# The New zEnterprise –
A Smarter System
# For A Smarter Planet

A Closer Look At zEnterprise

z196 Has A Familiar 4-Book Design, But Packs More Inside

- Each book has 6 quad-core central processors (CPs) …
  - ▶ Increased from 5 in System z10
  - ▶ Fully connected topology
- ...Plus 2 shared cache (SC) chips
  - ▶ Each holds up to 96 MB eDRAM L4 cache shared per node
    - − 192 MB total per book
- Up to 3TB RAIM memory for system
  - ▶ Up to 768 GB per book
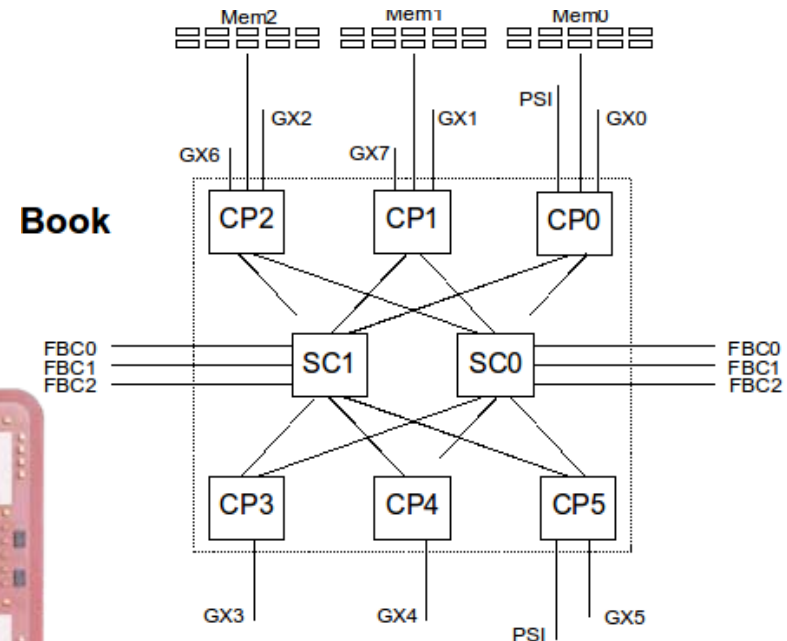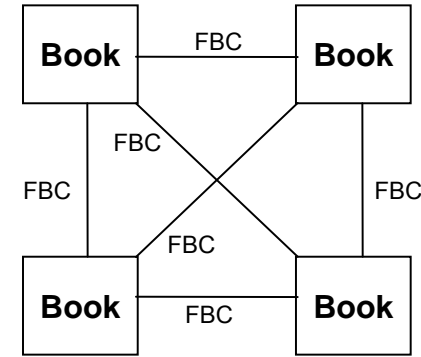
z196 Core Designed To Be The Fastest Available Today

