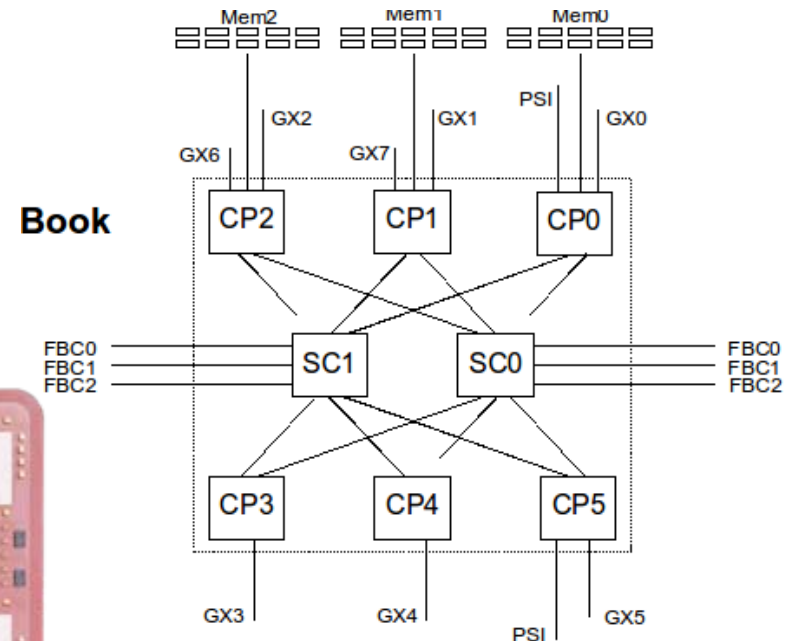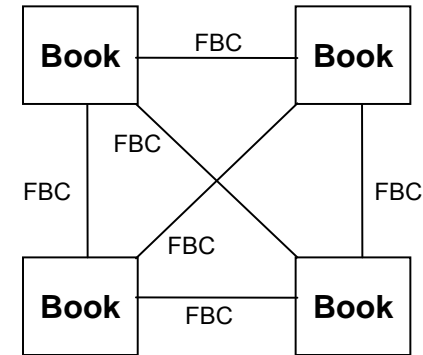# The New zEnterprise –
A Smarter System
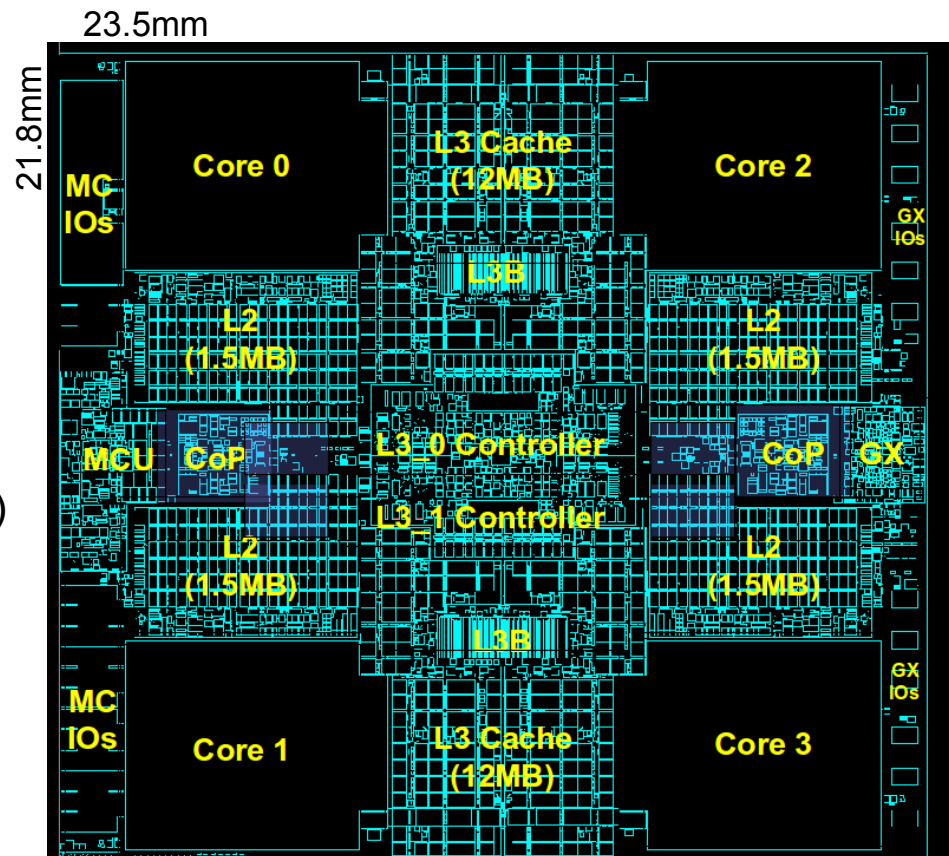# For A Smarter Planet

