

# z/VM, z/VSE, Linux on System z News



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## Agenda

§ **z/VSE**

§ **z/VM**

§ **Linux on System z**

§ **Software Pricing**



## Agenda

### ➔ § z/VSE

- Support status
- z/VSE V5.2
- SODs
- WebSphere MQ Server
- Remote Debugging with RDz

### § z/VM

### § Linux on System z

### § Software Pricing



## z/VSE Support Status (as of Oct 2014)

VSE Version and Release	Marketed	Supported	End of Support
<b>z/VSE V5.2</b> requires z9 or newer system	a	a	tbd
<b>z/VSE V5.1</b> requires z9 or newer system	a	a	<b>06/30/2016</b> 
<b>z/VSE V4.3</b> requires z900 or newer system	a	a	<b>10/31/2014</b>
<b>z/VSE V4.2</b> incl CICS/VSE V2.3, DL/I V1.1	r	r	10/31/2012
<b>z/VSE V4.1</b> <sup>2)</sup>	r	r	04/30/2011
<b>z/VSE V3.1</b> <sup>1)</sup>	r	r	07/31/2009
<b>VSE/ESA V2.7</b>	r	r	02/28/2007

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 Version 5 Release 2

*Announced April 7, 2014, General Availability April 25, 2014*

### § Hardware Exploitation

- Integration of PTFs delivered with z/VSE V5.1.2+
  - zBC12 exploitation (incl. support for Crypto Express4S, OSA-Express5S)
  - TS1140 tape drive (incl. encryption capabilities)
- Virtual disk in 64-bit virtual memory objects

### § Ease of Use

- Install from DVD for ECKD devices
  - Tape-less system for initial install

### § Networking

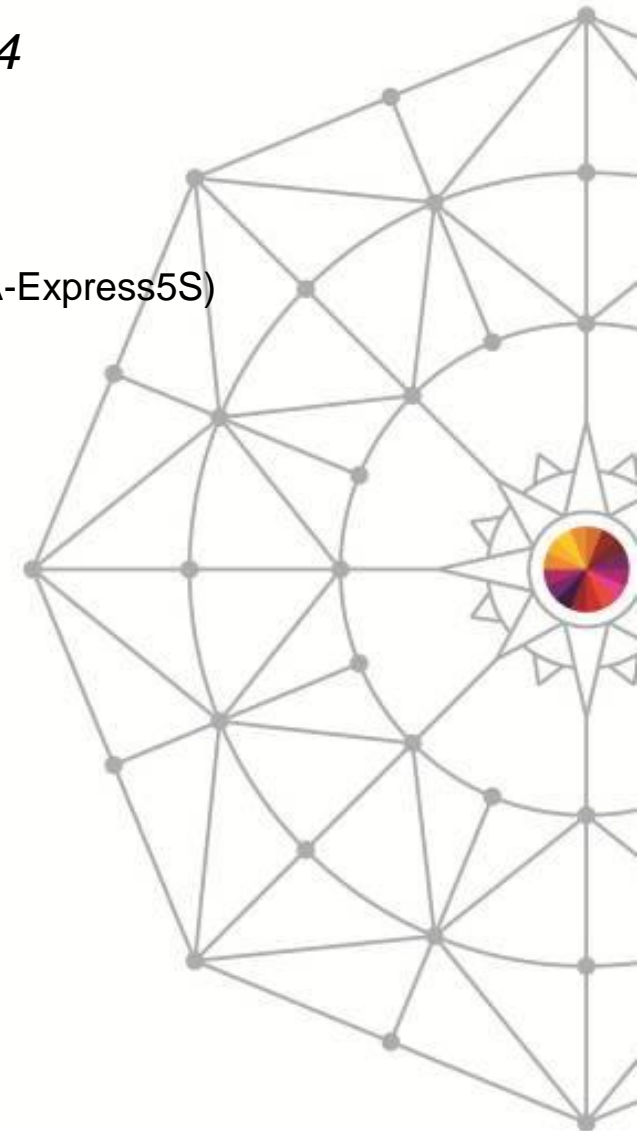
- IPv6 enhancements

### § Security

- Auditing enhancements
- OpenSSL integration

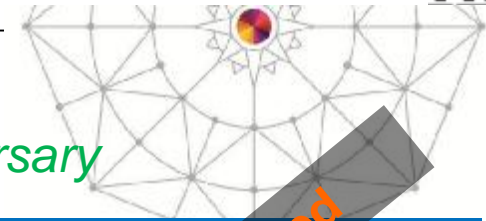
### § Customer Requirements

### § **New z/VSE Statements of Direction**



## z/VSE Statements of Direction (SODs)

Announced April 7, 2014 – *jointly with Mainframe50 Anniversary*



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

Fulfilled

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.

Fulfilled



IBM intends to rename the product z/VSE Central Functions to z/VSE in a new z/VSE version.



z/VSE V5.2 will be the last release that supports IBM System z9. Future releases of z/VSE will support IBM System z10 and higher.



IBM intends to provide new capability in a future release of IBM CICS Transaction Server for z/VSE to provide:

- i. Updates to CICS resources for CICS Explorer, and
- ii. Channels and Containers to enable the transfer of large amounts of data between CICS applications.



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.

# WebSphere MQ Server for z/VSE – Announced to be withdrawn

## § End of Marketing Announcement

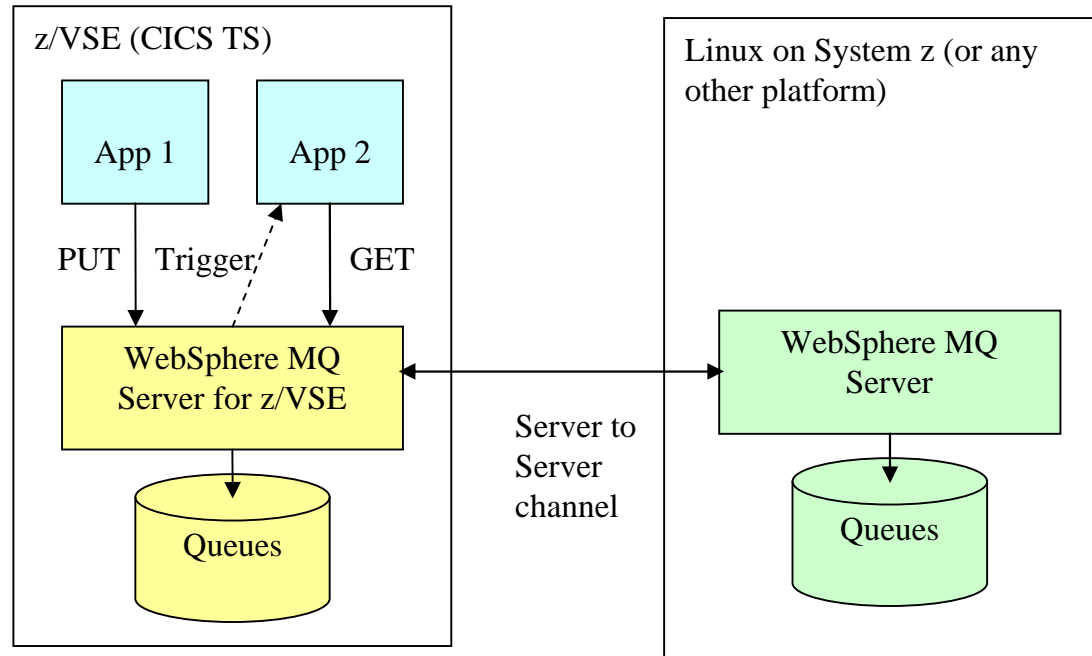
- IBM WebSphere MQ for z/VSE 3.0 (5655-U97) announced EoM on June 3, 2014
- EoM effective since Sep 8, 2014

## § End of Service Announcement

- WebSphere MQ for z/VSE 3.0 announced EoS on Aug 5, 2014
- EoS planned to become effective by Sep 30, 2015
- Individual service extension contracts can be requested for service beyond Sep 30, 2015 for a period of at least 3 years.

