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IBM WebSphere Application Server and Extensions

WebSphere

| the fastest way to dynamic e-business |

Customer and Partner Applications

Application Accelerators

| Development | Presentation | Deployment | Integration |

Foundation Extensions

Cross-Platform Foundation

Customer and Partner Applications

MQSeries Workflow   **WS Commerce Suite**   **Lotus Collaboration**   **WS B2B Integrator**

Application Accelerators

Development

WS Homepage Builder
WS Studio
VisualAge for Java
Versata Studio
WS Business Components
VisualAge Generator

Presentation

WS Transcoding Publisher
WS Everyplace Suite
WS Voice Server
WS Translation Server
WS Personalization
WS Portal Server
Web Content Management

Deployment

WS Edge Server
WS Site Analyzer
Tivoli Policy Director

Integration

MQSeries Integrator
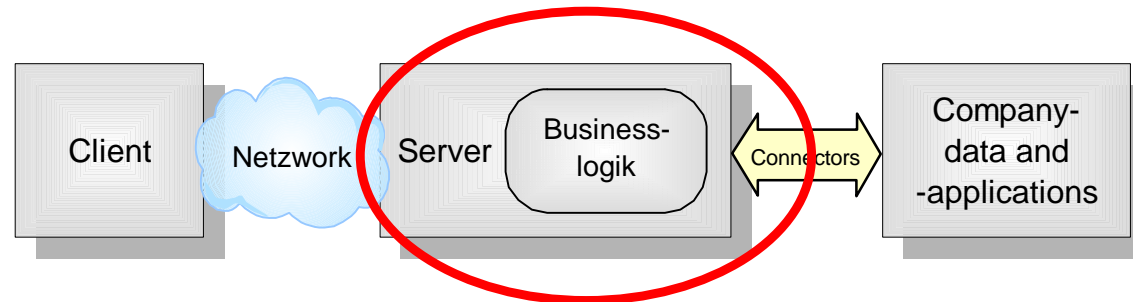MQ Adapter Offering
Host Integration

