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Apache DeltaSpike

...closes the gap

About the Speakers

- http://github.com/struberg
- http://people.apache.org/~struberg
- Apache Software Foundation member
- Apache OpenWebBeans, MyFaces, BVAL, OpenJPA, Maven, DeltaSpike, ...
- CDI EG member

Agenda

- CDI Quickstart
- CDI Extensions Howto
- DeltaSpike History and Future
- deltaspike-core
- deltaspike-cdictrl
- deltaspike-jpa
- deltaspike-jsf

How the ASF works

- OSS vs closed source
- Why is DeltaSpike Open Source?
- ALv2
- Non profit Organization
- Contributors, Committers, PMC
- ASF members, board of directors
- often professional support available

About Apache DeltaSpike

- Apache Top Level Project since 2013-04
- Homepage:
  http://incubator.apache.org/deltaspike
  http://deltaspike.apache.org
- Source:
  http://git.apache.org/incubator-deltaspike
- deltaspike-dev@incubator.apache.org
  dev@deltaspike.apache.org
- irc.freenode.net channel #deltaspike
- https://issues.apache.org/jira/browse/DELTASPIKE

CDI Basics

JSR-299 Overview

- Contexts and Dependency Injection for the Java EE platform (CDI)
- Component Model for Java (SE and EE)
- Originally designed for J2EE but also usable for standalone applications
- Based on JSR-330

CDI Features

- Typesafe Dependency Injection
- Interceptors
- Decorators
- Events
- SPI for Portable Extensions
- Unified EL integration

Available Implementations

- JBoss Weld (RI)
- Apache OpenWebBeans
- Resin CanDI
- Every JavaEE 6 container!
- Available CDI-1.1 implementations
  - Weld-2.0-alpha (not finished)
  - OpenWebBeans-2.0 in preparation

A small Example

- Create a META-INF/beans.xml marker file
- Create a MailService implementation

```
@ApplicationScoped
public class MyMailService
implements MailService {
  private @Inject User usr;
  public send(String from, String to,
              String body) {
    .. do something
  }
}
```

A small Example

- We also need a User bean

```
@SessionScoped
@Named
public class User {
  public String getName() {..}
  ..
}
```

A small Example

- Injecting the Bean

```
@RequestScoped
@Named(„mailForm“)
public class MailFormular {
  private @Inject MailService mailSvc;
  private @Inject User usr;
  public String sendMail() {
    mailSvc.send(usr.getEmail(),
                 „other“, „sometext“);
    return “successPage”;
  }
}
```

A small Example

- Use the beans via Expression Language

```
<h:form>
  <h:outputLabel value="username"
   for"username"/>
  <h:outputText id="username"
   value="#{user.name}"/>
  <h:commandButton value="Send Mail"
     action="#{mailForm.sendMail}"/>
</h:form>
```

'Singletons', Scopes, Contexts

- Each created Contextual Instance is a 'Singleton' in a well specified Context
- The Context is defined by it's Scope
- @ApplicationScoped ->ApplicationSingleton
- @SessionScoped -> SessionSingleton
- @ConversationScoped -> ConversationSingleton
- @RequestScoped -> RequestSingleton
- ... code your own ...

Portable Extensions

Writing own Extensions

- CDI Extensions are **portable**
- and **easy to write**!
- Are **activated by** simply **dropping** them **into** the **classpath**
- CDI Extensions are based on java.util.ServiceLoader Mechanism

```
META-INF/services/
javax.enterprise.inject.spi.Extension
```

Extension Basics

- During the boot, the BeanManager sends **CDI Lifecycle Events** to the Extensions
- CDI Extensions can do anything you can do with Annotations. ... and even more!
- **Attention**:
  strictly distinguish between boot and runtime!

