# System z 2013 3Q
# ISV and SI Technical Marketing Call

25 July 2013

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# Agenda

1. **System z Hardware Update for ISVs**
   Harv Emery, IBM Gaithersburg
   Exec IT Specialist - System z Hardware

2. **z/VM Update with z/VM 6.3**
   Dan Griffith, IBM Endicott
   z/VM Development & Planning

3. **z/OS Version 2 - Freedom to Innovate**
   Barbara Sannerud, IBM Somers
   System software strategy - STG

# System z Hardware Update for ISVs: July 23, 2013 Announcement

*Updated: July 14, 2013*
*File Name: System z ISV Hardware Update July 25 Jul14a.ppt*
*File Owner: Harv Emery*

# zBC12 and zEC12 GA2 July 23, 2013 Announcement Hardware Highlights

# IBM zEnterprise EC12 and zBC12 – September 2013

## IBM zEnterprise EC12 (2827)

- Announced 08/12
- 5 models – H20, H43, H66, H89, and HA1
  - Up to 101 CPs
- Granular Offerings for up to 20 CPs
- PU (Engine) Characterization
  - CP, IFL, ICF, zAAP, zIIP, SAP, IFP
- On Demand Capabilities
  - CoD: CIU, CBU, On/Off CoD, CPE
- Memory – up to 3 TB for Server, 1 TB per LPAR
  - 32 GB Fixed HSA
- Channels
  - PCIe bus
  - Four CSSs, up to 60 LPARs
  - 3 Subchannel Sets per CSS
  - FICON Express8 and 8S
  - zHPF
  - OSA 10 GbE, GbE, 1000BASE-T
  - InfiniBand Coupling Links
  - Flash Express
  - Compression Acceleration (zEDC)
  - RDMA over CEE (RoCE)
- Configurable Crypto Express4S
- Parallel Sysplex clustering
- HiperSockets – up to 32
- Enhanced Book Availability
- IBM zAware
- Unified Resource Manager
- Operating Systems
  - z/OS, z/VM, z/VSE, z/TPF, Linux on System z

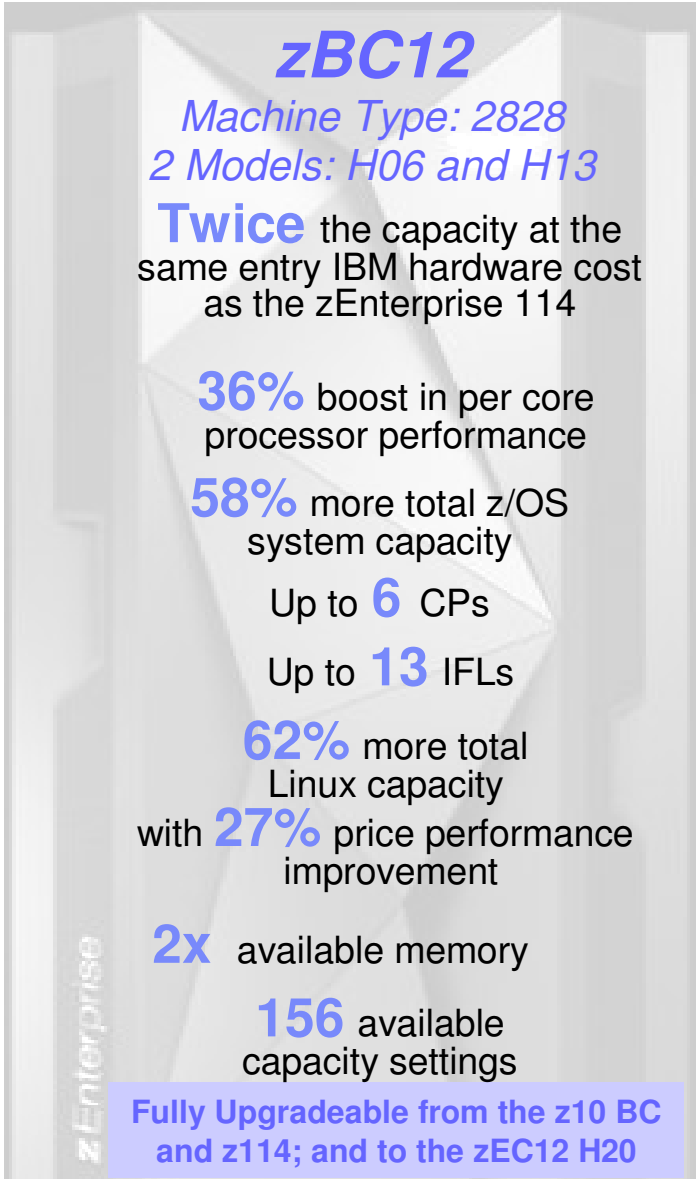
## IBM zEnterprise Blade Extension (2458)

- First Announced 7/10
- Model 003 for zEC12 – 08/12
- zBX Racks (up to 4) with:
  - BladeCenter Chassis
  - N + 1 components
  - Blades
  - Top of Rack Switches
  - 8 Gb FC Switches
  - Power Units
  - Advanced Management Modules
- Up to 112 Blades
  - POWER7 Blades
  - IBM System x Blades
  - IBM WebSphere DataPower Integration Appliance XI50 for zEnterprise (M/T 2462-4BX)
- Operating Systems
  - AIX 5.3 and higher
  - Linux for Select IBM x Blades
  - Microsoft Windows for x Blades
- Hypervisors
  - PowerVM Enterprise Edition
  - Integrated Hypervisor for System x

## IBM zEnterprise BC12 (2828)

- Announced 07/13
- 2 models – H06 and H13
  - Up to 6 CPs, up to 13 characterized PUs
- High levels of Granularity available
  - 156 Capacity Settings
- PU (Engine) Characterization
  - CP, IFL, ICF, zAAP, zIIP, SAP, IFP
- On Demand Capabilities
  - CoD: CIU, CBU, On/Off CoD. CPE
- Memory – up to 512 GB for Server
  - 16 GB Fixed HSA
- Channels
  - PCIe bus
  - Two CSSs. up to 30 LPARs
  - 2 Subchannel Sets per CSS
  - FICON Express8 and 8S
  - zHPF
  - OSA 10 GbE, GbE, 1000BASE-T
  - InfiniBand Coupling Links
  - Flash Express
  - Compression Acceleration (zEDC)
  - RDMA over CEE (RoCE)
- Configurable Crypto Express 4S
- Parallel Sysplex clustering
- HiperSockets – up to 32
- IBM zAware
- Unified Resource Manager
- Operating Systems
  - z/OS, z/VM, z/VSE, z/TPF, Linux on System z

# zBC12: Extending the capabilities of the modern mainframe




## New technology with unprecedented performance

- New 4.2GHz core with improved cache designs and new hardware function designed to boost software performance
- Increased core counts and memory and SSI scale for additional flexibility, growth and economies of scale consolidation
- Increased granularity for right-sizing system to business needs
- Built to support future data center design, modernization and energy efficiencies requirements

## Innovative Features bolster platform differentiators

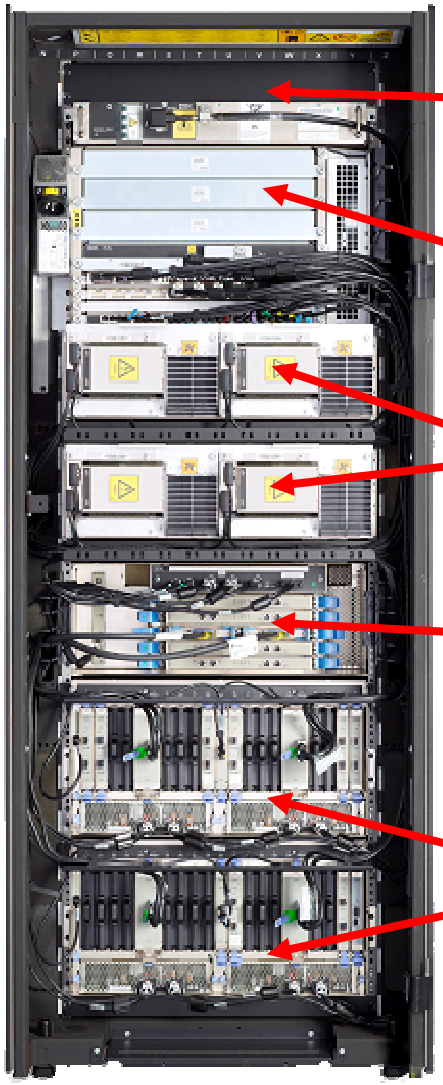
- Storage Class Memory and integrated system health analytics to improve availability: Flash Express and IBM zAware
- Enhanced high speed, low latency networking fabric for z/OS to z/OS communications: 10GbE RoCE Express
- New compression acceleration adapter to improve system performance and reduce CPU and storage costs : zEDC Express
- Enhanced security with extended EP11 and enhanced IBM CCA support
- Hybrid-enabled to optimize workload integration and to provide System z governance: zBX and Unified Resource Manager

## Improved Platform Economics

- Modular two drawer design for low cost of entry
- Improved price performance across the stack
- Second generation upgradeability for investment protection

# zBC12 Structure

# zBC12 H13 – Under the covers



Internal Batteries (optional)

Power Supplies

Processor drawers: Memory and HCAs
Top Drawer: Model H13 only

I/O drawer

PCIe I/O drawers

Note: One I/O drawer with two PCIe I/O drawers requires a total of six HCAs so it requires a Model H13.

Ethernet cables for internal System LAN connecting Flexible Service Processor (FSP) cage controller cards (not shown)

2 x Support Elements


**Rear View**

**Front View**

# Processor Drawers (Model H06 and H13)

NEW

- **Model H06 – One Processor Drawer**
  - Up to 6 client engines plus 2 SAPs and 1 IFP
    - No more than 6 CPs, IFLs or ICFs
    - zIIPs and zAAPs based on the number of CPs
  - 8 to 240 GB of client memory
  - Up to 4 I/O Fanouts to support I/O drawers and coupling links

- **Model H13 – Two Processor Drawers**
  - **More processors, memory and I/O fanouts**
  - Up to 13 client engines plus 2 SAPs, 1 IFP and 2 spares
    - No more than 6 CPs, up to 13 IFLs or ICFs
    - zIIPs and zAAPs based on the number of CPs
  - 8 to 496 GB of client memory
  - Up to 8 I/O Fanouts to support I/O drawers and coupling links

**Planning Note: Unlike the zEC12 Books, add or remove of a zBC12 processor drawer requires a scheduled outage**

# zEnterprise BC12 Models H06 versus H13

- **M/T 2828 – Model H06**
  - Air cooled
  - Single Frame
  - Non-raised floor option available
  - 30 LPARs
- **Processor Units (PUs)**
  - One Processor drawer
  - 9 processors
    - 2 SAPs and 1 IFP standard
    - Up to 6 CPs
    - Up to 6 IFLs or ICFs
    - zIIP and zAAPs per ratio to CPs
    - 0 spares when fully configured

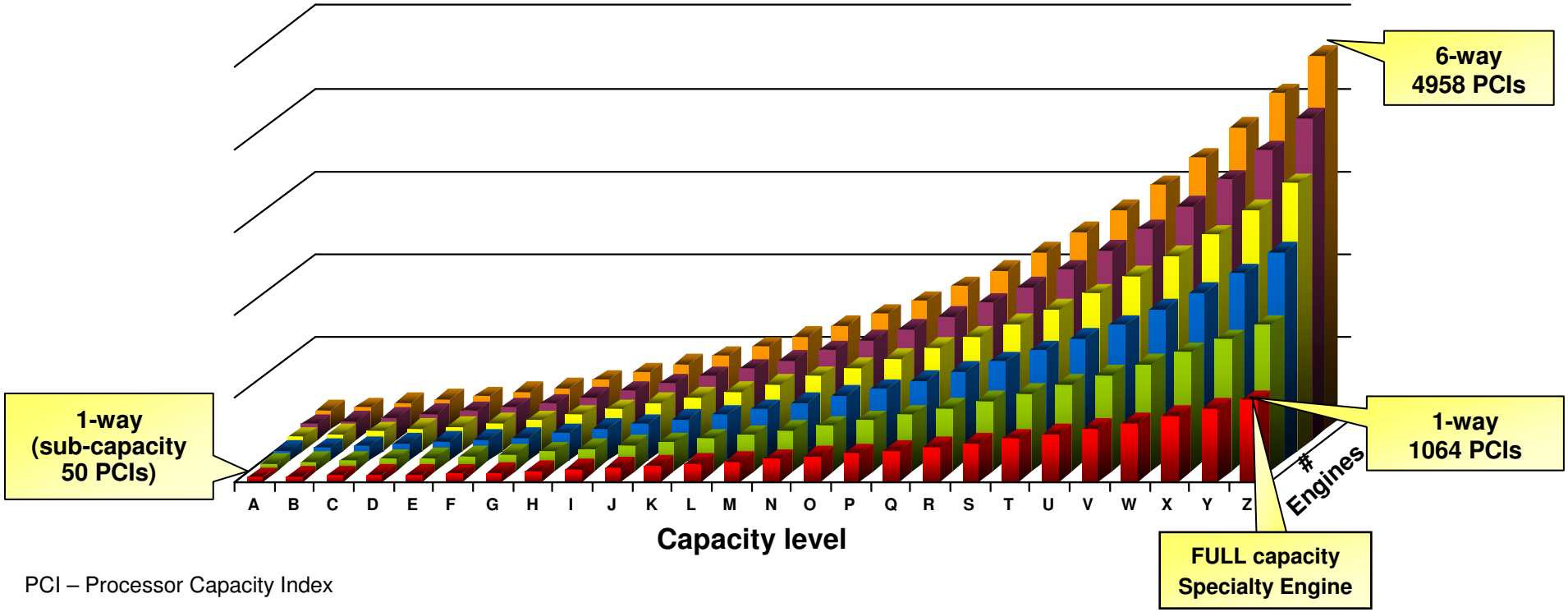
- **M/T 2828 – Model H13**
  - Air cooled
  - Single Frame
  - Non-raised floor option available
  - 30 LPARs
- **Processor Units (PUs)**
  - Two processor drawers
  - 18 processors
    - 2 SAPs and 1 IFP standard
    - Up to 6 CPs
    - Up to 13 IFLs or ICFs
    - zIIPs and zAAPs per ratio to CPs
    - 2 dedicated spare processors

- **Why the H13 (2nd processor drawer)?**
  - More than 6 Customer engines (processors)
  - More than 240 GB memory (Linux?)
  - More than 4 I/O Fanouts for connectivity – especially PSIFB links
    - Needs vary depending on I/O feature and PSIFB link requirements

