IBM System z Technology Summit



Why WebSphere Application Server on System z?

Scott Simons

WebSphere Technical Professional and zChampion

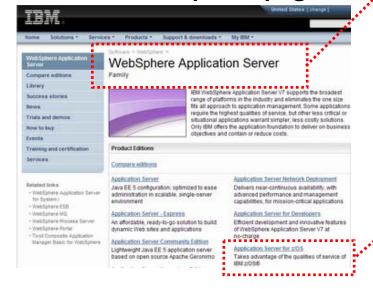
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Two Questions We'll Answer Today ...

ibm.com WebSphere page ...



WebSphere Application Server

Family

WebSphere. software

How does WebSphere Application Server address your business imperatives?

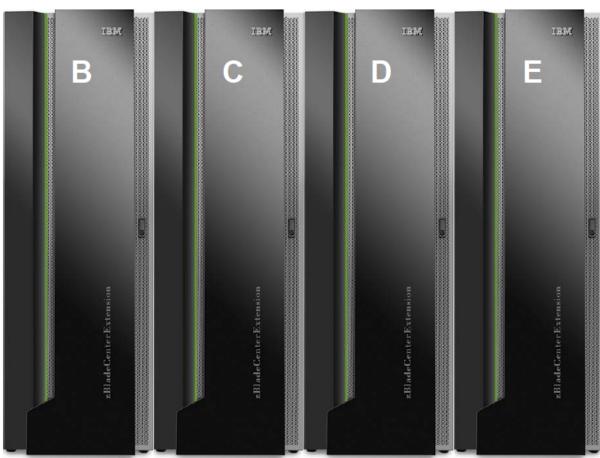
Application Server for z/OS

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?"

IBM zEnterprise System





IBM zEnterprise 196 (z196)

IBM zEnterprise BladeCenter Extension (zBX)

IBM zEnterprise Unified Resource Manager (zManager)





z196 – Under the covers (Model M66 or M80)

Internal Batteries (optional)

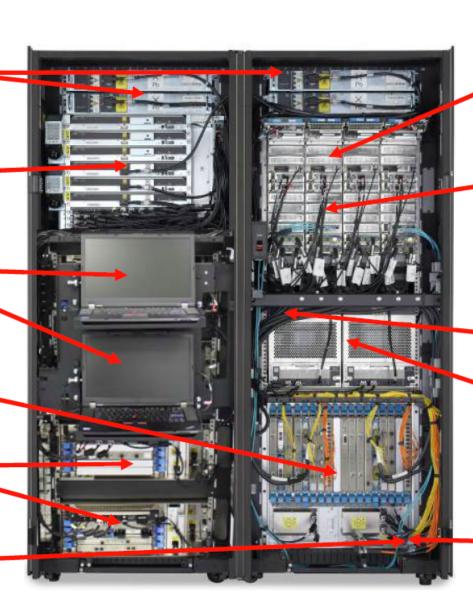
Power Supplies

2 x Support Elements

I/O cage

I/O drawers

Fiber Quick Connect (FQC) Feature (optional)



Processor Books, Memory, MBA and HCA cards

Ethernet cables for internal System LAN connecting Flexible Service Processor (FSP) cage controller cards

InfiniBand I/O Interconnects

2 x Cooling Units



z196 Water cooled - Under the covers (Model M66 or M80) front

view

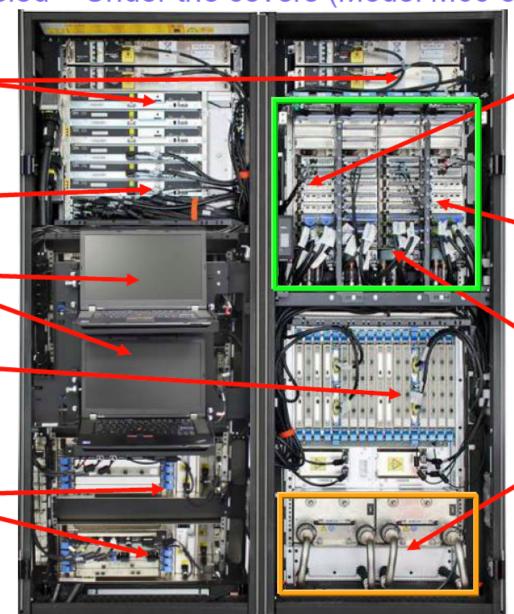
Internal Batteries (optional)

Power Supplies

Support* Elements

I/O cage

I/O drawers



Ethernet cables for internal System LAN connecting Flexible Service Processor (FSP) cage controller cards

