Hardware Innovation with the IBM zEnterprise EC12
The following are trademarks of the International Business Machines Corporation in the United States and/or other countries.

- AIX*
- BladeCenter*
- CICS*
- Cognos*
- DataPower*
- DB2*
- DS8000*
- IMS
- InfiniBand
- Lotus*
- Parallel Sysplex*
- POWER*
- POWER4*
- Power7*
- PowerHA
- Power Systems
- PowerVM
- PR/SM
- PureSystems
- Rational*
- Redbooks*
- RMF
- System x*
- System z*
- System z10*
- Tivoli*
- z/OS*
- z/VSE*
- z/VM*
- zEnterprise*

* Registered trademarks of IBM Corporation

The following are trademarks or registered trademarks of other companies.

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

IT Infrastructure Library is a registered trademark of the Central Computer and Telecommunications Agency which is now part of the Office of Government Commerce. Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

Windows Server and the Windows logo are trademarks of the Microsoft group of companies.

ITIL is a registered trademark, and a registered community trademark of the Office of Government Commerce, and is registered in the U.S. Patent and Trademark Office.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Java and all Java based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc. in the United States, other countries, or both and is used under license therefrom. Linear Tape-Open, LTO, the LTO Logo, Ultrium, and the Ultrium logo are trademarks of HP, IBM Corp. and Quantum in the U.S. and other countries.

* Other product and service names might be trademarks of IBM or other companies.

Notes:

- Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user’s job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

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

All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions. This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.

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

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

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

© 2012 IBM Corporation
Evolution of hybrid computing with IBM System z

IBM zEnterprise® 196 (z196)
First ever multiplatform computer – mainframe and distributed with single management

Availability of zBX with IBM POWER7® blades and IBM Smart Analytics Optimizer

July 2010

Nov 2010

Mar 2011

IBM System x® on HX5

Availabilty of Linux® on IBM System x®

Aug 2012

Dec 2011

Oct 2011

Sep 2011

Jul 2011

Availability of Microsoft® Windows® on System x blades in zBX and APIs

IDAA – evolution of IBM Smart Analytics Optimizer – coming out of the zBX and into Netezza technology

DataPower® XI50z within the IBM zEnterprise BladeCenter® Extension (zBX)

Announce zEnterprise 114

IBM zEnterprise EC12 (zEC12) Next generation of hybrid computing
Clients continue to invest in the value of zEnterprise

**System z Total Installed Capacity**

- **140+** BladeCenter Extension units; **1,100+** blades shipped [ITD]
- **120+** new accounts since 3Q10 zEnterprise launch [as of 1Q12]
- **35%+** new growth market accounts; **12%** new accounts w/w in FSS
- **67%** of Top 100 accounts have installed IFLs [as of 2Q12]
- **36%** System z clients have IFLs installed [as of 2Q12]
- **21%** of total installed MIPS run Linux [as of 2Q2012]
zEnterprise EC12 is the core of next generation of System z

zEC12
Machine Type: 2827
Models: H20, H43, H66, H89, HA1

- Advanced Technology 5.5 GHz processor chip for performance boost for all workloads
  - Over 78,000 MIPS for large scale consolidation
  - Larger cache for data serving
- Processor chip optimized for software performance – exploited by Java, PL/I, compilers, DB2 and more
- Innovation to drive availability to superior levels
  - IBM zAware offers snap-shot of the current state of your business
  - FLASH Express and pageable large pages to drive availability and performance for critical workloads
- Security and reliability are in our DNA
  - High speed cryptography integrated as part of the chip
  - Enhanced functions with new Crypto Express4S
  - PR/SM designed for EAL5+ certification

1. Based on preliminary internal measurements and projections against a z196. Official performance data will be available upon announce and can be obtained online at LSPR (Large Systems Performance Reference) website at http://ibm.com/servers/resourcelink/lib03060.nsf/pages/lsprindex. Actual performance results may vary by customer based on individual workload, configuration and software levels.
System z Servers Continue to Scale with zEC12

Each new range continues to deliver:

- New function
- Unprecedented capacity to meet consolidation needs
- Improved efficiency to further reduce energy consumption
- Continues to delivering flexible and simplified on demand capacity
- A mainframe that goes beyond the traditional paradigm

