



# The IBM zEnterprise System

## *A New Dimension in Computing*

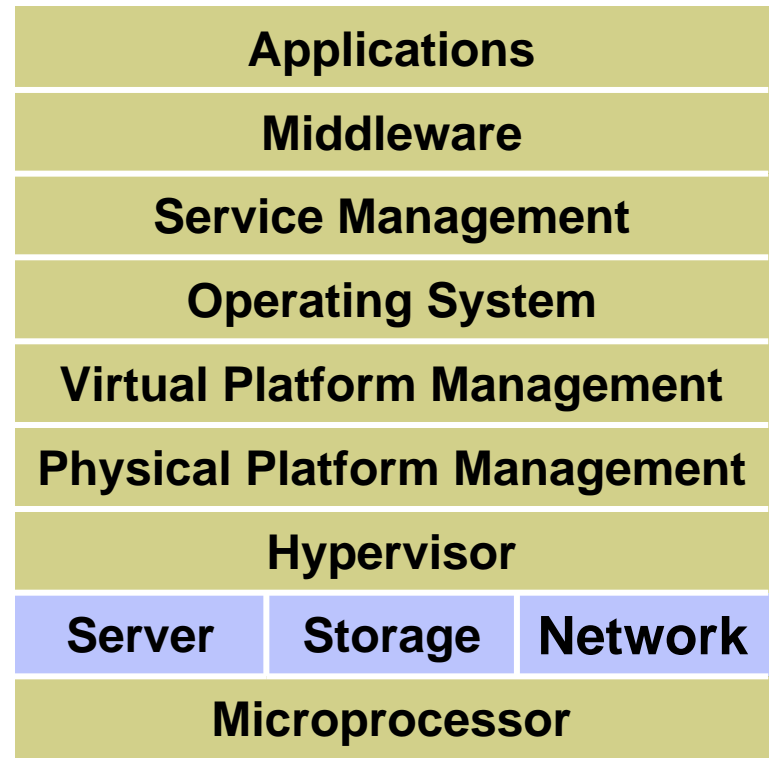
Jim Elliott

Consulting Sales Specialist – System z

IBM Canada Ltd.



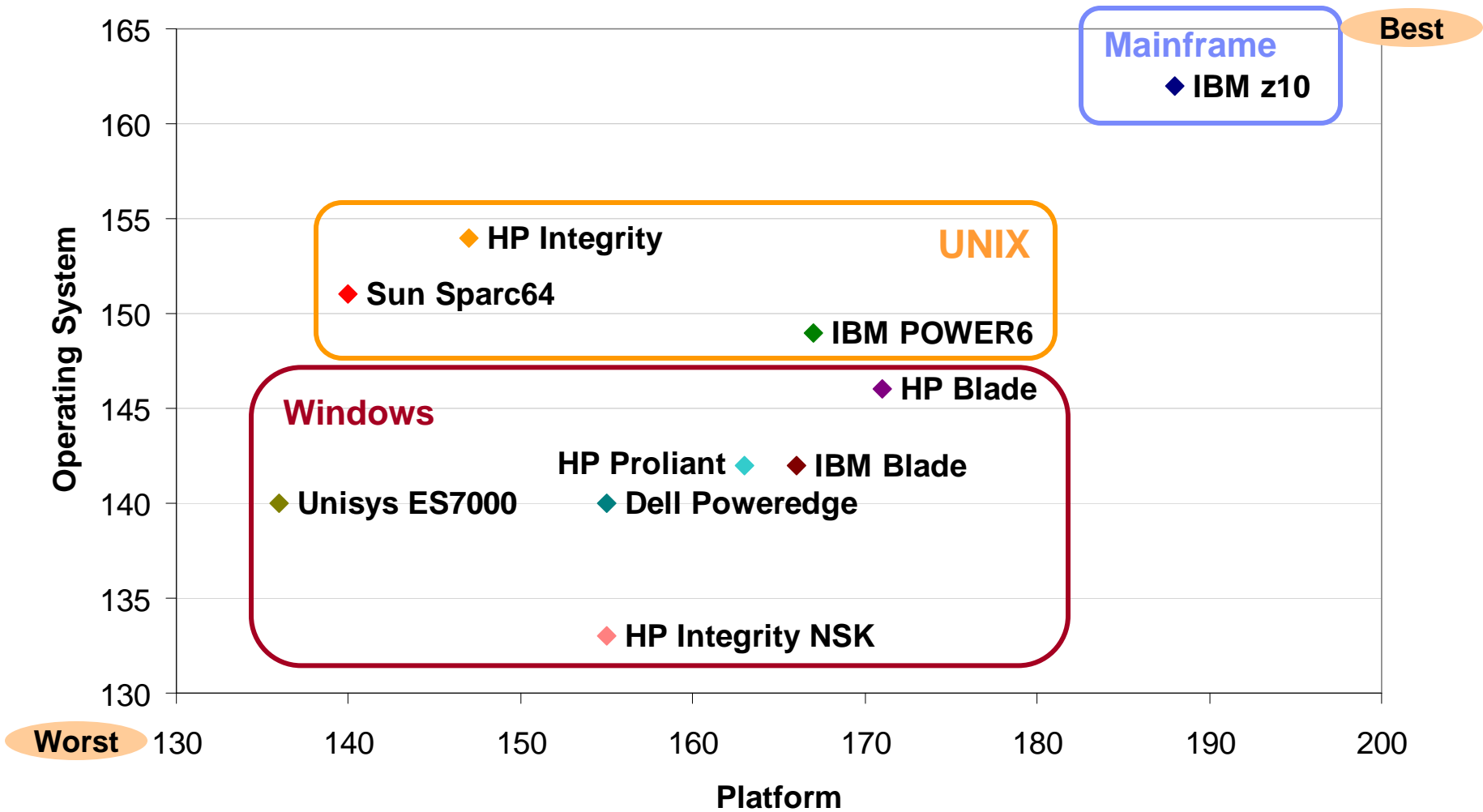
# Innovation, integration and optimization at every level



