Fatima Otori

footori@us.ibm.com

System z WebSphere IT Specialist

IBM

Why WAS on z?

Two Questions We'll Answer Today …

ibm.com WebSphere page …
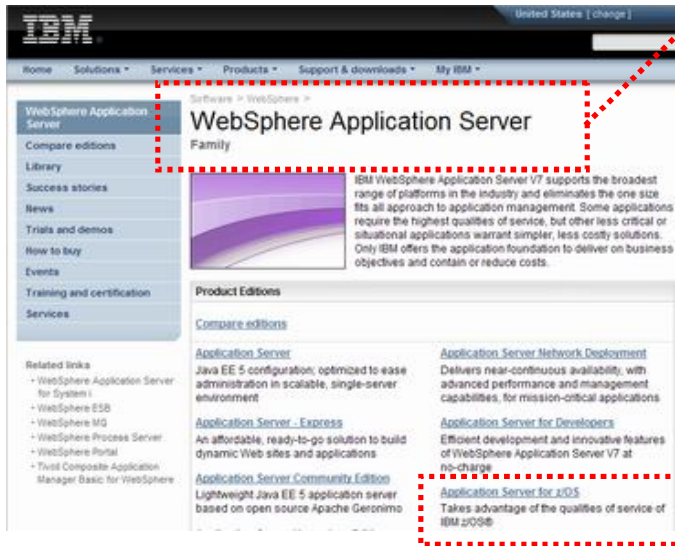
WebSphere Application Server
Family

How does WebSphere Application Server address your business imperatives?

Application Server for z/OS
Takes advantage of the qualities of service of IBM z/OS®

What is meant by "Takes advantage of the qualities of service of IBM z/OS?"

The WebSphere Application Server Family

An industry-leading open standard application server platform, with powerful business functionality
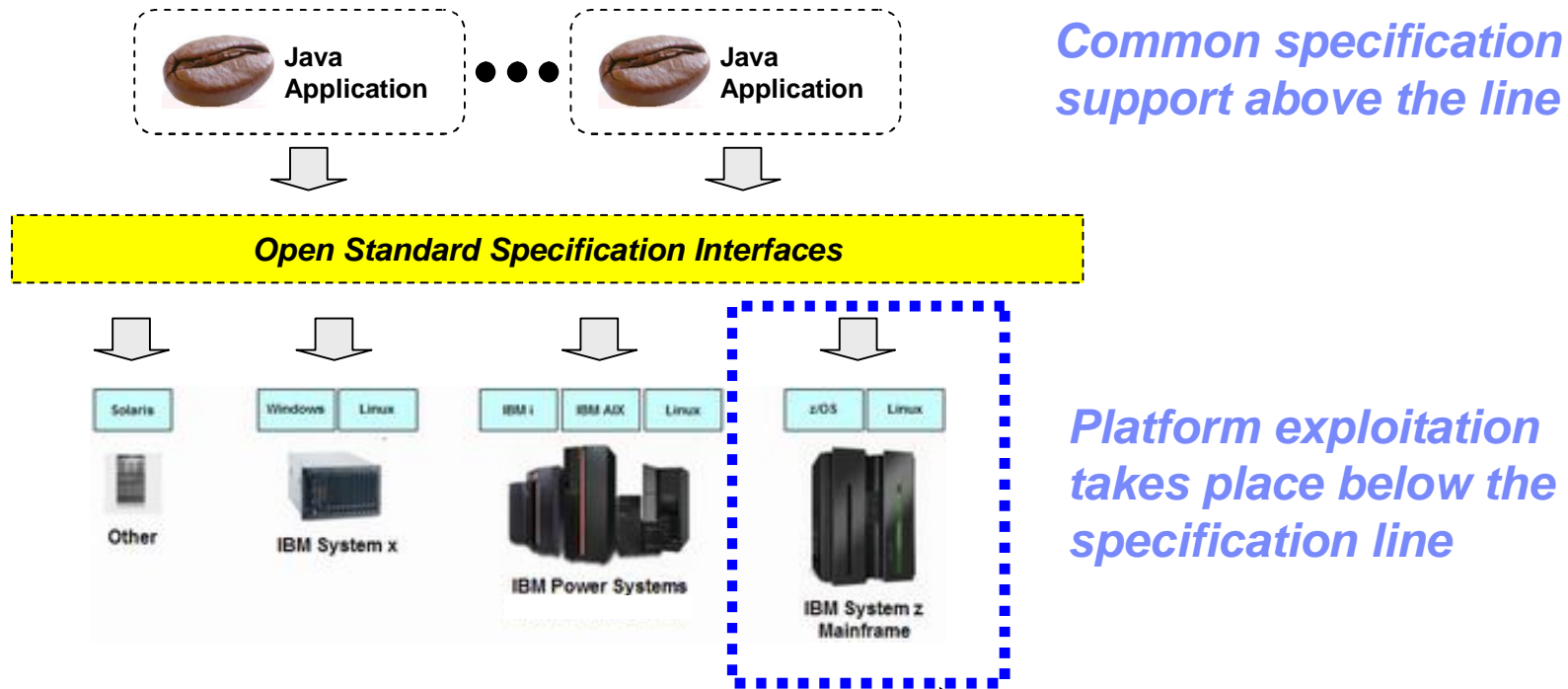
Manage Cost

