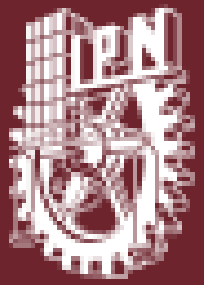

Instituto Politécnico Nacional

Escuela Superior de Cómputo

THEMATIC UNIT: I

Introduction to Web Applications

M. en C. José Asunción Enríquez Zárate *asuncionez@g*

Introduction to Web Applications

UNIT OF COMPETENCE

The student determines the characteristics of Web applications based on JEE specification.

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Enterprise Computing

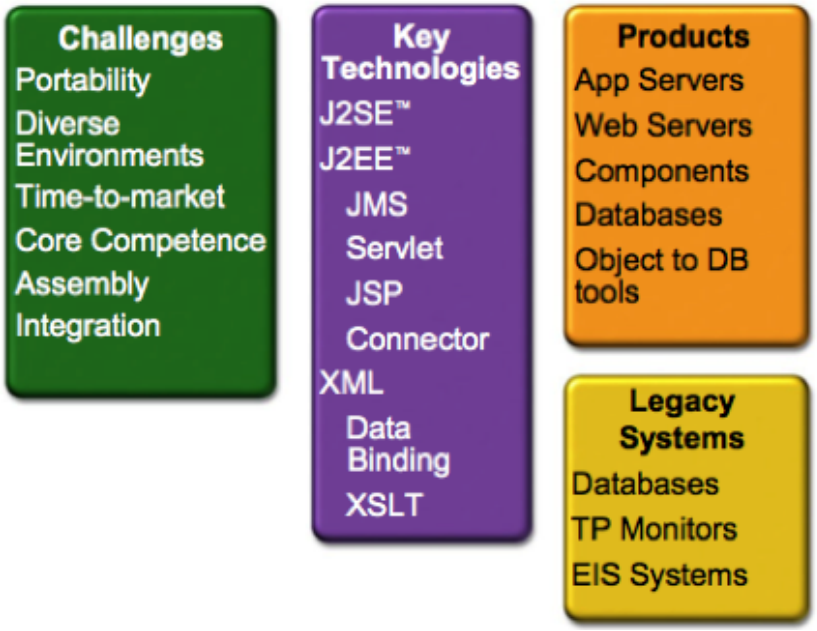

Figure: Enterprise Computing

Enterprise Computing

Enterprise Computing

- Open and standard based platform for
  - developing, deploying and managing
  - n-tier, Web-enabled, server-centric, and component-based enterprise applications

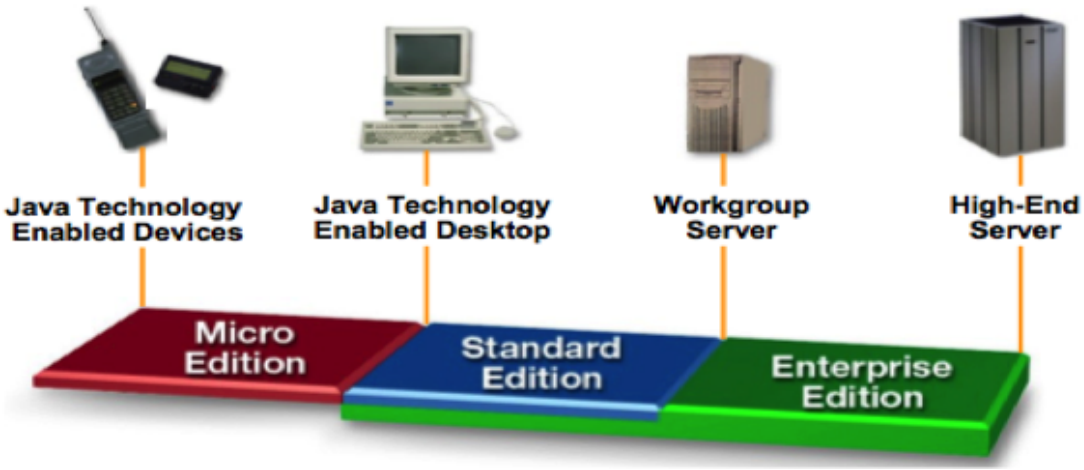

Figure: Enterprise Computing

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Multilayer architectures

Distributed Multitiered Applications

- The Java EE platform uses a distributed multitiered application model for enterprise applications.
  - Application logic is divided into components according to function, and the application components that make up a Java EE application are installed on various machines depending on the tier in the multitiered Java EE environment to which the application component belongs.

