Principles and Techniques of DBMS 1 Web Applications

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What is web application ?

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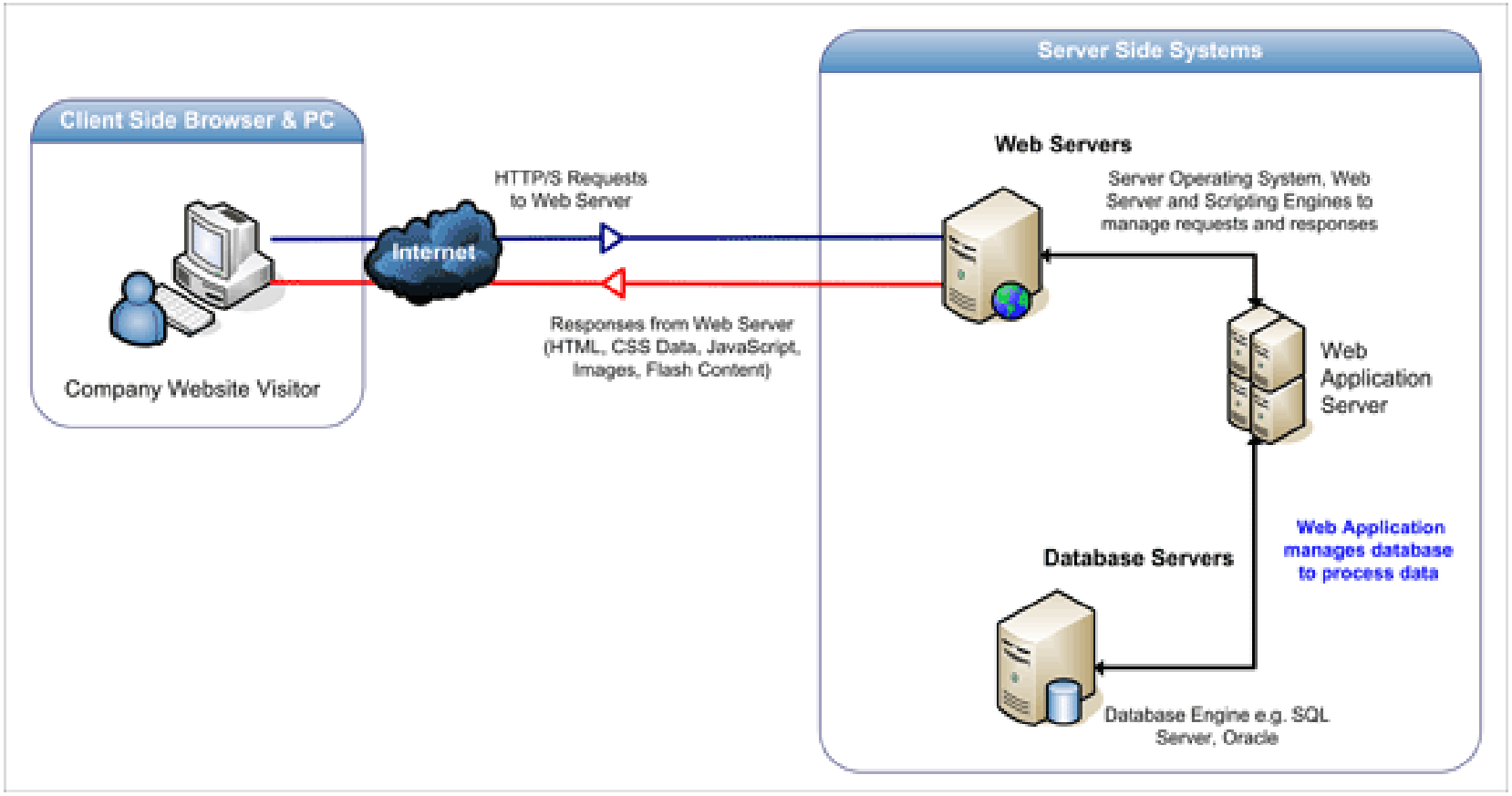
- Web applications are
  - computer programs allowing website visitors to submit and retrieve data to/from a database over the Internet using their preferred web browser.



