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Testing Java EE 6 Applications:

Tools and Techniques

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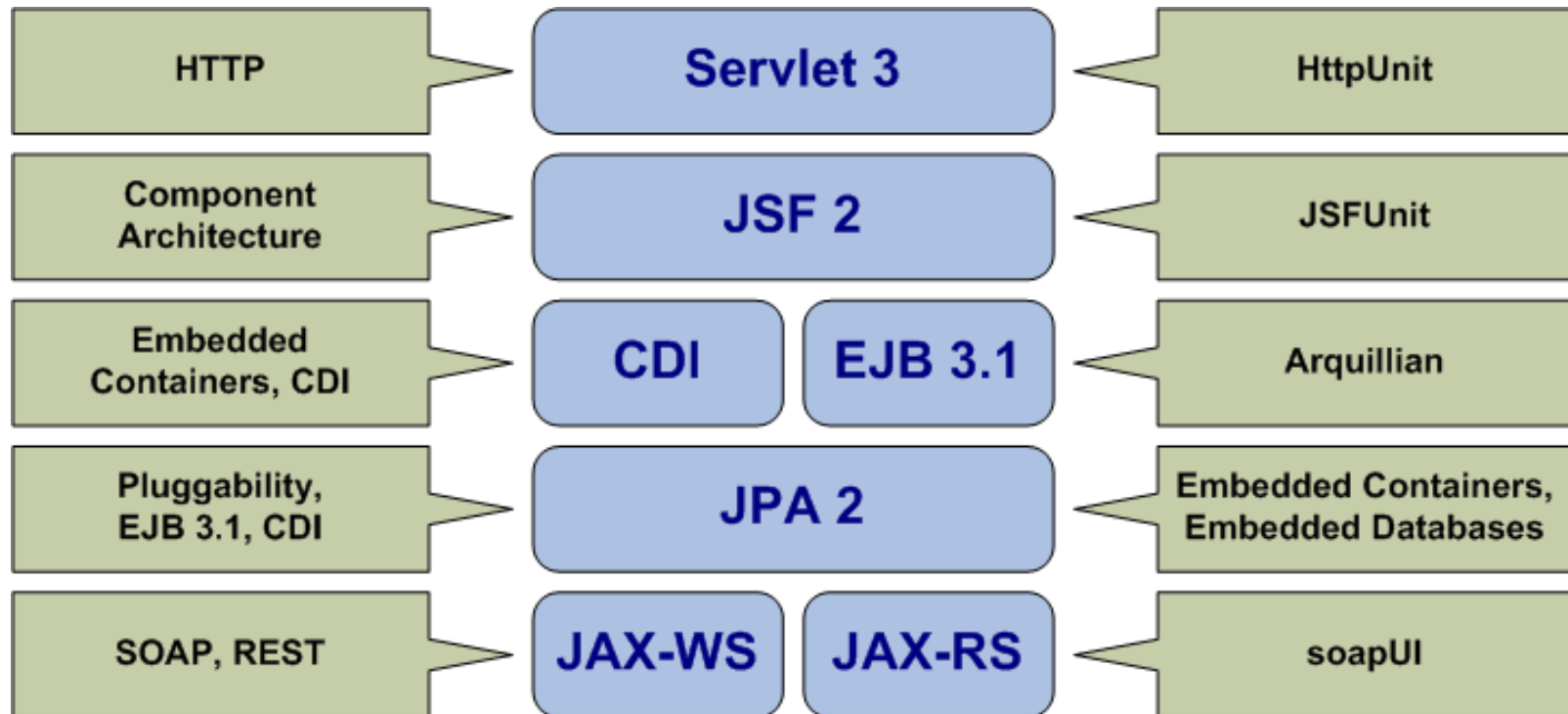**Author,** *EJB 3 in Action*

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Testing and Java EE

- **Testing critical in enterprise development**

- **Pain-point that was not addressed well by Java EE**

- **Java EE 6 helps enormously by providing a number of enabling features geared towards testing**