## § WebSphere MQ Client for z/VSE continues to be available

- No EoM / EoS planned for the WebSphere MQ client for z/VSE



§ EoM: <http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?subtype=ca&infotype=an&appname=iSource&supplier=897&letternum=ENUS914-104>  
§ EoS: <http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?subtype=ca&infotype=an&appname=iSource&supplier=897&letternum=ENUS914-150>

## WebSphere MQ Server for z/VSE

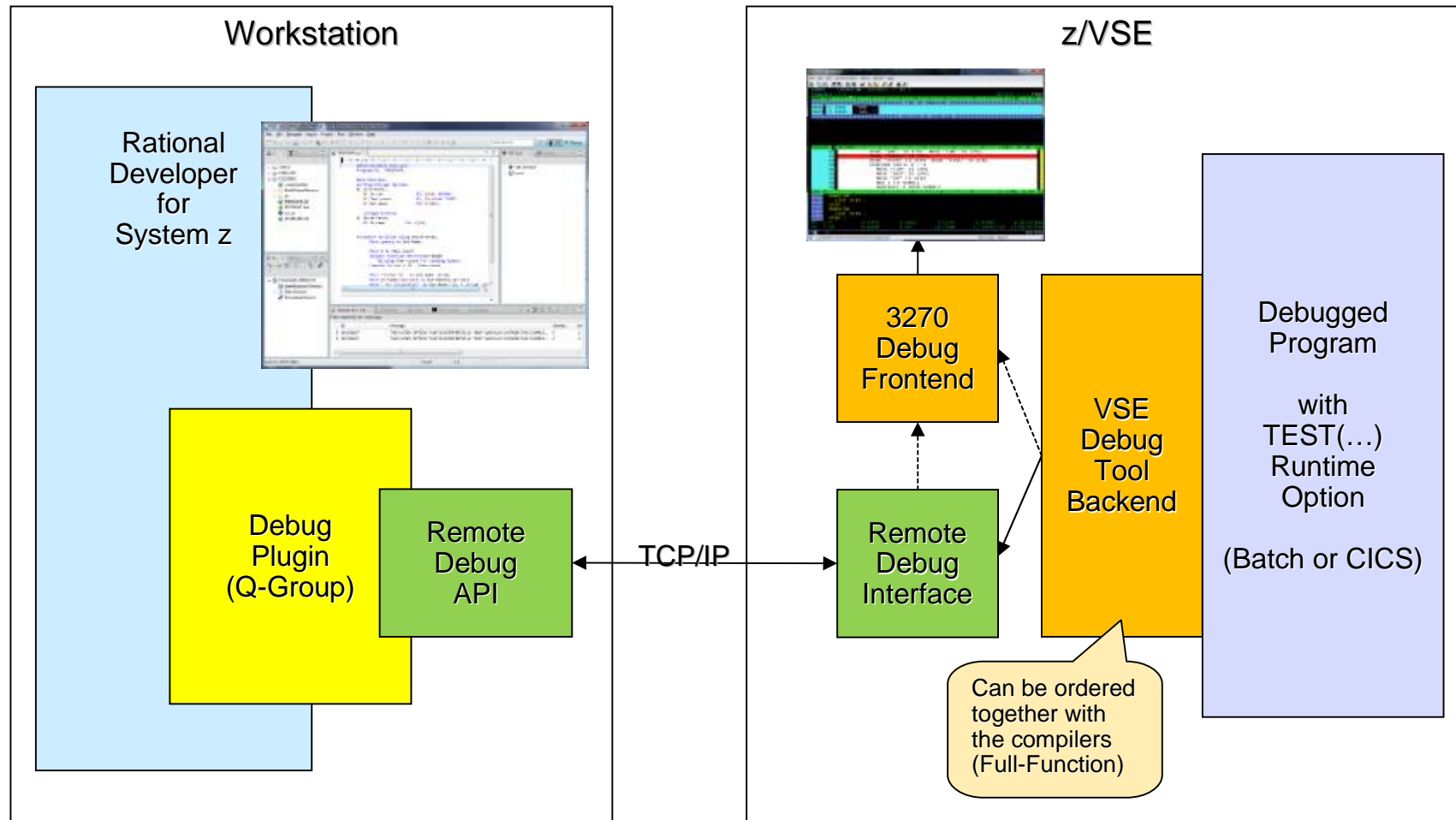
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**§ If you are interested in a replacement solution for WebSphere MQ Server for z/VSE, talk to us.**



## z/VSE Remote Debugging with RDz

*Available as Beta code for z/VSE V5 customers under NDA*



## Agenda

### § z/VSE

### ➔ § z/VM

- Support status
- z/VM V6.3 highlights
- CMO
- IISz

### § Linux on System z

### § Software Pricing



## z/VM Release Status Summary (as of Oct 2014)



z/VM	Level	GA	End of Service	End of Marketing	Minimum Processor Level	Security Level
<b>Version 6</b>	Release 3	7/2013	4/2017		IBM System z10 <sup>®</sup>	EAL 4+[ <sup>2</sup> ] OSPP-LS
	Release 2	12/2011	12/2016 <sup>[3]</sup>	7/2013	IBM System z10 <sup>®</sup>	-
	Release 1	10/2009	4/2013	12/2011	IBM System z10 <sup>®</sup>	EAL 4+ OSPP-LS
<b>Version 5</b>	Release 4	9/2008	12/2016 <sup>[1]</sup>	3/2012	IBM eServer zSeries 800&900 (z800, z900)	-
	Release 3	6/2007	9/2010	9/2010	z800, z900	EAL 4+ CAPP/LSP

[1] Or later (Announced Aug 6, 2014)

[2] Targeted Security Level in z/VM V6.3 SOD

[3] Extended from original date (Announced Feb 4, 2014)