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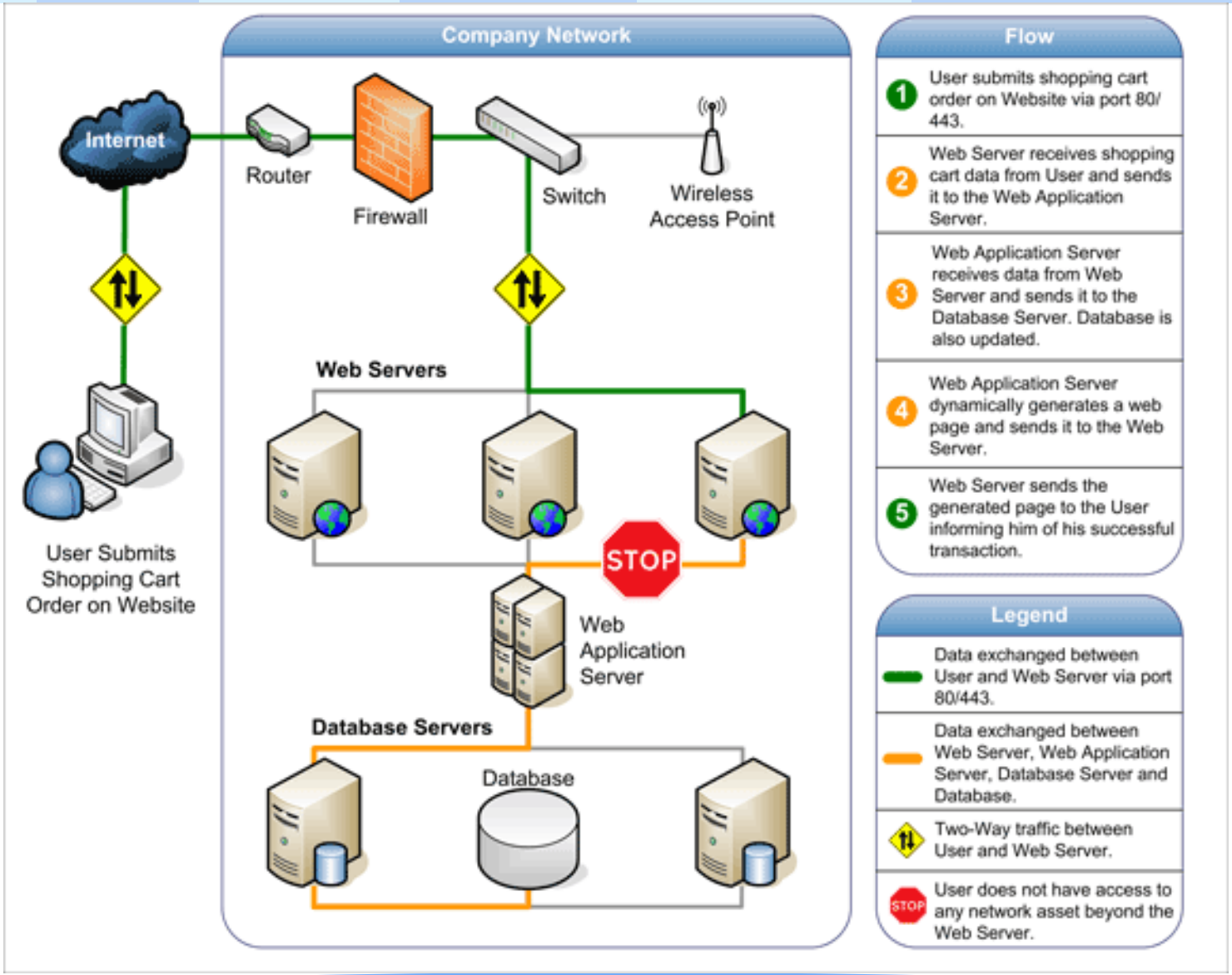