- Quad-core CP chips designed to reach speeds of 5.2 GHz
  - ▶ Exceeds z10 speed of 4.4 GHz
- Four levels of cache:
  - ▶ Over twice as much on-chip cache as System z10
  - ▶ L1: 64KB I / 128K D private, per core
  - ▶ L2: 1.5MB private, per core (adjacent)
  - ▶ L3: 24MB per chip, shared by all 4 core
  - ▶ Interface to L4 cache (SC Chips) at 40+ GB/sec
- Cryptographic and data compression co-processors
- Memory controller
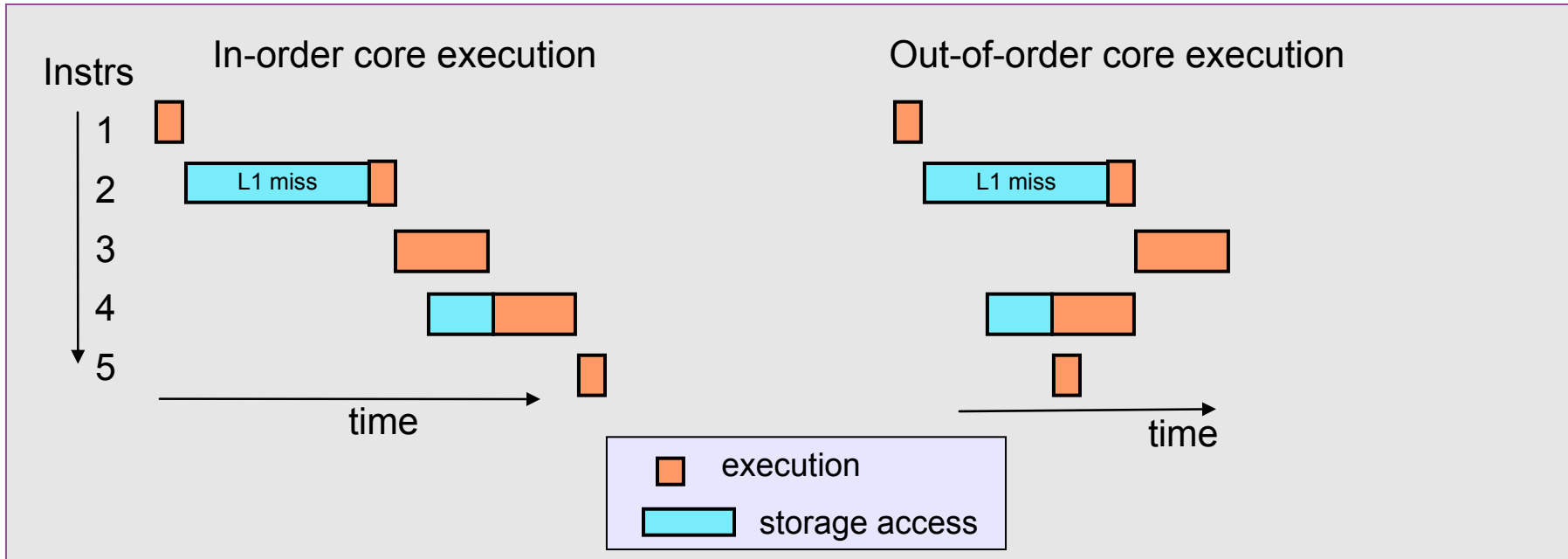- I/O Bus Controller (GX)
- Over 100 new instructions
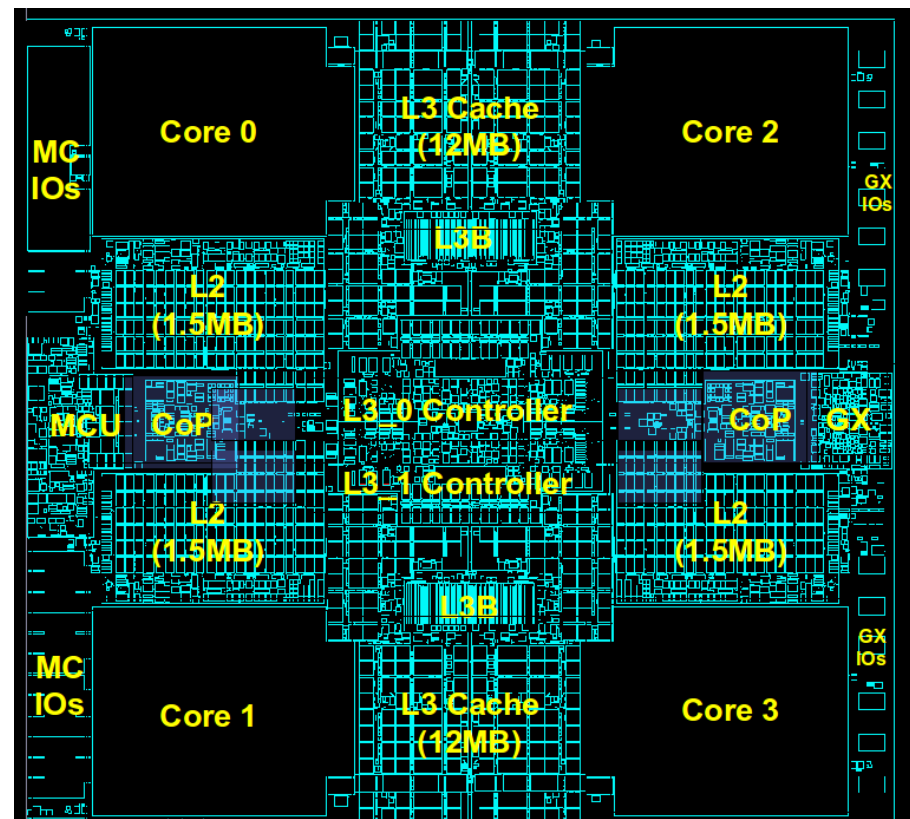
CP Floor Plan – 512.3 mm^2, 1.4B transistors

