Testing Java EE with Arquillian

The star shining in the universe of Java testing

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Agenda

Section 1

What is Arquillian?

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Pick the correct answer

(a) A part of comprehensive tool set for application developers

(b) Another testing framework reinventing the wheel

(c) A fancy name for a beer bottle opener

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Java EE application testing

Problems

Java EE applications are complex, thus it is difficult to isolate components

- communication (JMS, HornetQ, ...)
- UI (web based - JSF, JSP, RichFaces, GWT)
- database layer (JPA, Hibernate, ...)
- application server (JBoss AS, GlassFish, WebSphere, ...)

Testing is highly time consuming, not enjoyable and hard to be done properly!

Goals of Arquillian

- Provide a simple way how to write integration test
  - Manage container's lifecycle
  - Build and deploy test archive
  - Enrich test classes
  - Capture test results
  - Keep configuration externally
  - Isolate classpath
- Can be easily extended to support tool of your choice

Arquillian makes integration testing a breeze

Parts of Arquillian

Not a complete list, but what you might find useful:

Arquillian

One framework to rule them all, still your tests are basically JUnit or TestNG

ShrinkWrap

The crucial component to pack your testing archive

Descriptors

A DSL language in Java to create mock XML configuration, for instance:

- Java EE descriptors, Arquillian configration, etc.

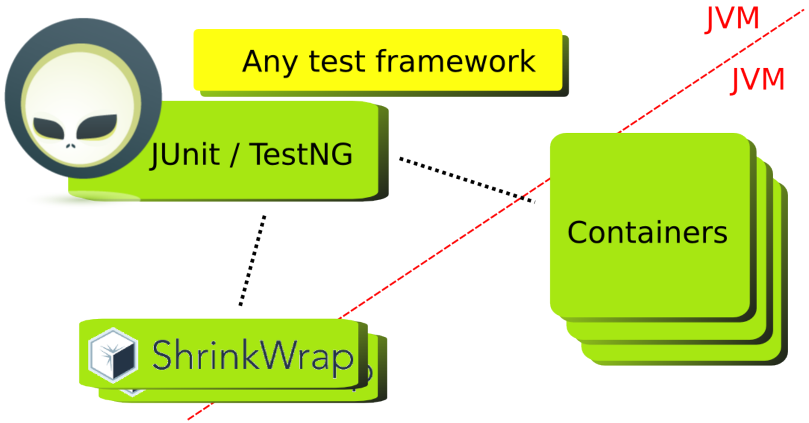
Extensions and supported frameworks

Dependencies	Use Maven to fetch dependencies
Byteman	Coming soon!
JSFUnit	Test JSF pages
Jacoco	Measure test coverage
Selenium	Run functional tests
Ajocado	Type safe AJAX tests

Other remarks

Support for JBoss AS 5, 6; Jetty 7; Glassfish 3; Tomcat 6; JSR-299 impls; OSGi; ...

Execution scheme



Section 2

How to use Arquillian?

Arquillian modes

Set Arquillian mode for your test with `@Run(RunModeType)`. You can mix them as they can be specified per test method

IN_CONTAINER

- The default way
- Test is deployed along side with deployment
- Test is run inside of container

AS_CLIENT

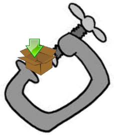
- Use Arquillian to build `@Deployment`
- Test is not run inside of container

ShrinkWrap

What it does?

- Builds JAR, WAR or EAR archive directly in Java code
- Let you pick up only the required parts of application
- Allows you to reuse Maven bits if desired
- Import from / export to external archives

```
ShrinkWrap.create(JarArchive.class)
    .addClasses(Foo.class, Bar.class)
    .addPackages(Z.class.getPackage());
```



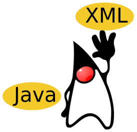
ShrinkWrap Descriptors

```
Descriptors.create(BeansDescriptor.class)
    .decorator(DecoratorBean.class);
```

```
Descriptors.create(WebAppDescriptor.class)
    .distributable()
    .facesServlet()
    .filter(Filter.class, "/*.foo", "bar/*")
    .servlet(Servlet.class, "/*.foo", "bar/*");
```

What it does?

- Build an XML from Java using type-safe DSL
  - Specify only required bits
  - Modify existing files
- Descriptors can be deployed by Arquillian aside archives



JUnit

Enabling Arquillian for your test

```
@RunWith(Arquillian.class)
public class Test {

    @Deployment
    public static Archive<?> war() {
        return ShrinkWrap.create(WebArchive.class, "test.war")
            .addClasses(TheBean.class)
            .setWebXML(new File("src/test/web.xml"));
    }

    @Test
    public void testExtraFeature() {
        ...
    }
}
```

TestNG

Enabling Arquillian for your test

```
public class Test extends Arquillian {

    @Deployment
    public static Archive<?> jar() {
        return ShrinkWrap.create(JavaArchive.class)
            .addPackage(MyBean.class.getPackage());
    }

    @Test
    public void testExtraFeature() {
        ...
    }
}
```

How to make your test units isolated?