Web 1.0

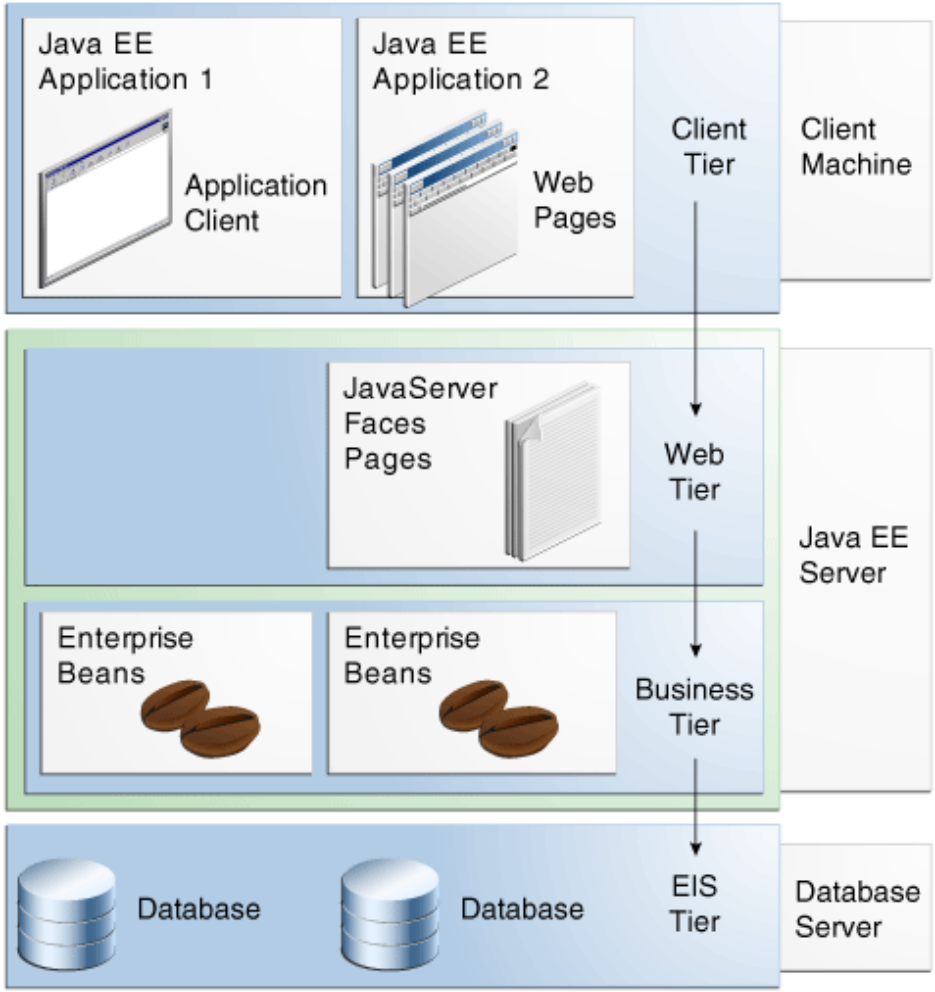
- Traditional web client server interaction model
  - User enters interacts with a web page
  - Browser sends data to web server
  - Server sends data back to browser
  - Browser receives the data and updates the page
  - Page refresh may be intrusive and irritating

Web 2.0

- JavaScript is used extensively in the browser
- Single web-page applications are possible
  - Entire page need not be refreshed
  - Browser interacts with server by sending and receiving small chunks of data
  - These update individual components or data items on a page
  - This is also known as AJAX (misleading but widely used term) (Asynchronous JavaScript and XML)
- Two advantages
  - Speed: fewer data items are exchanged
    - Faster network transfer, less work for server and browser
  - Smoother experience for user – less clunky

Java EE Platform

- The Java EE application parts shown in left figure are presented in Java EE Components.
  - Client-tier components
    - run on the client machine.
  - Web-tier components
    - run on the Java EE server.
  - Business-tier components
    - run on the Java EE server.
  - Enterprise information system (EIS)-tier software
    - runs on the EIS server.