40% improvement for n-way processors
60% more total capacity than System z10

zEnterprise Includes System z's First Out-Of-Order (OOO) Core

- **Instructions can be reordered**
  - ▶ Later (younger) instructions can execute ahead of older stalled instruction
  - ▶ Re-order storage accesses and parallel storage accesses
  - ▶ Yields significant performance benefit for compute-intensive applications

Instrs

In-order core execution

Out-of-order core execution

1

2 — L1 miss

3

4

5

time

time

execution

storage access

z196 – A New Generation Of Mainframe Available In Five Models

- Machine type 2817
  - Five models – M15, M32, M49, M66, M80
- Configurable up to 96 CPs
  - 20 CPs per node (24 for M80)
  - 80 configurable as GP, SAP, IFL, ICF, zAAP, zIIP
  - 2 spares per system
- Capacity On Demand capabilities included
- Up to 60 logical partitions
  - Up to 1TB per LPAR
- Support for:
  - z/OS, z/VM, z/VSE, z/TPF, Linux on System z

Sub-capacity pricing available:
7xx = 100%
6xx = 64%
5xx = 49%
4xx = 20% (xx = 01 - 15)

z196 Yields Dramatic Improvements Over IBM System z10

For Linux

Up to **60%**

Improvement in performance

at **35%**

Less cost

For z/OS

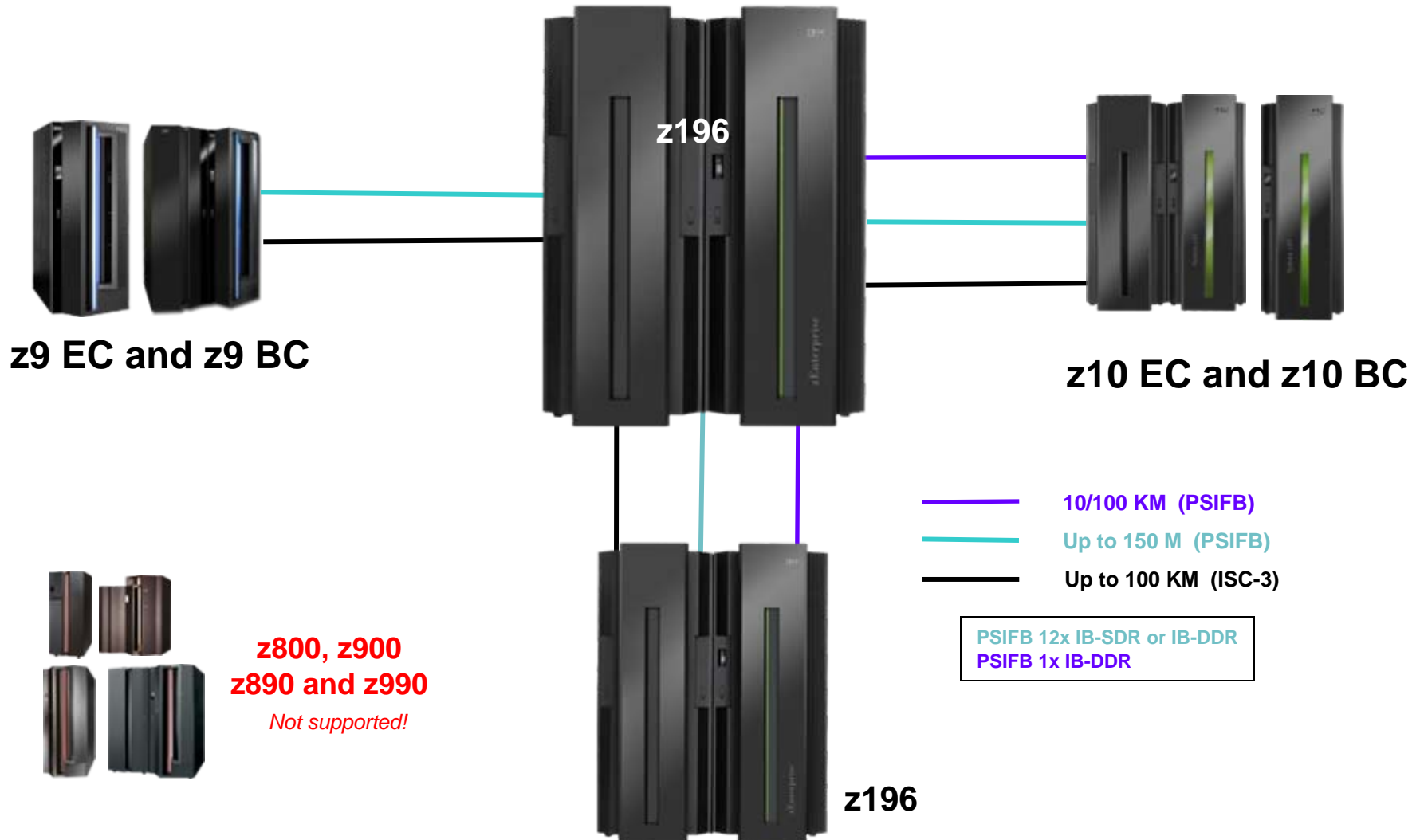Up to **40%**

Improvement in performance

with **60%**

More capacity

With no increase in energy consumption