PCI - Processor Capacity Index

*z/OS supports up to a 100-way only
IBM System z

zEC12 Continues the CMOS Mainframe Heritage Begun in 1994

- **2000** z900
  - 189 nm SOI
  - 16 Cores
  - Full 64-bit
  - z/Architecture

- **2003** z990
  - 130 nm SOI
  - 32 Cores
  - Superscalar
  - Modular SMP

- **2005** z9 EC
  - 90 nm SOI
  - 54 Cores
  - System level scaling

- **2008** z10 EC
  - 65 nm SOI
  - 64 Cores
  - High-freq core
  - 3-level cache

- **2010** z196
  - 45 nm SOI
  - 80 Cores
  - OOO core
  - eDRAM cache
  - RAIM memory
  - zBX integration

- **2012** zEC12
  - 32 nm SOI
  - 101 Cores
  - OOO and eDRAM cache improvements
  - PCIe Flash
  - Arch extensions for scaling

MHZ/GHz

- 770 MHz
- 1.2 GHz
- 1.7 GHz
- 4.4 GHz
- 5.2 GHz
- 5.5 GHz

© 2012 IBM Corporation
zEC12 Full and Sub-Capacity CP Offerings

• Subcapacity CPs, up to 20, may be ordered on ANY zEC12 model. If 21 or more CPs are ordered all must be full 7xx capacity.
• All CPs on a zEC12 CPC must be the same capacity.
• All specialty engines run at full capacity. The one for one entitlement to purchase one zAAP and one zIIP for each CP purchased is the same for CPs of any capacity.
• Only 20 CPs can have granular capacity but other PU cores may be characterized as full capacity specialty engines.
• For no CPs, the capacity setting is 400.
• PVU for zEC12 is 120.

CP Capacity Relative to Full Capacity Uni
7xx = 100% ≈ 1514 PCI
6xx ≈ 63% ≈ 947 PCI
5xx ≈ 42% ≈ 631 PCI
4xx ≈ 16% ≈ 240 PCI
xx = 01 Through 20

MSU Sub Capacity
IBM System z

IBM zEnterprise EC12: An optimized system

- Semiconductor Technology
- Microprocessor Design
- Systems Design
- Virtualization and Operating Systems
- Compilers and Java Virtual Machine
- Optimized Middleware

- Linux
- z/OS
- z/TPF
- z/VM
- z/VSE
- Rational
- WebSphere
- Information Management
- Tivoli
- Lotus
- Cognos
IBM zEnterprise EC12: An optimized system

**Semiconductor Technology**
- eDRAM cache integrated on processor chip
- Efficient packaging
- Optimized high-K metal gate transistor design
- 2x transistor density for logic and on-chip memory

**Microprocessor Design**
- World’s fastest chip at 5.5 GHz
- More cache for superior data serving
- On-chip crypto and data compression
- Instruction co-optimized with compilers, Java, DB2
- Transactional Execution
- Runtime Instrumentation
- Decimal Format Conversions
- 2 GB page frames

**Systems Design**
- Optimized I/O pathways & subsystems with massive scale
- Best-of-breed reliability, availability & serviceability
- RAIM memory for high availability
- Integrated cryptographic coprocessor
- I/O cryptographic coprocessor
- Highest commercial security certification in industry (EAL5+ & FIPS 140-2 level 4)
- Multi-platform design of mainframe and distributed technologies
- Designed for highest utilization with heterogeneous workloads

**Virtualization and Operating Systems**
- Intelligent policy management of mainframe & distributed technologies
- Granular, scalable virtualization of servers, memory and I/O with low overhead
- PR/SM and z/VM offer two-tier approach for superior virtualization supporting native Linux
- Dispatching on z/OS keeps software close to cache for optimized performance
- Highly available and resistant partition architecture suitable for private cloud

**Compilers and Java Virtual Machine**
- Java, ASM, C/C++, PL/I Compilers optimized to exploit hardware architecture
- Java Runtime Environment exploits dynamic optimization (transactional execution)
- WebSphere, WebSphere MQ, DB2 exploit multi-system workload management, scale and availability
- Middleware optimized and tuned to scale up
- Tivoli optimized for operations management and security
- High volume, high performance, low cost transaction processing with CICS and IMS

* Compared to z196
zEC12 – Optimization and scale improvements starting at the core

