



Websphere - Smarter Software For A Smarter Planet

Build On A Solid Foundation
For Smarter Planet Solutions –
WebSphere Application Server

IBM WebSphere & DB2 Solutions: The Strongest Foundation In The Industry

As a bank, we need to assure we have the strongest foundation in place to run our business.

We can NOT accept 2nd best!



**Service Oriented Finance
CIO**

WebSphere Application Server and DB2 provides the strongest foundation in the industry for your business.

Let's look at WebSphere first



IBM

WebSphere Application Server Is The Undisputed Market Leader For The **Last 12 Years**

■ Largest Customer Base!

- ▶ 90% of the World's largest Fortune Global's 100 corporations run their businesses on WebSphere Application Server
- ▶ Over 18,000 Customers in Production



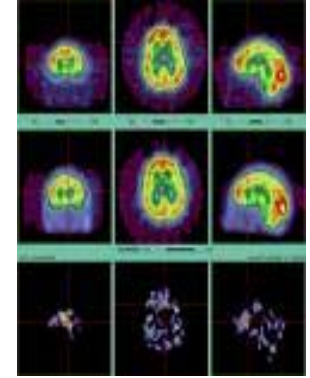
■ Unparalleled expertise, and level of investment

- ▶ Broadest, Deepest portfolio of offerings
- ▶ 13,000+ assets in the SOA business catalog (90% from business partners)
- ▶ IBM investing over \$1B a year in WebSphere
- ▶ More than 700 WebSphere patents and over 6,700 IBM developers
- ▶ Trained IBM SOA community over 100K
- ▶ IBM uses WAS in over 300 IBM Solutions!

■ Strongest Ecosystem

- ▶ 7,420 SOA community business partners

Thousands Of Customers Across All Industries And Applications Choose WAS



Wimbledon had peak 1 million hits/min, 30K simultaneous access to scoreboard

Schwab.com handles 16.5 million transactions per day

eBay.com is running on WebSphere and handles 1+ Billion page views/day

The IBM employee portal handles 30 million requests a day, maintaining sub-second transaction response times for many applications

Because of Scalability, Reliability & Availability

eBay

Schwab

Shell

Deutsche Telekom

Bank of Montreal

Farmers Insurance

Dassault Aviation

Office Depot

Nissan

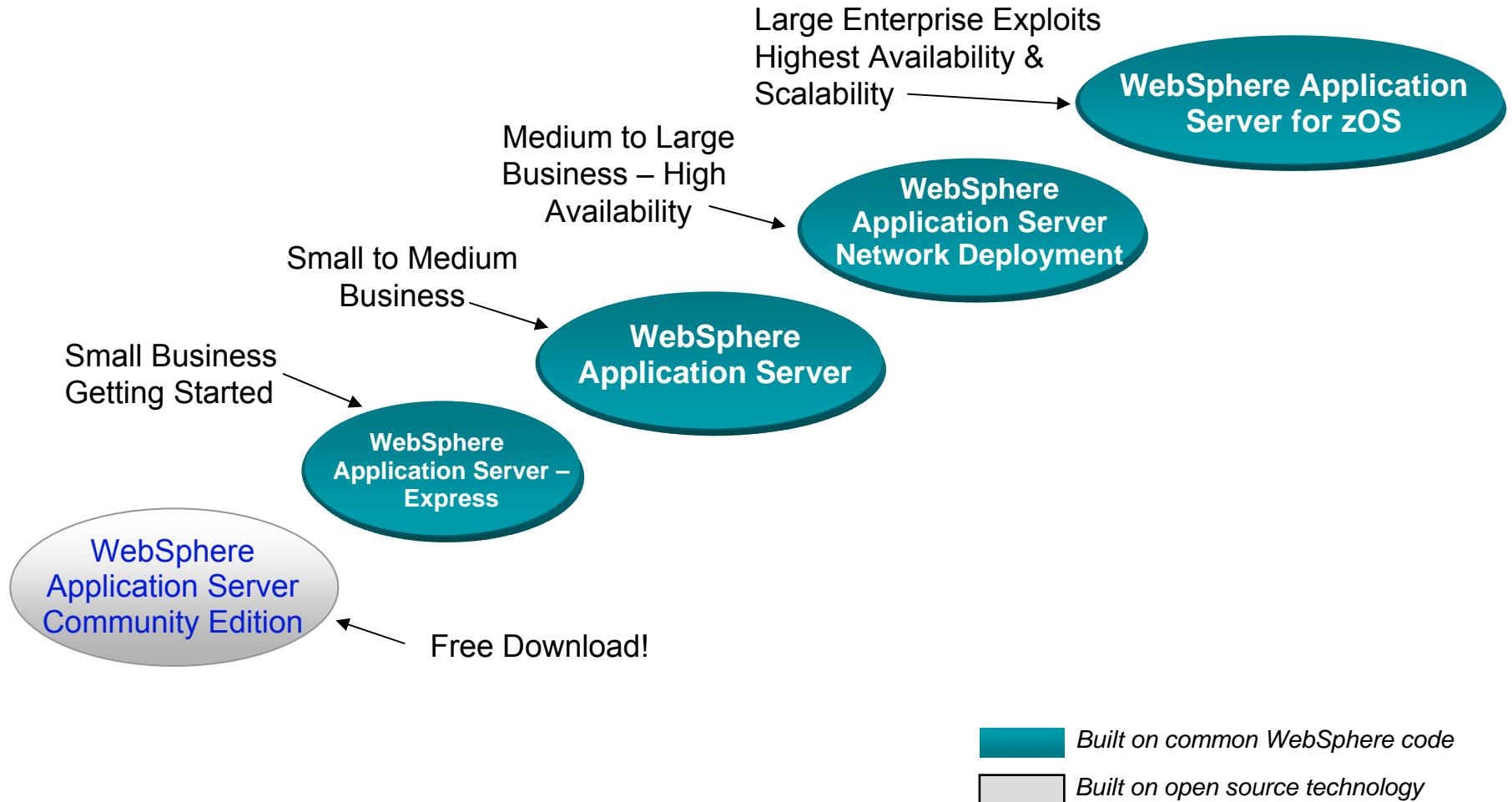
AAA Carolinas

Pear's Gourmet

Australian Open

Tony Awards

The WebSphere Application Server Family – Tailored To Customer Needs



The WebSphere Application Server Family – Special Purpose Capabilities

**WebSphere
Application Server
Hypervisor Edition**

World's first Application Server private cloud

**WebSphere
Virtual Enterprise**

Manage performance, health, and editions of applications for non-stop operation

**WebSphere
eXtreme Scale**

In-memory data grid for extreme transaction processing

**WebSphere
Compute Grid**

Execute and manage Java batch processes

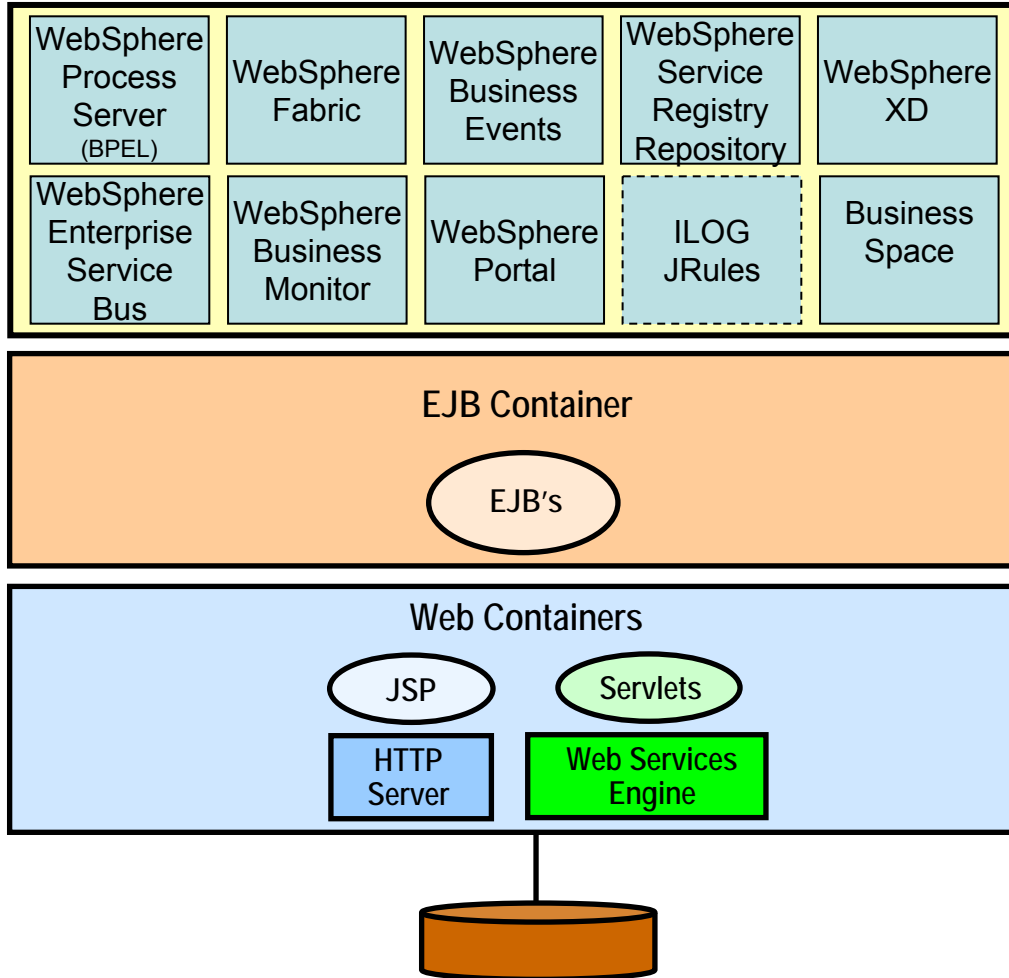
WebSphere Application Server Beats The Competition

- Stable architecture to protect investments
- Best performance and Total Cost of Ownership
- Best transaction integrity



WebSphere Application Server Is The Foundation For IBM's Smart Work Framework


Stable Architecture to Protect Your Investments



- One integrated framework for smart work solutions
- Based on open standards
- Built on WebSphere Application Server

Oracle Fusion Confusion – Not An Integrated Solution! Which Choices Are Strategic?