* Based on 60% increase in total capacity and 40% improvement in engine speed of z199 compared to z10. Also, includes new pricing for IFL, memory and maintenance.

z196 Can Coexist In A Parallel Sysplex With z10 And z9

z196

z9 EC and z9 BC

z10 EC and z10 BC

z196

z800, z900
z890 and z990
Not supported!

10/100 KM (PSIFB)

Up to 150 M (PSIFB)

Up to 100 KM (ISC-3)

PSIFB 12x IB-SDR or IB-DDR
PSIFB 1x IB-DDR

zBX Is An Extension Of System z

Machine Type: 2458 – Model 002

- **Integrated IBM Certified Components**
  - ▶ Standard parts – Top-of-rack (TOR) switches, BladeCenter Chassis, Power Distribution Units, Optional Acoustic Panels

- **System z support**
  - ▶ Problem reporting, hardware and firmware updates

- **Expanded operating system support for zEnterprise**
  - ▶ AIX, Linux on System x[1]

- **Simplified management**
  - ▶ Improved time to install and implement new applications
  - ▶ Central point of management for heterogeneous workloads
  - ▶ No change to applications

Optimizers
- **IBM Smart Analytics Optimizer**
- **WebSphere® DataPower® appliance[1]**

Select IBM Blades
- **BladeCenter PS701 Express**
- **System x[1]**

| |
|---|
| **One to four – 42u racks – capacity for 112 blades** |
| **No System z software running in zBX – Passport Advantage software licensed to blades** |
| **No MIPS/MSU rating** |
| **Configured for high availability** |
| **Optional rear door heat exchanger** |

