A Technical Tour of the newest z Innovations

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DataPower*	IBM eServer	RP/SM	z9*	z/VSE
DB2*	IBM (logo)*	RACF*	z10 BC	
FICON*	InfiniBand*	System x*	z10 EC	
GDPS*	Parallel Sysplex*	System z*	zEnterprise	
Geographically Dispersed Parallel Sysplex	POWER*	System z9*	z/OS*	

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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.

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Information Technology Today:
Limitations

> *Information technology today is limited by the technology and architecture configurations available.*
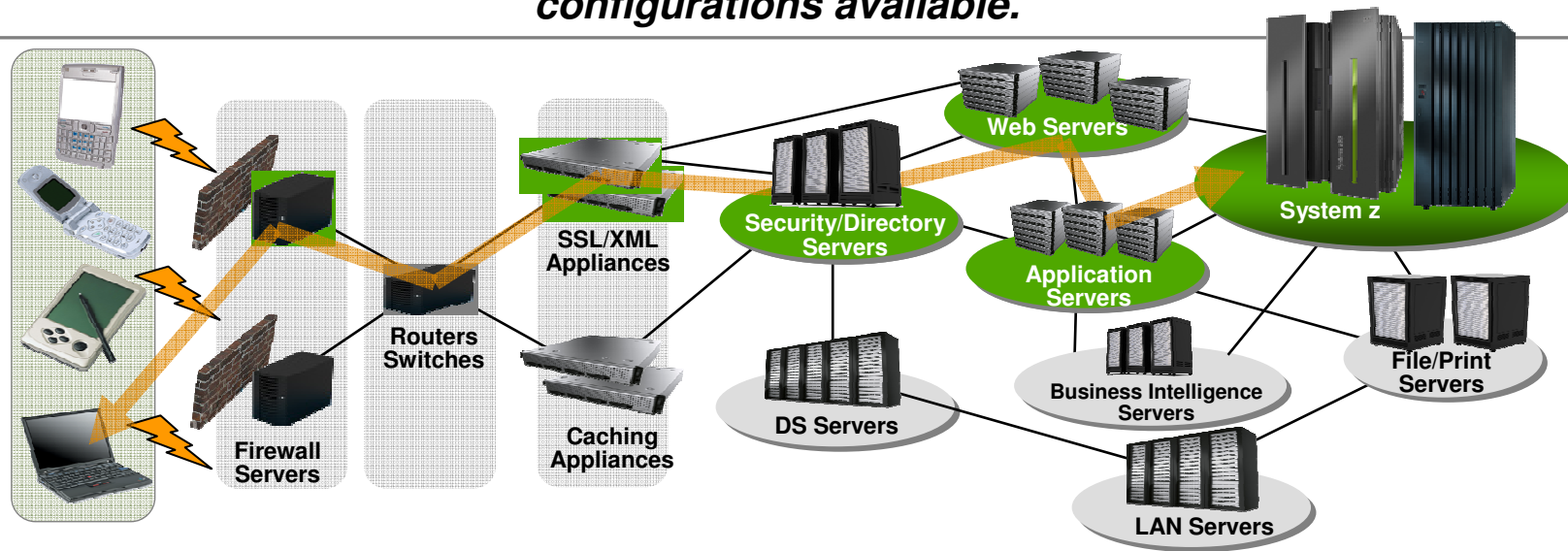
- Business processes and the applications that support them are becoming more service oriented, modular in their construction, and integrated.
- The components of these services are implemented on a variety of architectures and hosted on heterogeneous IT infrastructures.
- Approaches to managing these infrastructures along the lines of platform architecture boundaries cannot optimize: alignment of IT with business objectives; responsiveness to change; resource utilization; business resiliency; or overall cost of ownership.
- **Customers need better approach: The ability to manage the IT infrastructure and Business Application as an integrated whole.**

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IBM zEnterprise System – Best in Class Systems and Software Technologies
A system of systems that unifies IT for predictable service delivery

Unified management for a smarter system: zEnterprise Unified Resource Manager

- Provides platform, hardware and workload management
- Unifies management of resources, extending IBM System z® qualities of service across the infrastructure

