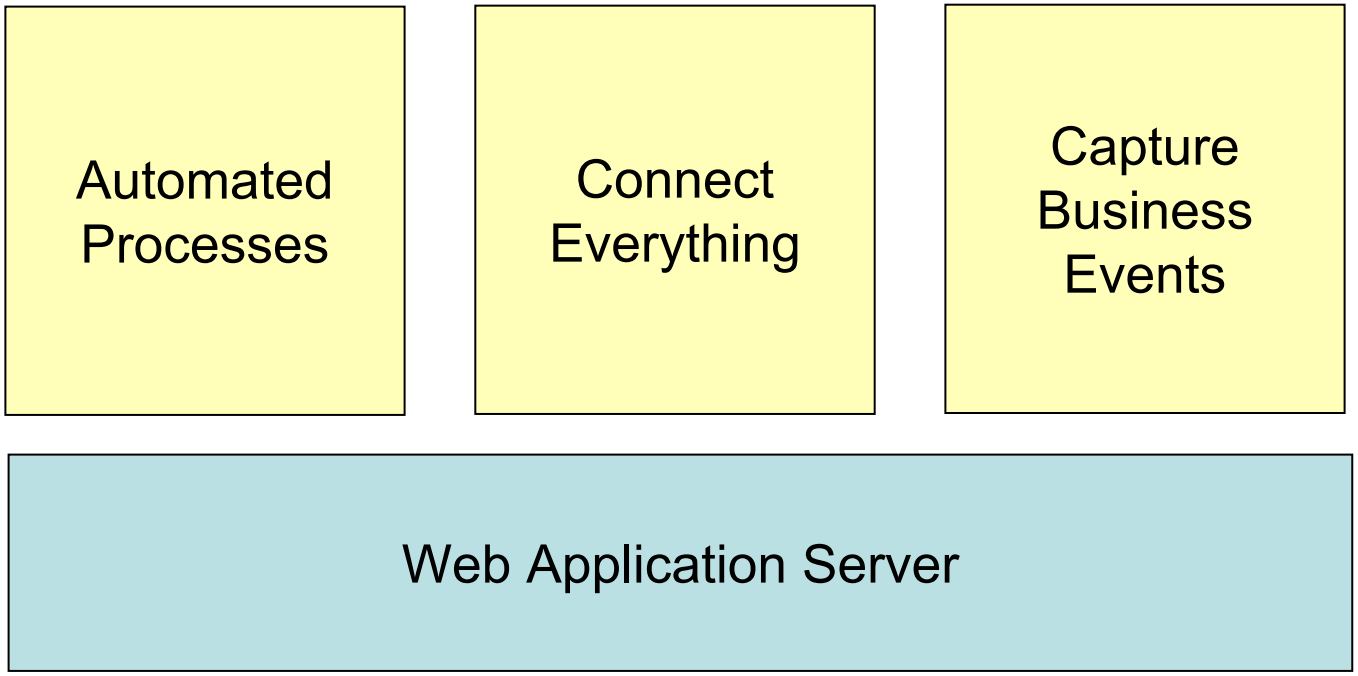
Start With A Solid Foundation – WebSphere Application Server

Quiz

- What piece of software does every business need to have ?
- Answer: A web application server

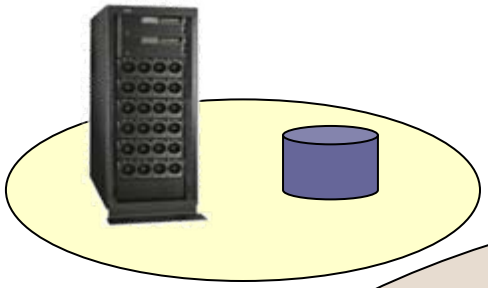
- For what purpose was a web application server originally invented?
- Answer: Make business applications accessible via the internet

Web Application Servers Also Host Other Functions



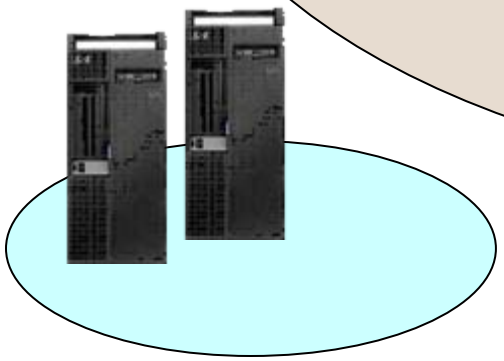
Make sure you have a strong foundation!

Smart Work Solutions Need To Build On Existing Systems



Smart Work Solutions

1. Build on a Strong Foundation
2. Automate Business Processes
3. Capture Business Expertise
4. Connect Everything with an Intelligent Bus
5. React to Business Events in Real Time



WebSphere Application Server Is The Undisputed Market Leader For The Last 11 Years

- **Largest Customer Base!**
  - 90% of the World's 100 largest corporations run their businesses on WebSphere Application Server
  - 7,022 Customers in Production

- **Unparalleled expertise, and level of investment**
  - Trained IBM SOA community over 100K
  - 13,000+ assets in the SOA business catalog (90% from business partners)
  - Broadest, Deepest portfolio of offerings
  - IBM investing over $1B a year to deliver SOA and Web services capabilities
  - More than 700 WebSphere patents and over 6,700 IBM developers

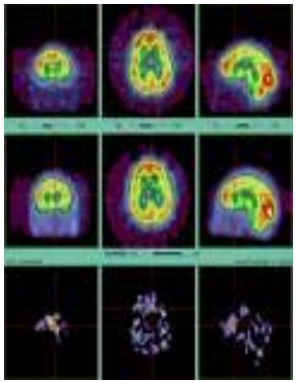
- **Strongest Ecosystem**
  - 7,420 SOA community business partners

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

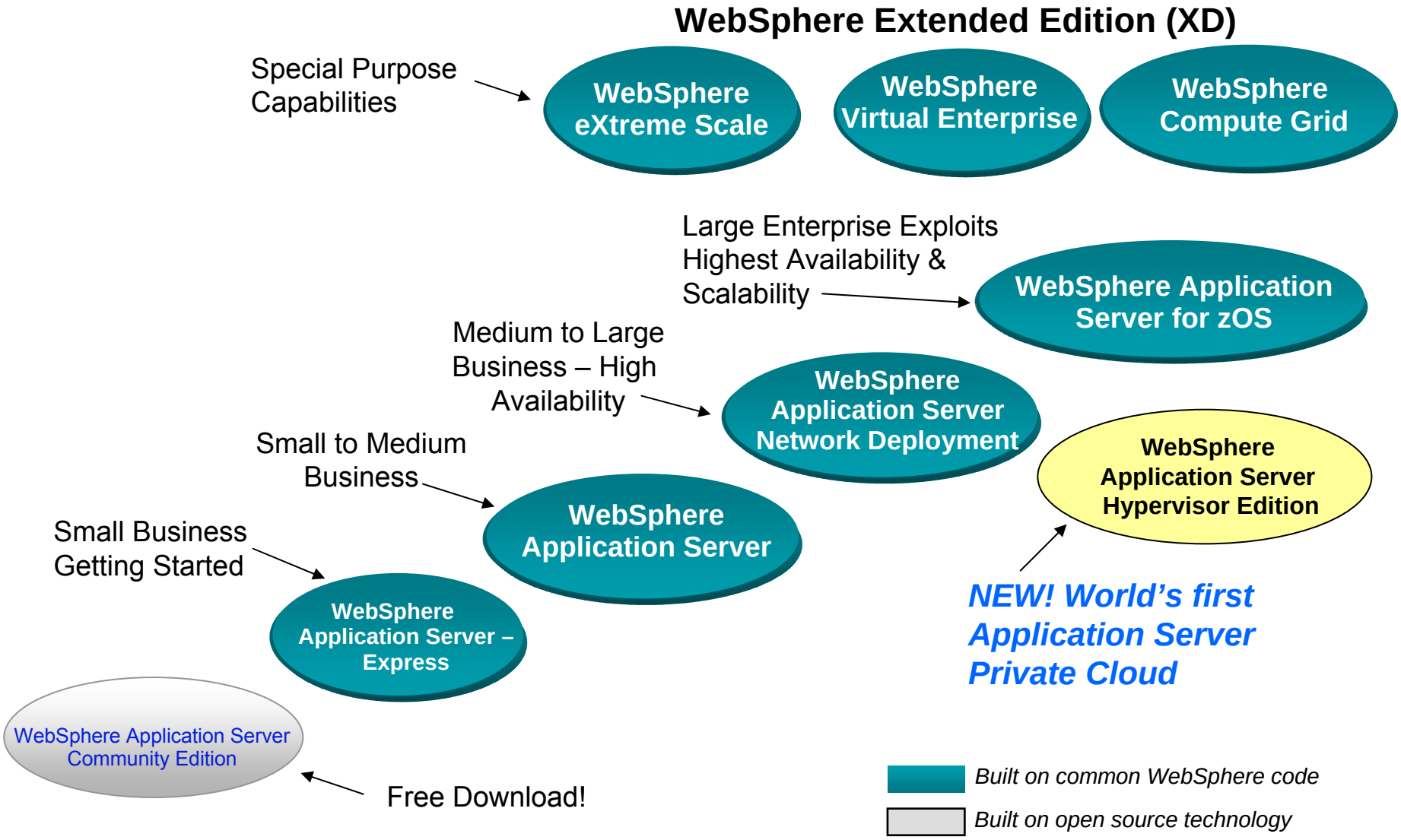
Because of Scalability, Reliability & Availability

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

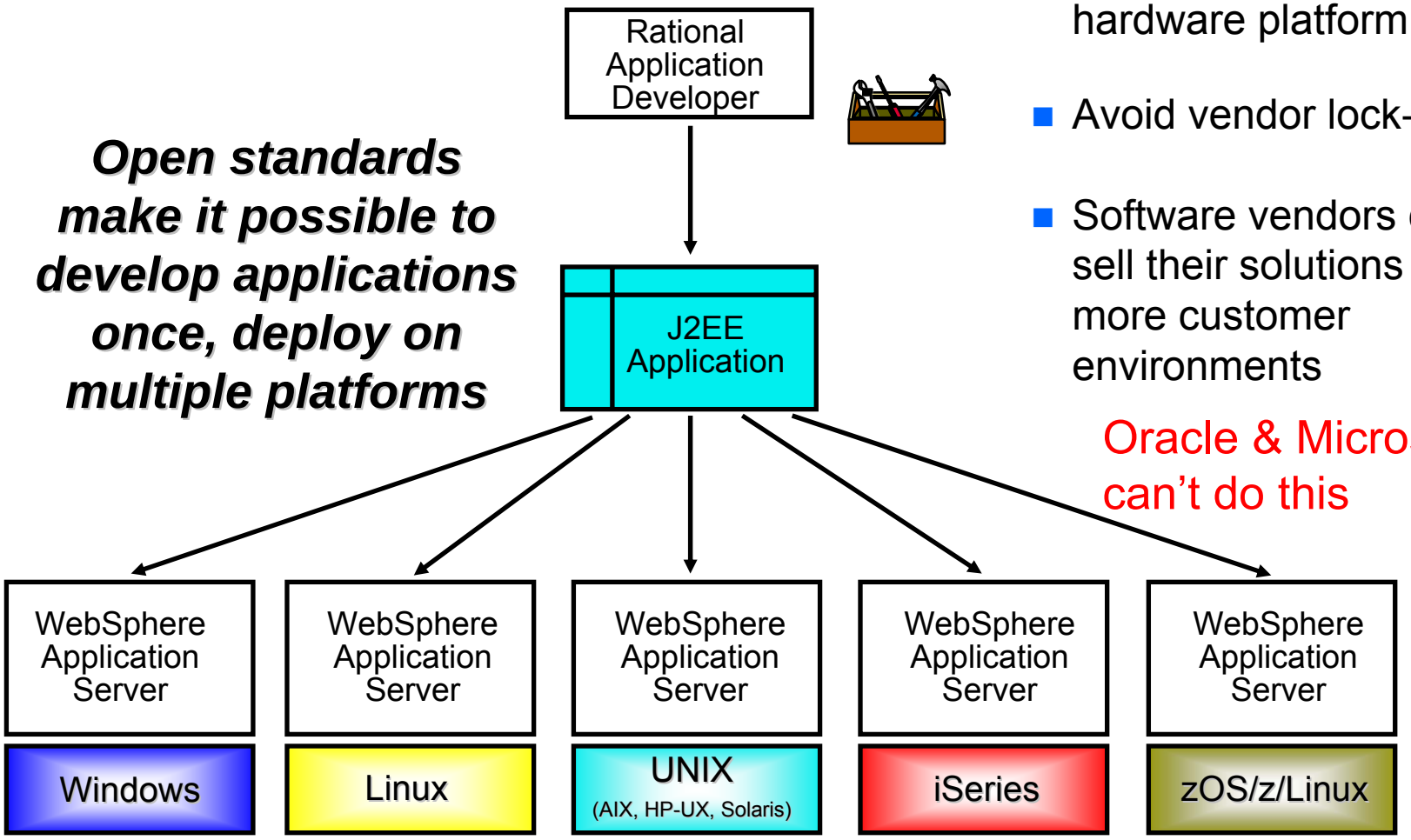


WebSphere Application Server Beats The Competition

- Create once, run anywhere
- Stable architecture to protect investments
- Best performance
- Best transaction integrity
- Cost of ownership lower than Open Source
- Easy cloud-like deployment
- Dynamically adapt to changing workloads based on policies
- Non-stop operation

