WINTERGREEN RESEARCH

Practical Advice on Application Deployment:
Making the Most of the zEnterprise

IBM zEnterprise 196--zBx Blades:
Hybrid Enterprise and Blade Server Systems Applications

Susan Eustis - Tom Caruso
March, 2011
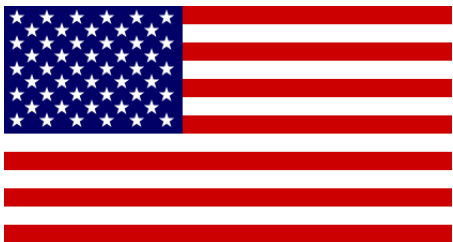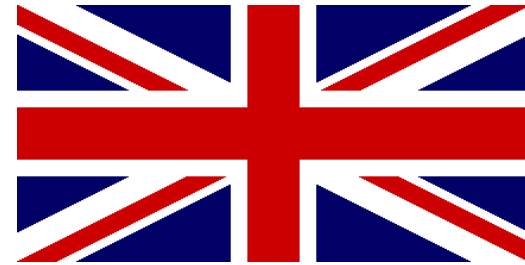Email: susan@wintergreenresearch.com

WGR Worldwide Market Presence

35 Distributors Worldwide

- **Thompson Financial**
- **Dialog**
- **Global Information GII**
- MarketResearch.com
- ResearchandMarkets.com
- Electronics.ca
- **Report Linker**

IBM Brand Transformation: What Does it Do For Applications?

- ## Transform:

- ## Efficient and Innovative IT for Improved Economics

zEnterprise Applications Topics

- **Integration** with WebSphere Application Server – zEnterprise zVM virtual hosting and consolidatiion

- **Automation** of process to reduce overhead and the costs of running the business

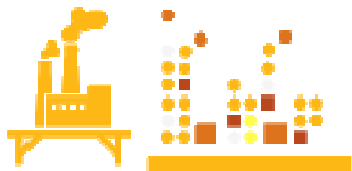- Implement the best available data center **Security** running RACF

Smarter Planet:
The progress is inspiring
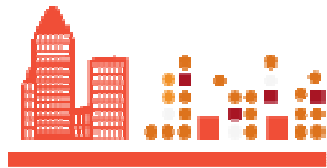
Smarter cities around the world

Smarter medicine

Smarter energy grid

Smarter traffic systems

WINTERGREEN RESEARCH

Practical Advice on Application Deployment:
Making the Most of the zEnterprise Linux

- Virtualization: Launch zVM to consolidate Linux images

- Use open source Linux OS: Red Hat and SUSE

- Linux on Mainframe zEnterprise 196

- 80% energy savings :   87% less floor space

- ……………

- **Transformationnel change comes from a smarter infrastructure**

WINTERGREEN RESEARCH

Practical Advice on Application Deployment:
Making the Most of the zEnterprise Speed
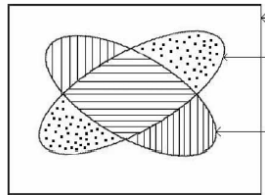
- **44%** lower cost per credit card transaction

- **67%** lower cost per ATM transaction

- **25%** lower cost per mega watt hour produced

Application Deployment Efficiencies:
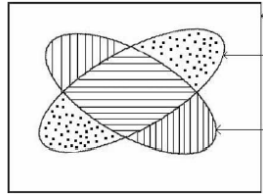
- Lower cost per hospital bed patient treated

•Lower cost per retail store transaction

•Lower cost per barrel of oil produced

•Lower cost per vehicle manufactured and sold

•Lower cost per financial trade

•Lower cost per cell phone call

•Lower number of crimes perpetrated

WINTERGREEN RESEARCH

zEnterprise Processor Improvements
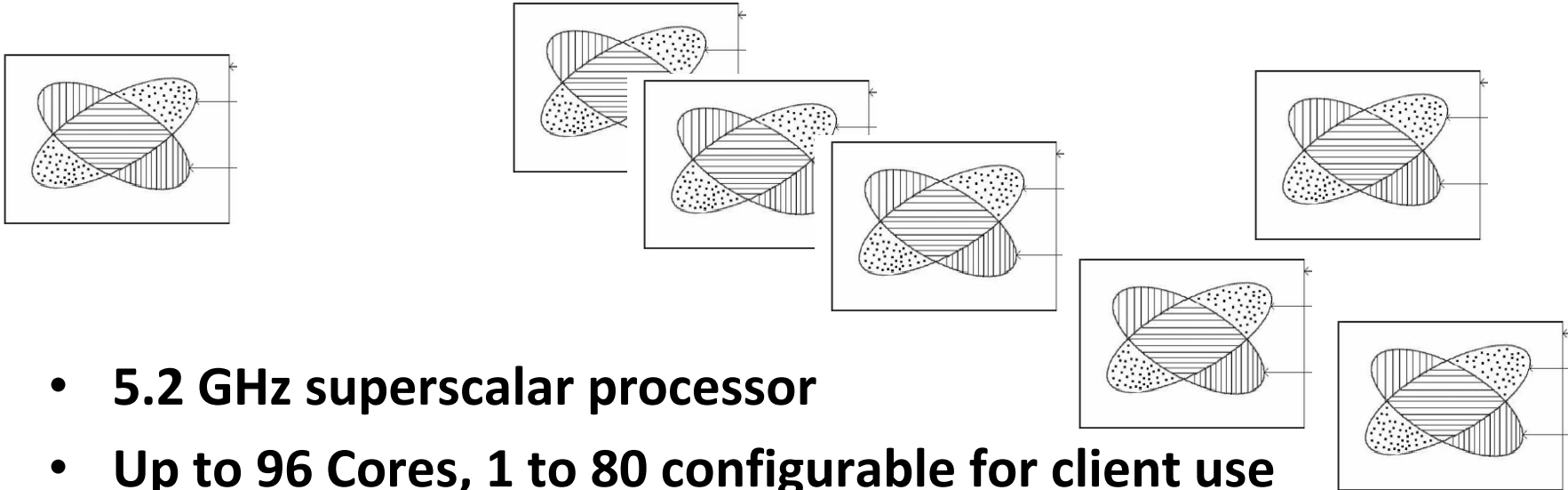
- **5.2 GHz superscalar processor**

