IBM System z Technology Summit

zEnterprise – The First System Of Systems

Deploying Web Applications

David Rhoderick

25th May 2011

We're extending our core CICS systems to the web. What's the best choice for deploying our Web applications?

Development Manager

Let's see how you can consolidate on zEnterprise and save.

First, let's look at the DataPower optimizer as a messaging device…

IBM

Event Driven Businesses Need Message Processing

Announcing WebSphere DataPower Integration Appliance XI50z for zEnterprise

- Double-wide blade, purpose-built for the zEnterprise BladeCenter Extension (zBX)
- High capacity optimized for lowest cost

Enterprise Service Bus Capabilities

- Content-based routing
- Data transformation
- Bridge between messaging protocols
- Direct-to-database access via XML

Firewall Capabilities

- Access control
- Encryption
- Data validation
- Field-level security
- Web services management

System z With DataPower XI50z Is A Powerful Synergy

- DataPower hardware acceleration reduces mainframe CPU usage
- Provides Web services front end for z backend systems with content-based routing
  - IMS, COBOL via copybook, DB2 (and other databases), CICS
- XI50z Complementary High Availability features
  - Dual power supplies
  - Active/passive failover support
  - No spinning media
  - Self-healing capability
- Remote SAF/RACF and Crypto security integration

Let's look at how you can consolidate workloads with DataPower and WebSphere Application Server on zEnterprise!

What's next?

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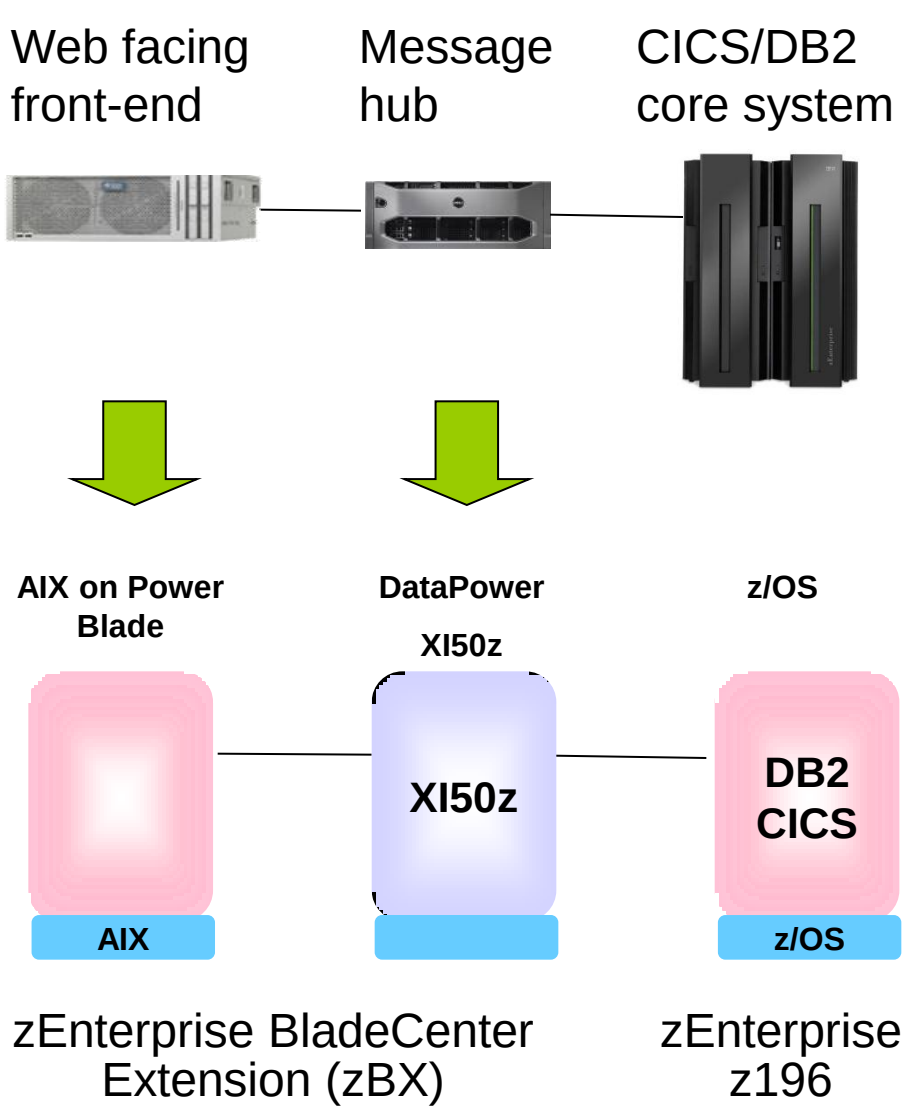
Collapse Web Front End Workloads On To zEnterprise Platform



- Run as ensemble of virtual servers
- Unified management of virtual machines
- Manage ensemble as a single workload with service goals
- Dynamic adjustment of CPU resources drives 10% higher utilization
- Assign best fit to Power blade and XI50z for lowest cost per workload
- Embedded pre-configured data network

Web Front Ends Cost 58% Less On zEnterprise

28 front end WebSphere applications

Competitive App Server
57 SPARC T3-1B blades in SUN racks
2 HP DL380 servers (for ESB)
936 cores total

Deploy on new SPARC T3 hardware

$11.7M
3yr TCA HW+SW

WebSphere App Server
28 POWER7 blades
2 DataPower XI50z in zBX
240 cores total

Power Blades in zBX

$4.9M
3yr TCA HW+SW

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WebSphere App Server
28 POWER7 blades
2 DataPower XI50z
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224 cores total

Power Blades in zBX

$4.9M
3yr TCA HW+SW

Why?