***Focused, collaborative innovation***  
***A “complete systems” approach***  
***Intelligent performance***

# Gartner's platform positioning

## *Selected platforms*



Source: Gartner, Application Server Evaluation Model - Enterprise Server Update; December 2009

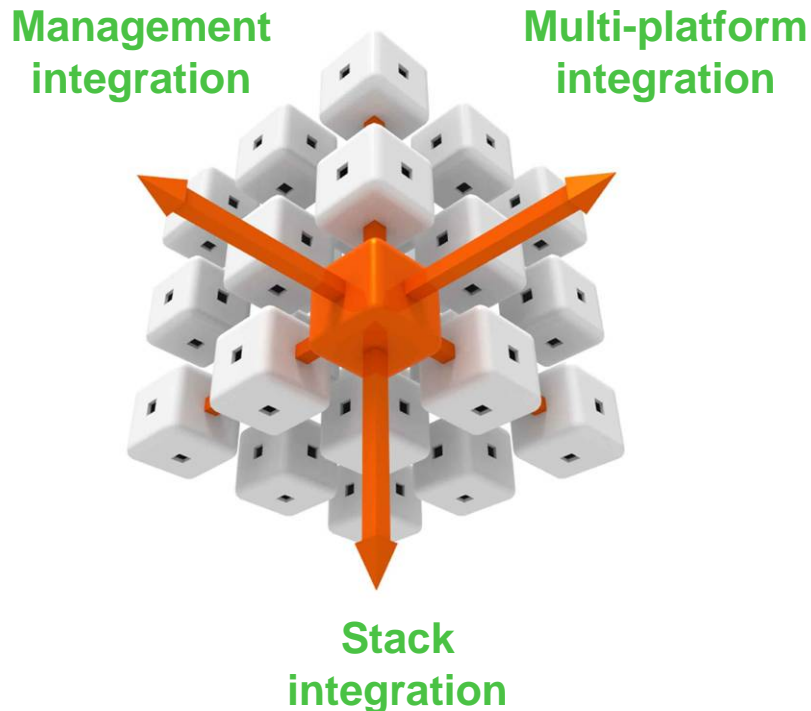
# System z investment areas

- 1. Innovate to address the IT infrastructure challenges of today and the future**
  - Further simplify, consolidate and reduce the costs of an IT infrastructure
  - Integrate, virtualize and coherently manage the multiple and varied elements of business applications
  - Scale up and leverage System z strengths in data serving
- 2. Extend strengths of System z**
  - Invest for continued leadership in System z: performance, virtualization, enterprise security, enterprise business continuity
  - Extend System z best of breed capabilities to a broader set of workloads
  - Deploy optimized technologies for specific applications or components
- 3. Expand the ecosystem and support core applications that our clients want**
  - Recruit new solutions and solution providers and integrators
  - Expand skills and capabilities across the globe