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

zBX Supports New Power PS701 Blades

- POWER7 8-core processor 3.0GHz

- Single wide blade server

- 3 configurations supported in zEnterprise System

  ▶ 32 GB, 64 GB, 128 GB

- AIX OS 5.3 or greater

- PowerVM

- Hot Swap Power Blades in BladeCenter Chassis

- Auto sensing by z196 initiates configuration and firmware updates done at HMC
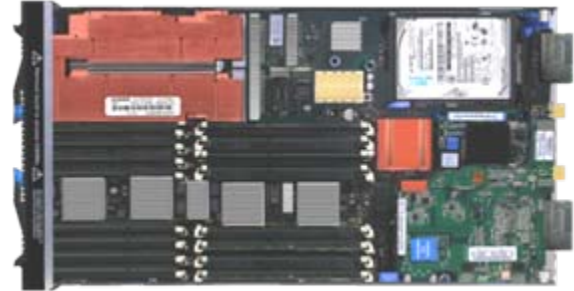
Machine Type: 8406
Model 71Y

System z support extended to zBX blades:
- *Problem reporting and 'phone home' capability*
- *Blade warranty provided as part of zBX warranty and terms*
- *Support by IBM System z Service Support Rep (SSR)*

IBM Smart Analytics Optimizer Uses Breakthrough Technology To Accelerate Business Analytics

What is it?

System x blades, memory, and software designed to work transparently with DB2 for z/OS

Snapshot of datamart is maintained in blade memories, organized by column, and compressed

Accelerates select queries from DB2 for z/OS, with unprecedented response times

How is it different?

Performance

Integration

Transparency

Simplified administration

WebSphere DataPower Appliance Simplifies Deployment And Hardens Security

What is it?

Helps simplify, govern, and enhance the security of XML and IT services

Provides connectivity, gateway functions, data transformation, protocol bridging, and intelligent load distribution

How is it different?

Security

Improved support

System z packaging

Operational controls

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zEnterprise zBX Integration

Hypervisors are shipped, serviced, and deployed as System z Licensed Internal Code

Booted automatically at power on reset

Pre-configured private and physically isolated internal management network

1 Gbps that connects all resources for management purposes

Private and secure data network

10 Gbps that connects all resources

Access-controlled using integrated virtual LAN (VLAN) provisioning that requires no external switches or routers

Less latency – fewer 'hops' to get to the data and no need for encryption / firewall

Full redundancy for high availability

Centralized and Secure Virtualization Platform

System z Hypervisor | Power Hypervisor | System x Hypervisor

Data Network

Management Network
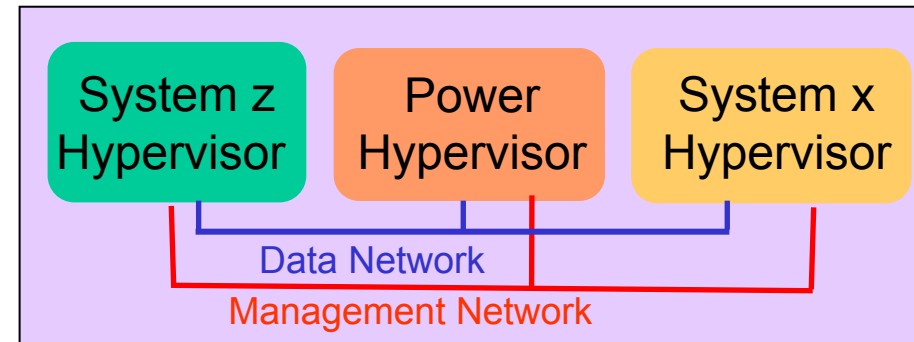
zEnterprise

Uniform Resource Manager (URM) Integrates Management of z196 And zBX Environments