# zBC12 Sub-capacity Processor Granularity

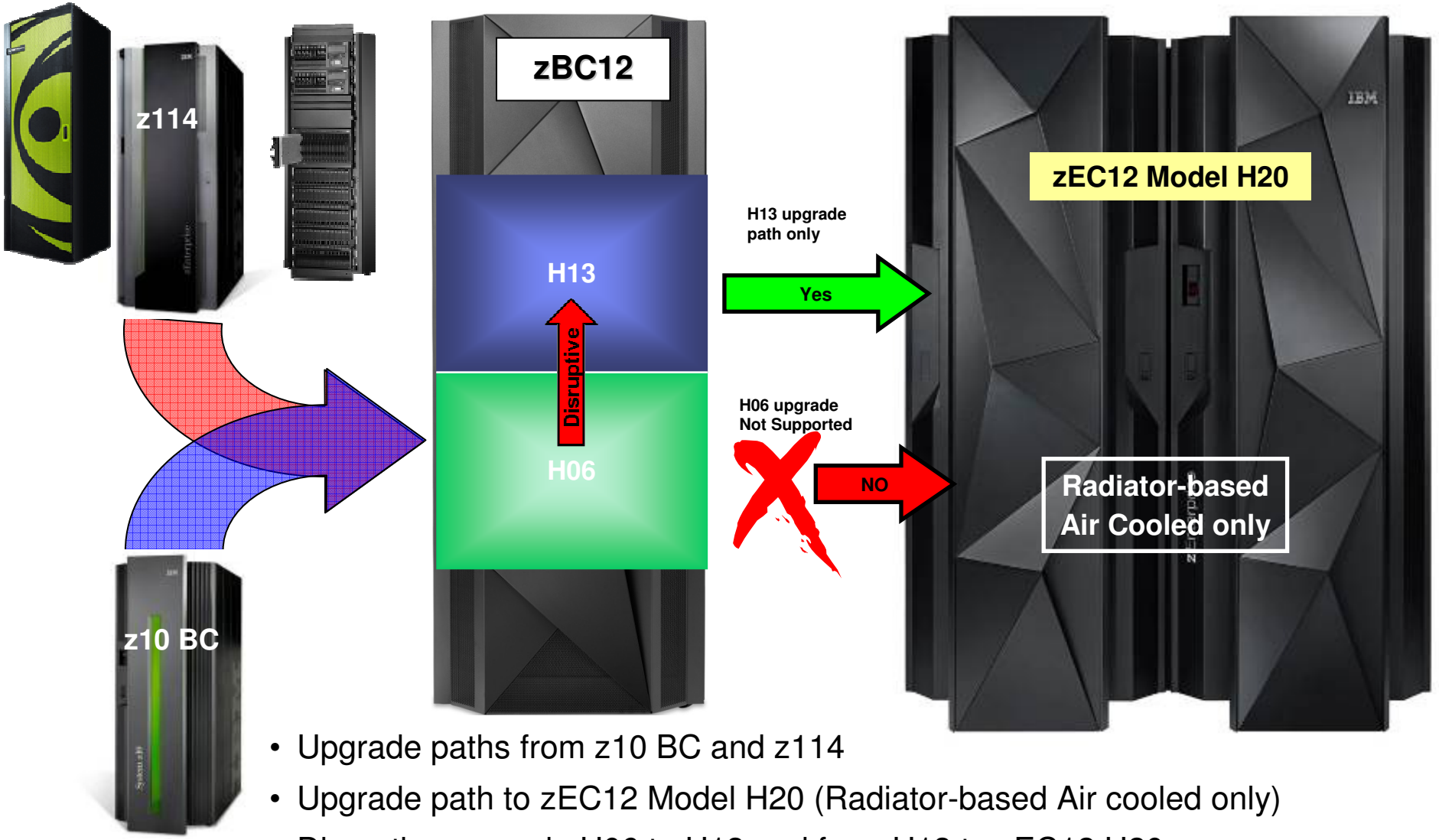
- The zBC12 has 26 CP capacity levels (26 x 6 = 156)
  - Up to 6 CPs at any capacity level
  - All CPs must be the same capacity level
- The entitlement to purchase zAAPs and zIIPs is based on the number of CPs and does not depend on the CP capacity setting
- All specialty engines run at full capacity
  - Processor Value Unit for IFL = 100 (Equal to z114)

| Number of zBC12 CPs | Base Ratio | Ratio z114 To zBC12 |
|---|---|---|
| 1 CP | z114 Z01 | 1.36 |
| 2 CPs | z114 Z02 | 1.37 |
| 3 CPs | z114 Z03 | 1.37 |
| 4 CPs | z114 Z04 | 1.36 |
| 5 CPs | z114 Z05 | 1.36 |
| 6 CPs | z114 Z05 | 1.58 |




PCI – Processor Capacity Index

# zBC12 Upgrade paths




- Upgrade paths from z10 BC and z114
- Upgrade path to zEC12 Model H20 (Radiator-based Air cooled only)
- Disruptive upgrade H06 to H13 and from H13 to zEC12 H20

# I/O Infrastructure

# zBC12 I/O Features supported

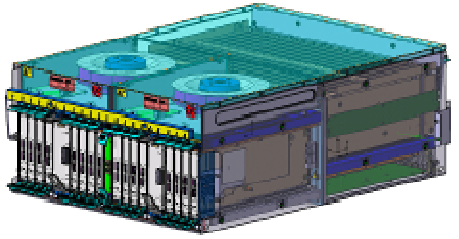
NEW

## Supported features

**PCIe I/O drawer**

- The drawer itself does NOT carry forward but the cards do

**32 slot PCIe I/O drawer**



- **Cards that Carry Forward**
  - OSA-Express4S 1 GbE LX and SX, OSA-Express4S 10 GbE LR and SR
  - FICON Express8S 10Km LX and SX
- **Cards New Build**
  - FICON Express8S 10Km LX and SX
  - **Crypto Express4S (1 processor)**
  - **OSA-Express5S GbE LX and SX, OSA-Express5S 10 GbE LR and SR, OSA-Express5S 1000BASE-T**
  - **IBM Flash Express**
  - **10 GbE RoCE Express**
  - **zEDC Express**

**I/O drawer**

- The drawer itself can carry forward. It cannot be ordered on new build
- One I/O Drawer can be carried forward, two I/O drawers requires **RPQ 8P2733**

**8 slot I/O drawer**

- **Cards that Carry Forward**
  - **Not Supported: ESCON**, older FICON, FICON Express4 LX 4 km (4-port or 2-port), OSA-Express2, PSC
  - OSA-Express3 Gigabit LX and SX, OSA-Express3 1000BASE-T, OSA-Express3-2P 1000BASE-T, OSA-Express3 10 Gigabit LR and SR, OSA-Express3-2P Gigabit SX
  - FICON Express8 10KM LX, FICON Express8 SX, FICON Express4 10KM LX (4-port only), FICON Express4 SX, FICON Express4-2C SX
  - Crypto Express3, Crypto Express3-1P
  - ISC3

# zBC12 Physical Planning

- **Extend / Maintain Datacenter Characteristics**
  - zBC12 one frame system (air cooled, no radiator)
  - No significant increase in weight
  - Maintain floor tile cutouts for raised floor system (same as z10 BC or z114)

- **Better control of energy usage and improved efficiency in your data center**
  - Same number of power cords (2 or 4) as an "equivalent" z114 configuration
  - Maintain box max input power
  - All power and I/O cables the same as z114 except:
    - 400V AC is an orderable feature (Was a z114 RPQ)
    - New 380-415v AC bottom and top exit
    - Different rule for non-raised floor than z114

**Always Refer to the Installation Manual for Physical Planning for details:**

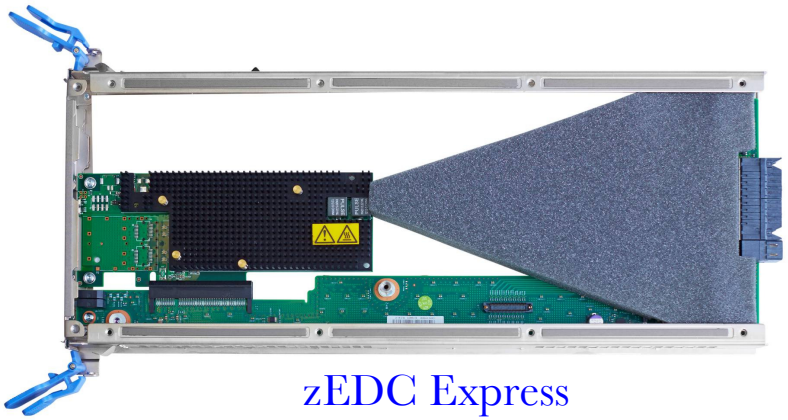
**M/T 2828 – GC28-6923**
**M/T 2458 – GC27-2619-01 (Model 003)**

# IBM zEnterprise Data Compression (zEDC)

# zEDC Express feature


- **Designed to support high performance data serving by providing:**
  - A tenfold increase in data compression rates with much lower CP consumption than using software compression, including software compression that exploits the System z Compression Call instruction (System z hardware data compression)
  - A reduction in storage capacity required (creation of storage “white space”) that in turn reduces the cost of storage acquisition, deployment, operation, and management

- **Configuration:**
  - One compression accelerator per PCIe I/O feature card
  - Supports concurrent requests from up to 15 LPARs
  - Sustained aggregate 1 GBps compression rate when given large block inputs
  - Up to 8 features supported by zBC12 or zEC12
  - **Minimum two feature configuration recommended**



zEDC Express
FC # 0420

- **Exploitation and Compatibility**
  - Exclusive to zEC12 GA2 and zBC12
  - z/OS Support Planned:

    z/OS V2.1 – Hardware exploitation for SMF log data in September 2013, for BSAM and QSAM SOD* for 1Q2014, DFSMSdss and DFSMShsm SOD* for 3Q2014, and in a future update of IBM SDK for z/OS Java

    z/OS V1.13 and V1.12 - Software support only, no hardware compression/decompression acceleration support

    z/VM SOD* for guest support in a future deliverable

    Authorized APIs for ISV use are planned

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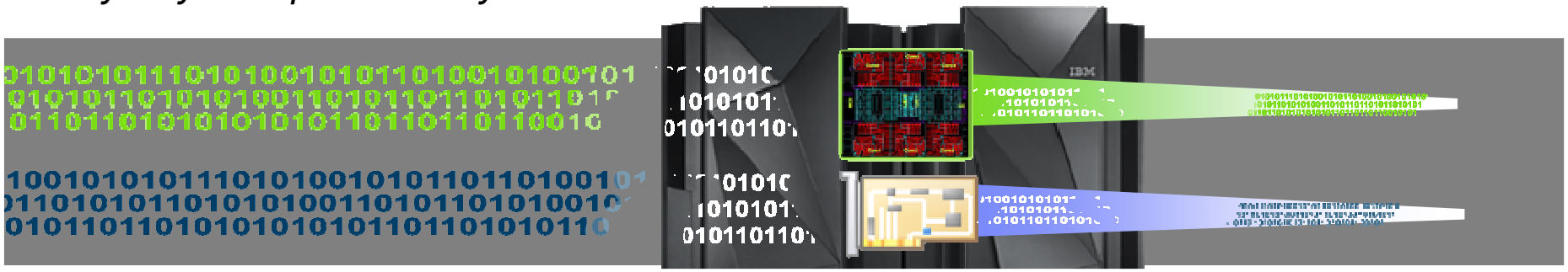
# New hardware data compression accelerator can reduce CPU and storage

*Every day 2.5 quintillion bytes of data are created*



*Compress your data*

*4X**

*(efficient system data compression)*

*Up to 118X reduction in CPU and up to 24X throughput improvement when zlib uses zEDC ***

Data Ready

Efficiently compress active data by providing a low CPU, high performance, dedicated compression accelerator

Industry standard compliance compression for cross platform data distribution **

## *Typical Client Use Cases:*

**Significant disk savings** with trivial CPU cost for large BSAM/QSAM sequential files

**More efficiently store audit data** in application logs

**Reduce the amount of data** needed for data migration and backup/restore **

**Transparent acceleration** of Java compressed applications **

NEW **zEDC Express**

NEW **z/VM 6.3 support for guests*****

NEW **z/OS V2.1 zEDC**

* 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 specific workload, configuration and software levels

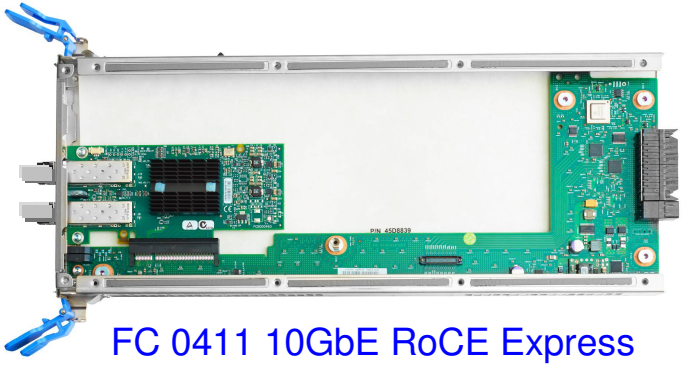
*** All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

# 10GbE RoCE Express

# 10GbE RoCE Express Feature

NEW

- **Designed to support high performance system interconnect**
  - Shared Memory Communication (SMC) over Remote Direct Memory Access (RDMA) (SMC-R) Architecture exploits RDMA over Converged Ethernet (CE) - RoCE
  - Shares memory between peers
  - Read/write access to the same memory buffers without application changes
  - Designed to increase transaction rates greatly with low latency and reduced CPU cost
- **Configuration**
  - One 10 GbE SFP+ port enabled per feature
  - Each feature must be dedicated to one LPAR
  - A switched connection requires an enterprise-class 10 GbE switch
    - SR Optics, *Global Pause* enabled & *Priority Flow Control (PFC)* disabled
  - Point-to-point connection is supported
  - Not defined as a CHPID and does not consume a CHPID number
  - Up to 16 features supported on a zBC12/zEC12
  - Link distance up to 300 meters over OM3 50 micron multimode fiber




FC 0411 10GbE RoCE Express

OM3 fiber recommended

- **Exploitation and Compatibility**
  - Exclusive to zEC12 GA2 and zBC12
  - z/OS V2.1 Exploitation
  - SOD* - Future update of IBM SDK for z/OS Java
  - SOD* - z/VM V6.3 support for guests to exploit the 10GbE RoCE Express
  - Linux on System z – IBM is working with Linux distribution partners to include support in future releases

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# Optimize server to server networking – transparently

## *"HiperSockets™-like" capability across systems*

*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 *****


### *Shared Memory Communications (SMC-R):*

Exploit RDMA over Converged Ethernet (RoCE) with qualities of service support for dynamic failover to redundant hardware

### *Typical Client Use Cases:*

Help to reduce both latency and CPU resource consumption over traditional TCP/IP for communications across z/OS systems

**Any** z/OS TCP sockets based workload can **seamlessly** use SMC-R without requiring any application changes

NEW **z/OS V2.1 SMC-R**

NEW **z/VM 6.3 support for guests***

NEW **10GbE RoCE Express**

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

** 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.

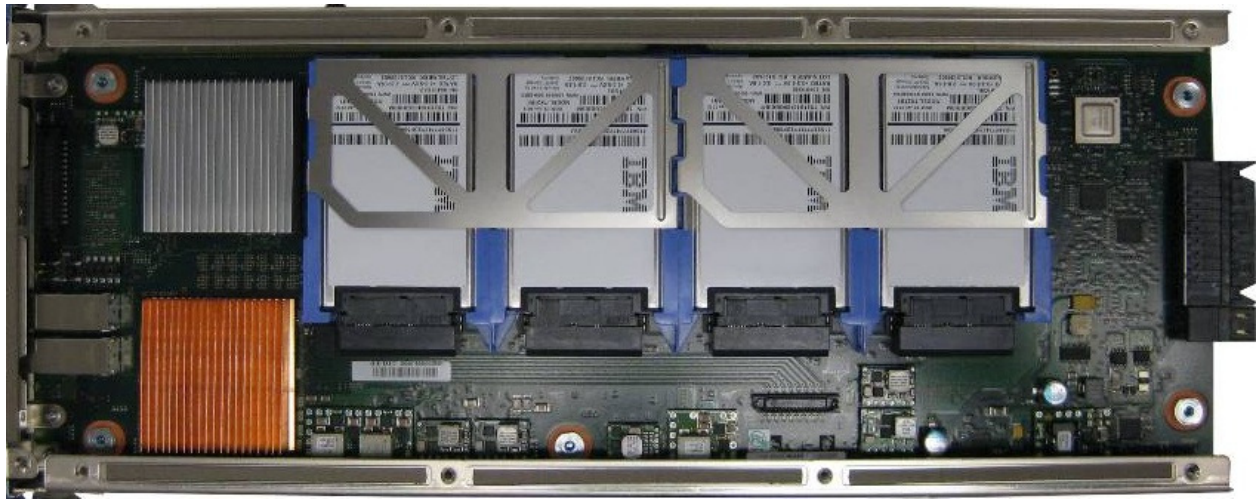
*** Based on internal IBM benchmarks using a modeled CICS workload driving a CICS transaction that performs 5 DPL (Distributed Program Link) calls to a CICS region on a remote z/OS system via CICS IP interconnectivity (IPIC), using 32K input/output containers. Response times and CPU savings measured 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.

