



# J2EE for ABAP Programmers

**Jeff Gebo**

**SAP Labs, LLC**

## The central hub for the SAP technology community

- Everyone can connect, contribute and collaborate—consultants, administrators and developers
- Focus around SAP NetWeaver and SAP xApps

## High quality of technical resources

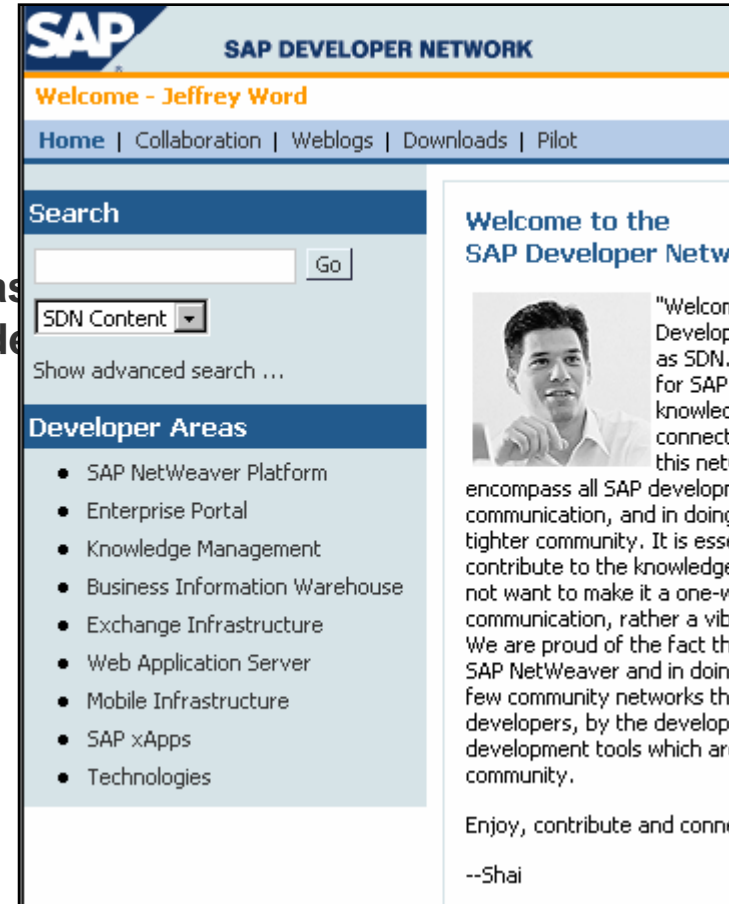
- Articles, how-to guides, weblogs, collaborative areas, discussion forums and downloads, toolkits and code samples

## A collaboration platform, not a one-way street

- SAP experts from customers, partners and SAP

## SDN is powered by SAP NetWeaver™

- Built on the SAP Enterprise Portal
- Featuring collaboration capabilities of SAP Knowledge Management



## Focus: Get a J2EE Overview using the ABAP Paradigm

As a result of this Know How Call, you will be able to:

- **Receive an understanding of J2EE and all the J2EE Buzz-Words**
- **Understand how J2EE compares to ABAP**
- **Learn what SAP is bringing from the ABAP World to the J2EE World**
- **Get a learning roadmap to take your ABAP skills to the J2EE world**

## Web AS Overview

- **J2EE & ABAP Combined**
- **System Architecture**

## Web Programming

- **JSPs ~ BSPs**
- **Servlets ~ BSP Controllers**

## Business Programming

- **Enterprise JavaBeans ~ BAPIs/RFMs**

## SAP Enhancements for Business Development

- **Java Dictionary ~ ABAP Data Dictionary**
- **Open SQL for Java ~ Open SQL for ABAP**
- **Java Development Infrastructure ~ ABAP Development Infrastructure**

## ABAP to J2EE Learning Roadmap!

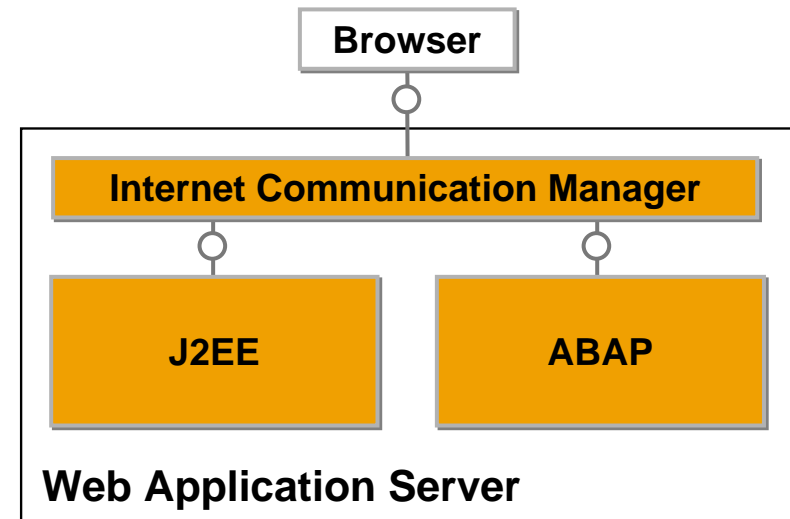
# Two Personalities in One Web Application Server

## Web Application Server

- **Both, a Fully Compliant J2EE and an ABAP personality**
- **Single, comprehensive and unified environment**