Automatic inventory of all elements

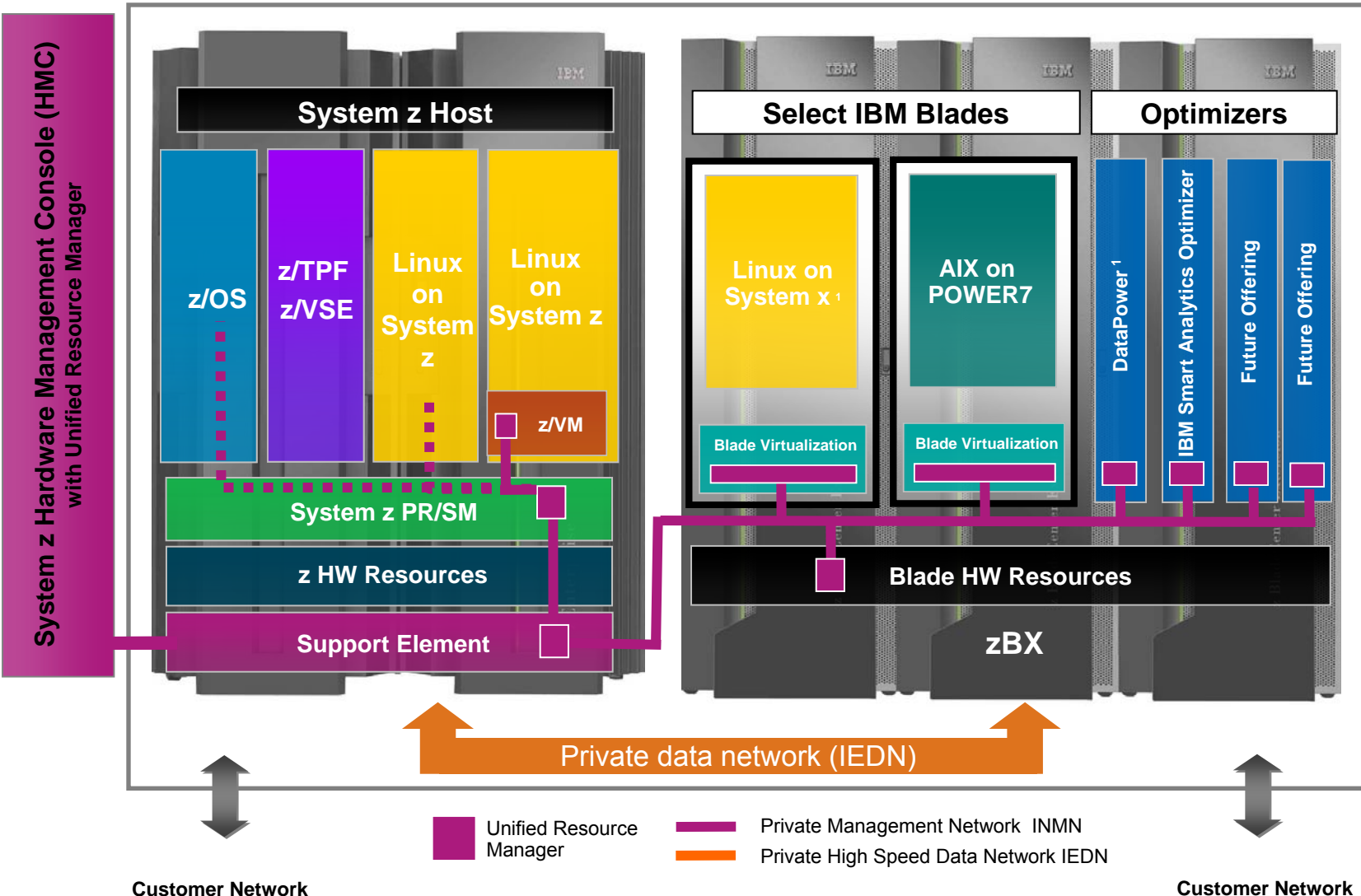Automatic installation of hypervisors

Create virtual networks

Create virtual machines on any hypervisor from one console

Manage performance of virtual machines as a group for a business workload

Hardware Management Console (HMC)

Unified Resource Manager

| DB2 | WAS | Smart Analytics Optimizer |
| System z Hypervisor | Power Hypervisor | System x Hypervisor |

