IBM zEnterprise System

A new dimension in computing

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Customers need the ability to manage the IT infrastructure and Business Application as an integrated whole.
IBM zEnterprise
The integration of System z and distributed technologies into a revolutionary combination

IBM zNext
Unified Resource Manager
- Unifies resources, extending System z qualities of service across the infrastructure
- Install, Monitor, Manage, Optimize, Diagnose & Service

IBM zEnterprise
BladeCenter Extension

IBM zCPC
- The industry’s fastest and most scalable enterprise system
- Ideally suited for large scale data and transaction serving and mission critical enterprise applications

Unified Resource Manager
- Workload specific accelerators to deliver significant performance and/or lower cost per transaction
- Runs app unchanged and supports what you know. Logical device integration between System z and distributed resources

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IBM zEnterprise System CPC and zBX Model 002
IBM System z10 CPC and zBX Model 001

z10 CPC

zBX Model 001
zEnterprise System Hardware Components

### System z CPC
- Rack
- Top-of-Rack Switch
- Blade Center Chassis
- Ethernet & FC Cables
- BC Switches (ESM, FC)
- Power Dist. Units
- Opt: Heat Exchanger, Power cord types

### zBX Infrastructure
- Rack
- Top-of-Rack Switch
- Blade Center Chassis
- Ethernet & FC Cables
- BC Switches (ESM, FC)
- Power Dist. Units
- Opt: Heat Exchanger, Power cord types

#### New System z Machine Types:
- CPC = 2817
- zBX = 2458 Model 002
- Blades are provided by the customer as IBM System x* and p Blades

#### Key points:
1. CPC Availability and Integrity
2. Independent Lifecycles
   - Asynchronously Upgradeable
   - Enhancements not tied to CPC HW
3. Data availability not tied to single CPC
   - Shareable between CPCs
4. Growth
5. System z service

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zEnterprise System description

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IBM POWER7 and System x\(^1\) Blades
General purpose processors under one management umbrella

**What is it?**

*The zBX infrastructure can host select IBM POWER7 and System x blades. Each blade comes with an installed hypervisor that offers the possibility of running an application that spans z/OS, Linux on System z, AIX on POWER, or Linux on System x (SOD)\(^1\) but have it under a single management umbrella.*

**How is it different?**

- **Complete management:** Advanced management brings operational control and cost benefits, improved security, workload management based on goals and policies.
- **Virtualized and Optimized:** Virtualization means fewer resources are required to meet peak demands with optimized interconnection.
- **Integrated:** Integration with System z brings heterogeneous resources together that can be managed as one.
- **Transparency:** Applications certified to run on AIX 5.3 or 6.1 will also be certified and run on the POWER7 blade. No changes to deployed guest images.
- **More applications:** Brings larger application portfolio to System z.

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IBM Smart Analytics Optimizer
Capitalizing on breakthrough technologies to accelerate business analytics

What is it?
The IBM Smart Analytics Optimizer is a workload optimized, appliance-like, add-on, that enables the integration of business insights into operational processes to drive winning strategies. It accelerates select queries, with unprecedented response times.

How is it different?
- **Performance**: Unprecedented response times to enable 'train of thought' analyses frequently blocked by poor query performance.
- **Integration**: Connects to DB2 through deep integration providing transparency to all applications.
- **Self-managed workloads**: Queries are executed in the most efficient way.
- **Transparency**: Applications connected to DB2, are entirely unaware of IBM Smart Analytics Optimizer.
- **Simplified administration**: Appliance-like hands-free operations, eliminating many database tuning tasks.

*Faster insights for enabling new opportunities*
zEnterprise: Smart Analytics Optimizer

System z Hardware Management Console (HMC) with Unified Resource Manager

System z Host

Select IBM Blades

Optimizers

z/OS

System z PR/SM™

z HW Resources

Support Element

Blade HW Resources

zBX

Private data network (IEDN)

Customer Network

Unified Resource Manager

Private Management Network INMN

Private High Speed Data Network IEDN

Customer Network
Statement of direction: WebSphere DataPower

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WebSphere® DataPower® ¹ appliance in the zBX
Purpose-built hardware for simplified deployment and hardened security

What is it?
The IBM WebSphere DataPower appliance integrated in the zEnterprise System, can help simplify, govern, and enhance the security of XML and IT services by providing connectivity, gateway functions, data transformation, protocol bridging, and intelligent load distribution.