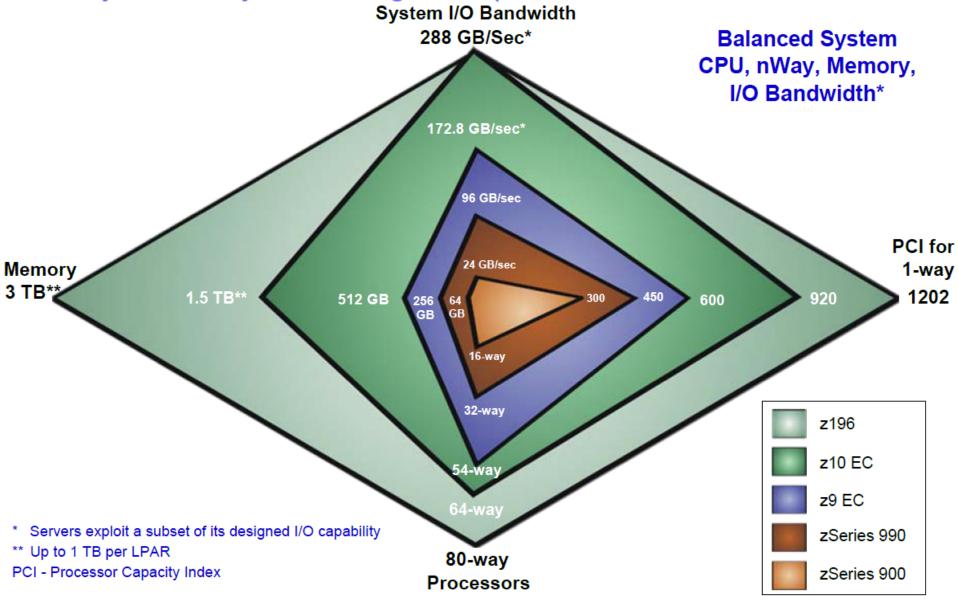
Processor Books, Memory, MBA and HCA cards