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 storage control (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
- Elliptic Curve Cryptography

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
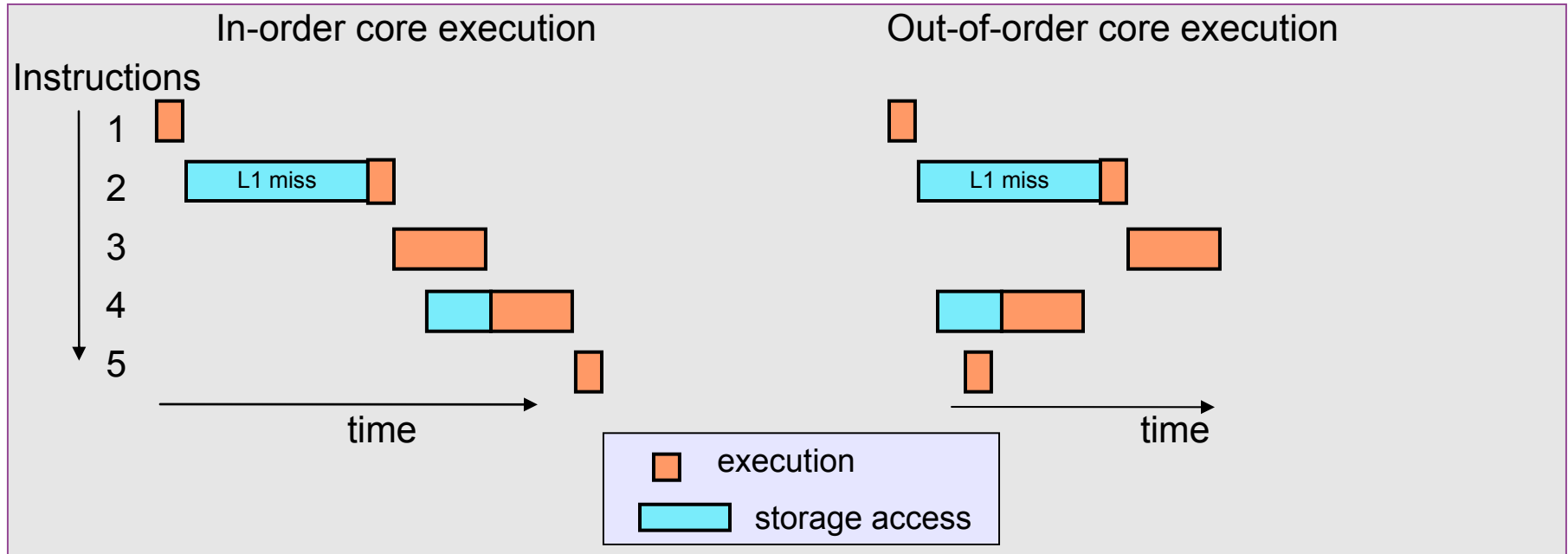- I/O Bus Controller (GX)
- Over 100 new instructions

