

Advanced Java programming (Haladó Java programozás)

P-ITSZT-0017



Course information

- ▶ Class schedule: every two weeks Thursday
16:15–19:00
- ▶ Where: 219 PC lab
- ▶ Lecturers:
 - Dr. Karlócai Balázs
 - Balogh Zsuzsanna
 - Berényi Zsolt
- ▶ Credit: 2
- ▶ Preliminary requirement: Java Programming
- ▶ Exam type: 1 written exam + project



Course information

headcount: 25

Study	
Mérnök informatikus BSc	13
Mérnökinformatikus	5
Mérnökinformatikus MSC	3
Mérnökinformatikus MSC (angol)	2
Molekuláris bionika mérnöki BSc	2

taken	db
1	24
2	1

Catalog? Obligatory?

DEVELOPMENT	MIN	MAX	AVERAGE
Junior Software Developer	360 000	480 000	430 000
Software Developer	550 000	750 000	700 000
Senior Software Developer	850 000	1 100 000	950 000
Lead Developer	950 000	1 450 000	1 200 000

The 2017 Hays Salary Guide

€ 3.000

4 days Java EE course
(JB325 Advanced JBoss Enterprise Development)

NO!

Recommended reading

- ▶ **EJB 3 in Action** (Debu Panda, Reza Rahman, Derek Lane)
- ▶ **Sams Teach Yourself J2EE in 21 Days** (Martin Bond, Debbie Law, Andy Longshaw, Dan Haywood, Peter Roxburgh)
- ▶ <http://www.manning.com/catalog/java/>



Topics

- ▶ SOA, Basics of Java EE
- ▶ Business Logic layer – EJB
- ▶ Web technologies – Servlets, Java Server Pages
- ▶ Web application frameworks, JavaServer Faces
- ▶ Persistence layer – JPA, Hibernate
- ▶ XML WebServices
- ▶ Java EE security solutions
- ▶ Performance of Java EE
- ▶ Testing Java EE applications
- ▶ Interface – REST



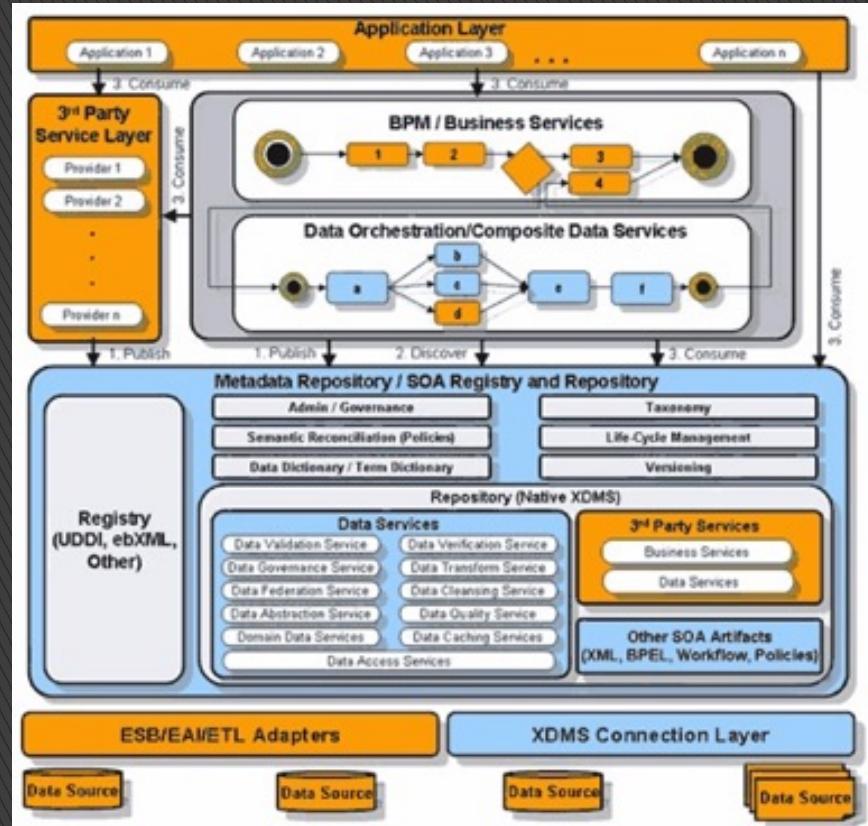
Mindset

- ▶ Monolithic
- ▶ Modular
- ▶ Object oriented
- ▶ Component oriented
- ▶ Service oriented
- ▶ Cloud
- ▶ Microservice oriented