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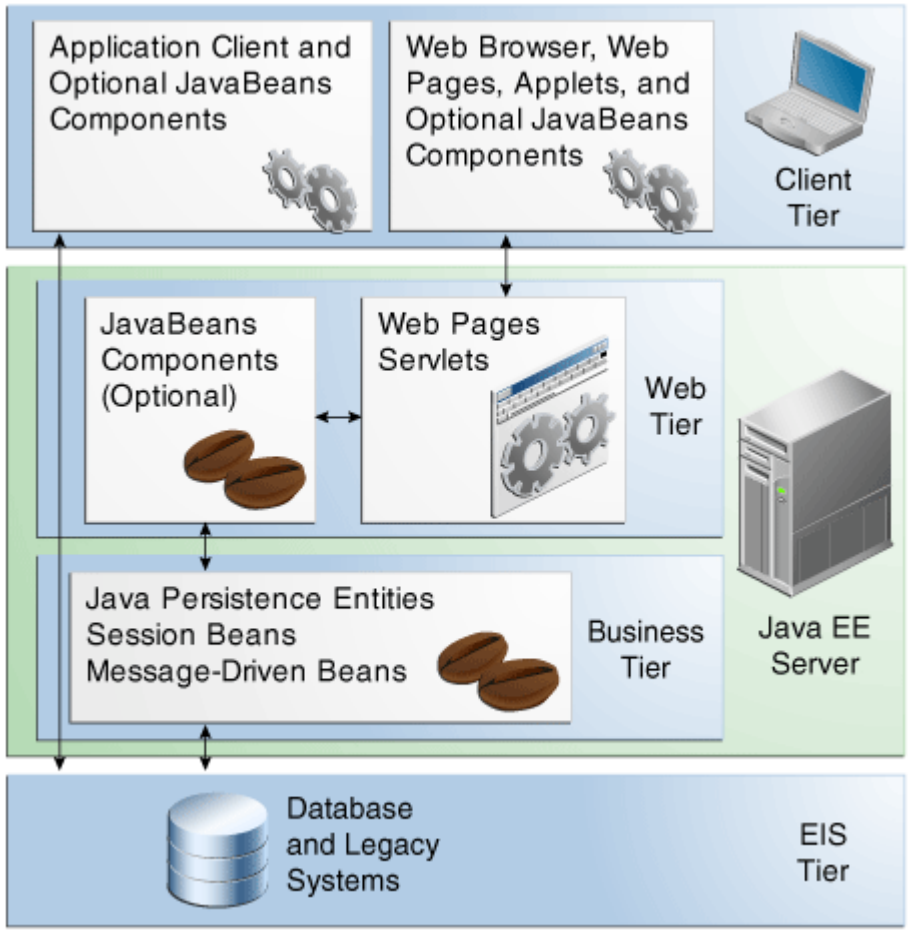
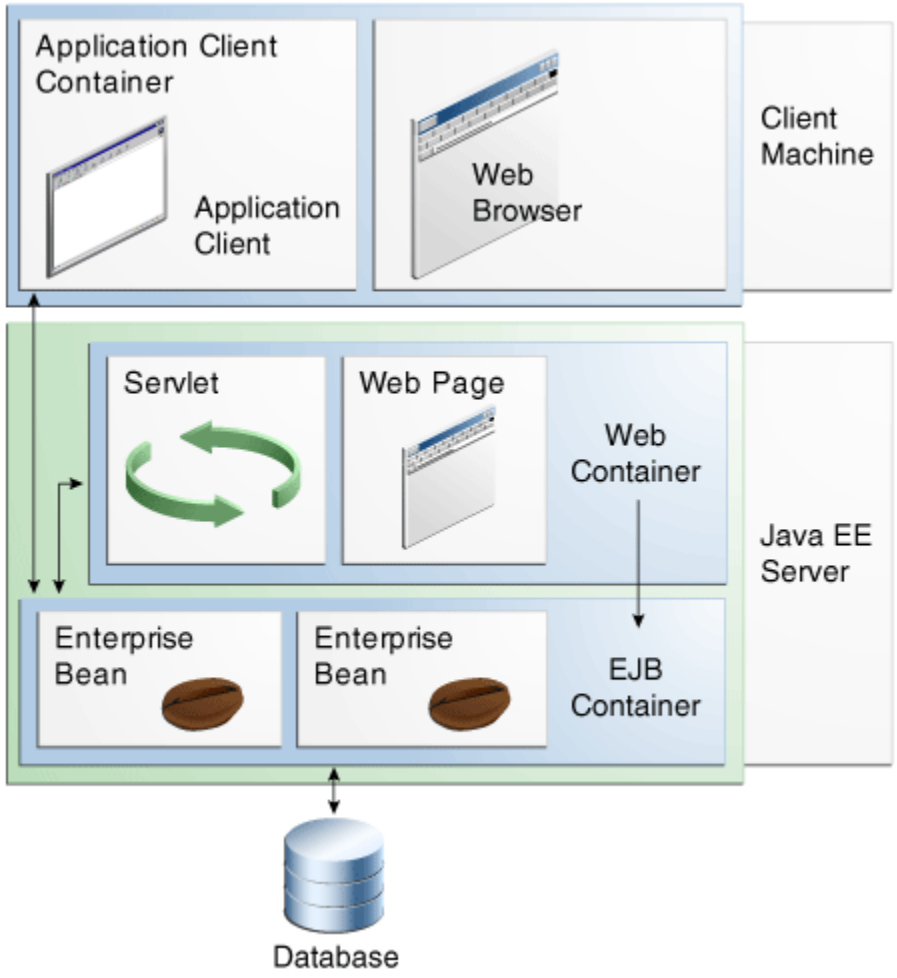


Java EE Platform

- Containers
  - are the interface between a component and the low-level platform-specific functionality that supports the component.
  - Before it can be executed, a web, enterprise bean, or application client component must be assembled into a Java EE module and deployed into its container.
  - Container settings customize the underlying support provided by the Java EE server, including such services as
    - Security
    - Transaction management
    - Java Naming and Directory Interface (JNDI) API lookups,
    - and remote connectivity.