> InfiniBand I/O Interconnects

> > 2 x Water Cooling Units



IBM System z: System Design Comparison



Information Management Lotus

IBM WebSphere Data Interchange for z/OS

Rational

Tivoli WebSphere

Information Management Application Provisioning Manager Family Data Governance Messaging Applications Software Delivery Asset Management IBM Rational Software Architect IBM WebSphere Transformation Extender Family IBM WebSphere IBM ILOG Views Data Application Advanced Messaging Enterprise Asset IBM InfoSphere Global Name Recognition Family Extension for Deployment Planning IBM Tivoli Release Process Manager **Functional Testing** General/Jazz IBM Lotus Domini Enterprise Client IBM ILOG Views IBM Security Network Intrusion IBM CICS Connectors Alloy by IBM and SAR IBM Maximo Asset Management IBM Rational Functional Tester IBM Rational Software Arch Extension for IBM Tivoli Remote Access License IBM Rational Insight 18M InfeSobare Prevention System Transformation Extender Options Family Data Managem IBM Lotus Domino Express Family BM Rational Functional Tester IBM Tivoli Service Automation Manage IBM Rational Lifecycle Package **IBM Lotus Enterprise** Manageme Essentials Distributed IBM Lotus Domino IBM InfoSphere QualityStage Family Integrator for Domino Extension for Oracle Applications Business Process Management and Industry Solution IBM Rational Publishing Engine IBM Rational SoDA IBM Security SiteProtector System Event Manage IBM DB2 Advanced Enterprise Server Edition for Linux, UNIX, and Windows IBM Maximo Asset IBM CICS Tools IBM WebSphere ILOG Decision Validation Services **IBM Rational** BM Rational Functional Tester IBM InfoSphere QualityStage Module Software Architect Extension for SOA and WebSphere IBM Lotus Domin Messaging Client Management Scheduler Design & Construction IBM Security Virtual Server Protection for IBM Operations IBM CICS Transaction Gateway Deaktop Edition **Business Process IBM Rational Team** IBM Lotus Domino Designer Manager for z/VM IBM Tivoli IBM WebSphere Access License IBM Maximo Change and Corrective Action for DPID IBM Rational Robo IBM DB2 Data Server Family ILOG Decision Validation Services for Linux on System IBM Rational Software Architect AF/OPERATOR on IBM Security zSecure Master Data IBM Lotus Expedito IBM CICS Transaction Server IBM Rational Service IBM Blueworks Live **IBM Lotus Notes** IBM DB2 Everyplace Management IBM Lotus Workflow Tester for SOA Quality IBM Tivoli Data and Application Security IBM Lotus Notes IBM Tivoli Netcool/OMNIbus IBM InfoSphere Master Content fo **IBM Ratio** IBM WebSohere IBM Rational Method IBM DB2 Express-C IBM CICS Transaction Server for z/OS Performance Teating IBM Tivoli Identity and Access IBM WebSphere Business Compass Advanced Edition ILOG Decision Validation Services for z/OS IBM Twoli InfoSphere Maste Data Managemen Netcod/OMNIbus Gateways 18M DB2 Express-C IBM Rational Portfolio Manager IBM Maximo Asset IBM Rational Performance Fixed Term Ucense IBM Dational IBM Tivoli OMNIbus and Network Manager IBM WebSphere IBM Express Runtime IBM WebSphere Business Modeler Family IBM Express Runtime IBM Rational Suite IBM InfoSphere Master Information Hub LOG JRules IBM Informix Choice Edition IBM Lotus EasySync IBM Hourglass Applications IBM Rational Statemate IBM Rational IBM Tivoli Key Lifecycle Manager for z/OS Software Delivery IBM Open Source ILOG JRules for Linux on System z Enterprise Asset Management Opti Job Schaduling IBM Informix Family IBM InfoSphere Streams Organizational Productivity, Portals and Collaboration IBM Rational Suite for Technical Developers IBM Informix Growth IBM Tivoli Worklo Scheduler Family **IBM Rational** IBM Twoli Security IBM WebSohere Automation Framework for WebSphere IBM Maximo Enterprise Asset Management Options Family IBM InfoSphere Traceability Server Security Business Services Fabric Family Server Advanced Edition with Informix Database Network Manage & Performance IBM Rational Tax Portals IBM Rational AppScan Family IBM Tivoli Security Information and Event Manager LOG Rule Solutions for Office IBM Initiate Master IBM Custome IBM Rational Build Forge Family IBM Informix Ultimate Edition Data Service IBM Rational Policy IBM Throll NetView for z/OS Experience Suite IBM Maximo Soatial IBM TXSeries for IBM Rational Systems Tester IBM WebSphere ILOG Rule Team IBM Multiform Maste IBM Letus Multiplatforms Tester Family IBM Tivoli Security Management for IBM Tivoli Network Manager IP Edition IBM Tivoli OMNIbus IBM Red Brick IBM Rational Software Analyzer Family Data Management Family IBM WebSphere IBM Rational TTCN Suite Test and Change IT Asset Managemen z/05 IBM Lotus ActiveInsight for IBM solidDB IBM License Metric ILOG Rule Team Server for Linux or System z Compilers and Modernization IBM WebSphere Remote Server IBM Rational Quality Manager Family IBM WebSphere Lombardi Edition Database Extensi IBM InfoSphere Warehouse Family IBM Security zSecure IBM Lotus Workforce IBM Maximo Asset Management for Energy Optimization IBM Tivoli Performance Modeler for z/OS IBM DB2 pureScale IBM WebSphere ILOG Rule Team Server for z/OS IBM Rational Test Lab Manager Compilers Feature IBM Rational DOORS IBM COBOL for AIX IBM WebSphere IBM Homogeneou Replication Featur for DB2 Enterpris Server Edition IBM Rational Lifecycle Package IBM Tivoli Asset Architecture, Design and Construction IBM WebSphere ILOG Rule Team Server for .NET IBM WebSphere Systems, Application, and Transaction **IBM Tivali Directory** IBM WebSphere Sensor Events Discovery for IBM InfoSphere Warehouse Pack for Market and Dashboard Framework IBM Rational Requirements Processing IBM WebSphere Enterprise Architects IBM Tivoli Federated IBM WebSphere ILOG Rules for COBOL IBM Tivoli Asset Discovery for z/05 **Business Event** IBM WebSphere Dashboard IBM Rational Asset Manager IBM PL/I for AIX Campaign Insight IBM Rational RegulatePro IBM Tivoli Composite Application Manager Family IBM InfoSphere Warehouse Pack for Supply Chain Insid IBM Tivoli Federated Identity Manager Family IBM Tivoli Asset Management for IT Extended Deployment IBM Rational Ada IBM Rational System IBM WebSphere IBM WebSphere ILOG Rules for .NET Business Events IBM WebSphere Project and Por IBM WebSphere Extended Deployment **Database Tools** IBM Tivoli Composite IBM WebSphere Portal Accelerato IT Asset Management IBM Tivoli Federated Identity Manager for Commerce, Mobile Portal and Speech Application Application Manager for Application Development Studio for IBM i Business Events eXtreme Scale IBM Informix Tools Family IBM Maximo Asset Management for IT Options Family Compute Grid #JOS IBM Rational Focal IBM WebSphere IBM Throil Monitoring IBM XL C and C++ Compiler