- WAS on PS701 delivers 1.84x processing capacity
  - Competitive Application Server cannot effectively utilize the threads available in T3 blade
- DataPower better price/performance
- Need to over provision SPARC T3 since no zManager

Advantages Of Power 701 Blade in zBX

- ☑ **Lowest** cost
- ☑ zManager reduces system management costs and improves reliability by providing centralized system monitoring and management
- ☑ Connect to z196 using a high-speed private internal network
  - Physically secure private network means no encryption or firewall required between the POWER7 blade and the z196

WebSphere on zBX Power Blade

Oracle SPARC T3-1 Solution

Oracle SPARC T3-1 and z196

- No centralized system monitoring and management ➡ Higher System Management Costs
- Connect to z196 using standard IT network
  - Cost comparison was shown based on NO encryption for T3-1 network ➡ security risk
  - Encryption and firewall between SUN server and the z196 is preferred, requiring more hardware capacity and software licenses

What about new mission-critical applications? We need absolute 24x7 availability for them.

Development Manager

WebSphere for z/OS is the best choice for vital applications!

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Quality Of Service Advantages For WebSphere On z/OS

- **Ultra-high Availability**
  - Comprehensive z196 design for reliability and serviceability
  - Parallel Sysplex
  - 99.999% availability
  - Disaster recovery
- **Co-location benefits:** WebSphere in the same LPAR with back-end systems
  - WOLA communications between WebSphere and CICS significantly reduces CICS cost
  - Local JDBC Type 2 and WOLA communications give faster response time
- **Most secure** solution
  - Enhanced security via z/OS Communications Server, RACF, and hardware crypto support

Availability Is Paramount

August 3, 2009 1:37 PM PDT

PayPal suffers from e-commerce outage

by Stephen Shankland Font size Print E-mail Share 10 comments

PayPal suffered a global outage and slow performance Monday, but eBay said its online payment system is mostly back in working order.

"About an hour ago, PayPal started experiencing site issues that affected the ability to send and receive money. We have all hands on deck to get this fixed," said PayPal spokesman Anuj Nayar in a blog post about noon PDT. "We're really sorry for the inconvenience."

PayPal

- One hour+ outage August 2009
- $2,000 lost per second
- $7.2M+ lost revenue

Financial Impact of Downtime Per Hour

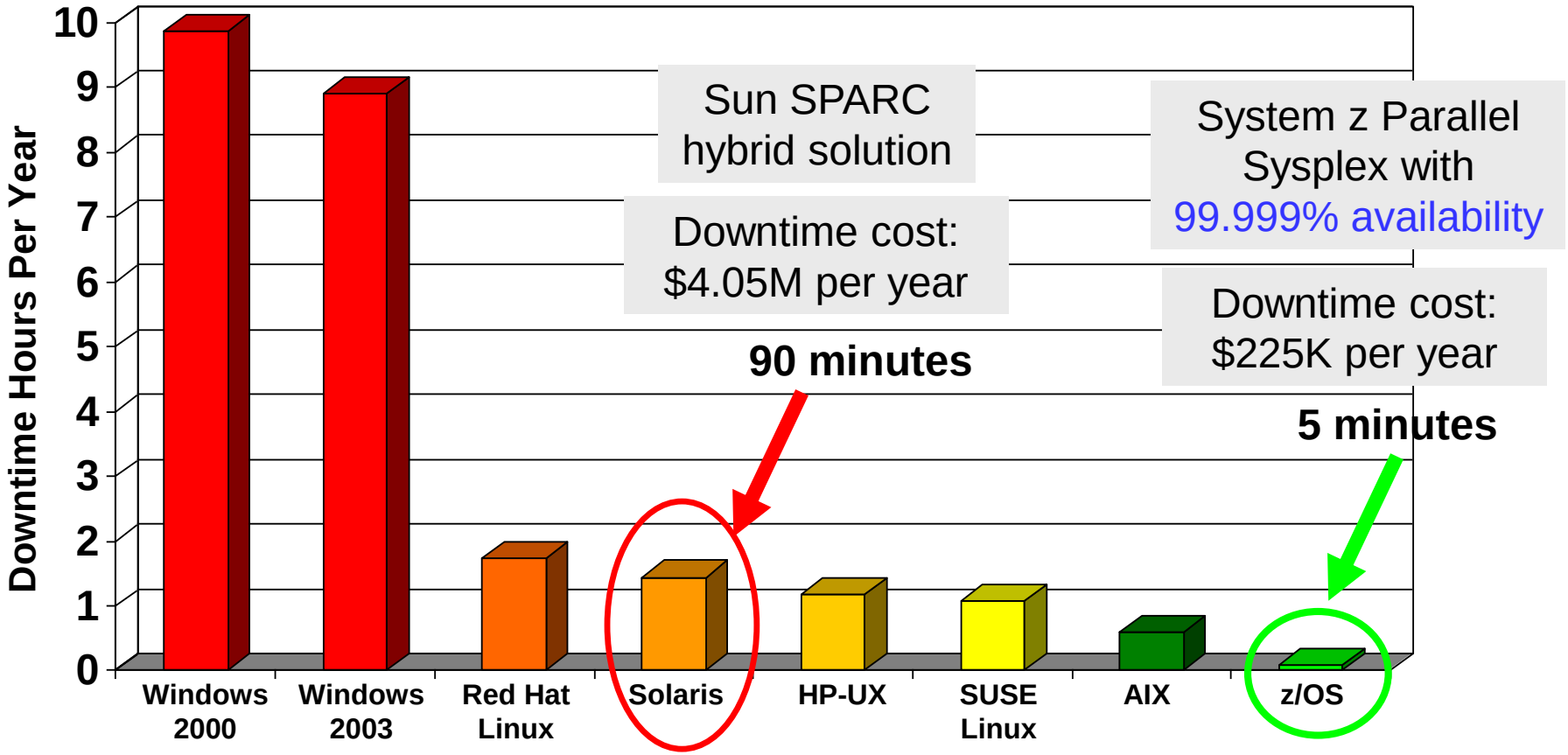
Figure 1 Cost of downtime by industry segment