CP Floor Plan – 512.3 mm², 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

In-order core execution   Out-of-order core execution

Instructions

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
- Scalable to 96 CPs
  - ▶ 20 CPs per node (24 for M80)
  - ▶ 80 configurable as GP, IFL, ICF, zAAP, zIIP
  - ▶ 2 spares per system, up to 14 SAPs
- Hot-pluggable I/O
- 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:
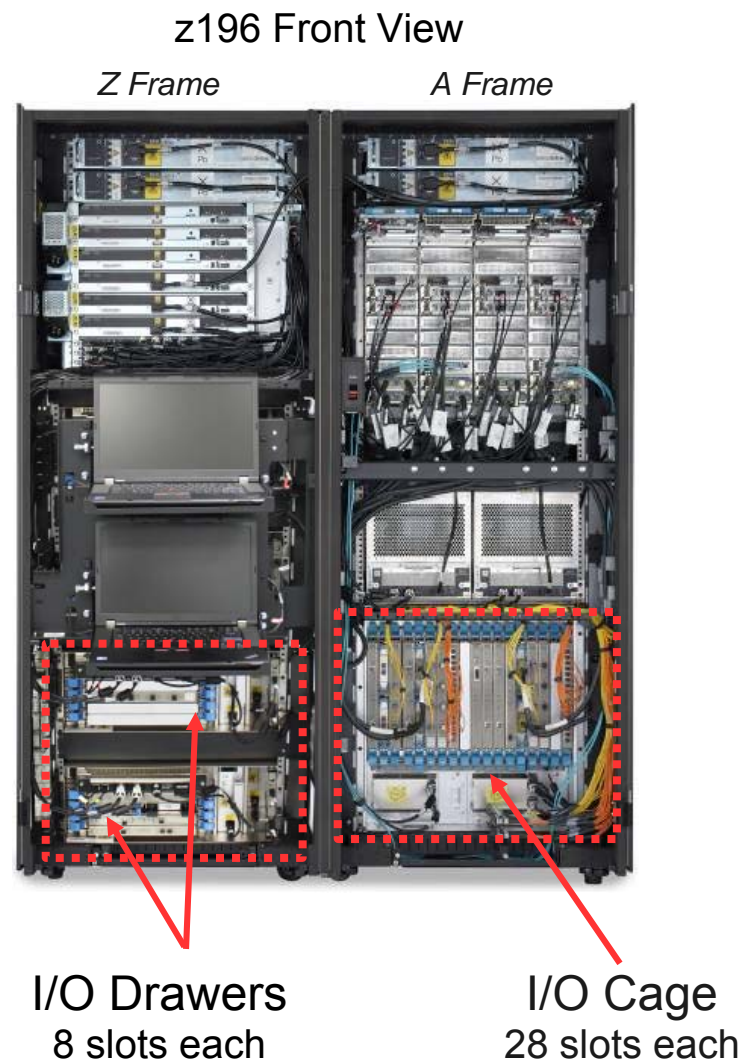*7xx = 100%*
6xx = 64%
5xx = 49%
4xx = 20% (xx = 01 - 15)

z196 Introduces New I/O Drawer Technology Designed For Concurrent Use

- z196 infrastructure supports both cages (z10 EC style) and drawers (z10 BC style) for I/O

  ▶ Both support full range of FICON, ESCON, OSA, ISC, Crypto Express and Infiniband cards