- **Still somewhat a patchwork of evolving solutions**

- **Only covers developer (unit and integration) testing**

- **Primarily based on JUnit**

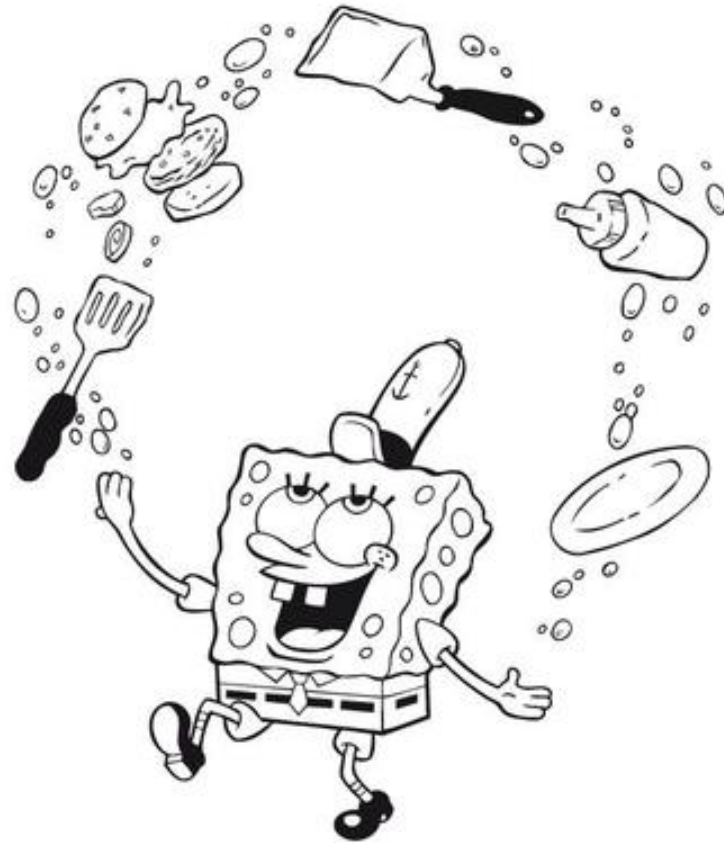- **More about tools rather than new techniques per se**

Testing Java EE Applications

HTTP	Servlet 3	HttpUnit
Component Architecture	JSF 2	JSFUnit
Embedded Containers, CDI	CDI / EJB 3.1	Arquillian
Pluggability, EJB 3.1, CDI	JPA 2	Embedded Containers, Embedded Databases
SOAP, REST	JAX-WS / JAX-RS	soapUI

Testing Servlet 3

- JUnit, HttpUnit, HtmlUnit great choices

- See if your container can be embedded into a unit test

- Cactus and Selenium can be good choices too

- Simulated Servlet containers like ServletUnit or mocking Servlet objects with EasyMock or Mockito options for very simple cases
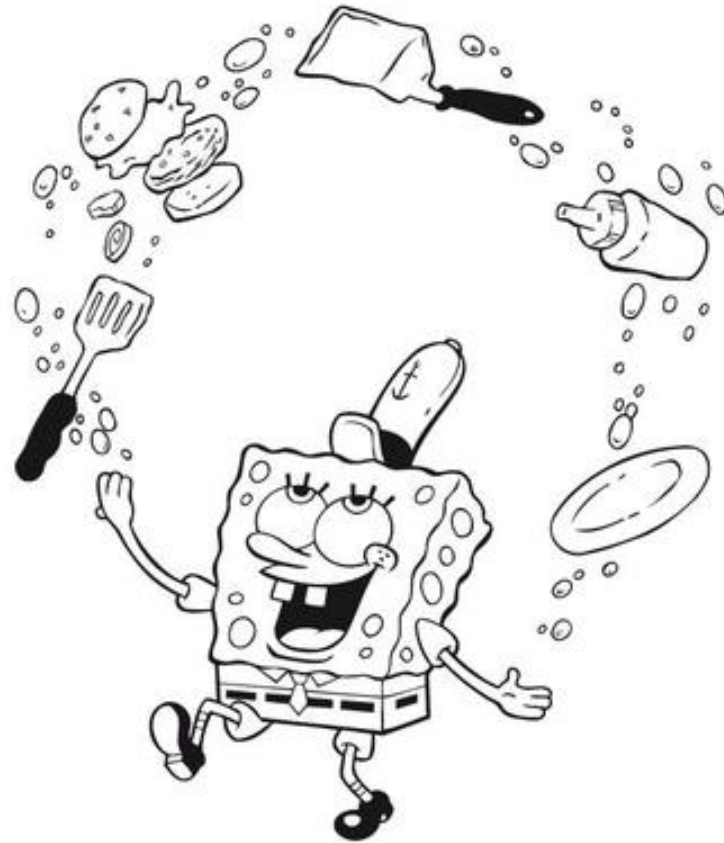
Servlet 3 Testing Demo!

