Dr. Klaus Goebel
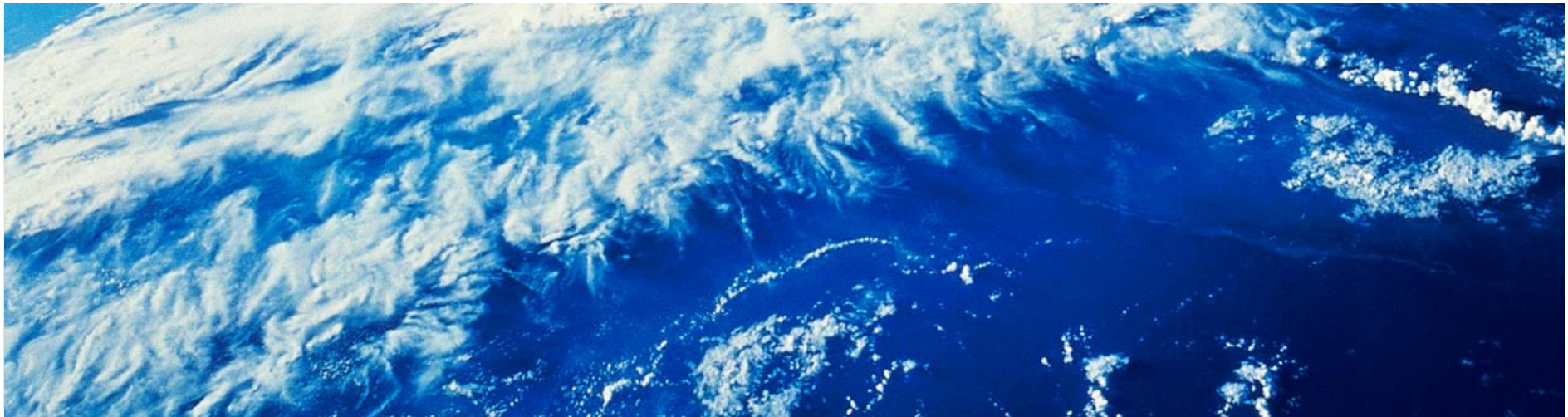
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Aktuelles zu z/VM, z/VSE und Linux on System z

Frühjahrstagung 2013, Leipzig, April 2013

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Agenda

§ **IBM System z Trends**

§ **Service & Support Status**

§ **Development Trends**

§ **New Announcements**

§ **OpenStack & Cloud**

§ **Learning, Reading, Miscellaneous**

zEnterprise EC12 is the Core of Next Generation System z

Up to 25% — **Performance improvement over z196 uniprocessor**[1]

Up to 50% — **Total capacity improvement over z196 M80**[1]

Up to 101 — **Configurable cores for client use**

60 subcapacity settings

Up to 3 TB RAIM memory

IFL, zIIP, zAAP, ICFs and optional SAPs

Environmental focus to improve data center efficiencies including new non raised floor option

Upgradeable from IBM zEnterprise 196 (z196) and System z10® Enterprise Class (z10 EC™)
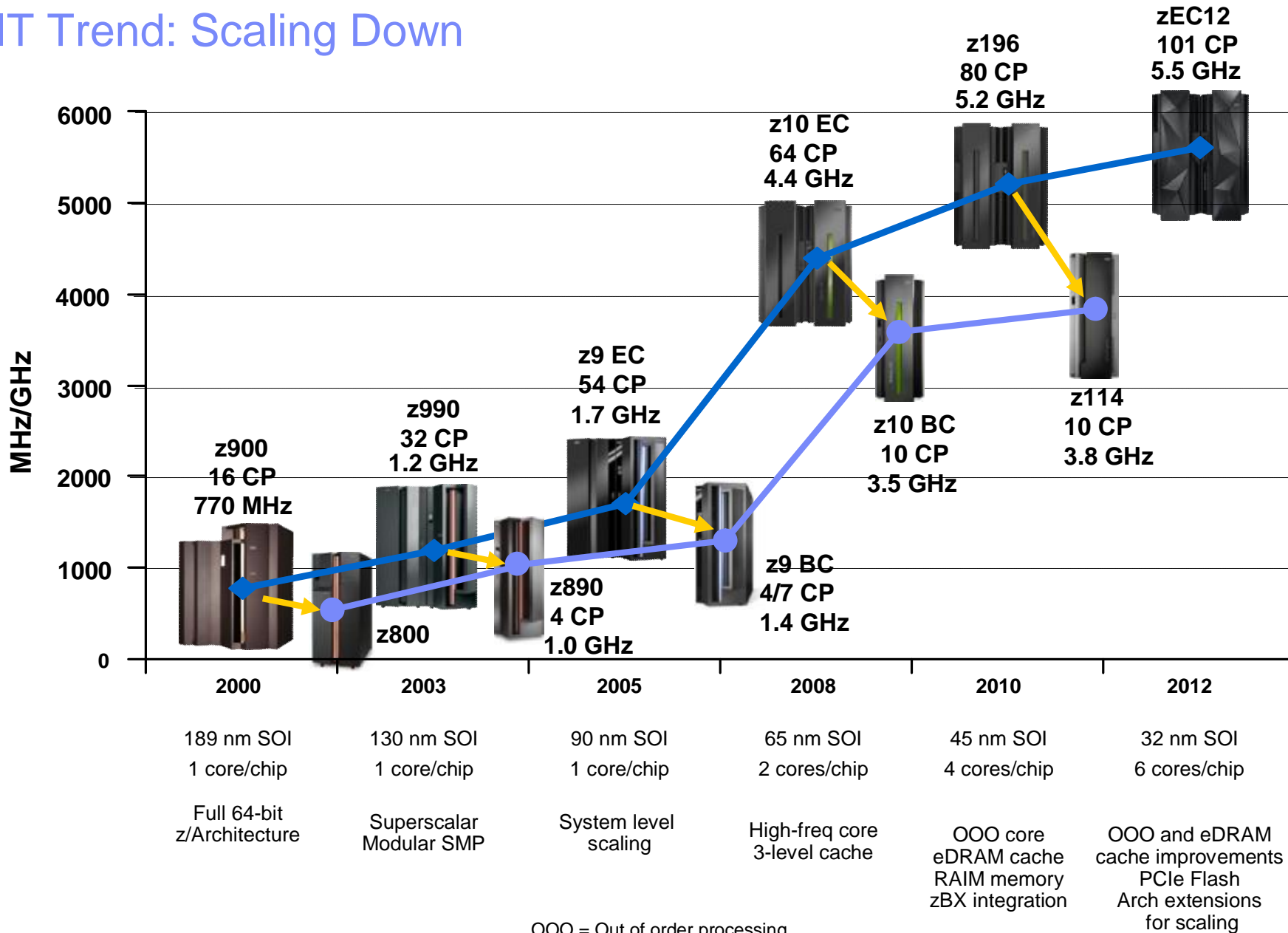
zEC12
Machine Type: 2827
Models: H20, H43, H66, H89, HA1

§ Advanced Technology 5.5 GHz processor chip for performance boost for all workloads

- Over ***78,000 MIPS*** for large scale consolidation
- ***Larger cache*** for data serving

§ Processor chip optimized for software performance

- Advanced performance functions exploited by ***Java, PL/I, compilers, DB2*** and more

§ Innovation to drive availability to superior levels

- ***IBM zAware*** with out-of-band analytics provide point in time snap-shot of the current state of your business and can help you improve availability
- ***FLASH Express and pageable large pages*** to drive availability and performance for critical workloads

§ Security and reliability are in our DNA

- High speed ***cryptography integrated as part of the chip***
- Enhanced support for applications requiring data encryption, cryptographic keys and digital signing with new ***Crypto Express4S***
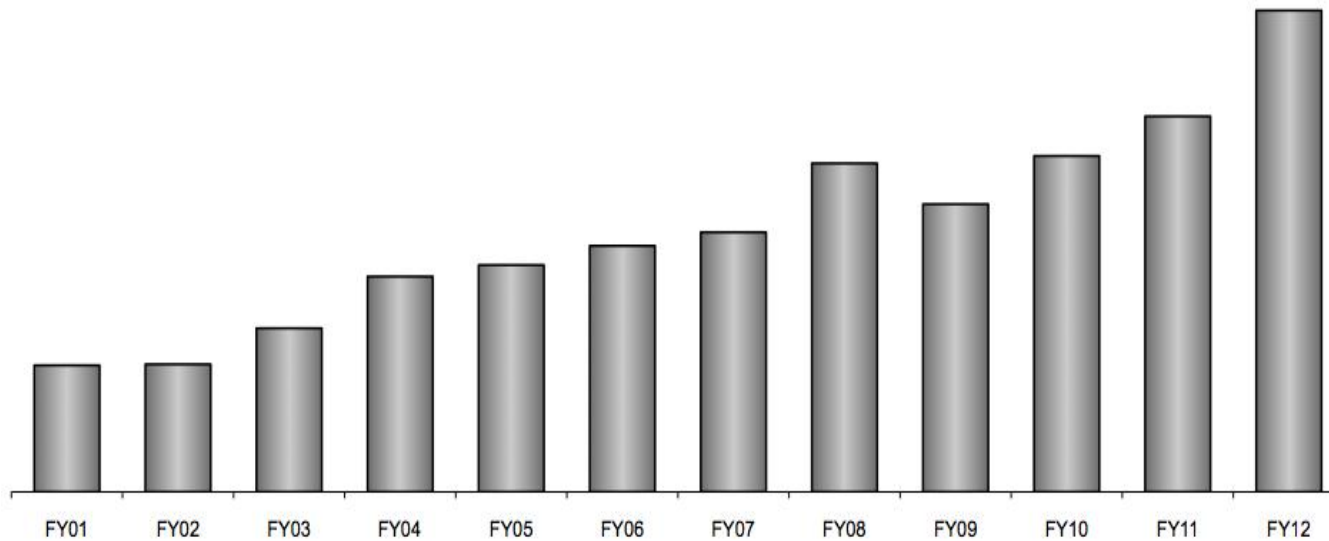- PR/SM designed for ***EAL5+ certification***

Based on preliminary internal measurements and projections. Official performance data will be available upon announce and can be obtained online at LSPR (Large Systems Performance Reference) website at: https://www-304.ibm.com/servers/resourcelink/lib03060.nsf/pages/lsprindex?OpenDocument . Actual performance results may vary by customer based on individual workload, configuration and software levels.