- Unlike cages, drawers can be added or removed without affecting system power

  ▶ Must have at least 2 drawers installed to work non-disruptively

- Drawers are favored on z196

  ▶ Up to 32 I/O cards – use 1-4 drawers

  ▶ With 32-72 I/O cards – use 1 or 2 cages , plus up to 2 drawers

Reduce downtime and increase flexibility with non-disruptive, pluggable I/O

z196 Front View

Z Frame   *A Frame*

I/O Drawers
8 slots each

I/O Cage
28 slots each

z196 Yields Dramatic Improvements Over IBM System z10

For Linux

Up to **60%**

Improvement in performance

at **33%**

Less cost

For z/OS

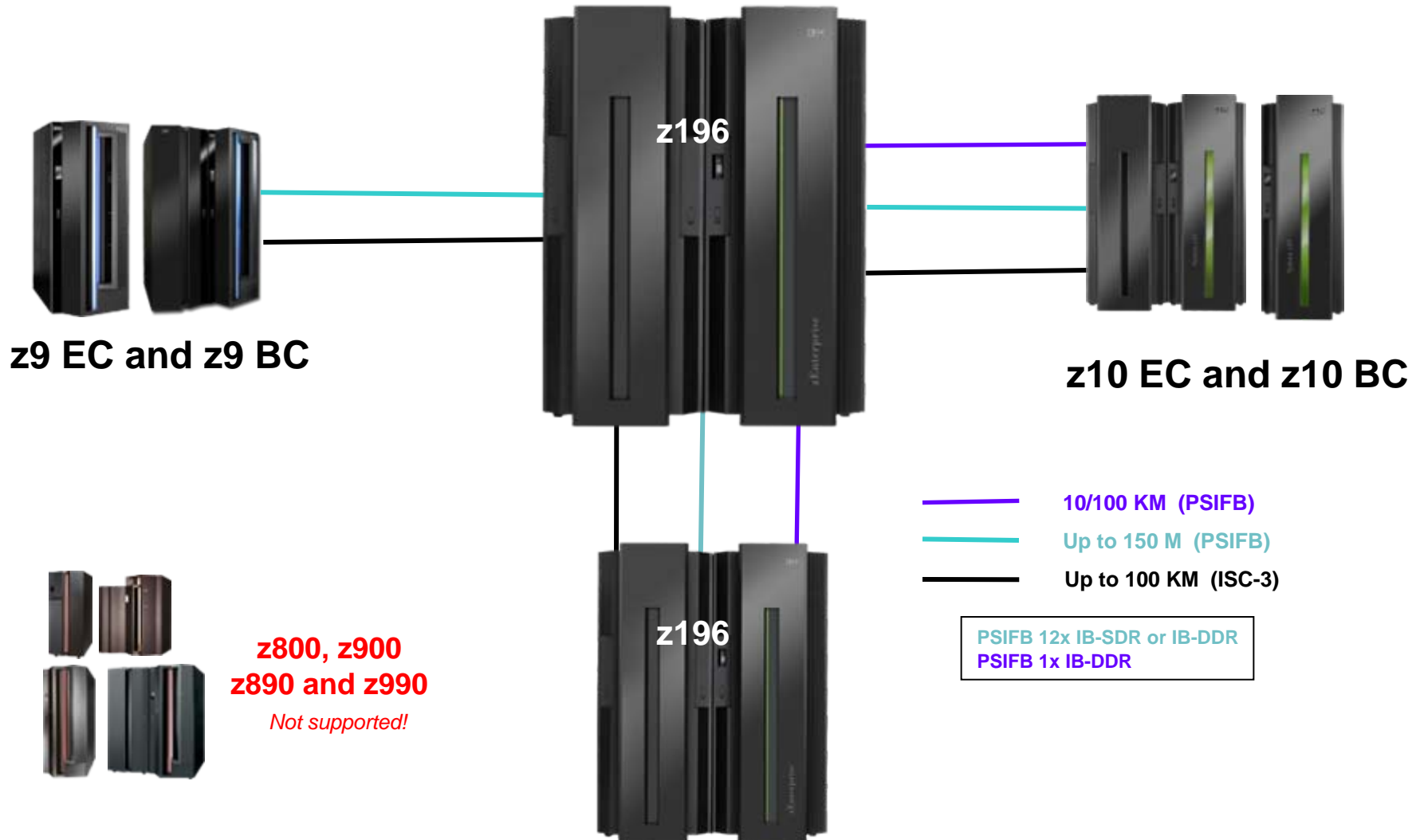Up to **40%**

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 z196 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

z800, z900 z890 and z990

Not supported!

z196

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]**

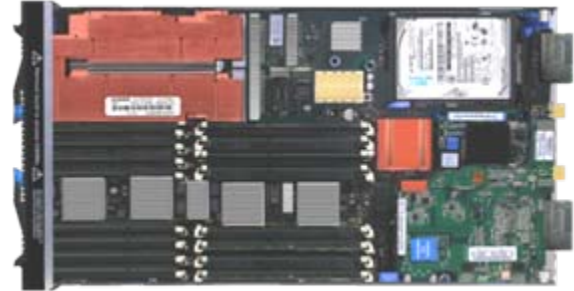**Select IBM blades**
- **BladeCenter PS701 Express**
- **System x[1]**

One to four 42u racks – up to 112 blades, < 26m from z196
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?