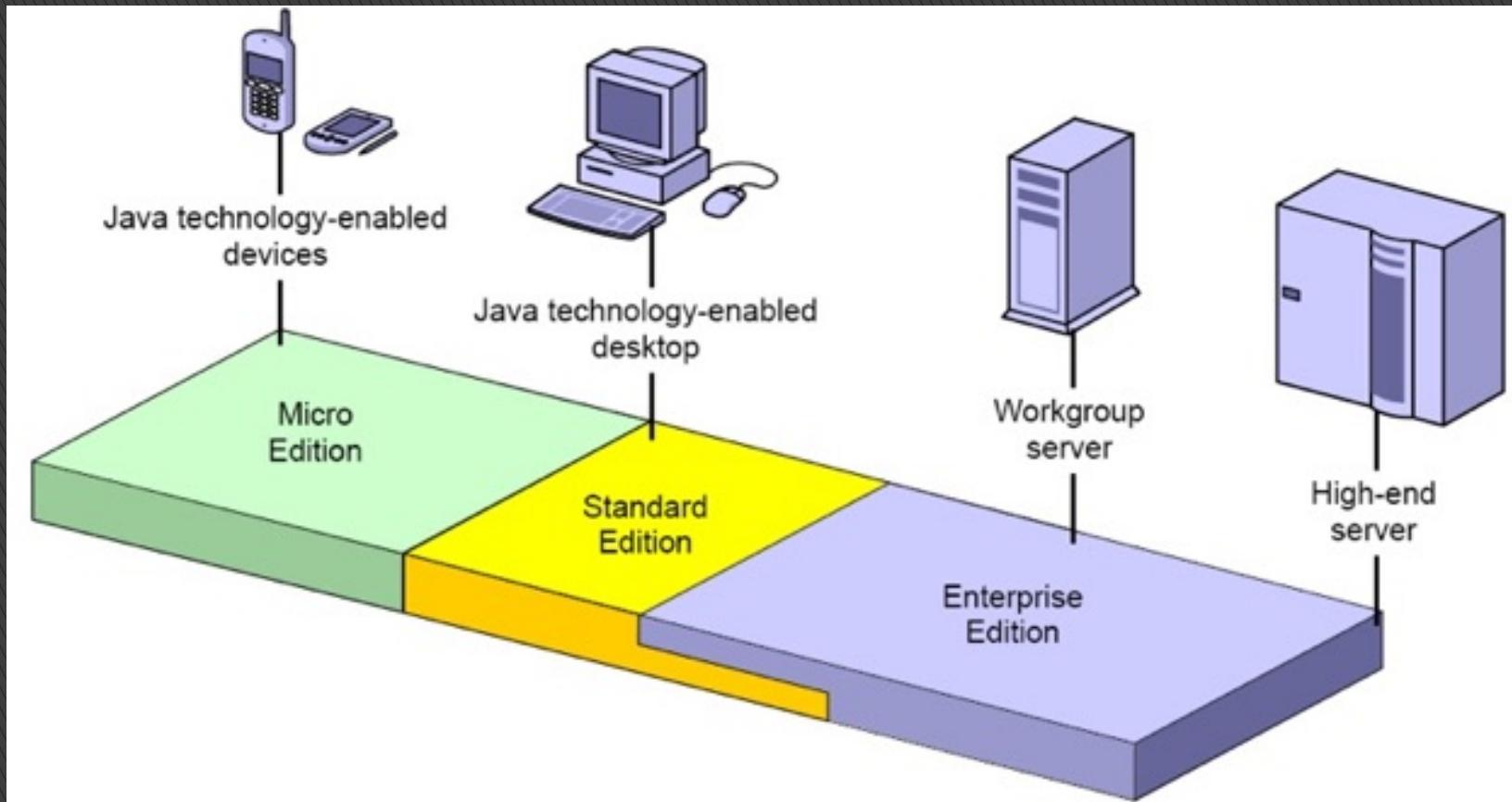


Services

- Lazy connected
- Safe
- Standard
- Reuseable
- Can be combined
- Variable



Java technologies



Java EE definition

- ▶ Java EE platform to develop an architecture for enterprise-scale applications, using
 - Java language and
 - standard internet based technologies



Java EE services

- ▶ Multithreading
- ▶ Transaction Management
- ▶ Security
- ▶ Persistence
- ▶ Name Service
- ▶ Objects lifecycle management
- ▶ Remote method call
- ▶ Asynchronous messaging
- ▶ Scalability
- ▶ Load Balancing



Java EE API

- ▶ APIs services are available through a variety of APIs, eg .:
 - Java Persistence API (JPA): object-relational mapping
 - Enterprise JavaBeans (EJB): distributed business logic components,
 - Java message Service (JMS): asynchronous messaging,
 - Java transaction API (JTA): transaction management
 - Contexts and Dependency Injection for Java (CDI): dependency injection management



Java EE API

- ▶ Java Authentication and Authorization Service (JAAS) security
- ▶ Web technologies:
 - Java Servlets
 - Java Server Pages,
 - Java Server Faces
- ▶ Web services,
 - Java API for XML-based Web Services (JAX-WS): SOAP-based XML Web services,
 - Java API for RESTful Web Services (JAX-RS): REST-style Web services