Foundation Extensions

WebSphere Application Server   **MQSeries**

Cross-Platform Foundation

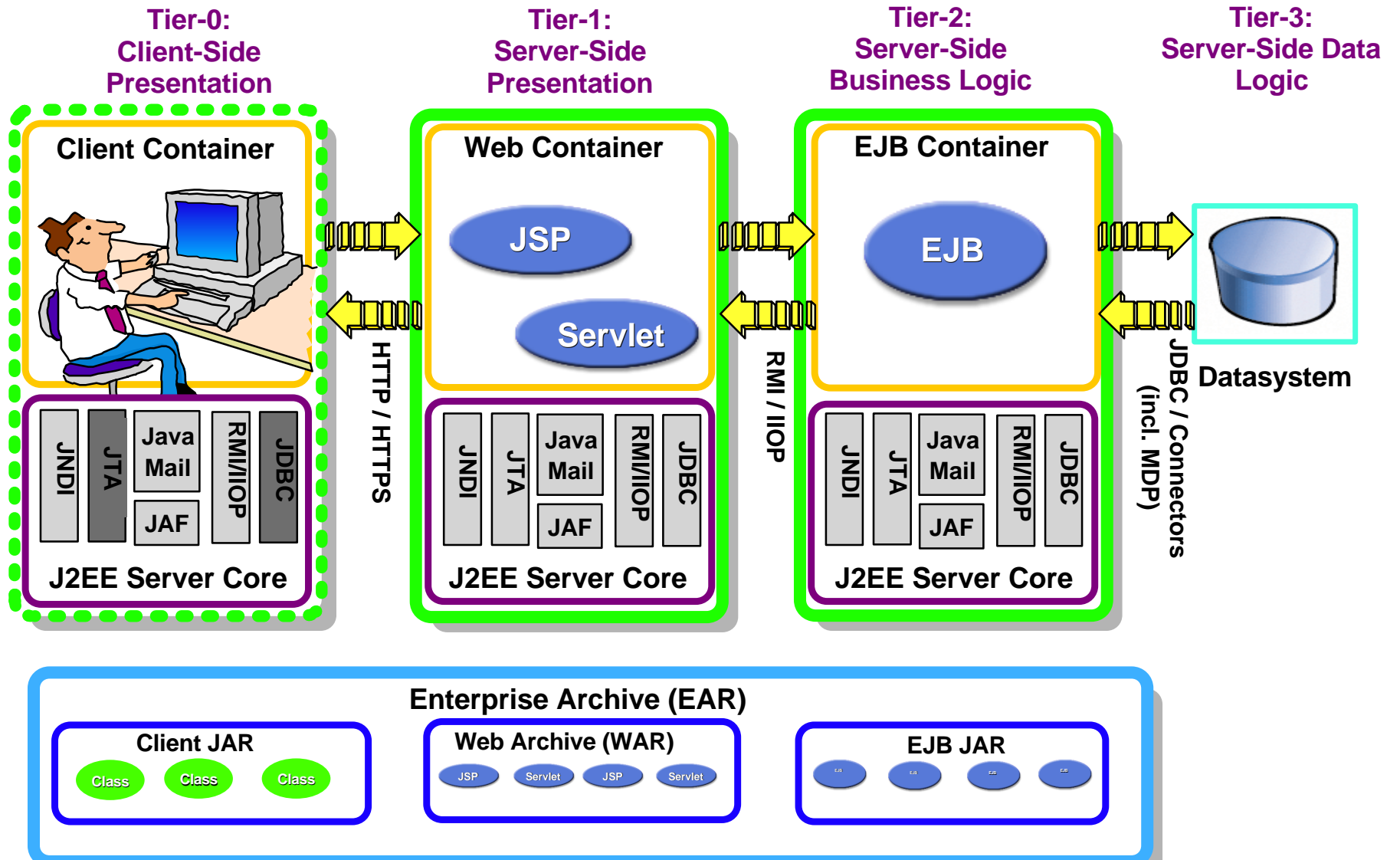# Application Server Tasks

► functional

- ► Session State Management
- ► Runtime for Servlets, Java-Businesskomponents, JSPs
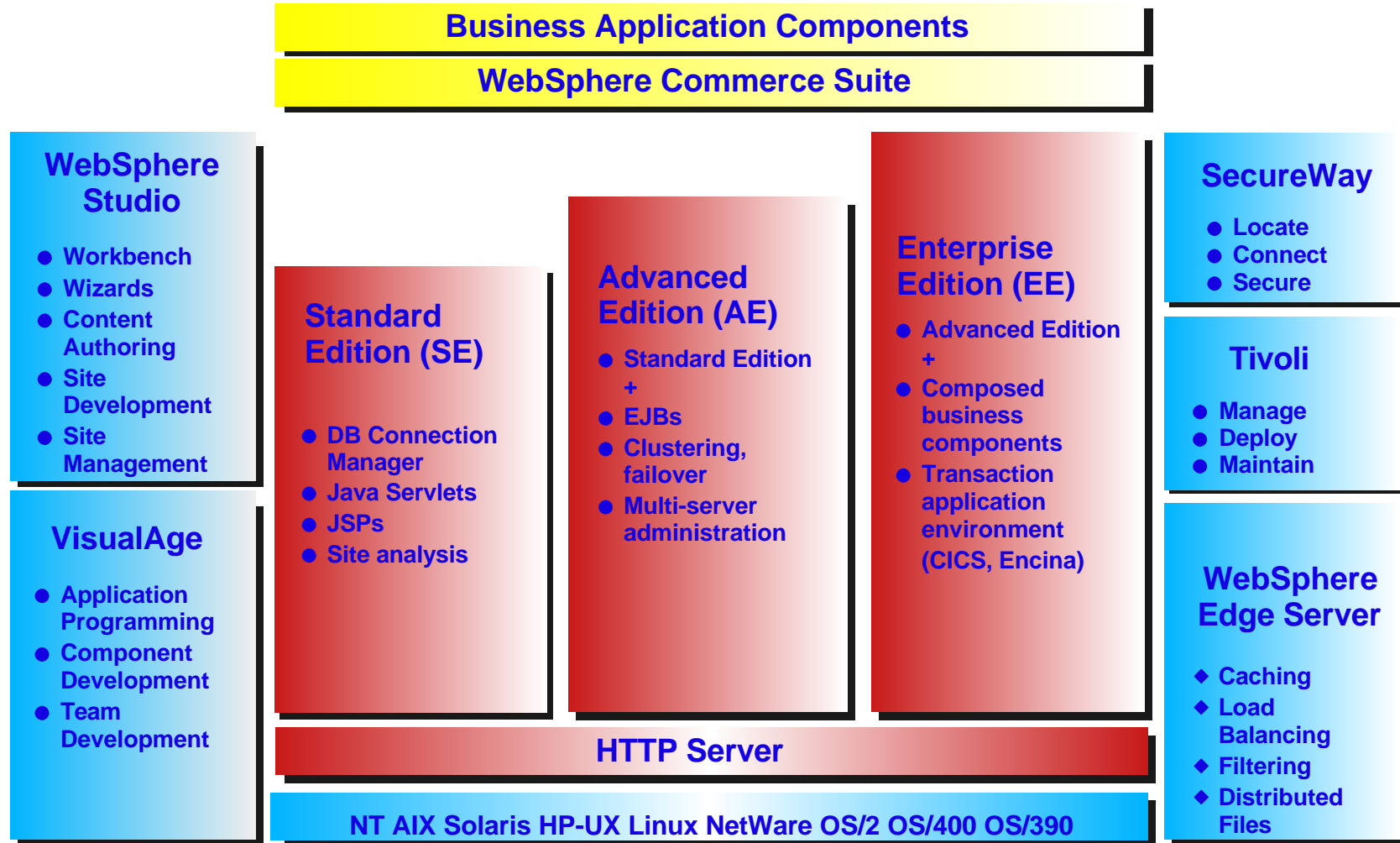- ► Connect to Backendsystems

► non-functional

- ► Highperformance access
- ► Scalability (horizontal and vertical)
- ► Availability (failover handling and load balancing)
- ► Extensions
- ► Flexability

J2EE Server Model

Tier-0:
Client-Side
Presentation

Tier-1:
Server-Side
Presentation

Tier-2:
Server-Side
Business Logic

Tier-3:
Server-Side Data
Logic

Client Container

Web Container

JSP

Servlet

EJB Container

EJB

HTTP / HTTPS

RMI / IIOP

JDBC / Connectors
(incl. MDP)

Datasystem

JNDI	JTA	Java Mail	RMI/IIOP	JDBC
		JAF		

J2EE Server Core

JNDI	JTA	Java Mail	RMI/IIOP	JDBC
		JAF		

J2EE Server Core

JNDI	JTA	Java Mail	RMI/IIOP	JDBC
		JAF		

J2EE Server Core

Enterprise Archive (EAR)

Client JAR

Class   Class   Class

Web Archive (WAR)

JSP   Servlet   JSP   Servlet

EJB JAR

EJB   EJB   EJB   EJB

WebSphere Application Server

Business Application Components

WebSphere Commerce Suite

WebSphere Studio

- **Workbench**
- **Wizards**
- **Content Authoring**
- **Site Development**
- **Site Management**

VisualAge

- **Application Programming**
- **Component Development**
- **Team Development**

Standard Edition (SE)

- **DB Connection Manager**
- **Java Servlets**
- **JSPs**
- **Site analysis**

Advanced Edition (AE)

- **Standard Edition +**
- **EJBs**
- **Clustering, failover**
- **Multi-server administration**

Enterprise Edition (EE)

- **Advanced Edition +**
- **Composed business components**
- **Transaction application environment (CICS, Encina)**

SecureWay

- **Locate**
- **Connect**
- **Secure**

Tivoli

- **Manage**
- **Deploy**
- **Maintain**

WebSphere Edge Server

- **Caching**
- **Load Balancing**
- **Filtering**
- **Distributed Files**

HTTP Server

NT AIX Solaris HP-UX Linux NetWare OS/2 OS/400 OS/390

Build   *Run*   *Manage*

IBM HTTP Server

- HTTP Server (powered by Apache)
  - ► Graphical Administration (Concept 2)
  - ► Machine Translation between languages
  - ► WebDav Support for versioning
  - ► Security improvements
    - – Password encryption on NT
    - – LDAP, SSL improvements
    - – Single sign-on to domain using LTPA
  - ► FastCGI support
  - ► Tivoli and SNMP instrumentation
  - ► Performance improvements on AIX and NT
    - – AFPA / FRCA cacheing
  - ► Proxy/Cache module
  - ► Session affinity

