



Web Application Server:  
Platform for Developing  
ABAP and Java  
Applications

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 Contributing Speaker(s)



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## Learning Objectives

As a result of this workshop, you will be able to:

- See how SAP Web Application Server 6.40 fits into the big picture of SAP NetWeaver '04 Enterprise Services Architecture
- Understand development strategies and application scenarios including:
  - New 6.40 features in ABAP and Java
  - Java Development Tools and Infrastructure
  - Connectivity options between ABAP and Java
- How to leverage the infrastructure services of the Enterprise Portal in your development projects
- See “theory in action” with a live demo build of best practices



## Agenda

### NetWeaver Overview

#### Application Platform

- Overview
- Provide Business Data with ABAP
- Web Service with ABAP
- Java Development Infrastructure
- Web Dynpro for Java
- Interactive Forms

#### Portal Integration

- Web Dynpro with Portal
- Application interaction

#### Summary



**The next evolution: Enterprise Services Architecture (ESA)**

**Enterprise Services Architecture**

- ESA is a **blueprint** for services-based and enterprise-scale business solutions

**SAP NetWeaver**

- Technical **enabler** for these solutions, based on ESA

**SAP Web Application Server**

- Technical **Web Service-based** platform for all SAP NetWeaver components

The diagram illustrates the Enterprise Services Architecture (ESA) stack. At the top is an 'Open, Web Services Environment' containing 'Snap-on business processes' (represented by a blue arrow). Below this are three stacked yellow boxes: 'People Integration', 'Information Integration', and 'Process Integration'. These three layers are collectively labeled as 'Enterprise Services'. At the bottom, three blue boxes represent 'Existing Systems', which are connected to the Enterprise Services layer by orange lines.

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**SAP Web App Server provides a common foundation for SAP NetWeaver**

**The Web Application Server is the complete infrastructure to develop, deploy and run:**

- All SAP NetWeaver components
- mySAP Business Suite
- Customer-developed applications
- 3<sup>rd</sup>-party Java 2—Enterprise Edition-compliant applications

**Integrates the proven ABAP and the innovative internet-driven Java technology in one application server**

The diagram shows the SAP NetWeaver architecture. At the top is the 'mySAP Business Suite' with three main components: CRM, ERP, and SRM. Below this is the 'SAP NetWeaver™' layer, which includes five modules: BW, EP, XI, MI, and MDM. At the bottom is the 'Web Application Server' layer, which supports both 'Java' and 'ABAP' technologies.

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### People Integration - SAP Enterprise Portal

**Portal Infrastructure**

- Web-based, role-based, secure access
- Integrating any kind of structured information
- Sophisticated navigation possibilities
- Wide platform support, wide language support
- Built on open standards

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### Application Platform - SAP Web Application Server

**SAP Web Application Server**

- Supports open standards
- Web services capabilities out of the box
- Scalability
- Security
- Common installation + administration
- Software lifecycle management

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**Agenda**

**NetWeaver Overview**

**Application Platform**

- Overview
- Provide Business Data with ABAP
- Web Service with ABAP
- Java Development Infrastructure
- Web Dynpro for Java
- Interactive Forms


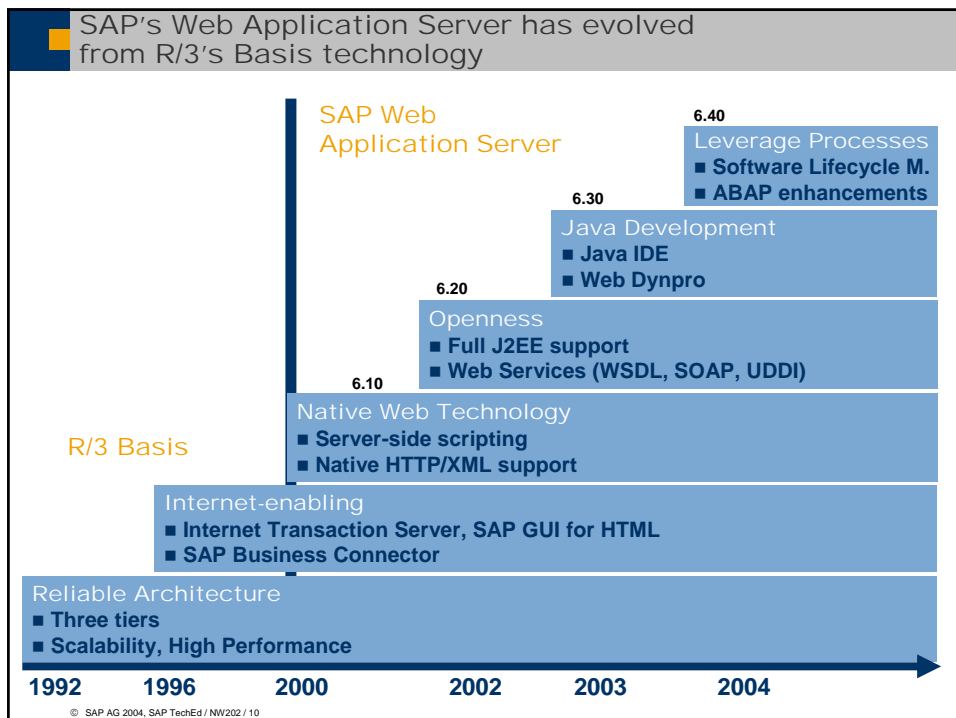
**Portal Integration**

- Web Dynpro with Portal
- Application interaction

**Summary**

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SAP Web Application Server is based on open standards

Fully **J2EE** certified

**Web services** for standards-based communication

SAP NetWeaver Developer Studio is based on the Open Source **Eclipse** framework

SAP participates in the **Java Community Process**

SAP is a founding member of the **Web Services Interoperability Organization (WS-I)**

SAP is a **UDDI Business Registry** node operator



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SAP Web Application Server Unique Differentiators

**Enterprise-scaled**, platform-independent, application server with both **Java** and **ABAP** in one integrated and flexible architecture

Leverages more than **10 years** experience in application server development

**Common** security capabilities for both **ABAP** and **Java**

**Web Dynpro** for professional **UI** development

**Database-independent** persistence framework

Highly efficient development environment for **team** development


**Integrated** software lifecycle management for **ABAP** as well as for **Java**

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## SAP Web AS ABAP Features and Highlights



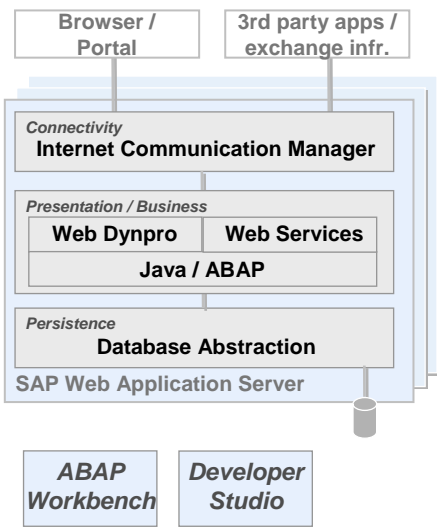
- Comprehensive Infrastructure**
  - Development and Lifecycle Infrastructure
- Integrated ITS**
  - Ease your system infrastructure
- Web Services**
  - Comprehensive Standard-based Infrastructure
- Process forms (pdf - Powered by Adobe )**
  - Documents get printed, e-mailed, archived or faxed
- Performance and Productivity**
  - Simple transformation for XML
  - Shared objects
- Outlook**
  - Web Dynpro for ABAP (next release)
  - Interactive Forms

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## SAP Web Application Server

- Shared benefits**
  - Multi tier architecture
  - Highly scalable and reliable
  - Platform independence
- Common connectivity**
  - Different protocols (SOAP, HTTP, SMTP, RFC, FTP)
  - Advanced caching
- Sophisticated persistence**
  - Database independence
  - Caching
- Efficient development environment**
  - Professional UI Web Dynpro development
  - Proven ABAP development tools Shared facilities
  - Comprehensive Standard-based Web Services infrastructure
- Integrated SAP GUI for HTML**



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## SAP Java Connectivity

**SAP Java Connector (JCo)**

- Enables bidirectional communication between ABAP and Java

**SAP Enterprise Connector**

- Plugin to NWDS that provides easy-to-use call interface to Java programmers
- Supplies a higher level Java API on top of generic SAP Java Connector (JCo) API
- Class and method names correspond to RFM and parameter names
- Strongly-typed interfaces

The diagram illustrates the bidirectional communication between Java and ABAP. On the Java side, the SAP JCo (Java Connector) provides a Java API and JNI Layer, which interfaces with the libRFC library. On the ABAP side, the RFC Layer handles communication with Function Modules and ALE IDocs. The communication protocols used are RFC, tRFC, and qRFC. Below the diagram is a screenshot of the SAP Java Connectivity Builder tool, which lists various SAP interfaces available for integration, such as BAPI\_RESOURCE\_GROUP\_GET\_DETAIL and BAPI\_CUSTOMER\_CREATEFROMDATA.