Industry/Sector	Revenue/Hour
Energy	$1,468,798
Telecommunications	$4,611,604
Financial	$8,213,470
Information Technology	$3,316,058
Insurance	$2,582,382
Pharmaceuticals	$2,058,710
Banking	$1,145,129
Consumer Products	$989,795
Chemicals	$1,071,404
Transportation	$1,463,128

Source: Robert Frances Group 2006

Average = $2.7M

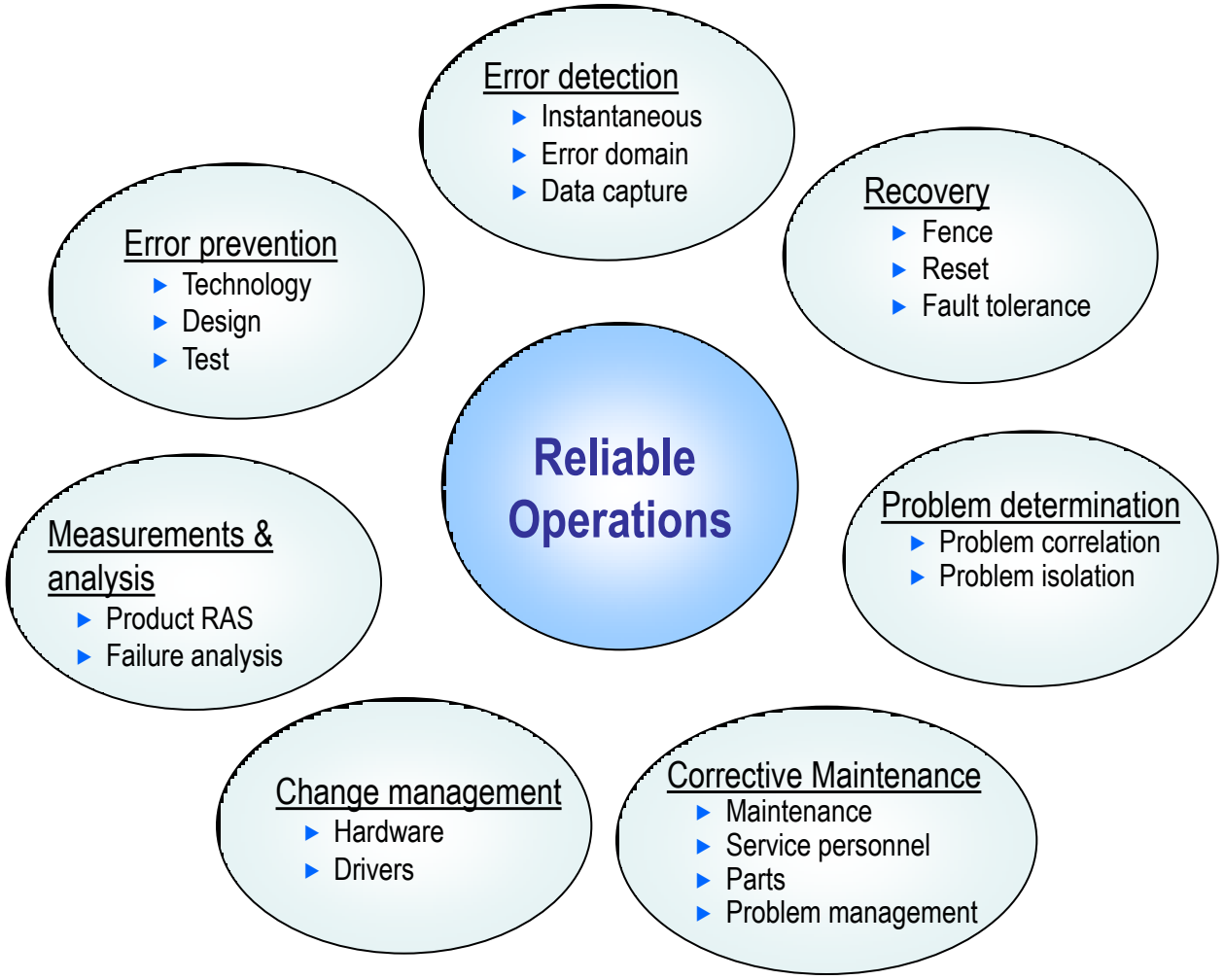
Result: z/OS Delivers The Highest Availability And The Lowest Downtime Cost