Function Area	Oracle Products	BEA Products	Sun Products
Application Server	<ul style="list-style-type: none"> • Oracle Application Server 	<ul style="list-style-type: none"> • WebLogic Server 	<ul style="list-style-type: none"> ■ Glassfish Enterprise Server
J2EE Development	<ul style="list-style-type: none"> • JDeveloper • (not Eclipse) 	<ul style="list-style-type: none"> • WebLogic Workshop (Eclipse) 	<ul style="list-style-type: none"> ■ NetBeans IDE (not Eclipse)
Portal/Web 2.0	<ul style="list-style-type: none"> • Oracle Portal • WebCenter 	<ul style="list-style-type: none"> • AquaLogic User Interaction • WebLogic Portal 	<ul style="list-style-type: none"> ■ Sun Java System Portal Server ■ Glassfish Web Space Server
Modeling	<ul style="list-style-type: none"> • BPA Suite (OEM'd IDS Sheer's Aris) 	<ul style="list-style-type: none"> • AquaLogic BPM 	
BPM	<ul style="list-style-type: none"> • BPEL Process Manager 	<ul style="list-style-type: none"> • AquaLogic BPM • WebLogic Integration 	<ul style="list-style-type: none"> ■ Sun Business Process Manager
BAM	<ul style="list-style-type: none"> • Oracle BAM 	<ul style="list-style-type: none"> • AquaLogic Monitoring • ProActivity BAM (OEM) 	
ESB	<ul style="list-style-type: none"> • Oracle ESB • Oracle AQ 	<ul style="list-style-type: none"> • AquaLogic Service Bus 	<ul style="list-style-type: none"> ■ Sun ESB Suite ■ Glassfish ESB
Registry	<ul style="list-style-type: none"> • Systinet (OEM) 	<ul style="list-style-type: none"> • Systinet (OEM) • Flashline 	
Server Virtualization	<ul style="list-style-type: none"> • Oracle VM 		<ul style="list-style-type: none"> ■ Logical Domains ■ Dynamic System Domains ■ Sun Solaris Containers

 = Oracle has said this one is “strategic”

Years Of Migration Misery!

Oracle Information Management – More Confusion With The Sun Acquisition

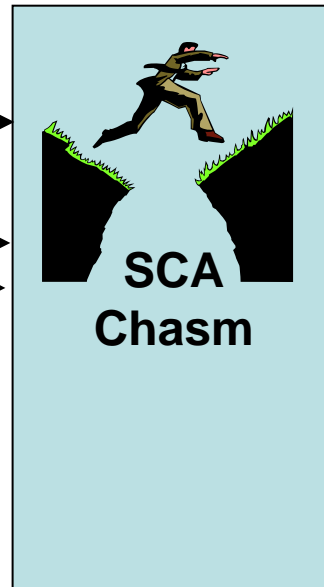
Function Area	Oracle Products	Sun Products
Business Intelligence	Siebel Answers Hyperion Web Analysis Brio Reporting Oracle BI Publisher	
MDM	Oracle MDM Suite	Sun Master Patient Index
Data Warehousing	Oracle Database 11g Exadata	mySQL PostgreSQL
Database	Oracle Database 11g Oracle RAC Exadata	mySQL Java DB (Apache Derby) PostgreSQL
ETL	Oracle Data Integrator (Synopsis) Oracle Data Warehouse Builder Golden Gate	Sun Data Integrator

And Oracle 10g To 11g CHASM Is Another Nightmare For Customers

1. 11g is SCA based (finally), customers will have to migrate their 10g solutions to an entirely NEW SCA environment!
2. All Oracle AIA connections will have to be re-written
3. And the Glue that holds it all together (Oracle Service Bus) is still 10g

10g Products

1. Oracle BPM (BEA AquaLogic)
2. Oracle Service Bus
3. Oracle AIA
4. Oracle BPA (modeling)
5. Oracle Forms
6. Oracle OC4J

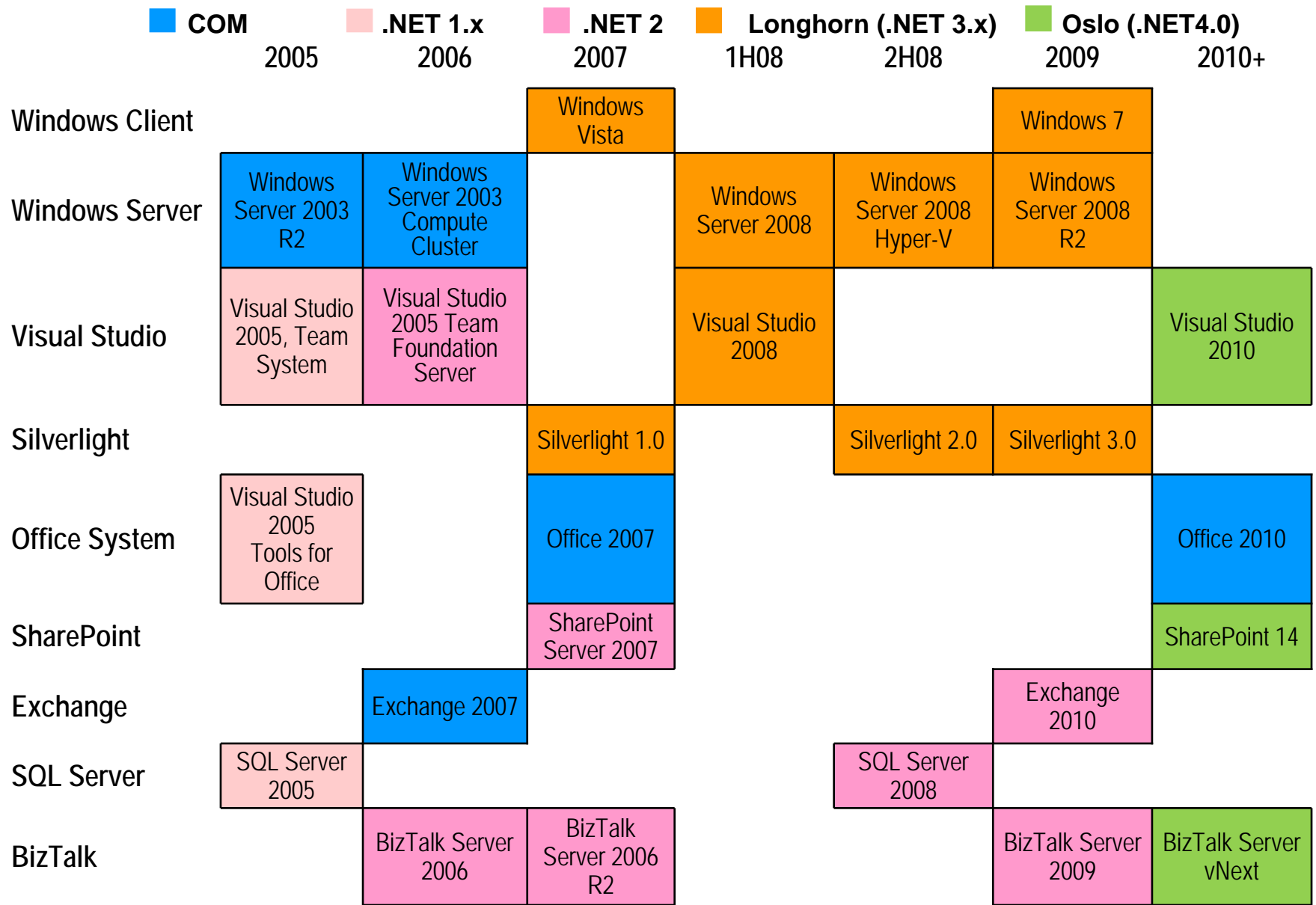


11g Products

1. Oracle WLS
2. Oracle BPEL Process Manager
3. JDeveloper
4. Oracle Business Activity Monitor

Dead End

Microsoft Middleware Roadmap Also Creates Migration Misery



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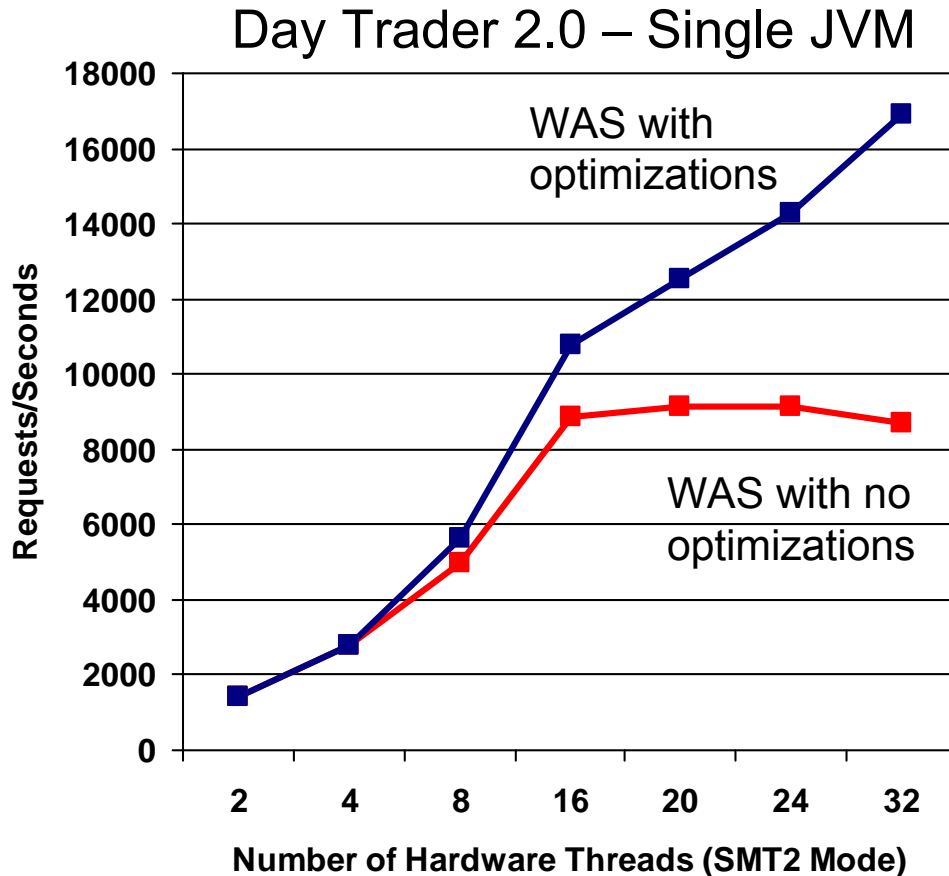


Accomplishments To Date: WebSphere Optimizations On POWER7

- Doubled the single-instance peak scaling of WebSphere Application Server from 16 to 32 hardware threads
 - ▶ Met target of POWER7 socket scalability (8 cores, 4 threads per core)
 - ▶ Single-instance peak performance improved by 85%
- Two-instance peak performance improved by 50%
- Total of 47 changes prototyped in core classes, resolving locking bottlenecks, reducing path length, and exploiting Power Architecture

