2

Defining Java Enterprise Edition Terminology and Architecture

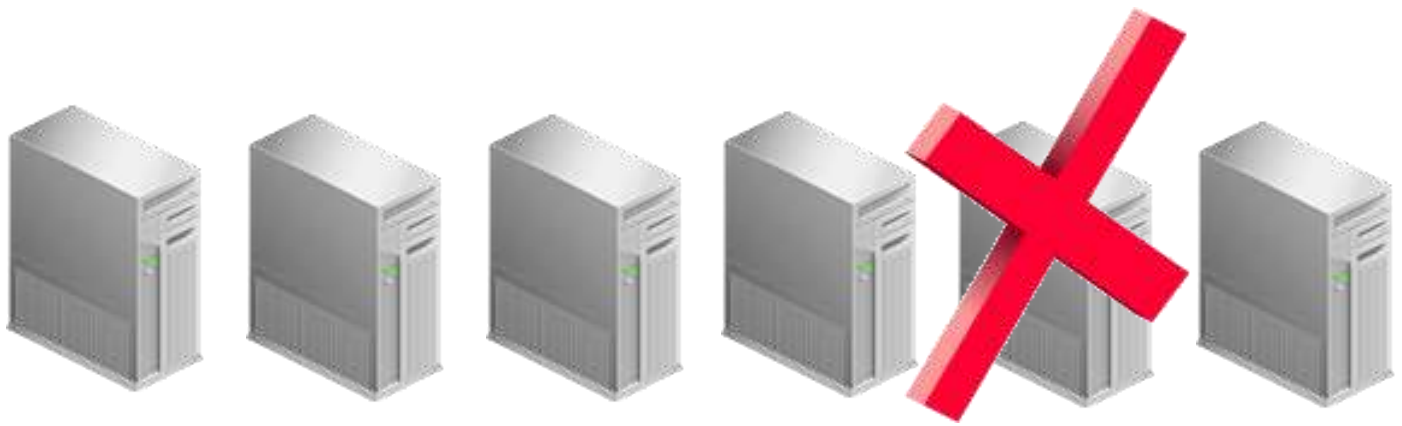
Objectives

After completing this lesson, you should be able to:

- Explain the motivation behind distributed systems
- List the major components of the Java Platform Enterprise Edition 5 (Java EE) specification

Distributed Systems

- Distributed systems divide the work among several independent modules.
- The failure of a single module has less impact on the overall system, which makes the system more:
  - Available
  - Scalable
  - Maintainable



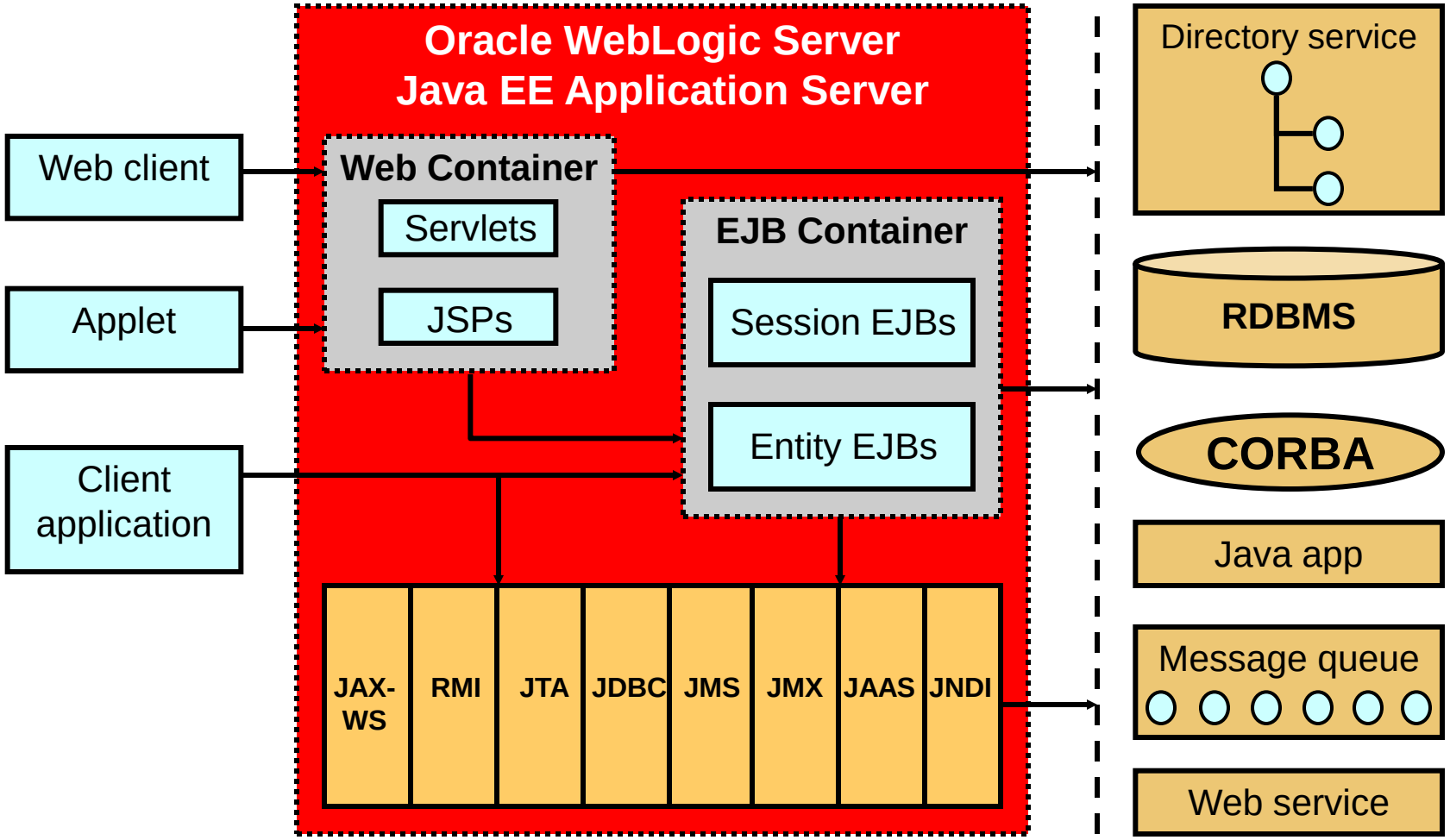
How Standards Help

- Many advantages of distributed systems come from standards.
- Standards allow:
  - Modularization of complex hardware and software
  - A larger portion of the project costs to go toward solving business software needs