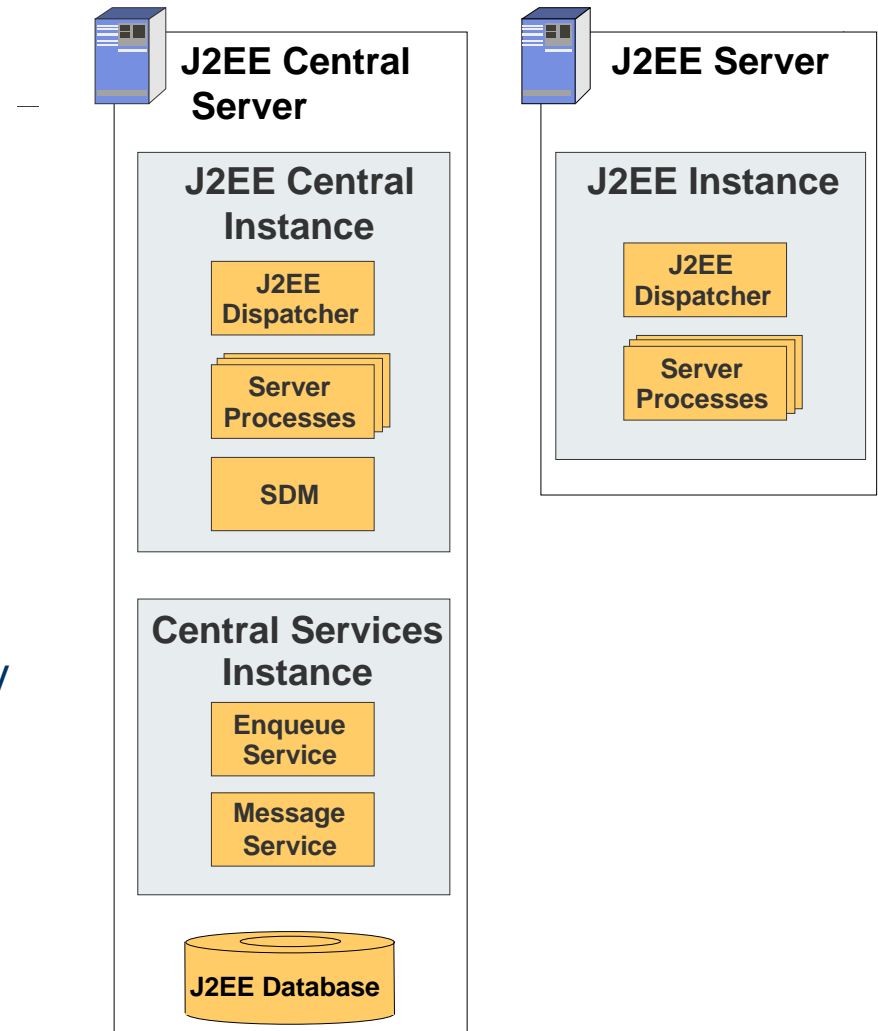
## Benefits

- **Preserve customer's investments in the existing software and skills**
- **Offer customers business-strength access to J2EE**
- **Reducing deployment costs**
  - ◆ Training
  - ◆ Administration & Monitoring
  - ◆ System and End User Support
- **Bring Enterprise and Web Developers on One Common Platform**
- **Opens Larger Talent Pool**

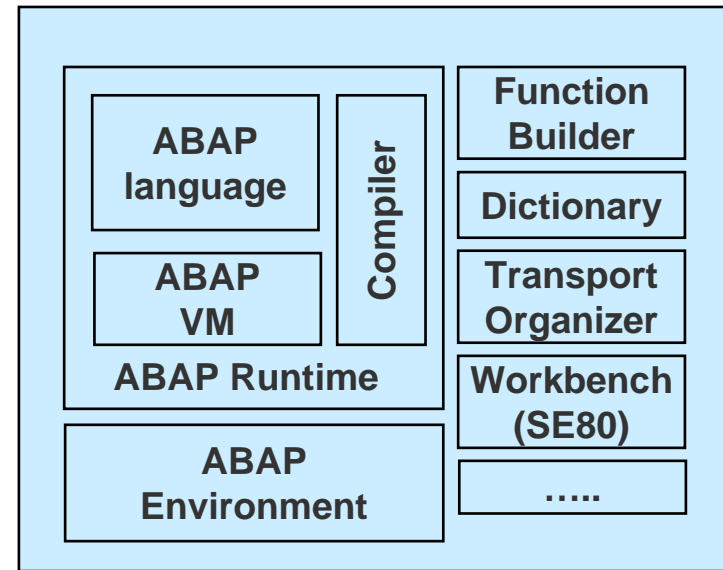
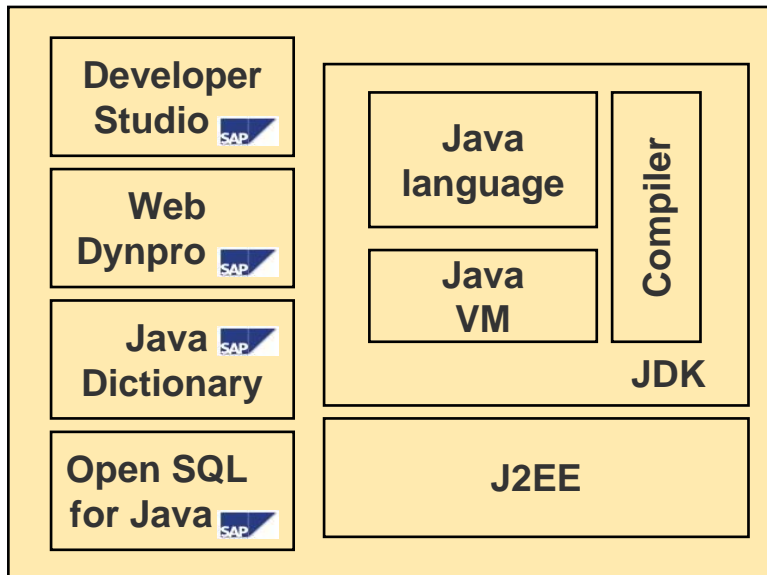


# SAP Web AS - Server and Cluster Architecture

- Use a central DB as configuration and application store  
-> stability
- Use the Enqueue Server as reliable lock handler  
-> stability
- Use the Message Server as message hub  
-> scalability
- Use SDM (Software Delivery Manager) to keep track of deployed software components  
-> supportability



# Java Language - J2EE and ABAP



Java is an object-oriented programming language – *So is ABAP!*

- Source code is compiled into byte-code
- Byte-code is interpreted by a Java Virtual Machine (JVM)

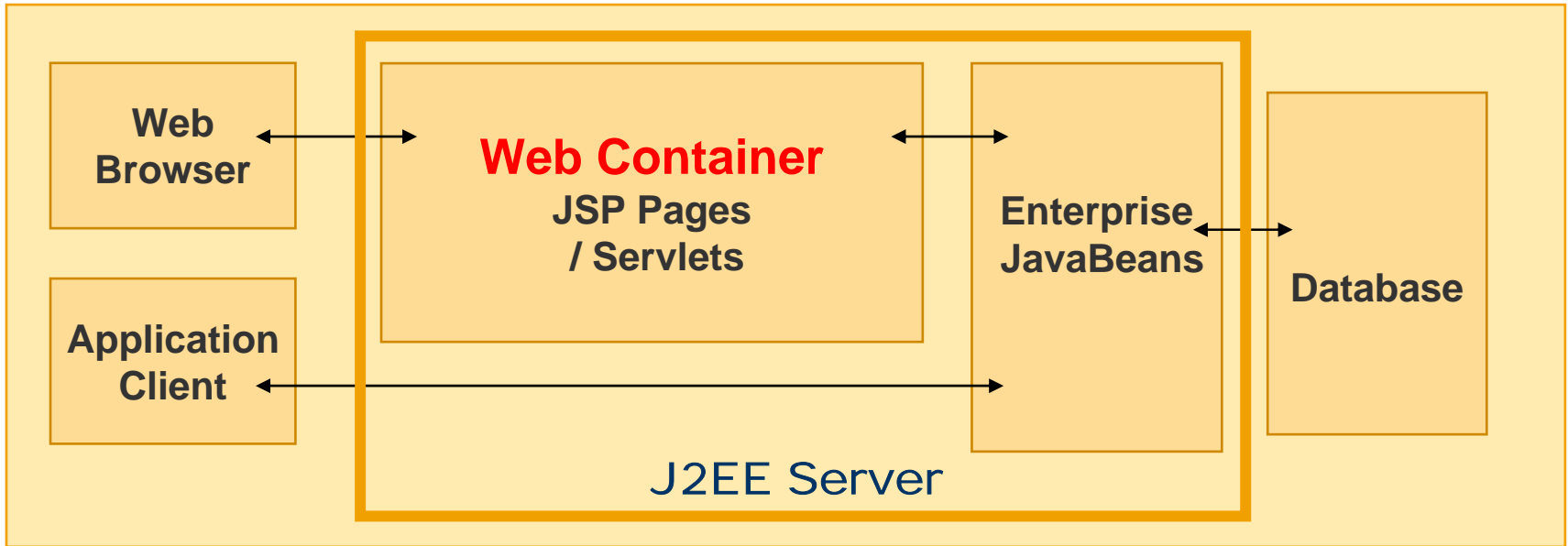
Java is platform independent – *So is ABAP!*