IT Trend: Scaling Down

zEC12
101 CP
5.5 GHz

z196
80 CP
5.2 GHz

z10 EC
64 CP
4.4 GHz

z9 EC
54 CP
1.7 GHz

z990
32 CP
1.2 GHz

z900
16 CP
770 MHz

z890
4 CP
1.0 GHz

z800

z9 BC
4/7 CP
1.4 GHz

z10 BC
10 CP
3.5 GHz

z114
10 CP
3.8 GHz

MHz/GHz axis: 0, 1000, 2000, 3000, 4000, 5000, 6000

2000	2003	2005	2008	2010	2012
189 nm SOI	130 nm SOI	90 nm SOI	65 nm SOI	45 nm SOI	32 nm SOI
1 core/chip	1 core/chip	1 core/chip	2 cores/chip	4 cores/chip	6 cores/chip
Full 64-bit z/Architecture	Superscalar Modular SMP	System level scaling	High-freq core 3-level cache	OOO core eDRAM cache RAIM memory zBX integration	OOO and eDRAM cache improvements PCIe Flash Arch extensions for scaling

OOO = Out of order processing

The Growing IBM zEnterprise System Ecosystem (as of 4Q12)

System z Total Installed Capacity

FY01 FY02 FY03 FY04 FY05 FY06 FY07 FY08 FY09 FY10 FY11 FY12

4Q12: 66% YtY. The highest shipped MIPS growth in history.

56%	**180+**	**220+**	**3/4+**	**1,000+**	**7,400+**
yty revenue growth in 4Q12, best absolute dollar amount since before 2000	new accounts since 3Q10 zEnterprise launch, with 1/3+ in growth markets	hybrid computing units shipped since 3Q10	of Top 100 enterprises have installed IFLs	schools in 67 countries are part of the IBM Academic Initiative for System z	ISV apps run on IBM System z; 90 new ISVs added in 2012

The Growing Linux on IBM System z (as of 4Q2012)

Installed Linux MIPS at 51% CAGR*

Installed Capacity Over Time

Total Installed Linux MIPS

2004 2005 2006 2007 2008 2009 2010 2011 2012

Installations at System z Clients

36%

64%

IFL installations

70%

30%
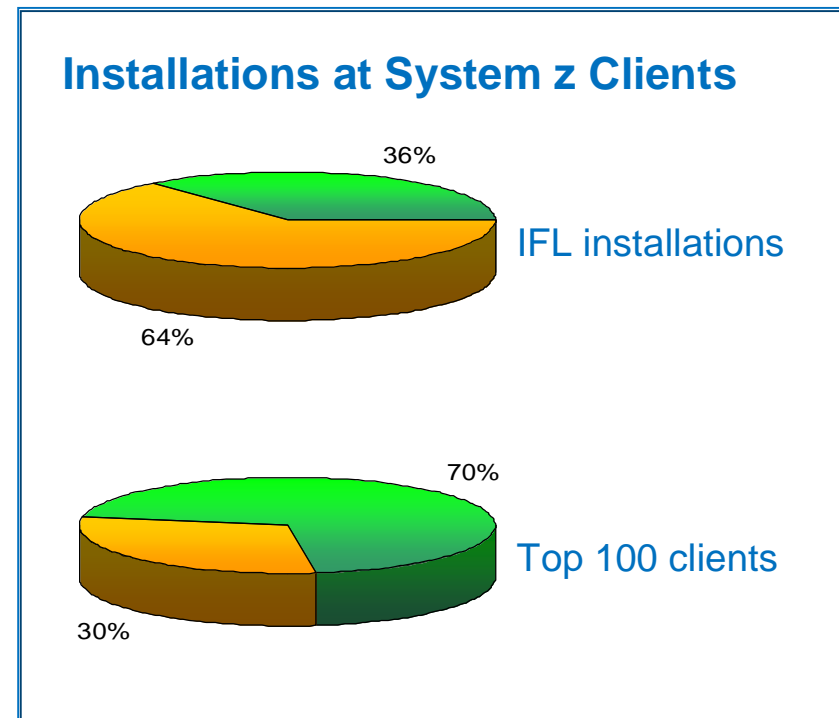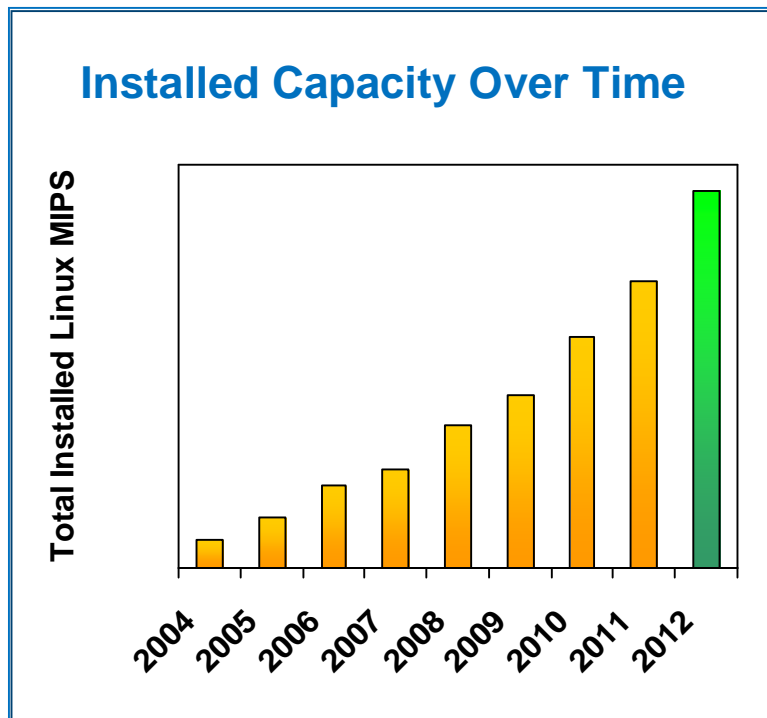
Top 100 clients

- 22,8% of total installed System z MIPS run Linux

- Installed IFL MIPS increased 32% from 4Q11 to 4Q12

- 36% of System z Clients have IFL's installed

- 70 of the Top 100 System z Clients are running Linux on System z*

*Top 100 is based on Total Installed MIPS

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➡ § **Service & Support Status**

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IBM

Linux on System z Distributions - Status as of April 2013

SUSE Linux Enterprise Server 9 (GA 08/2004)
 Kernel 2.6.5, GCC 3.3.3, Service Pack 4 (GA 12/2007),
 end of regular life cycle
SUSE Linux Enterprise Server 10 (GA 07/2006)
 Kernel 2.6.16, GCC 4.1.0, Service Pack 4 (GA 04/2011)
SUSE Linux Enterprise Server 11 (GA 03/2009)
 Kernel 3.0.13, GCC 4.3.4, Service Pack 2 (GA 02/2012)

Red Hat Enterprise Linux AS 4 (GA 02/2005)
 Kernel 2.6.9, GCC 3.4.3, Update 9 (GA 02/2011),
 end of regular lifecycle
Red Hat Enterprise Linux AS 5 (GA 03/2007)
 Kernel 2.6.18, GCC 4.1.0, Update 9 (GA 01/2013)
Red Hat Enterprise Linux AS 6 (GA 11/2010)
 Kernel 2.6.32, GCC 4.4.0, Update 4 (GA 02/2013)

Others
Debian, Slackware,
Support may be available by some third party

| 10 SP4 |
| 04/2011 |

| 11 SP2 |
| 02/2012 |

| 5.9 |
| 01/2013 |

| 6.4 |
| 02/2013 |

Enterprise Linux Distributions for System z

The listed distributions are 64-bit distributions; they all include the 31-bit emulation layer to run 31-bit software products.