Java EE Standard

- Java Platform Enterprise Edition 5 (Java EE) helps you to overcome distribution liabilities.
- Applications deployed with Java EE technologies are:
  - Standardized
  - Adherent to specification guidelines
  - Written in Java
  - Deployable in any compliant application server
- Java Community Process (JCP) is the oversight (custodial) process for moderating Java's future direction.
  - http://jcp.org/en/home/index
  - http://jcp.org/en/introduction/faq

Java EE Architecture



Java Servlets

- A servlet is a Java program that executes on the server, accepting client requests and generating dynamic responses.
- The most prevalent type of servlet is an HttpServlet that accepts HTTP requests and generates HTTP responses.
- Servlets:
  - Do not just generate HTML
  - Can also be used to generate other MIME types, such as images

SimplestServlet.java

Creates HTML

```
package mypackage;
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;

public class SimplestServlet extends HttpServlet {
  public void service(HttpServletRequest request,
    HttpServletResponse response)
      throws ServletException, IOException {
       response.setContentType("text/html");
       PrintWriter out = response.getWriter();
       out.println("<HTML><BODY>");
       out.println("<H1>Hello, World!</H1>");
       out.println("</BODY></HTML>");
  }
}
```

JavaServer Pages (JSPs)

- Are HTML documents that are interwoven with Java
- Provide a dynamic response that is based on the client's request
- Provide for the separation of responsibilities between the Web presentation and the dynamic content
- Are portable (write once, run anywhere)
- Compile and run as servlets
- May include JavaServer Faces tags

realsimple.jsp

Creates HTML

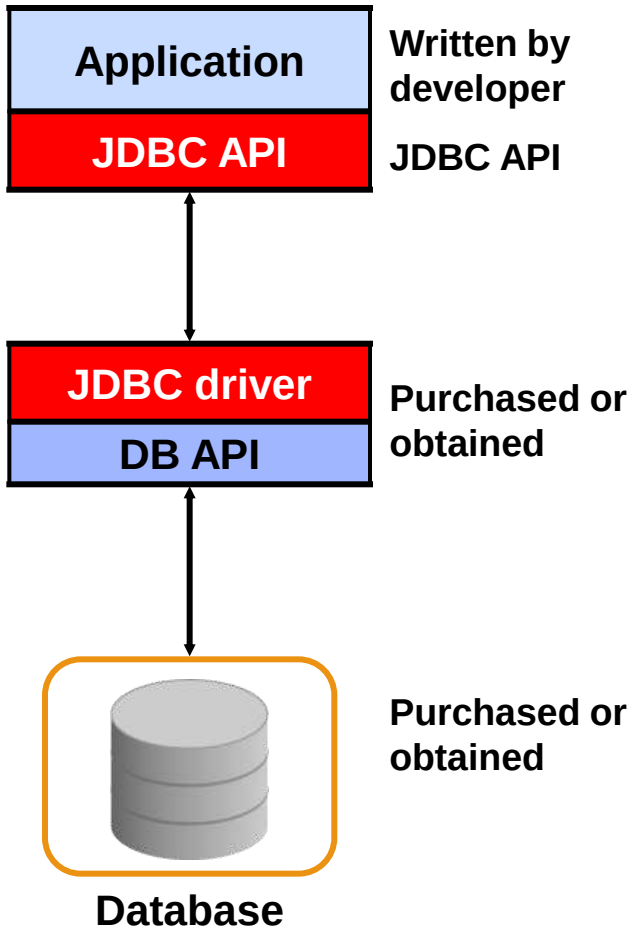
```
<!-- this is a comment -->
<HTML>
  <HEAD>
    <TITLE>My title</TITLE>
  </HEAD>
  <BODY>
    <H1>A big heading</H1>
    <P>Blah blah blah blah blah.</P>
    <% for (int i=0; i<3; i++) { %>
    <H3>Say it again, Sam.</H3>
    <% } %>
  </BODY>
</HTML>
```

Enterprise JavaBeans (EJBs)

- Are distributed components written in the Java programming language
- Provide distributable and deployable business services (logic) to clients
- Have well-defined interfaces
- Are reusable across application servers
- Execute within a container that provides management and control services
  - Oracle WebLogic Server 10.3.1 supports the EJB 3.0 specification.

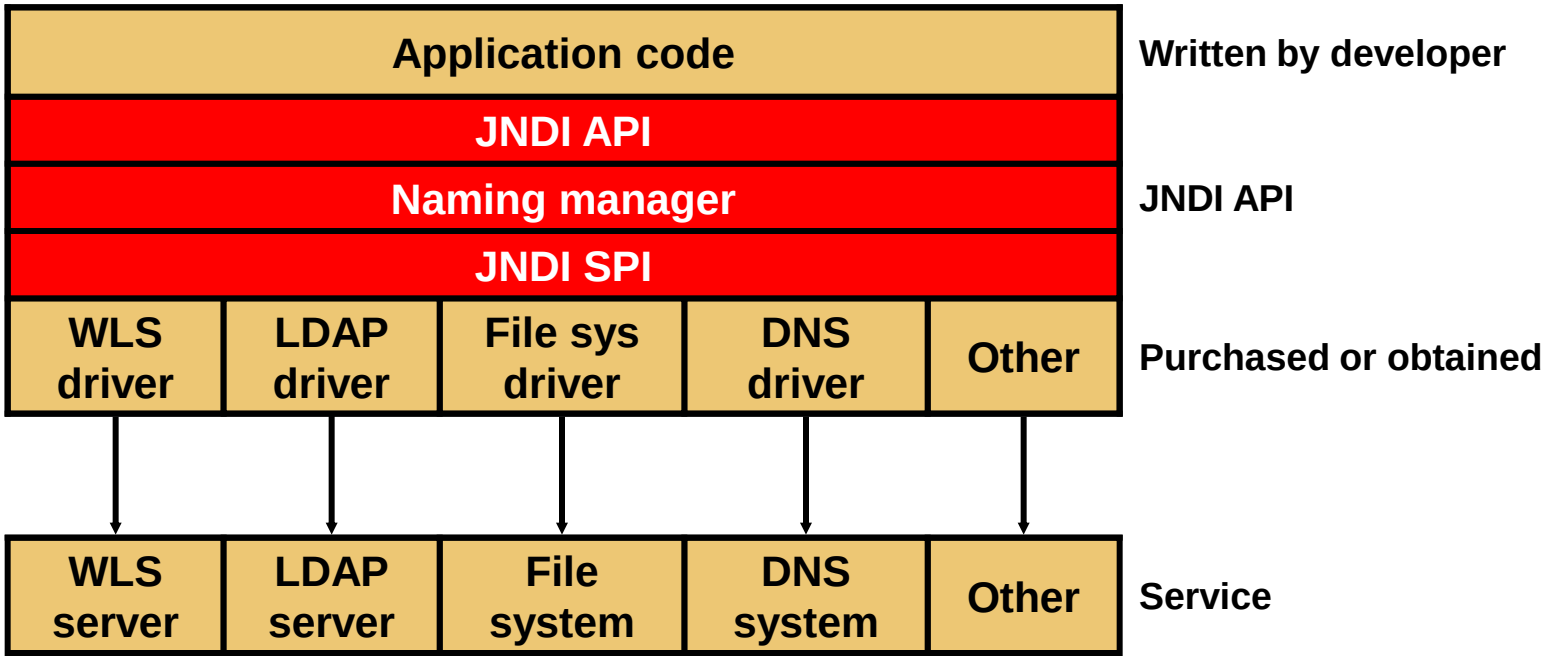
Java Database Connectivity (JDBC)