- **Common standards across all platforms**

- **Common tooling across all platforms**

- **Many of the same skills across all platforms**

Enhance Agility

- **Rapid development and deployment model**
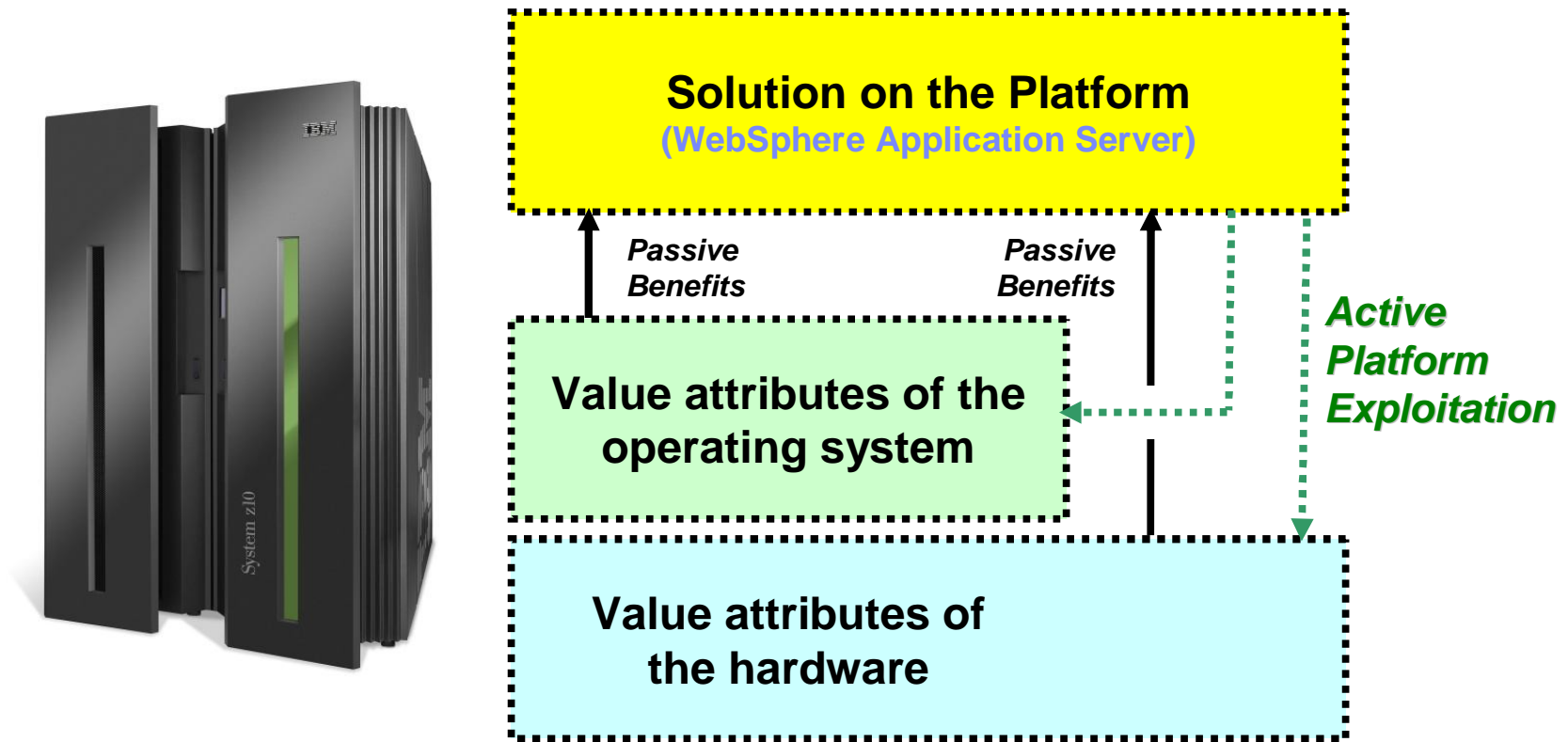
- **Many dynamic runtime elements**

Common business applications runtime across the enterprise … development, test, production

IBM

Common Standards Across Family of Platforms

Java Application ● ● ● Java Application

Common specification support above the line

Open Standard Specification Interfaces

Solaris — Other

Windows | Linux — IBM System x

IBM i | IBM AIX | Linux — IBM Power Systems

z/OS | Linux — IBM System z Mainframe

Platform exploitation takes place below the specification line

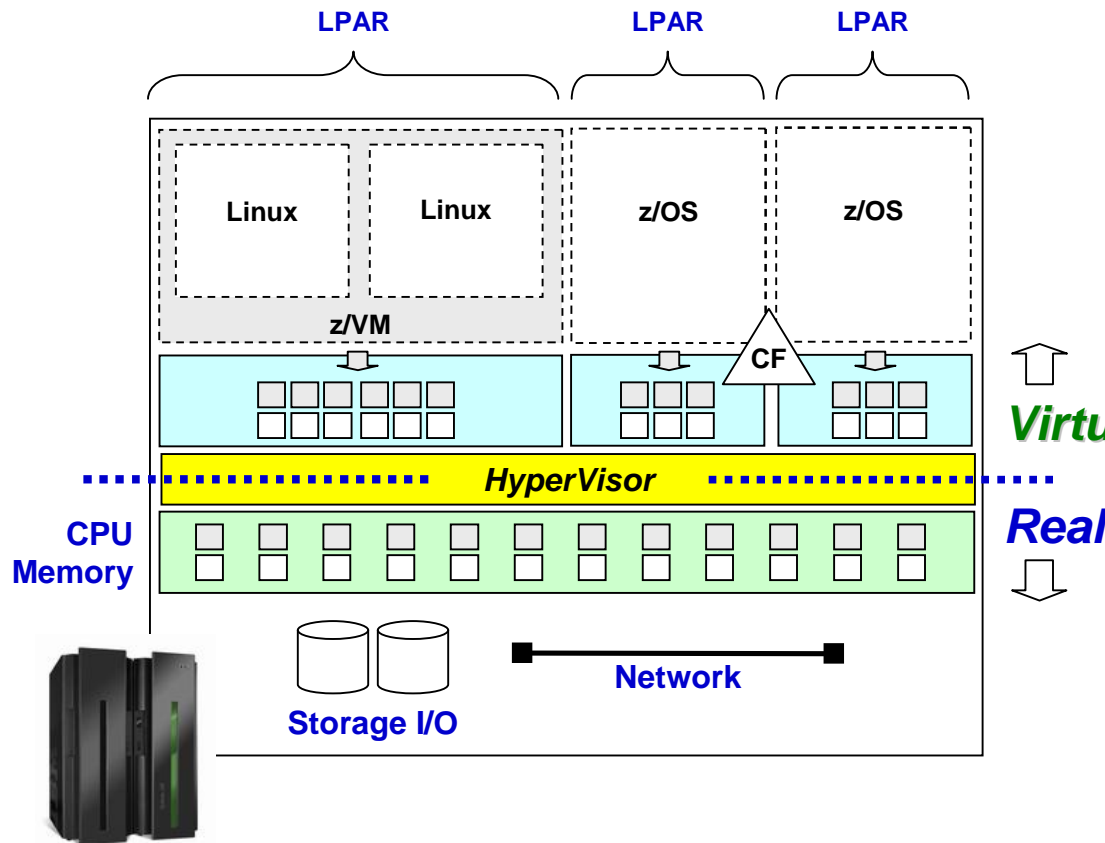## *It's all about the System z and z/OS platform and the way WAS z/OS exploits the platform*

Passive and Active Exploitation

Solution on the Platform
(WebSphere Application Server)

