage constraint relief
- ØIPv6/VSE as optional product
- ØLinux Fast Path with z/VM

+ SoD: CICS Explorer, LFP in LPAR

+ SoD: 64-bit virtual support

z/VSE V5.1.2
Announced April-02-2013, available since June-14-2013

§ **Support innovative zEnterprise EC12/BC12 technology**
  – Configurable Crypto Express4S
  – OSA-Express4S 1000BASE-T
  – OSA-Express5S 1000BASE-T

§ **Support enhanced IBM System Storage options**
  – TS1140 tape drive (with encryption capabilities)
  – TS7700 Virtualization Engine Release 3.0 (includes disk-based encryption)
  – DS8870 (for use with both, ECKD and FCP-attached SCSI disks)
  – Storwize V7000 Release 6.4 (for use with FCP-attached SCSI disks)

§ **64-bit Input / Output processing for applications**
  – Enhances 64-bit virtual support by allowing to use 64-bit virtual storage also for I/O buffers
  – Benefits from increased processor storage of latest zEnterprise servers

§ **Extend z/VSE connectivity and networking options in heterogeneous environments**
  – z/VSE database connector connection pooling – performance improvement
  – Configurable HiperSockets buffers – for improved throughput to Linux on System z

§ **Provide IPv6/VSE security enhancements**
  – Secure Sockets Layer (SSL) support – secure transmission of data to and from remote systems
  – Exploits hardware-assisted encryption with System z cryptographic adapters and CPACF

z/VSE Statements of Direction (SODs)
Announced April-02-2013

§ IBM intends to add functionality that **allows initial installation of z/VSE without requiring a physical tape.**

- Clients who use a tape for initial installation only, may no longer be forced to include a tape in the z/VSE configuration.
- With this ease of use function IBM will fulfill client requirements.

§ IBM intends in the future to **enhance IBM CICS Explorer** for IBM CICS Transaction Server for VSE/ESA to provide updates to CICS resources.

§ It is planned to **reduce** the AEWLC and MWLC **list price of IPv6/VSE** V1.1.

Fulfilled as of July-01-2013
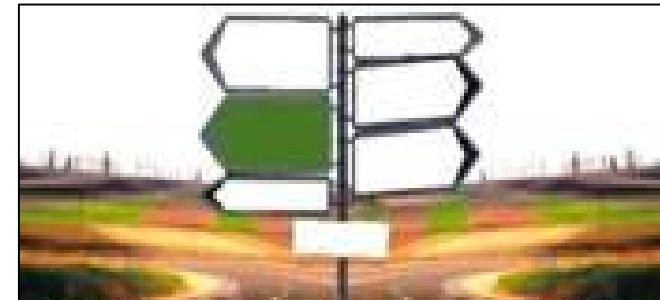
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IBM Worklight – System z Implementation Topology

z/VM

CICS

z/OS
z/VSE

Web Services

z/Linux (*)

Worklight Server

Server-side
Application Code

JSON Translation

Authentication

Adapter Library

Stats Aggregation

Client-side
App Resources

Direct Update

Mobile
Web Apps

Unified Push
Notifications

Device Runtime

Phone**Gap**

• Cross Platform Technology

Worklight

• Security and
  Authentication
• Back-end Data Integration
• Post-deployment control
  and Diagnostics

Application Code

(*) – no documented platform requirement nor any restriction

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§ **IBM zEnterprise BC12**

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⟹ § **System z Cloud Ecosystem**

§ **Software Pricing**

Hybrid Computing Model integrated and enabled for Cloud

Service Management Layer (provided by SmartCloud technologies)

openstack
CLOUD SOFTWARE

z/VM	zManager	kvm	Hyper-V	Power VC	FSM	VMware

Datawarehousing IDAA Solution   **zManager for z/OS® and zBX**   **Systems Director for Power System x and storage**   **FSM for Intel® and Power ITEs**   **3rd party Managers and Servers**

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What is OpenStack?

OpenStack is a global collaboration of developers and cloud computing technologists that seek to produce a ***ubiquitous Infrastructure as a Service (IaaS) open source cloud computing platform*** for public and private clouds. OpenStack was founded by Rackspace Hosting and NASA jointly in July 2010.