# The IBM zEnterprise System

## *A New Dimension in Computing*



- A “System of Systems”, integrating IBM’s leading technologies to dramatically improve productivity of today’s multi-architecture data centers and tomorrow’s private clouds.
- The world’s fastest and most scalable enterprise system with unrivalled reliability, security, and manageability.
- The industry’s most efficient platform for large scale data center simplification and consolidation.

# IBM zEnterprise system – Best in class technologies

*A system of systems that unifies IT for predictable service delivery*



Unified management for a smarter system:  
**zEnterprise Unified Resource Manager**

The world's fastest and most scalable system:  
**zEnterprise™ 196 (z196)**

- Ideal for large scale data and transaction serving and mission critical applications
- Most efficient platform for Large-scale Linux® consolidation
- Leveraging a large portfolio of z/OS® and Linux on System z applications
- Capable of massive scale up, over 50 Billion Instructions per Second (BIPS)



Scale out to a trillion instructions per second:  
**zEnterprise BladeCenter® Extension (zBX)**

- Select IBM POWER7® blades and IBM x86 blades<sup>1</sup> for tens of thousands of AIX® and Linux applications
- High performance optimizers and appliances to accelerate time to insight and reduce cost
- Dedicated high performance private network

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

# IBM zEnterprise 196 – The heart of the new machine

*The industry's fastest and most scalable enterprise system*

5.2 GHz superscalar processor

Up to 96 Cores, 1 to 80 configurable for client use

45 sub-capacity settings

Up to 3 TB RAIM memory

Over 100 new instructions

1.5MB L2 Cache per core, 24MB L3 Cache per processor chip

192MB L4 Cache per book

Cryptographic enhancements

Optional water cooling

**Dramatic improvement over IBM System z10 EC**

**For Linux**

Up to **60%**

**Improvement in performance**

for **35%**

**Less cost**

- **With no increase in energy consumption**
- **And even better performance with new software**