Marketed & Serviced

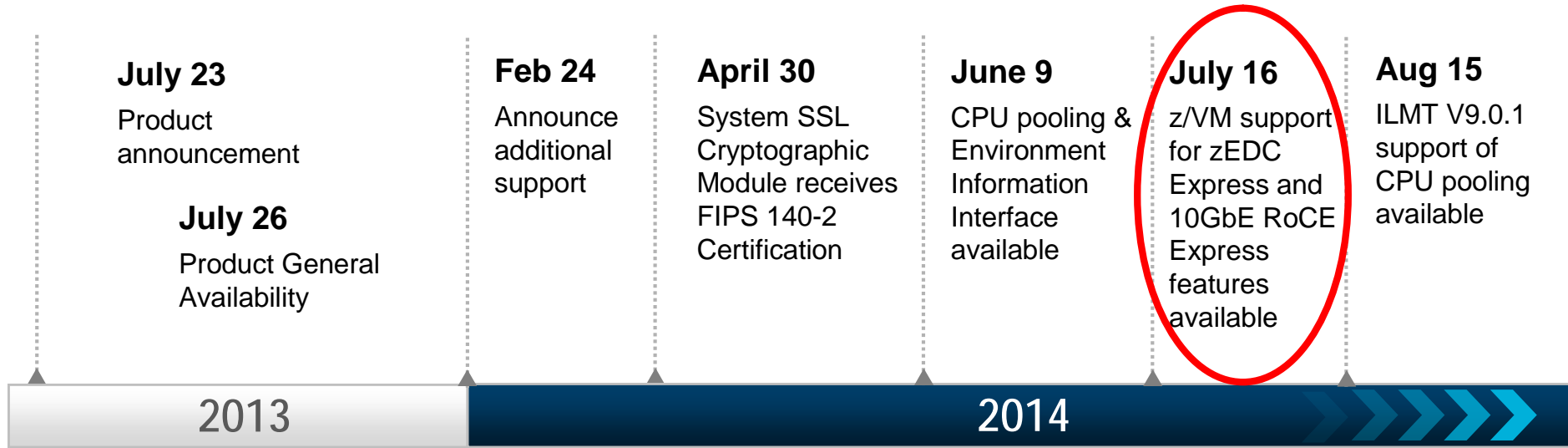
Serviced, but not Marketed

End of Service & Marketing

Extended support contracts are available.

# z/VM Version 6 Release 3

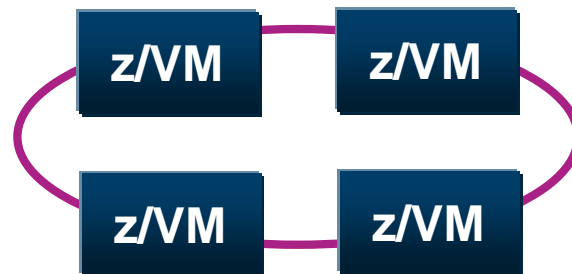
## Making Room to Grow Your Business



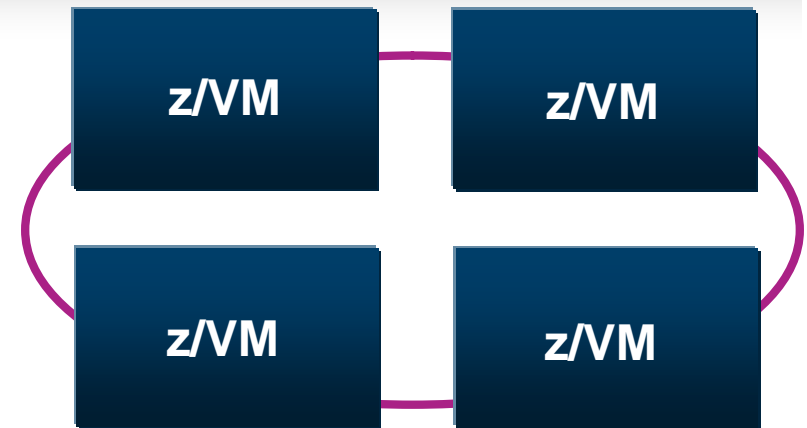
See <http://www.vm.ibm.com/zvm630/>



**z/VM 6.1**



**z/VM 6.2**



**z/VM 6.3**

## z/VM V6.3 GA Highlights

### § Large Memory Support

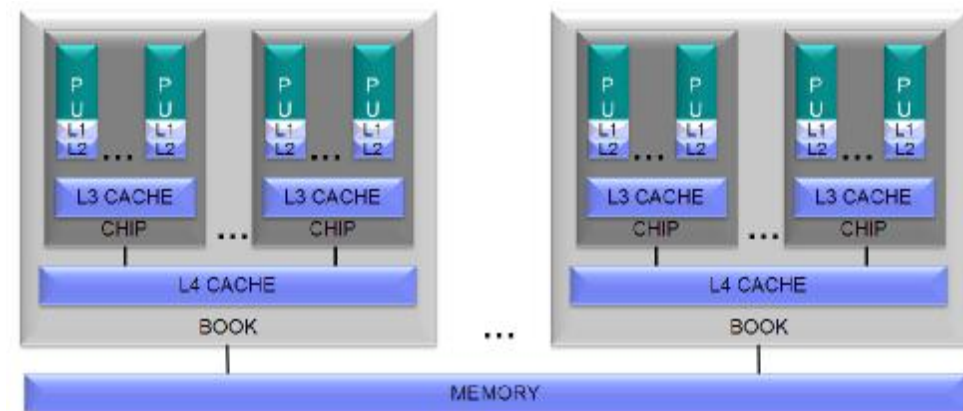
- Real memory limit raised from 256 GB to **1 TB**
- Efficiency benefits for smaller systems
- Reduces the amount of disk space required for paging
- Eliminates the need for expanded storage, allowing greater flexibility
- Individual virtual machine memory limit remains unchanged at **1 TB**

### § Enhancements establishing base for OpenStack support

- Enables IBM software based on OpenStack to run with z/VM

### § HiperDispatch Support

- More efficient use of processor cache
- Intelligent dispatching with processor topology awareness
- Exploitation of hardware Vertical CPU Management



## z/VM V6.3 Post-GA Highlights – available with PTF UM34348

### § CPU Pooling

- Define and limit the aggregate amount of CPU resources that a group of z/VM guests is allowed to consume
  - Allows capping of CPU utilization for a set of guests to better balance resource utilization
- Define one or more named pools in which a limit of CPU resources is set
  - No restrictions on number of pools or aggregate capacity (can overcommit)
- Two flavors of limits:
  - LIMITHARD - Percentage of system
  - CAPACITY – Number of CPUs (fragments are allowed, too)
- CPU pools coexist with individual share limits
  - More restrictive limit applies



### § Environment Information Interface

- New interface allows guest to capture execution environment
  - Configuration and capacity information
  - Various levels: machine, logical partition, hypervisor, virtual machine, CPU pools
- New problem state instruction
  - STore HYpervisor Information (STHYI)
- Foundation for IBM License Metric Tool (ILMT)

## CMO – IBM Cloud Manager with OpenStack for System z V4.1

### § Formerly offered as IBM SmartCloud Entry V3



### § Benefits:

- Full access to OpenStack APIs, backed with IBM support
- Cloud management solution that is easy to use
- Self service portal for workload provisioning and virtualized image management
- Heterogeneous support for IBM PowerVM®, z/VM, IBM PowerKVM and x86, and more
- Deploy, resize and capture
- Linux server backup and restore
- Manage z/VM from z/VM or manage z/VM from other platforms