Testing JSF 2

• JSF 2 project stages invaluable for debugging, test configuration, component development

• For simple cases, generic Servlet testing tools could be used, especially Selenium

• JSFUnit ideal for more complete JSF testing

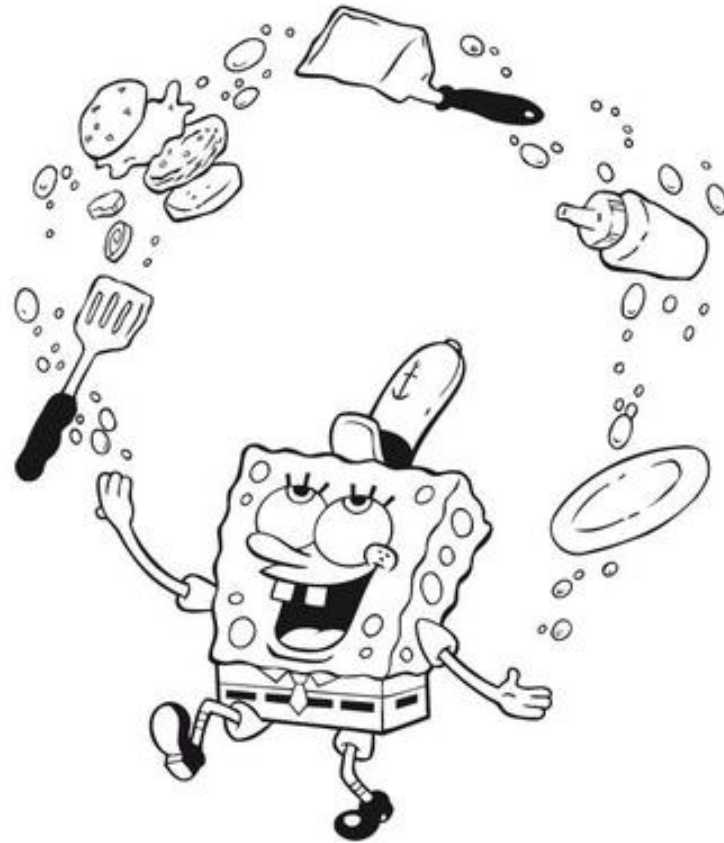• JSFUnit uses Cactus, JUnit, HttpUnit, HtmlUnit under the hood

JSF 2 Testing Demo!

Testing EJB 3.1/CDI

• CDI increases Java EE middle-tier testability by leaps and bounds

• EJB 3.1 embedded containers, generic dependency injection, @Alternative, portable extensions, XML deployment descriptors key enablers

• Arquillian/ShrinkWrap ideal cross-vendor CDI/EJB 3.1 testing tools

• Check to see if your application server provides specific testing or JUnit integration support (Resin provides excellent JUnit integration support, for example)

Testing EJB 3.1/CDI

- Embedded containers can be used directly with JUnit for simpler cases, especially OpenEJB