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## ABAP Application Development

**Presentation Layer**

- Classical Dynpro
- Integrated ITS support  
SAP GUI for HTML and IACs
- Business Server Pages  
Web UI based on HTML
- Web Dynpro for ABAP  
(NetWeaver 2005)

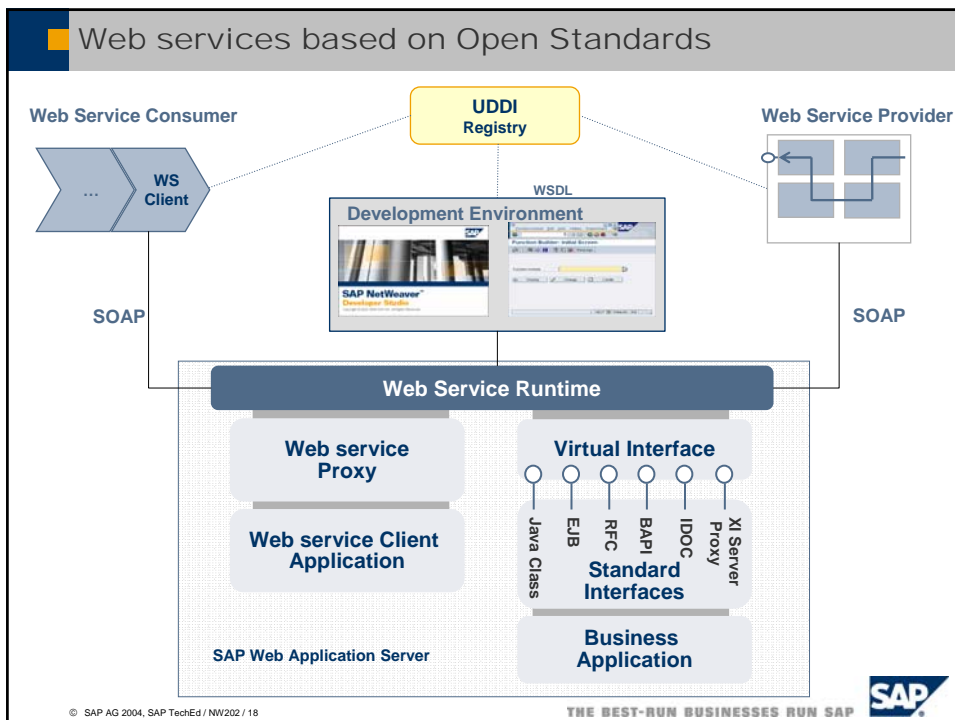
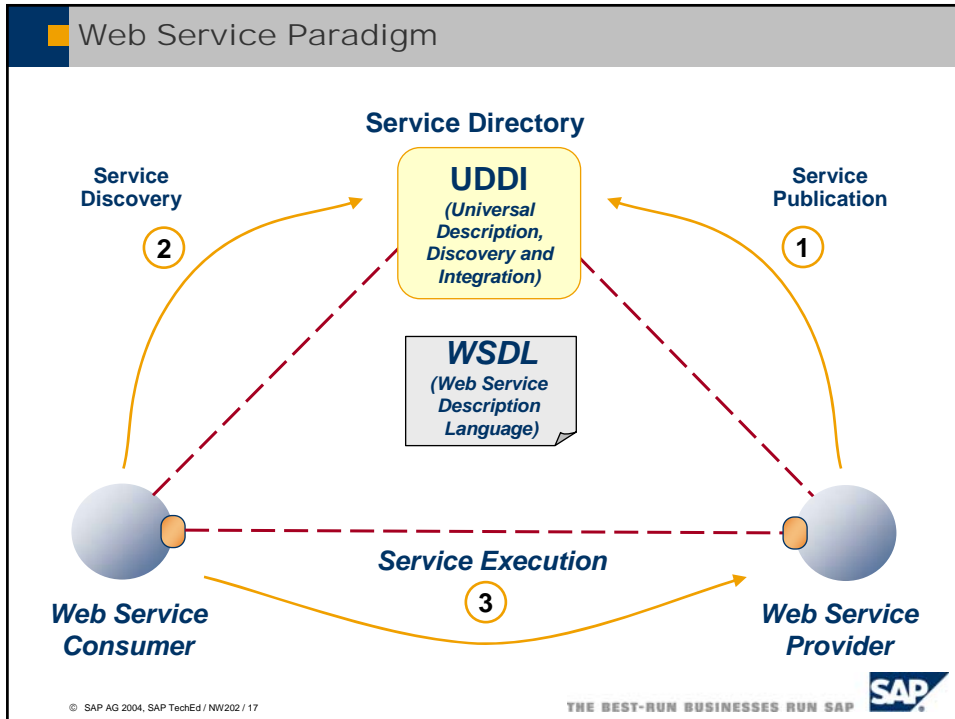
**Business Layer**

- Module Pool contains control and business logic
- Web Service support
- RFC and BAPI providing business functionality

The diagram shows the layered architecture of ABAP application development. The Presentation Layer includes Dynpro, ITS, BSP, and Web Dynpro. The Business Layer consists of the Module Pool, Web Service, and RFC / BAPI. Open SQL is used for database access. The Database Instance contains the ABAP Schema and Java Schema.

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Demo: Create a Web Service Based on ABAP

The screenshot shows the SAP Function Builder interface. The main window displays the code for a function module named 'Z\_MATERIAL'. The code includes a local interface, tables, and a function body. A menu is open over the 'More Utilities' option, with 'Create Web Service' highlighted. A tooltip indicates that the web service can be created 'From the Function Module' or 'From the Function Group'. Below the main window, a smaller window titled 'Web Service Administration for SOAP Runtime' shows a tree view of web services, including 'z\_material\_ws'.

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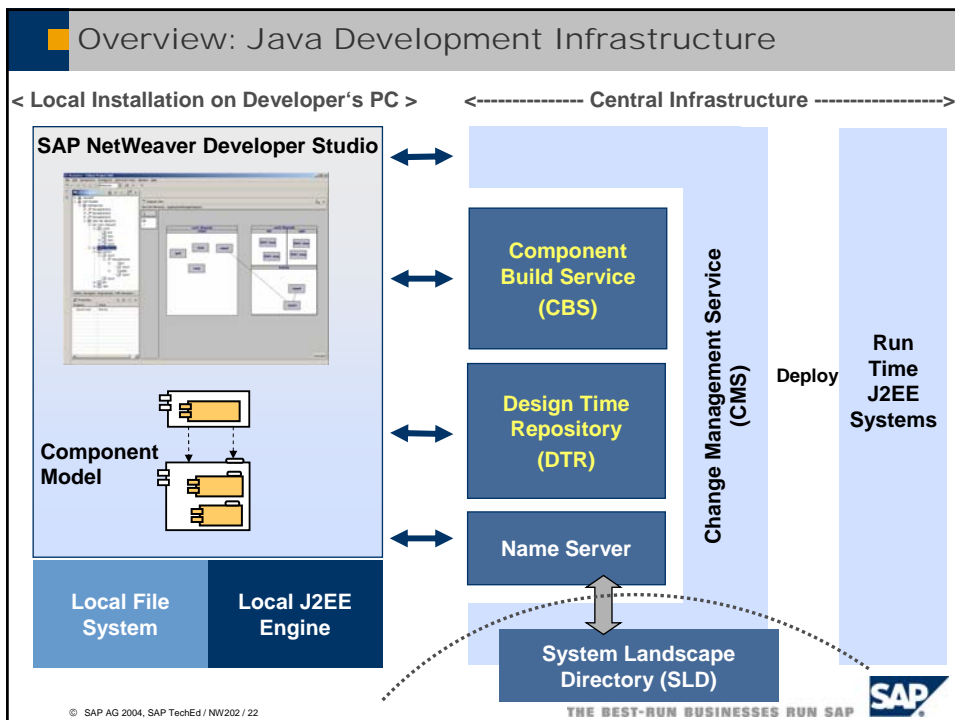
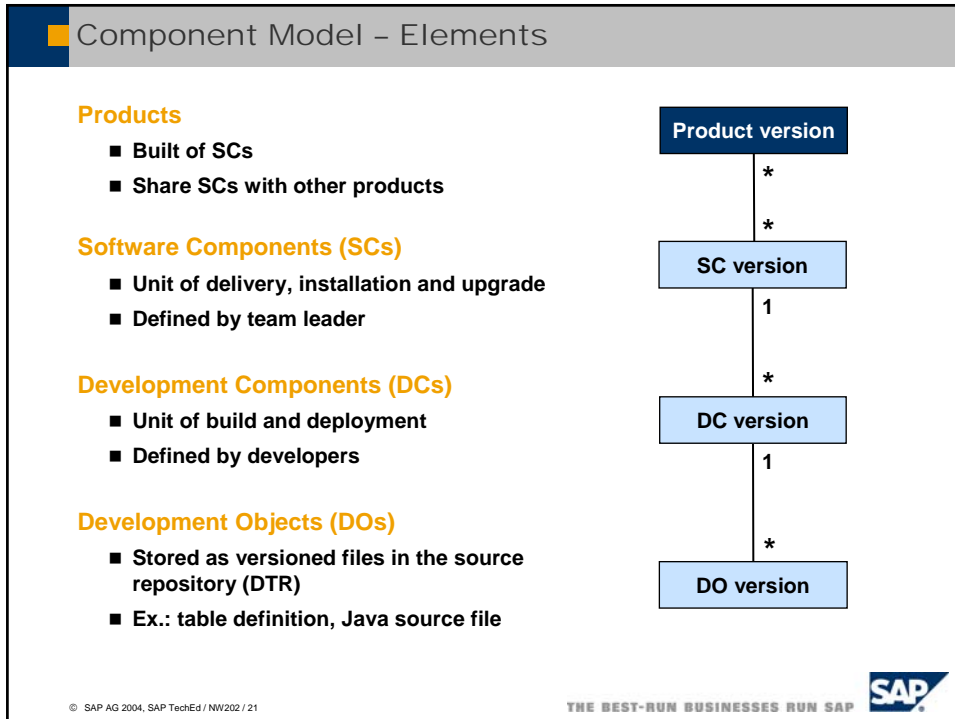
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SAP Web AS Java Features and Highlights