- The standard Java interface for accessing heterogeneous databases
- The specification that defines four driver types for connecting to databases

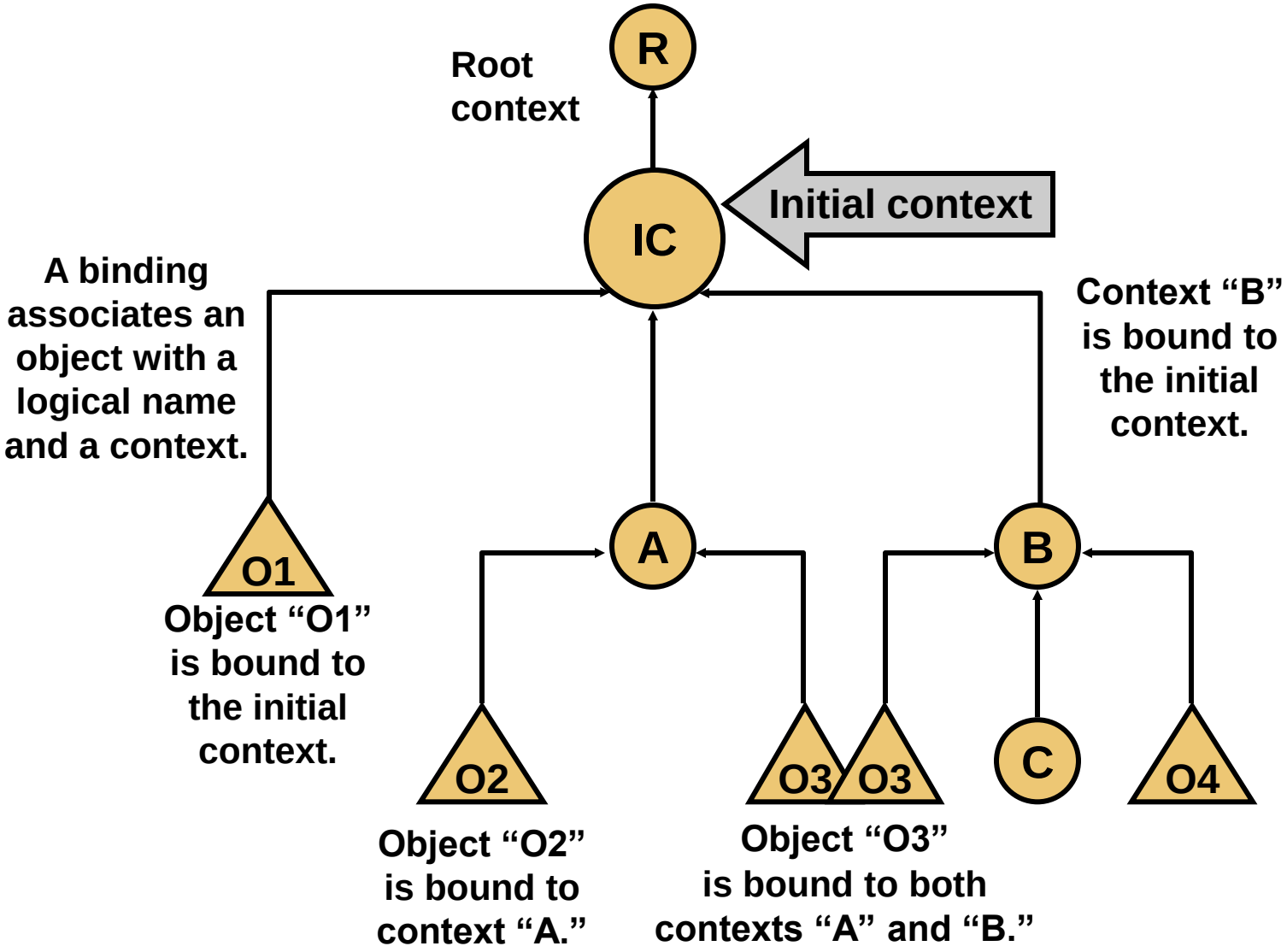


Java Naming and Directory Interface (JNDI)

- Java API for accessing naming and directory services
- Built as a layer over DNS, LDAP, and so on



JNDI Tree



JNDI Contexts and Subcontexts

- Subcontexts are referenced through dot delimiters (`.`).
- Subcontexts must be created before objects are placed into them.
- Typically, when objects are bound to a JNDI tree, subcontexts are automatically created based on the JNDI name.