Passive Benefits   *Passive Benefits*

Active Platform Exploitation

Value attributes of the operating system

Value attributes of the hardware

WebSphere Application Server z/OS benefits from both

IBM

Industry-Leading Virtualization Technology

LPAR   LPAR   LPAR

Linux   Linux   z/OS   z/OS

z/VM

CF

HyperVisor

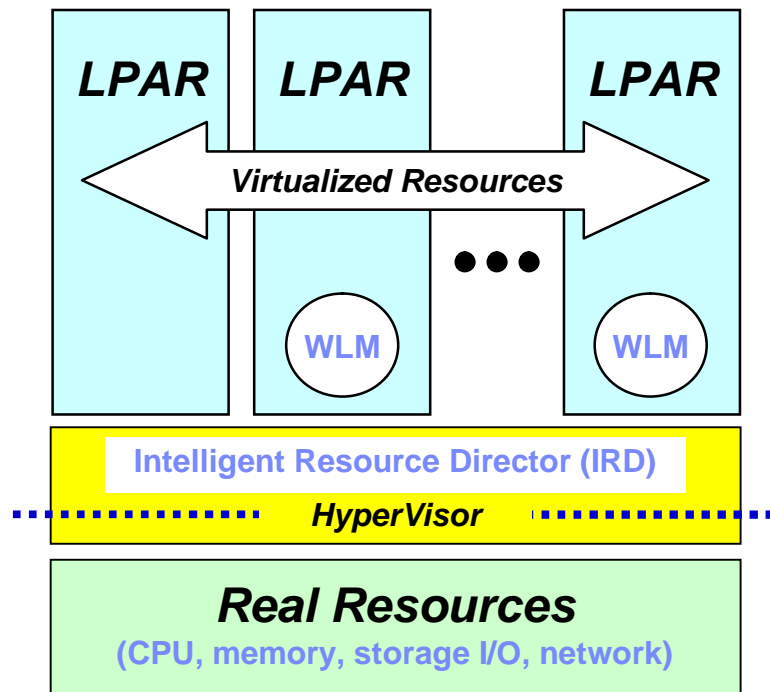Virtualized

CPU Memory

Real

Storage I/O   Network

Not merely "like" the mainframe

It *is* the mainframe

Proven enterprise quality virtualization technology

Not all virtualization technologies are the same

IBM

Dynamic Resource Re-Allocation Between LPARs

LPAR	LPAR	LPAR

Virtualized Resources

• • •

WLM   WLM

Intelligent Resource Director (IRD)

HyperVisor

Real Resources
(CPU, memory, storage I/O, network)

Add CPU non-disruptively

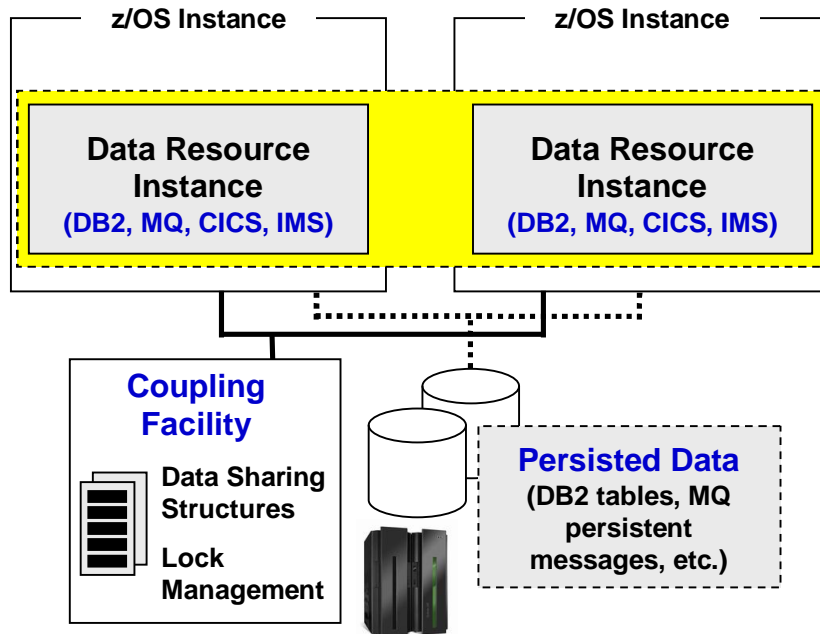**Re-allocate CPU non-disruptively**

IRD intelligently balances

Vary I/O capacity dynamically

WLM advise IRD

Virtualization technology that evolved in the enterprise

Solid, stable and proven

IBM

True Data Sharing From Multiple Resource Instances

z/OS Instance   z/OS Instance

Data Resource
Instance
(DB2, MQ, CICS, IMS)

Data Resource
Instance
(DB2, MQ, CICS, IMS)

**Coupling
Facility**

Data Sharing
Structures

Lock
Management

Persisted Data
(DB2 tables, MQ
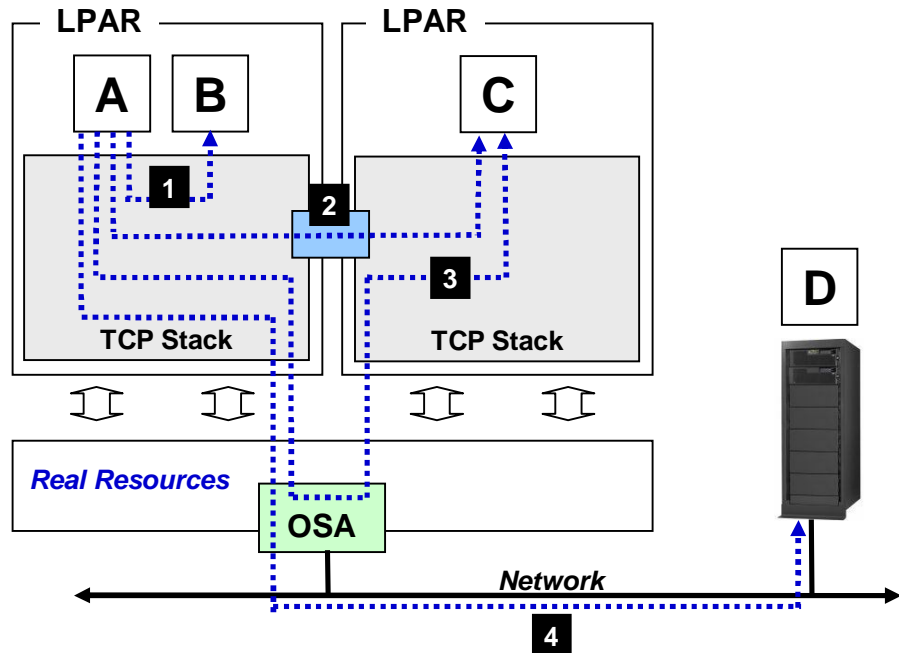persistent
messages, etc.)