- Fully J2EE 1.3 compliant**
- Java Development Infrastructure**
  - Comprehensive development & lifecycle
- Java Dictionary & Open SQL for Java**
  - DB-independent persistence framework
- Web Dynpro**
  - Professional UI
- Web Services**
  - Comprehensive Standard-based Infrastructure
- Interactive Forms Solution – Powered by Adobe**
  - User-friendly design tool
- Enterprise Portal**
  - Role based, secure and Web based


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## SAP NetWeaver Developer Studio

- Extensible and open IDE based on open source framework Eclipse
- Graphical and easy-to-use tools
- Web Services Tools for connectivity based on open standards
- Web Dynpro Tools for model-driven UI design
- Design Time Repository Client
- Java Dictionary for centralized data type and data structure management
- Integrated software development kits for all NetWeaver components



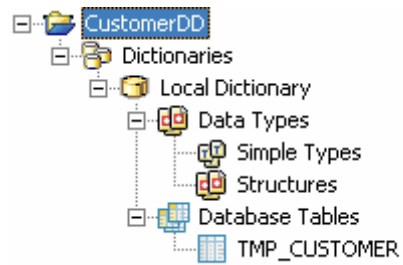
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## Java Dictionary (JDIC) - a Light Weight Data (ABAP) Dictionary

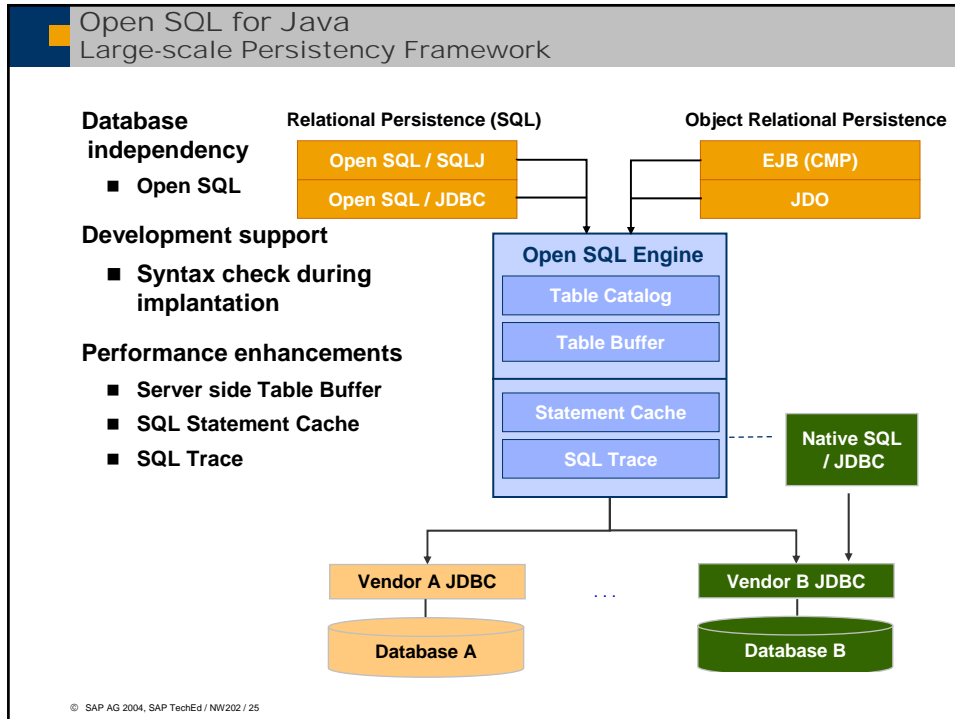
**Create elementary types, structures, and database tables**

<p><b>Supported</b></p> <ul style="list-style-type: none"> <li>■ DB index</li> <li>■ Table buffer</li> <li>■ Global namespace (Name Server)</li> <li>■ Data types</li> </ul> <p><b>Benefits</b></p> <ul style="list-style-type: none"> <li>■ Enables database independency</li> <li>■ SQLJ is based on JDIC</li> <li>■ Included in Web Dynpro</li> <li>■ Open SQL features</li> </ul>	<p><b>Not supported</b></p> <ul style="list-style-type: none"> <li>■ Foreign keys</li> <li>■ Same data types as ABAP</li> <li>■ No Domain concept</li> <li>■ No transport of content</li> </ul>
---	---



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**What is Web Dynpro?**

**Web Dynpro**

- Is SAP's development framework for creating professional UIs for business applications
- Includes sophisticated runtime services
- Minimizes manual coding because of its model-driven approach
- Uses visual tools to design and re-use UI components
- Gives developers full control of the generated code at all stages of the development process

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SAP

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Web Dynpro  
Professional Browser-based User Interface

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Web Dynpro  
Professional Browser-based User Interface

**Professional**

- Tool based design
- Model-View-Controller architecture
- Browser based, zero footprint
- Screen updates w/o page reloads

**Declarative**

- Reuse of components
- Separation of UI design and business logic
- Arbitrary backends (ABAP, Java, Web Service)
- Device independent

**Comprehensive**

- User personalization
- 508 accessibility compliance
- Internationalization support

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Advantages for End Users

Consistent and user-friendly frontend

- Through UI elements based on **Unified Rendering**

Follows **accessibility standards** (especially screenreader and keyboard support)

**“Flicker free”** user experience due to the avoidance of full-page reloads — it only changes what needs to be changed on the screen.



Web Dynpro – Component Based UI Design

Web Dynpro Component

- View
  - Predefined UI Elements
  - Constitute the look & feel
  - Build-In functions in UI Elements
- Controller
  - Graphical Navigation flow
  - Graphical Data flow – automatic data transport
- Model
  - ABAP
  - Java
  - Web Services
- Graphical modeling tools
  - more design, less maintenance

**View**

Item	Product Category	Product
10	MAT_HAWA	DH_PROD01
20	MAT_HAWA	DH_PROD01
30	MAT_HAWA	DH_PROD01

UI Elements

**Controller**

**Navigation**

**Data**

```

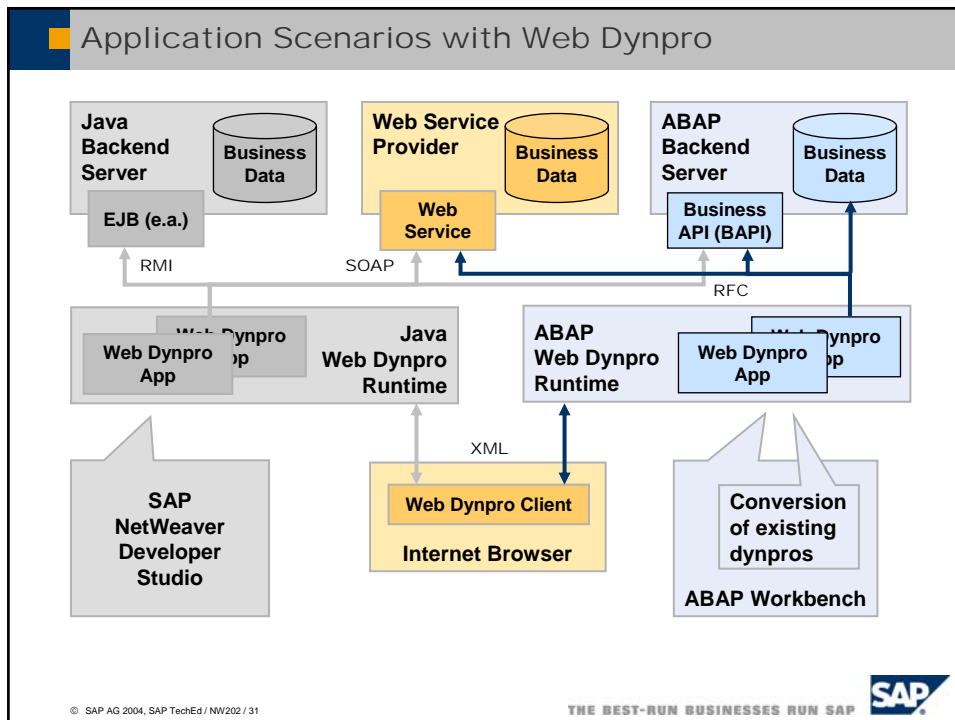
Context
├── BapiFlightGetDetailInput
├── DetailOutput
├── Airlineid
├── Connectionid
├── Flightdate
    
```

DB

ABAP Java Model

Web Service





### Interactive Forms - Benefits

**Interactive Forms based on Adobe software is fully integrated in SAP Web AS**

- **Uses standard Adobe tools**
  - Adobe Designer is fully integrated in NetWeaver Developer Studio and ABAP Workbench
  - Adobe document services are available for ABAP and Java
- **Reduced TCO at customer site**
  - Standard approach for forms: One template per business form
  - Excellent usability and unique XML/PDF capabilities
  - Predefined PDF forms
- **Migration Services**
  - Smart Forms
  - SAPscript forms