Family IBM WebSphere Extended Deployment for z/OS IBM Rational Portal Family IBM WebSphere Portlet Factory Industry Solutions IBM Rational Method IBM WebSphere Commerce Family IBM Chemical and Petroleum Integrated Information Framework and Provisioning IBM Retail Store Server IBM XI, Fortran Developer for WebSphere Software Database Tools - Other IT Financial Portal Compiler Family IBM Tivoli Identity Manager IBM DB2 Tools for z/OS Family IBM Rational Application Forms Manage IBM Tivoli OMEGAMON XE IBM Mobile Portal Accelerator eXtreme Scale IBM WebSphere Real Enterprise IBM Tivoli Decision Support for z/OS Change and Configuration Management IBM IMS Tools Family Threat Mitigation IBM Retail Store Family IBM Thyoli System Desktop Productivity IBM Host Access Client Package Family IBM Tivoli Usage and Accounting Manager Database Connect IBM Proventia Intelligent IBM Embedded ViaVoice Family Network Multi-Function Security IBM Lotus Symphony Applications Database Change Manag Integrated Operations Manager IBM WebSphere Banking Content Pack IBM WebSphere Translation Server for Multiplatforms IBM DB2 Connect Family Network and Service IBM Rational Change Social Software **IBM Personal** IBM Security Network Intrusion Systems Performance IBM Customer Prevention System IBM Security Serve Communications IBM ISPE Integrated Data Management Experience Suite **IBM Rational Asset** IBM WebSphere IBM WebSphere Unified Messaging for WebSphere Voice IBM Rational Software Architect Service Provider Productivity Tool Front Office for Financial Markets Ufecycle Package IBM Migration Utility for z/OS IBM Rational Business Developer IBM Data Studio Extension for IBM Security SiteProtector System IBM Tivoli Netcool IBM WebSphere Healthcare Content Pack Learning Software IBM Rational Developer for Powe Systems Software Application Lifecycle Management IBM WebSphere Voice Response for AIX IBM Problem IBM Tivoli Decision IBM InfoSphere Model-driven IBM WebSphere IBM Rational Team Concert Family Network Performa Optim Query Tuner for DB2 for Linux, IBM Workplace **IBM Rational** 1BM WebSohere Industry Content Pack Family IBM Tivoli OMEGAMON XE CloudBurst Appliance IBM WebSphere Virtual Enterprise IBM Rational Data and Application Modeling Bundle Service Manag Configuration Networking UNIX and Windows IBM Tivoli Netcool Performance Manager Learning Application Mobile and Enterprise IBM Rational Developer for System IBM Tivoli Output Manager for z/OS Optim Query Tuner for DB2 for z/OS IBM Tivoli Netcool Performance Manag for Wireless IBM Tivoli Network IBM Rational Professional Bundle z with EGL IBM WebSphere IBM Tivoli Performance Modele for z/OS IBM Commun Server Family 18M InfoSobere IBM Enhanced IBM Lotus EasySync and Connectivity BM Rational IBM Ration Presence Server Access Control for SCLM for z/OS Optim Query Workload Tuner for DB2 for z/OS IBM X.25 Over TCP/IP for Communication Controller for Linux Enterprise Service Bus Rhapsody Architect for Software IBM WebSphere Product Lifecycle Management Cont IBM Lotus Expeditor Performance Flow Analyzer IBM WebSohere IBM Merge Tool for z/OS and OS/390 IBM Lotus Mobile Connect **IBM Rational** IBM Rational Rhapsody Architect for Systems IBM Optim Data Growth Solution IBM Rational GearCase Family Service Quality IBM Twoli System IBM Mobile Portal IBM WebSphere Enterprise Service Bus for z/OS for Application IBM WebSohen Management IBM Tivoli Netcool IBM Rational Host Engineers Remote Server IBM Rational Synergy IBM Rational Rhapsody Automatic Test Generation Add IBM Tivoli IntelliWatch Pinnacle IBM SCLM Web Content Service Quality Management Center IBM WebSphere Telecom Content IBM WebSphere Message Broker Family Service for 5250 Applications IBM Optim Data Management IBM SCLM Advanced Edition for z/OS Security Managemen Pack BM Dations Transaction **IBM Rational Host** IBM WebSphere Telecom Web Services Server IBM Optim Database **Business Service** IBM SCLM Developer Toolkit Access Hanagement IBM Lotus Web Rhapsody Designe for Systems Incineers Relationship Analyze IBM Tivoli Access Content Management IBM Lotus Web IBM Tivali OMEGAMON DE on IBM Tivoli Business IBM WebSphere MQ IBM WebSphere XM Document Management Server Service Manager IBM Rational IBM Rational Host Integration Solution Family IBM Tivoli Data and Application Security Rhapsody Developer Other Service Management, Standard Edition IBM WebSphere MQ Family IBM Rational
Rhapsody Developer
Rules Composer and
Rules Player Add On
IBM Rational IBM Tivoli Federated Identity Manager Business Gateway IBM Deploym Planning and Automation Warehousing ILOG Products TRM Dational IBM Tivoli Netcool/Impact IBM Tivoli Advanced Allocation Management for IBM Smart Analytics Optimizer Team Collaboration Partner Gateway IBM Tivoli Federates IBM Lotus Foundations Start IBM Rational IBM WebSphere Partner Gateway Change & IBM ILOG Diagram Identity Manager Business Gateway Single Business Partner IBM Tivoli Federated Configuration System 9600 IBM Tivoli Automated Tape Allocation Manager for z/OS IBM Rational Accelerator for Systems and Software Engineering IBM Letus Quick Family IBM CloudBurn InfoSphere IBM Rational Suite DevelopmentStudio Covernance IBM ILOG Elixir Enterprise IBM Deployment IBM WebSphere BM Rational for UNDO Service Reques IBM ILOG Gantt for Accelerators Software as a Service Identity Manager Family Service Registry and Repository Rhapsody Family Management Service Deak Cloud Computing IBM Rationa IBM ILOG JViews Charts IBM Tivoli Identity and Access Rhapsody Test Conductor Add On IBM Service Delivery Manager IBM LotusLive Family IBM SCLM Advanced Edition for z/OS Adapters IBM Enterprise Modernization Accelerator for IBM InfoSphere Entity Analytic Solutions Family Unified IBM WebSphere Adapter Family IBM Tivoli Application IBM ILOG T/Jews IBM WebSphere Host On-Demand Service Request Management Options IBM InfoSphere Warehouse Packs IBM ILOG JViews Enterprise Quality and Security IBM Tivoli Key Lifecycle Manager for z/05 IBM Rational Rose Data Modeler Instant Messaging and Family IBM WebSphere DataPower SQA IBM ILOG JViews IBM Rational Rose Information IBM Lotus Sametime Appliances Family IBM Tivoli Security Database IBM ILOG JViews Integration IBM Rational Purify Family olicy Manager Data Transformation IBM Rational Rose Technical Develop **Data Protection** Telephony Configuration
Manager for IBM ILOG JViews Graph Layout for IBM Rational PurifyPlus Family IBM Rational IBM Tivoli Unified Single Sign-On IBM WebSphere Data Interchange for MultiPlatforms IBM Rational SDL IBM Lotus Sametime Unified Telephony IBM InfoSphere DataStage Family Compliance Management IBM ILOG JViews IBM Backup and Restore Manager