Expect further POWER7 Performance Enhancements

Optimizations Result In Amazing WebSphere Application Server Scalability



- Near linear scaling on Power up to **32** threads
- Optimizations improve performance by **85%** over non-optimized single instance

Simplifies deployment configurations since fewer instances are needed to leverage POWER7 threads

Summary Of Optimizations On The WebSphere Application Server Stack

WebSphere Application Server

Reduced code path length when running on Power
Optimized to reduce the amount of lock contention on Power
Access to AIX environment parameters

Java Virtual Machine

Uses 64K pages by default on AIX
Elimination of unneeded exit tests in the Just-In-Time (JIT) compiler

Operating System

Caching optimizations in AIX to improve performance when lock contention is occurring in WebSphere

Power Hardware

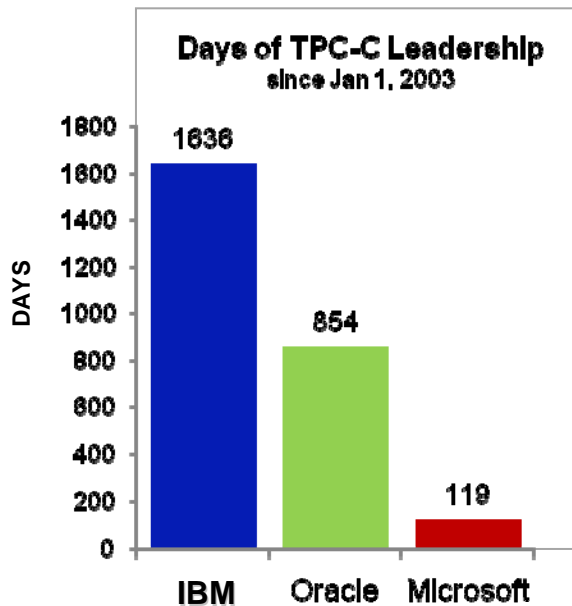
WebSphere takes advantage of the increased number of hardware threads available in POWER7 systems

Notes:

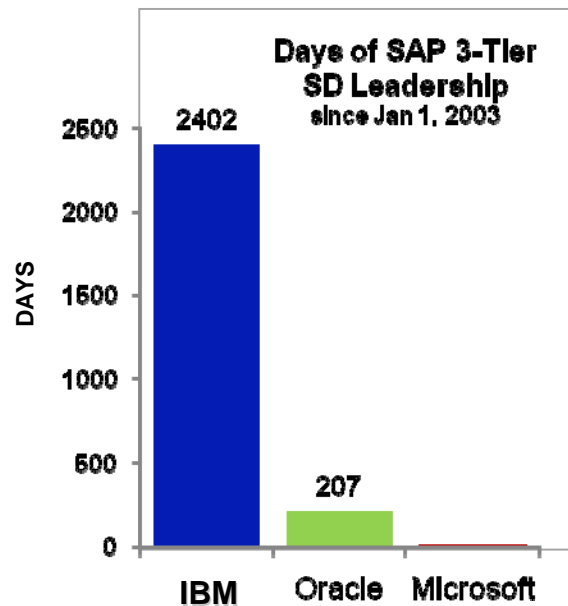
- **WebSphere Application Server optimizations in Fix Pack 9 (7.0.0.9) – to be available soon**
- **JVM optimizations to be available with WAS Fix Pack 9 as a separate download**
- **AIX V6.1 optimizations coming in April (Technology Level 5)**

Trusted Performance Is Measured By The Speed To Handle The World's Most Demanding Business Transactions

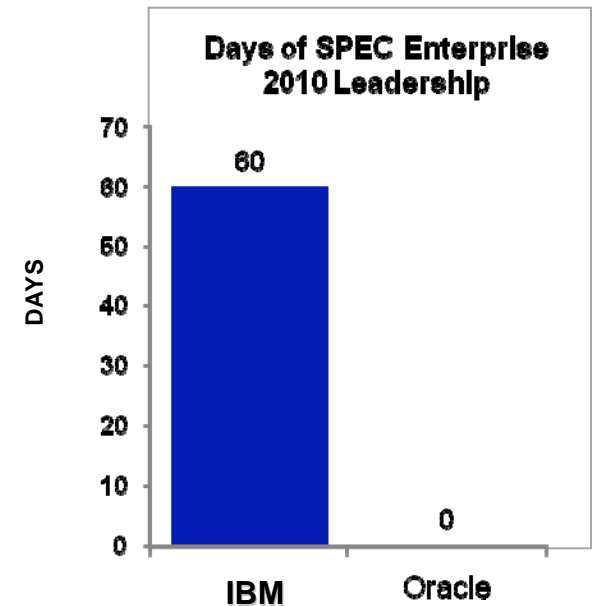
TPC-C performance leadership



SAP SD performance leadership



SPECjEnterprise2010 Performance leadership



Source: IBM-maintained records of performance benchmark leadership. TPC-C and SAP 3-Tier SD leadership days are up to and including 22 Feb 2010. SPECjEnterprise2010 up to 05 Mar 2010.

WebSphere Application Server Beats The Competition

- Stable architecture to protect investments
- Best performance and Total Cost of Ownership
- Best transaction integrity



Transaction Integrity - A Common Business Challenge

We transfer money between banks all the time. We need to ensure that the transfer of data will be 100% accurate; even under adverse conditions!



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WebSphere will maintain data integrity and recover from adverse conditions such as power and network outages and application failures.



IBM

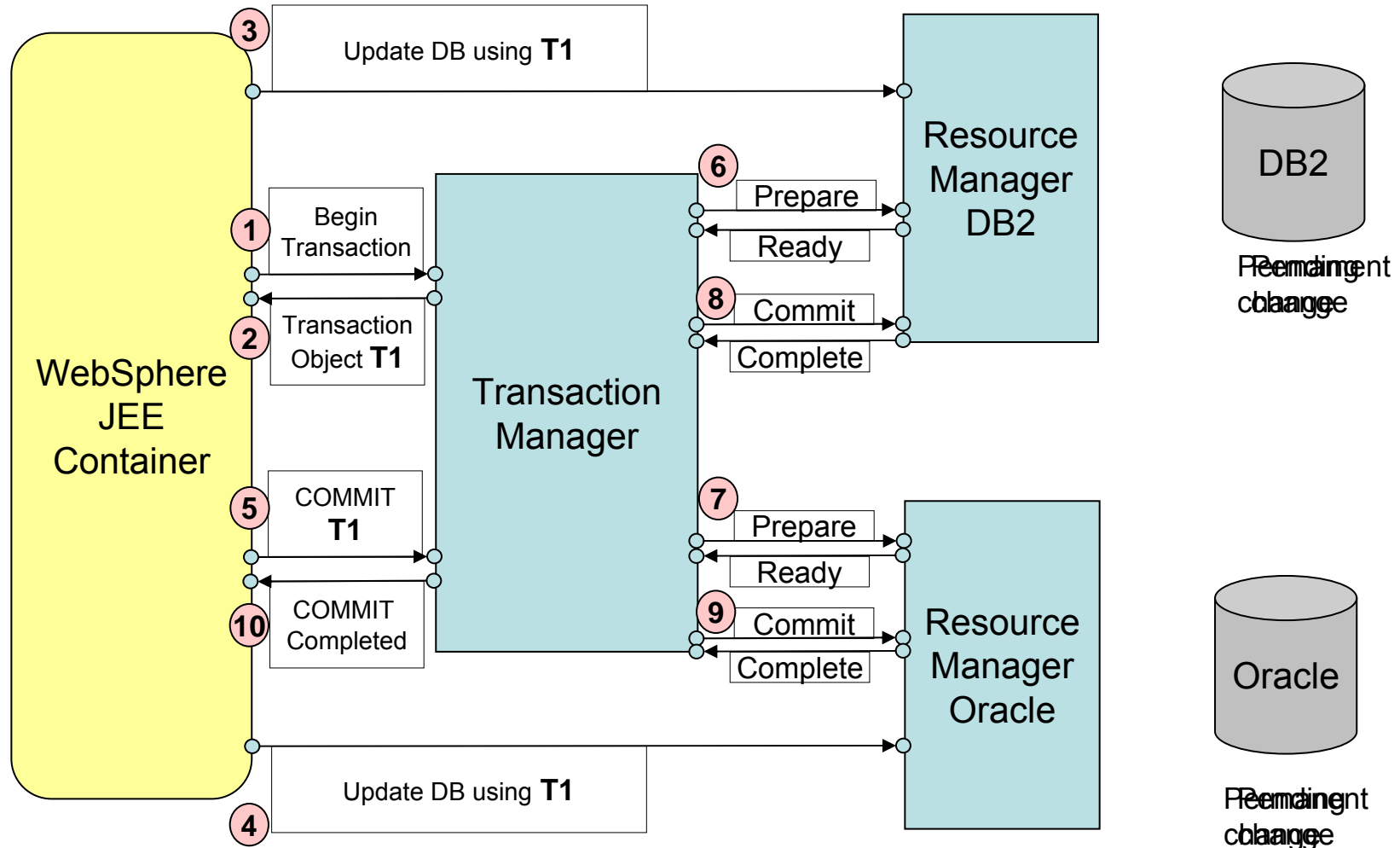
What Is Transaction Integrity?

Transaction Integrity is fundamental to any business!