Distribution	zEnterprise EC12	zEnterprise - z114 and z196	System z10	System z9	zSeries
RHEL 6	✔ (1)	✔	✔	✔	X
RHEL 5	✔ (2)	✔	✔	✔	✔
RHEL 4 (*)	X	✔ (5)	✔	✔	✔
SLES 11	✔ (3)	✔	✔	✔	X
SLES 10	✔ (4)	✔	✔	✔	✔
SLES 9 (*)	X	✔ (6)	✔	✔	✔

Latest information found at: ibm.com/systems/z/os/linux/resources/testedplatforms.html

(1) Recommended level: RHEL 6.3
(2) Recommended level: RHEL 5.8
(3) Recommended level: SLES 11 SP2
(4) Recommended level: SLES 10 SP4 with latest maintenance updates
(5) RHEL 4.8 only. Some functions have changed or are not available with the z196, e.g. the Dual-port OSA cards support to name one of several. Please check with your service provider regarding the end of service.
(6) SLES 9 SP4 with latest maintenance updates only. Some functions have changed or are not available with the z196, e.g. the Dual-port OSA cards support to name one of several. Please check with your service provider regarding the end of service.
X   Indicates that the distribution is not supported by IBM on this server.
(*) The distribution is out of service, extended support is required.

IBM

z/VM Release Status Summary (as of April 2013)

z/VM Level		GA	End of Service	End of Marketing	Minimum Processor Level	Security Level
Ver 6	Rel 3	3Q / 2013	TBA		z10	TBA
	Rel 2	12 / 2011	4 / 2015	3Q / 2013	z10	-
	Rel 1	10 / 2009	4 / 2013	12 / 2011	z10	EAL 4+[1] OSPP-LS
Ver 5	Rel 4	9 / 2008	12 / 2014[2]	3 / 2012	z800, z900	-
	Rel 3	6 / 2007	9 / 2010	9 / 2010	z800, z900	EAL 4+ CAPP/LSPP

[1] Currently in evaluation
[2] Or later (Announced August 7, 2012)

Marketed & Serviced

Serviced, but not Marketed

End of Service & Marketing

Extended support contracts are available.

z/VM Support for zEC12

- **Updates for z/VM 6.2, 6.1, and 5.4**
    - VM65007   CP
    - VM65131   IOCP
    - VM65046   Performance Toolkit
    - VM65047   HCD
    - VM64747   HCM (z196 support: 6.1 and 5.4 only)
    - VM65130   EREP
    - OA38418   OSA/SF for OSA-Express4S
    - PM49761   High Level Assembler (new instructions)

- **PSP Bucket**
    - Upgrade **2827DEVICE**
    - Subset **2827/ZVM**
    - Subset **2827/ZOS** for ICSF service to support EP11 when running as a guest

z/VSE Support Status (as of April 2013)

VSE Version and Release	Marketed	Supported	End of Support
z/VSE V5.1	a	a	tbd
z/VSE V4.3	r	a	05/31/2014
z/VSE V4.2 incl CICS/VSE V2.3, DL/I V1.11	r	r	10/31/2012
z/VSE V4.1 [2]	r	r	04/30/2011
z/VSE V3.1 [1]	r	r	07/31/2009
VSE/ESA V2.7	r	r	02/28/2007

(Diagonal watermark: Service Extension Contracts available on request)

[1] z/VSE V3 is 31-bit mode only. It does not implement z/Architecture, and specifically does not implement 64-bit mode capabilities. z/VSE is designed to exploit select features of IBM System z10, System z9, and zSeries hardware.

[2] z/VSE V4 is designed to exploit 64-bit real memory addressing, but will not support 64-bit virtual memory addressing

z/VSE Support for zEC12

§ **z/VSE Release Support**

- z/VSE supports the zEC12 with z/VSE V4.2, V4.3 and V5.1

    No PTFs are required to run z/VSE on zEC12

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

§ **Configurable Crypto Express4s – new with zEC12**

- z/VSE toleration PTF required to use Crypto Express4s

    Toleration PTF (DY47414) will be 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

§ **OSA-Express4s 1000BASE-T – new with zEC12**
- No z/VSE PTF required
- 1000BASE-T supported with existing z/VSE functionality

§ **SCRT – Subcapacity Pricing**
- z/VSE 4.2 requires DY47111 (same as for z196, z114)

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z/VSE continues to demonstrate IBM's Commitment

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

z/VSE V5.1+ - 2Q2012

Ø**CICS Explorer Monitoring**
Ø**Universal database connector**
Ø**Linux Fast Path in LPAR**

z/VSE V5.1 - 4Q2011

Ø**zEnterprise exploitation**
Ø**IEDN connection to zBX**
Ø**64-bit virtual memory objects**
Ø**ALS to System z9 (+ higher)**
Ø**z/VSE z/VM IP Assist (VIA)**

z/VSE V5.1++ - 2Q2013

Ø**64-bit I/O for applications**
Ø**Networking enhancements**
Ø**Security enhancements**

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

z/VSE V4.3 - 4Q2010

Ø**z196 toleration / exploitation**
Ø**4-digit device addresses**
Ø**24-bit virtual storage
constraint relief**
Ø**IPv6/VSE as optional product**
Ø**Linux Fast Path with z/VM**

+ SoD: CICS Explorer, LFP in LPAR

+ SoD: 64-bit virtual support

z/VSE 5.1+ and ++ denote enhancements
made available via PTF

z/VSE V5.1++ Additional Enhancements

§ **Support innovative zEnterprise EC12 technology**

- – Configurable Crypto Express4S
- – OSA-Express4S 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
- – IPv6/VSE: Layer-2 support for IPv4 links in addition to IPv6 links – more flexibility in mixed z/VSE, z/VM, Linux on System z configurations

§ **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

Announced April-2-2013, GA June-14-2013
§ Made available with PTFs on top of z/VSE V5.1
§ Selected HW support is also available with z/VSE V4.3

New Statements of Direction – Announced on April 2, 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.
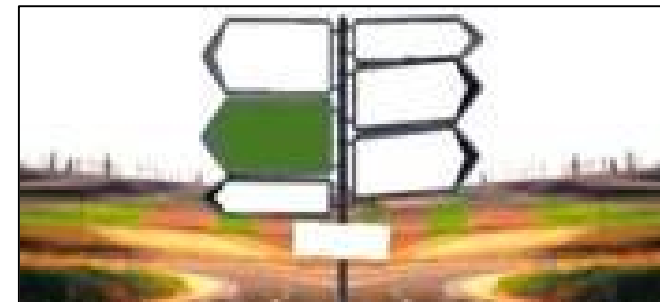
Note: IBM's statements regarding its plans, directions, and intent are subject to change or withdrawal without notice at IBM's sole discretion. Information regarding potential future products is intended to outline our general product direction and it should not be relied on in making a purchasing decision. The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code, or functionality. Information about potential future products may not be incorporated into any contract. The development, release, and timing of any future features or functionality described for our products remains at our sole discretion.