Multilayer architectures

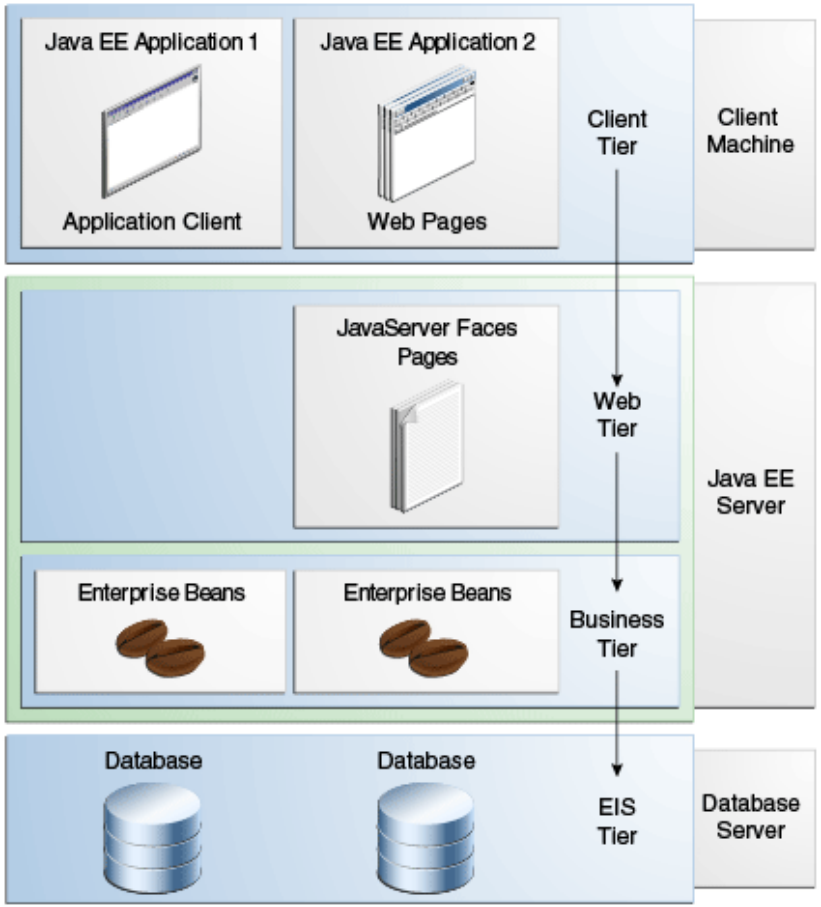

Figure: Distributed Multitiered Applications

Multilayer architectures

Client-tier

- Client-tier components run on the client machine.

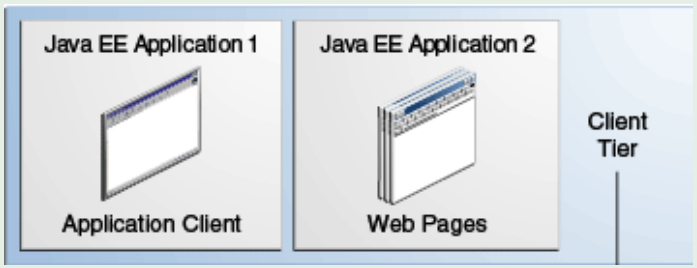

Figure: Client-tier

Multilayer architectures

Web-tier

- Web-tier components run on the Java EE server.

Figure: Web-tier

Multilayer architectures

Business-tier

- Business-tier components run on the Java EE server.

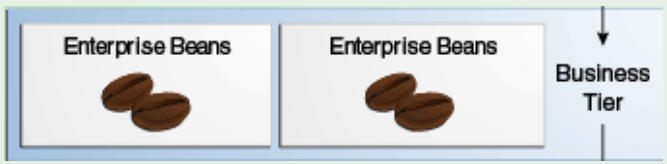

Figure: Business-tier

Multilayer architectures

Enterprise information system (EIS)-tier

- Enterprise information system (EIS)-tier software runs on the EIS server.

Figure: Enterprise information system (EIS)-tier

Multilayer architectures

Distributed Multitiered Applications

- Java EE multi tiered applications are generally considered to be three-tiered applications because they are distributed over three locations:
  - Client machines.
  - The Java EE server machine.
  - And the database or legacy machines at the Back End.
- Three-tiered applications that run in this way extend the standard two-tiered client- and-server model by placing a multithreaded application server between the client application and back-end storage.

Contents

The JEE standard

The J2EE standard

- API and Technology specifications Development and Deployment Platform.
- Standard and production-quality implementation.
- Compatibility Test Suite (CTS) JEE brand JEE Blueprints.
- Sample codes.