Source: 2007-2008 Global Server Operating Systems Reliability Survey, Yankee Group, March 2008.
Source: IBM Internal Study
Source: Robert Frances Group 2006. Average of $2.7M revenue lost per hour of downtime

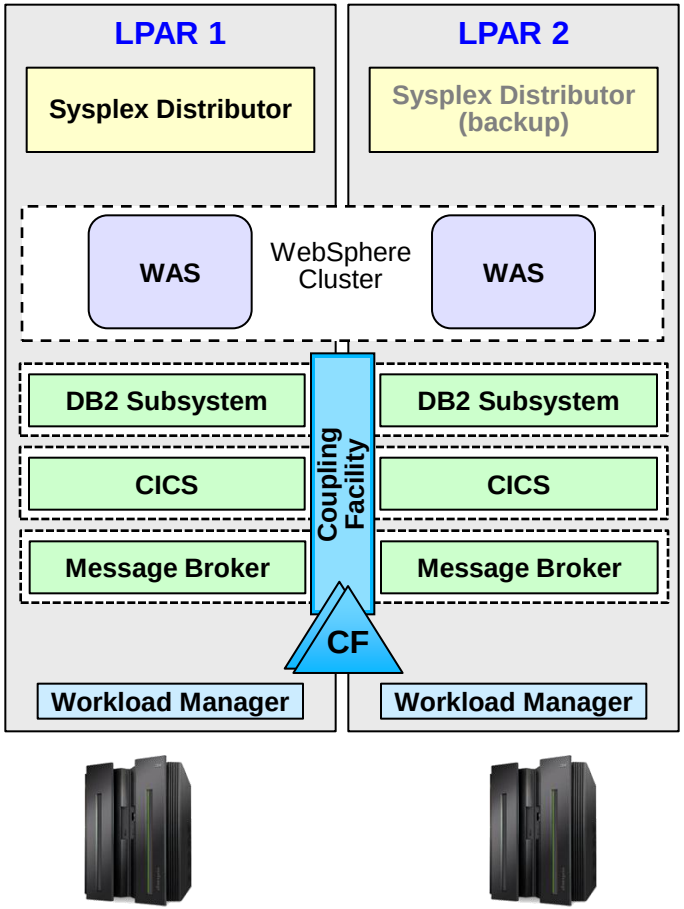
z196 Is Designed For Reliability And Serviceability