# Flash Express

# Flash Express PCIe Adapter Card

Four 400 GB SSDs support
1.4 TB of Storage Class Memory
(AES encrypted)

Cable connections to form a RAID 10 Array
on a pair of Flash Express Cards

Exclusive to IBM zEC12 and zBC12
Up to four Flash Express pairs per system

# Flash Express cuts away at availability lapses

*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*

*Up to 28%*

*Improvement in DB2 throughput leveraging Flash Express with Pageable Large Pages (PLP)*


Innovative PCI-e storage-class memory

Enables the use of large 1 MB pageable pages

***Typical Client Use Cases:***

**Improve availability and performance** during workload transition and spikes

**Faster, less disruptive** diagnostics

NEW **Cost effective, resilient solution** for overflow of MQ shared queues in Coupling Facility (SOD) *

**Supported on z/OS V1.13 or Higher ****

NEW **Dynamic Reconfiguration for Flash Express**

**Flash Express feature for zEC12 and zBC12**

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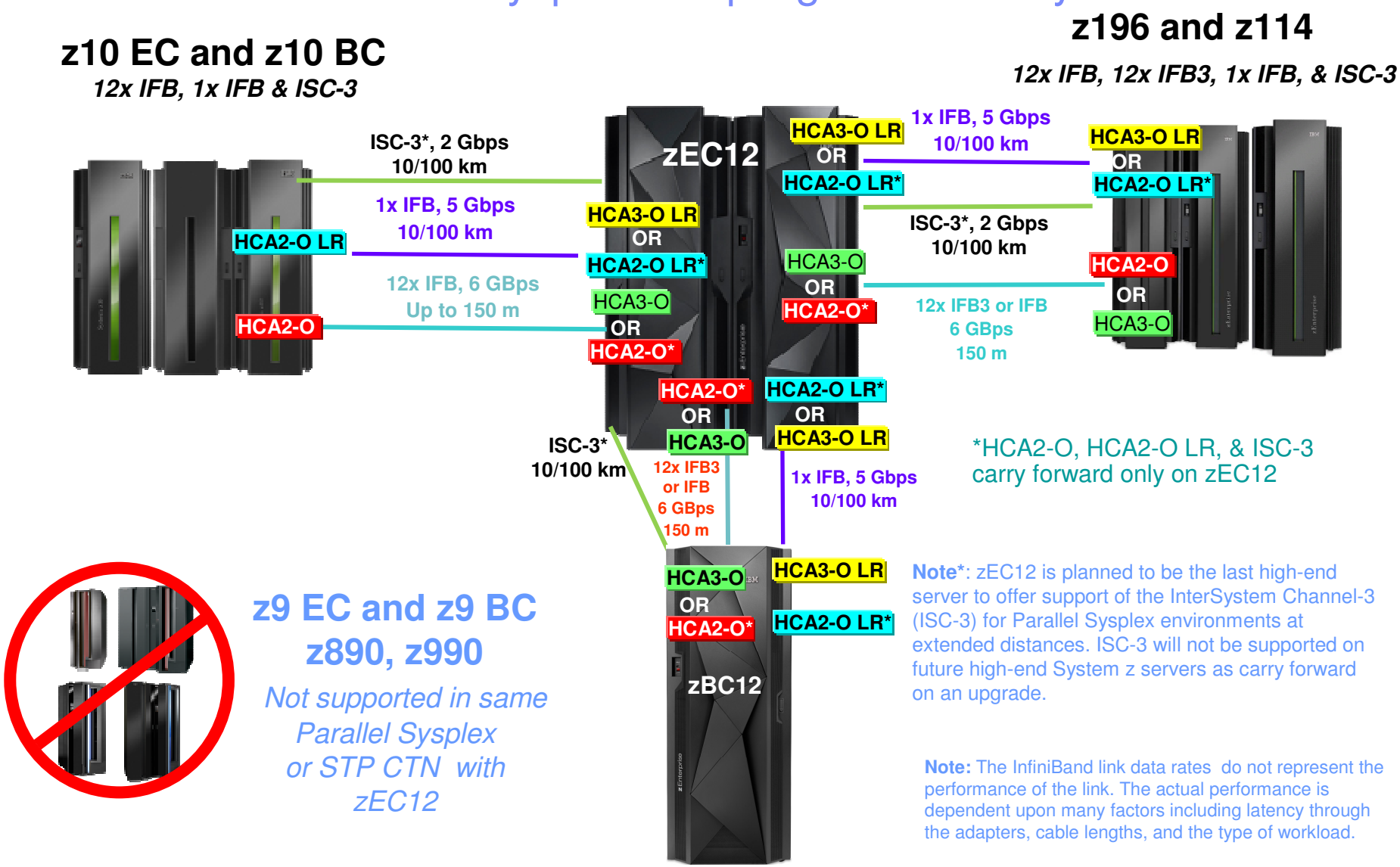
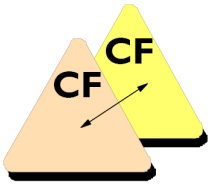
** With the March 2013 RSM Enablement Offering Web deliverable.

# Parallel Sysplex and Server Time Protocol

# zEC12/zBC12 Parallel Sysplex Coupling Connectivity



# zBC12 and zEC12 GA2 CFCC Level 19: Coupling "Thin Interrupts" Support


- A z/Architecture enhancement allows a new class of "thin interrupts" to be generated when Parallel Sysplex coupling events such as the following occur:
  - On the CF side: If DYNDISP=THININTERRUPT (new) is specified
    - A CF command is received by a CF LPAR with shared logical processors (e.g. arrival of a primary CF command that needs to be processed)
    - A CF signal is received by a CF LPAR with shared logical processors (e.g. arrival of a secondary message duplexing signal that needs to be processed)
    - At completion of a secondary message sent by the CF (e.g. completion of a secondary message duplexing signal sent by the image)
  - On the z/OS side: If enabled in COUPLExx or by SETXCF FUNCTIONS in z/OS 2.1 or z/OS 1.13 and 1.12 with PTFs
    - A CF signal is received (e.g. arrival of a secondary message from another system)
    - An asynchronous CF operation completes on a z/OS image
- The coupling thin interrupt causes PR/SM to dispatch the partition with shared logical processors, if it is not already dispatched, to allow the request or signal to be processed
- Once dispatched, the CF or z/OS partition with shared logical processors:
  - Will use existing "poll for work" logic as-is to locate and process the work.
  - The partition will give up control:
    - When work is exhausted OR
    - When PR/SM takes the physical processor away from the shared logical processor
  - The new thin interrupt simply expedites dispatching of the partition.
- This MAY in some cases eliminate the need to dedicate processors to a CF; but, **Dedicated logical processors are still recommended for best CF performance**

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# THANK YOU

## Discussion and questions…

# Backup Charts

# IBM zEnterprise BC12 (zBC12) Key Dates – 2013 – Driver Level 15F


- IBM zEnterprise BC12 (zBC12) Announcement – July 23, 2013
  - First Day Orders for GA Systems
  - Resource Link™ support available
  - Capacity Planning Tools (zPCR, zTPM, zCP3000) - updated
  - SAPR Guide and SA Confirmation Checklist available
    - New, SAPR Guide for zBC12, SA13-002-01
    - New, SAPR Guide for zBX Model 003, SA12-004-04

- ITSO Redbooks – July 23, 2013 - Draft Versions
  - New – IBM zBC12 Technical Guide, SG24-8138-00
  - Updated – IBM zEnterprise EC12 and zBC12 Technical Introduction, SG24-8050-01
  - Updated - IBM zEnterprise EC12 Technical Guide, SG24-8049-01
  - Updated - IBM zEnterprise System Connectivity Guide, SG24-5444-14

- IBM System z Batch Network Analyzer (Target date – 4Q2013)
- Technical Leadership Library (TLLB) – July 23, 2013
  - IBMers: search for TLLB at:
    http://w3.ibm.com/sales/support

# IBM zEnterprise BC12 (zBC12) Availability Dates – 1 of 2

- **September 20, 2013**
  - Features and functions for the IBM zEnterprise BC12
  - IBM zEnterprise BC12 (zBC12) Models H06 and H13
  - IBM zEnterprise BladeCenter Extension (zBX) Model 003 attached to a zBC12
  - IBM zEnterprise 114 (z114) upgrades to zBC12 Models H06 and H13
  - z114 with zBX Model 002 upgrades to zBC12 Models H06 and H13 with zBX Model 003
  - IBM System z10 Business Class (z10 BC) upgrades to zBC12 Models H06 and H13
  - IBM zEnterprise 196 (z196) with zBX Model 002 upgrades to zBX Model 003 attaching to a new zBC12
  - z114 with zBX Model 002 upgrades to zBX Model 003 attaching to a new zBC12
  - zBX Model 003 move from a zEC12 to a new zBC12
  - Field-installed features and conversions that are delivered solely through a modification to the machine's Licensed Internal Code (LIC)
  - IBM zEnterprise Unified Resource Manager enhancements:
    - CPU management enhancement to the Automate Firmware Suite (#0020) for the IBM BladeCenter HX5 blade in the zBX Model 003
    - Availability management enhancement to the Automate Firmware Suite (#0020) for the IBM BladeCenter HX5 and IBM BladeCenter PS701 blades in the zBX Model 003
  - IBM zAware (#0138, #0139, #0140, #0141, #0142, #0143, #0150, #0151)
  - Flash Express (#0402)
  - zEDC Express (#0420)
  - 10GbE RoCE Express (#0411)
  - Crypto Express4S (#0865)
  - Common Cryptographic Architecture (CCA) enhancements on zBC12
  - Crypto Express4S EP11 enhancements
  - TKE workstation (#0842)
  - TKE 7.3 LIC (#0872) on zBC12, z196, and z114
  - 24k subchannels for FICON Express
  - OSA-Express5S (#0413, #0414, #0415, #0416, #0417)
  - Coupling Facility Control Code (CFCC) Level 19
  - Hardware Management Console (#0092)

# IBM zEnterprise BC12 (zBC12) Availability Dates – 2 of 2

- **September 30, 2013**
  - z/OS V2.1 zEnterprise Data Compression (zEDC) acceleration for SMF log data
- **October 31, 2013**
  - MES features with already existing PCIe I/O drawers (#4009)
  - Flash Express (#0402)
  - zEDC Express (#0420)
  - 10GbE RoCE Express (#0411)
  - Crypto Express4S (#0865)
  - FICON Express8S (#0409, #0410)
  - OSA-Express5S (#0413, #0414, #0415, #0416, #0417)
- **December 31, 2013**
  - MES features for zBC12 and zBX Model 003
  - Model conversions - zBC12 Model H06 to zBC12 Model H13
  - zBX Model 003 move from one zBC12 to an existing zBC12
  - zBX Model 003 move from a zEC12 to a zBC12
  - z196 with zBX Model 002 upgrades to zBX Model 003 attaching to an existing zBC12
  - z114 with zBX Model 002 upgrades to zBX Model 003 attaching to an existing zBC12
- **4Q 2013**
  - CCA enhancements on z196 and z114
  - GDPS automated multisite recovery for zBX

# IBM zEnterprise EC12 (zEC12) GA2 Availability Dates

- September 20, 2013
  - Features and functions for the zEC12
  - Common Cryptographic Architecture (CCA) enhancements on zEC12
  - TKE 7.3 LIC (#0872) on zEC12, IBM zEnterprise 196 (z196), and IBM zEnterprise 114 (z114)
  - Hardware Management Console (#0092) on zEC12 and zBX Model 003
- September 30, 2013
  - z/OS V2.1 zEnterprise Data Compression (zEDC) acceleration for SMF log data
- October 31, 2013
  - MES features adds
    - zEDC Express (#0420)
    - 10GbE RoCE SR (#0411)
    - OSA-Express-5S cards (#0413, #0414, #0415, #0416, #0417)
- December, 2013
  - z/OS V2.1 zEDC acceleration for extended format BSAM/QSAM sequential data
- 4Q 2013
  - CCA enhancements on z196 and z114
  - GDPS automated multisite recovery for zBX

# IBM System z10 family – Withdrawn from Marketing, June 30, 2012

- Field installed features and conversions including STP LIC that are delivered solely through a modification to the machine's Licensed Internal Code (LIC) will continue to be available until June 30, 2013. After June 30, 2013, features and conversions that are delivered solely through a modification to the LIC will be withdrawn.
- The Capacity on Demand offerings that are configured prior to withdrawal are usable until the offering expiration date or termination date, as applicable

## IBM System z10 EC (2097)

- Announce 2/08 – Server w/ up to 77 PU cores
- 5 models – Up to 64-way
- Granular Offerings for up to 12 CPs
- PU (Engine) Characterization
  - CP, SAP, IFL, ICF, zAAP, zIIP
- On Demand Capabilities
  - CoD, CIU, CBU, On/Off CoD, CPE
- Memory – up to 1.5 TB for Server and up to 1 TB per LPAR
  - 16 GB Fixed HSA
- Channels
  - Four LCSSs
  - 2 Subchannel Sets
  - MIDAW facility
  - 63.75 subchannels
  - Up to 1024 ESCON® channels
  - Up to 336 FICON® channels
  - FICON Express2, 4 and 8
  - zHPF
  - OSA 10 GbE, GbE, 1000BASE-T
  - InfiniBand® Coupling Links
- Configurable Crypto Express3
- Parallel Sysplex clustering
- HiperSockets™ – up to 16
- Up to 60 logical partitions
- Enhanced Availability
- Operating Systems
  - z/OS, z/VM, z/VSE™, TPF, z/TPF, Linux on System z

## IBM System z10 BC (2098)

- Announced 10/08 – Server w/ 12 cores
- Single model – Up to 5-way CPs
- High levels of Granularity available
  - 130 Capacity Indicators
- PU (Engine) Characterization
  - CP, SAP, IFL, ICF, zAAP, zIIP
- On Demand Capabilities
  - CoD, CIU, CBU, On/Off CoD. CPE
- Memory – up to 256 GB for Server
  - 8 GB Fixed HSA
- Channels
  - Two LCSSs
  - 2 Subchannel Sets
  - MIDAW facility
  - 63.75 subchannels
  - Up to 480 ESCON channels
  - Up to 128 FICON channels
  - FICON Express2, 4 and 8
  - zHPF
  - OSA 10 GbE, GbE, 1000BASE-T
  - InfiniBand Coupling Links
- Configurable Crypto Express3
- Parallel Sysplex clustering
- HiperSockets – up to 16
- Up to 30 logical partitions
- Enhanced Availability
- Operating Systems
  - z/OS, z/OS.e, z/VM, z/VSE, TPF, z/TPF, Linux on System z

# Supported I/O features to consider removing on an MES upgrade

| I/O Feature Description | Reason to Consider Removal |
|---|---|
| **FICON Express4** | ***SOD: Not supported on future System z servers**<br>Lower performance than FICON Express8S or FICON Express8<br>**Note: *Carry forward* FICON Express4 if 1 Gbps point-to-point connectivity is required** |
| **ISC-3 Coupling Links** | ***SOD: Not supported on future System z servers**<br>Less responsive and less bandwidth than InfiniBand 1x or 12x coupling links<br>Does not support for multiple coupling CHPIDs per link |
| **OSA-Express3** | ***SOD: Not supported on future System z servers**<br>10GbE – Lower performance than 10 GbE OSA-Express4S or OSA-Express5S |
| **Crypto-Express3** | ***SOD: Not supported on future System z servers**<br>Does not support the Public-Key Cryptography Standard (PKCS) EP11 mode |
| **FICON Express8** | Fewer I/O operations per second and lower bandwidth than FICON Express8S |
| **Note: If any of the old technology I/O features above remains on a zBC12, two or more old technology I/O fanouts will be required. The fanout slots might be better used to support an additional PCIe I/O drawer or PSIFB coupling.** | |
| **HCA2-O 12x PSIFB**<br>**HCA2-O LR 1x PSIFB** | ***SOD: Not supported on future System z servers**<br>12x PSIFB – No support for the improved IFB-3 protocol supported by HCA3-O<br>1x PSIFB – Half the number of ports (only 2) compared to HCA3-O LR |

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# zBC12 Summary

# zBC12 Offering Plan Content Summary

**Machine Type 2828**

2 Models – H06, H13
Single frame, air cooled
Non-raised floor option available
Overhead Cabling and DC Power Options

## Base Content

**Processors**
13 available PUs
Up to 6 CPs at 26 capacity points,
50 to 4958 MIPS
zIIP/zAAP/IFL/ICF/IFP (integrated firmware processor)
Up to the equivalent of 8733 MIPS with 13 IFL's
Uni- Processor Capacity 1064 MIPS
9 PU cores (using 4 and 5 core PU SCMs) per drawer (One for H06 and two for H13)
2 SAPs per system, standard
2 spares designated for Model H13

**Memory**
System minimum = 16 GB
16 GB HSA separately managed
RAIM standard
Maximum 496 GB (model H13)
Increments of 8 or 32 GB

**I/O**
Up to 8 Legacy Channel Cards (16 via RPQ)
Up to 64 PCIe Channel Cards
Concurrent Add, Remove & Replace of IO drawers