The JEE standard

The JEE standard

- Enterprise applications provide the business logic for an enterprise.
- They are centrally managed and often interact with other enterprise software.
- In the world of information technology, enterprise applications must be designed, built, and produced for less money, with greater speed, and with fewer resources.

The JEE standard

The JEE standard

- The most important goal of the Java EE platform is to simplify developmen.
  - By providing a common foundation for the various kinds of components in the Java EE platform.
- Developers benefit from productivity improvements.
  - More annotations.
  - Less XML configuration.
  - More Plain Old Java Objects (POJOs).
  - Simplified packaging.

The JEE standard

The JEE standard

- The Java EE platform includes the following new features:
  - New technologies.
    - Batch Applications for the Java Platform.
    - Concurrency Utilities for Java EE.
    - Java API for JSON Processing (JSON-P).
    - Java API for WebSocket.
  - New features for EJB components.
  - New features for servlets.
  - New features for JavaServer Faces components.
  - New features for the Java Message Service (JMS).

The JEE standard

Java EE Application Model

- Java EE is designed to support applications that implement enterprise services for customers, employees, suppliers, partners, and others who make demands on or contributions to the enterprise.
- Such applications are inherently complex, potentially accessing data from a variety of sources and distributing applications to a variety of client.

The JEE standard

Java EE Application Model

- To better control and manage these applications, the business functions to support these various users are conducted in the middle tier.
  - The middle tier is typically run on dedicated server hardware and has access to the full services of the enterprise.
- The Java EE application model defines an architecture for implementing services as multi tier applications that deliver the scalability, accessibility, and manageability needed by enterprise-level applications.

The J2EE standard

Java EE Application Model

- The Java EE Application Model, partitions the work needed to implement a multi tier service into the following parts:
  - The business and presentation logic to be implemented by the developer.
  - The standard system services provided by the Java EE platform.
- The developer can rely on the platform to provide solutions for the hard systems- level problems of developing a multi tier service.

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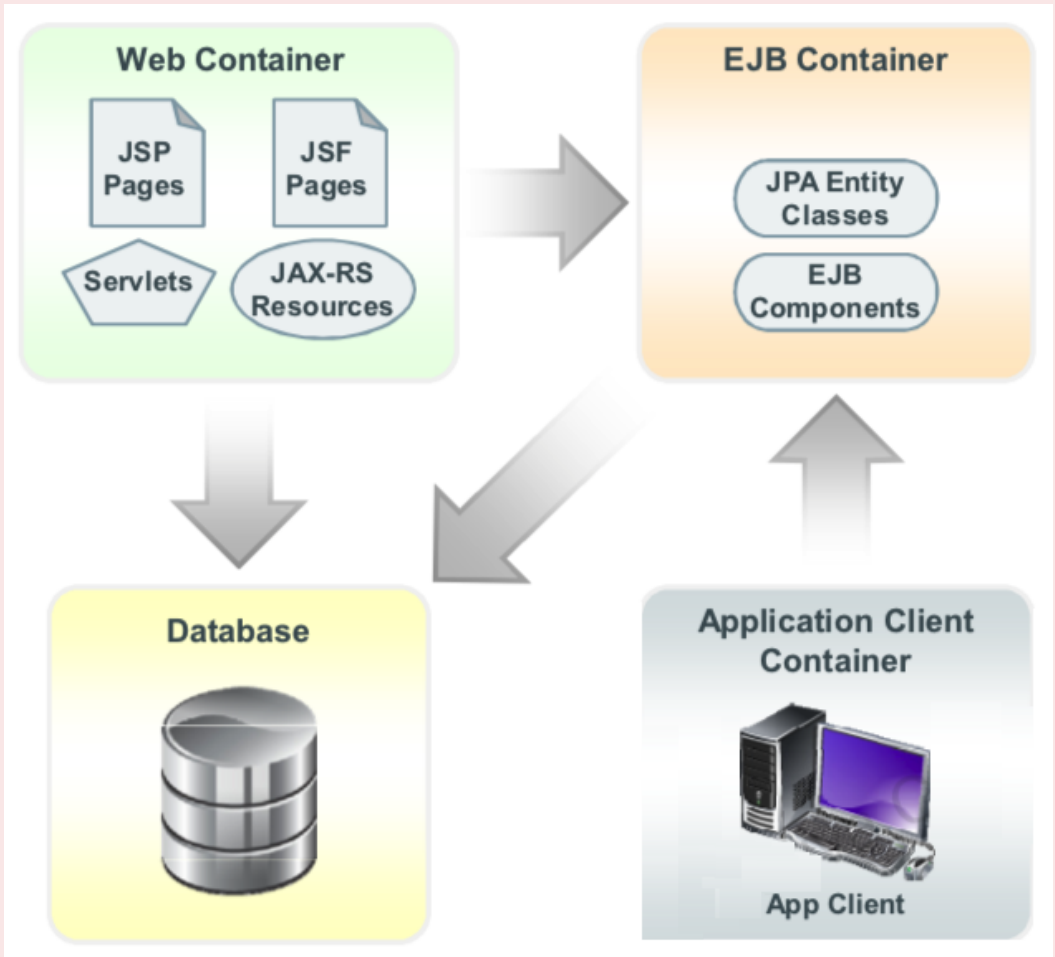
Java EE Containers