IBM Rationa

ftware Architec IBM Rational Software Architect Extension for

IBM Rational Software Architec Extension for C4-

Management for z/05 IBM Tivoli Monito

and Provisioning for IBM Retail Store

IBM ILOG JViews Telecom Graphic

IBM ILOG Views IBM ILOG Views

PurifyPlus for AIX

Software Develops



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

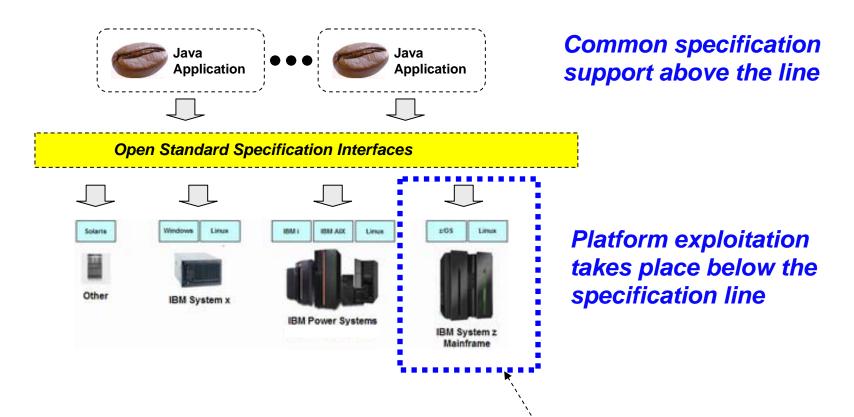
Enhance Agility

- Rapid development and deployment model
- Many dynamic runtime elements

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



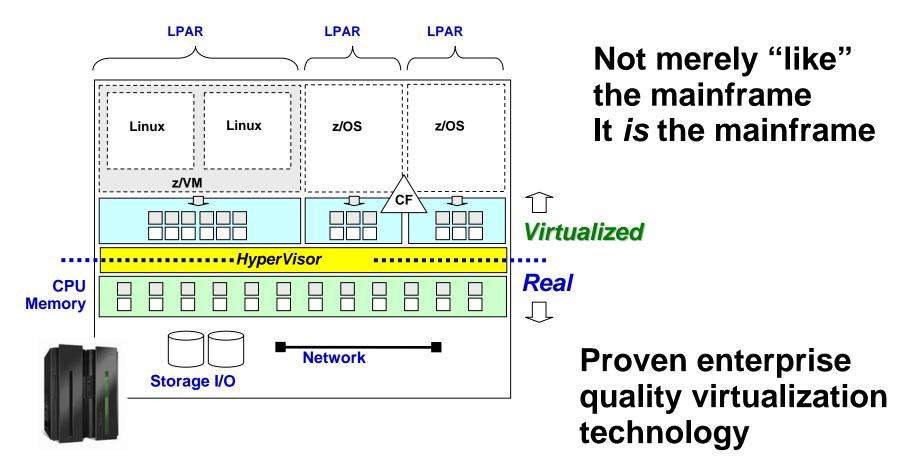
Common Standards Across Family of Platforms