Examples of hardware reliability and serviceability features

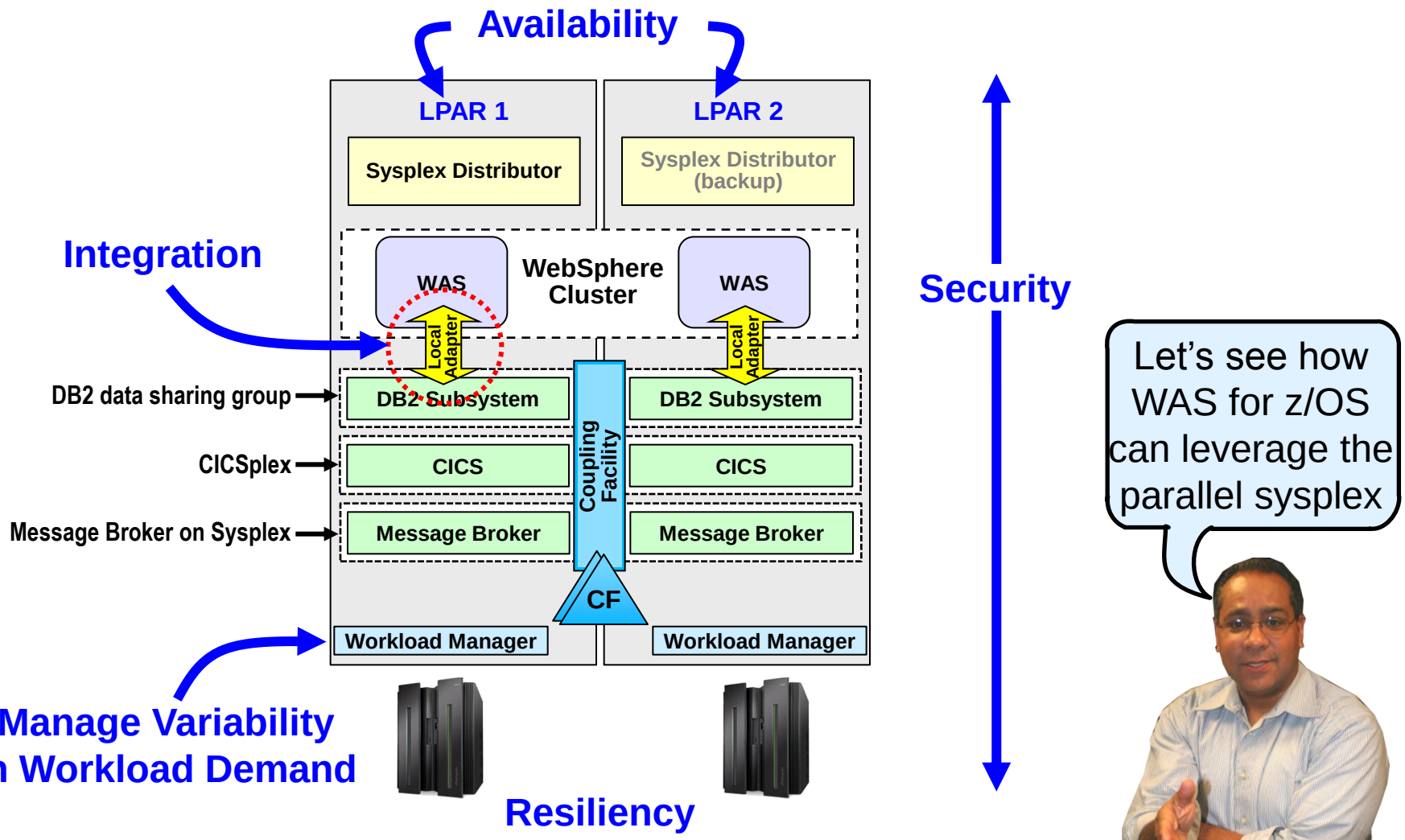


Parallel Sysplex Is The Key Enabler For High Availability

- **Parallel Sysplex** links two or more cooperating hosts in an Active/Active configuration
- **Coupling Facility** provides memory shared between hosts for
  - Locks
  - Cache
  - Data lists
- **Clusters** group cooperating middleware instances across the Sysplex
  - If one instance fails, another takes the load
  - Incoming transactions intelligently distributed to WAS instances in the cluster for load balancing
  - DB2 clusters implement data sharing
  - CICSplex shares customer workload
  - MQ uses Sysplex to provide high availability for message-driven applications

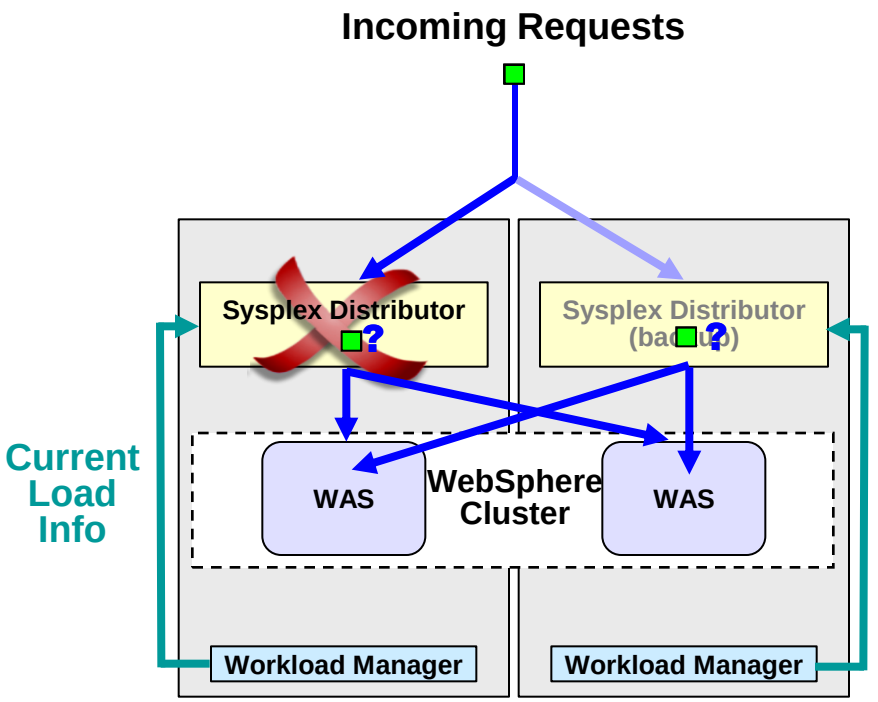


WebSphere For z/OS Can Be Deployed In A Parallel Sysplex Configuration



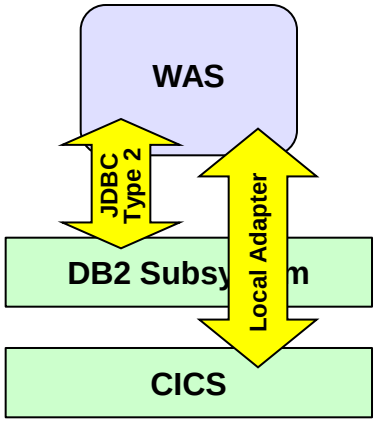
Sysplex Distributor Sends Incoming Requests To Best Available Server