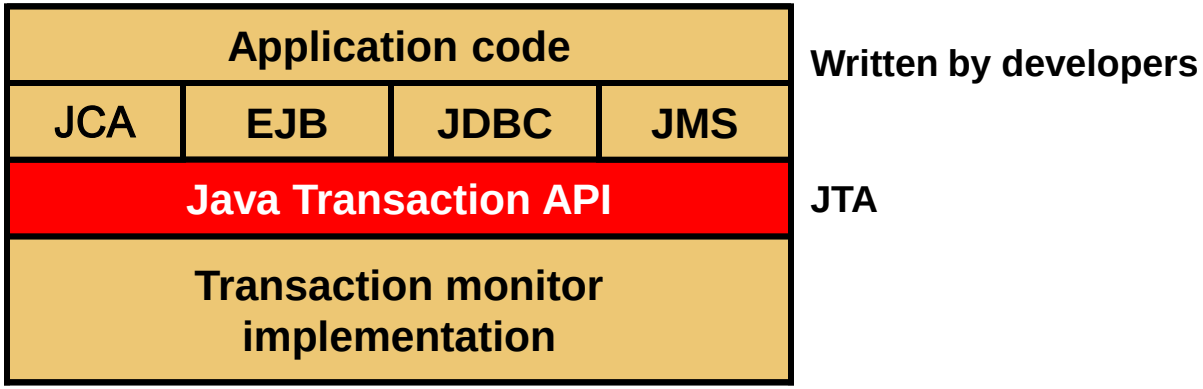
If the following context exists:
`com.oracle.examples`

Then you cannot bind:
`com.oracle.examples.ejb.`**`SomeObject`**

Without first creating:
`com.oracle.examples.`**`ejb`**

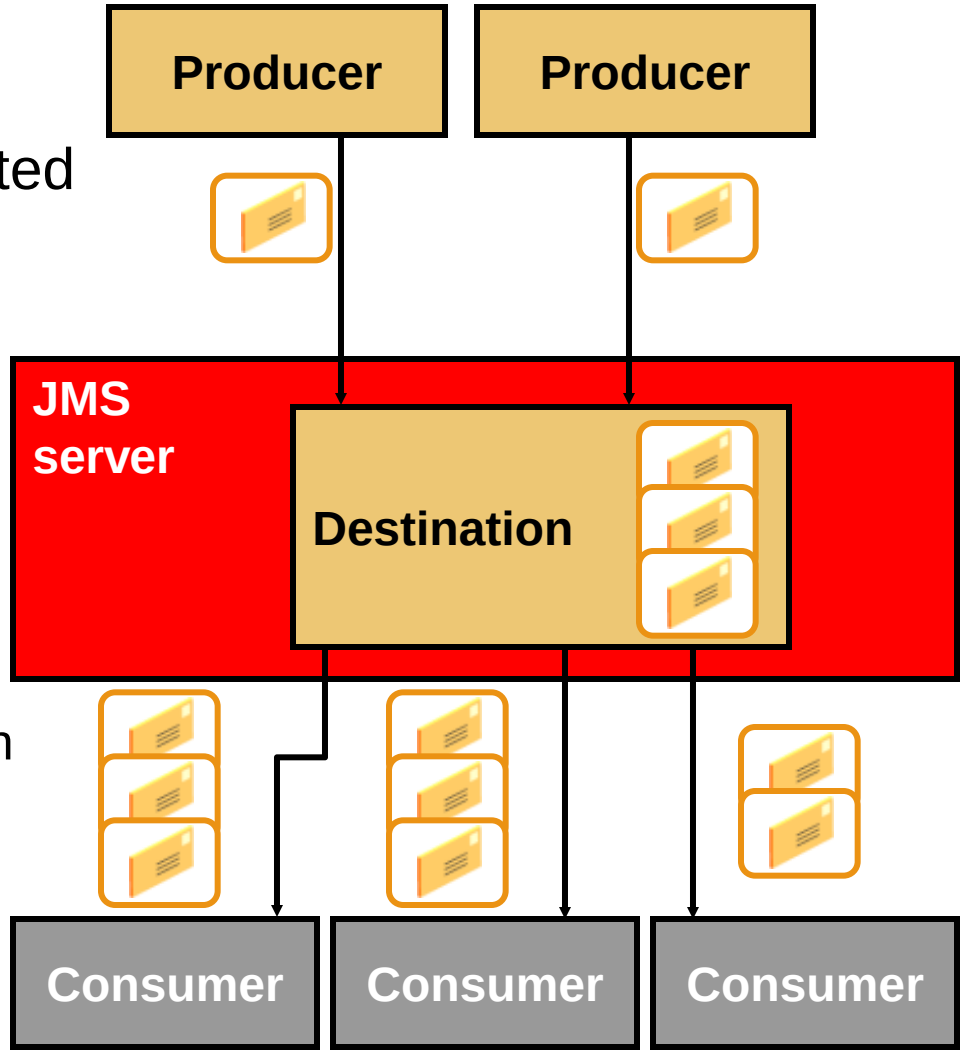
Java Transaction API (JTA)

JTA is a standard Java API for demarcating transactions within a program.



Java Message Service (JMS)

- JMS is a Java API for accessing message-oriented middleware.
- The interface supports:
  - Point-to-point domain
  - Publish/subscribe ("pub/sub") domain
  - Guaranteed message delivery
  - Transactional participation
  - Dynamically configurable services
  - Application- or system-scoped resources
  - Interoperability with other messaging systems

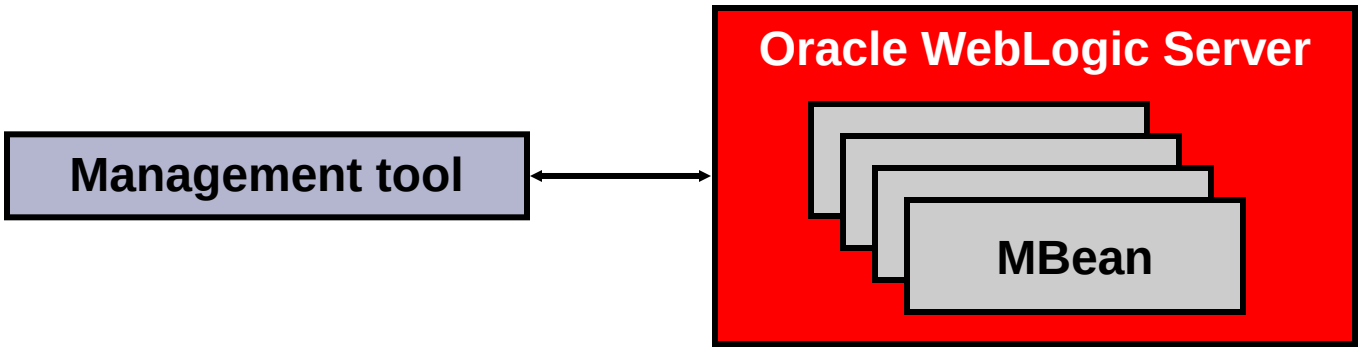


Java Authentication and Authorization (JAAS)