How is it different?
- **Security:** VLAN support provides enforced isolation of network traffic with secure private networks. And integration with RACF security.
- **Improved support:** Monitoring of hardware with “call home” for current/expected problems and support by System z Service Support Representative.
- **System z packaging:** Increased quality with pre-testing of blade and zBX. Upgrade history available to ease growth. Guided placement of blades to optimize.
- **Operational controls:** Monitoring rolled into System z environment from single console. Time synchronization with System z. Consistent change management with Unified Resource Manager.

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zEnterprise System and zBX – Unified Resource Manager

- **zEnterprise CPC**
  - Change Management
  - Configuration Management
  - Operations Management
  - Performance Management

- **zBX Infrastructure**
  - Serviceability Management
  - Problem Management
  - Service Reporting
zEnterprise Unified Resource Manager
Transforming the way resources are managed and deployed

What is it?

Unified Resource Manager provides **workload awareness** to optimize the system resources in accordance with understanding the policies assigned to that particular workload. Functions are grouped into two suites of tiered functionality that enable different levels of capability - Manage suite and Automate suite.

How is it different?

- **Heterogeneous management**: Total systems management across heterogeneous resources
- **Integration**: Single point of control, common skills for resources, reduced complexity of day to day operations.
- **Monitoring**: New dashboard for CPU resources and energy management.
- **Simplified installation**: Auto discovery and configuration of resources and workloads with single interface
- **Secure**: Improved network security with lower latency, less hops and less complexity. Improved control of access due to management of hypervisors as firmware.
- **Service and support management**: Virtual machines and blades able to perform hardware problem detection, reporting and call home
zEnterprise Unified Resource Manager

Hardware Management

Hypervisor Management
- Integrated deployment and configuration of hypervisors
- Hypervisors (except z/VM) shipped and serviced as firmware
- Management of ISO images
- Creation of virtual networks

Operational Controls
- Auto-discovery and configuration support for new resources
- Cross platform hardware problem detection, reporting and call home
- Physical hardware configuration, backup and restore
- Delivery of system activity using new user interface

Network Management
- Private, secure and physically isolated data and service networks

Energy Management
- Monitoring and trend reporting of CPU energy efficiency

Key
- Manage suite
- Automate suite
zEnterprise Unified Resource Manager

Platform Management

- **Hypervisor Management**
  - Manage and control communication between virtual server operating systems and the hypervisor

- **Energy Management**
  - Static power saving
  - Ability to query maximum potential power

- **Workload Awareness and Platform Performance Management**
  - Wizard-driven management of resources in accordance with specified business service level objectives
  - HMC provides a single consolidated and consistent view of resources
  - Monitor resource use within the context of a business workload
  - Define workloads and associated performance policies

- **Virtual Server Lifecycle Management**
  - Single view of virtualization across platforms.
  - Ability to deploy multiple, cross-platform virtual servers within minutes
  - Management of virtual networks including access control

**Key**
- Manage suite
- Automate suite
The whole picture of Unified Resource Manager

**Hypervisor Management**
- Integrated deployment and configuration of hypervisors
- Hypervisors (except z/VM) shipped and serviced as firmware.
- Management of ISO images.
- Creation of virtual networks.
- Manage and control communication between virtual server operating systems and the hypervisor.

**Operational Controls**
- Auto-discovery and configuration support for new resources.
- Cross platform hardware problem detection, reporting and call home.
- Physical hardware configuration, backup and restore.
- Delivery of system activity using new user.

**Network Management**
- Management of virtual networks including access control

**Energy Management**
- Monitoring and trend reporting of CPU energy efficiency.
- Static power savings
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Key
- Manage suite
- Automate suite
What is a zEnterprise Ensemble?

- An ensemble is a collection of up to 8 zEnterprise nodes that are managed collectively by the Unified Resource Manager as a single logical virtualized system.

- A zEnterprise node is a z196 CPC with 0 or 1 zBX. The zBX may contain from 1 to 4 racks each containing up to 2 blade centers. zEnterprise nodes are deployed within a single site.