WebSphere Application Server – Develop Once Run Anywhere

Open standards make it possible to develop applications once, deploy on multiple platforms

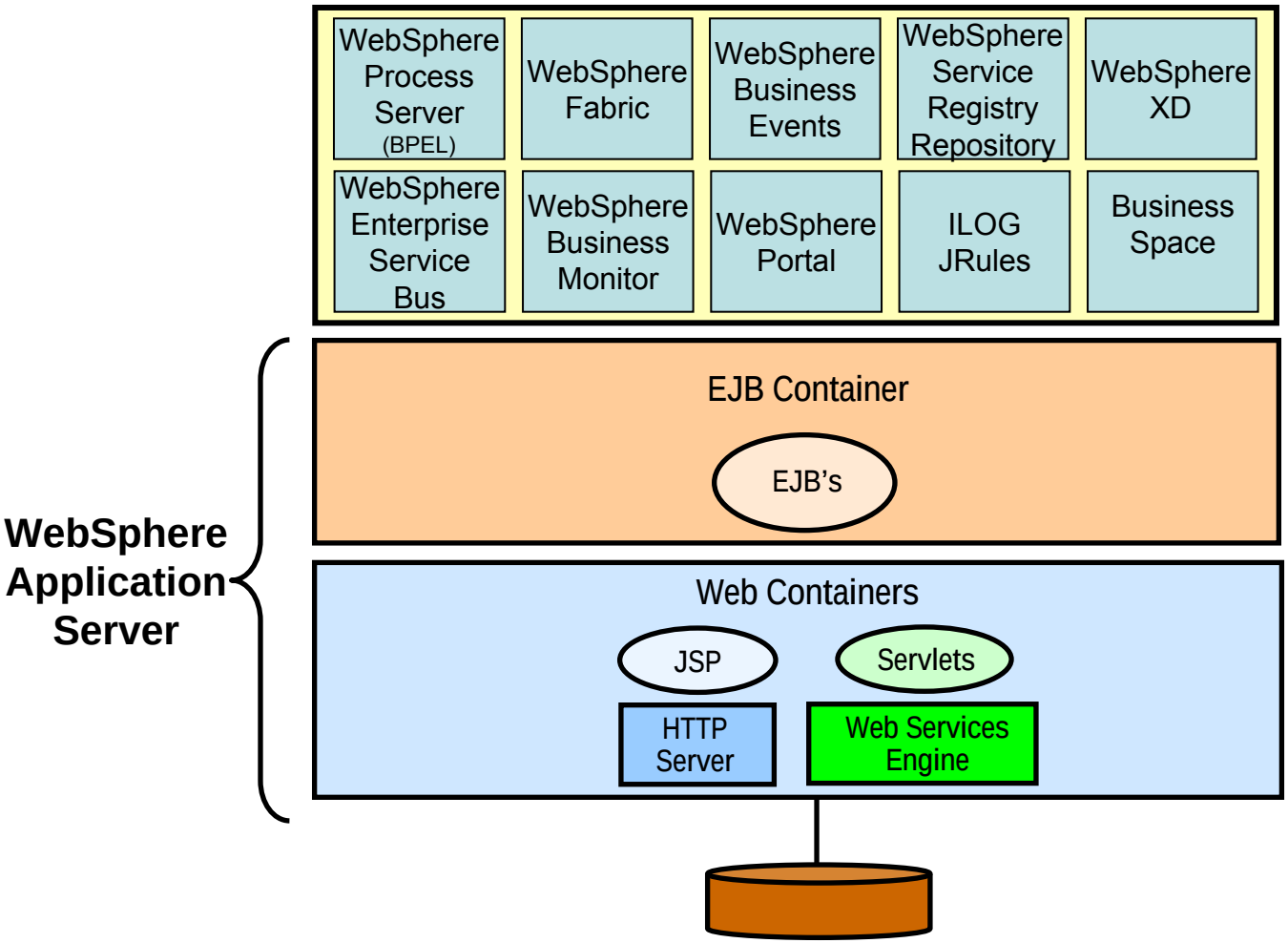


- Flexibility to choose hardware platform
- Avoid vendor lock-in
- Software vendors can sell their solutions into more customer environments

Oracle & Microsoft can't do this

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

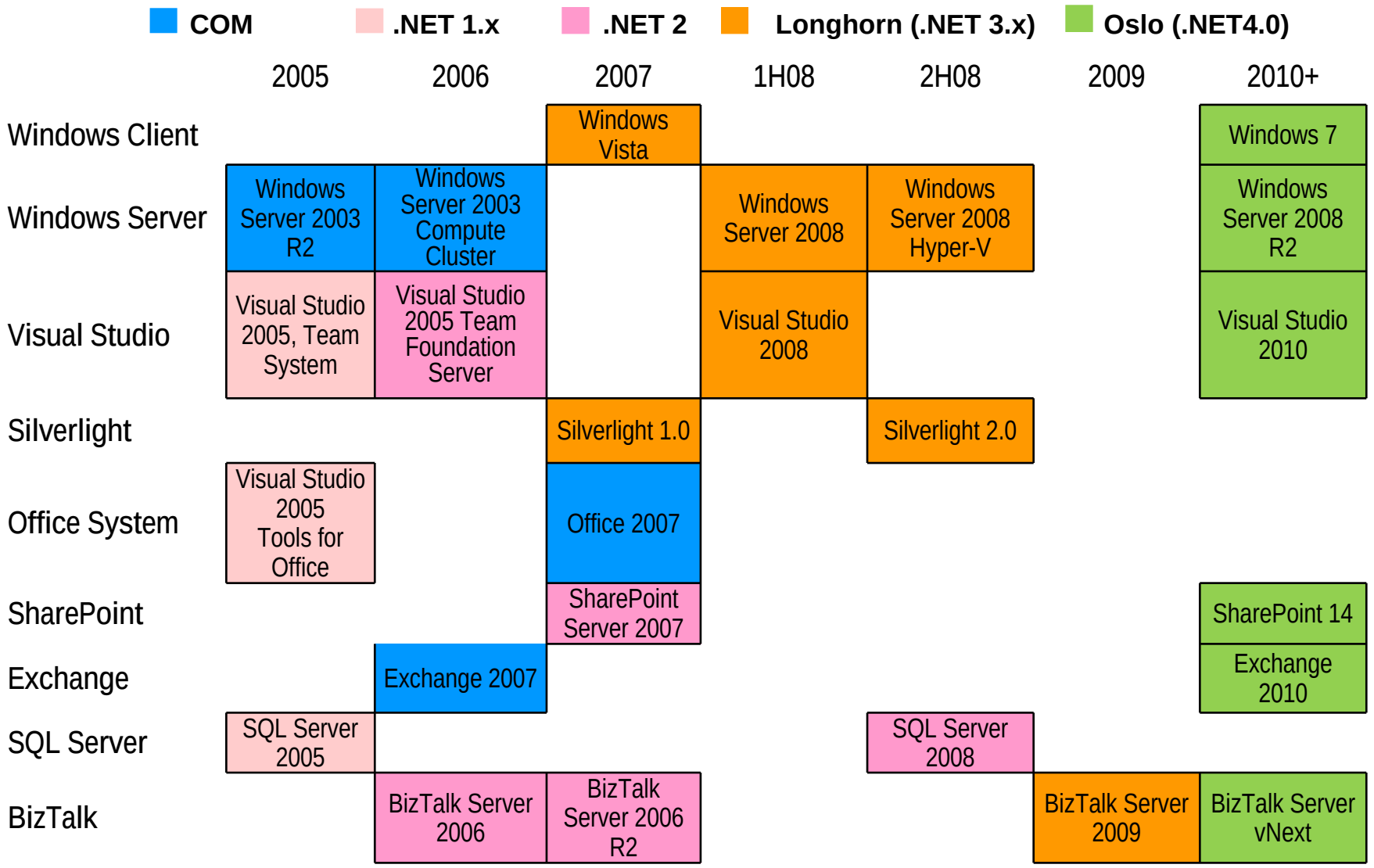
Oracle Fusion Confusion – Not An Integrated Solution! Which Choices Are Strategic?

Function Area	Oracle Product(s)	BEA Product(s)	Total Number
Application Server	■ Oracle Application Server	■ WebLogic Server ★	2
J2EE Development	■ JDeveloper ★ ■ (not Eclipse)	■ WebLogic Workshop (Eclipse)	2
Portal/Web 2.0	■ Oracle Portal ★ ■ WebCenter	■ AquaLogic User Interaction ■ WebLogic Portal ★	4
Modeling	■ BPA Suite (OEM'd IDS Sheer's Aris) ★	■ AquaLogic BPM	2
BPM	■ JDeveloper and BPEL Process Manager ★	■ AquaLogic BPM ★ ■ WebLogic Integration	3
BAM	■ Oracle BAM	■ AquaLogic Monitoring ★ ■ ProActivity BAM (OEM)	3
ESB	■ Oracle AQ ■ Oracle JMS	■ AquaLogic Service Bus ★	3
Registry	■ Systinet (OEM) ★	■ Systinet (OEM) ■ Flashline ★	2

★ = Oracle has said this one is "strategic"

Years Of Migration Misery!

Microsoft Middleware Roadmap Also Creates Migration Misery



Transaction Integrity - A Common Business Challenge

We are going to be selling investment bonds online and need to be sure that our data will be 100% accurate; we can not afford to lose orders!