- **Parallel Sysplex provides clustered z/OS instances**

- **Shared data, lock management, coordinated time management, high-speed data transfer**

- **Mature, stable, reliable**

- **Unbeatable availability**

Provides scalability and availability … to levels used throughout the world for critical activity
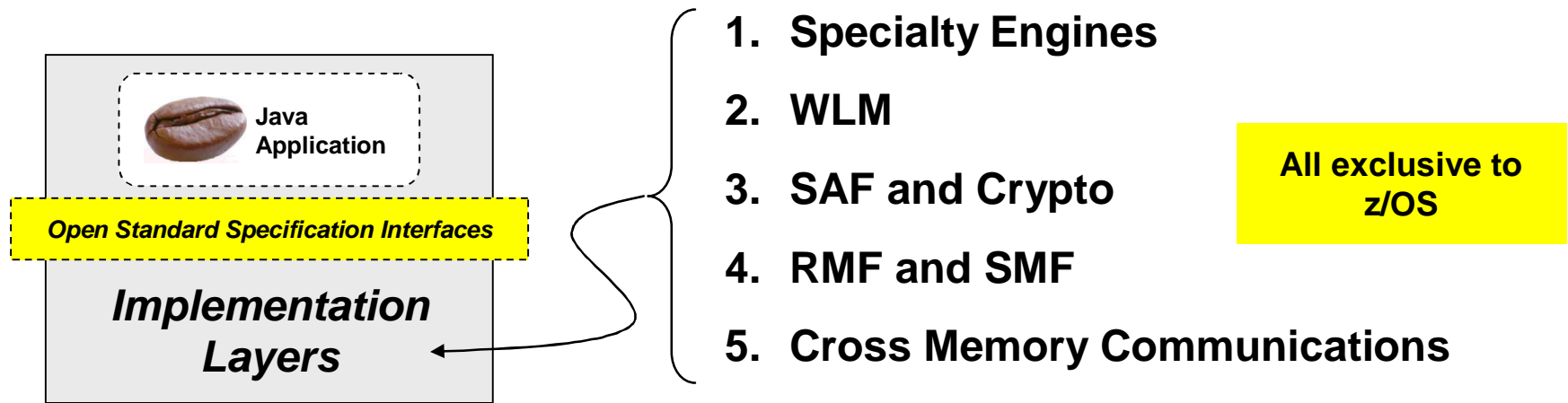
IBM

Intelligent TCP/IP

1. **Same LPAR**
   No network … cross memory … *ultra* fast

2. **Different LPAR, HiperSockets**
   No network … cross memory … very fast

3. **Different LPAR, *not* HiperSockets**
   No wire … just adapter card … fast

4. **Off System z**
   Traditional networking here

When throughput and scalability is important, network delays can add up

TCP/IP on z/OS is very aware and optimizes its path to reduce overhead and benefit your business
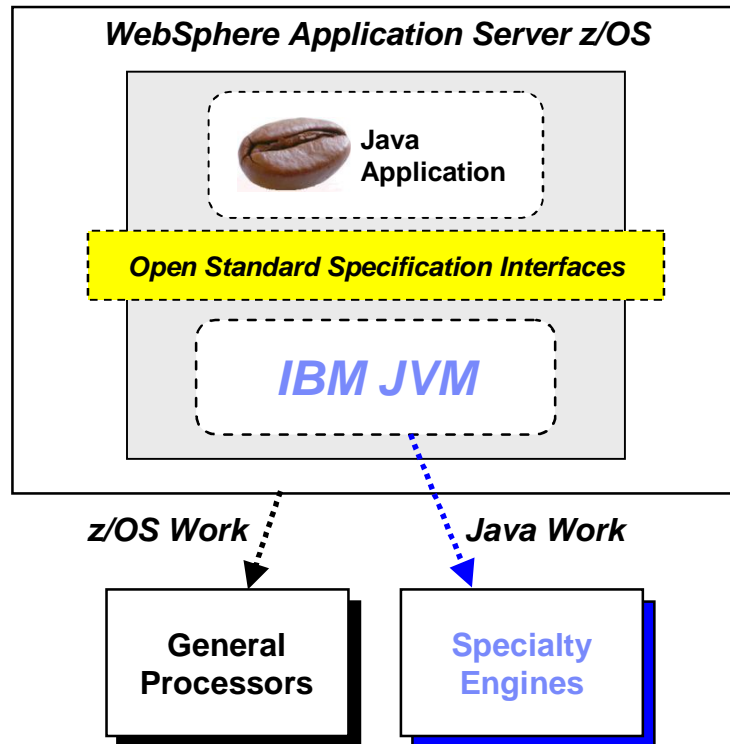
Key Areas of *Active* Platform Exploitation by WAS z/OS

Java Application

Open Standard Specification Interfaces

Implementation Layers

1. **Specialty Engines**

2. **WLM**

3. **SAF and Crypto**

4. **RMF and SMF**

5. **Cross Memory Communications**

All exclusive to z/OS

WebSphere Application Server is "platform aware" on all platforms

WebSphere Application Server for z/OS knows about key z/OS value attributes

It reaches out and exploits them to your advantage

Let's see what that means to you …

Specialty Engine Exploitation

WebSphere Application Server z/OS

Java Application

Open Standard Specification Interfaces

IBM JVM

z/OS Work   Java Work

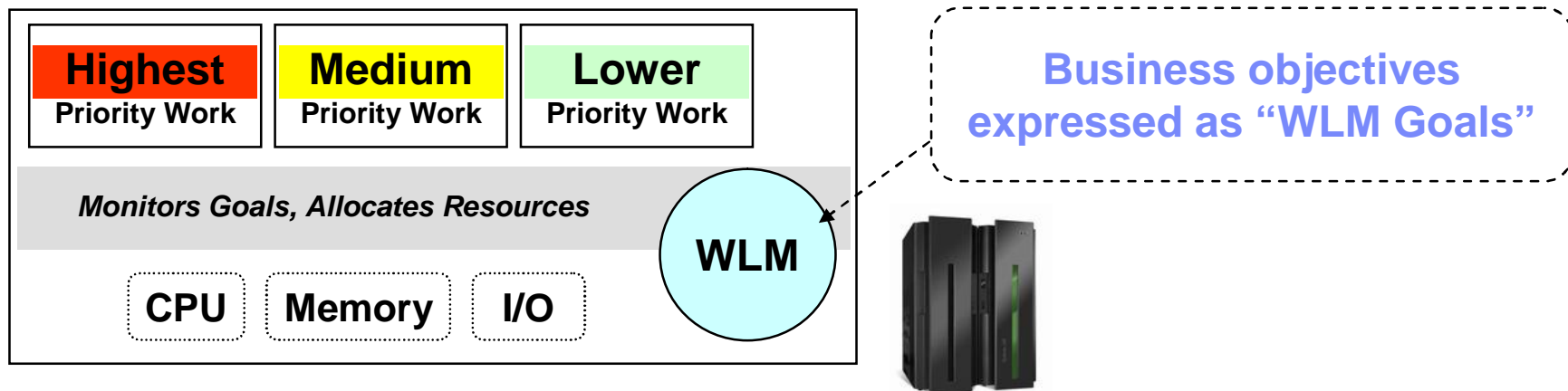**General Processors**

Specialty Engines

- **Offload Java work to financially attractive specialty engines**

- **Completely transparent process to applications**

- **Greater general processor capacity for non-Java work**

- **Lower software licensing costs, and/or the avoidance of additional costs**

Works for Java offload, Linux on System z offload and certain DB2 processing offload

A feature enthusiastically embraced by many System z and z/OS customers!