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### Interactive Forms Solution - Scenarios

- Online interactive forms**
  - Full integration into Java Web Dynpro framework
  - Context-sensitive value help, online checks
- Offline interactive forms**
  - Offline interaction (no SAP system access needed)
  - Static value help, static checking, simple arithmetic calculations
  - Self-contained PDF (XML data+layout)
- Process forms**
  - Documents get printed, e-mailed, archived or faxed

**Browser with Adobe Reader plug-in** ↔ **SAP Web Application Server**

**Adobe Reader offline** ↔ **save** / **e-mail** ↔ **SAP Web Application Server**

**Print** / **Archive** / **E-mail** ↔ **SAP Web Application Server**

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### ABAP and Java together

**Presentation Layer** (Java): Web Dynpro

**Business Layer** (Java): EJB

**Persistence** (Java): Open SQL

**ABAP**: Web Dynpro, FM / BAPI, Open SQL

**Database Instance**: Java Schema, ABAP Schema

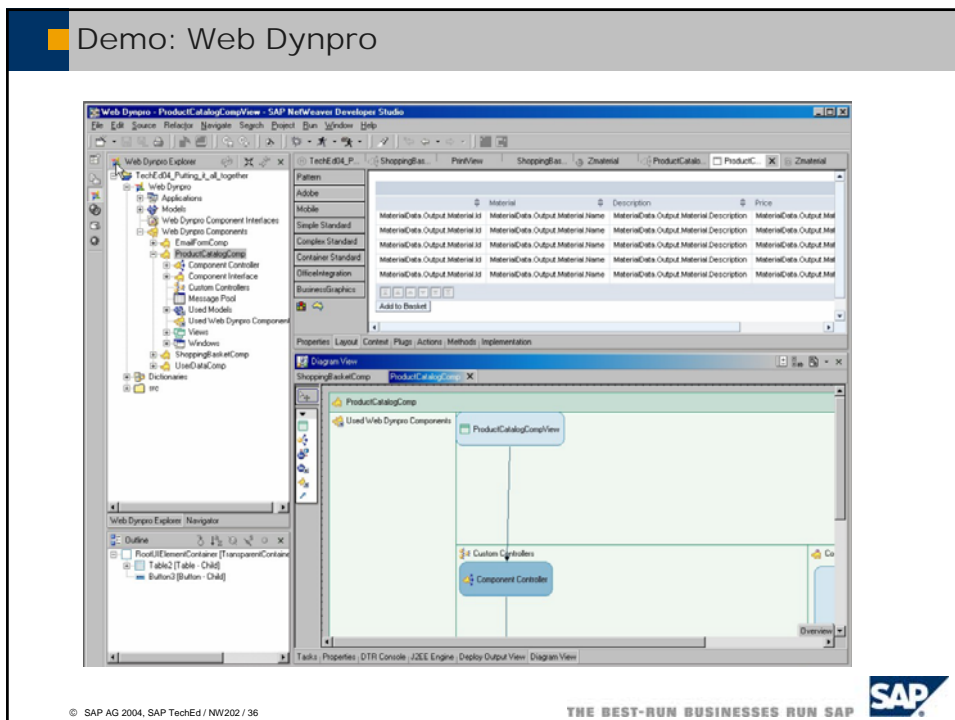
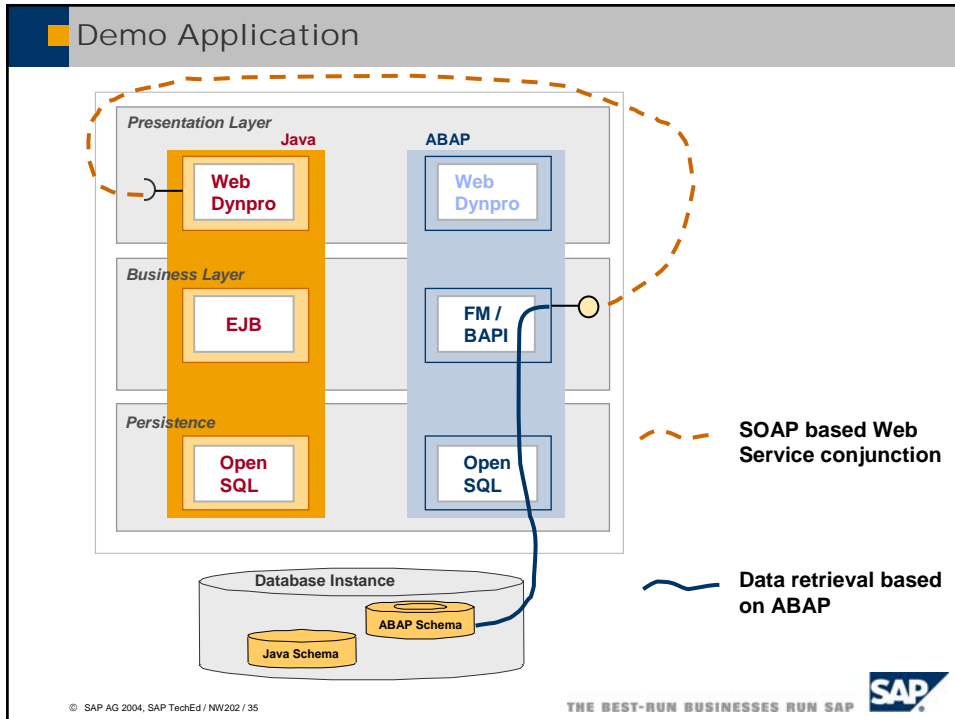
**Legend:**

- Green wavy line: recommended Connectivity between ABAP and Java
- Red dashed line: NOT recommended Connectivity between ABAP and Java
- Yellow circle: Web Service consumer
- Black bracket: Web Service provider

Any Web Service consumer can use any Web Service provider

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**Agenda**

**NetWeaver Overview**

**Application Platform**

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**Portal Integration**

- Web Dynpro with Portal
- Application interaction

**Summary**

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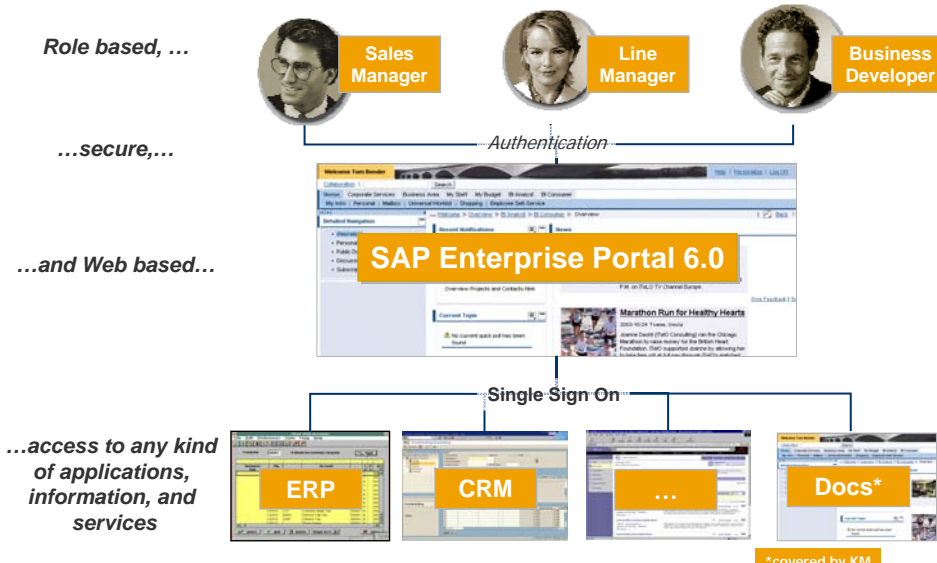
**SAP Enterprise Portal**

*Role based, ...*

*...secure,...*

*...and Web based...*

*...access to any kind of applications, information, and services*



**Sales Manager**

**Line Manager**

**Business Developer**

**Authentication**

**SAP Enterprise Portal 6.0**

**Single Sign On**

**ERP**

**CRM**


**...**

**Docs\***

\*covered by KM

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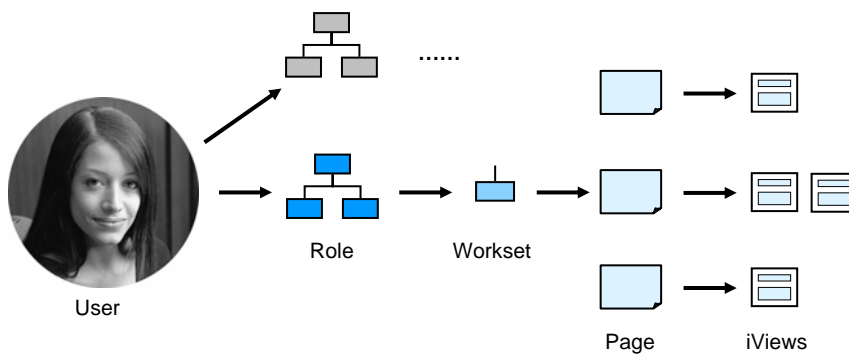
Portal Content Structure

**Role** - A role defines a person's responsibilities in the organization

**Worksets** - A workset is cluster of related tasks

**Page** - Defines a set of coherent iViews

**iViews** - iViews are the smallest units of information



What is an iView?

