



Connecting tools to the SEALS Platform

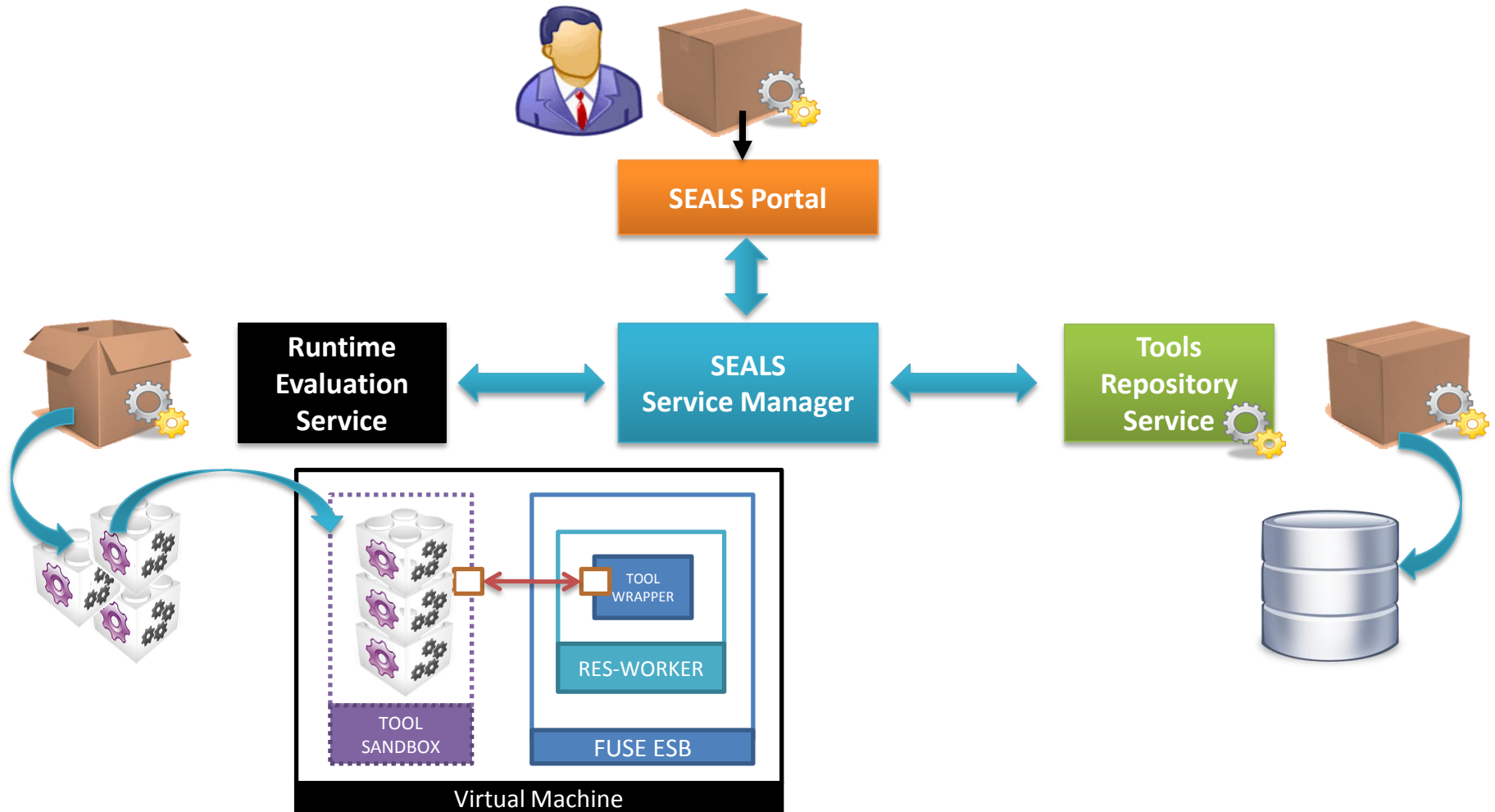
Miguel Esteban Gutiérrez, UPM

1st SEALS Tutorial
8th Extended Semantic Web Conference ESWC 2011
Heraklion, Greece