Workload Manager (WLM) Exploitation

Highest	Medium	Lower
Priority Work	**Priority Work**	**Priority Work**

Monitors Goals, Allocates Resources

WLM

CPU | Memory | I/O

Business objectives expressed as "WLM Goals"

Benefits to you and your business:

- **Intelligent control of resources towards meeting *your* goals**
- **Very efficient resource sharing can be accomplished**
- **Critical work gets the resources, less critical held off temporarily**
- **Intelligent routing of work based on WLM monitoring of system**

Manage costs -- very efficient utilization of asset investment

Provide agility -- intelligent and dynamic allocation to meet goals

SAF and Crypto Hardware

WebSphere Application Server z/OS

Security Access Facility

Crypto Hardware
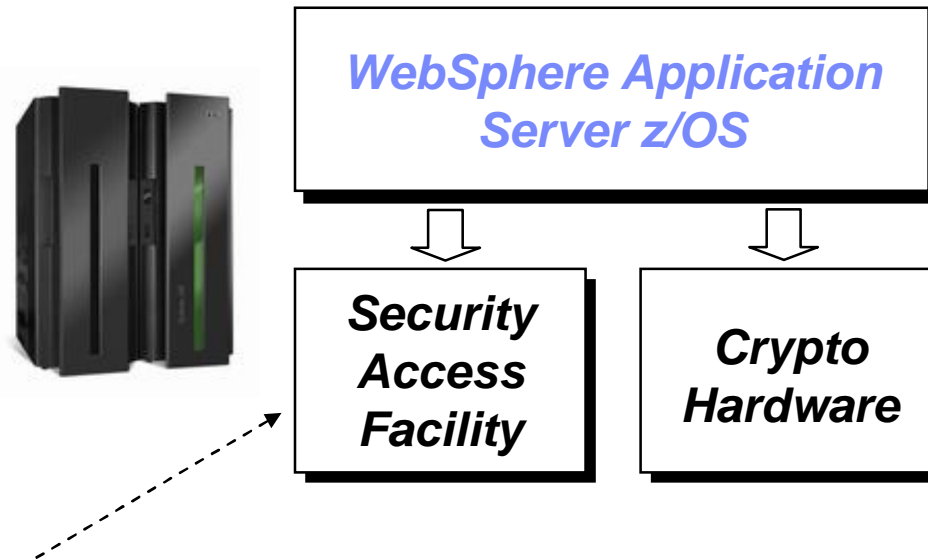
- **Highest level of security for storage of private keys**

- **Very fast encryption and decryption**
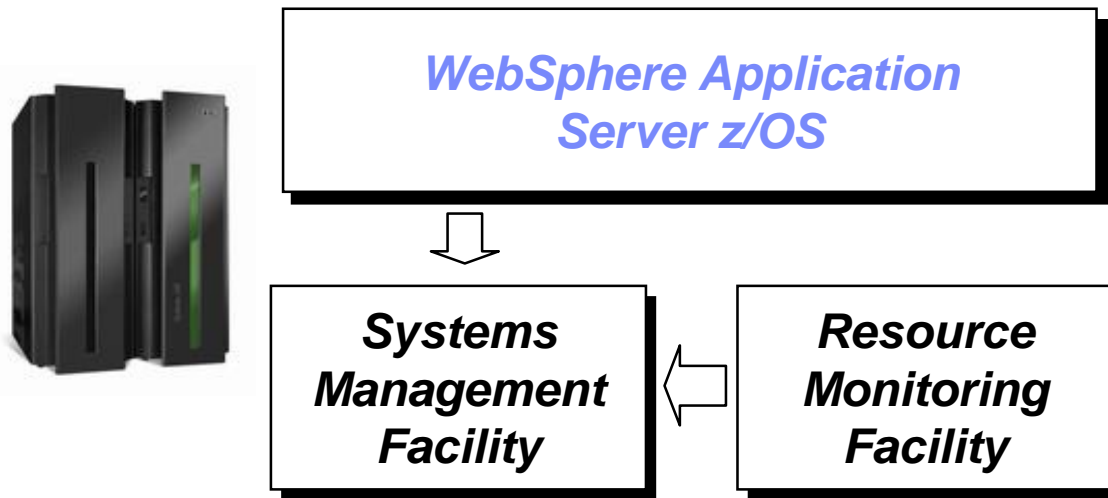
- **Enhances security**

- **System interface for security products (IBM = RACF)**

- **Single, integrated security facility for tighter process control**

- **Define many classes of security profiles, including digital certificates**

Security breaches are very disruptive and very expensive

Protecting secure data is a business imperative

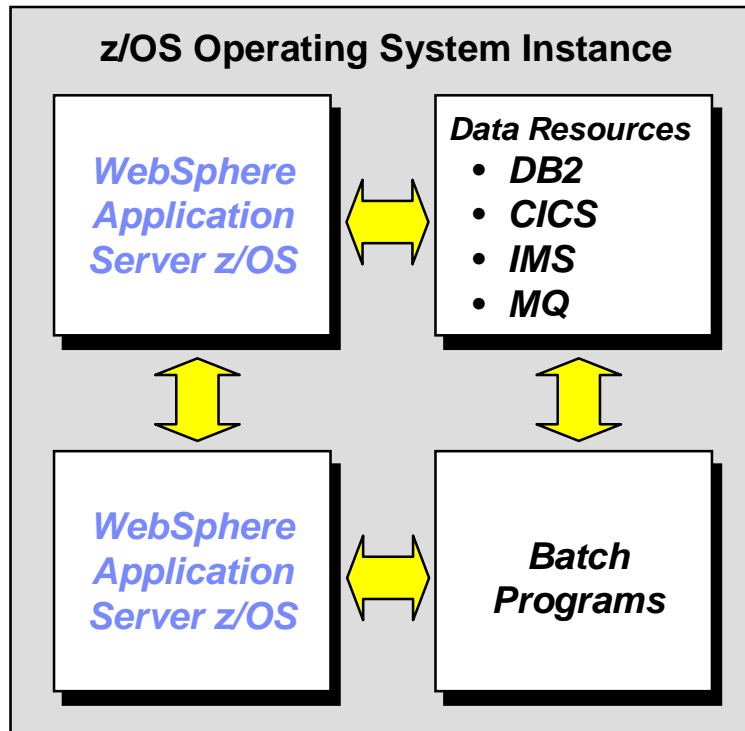*SAF has proven itself to be secure and trusted*