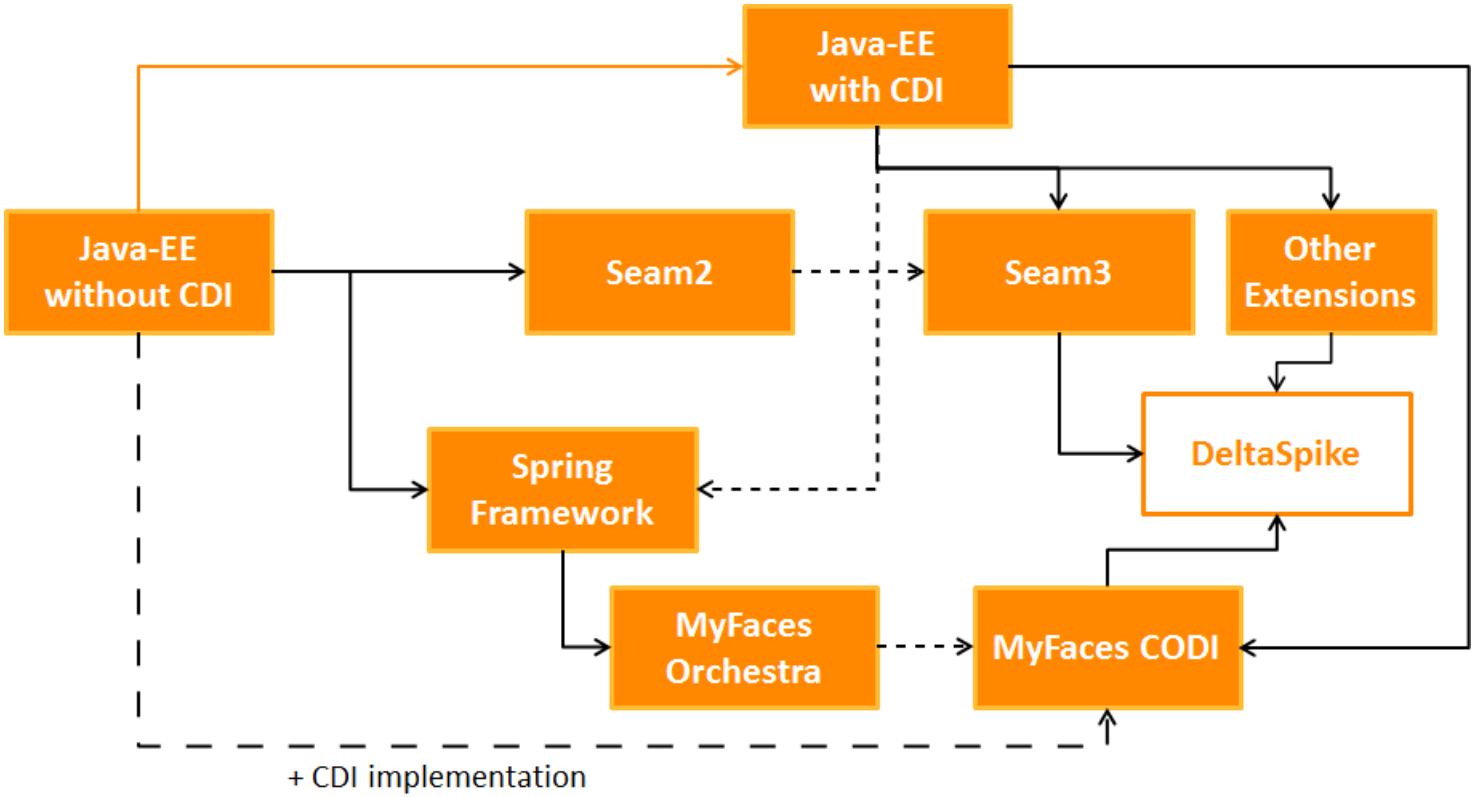
Extension Lifecycle Events

- Container sends CDI 'system events' which all Extensions can @Observes:
  - BeforeBeanDiscovery
  - ProcessAnnotatedType
  - ProcessInjectionTarget
  - AfterBeanDiscovery
  - AfterDeploymentValidation
  - BeforeShutdown
- eat your own dog food: using CDI events for Extensions

Popular Extensions

- Apache MyFaces CODI
  http://myfaces.apache.org/extensions/cdi
- JBoss Seam3
  http://seamframework.org/Seam3
- Apache DeltaSpike
  https://cwiki.apache.org/confluence/display/DeltaSpike/Index
  http://incubator.apache.org/deltaspike
  http://deltaspike.apache.org

Apache DeltaSpike History



DeltaSpike Status Quo

- CORE - finished
- JPA - finished
- CdiCtrl - finished
- JSF - 95%
- DeltaSpike Core, CdiCtrl and JPA already gets used in Production!
- Used as base for JBoss projects like JBoss AearoGear and others.