- x86 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

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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
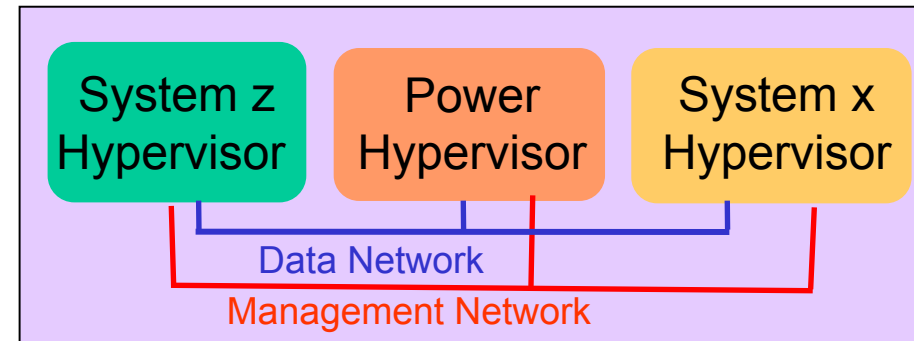- Operational controls

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

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
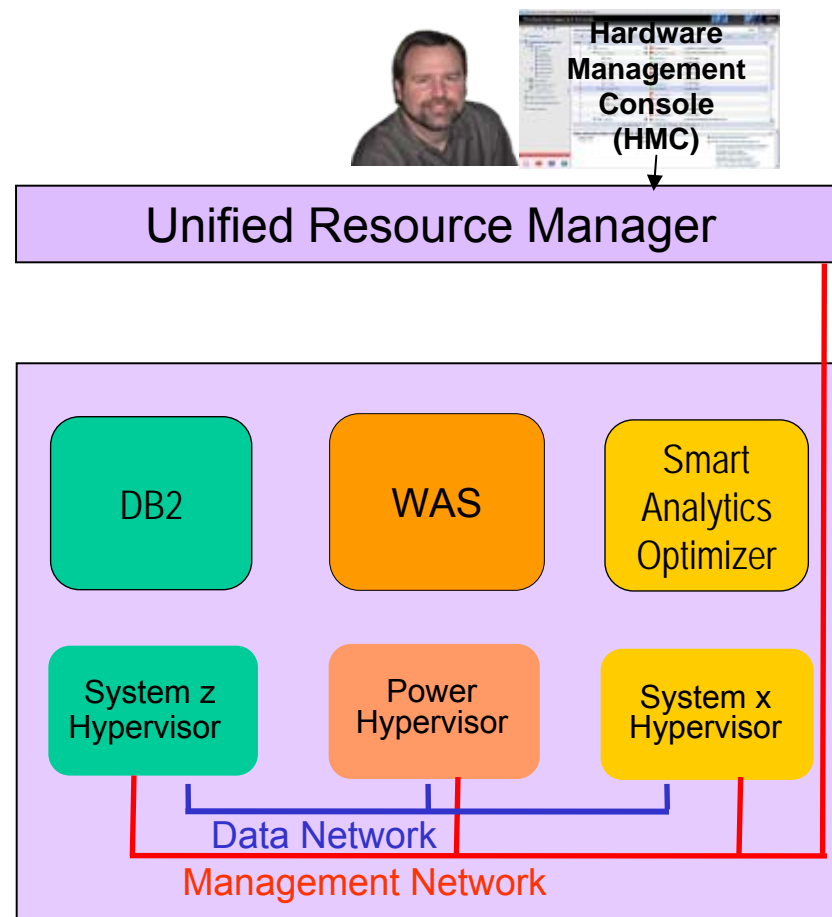 - ▶ Full redundancy for high availability