IBM

SMF and RMF -- Measuring and Reporting on Activity

WebSphere Application Server z/OS

Systems Management Facility	Resource Monitoring Facility

- Achieve very accurate and customized reporting of system activity

- Perform very precise capacity measurement and planning

- Capture who is using what resources and when

- Allows finer-grained accounting and chargeback

- Many tools on the shelf to do analysis and reporting

Have a clear view of your resource investment and utilize is as fully as you can with the information you can gather

IBM

Collocation Benefits

z/OS Operating System Instance

WebSphere Application Server z/OS

Data Resources
- **DB2**
- **CICS**
- **IMS**
- **MQ**

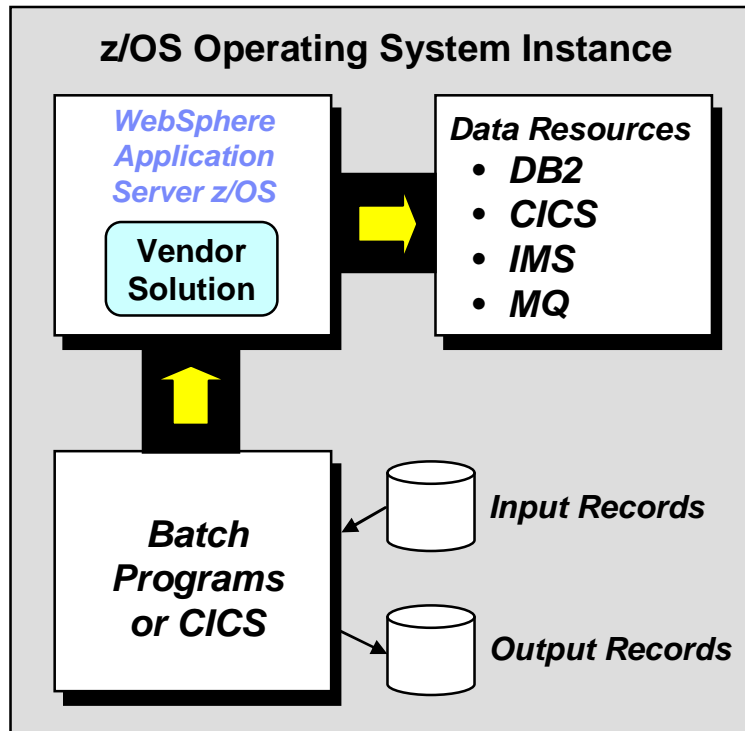*WebSphere Application Server z/OS*

Batch Programs

- ***Extremely* fast data transfer**

- **Tightly controlled by z/OS authorization processes**

- **Eliminate need to serialize and deserialize data and objects**

- **Eliminate need for encryption overhead**

- **Propagate several forms of user identity**

Efficient -- very low overhead so scalability can be addressed

Secure -- no network, can't be sniffed or hacked

Fast -- for very high volume workloads

IBM

Example: Leveraging Vendor EJB Solutions from Batch

z/OS Operating System Instance

WebSphere Application Server z/OS

Vendor Solution

Data Resources
- DB2
- CICS
- IMS
- MQ

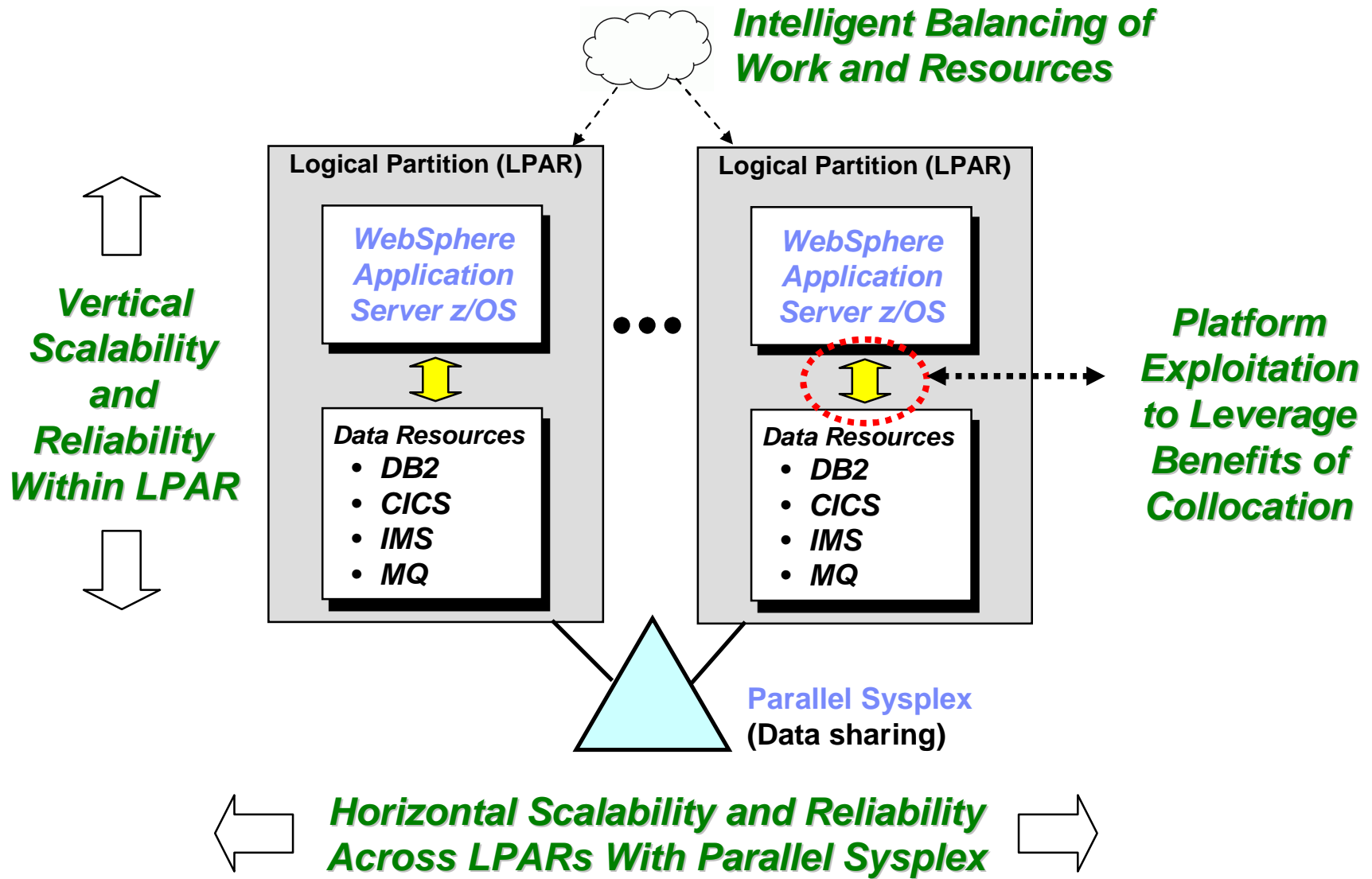**Batch Programs or CICS**

Input Records

Output Records

Advantages:

- *Very* low overhead
- *Very* high throughput
- Exploit data assets in DB2, CICS, IMS or across MQ using their local connectors
- Maintain transaction integrity with RRS

- **Increasingly we see ISVs creating solutions using Java EE EJBs**

- **Challenge becomes how best to drive *into* WebSphere Application Server to take advantage of vendor solutions**

- *WebSphere Optimized Local Adapter (WOLA) -- **z/OS exclusive** -- an extremely efficient bi-directional cross-memory mechanism*

Leveraging the platform's capabilities to address your business needs

16

IBM

Collocation, Scalability *and* High Availability

Intelligent Balancing of Work and Resources

Logical Partition (LPAR)

WebSphere Application Server z/OS

Data Resources
- *DB2*
- *CICS*
- *IMS*
- *MQ*

Logical Partition (LPAR)

WebSphere Application Server z/OS

Data Resources
- *DB2*
- *CICS*
- *IMS*
- *MQ*

Vertical Scalability and Reliability Within LPAR

Platform Exploitation to Leverage Benefits of Collocation

Parallel Sysplex
(Data sharing)

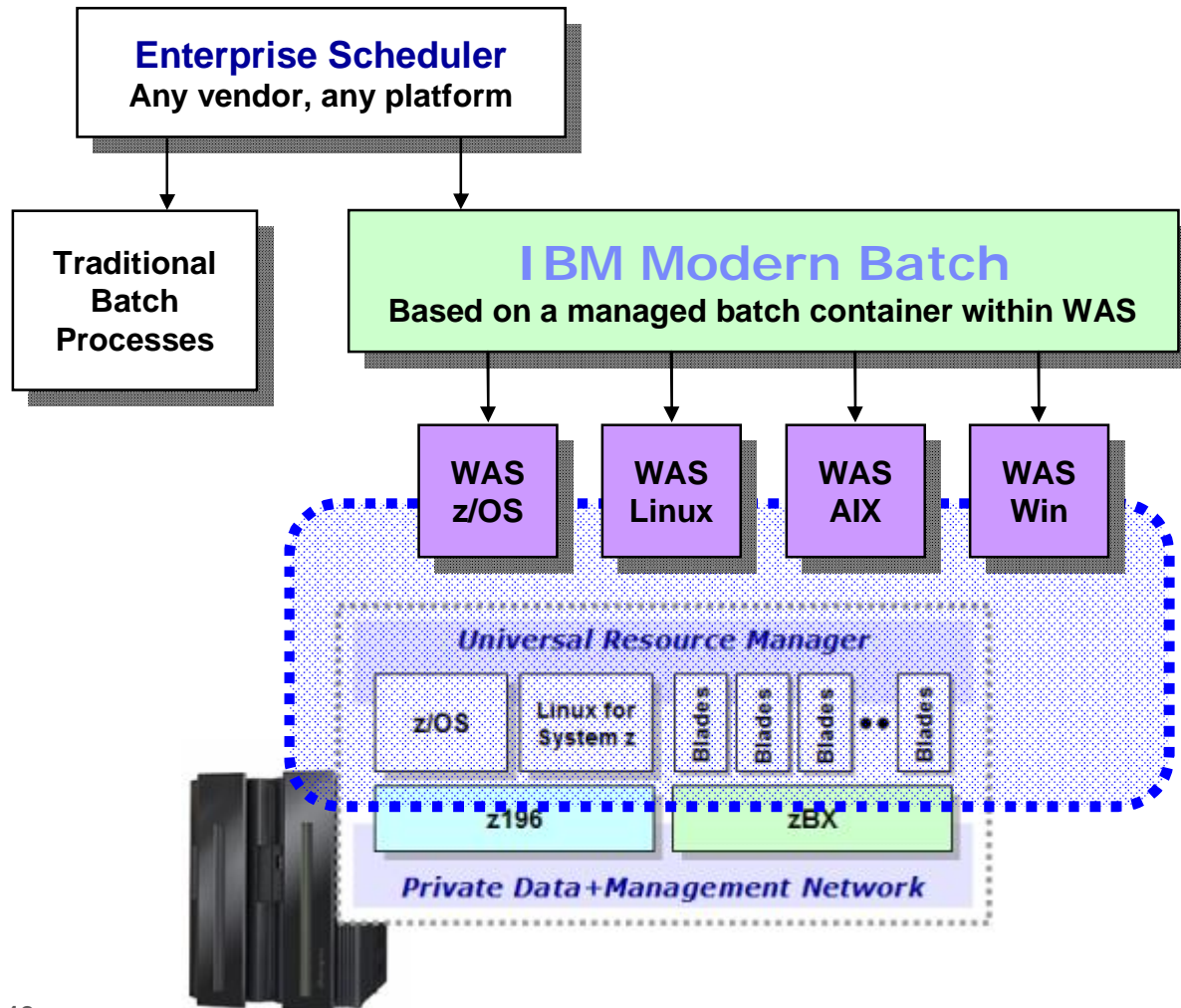**Horizontal Scalability and Reliability Across LPARs With Parallel Sysplex**

zEnterprise – Best of All Worlds

The z/OS benefits we've discussed for work best suited for that, and a coordinated and integrated multi-system machine it all