Java EE Containers



Application Servers

- An application server provides an environment in which applications can execute. To ensure application portability, application server environments conform to various specifications.
- The collection of specifications that a server conforms to is known as a profile. Java EE includes the Web and Full profiles.
- Java EE servers provide deployment, management, and execution support for conforming application components.

Application Servers

Java EE Implementations

There are many Java EE application server implementations.

- Oracle Fusion Middleware
- GlassFish
- WebLogic
- Other vendors
  - IBM WebSphere
  - Apache TomEE
  - JBoss Application Server
  - Payara Application Server

Application Servers

Selecting an Application Server

Portable Java EE applications can be deployed to a wide range of servers with very little to no modification. The selection of an application server can be influenced by many factors other than code portability.

- Cost
- Support
- Documentation
- Integration
- Reliability
- Ease administration
- Performance
- Backward compatibility
- Supported Java versions
- Supported profiles

Application Servers

Payara Server

- Is freely available from https://www.payara.fish/
- Serves as the Java EE Platform reference implementation
- Is available in Java EE Full Platform and Web Profile downloads
- Has a simplified zip installation option. You just need to unzip to install
- Is community-supported https://blog.payara.fish/topic/spanish-language

Contents

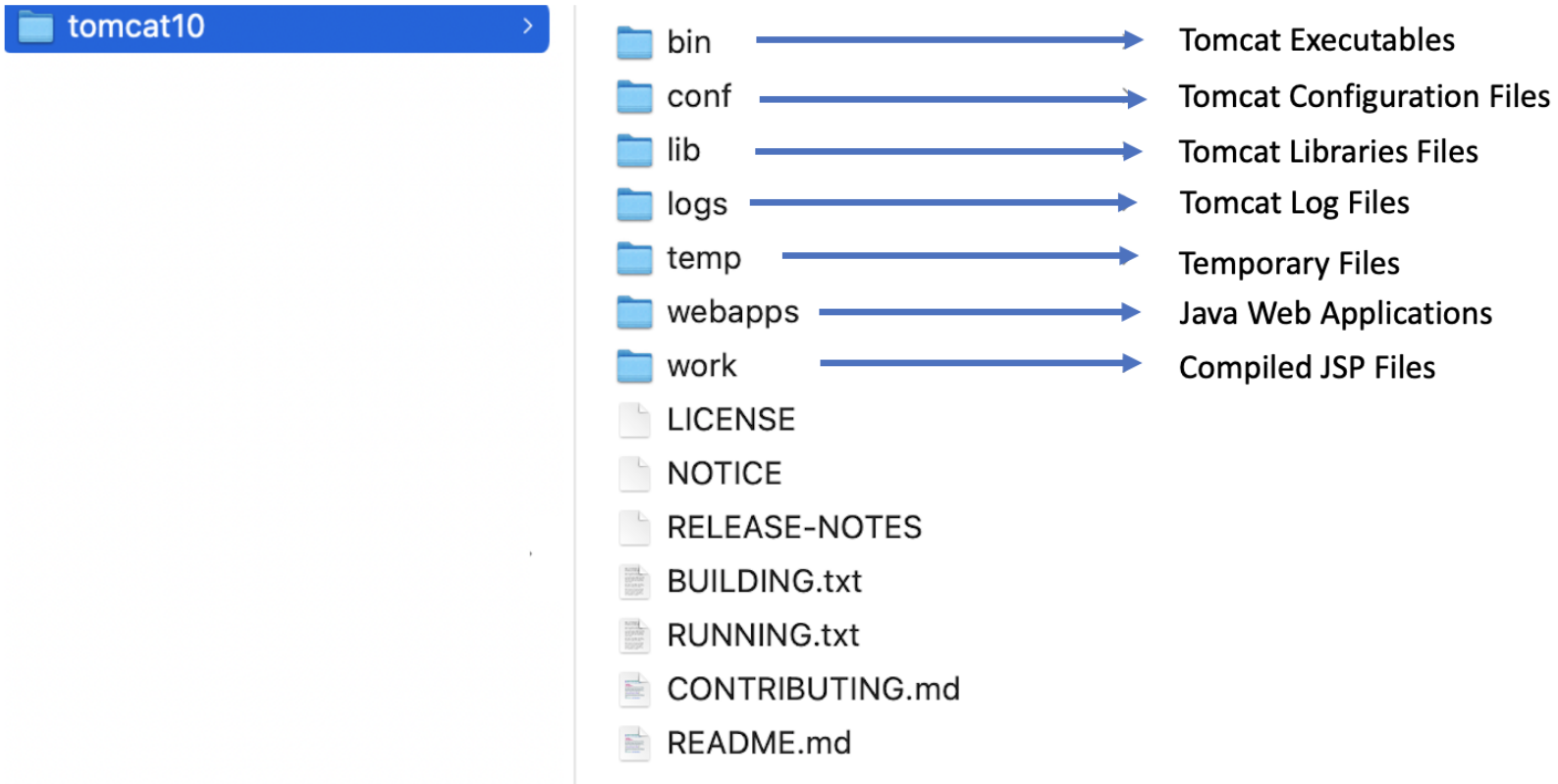
Tomcat Application Server

Tomcat Application Server

Apache Tomcat. Is an open source software implementation of the Java Servlet and JavaServer Pages technologies.

Servlet Spec	JSP Spec	EL Spec	WebSocket Spec	Authentication (JASIC) Spec	Apache Tomcat Version	Latest Released Version	Supported Java Versions
5.0	3.0	4.0	2.0	2.0	10.0.x	10.0.2	8 and later
4.0	2.3	3.0	1.1	1.1	9.0.x	9.0.43	8 and later
3.1	2.3	3.0	1.1	1.1	8.5.x	8.5.63	7 and later
3.1	2.3	3.0	1.1	N/A	8.0.x (superseded)	8.0.53 (superseded)	7 and later