It is the basic unit of portal content – a small application that displays information

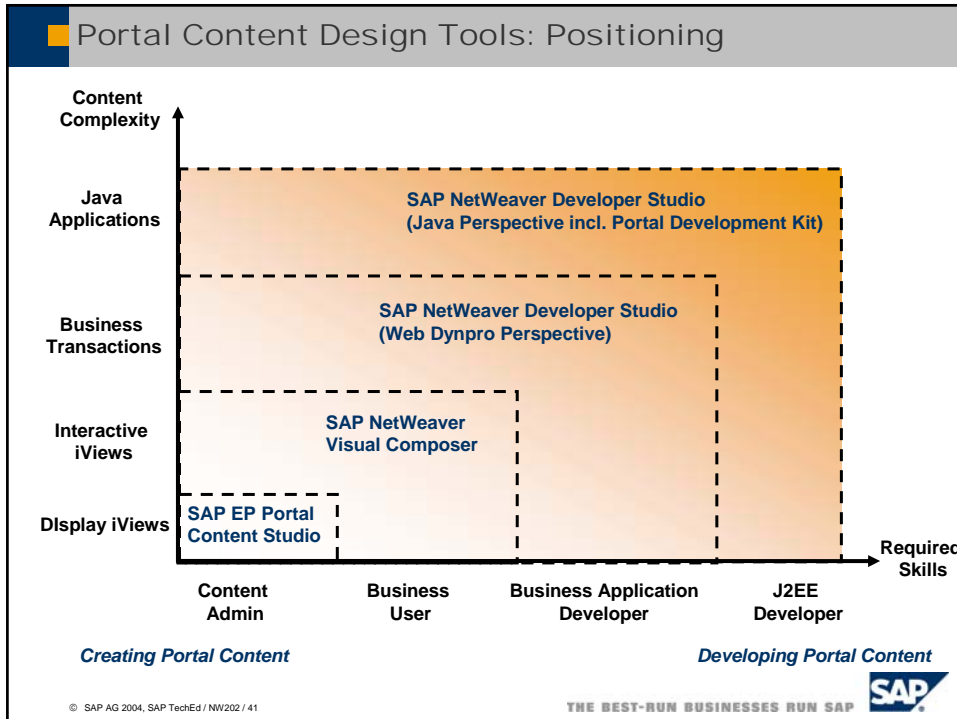
- iView information can be in any format (texts, figures, graphs, reports, tables, charts etc.)
- iViews can be interactive, allowing you to perform business functions
- iViews can display information from any data source

Order	Description	Budget Assigned	Currency	Consumption in %	50%	100%	150%	ISR	Master Data
200206	ORCA ORD1	499.400.00	254.181.70	EUR	51.00				
200207	Avi ORD1	1.200.400.00	488.481.70	EUR	40.69				
200208	Cost4 ORD1	640.800.00	254.181.70	EUR	39.82				
200209	dat moderate Euro GR01	380.800.00	111.265.00	EUR	29.22				
200214	Systeme ORD1	783.200.00	254.181.70	EUR	32.45				
200217	Hausmesse GR01	721.800.00	234.186.70	EUR	32.45				
200218	Future World GR01	919.600.00	298.415.80	EUR	32.45				

Project Name	Transaction Description	Phase Description	User Status	Start Date	Closing Date	Exp. Sales Val.	Curr.	Employee Responsibility
Donat& Interessent ID-75781 Vhalbart	LeadFunnel Analysis 02		In Progress	29.07.2001	03.08.2001	100.00,00	EUR	Donat& Heppmann/FP
Team VMB / O&A 4711 Routine	Lead 180001	Decision Making	In Progress	19.08.2001	10.07.2001	100.00,00	EUR	Donat& Heppmann/FP
Donat& Interessent ID-75781 Vhalbart	LeadFunnel Analysis 03	Discussion of Solutions	Open	28.07.2001	03.08.2001	100.00,00	EUR	Donat& Heppmann/FP
Fuhrmann Retail AG ID-68111 Vhalbart	Lead Generation	Phone Capabilities	First Contact	31.05.2001	29.08.2001			J&G Dreiermann/ID-1





### Integrating Web Dynpro Applications into SAP EP

What has been achieved to NetWeaver '04

- Web Dynpro iView wizard
- Unified rendering, unified branding (by portal theme)
- Portal eventing between different Web Dynpro applications (and other non Web Dynpro portal content)
- Web Dynpro applications can trigger page- or object link navigations from (almost) any available Web Dynpro UI element.
- Work Protect Mode
- Session management for managing sessions on backend systems

The screenshots show the 'iView Wizard' with steps: 1. Template Selection, 2. General Properties, 3. Selection of Application Variant, 4. Application Parameters, and 5. Summary. The 'Portal Branding' screenshot shows options for unified rendering and branding across different portal themes.

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How Client Eventing works with WebDynpro iViews

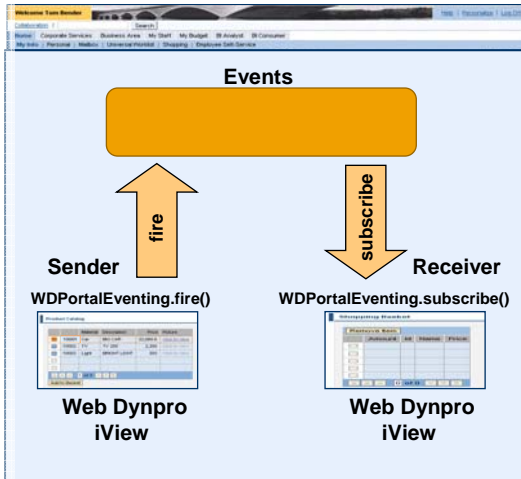
**Client Eventing** makes it possible for iViews to communicate with one another

Receiver iView must **"subscribe"** to the corresponding event

Sender iView have to pass the data on **corresponding event**

Eventing is done with **JavaScript routines** on the client

Portal



Demo: Online Shop Running in the Enterprise Portal

Purchase Home Content Administration User Administration System Administration

Online Shop

Shop | History | Back | Forward

Detailed Navigation

- Welcome
- Shop
- Contact

Product Catalog

ID	NAME	DESCRIPTION	PRICE	PICTURE
10001	Rice	Nice rice (1 ton per unit)	340	<a href="#">Click to view</a>
10002	Corn	Pop corn (1 ton per unit)	190	<a href="#">Click to view</a>
10003	Wheat	White wheat (1 ton per unit)	105	<a href="#">Click to view</a>
10004	Sugar	Sweet sugar (1 ton per unit)	480	<a href="#">Click to view</a>
10005	Potatoes	Big potatoes (1 ton per unit)	180	<a href="#">Click to view</a>

Add To Basket

Shopping Basket

Remove Item	Amount	Id	Name	Price
<input type="checkbox"/>	1	10001	Rice	340
<input type="checkbox"/>	1	10004	Sugar	480
<input type="checkbox"/>	1	10002	Corn	190

Sum: 1,010 Recalculate

Print Order



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**Summary**

- **SAP Web AS provides the foundation platform**
  - NetWeaver Components and mySAP Business Suite
  - Custom applications and 3<sup>rd</sup> party (J2EE compliant)
  - Enterprise Services Architecture
- **Explored new functionality and features in SAP Web AS 6.40**
- **Application scenarios using combinations of ABAP and Java**
- **How to Integrating Web Dynpro Applications into SAP EP utilizing**
  - Client Eventing
  - User Management Engine (UME)
  - Portal themes
- **Building of demo that consisted**
  - ABAP business Logic exposed as a Web Service
  - Creating the presentation layer UI using model driven Web Dynpro
  - Reusing development components
  - Enterprise Portal Integration

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Further Information

Public Web:

[www.sap.com](http://www.sap.com)

**SAP Developer Network:** [www.sdn.sap.com](http://www.sdn.sap.com)

➔ Web Application Server

➔ Enterprise Portal

SAP Customer Services Network: [www.sap.com/services/](http://www.sap.com/services/)

Related SAP Education Training Opportunities

<http://www.sap.com/education/>

Related Workshops/Lectures at SAP TechEd 2004

**JAVA104, SAP Web Application Server - An Overview, Lecture (1 h)**

**JAVA102, SAP Java Development Infrastructure - An Overview, Lecture (2 h)**

**PRTL202, Integrating Web Dynpro App. into SAP Enterprise Portal, Lecture (1 h)**

**NW102, Services at Your Service – SAP NetWeaver as an Enabler of Change, Lecture (2 h)**



SAP Developer Network

Look for SAP TechEd '04 presentations and videos on the SAP Developer Network.

Coming in December.

<http://www.sdn.sap.com/>




Questions?



# Q&A

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## Feedback


Please complete your session evaluation.

Be courteous — deposit your trash,  
and do not take the handouts for the following session.