**Coupling**
Up to 16 12x PSIFB ports (model H13)
Up to 32 1x PSIFB ports (model H13)


## Extended Content

**From zEC12 GA1:**
Crypto Express4S
IBM zAware
Flash Express

**IO enhancements**
zEDC Express
10GbE RoCE Express
OSA-Express5S

**zManager Enhancements**
CPU management for xBlades support
Ensemble Availability Manager

**Security Enhancements**
Crypto EP11 enhancements

**Coupling Facility Enhancements**
CFCC Flash Exploitation
Coupling Thin Interrupts

## Migration

Disruptive upgrade from H06 to H13
Upgrades from z10 BC and z114
Upgrades to zEC12 H20, radiator-based air cooled only, from zBC12 H13

# 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** | Up to 4 | Up to 3 | Up to 3 | Up to 3(1) | Up to 3(1) |
| **I/O slots per I/O drawers/ PCIe I/O drawers** | 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 | Depends on CPs | Depends on 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) | |

# Notes for Configuration comparisons chart

(1) Up to 3 drawers standard, a combination of I/O drawers and PCIe I/O drawers as defined

| H06 | | H13 | |
|---|---|---|---|
| I/O drawer | PCIe I/O drawer | I/O drawer | PCIe I/O drawer |
| 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 |
| 0 | 2 | 0 | 2 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 1 | 1 |
| | | 1 | 2 |
| 2* | 0 | 2* | 0 |
| 2* | 1 | 2* | 1 |

* 2nd I/O drawer offered via an RPQ

(2) 28 slots per I/O cage, 8 card slots per I/O drawer, 32 per PCIe I/O drawer
(3) FICON count is based on 2 PCIe I/O drawers (z114/zBC12 or 4 I/O drawers (z10 BC)
(4) Quantity of 0 ESCON channels is consistent with Statement of Direction
(5) Quantity of 0 ICB-4 links is consistent with Statements of Direction
(6) 8 ports of 12x IFB, 16 ports of 1x IFB links available on model H06 based on 4 HCA
(7) 16 ports of 12x IFB, 32 ports 1x IFB links available on model H13 based on 8 HCA
(8) ISC-3s. Carry forward only for zBC12/zEC12. Not available for 'new' build or migration offerings

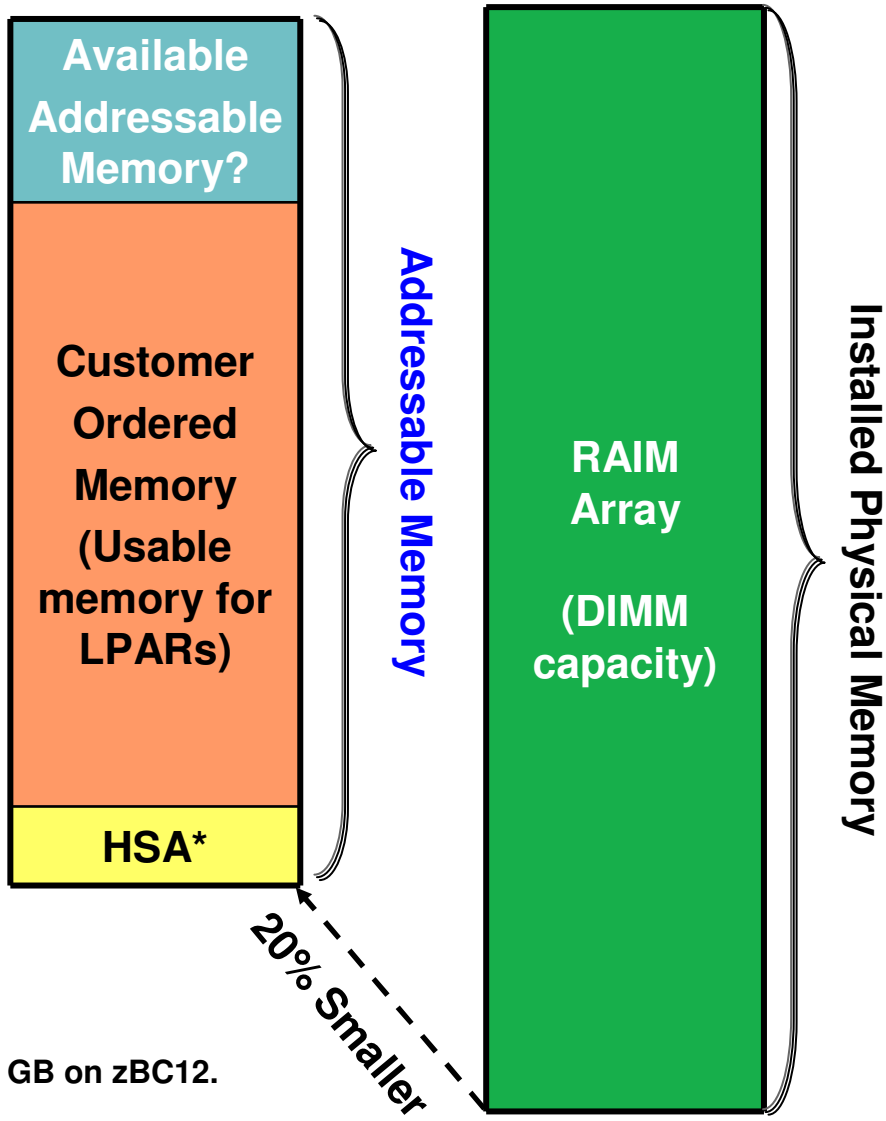
# IBM System z Config Comparisons, zBC12 vs. zEC12 Model H20

| | zBC12 H06 | zBC12 H13 | zEC12 Model H20 |
|---|---|---|---|
| **Uniprocessor Performance** | 1064 MIPs | | 1514 MIPs |
| **z/OS Capacity** | 50 – 4958 MIPs | | 240 – 21380 MIPs |
| **Maximum System Memory** | 240 GB | 496 GB | 704 GB |
| **Configurable Engines** | 6 | 13 | 20 |
| **Configurable CPs** | 0 – 6 | | 0 - 20 |
| **LPARS/CSS** | 30/2 | | 60/4 |
| **HiperSockets** | 32 | | 32 |
| **I/O Cages/ I/O drawers/ PCIe I/O drawers** | 0/2*/2 | 0/2*/2 | 1/2/5 |
| **I/O slots per Cage/ I/O drawers/ PCIe I/O drawers** | 0/8/32 | | 28/8/32 |
| **FICON® Channels** | 128(3) | | 256 |
| **OSA Ports (10GbE/1GbE/1000BASE-T)** | 48/96/96 | | 48/96/96 |
| **ESCON® Channels** | 0(4) | | 0(4) |
| **IFB host bus Bandwidth PCIe Gen2 Bandwidth** | 6.0 GB/sec (IFB) 8.0 GB/sec (PCIe) | | 6.0 GB/sec 8.0 GB/sec |
| **ICB-4/ISC-3(8)/PSIFB** | 0(5)/32/8 -16(6) | 0(5)/32/16 - 32(7) | 0(5)/48/16 - 32 |
| **zIIP/zAAP Maximum Qty** | Depends on CPs | Depends on CPs | Depends on CPs |
| **IFL Maximum Qty** | 6 (4518 MIPs) | 13 (8199 MIPs) | 20 (21380 MIPs) |
| **ICF Maximum Qty** | 6 | 13 | 20 |
| **Capacity Settings** | 156 | 156 | 80 |
| **Upgradeable** | Upgrade H06 to H13, H13 to zEC12 Model H20 (Radiator cooled only) | | zEC12 H43, H66, H89, HA1 Radiator and Water Cooled |

See previous chart for foot notes

# zEC12 and zBC12 Memory Usage and Allocation

- **Installed Physical Memory** (DIMM capacity) in configuration reports is **RAIM Array** size. **Addressable Memory** for customer LPARs and HSA is 20 percent smaller.
- Servers are configured with the most efficient configuration of memory DIMMs that can support **Addressable Memory required for Customer Ordered Memory plus HSA**. In some cases, there will be **Available Addressable Memory** that **might** support one or more concurrent LIC CC Customer Memory upgrades with no DIMM changes.
  - Note: DIMM changes require a disruptive POR on zBC12 and on zEC12 Model H20. They are always done without a POR on zEC12 models with multiple books using Enhanced Book Availability (EBA). On those models, some or all LPARs can continue to run during with one book out of service to have DIMMs changed or added. Probably all LPARs, if **Flexible Memory** is selected.
- To determine the size of the largest LIC CC Customer Memory upgrade possible, examine the configurator default "**Memory Plan Ahead Capacity**" field. If the customer requires a LIC CC upgrade larger that that, configure Plan Ahead Memory by selecting a larger "Memory Plan Ahead Capacity" target value.




***HSA size is 32 GB on zEC12, 16 GB on zBC12.**

# zBC12 Model H06 and Model H13 Memory (New Build)


- zBC12 has the same RAIM Memory infrastructure as z114
- Minimum client memory is 8 GB for both models with 8 GB or 32 GB purchase increments
- HSA is 16GB on both models

| H06 Physical Memory RAIM GB<br>Addressable Memory GB | Client GB | Increment GB |
|---|---|---|
| 40 RAIM (10 x 4GB)=<br>32 for HSA + Client | 8<br>16 | 8 |
| 80 RAIM (10 x 8GB)=<br>64 for HSA + Client | 24<br>32<br>40<br>48 | 8 |
| 160 RAIM (10 x 16 GB)=<br>128 for HSA + Client | 56<br>64<br>72<br>80<br>88<br>96<br>104<br>112 | 8 |
| 320 RAIM (10 x 32 GB)=<br>256 for HSA + Client | 144<br>176<br>208<br>240 | 32 |

| H13 Physical Memory RAIM GB<br>Addressable Memory GB | Client GB | Increment GB |
|---|---|---|
| 80 RAIM (20 x 4GB)=<br>64 for HSA + Client | 16<br>24<br>32<br>40<br>48 | 8 |
| 120 RAIM (10 x 4GB + 10 x 8 GB)=<br>96 for HSA + Client | 56<br>64<br>72<br>80 | 8 |
| 160 RAIM (20 x 8 GB)=<br>128 for HSA + Client | 88<br>96<br>104<br>112 | 8 |
| 240 RAIM (10 x 8 GB + 10 x 16 GB)=<br>192 for HSA + Client | 144<br>176 | 32 |
| 320 RAIM (20 x 16 GB) =<br>256 for HSA + Client | 208<br>240 | 32 |
| 480 RAIM (10 x 16 GB + 10 x 32 GB)=<br>384 for HSA + Client | 272<br>304<br>336<br>368 | 32 |
| 640 RAIM (20 x 32 GB)=<br>512 for HSA + Client | 400<br>432<br>464<br>496 | 32 |

**Memory upgrades that require DIMM changes are disruptive. Plan Ahead Memory can be added to eliminate disruption. On both models, memory upgrades within each row (same color) are concurrent without adding Plan Ahead Memory.**

# Last Slide

# z/VM Update with z/VM 6.3

Version 2.2+

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z/VM Development & Planning
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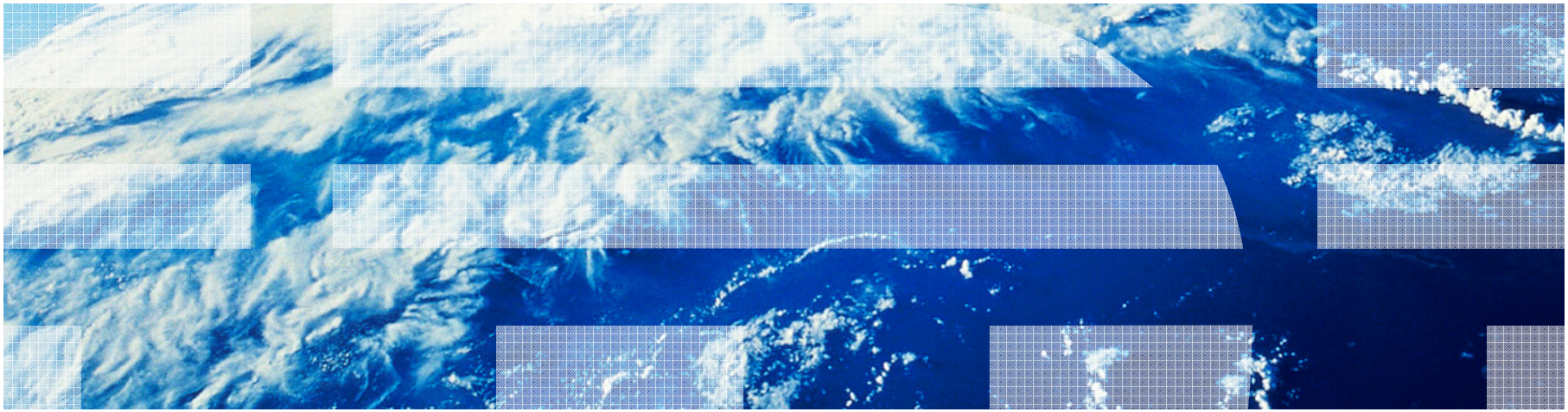

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| IBM Logo* | Tivoli* | System z114 |
| DB2* | z10 BC | System zEC12 |
| Dynamic Infrastructure* | z9* | |
| GDPS* | z/OS* | |
| HiperSockets | z/VM* | |
| Parallel Sysplex* | z/VSE | |
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- Emily Hugenbruch
- Romney White

# Agenda

- Release Status and Information
- z/VM Version 6 Release 2 – A Quick Review
- z/VM Version 6 Release 3
- Value of z/VM

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- Futures and Statements of Direction
- References and Backup

# Release Status and Information

# z/VM Release Status Summary

| z/VM | Level | GA | End of Service | End of Marketing | Minimum Processor Level | Security Level |
|---|---|---|---|---|---|---|
| Ver 6 | Rel 3 | 7 / 2013 | 4 / 2017 | | z10 | EAL 4+[2] OSPP-LS |
| | Rel 2 | 12 / 2011 | 4 / 2015 | 3Q / 2013 | z10 | - |
| | Rel 1 | 10 / 2009 | 4 / 2013 | 12 / 2011 | z10 | EAL 4+ OSPP-LS |
| Ver 5 | Rel 4 | 9 / 2008 | 12 / 2014[1] | 3 / 2012 | z800, z900 | - |
| | Rel 3 | 6 / 2007 | 9 / 2010 | 9 / 2010 | z800, z900 | EAL 4+ CAPP/LSPP |

# z/VM Version 5 Release 4


- The last release of z/VM to support IBM System z9 and older processors
  - **No longer available as of March 12, 2012**
  - Also supports the zEC12
- End of Service has been extended to **December 31, 2014** or end of IBM service for System z9, whichever is ***later***
  - Was September 30, 2013
  - Later, but not *too* much later!
  - Be on the lookout for Delayed Onset Panic Syndrome
- Note the SOD in the V6.3 announce: The IBM zEnterprise EC12 and IBM zEnterprise BC12 are planned to be the last System z servers supported by z/VM V5.4.