3.0	2.2	2.2	1.1	N/A	7.0.x	7.0.108	6 and later (7 and later for WebSocket)
2.5	2.1	2.1	N/A	N/A	6.0.x (archived)	6.0.53 (archived)	5 and later
2.4	2.0	N/A	N/A	N/A	5.5.x (archived)	5.5.36 (archived)	1.4 and later
2.3	1.2	N/A	N/A	N/A	4.1.x (archived)	4.1.40 (archived)	1.3 and later
2.2	1.1	N/A	N/A	N/A	3.3.x (archived)	3.3.2 (archived)	1.1 and later

Tomcat Application Server



Tomcat Application Server

Home | Documentation | Configuration | Examples | Wiki | Mailing Lists | Find Help

Apache Tomcat/10.0.2

APACHE SOFTWARE FOUNDATION http://www.apache.org/

If you're seeing this, you've successfully installed Tomcat. Congratulations!

Recommended Reading:

Security Considerations How-To

Manager Application How-To

Clustering/Session Replication How-To

Server Status

Manager App

Host Manager

Developer Quick Start

Tomcat Setup | Realms & AAA | Examples | Servlet Specifications

First Web Application | JDBC DataSources | Tomcat Versions

Managing Tomcat

For security, access to the manager webapp is restricted. Users are defined in:

```
$CATALINA_HOME/conf/tomcat-users.xml
```

In Tomcat 10.0 access to the manager application is split between different users. Read more...

Release Notes

Changelog

Migration Guide

Security Notices

Documentation

Tomcat 10.0 Documentation

Tomcat 10.0 Configuration

Tomcat Wiki

Find additional important configuration information in:

```
$CATALINA_HOME/RUNNING.txt
```

Developers may be interested in:

Tomcat 10.0 Bug Database

Tomcat 10.0 JavaDocs

Tomcat 10.0 Git Repository at GitHub

Getting Help

FAQ and Mailing Lists

The following mailing lists are available:

tomcat-announce
Important announcements, releases, security vulnerability notifications. (Low volume).

tomcat-users
User support and discussion

taglibs-user
User support and discussion for Apache Taglibs

tomcat-dev
Development mailing list, including commit messages

Contents

Payara Application Server

Payara Application Server

Payara Server is an open source middleware platform that supports reliable and secure deployments of Java EE(Jakarta EE) applications in any environment: on premise, in the cloud or hybrid.

