Building CDI Extensions

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what i'm **not** talking about

JSR 299 - Java EE 6

@Inject

Alternatives

Qualifiers

JSR 346 - Java EE 7

Scopes

Decorators

Portable Extensions

Extensions allow you to customize the platform for your individual needs.

Saying they're portable allows them to work with any CDI implementation (Weld, OpenWebBeans, CanDI).

Anatomy of a Portable Extension

Only 3 things

What are they?

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beans.xml (optional in CDI 1.1)

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beans.xml (optional in CDI 1.1)
services file

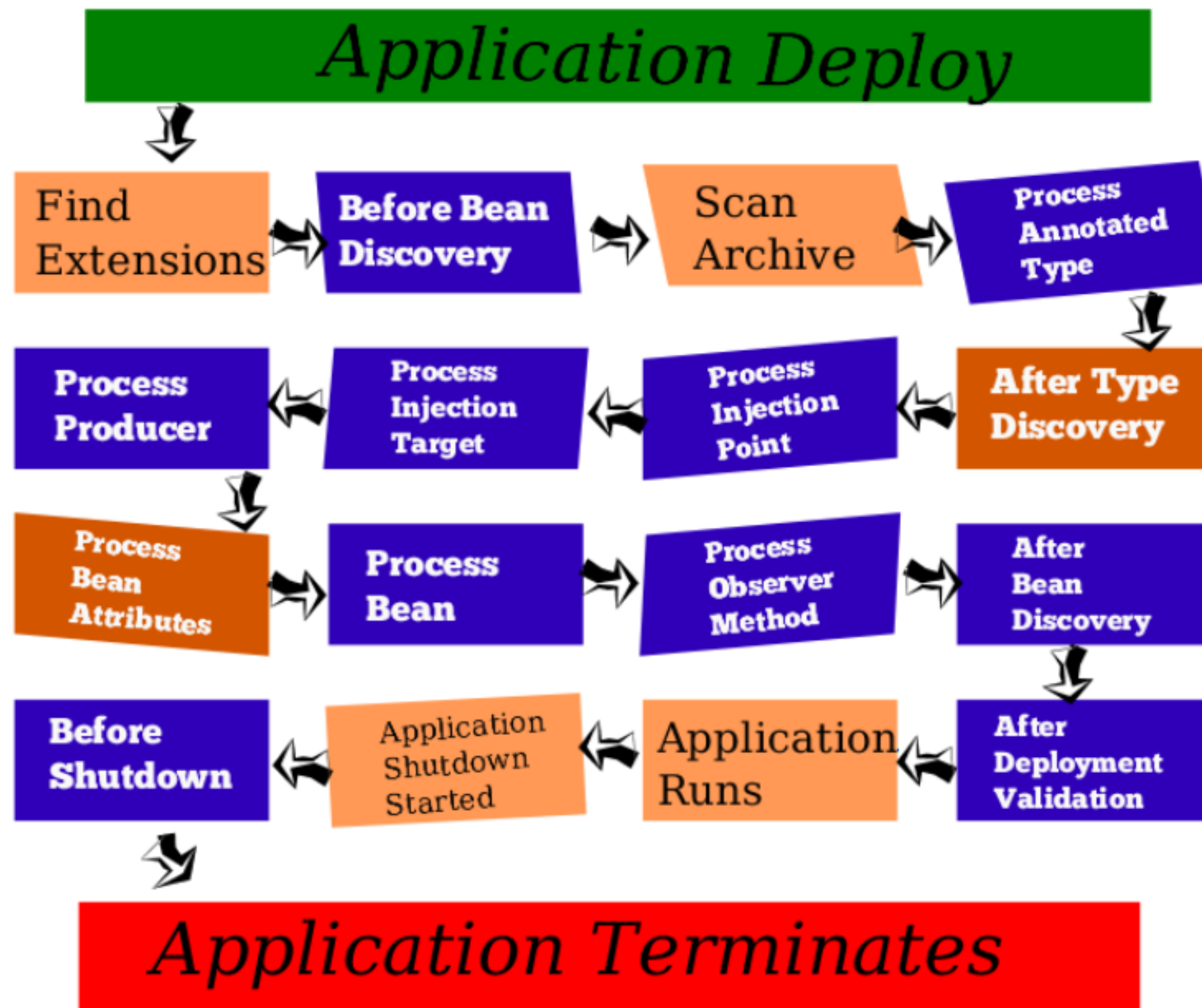# What are they?

beans.xml (optional in CDI 1.1)
services file
POJO observing one of the CDI lifecycle events

Okay, maybe only **2** :)