DeltaSpike Future

- Finish JSF module and release this month
- Spring Bridge
- 2-monthly releases
- What else do you need?
  Please add it to our feature backlog!

Apache DeltaSpike Core

DeltaSpike CORE

- Solves Core Java problems
- Has no external dependencies
- Especially no Java EE dependencies
- Base for all other DeltaSpike modules
- Too many features to showcase in this talk...

DeltaSpike CORE Features

- ProjectStage
- Configuration
- Catch Handler
- Utils
- BeanProvider/BeanManagerProvider
- conditional Exclude
- Typesafe Messages
- ClassDeactivator

DeltaSpike Configuration

- The Problem
  - default configuration
  - plus optional plugin configuration
  - plus optional external configuration
  - plus, plus, plus, ...
  - from lots of different `ConfigSources`

DeltaSpike Configuration

- Pick up information from various places (ConfigSource)
- Ordinal based (`deltaspike_ordinal=..`): higher number -> more important
- Extensible, register your own ConfigSource

Using the Configuration

- **ConfigResolver.getPropertyValue**(..)
- You can also inject the config:

```
@Inject
@ConfigProperty(name="printerId")
private String printerId;
```

Own property ConfigSource

- Register your own via ServiceLoader
- Easy mechanism for property files:
  - implement PropertyFileConfig
  - picks up all property files with the name returned in getPropertyFileName() and registers them as ConfigSource

own property config

```
public class NfcCardProdConfigDefinition
implements PropertyFileConfig {
    @Override
    public String getPropertyFileName() {
        return "nfcCardProd.properties";
    }
}
```

Config Ordinals

- PropertyFileConfigSource: 100 META-INF/apache-deltaspike.properties
- LocalJndiConfigSource: 200 java:comp/env/deltaspike/..
- EnvironmentPropertyConfigSource: 300
- SystemPropertyConfigSource: 400
- your own config defaults to 1000

Vetoing Beans

- Can be used to dynamically disable a Bean
- Most powerful in combination with
  - @Alternative
  - @Specializes
- internally uses: ProcessAnnotatedType#veto()
- Inspired CDI-1.1 feature '@Vetoed'

DeltaSpike @Exclude

- Used to disable bean depending on a certain situation
- @Exclude()
- @Exclude(ifProjectStage=ProjectStage.Production.class)
- @Exclude(exceptIfProjectStage=ProjectStage.Development.class)
- @Exclude(onExpression=”dbVendor!=oracle”)

BeanManagerProvider

- Access to the BeanManager in places where it cannot get injected
  - JPA Entity Listeners
  - JSF Components
  - JMX Beans
  - ServletListener or ServletFilter if not running in EE Server
- Will be available in CDI-1.1:

```
CDI.current()
```

BeanProvider

- internally uses BeanManagerProvider
- #getContextualReference(String);
- #getContextualReference(Type, Qualifiers...);
- #injectFields Used to fill all injection points of a existing instance

Core Utility Classes

- helps for writing own CDI Extensions
- BeanBuilder
- AnnotatedTypeBuilder
- AnnotationInstanceProvider
  allows to dynamically create Annotation instances + any values

Apache DeltaSpike CdiCtrl

Container Bootstrap

- Allows to boot CDI containers with a vendor independent API
- Implementations for:
  - Apache OpenWebBeans
  - JBoss Weld
  - Apache OpenEJB (TomEE embedded)
  - add your own
- Simply replace the impl jar to switch!

Container Bootstrap

- Very usable for unit tests, batches or other standalone Java processes:

```
CdiContainer cdiContainer =
  CdiContainerLoader.getCdiContainer();
  cdiContainer.boot();
  cdiContainer.getContextControl().
    startContexts();
```

Context Control

- Also usable in EE containers
- Usage:

```
@Inject ContextControl ctxCtrl;
```

- Allows to attach dummy RequestContext, SessionContext etc to the current Thread.
- Usable for Quartz extensions or any other async work

Apache DeltaSpike JPA

Interceptors

- An Interceptor decouples technical concerns from business logic
- Applying cross cutting concerns to beans
- JSR-299 allows you to write your own interceptors
- Interceptors are treated as being @Dependent to the intercepted class