July 2010: OpenStack launches with code from NASA & Rackspace & support of 25 organizations

July 2011: 80 participating orgs, 1200 individual members

Feb 2011: IBM Joins OpenStack

Sep 2012: Independent OpenStack Foundation Launches w/ 21 Sponsors, 150+ participating orgs & 5600 individual members

2013 APR 4
Release: Grizzly
832,844 lines of code

2011 SEP 22
Release: Diablo
405,844 lines of code

2012 SEP 27
Release: Folsom
607,502 lines of code

2012 APR 5
Release: Essex
444,388 lines of code

Mar 2013: IBM announces it will base its Cloud software & services on an Open Cloud Architecture, centered around OpenStack

2011 APR 15
Release: Cactus
108,917 lines of code

2010 OCT 21
Release: Austin
44,096 lines of code

2011 FEB 3
Release: Bexar
76,570 lines of code

July 2010:
Austin Design Summit
42 orgs, 95 developers

Nov 2010:
Design Summit
62 orgs, 165 developers, 250 attendees

Apr 2011:
Design Summit
133 orgs, 217 developers, 500 attendees

openstack TODAY

50 Sponsors

9,511+ Individual Members

209+ Orgs

Platinum Sponsors

nebula rackspace AT&T redhat SUSE IBM hp at&t ubuntu

Gold Sponsors

NetApp CISCO YAHOO! Dreamhost intel DELL NEC MIRANTIS MORPH LABS vmware eNovance Piston cloudscaling

IBM invests significant Time & IP in OpenStack

OpenStack Compute
- Platform integration
- Provision and manage large networks of virtual machines
- High Availability enhancements
- Resource optimization
- Live upgrade contributions
- Enablement for IBM Power Systems™ and IBM System z®, DB2® ESXi support (w/VMware)
- VM group enablement in scheduler
- CPU allocation for vCPUs
- Cross hypervisor testing and validation

OpenStack Networking
- Support for key emerging networking standards
- Create petabytes of secure, reliable storage using standard hardware
- Quantum blueprints & migration from Nova
- FibreChannel support

OpenStack Storage
- Create petabytes of secure, reliable storage using standard hardware
- Block & object storage enablement for IBM capability
- Nova blueprints
- Cinder local storage & local instance clone
- Efficient clone image in Cinder SVC driver for cFlex
- Nova & Cinder storage blueprints
- Storwise/SVC driver update – support iSCSI CHAP auth
- Wsgi application interface enabling external web server
- Swift / Keystone interface for Keystone v3 API
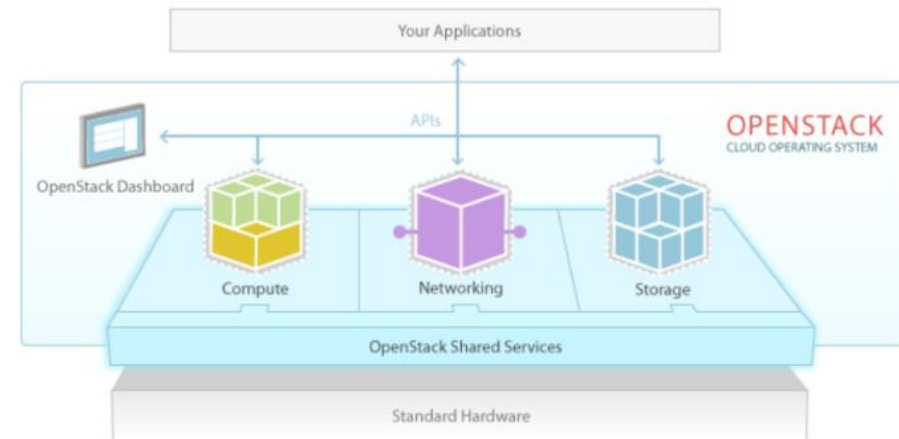
OpenStack Shared Services
- Libraries that provide image management, authentication & security across all OpenStack projects
- Security & authentication enhancements
- Image activation for OVF
- Guest level metric collection
- APIs: Enablement for key emerging standards
- Membership services enhancements
- Glance: multiple image locations

General OpenStack Contributions
- Globalization and crowd-sourced translation integration
- Drive IBM value-add capability from SCP
- Community facing contributions – bug fixing, community building & promotion
- QA enhancements