Service Oriented Finance CIO

WebSphere will maintain process integrity and recover from all adverse conditions

IBM

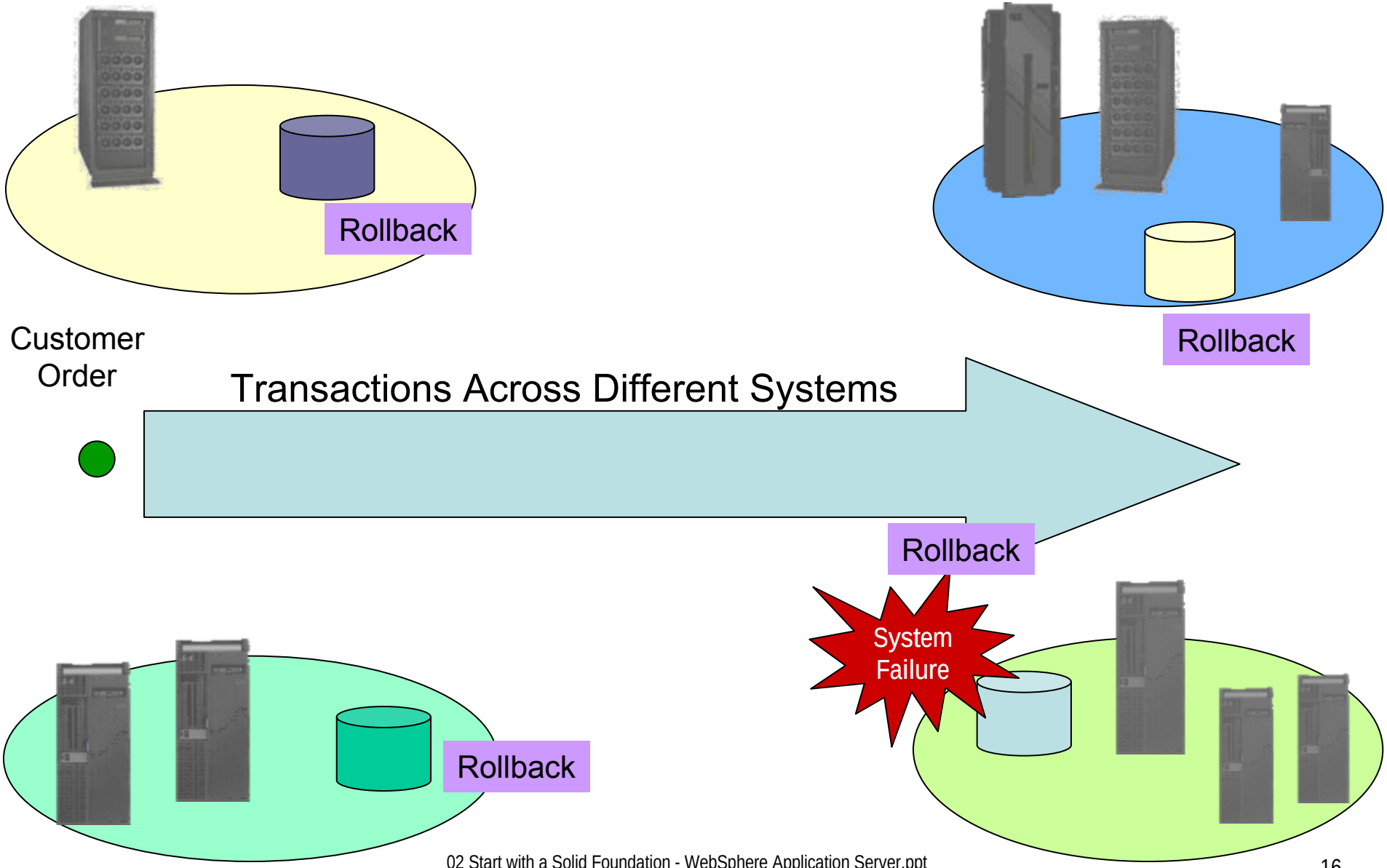
What Is Transaction Integrity?

IBM has been doing this right for 35+ years!!

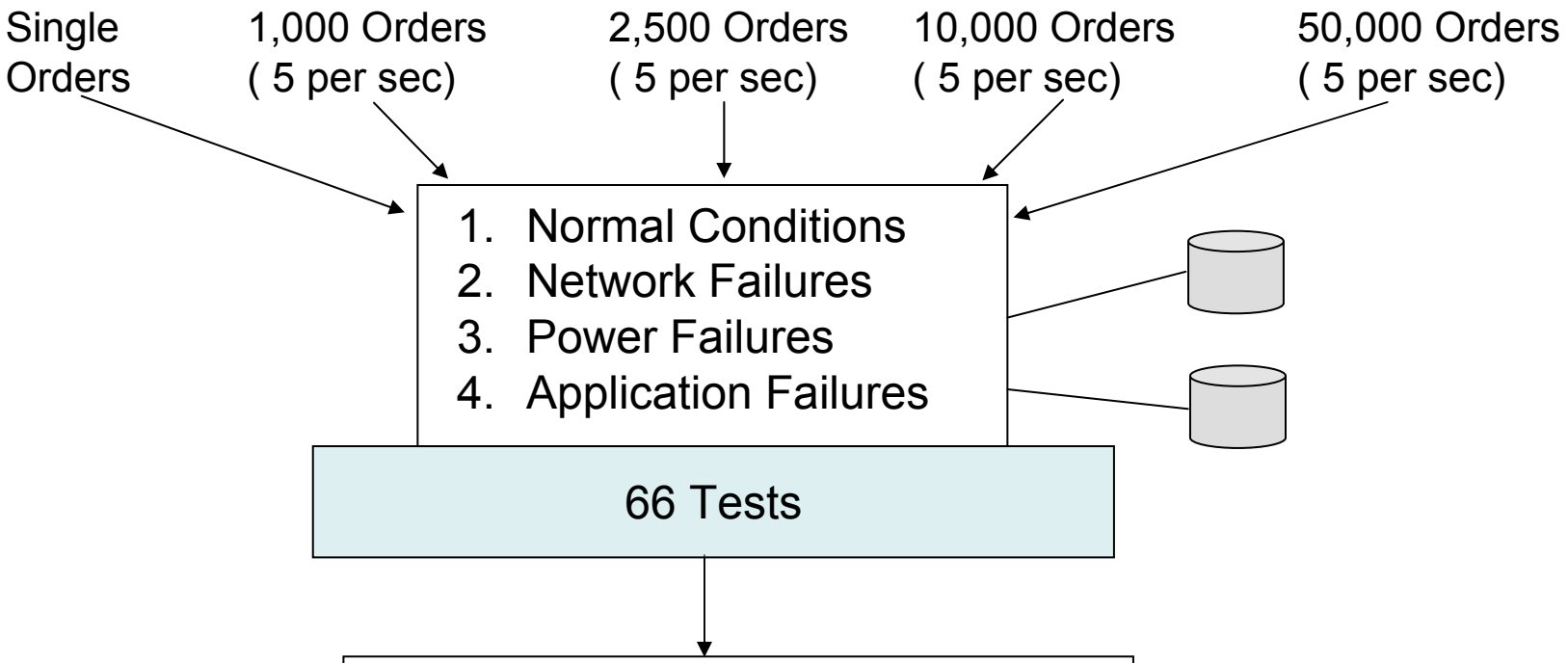
Transaction Integrity is fundamental to any business!