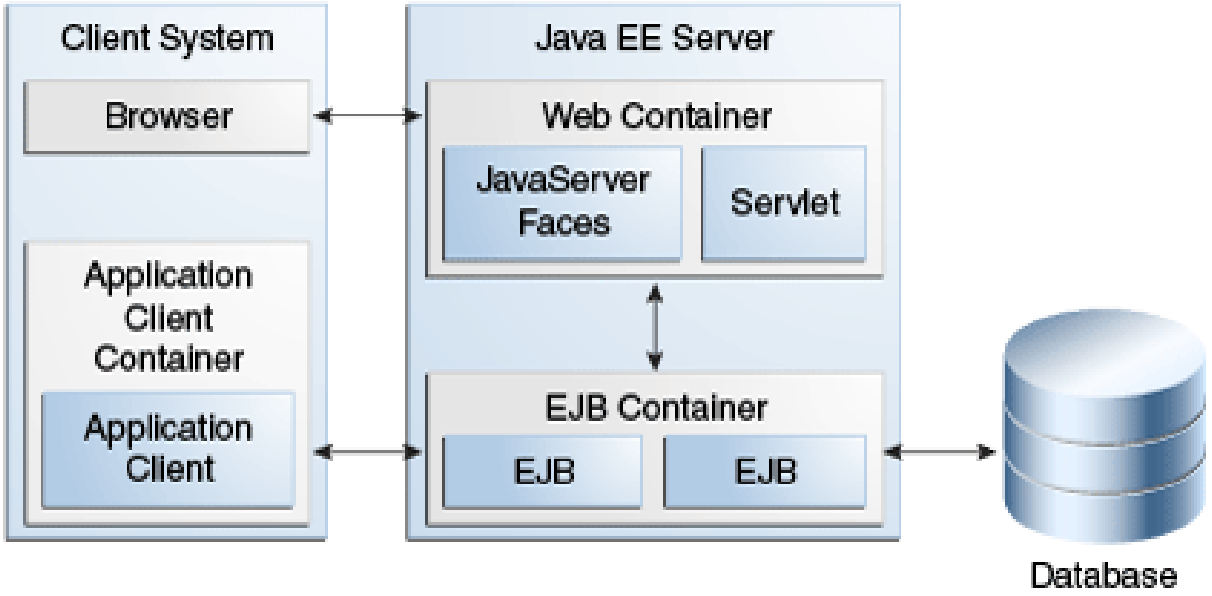
Java EE Platform

- Container types



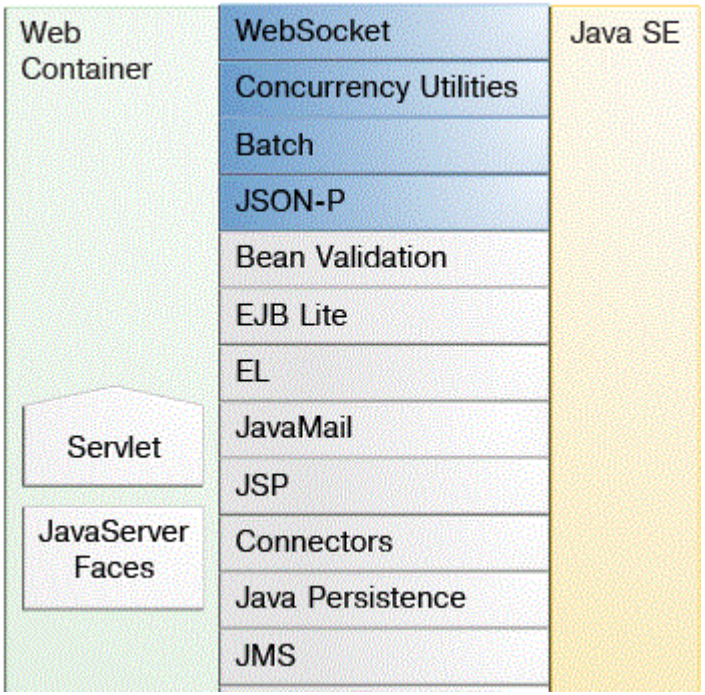
Java EE Platform

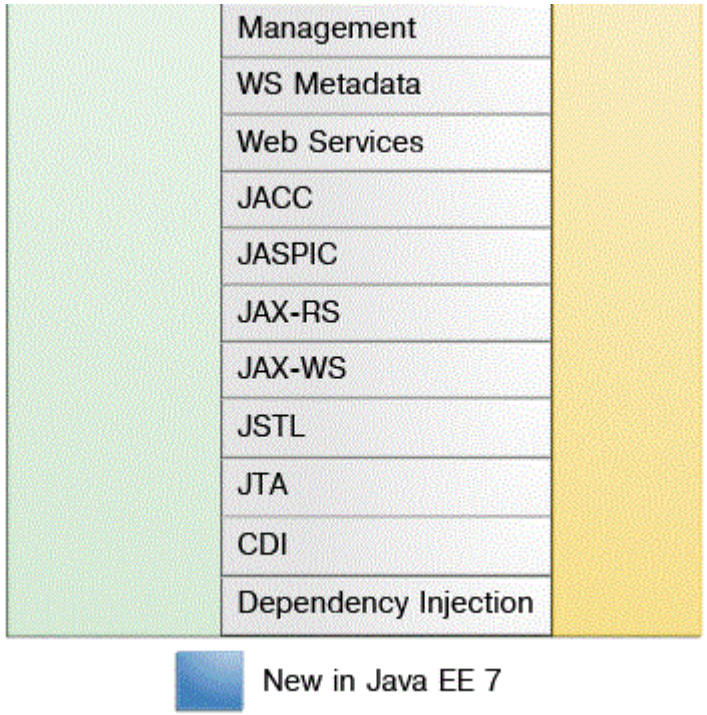
- Container types



Java EE Platform

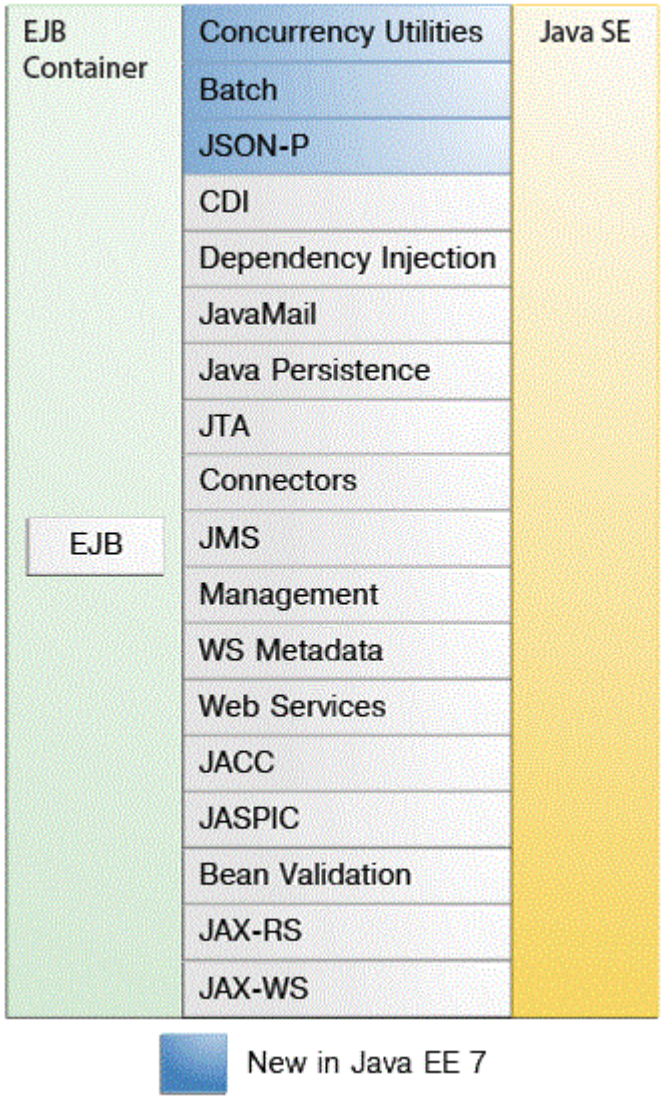
- Java EE APIs in the Web Container





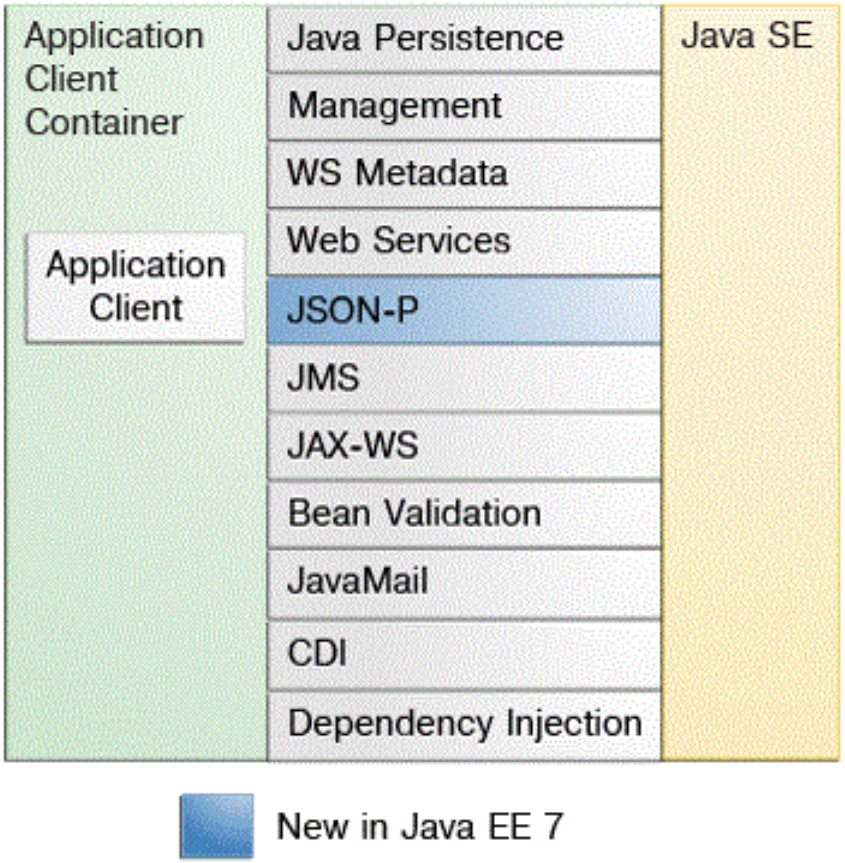
Java EE Platform

- Java EE APIs in the EJB Container



Java EE Platform

- Java EE APIs in the Application Client Container



Java EE Platform

- Technologies required by Java EE platform:
  - Enterprise JavaBeans Technology
    - session bean
    - message-driven bean
  - Java Servlet Technology
  - JavaServer Faces Technology
  - JavaServer Pages Technology
  - JavaServer Pages Standard Tag Library
  - Java Persistence API