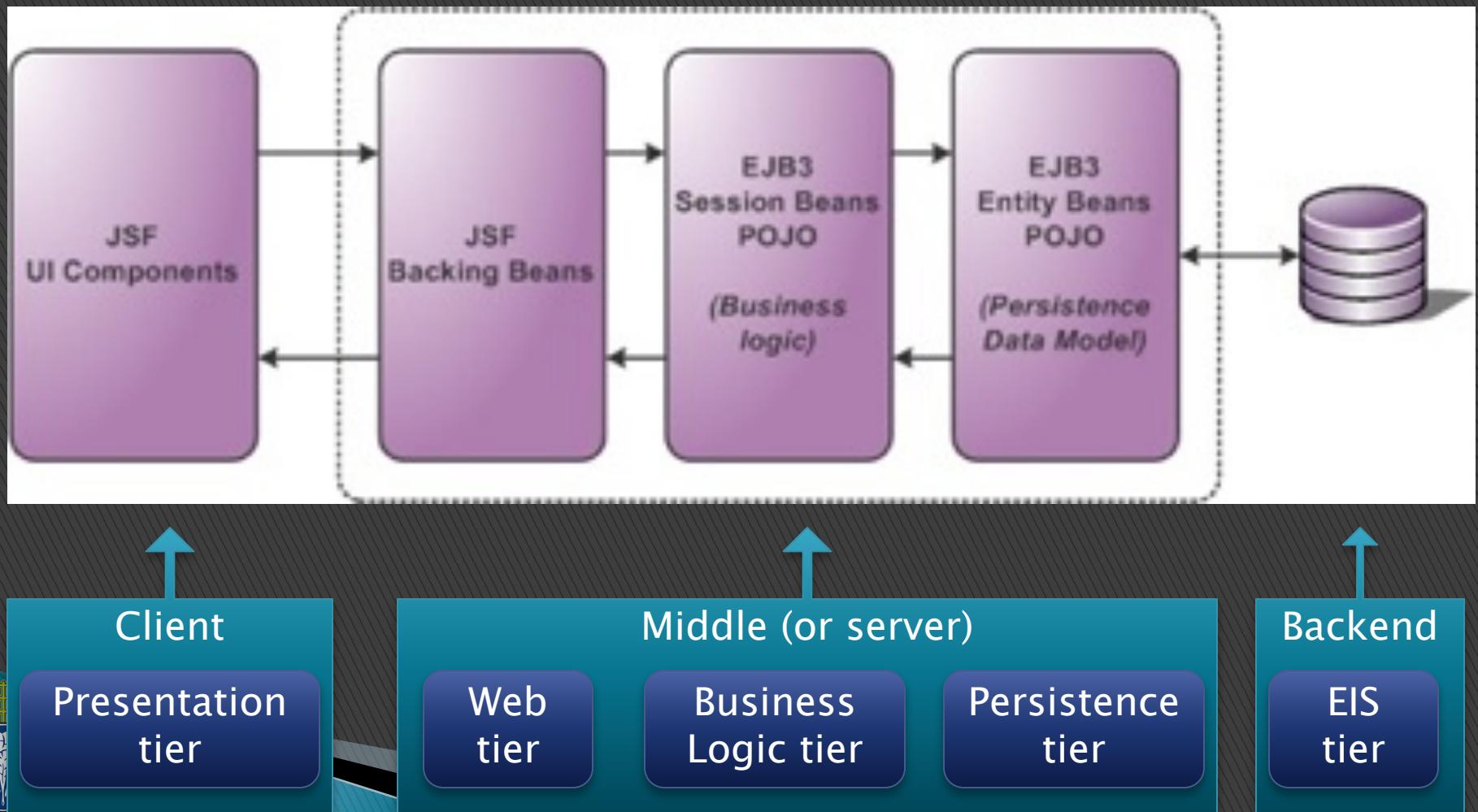


Java EE API

- ▶ The Java EE APIs are all open standards, multiple implementations are present
- ▶ API are defined within the mechanism of Java Community Process (JCP) by Java Specification Requests (JSR)
- ▶ Formulating the final version of the JSR, industry developer needs take into account
- ▶ Java Application Server is a software product implementing the Java EE APIs



Typical Java EE application server architecture



Backend or data layer

- ▶ is responsible for persistent data storage, support can be performed on data of elementary operations (create, query, modify, delete)
- ▶ Most relational databases
- ▶ It includes all the systems to which your application retrieves data from (mainframe, ERP system, legacy application), in such cases the layer is called EIS (Enterprise information system)



Business logic layer

- ▶ The portion of the application that ensures proper functionality for specific application areas (Business domain) needs
- ▶ Call the data layer services, taking into account business rules
- ▶ Eg. a banking application business logic task of carrying out a transfer, check the permissions in this and calls on the data layer to withdraw one's account balance, and add balance to the other's
- ▶ In a student information system a “new course” is a business function
- ▶ Java EE business logic layer can be implemented components called the Enterprise JavaBeans (EJB)



Client (presentation) layer

- ▶ Provides the user interface, such as:
 - the effect of user intervention invokes the appropriate business logic function,
 - displays the results
- ▶ Two types:
 - Fat client: normal desktop application, the most common graphical user interface
 - Thin client: a Web browser