Step 1 - informational websites

- WebSphere Standard Edition v3.5
  - ► Optimised access to databases
  - ► Personalisation Support
  - ► XML support
  - ► Servlets and JSPs
    - – Access DB2, Oracle, MQ, CICS, Tuxedo, etc as a non-transactional two-tier client
  - ► Integrates into enterprise security with LDAP
  - ► Works with all major webservers
    - – IIS, Netscape, Apache, Domino
  - ► IBM JDK 1.2.2 support
  - ► Alternative configuration tools
    - – XMLConfig / WSCP / HTTP-base admin
  - ► Tivoli Plus modules

Step 2 - standalone transactional systems

- **WebSphere Advanced Edition v3.5**
  - ► Scalable, Highly available transactional runtime
    - – Multiple replicated nodes
  - ► EJB 1.0 plus support, including container managed persistence, RMI/IIOP, JMS, JTA/JTS
  - ► ACID transactions
  - ► Integrates with DB2, Sybase and Oracle databases
  - ► CORBA/IIOP support including enhanced Java ORB
  - ► One-Click install/Improved documentation
  - ► + all of Standard Edition

Step 3 - integrated transactional systems

- WebSphere Enterprise Edition v3.5
  - ► Supports EJBs, C++ and Java CORBA Business Objects, plus existing COBOL and C CICS and Encina transactions
  - ► Transactional integrity with DB2, Sybase, Oracle, IMS, CICS and MQSeries
  - ► Scalable
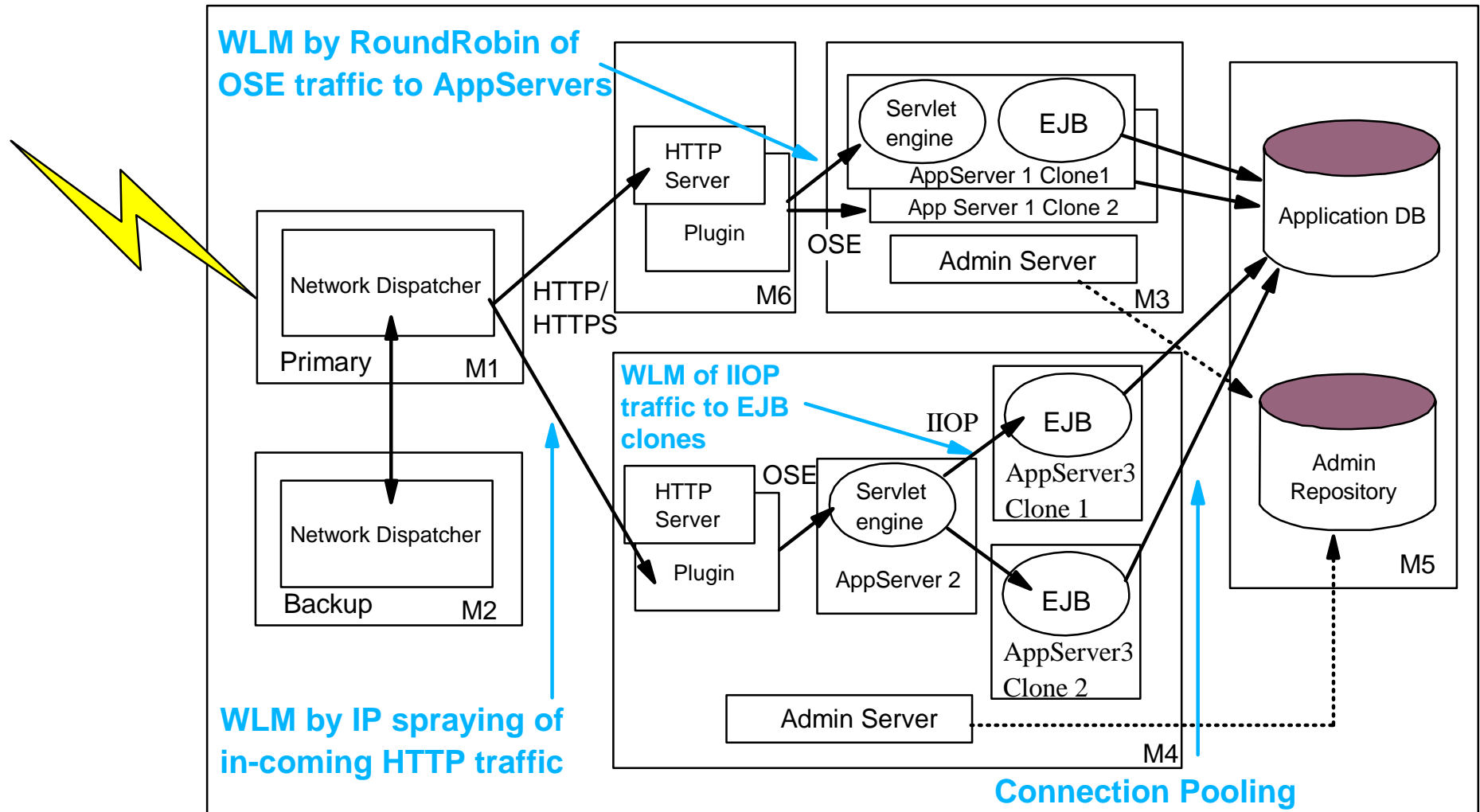 - ► Full CORBA support (10/15 services) and support for Java, C++ and ActiveX clients