# A quick look at z/VM Version 6 Release 2

# z/VM Version 6 Release 2


- Generally available December 2, 2011

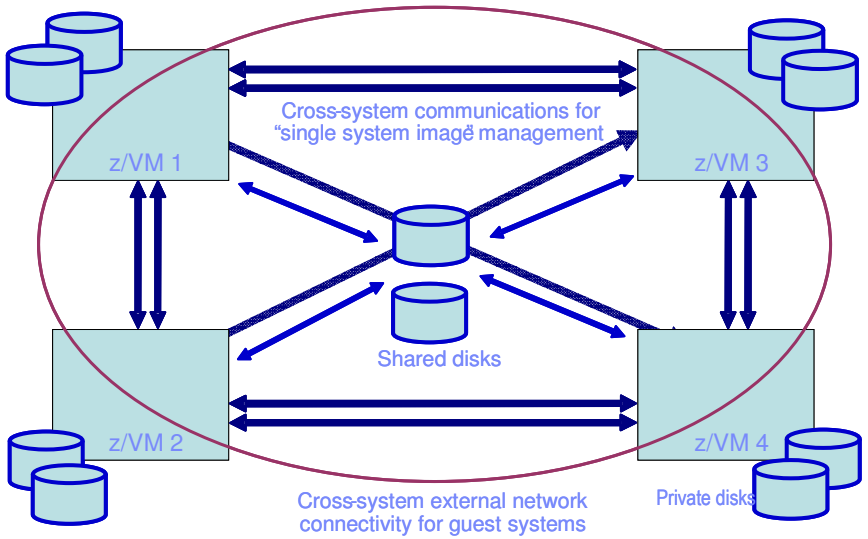
- Has been withdrawn from marketing 3Q 2013
  - Concurrent with z/VM V6.3 GA

- Major changes include:
  - Single System Image
  - Live Guest Relocation

z/VM V6.2
End of Service
April 30, 2015

# Single System Image (SSI) Feature
# Clustered Hypervisor with Live Guest Relocation

- Optional priced feature
- Connect up to four z/VM systems as members of a Single System Image cluster
- Cluster members can be run on the same or different System z servers
- Simplifies management of a multi-z/VM environment
  - Single user directory
  - Cluster management from any member
    - Apply maintenance to all members in the cluster from one location
    - Issue commands from one member to operate on another
  - Built-in cross-member capabilities
  - Resource coordination and protection of network and disks



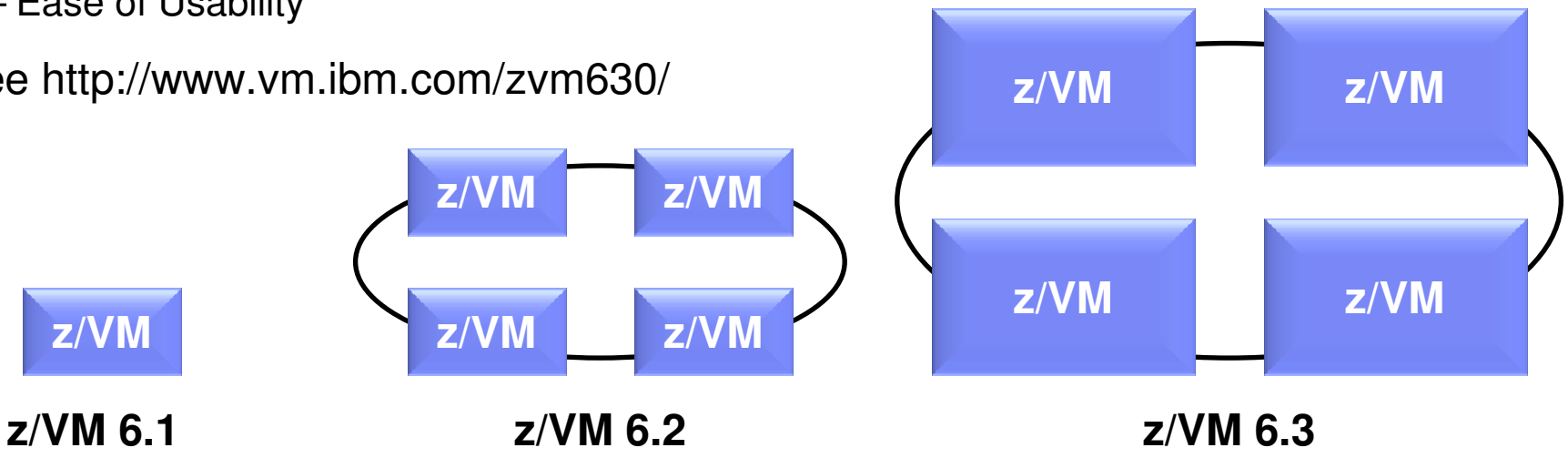
# Benefits and Uses of z/VM SSI Clusters

- Horizontal growth of z/VM workloads
  - Increased control over virtual server sprawl
  - Distribution and balancing of resources and workloads
- Flexibility for planned outages for service and migration
    - z/VM
    - Hardware
  - Less disruptive to virtual server workloads
- Workload testing
  - Different service/release levels
  - Various environments (stress, etc.)
  - New/changed workloads and applications can be tested before moving into production
- Simplified system management of a multi-z/VM environment
  - Concurrent installation of multiple-system cluster
  - Single maintenance stream
  - Reliable sharing of resources and data

# z/VM Version 6 Release 3
# Announced 23-July-2013

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

- Preview announcement on February 5, 2013
- Product announcement: July 23, 2013
- General Availability: July 26, 2013 (preview stated 3rd Quarter 2013)
- Continued Evolution:
  - Improved TCO
  - Scaling and efficiency improvements
  - Ease of Usability
- See http://www.vm.ibm.com/zvm630/



# Reduce the number of z/VM systems you need to Manage z/VM 6.3


- Expand z/VM systems constrained by memory up to four times (almost two times on the zBC12), thus increasing the number of Linux virtual servers in a single z/VM system
- Exploit HiperDispatch to improve processor efficiency, allowing more work to be done per IFL and therefore supporting more virtual servers per IFL, potentially requiring fewer systems for applicable workloads
- Expand the real memory used in a Single System Image Cluster up to 4TB
  - z/VM 6.3 has the ability to fully utilize memory of a zBC12 at a maximum of 496 GB

# Improved Memory Management Flexibility and Efficiency

- Benefits for z/VM systems of all memory sizes
- Prioritize virtual server use of real memory more effectively through enhanced memory reservation support
- Exploit improved management of memory on systems with diverse virtual server processor and memory use patterns
- Eliminate use of expanded storage for z/VM paging, allowing greater flexibility and avoiding some of the restrictions associated with expanded storage

# Simplify z/VM Systems Management

- Manage z/VM virtual servers with xCAT (Extreme Cloud Administration Toolkit) is ready to go after z/VM V6R3 installation; nothing else needs to be installed
- Adopt a foundation built on xCAT restful APIs to allow future extensions for open source systems management solutions, such as OpenStack
- Enable scalable support for the larger systems that z/VM V6R3 supports
- Safely migrate an existing z/VM V6R2 SSI Cluster to z/VM V6R3 in a step-wise approach, without having to shut down the cluster, using the new “Installation Upgrade In Place” capability

# Large Memory Support

- Real memory limit raised from 256GB to **1TB**
  - Proportionately increases total virtual memory based on tolerable over-commitment levels and workload dependencies
- Virtual machine memory limit remains unchanged at **1TB**
- Paging DASD utilization and requirements change
  - Removed the need to double the paging space on DASD
  - Paging algorithm changes increase the need to have a properly configured paging subsystem
- Expanded Storage continues to be supported with a limit of **128GB**

# Large Memory Support

- Reorder processing removed
  - Commands remain, but have no impact

- Improved effectiveness of the CP SET RESERVE command
  - Stronger “glue” to hold reserved pages in memory
  - Support for reserving pages of NSS or DCSS
    - Example: Use with the Monitor Segment (MONDCSS)
  - Ability to limit the overall number of reserved pages for the system

# Enhanced Dump Support

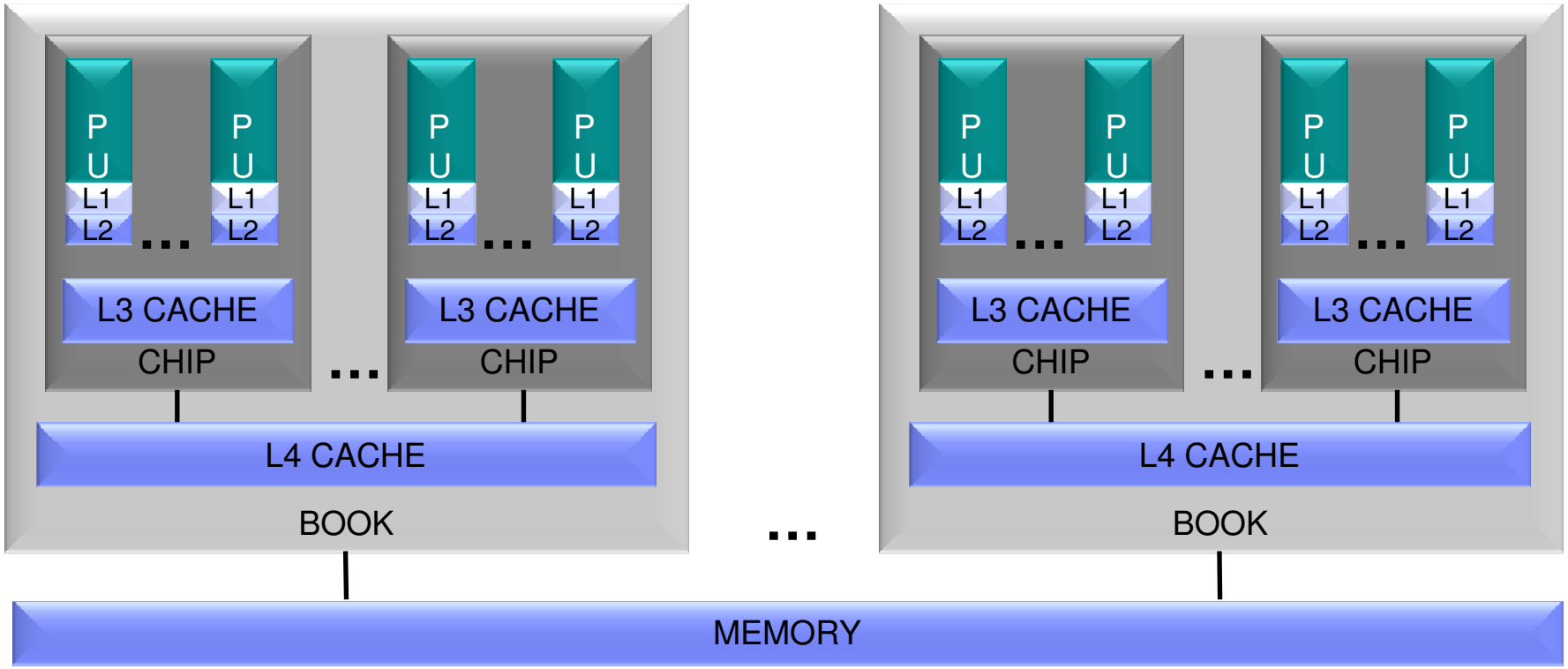
- Stand-alone Dump utility has been rewritten
  - Creates a CP hard abend format dump
  - Dump is written to ECKD or SCSI DASD
- Larger memory sizes supported, up to a maximum of 1 TB.
  - Includes Stand-alone dump, hard abend dump, SNAPDUMP, DUMPLD2, and VM Dump Tool.
- Performance improvements for hard abend dump
  - Reduces time to take a CP hard abend dump

# HiperDispatch

- Improved 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:
  - Dispatching Affinity
  - Vertical CPU Management

# HiperDispatch- Dispatching Affinity

- Processor cache structures become increasingly complex and critical to performance
- Goal is to re-dispatch work close (in terms of topology) to where it last ran



# HiperDispatch- Dispatching Affinity

- Dispatcher is aware of the cache and memory topology
  - Dispatch virtual CPU near where its data may be in cache based on where the virtual CPU was last dispatched
- Better use of cache can reduce the execution time of a set of related instructions
- z/VM V6.2 and earlier uses “soft” affinity to dispatch virtual CPUs
  - No awareness of chip or book

# HiperDispatch: Vertical CPU Management

- Today's “horizontal” management distributes the LPAR weight evenly distributed across the logical processors of the z/VM LPAR

- “Vertical” management attempts to minimize the number of logical processors, allowing LPAR to similarly manage logical CPUs

Example:

- 10 Physical IFLs, 7 logical IFLs, weight of 400 out of 1000
  - Each logical IFL (LPU) entitled to 57% of an IFL

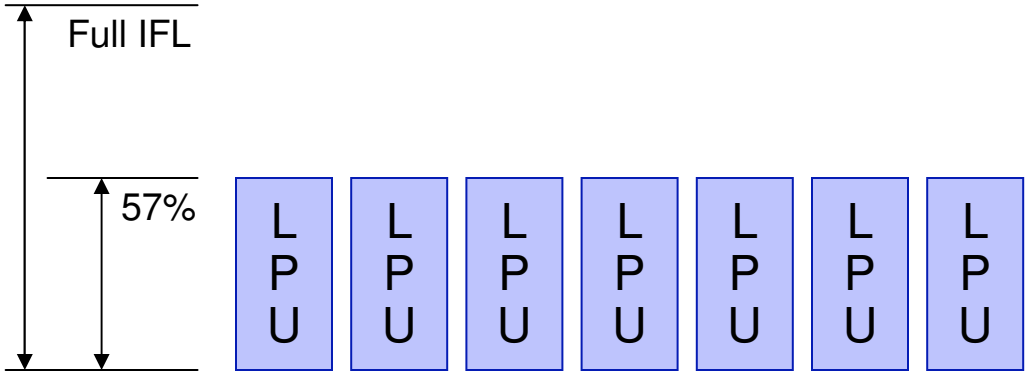
- When CEC is constrained, the LPAR’s entitlement is reduced to 4 IFLs, so 7 is more than required

- z/VM & LPAR will cooperate
  - z/VM will concentrate the workload on a smaller number of logical processors
  - LPAR will redistribute the partition weight to give a greater portion to this smaller number of logical processors (~100% of 4 CPUs)

# Horizontal vs. Vertical CPU Management

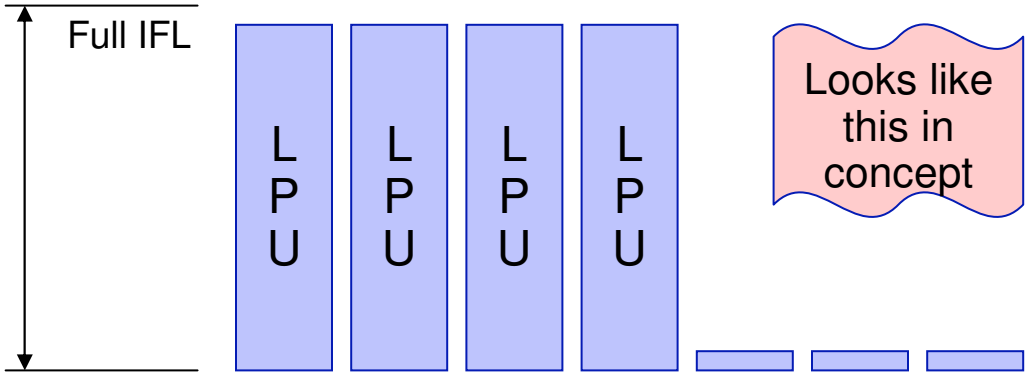
## Horizontal:

- The logical processors are all created/treated equally.
- z/VM dispatches work evenly across the 7 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.



# Virtual Networking Improvements

- Live Guest Relocation support for port-based virtual switches built on existing support:
  - Allow relocation of port-based interface
  - Prevent relocation of an interface that will be unable to establish proper network connectivity
  - Adjust the destination virtual switch configuration, when possible, by inheriting virtual switch authorization from the origin

- MPROUTE server upgraded to z/OS V1.13 OMPROUTE functional equivalency.