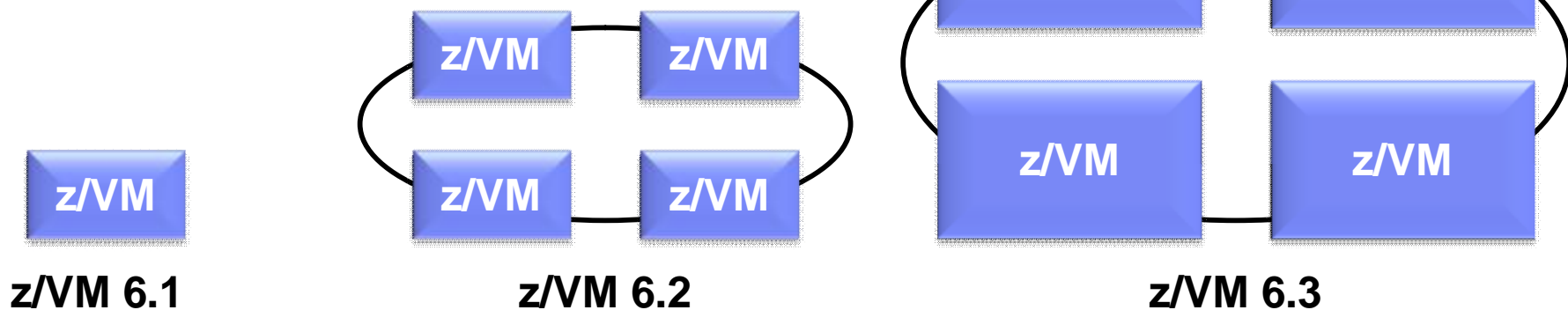# z/VM Version 6 Release 3 – Preview

Making Room to Grow Your Business

§ Preview announcement on February 5, 2013

§ Planned Availability: 3rd Quarter 2013

§ Major Enhancements for Scalability and Performance

– Support for larger amounts of real memory

– Increased processor efficiency

§ See http://www.vm.ibm.com/zvm630/

z/VM 6.1   **z/VM 6.2**   **z/VM 6.3**

z/VM V6.3 Preview – 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 Preview – 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
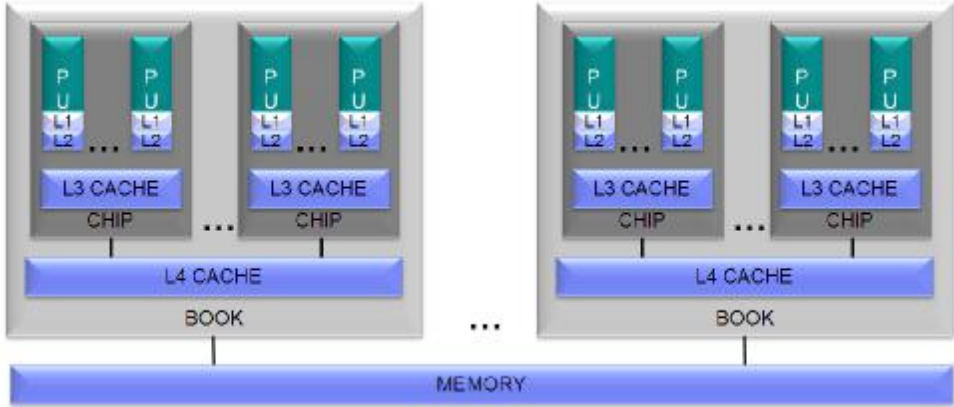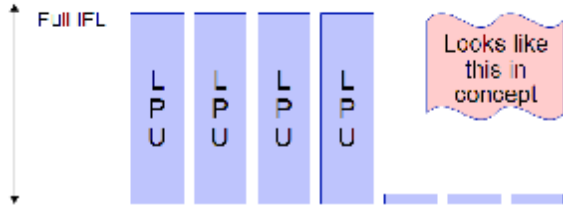
Horizontal:
- The logical processors are all created/treated equally.
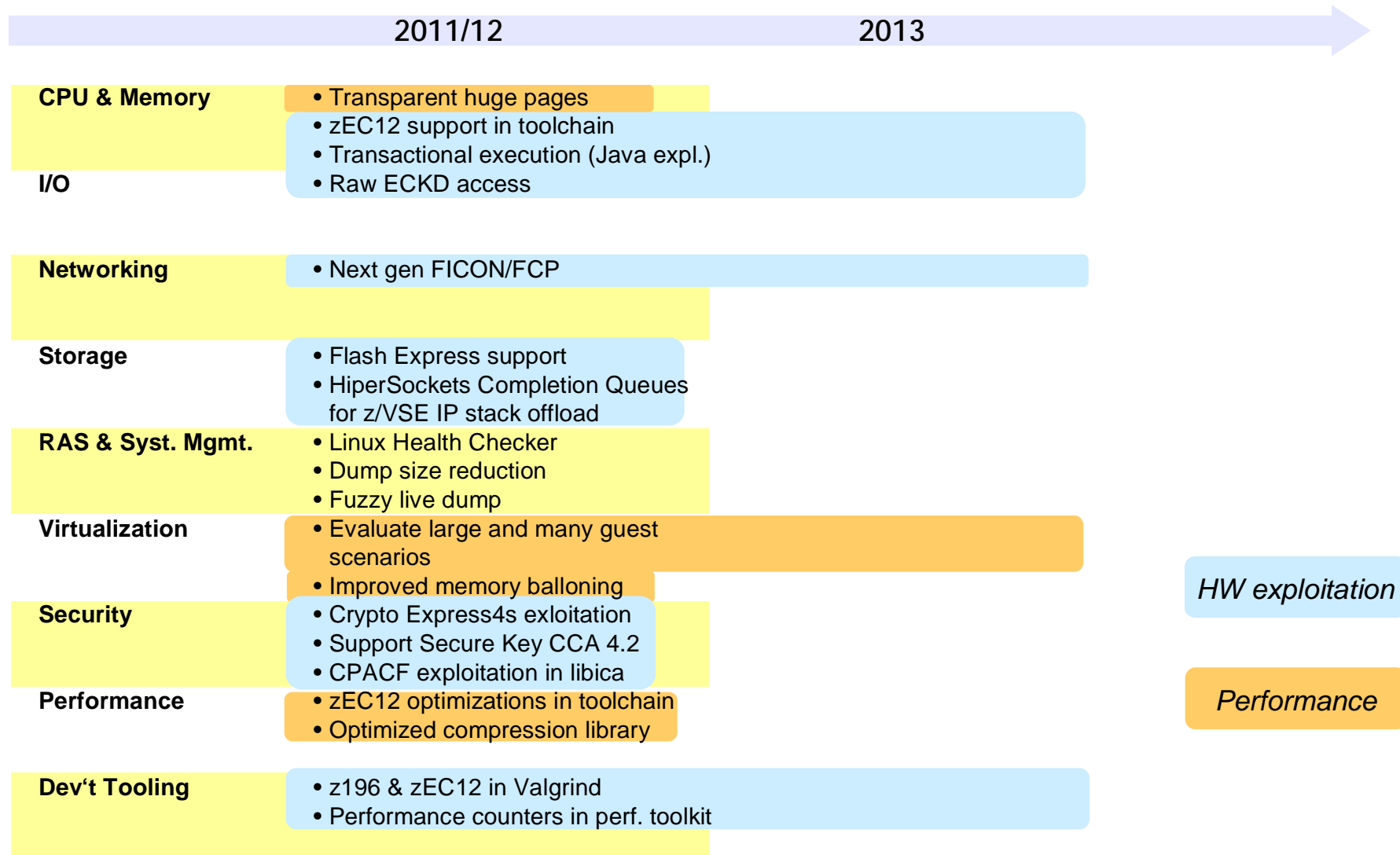- z/VM dispatches work evenly across the logical processors.
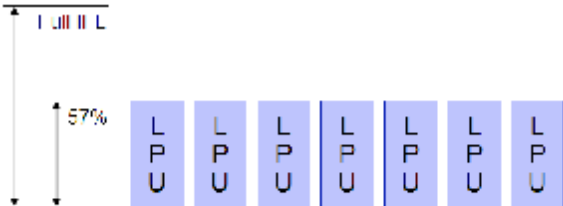
Vertical:
- The logical processors are skewed to where some get greater share of the weight.
- z/VM dispatches work accordingly to the heavier weighted workload.

News with z/VSE, z/VM and Linux on System z   © 2013 IBM Corporation

Linux on System z: Development Line Items 2011/12/13

2011/12 → 2013

CPU & Memory
- Transparent huge pages
- zEC12 support in toolchain
- Transactional execution (Java expl.)

I/O
- Raw ECKD access

Networking
- Next gen FICON/FCP

Storage
- Flash Express support
- HiperSockets Completion Queues for z/VSE IP stack offload

RAS & Syst. Mgmt.
- Linux Health Checker
- Dump size reduction
- Fuzzy live dump

Virtualization
- Evaluate large and many guest scenarios
- Improved memory balloning

Security
- Crypto Express4s exloitation
- Support Secure Key CCA 4.2
- CPACF exploitation in libica

Performance
- zEC12 optimizations in toolchain
- Optimized compression library

Dev't Tooling
- z196 & zEC12 in Valgrind
- Performance counters in perf. toolkit

HW exploitation

Performance

Linux on System z Features in SLES 11 SP3 – Tentative

11 SP3

xx/2013

- EC12 + zBX = IBM zEnterprise exploitation continued
  - z9,z10,z196,z114 support continued
  - zBX HX5 support
  - Update to Java 7 and supportive kernel enhancements
  - Cross memory attach APIs for middleware
  - GCC 4.7 for applications targeting EC12 processor

- Improved tools and z specific support
  - Enhanced DASD statistics for PAV & HPF
  - Disk mirroring with real-time enhancement for z
  - 2 stage & network dump storage sharing, plus compression
  - Thin provisioning support (LVM and reference links)
  - s390-tools update, terminal server appliance for z/VM

Source: Marcus Kraft, SUSE Product Mgr. All rights reserved. SUSE 2013

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zEnterprise Industry Solutions
***Announced on Feb-5-2013**

Smarter Planet® – Industry Solutions

Banking	Insurance	Government / Smarter Cities	Healthcare / Life Sciences	Retail
• IBM Financial Transaction Manager on zEnterprise	• IBM Smarter Analytics: Anti-Fraud, Waste and Abuse Solution for Insurance	• IBM zEnterprise Starter Edition for Cloud for Government	• IBM Smarter Analytics Signature Solution: Anti-Fraud, Waste and Abuse	• IBM zEnterprise Smarter Analytics for Retail**
• SAP Bank Analyzer on zEnterprise	• IBM Genelco Insurance Administration Solution	• IBM Intelligent Operations Center for Smarter Cities**	• IBM Health Plan Integration Hub	
• IBM Core Banking Solution on zEnterprise	• IBM zEnterprise Insurance Integration Hub	• IBM Smarter Infrastructure for Social Services - Curam on zEnterprise**		
• FSS Business Intelligence and Data Analytics Solution		• IBM Enterprise Asset Management (Maximo) for Government**		
• IBM Smarter Analytics Anti-Fraud Infrastructure for zEnterprise **				

System z Growth Solutions Community

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IBM MobileFirst – A new Brand in IBM

IBM MobileFirst will address the following concerns:

Fragmentation and developing for multiple mobile platforms

- Highly fragmented set of devices, platforms, languages, and tools complicates development, test, and operations

Delivering high quality apps

- Consumers demand a high quality user experience where quality is influenced as much by design as it is by function

Accelerated time to market requirements

- Higher frequency of new releases puts added pressure on teams to deliver on time and with high quality

Connecting apps with existing enterprise systems

- Apps typically need to leverage existing enterprise services, which must be made mobile-consumable
- Enterprise wireless networks are running out of bandwidth to accommodate employee devices
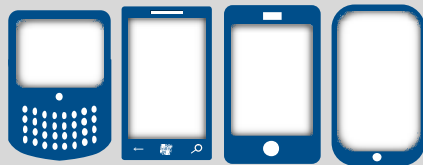
IBM Worklight Overview
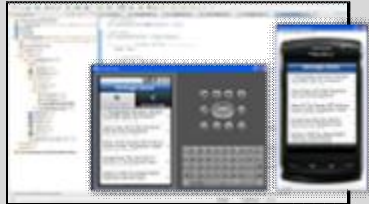
Worklight Studio Eclipse Based
The most complete, extensible development environment with maximum code reuse and per-device optimization