### § Requires z/VM 6.3 with appropriate service

- <http://www.vm.ibm.com/sysman/osmntlvl.html>

### § Dates:

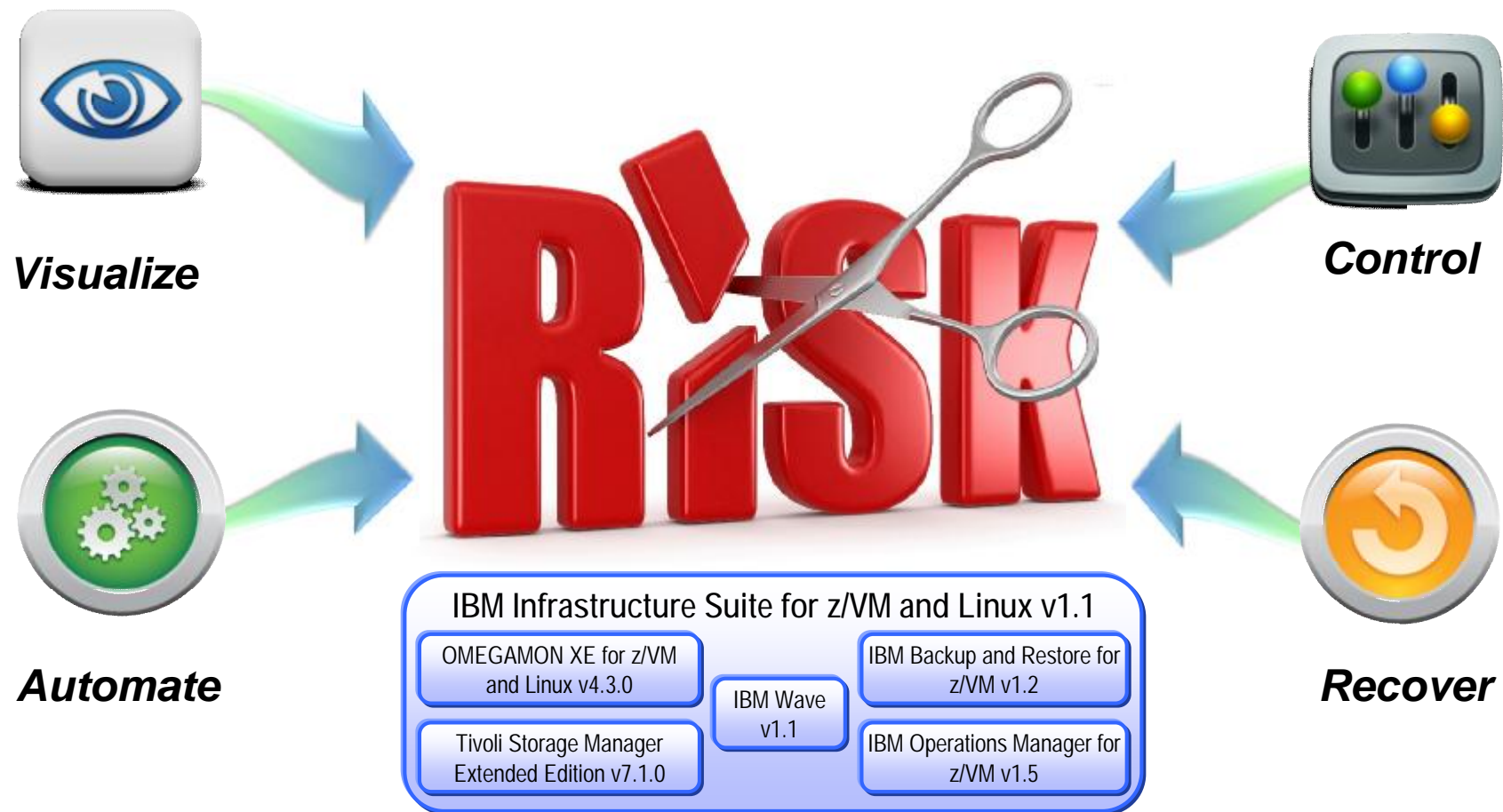
- Announced: May 19, 2014
- Available: June 13, 2014
- Manage z from z support announced: September 9, 2014
- Available: September 16, 2014





# IISz – IBM Infrastructure Suite for z/VM and Linux V1.1 (5698-IS2)

*Announced Sep 2, 2014, General Availability Sep 5, 2014*



A comprehensive toolkit to manage the entire z/VM environment

<http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?infotype=AN&subtype=CA&htmlfid=897/ENUS214-350&appname=USN>



## Agenda

### § z/VSE

### § z/VM

### → § Linux on System z

- LDP status
- z/OS data access
- Hadoop
- GPFS

### § Software Pricing



## Linux Distributions - Status as of October 2014

§ **SLES 10 SP4: Available since 04/2011**

§ **SLES 11 SP3: Available since 07/2013**

§ **SLES 12: Expected to become available very very soon**

- ALS (Architecture Level Set) to IBM z196 (and later hardware)
- zEC12 exploitation in toolchain (gcc and binutils)
- Transparent large pages for System z on LPAR
- LLVM for System z
- QSAM access method for data sharing with z/OS – Stage 1

§ **RHEL 5.11: Available since 09/2014**

§ **RHEL 6.6: Available since 10/2014**

§ **RHEL 7: Available since 06/2014**

- ALS (Architecture Level Set) to IBM z196 (and later hardware)
- zEC12 exploitation in toolchain (gcc and binutils)
- Transparent large pages for System z on LPAR
- LLVM for System z



## s390-Tools Package – The zdsfs File System

### Mount a z/OS DASD

#### § Goal

- Transfer bulk data from z/OS to Linux on System z
- Faster than network transfer (e.g. FTP, NFS)
- Use less CPU cycles than networked transfer

#### § NOT intended for CONCURRENT access

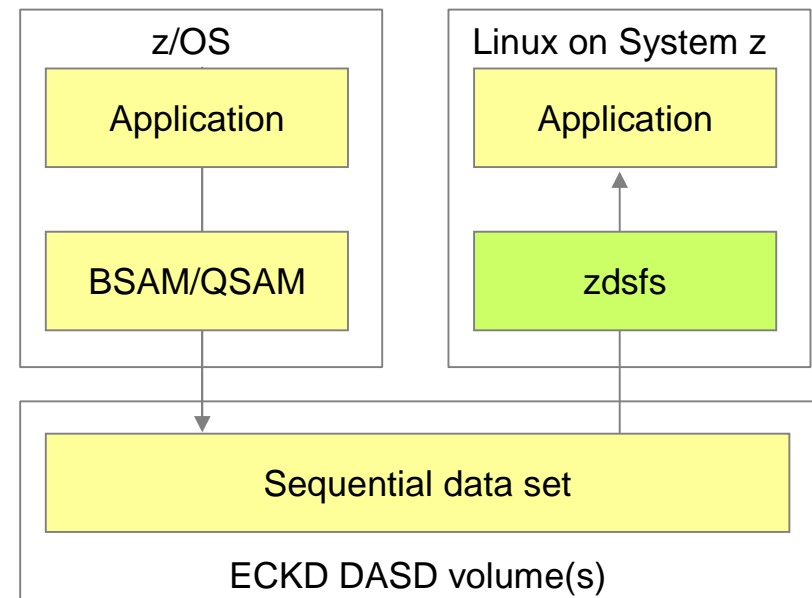
- Not a cluster file system

#### § Approach

- Read records from DASD volumes
- Translate into Linux file system semantics
  - Physical Sequential data set → File
  - Partitioned data set → Directory containing members as files