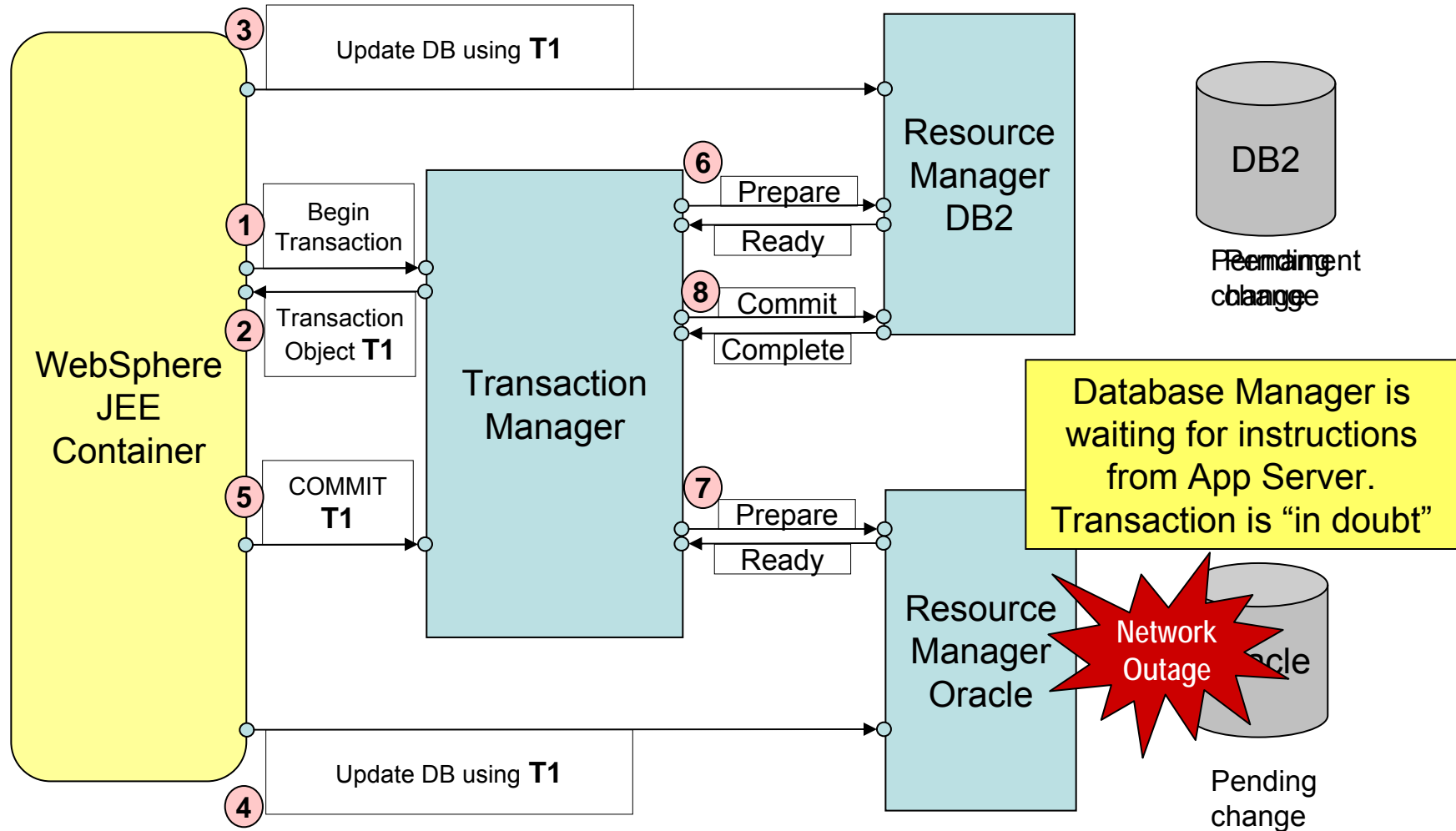
- Smarter planet processes usually span different systems and databases
- Data across the business must remain synchronized in logically **consistent** relationships
- Business processes must **not be lost** and must eventually be completed
- Business operations must **continue without error** despite system failures

IBM has been doing this right for 40+ years!!

Application Server Test – Two Phase Commit

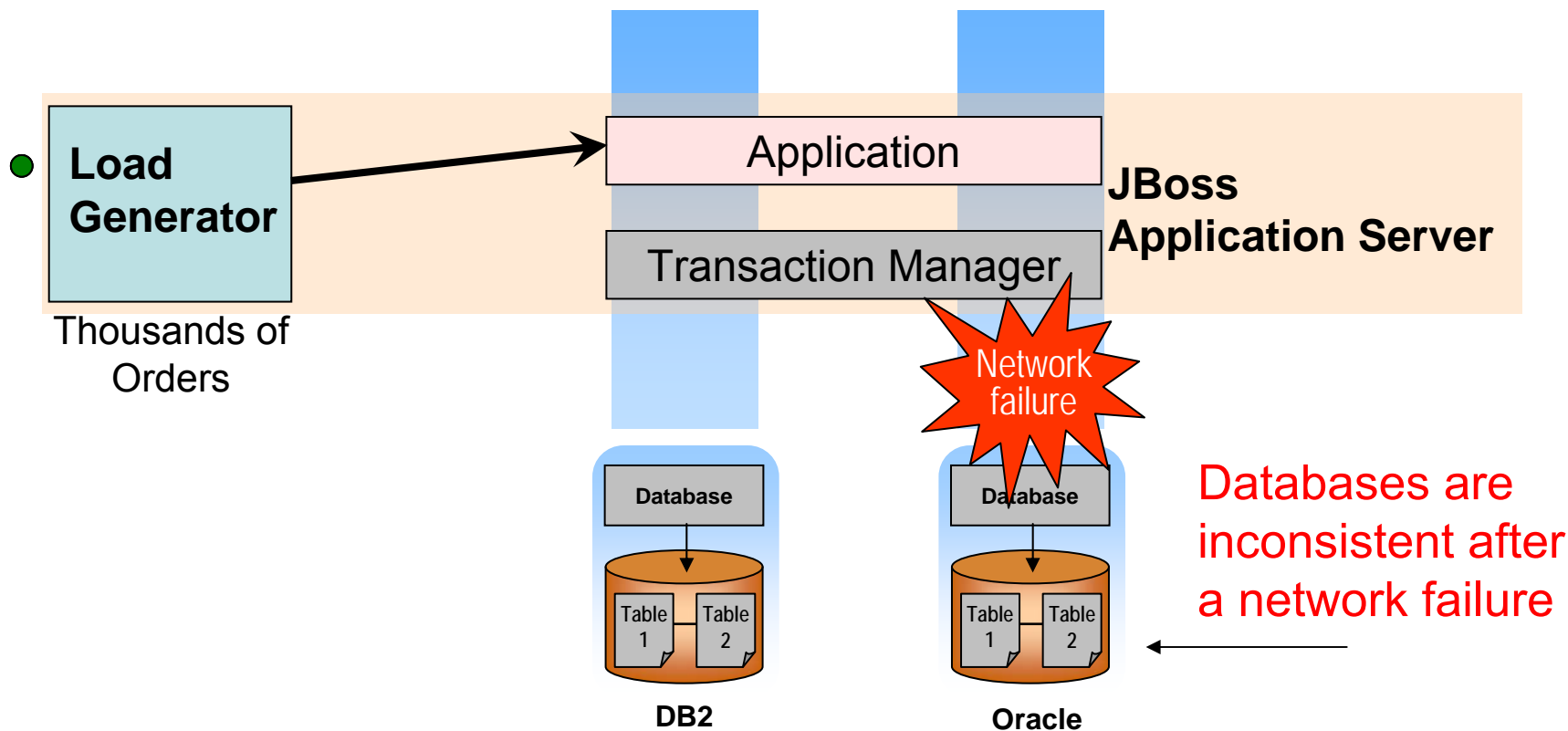


Application Server Test – Two Phase Commit “In Doubt Transaction”



DEMO: JBoss Synchronous Application Server Under Load With Network Outage

- Enterprise requirements
 - ▶ Data is always consistent and visible to other instances
 - ▶ Automatic data recovery in the event of a network failure
 - ▶ Return exception after failure, application may retry



Network Or Power Failure Between Database Commits

- **What happens if there is a failure after the first data base commit and before the second database commit?**
 - ▶ One database has been changed and the changes committed, locks have been released
 - ▶ The other database has rows locked and is not committed
 - ▶ The transaction is “in doubt”

- **Failure to recover properly has serious consequences**
 - ▶ Data is corrupted – inconsistent between the databases
 - ▶ Held locks impact all applications using the database
 - ▶ Systems will have to be taken down while DBA’s manually “fix the problem”
 - And they have to re-construct what happened (time consuming)

Think About The Business Implications



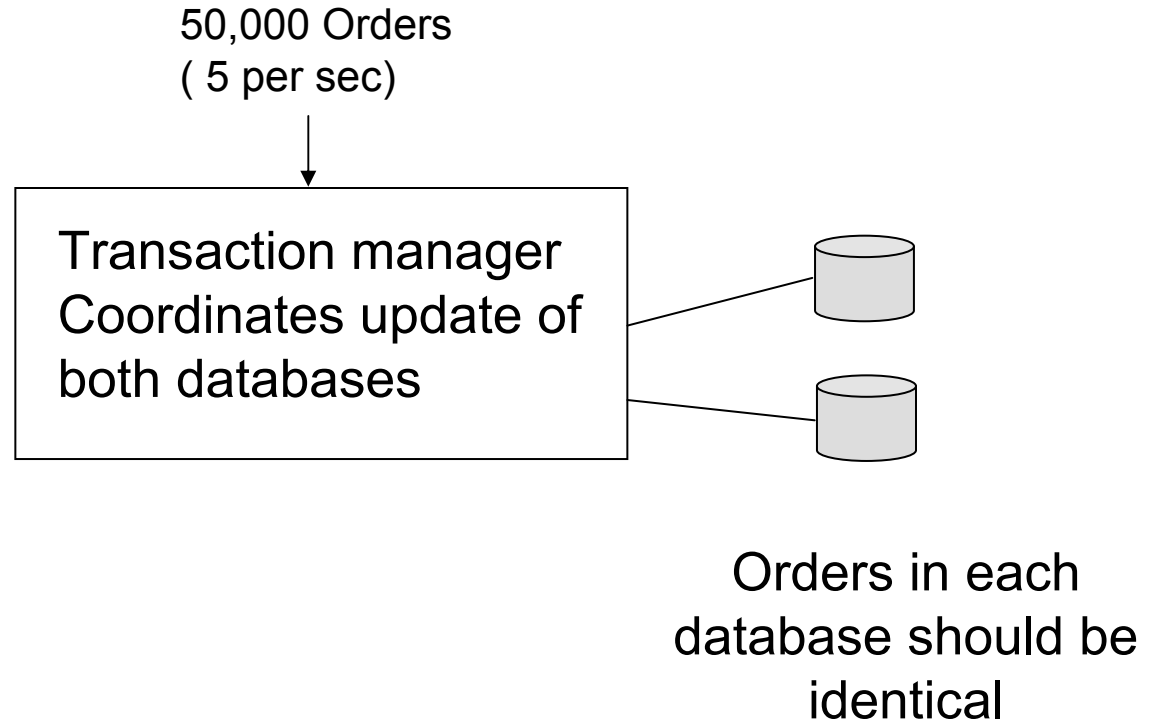
- Can any business afford to lose orders or money?
- Would customers tolerate missing money or shipments with missing items?
- How are inventory levels managed if your inventory tracking is incorrect?
- How are key databases reconciled that get out of sync?