• New 5.5 GHz 6-core processor chip continues our leadership in microprocessor design with a boost in performance for all workloads
  – Second generation out of order execution design

• Larger caches to optimize data serving environments

• New hardware functions optimized for software performance
  – Transactional Execution Facility for parallelism and scalability
  – Runtime Instrumentation Facility is intended to help reduce Java overhead
  – 2 GB page frames are intended to offer performance improvements for DB2 buffer pools and Java heaps
  – New IBM Enterprise PL/I compiler is planned to exploit and get a performance boost from decimal format conversions facility

• Integrated cryptographic function available on each core characterized as a CP or IFL with enabling microcode
Processor chip optimized for software performance

*Exploited by Java, PL/I, compilers, DB2, more*

- Our leadership in microprocessor design supports a boost in performance for all workloads
  - Second generation out of order design
  - Multi-level branch prediction supports complex workloads
- Larger caches to optimize data serving environments
  - Almost 2x on chip and 2x additional on book
- New hardware functions optimized for software performance
  - **Transactional Execution Facility** for parallelism and scalability
  - **Runtime Instrumentation Facility** is intended to help reduce Java overhead
  - **2 GB page frames** are intended to offer performance improvements for DB2 buffer pools and Java heaps
  - Up to **30% improvement in IMS throughput** due to faster CPU and cache, compilers, and more
  - New IBM Enterprise PL/I compiler is planned to exploit and get a performance boost from **decimal format conversions facility**

---

**Excellent Results:**

- **Up to 45% Improvement for Java workloads**
- **Up to 27% Improvement in CPU intensive integer & floating point C/C++ applications**
- **Up to 30% Improvement in throughput for DB2 for z/OS operational analytics**
- **More than 30% Improvement in throughput for SAP workloads**

---

1. Based on preliminary internal measurements and projections
2. Aa measured by the IBM 9700 Solution Integration Center. The measured operational BI workload consists of 56 concurrent users executing a fixed set of 160,860 Cognos reports. Compared DB2 v10 workload running on IBM’s z196 w/10 processors to an zEC12 w/10 processors
Extending System z Availability with Flash Express and IBM zAware

<table>
<thead>
<tr>
<th>Server Design</th>
<th>Systems Availability</th>
<th>Operations Availability</th>
<th>Business Application Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sparing</td>
<td>HyperSwap™</td>
<td>Capacity on Demand</td>
<td>Flash Express</td>
</tr>
<tr>
<td>Enhanced book availability</td>
<td>Concurrent upgrade</td>
<td>Capacity Back Up</td>
<td>IBM zAware</td>
</tr>
<tr>
<td>Hardware checks</td>
<td>Virtual networking</td>
<td>GDPS®/HyperSwap</td>
<td></td>
</tr>
<tr>
<td>Redundant parts</td>
<td>Data sharing</td>
<td>Call home</td>
<td></td>
</tr>
<tr>
<td>Parallel Sysplex®</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Designed to prevent hard failures**

**Designed to improve system software availability**

**Designed to improve continuous operations**

**Designed to improve business availability**

Highly resilient and available systems
IBM zAware delivers smarter message monitoring capabilities

- The complexity and rate of change of today’s IT infrastructures stress the limits of IT to resolve problems quickly and accurately – while preserving SLAs

- IT is challenged to diagnose system anomalies and restore service quickly
  - Systems often experience problems which are difficult or unusual to detect
  - Existing tools do little to quickly identify messages preceding system problems
  - Some incidents begin with symptoms that remain undetected for long periods of time
  - Manual log analysis is skills-intensive, and prone to errors

- IBM zAware with Expert System Diagnostics Gets it Right, Fast
  - IBM zAware helps improve problem determination in near real time – helps rapidly and accurately identify problems and speed time to recovery
  - Analyzes massive amounts of data to identify problematic messages, providing information to enable faster corrective action
  - Analytics on log data provides a near real time view of current system state
  - Cutting edge pattern recognition examines system behavior to help you pinpoint deviations
  - Machine learning, modeling and historical data work to describe your unique environment
## IBM zAware – Identifies Unusual System Behavior

IBM zAware contains sophisticated analytics, applies IBM insight, and machine learning to understand your unique system.