- Support for OSA-Express5S devices

- Virtual Switch recovery and stall prevention
  - New SET VSWITCH UPLINK SWITCHOVER command.
  - Change from current device to one of the configured backup devices

# Security Enhancements

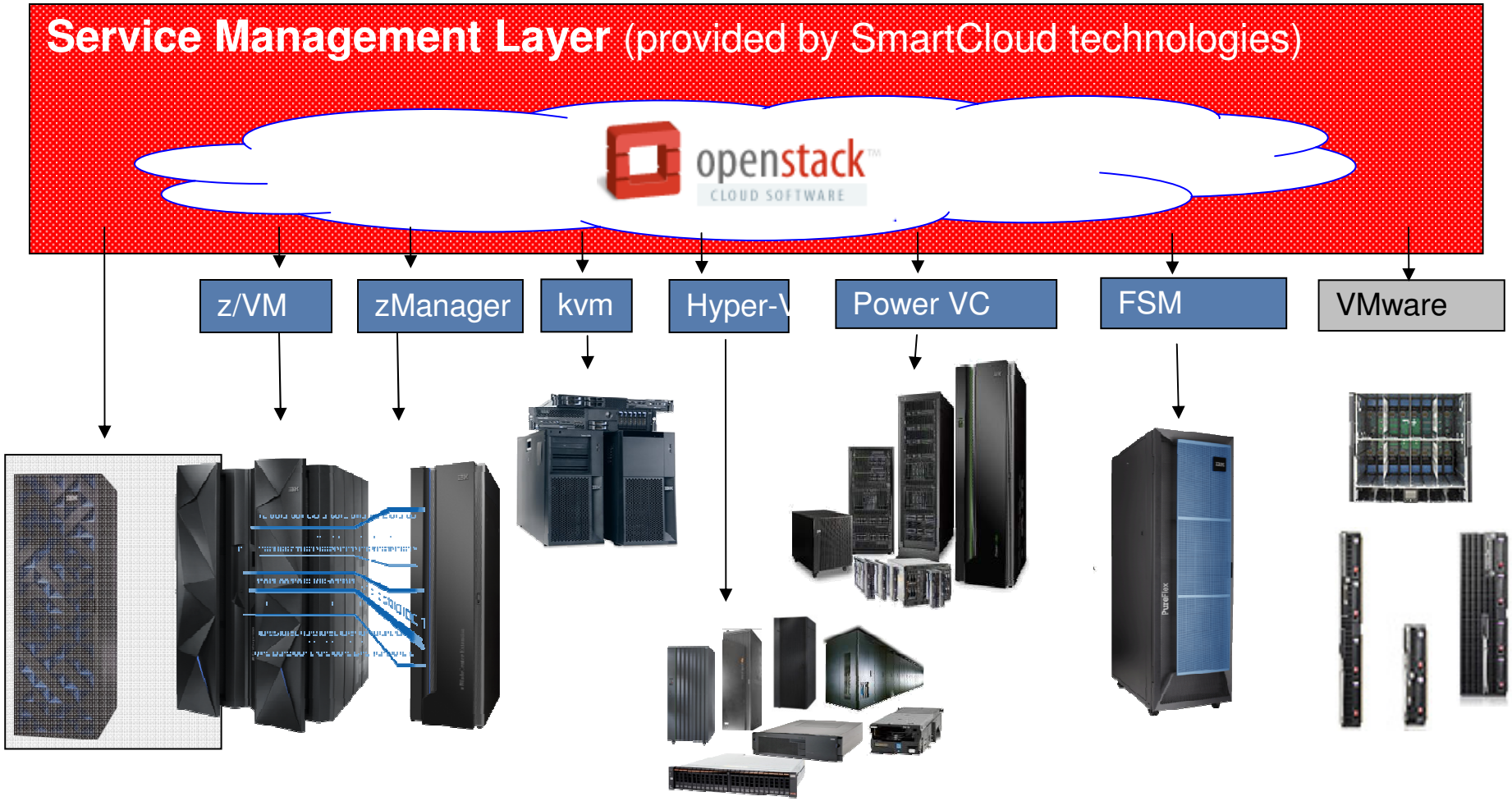
- Crypto Express4S
  - Guest support for Crypto Express4S which is a feature available on zEC12 and zBC12
  - Can be configured in one of three ways:
    - IBM Common Crytpographic Architecture (CCA) coprocessor
    - IBM Enterprise Public Key Cryptographic Standards (PKCS) #11 (EP11) coprocessor
    - Accelerator

- SSL Server Upgrade
  - z/OS V1.13 equivalency
  - Includes support for Transport Layer Security (TLS) protocol, Version 1.2

# IPL Changes for NSS in a Linux Dump

- The Linux Disk Dump utility is preferred over the CP VMDUMP command in most cases.
- Previously, the contents of an NSS could not be captured with Linux Disk Dump utility.
- Changes in IPL now allow the NSS to be included
  - New NSSDATA parameter
- For more background, see:
  - http://download.boulder.ibm.com/ibmdl/pub/software/dw/linux390/docu/l26ddt01.pdf for Linux Disk Dump utility information
  - http://www.vm.ibm.com/perf/tips/vmdump.html for information on differences between VMDUMP and Linux utility

# Hybrid computing model integrated and enabled for Cloud




**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**

# z/VM Version 6
# Security Certification Plans


- Common Criteria (ISO/IEC 15408)
  - z/VM 6.1 has been certified: BSI-DSZ-CC-0752
  - Evaluated to EAL 4+ for the Operating System Protection Profile (OSPP) with:
    - Virtualization extension (-VIRT)
    - Labeled Security extension (-LS)

- Federal Information Protection Standard (FIPS) 140-2
  - z/VM 6.1 System SSL is FIPS 140-2 Validated(TM)
  - Enablement requirements for certificate database and servers
    - http://csrc.nist.gov/groups/STM/cmvp/documents/140-1/1401val2012.htm#1735


- z/VM 6.2 & 6.3 are designed to conform to both Common Criteria and FIPS 140-2 evaluation requirements
  - Note the SOD in V6.3 Announce that IBM intends evaluation of V6.3 for conformance Common Criteria (ISO/IEC 15408), at EAL4+ and FIPS 140-2

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# Summary

## Leadership

z/VM continues to provide additional value to the platform as the strategic virtualization solution for System z

## Innovation

z/VM 6.2 introduced horizontal scalability and guest mobility through Single System Image clustering and Live Guest Relocation with RAS in the forefront of the design

## Growth

z/VM 6.3 increases the vertical scalability and efficiency to complement the horizontal scaling introduced in z/VM 6.2, because we know our customers' systems continue to grow

# *Thanks!!*

*Contact Information:*

Dan Griffith
DanGriff@us.ibm.com

# Statements of Direction

July 23, 2013

Subject to change or withdrawal without notice,
representing IBM goals and objectives only.

# Security Evaluation of z/VM 6.3

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+).

- We continue the practice of taking every other release through certification.
- Evaluation is with inclusion of RACF Security Server optional feature.
- See http://www.vm.ibm.com/security/ for current z/VM Security information.

# FIPS Certification of z/VM 6.3

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.

- Federal Information Protection Standard (FIPS) 140-2
  - Target z/VM 6.3 System SSL is FIPS 140-2 Validated(TM)
  - Enablement requirements for certificate database and servers
    - http://csrc.nist.gov/groups/STM/cmvp/documents/140-1/1401val2012.htm#1735
- See http://www.vm.ibm.com/security/ for current z/VM Security information.

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# Support of the 10GbE RoCE Express Feature

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 is to allow guests to utilize Remote Direct Memory Access over Converged Ethernet (RoCE) for optimized networking.

- RoCE is high bandwidth, low latency link layer protocol
- Guest support for devices dedicated to z/VM guests that support RoCE
- Requires 10GbE RoCE Express feature on either the IBM zEC12 or IBM zBC12

# Support of the zEDC Express Feature

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

- New data compression hardware feature to improve ability to do compression by offloading to zEDC
- Support is planned for guest usage
- Requires zEDC Express feature on either the IBM zEC12 or IBM zBC12

# Stabilization of z/VM 5.4 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. Refer to Withdrawal Announcement 912-144, (RFA56762) dated August 7, 2012.

- While support will continue to the later date of December 31, 2014 or until the z9 processors are withdrawn from future, support for new function and processors is being stabilized.
- z/VM 5.4 will not be supported on processors after the zEC12 and zBC12.
  - This includes running as a guest of a supported z/VM Version 6 release.
- Plan now to avoid a migration which would involve both hardware and software at the same time.

# Withdrawal of Support for Expanded Storage

z/VM 6.3 will be the last release to support expanded storage (XSTOR) as part of the paging configuration. 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 run efficiently in a configuration using only central storage

- In z/VM 6.3, it is recommended to configure all processor memory as central storage.
  - Support remains to use expanded storage in z/VM 6.3, but is suggested for use only in special cases.

# Reference & Backup

# Unified Resource Manager (zManager) and z/VM 6.3 Announcement

In light of IBM's cloud strategy and adoption of OpenStack, the management of z/VM environments in zManager is now stabilized and will not be further enhanced. Accordingly, zManager will not provide systems management support for z/VM 6.3. However, zManager will continue to play a distinct and strategic role in the management of virtualized environments created by integrated firmware hypervisors (PR/SM, PowerVM, and x hypervisor based on kvm) of zEnterprise. Looking ahead, IBM's vision is to enable OpenStack to provide heterogeneous systems management across zEnterprise, z/VM and distributed platforms, which in turn can be exploited by IBM's future SmartCloud offerings.

# Positioning of z/VM and zManager

- The IBM zEnterprise Unified Resource Manager (zManager) is designed to provide systems management capabilities across the multi-architecture environment of zEnterprise.
- Many customers are planning to exploit these system management capabilities to deploy a framework for a heterogeneous cloud environment, thereby providing an effective means to deliver IT services.
- To accelerate the delivery of its cloud offerings, IBM recently announced plans to base all of its cloud services and software on open standards, including OpenStack and other cloud standards. OpenStack is an Infrastructure as a Service (IaaS) cloud computing open source project.
- IBM joined this project last year and in support of System z, is enhancing z/VM to be the first System z operating environment enabled for OpenStack.
- This capability is provided with z/VM 6.3.

# Positioning of z/VM and zManager *(cont.)*

- In light of IBM's cloud strategy and adoption of OpenStack, the management of z/VM environments in zManager is now stabilized and will not be further enhanced.
- Accordingly, zManager will not provide systems management support for z/VM 6.3.
- However, zManager will continue to play a distinct and strategic role in the management of virtualized environments created by integrated firmware hypervisors (PR/SM, PowerVM, and x hypervisor based on kvm) of zEnterprise.
- Looking ahead, IBM's vision is to enable OpenStack to provide heterogeneous systems management across zEnterprise, z/VM and distributed platforms, which in turn can be exploited by IBM's future SmartCloud offerings.
- This will give customers greater flexibility by removing the need to develop specific interfaces for different cloud services and enabling enterprise-wide cloud deployments.

# Support for IBM zEnterprise EC12

- Updates for z/VM 6.2 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

Recent addition to the bucket for APAR VM65262
z/VM V5R4: PTF UM33877
z/VM V6R1: PTF UM33878
z/VM V6R2: PTF UM33879

# Support for IBM zEnterprise BC12

- Updates for z/VM 6.3, 6.2 and 5.4
  - VM65239: VMHCD support
  - VM65236: VMHCM support
  - VM65279: EREP support
  - VM65278: IOCP support
  - VM65360: SYSEVENT QVS support
    - VM65356: SYSEVENT QVS support (pre-req to VM65360)

- Update for z/VM 6.2 and in base of z/VM 6.3
  - PM83966: TCP/IP support

- PSP Bucket
  - Upgrade **2828DEVICE**
  - Subset **2828/ZVM**

# z/VM Storage Support

- z/VM 6.2 & 6.3 supports
  - DS8000 Series (FCP or FICON)
  - DS6000 Series (FICON)
  - XIV (FCP)
  - IBM San Volume Controller (FCP)
  - IBM Storwize V7000 (FCP)
    - See http://www.ibm.com/support/docview.wss?uid=ssg1S1003703#_zvm
  - As well as many of the older storage devices

- Note: The System Storage Interoperation Center (SSIC) support page has some omissions of the above support
  - http://www.ibm.com/systems/support/storage/ssic/interoperability.wss

- The z/VM 6.2 General Information Manual has additional information, but had not been updated for Storwize, see URL above for requirements.

# z/OS Version 2
## Freedom to Innovate

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# IBM continues to redefine and extend the role of the mainframe to deliver new strategic capabilities and deeper client value

## Data Ready

*Enterprise data repository that integrates operational analytics for accelerated insight*

- Enterprise data hub
- High-volume secure and reliable transaction processing
- Integrated, real-time operational analytics

## Mobile Ready

*Connecting backend systems to mobile devices to turn each interaction into an opportunity*

- Build and connect to back end systems
- Secure and manage with the highest level of security
- Extend and transform capabilities to mobile devices


## Cloud Ready

*Highly scalable, agile heterogeneous enterprise private cloud*

- Elastic, virtually limitless expansion
- Shared everything design
- Secure hybrid computing with centralized management
- Built on open industry standards

## Security Ready

*Trusted security and reliability for critical business processes, applications and data*

- Ultimate data security protection
- Built-in cryptography
- Unmatched resiliency and availability
- Support for industry standards

# New innovations available on zBC12 and zEC12


NEW

## Data Compression Acceleration

Reduce CP consumption, free up storage & speed cross platform data exchange

***zEDC Express***

NEW

## High Speed Communication Fabric

Optimize server to server networking with reduced latency and lower CPU overhead

***10GbE RoCE Express***

ENHANCED

## Flash Technology Exploitation

Improve availability and performance during critical workload transitions, now with dynamic reconfiguration; Coupling Facility exploitation (SOD)

***IBM Flash Express***

ENHANCED

## Proactive Systems Health Analytics

Increase availability by detecting unusual application or system behaviors for faster problem resolution before they disrupt business

***IBM zAware***

NEW

## Hybrid Computing Enhancements

x86 blade resource optimization; New alert & notification for blade virtual servers; Latest x86 OS support; Expanding future roadmap

***zBX Mod 003; zManager Automate; Ensemble Availability Manager; RMF™ Support***

# z/OS V2.1 quick reference

| Messages | Value | z/OS® V2.1 Enhancements | Which Companies Benefit? |
|---|---|---|---|
| **Data and Analytics Ready**  | Customers can manage significantly more data for less Customers can process active content at scale | ▪ Compression zEDC<br>▪ SMC-R (RoCE)<br>▪ VSAM RLS enhancements<br>▪ Batch enhancements<br>▪ Fonts | ▪ Companies who need to securely process huge volumes of data.<br>▪ Companies who need to analyze more active data, move data efficiently and quickly. |
| **Cloud Ready**  | Drive higher throughput, remarkable availability, and scale like no other system | ▪ 2GB pages<br>▪ Flash Express<br>▪ Transactional Execution<br>▪ 100 way SMP<br>▪ RMF enhancements | ▪ Companies with advanced, or complex workloads requiring extreme availability resiliency and scale.<br>▪ Companies who need to connect private clouds with back end systems and data |
| **Security Ready**  | Secure your infrastructure, protect assets and data, leverage crypto as a service Audit and comply with regulations. | ▪ Crypto as a service<br>▪ New health checks<br>▪ PKCS #11 and EMV standards<br>▪ Improved auditing, compliance<br>▪ Designed for EAL 5+ | ▪ Service Providers, Telcos, Banks, or any company who needs highly secured data with centralized policy based management<br>▪ Companies that need to comply with regulations and improve audit readiness |
| **Mobile Ready**  | Extend mainframe application data securely to mobile devices | ▪ CICS® JSON interfaces<br>▪ Worklight® for delivery to devices<br>▪ Workload isolation<br>▪ Secured , high speed communications | ▪ Customers with systems of record requiring mobile access to secured content and enforced isolation of workloads |

# Cloud Ready

## Cloud

Effective administration of services and rapid development of new offerings at lower costs.

- Highly scalable enterprise private cloud
- Supports critical core workloads alongside emerging workloads
- Centralized platform management and optimization
- Highly elastic with shared everything design
- Smart availability and performance

**"On the understanding that the business was going to grow, IBM System z® was chosen as the highest availability platform."**

*—Larry Fitch, Data Center Operations Senior Manager, Jack Henry & Associates*

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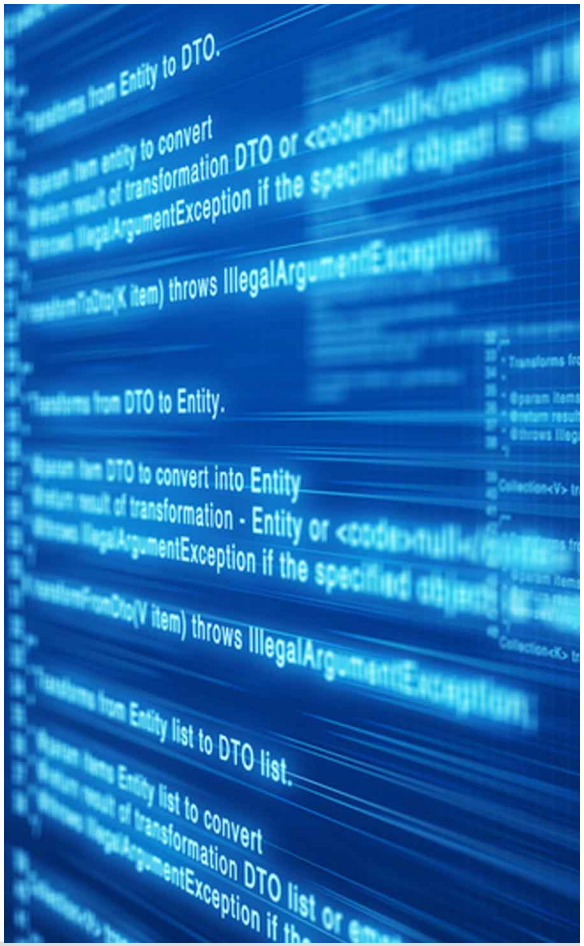
# Drive scale and throughput to new heights