#### § Attention

- Other z/OS data set formats are not supported at this point
  - No VSAM
  - No extended-format data sets
- Set devices in z/OS offline before mounting them in Linux
- Through zdsfs file system the whole DASD is accessible in Linux but the access is not controlled by z/OS auditing mechanisms



# What is **hadoop** ?

***Hadoop is an open source software framework from the Apache Software Foundation that supports data-intensive highly parallel applications***

High throughput, batch processing

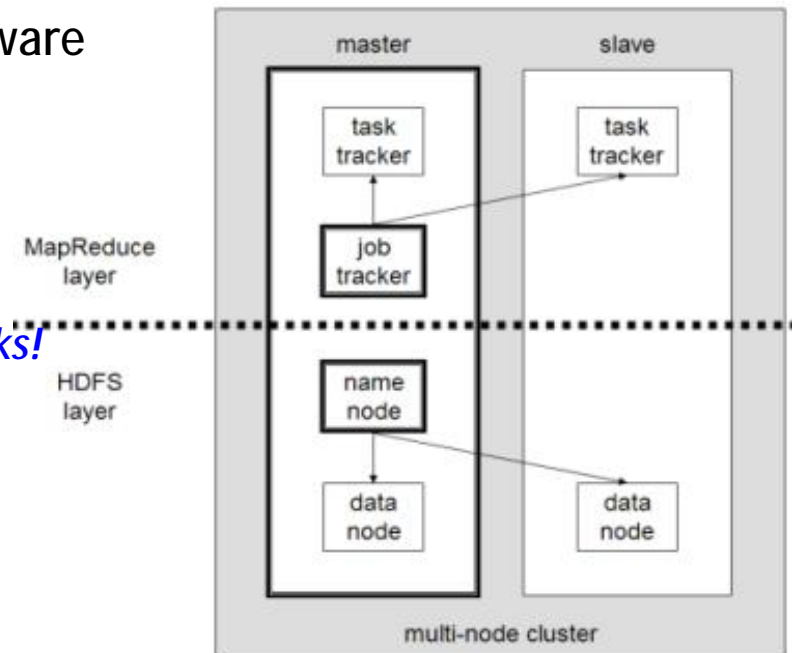
Designed to run on large clusters of commodity hardware

- Lots of cores – inexpensive cores working all the time
  - Processors fail – that’s ok – just replace them
- Lots of redundant disks – really inexpensive disks
  - Disks crash – that’s ok – just replace them

*But nothing in Hadoop requires commodity cores and disks!*

## § Two main components

- Hadoop Distributed File System (HDFS)
  - Where Hadoop stores data
  - Self-healing, high-bandwidth clustered storage
- MapReduce engine
  - How Hadoop understands and assigns work
  - A simple, powerful framework for parallel computation



# IBM InfoSphere BigInsights for Linux on System z V2.1.2

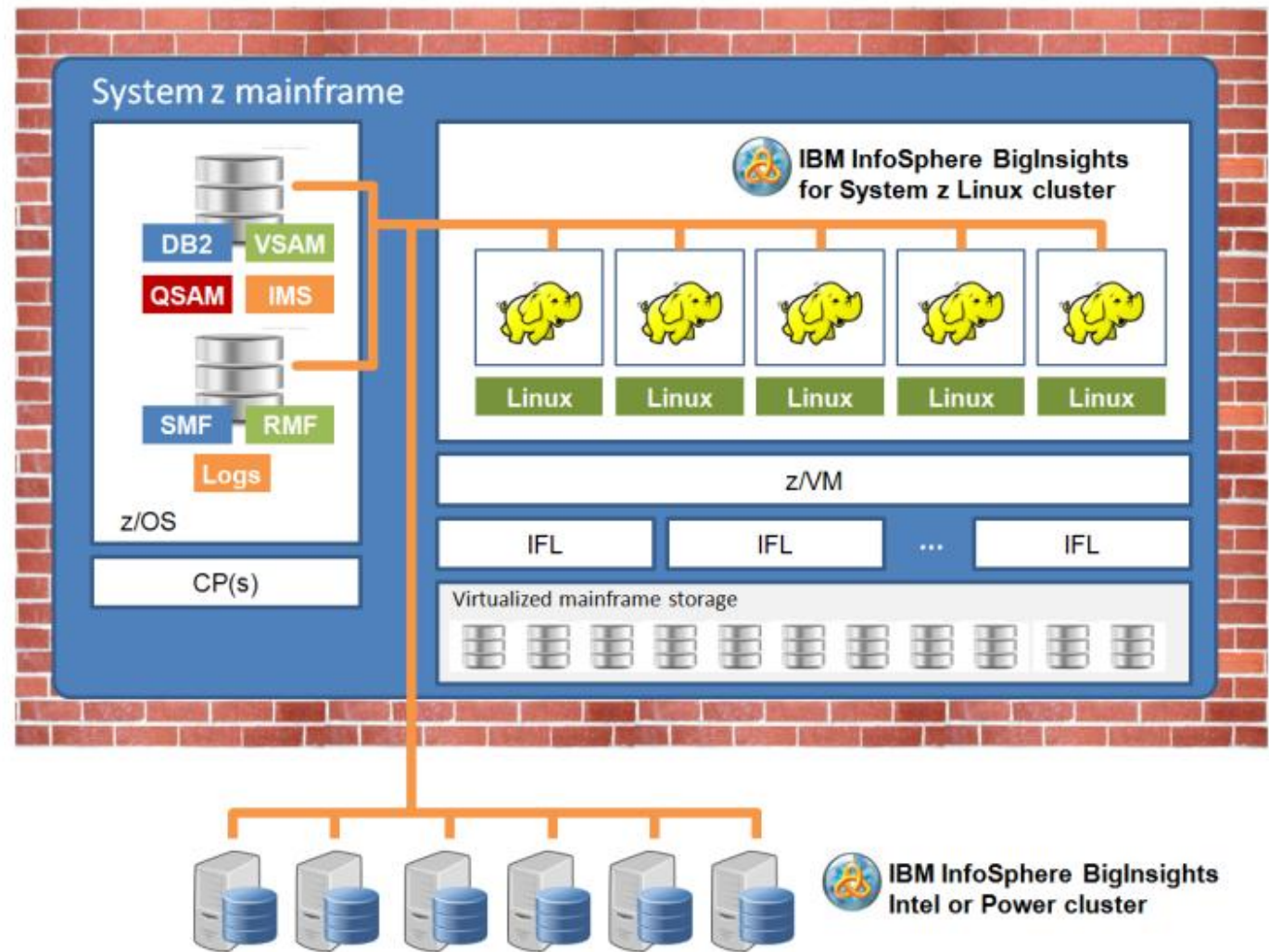
*Builds on open source Hadoop capabilities for enterprise class deployments*

## Use cases:

- § Data originates mostly on the mainframe (e.g. log files, database extracts, other record-oriented files)
- § Data security a primary concern – data cannot be sent across external net
- § z governance and security models needed
- § Results from external sources may be needed
- § High GB – low TB range of data to analyze

## Some additional details:

- § Available from Fix Central since August 5, 2014
- § GA release based on BigInsights 2.1.2
- § Supports RHEL 6.4
- § Pricing identical to System x and Power – per node/VM licensing, perpetual



## Elastic Storage for Linux on System z – aka GPFS

*Announced October 6, 2014, General Availability planned for December 5, 2014*

Elastic Storage for Linux on System z will enable enterprise clients to use a **highly available clustered file system** with Linux in LPAR or as guest on z/VM.