<table>
<thead>
<tr>
<th>Monitoring</th>
<th>Detection</th>
<th>Frequency</th>
<th>Reporting</th>
<th>1. All statements regarding IBM future direction and intent are subject to change or withdrawal without notice and represents goals and objectives only.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Supports IBM and non-IBM middleware and applications</td>
<td>• Detects anomalies other solutions might miss</td>
<td>• Samples every 2 minutes</td>
<td>• Near real time analysis</td>
<td></td>
</tr>
<tr>
<td>• Monitors OPERLOG in a sysplex or monoplex</td>
<td>• Can find the rare or infrequent message</td>
<td>• 10 minute interval</td>
<td>• Intuitive reporting – both high level and drill down</td>
<td></td>
</tr>
<tr>
<td>• Assigns a message anomaly score to help identify potential issues</td>
<td>• Can detect an unusual number of normal messages</td>
<td>• Uses 90 day rolling baseline; a utility provided to populate baseline; flexibility provided</td>
<td>• Color coded browser display</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Can detect messages issued out of context</td>
<td></td>
<td>• XML output can feed ISVs or processes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– Tivoli intends to provide alert and event notifications</td>
<td></td>
</tr>
</tbody>
</table>
IBM Flash Express – Smarter Availability for Smarter Systems

- **Flash Express is an innovative solution designed to help you compete effectively in today’s market**
  - Automatically improve availability for key workloads at critical processing times
  - Drive availability and performance for workloads that cannot tolerate paging spikes or inconsistent performance
  - Slash latency for critical application processing such as diagnostics collection

- **Extends IBM’s expertise in memory management introducing a new tier of memory using Flash Express**

- **Provides a secured, resilient and immediately usable solution**

- **Planned Flash Express and pageable large page exploiters:**
  - z/OS V1.13 *Language Environment*
  - Java SDK7 and by extension
    - WAS Liberty Profile v8.5
    - DB2
    - IMS 12
    - And a future release of *CICS Transaction Server*
  - IMS 12 Common Queue Server
Relative Access Times for different technologies

- **CPU**: < 20 ns
- **Cache**: < 200 ns
- **Random Access Memory (RAM)**: < 200 ns
- **Flash Express**: 5-20 micro sec.
- **Solid State Drive (SSD) Storage**: 1-3 ms
- **Spinning Disk Drive**: < 10 ms
- **WORM, Tape Library**: seconds
IBM System z Security as the Enterprise Standard

• **Intrinsic platform security and privacy for transactions and sensitive data helps enable System z to be the secure enterprise application server and data vault**
  – Hardware cryptography built into each general purpose CP and IFL, and via the new Crypto Express4S coprocessors
  – Secure your critical information assets (or data) throughout their life cycle

• **Security capabilities that span the needs of multiple industries**
  – Strong focus on security and crypto functions required by the Banking/Finance industries
  – Support for the payment card industry with solutions that leverage the zEC12 for compliance and security (i.e. EMV for American Express)
  – New IBM Enterprise PKCS #11 Coprocessor firmware and support from z/OS helps meets the requirements of the European Union and public sector clients

• **zEC12 supports the System z exclusive protected key processor based cryptography**
  – Blends the speed of processor based crypto with the security of the Crypto Express coprocessor

• **PR/SM™ designed for EAL 5+ certification**
zEC12 – Supports efficiencies in the data center

• New non-raised floor option offers flexible possibilities for the data center

• Continuing to support options for better control of energy usage and improved efficiency in your data center
  – zEC12 has a new radiator-based air cooled system design for more efficient cooling and improved concurrent maintenance
  – Water cooled options on zEC12 allow for up to 9% additional data center energy savings\(^1\)
  – Savings with optional HV DC power when implemented in a new data center could be on the order of 7-12% of server input power\(^2\)

• More capacity but little change to the footprint in the data center
  – Identical floor cutouts for zEC12 as the z196 and z10 EC\(^3\) with no significant increase in weight
  – Depth of system with covers will increase by 64 mm / 2.52 inches

• Over 12 years experience in designing and building earthquake resistant servers

1. Based on internal measurements with average power usage effectiveness (PUE) of 2 with well configured zEC12 configuration.
2. Based on internal measurements and projections.
3. With the exception of water cooling and overhead cabling
Parallel Sysplex and Coupling Facility improvements