$$2+2=4$$



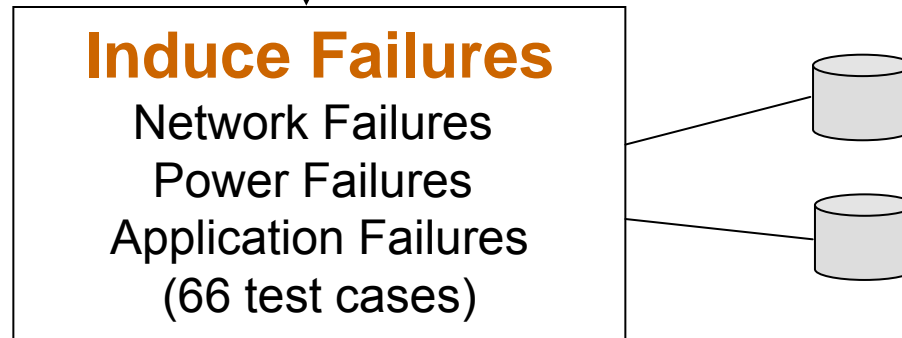
IBM

Overview – The IBM Transaction Integrity Study



Overview – The IBM Transaction Integrity Study

50,000 Orders
(5 per sec)



Results

Corrupted Data Failures Operational Integrity Failures	Failed the tests
Security Concerns Administration Productivity Developer Productivity	Quality of Service Issues

**Oracle, JBoss
and Microsoft
exhibited
these issues**

Transaction Integrity – Test Results

IBM WAS

- Passed all the failure tests including network failures, power outages and application exceptions.
- Does not corrupt data or degrade performance

JBoss AS

- Fails to handle a network / power outage causing a corrupted data problem

Oracle OC4J

- Performance degradation following power outage
- Frequent reboots of OS due to Application Server hangs

Oracle WebLogic Server

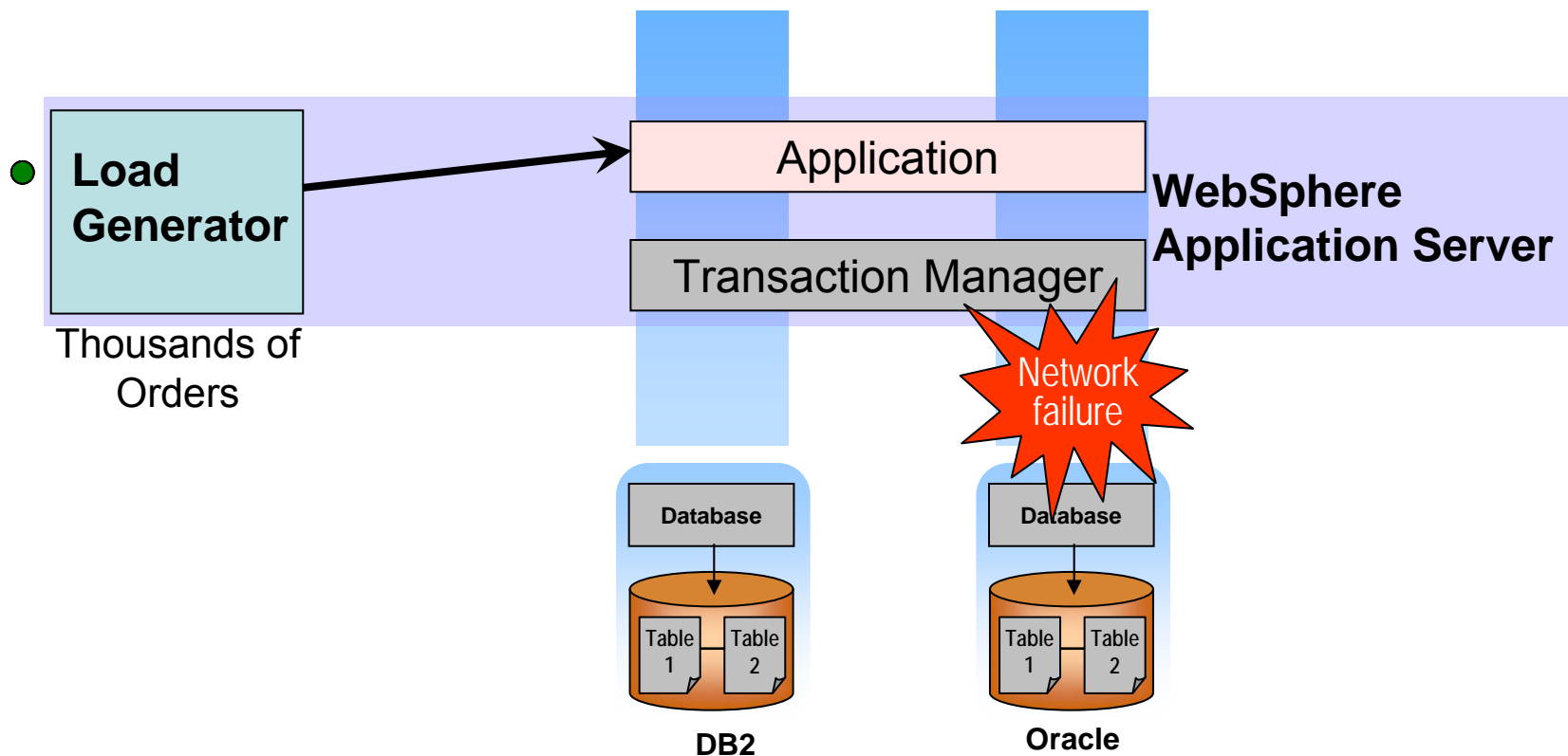
- Fails to reject incorrect data (duplicate key)
- Poor recovery from network outages led to corrupted data problems 25% of the time

Microsoft .NET

- Enabling transaction support exposes serious security risks, such as malicious DLLs being loaded in the kernel

DEMO: IBM Synchronous Application Server Under Load With Network Outage

- Enterprise requirements
 - ▶ Data is always consistent and visible to other instances
 - ▶ Automatic data recovery in the event of a network failure
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WebSphere Application Server – The Best Foundation For Your Business

	IBM	Oracle	Open Source	Microsoft
Stable architecture to protect investments	YES	Mixed	NO	Mixed
Performance	YES	"2 nd Place"	Really BAD	"3 rd Place"
Transaction Integrity	YES	Some Failures	Really BAD Failures	Security Issues

DB2 Solutions: Built To Address Smarter Planet Solutions

How can DB2 help my foundation?



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CIO**

DB2 and WebSphere are highly Integrated. DB2 can provide your business with a high competitive edge with the industry's best scaling features at a lower cost of ownership



IBM

DB2 Is Built For Smarter Planet Transactions

- **High Performance DB2 Software** ****NEW IN DB2 9.8!****
optimized for POWER7
- **High Efficiency DB2 pureScale**
provides unapproachable OLTP
Scale out
- DB2's **pureXML**
storage takes less space and has
much better performance
- DB2 has **Deep Compression**
saves more on storage



DB2 Optimizations For POWER7

■ DB2 optimizations for POWER7

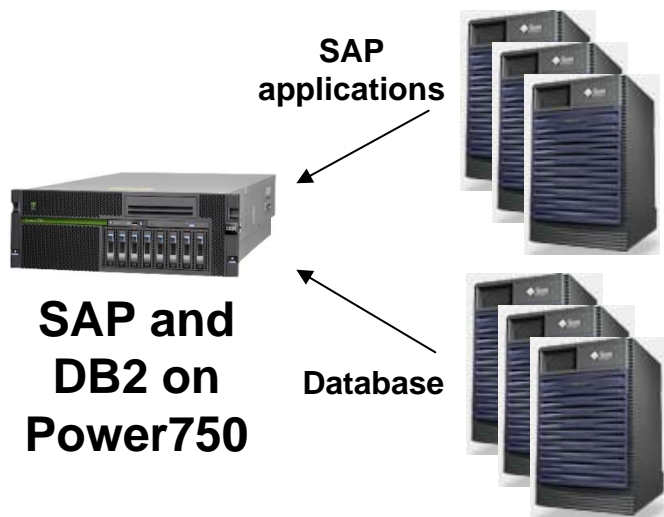
- ▶ Improved tablespace storage allocation mechanism reduces lock contention
- ▶ Corresponding changes in AIX file system lock implementation
- ▶ Resulted in **19x** performance improvement on 16-core POWER6 for an online trading workload*

■ Previous DB2 optimizations for Power Systems

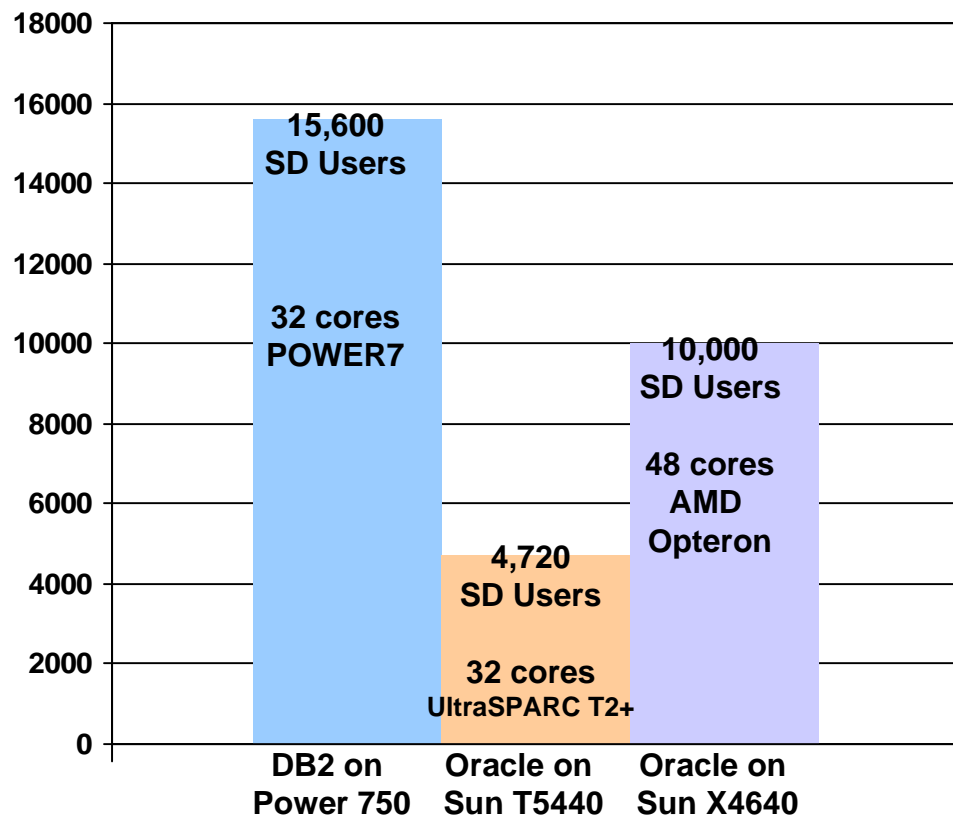
- ▶ DB2 Supports AIX 64KB, 16MB and 16GB large page sizes
- ▶ Workload management integration with AIX
- ▶ Finer granularity of service levels
- ▶ DB2 utilizes AIX storage protection keys for security
- ▶ First Failure Data Capture (FFDC) captures failure diagnostic information