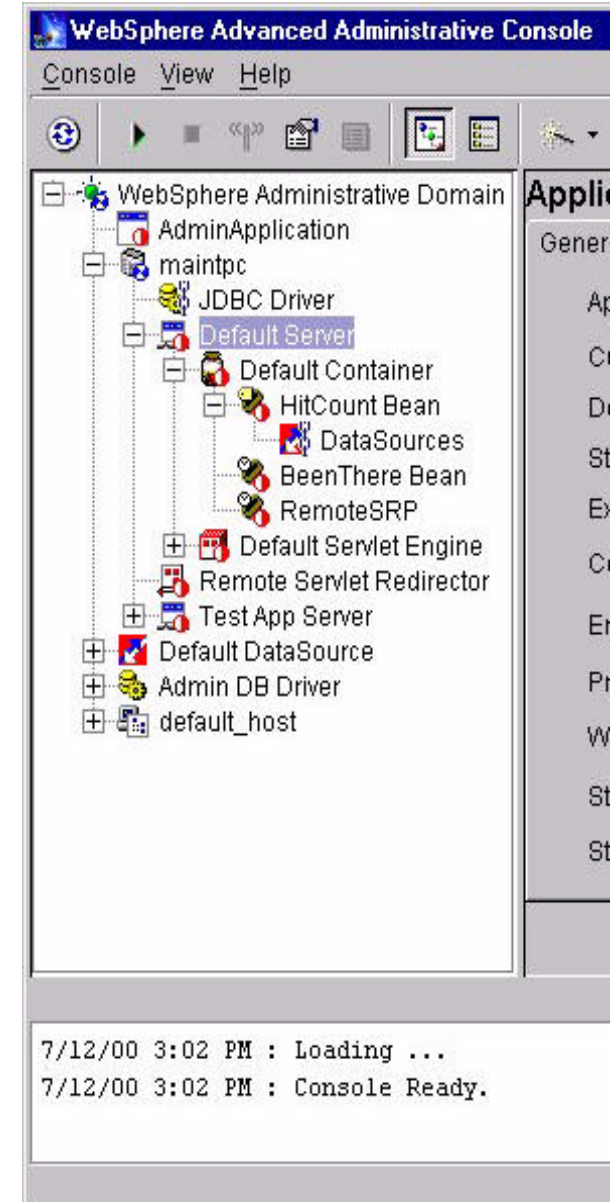- + all of Standard & Advanced

WebSphere Architecture
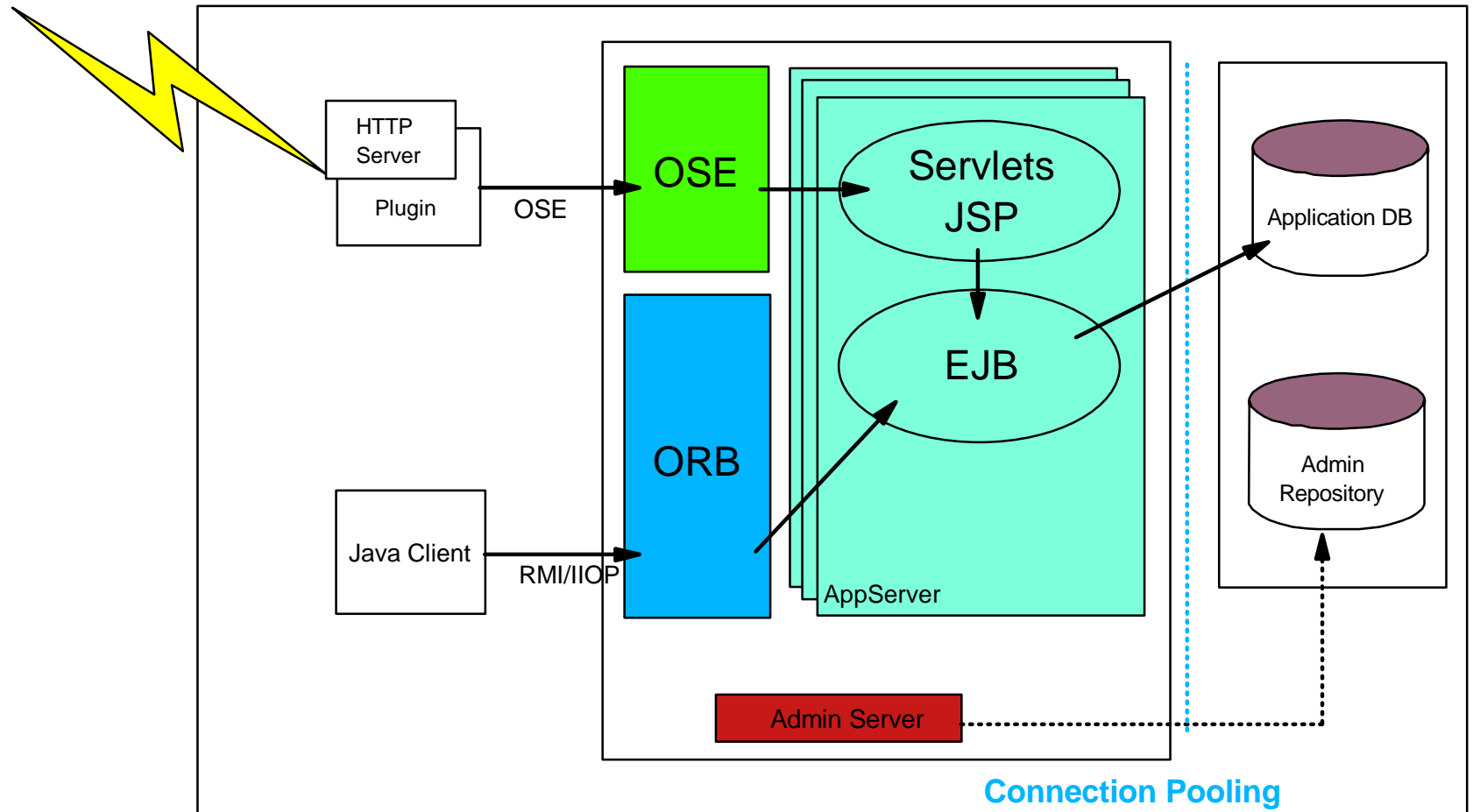
What is WebSphere WLM?

Use highly available database resources!