J2EE (Java 2 Platform Enterprise Edition)

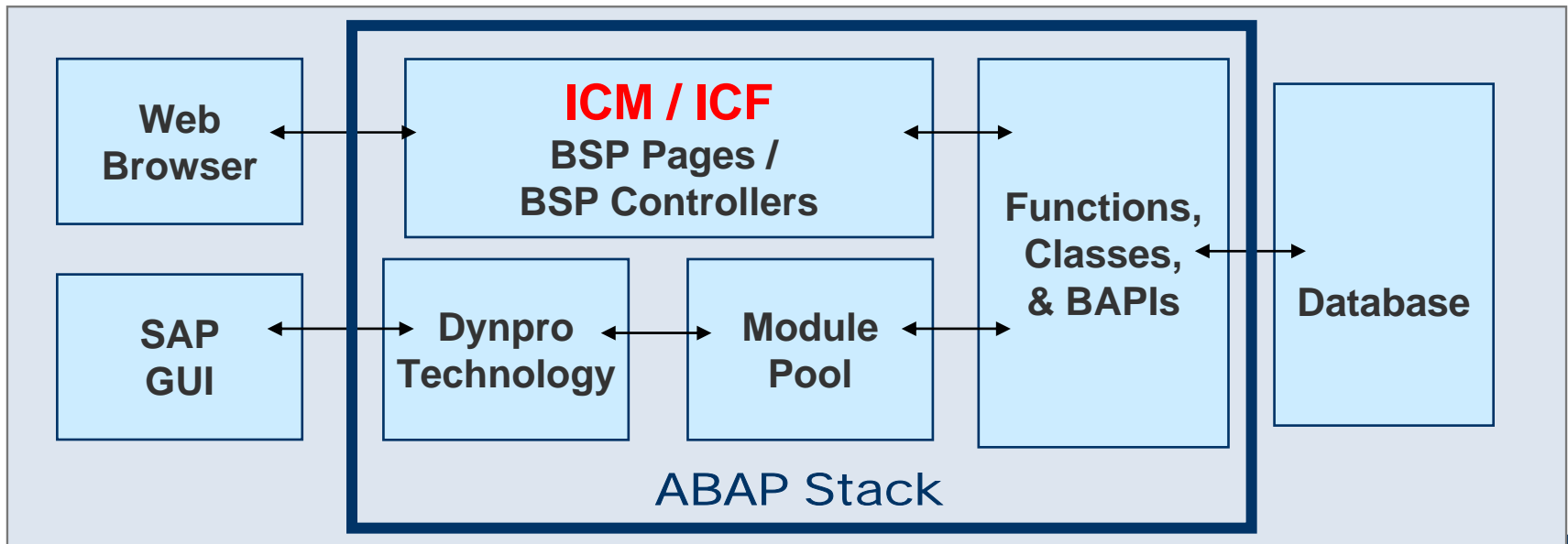
- Platform which simplifies and accelerates developing, deploying and managing n-tiered **business applications** using Java technologies

# J2EE vs. ABAP – Programming Model

Java



ABAP





## Web container

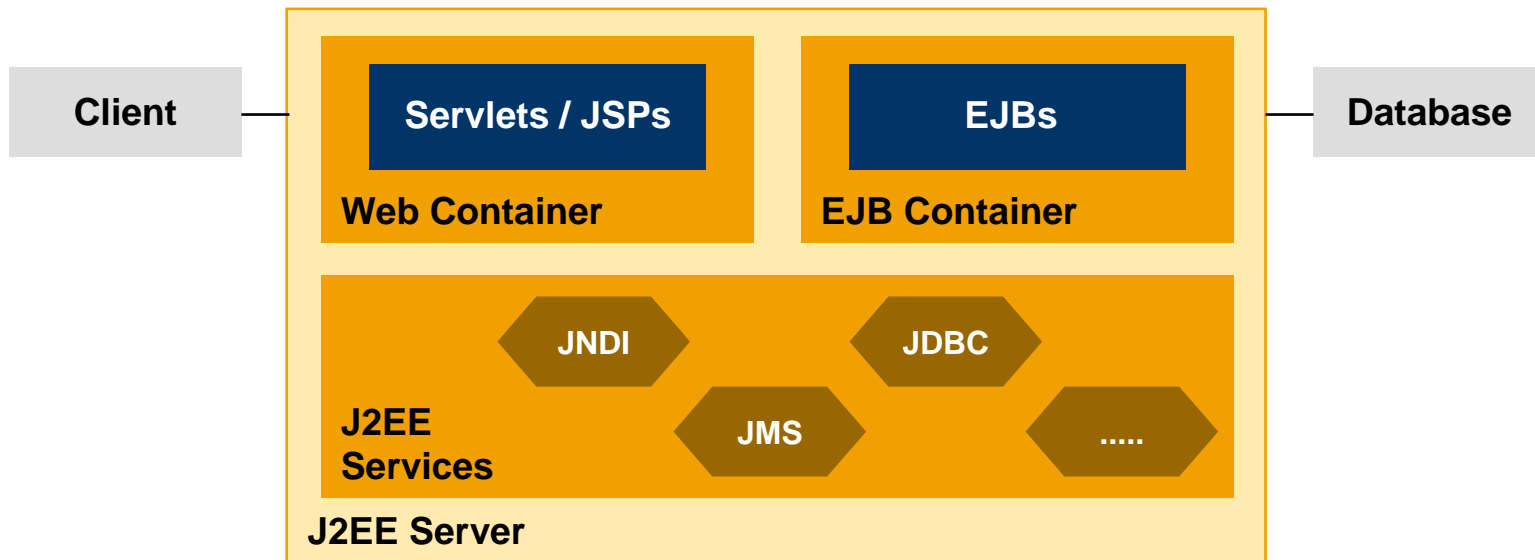
- Manages the execution of JSP page and servlet components for J2EE applications

## EJB container

- Manages the execution of enterprise beans for J2EE applications

## J2EE Services

- Foundation for implementation of multi-tier enterprise applications



## Web AS Overview

- **J2EE & ABAP Combined**
- **System Architecture**

## Web Programming

- **JSPs ~ BSPs**
- **Servlets ~ BSP Controllers**

## Business Programming

- **Enterprise JavaBeans ~ BAPIs/RFMs**

## SAP Enhancements for Business Development

- **Java Dictionary ~ ABAP Data Dictionary**
- **Open SQL for Java ~ Open SQL for ABAP**
- **Java Development Infrastructure ~ ABAP Development Infrastructure**