Injection, EJB

- Package necessary classes and configuration files
- Use `@Inject` or `@EJB` in test class to get instance from container

```
@Deployment
public static JavaArchive createDeployment() {
   return ShrinkWrap.create(JavaArchive.class, "test.jar")
      .addClasses(GreetingManager.class,
                  GreetingManagerBean.class);
}

@EJB GreetingManager greetingManager;

@Test
public void shouldGreetUser() throws Exception { ... }
```

redhat.

How to use persistence context?

Persistence

- Package necessary classes and configuration files
- Use `@PersistenceContext` and `@Produces` to create EntityManager which is bound automatically

```
@PersistenceContext @Produces @Default
EntityManager em;

@EJB AuctionManager auctionManager;

@Test
public void testLogin() {
    auctionManager.findAll();
    ...
}
```

Dive into extensions

Selenium/Ajocado

- Verify your application via functional test
- Let Arquillian manage:
  - Browser object - `@Selenium`
  - Deployed URL - `@ContextPath`
- Ajocado is Selenium on steroids

```java
@Selenium AjaxSelenium driver;
@ContextPath URL contextPath;

@Test @Run(AS_CLIENT)
public void testLogin() {
    driver.open(contextPath);
    driver.type(LOGIN_INPUT, "kpiwko");
    waitHttp(driver).click(LOGIN_BUTTON);
}
```

Dive into extensions cont'd

ShrinkWrap dependencies

- Include Maven artifacts in your ShrinkWrap archives
- Highly customizable
- Reuse Maven POM and settings files

```
@Deployment
public static Archive<?> war() {
    return ShrinkWrap.create(WebArchive.class)
        .addLibraries(
        Dependencies.artifact("foo:bar:1.0.0)
            .exclusions("foo:no", "foo:never")
            .artifact("foo:yes:pom:1.0.0)
                .scope("import")
            .resolve()
        );
}
```

Section 3

Arquillian on the edge

Coming soon in your tests!

- Multiple target (`@Target`) containers for an archive
- Inject Arquillian bits into your test classes - `@ArquillianResource`
  - Parallelization, HA and cluster testing
- Support cloud targets
- Multiple browser for Selenium extension
- More extensions (Byteman, RushEye support)

redhat.

Where to continue?

Questions, feature requests, bug reports

- #jbosstesting on irc.freenode.net
- JIRAs (ARQ, ARQAJO, SHRINKWRAP, SHRINKDESC)
- jboss.org blogs and RSS
- JBUG in the future (Coming to Brno!)

Track current progress

- `http://github.com/aslakknutsen/arquillian/tree/the_bigger_picture`
- `http://github.com/aslakknutsen/descriptors/tree/SHRINKDESC-25`
- `http://github.com/ALRubinger/shrinkwrap/tree/SHRINKWRAP-140`
- `http://github.com/kpiwko/arquillian/tree/ARQ-329`

Czech JBoss User Group

Now in your city!
Come to the first session on March 2nd
at 6 p.m., FI MU

Kick-off planned: RESTEasy

The end.

Thanks for listening.

Lecture room	D2 (80)	D3 (150)
9:00-9:45	ABRT 2.0 – Karel Klíč, Jiří Moskovčák	Matahari & FMCI – Jaroslav Řezník
9:50-10:35	Beyond Myths: Revealing JSF 2 & RichFaces 4 - Lukas Fryc	coreutils - tips & common mistakes – Ondřej Vašík
10:40-11:25	The truth about Seam – Jozef Hartinger	OpenLDAP, Kerberos, SSSD, FreeIPA - Jan Vcelak, Zbysek Mraz, Jan Zeleny, Pavel Zuna
11:30-12:30	lunch	lunch
12:30-13:15	Testing Java applications with Arquillian – Karel Piwko	Build HA cluster – marek Grác
13:20-14:05	New features in OpenJDK 7 – Pavel Tišnovský	Debugging Tools Intro – Jan Kratochvíl
14:10-14:55	Byteman – Martin Večeřa	OpenSCAP – Peter Vrabec
15:00-15:45	Spacewalk on PostgreSQL – Jan Pazdziora	TeX Live – Jindřich Nový
15:50-16:35	Confining Spacewalk with SELinux – Jan Pazdziora	Amateur radio in Fedora – Jaroslav Škarvada
16:40-17:25	Func: Fedora Unified Network Controller – Marek Mahut	Performance evaluation of Linux Discard Support - Lukáš Czerner

	Lab1 (B007)	Lab2 (B011) – Laptops needed
9:00-10:10		Infinispan 4 - Data Grids Hands-On lab - Radoslav Husar, Michal Linhard
10:15-11:25	Django for beginners - Dan Mach	Infinispan 4 - Data Grids Hands-On lab (continued) - Radoslav Husar, Michal Linhard
11:30-12:30	lunch	lunch
12:30-13:40	Working with Tito - Miroslav Suchý	Firewalld - Thomas Woerner (presentation and discussion)
13:45-14:55	SSSD setup - Jan Zeleny, Jakub Hrozek	
15:00-16:10		Modern Enterprise Java Development and Testing – Karel Piwko, Lukas Fryc
16:10-17:25		Modern Enterprise Java Development and Testing (continued) – Karel Piwko, Lukas Fryc