* Source: IBM Internal Study

Simplify Enterprise Application Infrastructure - Support 15,000 Users



SAP Sales and Distribution ERP 6.0 EHP 2-Tier Performance



<http://download.sap.com/download.epd?context=40E2D9D5E00EEF7CC663DDC83061BA6F9242BF63884801E0C4E97204702C1F27>

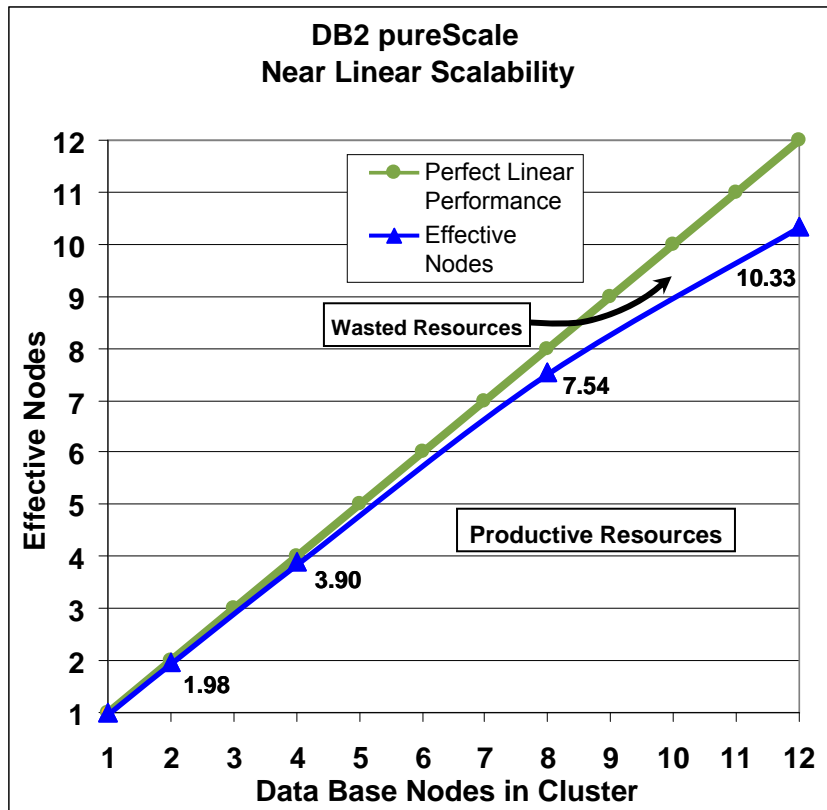
IBM Power 750 certification number not available at press time and can be found at sap.com/benchmarks. IBM Power System 750, 4p / 32-c / 128-t, POWER7, 3.55 GHz, 256 GB memory, 15,600 SD users, dialog resp.: 0.98s, line items/hour: 1,704,330, Dialog steps/hour: 5,113,000, SAPS: 85,220, DB time (dialog/ update):0.015s / 0.028s, CPU utilization: 99%, OS: AIX 6.1, DB2 9.7;;SUN T5440, 4p / 32-c / 256-t, 256 GB memory, 4720 SD users, UltraSPARC T2 plus OC, 1.6 GHz, Solaris 10, Oracle 10g, cert# 2009026-1; SUN X4640, 8p / 48-c / 48-t, 256 GB memory, 10000 SD Users, Sun Fire X4640 Six-Core AMD Opteron, 2.6 GHz, Solaris 10, Oracle 10, cert# 2009049; All results are 2-tier, SAP EHP 4 for SAP ERP 6.0 (Unicode) and valid as of 2/9/2010.

Cost of Hardware, Operating System and Three Years Support For Enterprise Application

- Support 3.3x more users on DB2 and Power 750 than Oracle Database on Sun T5440

- Infrastructure costs per user
 - ▶ DB2 on Power 750 \$100/user
 - ▶ Oracle on Sun T5440 **\$185/user**
 - ▶ Oracle on Sun X4640 **\$123/user**

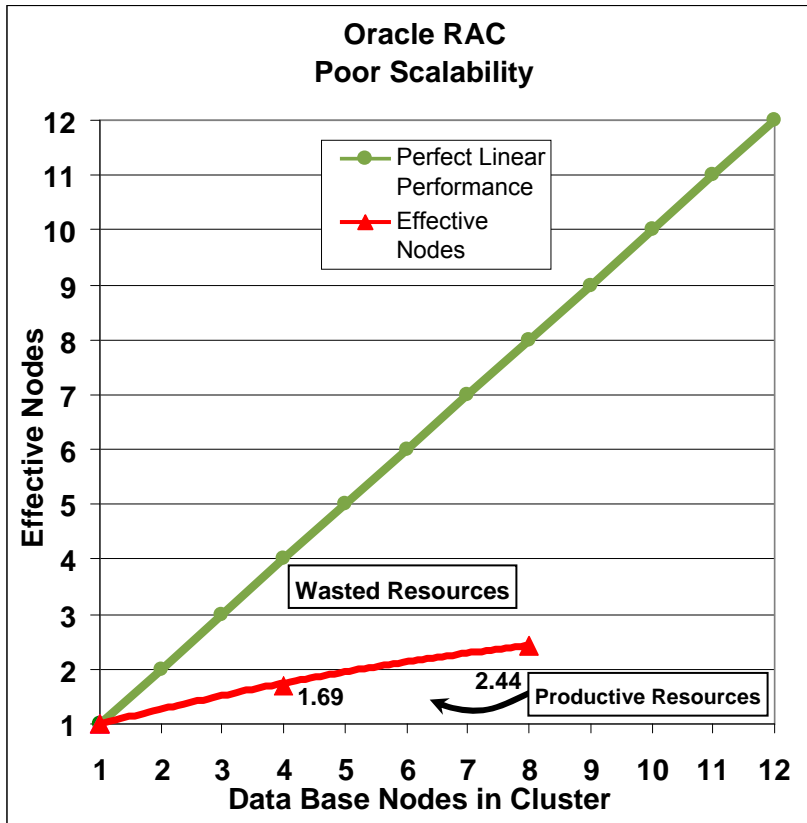
DB2 pureScale Scales Efficiently And Transparently



- Unique DB2 pureScale clustering design achieves near linear scaling
 - ▶ No data partitioning required
 - ▶ No transaction routing required
 - ▶ No changes or cluster awareness required in applications
- Preserves business agility when adding or removing capacity
 - ▶ Applications are not tied to database partitioning schemes
 - ▶ Automatically balances workload across cluster
- Virtually unlimited capacity
 - ▶ Large DB2 pureScale clusters can harness the power of a massive number of POWER7 cores and execution threads
 - ▶ IBM has demonstrated near linear scaling up to 128 nodes
- Continuous availability during both planned and unplanned outages

DB2 pureScale characteristics as shown in IBM published results from internal tests

Without Application Changes and Extensive Database Tuning, Oracle RAC Does Not Scale



- Oracle RAC is inefficient by design
 - ▶ Scaling RAC requires complex tuning, partitioning, or application changes
 - TPC-C RAC results
 - TPC-H RAC results
- **Sacrifices Business Agility** to overcome poor performance
 - ▶ Partitioning schemes force changes into application business logic
- Published studies demonstrate difficult or poor scalability
 - ▶ Dell (shown in chart): Poor scalability despite using InfiniBand for RAC interconnect
 - ▶ CERN: Four month team effort to tune RAC, change database, change application
 - ▶ Insight Technology: Even a simple application on two node RAC requires complex tuning and partitioning to scale

Oracle RAC characteristics as shown in Dell RAC InfiniBand Study

<http://www.dell.com/downloads/global/power/ps2q07-20070279-Mahmood.pdf>

CERN (European Organization for Nuclear Research)

http://www.oracleracsig.org/pls/apex/RAC_SIG.download_my_file?p_file=1001900

Insight Technology

<http://www.insight-tec.com/en/mailmagazine/vol136.html>

WebSphere Cloudburst Can Lower Labor Costs Significantly

What is WebSphere Cloudburst? Can it help me?



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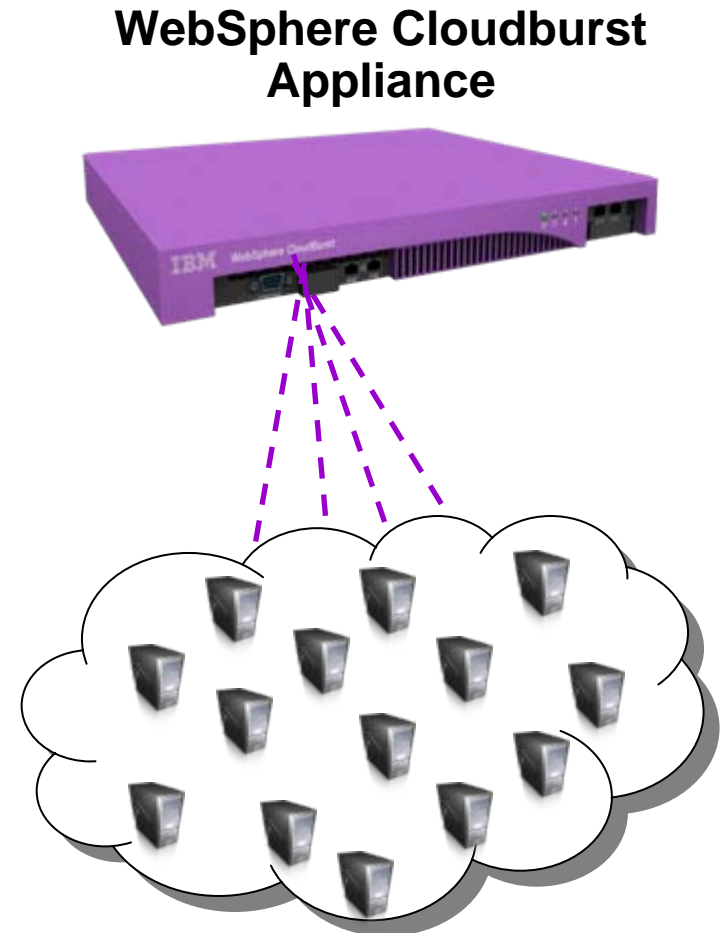
WebSphere Cloudburst Appliance can significantly reduce labor costs!