The world's fastest and most scalable system: IBM 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
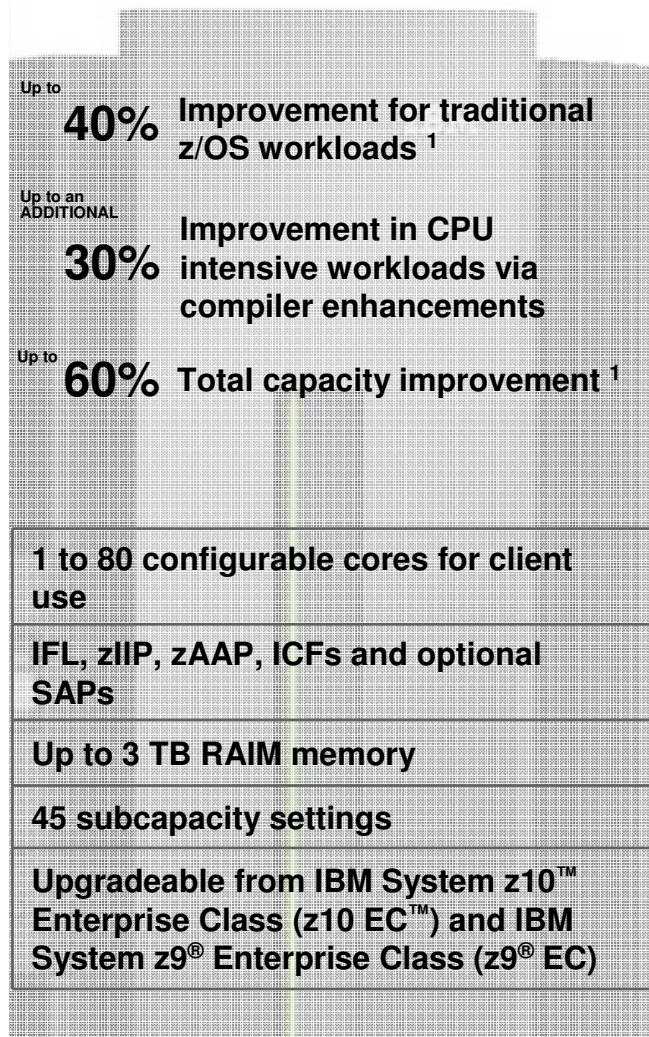- Capable of massive scale up, over 50 Billion Instructions per Second (BIPS)

z/OS
z/VM
z/VSE
z/TPF
Linux

HMC

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

- Selected IBM POWER7® blades and IBM System x® Blades[1] 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

AIX
Linux

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The Value Begins At the Heart of z196 …

Up to
40% Improvement for traditional z/OS workloads [1]

Up to an ADDITIONAL
30% Improvement in CPU intensive workloads via compiler enhancements

Up to
60% Total capacity improvement [1]

1 to 80 configurable cores for client use

IFL, zIIP, zAAP, ICFs and optional SAPs

Up to 3 TB RAIM memory

45 subcapacity settings

Upgradeable from IBM System z10™ Enterprise Class (z10 EC™) and IBM System z9® Enterprise Class (z9® EC)

zEnterprise 196 (z196)
Machine Type: 2817
Models: M15, M32, M49, M66, M80

- **Operating System Flexibility**
  - z/OS, z/VM®, z/VSE™, z/TPF and Linux on System z
- **Security and reliability enhancements**
  - Elliptic curve cryptography
  - Concurrent patch update enhancements
- **Improved connectivity**
  - One to four books
  - Hot pluggable I/O drawer
  - InfiniBand Coupling links
- **Holistic approach to energy management**
  - Options to help eliminate hotspots and save on energy
  - Static power savings
  - Query maximum potential power

[1] For average LSPR workloads running z/OS 1.11.