- Java Authentication and Authorization Service (JAAS) is a Java-based security management framework.
- JAAS supports:
  - Single sign-on
  - A Pluggable Authentication Module (PAM)
- JAAS enables flexible control over authorization whether it is based on:
  - Users
  - Groups
  - Roles

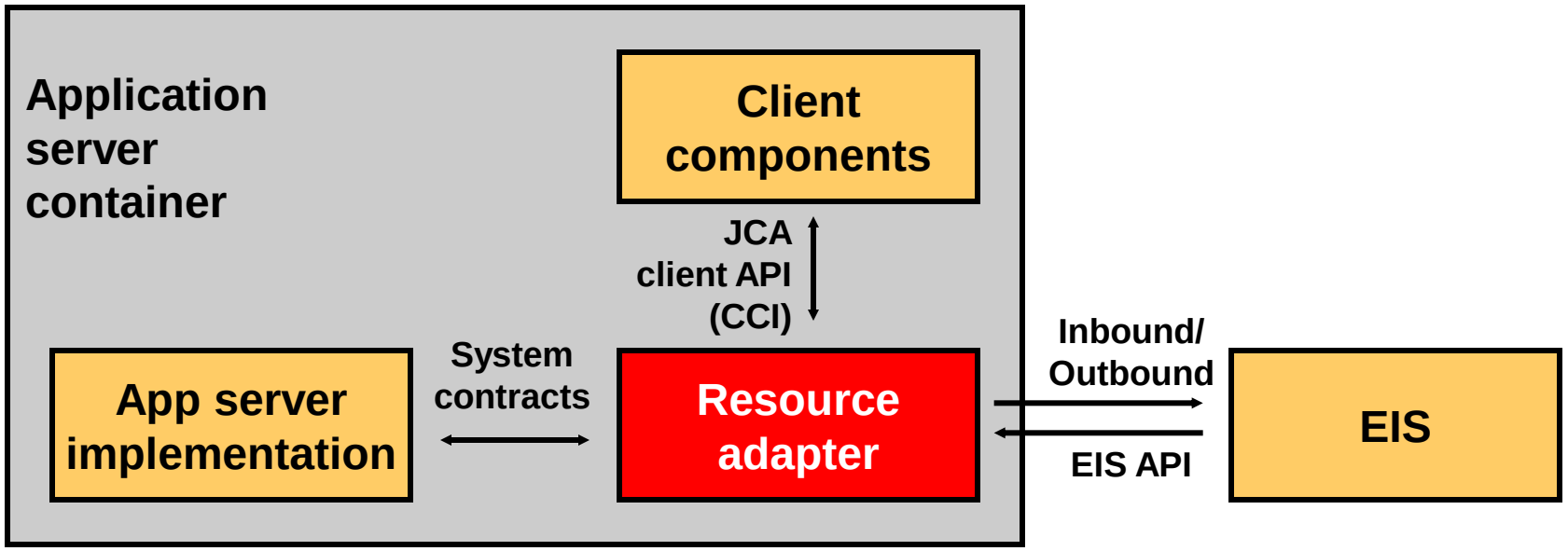
Java Management Extensions (JMX)

- Java Management Extensions (JMX):
  - Defines a standard infrastructure to manage a device from Java programs
  - Decouples the managed device from the management tools
- The specification describes MBeans, which are the building blocks of JMX.



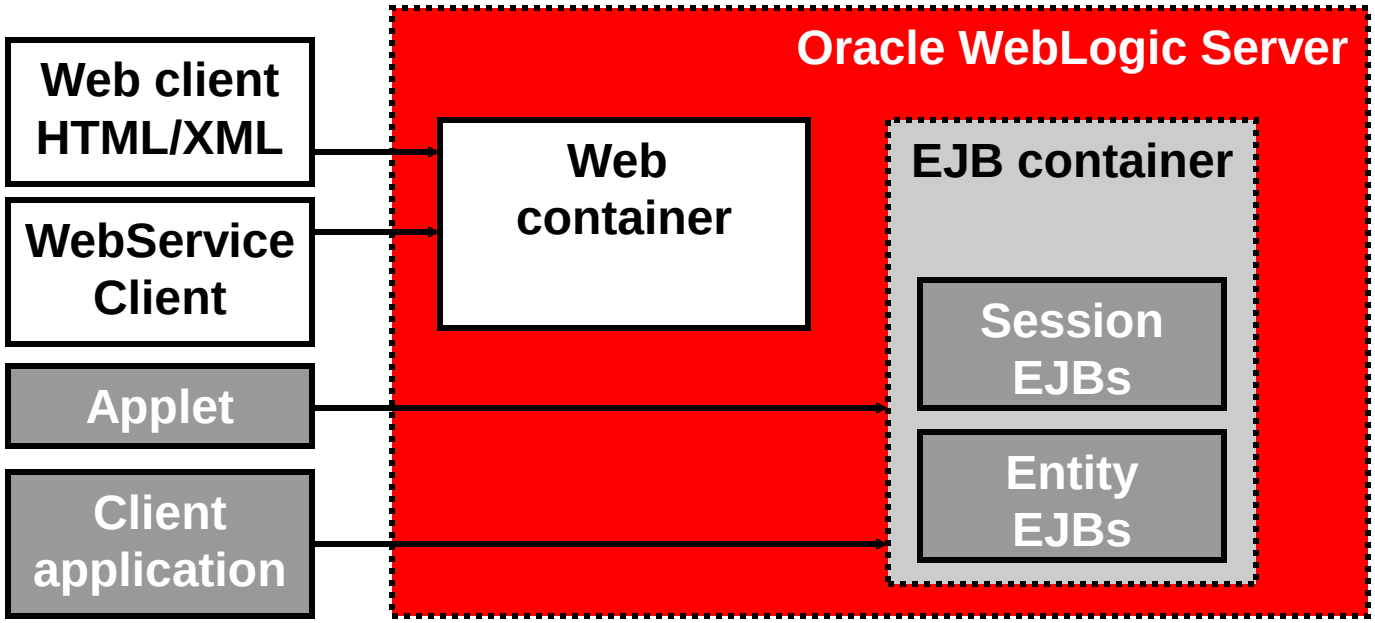
Java EE Connector Architecture (JCA)

- Connects Enterprise Information Systems (EIS) with resource adapters
- Resource adapters can be deployed in a Resource Adapter Archive (RAR)



