Maven tools for OSGi

• **Goal**
  - Introduce Maven tools to help you get started with OSGi.
  - No time to cover all OSGi tooling – there is a wide variety.

• **Industry Benefits**
  - Gradual learning curve – concentrate on *code* not build.
  - Good integration with popular Java IDEs (Eclipse, IDEA).
Maven

• Tool for building & managing Java projects
  • Project Object Model (pom.xml)
  • well-defined build life-cycle
  • extensible plugin system

• Supports remote and local repositories
  • dynamically fetch plugins / dependencies

• Build artifacts have unique identifiers
  • groupId, artifactId, version
Bnd tool

- Create **OSGi bundle** from
  - classpath (jars, class folders)
  - simple instructions

- **Uses Pull** approach
  - contents defined by instructions
  - generates OSGi metadata for you
Bnd tool (continued)

- Can be used as
  - command-line tool
  - ant task
  - maven plugin
  - eclipse plugin
maven-bundle-plugin

- New packaging type: **bundle**
  - uses Bnd tool to create the OSGi artifact
  - default instructions from Maven project
  - can be configured further in pom.xml

- Simple migration for existing projects
  - change packaging from jar to bundle
Pax Construct

- **Templates** to kick-start development
  - project / bundles / common techniques
- Simple scripts (Windows and *nix)
- Maven pax plugin
  - manages project build files
  - Eclipse support (extends maven-eclipse-plugin)
  - OSGi provisioning (Equinox, Knopflerfish, Felix)
Example – starting a new project

```
pax-create-project -g com.example
    -a osgi-test
```

```
osi-test
  \__poms
    \__compiled
    \__imported
    \__wrappers
```
Example – create an OSGi bundle

```bash
pax-create-bundle -p com.example.client
        -n simple-test-client
```

```bash
osgi-test
  \__poms
  \__/simple-test-client
    \__src  (template code)
    \__/target  (build output)
```
Example – wrap jar as OSGi bundle

```
pax-wrap-jar -g net.sf.kxml
   -a kxml2
   -v 2.2.2

osgi-test
   \__poms
   \__simple-test-client
   \__net.sf.kxml.kxml2
```
Example – import an OSGi bundle

```
pax-import-bundle -g org.ops4j.guice-osgi
    -a org.ops4j.guice-osgi.core
    -v 0.1.0-SNAPSHOT
```

```
  osgi-test
  \\poms
  \\simple-test-client
  \\net.sf.kxml.kxml2
  \\org.ops4j.guice-osgi.core
```
Example – embed jar inside bundle

```
pax-embed-jar -g net.sf.kxml -a kxml2 -v 2.2.2
```

Include-Resource:\
  target/kxml2.jar=target/kxml2.jar
Bundle-ClassPath:.,target/kxml2.jar

- Also supports **unpacking** of jars inside bundles
  - benefit: can compile against the bundle
  - downside: lose encapsulation / separation
Example – unpacking a jar

```
pax-embed-jar -g aopalliance -a aopalliance
   -v 1.0 -- -Dunpack=true

Include-Resource:
   @target/aopalliance.jar,
   target/aopalliance.jar=_placeholder_.jar
Bundle-ClassPath:.\,target/aopalliance.jar
```

- note: additional entries are there to satisfy Eclipse PDE
Example – build and provision

mvn clean install pax:provision

Pax Runner from OPS4J – http://www.ops4j.org

Working Dir: /home/stuart/Code/ops4j/lab/guice-osgi/target/runner/work
  Starting: org.ops4j.guice-osgi, runner, 0.1.0-SNAPSHOT
  Name: Guice-OSGi
Description: Lab project investigating using Guice to inject OSGi services
  Starting: org.ops4j.guice-osgi, runner, 0.1.0-SNAPSHOT

Platform: equinox

.osgi>
Example – import to Eclipse PDE
Summary

- Maven
  - flexible build system for Java
- Bnd tool
  - create and verify OSGi bundles
- Pax Construct
  - quick way to start OSGi projects

There are many more tools for OSGi...
Resources

- Maven
  - http://maven.apache.org

- Bnd tool
  - http://www.aquete.biz/Code/Bnd

- maven-bundle-plugin

- Pax Construct
  - http://wiki.ops4j.org/confluence/display/ops4j/Pax+Construct