Payara Application Server

Contents

Development Tools

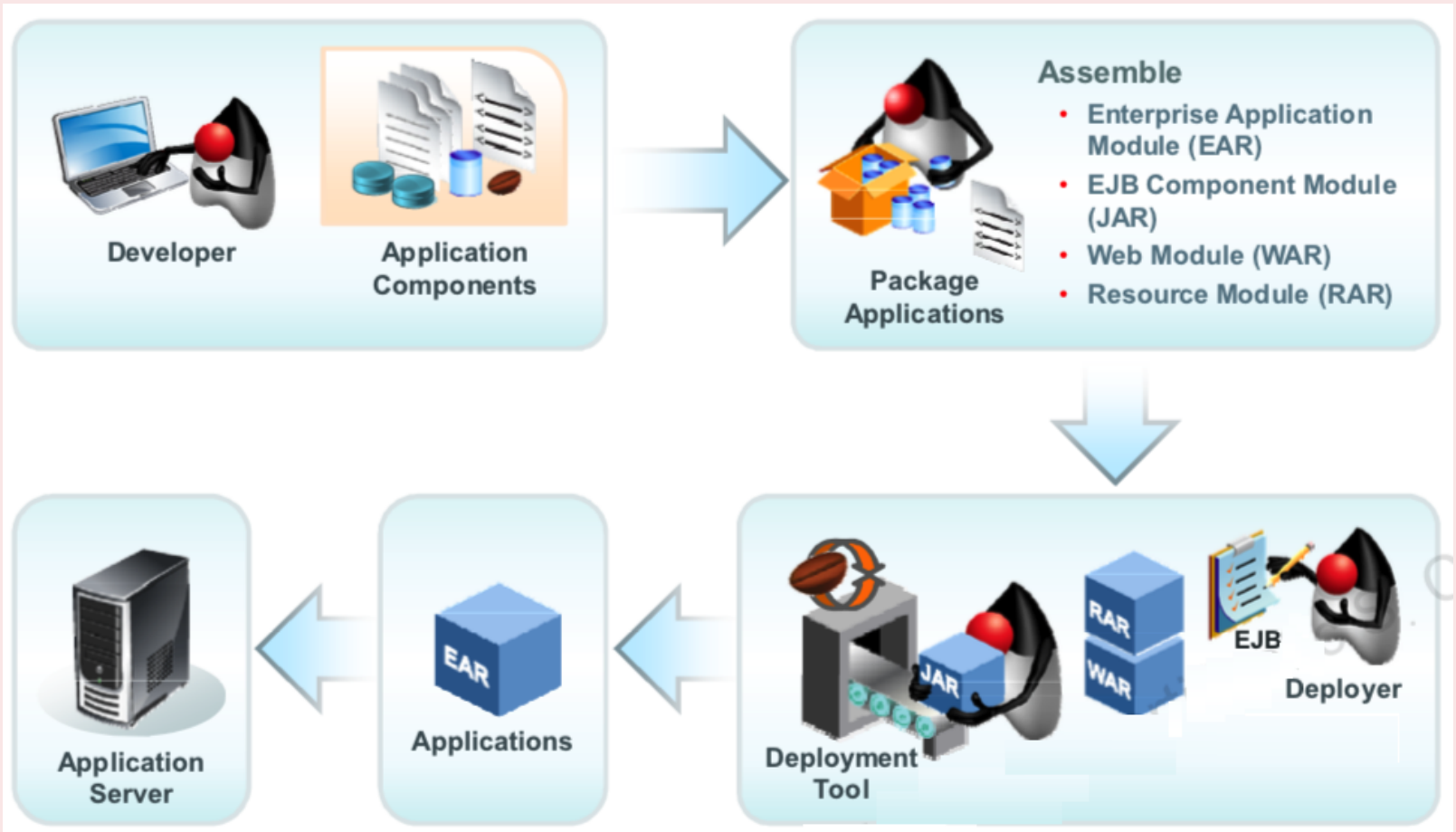
Development Tools

Java applications are traditionally developed within an IDE. IDEs provide:

- An editor
- The ability to:
  - Manage Java components in a graphical manner
  - Compile from within the IDE
  - Debug source code
  - Validate XML and HTML files
  - Connect to source code control systems

Java EE Application Development Process

Java EE Application Development Process



Modern Java Enterprise Development

Modern Java Enterprise Development

Java EE Component Characteristics

Java EE Component Characteristics

- Encapsulation by a container
- Container-controlled life cycle (managed)
  - Multi-threaded
  - Single-threaded
  - Instance per-request
  - Instance per-session
  - Instance per-application
- Dependency injection
- EJB-specific
- Support for local and distributable component interctions
- Location transparency