**CFCC Level 18**

- **Scalability enhancements**
  - Up to 64 1x IFB3 links
  - 16 logical engines per CF LPAR

- **RMF™ channel path details**
  - Differentiate various IFB link types
  - Detect if CIB link running "degraded"

- **Serviceability enhancements**
  - Additional structure control info in CF dumps
  - Enhanced triggers for CF non-disruptive dumping
  - Enhanced CFCC tracing support

- **Performance enhancements**
  - DB2 GBP cache bypass
  - Dynamic structure size alter improvement
  - Cache structure management
IBM System z

zBX – A Uniquely Configured Extension of the zEnterprise

- **zBX Model 003 supported by zEC12**
  - Investment protection – Model 002 upgrades to Model 003

- **No need to make changes to applications and application certifications are inherited from blades**

- **Managed by Unified Resource Manager**
  - Management of resources as defined by your business goals and objectives
  - Integrated network for better security, control and faster time to value
  - Programmable interfaces (APIs) to connect with system management tools for total management capabilities - IBM Tivoli Monitoring (ITM) has been enhanced to use the APIs

---

**zBX**

*Machine Type: 2458*  
*Model: 003*

- Up to 112 PS701 blades (112 max)
- HX5 (7873) blades (56 max)
- DataPower XI50z (28 max)

- 1-4 Racks based on number of installed blades
- One zBX per zEC12
- Optional Acoustic Doors
- Optional Rear Door Heat Exchanger
- Upgradeable from zBX Model 002

---

© 2012 IBM Corporation
Continuing to build a multi-platform roadmap for the future

**Strengthening the story**

- **New Systems Director capability delivered through Unified Resource Manager APIs**
  - Ability to discover, inventory, and visualize zBX resources under the Systems Director umbrella
  - Image management provided for blades with in a zBX to support provisioning of new virtual servers
  - Energy Management of the zBX to lower energy consumption and costs
  - Power capping on System x and Power blades and power savings for Power blades

- **In the future, System z will continue to expand in the hybrid computing area**

- **IBM intends to deliver workload-aware optimization for System x blades through function in Unified Resource Manager**

- **IBM intends to deliver automated multi-site recovery for zBX hardware components based upon GDPS technologies**

---

1. All statements regarding IBM future direction and intent are subject to change or withdrawal without notice and represents goals and objectives only.
Flexible Connectivity on zEC12

*Improving bandwidth, granularity and options for connections*

**For Clustering**
- HCA-3 InfiniBand® Coupling Links
  - 12x InfiniBand
  - 1x InfiniBand (4 ports) *improved scalability*
- ISC-3 (peer mode only) ¹
- STP
  - Improved broadband security

**Heterogeneous environments**
- zBX
  - Intraensemble data network (IEDN)
  - Intranode management network (INMN)
  - *Increased 10 Gb Ethernet connectivity within zBX*
- To PureSystems
  - 10 Gb Ethernet

**HMC**
- New IBM zAware partition managed from HMC
- Location to run Unified Resource Manager – including monitoring CPU, energy, workload performance
- Host of the ensemble – controlling all functions of the ensemble
- Primary with Alternate needed for DR

**Within zEC12**
- PCIe I/O Infrastructure
- I/O Drawer and I/O Cage
  - *Flash Express*

**To the Data**
- FICON® Express8S (PCIe-based)
  - SX and 10KM LX
- FICON Express8 ¹
  - SX and 10KM LX *Enhanced channel subsystem*

**To the Network**
- OSA-Express4S PCIe based)
  - 10 Gb Ethernet LR and SR
  - 1 Gb Ethernet SX and LX
  - 1000BASE-T Ethernet
- OSA-Express3 ¹
  - 10 Gb Ethernet
  - 1 Gb Ethernet
  - 1000BASE-T Ethernet

¹. Carry forward only
IBM System Storage DS8800

Unique performance, availability and scalability makes DS8800 the ideal storage platform for zEnterprise

- **Self-optimizing performance and cost for hybrid computing**
  - Easy Tier can improve performance by up to 3x by moving only 3% of data to SSDs
  - Integrated QoS management aligns server and storage resources with application priorities
  - 8x faster query performance for operational analytics with special DS8000® List Prefetch Optimizer for High Performance FICON