## ABAP to J2EE Learning Roadmap!

## JSP Page is text file that

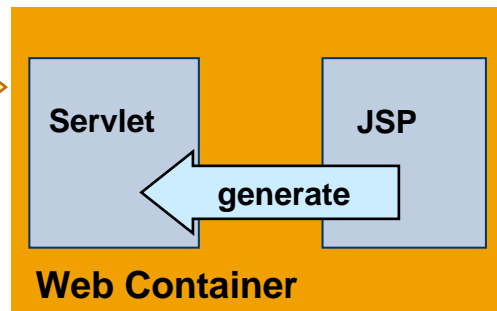
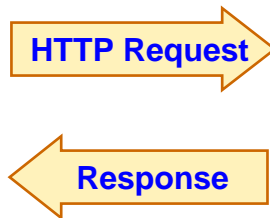
- Is written with markup language (HTML, XML, WML)
- Includes Java code to bring dynamic information to the page
- Will always be converted to servlet at execution time

## JSP Page hides HTTP complexity from programmer

```
<%@ page import="flightdemo.generated.*" %>
<%@ page import="flightdemo.*" %>
<html>
<head>
<title> FlightAnswerList </title>
</head>
<body>
<jsp:useBean id="flightdemoBean" scope="session"
class="flightdemo.FlightdemoBean" />
<h1> Answers for Request </h1>
<table border=1>
<th>From</th>
<th>To</th>
<th>Date</th>
<th>Time</th>
<!-- Loop through the list and display the fields
for which table headings are defined above -->
<% FlightdemoBean bean = new FlightdemoBean();
    bean.setAirportFrom("Frankfurt");
    bean.setAirportTo("New York");
    bean.searchFlights();
BapisfldatTypeLis
Bapisf-
```



Browser



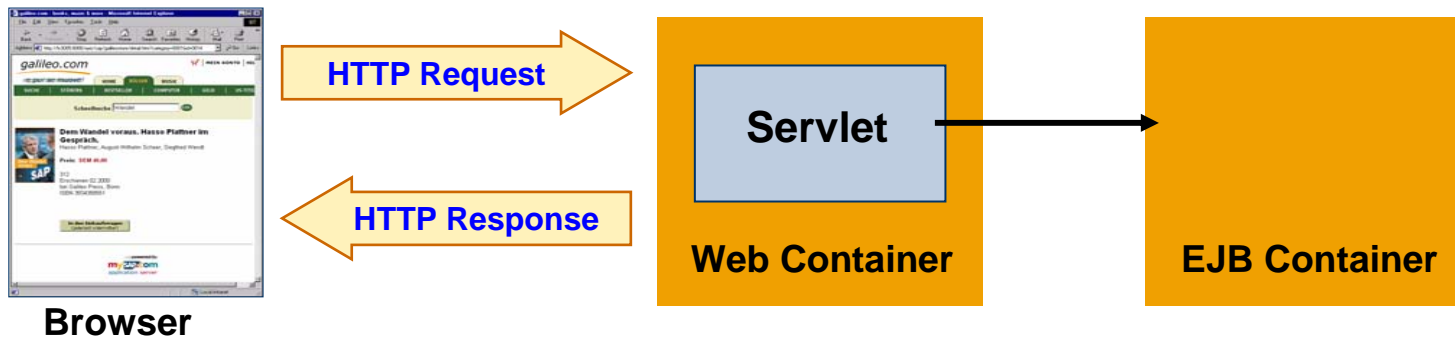
Java ~ ABAP

JSP ~ Layout of BSP page

## Servlet is a Java class that

- Handles HTTP communication
- Runs on a Web server
- Generates dynamic Web pages

Servlets can directly access resources like Enterprise JavaBeans components, JDBC data sources ...



Java ~ ABAP

Servlet ~ BSP Controller

## Web AS Overview

- **J2EE & ABAP Combined**
- **System Architecture**

## Web Programming

- **JSPs ~ BSPs**
- **Servlets ~ BSP Controllers**

## Business Programming

- **Enterprise JavaBeans ~ BAPIs/RFMs**

## SAP Enhancements for Business Development

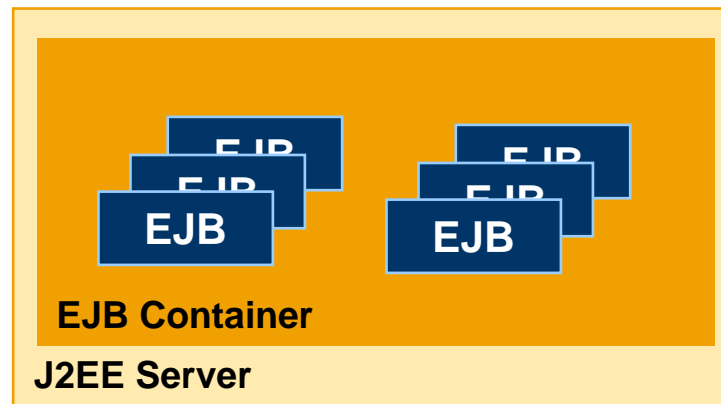
- **Java Dictionary ~ ABAP Data Dictionary**
- **Open SQL for Java ~ Open SQL for ABAP**
- **Java Development Infrastructure ~ ABAP Development Infrastructure**

## ABAP to J2EE Learning Roadmap!

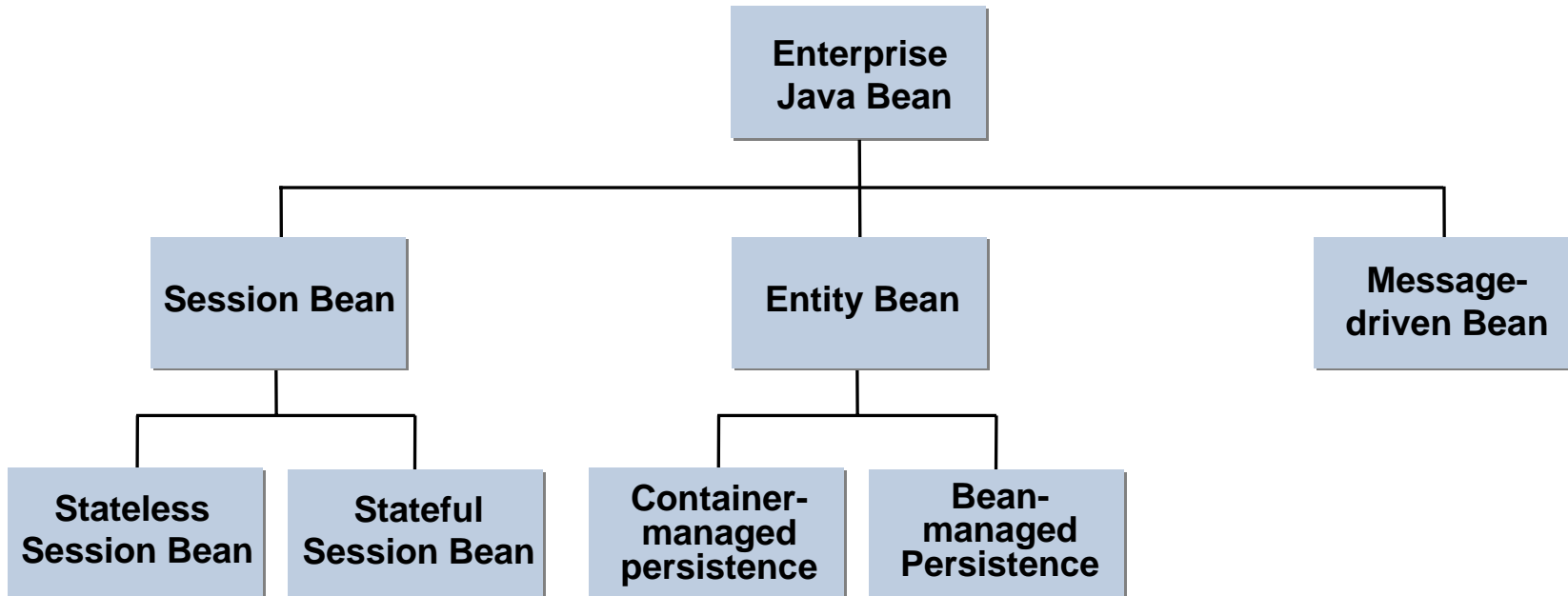
**An Enterprise Java Bean is a server-side component that encapsulates the business logic of an application**