**For z/OS**

Up to **40%**

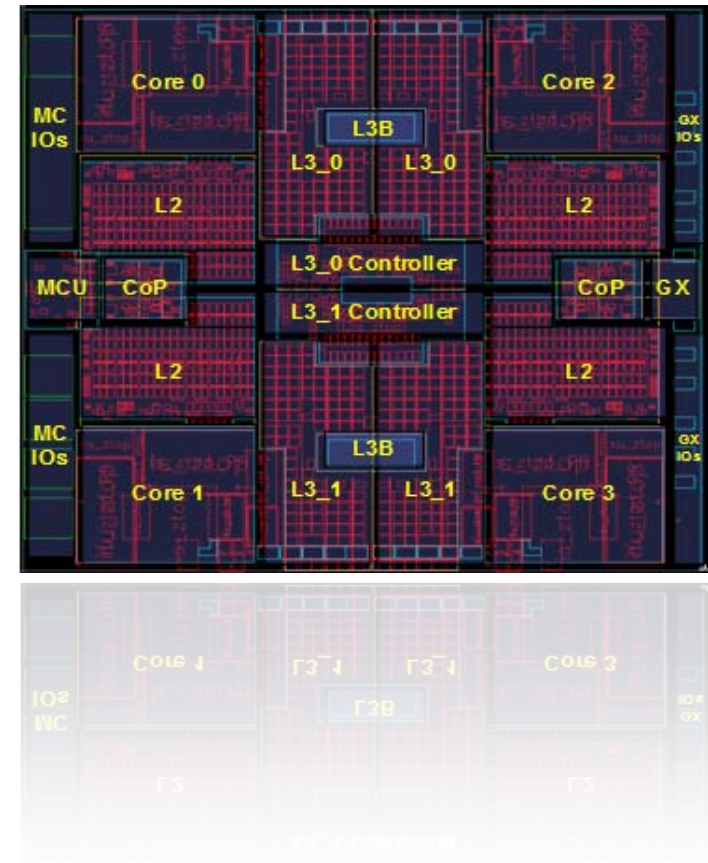
**Improvement in performance**

with **60%**

**More capacity**

## z196 – IBM leadership technology at the core

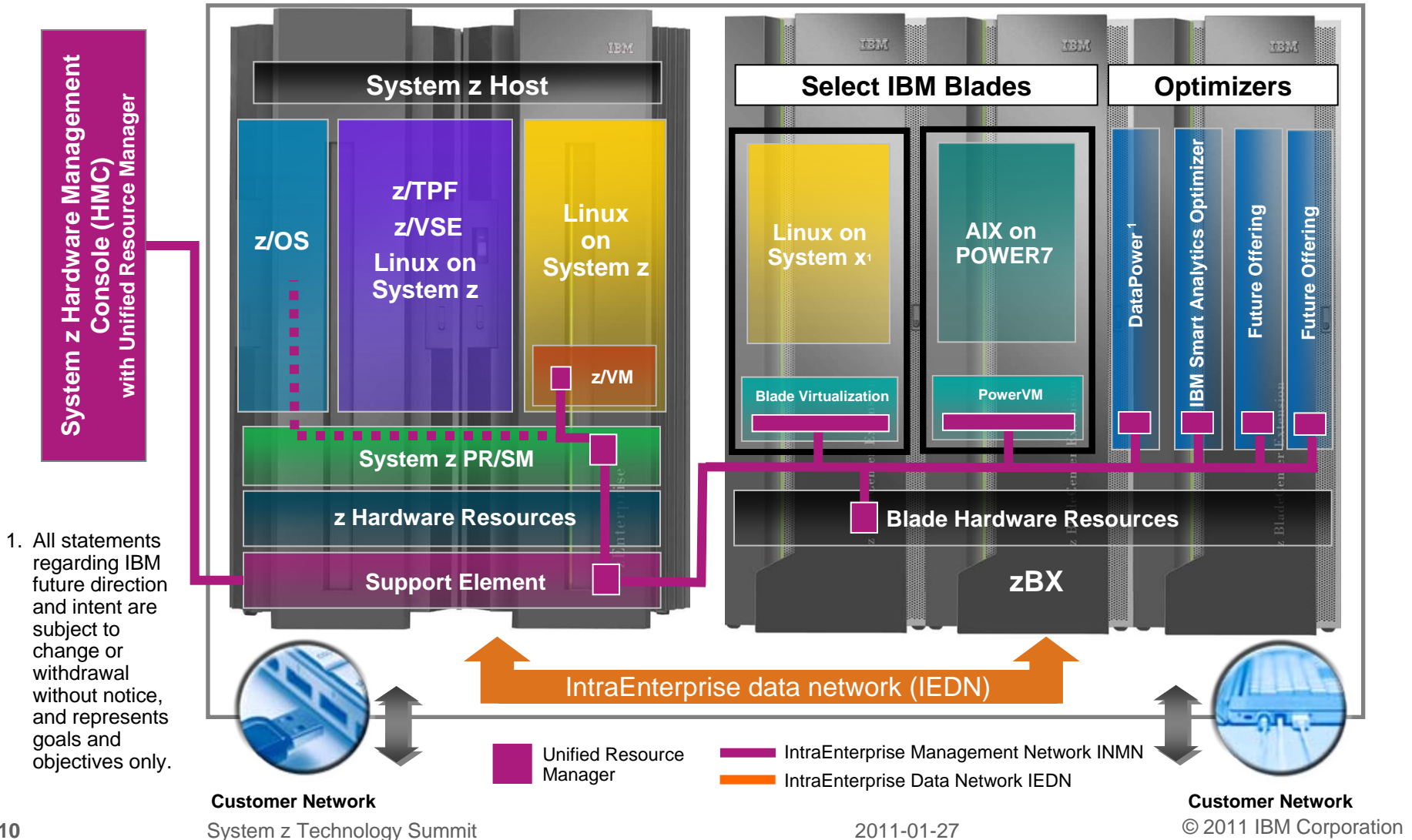
- **New 5.2 GHz Quad Core Processor Chip boosts hardware price/performance**
  - Over 100 new instructions – improvements for CPU intensive, Java™, and C++ applications
  - Over twice as much on-chip cache as System z10 to help optimize data serving environment
  - Out-of-order execution sequence gives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