- **Designed for near-continuous operations with over six-nines availability**
  - Fully-redundant design for near-continuous data access
  - Tight integration between DS8000 remote mirroring and GDPS HyperSwap is designed for over six-nines (99.9999%) availability

- **Optimized for zEnterprise efficiency and scalability**
  - Support for System z Discovery and Auto-Configuration simplifies configuration
  - Extended Address Volumes of up to 1 TB volumes simplifies management of large volumes
  - New support for System z load balancing algorithms can optimize throughput and response times between server and DS8000
Robust tape storage to protect your information

**Helping our clients retain data securely and in compliance with regulatory requirements**

## Comprehensive tape storage product line for System z attachment

<table>
<thead>
<tr>
<th>Product</th>
<th>Features</th>
</tr>
</thead>
</table>
| **TS1140 Tape Drive** | • Offers high performance (250 MBps) and high native capacity (4 TB) for storage consolidation  
• Provides information security with support for encryption and key management  
• Supports Write Once Read Many (WORM) cartridges to help satisfy compliance requirements |
| **TS3500 Tape Library** | • Scalable, automated data retention with up to 2.7 EB capacity with 3:1 compression  
• Offers enhanced data availability and reliability with optional dual library accessory  
• Provides data security and regulatory compliance via support for tape drive encryption and WORM cartridges |
| **TS7700 Virtualization Engine** | • Virtualization solution implements a fully integrated tiered storage hierarchy of disk and tape  
• Reduces batch processing time, total cost of ownership and management overhead  
• Disk-only models with up to 1.3 PB native tape volume cache  
• Grid configurations for information availability and business continuity |

## Tape is often cost effective versus disk

- Lower price per MB
- Lowest power and cooling storage option available today
Synergy with zEC12 operating systems

**z/OS**

- Java exploitation of *Transactional Execution* for *increased parallelism and scalability*
- Enhanced security support for *digital signatures*
- Faster problem determination with *IBM zAware for improved availability*
- Improve availability and performance with *Flash Express*
- *2GB page* support
- Simpler Specialty Engine (*zIIP*) exploitation
- z/OS v1.13 exploitation of new hardware
- Plus *over 4,100* applications enabled on z/OS

**Linux on System z**

- *Improved consolidation ratio* through new capacity performance
- Improved I/O performance using *High Performance FICON (zHPF)*
- *Application and Linux optimization* enabled by full exploitation of zArchitecture extensions
- Optimized system setup via *Linux health checker*
- *FCP end-to-end data integrity checking* for applications and storage subsystems
- Plus *over 3,000* applications on System z

**z/VM**

- *z/VM Compatibility support*
- Guest exploitation *support for new encryption technology*
- Improved I/O performance using *High Performance FICON (zHPF)* for guest exploitation

**z/TPF**

- Support for *86 CPUs*
- *Hardware exploitation* for performance improvements

**z/VSE**

- *64-bit addressing* with z/VSE V5.1
- Strong *interoperability with Linux* on System z
- New CICS functionality (*CICS Explorer*)

*AND with blades on the zBX there are even more options with applications on AIX, Linux on System x or Microsoft Windows*
Operating System Support for zEC12

• The following are the minimum operating systems planned to run on zEC12:
  – z/OS V1.12, V1.13; z/OS V1.11, V1.10 with z/OS Lifecycle Extension
  – SUSE Enterprise Server (SLES) 10 and 11; Red Hat Enterprise Linux (RHEL) 5 and 6
  – z/VM V5.4, 6.1, 6.2, with PTFs; z/VM V6.1, 6.2 for zBX support
  – z/VSE V4.3, V5.1, with PTFs; z/VSE V5.1 with PTFs for Crypto Express4S toleration
  – z/TPF V1.1

• Using the general purpose application server blades we have:
  – Red Hat Enterprise Linux (RHEL) 5.5 and up, and 6.0 and up
  – SUSE Linux Enterprise Server (SLES) 10 SP4 and 11 SP1 and up
  – Microsoft Windows Server 2008 R2 and Microsoft Windows Server 2008 SP2 (Datacenter Edition recommended)
  – AIX 5.3 Technology Level 12 or higher, AIX 6.1 Technology Level 5 or higher, AIX 7.1
**z/OS Support Changes**