**EJBs always execute within an EJB container, which provides system services to EJBs**

**These services include transaction management, persistence, pooling, clustering and other infrastructure**



# Types of Enterprise Beans



- Related to the user session
- Session bean is not persistent

- Handles the persistence in a object-oriented manner
- Represent a business object

- Message based
- Receive asynchronous JMS messages

## Web AS Overview

- **J2EE & ABAP Combined**
- **System Architecture**

## Web Programming

- **JSPs ~ BSPs**
- **Servlets ~ BSP Controllers**

## Business Programming

- **Enterprise JavaBeans ~ BAPIs/RFMs**

## SAP Enhancements for Business Development

- **Java Dictionary ~ ABAP Data Dictionary**
- **Open SQL for Java ~ Open SQL for ABAP**
- **Java Development Infrastructure ~ ABAP Development Infrastructure**

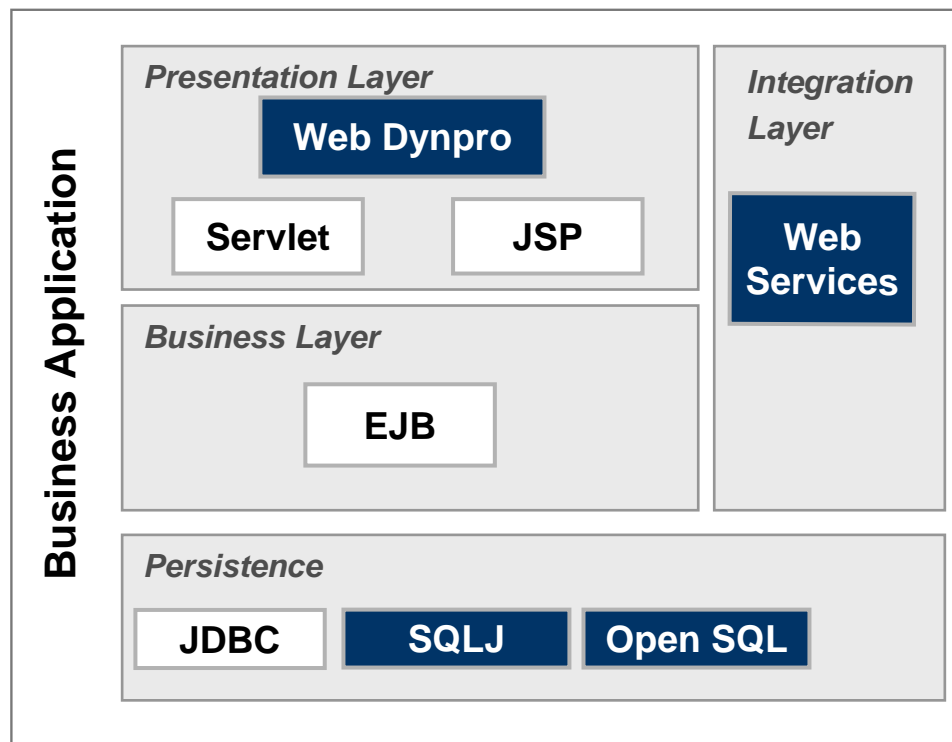
## ABAP to J2EE Learning Roadmap!



# J2EE doesn't cover everything!

## To adopt J2EE for large business applications, SAP

- ... must extend the programming model
- ... has to provide new features
- ... must integrate existing non-J2EE open standards
- ... has to provide a highly productive development infrastructure



## Eclipse is an Open Source project

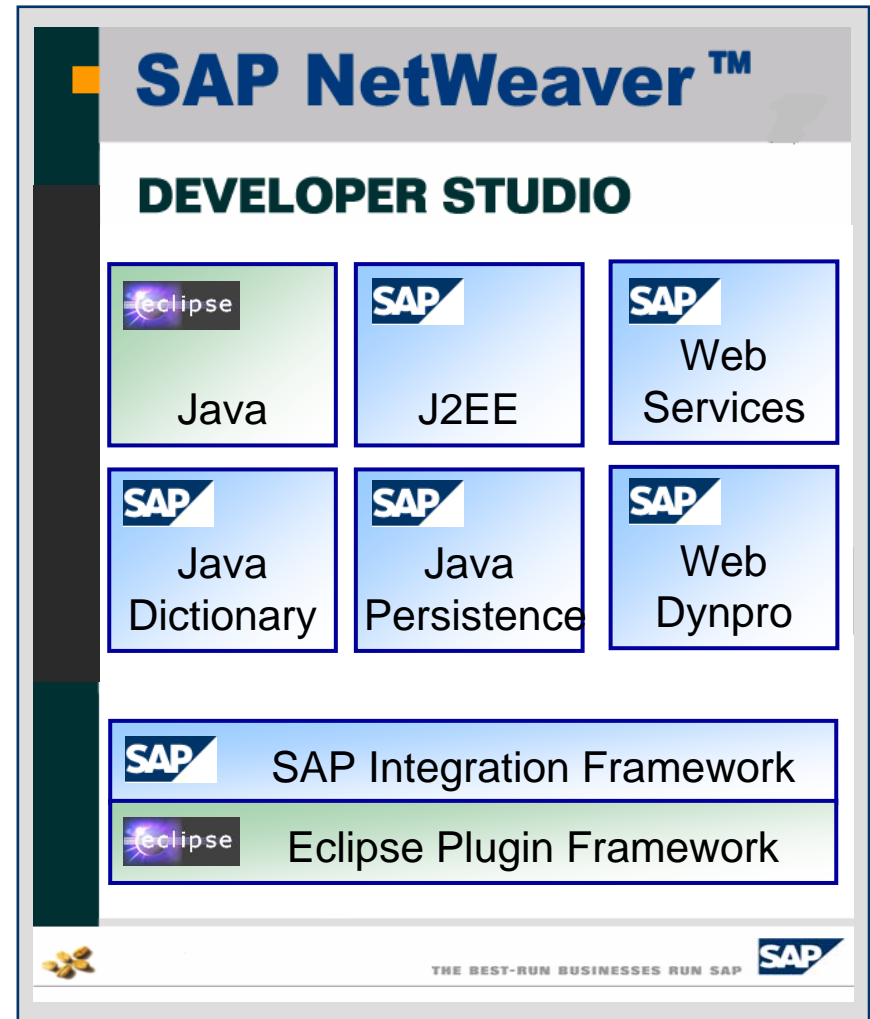
### Eclipse consists of

- a complete Java (J2SE) IDE
- an open Tool Integration Framework

### SAP's Java IDE can be extended by 3rd party Eclipse tools

- Already many tools available
- Strong industry drive

### Your SAP Java IDE can be extended by 3rd party Eclipse tools and own Eclipse tools



Java ~ ABAP

Developer Studio – SE80

# J2EE Perspective

The screenshot displays the SAP NetWeaver Developer Studio interface in the J2EE Perspective. The main window title is "J2EE Development - CarRentalStatefulServicesEJBBean - SAP NetWeaver Developer Studio".