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



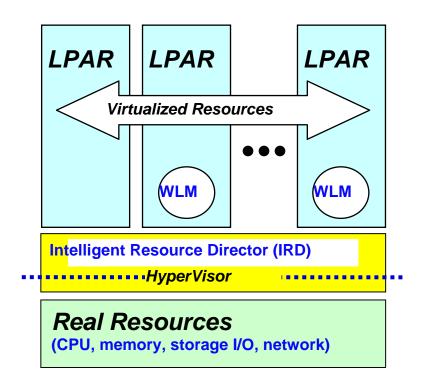
Industry-Leading Virtualization Technology



Not all virtualization technologies are the same



Dynamic Resource Re-Allocation Between LPARs



Add CPU non-disruptively

Re-allocate CPU non-disruptively

IRD intelligently balances

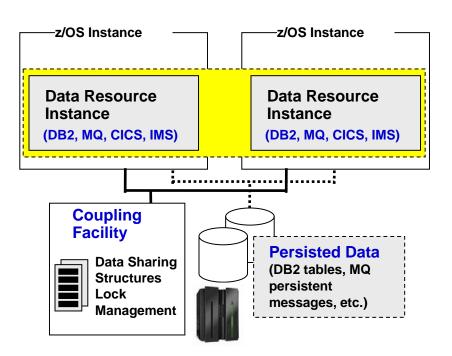
Vary I/O capacity dynamically

WLM advise IRD

Virtualization technology that evolved in the enterprise Solid, stable and proven



True Data Sharing From Multiple Resource Instances

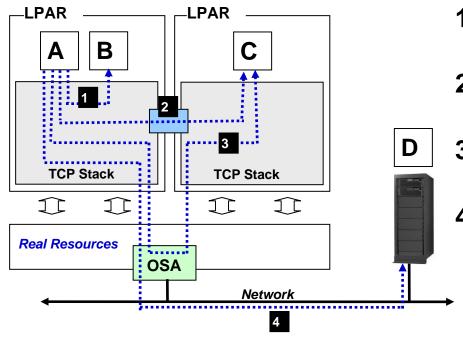


- Parallel Sysplex provides clustered z/OS instances
- Shared data, lock management, coordinated time management, high-speed data transfer
- Mature, stable, reliable
- Unbeatable availability

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



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

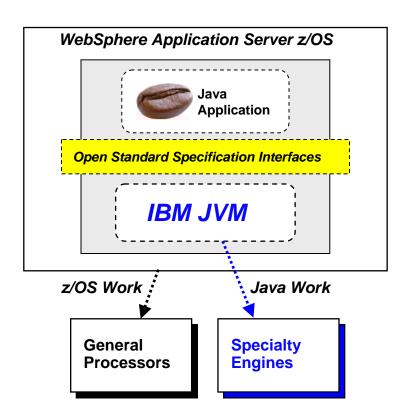
 Traditional networking here

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



Specialty Engine Exploitation



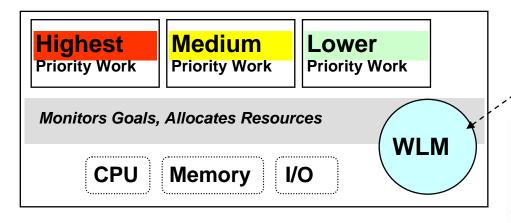
- Offload Java work to financially attractive specialty engines
- Completely transparent process to applications
- Greater general processor capacity for non-Java work
- Lower software licensing costs, and/or the avoidance of additional costs

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



Business objectives expressed as "WLM Goals"

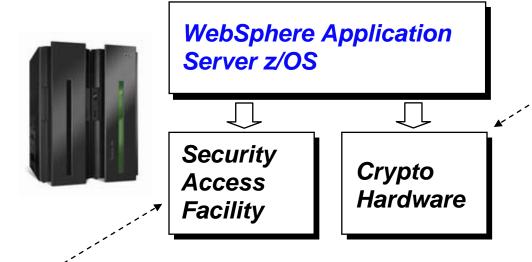


Benefits to you and your business:

- 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



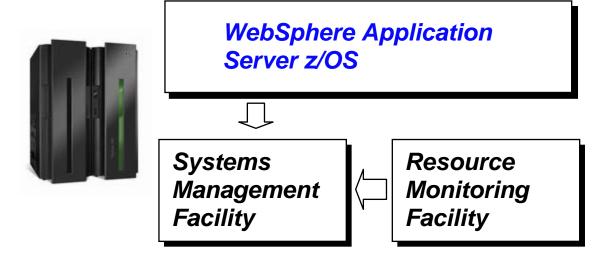
- Highest level of security for storage of private keys
- Very fast encryption and decryption
- Enhances security