WLM by RoundRobin of OSE traffic to AppServers

HTTP Server

Plugin

M6

Servlet engine

EJB

AppServer 1 Clone1

App Server 1 Clone 2

OSE

Admin Server

M3

Application DB

Network Dispatcher

Primary

M1

HTTP/HTTPS

Network Dispatcher

Backup

M2

WLM by IP spraying of in-coming HTTP traffic

WLM of IIOP traffic to EJB clones

IIOP

EJB

AppServer3 Clone 1

OSE

HTTP Server

Plugin

Servlet engine

AppServer 2

EJB

AppServer3 Clone 2

Admin Server

M4

Admin Repository

M5

Connection Pooling

Admin Console Improvements

- Simplified menu
- Improved toolbar
- Performance Analyzer is a separate tool
- Better EJB deployment
  - ► Don't have to restart adminserver
  - ► Deployment descriptor can be viewed
- Enhanced tasks
- Context-sensitive actions
- Better Help
- New task wizards added
  - ► Create Data Source
  - ► Deploy Enterprise Beans
  - ► Security Tasks
  - ► Import/Export added
- Trace improvements

WebSphere Advanced Administrative Console

Console   View   Help

WebSphere Administrative Domain   Appli
- AdminApplication   Gener
- maintpc   A
  - JDBC Driver   C
  - Default Server   D
    - Default Container   St
      - HitCount Bean   Ex
        - DataSources   C
      - BeenThere Bean   Er
      - RemoteSRP   Pr
      - Default Servlet Engine   W
    - Remote Servlet Redirector   St
    - Test App Server   St
- Default DataSource
- Admin DB Driver
- default_host

7/12/00 3:02 PM : Loading ...
7/12/00 3:02 PM : Console Ready.

The XMLConfig Tool

- A utility based on Java classes in xmlconfig.jar
- Especially good for exporting and importing configurations
- Use from the command line:
  - ► Call setupCmdLine.bat/sh
  - ► Set up classpath
  - ► Invoke the XMLConfig tool

  ```
  %JAVA_HOME%\bin\java %CLIENTSAS% -classpath %WAS_CP% -Dserver.root=%WAS_HOME%
  com.ibm.websphere.xmlconfig.XMLConfig %1 %2 %3 %4 %5 %6 %7 %8 %9
  ```

- Supported Operations

Create	Update
Delete	Locate
Export	Start
Stop	Restart
Enable	Disable

File　Edit　View　Go　Communicator　Help

Back　Forward　Reload　Home　Search　Netscape　Print　Security　Shop　Stop

Bookmarks　Location: http://roman3500/admin/xmleditor/frameset.html　What's Related

Instant Message　WebMail　Radio　People　Yellow Pages　Download　Calendar　Channels

IBM Websphere Systems M...

- Introduction
- Commit All Modifications
- Tasks
  - Create Objects
    - Create Virtual Host
    - Create Server
    - Create Servlet Engine
    - Create Web Applica
    - Create JDBC Driver
    - Create Data Source
    - Create Servlet
  - Export Workspace to X
  - Resources
    - default_host
    - Admin DB Driver
    - Default DataSource
    - roman3500
      - Default Server
        - Default Servlet Engin
          - default_app
          - admin
            - **install**
            - jsp10
            - file
            - invoker
            - ErrorReport
          - examples
          - WSsamplesD

install (servlet)

roman3500

Ready

The following properties have been assigned to this servlet. The properties may belong to the actual Administrative System Repository or they may have been altered within this Temporary Workspace.

NOTE: **Submit Modifications** *will assign variables to the Temporary Workspace memory.*

Servlet Properties

Name	install
Description	Install the WAServer Admin GUI
Java Class Name	com.ibm.servlet.engine.webapp.AdminClientServlet
Load Servlet at Server Startup?	○ True ○ False
Servlet Enabled	● True ○ False
Debug Mode	○ True ● False
Servlet URI Paths	/install

	NAME	VALUE
Init Parameters	install/ install/ IBMWebASv3_NT_Admi	adminclient.for.nt
	install/ install/ IBMWebASv3_AIX_Adm	adminclient.for.aix
	install/ install/ IBMWebASv3_SUN_Adm	adminclient.for.sun

Submit Modifications　Delete　Create Like...

How do you use

1. Navigate in topology tree

2. Change values

3. Submit changes

4. Repeat 2, 3 for many changes

5. Commit changes (write into repository as batch)

Applet com.ibm.webexec.applets.NavApplet running

The wscp Tool (WS Control Program)

- Command-line program with interactive shell based on JACL (Java TCL)
- Use remotely by
  - ► Authenticating to the administrative server
    - Create a properties file
    - Add information to the .wscprc file
  - ► Connecting to the local and remote nodes
    - By default, wscp connects to the administrative server running on the local machine
    - Use the wscp.hostName property to specify a remote host
- Supported actions vary by object type
- Servlet actions include:

attributes	help	remove
containment	list	show
create	modify	start
defaults	operations	stop