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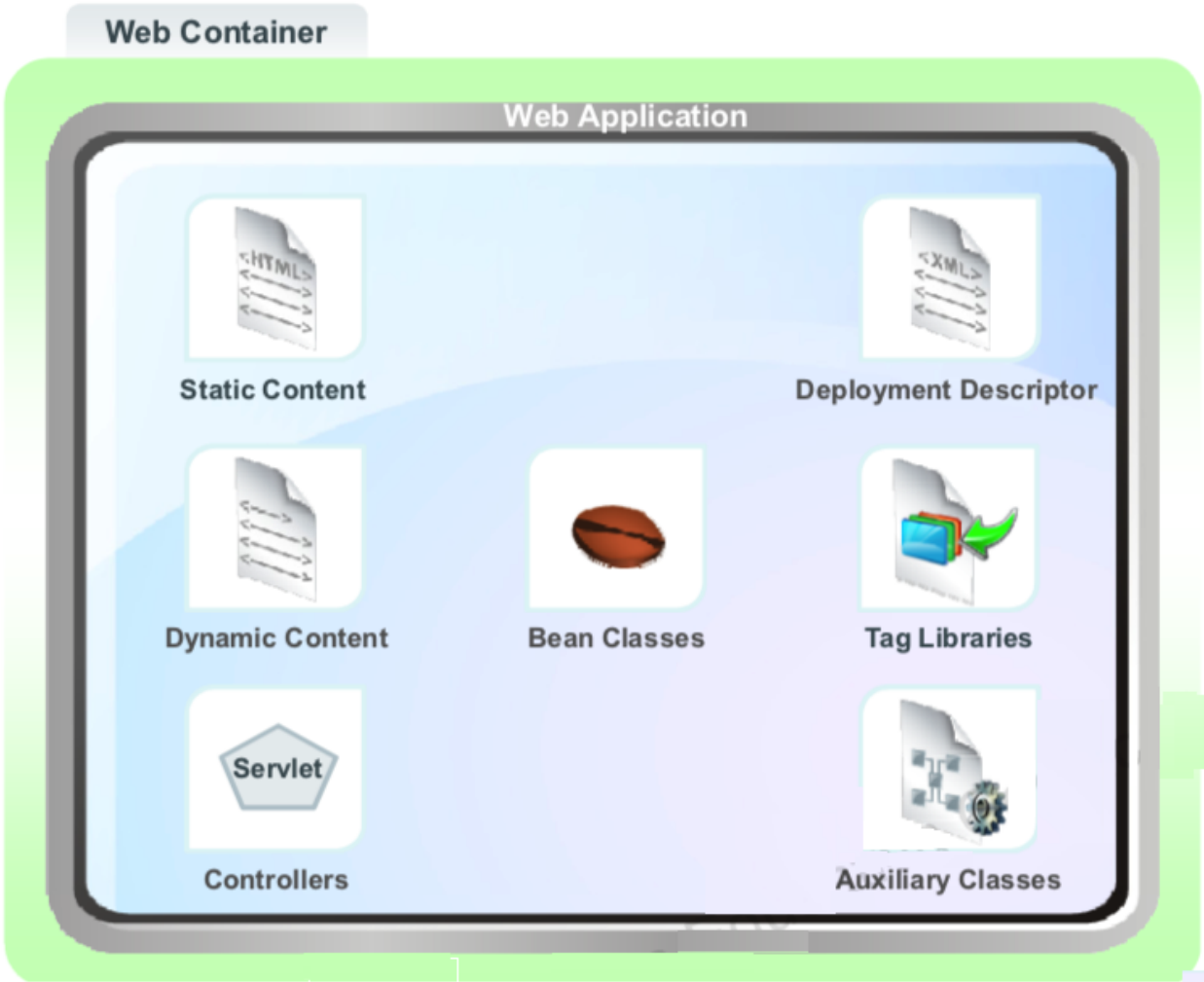
Structure of a Web application