IBM

System z Cloud Ecosystem

	Integrate	Automate	Orchestrate

IBM Products & Offerings

§ zEnterprise: zEC12, z196, zBC12, z114

§ Linux on System z

§ Tivoli Provisioning Manager

§ Cloud Ready for Linux on System z

§ Tivoli Service Automation Manager

openstack

New

§ z/VM 6.3

§ SmartCloud Entry

§ SmartCloud Provisioning

§ SmartCloud Orchestrator

System z support currently in development

ISV Solutions

CSL-Wave
§ Provided by **CSL International**
§ Hypervisor Manager
§ Cross marketing agreement to market and promote product

Acquired by IBM in 2013

zPRO
§ Provided by **Velocity Software**
§ Add-on feature to Velocity's zVPS product that provides performance management
§ Provides golden image creation, cloning, and operational controls

APPLogic
§ Provided by **Computer Associates**
§ Manages both distributed and z/VM environments.

MOAB
§ Provided by **Adaptive Computing**
§ Provides a policy based cloud management based on xCAT

Open Source Options

xCAT
§ **Ex**treme **C**loud **A**dministration **T**ool
§ Now shipped in z/VM 6.3 and supported through IBM services offering (GTS)

OpenStack
§ Being enabled for z/VM 6.3
§ Being used as a code base for SCE / SCP / SCO

CSL-WAVE: Visualizes virtual and physical Resources
Computer Solutions Leaders International Web Administration VM Environment

CSL-WAVE provides the graphical interface that simplifies and helps to automate the management of z/VM and Linux on System z virtual servers.

§ Monitors and manages virtual servers and resources **from a single graphical interface**

§ Simplifies and automates **tasks**

§ Provisions virtual resources **(guests, network, storage)**

§ Supports advanced z/VM capabilities **such as Single System Image and Live Guest Relocation**

§ Allows delegation of administrative capabilities **to the appropriate teams**
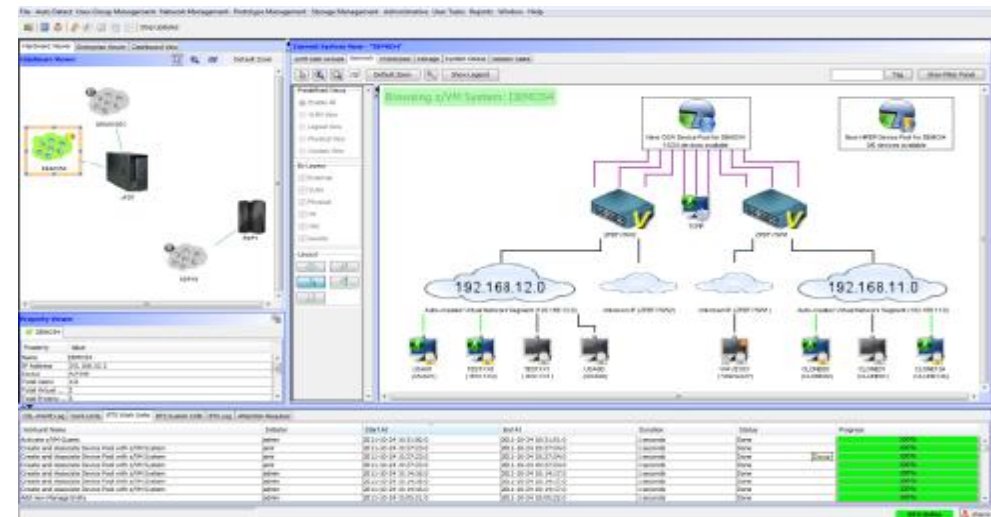
A simple, intuitive graphical tool providing management, provisioning, and automation for a z/VM environment, supporting Linux virtual servers.