# Thank You !

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- JavaScript is a registered trademark of Sun Microsystems, Inc., used under license for technology invented and implemented by Netscape.
- MaxDB is a trademark of MySQL AB, Sweden.
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**J2EE  
@  
SAP**



Basics of J2EE


SAP AG

Presentation Overview



- ➔ *A piece of history*
- ➔ *SAP for the Java World*
- ➔ *J2EE for the ABAP World*
- ➔ *Conclusions*

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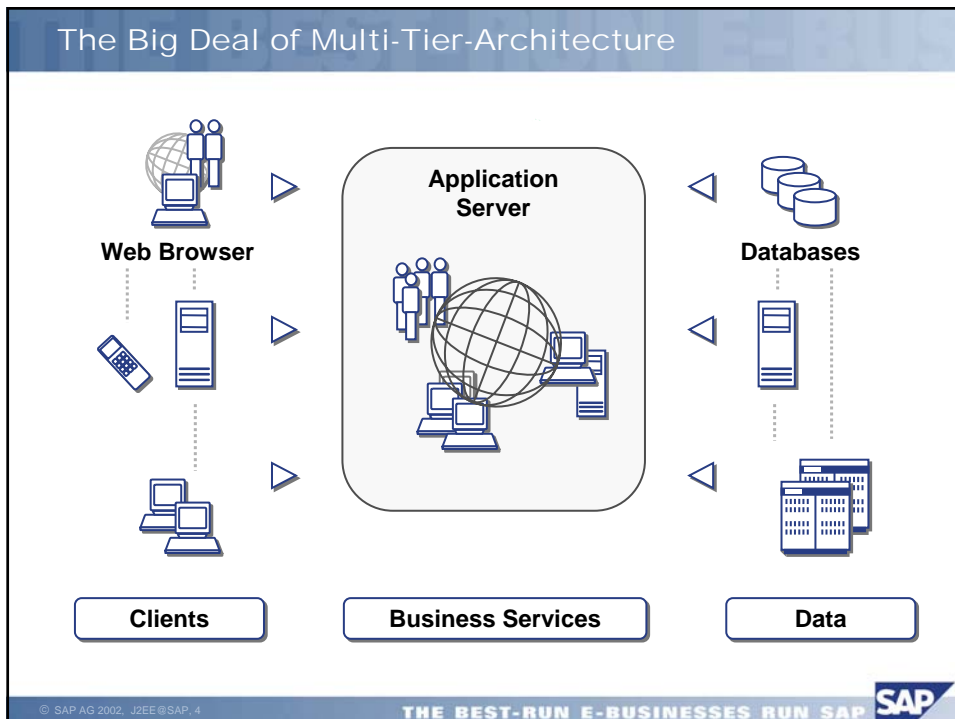
### Presentation Overview

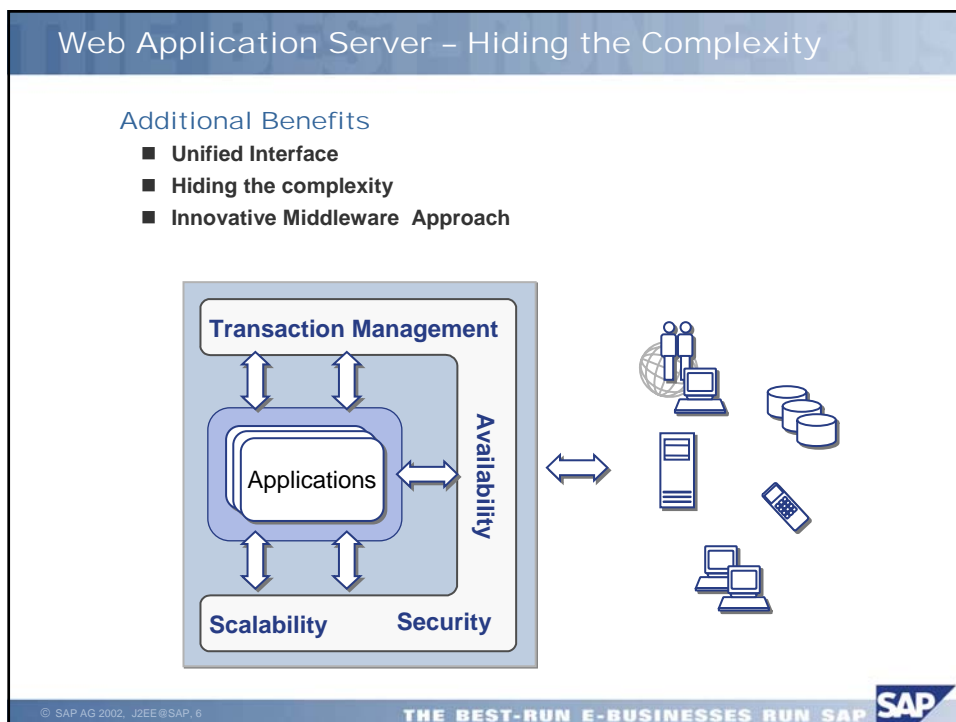
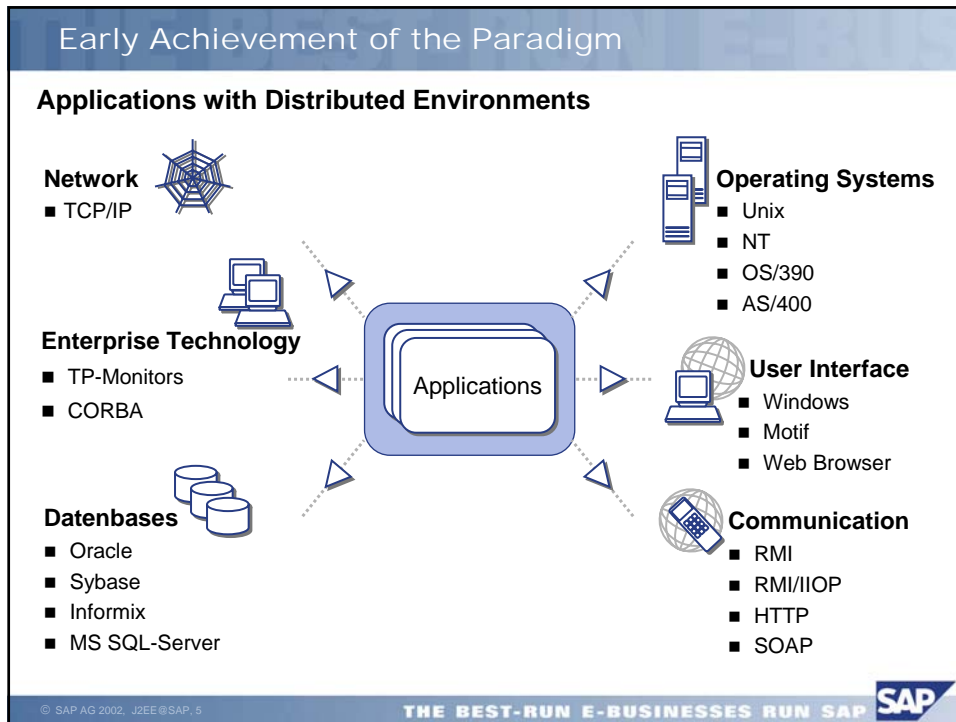


- *A piece of history*
- *SAP for the Java World*
- *J2EE for the ABAP World*
- *Conclusions*

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## Why does SAP Build on Java Based Technology?

Java is a widely accepted open standard

- Java based software market grows rapidly
- Java developer community grows rapidly


And this is because of....

Java technology is platform independent


- Runs on all major hardware platforms
- Runs on all major operating systems

The language is


- Object-Oriented
- Non proprietary
- And has many features to make programmer's life easier (on system level!)



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## What SAP Means to the people using it

Large application means REALLY large

- Comes in a box with 20 CD's
- Installs in three days!
- Installs a database with over 16.000 tables
- A single action may touch up to 5.000 tables

Facts to know

- **EVERYTHING** is in one large database (programs and data)
- Development always is on the server through remote Interface
- SAP Software is generally written in ABAP, an object and procedure oriented, interpreted language running on a virtual machine that has a 40 MB executable

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## Benefits that the Java World is dreaming about

SAP software is database independent

- You can copy everything to a supported DB and start over on another platform

SAP Support works remotely on your software!

- They have a database with all your changes to the software

Large groups work with up to 1000 programmers on same software

- Program changes can be run against system immediately and rolled back automatically

Upgrades can be rolled back

Do we have to offer something to Java?

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## Why don't we go Java completely?

It's a running system (and mission critical)

### Development effort

- Over 10 years of programming
- Customers invested over 10 billion \$ in own code

### Technical reasons

- ABAP is process oriented, J2EE is thread oriented
  - Every user has a process/ thread
  - In case something goes wrong, that means for
    - ABAP: it affects only the current user
    - Java: it affects all users in that process
  - Crashing the system means crashing your context and that is:
    - Java: usually web applications in the range of kilobytes
    - ABAP: usually mission critical in the range of MegaBytes (and can go up to GB)
- We are working on this!

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*A piece of history*



*SAP for the Java World*



*J2EE for the ABAP World*



*Conclusions*

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## What is Java?

Java is an object-oriented programming language

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

Java is platform independent

- All you ever need to run the programs is a JVM on the targeted platform

Java technologies are fueled by the Java community process

- Java Specification Request (JSR)

```
package flightdemo.ejb;

import java.rmi.*;
import javax.ejb.*;
import javax.naming.*;
import java.util.Vector;

public class FlightSearchingBean implements
SessionBean {

private SessionContext sessionContext;
public void ejbCreate() { }
public void ejbRemove() throws RemoteException {
}
public void ejbActivate() throws RemoteException
{ }
public void ejbPassivate() throws RemoteException
{ }
public void setSessionContext(SessionContext
sessionContext) throws RemoteException {
this.sessionContext = sessionContext; }

//public business methods
public FlightTable searchGuest(String
airportFrom, String irportTo, String
departureDate, String airline) throws
FlightdemoException {
try
    { if(getMode().equals("offline"))
return
...
}
```

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## What is J2EE?