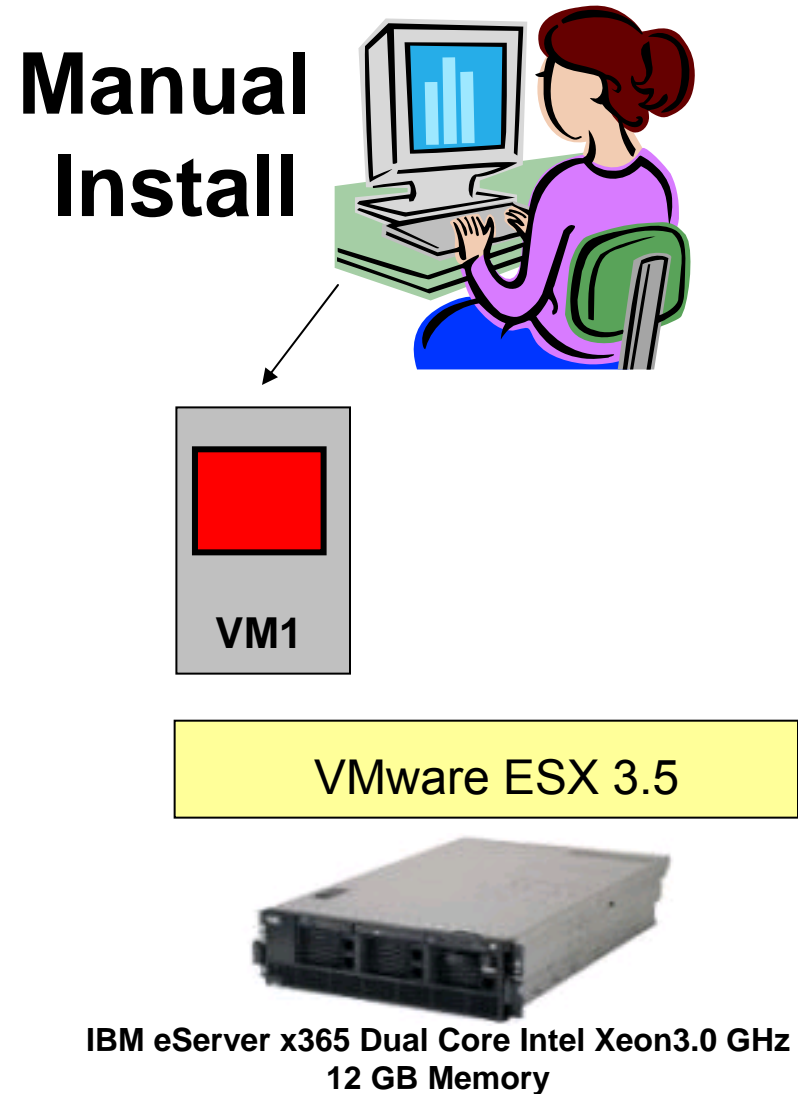
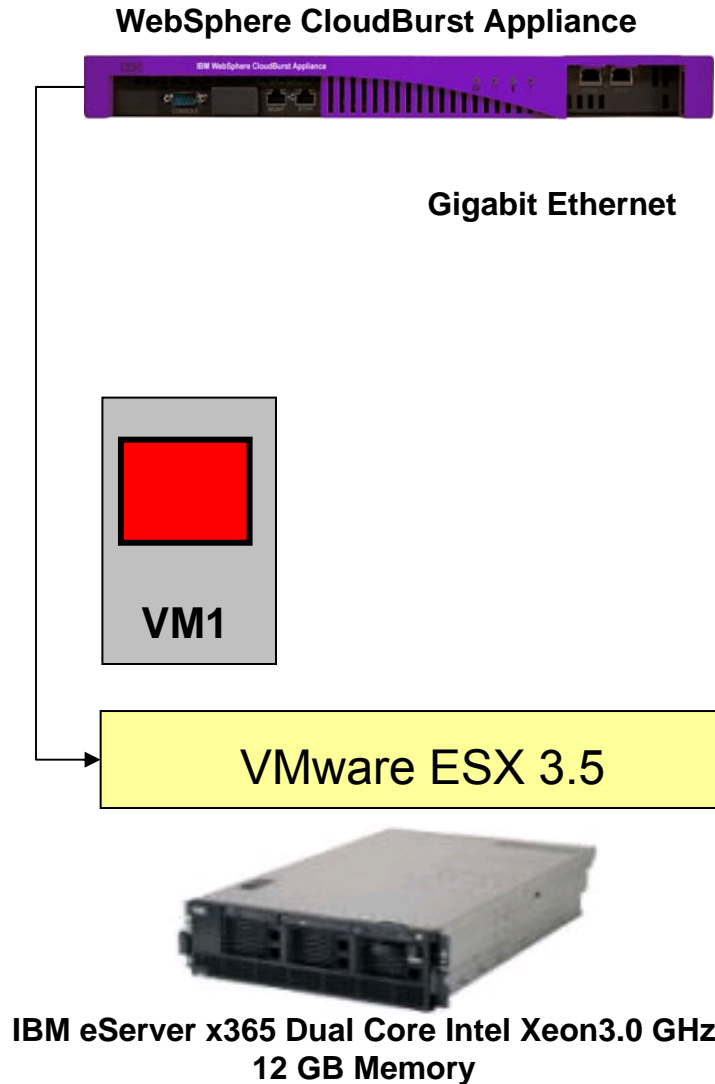
IBM

Leverage WebSphere Cloudburst Appliance For Faster, More Flexible Deployments

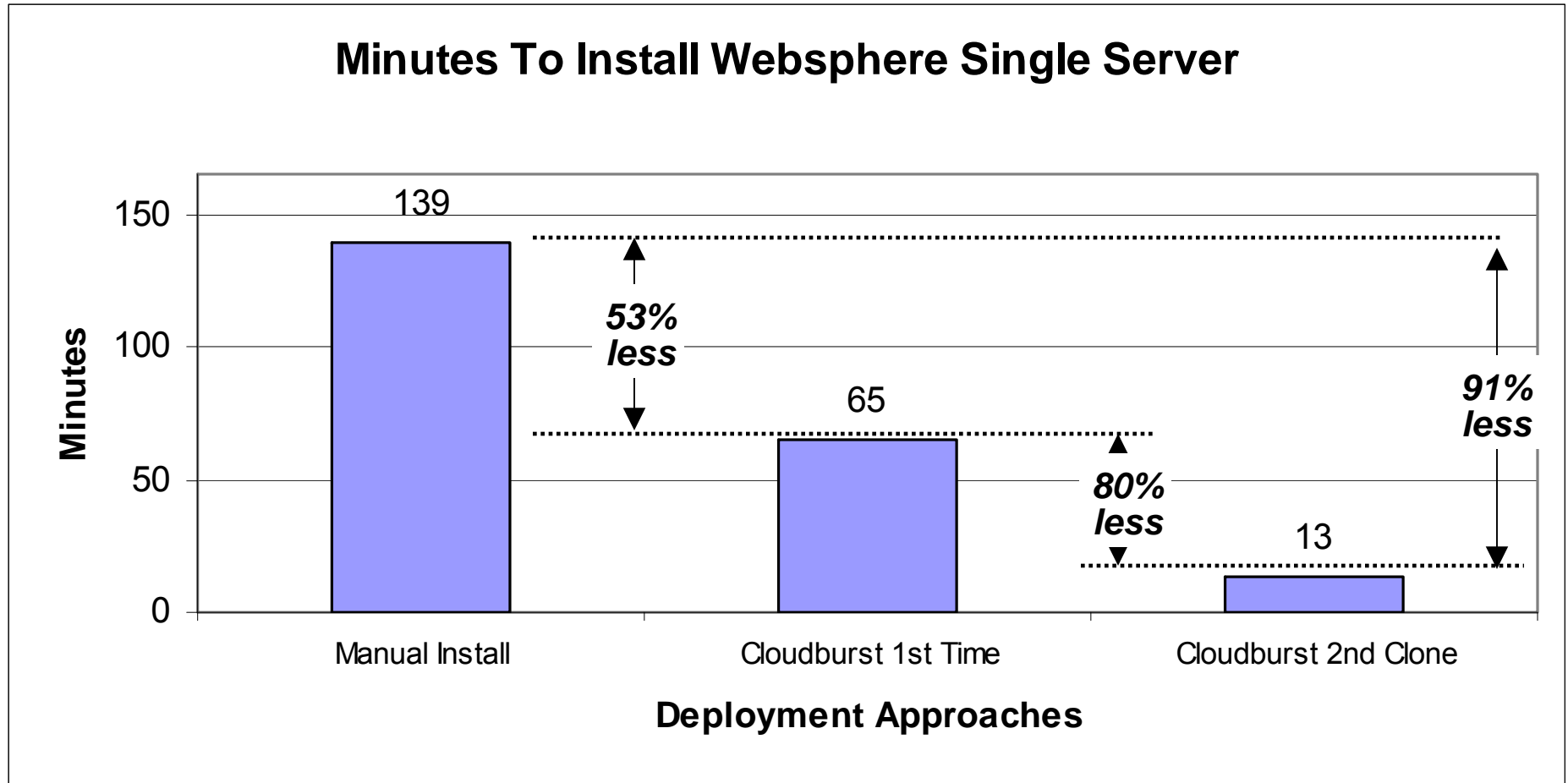
- New class of hardware appliance for data centers
- Secure, self-service cloud management device
- Dispenses hardened WAS patterns into a pool/cloud of virtualized hardware running a supported hypervisor (e.g. VMware)
 - ▶ Patterns leverage 10 years of WAS best practices deployment and configuration experience
- Enables consistent and repeatable deployment of application environments based on patterns (e.g. single server, multi-tier, etc.)



Deployment Study: WebSphere Cloudburst vs. Manual Installation



WebSphere Cloudburst Appliance Is Fastest!