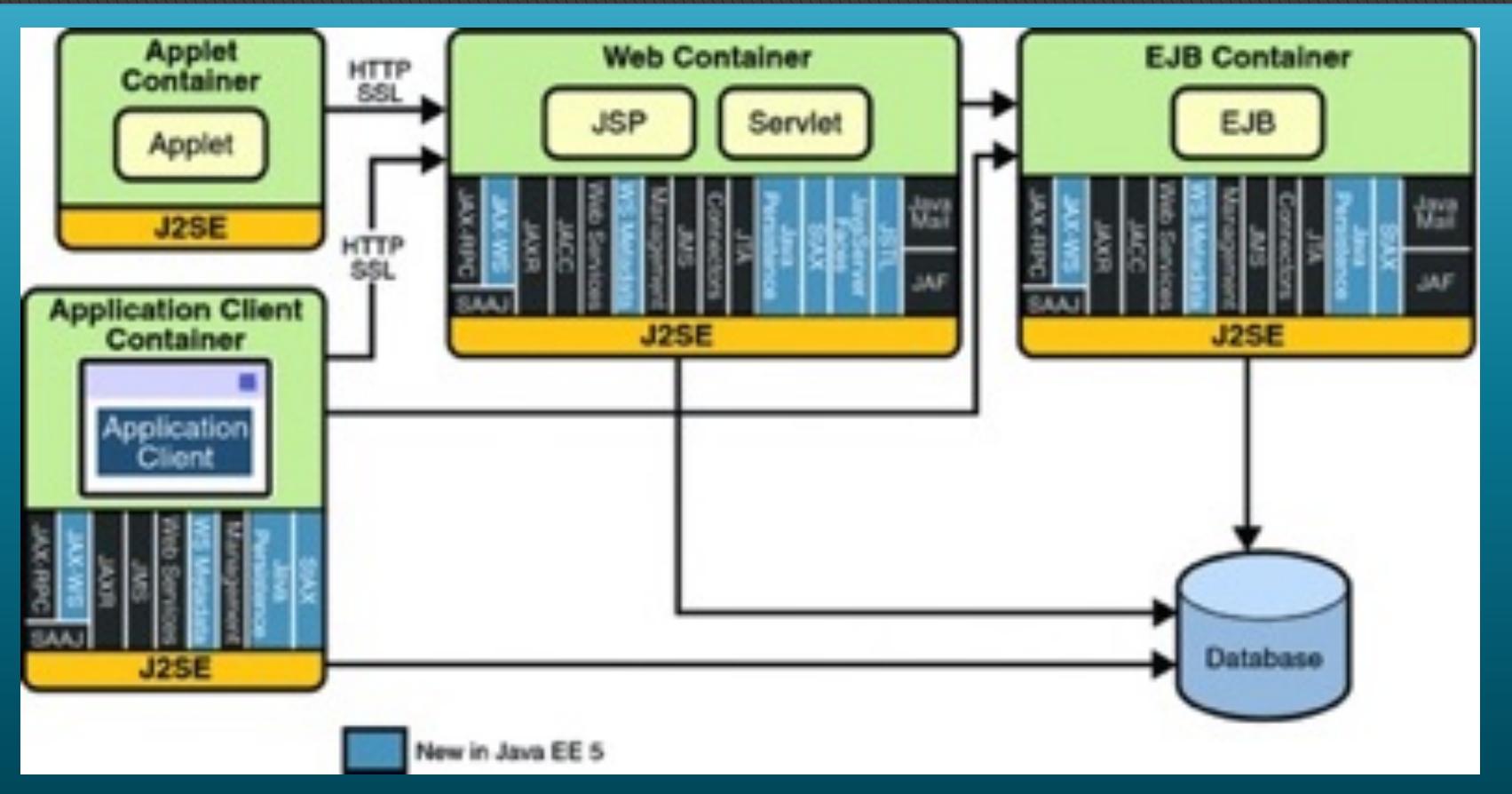


Web layer

- ▶ This allows you to connect thin clients
- ▶ after calling the business logic usually generate HTML response to the browser HTTP requests



Java container



Java EE components

- ▶ Portable (between Java EE application servers), reusable installation units
- ▶ Lazy attached, so the component can be developed without knowing the specific installation environment,
- ▶ more classes, interfaces packaged implementing cohesive functionality
- ▶ running in a container



Java EE components

- ▶ reach each other through interfaces
- ▶ advantage: the container can insert a proxy between the caller and the actual implementations to call various extra services
- ▶ Can be distributed, then remotely (from other JVM) called
- ▶ Location transparency (the caller does not need to know where you are physically the called components)



Java EE roles

- ▶ By the development, installation and operation of applications
 - Component developer (application component provider)
 - application server vendor provides independent components
 - Application Assembler:
 - assemble an application from components (between components resolution of dependencies), which is still vendor-independent
 - Deployer:
 - install the application on your particular application server (resolution of external dependencies, integrate existing security infrastructure)