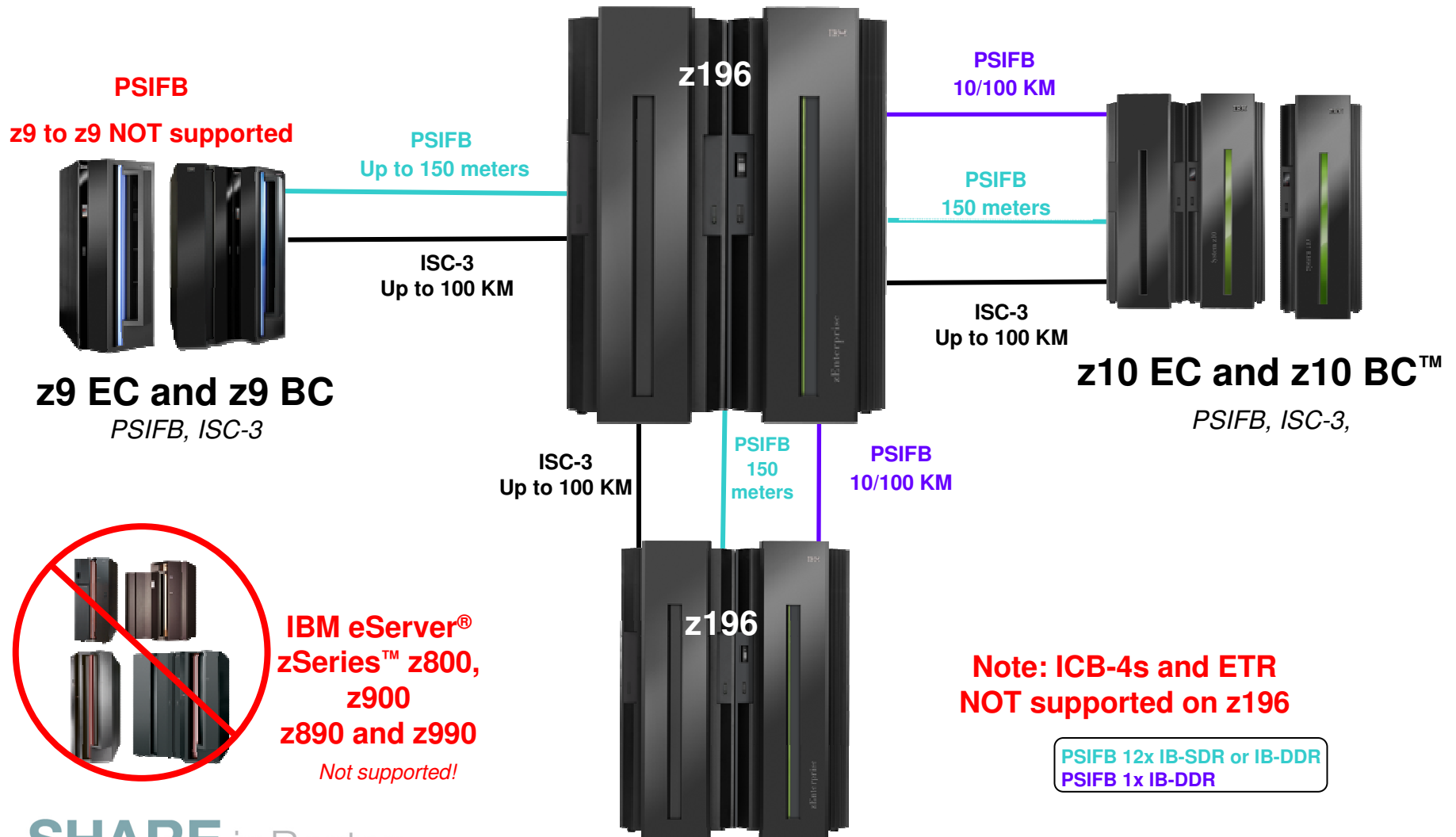# Storage Connectivity Has Gotten Easier and Performance Better

Designed, developed and tested together is key to unlocking value

- Simplified configuration of FICON® disk and tape with z/OS discovery and auto-configuration (zDAC)

- zHPF enhancements allows for increased exploitation transparently to applications and middleware

- Introduction of hot pluggable I/O drawer

- Extending for storage growth with new three subchannel sets per LCSS

DS8700

TS1130
Tape Drive

TS7680
Deduplication
Gateway

TS3500 Library

TS7700
Virtualization
Engine

z196 Parallel Sysplex coexistence of Servers/CFs and coupling connectivity

PSIFB

z9 to z9 NOT supported

PSIFB
Up to 150 meters

z196

PSIFB
10/100 KM

PSIFB
150 meters

ISC-3
Up to 100 KM

ISC-3
Up to 100 KM

z9 EC and z9 BC
PSIFB, ISC-3

z10 EC and z10 BC™
PSIFB, ISC-3,

ISC-3
Up to 100 KM

PSIFB
150 meters

PSIFB
10/100 KM

z196

IBM eServer®
zSeries™ z800,
z900
z890 and z990
Not supported!