Interceptor usage

- Interceptor annotations can be applied on method or class level

```
@ApplicationScoped
public class UserService {
  @Transactional
  public storeUser(User u) {
    ...
  }
}
```

InterceptorBinding Type

- InterceptorBindings are used to identify which Interceptors should be applied to a bean

```
@InterceptorBinding
@Retention(RetentionPolicy.RUNTIME)
@Target( { ElementType.TYPE,
           ElementType.METHOD })
public @interface Transactional {
}
```

The Interceptor Impl

```
@Interceptor @Transactional
public class TransactionalInterceptor {
  private @Inject EntityManager em;
  @AroundInvoke
  public Object invoke(InvocationContext context)
  throws Exception {
    EntityTransaction t = em.getTransaction();
    try {
      if(!t.isActive()) t.begin();
      return context.proceed();
    } catch(Exception e) {
      .. rollback and stuff
    } finally {
      if(t != null && t.isActive())
        t.commit();
```

Enabling Interceptors

- Interceptors need to be **enabled manually** in beans.xml
- You can define the **order** in which multiple Interceptors stack

```
<beans>
  <interceptors>
    <class>org.mycomp.Secured</class>
<class>org.mycomp.Transactional</class>
  </interceptors>
</beans>
```

DeltaSpike @Transactional

- Handles native EntityManager handling
- Handles UserTransaction handling
- EntityManager can have any scope:
  - @RequestScoped
  - @TransactionScoped

EntityManagerFactoryProducer

- Uses PersistenceConfigurationProvider to pick up config Properties
- Add a producer for EntityManager

```
public @ApplicationScoped class EntityManagerProducer {
 private @Inject @UnitName("MyPU") EntityManagerFactory emf;

 @Produces @RequestScoped
 public EntityManager createEM() {
        return emf.createEntityManager();
}
 public void dispose(@Disposes EntityManager em) {
        em.close();
}
```

Apache DeltaSpike JSF

Features

- Typesafe JSF Messages
- Typesave Navigation
- PageBeans
- @JsfPhaseListener
- Browser Tab Support
- JSF related CDI events
- New Scopes
- ongoing JSF-2.2 integration

Typesafe Messages

```
@MessageContextConfig(
    messageSource="myproject.properties")
@MessageBundle
public interface UserMessage {
  @MessageTemplate("{hellomsg}")
  String sayHello(String name);
}
```

Typesafe JSF Messages

```
@Inject
private JsfMessage<UserMessage> msg;

String doAction() {
  msg.addInfo().simpleMessageNoParam();
  msg.addFatal().
    accessNotAllowed(userName, resource);

  // or manually:
  String message = msg.get().someMsg();
}
```

DeltaSpike Scopes

- @WindowScoped
- @ViewAccessScoped (in 0.5)
- @ConversationScoped (CODI conv., in 0.5)
- @ViewScoped
- @RenderScoped

Typesafe JSF Navigation

```
@Page(navigation = REDIRECT)
interface Pages extends ViewConfig {
    class Index implements Pages{}

    @Page(viewParams = INCLUDE)
    @Secured(AdminVoter.class)
    class Admin implements Pages {}

    //'navigation' overruled
    @Page(navigation = FORWARD)
    class Home implements Pages {}

    class CustomErrorPage extends DefaultErrorView {}
}
```

Using Typesafe Navigation

```
@Model
public class MyBackingBean {
  public Class<? extends ViewConfig> overview(){
    return Pages.Overview.class;
  }
  public Class<? extends Pages> goHome(){
    return Pages.Home.class;
  }
    //navigates to /pages/customErrorPage.xhtml
  public Class<? extends ViewConfig> showError() {
    return DefaultErrorView.class;
  }
}
```

JSF Lifecycle Events

- `doSthg(@Observes @AfterJsfRequest FacesContext ct) {`
- `doSthg(@Observes @BeforeJsfRequest FacesContext ct) {`
- `doSthg(@Observes @BeforePhase(PhaseId.RESTORE_VIEW) FacesContext ct) {`
- `doSthg(@Observes @AfterPhase(PhaseId.RESTORE_VIEW) FacesContext ct) {`
-

Legal stuff

- Apache, OpenWebBeans, MyFaces, OpenEJB and OpenJPA are trademarks of the Apache Software Foundation
- Seam3 and Weld are trademarks of JBoss Inc
- CanDI is a trademark of Caucho Inc