- **Scale to meet tomorrow's workload demands**
  - Scale up-z/OS V2.1 can deliver a huge **100-way SMP** support in a single IBM zEnterprise® EC12 (zEC12) partition, 32 images in a sysplex
- **Flexibility in Capacity Provisioning Manager (CPM)**
  - New automatic, policy-based responses to help you if you encounter capacity shortages
  - Capacity Provisioning allows managing manually activated capacity in order to let CPM deactivate capacity when no longer needed according to policy.
- **Enhanced hardware transactional execution – improve throughput by reducing contention**
  - New transactional memory for XL C/C++, Java™ support is designed to improve throughput and performance through reduced locking
- **Free up Resources Faster for Improved Throughput, Performance**
  - Global Resource Serialization (GRS) supports changing of an exclusive enqueue to a shared enqueue
  - Similar capability is available for use in "jobs steps" to free up datasets at earliest possible time
- **Improve Batch Recall of Datasets**
  - Parallel versus a sequential recall of DFSMShsm™ migrated data sets in batch can improve batch elapsed time, critical for tight batch windows




***40% FASTER RECALL FOR MIGRATED DATASETS***

*DFSMShsm will recall data sets in parallel for batch jobs. By increasing the number of HSM recall tasks from one to two, recall elapsed time was reduced by 40%.*

# Take out availability and performance lapses

## The legendary availability of z/OS is extended even further …

### VSAM Record Level Sharing (RLS) (in a Parallel Sysplex®) enhancements extended to user and volume catalogs

- New improved availability and performance of catalogs
  - Helps to eliminate user/volume catalog contention, improving availability, performance
  - Improves batch and performance when processing catalog updates
  - VSCR designed to increase available storage and improve performance
  - Support for directory-only caching (bypass caching all RLS file data) when the cost of caching outweighs the benefits

### Coupling Facility enhancements

- CFLEVEL 19 on IBM zEnterprise EC12 (zEC12) and IBM zEnterprise BC12 (zBC12), shared engine CFs can be used in many production environments to reduce need for dedicated coupling facilities
- CF structures can now be rebuilt in priority order to restore them more quickly

**VSAM RLS reduces elapsed time 89% for critical dataset activities***

* When running batch jobs using ICF catalogs accessed using VSAM RLS, the elapsed time for batch jobs to delete 300, 000 data sets from a shared user catalog improved over 89% and the CPU time improved over 76% compared to results conducted without using RLS for ICF catalogs (*test was conducted using 3 systems in a sysplex*

# Flash Express improves system availability and performance during key transition periods

*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*

*Up to 28%*

*Improvement in DB2® throughput leveraging Flash Express with Pageable Large Pages (PLP)*


## Flash Express:

Improve availability and performance during workload transition and spikes

NEW

Faster, less disruptive diagnostics

Cost effective, resilient solution for overflow of MQSeries® shared queues in Coupling Facility (SOD) *

**Supported on z/OS V1.13 or Higher****

NEW

**Dynamic Reconfiguration for Flash Express**

**Flash Express feature for zEC12 and zBC12**

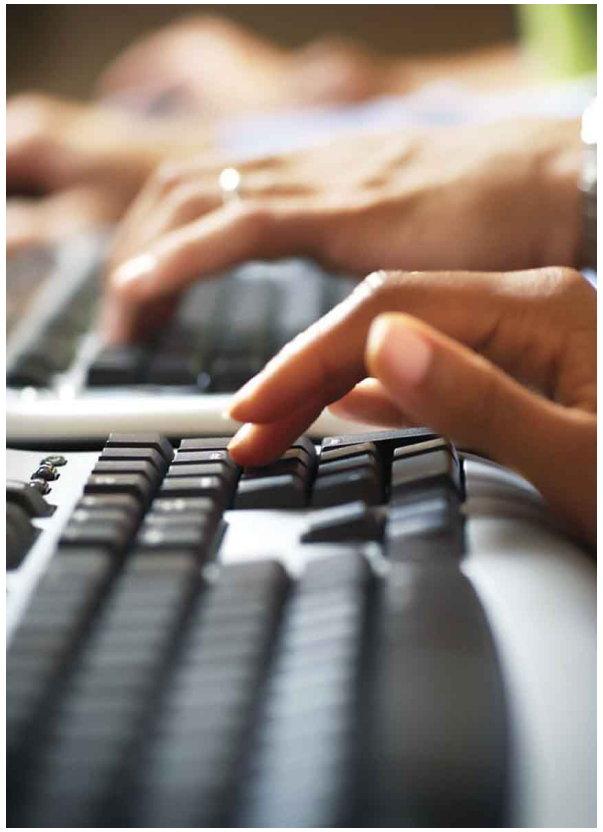
All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

** With the March 2013 RSM Enablement Offering Web deliverable

# Drive performance to meet aggressive service levels

## Deliver scalability, extreme availability and higher throughput to meet or exceed your most aggressive SLAs

- **Larger fixed pages helps improve paging performance**
  - New 2 GB (versus 4k or even versus 1 MB *pageable* large pages) can improve system performance for workloads such as Java
- **CF write-around support in a Parallel Sysplex to help online performance**
  - z/OS V2.1 with IBM DB2 11 running on zEC12 or later servers with CFLEVEL 18 is designed to allow batch updates to be written directly to disk without being cached in the CF.
- **System Logger enhancements for throughput**
  - New higher overall concurrency of z/OS CF and DASD logging tasks is designed to drive highly efficient logging
- **Adaptable, Flexible I/O processing**
  - Enhanced Dynamic Channel Routing to increase I/O performance based on workload needs
  - High Performance FICON enhancements deliver I/O performance improvements for EXCP processing



# Networking enhancements for the interconnected world

## Drive speed and efficiency for secured data transfer

### Performance

- Reduced CPU especially for interactive workloads using new default fast path processing for sockets
- Support selective acknowledgment (SACK) of packet retransmission to help reduce network overhead by not retransmitting the entire packet stream if a few packets are lost

### Productivity

- Validate syntax of your TCP/IP profile to detect possible errors ***before*** making configuration changes effective

### Security

- QDIOACCELERATOR , the high performance packet routing between HiperSockets™ and OSA QDIO connections, now includes support for IP Security filtering extending security capabilities
- Communications Server supports two new security exits for the z/OS FTP client to help provide more control over file transfer activities

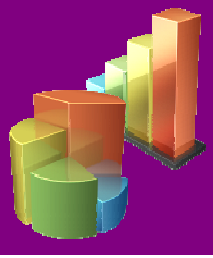
***25% Communications Server CPU Efficiencies with Enhanced Fast Path Socket Support****

* A synchronous API interactive workload will achieve up to 25% CPU reduction of the CommServer portion of the overall CPU cost with Enhanced Fast Path socket support with z/OS 2.1. Results vary depending on directory size and whether the update was done on the same or another system as the file system or another system in the sysplex

# Analytics

## Analytics

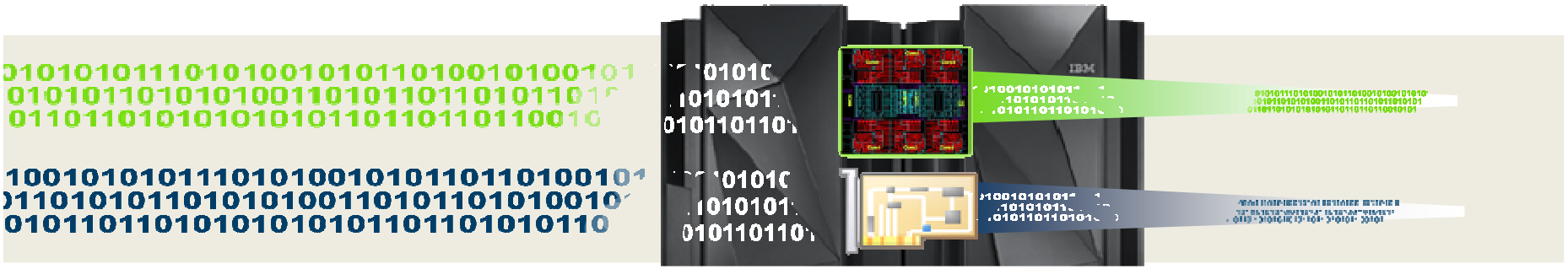
Turn information into actionable insights to personalize and expand customer offerings and services



- Exponential data growth can be managed by IBM zEnterprise with z/OS delivering an ideal foundation for operational analytics
- z/OS highly tuned I/O processing offers integrated capabilities for high performance data serving
- Deliver accelerated business insight from vast amounts of information using optimized data movement and active data management

# zEnterprise Data Compression (zEDC) - can help to reduce CPU and storage

*Every day 2.5 quintillion bytes of data are created*



*Compress your data*
*4X**
*(efficient system data compression)*

*Up to 118X reduction in CPU and up to 24X throughput improvement when zlib uses zEDC ***

Data Ready

Efficiently compress active data by providing a low CPU, high performance, dedicated compression accelerator
Industry standard compliance compression for cross platform data distribution **

***Typical Client Use Cases:***

**Significant disk savings** with trivial CPU cost for large BSAM/QSAM sequential files
**More efficiently store audit data** in application logs
**Reduce the amount of data** needed for data migration and backup/restore **
**Transparent acceleration** of Java compressed applications **

NEW **zEDC Express**

NEW **z/VM 6.3 support for guests*****

NEW **z/OS V2.1 zEDC**

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

# Optimize server to server networking – transparently

*"HiperSockets™-like" capability across systems*

*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 *****


## *Shared Memory Communications (SMC-R):*

Exploit RDMA over Converged Ethernet (RoCE) with qualities of service support for dynamic failover to redundant hardware

## *Typical Client Use Cases:*

Help to reduce both latency and CPU resource consumption over traditional TCP/IP for communications across z/OS systems

**Any** z/OS TCP sockets based workload can **seamlessly** use SMC-R without requiring any application changes

NEW **z/OS V2.1 SMC-R**

NEW **z/VM 6.3 support for guests***

NEW **10GbE RoCE Express**

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

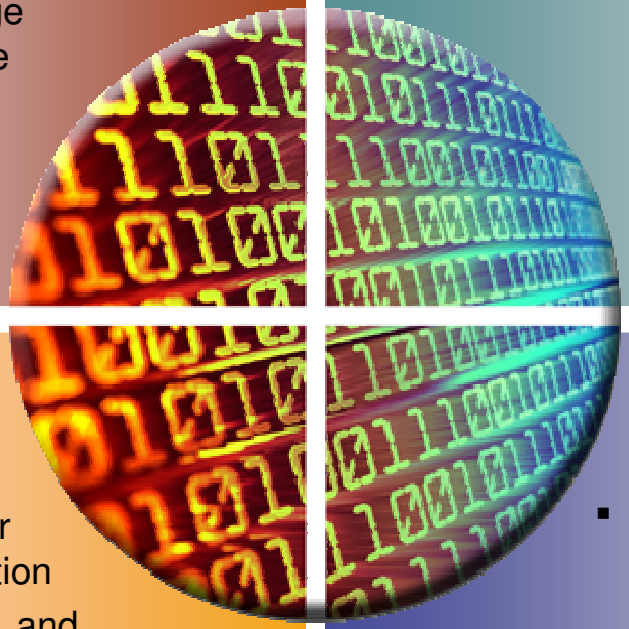
# Data management for high performance processing of information

**Enhanced policy-based data management with new Storage Tiering**

- Automated, policy-based movement of active data in the primary storage hierarchy helps optimize storage
  - Moves actively used data to more cost effective devices

**New zFS file system handles Big Data**

- Designed to significantly improve performance for file systems with large directories
- Designed to raise limits on the number of names stored
- Increases maximum file system size to 16 TB from 4TB



**Increased productivity with PDSE V2**

- Recover prior levels of a member even after a deletion or modification
- Designed for faster performance, and reduced virtual storage use

**Fast physical tape performance**

- Fast tape performance –read many small consecutive tape files efficiently

***With zFS V5 directory updates can be up to 48 X faster and lookups up to 175 X faster ****

*zFS V5 raises limits on the number of names that can be stored in zFS directories, and increases the maximum file system size 4 fold, now 16 TB. With zFS V5 a directory update may be up to 48 times faster and a directory lookup may be over 175 times faster. These improvements can benefit SAP workloads or systems where directories contain a large number of names.

# Batch enhancements to deliver application flexibility and agility

## Batch and Online interoperability

- z/OS Batch Runtime Environment will allow COBOL, Java and PL/I programs to interoperate using shared DB2 for z/OS and transactional VSAM (DFSMStvs)
- Helps online and batch programs run together seamlessly

## Language Environment

- New run-time option can show memory overlays that can cause heap damage- a productivity assist for programmers!
  - Enhanced symbol support facilitates passing of information to a program for more dynamic operations

## Ease of Use and Productivity

- z/OS Jobs REST Interface allows users to submit jobs from data sets and z/OS UNIX® files to help bridge access to batch resources
- New IBM Batch Programming Model (similar WebSphere® Compute Grid) helps improve portability of Java Applications across different platforms and improves operational efficiencies

## Printing in a global market

**NEW!** Fonts from the AFP Font Collection for S/390®, IBM Infoprint® Fonts, as well as World Type fonts are now included automatically for convenient printing requirements

Enterprise COBOL for z/OS 5.1 improves performance. Many well structured, CPU-intensive batch applications have shown performance increases of greater than 10%*. Many numerically intensive programs have shown performance increases of greater than 20%.

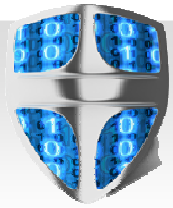
# Security Ready

## Security

Strengthen customer trust by helping ensure the protection and availability of client data

- z/OS with zEC12 and zBC12 provides unparalleled “bullet-proof” security features such as isolation of processes, encryption of information, and secured key management
- z/OS delivers improvements for auditing support to help reduce risk and help with compliance
- Continued standards and leading certifications mean z/OS can continue to serve the demanding needs of financial, retail and government organizations

***87% percent of research participants recognized the mainframe as their most available, scalable, and secure platform***
***Forrester 2013 Security Study***



# Outstanding security

**Security of critical assets remains a top priority, with increasing sophistication of attacks**

**Crypto as a Service***

- IBM Tivoli® Directory Server enables Linux® applications (including Linux apps on a IBM BladeCenter® Extension (zBX)) to encrypt data transmitted over the network allowing Linux applications to use mainframe secure key encryption without exposing key material

**▪Manage certificates better, improve auditability and reduce risk**

- RACF® enhancements for certificate processing helps ensure keys are not inadvertently deleted
- New health checks help you identify digital certificates that are due to expire

**▪UNIX**

- z/OS UNIX System Services – log off users after a period of inactivity to help reduce risk of unauthorized access

**▪Standards**

- Continued support for PKCS #11 and EMV standards support industry requirements

**▪System z Security Portal**

- Stay more current with security and system integrity fixes including scoring for new APARs so you know which fixes are most critical to apply

***Designed to help reduce the cost and management overhead of supporting additional distributed Hardware Security Modules**

# Mobile Ready


NEW

## CICS Transaction Server Feature Pack for Mobile Extensions V1.0

Extending CICS transactions and data connectivity to mobile applications with JSON standards

NEW

## IBM Worklight®

Common toolset for development of rich multi-platform apps using Linux on System z.

RECENTLY UPDATED

## IBM Endpoint Manager

Provides a single device view for visibility, control, and automation; with integration of LDAP on zEnterprise

NEW

## IBM WebSphere DataPower® Gateway Appliances

Easy-to-use security enhanced integration and IMS™ integration for mobile devices

NEW

## IBM Cognos® Mobile

Receive timely, informative and interactive dashboards, reports, metrics and analysis

SICOOB

*Enabled transaction growth of **600% in mobile, 200% in Internet and 60% in-branch**, while avoiding US$1.5M in electricity costs annually with a virtualized Linux on zEnterprise landscape.*

# Smart management for z/OS


## z/OSMF V2.1

RECENTLY UPDATED

- More agile management with smaller footprint
- Simplified Web based management for z/OS

NEW

- Smarter software management

## RMF Enhancements

RECENTLY UPDATED

- Monitor and report on the health of your entire zEnterprise with monitoring for Windows 2008 servers on zBX, Flash Express, SMC-R, zEDC and more

## Health Checks

RECENTLY UPDATED

- Simplified management and increased vigilance with new Health Checker started automatically

## FICON zDAC

- Usability and performance improvements for z/OS FICON Discovery and Auto Configuration (zDAC)

***Efficient to the extreme….z/OS V2.1 is designed to run on System z servers at up to 100% utilization.***

# z/OSMF V2.1 - A winning combination: efficient, powerful management

- **New WebSphere Application Server for z/OS V8.5 (Liberty profile ) *dramatically* reduces resource requirements of running z/OSMF**

- **Capacity Provisioning Managed through z/OSMF**
  - The capacity provisioning application replaces the Microsoft® Windows® based Capacity Provisioning Control Center (CPCC), which is removed in z/OS V2.1
  - Manage domain configurations and policies, and simplify the use of On/Off Capacity on Demand

- **More Seamless Management for Improved Productivity**
  - More seamless navigation between z/OSMF Resource Monitoring and Workload Management for easier service policy management
  - Report on zBX workloads (now including Windows 2008 server) through RMF and view zEnterprise performance

- **New Workflow Capability Designed to Help Improve Repeatability of Tasks**
  - New workflow infrastructure - sequence tasks to manage configuration of your system.
  - Uses role-based assignments of work and also issues notifications to alert users as to their next process steps
  - Exploiters of the Workflows task can simplify work through guided steps, and use administrative functions for assigning responsibilities and tracking progress.