Application Server Transaction Mgmt
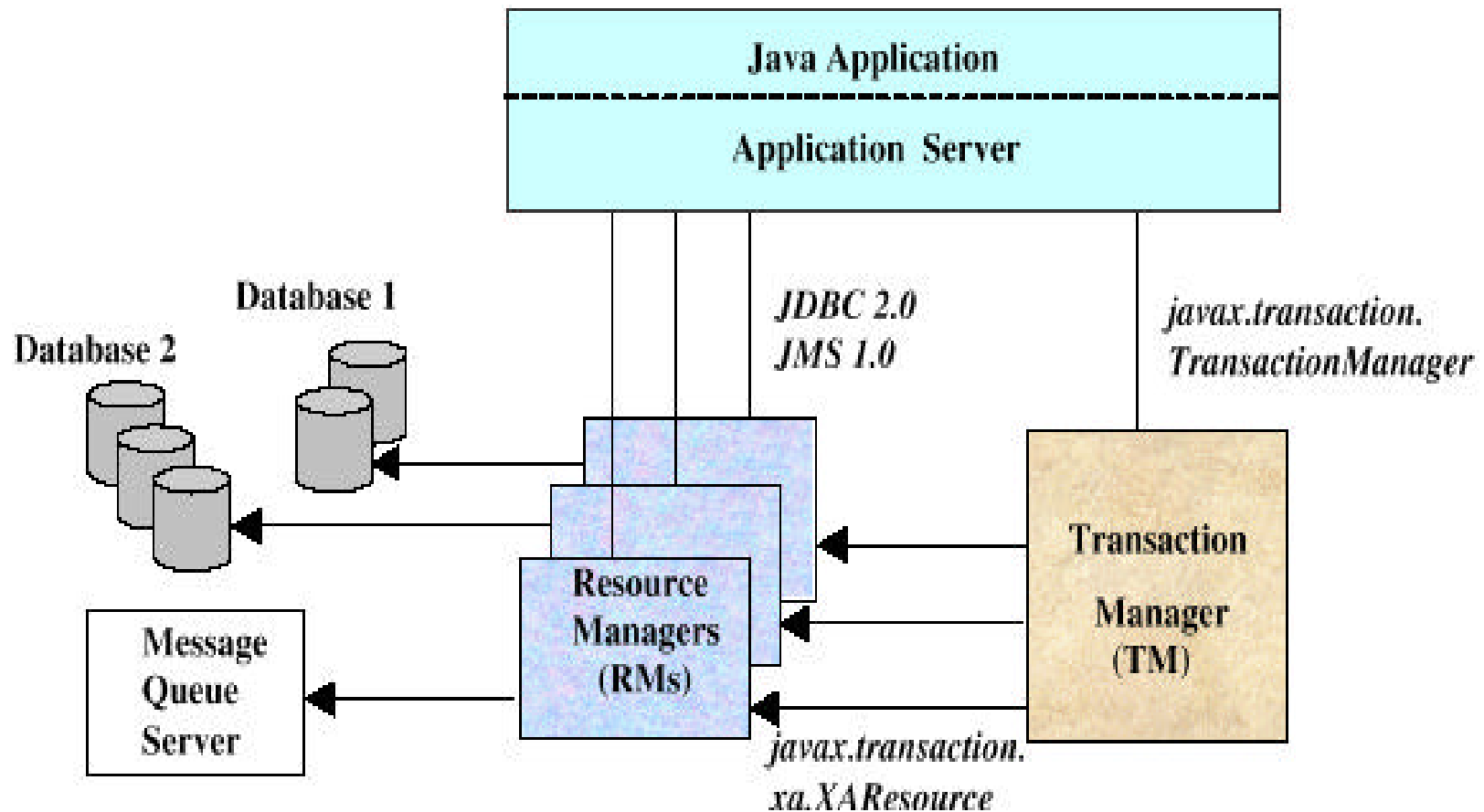
Basic Security Concepts

- Authentication
  - ► Process of verifying 'users'; i.e. userid/password, certificate or token

- Authorization
  - ► Process of determining if a principal has any rights to access a resource and the type of access
  - ► e.g. can a principal access a file; can he write or only read it

- Delegation
  - ► Process of giving a principal another identity

Authentication Mechanisms

- Challenge Mechanisms
  - None
  - Basic (uid/pw)
  - Certificate
  - Token
- Authentication Mechanisms
  - **LTPA** - Lightweight, token-based, three party authentication
  - **LDAP** - LDAP Bind over SSL
  - **Certificate List** - List of valid digital certificates
  - **User List** - List of valid users
  - **OS** - Operating System authentication
- User Registries
  - LDAP
  - Operating System registry
- Secure Association Establishment
  - Inbound/Outbound Trust Lists

challenge user

Challenge Mechanism

Authentication Data (uid/pw,cert,token)

Authentication Mechanism

Authenticated Credentials

Authentication Data

Credentials

User Registry
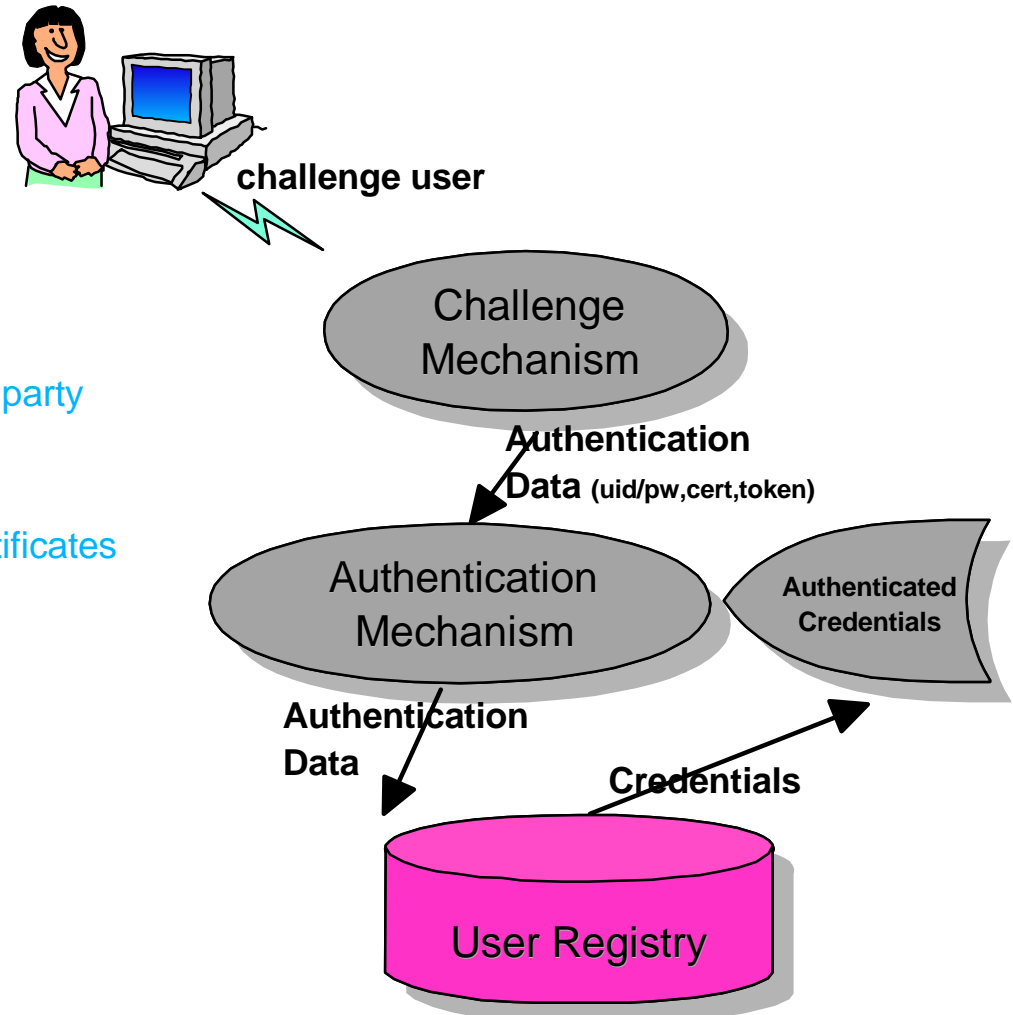
WebServices - A New Web Model