- 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

Synchronous Transaction Integrity – Adverse Conditions

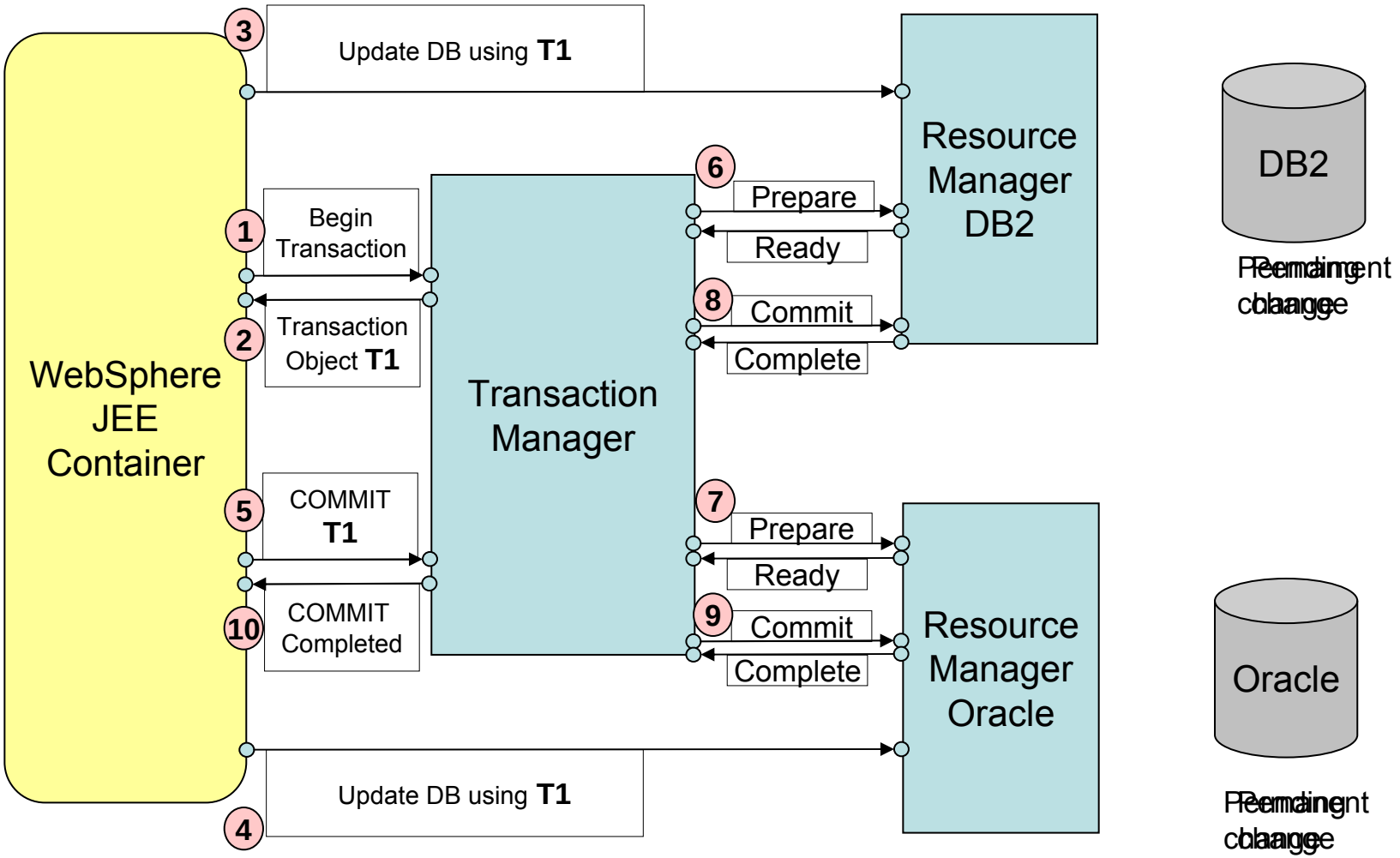


Overview – The IBM Transaction Integrity Study

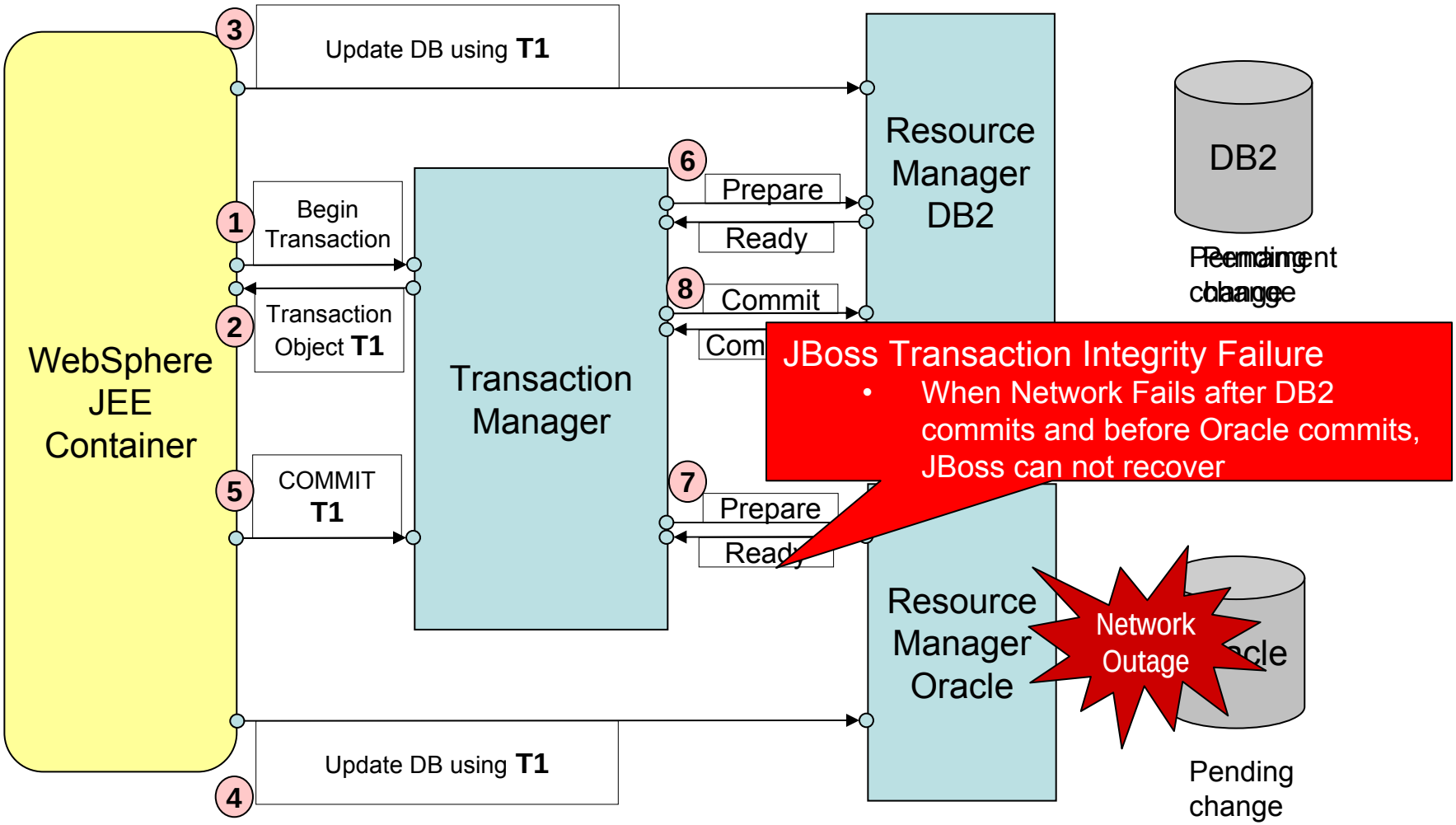


Oracle, BEA, JBoss and Microsoft exhibited these issues

Application Server Test – Two Phase Commit



Application Server Test – Two Phase Commit "In Doubt Transaction" With JBoss

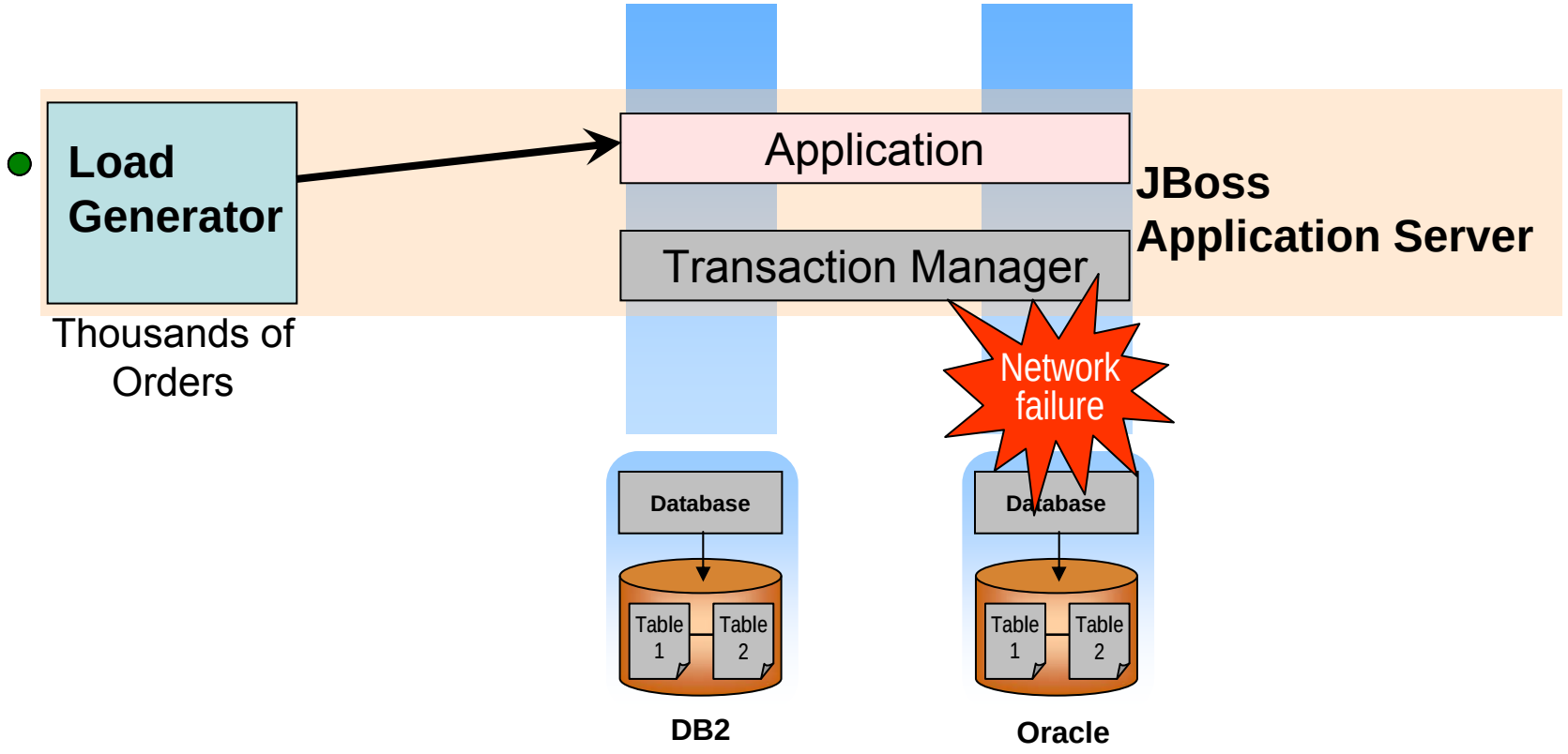


Network Failure Between Data Base Commits

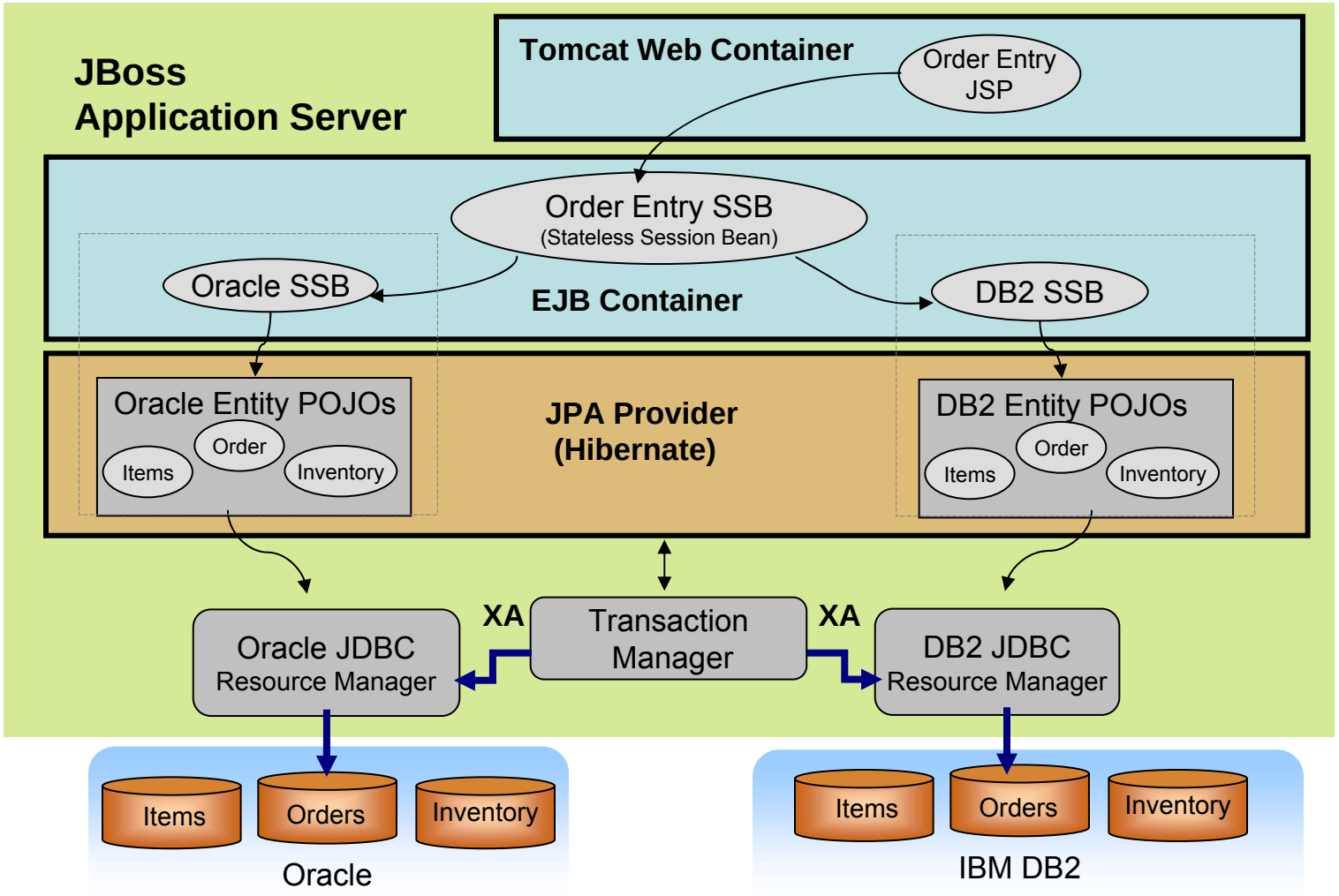
- What happens if there is a network failure after the first data base commit and before the second data base commit?
  - One data base has been changed and the changes committed, locks have been released
  - The other data base has rows locked and is not committed
  - The transaction is “in doubt”
- **In Doubt Transactions have serious ramifications**
  - Held locks impact all applications using the data base
  - Data is inconsistent between the data bases
  - Requires coordinated data base recovery

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 an **in doubt transaction**
  - Return exception after failure, application may retry

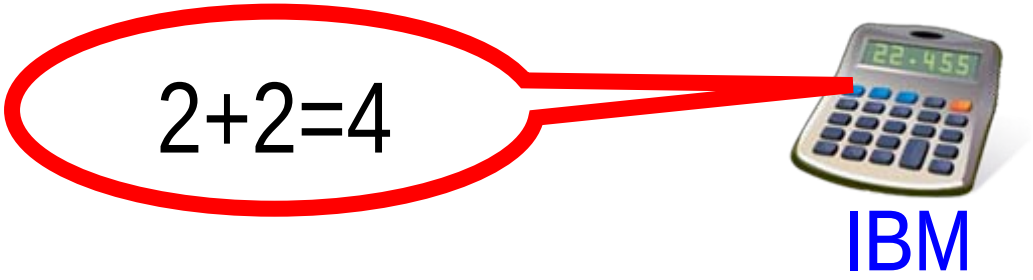


Application Server Test Architecture - Two Phase Commit For JBoss



Think About The Business Implications

- Can a business afford to lose orders?
- Would customers tolerate 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?



DEMO: IBM Synchronous Application Server Under Load With Network Outage

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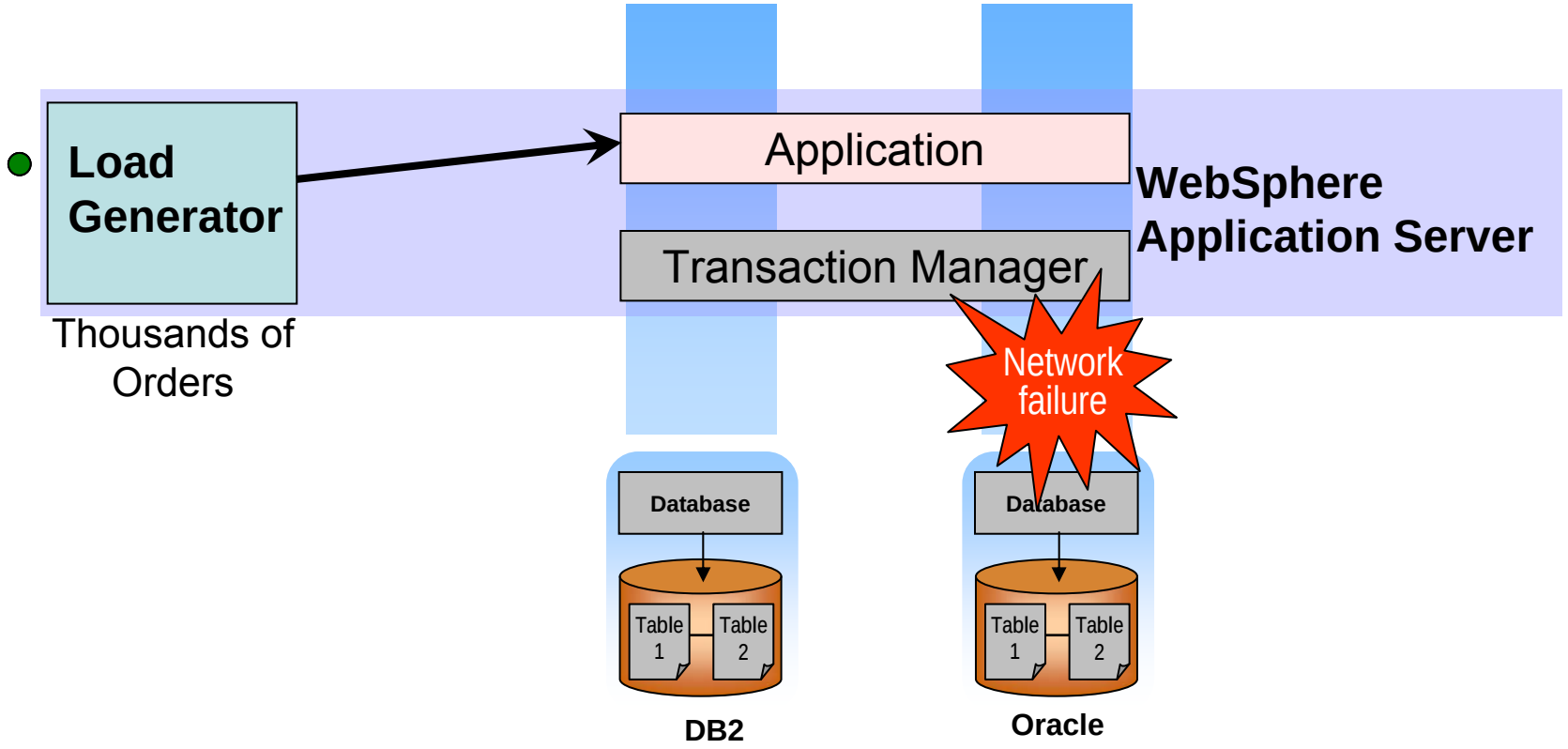