Agenda

§ **IBM zEnterprise BC12**

§ **z/VM**
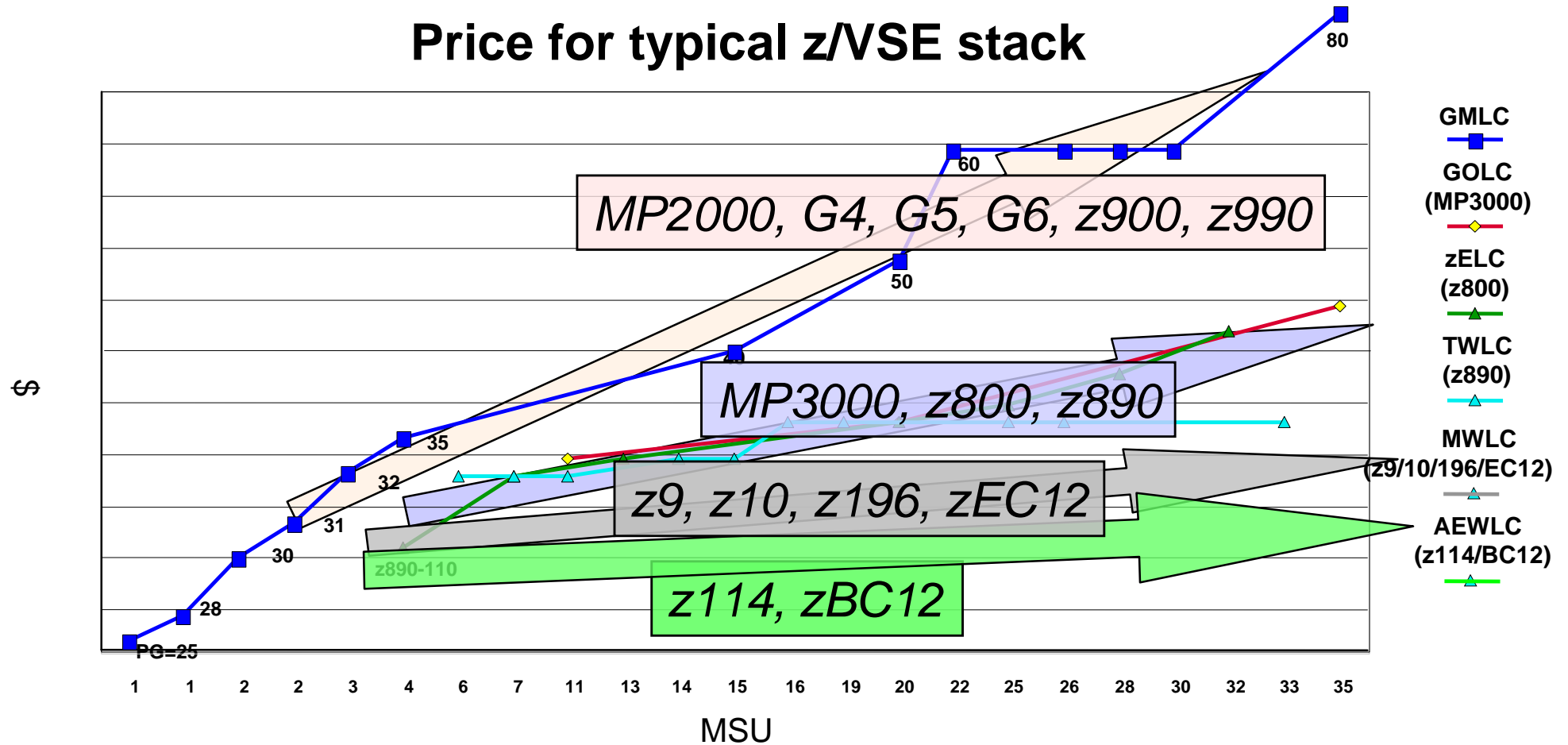
§ **Linux on System z**

§ **z/VSE**

§ **System z Cloud Ecosystem**

§ **Software Pricing**

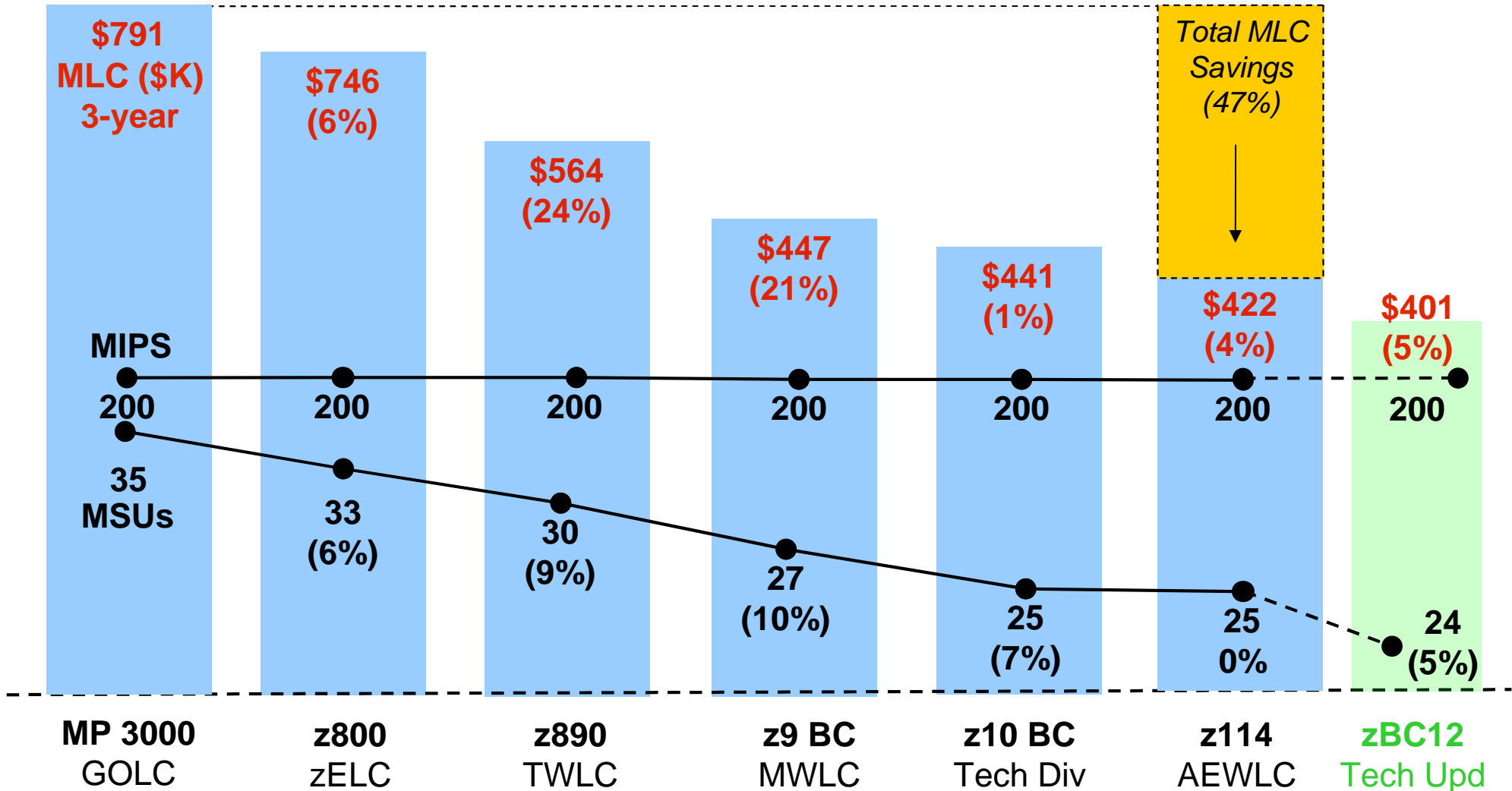# MWLC on z9/z10/z196 and zEC12, AEWLC on z114 and zBC12

Price for typical z/VSE stack

Typical z/VSE stack consists of z/VSE Operating System, LE, CICS TS, VTAM, TCP/IP, DB2

IBM

MLC Price Performance across HW Generations for z/VSE

* 200 MIPS example for a typical z/VSE stack

$791
MLC ($K)
3-year

$746
(6%)

$564
(24%)

$447
(21%)

$441
(1%)

Total MLC Savings (47%)

$422
(4%)

$401
(5%)

MIPS

| 200 | 200 | 200 | 200 | 200 | 200 | 200 |

35 MSUs

33 (6%)

30 (9%)

27 (10%)

25 (7%)

25 0%

24 (5%)

| MP 3000 GOLC | z800 zELC | z890 TWLC | z9 BC MWLC | z10 BC Tech Div | z114 AEWLC | zBC12 Tech Upd |

* MLC savings will vary significantly by customer - actual customer configuration must be priced out to be accurate.