- Until now, the Web has provided for
  - ► browsing of linked documents
  - ► manually-initiated purchases and transactions
  - ► downloading files
    - ➡ all of this is manual, by way of a browser
- Web Services is a new model for using the Web
  - ► transactions initiated automatically by a program,
  - ► not necessarily using a browser
  - ► can be described, published, discovered, and invoked
  - ► dynamically in a distributed computing environment
  - ► new ways of using the web: intelligent agents,
  - ► marketplaces, auctions
    - ➡ all built on XML and other internet standards!

Web Services: Base Technologies

- SOAP - Simple Object Access Protocol
  - ► an XML protocol to invoke a method on a server to execute
  - ► a requested operation and get a response in XML
  - ► object-oriented programming on web-based objects
    - ➡ but with multiple return values
  - ► request message is sent by service requestor
  - ► response message is sent by service provider
- UDDI - Universal Description, Discovery, Integration
  - ► UDDI servers act as a directory of available services and
  - ► service providers
  - ► SOAP can be used to query UDDI for services
- WSDL - Web Services Description Language
  - ► an XML vocabulary to describe service interfaces

Web Services Scenario

Application Server

Servlets
JSP
EJB

UDDI SOAP Request

UDDI SOAP Response

WebServices

WSDL

locate

register

HTTP

Business
Registry

Client

Service
Broker

Publish
WSDL

Find
UDDI

SOAP
Bind

Service
Provider
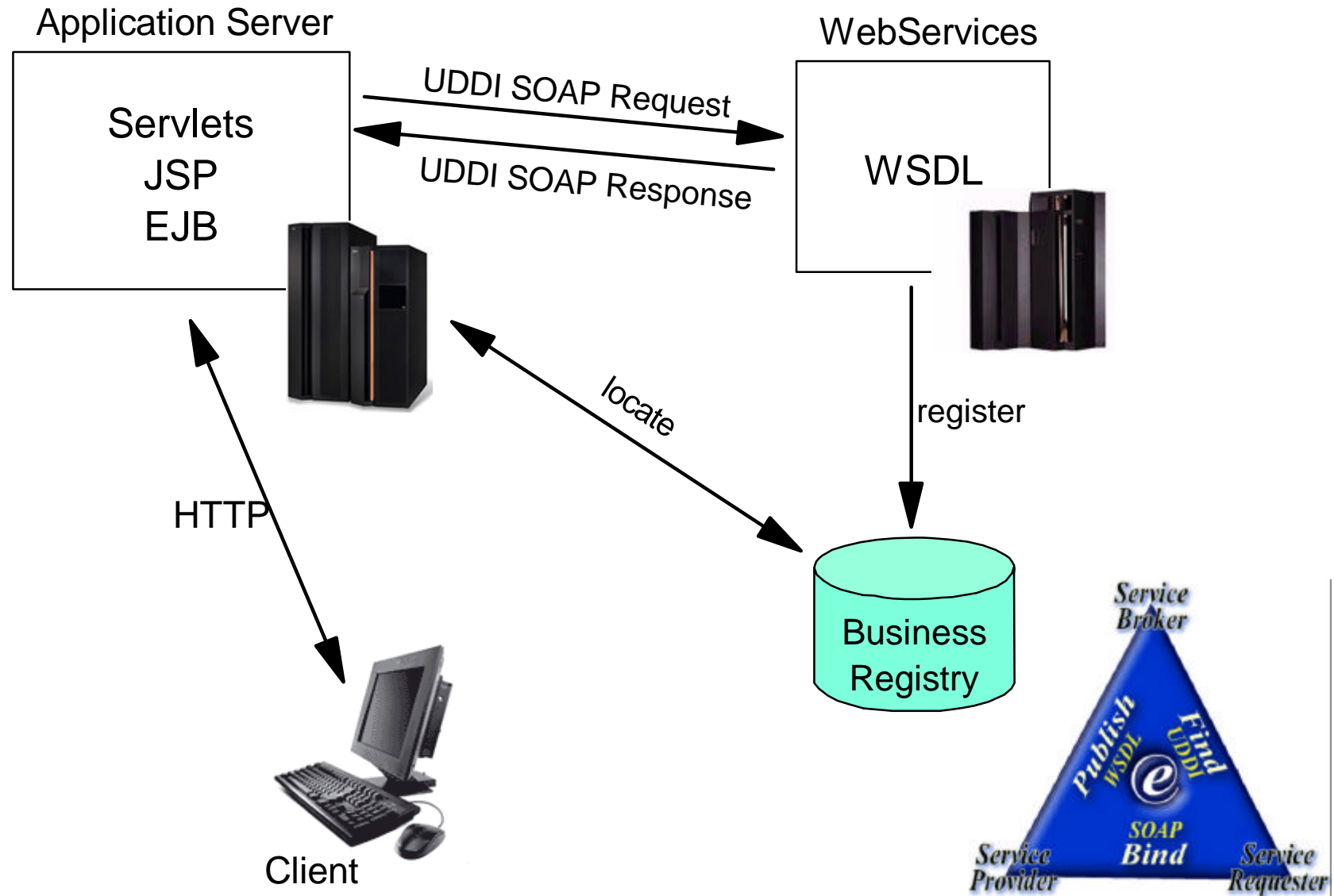
Service
Requester

Web Services Tools

- IBM Web Services Toolkit
  - ► An implementation of the Web Services architecture for creating, locating and invoking web services
  - ► Several useful papers on Web Services
  - ► Can be used with Apache Tomcat (included), or IBM WebSphere Application Server
  - ► Needs only a JDK to run
  - ► Available for free download from ibm.com/alphaworks
- IBM XML and Web Services Development Environment
  - ► Provides all of the developer tooling needed to create Web services
  - ► available at http://www.ibm.com/alphaworks