  - Java Transaction API
  - Java API for RESTful Web Services
  - Managed Beans
  - Contexts and Dependency Injection for Java EE
  - (to be continued)

Java EE Platform

- Technologies required by Java EE platform:
  - Dependency Injection for Java
  - Bean Validation
  - Java Message Service API
  - Java EE Connector Architecture
  - JavaMail API
  - Java Authorization Contract for Containers
  - Java Authentication Service Provider Interface for Containers
  - Java API for WebSocket
  - Java API for JSON Processing
  - Concurrency Utilities for Java EE
  - Batch Applications for the Java Platform

Java EE Platform

- Java EE 7 APIs in the Java Platform, Standard Edition 7
  - Java Database Connectivity API
  - Java Naming and Directory Interface API
  - JavaBeans Activation Framework
  - Java API for XML Processing
  - Java Architecture for XML Binding
  - Java API for XML Web Services
  - SOAP with Attachments API for Java
  - Java Authentication and Authorization Service
  - Common Annotations for the Java Platform

Java EE Platform

- Java EE without EJB
  - Spring – IoC
  - Struts – MVC
  - Hibernate – ORM
  - LAMP: Linux+Apache+Mysql/MariaDB+Perl/PHP/Python

What is Enterprise Application

- Enterprise applications
  - usually involve persistent data
  - usually have a lot of data
  - usually many people access data concurrently
  - usually have a lot of user interface screens
  - usually they need to integrate with other enterprise applications scattered around the enterprise
  - conceptual dissonance with the data
  - complex business "illogic"