- An ensemble can consist of a single z196 with no zBX attached, or two to eight z196s where at least one of the z196s has a zBX attached.

- Blade-based fit-for-purpose solutions.

- Power7 and x86 (SOD)* Blades will be supported.

- Unified Resource Manager.


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zEnterprise ensemble networks – relative to OSA – 3 types

**zEnterprise node**

1. Customer External Network (OSD CHPID)

2. Intra-Ensemble Data Network
   - 10GbE (OSX CHPID)

3. Intra-Node Management Network
   - 1GbE (OSM CHPID)

LAN extends to other nodes
IBM zEnterprise

Insights
System z Servers Continue to Scale with System zNext

- 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

![Diagram showing scale and capacity of System z servers]

- z900
  - z/OS 1.6
  - 77 engines (32-way)
- z990
  - z/OS 1.6
  - 64 engines (54-way)
- z9 EC
  - z/OS 1.6
  - 48 engines (32-way)
- z10 EC
  - z/OS 1.8
  - 20 engines (16-way)
- zNext
  - z/OS 1.11
  - 96 engines (80-way)

*Minimum ITR: z900, 20 engines (16-way); z990, 64 engines (54-way); z9 EC, 48 engines (32-way); z10 EC, 20 engines (16-way); zNext, 96 engines (80-way).*

*z/OS release used for LSPR measurements. zEnterprise measurements are for a xx-way.*

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New 5.2 GHz Quad Core Processor Chip boosts hardware price/performance
- 100 new instructions – improvements for CPU intensive, Java, and C++ applications
- Over twice as much on-chip cache as System z10 to help optimize data serving environment
- Out-of-order execution sequence gives significant performance boost for compute intensive applications
- Significant improvement for floating point workloads

Performance improvement for systems with large number of cores – improves MP ratio

Data compression and cryptographic processors right on the chip
zEnterprise Overview

- **Machine Type**
  - 2817

- **5 Models**
  - M15, M32, M49, M66 and M80

- **Processor Units (PUs)**
  - 20 (24 for M80) PU cores per book
  - Up to 14 SAPs per system, standard
  - 2 spares designated per system
  - Dependant on the H/W model - up to 15,32,49,66 or 80 PU cores available for characterization
    - Central Processors (CPs), Integrated Facility for Linux (IFLS), Internal Coupling Facility (ICFs), System z Application Assist Processors (zAAPs), System z Integrated Information Processor (zIIP), optional - additional System Assist Processors (SAPs)
  - Sub-capacity available for up to 15 CPs
    - 3 sub-capacity points

- **Memory**
  - System Minimum of 32 GB
  - Up to 768 GB per book
  - Up to 3 TB for System and up to 1 TB per LPAR
    - 16 GB Fixed HSA, standard
    - 32/64/96/112/128/256 GB increments

- **I/O**
  - Up to 48 I/O Interconnects per System @ 6 GBps each
  - Up to 4 Logical Channel Subsystems (LCSSs)

- **STP – optional**
zBX Overview

- **Machine Type/Model 2458-002**
  - 1 Model with 5 pre-configured Solutions for IBM Smart Analytics
  - Optimizer

- **Racks – Up to 4 (B, C, D and E)**
  - 42U Enterprise, (36u height reduction option)
  - 4 maximum, 2 chassis/rack
  - 2-4 power line cords/rack
  - Non-acoustic doors as standard
  - Optional Acoustic Doors
  - Optional Rear Door Heat Exchanger (conditioned water required)

- **Chassis – Up to 2 per rack**
  - 9U BladeCenter
  - Redundant Power, cooling and management modules
  - Network Modules
  - I/O Modules

- **Blades (Maximum 112 in 4 racks)**
  - IBM Smart Analytic Optimizer Blades (up to 7 to 56)
  - POWER7 Blades (up to 0 to 112)
  - x Blades* (up to 0 to 112)

- **Management Firmware**
  - SE/HMC Hardware management

- **Top of Rack (TOR) Switches - 4**
  - 1 GbE intra node management network (INMN)
  - 10 GbE intra ensemble data network (IEDN)

- **Network and I/O Modules**
  - 1 GbE and 10 GbE modules
  - 8 Gb Fibre Channel (FC) connected to customer supplied disks
  - IBM Smart Analytic Optimizer uses DS5020 disks