IBM
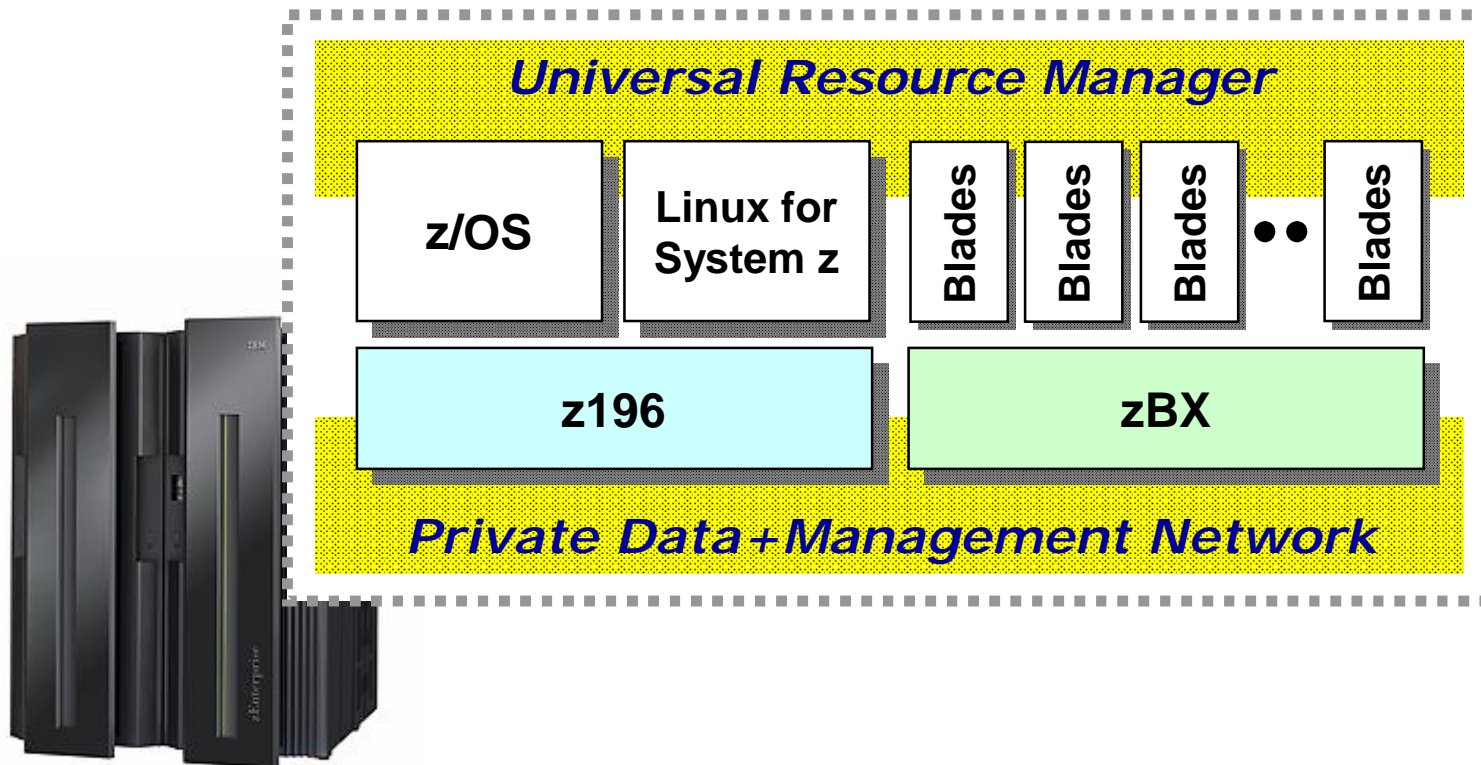
Modern Batch … Coupled with zEnterprise

IBM's Modern Batch provides flexible Java batch processing across multiple environments. Put the zEnterprise underneath and …

Enterprise Scheduler
Any vendor, any platform

Traditional Batch Processes

IBM Modern Batch
Based on a managed batch container within WAS

| WAS z/OS | WAS Linux | WAS AIX | WAS Win |

Universal Resource Manager

z/OS | Linux for System z | Blades | Blades | Blades | • • | Blades
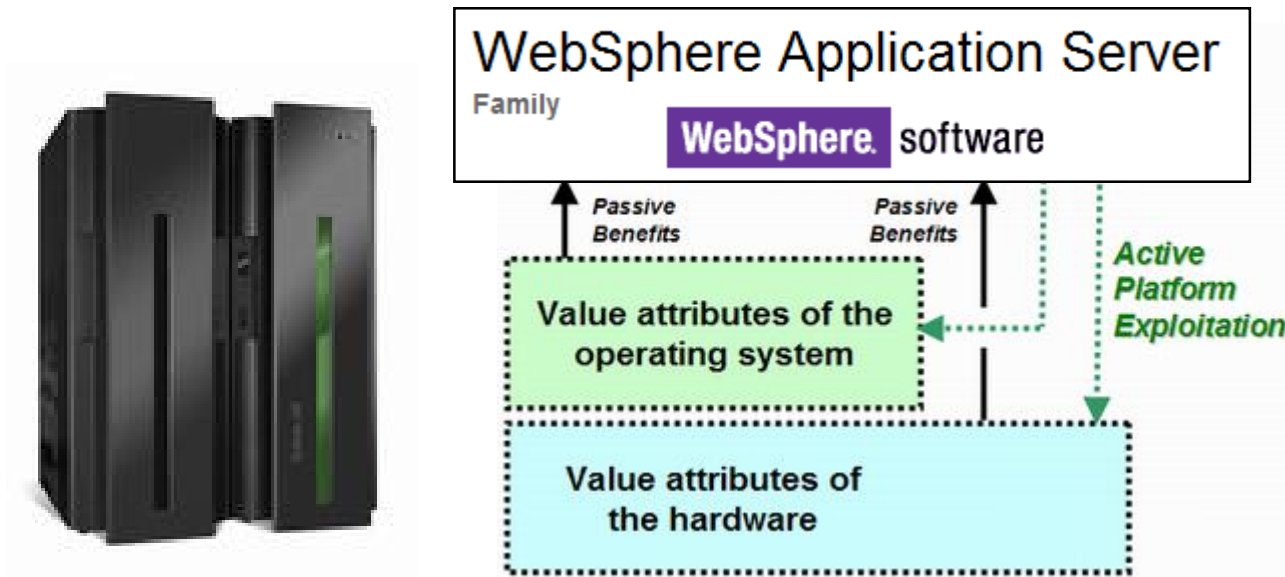
z196 | zBX

Private Data+Management Network

IBM's Modern Batch provides the managed container environment for Java batch

WAS provides the runtime for combined OLTP and Batch

zEnteprise provides the execution environments that allow the best "fit for purpose" for your needs

Summary -- Integrated System, Active Exploitation

Hardware designed to be reliable and scalable

z/OS operating system tightly integrated with hardware

WebSphere Application Server for z/OS designed to exploit the platform

Efficient use of assets, optimized costs, flexible and agile because of open standards and common tooling across platforms

System z + z/OS + WebSphere Application Server

IBM

Thank you!!
Questions?