Transaction Integrity – Test Results

IBM

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

JBoss

- Fails to handle a network / power outage causing a data integrity problem
- Little to no support for EJB 3.0 development

Oracle

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

BEA

- Fails to handle a duplicate key, causing a data integrity problem
- Poor recovery from network outages led to corrupted data problems

Microsoft

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

A Foundation For Smart Work

Even Open Source offers a Java Enterprise Edition Application Server.

Why should I pay for WebSphere?

Service Oriented Finance CIO

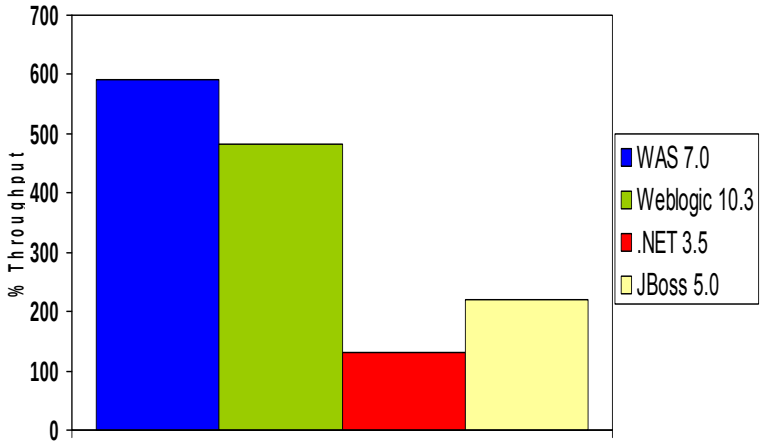
It may come as a surprise to you that WebSphere Application Server actually costs less than JBoss.

Let me prove it to you!

IBM

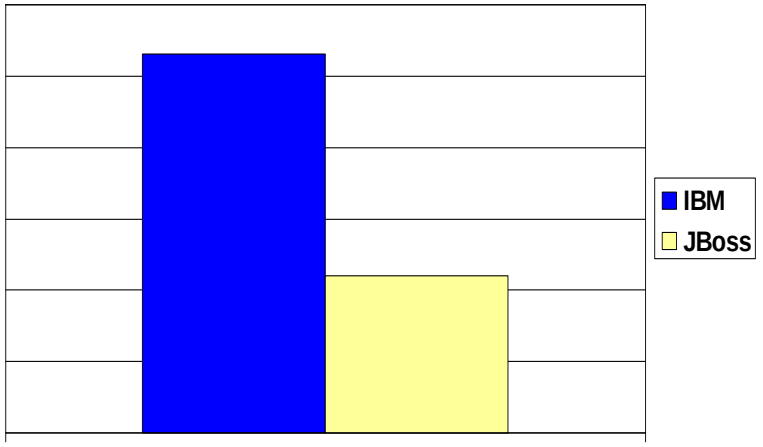
WebSphere Application Server Beats JBoss In Performance

IBM Friendly Bank
Transaction Benchmark

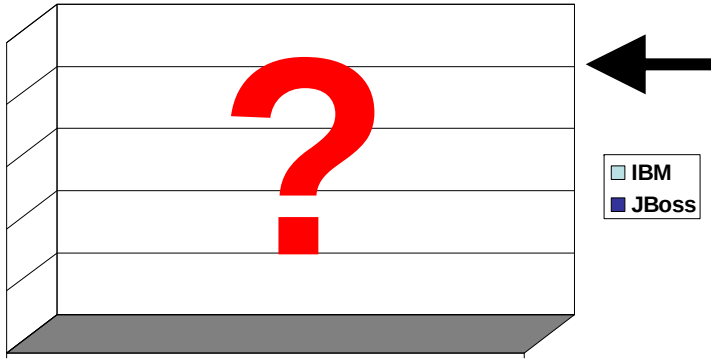


IBM is 2.7x faster

Apache DayTrader
Transaction Benchmark



IBM is 2.4x faster



Red Hat and Open Source JBoss have never submitted a single SPECjAppServer2004 result!

Source: Summa Technologies, Inc. May 2009 TCO Study

2009 IBM Internal Study

Why Does JBoss Cost More Than IBM WebSphere Application Server?

- **Summa Technologies, Inc. May 2009 study compared the TCO of WebSphere Application Server vs. JBoss v.4**

- **Hardware**
  - JBoss needs twice as many servers to handle the same load
  - JBoss needs additional servers for LDAP, Cache, HTTP and WLM[1]
  - **Result: Hardware costs are 2.2x more for JBoss**

- **Software support**
  - JBoss license is free but there is an annual support charge
  - More hardware requires more licenses for LDAP, System Management (JON[2]) and JBoss annual support
  - **Result: Software costs are 2.1x more for JBoss**

[1] Work Load Management (proxy server)

[2] JBoss Operations Network

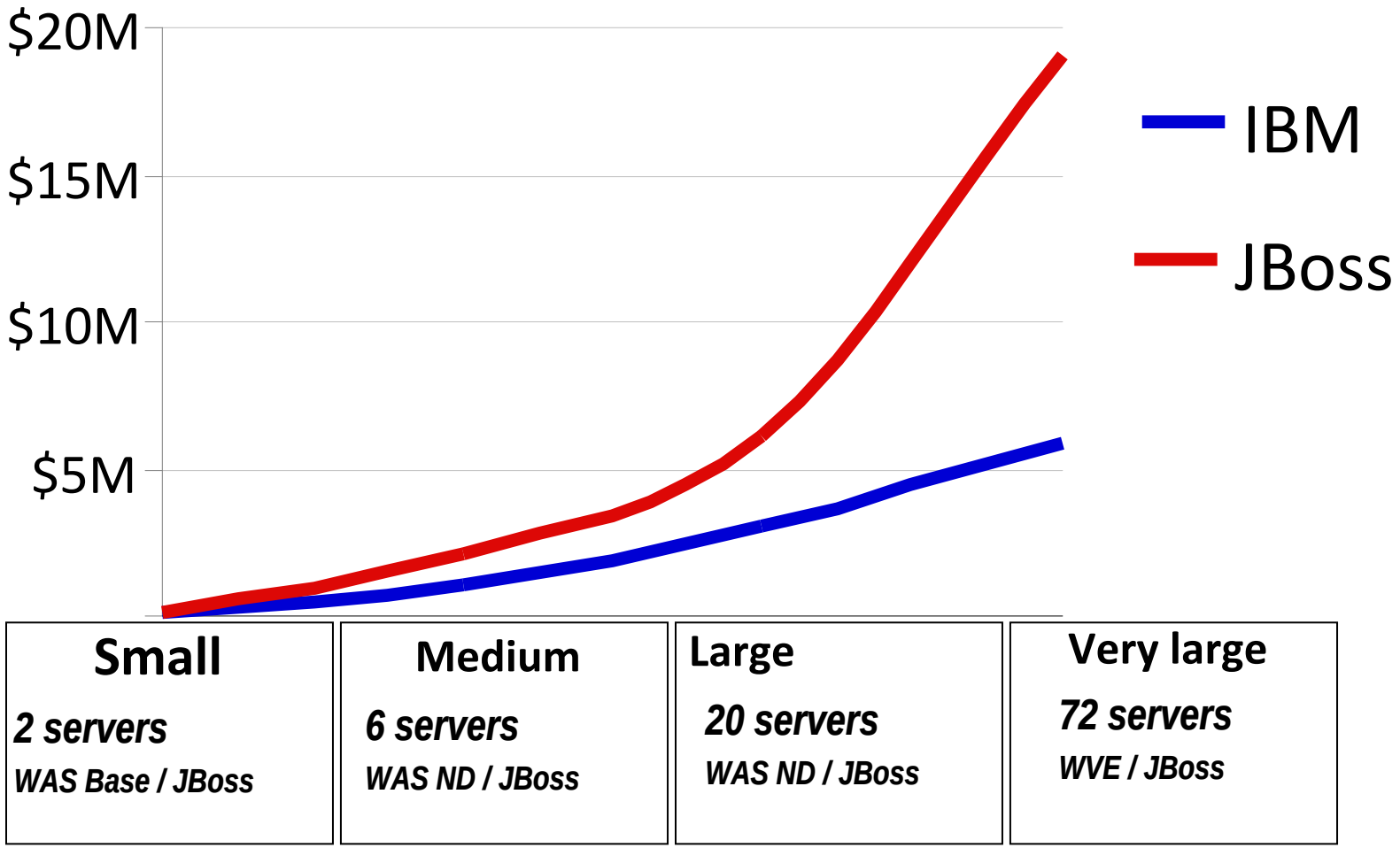
Why Does JBoss Cost More Than IBM WebSphere Application Server (cont)?

- **Application management**
  - More servers require more people to manage them
  - Higher skills required for manual deployment
  - Many deployment changes require server restarts
  - No management tool for JBoss v5
  - No problem determination tools
  - **Result: Application management costs are 2.7x more for JBoss**
- **Infrastructure management**
  - No central administration console or scripting
    - Requires manual XML editing and copying to servers
  - Higher administration skill level for day-to-day maintenance operations
  - JBoss servers required restarts every 12-hours due to out of memory errors
  - **Result: Infrastructure management costs are 1.4x more for JBoss**

Summa Technologies, Inc. May 2009 TCO Study

Summa Technologies TCO Study Results: JBoss Costs More Than WebSphere!

Application Server TCO over 5 years for environments of different scale



Source: Summa Technologies, Inc. May 2009 TCO Study

Concern About RedHat Support For JBoss v5

- RedHat officially supports JBoss v4 (**NOT JBoss v5**)

?

- JBoss v5 has been available since December 2008
  - EJB 3.0
- Problems noted about JBoss v5 in Summa study
  - No native administration scripting or GU
  - Must manually deploy (error prone) applications and configurations to every node in a JBoss 5 cluster
  - Breaks backwards compatibility (Apache DayTrader J2EE 1.4 application that worked in JBoss v4 does not deploy on JBoss v5)
  - Lack of administrative security roles and resource scope separation
  - No audit trails provided
  - Clustered configuration is not secure; can penetrate within the same LAN
  - Documentation is missing or inaccurate

Leverage Cloud Services For More Flexible Deployments

Introducing WebSphere Cloud Services Environment

- Dramatically reduces WebSphere deployment time from weeks to minutes
- Ships with pre-defined application environments based on 10 years of best practices
- Comes pre-loaded with WebSphere Application Server virtual images
  - Optimized to instantly run in server virtualization environments including VMware
- Tamper resistant security in an appliance designed for a private cloud environment
- Out of the box reports for charge-back and management reporting to track usage

WebSphere CloudBurst is the first hardware appliance of its kind

+

WebSphere Application Server Hypervisor Edition

Microsoft, Oracle and JBoss cannot do this!