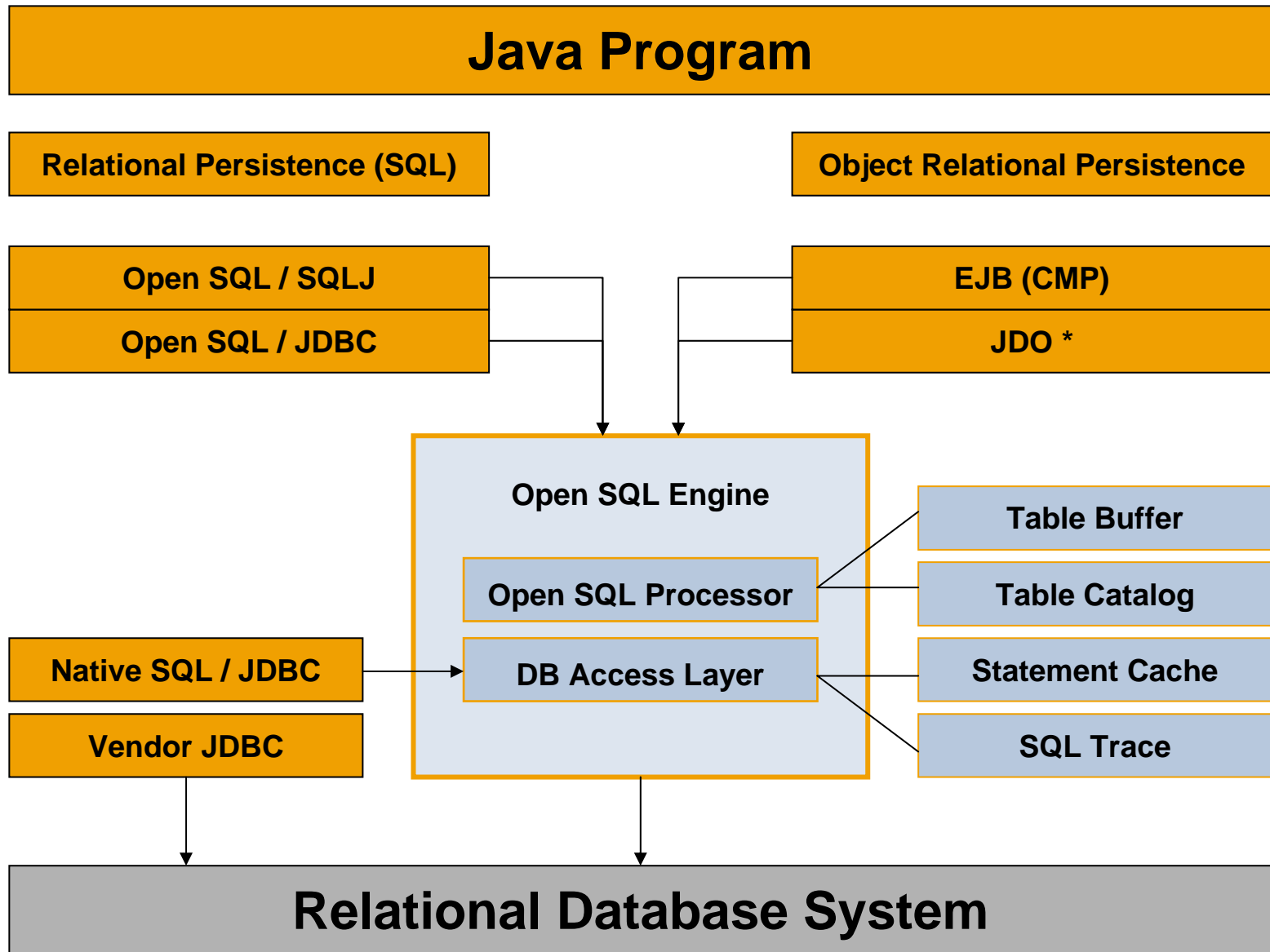
**Left Panel (J2EE Explorer):** Shows a hierarchical tree structure of the project. The selected component is `CarRentalStatefulServicesEJBBean`, which contains several methods: `addReservation`, `cancelReservations`, `changeReservation`, `ejbCreate`, `getCustomerId`, `listReservations`, and `setCustomerId`. Below the Bean Registry, there is an `ejbModule` containing a `com` package with a `sap` sub-package, which includes `techpm` and `webas` packages. The `webas` package contains `carrental`, `common`, and `ejb` sub-packages. The `ejb` package lists several Java files: `CarRentalStatefulServicesEJB.java`, `CarRentalStatefulServicesEJBBean.java`, `CarRentalStatefulServicesEJBHome.java`, `CarRentalStatefulServicesEJBLocal.java`, and `CarRentalStatefulServicesEJBLocalHome.java`. Other packages include `persistence`, `Virtual Interfaces`, `Web Service Definitions`, `CarRentalWebAss`, and `CarRentalWebSource`.

**Right Panel (Methods):** Displays the methods for the selected bean, categorized into `Business Methods` and `EJB Methods`.

- Business Methods:**
  - `addReservation(ReservationDTO)`
  - `cancelReservations(String[])`
  - `changeReservation(ReservationDTO)`
  - `getCustomerId()`
  - `listReservations()`
  - `setCustomerId(String)`
- EJB Methods:**
  - Create Methods:**
    - `ejbCreate()`

**Bottom Panels:** The `Tasks` panel shows "Tasks (Filter matched 0 of 229 items)". The `Properties` panel is currently empty. The status bar at the bottom indicates "0 items: 0 tasks, 0 errors, 0 warnings, 0 infos".