Next

CDI Extension Lifecycle

API docs at http://docs.jboss.org/cdi/api/1.1/

Lifecycle Deep Dive

BeforeBeanDiscovery

Add AnnotatedType (deprecated in CDI 1.1)

Add interceptor bindings

Add qualifiers

Add scopes

Add stereotypes

API JavaDoc

ViewScopedExtension.java

```java
public void addViewScoped(@Observes BeforeBeanDiscovery beforeBeanDiscovery)
{
    isActivated = ClassDeactivationUtils.isActivated(getClass());

    if (!isActivated)
    {
        return;
    }

    beforeBeanDiscovery.addScope(ViewScoped.class, true, true);
}
```

Replace AnnotatedType veto

API JavaDoc

NamingConventionAwareMetadataFilter.java

```java
public void ensureNamingConvention(@Observes ProcessAnnotatedType processAnnotatedType)
{
    Class<?> beanClass = processAnnotatedType.getAnnotatedType().getJavaClass();

    Named namedAnnotation = beanClass.getAnnotation(Named.class);
    if (namedAnnotation != null &&
            namedAnnotation.value().length() > 0 &&
            Character.isUpperCase(namedAnnotation.value().charAt(0)))
    {
        AnnotatedTypeBuilder builder = new AnnotatedTypeBuilder();
        builder.readFromType(beanClass);

        String beanName = namedAnnotation.value();
        String newBeanName = beanName.substring(0, 1).toLowerCase() + beanName.substring(1);

        builder.removeFromClass(Named.class)
                .addToClass(new NamedLiteral(newBeanName));

        processAnnotatedType.setAnnotatedType(builder.create());
    }
}
```

AfterTypeDiscovery NEW in CDI 1.1

Add AnnotatedType
Add / Remove Alternatives
Add / Remove Interceptors
Add / Remove Decorators

API JavaDoc

ProcessInjectionPoint

Modify an InjectionPoint
Add a definition error

API JavaDoc

Modify an InjectionTarget
Add a definition error

API JavaDoc

ProcessProducer

Modify a Producer
Add a definition error

API JavaDoc

Example

MessageBundleExtension.java

ProcessBeanAttributes NEW in CDI 1.1

Modify BeanAttributes
Veto
Add a definition error

API JavaDoc

ProcessBean

Query information about the Bean
Add a definition error

API JavaDoc

Example

ExceptionControlExtension.java

ProcessObserverMethod

Query information about an observer
Add a definition error

API JavaDoc

AfterBeanDiscovery

Add a new Bean

Add a new Context

Add a new observer method

Query information about AnnotatedTypes

API JavaDoc

TransactionContextExtension.java

```java
protected void registerTransactionContext(@Observes AfterBeanDiscovery afterBeanDiscovery)
{
  if (!isActivated)
  {
      return;
  }

  TransactionContext transactionContext = new TransactionContext();
  afterBeanDiscovery.addContext(transactionContext);
}
```

AfterDeploymentValidation

Add a deployment problem

API JavaDoc

Example

ExceptionControlExtension.java

BeforeShutdown

Cleanup not done by the container

API JavaDoc

MBeanExtension.java

```java
protected void shutdown(@Observes final BeforeShutdown shutdown) throws Exception
{
  if (!isActivated)
  {
      return;
  }

  final MBeanServer mBeanServer = mBeanServer();
  for (ObjectName objectName : objectNames)
  {
      mBeanServer.unregisterMBean(objectName);
      LOGGER.info("Unregistered MBean " + objectName.getCanonicalName());
  }
  objectNames.clear();
}
```

Next.

Apache DeltaSpike

What is it?
How do I get it?
http://deltaspike.org

How can Apache DeltaSpike help?

Source of examples from experts
Default implementation for metadata classes
Additional helpers

Helpers

BeanUtils
HierarchyDiscovery
Annotateds

Metadata Helpers

ImmutableBean wrappers
Basic Context implementation
AnnotatedInstanceProvider
WrappingbeanBuilder

https://github.com/apache/deltaspike

https://git-wip-us.apache.org/repos/asf/deltaspike.git

Next.
Testing

Best way to test:

arquillian

Users of Arquillian:

Apache DeltaSpike
CDI TCK
TomEE
many, many others

Arquillian allows you to test inside the actual container

No mocks, **stubs**, or **embedded container**

Deploy as much or as little of your application as needed

Example

recap

Extensions allow you to customize the platform.

CDI has a rich set of observable lifecycle events making extensions possible.

Apache DeltaSpike, besides having a vast set of extensions, contains many helpers for extension authors.

Finish off with testing inside your container with Arquillian

discussion