- **Up to 96 Cores, 1 to 80 configurable for client use**

- **Up to 3 TB RAIM memory**

- **Over 100 new instructions**

- **1.5MB L2 Cache per core, 24MB L3 Cache per processor chip**

- **Cryptographic enhancements**

- **Optional water cooling**

WINTERGREEN RESEARCH

zEnterprise Speed Improvements
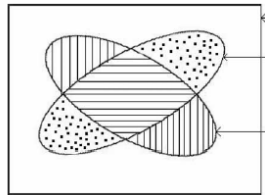
- **Dramatic improvement over IBM System z10™:**

- ## For Linux: 60% Improvement in performance

- **60% Improvement in capacity**

Best Fit Workloads for Linux on zEnterprise 196:

- Business connectors: WebSphere®MQSeries®, DB2®Connect, CICS®Transaction Gateway, IMS™Connect for Java®

- Business critical applications: e.g. SAP

- Development of WebSphere and Java™applications

- WebSphereApplication Server(WAS)

- Email & collaboration: Domino™, Web 2.0

- Network Infrastructure: FTP, NFS, DNS, etc. and CommServer and Communications Controller for Linux, CommuniGatePro (VoIP)

- Data services: Cognos®, Oracle, Informix®, Information Builders WebFOCUS

WINTERGREEN RESEARCH

Best Fit Workloads for zEnterprise 196:

- **Applications requiring** ~~top end disaster recovery model~~

- **Virtualization and Security Services**

- **Web Serving**

- **Systems Management**

- **OLTP**

- **Application Development**

WINTERGREEN RESEARCH

IBM zEnterprise 196 Next Generation System

- Transforms the data center

- Provides the core of enterprise cloud computing

- Runs thousands of WebSphere® Software images on z Linux using zVM - more efficient than VMware by quantuum difference

- WebSphere software for SOA environments

- Enables dynamic, interconnected business processes

- Delivers highly effective application infrastructures

- Works to implement industry specific frameworks, different for different business situations

WINTERGREEN RESEARCH

zEnterprise 196 Adopted at Rapid Pace

- **64 of the top 100 System z clients are running Linux on the mainframe**

- **32% of System z customers have IFLsinstalled**

- **Linux represents 19% of the System z install base capacity (MIPS)**

- **Installed IFL MIPS increased 35% from 4Q09 to 4Q10**

- **> 3,250 applications are available for Linux on System z**

WINTERGREEN RESEARCH

WebSphere Application Server Leverages Linux on zEnterprise 196

WebSphere software

- WebSphere supports agile systems, flexible response to changing market conditions

- IT complexity and costs are managed by application integration.

- Connecting the right information and the right people at the right time, is needed to address opportunities in a timely manner

- WebSphere provides connectivity, application integration

- Middleware to leverage new ways of connecting people, process and information.

WebSphere Application Server on zEnterprise 196

- IBM SMART SOA™ approach integrates applications and services via an enterprise service bus (ESB) solution

- Delivers business agility and cost optimization

- Comprehensive ESB solution has two primary functional areas—messaging and enrichment

- Service-oriented architecture (SOA) leverages existing skills and assets.

- Updating or replacement of a business service, or the development of a new composite solution leveraging existing services. Enable a much greater degree of reuse than otherwise possible

WebSphere® Software Images on z Linux using zVM

- Management a plus: Software costs on distributed usually don't include systems management software

- zEnterprise hardware costs are low: Distributed hardware was 130% of mainframe hardware cost

- Consolidation of images decreases labor costs: Distributed labor was 178% of mainframe labor cost

- Huge energy efficiencies: Distributed power was 891% of mainframe power cost

- Floor space efficiencies: Distributed space was 367% of mainframe space cost

WINTERGREEN RESEARCH

Integration

- integrate applications and services via an enterprise service bus (ESB) solution that ensures business gets the right information to the right place at the right time and ultimately delivers business agility and cost optimization

WINTERGREEN RESEARCH

zEnterprise 196 Supports Appliances

- DataPower a hardened appliance

- Securing and management of SOA Applications

- Enterprise service bus (ESB) integration

- High speed XSL execution

- Robust security features

- Tamper protection of the device

- Web services, security, and integration strategies

WINTERGREEN RESEARCH

Datapower

- IBM® WebSphere® DataPower® SOA Appliances are purpose-built network devices that offer a wide variety of functionality such as the securing and management of SOA Applications, enterprise service bus integration, and high speed XSL execution.

- DataPower provides robust security

- DataPower SOA Appliances are a key element in IBM's holistic approach to Service Oriented Architecture (SOA).

© Copyright Wintergreen Research 2011

WINTERGREEN RESEARCH

Security Appliance

- zEnterprise 196 can be provisioned as an appliance to run security for the entire data center.