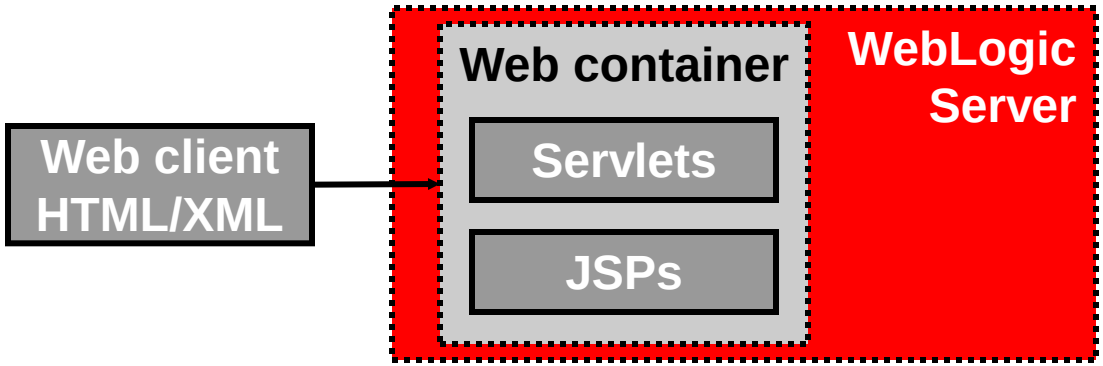
Client Application

- The client application interacts with WLS through JRMP/T3, IIOP, and jCOM.
- The types of clients include:
  - Stand-alone Java applications
  - Applets within a browser



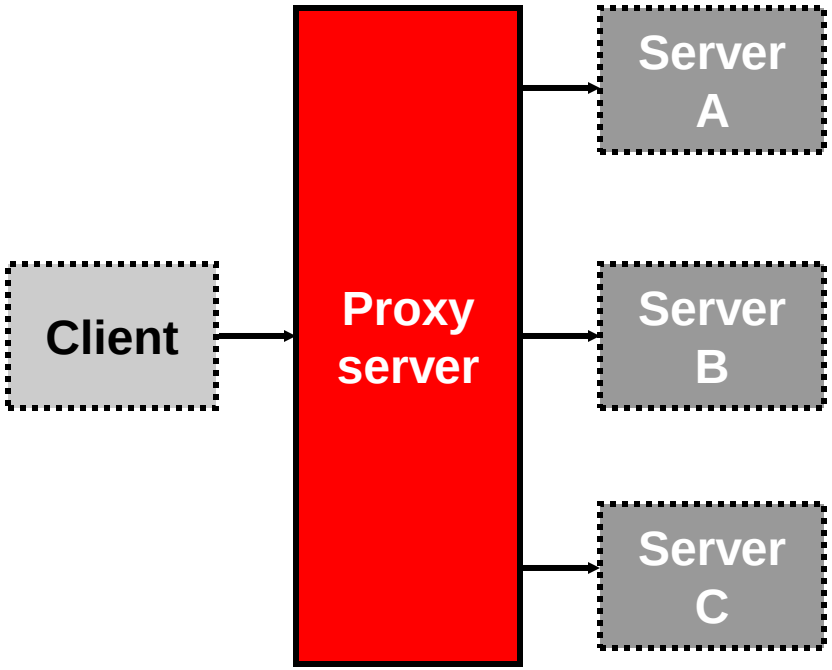
Web Client

- A Web client interacts with Oracle WebLogic Server via HTTP using servlets or JSPs.
- The types of Web clients include:
  - Browser
  - WebService (SOAP over HTTP)



Proxy Server

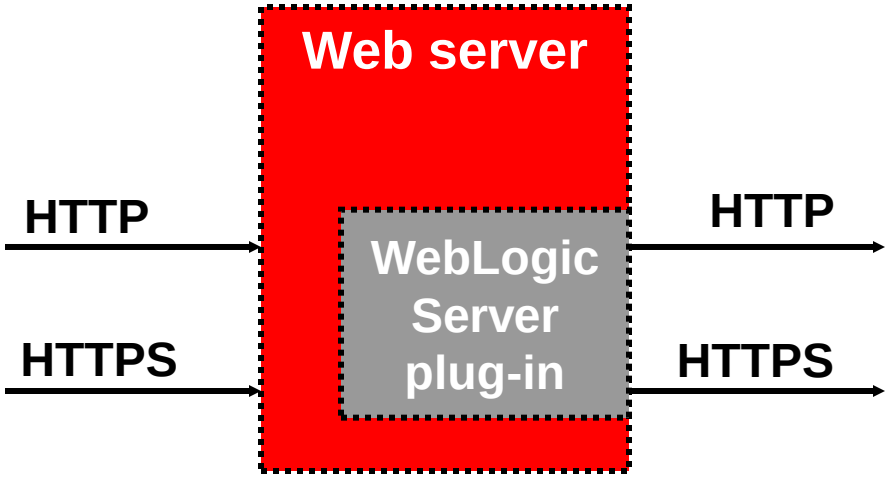
- The proxy server:
  - Forwards requests to other machines
  - Can be used as a level of indirection and security
  - Can be used to load-balance a system
- A reverse proxy is a Web page cache.