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Internal Batteries (optional)

Power Supplies

Support Elements

I/O cages

Fiber Quick Connect (FQC) Feature (optional)

Ethernet cables for internal System LAN connecting Flexible Service Processor (FSP) cage controller cards

Processor Books, Memory, MBA and HCA cards

InfiniBand I/O Interconnects

2 x Water Cooling Units

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<table>
<thead>
<tr>
<th><strong>z10 EC MCM</strong></th>
<th><strong>zEnterprise MCM</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MCM</strong></td>
<td><strong>MCM</strong></td>
</tr>
<tr>
<td>– 96mm x 96mm in size</td>
<td>– 96mm x 96mm in size</td>
</tr>
<tr>
<td>– 5 PU chips per MCM</td>
<td>– 6 PU chips per MCM</td>
</tr>
<tr>
<td>• Quad core chips with 3 or 4 active cores</td>
<td>• Quad core chips with 3 or 4 active cores</td>
</tr>
<tr>
<td>• PU Chip size 21.97 mm x 21.17 mm</td>
<td>• PU Chip size 23.5 mm x 21.8 mm</td>
</tr>
<tr>
<td>• 4.4 GHz</td>
<td>• 5.2 GHz</td>
</tr>
<tr>
<td>• Superscalar, In order execution</td>
<td>• Superscalar, OOO execution</td>
</tr>
<tr>
<td>• L1: 64K I / 128K D private/core</td>
<td>• L1: 64K I / 128K D private/core</td>
</tr>
<tr>
<td>• L1.5: 3M I+D private/core</td>
<td>• L2: 1.5M I+D private/core</td>
</tr>
<tr>
<td>– 2 SC chips per MCM</td>
<td>– 2 SC chips per MCM</td>
</tr>
<tr>
<td>• L2: 2 x 24 M = 48 M L2 per book</td>
<td>• L3: 24MB/chip - shared</td>
</tr>
<tr>
<td>• SC Chip size 21.11 mm x 21.71 mm</td>
<td>• L4: 2 x 96 MB = 192 MB L4 per book</td>
</tr>
<tr>
<td>– Power 1800 Watts</td>
<td>– Power 1800 Watts</td>
</tr>
</tbody>
</table>
System z Cache Topology – z10 EC Vs zEnterprise Comparison

**z10 EC**

- **L1**: 64KI + 128KD
  - 8w Set Associative DL1
  - 4w Set Associative IL1
  - 256B line size

- **L1.5**: 3MB Inclusive of L1.5
  - 12w Set Associative
  - 256B cache line size

- **L2**: 48MB Excl Inclusive + XI Dir
  - 24w Set Associative
  - 256B cache line size

**z196**

- **L1**: 64KI + 128KD
  - 8w DL1, 4w IL1
  - 256B line size

- **L2**: Private 1.5MB Inclusive of L1s
  - 12w Set Associative
  - 256B cache line size

- **L3**: Shared 24MB Inclusive of L2s
  - 12w Set Associative
  - 256B cache line size

- **L4**: 192MB Inclusive
  - 24w Set Associative
  - 256B cache line size
zEnterprise Out-of-Order (OOO) Value

- zEnterprise is System z’s 1st CMOS OOO core
- zEnterprise is System z’s 1st OOO core since 1991
- OOO yields significant performance benefit for compute intensive apps through
  - Re-ordering instruction execution
    - Later (younger) instructions can execute ahead of a stalled instruction
  - Re-ordering storage accesses and parallel storage accesses
- OOO maintains good performance growth for traditional apps
zEnterprise Full and Sub-Capacity CP Offerings

- **Subcapacity CPs may be ordered on ANY zEnterprise model with 1 to 15 CPs.**
  - If 16 or more CPs are ordered all must be full 7xx capacity
- **All CPs on a zEnterprise 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 15 CPs can have granular capacity but other PU cores may be characterized as full capacity specialty engines**
**zCPC Channel Type and Crypto Overview**