Data Center Servers

zEnterprise 196
Security Appliance
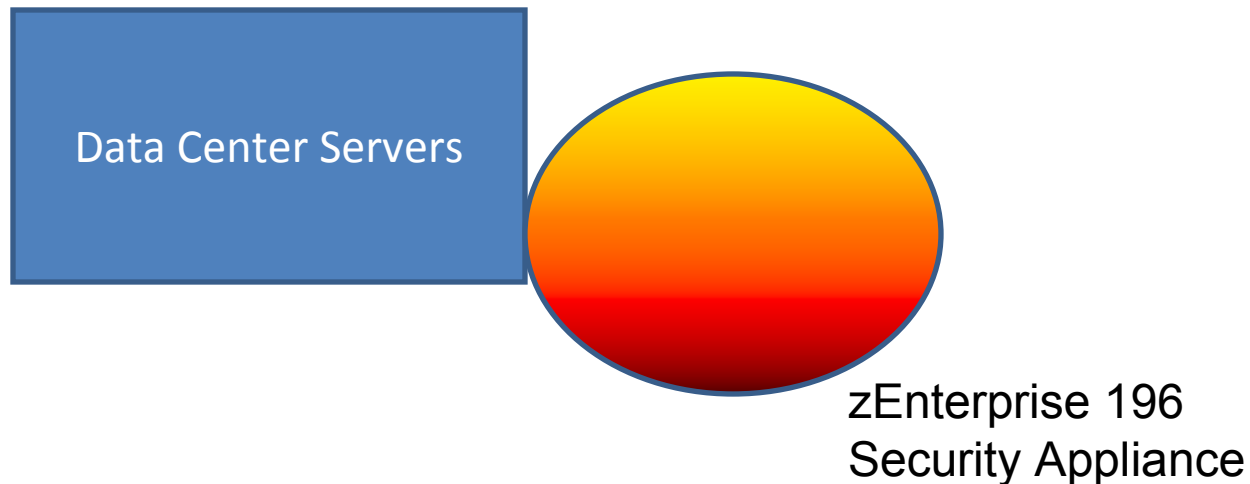
zEnterprise 196 Can Be a Security Appliance

- zEnterprise mainframe sits at edge of network, becomes an edge router

- Provides security filtering for access to applications

- I/O is sufficient to handle even largest networks

- Processor speed sufficient to manage all traffic in data center

- Appliance price under $1 million with solutions editions

- RACF provides unmatched security capability

© Copyright Wintergreen Research 2011

Analytics: The New Path to Value

- **The smartest organizations are embedding analytics.**

- **Analytics are used to transform insights into action**

- **Analytics depend on dashboards and visualization**

Smart Analytics

WINTERGREEN RESEARCH

Data Center Energy Assessment

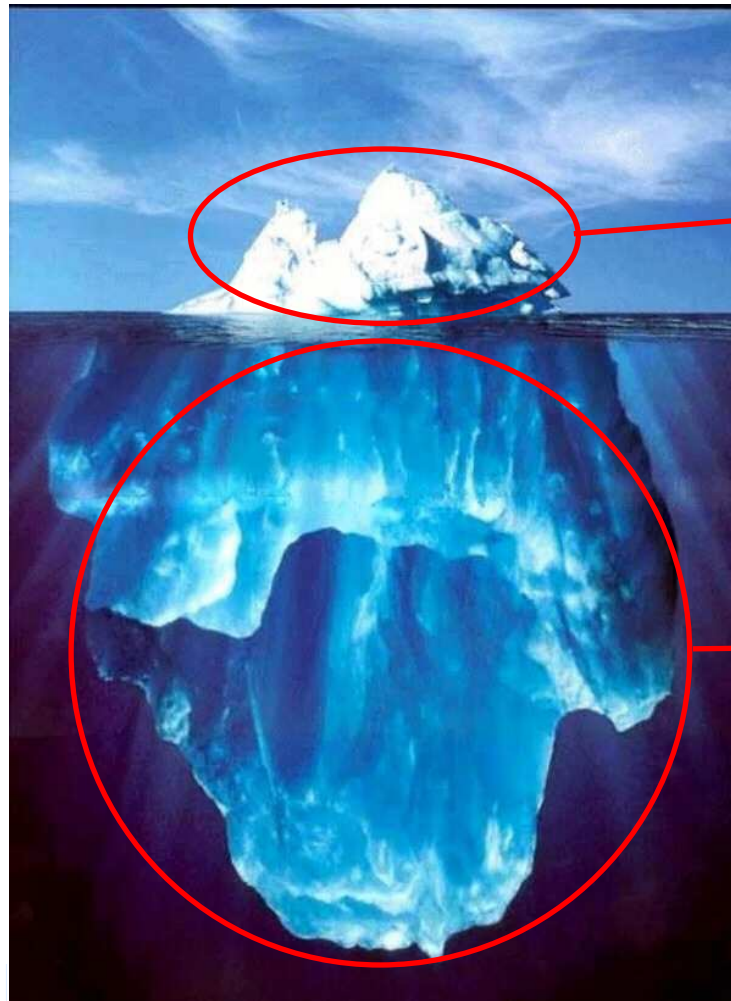**zEnterprise in a private cloud environment can save 47% of data center energy**

GreenWay Collaborative

Sustainability experts concentrating on trends and best practices in IT data center energy consumption. An ongoing, comprehensive study will be used to generate a quarterly Research Report
Susan@wintergreenresearch.com