Service Oriented Finance Needs A Flexible Infrastructure

My Gold class customers should have a better response time than my Silver class customers!

Business Expert

It's too costly to create two different websites for these two classes of customers!

CIO

WebSphere Virtual Enterprise Solves Flexibility Requirements

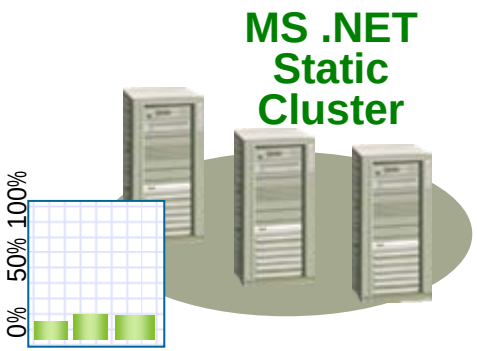
- Ensure differentiated response time objectives for classes of customers and applications
  - On demand router sequences incoming requests based on response time objectives
- Maintain response time objectives despite variable workload demands
  - Dynamic cluster capability borrows processor capacity from lower priority workloads
- Non-stop operation
  - Continuous availability during application maintenance

Microsoft, Oracle and JBoss cannot do all of these!

Shared Pool Dynamic Cluster Environment Increases Server Utilization and Enables Consolidation – Cost Reduction!

Dedicated static cluster environment

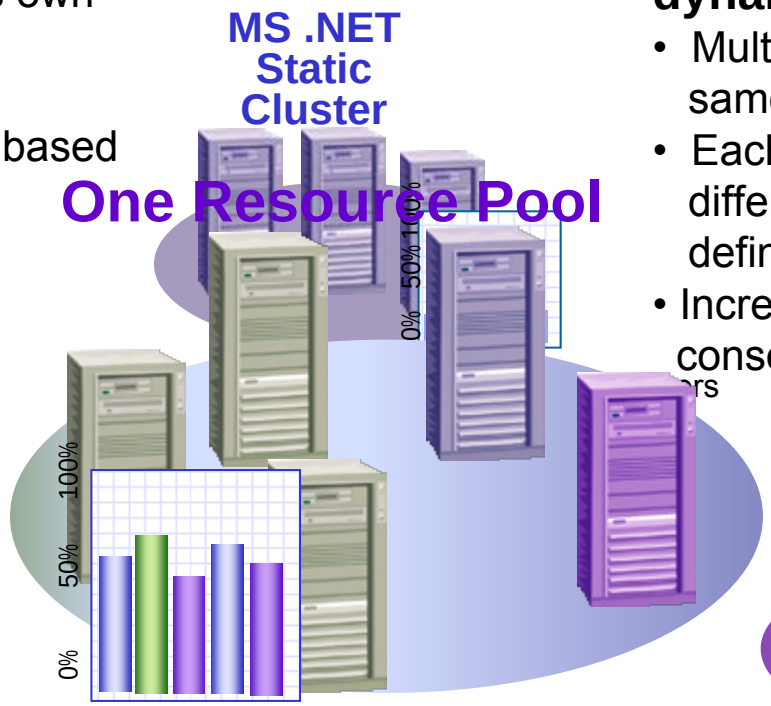
- Each application requires its own dedicated servers
- Low server utilization
- Cannot differentiate service based on response time to unique customer segments



20% Utilized Servers

Stock Trade

Response Time < 1.2s for Gold Users
Response Time < 2s for Silver Users
Response Time < 4s for Bronze Users



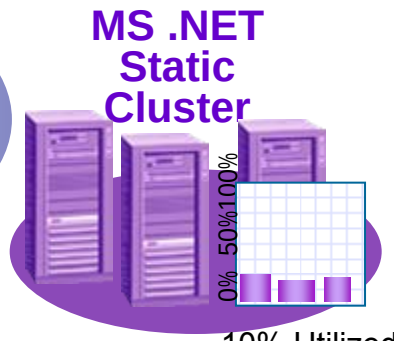
55% Utilization
44% Consolidation

Stock Query

Response Time < 1s

Shared resource pool dynamic cluster environment

- Multiple applications share the same server resources
- Each application can support differentiated service levels defined by response time goals
- Increases utilization and enables consolidation



10% Utilized Servers

Account Mgmt.

Response Time < 2s

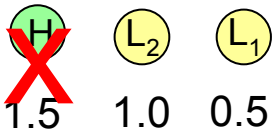
On Demand Router Sequences Requests To Satisfy Differentiated Response Time Objectives

- H **Response time objective is 1 second**
- L **Response time objective is 2 seconds**

Both requests require 0.5 second to process.

Incoming Request Queue

Response Time



Response time objective not met

On Demand Router Sequences Requests To Satisfy Differentiated Response Time Objectives

H **Response time objective is 1 second**

L **Response time objective is 2 seconds**

Both requests require 0.5 second to process.

Incoming Request Queue

H L_2 L_1 H

On Demand Router

Response Time

H L_2 L_1

1.5 1.0 0.5

Response time objective not met

L_2 L_1 H

1.5 1.0 0.5

All response time objectives met

WebSphere Virtual Enterprise - Dynamic Workload Management

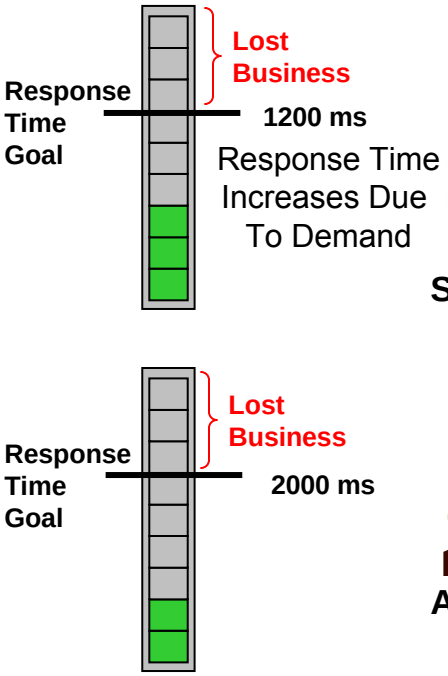
Service Policies

Client Requests

WVE On Demand Router

1. Classify Requests
2. Prioritize Requests
3. Dispatch Requests

Shared Resource Pool

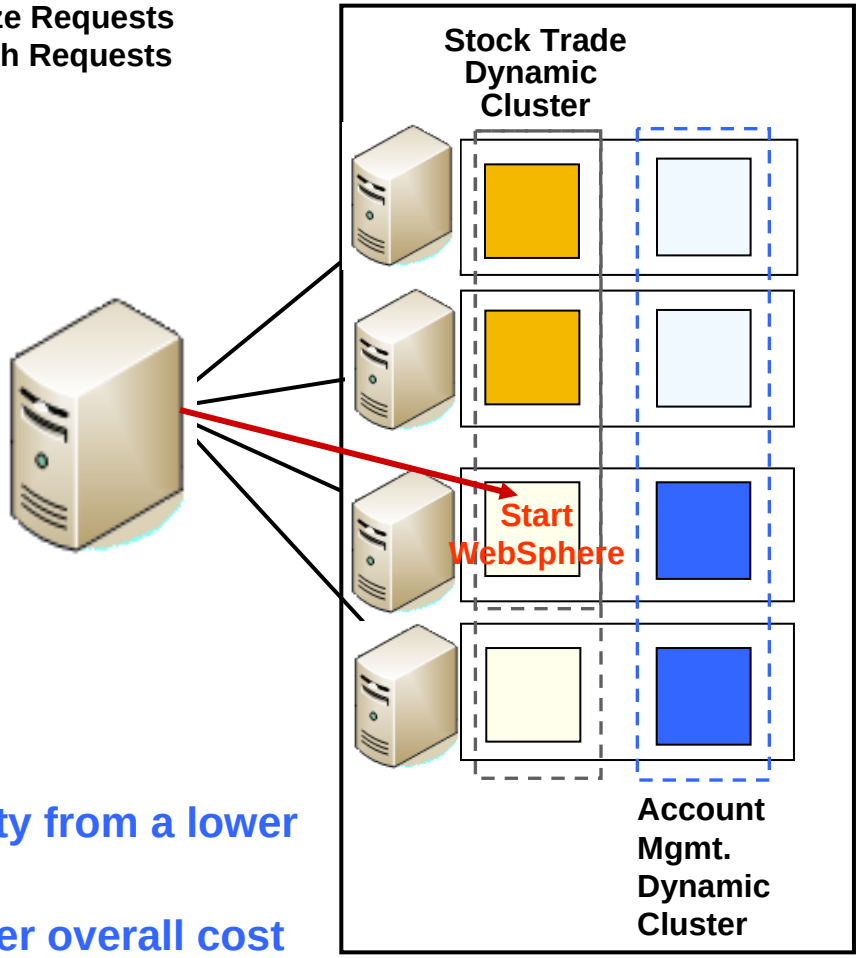


Stock Trade

Account Mgmt.

High Priority Requests

Low Priority Requests

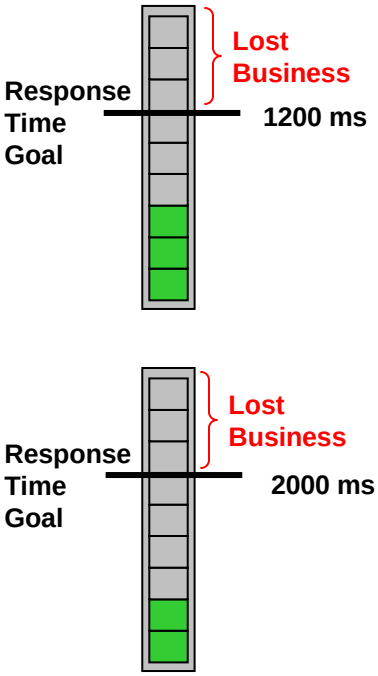


WVE borrows processing capacity from a lower priority workload.

Result: Better utilization and lower overall cost

WebSphere Virtual Enterprise - Dynamic Workload Management

Service Policies



Client Requests

Stock Trade

Account Mgmt.