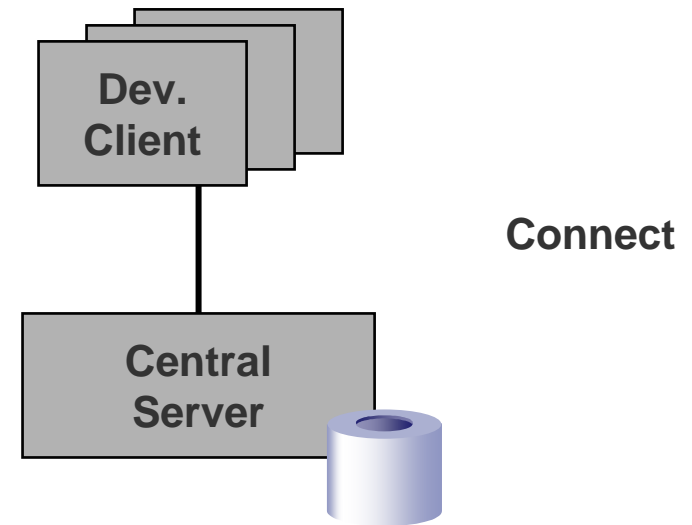




\* Not supported in the SAP Web Application Server 6.30 Release

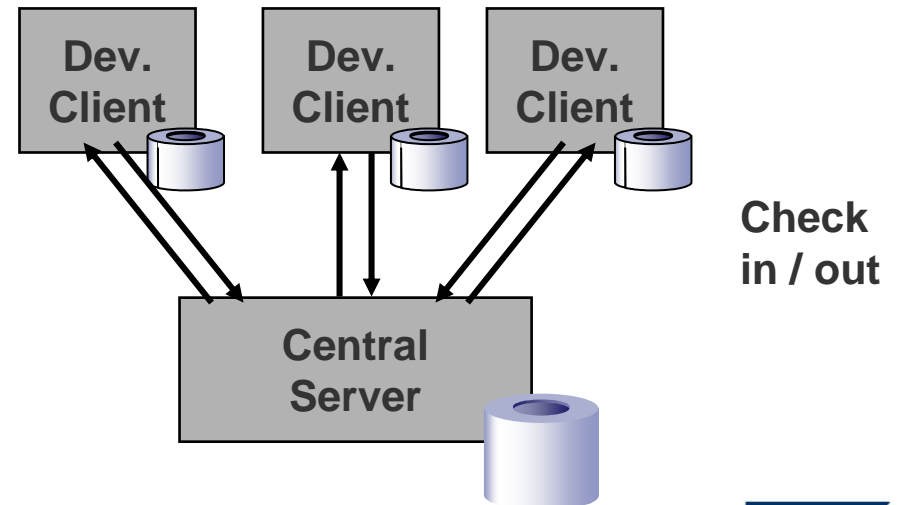
## ABAP

- Complete central environment for build and test
  - ◆ Minimal
  - ◆ Complete
- Instant build
- Continuous integration test



## Java

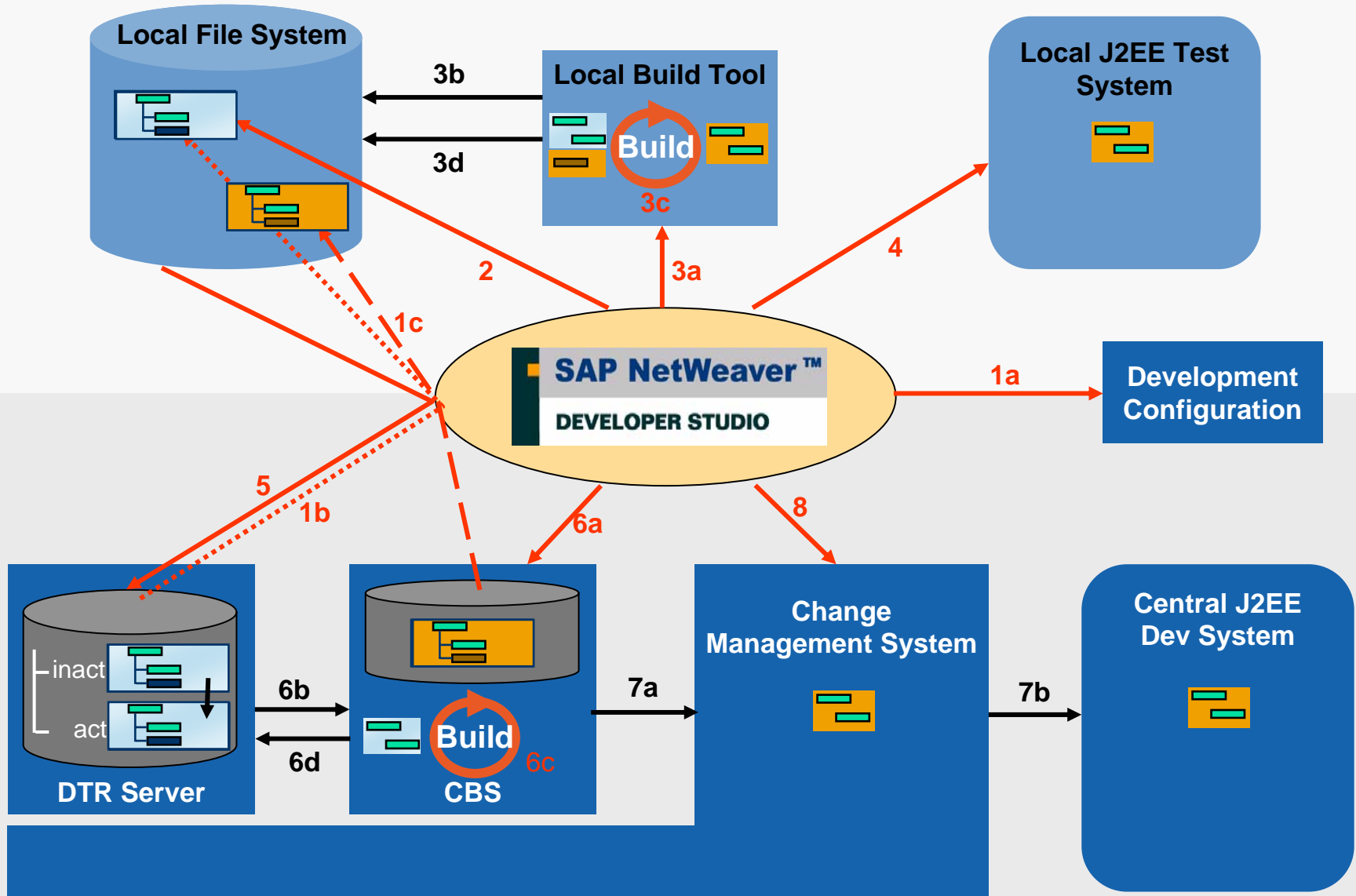
- Independent from central server
  - ◆ Availability
  - ◆ Performance
  - ◆ Offline usage
- Local files and folders
- Local test environment