- **z/OSMF Linkage to IBM Explorer for z/OS**
  - Links to IBM Explorer or z/OS for system application users
  - z/OS Explorer is an Eclipse-based integration platform to provide a focal point to administer IBM CICS, IMS, DB2, and WebSphere MQ

***z/OSMF CPU requirements have been significantly reduced by 60%.****

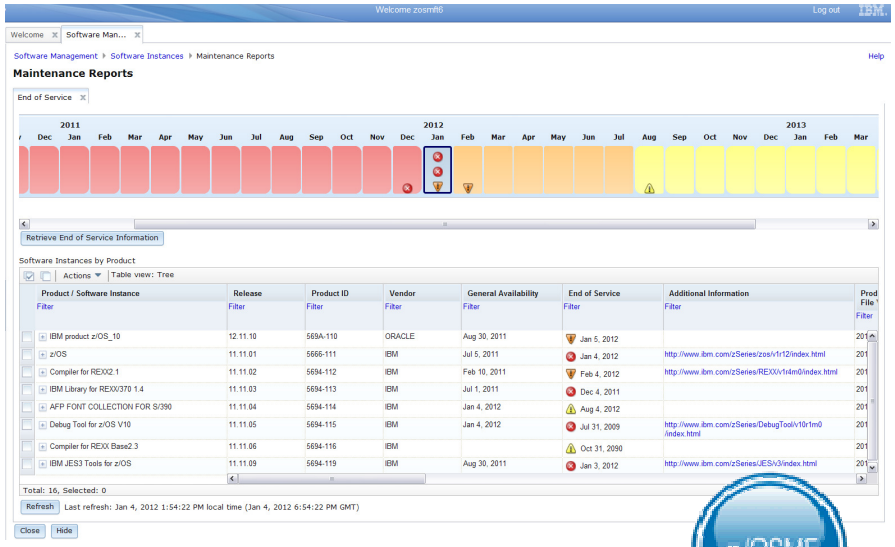
**Based on projections and measurements completed in a controlled environment.*
*Results may vary by customer based on individual workload, configuration and software levels.*

# z/OSMF V2.1: smarter software management at a glance

*Improved visibility Into software currency with new Software Management*

- **Gain visibility into installed software**
  - Understand your software currency
  - Plan ahead to create improved lifecycle support
  - Make it easier to create “gold” instances for standardize deployments
  - Manage software smarter--reduce costs, improving quality

- Visualize end of service information to help improve software management
- Check SMP/E inventory information against catalog entries and other data sets
- Provide reporting functions to plan software maintenance
- Easily identify end of service across the enterprise
- See all your products across your enterprise at a glance
- Readily pinpoint whether maintenance, fixes are installed or needed




**With z/OSMF manage software currency checking across the enterprise in less than 15 minutes versus days**

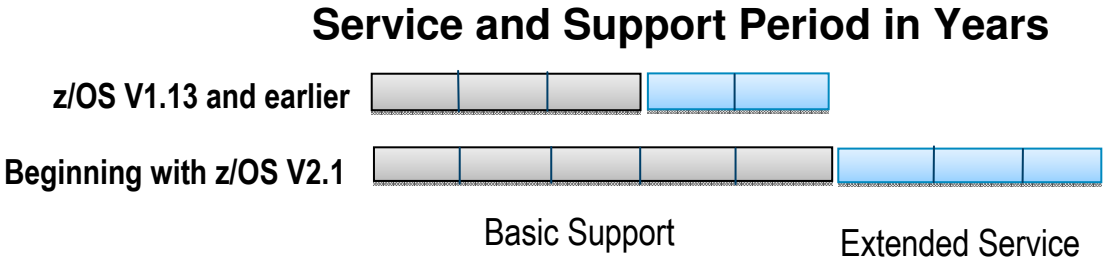
# Improved value

## Two year release cadence helps organizations fully leverage a release before migrating to the most current release

## 60% longer support and service period

- z/OS V2.1 support is planned for **5 years**
- z/OS V1.12 support is planned to be increased from **3** years to **4** years, to **September 30, 2014.**
- z/OS V1.13 support is planned to be increased from **3** years to **5** years, to **September 30, 2016.**
- In addition, to allow z/OS V1.11 and z/OS V1.12 customers to upgrade to z/OS V1.13, IBM plans to continue to make z/OS V1.13 available for ordering until z/OS V2.1 GA on **September 30, 2013**.

## Gain up to 2% CPU performance in z/OS V2.1 benefit just by migrating



धन्यवाद
Hindi

多謝
Traditional Chinese

ขอบคุณ
Thai

Спасибо
Russian

Bedankt
Nederlands

Thank You
English

شكراً
Arabic

Merci
French

Obrigado
Brazilian Portuguese

Gracias!
Spanish

多谢
Simplified Chinese

Danke
German

நன்றி
Tamil

ありがとうございました
Japanese

감사합니다

# Appendix

# Summary: Specific IBM zEnterprise EC12 & IBM zEnterprise BC12 Server Capabilities Leveraged by z/OS V2.1

| Scalability and Performance | Ultimate Security Ultimate Cryptography | Data and Applications enhancements | Superior Communications |
|---|---|---|---|
| ▪ 100-way multiprocessing , and up to 32 images in a sysplex<br>▪ Transactional Execution for Increased throughput for Java and C, C++ workloads<br>▪ Flash Express for superb performance and availability<br>▪ Improved processor cache and large page design optimize memory use<br>▪ Coupling Facility enhancements | ▪ Crypto enhancements - coprocessors and accelerators for improved security<br>▪ Support for new emerging standards for compliance needs (FIPS, ISO Common Criteria, PCKS#11, EMV)<br>▪ Crypto as a service leverages the System z crypto cards extending reach to Linux clients | ▪ New *Compression* Acceleration for efficient, low CPU data compression<br>▪ Enhanced RMF performance monitoring of zBX<br>▪ Exploitation of new hardware instructions<br>▪ Efficiencies in storage and processing of data<br>▪ IBM zAware support for more accelerated problem determination | ▪ *Shared Memory Communications over Remote Direct Memory Access (SMC-R)* with 10GbE RoCE Express for low latency communications<br>▪ High Performance FICON<br>▪ Improved network connectivity: OSA-Express4S<br>▪ FICON Express8S |

# Support

Out of service

Lifecycle Extension withdrawal 2 or 3 years later

Service Withdrawal Dates

| z/OS | z9® EC z9 BC | z10 EC™ z10 BC™ | z196 z114 | zBX | zEC12 zBC12 | End of Service | Coexists with z/OS... | Planned Ship Date[2] |
|---|---|---|---|---|---|---|---|---|
| R10 | x | x | x | x | x[3] | 9/11[1] | V1R12 | |
| R11 | x | x | x | x | x | 9/12[2] | V1R13 | |
| R12 | x | x | x | x | x | 9/14[2] | V2R1[2] | |
| R13 | x | x | x | x | x | 9/16[2] | V2R2[2] | |
| V2R1[2] | x | x | x | x | x | 2H18[2] | V2R3[2] | 2H13[2] |

1. Fee-based service extension available
2. All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.
3. Fee-based service extension required for support, or for some features

**z/OS V2.1 is designed to run on IBM System z servers starting from IBM System z9® up to the zEnterprise EC12 and zEnterprise BC12.**

# Summary: What's New in z/OS V2.1 and z/OSMF V2.1

## Cloud Efficiency at Scale

- Cloud-like scale to support huge volumes of workloads
- Availability/performance through innovations (Flash Express and Pageable large pages, 2 GB fixed)
- New application transparent and low latency inter CEC communications to move data quickly (SMC/R)
- Optimized throughput through improvements to multi- threading (Transactional Execution)
- System Logger enhancements for improved concurrency and throughput

## Data serving for Operational Analytics

- Designed for efficiency—Optimized data placement, access and retrieval
- Improve catalog sharing with extensions to VSAM record level sharing within a Parallel Sysplex
- zFS optimized file structures for improved scalability
- Fast memory to memory data transfers with SMC-R
- New low latency, low cost, out of band data compression
- Optimized management and performance improvements for FICON® channels, zDAC
- Improved throughput-DFSMShsm-migrated data sets can be recalled in parallel

## Security ready to protect assets

- Access System z encryption over the network (crypto as a service)
- Strengthened auditing and reporting for Digital Certificates
- Industry-ready standards support (NSA Suite B, TLS 1.2, new certificate validation support)
- Improved support for Enterprise PKCS #11 processing
- New health checks, enhancements to UNIX System Services security for automatic log off
- New EKMF key management solution provides a structured approach to key management

***Powered by a Superior Management Foundation***

- Improved software management to determine software currency
- Improve workflow –architecture for sequencing of configuration tasks; improved ease of use
- Reduced footprint, startup w Liberty Profile
- Redesigned Configuration Assistant, to provide network and security configuration tooling

# z/OS V2.1 Statements of Direction

z/OS V2.1 is planned to be the last release to include Version 1 of the Standards Based Linux Instrumentation for Manageability (SBLIM) CIM client for Java. Version 1 support for the SourceForge open source project was sunset in 2010. Version 2 of the SBLIM client, which is designed to be a JSR48-compliant implementation, is included in z/OS V1.13 and planned to be included in z/OS V2.1. IBM recommends that users of SBLIM Version 1 convert to Version 2.

z/OS V1.13 is planned to be the last release to provide support for Integrated Call Level Interface (ICLI).

The Cryptographic Support for z/OS V1R12-R13 web deliverable is planned to be the last level of ICSF to support IBM eServer™ zSeries® z800 and z900 servers. Future levels of ICSF are planned to require an IBM eServer zSeries®z890, z990, or later server.

Note: The Cryptographic Support for z/OS V1R12-R13 web deliverable includes the level of ICSF planned to be incorporated in z/OS V2.1. However, z/OS V2.1 itself is planned to require an IBM System z9 Enterprise Class (z9 EC), IBM System z9 Business Class (z9 BC), or later server.

z/OS V2.1 is planned to be the last release to include the IBM HTTP Server Powered by Domino® (IHS powered by Domino). IBM recommends you use the IBM HTTP Server Powered by Apache, which is available in z/OS Ported Tools as a replacement. IHS powered by Apache supports IPv6, 64-bit execution, and includes security authentication and authorization capabilities similar to those provided in IHS powered by Domino. Also, a refresh of IBM HTTP Server powered by Apache is planned later in 2013. IBM plans to provide documentation help with customer migration to IBM HTTP Server Powered by Apache.

z/OS V2.1 is planned to be the last release to support the z/OS BookManager® Build optional feature.

z/OS V2.1 is planned to be the last release to support the SNMP subagent function of Infoprint Server for communication with PSF-managed printers. IBM recommends you use the existing functions in z/OS Infoprint Central component of Infoprint Server to manage these printers instead.

IBM intends for z/OS V2.1 to be the last release to support the GATEWAY configuration statement in the TCP/IP profile. If you are using the GATEWAY statement to define static routes, you should use the BEGINROUTES/ENDROUTES configuration block instead.

IBM plans a number of changes to z/OS preventive service ordering for third quarter 2014.

In Shopz, the z/OS "all licensed products" service package type will be removed. Also in Shopz, z/OS Internet delivery service subscriptions will be removed. ServiceLink z/OS ESO packages will be supported only when used to order service for selected FMIDs.

z/OS preventive service orders will be based on installed products, which is intended to make order content a better reflection of the systems to be serviced.

If you currently order z/OS service based on licensed products, you are encouraged to begin using the other available service options at this time. IBM recommends use of the SMP/E RECEIVE ORDER command, the simplest method of acquiring z/OS service, which enables customers who are able to connect their z/OS host to the Internet fully automate service acquisition using local batch scheduling tools. SMP/E RECEIVE ORDER can be run using scheduled jobs to replace the current Shopz z/OS service subscription capabilities. Also, the ServiceLink z/OS ESO option is an alternative method you can use for ordering z/OS service if you are unable to upload a software inventory (bitmap or CSI) to IBM to identify installed software. Corrective service ordering remains unchanged.

For more information on Shopz service options, visit www.ibm.com/software/shopzseries

For more information on ServiceLink service options, visit www.ibm.com/ibmlink

For more information on the SMP/E RECEIVE ORDER command, see the z/OS SMP/E Users Guide.

# z/OS V2.1 Statements of Direction

zEnterprise Data Compression (zEDC) for z/OS V2.1, running on zEC12 and zBC12 servers with the zEDC Express adapter, is designed to support a new data compression function designed for low-latency compression. Initially, z/OS is designed to allow you to specify that SMF data written to log streams be compressed. In addition, IBM intends to provide support for the BSAM and QSAM access methods. This function, planned to be made available by the end of the first quarter of 2014, is intended to help you save disk space, improve effective channel and network bandwidth without incurring significant CPU overhead, and improve the efficiency of cross-platform data exchange.

IBM also plans to provide support for DFSMSdss™ to exploit zEDC by the end of the third quarter 2014. This function is designed to be available for dumping and restoring data, and also when DFSMShsm uses DFSMSdss to move data. This is intended to provide efficient compression with lower CPU overheads than the processor- and software-based compression methods already available.

IBM plans for future updates of IBM 31-bit and 64-bit SDK for z/OS Java Technology Edition, Version 7 (5655-W43 and 5655-W44) (IBM SDK 7 for z/OS Java) to provide exploitation of the zEDC Express feature and also to provide exploitation of Shared Memory Communications-Remote Direct Memory Access (SMC-R), which is utilized by the 10GbE RoCE Express feature. In addition, improved integration of Java with core z/OS workload management facilities is planned to provide new Java APIs that use the WLM SYSEVENT QRYCONT macro. These programming interfaces are designed to support adaptive concurrent online and batch workloads in Java-based processing environments such as WebSphere Compute Grid.

IBM plans that the IBM Encryption Facility for z/OS (5655-P97) will exploit zEnterprise Data Compression (zEDC) for z/OS V2.1, running on zEC12 and zBC12 servers with the zEDC Express adapter when the Java release supporting zEDC becomes available. This will complement the software compression support that exists today with Encryption Facility OpenPGP support.

IBM intends to provide exploitation of the Flash Express feature on zEC12 and zBC12 servers with CFLEVEL 19 for certain coupling facility list structures in the first half of 2014. This new function is designed to allow list structure data to be migrated to Flash Express memory as needed when the consumers of data do not keep pace with its creators for some reason, and migrate it back to real memory to be processed. When using WebSphere MQ for z/OS Version 7 (5655-R36), this new capability is expected to provide significant buffering against enterprise messaging workload spikes and provide support for storing very large amounts of data in shared queue structures, potentially allowing several hours' data to be stored without causing interruptions in processing. Also, z/OS V2.1 RMF is planned to provide measurement data and reporting capabilities for Flash Express when it is used in conjunction with coupling facilities.

# z/OSMF V2.1 Statements of Direction

z/OS V1.13 is planned to be the last release to support the Microsoft Windows based Capacity Provisioning Control Center (CPCC) function for use with the Capacity Provisioning Manager (CPM). IBM intends to enhance the z/OSMF-based Capacity Provisioning application to allow you to control your CPM policies.

IBM intends to add z/OSMF function to support presentation services for other applications. A new set of programming interfaces is designed to allow TSO/E-based applications to be imported into z/OSMF and supported within the z/OSMF user interface, while providing the capability to exploit graphical user interfaces supported by the client browsers.

IBM intends to provide additional REST programming interfaces in z/OSMF V2.1. These new RESTful interfaces are designed to provide access to z/OS data sets and files, with authorization control and serialization. This new function is intended to make it much easier to access data stored on z/OS from other platforms, such as from distributed servers or browser-based applications.

IBM intends to provide support for secure FTP (SFTP) in the Incident Log application in z/OSMF V2.1.

IBM intends to use the z/OSMF Workflow function to provide simplified instructions for installation of z/OSMF plug-ins.

# Question Time!

QUESTIONS?