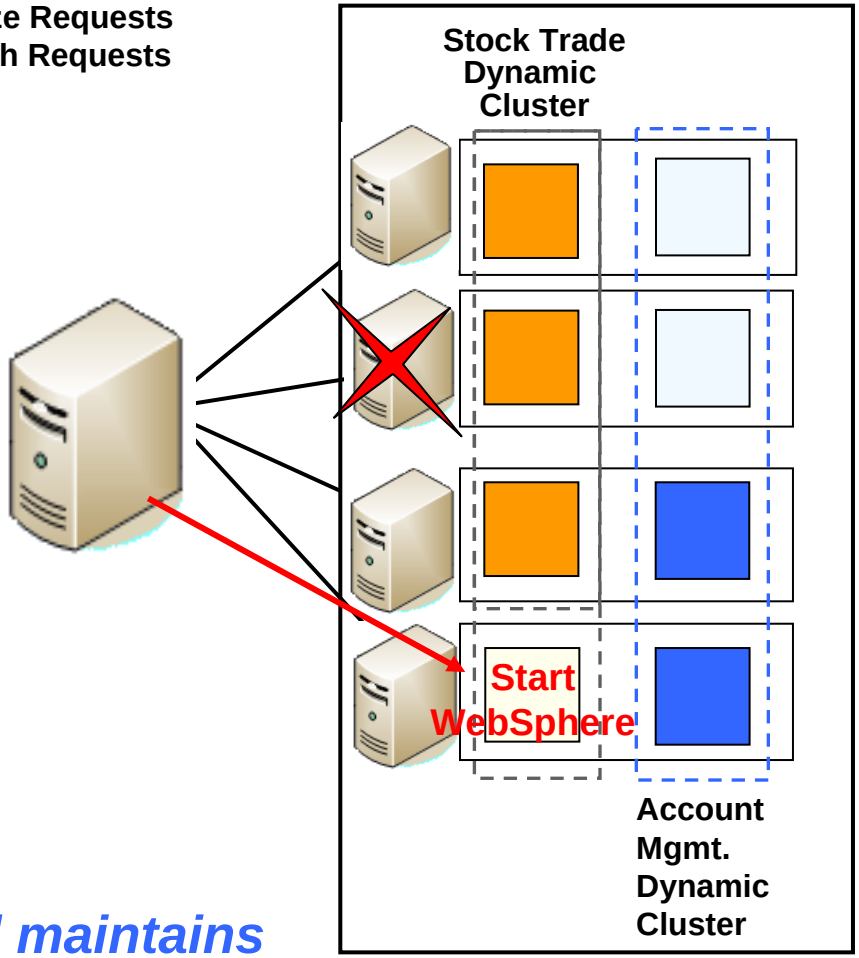
WVE On Demand Router

1. Classify Requests
2. Prioritize Requests
3. Dispatch Requests

High Priority Requests

Low Priority Requests

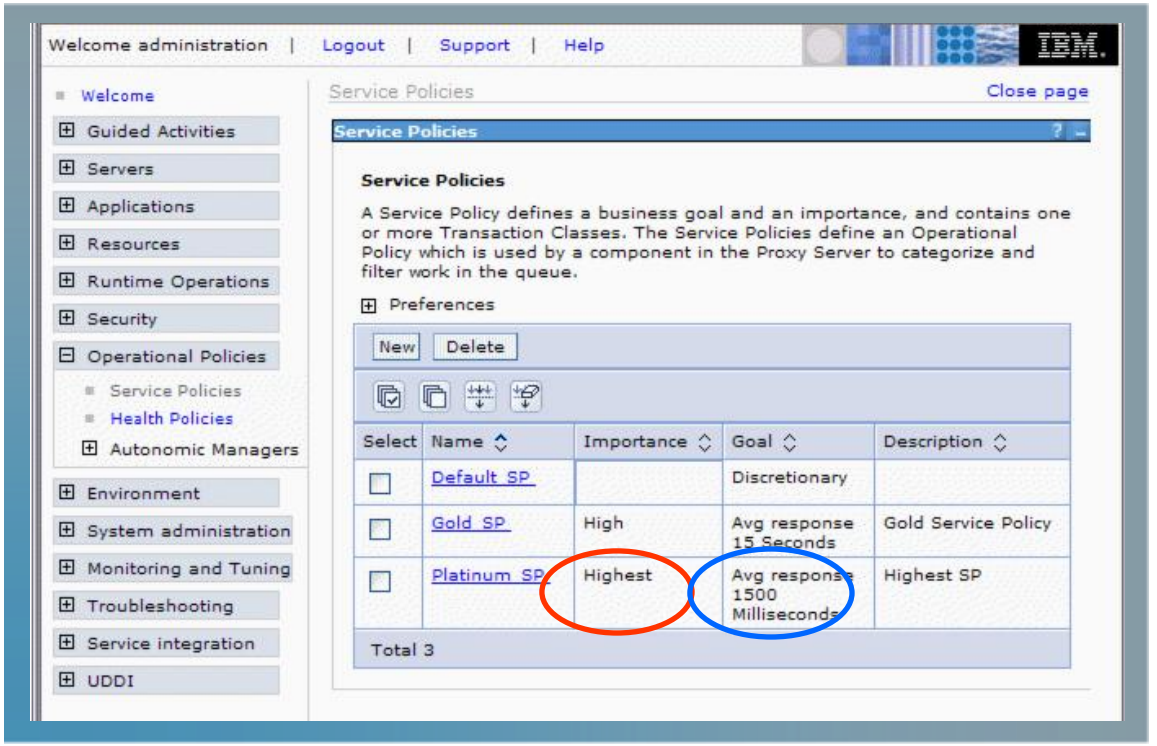
Shared Resource Pool



High priority workload maintains response time objectives despite server failure.

Response Time Management Using Service Policies

- Define service level goals with service policies
- Service policies specify the response time goals and the relative importance of the service policy relative to other service policies
- Application requests are mapped to service policies based on rules that classify, prioritize, and intelligently route requests to ensure that service policies are met



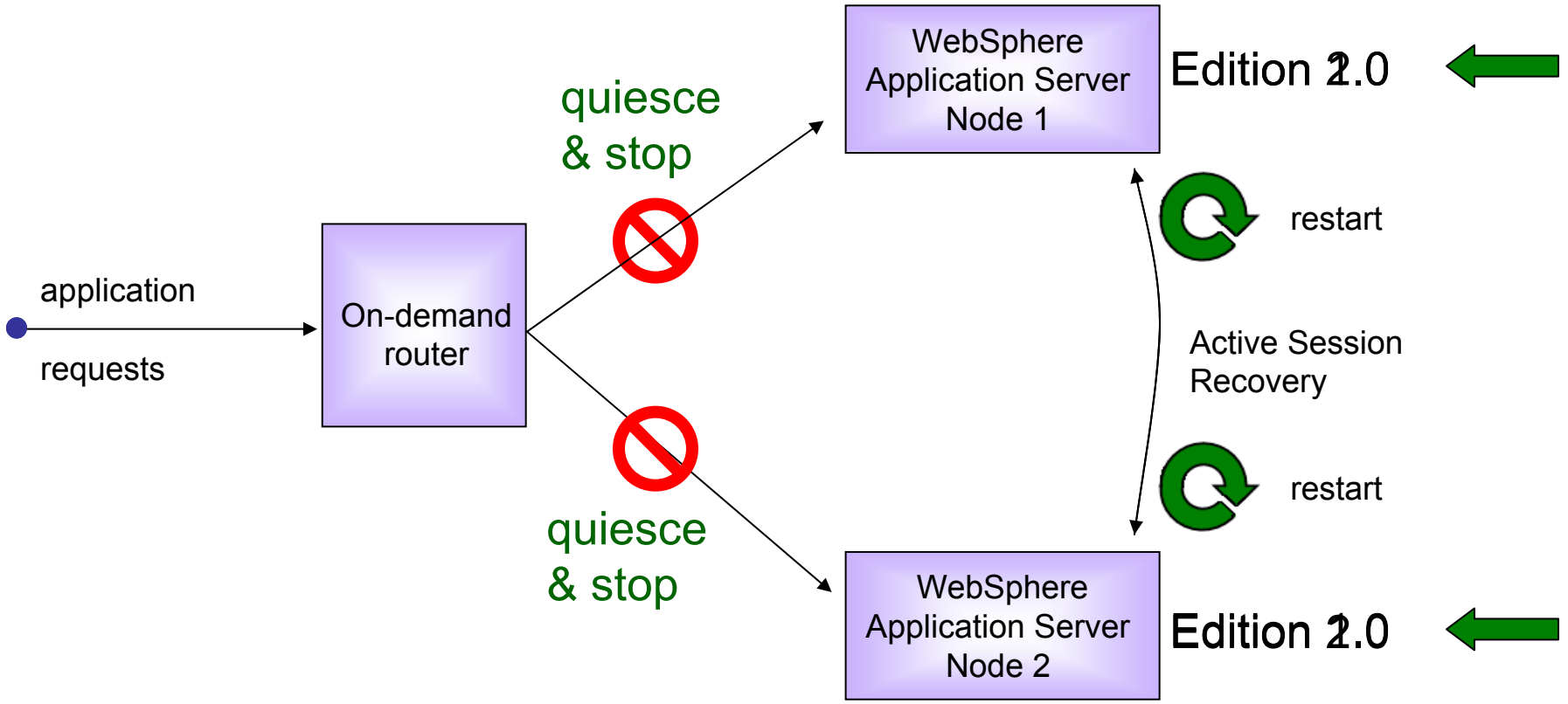
Service Policies define the relative importance and response time goals of application services

IBM Beats Oracle And Microsoft In Service Policy Management

- Oracle WebLogic Operations Control
  - Service policies are not defined as request response times
    - Out of the box service policies based on constraints such
      - Min/Max JVM Processor Load
      - Min/Max Avg Processor Load
  - No fine grained classification of application requests
    - All requests to the same application process are treated the same
  - Complex creation and administration of service policies
    - Must manually create policies that specify when to start additional application servers
  - No monitoring of application level request response time
    - Can only monitor utilization of resources
- Microsoft
  - No service policy management

Demo: Non-stop Operation During Software Maintenance

- Deploy new applications with lower risk of losing service.
- Deploy application versions without interruption.



WebSphere Virtual Enterprise Demonstrates Five Areas Of Cost Savings

Based On Over 60 Customer Assessments!

1. Typical hardware cost savings of 25 – 40%
2. Typical energy cost savings of 25 – 40%
3. Typical administrative operational cost savings of 35 – 55%
4. Typical planned maintenance cost savings of 45 – 55%
5. Typical reduction in unplanned outages of up to 98%
   - Achieve 99.999% uptime
   - Reduce unplanned outages from 263 min. to 5 min. annually

IBM Continues To Invest Heavily In WebSphere Application Server

I have heard that there are some new features in WAS Version 7?

Service Oriented Finance CIO

IBM continues to keep up with the latest standards as well as adding significant function that Increased productivity and reduces costs.

Let's look at a few……

IBM

Introducing Some Of The New Features In IBM WebSphere Application Server v7

1. Innovative flexible foundation to improve customer satisfaction

2. High Performance for 24 x 7, secure, business availability

3. Infrastructure Enhancements

Infrastructure	*Performance*	*Flexible*
Enhanced Standards		NEW Flexible Management
Enhanced Developer Environment	Enhanced Performance	New Dynamic Provisioning
Feature Pack Support		Enhanced Administration

Introducing The New Features In WebSphere Application Server v7 – Developer Productivity

New Innovative Developer Concepts

- **Uses the concept of *progressive disclosure***
- ***Annotations and injection support* reduced complexity**
- **EJBs can be developed as Plain Old Java Objects (POJOs)**
- **FULL POJO Support with annotations**

EJB 2.1

```
public abstract class CustomerBean implements Customer,
      EntityBean {
  public CustomerBean() { }
  public abstract String getName();
  public abstract void setName(String n);
  public abstract int getAmountSpent();
  public abstract void setAmountSpent(int amount);
private EntityContext ctx;

  public String ejbCreateByName(String) throws
      EJBException    { }
  public void setEntityContext (EntityContext theCtx) throws
      EJBException {
    ctx = theCtx; }
  public void unsetEntityContext() throws EJBException {
    ctx = null; }
}
```

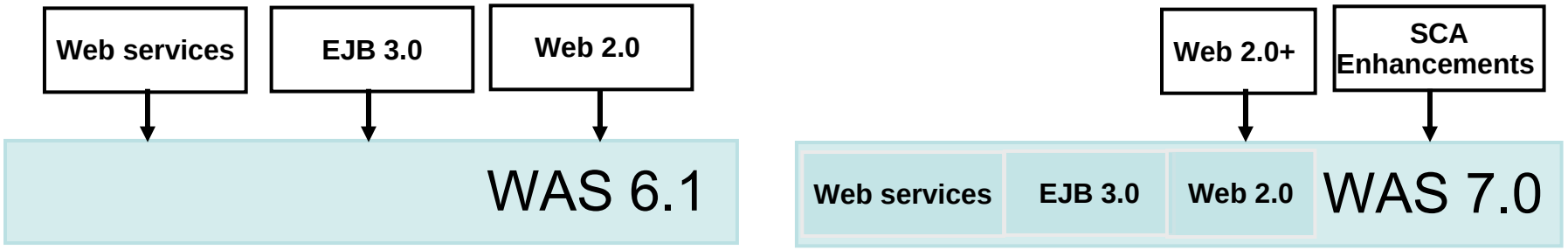
EJB 3.0

```
@Entity @Table (name="CUSTS")
public class Customer implements Serializable {
  public Customer() { }
  @Id
  public String getName()  {  return name; }
  public void setName(String n)  {  name = n; }
  public int getAmountSpent()  { return amountSpent; }
  public void setAmountSpent(int a) { amountSpent = a; }
  private String name;
  private int amountSpent;
}
```

Annotations & dependency injection improve productivity !