- Sysplex Distributor is an intelligent router
  - Receives incoming requests
  - Determines which potential target LPAR is the best
  - Redirects the request to that LPAR
- Uses current load information from Workload Manager to support dynamic load balancing among WebSphere instances
- In the event of a failure in the LPAR or TCP stack, Sysplex Distributor **automatically** routes to backup TCP/IP stack
- Transparent to the user and applications



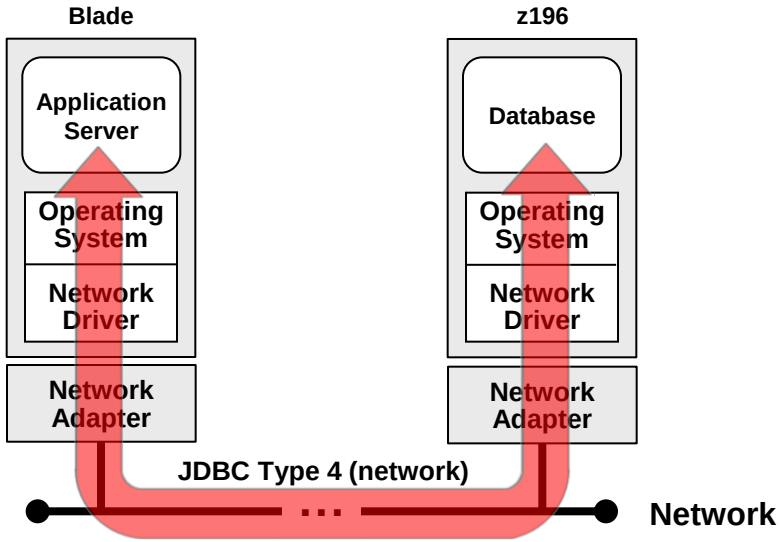
Webplex Co-locates Applications With Backend Systems For Efficiency And Security

WAS on z/OS



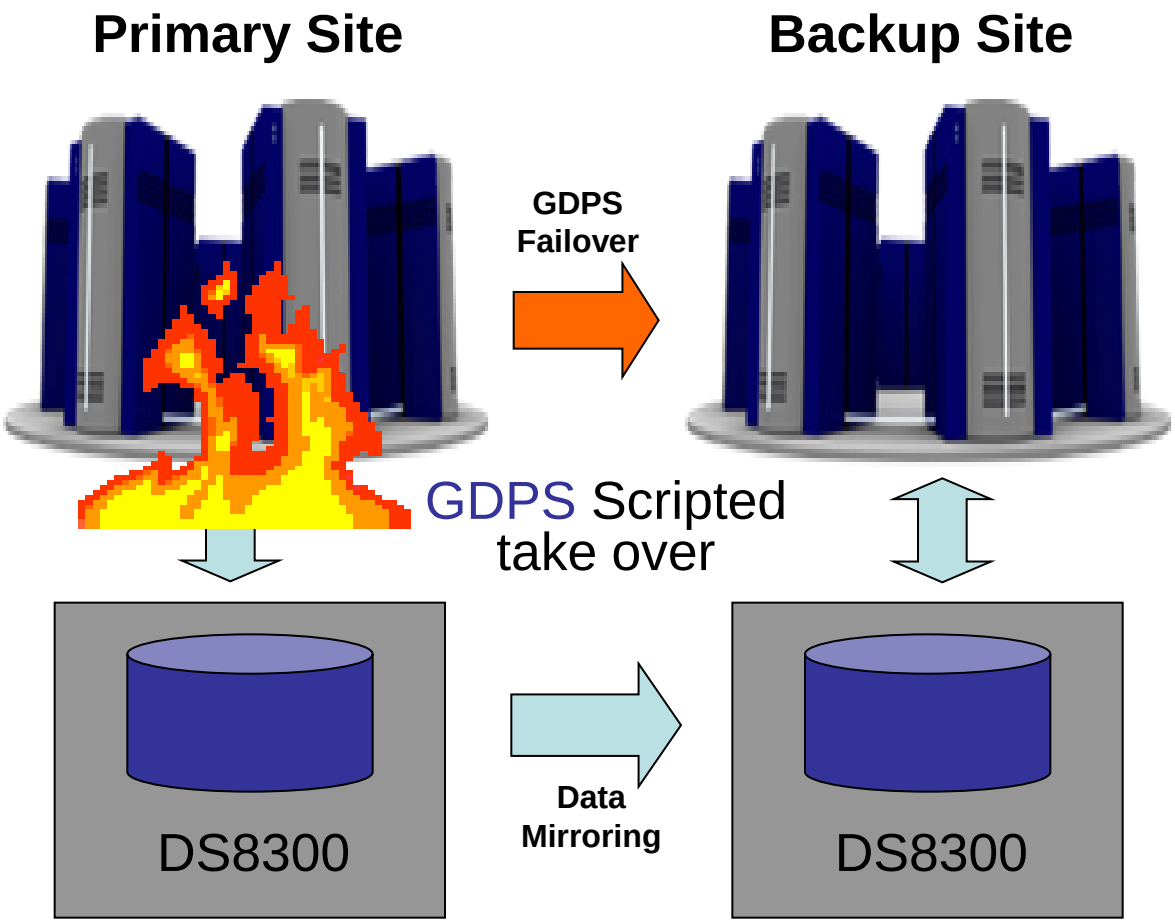
- Data can be shared in memory between WAS, DB2, and CICS by co-locating in same LPAR
  - Local adapters provide direct, cross-memory access
  - Optimal performance, faster response time
  - Security – data stays in same box