Web Server

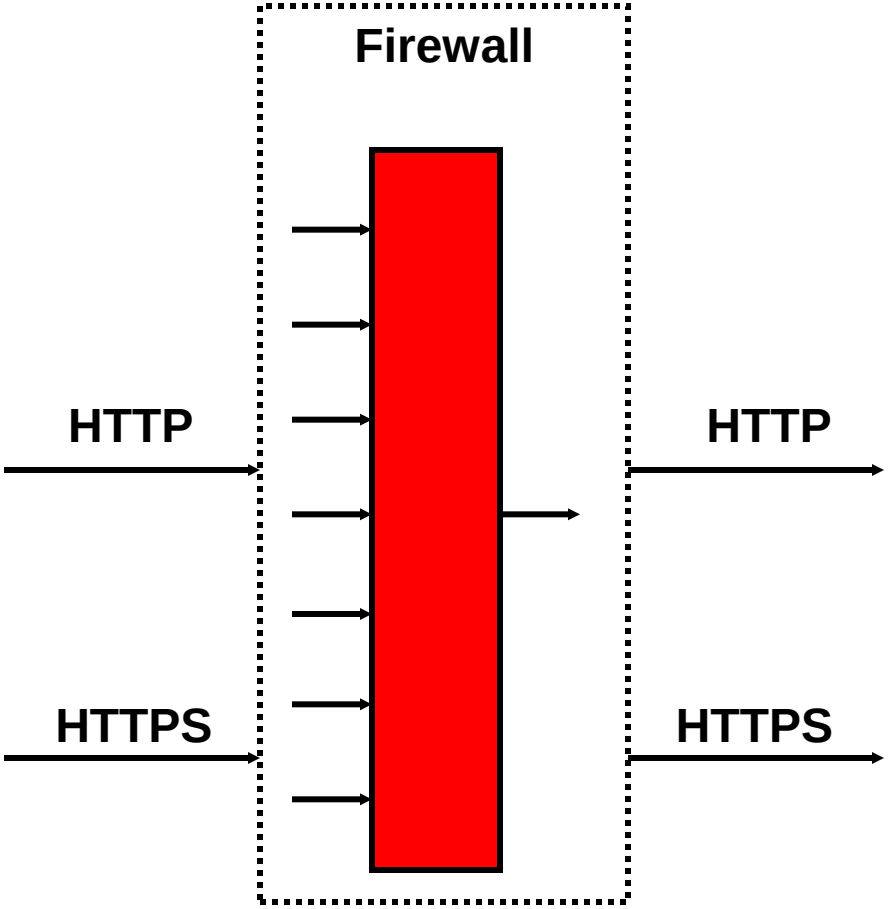
Web servers:

- Provide Web content
- Communicate via HTTP, FTP, and so forth
- Can handle CGI requests
- Proxy some requests to application servers



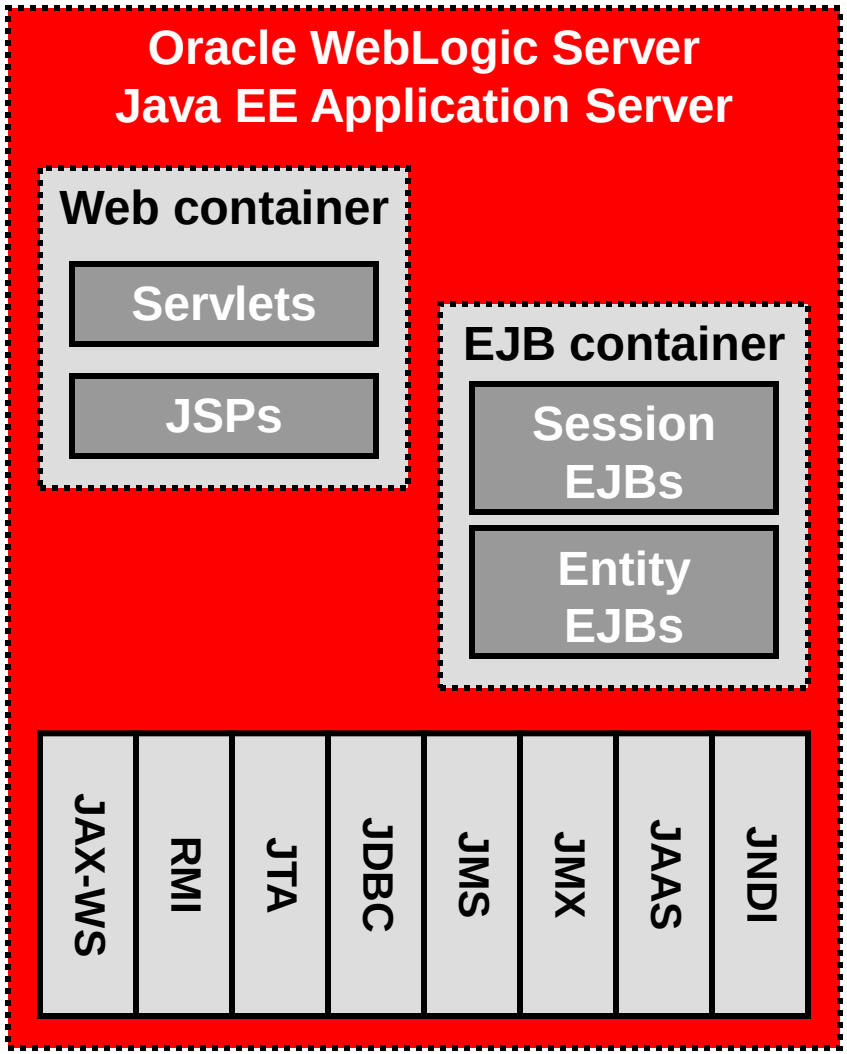
Firewalls

- Provide filtering, authorization, and authentication services
- Help keep out hackers
- Map port requests
- Can act as proxy servers
- Can decrease back-end network activity