- **I/O Channels**
  - FICON Express8
  - FICON Express4 (CF only on type upgrade)
  - ESCON – (240 or fewer channels)
- **OSA-Express (Up to 24 features)**
  - OSA-Express3
    - 10 Gigabit Ethernet LR and SR
      - Intraensemble data network (IEDN) requires two 10 GbE CHPIDs (LR or SR) on two different feature cards. OSX CHPID type.
    - Gigabit Ethernet LX and SX
    - 1000BASE-T Ethernet
      - Intranode Management Network (INMN) requires two 1000BASE-T CHPIDs on two different feature cards. OSM CHPID type.
  - OSA-Express2 (CF only on type upgrade)
    - 1000BASE-T Ethernet
    - Gigabit Ethernet LX and SX
- **HiperSockets (Define only, no additional charge)**
  - Up to 32 (was 16)

- **Coupling Links**
  - Up to 80 external coupling ports (was 64)
  - Up to 128 CHPIDs (was 64)
  - InfiniBand Coupling Links (Up to 32)
    - 12x InfiniBand DDR
    - 1x InfiniBand DDR
  - ISC-3 (Up to 48, Peer mode only)
  - IC (Define only, no additional charge)
- **Crypto**
  - Crypto Express3 (Up to 8 features)
    - New function
- **Not supported:**
  - I/O drawer or cage plan ahead
  - More than 72 feature cards
  - FICON (before FICON Express4)
    - FCV – ESCD Model 5 Bridge Card
  - OSA-Express2 10 GbE LR
  - OSA-Express (pre OSA-Express2)
  - ICB-4 and earlier ICB
  - Crypto Express2 and earlier
  - Sysplex Timer (ETR) Attachment

**Bold – available on new build**

**CF – carry forward**
zEnterprise Parallel Sysplex® coexistence of Servers/CFs and coupling connectivity

- **z9 EC and z9 BC S07**
  - PSIFB, ISC-3

- **z800, z900, z890 and z990**
  - Not supported!

- **zNExt**
  - PSIFB 1x IB-DDR 10/100 KM
  - PSIFB 12x IB-DDR 150 meters
  - ISC-3 Up to 100 KM

- **z10 EC and z10 BC**
  - PSIFB, ISC-3

*Note: ICB-4s and ETR NOT supported on zNext*
zCEC – Helping to control energy consumption in the data center

- Better control of energy usage and improved efficiency in your data center

- New water cooled option allows for energy savings without compromising performance
  - Maximum capacity server has improved power efficiency of 60% compared to the System z10 and a 70% improvement with water cooled option

- Savings achieved on input power with optional High Voltage DC by removing the need for an additional DC to AC inversion step in the data center

- Improve flexibility with overhead cabling option while helping to increase air flow in a raised floor environment

- zCEC is same footprint as the System z10 EC\(^1\)

\(^1\)With the exception of water cooling and overhead cabling
z196 Water Cooling Option

- Water cooled cold plate on processor MCM in each processor book
- 2N Water Conditioning Unit (WCU) with independent chilled water connections
- One WCU can support system
- Exhaust Air Heat Exchanger (XAHX) removes heat from exhaust air at back of both frames
- Target to remove 60-65% of air heat load from the System z
- Results in ~10kW system air heat load max (5kW per frame)
- Input energy savings of ~2-3kW/system for 3 and 4 book system.
- Additional power savings in data center for reduced air cooling heat load. Additional est. ~2.5kW savings.

Air cooling back-up mode for maximum robustness if complete loss of chilled water occurs!
Focused, collaborative innovation

A “complete systems” approach

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... value made possible by the Unified Resource Manager

- Simplified installation of hypervisors
  - Gain significant time to market with improved speed of deployment

- Save time, cost and simplify asset management
  - Decrease problem determination and resolution time for cross-platform resources
  - Improve and simplify cross-platform availability procedures
  - Enable broader and more granular view of resource consumption

- Factory installed and configured network
  - Improved network security with lower latency, less complexity, no encryption/decryption

- Simplified energy management
  - Energy cost savings

- Allow critical workloads to receive resources and priority based on goal-oriented policies established by business requirements

- Smart business adjustments based on workload insight
  - Enable broader and more granular view of resource consumption

- Gain flexibility, consistency and uniformity of virtualization

- Provide the business with faster time to market

- Simplified network management for applications
  - Value made possible by the Unified Resource Manager
z196 to zBX Model 002 – Communications