### What is Elastic Storage?

§ IBM's *shared disk, parallel cluster* file system

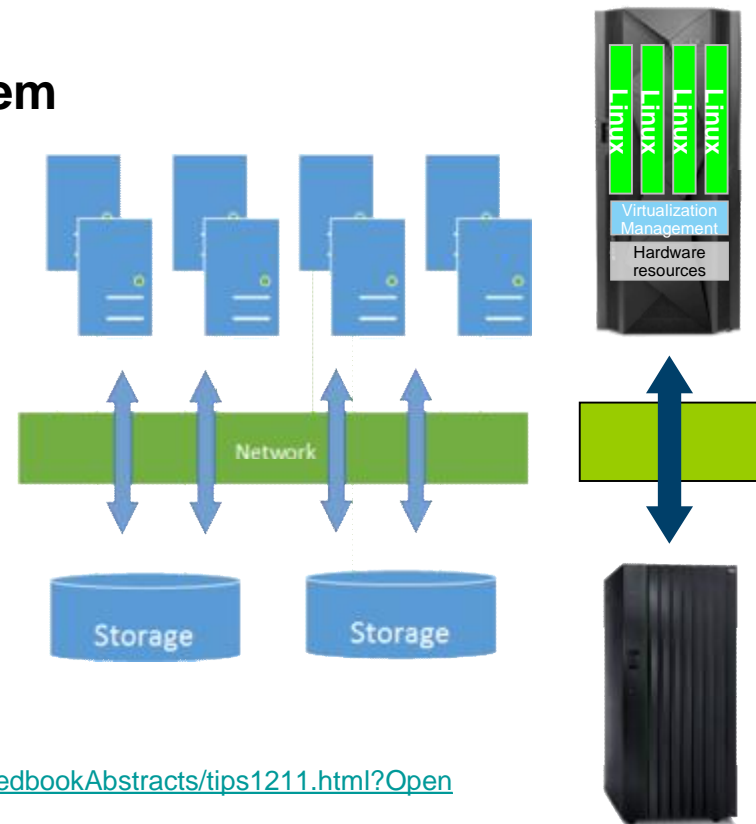
§ **Cluster:** 1 to 16,384\* nodes, fast reliable communication, common admin domain

§ **Shared disk:** all data and metadata on storage devices accessible from any node through block I/O interface (“disk”: any kind of block storage device)

§ **Parallel:** data and metadata flow from all of the nodes to all of the disks in parallel

§ New redbook solution guide: <http://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/tips1211.html?Open>

\* largest cluster in production as of August 2014 is LRZ SuperMUC with 9,400 Nodes of x86\_64



## Elastic Storage for Linux on System z (continued)

### § Based on the GPFS technology of the Express Edition 4.1 + service updates

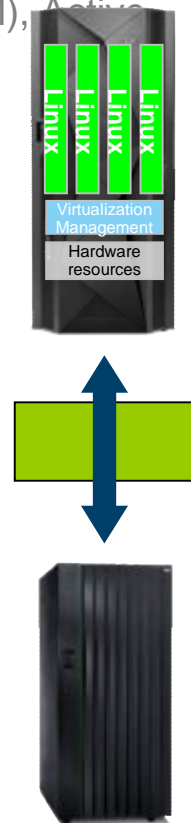
- Express Edition: Contains the base Elastic Storage functions
- Standard Edition: Includes the base function plus Information Lifecycle Management (ILM), Active File Management (AFM) and Clustered NFS
- Advanced Edition: Includes encryption and the features of Standard Edition

### § Initial releases comprises:

- Express Edition with base Elastic Storage functions
- Linux instances in LPAR mode or on z/VM (on the same or different CECs)
- Support for heterogeneous NSD Clients (mix of AIX, Linux on System x,p,z)
- Up to 32 cluster nodes (same or mixed Linux distributions/releases)
- Support for ECKD-based storage and FCP/SCSI-based storage
  - DS8000, Storwize v7000, XIV, IBM FlashSystem
  - Evaluating non-IBM storage

### § Minimum supported Linux distributions:

- SLES 11 SP3 + Maintweb-Update
- RHEL 6.5 + Errata Update



Note: While the first version of Elastic Storage for Linux on System z will not support all functionality available for other platforms, this gap is planned to be closed with future updates.



## Linux on System z: Development Roadmap 2014/15

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## Agenda

§ z/VSE

§ z/VM

§ Linux on System z

 § **Software Pricing**

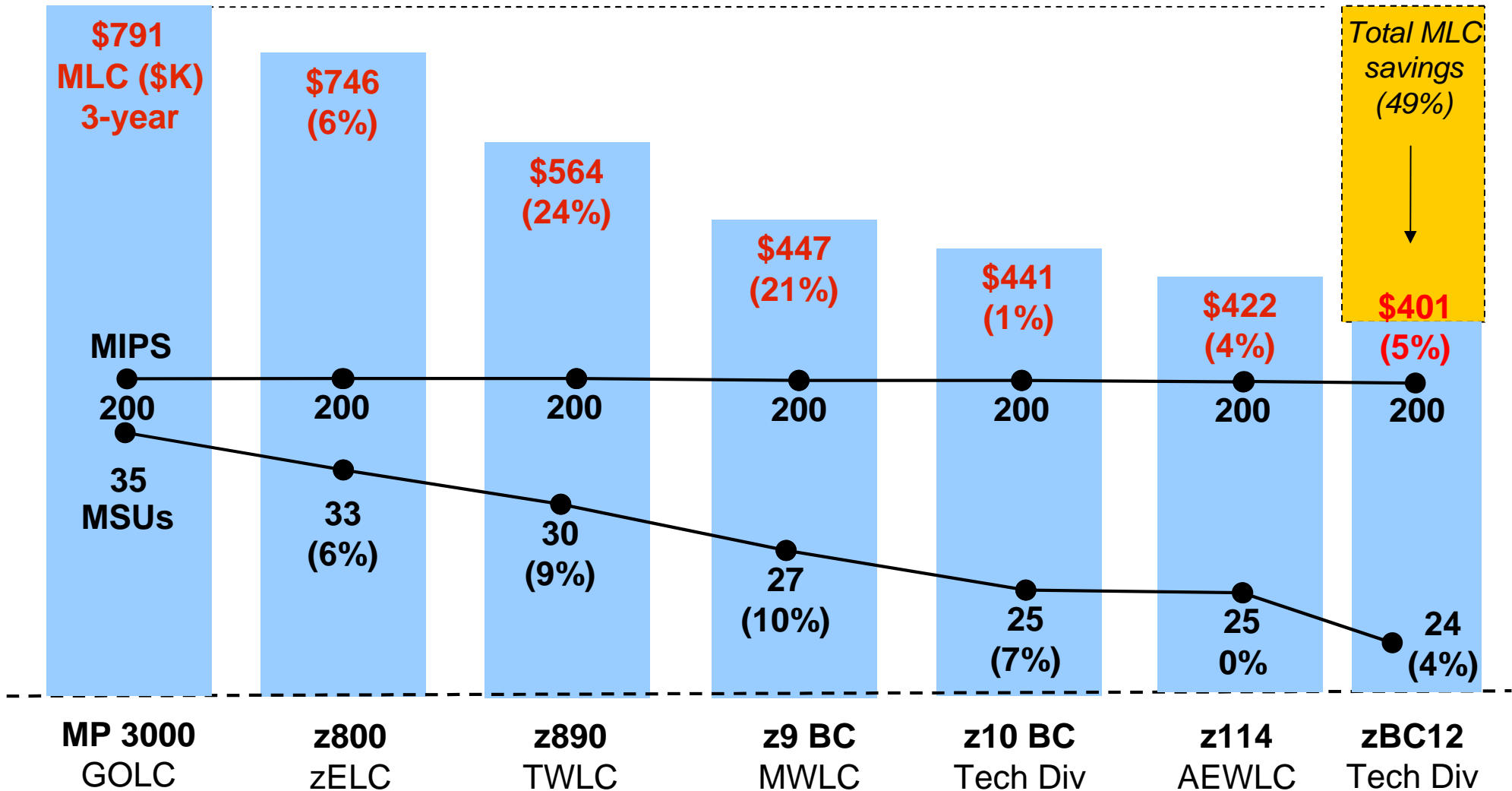
- MLC changes
- ILMT V9.0.1
- CAMS offerings