# A look inside the IBM zEnterprise System

## *Enabling a new dimension in application architecture*



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## zBX – An infrastructure to host and integrate non-System z components with System z

- **BladeCenter Frame to host multiple resource types**
  - Select IBM blades – POWER7<sup>®</sup> and IBM x86<sup>1</sup>
  - Optimizers – IBM Smart Analytics Optimizer and WebSphere<sup>®</sup> DataPower<sup>®1</sup> appliance
- **More System z-like service than BladeCenter**
  - Fully integrated system with tested and supported components
  - Redundant switches, power, blowers, network to improve availability
  - A simplified service method to provide tested code updates
  - Yet, no System z software running in zBX – No MIPS/MSU rating
- **Connected to z196 with dual (redundant) 10 Gb secure link**
  - Connection between zBX and z196 for data and support



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# Design points of zEnterprise BladeCenter Extension (zBX)

*Customers have connectivity but want management*

- **Enhance the overall experience of attaching blades and optimizers**
  - Increase availability of infrastructure – build in redundancy
  - Provide System z-like maintenance – by System z SSR – 24x7 warranty support, call home
- **Improve the connectivity between blades and IBM System z<sup>®</sup>**
  - Build a very high speed secure network
  - Ensure network availability – build in redundancy
  - Simplify – Significantly reduce the need for connection devices / black boxes (e.g. routers, switches)
- **Automate as many functions as possible across the infrastructure**
  - Consolidate “platform management” function and offer as integrated virtualization firmware for each component
  - Manage across multiple heterogeneous platforms including mainframes, POWER<sup>®</sup>, x86
  - Automatically maintain consistent firmware levels on distributed servers



# IBM POWER7 and IBM x86<sup>1</sup> Blades

*General purpose processors under one management umbrella*

## What is it?

- **The zBX infrastructure can host select IBM POWER7 and IBM x86 blades<sup>1</sup>. 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<sup>®</sup>, or Linux on System x<sup>1</sup> 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 later 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.**



***Faster insights for enabling new opportunities***

## 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.

# WebSphere DataPower<sup>1</sup> Appliance in the zBX

*Purpose-built hardware for simplified deployment and hardened security*

## What is it?

- **The IBM WebSphere DataPower appliance<sup>1</sup> 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.**



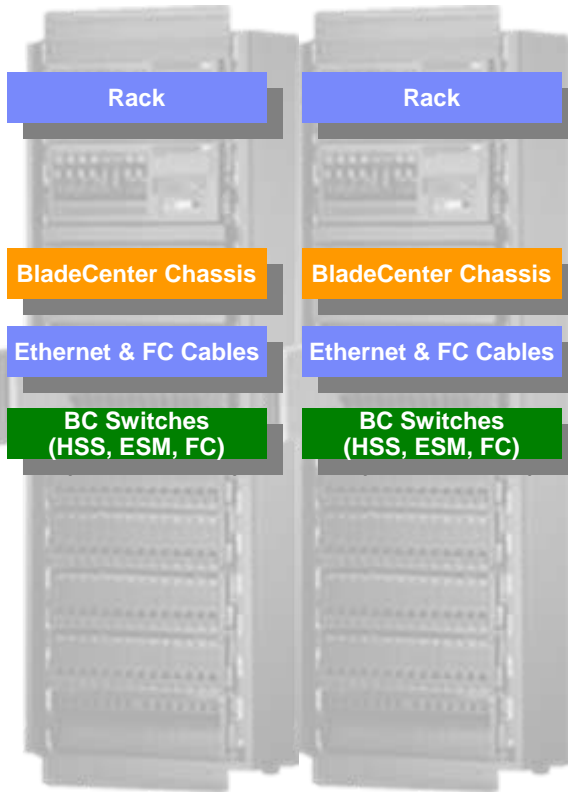
## How is it different?