Note: ICB-4s and ETR
NOT supported on z196

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

z196 – 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**

- **z196 is same footprint as the System z10 EC[1]**

[1] With the exception of water cooling and overhead cabling

Synergy with z196 Operating Systems

z/OS

- New automatic discovery and configuration for fabric-attached FICON® disk and tape devices can save you hours on storage configuration time

- New definitions for new management network and data network

- New "off the wire" network traffic separation improves performance for your critical interactive and streaming workloads, as well as sysplex distributor traffic

- Support for the next generation of public key technologies with ECC support that is ideal for constrained environments such as mobile devices.

- Participation with new z196 management capabilities by allowing monitoring of z/OS workloads - a new agent can send high level z/OS WLM data to the Unified Resource Manager

z/VM and Linux on System z

- Server and application consolidation on System z using Linux and z/VM is the industry leader in large-scale, cost-efficient virtual server hosting

- zEnterprise introduces virtual server provisioning and management for Linux guests running on z/VM

    - Use the Unified Resource Manager to create z/VM virtual machines

    - Simplify the skill level needed to manager a Linux on z/VM environment

- Faster cores and a bigger system cache on the z196 let you do even more with less when running Linux on z/VM

- Plus integrated blades on zBX offer added dimension for workload optimization

... and the Value Extends To Heterogeneous Platforms ...

IBM zEnterprise BladeCenter Extension (zBX)
Machine Type: 2458 – Model 002

- **Integrated IBM Certified Components driven by System z order**
  - Standard parts – TOR switch, BladeCenter Chassis, Power Distribution Units, Optional Acoustic Panels
- **System z support**
  - Problem reporting, hardware and firmware updates
- **Expanding 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
- **Secure network connection between zBX and z196 for data and support.**

... managed by the zEnterprise Unified Resource Manager

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

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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.
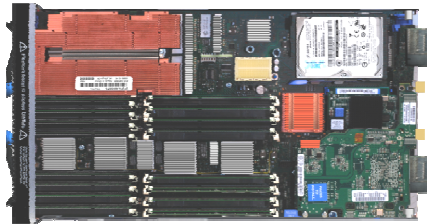
How is it different?