WebSphere Application Server 4.0

- IBM HTTP Server
  - ► Hardware Crypto Support
  - ► Security Enhancements
- Application Server
  - ► Single node/Multi node
  - ► J2EE 1.2.1 Full Programming Model Support including:
    JSP 1.1, Servlet 2.2, EJB 1.1, JMS 1.0, JNDI 1.2, JSSE
  - ► Application Assembly Tool
  - ► Command Line Deployment Tool
  - ► XML4J 3.1.1 (Xerces 1.2.1) and Lotus XSL 2.0 (Xalan 2.0)
  - ► HTTP Transport (DMZ)
  - ► Web Services Enablement via SOAP, UDDI4J and WSDL
  - ► Tuning Wizzard
  - ► Message Beans
  - ► Dynamc Servlet/JSP Cache

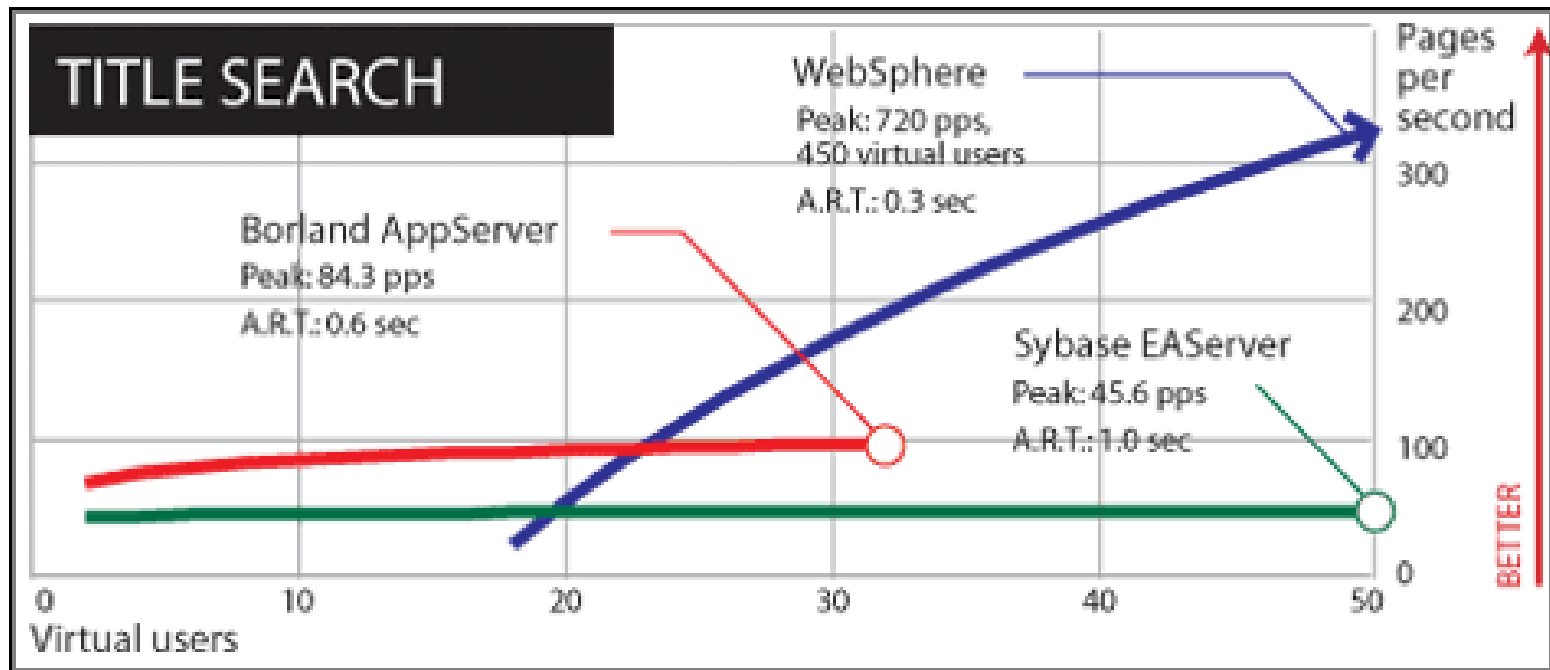# WebSphere Performace

IBM's WebSphere Application Server, Advanced Edition 3.5 was by far the fastest and most scalable server on the scenario test. At its peak, it maintained 4,000 virtual users at 177 pages per second. Because of its sophisticated dynamic page-caching algorithms, WebSphere was also the clear winner on the title search test. It also had the best A.R.T. at peak performance on nearly all of the tests. (PC Magazine)

TITLE SEARCH

WebSphere
Peak: 720 pps,
450 virtual users
A.R.T.: 0.3 sec

Borland AppServer
Peak: 84.3 pps
A.R.T.: 0.6 sec

Sybase EAServer
Peak: 45.6 pps
A.R.T.: 1.0 sec

Pages per second — 300, 200, 100, 0

BETTER

Virtual users — 0, 10, 20, 30, 40, 50

http://www.zdnet.com/products/stories/reviews/0,4161,2713476,00.html

Summary

- Widest variety of operating system support
  - ► Provides scalability and freedom
- Quick and simple installation
  - ► Saves time and improves evaluations
- Built on mission-critical architecture
  - ► Better performance
  - ► High-availability and failover
- Flexible management
  - ► XML and scripting automate tasks
  - ► Shorter time to configure and deploy
  - ► Remote operations
  - ► Superior site analysis

IBM WebSphere Software

▶ IBM and e-business   http://www.software.ibm.com/ebusiness

▶ IBM and Java   http://www.ibm.com/java

▶ IBM Redbooks   http://www.redbooks.ibm.com

▶ IBM WebSphere   http://www.software.ibm.com/webservers

▶ IBM VisualAge Products   http://www.software.ibm.com/ad

▶ Enterprise Java Beans   http://java.sun.com

Software is the soul of e-business.

It takes powerful software to transform your business into an e-business. That's the software IBM makes.