Worklight Server Java App
Mobile middleware offering unified push notifications, version management, security and integration
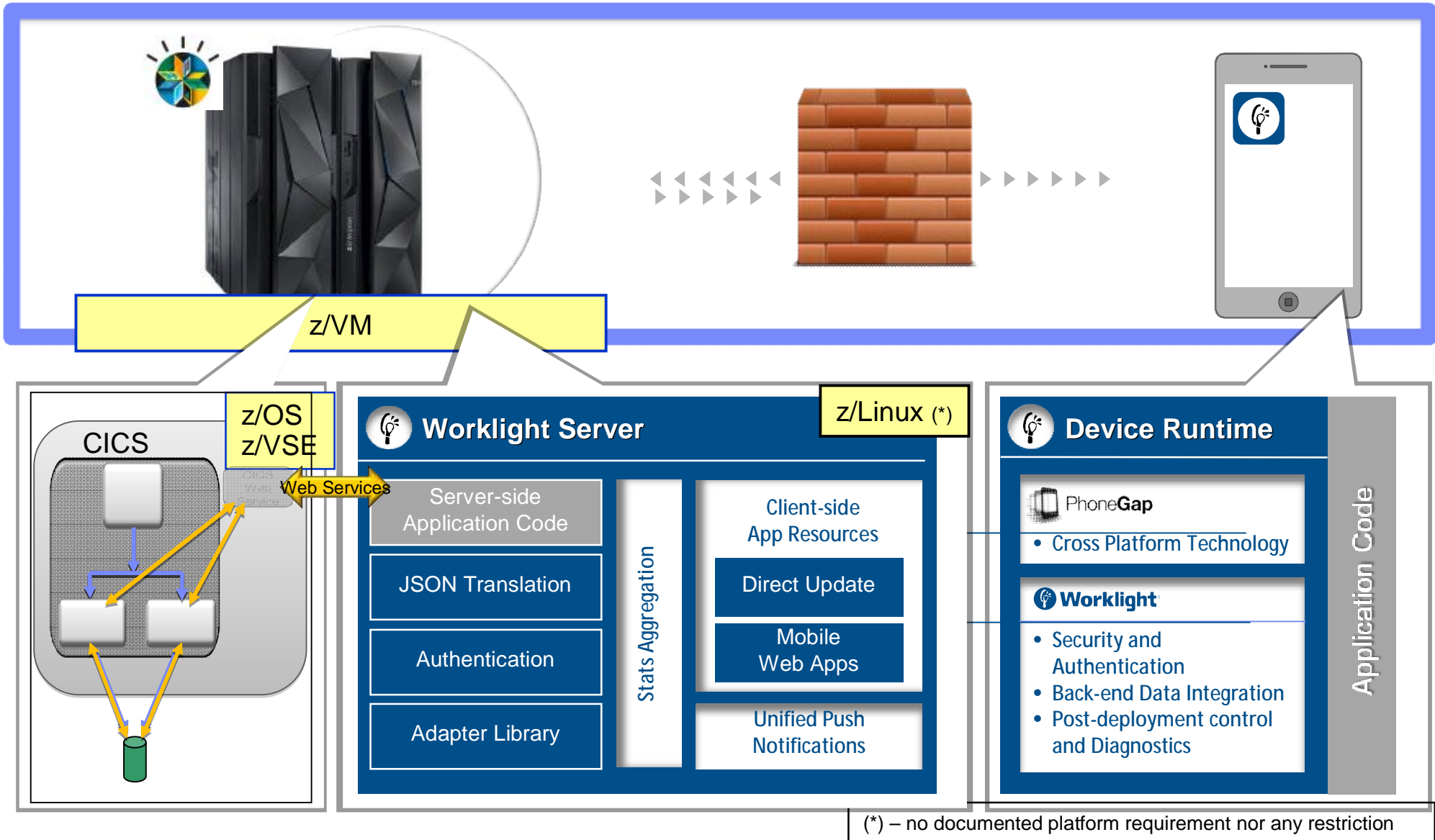

Worklight Runtime Components
Extensive libraries and client APIs that expose and interface with native device functionality and the Worklight Server

Worklight Console
A web-based console for real-time analytics and control of your mobile apps and infrastructure

IBM Worklight – System z Implementation Topology

z/VM

CICS

z/OS
z/VSE

Web Services

Worklight Server

z/Linux (*)

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

PhoneGap
• 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

Leveraging the successful z/VSE Strategy to build a Smarter Planet

Protect existing investments

Legacy applications and data on z/VSE

Key Capabilities

- 64-bit virtual addressing to reduce memory constraints through exploitation of data in memory
- Exploitation of selected zEnterprise functions and features as well as IBM System Storage options
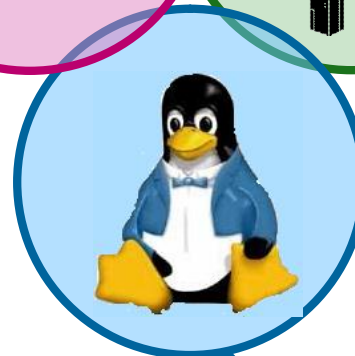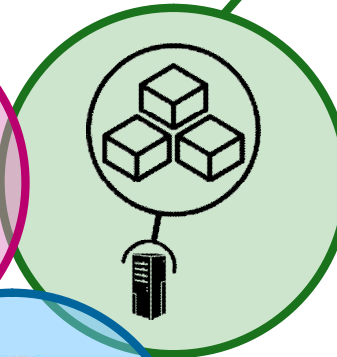
Integrate with other Systems

Connect to, and run backend System z applications

Build mobile applications

Key Capabilities

- z/VSE Connectors to Java capable clients, SOAP (Web Service), DRDA
- New DBCLI API for database connections
- Linux Fast Path

Extend for new workloads

Use the combination of Linux on System z and z/VSE

Key Capabilities

- Leverage Linux on System z for
  - Information on demand
  - IBM middleware
  - Infrastructure simplification

z/VSE Quick Reference App for Android – Available as Beta now!

ftp://public.dhe.ibm.com/eserver/zseries/zos/vse/download/zVSEQuickReferenceBeta.apk

Oracle DB 11gR2 now certified for RHEL 6.2 on Linux on System z

Flash

IBM Oracle International Competency Center (ICC)

February 18, 2013   email address: **ibmoracle@us.ibm.com**

_Red Hat® Enterprise Linux® available on IBM® System z® running with Oracle®
Database 11g Release 2!_

IBM is pleased to advise customers that Oracle has certified its 11g Release 2 database with Red Hat Enterprise Linux version 6.2. This certification was completed through the excellent IBM and Oracle technical collaboration.

On February 6, 2013, Oracle announced the availability of the Oracle Database 11g Release 2 with Red Hat Enterprise Linux version 6.2 on the IBM System z platform. Customers who have been testing Oracle Database 11g Release 2 on this version may now proceed to production with confidence that Oracle will fully support running on this new version. Information on the certification is available on Oracle's website "My Oracle Support" (see section "For additional information", below).

The certified release of the Oracle Database 11g Release 2 is 11.2.0.3.0 or higher. It is required to use Red Hat Enterprise Linux version 6 Update 2 or later as a minimum version, as issues have been identified with kernels before version 2.6.32-220.

http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/FLASH10797

IBM

SAP R/3 on IBM zEnterprise – Consolidation SAP in a Box

z196 / z114 / EC12

zBX

High Speed Private Network

HiperSockets

SAP Central Services

Coupling Facility

DB2 Data Sharing

SAP App Server

SAP App Server

SAP App Server

SAP App Server

SAP App Server

CF Links

zLinux

AIX

Windows

xLinux

z/OS USS

CF Microcode

z/OS

zLinux

z/VM

PowerVM

INxHY (KVM)

INxHY (KVM)

Shared Everything Infrastructure (CPU, Memory, Network, Adapters, Crypto, Devices)

zE-Managed Infrastructure (HW, Hypervisors, Virtual Servers)

Management Network

HMC (zManager)

Source: Dr. Bernd Kohler, SAP Dev Mgr. All rights reserved. 2013 SAP AG

SAP on IBM zEnterprise – Extensions

All SAP applications & components supported on zBX (except BWA, HANA & MDM)

Data Center Network

z196 / z114 / EC12

High Speed Private Network

HiperSockets

SAP Central Services

Coupling Facility

DB2 Data Sharing

SAP App Server

SAP App Server

CF Links

| zIOS USS | CF Microcode | zIOS | zLinux | z/VM |

Shared Everything Infrastructure (CPU, Memory, Network, Adapters, Crypto, Devices)

Management Network

HMC (zManager)

zBX

SAP App Server	SAP App Server	SAP App Server
AIX	Windows	xLinux
PowerVM	lNxHY (KVM)	lNxHY (KVM)

zE-Managed Infrastructure (HW, Hypervisors, Virtual Servers)

zLinux

IDAA

SAP App Servers

AIX Windows xLinux

PureFlex System managed

SAP Appliances

BWA HANA MDM

Continuous Availability à Parallel Sysplex, Coupling Facility, Failover, GDPS

Security à EAL5 certified, All z-managed, Trusted Context

Scalability à 2500+ DB Threads/Member, zBX/zEnterprise HW

Robustness à System z HA Capabilities, Tivoli SA, Disaster/Recovery

Performance à Fastest CP on market, HiperSockets, IBM DB2 Analytics Accelerator (IDAA)