Hybrid Design



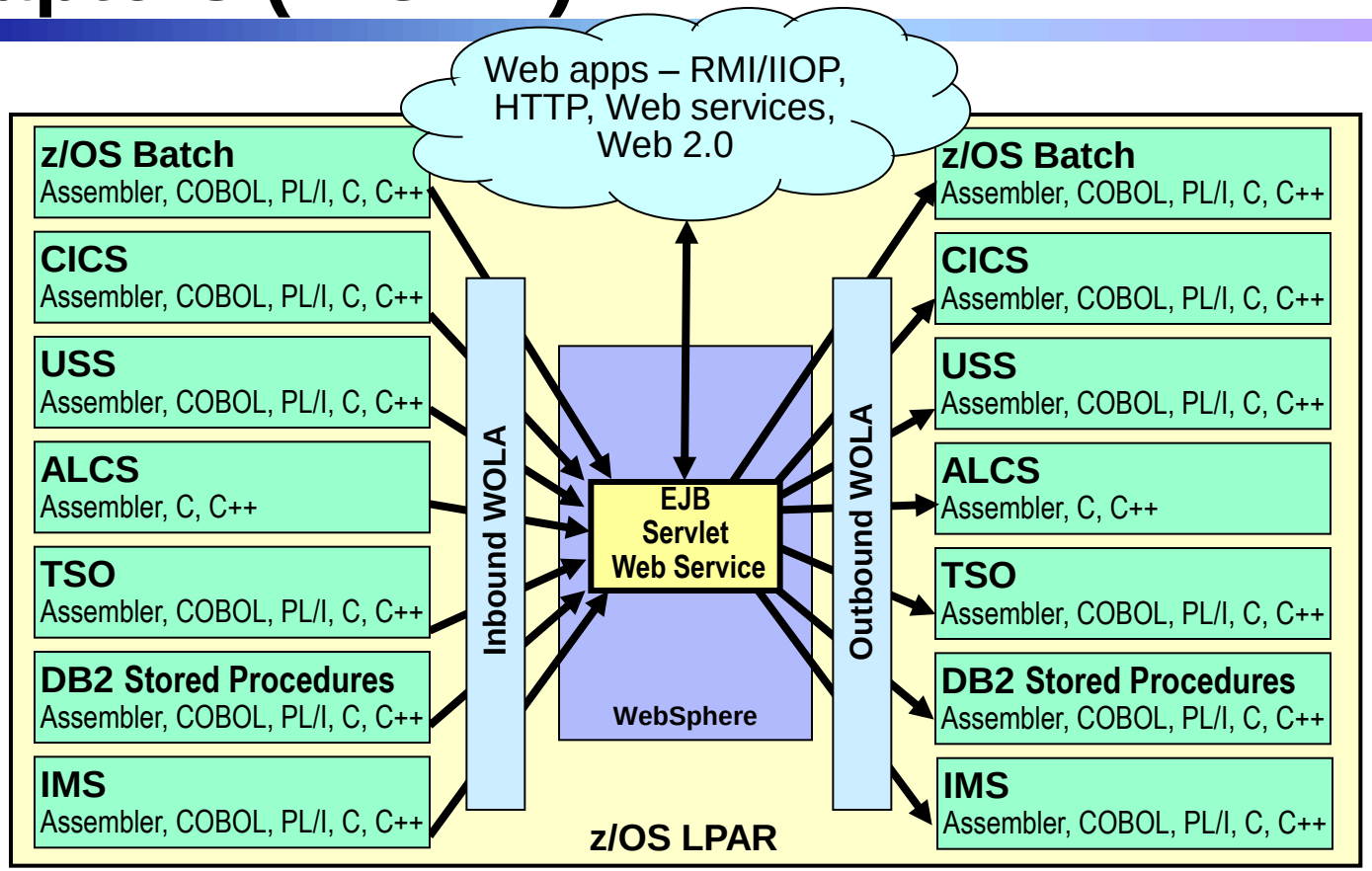
- Hybrid design separates applications from data and transactions
  - Accumulates network latency, security exposure
  - Web services overhead – XML parsing, serializing and deserializing Java objects, etc

z196 Keeps The Business Running Even In A Data Center Disaster



- Site Failover
  - Failover to secondary site in case of complete site failure
- Data Mirroring
  - Protect data in the event of a disk system failure

What Are WebSphere Optimized Local Adapters (WOLA)?



WOLA supports fast, **bi-directional,** local calls between z/OS native apps and WebSphere applications for

- Global transactions, security propagation, WLM context passing
- 1-phase and 2-phase commit from WAS to CICS
- WOLA v2 improves CICS Transactions support

Security Has Become A Critical Issue

consumeraffairs.com
knowledge is power!