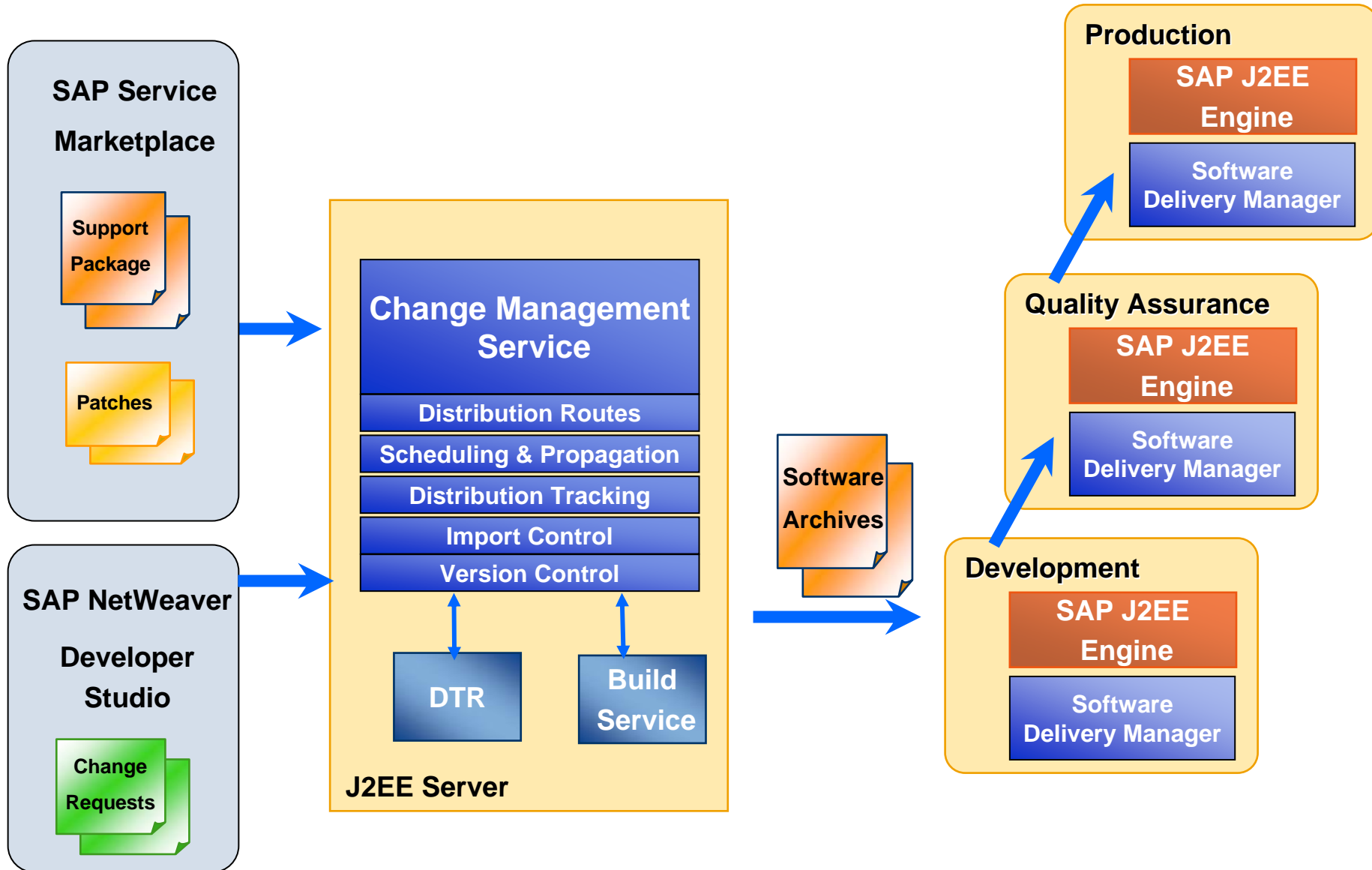
# SAP Java Development Process

Local Dev. Environment

Central Dev. Environment



# Deployment and Change Management for Java



## Web AS Overview

- **J2EE & ABAP Combined**
- **System Architecture**

## Web Programming

- **JSPs ~ BSPs**
- **Servlets ~ BSP Controllers**

## Business Programming

- **Enterprise JavaBeans ~ BAPIs/RFMs**

## SAP Enhancements for Business Development

- **Java Dictionary ~ ABAP Data Dictionary**
- **Open SQL for Java ~ Open SQL for ABAP**
- **Java Development Infrastructure ~ ABAP Development Infrastructure**

**ABAP to J2EE Learning Roadmap!**



## Learn ABAP Objects and Object Oriented Programming!

- SAP Offers Course: BC401 ABAP Objects

## Learn ABAP Web Programming – based on ABAP Objects

- SAP Offers Course: NET200 SAP Web Application Server: Developing BSP Applications
- Go to <http://service.sap.com/education> to sign up for the above classes

## Take basic Java Courses

Take J2EE Classes – **be on the look out for SAP's own J2EE Class.**

## Web Sites

SAP Developer Network – <http://sdn.sap.com/>

Sun's New to Java Site –  
<http://java.sun.com/learning/new2java/index.html>

Sun's J2EE Learning Site –  
<http://java.sun.com/j2ee/learning/index.html>

Java eBook – <http://www.mindview.net/Books/TIJ/>

Java World – <http://www.javaworld.com/>

The Server Side – <http://www.theserverside.com/>

## Books

**Core Servlets and JavaServer Pages** – a great book showing how to do basic J2EE web programming.

**Java for the Web with Servlets, JSP, and EJB: A Developer's Guide to J2EE Solutions** – Web development using JSPs, Servlets, and EJBs.

**Professional EJBs** – learn all about the details of EJBs.

**J2EE defines standards for developing multi-tier enterprise applications**

**J2EE handles many details of application behavior automatically, without complex programming**

- **Like transaction and security handling**

**Take your time and follow the learning map if you want to have a crack at it**

**J2EE does not fulfill all requirements for business applications**

**SAP provides a sophisticated infrastructure for development and deployment**

**Take your time and follow the learning map if you to take your ABAP skills to the J2EE world**

# Q&A



No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission of SAP AG. The information contained herein may be changed without prior notice.

Some software products marketed by SAP AG and its distributors contain proprietary software components of other software vendors.

Microsoft®, WINDOWS®, NT®, EXCEL®, Word®, PowerPoint® and SQL Server® are registered trademarks of Microsoft Corporation.

IBM®, DB2®, DB2 Universal Database, OS/2®, Parallel Sysplex®, MVS/ESA, AIX®, S/390®, AS/400®, OS/390®, OS/400®, iSeries, pSeries, xSeries, zSeries, z/OS, AFP, Intelligent Miner, WebSphere®, Netfinity®, Tivoli®, Informix and Informix® Dynamic Server™ are trademarks of IBM Corporation™ in USA and/or other countries.

ORACLE® is a registered trademark of ORACLE Corporation.

UNIX®, X/Open®, OSF/1®, and Motif® are registered trademarks of the Open Group.

Citrix®, the Citrix logo, ICA®, Program Neighborhood®, MetaFrame®, WinFrame®, VideoFrame®, MultiWin® and other Citrix product names referenced herein are trademarks of Citrix Systems, Inc.

HTML, DHTML, XML, XHTML are trademarks or registered trademarks of W3C®, World Wide Web Consortium, Massachusetts Institute of Technology.

JAVA® is a registered trademark of Sun Microsystems, Inc.

JAVASCRIPT® is a registered trademark of Sun Microsystems, Inc., used under license for technology invented and implemented by Netscape.

MarketSet and Enterprise Buyer are jointly owned trademarks of SAP AG and Commerce One.

SAP, R/3, mySAP, mySAP.com, xApps, xApp, SAP NetWeaver and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP AG in Germany and in several other countries all over the world. All other product and service names mentioned are the trademarks of their respective companies.