IBM Service Updates
Virtual Server to Virtual Server Communications
ISAOPT Database Updates
Power Monitoring / Management

Customer Management Network

HMC2 (Alternate)  HMC1 (Primary)

IBM/SE LAN (switch)

Eth Switch

Customer managed Data Network

OSX 10GBE OSA’s

OSM 1000bT OSA’s

z/OS DB2 ISAOPT

ODS Customer Network

zCPC

zBX

TOR

TOR

System z Virtual Servers
System z Virtual Servers
System z Virtual Servers
System z Virtual Servers

System Analytics Optimizer

Power Blades

Power Blades

Blade Center 1

Blade Center 2

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Service levels to match your business needs
Increased flexibility for your multi-architecture strategy when data is on z/OS

**TCO Focus**
- Silo managed islands of computing
- Less dynamic than z virtualization
- Minimal resource sharing with z resources

**TCA Focus**

**SCALABILITY, SECURITY, DYNAMIC WORKLOAD MANAGEMENT**

**Select IBM Blades in zBX**
- Expanded ISV support for enterprise applications
- Targeted for applications that interact with mainframe data and transactions
- Provisioned and managed by System z

**zEnterprise System**
- Extreme consolidation of servers and networking
- Superior levels of virtual server provisioning, monitoring and workload management
- Industry-best virtual I/O bandwidth and reliability
- Fewer components and reduced complexity
- System z qualities of dynamic resource management and capacity-on-demand
- Seamless integration with z/OS backup and disaster recovery solutions

**z/OS**
- Extreme scalability and performance for transaction processing and data serving
- High availability and cross-system scalability with Parallel Sysplex® and GDPS
- Leading policy-based capacity provisioning and workload management
- Pervasive, high-performance security support

**Linux on z/VM®**

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Availability Dates
zEnterprise System Upgrades

- **zEnterprise to higher hardware zEnterprise model**
  - Upgrade of z196 Models M15, M32, M49 and M66 to M80 is disruptive
  - When upgrading to z196 all the Books are replaced
  - Upgrade from Air to Water cooled not available

- **Any z9 EC to any z196**
- **Any z10 EC to any z196**
IBM zEnterprise System Key Dates

- **Planned Availability Dates:**
  - **September 10, 2010**
    - z196 Models M15, M32, M49, M60 and M80
    - Features and functions for the z196
    - z9 EC upgrades to z196 Air Cooled/Water Cooled
    - z10 EC upgrades to z196 Air Cooled/Water Cooled
    - Manage Suite for z196
    - Water Cooling for z196
    - 3-in-1 Bolt Down Kit for new built z196
    - System z discovery and autoconfiguration(zDAC)
  - **November 19, 2010**
    - Manage suite enhancement functions for z196
    - Automate suite for z196
    - zBX Model 002, IBM Smart Analytics Optimizer Solution sizes of 7, 14 and 28 Blades
    - zBX Model 002 POWER7 Blades support
  - **December 17, 2010**
    - zBX Model 002, IBM Smart Analytics Optimizer Solution sizes > 28 Blades
  - **December 31, 2010**
    - 3-in-1 Bolt Down Kit MES z196
    - MES features for Models M15, M32, M49, M66 and M80
    - Model conversions for z196

- **Statement of direction: in the first half of 2011 ....**
  IBM intends to offer a System x bladerunning Linux on System x in the IBM zEnterprise System on zBX model 002
  In the first half of 2011, IBM intends to offer a WebSphereDataPower Appliance for zEnterprise System on zBX mod002
IBM System z10 Key Dates for new functions/features

- **Planned Availability Dates:**
  - **November 09, 2010**
    - HMC w/Dual Ethernet (#0091) on z10 EC and z10 BC
    - TKE workstation (#0841) on z10 EC and z10 BC
    - TKE 7.0 LIC (#0860) on z10 EC and z10 BC
  - **December 17, 2010**
    - IBM Smart Analytics Optimizer enablement on z10 EC and z10 BC
    - zBX Model 001 with all solution sizes of IBM Smart Analytics Optimizer
    - Model 001 and Model 002 MES feature upgrades within each model
  - **March 17, 2011**
    - z10 EC with zBX 2458 Model 001 upgrades to z196 with zBX 2458 Model 002
Thank you for your attention