ENERGY USAGE: Baseline for Modernization

GreenWay
Collaborative

METRICS

Server Transactions Per Watt

Legend:
- x86
- Unix
- System z

(Y-axis: 0, 5000, 10000, 15000, 20000, 25000, 30000, 35000)
(X-axis: 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015)
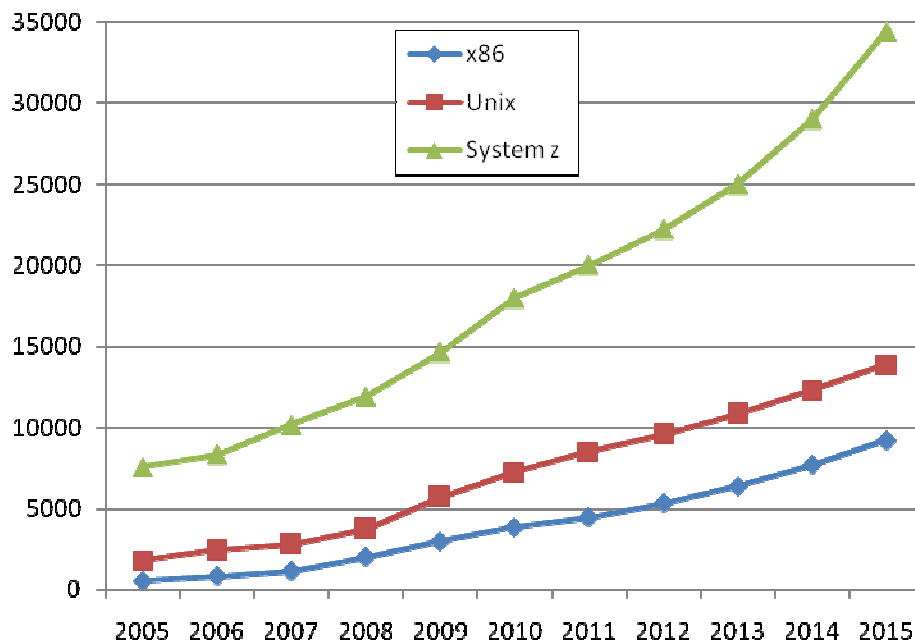
Other Available Metrics

Device Power Efficiency:
- Server
- Storage Systems
- Disks
- Network Equipment
- UPS
- Backup Power Supplies

Energy Consumption
- Per Workload
- Per Time Period

Power Estimator

Software Management of Energy

Renewable Energy Technologies
- Alternatives: Solar, Water, Wind
- Storage: Batteries, Fuel Cell, Resale Opportunities

WINTERGREEN RESEARCH

Actual Performance Per Watt metrics.

GREENWAY COLLABORATIVE

WebSphereMQ providing a Universal Messaging Backbone

Provide zEnterprise access to business data wherever it lives in a common manner

Recently announced WMQ Telemetry Transport Protocol is first step in reaching out to a much wider source of business data

zEnterprise

Regional Office

Branch Outlet

Sensor e.g. RFID

Retail Store

Pervasive Device

Petrol Forecourt

Refinery

WMQ zEnterprise Resilience
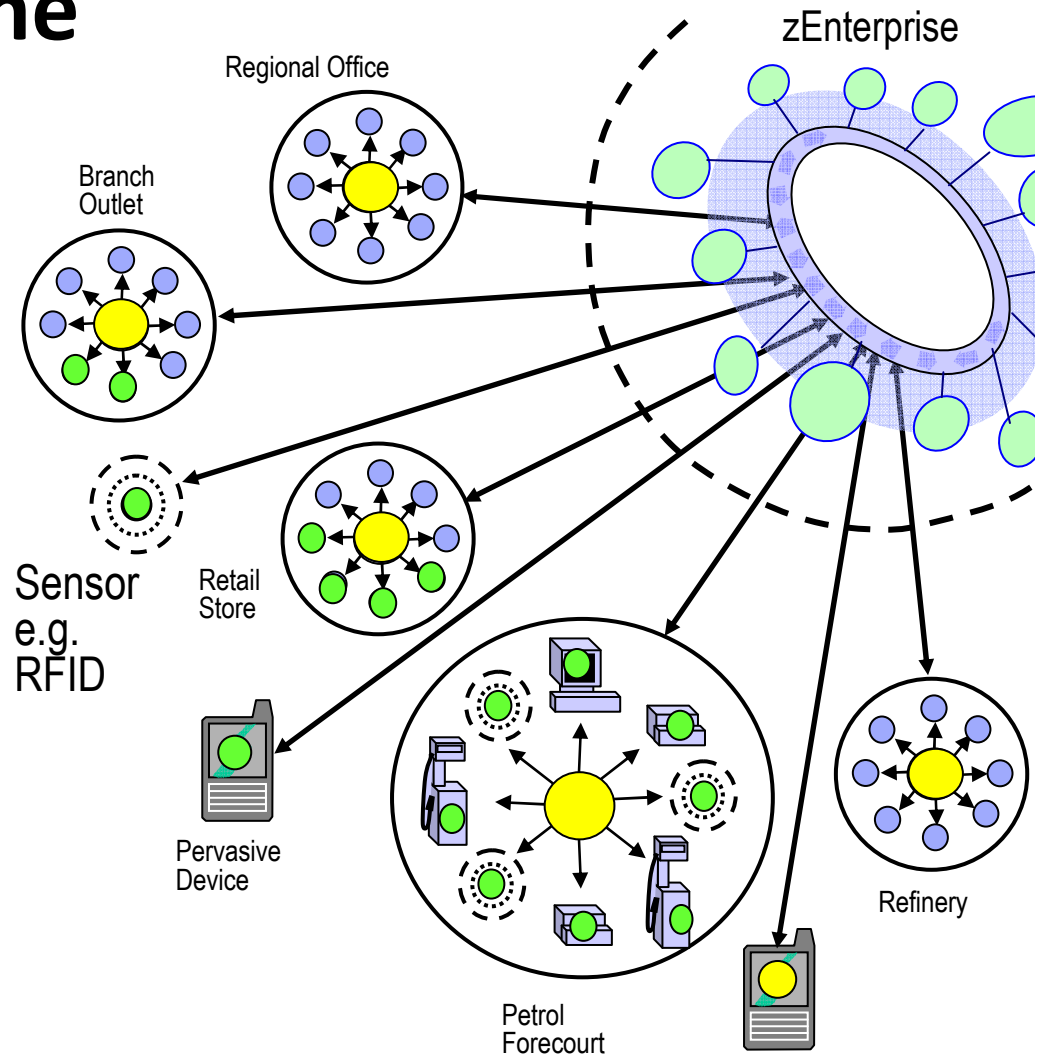
Leverage WebSphere MQ Using the Hybrid zEnterprise