## MLC Price Performance across HW Generations for z/VSE

\* 200 MIPS example for a typical z/VSE stack



\* 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

## Price Changes for selected IBM Monthly Licensed SW Products

*Announced August 12, 2014, Effective January 1, 2015*

### § **Monthly License Charges (MLC) are planned to increase**

- VWLC, AWLC, EWLC, PSLC, **AEWLC**

### § **Approx 4% MLC increase, depending on the features selected, e.g.**

- DB2 Server for VSE and VM V7
- MQ Series for VSE/ESA V2
- WebSphere MQ for z/VSE V3
- C, COBOL, PL/I, HLASM for MVS, VM, VSE
- Rational COBOL RT for z/VSE

### § **Approx 7% MLC increase for CICS for VSE products on all software billing metrics**

- CICS/VSE V2
- CICS TS for VSE/ESA V1

### § **Approx 5% MLC increase for z/OS V1 and its features**

- Align MLC prices for z/OS V1 and z/OS V2

### § **z/VSE V4 and z/VSE V5 MLC remain unchanged**

- IPv6/VSE V1 and TCP/IP for VSE/ESA V1 MLC remain unchanged, too



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.

## IBM License Metric Tool (ILMT) V9.0.1 supports CPU Pooling *Announced and Available August 12, 2014*

### § CPU Pooling

- Create pool of CPU resources available for a group of virtual machines in a z/VM system
- Allows capping of CPU utilization for a set of guests to better balance resource utilization
- Requires z/VM 6.3 with PTF UM34348 (APARs VM65418 & VM65419)



### § IBM License Metric Tool (ILMT)

- No-charge tool, used to determine PVU licensing requirements
- Peer to SCRT, used for distributed (Passport Advantage) software licensing
- New Linux interface exploited by ILMT 9.0.1 to assess software license conformance
- New ability available in ILMT 9.0.1 to track CPU pools
- Using ILMT you are only charged for the CPU pool capacity in use by PPA PVU-based software



[https://www.ibm.com/developerworks/community/blogs/a1a33778-88b7-452a-9133-c955812f8910/entry/ibm\\_license\\_metric\\_tool\\_9\\_0\\_1\\_and\\_ibm\\_endpoint\\_manager\\_for\\_software\\_use\\_analysis\\_9\\_1\\_application\\_update\\_9\\_0\\_1\\_are\\_available?lang=en](https://www.ibm.com/developerworks/community/blogs/a1a33778-88b7-452a-9133-c955812f8910/entry/ibm_license_metric_tool_9_0_1_and_ibm_endpoint_manager_for_software_use_analysis_9_1_application_update_9_0_1_are_available?lang=en)



## Sub-Capacity Licensing with and without z/VM CPU Pooling

DB2 WAS	DB2		DB2	DB2	WAS	WAS
Linux 1 3 vIFL	Linux 2 3 vIFL		Linux 3 4 vIFL	Linux 4 6 vIFL	Linux 5 1 vIFL	Linux 6 2 vIFL
Pool 1: 3 IFLs		Pool 2: 1 IFL	Pool 3: 8 IFLs		Pool 4: 4 IFLs	
LPAR zVM1: 4 dedicated IFLs			LPAR zVM2: 12 shared IFLs			
System z CEC – 16 IFLs						

### DB2

Virtualization Layer	Capacity with pooling	Capacity without pooling
Linux 1	3	3
Linux 2	3	3
Pool 1	3 (< 3+3)	
zVM1	3 (< 4)	4 (< 3+3)
Linux 3	4	4
Linux 4	6	6
Pool 3	8 (< 4+6)	
zVM2	8 (< 12)	10 (4+6<12)
CEC	11 (3+8 < 16)	14 (10+4<16)

### WAS

Virtualization Layer	Capacity with pooling	Capacity without pooling
Linux 1	3	3
Pool 1	3 (≤ 3)	
zVM1	3 (< 4)	3(<4)
Linux 5	1	1
Linux 6	2	2
Pool 4	3 (1+2 < 4)	
zVM2	3 (< 12)	3 (<12)
CEC	6 (3+3 < 16)	6 (3+3<16)

Rule for z/VM guests: The lower of the sum of the virtual engines available to each guest for a product, or the engine capacity of the z/VM LPAR that the guest obtains its resources from.

## Large system with virtual machines that require fractional IFL capacity

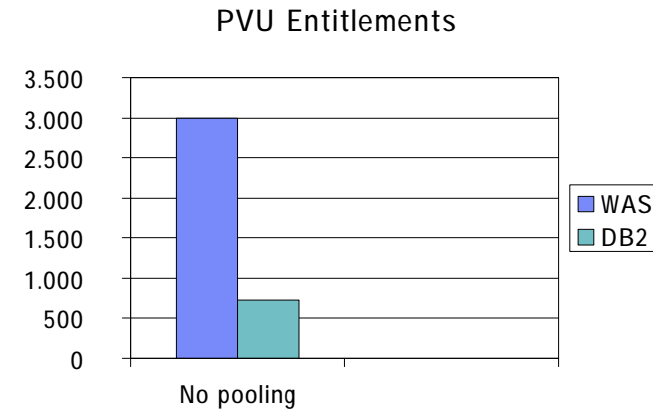
§ LPAR with 25 IFLs

§ 2 DB2 production guests

- Requires 6-engine DB2 entitlement

§ 3 WAS production guests and 12 small WAS test guests

- Requires 25-engine WAS entitlement



Note: All PVU Entitlement examples based on zEC12 (120 PVU per IFL) – will look proportionally the same on zBC12 (100 PVU per IFL)