Java 2 Platform Enterprise Edition

=

Platform for developing, deploying and managing n-tiered business applications using Java technologies

- Defined by Java community
- Collection of different standards
- Available now - J2EE 1.2
- Coming soon - J2EE 1.3

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### What is Defined to J2EE 1.2 / 1.3?

- **Java 2 Standard Edition (J2SE) 1.2 / 1.3**
  - Java Virtual Machine (JVM)
  - Java Database Connectivity (JDBC)
  - Remote Method Invocation (RMI / IIOP)
  - Java Naming and Directory Interface (JNDI)
- **Java Servlet 2.2 / 2.3**
- **Java Server Pages (JSP) 1.1 / 1.2**
- **Enterprise JavaBeans (EJB) 1.1 / 2.0**
- **JDBC 2.0 Extensions**
- **Java Transaction API (JTA) 1.0**
- **Java Message Service (JMS) 1.0.2**
- **Java Authentication and Authorization Service (JAAS) 1.0**
- **J2EE Connector Architecture (JCA) 1.0**
- **JavaMail 1.1 / 1.2**
- **JavaBeans Activation Framework (JAF)**
- **Java API for XML Parsing (JAXP) 1.1 supports XSLT, SAX and DOM**
- ...

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### Business Applications

**Presentation Layer**

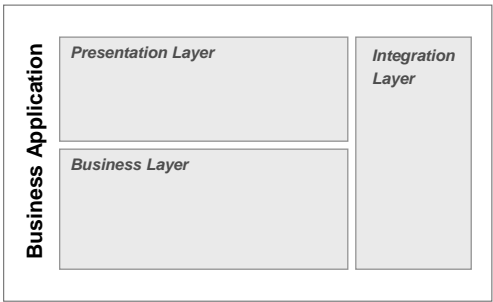
- **Presentation logic**
- **Navigation**
- **Interaction with client (GUI, browser, mobile device)**

**Business Layer**

- **Business rules and processes**
- **State management**
- **Interaction with data storage**


**Integration Layer**

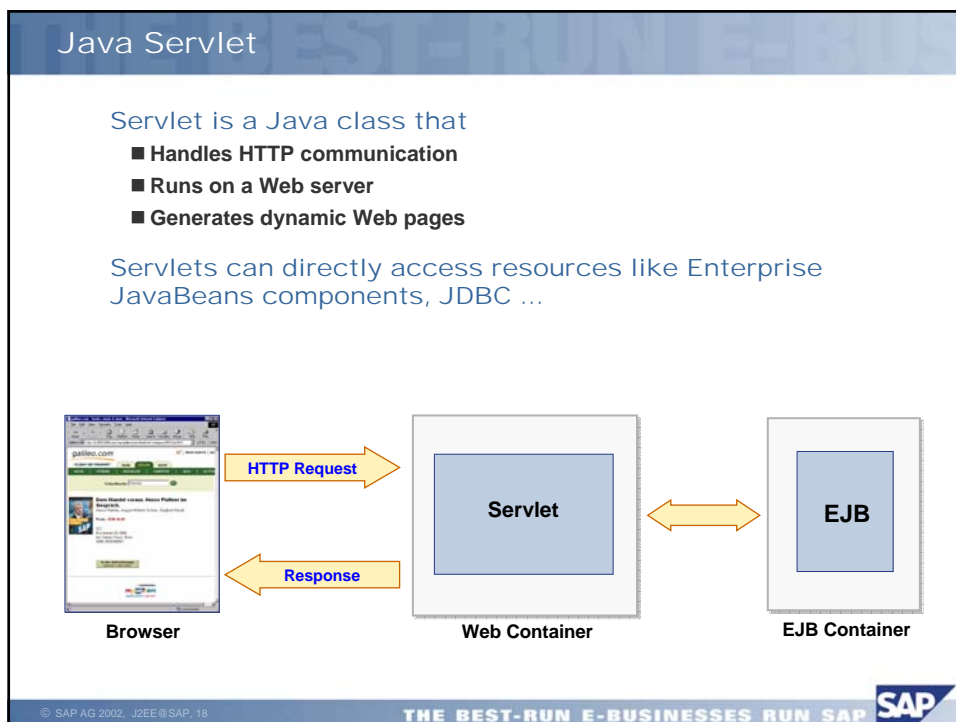
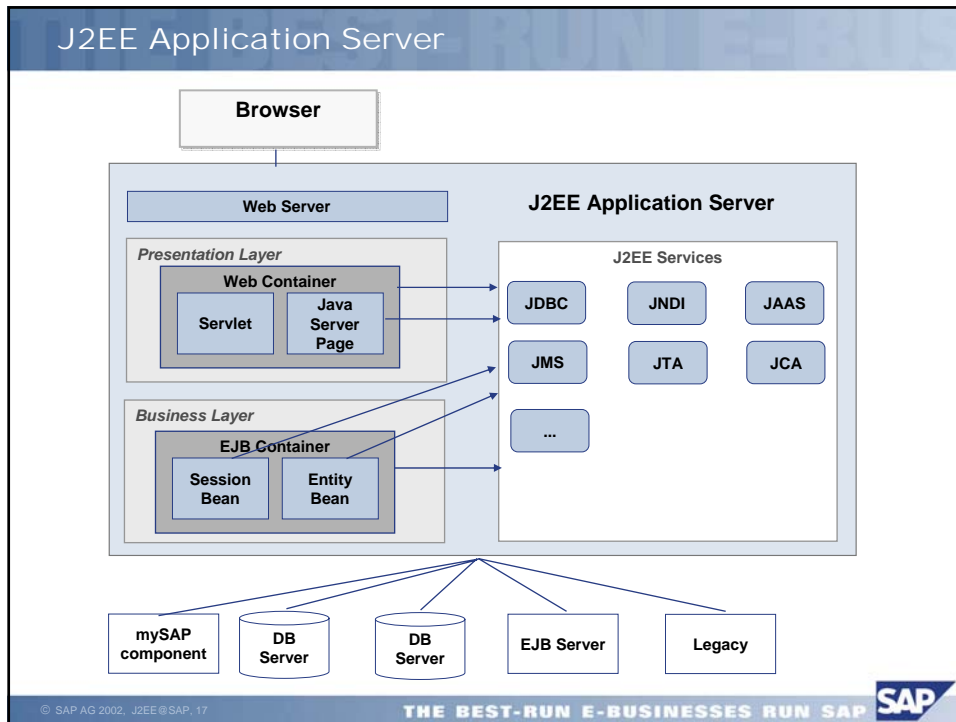
- **Interaction with external resources**



The diagram shows a vertical stack of three layers on the left, labeled 'Business Application'. The top layer is 'Presentation Layer', the middle is 'Business Layer', and the bottom is 'Integration Layer'. To the right of this stack is a separate vertical box labeled 'Integration Layer'.

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## Java Server Page (JSP)

Java Server 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

Java Server Page hides HTTP complexity from programmer



Browser

HTTP Request




Servlet

JSP

Web Container


Response

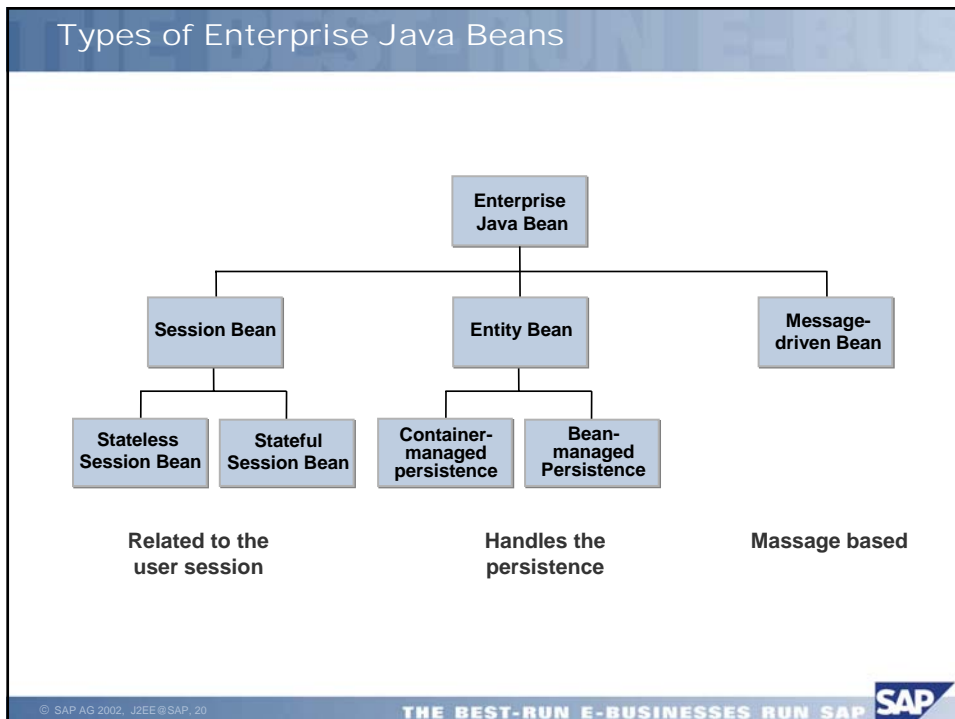


```

<%@ 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>
<tr>From</tr>
<tr>To</tr>
<tr>Date</tr>
<tr>Time</tr>
<!-- 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();
BapisfldatTypeList list = bean.getFoundFlights();
BapisfldatType[] entries = list.toArrayBapisfldatType();
for(int i=0; i<entries.length; i++) { %>
<tr>
<td>
<%= " " + entries[i].getAirline()%></td> <td>
<%= " " + entries[i].getAirportfr()%></td> <td>
<%= " " + entries[i].getAirportto()%></td> <td>
<%= " " + entries[i].getCityfrom()%></td> <td>
<%= " " + entries[i].getCityto()%></td> <td>
<%= " " + entries[i].getFlightdate()%></td> <td>
<%= " " + entries[i].getConnectid()%></td> </tr>
<% } %>
</table> </body> </html>
    
```