- Run Websphere MQ on-platform
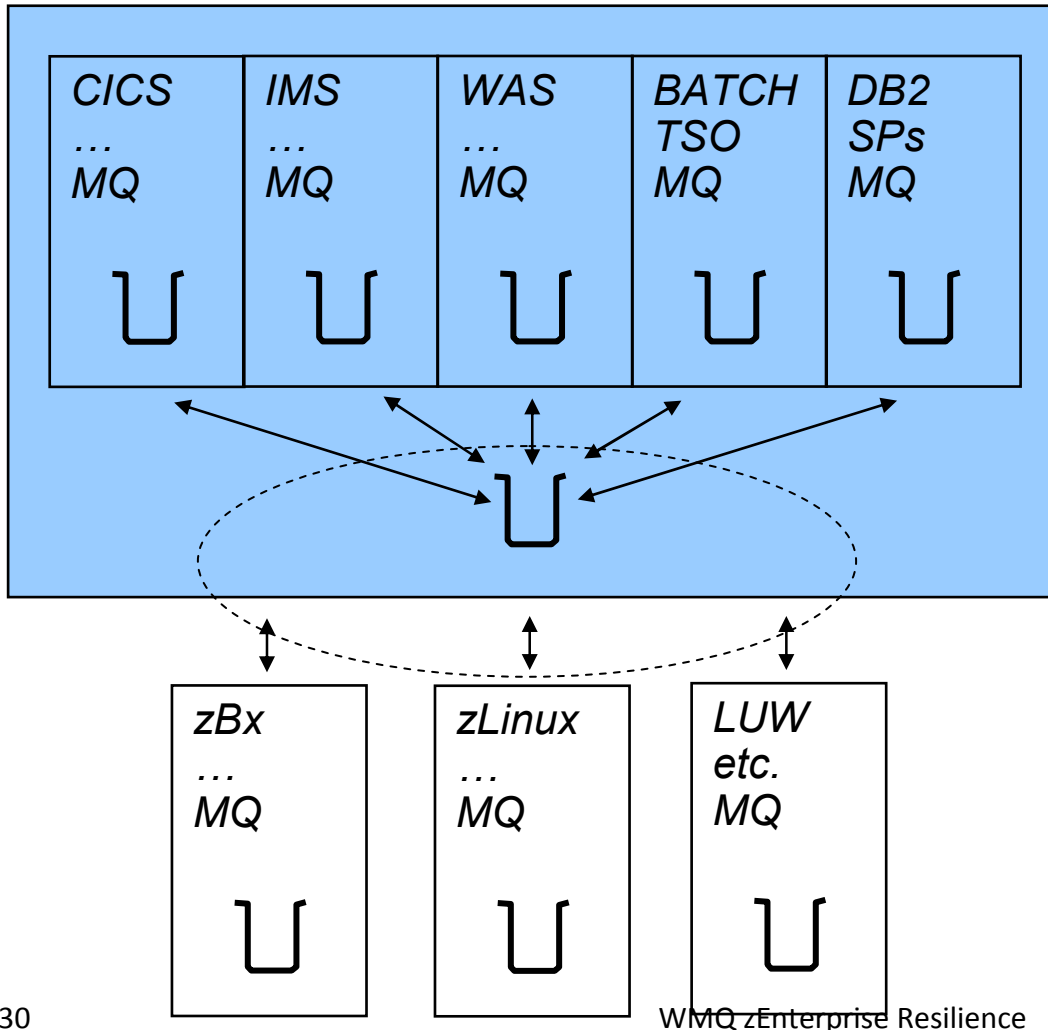
- Increased efficiency provides powerful incentive to modernize WebSphere MQ.