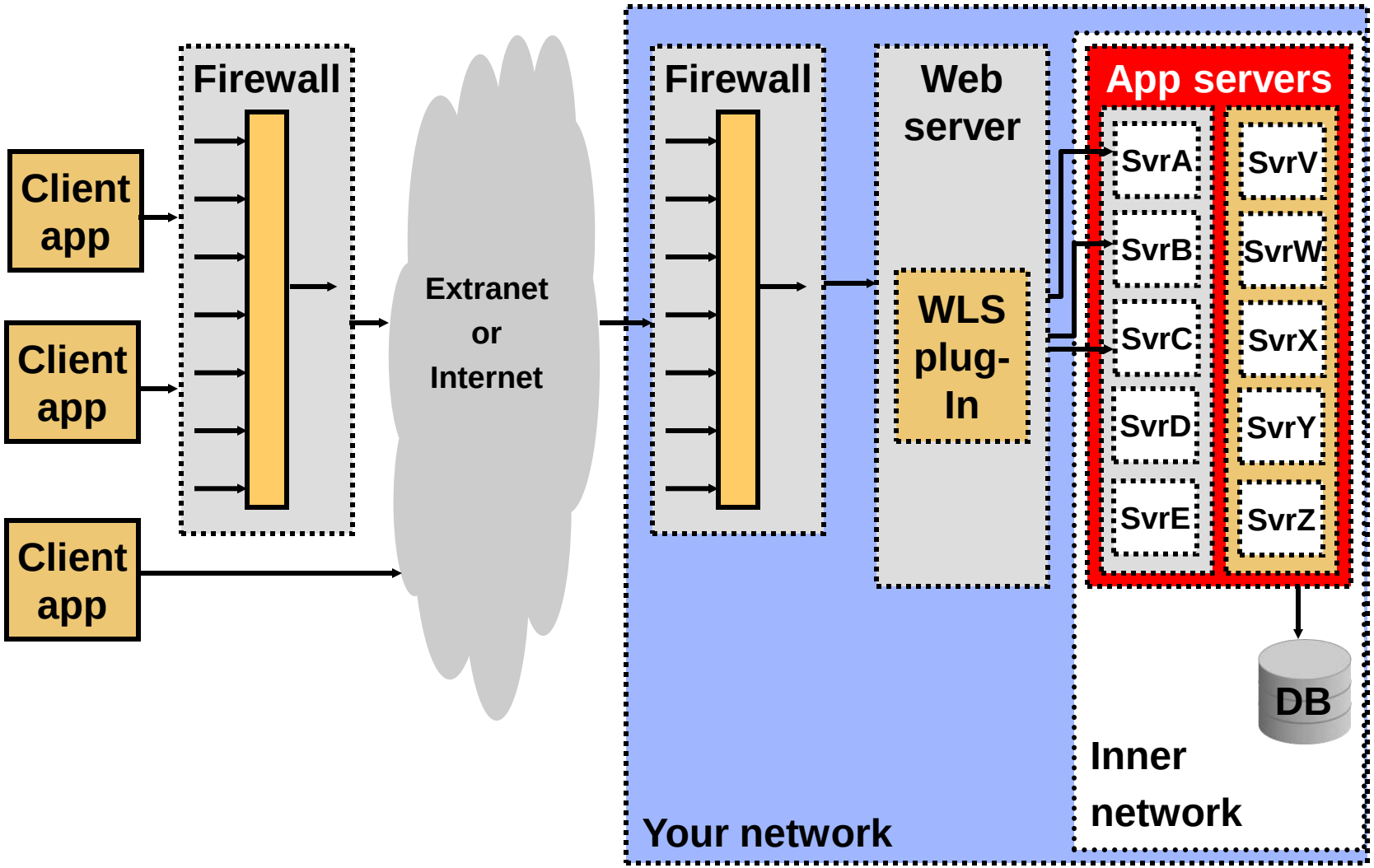


Application Servers

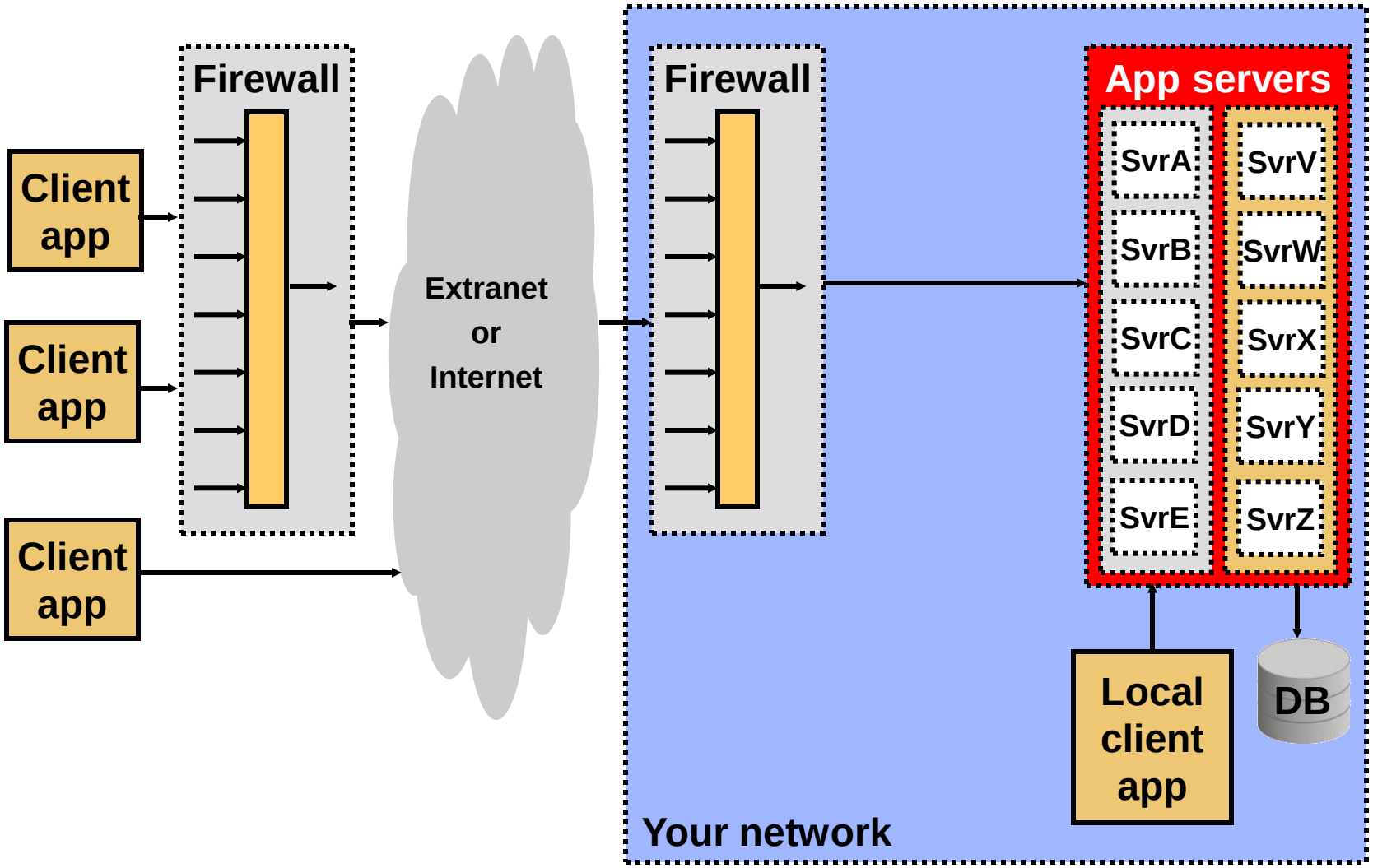
- Provide services that support the execution and availability of deployed applications
- Handle heavier processing chores than Web servers



Web Application Server Configuration



Application Server Configuration



Quiz

Oracle WebLogic Server 10.3.1 is certified with JDK 1.6.

1. True
2. False

Summary

In this lesson, you should have learned how to:

- Explain the motivation behind distributed systems
- List the major components of the Java EE specification

Practice 2 Overview: Defining Terminology and Architecture

There is no practice for this lesson.