Java EE roles

- ▶ System administrator
 - monitors running applications, and tune for optimal performance based on this
- ▶ Device Manufacturer (Tool provider)
 - Creates tools to support completion of the previous activities
- ▶ Application Server manufacturers (Product provider, vendor)
 - produces application server



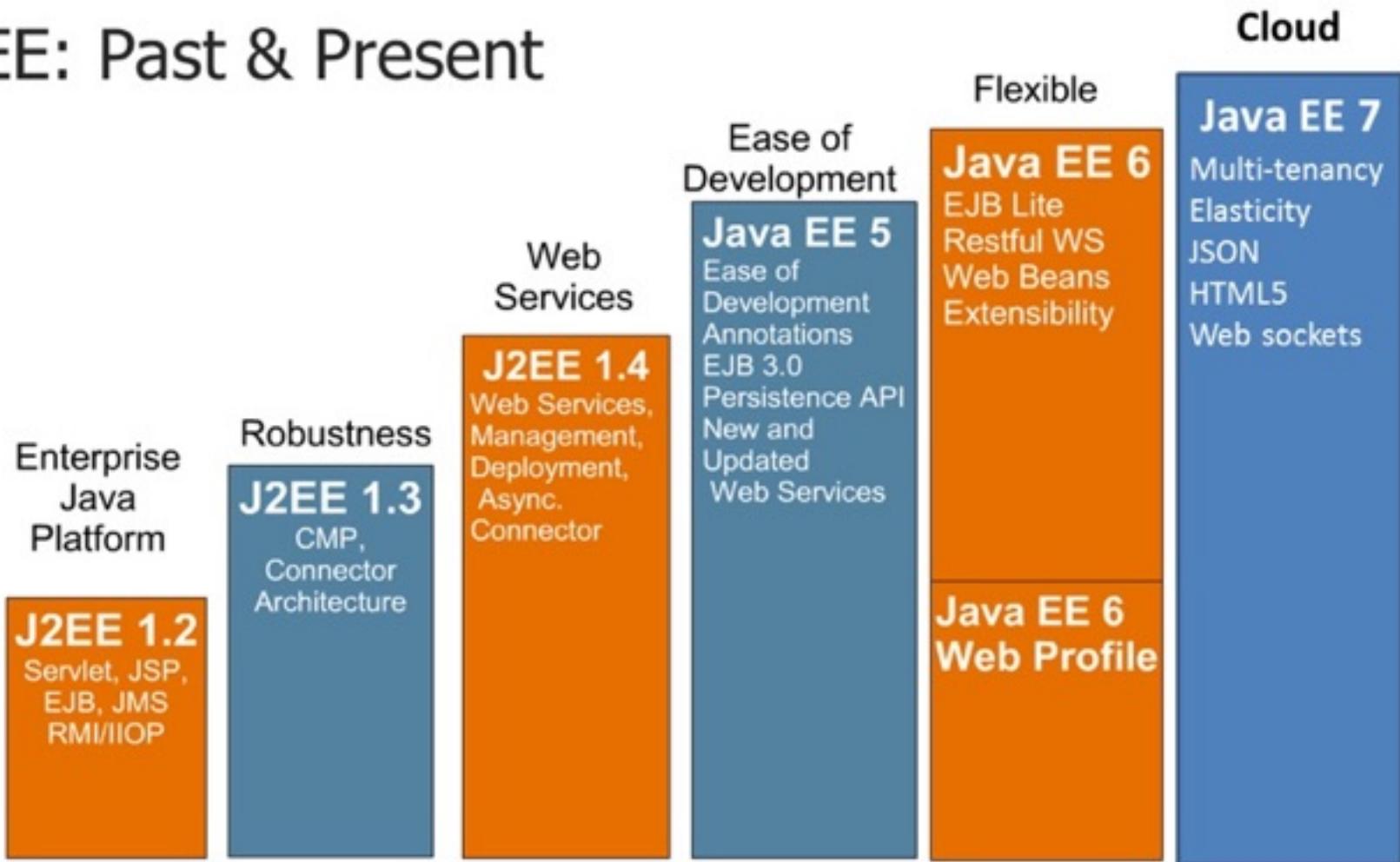
Java EE certification

- ▶ open standards -> many implementations
- ▶ Java EE certificate = appropriate version APIs to implement
- ▶ Oracle submits a test sequence, must pass
- ▶ Java EE Ex. 6:
 - EJB 3.1
 - JPA2.0
 - Servlet 3.0
 - JSF2.0
 - 1.1JMS
 - ...