TJX to Pay Mastercard $24M for Data Breach

Will set aside money to provide restitution for victims

CHICAGO SUN-TIMES
suntimes.com Member of the Sun-Times News Group

June 28, 2008 Associated press

Hackers breach Wards.com

A established Chicago retailer experienced a hack of credit card numbers but did not inform customers, despite notification laws

AXcess News
News for the X generation

USDA admits data breach, thousands of social security numbers revealed

17 April 2007- (AXcess News) Washington

The US Department of Agriculture admitted a security breach allowing 63,000 social security numbers to be made available on a public website

A Secure Foundation

- **zEnterprise has highest commercial common criteria rating**
  - PR/SM rated at EAL 5
- **Workload Isolation**
  - zEnterprise Hypervisor maintains strict isolation between workloads
  - Hardware storage protect keys protect system and user workloads
  - Architecture design makes typical buffer overflows and virus payloads inoperable

- **Integrated access control throughout the stack**
  - RACF enforces access control and logs security events
- **Secure cryptographic encoding**
  - Built-in on-chip crypto hardware assist
  - Optional high speed cryptographic processors
  - Support for Advanced Encryption Standard (AES) 192 and 256, SHA-384 and SHA-512

z/OS Provides Essential Network Security For Applications

- Communication Server for z/OS ensures
  1. The partner is who it claims to be (endpoint authentication)
  2. Data came from the intended partner (data origin authentication)
  3. Data was not changed since it was sent, via digital signatures (data integrity)
  4. Only the intended receiver can understand the data via encryption (data confidentiality)

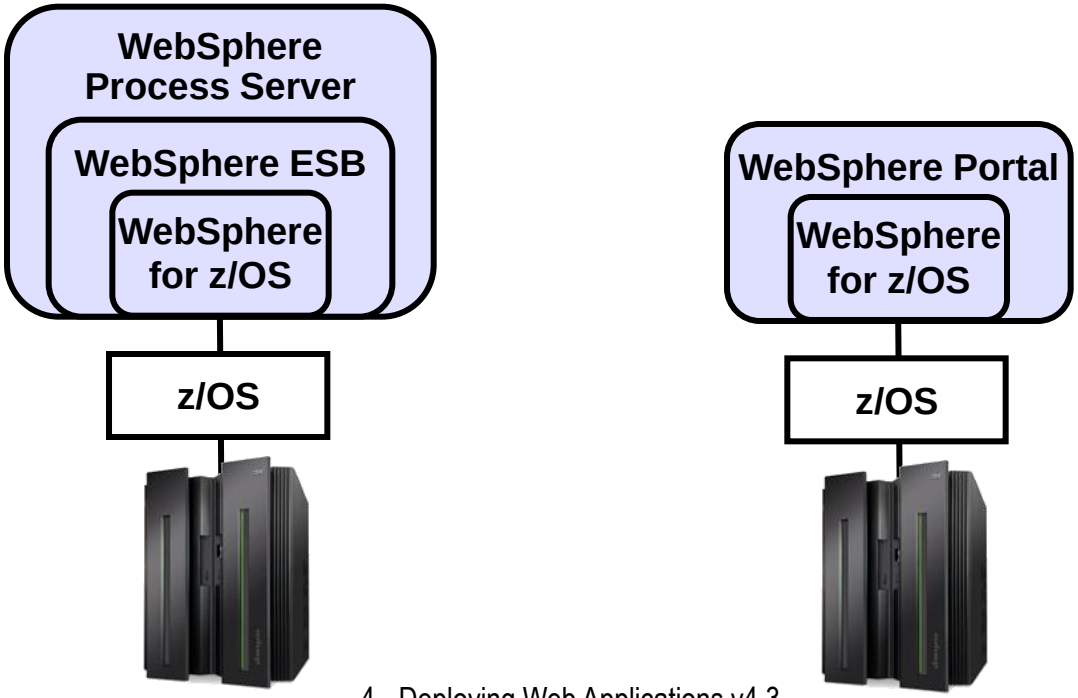
- Data integrity and confidentiality are accelerated by zEnterprise cryptographic hardware

z/OS Provides Advanced Network Security

- Communications Server for z/OS provides first line of defense against **network attacks**
  - Intrusion detection services
  - Dynamic defensive filtering protect from denial-of-service attacks
  - IPSec can encrypt data end-to-end, or across any portion, as controlled by a policy document
  - IPSec VPN offers system-to-system security, transparently to applications
  - SSL/TLS provides application-to-application security
- z/OS HTTPS conforms 100% to the standard, but adds:
  - Ability to store keys in SAF (RACF) or file stores
  - Use of crypto hardware accelerator to speed up the encryption and decryption processes

WebSphere Application Server For z/OS Is The Ideal Web Infrastructure

- WebSphere Application Server (WAS) for z/OS is also the foundation for
  - WebSphere Process Server for z/OS
  - WebSphere Enterprise Service Bus for z/OS
  - WebSphere Portal for z/OS



Summary: Deployment Options For WebSphere On zEnterprise

- Power and x86 blades in a zBX offer the lowest-cost solution for simple Web applications, while benefiting from zManager
- WebSphere for z/OS provides the best Qualities of Service
- WebSphere DataPower XI50z delivers stunning price performance for message processing

The Best Fit for Purpose depends on application requirements