- **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

Management Stack

Building an architectural construct of hardware, software, services

Service Management

- Visibility, Control and Automation for Applications, Transactions, Databases and Data Center Resources
- End-to End Workload Management and Service Level Objectives that Align IT Management with Business Goals
- Common Usage and Accounting for business accounting
- Dynamic/Centralized Management of Application Workloads based on Policies
- Business Resilience for multi-site recovery
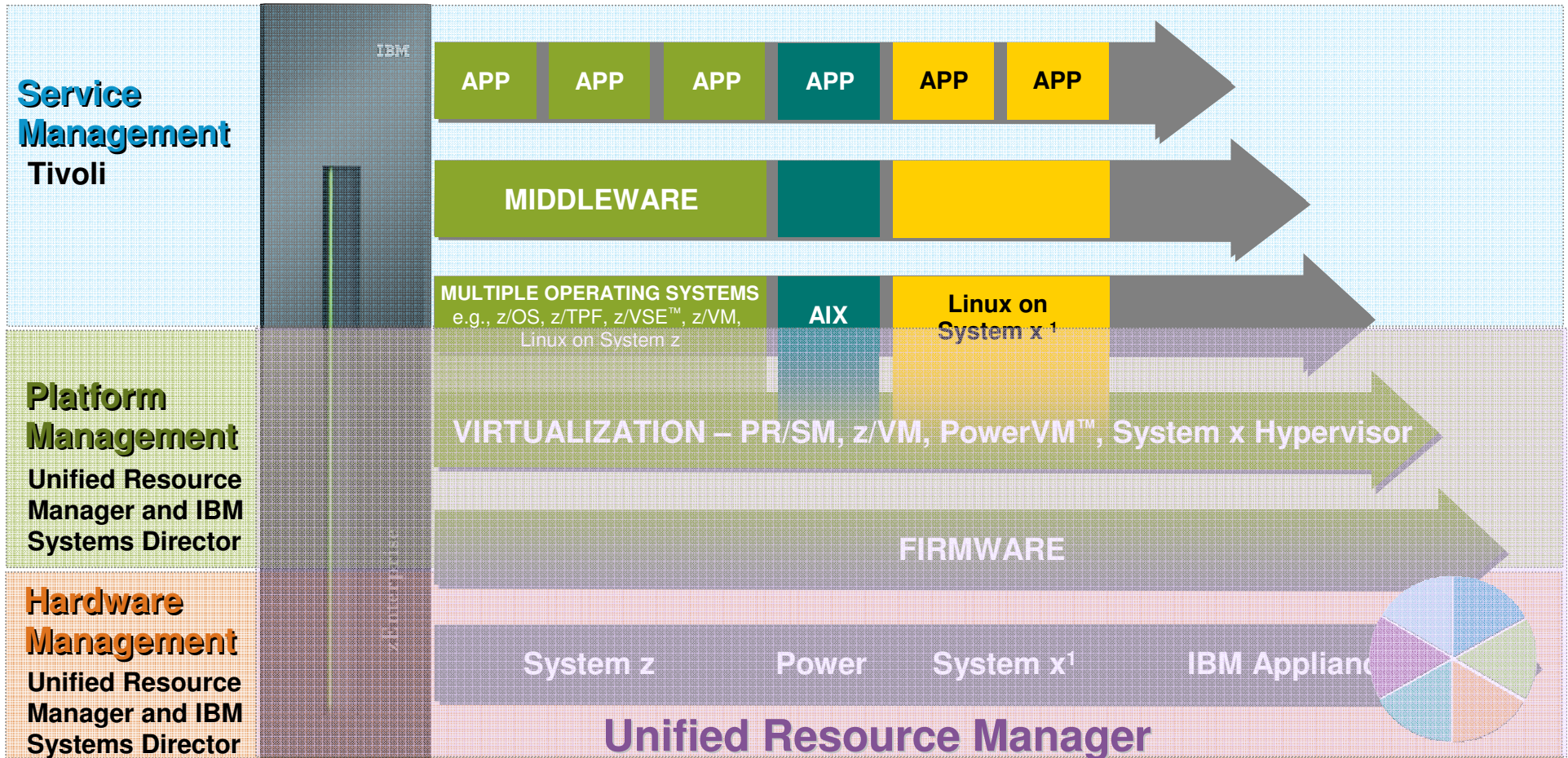- End-to-end Enterprise Security

Platform Management

Hardware Management

Extending with

Unified Resource Manager

- **Hypervisor management and creation of virtual networks**

- **Operational controls, service and support for hardware / firmware**

- **Network management of private and secure data and support networks**

- **Energy monitoring and management**

- **Workload awareness and platform performance management**

- **Virtualization management – single view of virtualization across the platform**

# Built On This Construct – zEnterprise – Innovation At Every Level

Service Management
Tivoli

Platform Management
Unified Resource Manager and IBM Systems Director

Hardware Management
Unified Resource Manager and IBM Systems Director

IBM

| APP | APP | APP | APP | APP | APP |

MIDDLEWARE

MULTIPLE OPERATING SYSTEMS
e.g., z/OS, z/TPF, z/VSE™, z/VM, Linux on System z

AIX

Linux on System x [1]

VIRTUALIZATION – PR/SM, z/VM, PowerVM™, System x Hypervisor

FIRMWARE

System z   Power   System x[1]   IBM Appliance

Unified Resource Manager

Focused, collaborative innovation
A "complete systems" approach

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Unified Resource Manager
Two suites of tiered functionality
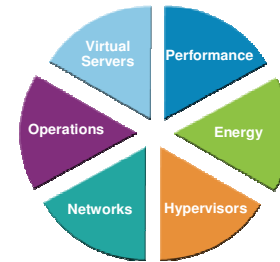
- ### *Manage*
  - Monitor and trend reporting of CPU energy efficiency.
  - New dashboard interface enabling a broader view of system resource consumption.
  - Integrated hardware / asset management across all elements of the system.
  - Private and physically isolated connections for secure support and data sharing.
  - Administrative simplification (wizard) for virtual server provisioning and enablement of integrated storage and network across hypervisors.