- WebSphere MQ is the Universal Messaging Backbone (UMB) for business data access

- Image / Virtualization & Cloud Management

- End point Management Solutions

- Network Management Solutions

Exploit the zEnterprise IN FULL - z/OS AND the zBx Environments

- Parallel Sysplex availability and scalability supplied by Queue Managers running in a Queue-Sharing Group configuration with access to shared message queues from co-located z/OS application execution environments (such as CICS, IMS, WAS)

- Tightly-coupled zLinux on z/OS native or zBx Blade environments is a huge value proposition

© Copyright Wintergreen Research 201:

WINTERGREEN RESEARCH

WebSphereMQ goals for business resilience in a Sysplex QSG (Queue Sharing Group)

CICS ... MQ	IMS ... MQ	WAS ... MQ	BATCH TSO MQ	DB2 SPs MQ

zBx ... MQ	zLinux ... MQ	LUW etc. MQ

Shared Message Capacity:
Goal is to provide Terabytes of affordable message capacity such that MQ is capable of meeting all business requirements for reliable message storage when processing applications are unable to run for whatever reason

Shared Message Availability:
Goal is to provide as near as possible continuous message data access under ALL failure scenarios (These scenarios include Application/Transaction failures, Application Execution Env. failures, Qmgr failures, CF failures, DASD failures, Network failures, CEC failures)

WINTERGREEN RESEARCH

WMQ zEnterprise Resilience

WebSphere MQ and zEnterprise

- Delivery to both inter and intra enterprise communication is achieved by providing a comprehensive suite of messaging capabilities allied with a range of transport protocols and Quality of Service options.
  For zEnterprise, this means exploitation of current and emerging capabilities to provide a compelling value proposition that delivers cost reductions and high business resilience.

- MQ started out on z/OS, code base is designed from the ground up to exploit the strengths of z/OS

WINTERGREEN RESEARCH

WebSphere MQ API Support

- Application Execution Environments on the z/OS platform are apart from explicit MQ API support (which are on loads of platforms) and are complemented by implicit support from CICS and IMS.

- Seamless MQ bridging to the CICS and IMS transaction processing envs. via the CICS and IMS Bridge technologies

- MQ V7 introduced Publish/Subscribe capabilities "out-of-the-box" on z/OS bringing a new range of capabilities to the z/OS customer

- Uses wrappers to support SOAP and JMS.

Sysplex Support

WINTERGREEN RESEARCH
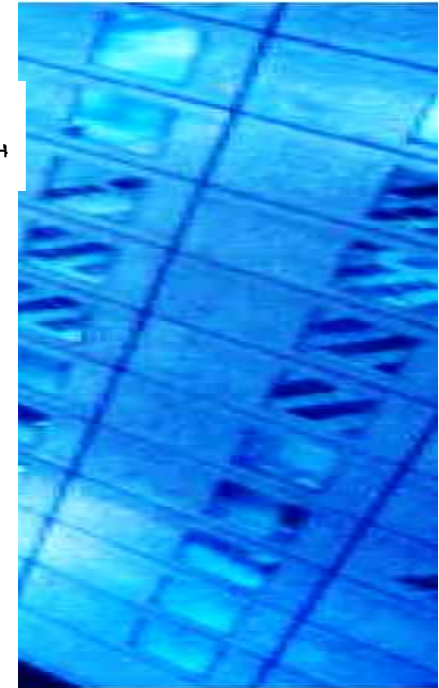
- WMQ V7.0.1 provides –
  - Transaction and Application Execution Env. (AEE) Failure isolation
    - A txn failure is NOT going to affect other running txns (but see Peer Recovery below)
    - A failure of a CICS, IMS, WAS, etc. is NOT going to affect other running txns in the Sysplex

  - QMgr failure isolation
    - A Qmgr failure is NOT going to affect other running txns in the Sysplex (but see Peer Recovery below)

  - Peer Recovery for in-flight transactions
    - If we get a txn, AEE failure or Qmgr failure, the MQ QSG will process to completion all in-flight UOWs (This means that any messages that had been retrieved from or placed in queues as part of running UOWs that had failed, will be rolled back as soon as the failure is detected thus restoring the overall consistency as soon as possible

  - Peer Recovery for in-doubt transactions
    - If we get a txn, AEE, or Qmgr failure using the MQ transactional client (e.g. a 2-pc txn running on zBx updating MQ shared queues on z/OS) leaving UOWS In-Doubt, the application can restart, reconnect to ANY Qmgr within the Sysplex and MQ will correctly resolve the UOW
    - This means that zBx applications can connect to ANY member of the QSG and can reconnect to ANY member under ANY failure circumstance and get correct UOW resolution.
    This means that can use Sysplex Distributor to workload balance MQ connections into the QSG under ALL circumstances !

33 WMQ zEnterprise Resilience

 - Automatic Shared Queue Structure rebuild for CF Structure failures

Industry Frameworks: Analytics

- Telecommunications: zEnterprise systems support base stations and wireless infrastructure systems that aim to support 5.5 billion wireless users

- Optical communications: zEnterprise systems support service provider delivery by implementing billing systems

- Retail: Improve central management of local stores, identifying local marketing opportunities utilizing analytics

- Government: Smart cities manage traffic better, run the police department in a way that reduces crime