- **Security:** VLAN support provides enforced isolation of network traffic with secure private networks. And integration with RACF<sup>®</sup> 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 coordination with System z. Consistent change management with Unified Resource Manager.

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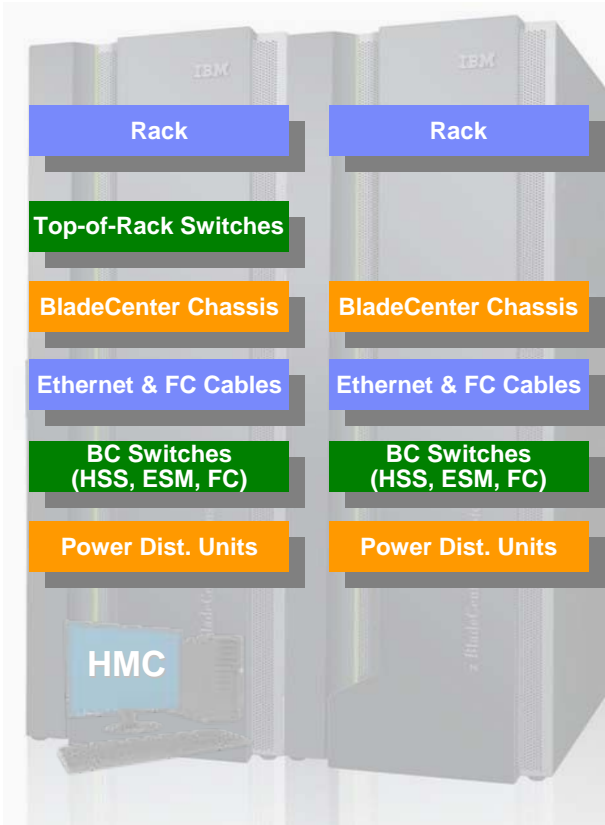
# zBX – A uniquely configured extension of the zEnterprise

*Looks like a rack with BladeCenters but much more*



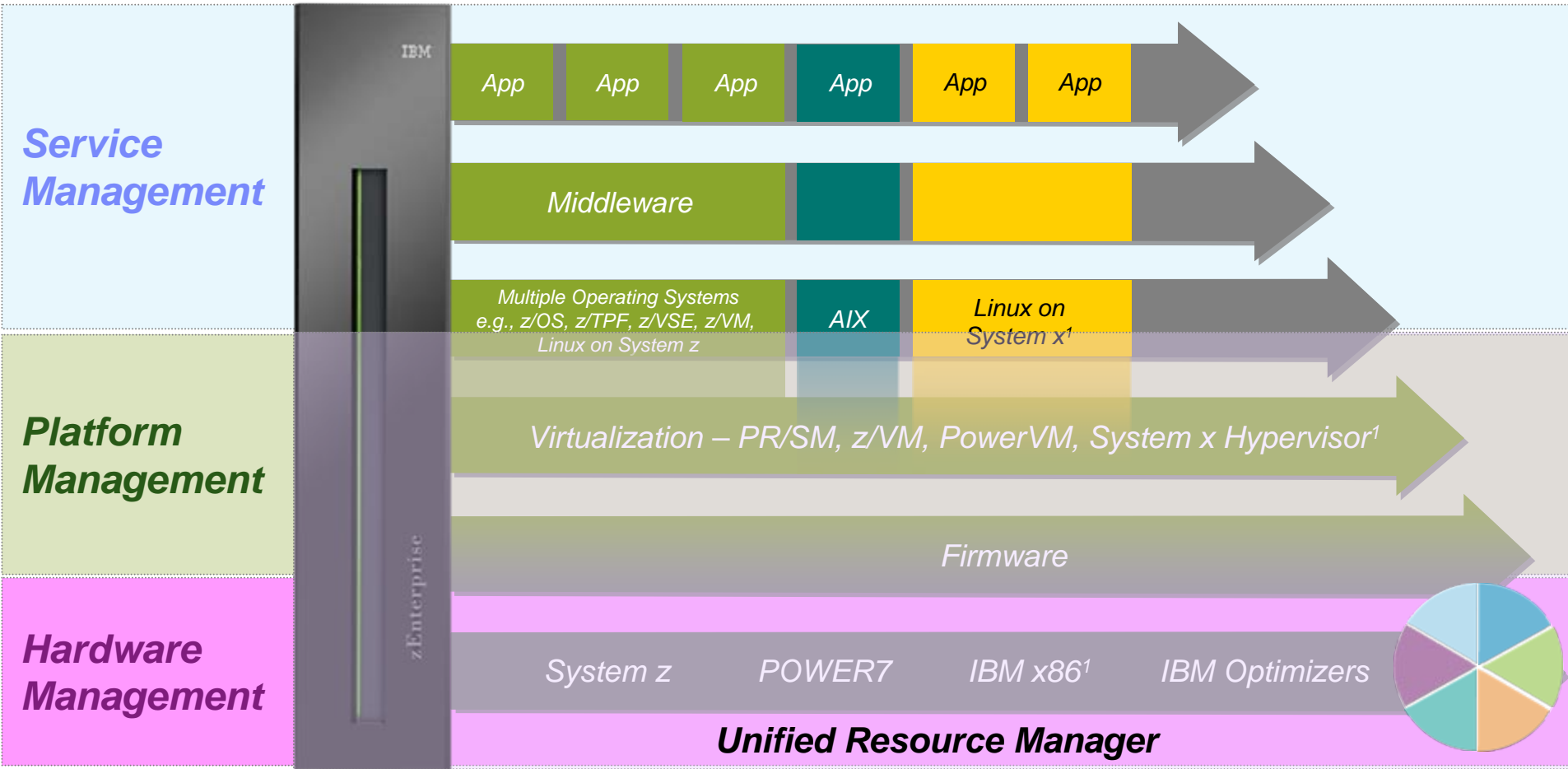
**Rack infrastructure hosting  
IBM BladeCenters**