TCO à Specialty engines (zIIP, ICF, IFL), Solution Edition

Source: Dr. Bernd Kohler, SAP Dev Mgr. All rights reserved. 2013 SAP AG

IBM

HANA CLI & DBSL on Linux on System z

SAP HANA DB will evolve into SAP's primary Business Intelligence database
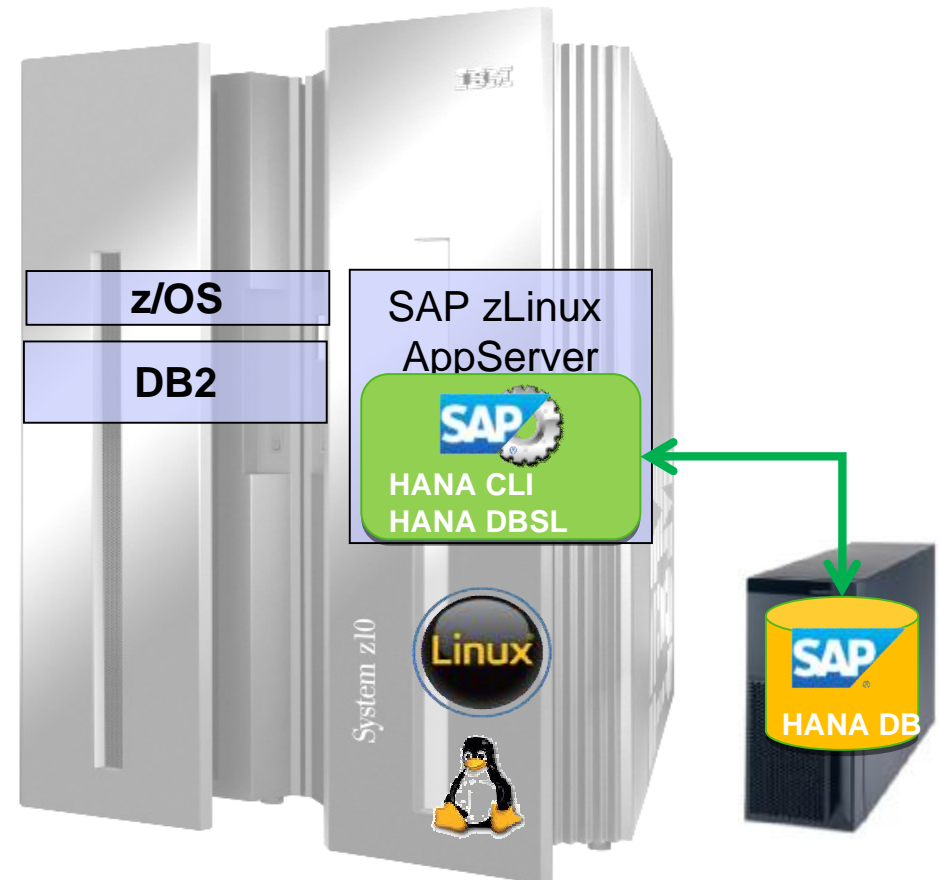
à *SAP BW powered by HANA*

SAP Applications exploiting HANA DB need

• HANA database client interface (CLI)
• HANA database abstraction layer (DBSL)

Typical use cases are

• SAP DB data replication to HANA
• SAP BW powered by HANA,
  where SAP BW AppServer runs on zLinux [*]

Available!

z/OS
DB2

SAP zLinux
AppServer

SAP
HANA CLI
HANA DBSL

Linux

System zI0

SAP
HANA DB

[*] Note: HANA CLI & DBSL also available for SAP BW AppServers on AIX, xLinux, Windows

Source: Dr. Bernd Kohler, SAP Dev Mgr. All rights reserved. 2013 SAP AG

z/VM 6.2 Live Guest Relocation
Example: Relocate SAP App.Server non-disruptively

Scenario

SAP Application Server (CI) running on zLinux (virtualized under z/VM 6.2)

SAP Application Server (DI) running on AIX (just an example, could as well run under zLinux, too)

z/VM 6.2 SSI cluster spans 2 physical machines: z196, z10

LGR triggered from
z196 à z10 and z10 à z196
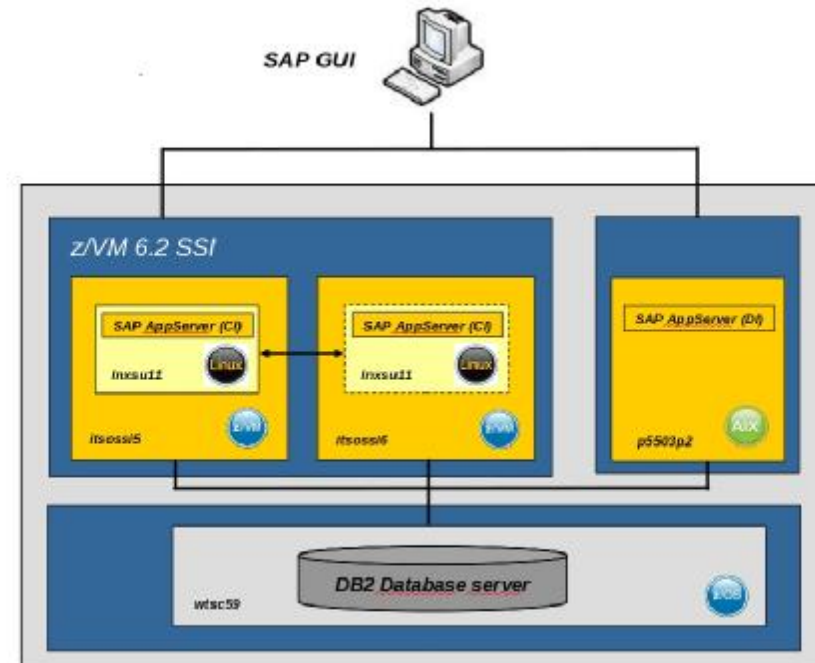
Relocation performed without disruption of running SAP System

Idle System: 9 seconds (Quiesce time just 2 seconds)

System running SGEN: 40 seconds (Quiesce time just 2 seconds)

Agenda

§ **IBM System z Trends**

§ **Service & Support Status**

§ **Development Trends**

§ **New Announcements**

§ **OpenStack & Cloud**

§ **Learning, Reading, Miscellaneous**

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. As of Jan 2013: 160 companies and close to 6,600 developers (April 2012: 2,600+).

http://openstack.org/
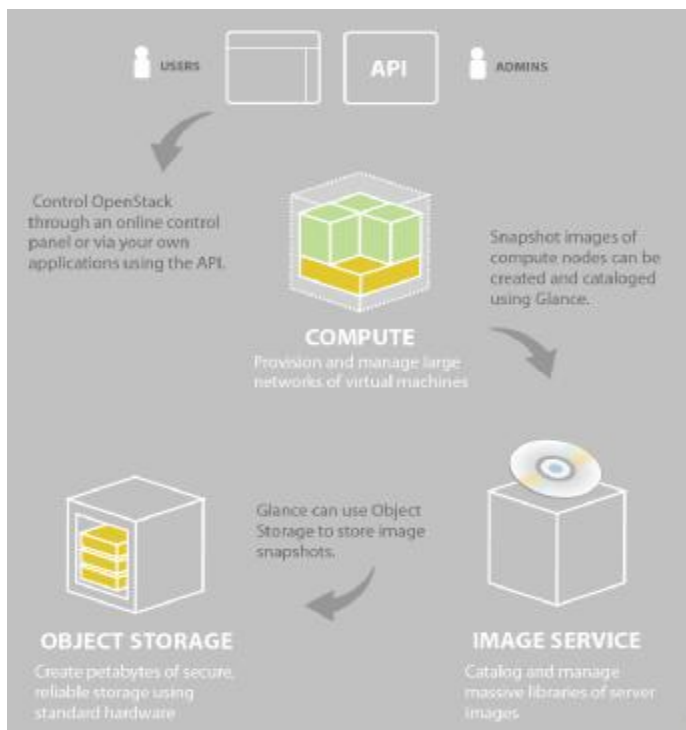
§ **OpenStack Compute (core)**
Provision and manage large networks of virtual machines

§ **OpenStack Object Store (core)**
Create petabytes of secure, reliable storage using standard hardware

§ **OpenStack Image Service (core)**
Catalog and manage massive libraries of server images
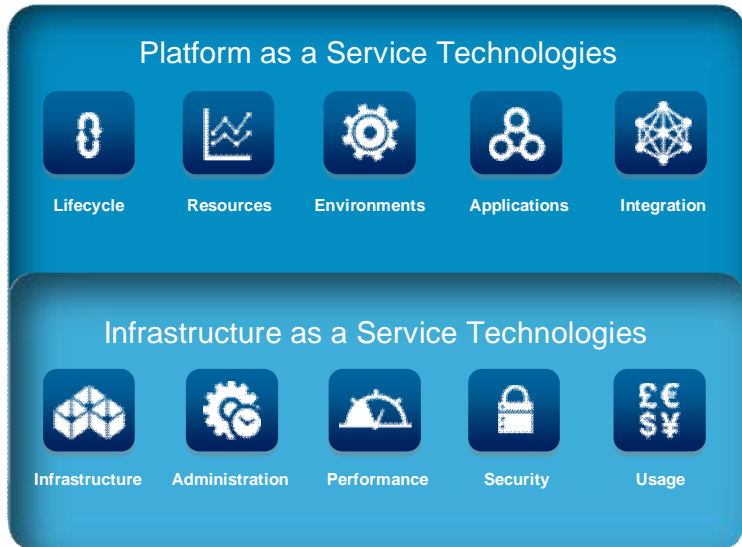
§ **OpenStack Identity (core)**
Unified authentication across all OpenStack projects and integrates with existing authentication systems.