- ### *Automate*
  - Additional wizard function to set up resources associated with a workload the capability to associate those 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 and energy management capabilities.

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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.

Energy Management
- Monitoring and trend reporting of CPU energy efficiency.

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.
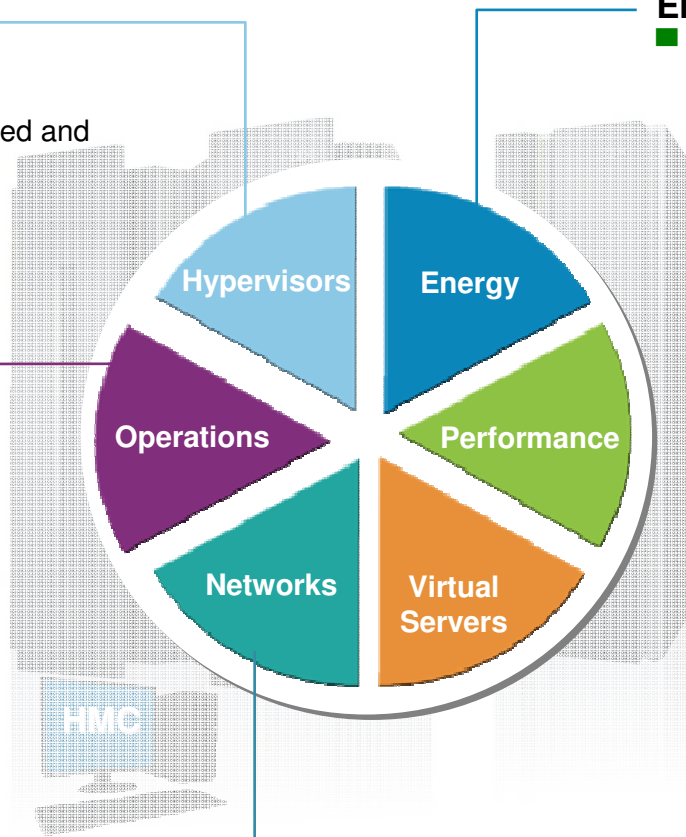
Network Management
- Management of virtual networks including access control