- **zBX is assembled and built at the IBM plant**
  - All parts and microcode – tested and shipped as a completed package
- **zBX hardware redundancy provides improved availability**
  - Redundant switches provide guaranteed connection between z196 and zBX
  - Redundant Power Distribution Units improve availability
  - Extra blowers manage heat dispersion/removal
- **zBX provides an isolated and secure network**
  - Four top-of-rack switches for connection to the controlling z196
  - Redundant 10 Gb private data network (IEDN)
  - **Foundation for zManager**



**IBM zEnterprise BladeCenter  
Extension (zBX)**

# zEnterprise extends Service Management for improved governance



## Focused, collaborative innovation – A “complete systems” approach

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# Unified Resource Manager (zManager) design points

*Integrate and manage your mainframe and distributed environment as one*

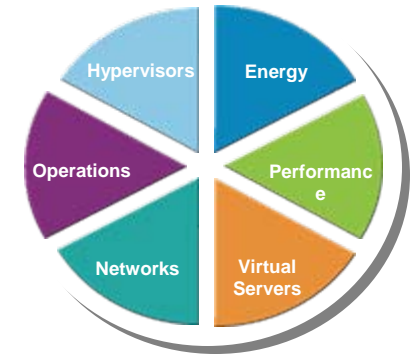
- **Incorporate “hardware management / platform management” capabilities into robust firmware to control each attached hardware component – mainframe to blade**
  - Hypervisors managed as firmware
  - Network managed by firmware – improved access control
  - Single management point of control – the HMC – reduced complexity of day-to-day operations
  - Simplified installation – auto discovery and configuration of resources inserted into the zBX
- **Deliver workload awareness to optimize the system resources in accordance with understanding the policies assigned to that particular workload.**
- **System z service and support management for the z196 and the virtual machines and blades**
  - Monitoring of heterogeneous architectures for problems, logging and analyzing of events, initiating recovery procedures, call home and notifying the user – all with time stamps to maintain data and transaction integrity
- **zManager offers virtual server provisioning and management for Linux guests running on z/VM – even if you don’t have a zBX**
  - Simplified skill level needed to manage a Linux on z/VM environment

Manage your mainframe and distributed servers with the same tools, same techniques, same practices