§ **OpenStack Dashboard (core)**
Enables administrators and users to access & provision cloud-based resources through a self-service portal.

Code available under Apache 2.0 license

IBMSmartCloud Foundation

Platform as a Service Technologies

Lifecycle	Resources	Environments	Applications	Integration

Infrastructure as a Service Technologies

Infrastructure	Administration	Performance	Security	Usage

LinkedData, OSLC TOSCA

OpenStack Open Source Reference

Cloud Standards Customer Council (CSCC)

Cloud Computing Reference Architecture (CCRA)

IBM's Ecosystem approach to standards

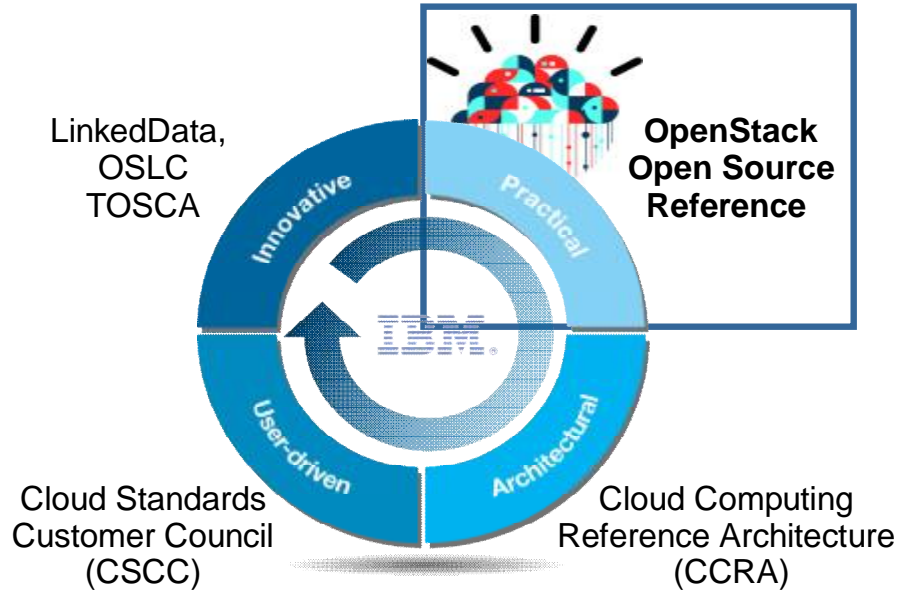## IBM joins the new OpenStack Foundation as Platinum Sponsor

New!

openstack™

Objectives

Contribute to open source projects and provide resources to help shape and promote the organization

Continues IBM strategy to **leverage standards** (LinkedData, CCRA, TOSCA, etc.) that accelerate clients' success with cloud
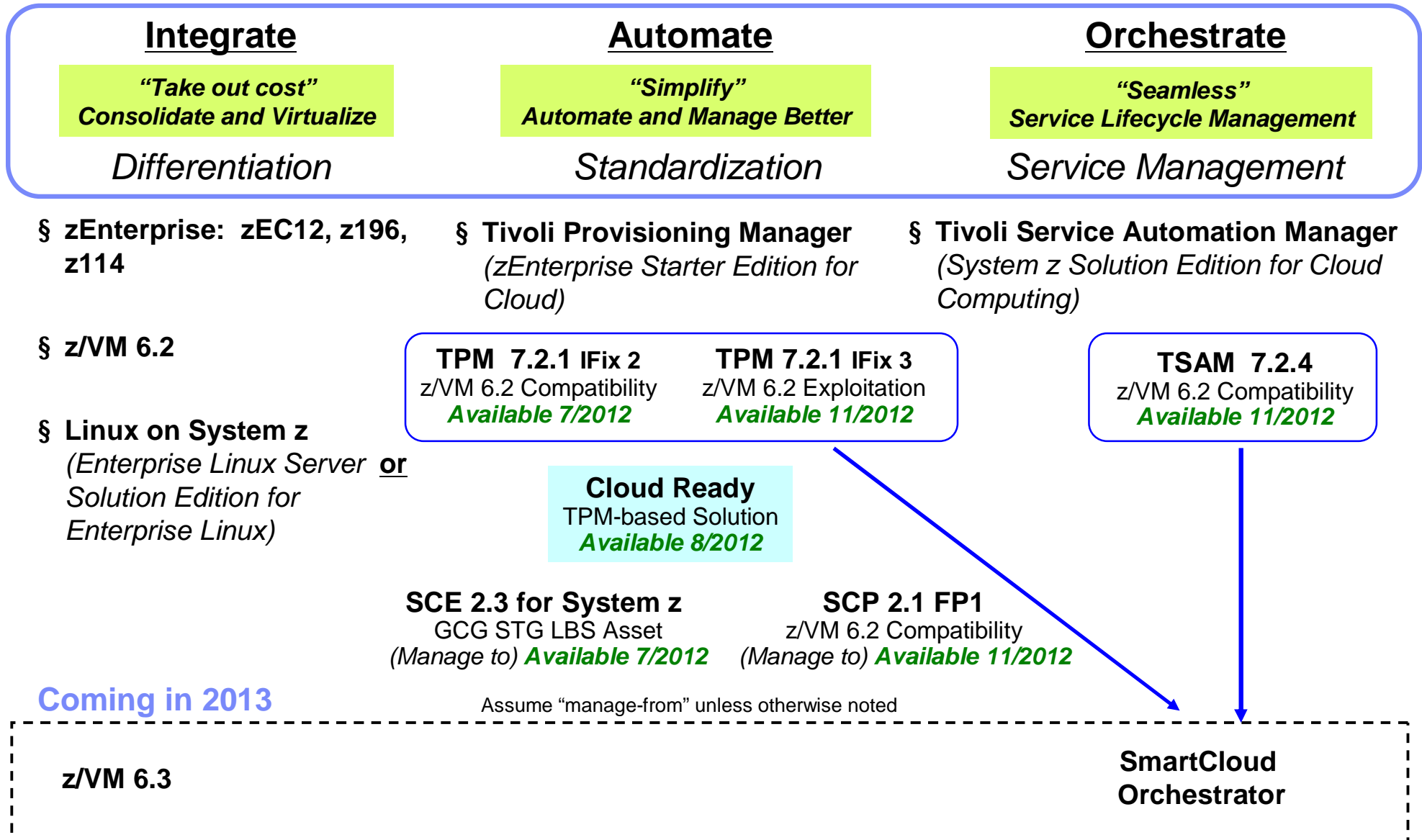
Focus the industry around an ubiquitous Infrastructure as a Service (IaaS) **open source cloud computing platform** for public and private clouds

Develop and sustain a **vibrant, innovative ecosystem** and become a platform of choice to build upon

IBM

System z Cloud Portfolio - Linux on System z

Integrate	**Automate**	**Orchestrate**
"Take out cost" *Consolidate and Virtualize*	*"Simplify"* *Automate and Manage Better*	*"Seamless"* *Service Lifecycle Management*
Differentiation	*Standardization*	*Service Management*

§ **zEnterprise: zEC12, z196, z114**

§ **z/VM 6.2**

§ **Linux on System z** *(Enterprise Linux Server* **or** *Solution Edition for Enterprise Linux)*

§ **Tivoli Provisioning Manager** *(zEnterprise Starter Edition for Cloud)*

TPM 7.2.1 IFix 2
z/VM 6.2 Compatibility
Available 7/2012

TPM 7.2.1 IFix 3
z/VM 6.2 Exploitation
Available 11/2012

Cloud Ready
TPM-based Solution
Available 8/2012

SCE 2.3 for System z
GCG STG LBS Asset
(Manage to) *Available 7/2012*

SCP 2.1 FP1
z/VM 6.2 Compatibility
(Manage to) *Available 11/2012*

§ **Tivoli Service Automation Manager** *(System z Solution Edition for Cloud Computing)*

TSAM 7.2.4
z/VM 6.2 Compatibility
Available 11/2012

Coming in 2013   Assume "manage-from" unless otherwise noted

z/VM 6.3

SmartCloud Orchestrator

Cloud Ready Offering supports quick and easy Provisioning of Images and Applications today

- Automated provisioning from simple VMs to clustered infrastructure applications

- Automated and integrated server lifecycle management for physical and virtual machines across platforms and hypervisors

- Pre-built automation that can be leveraged by customers existing tools

Benefits:

- Client turnaround time reduced per service request from 2 months down to 4 hours

- Build simple to complex VMs consistently and fast in an automated fashion

- Ensures standardized VM rollout at large volumes according to enterprises' best practices - 7 days a week, 24 hours a day, highly available and meeting the highest security standards

Solution Contains:

- Tivoli Provisioning Manager

- Tivoli System Automation for Multiplatform

- Tivoli Storage Manager
- SmartCloud Control Desk
- Tivoli Monitoring (Omegamon for z/VM & Linux)