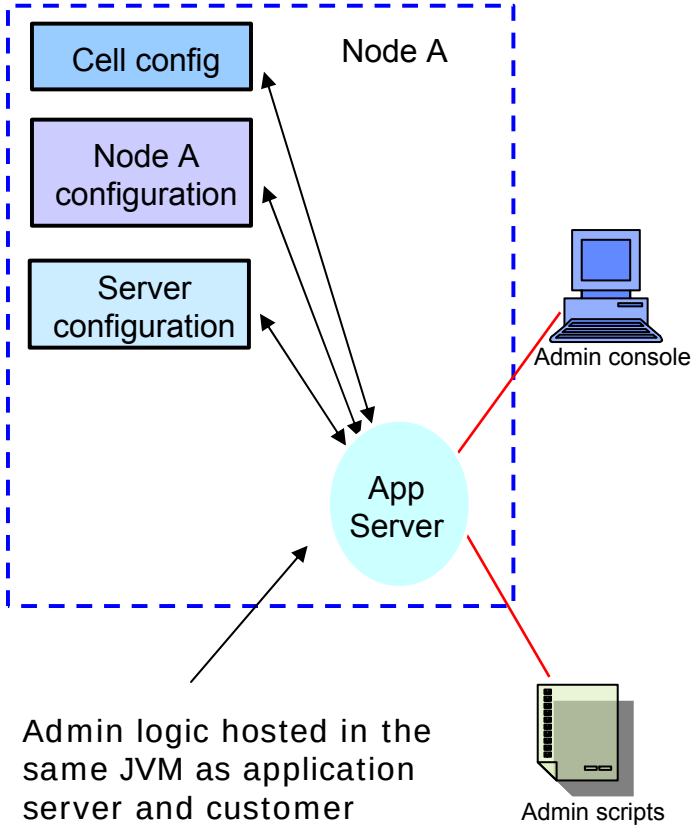
Introducing The New Features In WebSphere Application Server v7 - Usability

- ***Enhanced Standards***
  - Java EE5 certification and Java Development Kit (JDK) 6.0
  - EJB 3.0 support, and Java Persistence API (JPA)
  - WS-I Basic Profile 1.2 and 2.0, WS-I Reliable Secure Profile
  - Support for Java Portlets (JSR 286)
- ***Feature Packs***
  - *Enable you to implement new standards and features without having to upgrade to the next version of WAS*

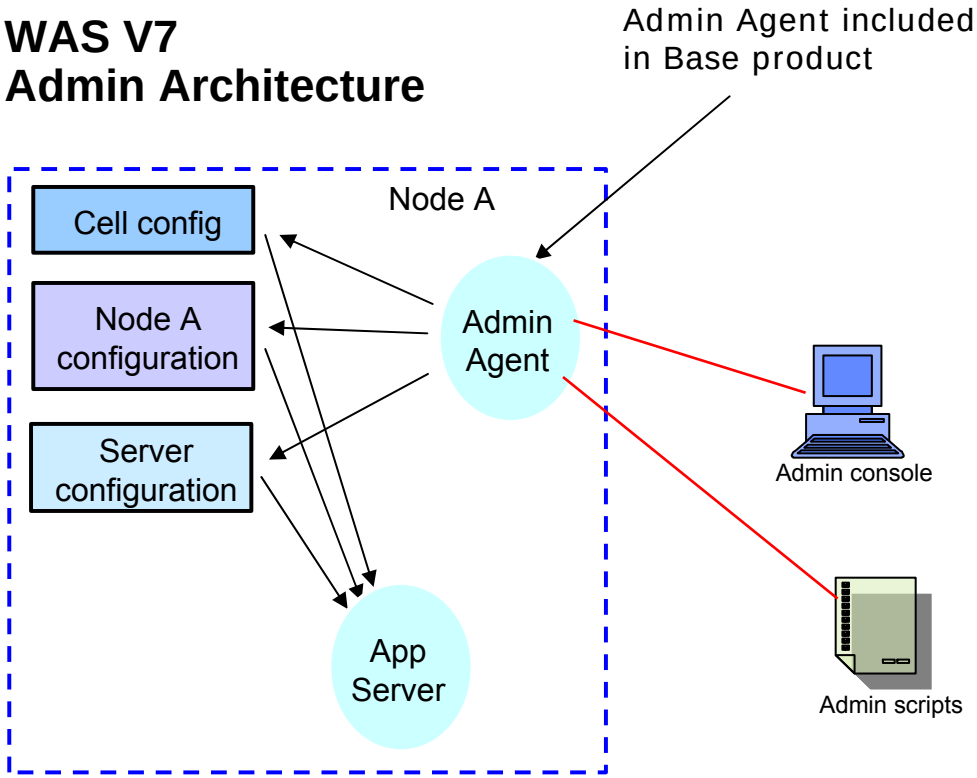


WAS V7 Introduces A New Flexible Management Option – Admin Agent

WAS V5 & V6 Admin Architecture

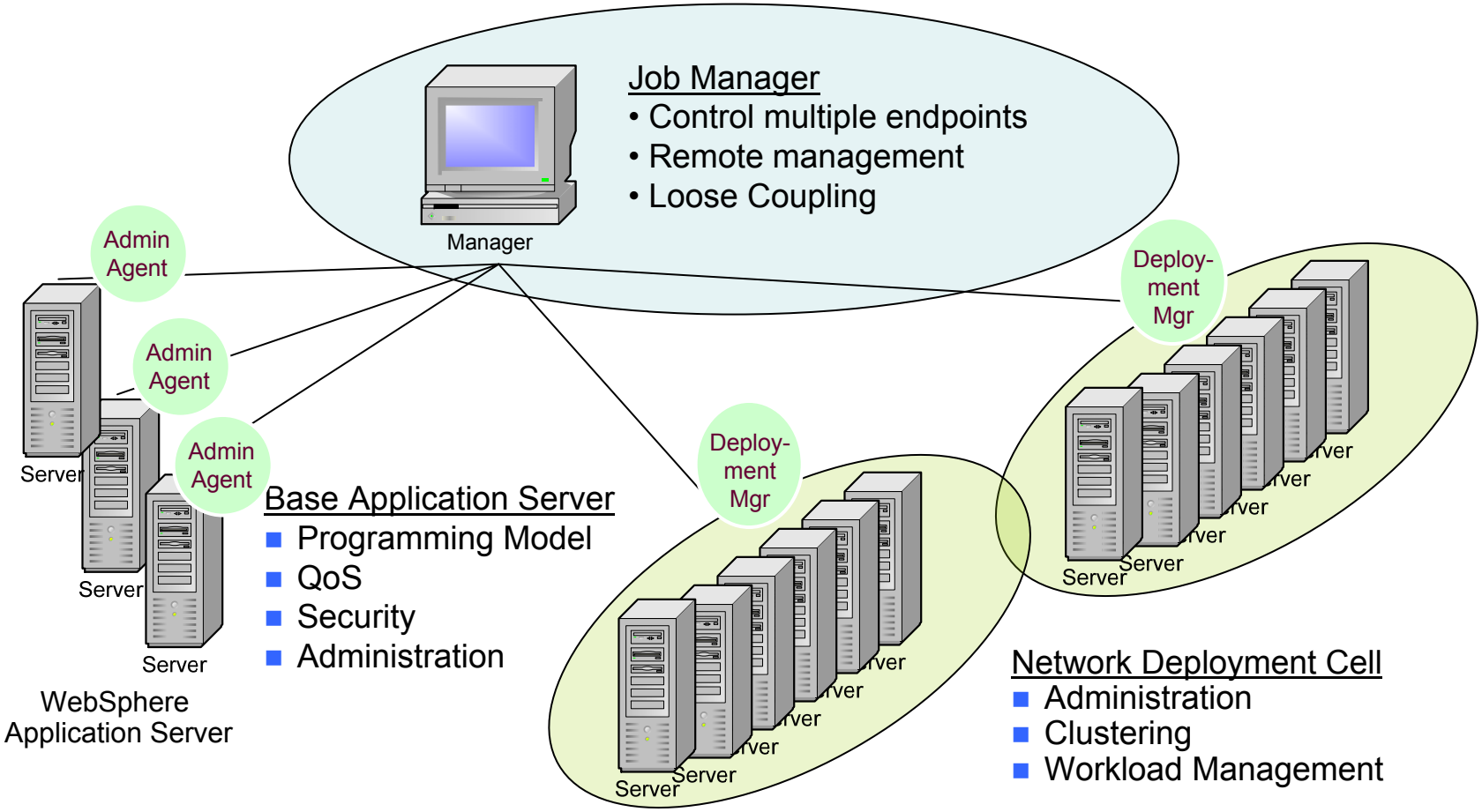


WAS V7 Admin Architecture



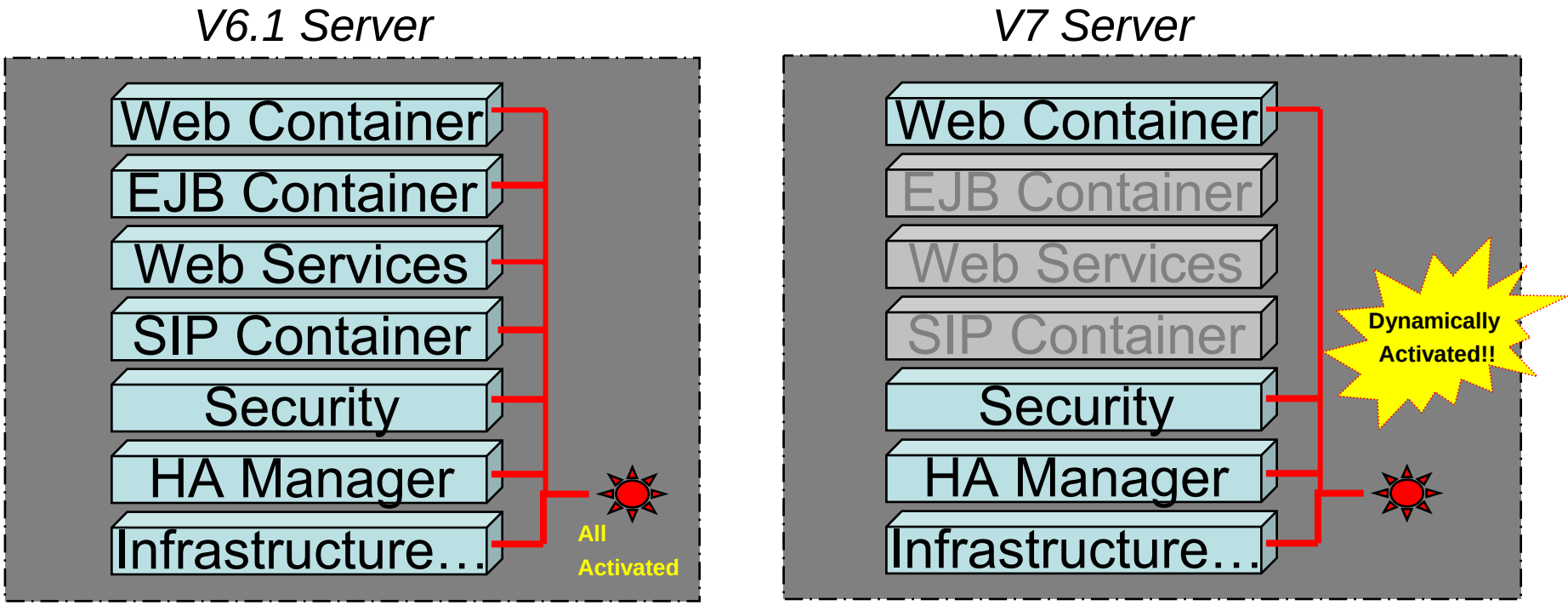
Distributed Multi-Node Management

WAS v7 Sets the Stage for More Flexible Management Topologies …



Dynamic Provisioning - Flexibility To Quickly Start Just What You Need

- Dynamic start of application server components based
- Reduces the runtime footprint – less memory required
- Can significantly reduce startup times; 50% is typical



WebSphere Application Server – The Best Foundation For Your Business

	IBM	Oracle	Open Source	Microsoft
Create once, run anywhere	YES	NO	NO	NO
Stable architecture to protect investments	YES	NO	NO	NO
Performance	YES	FAIR	NO	NO
Transaction Integrity	YES	NO	NO	NO
TCO Lower than JBoss	YES	N/A	NO	N/A
Easy Cloud-Like Deployment	YES	NO	NO	NO
Dynamically Adapt to Changing Workloads	YES	NO	NO	NO
Non-Stop Operation	YES	FAIR	NO	NO

Think About It

Can you afford to corrupt the data in your systems?
Can you afford to lose customers because of slow response times?
Do you want to build your enterprise on a solid foundation?

IBM

Now I see the value of a strong foundation – WebSphere Application Server.

Service Oriented Finance
CIO