## Align fractional capacity virtual machines to small CPU pools

§ LPAR with 25-IFLs

§ Set up a 1-IFL pool

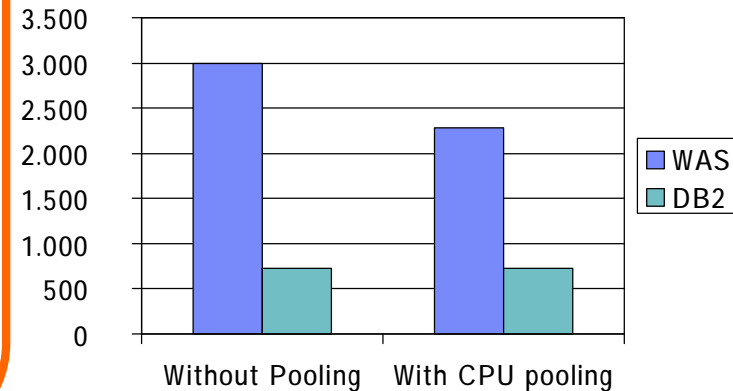
§ 2 DB2 production guests

- Requires 6-engine DB2 entitlement

§ 3 WAS production guests and 12 small WAS test guests in IFL pool

- Requires 19-engine WAS entitlement

PVU Entitlements



Note: All PVU Entitlement examples based on zEC12 (120 PVU per IFL) – will look proportionally the same on zBC12 (100 PVU per IFL)

## z/VSE Linux Growth Offering

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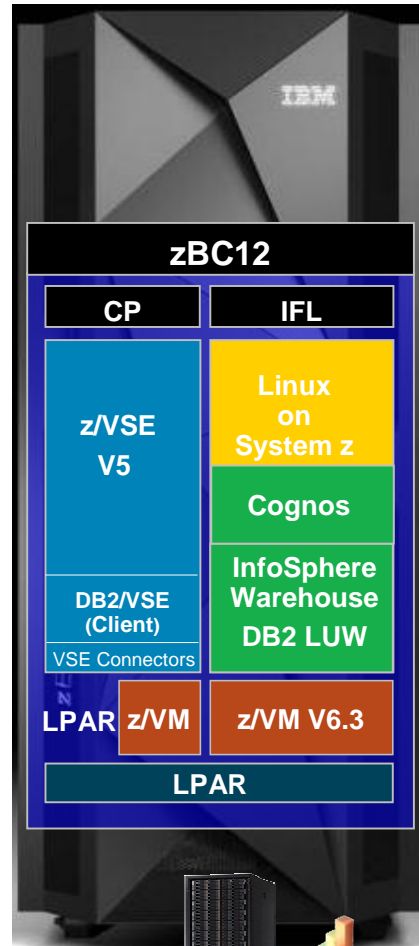
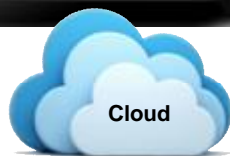
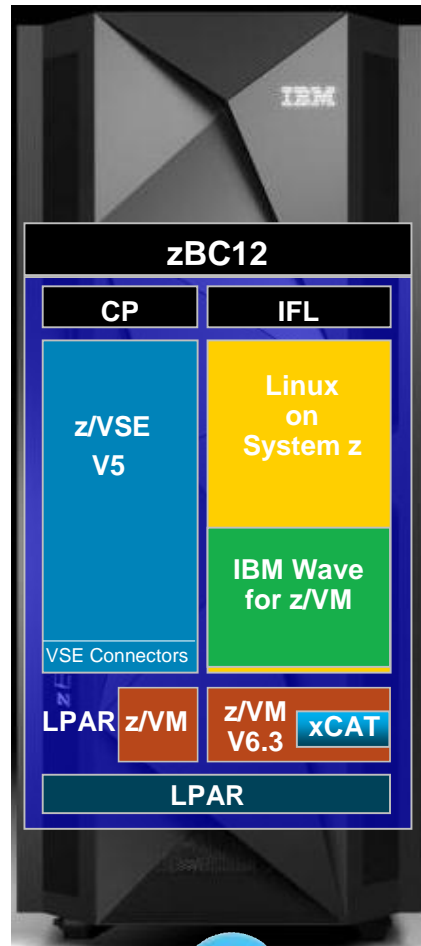
# z/VSE Linux Growth Offering – CAMS Solution Examples

**Cloud**

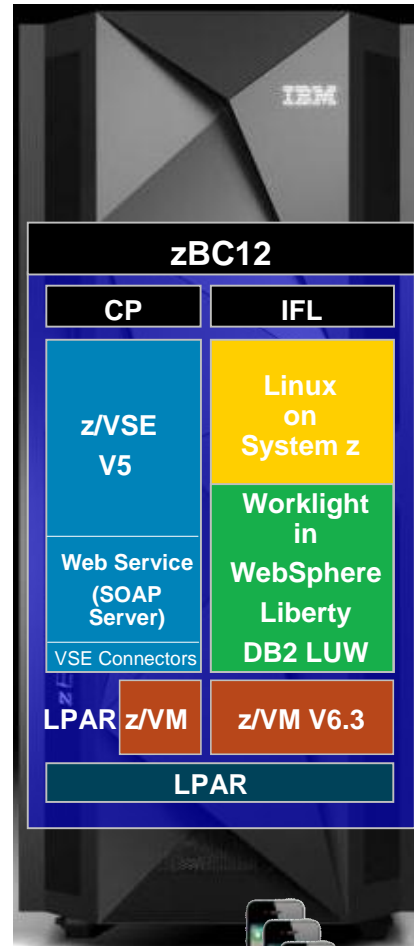
**Analytics**

**Mobile**

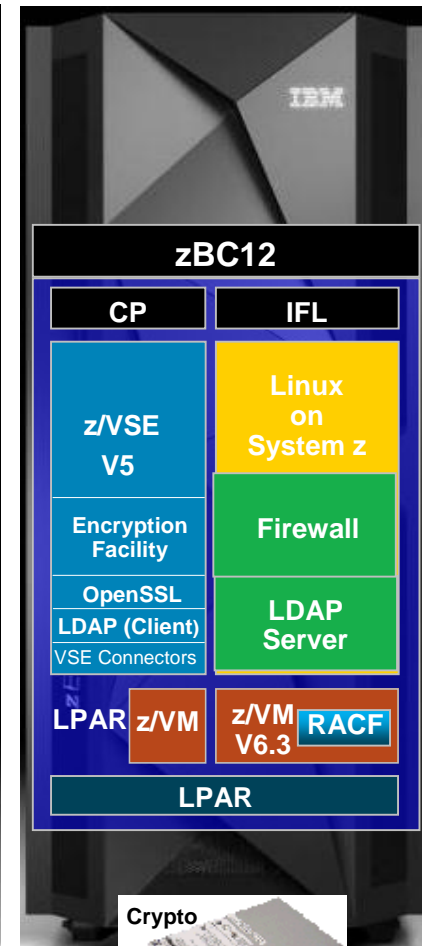
**Security**



XIV,  
DS8000



Mobile



Crypto



and  
many  
more  
....

## Questions?





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CICS*	FlashCopy	Parallel Sysplex*	WebSphere*
DB2*	GDPS*	System Storage	z/OS*
DFSORT	HyperSwap	System z	z/VM*
DFSMS	IBM*	System z9	z/VSE
DS6000	IBM eServer	System z10	zSeries*
DS8000	IBM logo*	System z10 Business Class	z9
Enterprise Storage Server*	IMS	Tivoli	z10
ESCON*	MQSeries*	TotalStorage*	z10 BC
FICON*	OMEGAMON*	VSE/ESA	z10 EC

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