Deployment Details From 1st Manual Install

Deployment/Install Task	Time
SLES 10 SP2 Linux OS Install	40 Mins
Upload and update Virtual Image to ESX Server	45 Mins
Install WAS 7 (including unzip)	7 Mins
Install IBM HTTP Server	3 Mins
Install Web Server Plugin	3 Mins
Install WebSphere Update Installer	1 Min
Install WebSphere + JDK Fixpack 3	15 mins
Install SCA Feature Pack + Fixpack	4 mins
Install Web 2.0 Feature Pack	4 mins
Download/Install ISA Lite	3 mins
Deploy Application using WebSphere Admin Console	10 mins
Restart WebSphere	4 mins
TOTAL TIME TO RUN APPLICATION MANUALLY	139 Minutes

Deployment Details From 1st Cloudburst Install

Deployment/Install Task	Time
Connect Cloudburst with VMware Server	15 minutes
Create enterprise application package	1 Minute
Upload enterprise application package	1 Minute
Add parameters to script	30 Seconds
Create new pattern	30 Seconds
Update pattern with Single Server Image + Script	30 Seconds
Save pattern	30 Seconds
Deploy new Pattern with enterprise application	46 minutes
TOTAL TIME TO RUN APPLICATION MANUALLY	65 Minutes

Deployment Details From 2nd And Subsequent Cloudburst Install

Deployment/Install Task	Time
Connect Cloudburst with VMware Server	0 minutes
Create enterprise application package	0 Minute
Upload enterprise application package	0 Minute
Add parameters to script	0 Seconds
Create new pattern	0 Seconds
Update pattern with Single Server Image + Script	0 Seconds
Save pattern	0 Seconds
Deploy new Pattern with enterprise application	13 minutes
TOTAL TIME TO RUN APPLICATION MANUALLY	13 Minutes

Demo: Deploying A New WebSphere System In The Cloud



Select Pattern

WebSphere CloudBurst Appliance



CloudBurst Downloads Application

CloudBurst Downloads Virtual Image

WAS HE VM Image

CloudBurst Downloads Customization Information



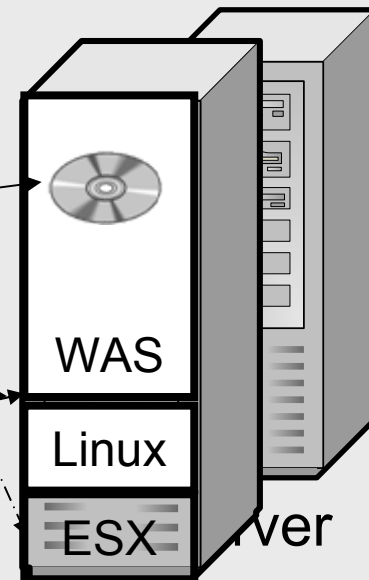
Private Cloud

CloudBurst Issues Deploy Image Command

WAS Installs Application

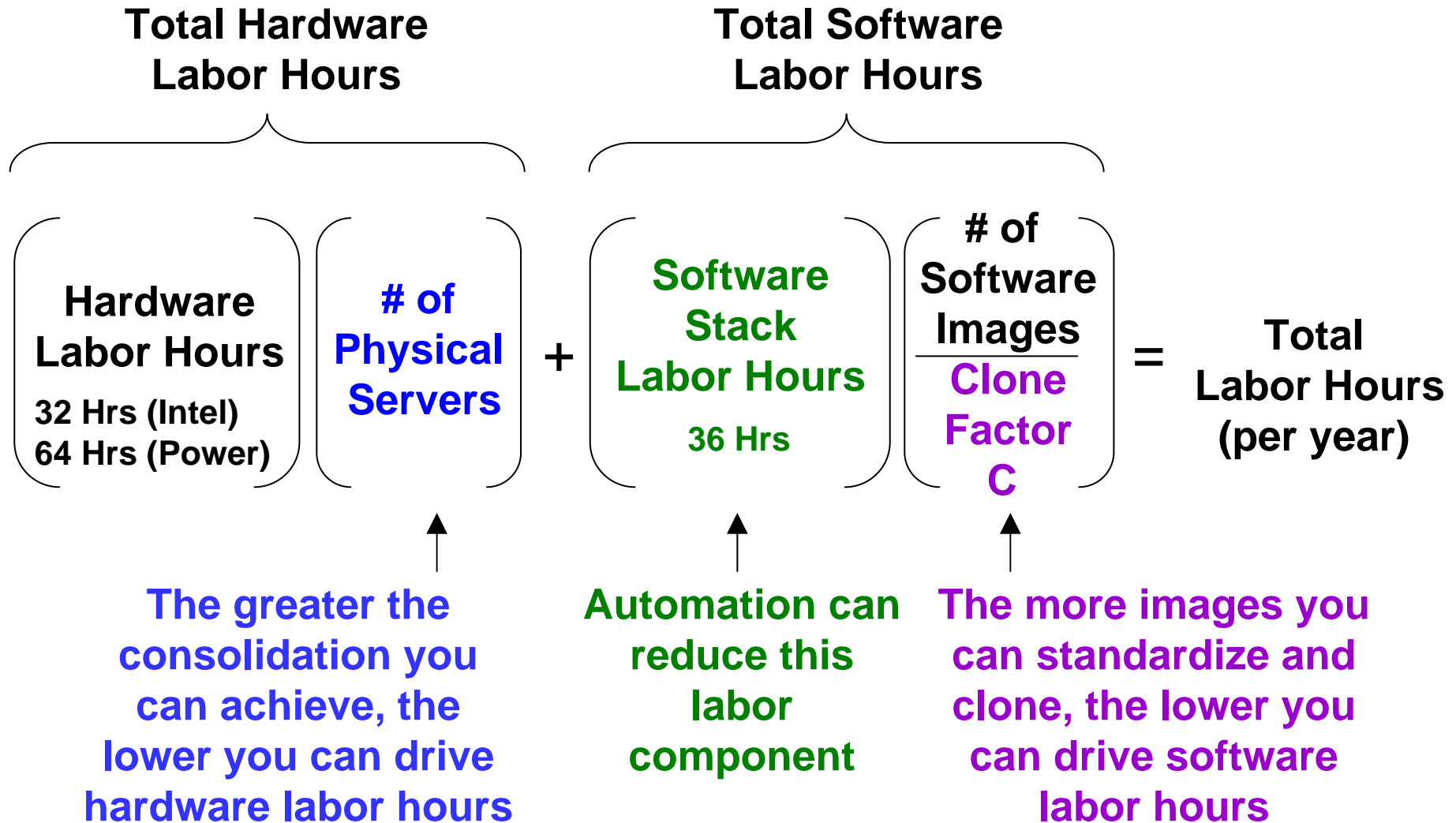
ESX Applies Customization

ESX Installs WAS HE Virtual Machine



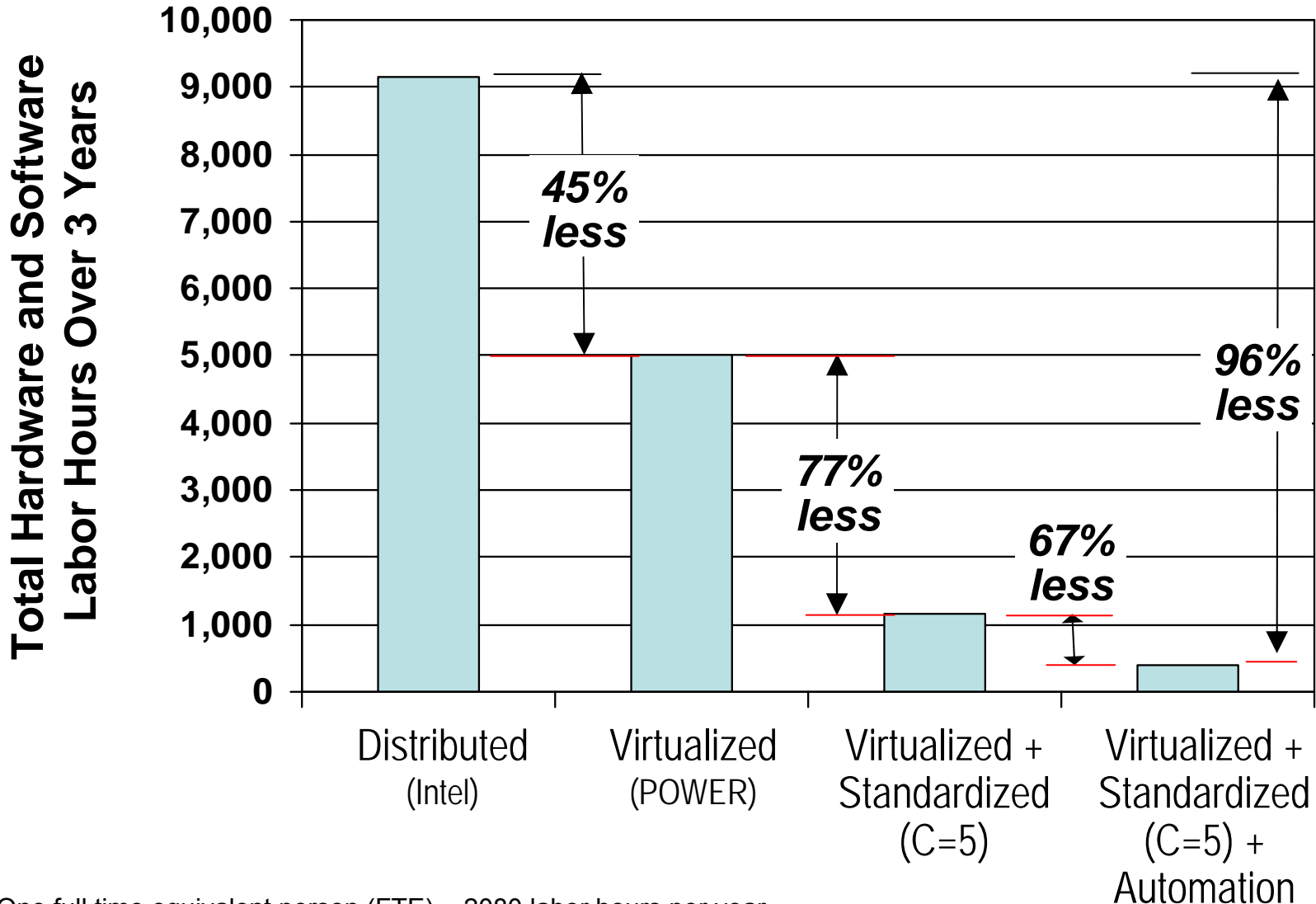
Server

Virtualization, Standardization And Automation Can Reduce Labor Costs



Note: labor model best fitted to field data

Total Hardware And Software Labor Hours For 45 Workloads Over 3 Years



One full time equivalent person (FTE) = 2080 labor hours per year

Think About It – Do You Want To Risk Your Business On An Inferior Foundation?

Can you afford to corrupt the data in your systems?

Do you want to build your enterprise on a solid foundation?

Can you afford to build on a database that does not scale your business?

Do you want to reduce costs with Cloud Computing?



IBM

Now I see the value of a strong foundation – WebSphere and DB2



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