Includes services

Cloud Test Drive with Linux on System z

- Up to 90 days, free of charge, access to up to 3 Linux on z servers under z/VM

- Hands-on experience with Cloud, Linux on z, z/VM, Tivoli Provisioning Manager (TPM), and a selection of 5 system images based on SUSE or Red Hat

    1. SLES 11 SP1 Base
    2. RHEL 5.8 Base
    3. SLES 11 SP1, DB2 9.7 Fixpack 5, WAS 8.5, IBM HTTP Server 8.5
    4. RHEL 5.8, DB2 9.7 Fixpack 5, WAS 8.5, IBM HTTP Server 8.5
    5. SLES 11 SP1, Oracle 11gR3, WAS 8.5, IBM HTTP Server 8.5

- Simple remote access over the internet to zEnterprise in the IBM Washington System Center in Gaithersburg, Maryland

- Customize your own Linux cloud with your own secure data

- Guided exercises for training

IBM Linux on System z
Cloud Test Drive
System Access and Learning Guide

Advanced Technical Skills – Washington Systems Center

IBM Sales and Distribution / Americas

Don Bagwell, Mitch Green, Barry Silliman,
Valerie Spencer, Doug Yellick

Version 1.3   September 12, 2012

http://techsales5.austin.ibm.com/tsna/techxpress.nsf/request.html

Agenda

§ **IBM System z Trends**

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z/VSE Live Virtual Classes (Webcasts)

§ **April 2013**
– Important Update on z/VSE Enhancements

§ **March 2013**
– z/VSE Release Migration Considerations - Part 2

§ **February 2013**
– z/VSE Release Migration Considerations - Part 1

§ **December 2012**
– System z Hardware Exploitation in z/VSE

§ **October 2012**
– VSE/POWER – all the News since z/VSE 4.2

§ **September 2012**
– Securing Data Transfers using IPv6/VSE

§ **July 2012**
– The New z/VSE Database Connector (DBCLI)

§ **May 2012**
– IPv6 in z/VSE

§ **March 2012**
– Monitoring Principles and z/VSE Monitoring Options

Replays available!
Dates and replays @
  http://www.ibm.com/zvse/education/

z/VM and Linux on System z Live Virtual Classes (Webcasts)

§ **April 2013**
  – zFCP Performance Analysis
§ **March 2013**
  – Live Demo – z/VM Live Guest Relocation
§ **February 2013**
  – z/VM 6.2 Performance Update
§ **January 2013**
  – Running Linux-HA on a IBM System z
§ **December 2012**
  – Kdump on System z
§ **October 2012**
  – Live Demo: Linux on z Debugging with Valgrind
§ **September 2012**
  – Linux on z Performance Update SLES11 SP2
§ **August 2012**
  – z/VM Live Guest Relocation – Planning and Use
§ **July 2012**
  – z/VM 6.2 Single System Image and Live Guest Relocation Overview
§ **June 2012**
  – Installation Methods for Linux on z without Repository Server
§ **May 2012**
  – Introducing the Linux Health Checker
§ **April 2012**
  – Linux on System z Current & Future Technology
§ **March 2012**
  – Optimizing Resource Utilization for Linux under z/VM – Part 2
§ **February 2012**
  – Memory Sizing for WebSphere Applications on System z Linux

Replays available!
Dates and replays @
   http://www.vm.ibm.com/education/lvc/

New Case Study on Linux on System z (March 2013)

Large Bank in Japan increases re-utilization rate by 18 percent

Bank of Tokyo-Mitsubishi UFJ builds a SOA with WebSphere Message Broker and Linux on System z

Overview

The need

The bank needed to satisfy customer demand for access to financial services any time, anywhere, through any device, and it sought to launch these new services using only its existing IT assets.

The solution

As a platform for SOA development, the bank adopted IBM® WebSphere® Message Broker, with its MQ-based, high-throughput messaging backbone which has a successful track record in the financial sector.

The benefit

With the SOA platform leveraging WebSphere Message Broker the bank has accelerated its ability to build services in response to business issues and has a service re-utilization rate increase of 18 percent.

The Bank of Tokyo-Mitsubishi UFJ (BTMU) is Japan's largest bank in terms of assets, with 40 million personal bank accounts and 500,000 corporate clients. The company delivers financial services in over 40 countries.

Quick launch of new financial services by leveraging existing IT assets

In today's banking environment financial institutions compete on the ability to quickly launch products and services and deliver them through new channels. Banking customers want freedom to execute a full range of transactions anywhere, anytime, and on any device.

As BTMU developed a Service Oriented Architecture (SOA) platform to realize this "cloud-banking" concept it found that long-term effective use of existing business systems and information was essential.

Flexible and scalable SOA

Within two years of beginning its SOA deployment, BTMU expanded its use to all branch offices. "While low-costs and short lead times were the most obvious requirements as we deployed, our biggest priority was to ensure zero impact on existing systems," recalls Mr. Motoyasu Mariko, Systems Infrastructure No.1, Systems Division.

http://public.dhe.ibm.com/common/ssi/ecm/en/zsc03154usen/ZSC03154USEN.PDF

New Articles on z/VM and Linux on System z (March 2013)

Using Crypto Hardware With Java in Linux on System z

by Reinhard Buendgen & Peter Spera in Enterprise Tech Journal

4 PAGES **1** 2 3 4

Cryptography can take many forms. It can be used to protect data in flight or data at rest, to authenticate a user, or provide a digital signature for banking or finance applications. Cryptography provides the building blocks applications use to protect the intellectual property that differentiates one customer from another.

Over the years, as Linux on System z has taken on a strong leadership role with Web- and Internet-facing applications, the value of Java and access to cryptography from Java has become paramount. Since Java is the most widely used language for Web applications, these applications have assumed the roles of protecting the confidentiality and integrity of data in the enterprise and the authentication of users and their authorization to various functions or data.

Hardware cryptography available on System z brings added business value to Java applications when running on Linux. The Crypto Express3 or Crypto Express4 cards in accelerator mode can provide cost-saving offload options, freeing up the processor to do other work as well as yielding drastic improvements in speed. The Central Processor Assist for Cryptographic Function (CPACF) capabilities, also available to Java applications, provide additional savings in processing time, which means better overall application throughput and cost savings. Banks and financial institutions can take advantage of the robust secure key and banking functions available on the Crypto Express3 and Crypto Express4 cards in coprocessor mode.

Writing a Java program that uses cryptographic functions from a library that exploits the System z cryptographic hardware can seem complex. It involves several components that must work together: the Linux kernel with a crypto device driver, System z-specific crypto libraries, openCryptoki with specific tokens, the Java Cryptography Architecture (JCA) with the Java Cryptography Extension (JCE) Application Program Interface (API) and the appropriate Java provider.

Source: http://enterprisesystemsmedia.com/article/using-crypto-hardware-with-java-in-linux-on-system-z
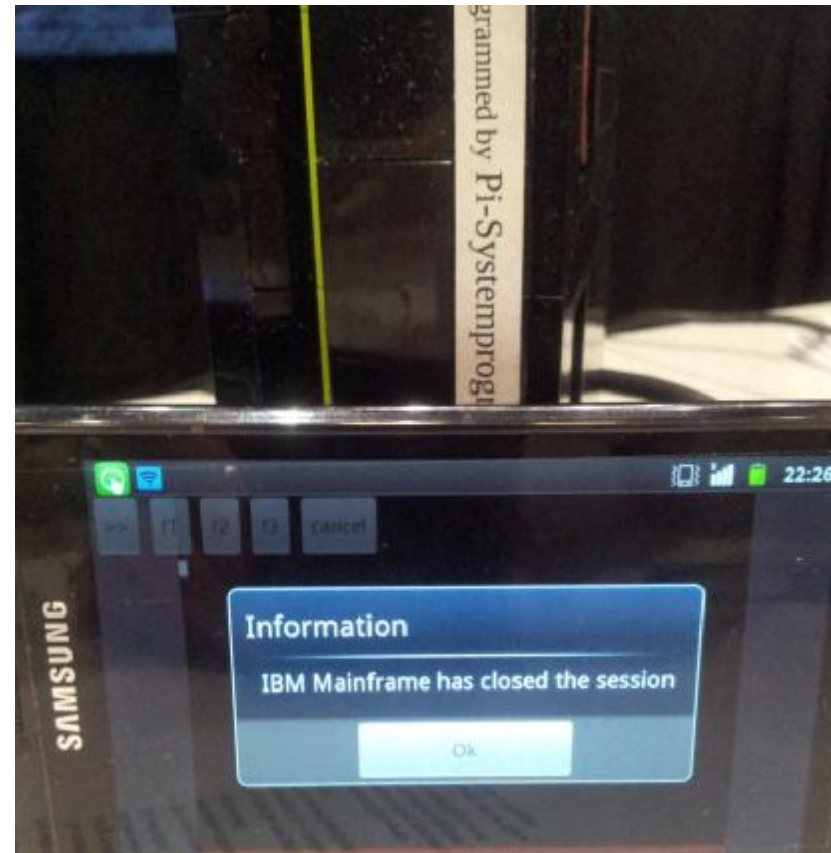
z/VM 6.2 Live Guest Relocation with Linux Middleware

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Source: http://public.dhe.ibm.com/software/dw/linux390/perf/ZSW03247-USEN-00.pdf

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Martin Trübner's 0.8 MIPS Mainframe
Built from z114 Lego Model

Thank You

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