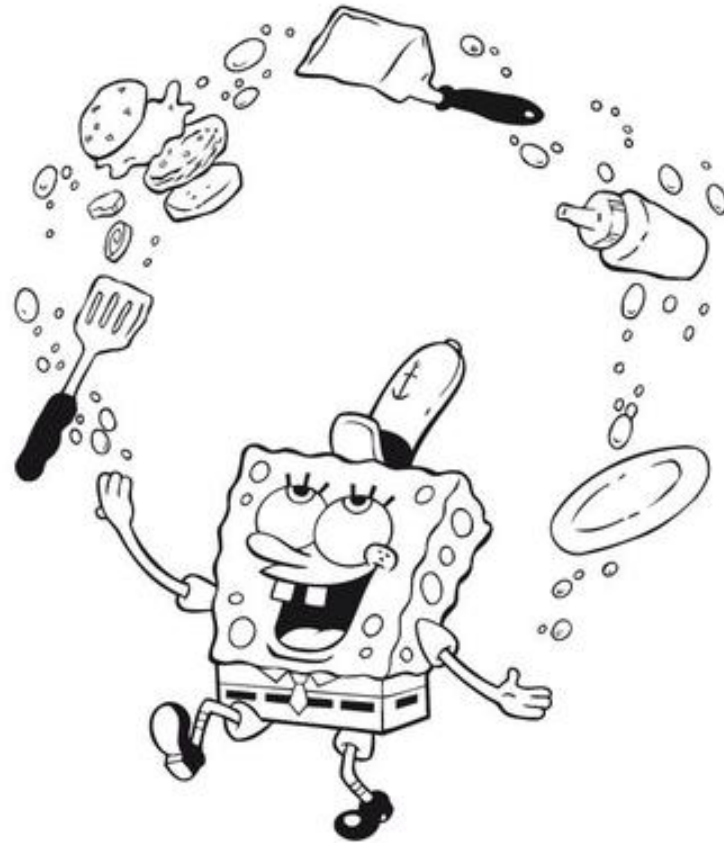- For the simplest cases, JUnit with EasyMock or Mockito is fine

EJB 3.1 + CDI Testing Demo!

Testing JPA 2

- Embedded containers/CDI tools with JUnit integration works well for JPA 2

- Consider using embedded databases like Java DB, Derby, HSQL

- You can use DBUnit for better data consistency

- JPA supports Java SE environments, non-JTA transactions, JDBC database connections for simpler cases

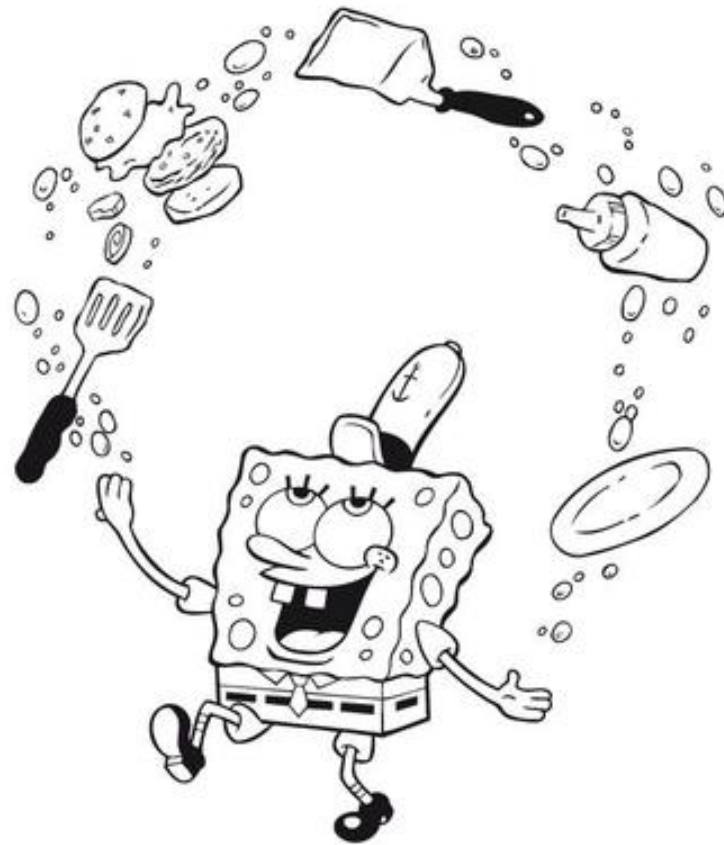- For simplest cases JUnit, EasyMock, Mockito or even EJB3Unit works

JPA 2 Testing Demo!

Testing JAX-WS and JAX-RS

• You can use JAX-WS, JAX-RS client APIs with JUnit

• For more complex cases consider soapUI (supports SOAP <u>and</u> REST)

JAX-WS/JAX-RS Testing Demo!

Summary

- **JSF 2 project stages, EJB 3.1 embedded containers, JPA 2 pluggability, CDI @Alternative, portable extensions, XML deployment descriptors key enablers for Java EE testing**
- **Range of new and existing tools available to fit your testing methodology, requirements**
- **Tools diversification, gradual convergence and further standardization likely going forward**

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