Data Network

Management Network
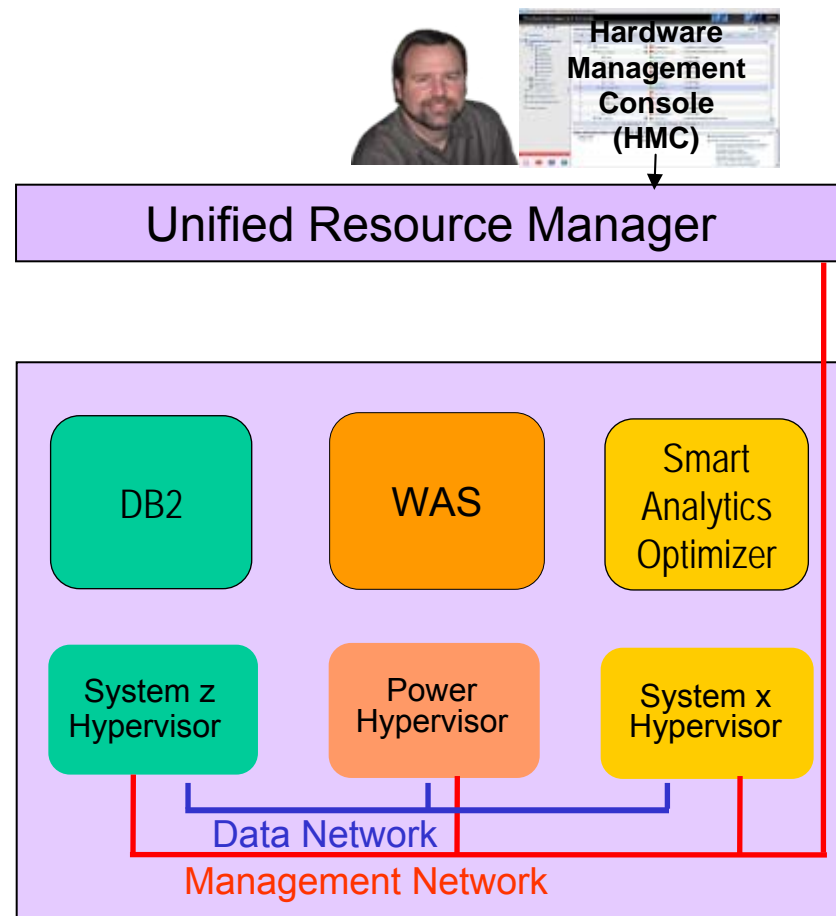
URM Works With HMC And SE To Manage Resources Between z196 And zBX

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

System z Host

- z/OS
- z/TPF z/VSE
- Linux on System z
- Linux on System z
- z/VM

System z PR/SM

z HW Resources

Support Element

Select IBM Blades

- Linux on System x [1]
- AIX on POWER7
- Blade Virtualization
- Blade Virtualization

Optimizers

- DataPower [1]
- IBM Smart Analytics Optimizer
- Future Offering
- Future Offering

Blade HW Resources

zBX

Private data network (IEDN)

- Unified Resource Manager
- Private Management Network INMN
- Private High Speed Data Network IEDN

Customer Network

Customer Network

A Smart New Release Of z/OS Yields Improved Performance And Ease Of Use

z/OS Version 1 Release 12....

Control-Area Reclaim improves performance up to 40% for applications using VSAM

Additional new data set types enable easier data management

Management and administration simplified with the z/OS Management Facility (z/OSMF); WLM Policy Editor integrated into z/OSMF

… a Smarter Operating System

Innovative self-learning, self-managing and self-optimizing capabilities

Learns heuristically from its environment; reports system abnormalities

Predictive Failure Analysis predicts problems before they occur

Real-Time Diagnostics quickly analyses key indicators on a running system

Discovery and Auto Configuration brings "plug and play" capabilities to z/OS platform

zEnterprise Is A New Generation Of Computing Power

A "system of systems" to revolutionize the data center

z196 – *a new, fast, high-performance breed of mainframe*

zBX – *integrated AIX and Linux-based application blade servers and blade appliances*

Unified Resource Manager – *resource and workload management firmware extending across the systems*