- 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



SMF and RMF -- Measuring and Reporting on Activity

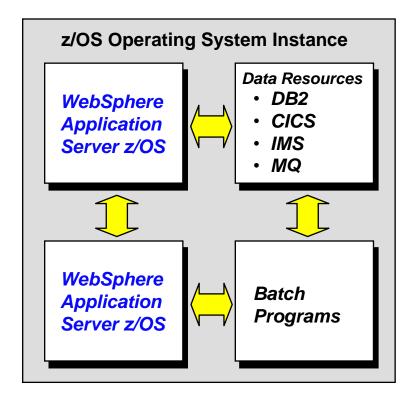


- Achieve very accurate and customized reporting of system activity
- Perform very precise capacity measurement and planning
- Capture who is using what resources and when
- Allows finer-grained accounting and chargeback
- Many tools on the shelf to do analysis and reporting

Have a clear view of your resource investment.



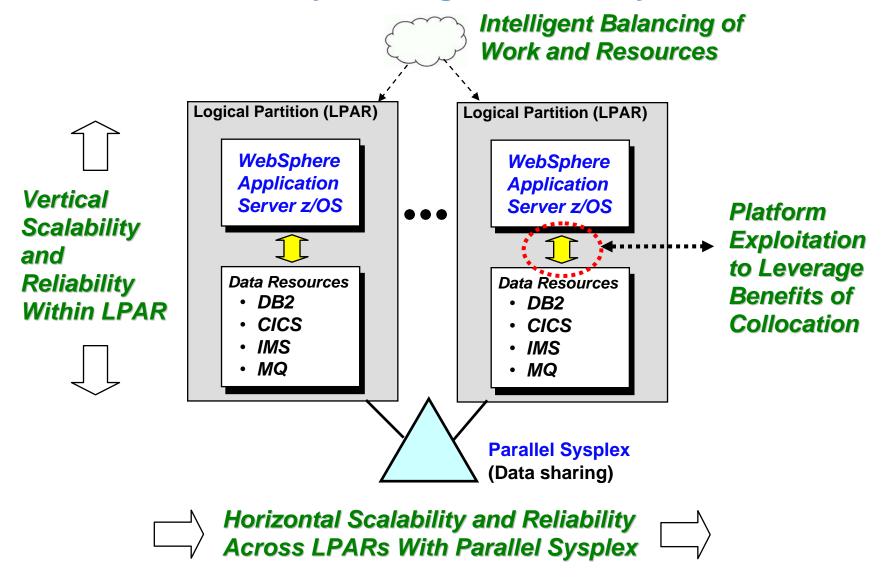
Collocation Benefits



- 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

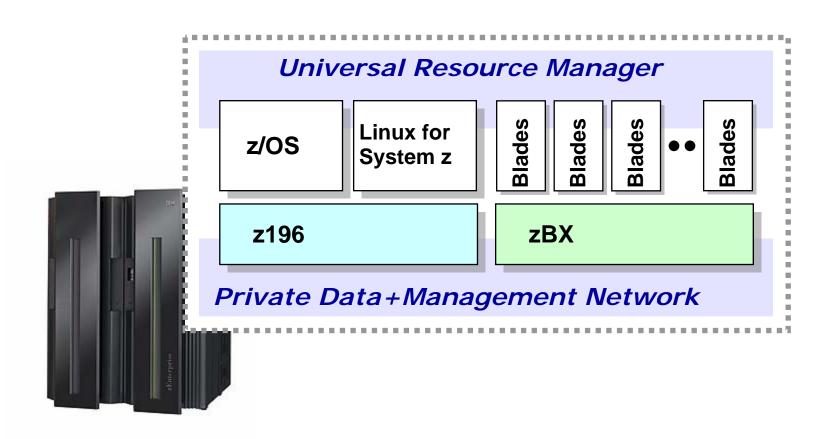
Collocation, Scalability and High Availability





zEnterprise – Best of All Worlds

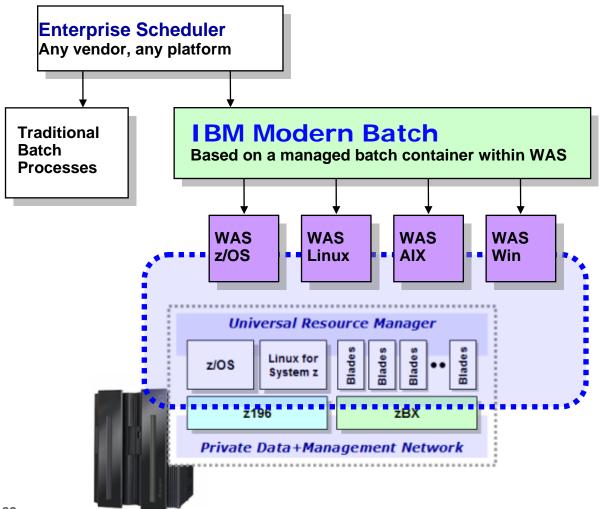
The z/OS benefits we've discussed also work for a coordinated and integrated multi-system machine.