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## Enterprise Java Bean (EJB)

<h3>Session Bean</h3> <ul style="list-style-type: none"><li>■ Represents process object (sales order creation, sales order confirmation)</li><li>■ Transient</li><li>■ Server-side service performing tasks for a client such as accessing databases or performing calculations</li><li>■ Private resource for a single client</li><li>■ Stateless or can maintain conversational state across methods and user dialogues</li><li>■ Container manages state</li></ul>	<h3>Entity Bean</h3> <ul style="list-style-type: none"><li>■ Represents business object (sales order, customer, supplier)</li><li>■ Persistent</li><li>■ Central resource that can be shared by several clients at the same time</li><li>■ Can be transactional</li><li>■ Recoverable</li><li>■ Container-managed persistence<ul style="list-style-type: none"><li>■ Container automatically manages all data retrieval and storage operations on behalf of the bean</li></ul></li><li>■ Bean-managed persistence<ul style="list-style-type: none"><li>■ Bean manages its own persistence</li></ul></li></ul>
---	---

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## EJB 2.0 Enterprise Bean Types

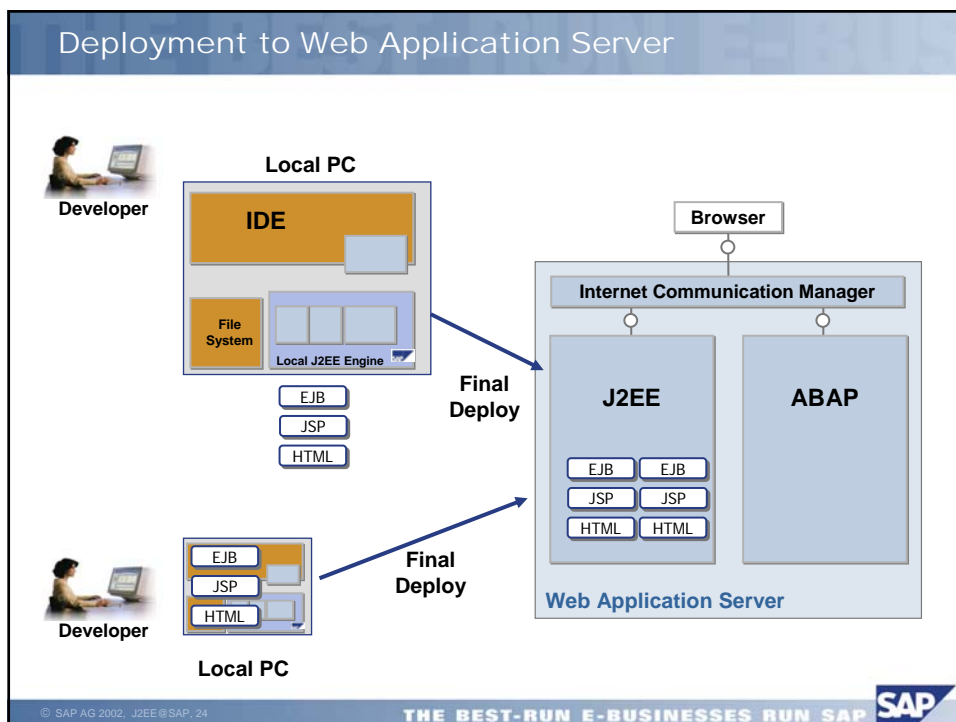
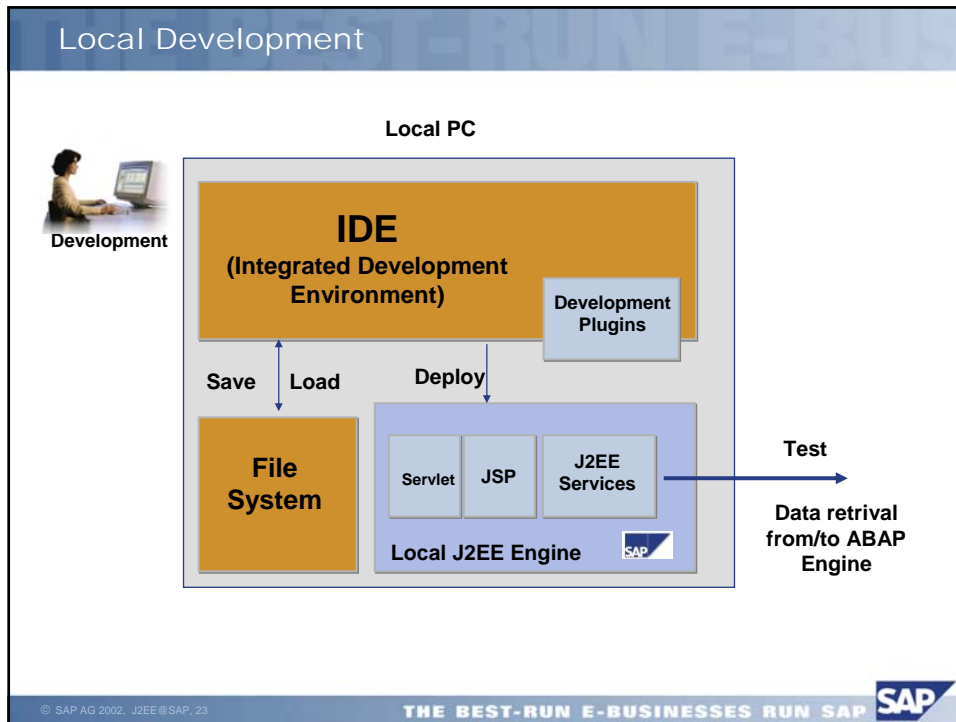
Session beans and entity beans cannot receive JMS messages asynchronously.

EJB 2.0 introduces a completely new enterprise bean type: the message-driven bean (MDB).

- **Message-driven beans are enterprise beans designated for asynchronous data receiving and (possibly concurrent) processing.**

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## What J2EE Does NOT Define

- Platform-independent persistence layer
- Development environment
- Software logistics and software life-cycle management
- Remote support
- ... and many other things that are necessary to develop and run mission-critical business applications


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### What J2EE Does NOT Define

- Persistence layer
- Database independency
- Development environment
- Software delivery

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### Competitive Information (SAP internal use)

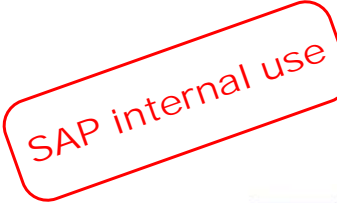
Key Players / Product

- BEA / Weblogic
- IBM / Websphere
- Sun / iPlanet
- Oracle / 9iAS
- Borland / Borland Application Server
- and several open source products


Do NOT compare J2EE with ABAP in terms of reliability or scalability!

- If the going gets tough our competitors use their legacy heavyweight Enterprise Iron (Tuxedo, MQSeries...)
- Let's do it the same way: We have always ABAP in the background.

They are no different from the rest of us!



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## Java and J2EE Resources

Want an overview about Java itself?

- <http://java.sun.com/docs/overviews/java/java-overview-1.html>

Want to know more about J2EE?

- <http://java.sun.com/j2ee/tutorial/>

General resources for J2EE and Java

- [Flashline \(http://www.flashline.com/\)](http://www.flashline.com/)
- [Java Developer's Journal \(http://www2.sys-con.com/java/\)](http://www2.sys-con.com/java/)
- [the serverside.com \(http://theserverside.com/home/index.jsp\)](http://theserverside.com/home/index.jsp)
- [JavaWorld \(http://www.javaworld.com/\)](http://www.javaworld.com/)
- [O'REILLY \(http://www.oreilly.com/\)](http://www.oreilly.com/)


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## What is our unique selling point? (SAP internal use)

**We are well known for our knowledge to deliver standard Enterprise Applications**

**J2EE Market today is talking about technology – We will talk about solutions**

**SAP internal use**

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## Summary (internal)

### J2EE@SAP

- We are moving there because of the market, not because of technology
- Currently most work is Front-end oriented
- A lot of questions are yet unanswered!
  - Software logistic
  - Upgrade management
  - How to develop with big teams?
- Java or ABAP?
  - Decide by project
  - Decide by skills of development team

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