Hypervisors

Energy

Operations

Performance

Networks

Virtual Servers
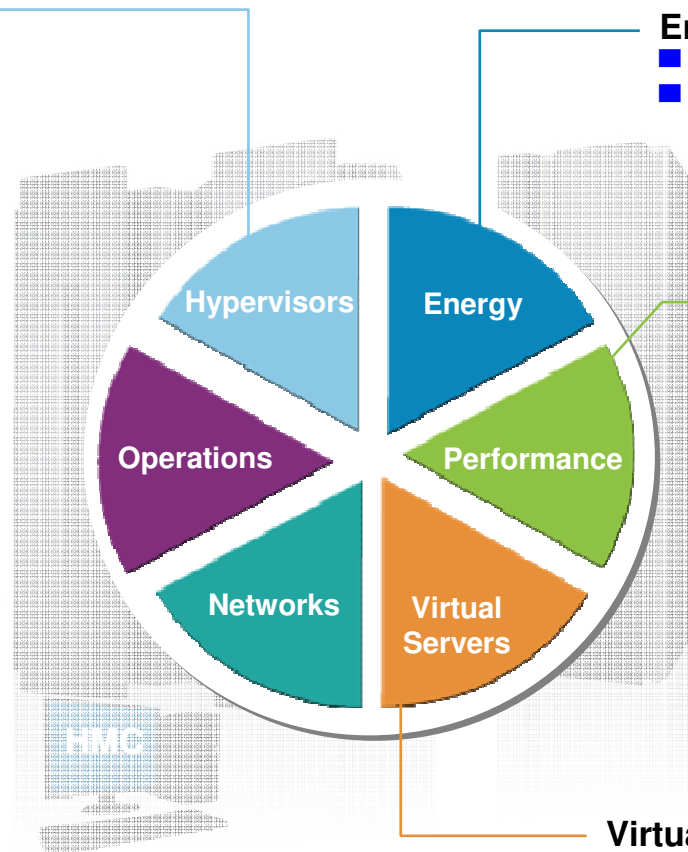
HMC

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 savings
- 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

… Value Made Possible By the Unified Resource Manager
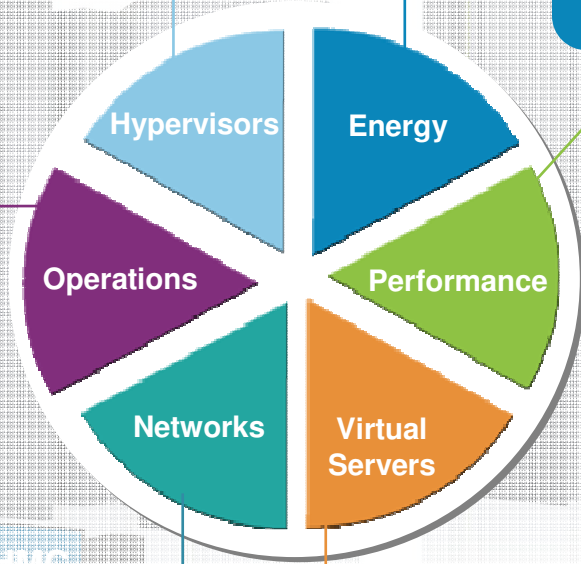
Simplified installation of hypervisors