Unified Resource Manager

# Unified Resource Manager

*Two suites of tiered functionality*



## ▪ Manage

- Monitoring and trend reporting of CPU energy efficiency
- Integrated hardware / asset management across all elements of the system
- Private and physically isolated connections for secure support and data sharing
- Simple administrative wizard

## ▪ Automate

- Additional wizard function – Capability to associate workload resources with a named business process
- Ability to manage to a user-defined performance service level policy and enable performance monitoring, reporting and resource optimization
- Static power savings (reduce power on z196 during low utilization such as DR or backup servers) and energy management capabilities

**zManager can help you to align the needs of the business  
with what IT can deliver and that brings real value**

## DS8000 family models

*Two base models with scalable controllers and capacity*



### ▪ DS8800

- POWER6+ controllers (2-way and 4-way)
- 8 Gb/s host and device adapters
- 2.5” Enterprise 6 Gbps SAS (SAS-2) drives



### ▪ DS8700

- POWER6 controllers (2-way and 4-way)
- 4 Gb/s and 2 Gb/s host and device adapters
- 3.5” Enterprise Fibre Channel drives

## DS8000 hardware overview

- DS8800 (2-way and 4-way)
  - Two dual POWER6+ based processor servers
  - Up to 384 GB Cache
  - 4- and 8-port 8 Gbps Fibre Channel/FICON host adapters
  - Up to 1,056 drives
  - Disk drive support
    - Solid-state: 300 GB
    - 6 Gbps Serial attach SCSI (SAS-2) drives: 146 GB 15K RPM; 450 GB, 600 GB 10K RPM
    - 6 Gbps SAS-2 drives with Full Disk Encryption: 450 GB, 600 GB 10K RPM
  - Physical capacity from 2.3 TB up to 634 TB with support for 3 full frames
- DS8700 (2-way and 4-way)
  - Two dual POWER6 based processor servers
  - Up to 384 GB Cache
  - 4-port 4 Gbps Fibre Channel/FICON host adapters
  - Up to 1,024 drives
  - Three tiers of drive options
    - Solid-state: 73 GB, 146 GB, 600 GB
    - Fibre Channel: 146 GB, 300 GB, 450 GB 15K RPM
    - Serial ATA (SATA): 2 TB 7200K RPM
  - Physical capacity from 1.1 TB up to 2,048 TB with support for 5 full frames

## System z education on the Web

*[ibm.com/vm/devpages/jelliott/educate.html](http://ibm.com/vm/devpages/jelliott/educate.html)*

- **On my education page, there are lots of links to education materials on System z**
  - IBM Training
  - IBM Webcasts
  - Non-IBM System z Training
  - Internet Discussion Lists
  - System z Academic Initiative
  - Information Centers and the Education Assistant
  - ABCs of z/OS System Programming
  - z/OS Communications Server
- **This web page is frequently updated and you can subscribe to change notifications**

# The IBM zEnterprise System:

*Extending System z cost savings and value to a new dimension*

- **Designed to meet the need of today's heterogeneous data centers**
- **Enables a mixed set of workloads to be deployed on best fit technologies**
- **Delivers lower acquisition and operating costs than a one size fits all approach**
- **Reduces risk by extending the reach of System z qualities of service**
- **Improves service through tighter integration for multi-tier workloads**
  - Integrated support for Business Intelligence
    - Automatic DB2<sup>®</sup> exploitation
    - In-memory database and lossless data compression
    - Query acceleration
    - Single platform data store
  - Integrated support for Service-Oriented Architecture
    - WebSphere DataPower Appliances<sup>1</sup>



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# Thank You!

## Jim Elliott

Consulting Sales Specialist and zChampion

IBM Sales & Distribution, STG Sales

Phone: 905-316-5813

Mobile: 416-527-0666

FAX: 845-491-5005

e-mail: [Jim\\_Elliott@ca.ibm.com](mailto:Jim_Elliott@ca.ibm.com)

Web: [ibm.com/vm/devpages/jelliott/](http://ibm.com/vm/devpages/jelliott/)

IBM Canada Ltd.

3600 Steeles Ave East

Markham, ON L3R 9Z7

Canada