Modern Batch ... Coupled with zEnterprise

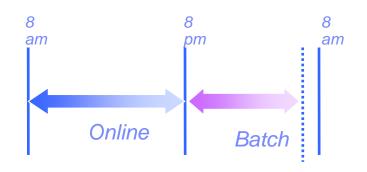
IBM's Modern Batch provides flexible Java batch processing across multiple environments. Put the zEnterprise underneathe and ...



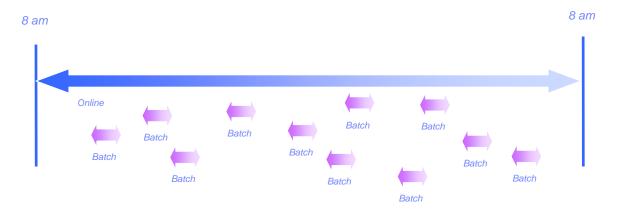
IBM's Modern Batch provides the managed container environment for Java batch WAS provides the runtime for combined OLTP and Batch zEnteprise provides the execution environments that allow the best "fit for purpose" for your needs



Defining the Issues of Traditional Batch on a Mainframe



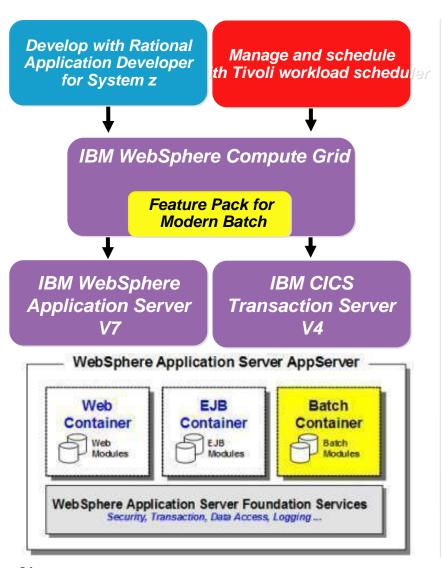
Globalization is putting pressure on traditional "batch windows". There's more data but shrinking batch time.



Is there a way to run batch concurrent with OLTP without affecting SLA for on-line applications?



Improved Utilization using Modern Batch on the zEnterprise



What it is

-- Architectural framework for meaningful integration between OLTP and batch applications. Reincorporates savings of batch processing into today's OLTP environment

What it offers

- -- Continuous interweaving of batch and OLTP processes **aka** 24 x 7 batch and OLTP
- -- Reduced cost through business logic sharing on a **shared** infrastructure
- -- Reduced operational cost from OLTP application and batch job **integration**
- -- High throughput and low resource consumption on z/OS for Java Batch when collocated with data subsystems



Already have a z/OS culture

- Already understand it
- Already built processes around it
 - Change management / Problem management
- Already know how to manage, measure, operate with it tooling and experience

Like zSeries Hardware Benefits

- Reliability, availability (5 or 6 nines capable), virtualization
- LPARs and internal network speeds zBX

Like z/OS Capabilities

- WLM for policy based performance management
- Parallel sysplex for multi-system data sharing
- RACF (resource access control facility) for most robust security system available
- RRS (resource recovery service) for transaction management

Want WAS based products close to mainframe apps

- CICS, IMS, DB2; also z/OS optimizations / h/w optimizations
- · Network bandwidth adds up

Possible TCO benefits

· vs. distributed environments

Performance Mgmt and Capacity Planning easier

- Tools and discipline exists for many years
- vs. distributed concept of `buy more/bigger h/w` drives up TCO





Batch features availability and comparison to Spring Batch

Features and QoS Guidance to choose

Features and QoS Guidance to choose optimal deployment option for Batch	VmWare- Spring Batch	WAS Base with FeP for Modern Batch	WAS on z/OS, WAS ND with Fep for Batch	WebSphere Compute Grid
vorkloads	75	7	75	75
Portable batch container, development tools to develop batch applications, Operational commands to manage Batch Job Life Cycle	V	V	V	V
Container managed check point, restart capabilities	V	V	V	V
Job management console	V	V	V	V
Application Execution Platform		√	V	√
Basic Scheduler/Job dispatcher		V	V	√
System managed job logs		V	V	√
High availability and clustering of Batch Job Scheduler/Job Dispatcher			V	√ ·
Multi-site disaster recovery for batch platform			V	V
Non-disruptive batch application update/endpoint quiesce				√
Job usage accounting, including SMF integration on z/OS				√
Job classes and workload classification				√
Parallel Job Manager to reduce Batch window				√
Enterprise Scheduler connectors				√ ·
Enterprise Monitoring capabailities				© 2011 IBM Corpora
Integration with VE to eliminate Batch window				√ ·

WAS Base with