- **Shift z/OS to a 2 year release cycle**
  - Release delivery cycle is planned to be every 2 years, in the second half of that year.
  - Will continue to deliver key hardware support & updates in-between releases
  - Maintain N-2 release migration (accommodate a 2 or 4 year migration cycle)
  - 5 Year Support with optional fee based service extension to accommodate migration
  - z/OSMF will be on the same release and service cycle
  - Minimum supported HW levels (z9 server or later, and 3990-3 controller or later)
  - R12 Support extended to 4 years, R13 Support extended to 5 years; bridges v2 migrations

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>R 1.10</strong></td>
<td></td>
<td>3 Year Support</td>
<td>Life Cycle Ext.</td>
<td>Extended Service</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>R 1.11</strong></td>
<td></td>
<td>3 Year Support</td>
<td>Life Cycle Ext.</td>
<td>Extended Service</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>R1.12</strong></td>
<td></td>
<td>3 Year Support</td>
<td>+1 Support</td>
<td>LCE</td>
<td>Extended Service</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>R1.13</strong></td>
<td></td>
<td>3 Year Support</td>
<td>+ 2 Support</td>
<td>Extended Service</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>v 2.1</strong></td>
<td></td>
<td></td>
<td></td>
<td>5 Year Support</td>
<td>Extended Service</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>v next2</strong></td>
<td></td>
<td></td>
<td></td>
<td>5 Year Support</td>
<td>Extended Service</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>v next3</strong></td>
<td></td>
<td></td>
<td></td>
<td>5 Year Support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Announced via Statement Of Direction on April 11, 2012*
Redbooks

• IBM zEnterprise EC12 Technical Introduction, SG24-8050
  – This book provides concepts, positioning, and a business value view of zEnterprise System capabilities, hardware functions/features, and associated software support. It is intended for IT Managers, consultants, IT Architects and Specialists, and anyone who wants to understand the basic elements of the zEnterprise EC12.

• IBM System z Connectivity Handbook, SG24-5444
  – This book highlights the hardware and software components, typical uses, coexistence, and relative merits of the System z I/O features. It is intended for data center planners, IT Specialists, system engineers, technical sales staff, and network planners who are involved in planning connectivity solutions for System z servers.

• IBM zEnterprise EC12 Technical Guide, SG24-8049
  – This book provides specific information about the zEnterprise EC12 (zEC12) and its functions, features, and associated software support. Greater detail is offered in areas relevant to technical planning. It is intended for systems engineers, system programmers (IT Specialists), planners, and anyone wanting to understand the zEC12 functions and plan for their usage.

• IBM zEnterprise EC12 Configuration Setup, SG24-8034
  – This book helps you install, configure, and maintain the IBM zEnterprise EC12 server. The zEC12 offers new functions that require a comprehensive understanding of the available configuration options. This book presents configuration setup scenarios, and discusses implementation examples in detail.
Protecting your investment in IBM technology

- **Designed to protect your investment**
  - Offering upgrades from z10 EC™ and z196 to the zEC12
  - Upgrades from zBX Mod 002 to zBX Mod 003

- **Full upgradeability within the zEC12 family**
  - Upgrade to Model HA1 will require a planned outage

- **On demand offerings offer temporary or permanent growth when you need it**
IBM zEnterprise EC12 in an information-centric world

- **Operational analytics to enable business opportunities**
  - Most sophisticated data warehousing and analytics solutions with the fastest query performance in the market
  - Leverage your data to build competitive advantage

- **Trusted resilience for unmatched security and reliability**
  - Most secure system with 99.999% reliability
  - Unified platform for rapid development of secure applications end-to-end

- **Efficiency at scale**
  - Most efficient and fastest system for mission-critical workloads
  - Increased efficiency will free up IT resources to focus on new services to drive growth
  - Hybrid architecture enables rapid cloud deployment
Thanks!

**J. L. (Jim) Elliott**  
*Consulting Sales Specialist – System z  
zChampion & Linux Champion  
Systems & Technology Group*

IBM Canada Ltd.  
3600 Steeles Avenue East  
Markham, ON L3R 9Z7

Office: 905-316-5813  
Fax: 845-491-5004  
Jim_Elliott@ca.ibm.com  
ibm.com/vm/devpages/jelliott/