Gain significant time to market with improved speed of deployment

Simplified energy management

Energy cost savings

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

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

Smart business adjustments based on workload insight

Provide deep insight into how IT resources are being used

- Hypervisors
- Energy
- Operations
- Performance
- Networks
- Virtual Servers

Factory installed and configured network

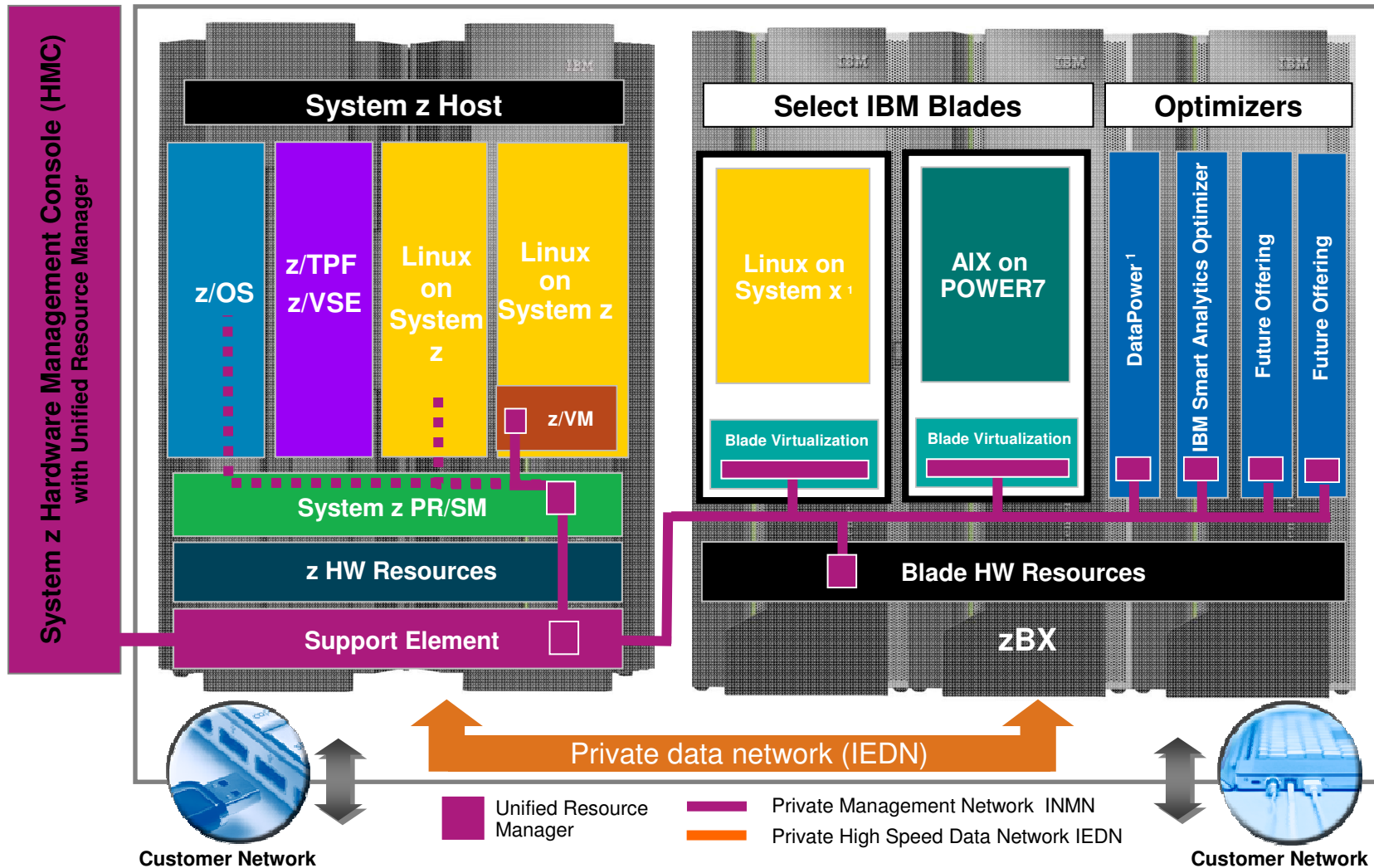**Improved network security with lower latency, less complexity, no encryption/decryption**

Gain flexibility, consistency and uniformity of virtualization

Provide the business with faster time to market

Simplified network management for applications

- ge suite
- Automate suite

Putting zEnterprise System to the task
Use the smarter solution to improve your application design

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

System z Host				Select IBM Blades		Optimizers

System z Host

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

Select IBM Blades

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

Optimizers

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

System z PR/SM

z HW Resources

Blade HW Resources

Support Element

zBX

Private data network (IEDN)

Customer Network

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

Customer Network

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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

TCA Focus

zEnterprise System

Distributed Systems
- ✓ Silo managed islands of computing
- ✓ Less dynamic than z virtualization
- ✓ Minimal resource sharing with z resources

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

Linux on z/VM
- ✓ 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

**LOWER**　　　**SCALABILITY, SECURITY, DYNAMIC WORKLOAD MANAGEMENT**　　　**HIGHER**

IBM zEnterprise System:
A revolutionary change has come to IT bringing a new dimension in computing

- **Redefining IT frameworks to bring change to operational silos and extend System z governance to POWER7 and System x1 blades**

- **Driving business decisions based on insight rather than hindsight**

- **Improving agility to compete with consolidation and simplification**

- **Delivering consistent business controls across applications and platforms**

- **Focused on integration and collaboration to fuel business growth**
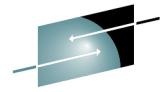
Backup

Operating System Support for zEnterprise System

- **Currency is key to operating system support and exploitation of future servers**
- **The following are the minimum operating systems planned to run on z196:**
  - z/OS
    - z196: z/OS V1.9[1] for toleration only; exploitation starts with z/OS V1.10 with full exploitation with z/OS V1.12
    - Ensemble support: z/OS V1.10
  - Linux on System z distributions:
    - Novell SUSE SLES 10 and SLES 11
    - Red Hat RHEL 5
  - z/VM
    - z196: z/VM V5.4 or higher
    - Ensemble support: z/VM V6.1
  - z/VSE V4.1 or higher
  - z/TPF V1.1 or higher

- **Using the general purpose blades:**
  - AIX 5.3, 6.1
  - Linux on System x[2] (SOD)

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