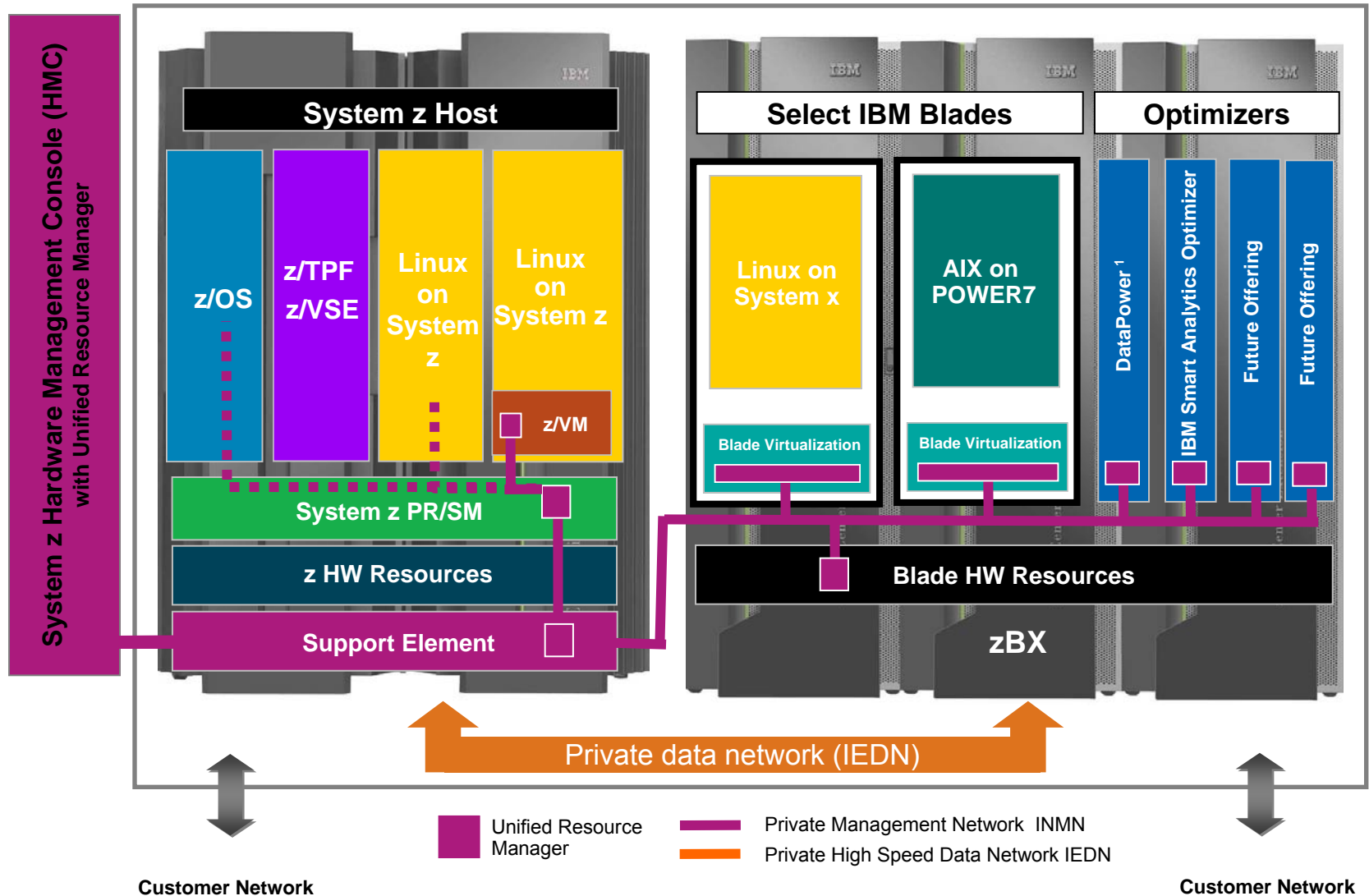
**Centralized and Secure
Virtualization Platform**

System z Hypervisor	Power Hypervisor	System x Hypervisor

Data Network

Management Network

zEnterprise

Unified Resource Manager 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

Unified Resource Manager Works With HMC And SE To Manage Resources Between z196 And zBX

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*