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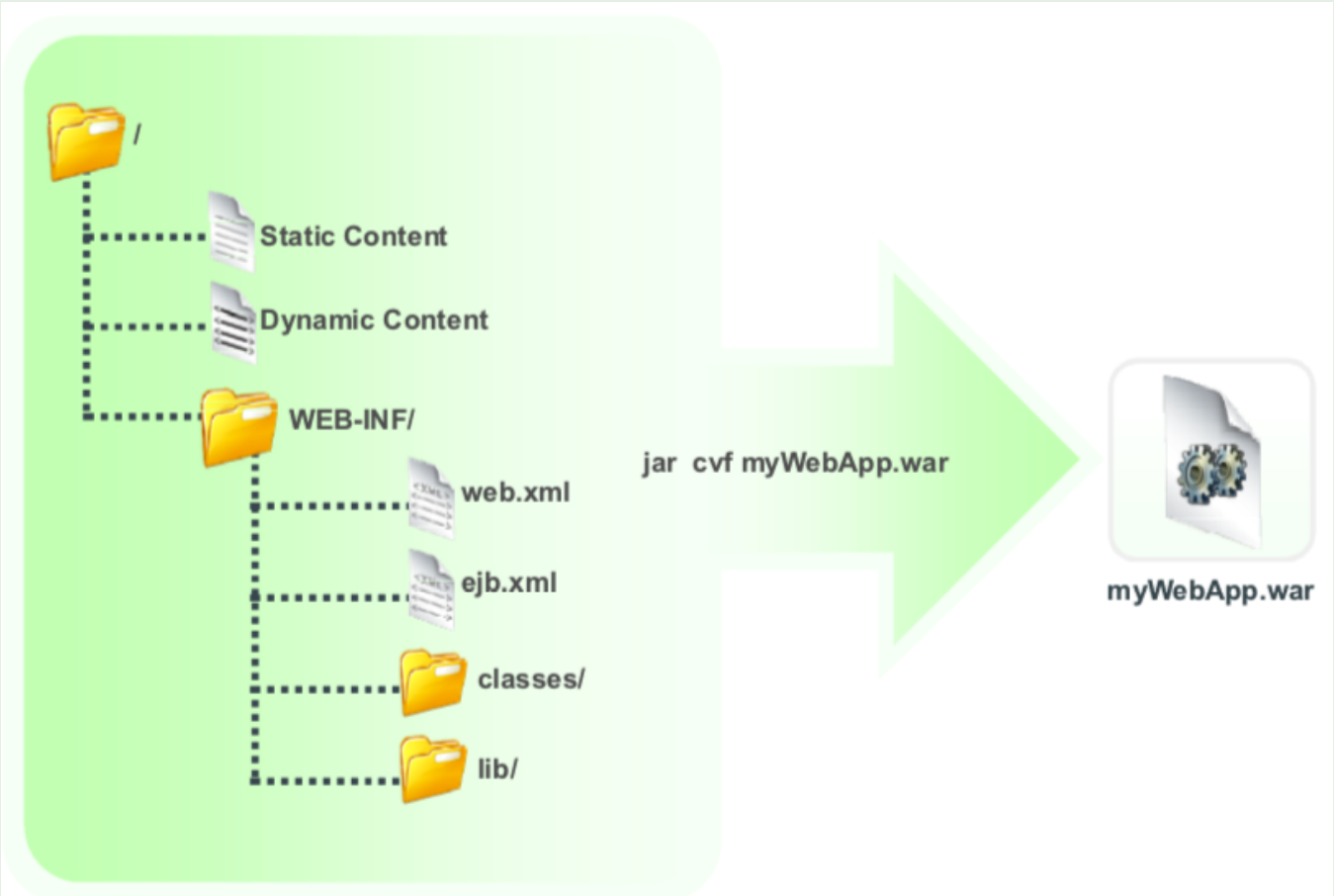
Directory Structure

Directory Structure



Directory Structure

Configuring and Packaging Java EE Applications

Four basic types of archive files are used in Java EE:

- WAR: Web Archives (most common)
- JAR: Java Archives (used for both library JARs and EJB JARs)
- RAR: Resource Archives (containing JCA components, uncommon)
- EAR: Enterprise Archives (used to package the other archives formats into a single archive)

Directory Structure

Java Archive Files

- Provide a standard mechanism for packaging and distributing Java class files and related resources
- Are normally given names that end in .jar
- Are defined by the Java EE specification as the packaging format for EJB components and Java EE clients

Contents

Configuration Files

```
<?xml version="1.0" encoding="UTF-8"?>
<web-app xmlns="http://xmlns.jcp.org/xml/ns/javaee"
         xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
         xsi:schemaLocation="http://xmlns.jcp.org/xml/ns/javaee
         http://xmlns.jcp.org/xml/ns/javaee/web-app_4_0.xsd"
         version="4.0"
         metadata-complete="true">
    <description> Web application description. </description>
    <display-name>Web application name.</display-name>
    <servlet>
        <servlet-name>HelloWorldExample</servlet-name>
        <servlet-class>HelloWorldExample</servlet-class>
    </servlet>
    <servlet-mapping>
        <servlet-name>HelloWorldExample</servlet-name>
        <url-pattern>/servlets/servlet/HelloWorldExample</url-pattern>
    </servlet-mapping>
    <welcome-file-list>
        <welcome-file>index.html</welcome-file>
        <welcome-file>index.xhtml</welcome-file>
        <welcome-file>index.htm</welcome-file>
        <welcome-file>index.jsp</welcome-file>
    </welcome-file-list>
</web-app>
```

Contents

Referencias

Oracle.
Web Component Development With Servlet and JSP Technologies
Oracle.

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Java EE 7: Back-end Server Application Development
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ava Platform, Enterprise Edition The Java EE Tutorial, Release 7
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