- Network Centric Operations

WINTERGREEN RESEARCH

Healthcare Frameworks

- Each Framework Tackles Projects Based on Desired Business Outcome

- Hospitals faced with need to implement electronic patient record

- Need to understand data from monitoring and scanning devices

- Need to automated process to reduce labor component of care delivery

- Need to improve quality of care once electronic patient record is implemented

- Frameworks address all these needs

zEnterprise 196 Supports Healthcare Crisis Management
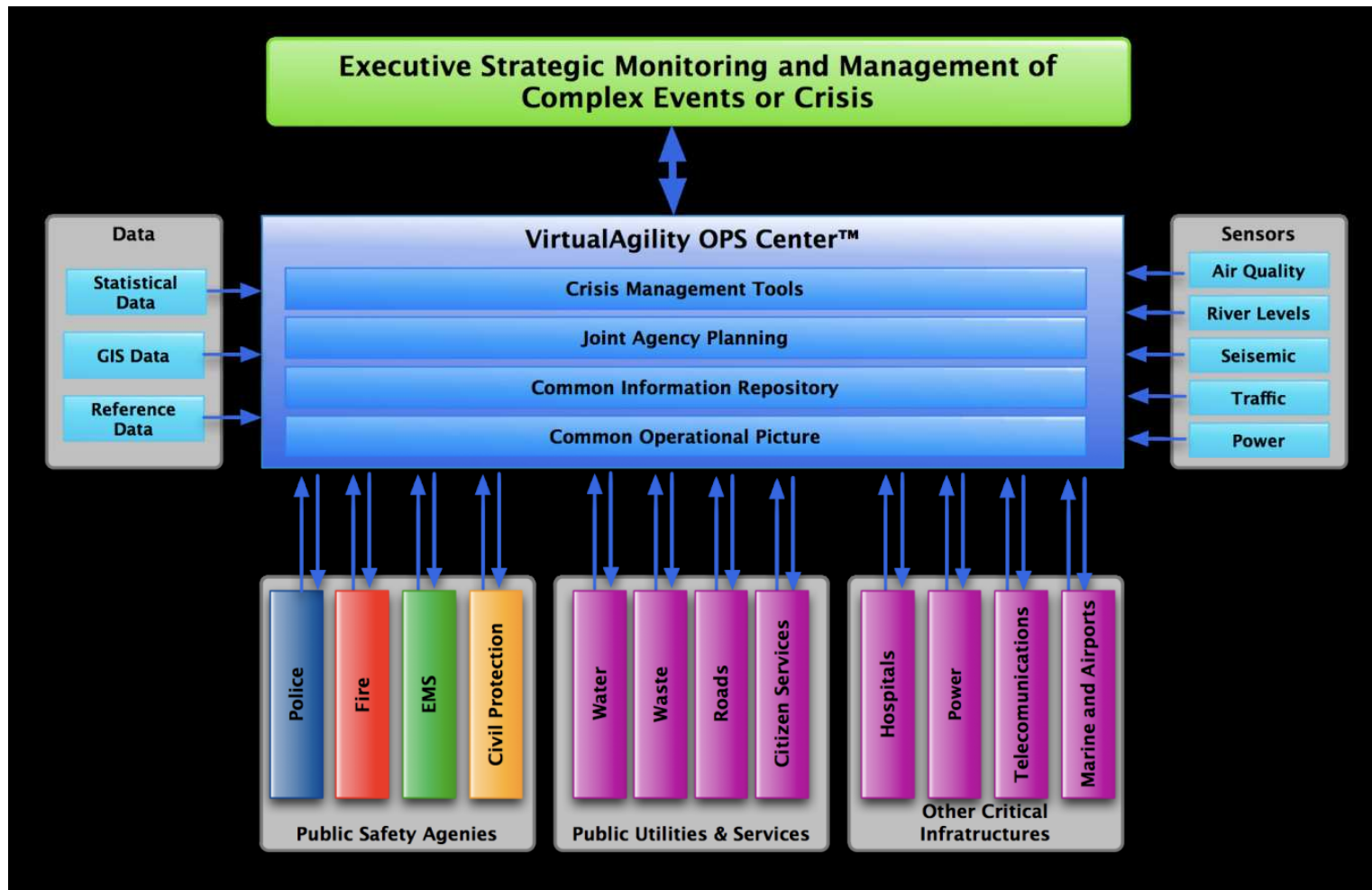
Source: IBM

3/1/2011

36

Industry Frameworks: Integration and SOA

- Banking Industry: Support branch office integration with the back end, sppeding loan approvals

- Financial Markets: Track bond trading on zEnerprise using Linux images that run on zVM in a very efficient manner

- Energy & Utilities: Implement the smart grid, using a combination of blades and zEnterprise 196 to bring digital automation to the substation. Prepare for renewable energy.

WINTERGREEN RESEARCH

Financial Industry Trading Application Frameworks

- *Volume Testing* –

- Large Linux servers can sit on an LPAR to host the 10 Linux Guest Machines

- IT managers can work on the existing LPAR and migrate each new server on to the new LPAR once it is available.

- Load testing scripts can be ported easily to the Linux environment.

- *Server Build*

- *ISV Vendor List*

WebSphere MQ Has A Huge Value Proposition (For Both Scalability And Availability) In Its Parallel Sysplex Support On z/OS.

WINTERGREEN RESEARCH

- Value is in accessing Sysplex Shared MQ queues FROM the zBx blades where with MQ V7.0.1 (the latest release) IBM provides resilient access to sysplex shared queues under ANY failure scenario with complete transactional integrity.
  This is the ONLY product - both IBM and non-IBM - that can make this claim.
  The scenario here would be MQ client (or transactional client) access to z/OS Queue Sharing Groups (MQ on z/OS Queue Managers connected together in the sysplex) from the zBx blades.

WebSphere MQ Transport

- Bridge to next-generation interconnectivity

- Flexibility and cost benefits

- Support for application integration

- Address challenge to emerging technologies and standards

- Support quick access to business information across people and processes

- Adapts a solution for complex and broad connectivity

- Bridge to Web 2.0 technologies—Representational State Transfer (REST), asynchronous, synchronous, HTTP, HTTPS, JMS, SOAP wrappers

WINTERGREEN RESEARCH

Homegrown Messaging Inefficiencies

- Homegrown transport layer requires recoding and re testing for each change, point to point programming
- JMS, HTTP, HTTPS, RPC, and other transport protocols not flexible enough

   Homegrown messaging systems :

   Not adaptable to changes in standards

   Lack flexibility

   Inhibit enterprise growth.