* A typical z/VSE stack includes z/VSE CF, CICS TS, VTAM, TCP/IP, DB2, Ditto, Cobol, HLASM

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PVU Table – RISC + System z
Processor Value Units

PVU Website Link:
click here

http://ibm.com/software/lotus/
passportadvantage/pvu_licen
sing_for_customers.html

Notes:
1) Each Integrated Facility for Linux (IFL) or Central Processor (CP) engine is equivalent to 1 processor core.

2) Refers to System z9, eServer zSeries, or System/390 servers.

3) Entitlements required for Power Processor Element (PPE) cores only.

4) The PVU requirement for the POWER7/7+ processor technology is dependent on the maximum possible number of sockets on the server.

5) z196 refers to IBM zEnterprise 196, zEC12 refers to IBM zEnterprise EC12.

6) z114 refers to IBM zEnterprise 114

PVU Table per Core (section 1 of 2 - RISC and System z)

Processor Technologies												
	Processor Brand			Processor Type								
Processor Vendor	Processor Name	Server model numbers	Maximum number of sockets per server	Cores per socket						IFL Engine	Proc. Model Number	PVUs per Core
				(1)	(2)	(4)	(6)	(8)	(16)			
IBM	POWER7 [4]	770, 780, 795	> 4			■	■	■			All	120
		750, 755, 760, 775 PS704, p460	4			■	■	■			All	100
		PS700-703, 710-740, p260, p270, 7R1, 7R2, p24L	2			■	■	■			All	70
	POWER6	550, 560, 570, 575, 595	All	■							All	120
		520, JS12, JS22, JS23, JS43	All	■							All	80
	POWER5, POWER4	All	All	■							All	100
	POWER5 QCM	All	All		■						All	50
	zEC12, z196, System z10 [1,5]	All	All							■	All	120
	zBC12, z114, System z9, z990, S/390 [1,2,6]	All	All							■	All	100
	PowerPC 970	All	All	■							All	50
	PowerXCell[TM], Cell/B.E.[TM] 8i[3]	All	All	■							All	30

Benefit from the security, performance and scalability of both technologies and save 50% on Red Hat Enterprise Linux on IBM System z Business Class servers

§ Consolidate workloads and save on software license costs

§ Bring Data closer to the Application

§ Explore Big Data and Analytics under Linux on System z

§ Extra security with SELinux and platform independent Management with RHN Satellite

Rules:
- *Discount of 50% on MSRP*
- *Applicable for Business Class (BC) machines only*
- *New workloads* (Net New Customers)*
- *Limited to 28th February 2014*

For more information - contact Red Hat's local Alliance Manager or:

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*Not valid for renewals of regular Subscriptions   www.redhat.com/products/enterprise-linux/for-ibm-system-z/promotions/

z114

zBC12

50% OFF

SLES for System z Business Class Multi-IFL Promotion (USD)

NEW

Basic Subscription Pricing*	1 IFL	2-5 IFLs	6-11 IFLs	12+ IFLs
1 year	$6,000	$5,700	$5,600	$5,500
3 year	$16,200	$15,400	$15,100	$14,800
5 year	$24,000	$22,800	$22,400	$21,900

Basic Subscription:
includes Code Maintenance, such as patches, fixes and security updates.
Can be combined with IBM GTS services

Standard Subscription Pricing*	1 IFL	2-5 IFLs	6-11 IFLs	12+ IFLs
1 year	$7,500	$7,200	$7,000	$6,900
3 year	$20,300	$19,300	$18,900	$18,500
5 year	$30,000	$28,500	$27,900	$27,300

Standard Subscription:
includes Basic Subscription deliveries plus 12x5 Support services delivered by SUSE Technical Services

Priority Subscription Pricing*	1 IFL	2-5 IFLs	6-11 IFLs	12+ IFLs
1 year	$9,000	$8,600	$8,400	$8,200
3 year	$24,300	$23,100	$22,600	$22,200
5 year	$36,000	$34,200	$33,500	$32,800

Priority Subscription:
includes Basic Subscription deliveries plus 24x7 Support services delivered by SUSE Technical Services

* Per IFL. Get more details on subscription and support service levels here !

ATTENTION:
ı **Offer is restricted to new System z Business Class purchases only**
ı **Promotion Period: September 2013 (with availability of zBC12) through December 31st, 2014**
ı **Get a 50% discount compared to regular Multi-IFL pricing – plus volume discount!**

Thank You

News with z/VSE, z/VM and Linux on System z