Java EE versions

Java EE: Past & Present



JPE
Project

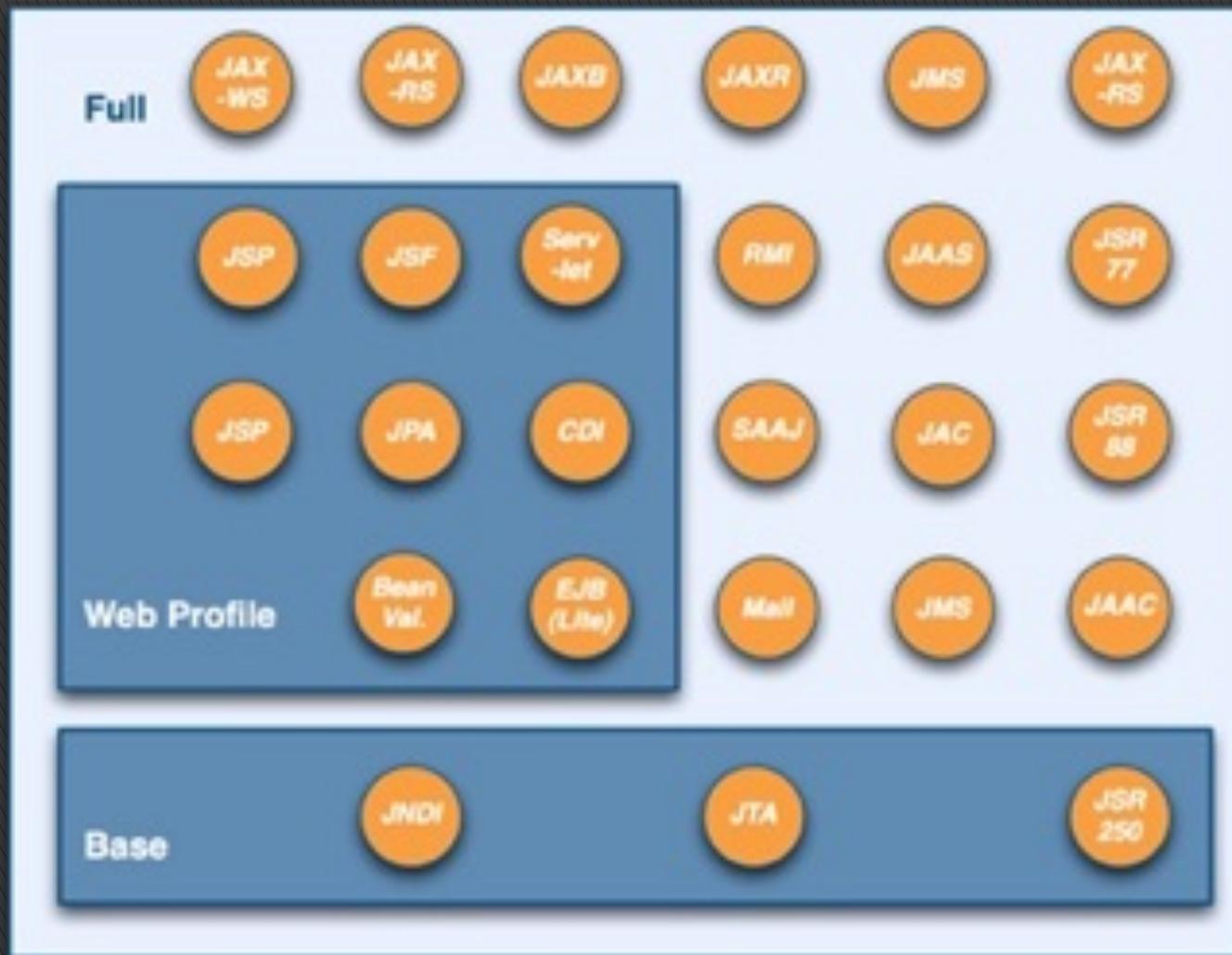


Java EE Profile

- ▶ Java EE 6 introduces a more flexible objective of the technology stack
- ▶ It is possible that a server does not implement all the technology (Full Profile), only a subset -> Called Profile
 - this technology is not limited to Java EE 6, may include other specifications, for example. SIP
 - Java EE 6 provides the way, how JCP define a profile, gives you a way to make reference to the technology
 - There is a specific profile defined in addition to the Full Profile: Web Profile



Java EE profiles (Java EE since 6)



Pruning

- ▶ New in Java EE 6: removal of some old technologies
 - like the *deprecated* method of indicating a complete technology to the next version of its presence is not guaranteed, so is not recommended for use