   Lack provision to adapt to changes going forward

Packaged Application Messaging Efficiencies

- Mission critical middleware software

- Cost of upgrades spread across customer base of 10,000

- Guaranteed once and only once message delivery

- Supports secure message transport

- Transactional messaging auto

- It works as advertised

- Ease of use

- Supports change cost effectively

- Changes pretested by vendor

WINTERGREEN RESEARCH

Platform Support From Middleware Software

- IBM WebSphere MQ software has been a leading messaging transport product family for more than 15 years, is used by 10,000 clients worldwide and includes more than 80 platforms.

WebSphere. software

IBM

- Message-level audit function
- Audit records that can be used to demonstrate specific compliance with a defined security policy

WINTERGREEN RESEARCH

WebSphere MQ

IBM Leading Market Share

Worldwide Mission Critical Message Middleware
License , Maintenance, and Services Market Shares, Dollars, 2008

Other 14%
Kabira 1%
Sonic 2%
Tibco 5%
Microsoft 6%
IBM 76%

Total $913 Million 2008
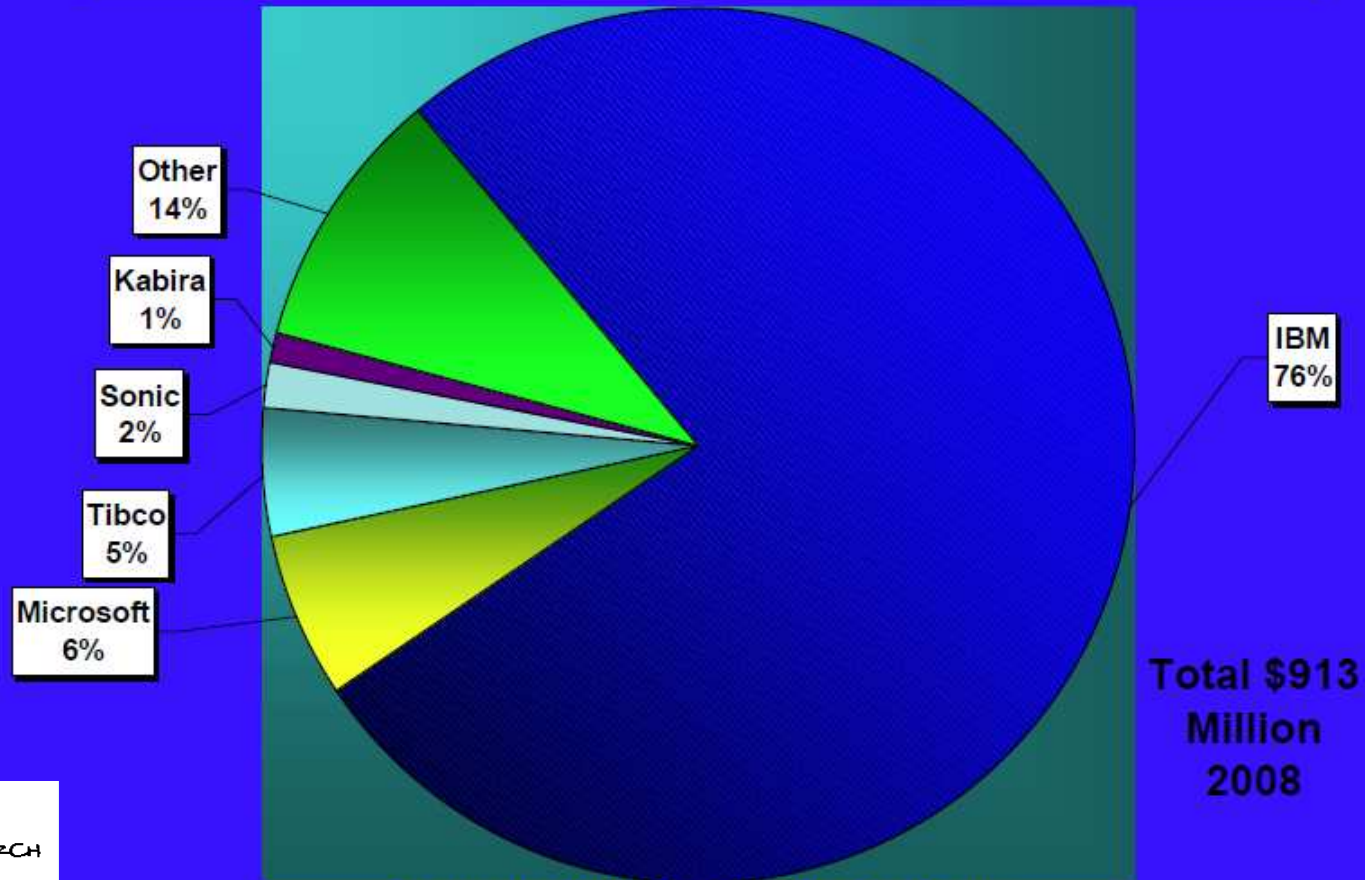
Source: WinterGreen Research, Inc.

WINTERGREEN RESEARCH

Packaged Messaging Software Positive ROI

40% **Lower costs can evolve from the combined WevSphere MQ and SOA benefits**

Reuse

Productivity gains

Interoperability

Faster development times

Support for existing business processes

Ability to develop new business process functionality

Direct bottom line savings

Less time for testing

Websphere MQ Messaging

Sure, your programmer can build connection
code modules inexpensively, But...

Testing is 90% of the cost

Maintenance will be an ongoing expense

Do you really want to be paying for that
maintenance?

Mainframe Security Self Assessment

- Tom we need to describe offering

Q&A

QUESTIONS?