Enterprise Applications

- An enterprise system is one that has the following qualities:
  - Shares some or all of the resources used by the application
  - Is intended for internal use
  - Must work within existing architecture
  - Will be deployed and supported by internal IT staff
  - Requires greater robustness, both in terms of exception-handling and scalability
  - Must fail gracefully
  - Must gracefully handle evolution over time

Dimensions of software complexity

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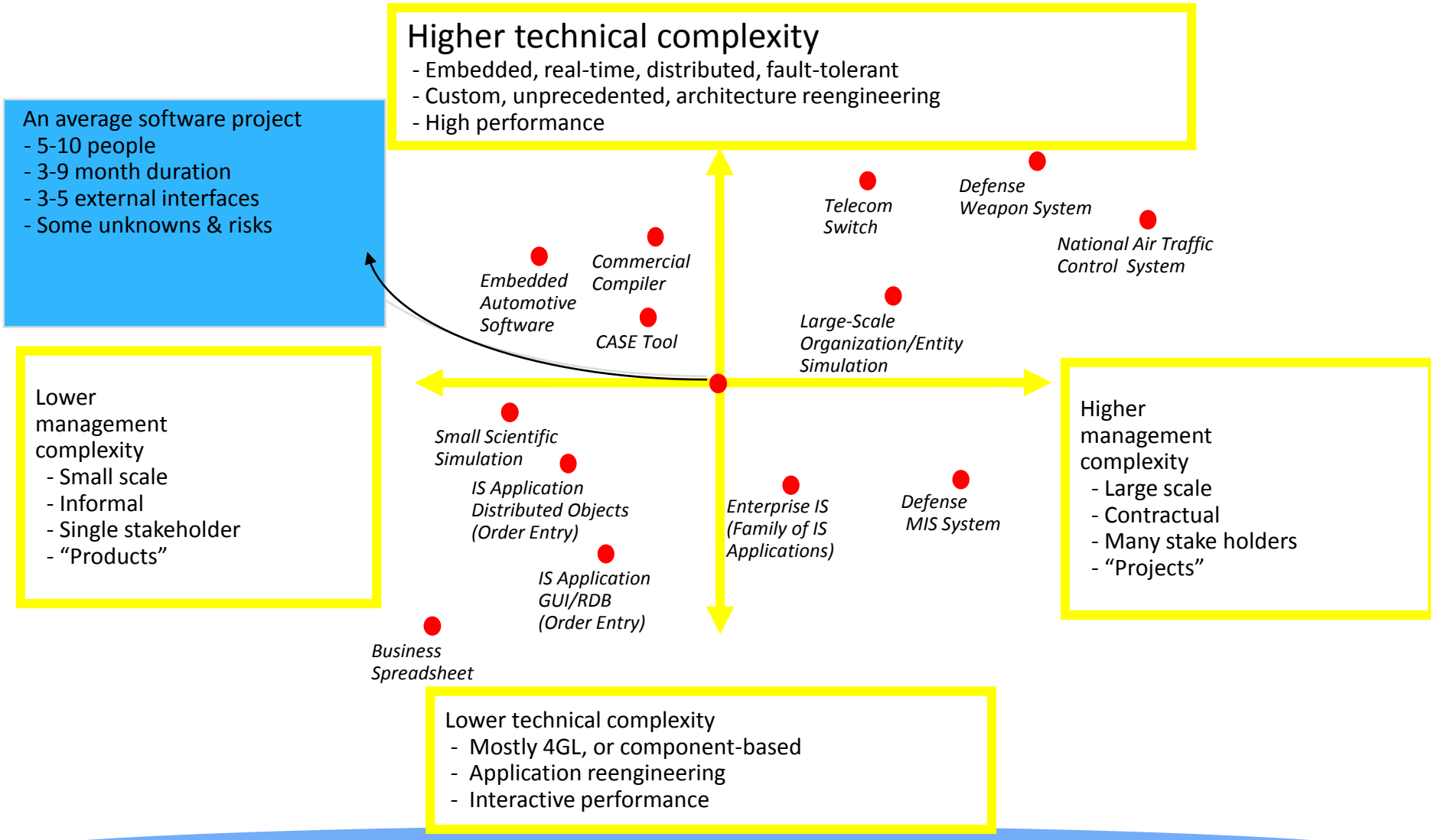

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Thank You!