- ▶ Java EE represents six of these to be removed:
 - JAX-RPC
 - JAXR
 - EJB 2.0 and older entity beans
 - Java EE Application Deployment



News in Java EE 7

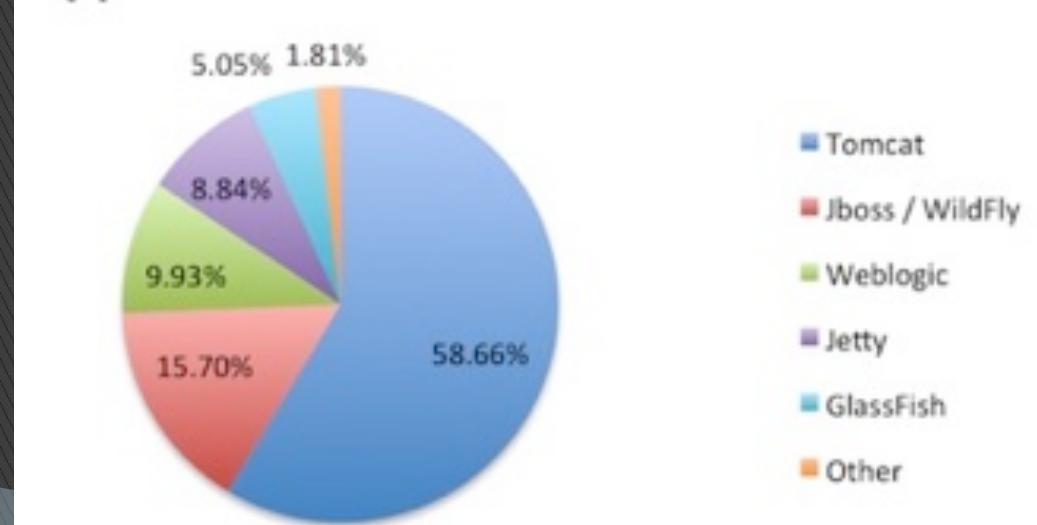
- ▶ Cloud
 - Multitenancy
 - Elasticity – load balance
- ▶ Html5
 - Web Sockets – direct Web Sockets calls
 - JAX-RS 2.0 – RESTful Api
 - JSON – built-in JSON handling
- ▶ Enterprise
 - Concurrency Utilities 1.0
 - Batch Applications for Java Platform 1.0



Common Java EE server implementations

- ▶ Glassfish (reference implementations, open source)
- ▶ JBO ss (open source)
- ▶ IBM WebSphere Application Server,
- ▶ Oracle (formerly BEA) WebLogic Server
- ▶ Jetty (open source, just webconatiner)
- ▶ Apache Tomcat (open source, just webconatiner)
- ▶ Tome (+ Tomcat OpenEJB)
- ▶

Application server market share 2015



Thank you for your attention!