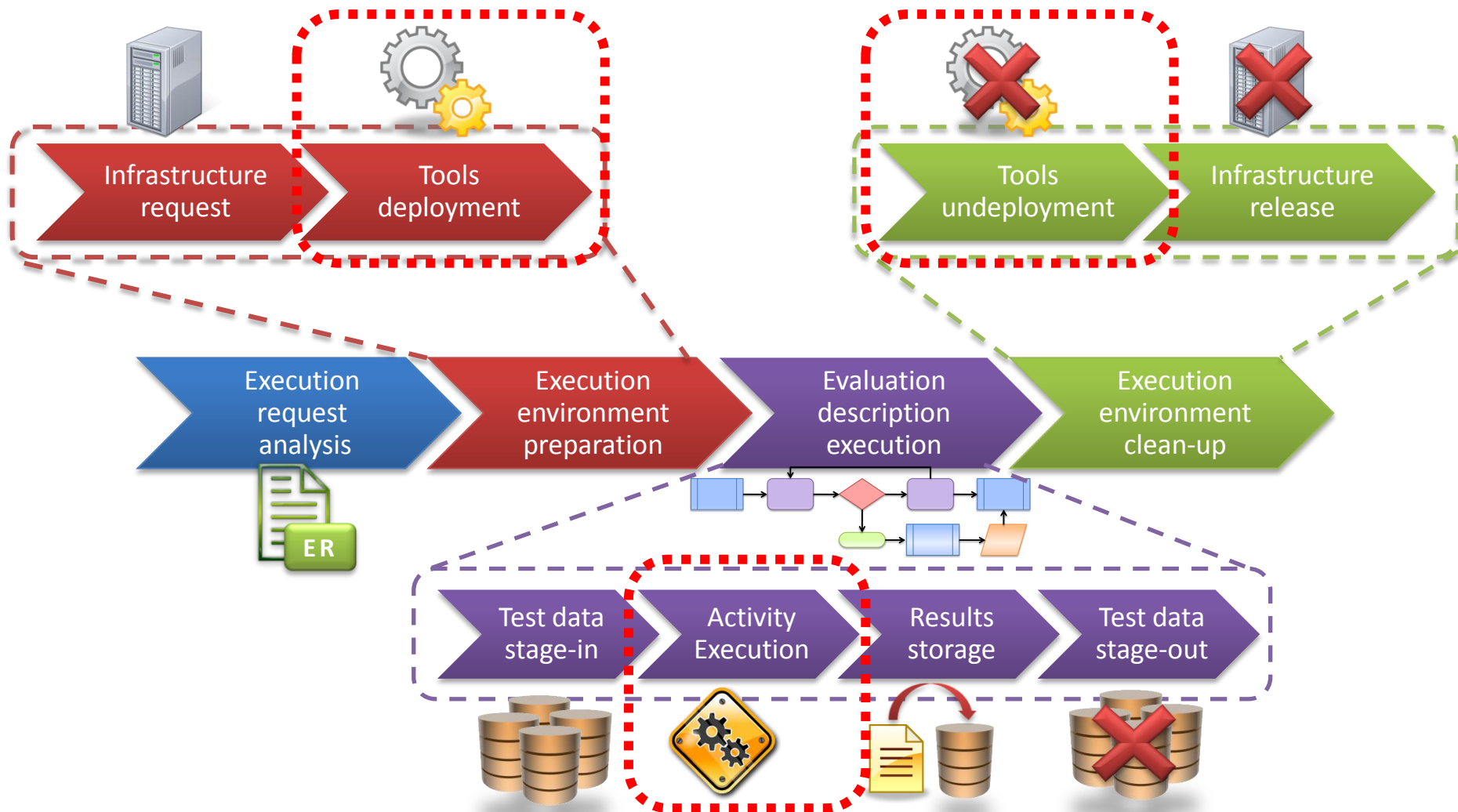
Outline

- *Introduction*
- *Tool Life-cycle*
- *Developing the Tool Wrapper*
- *Packaging the Tool Wrapper*

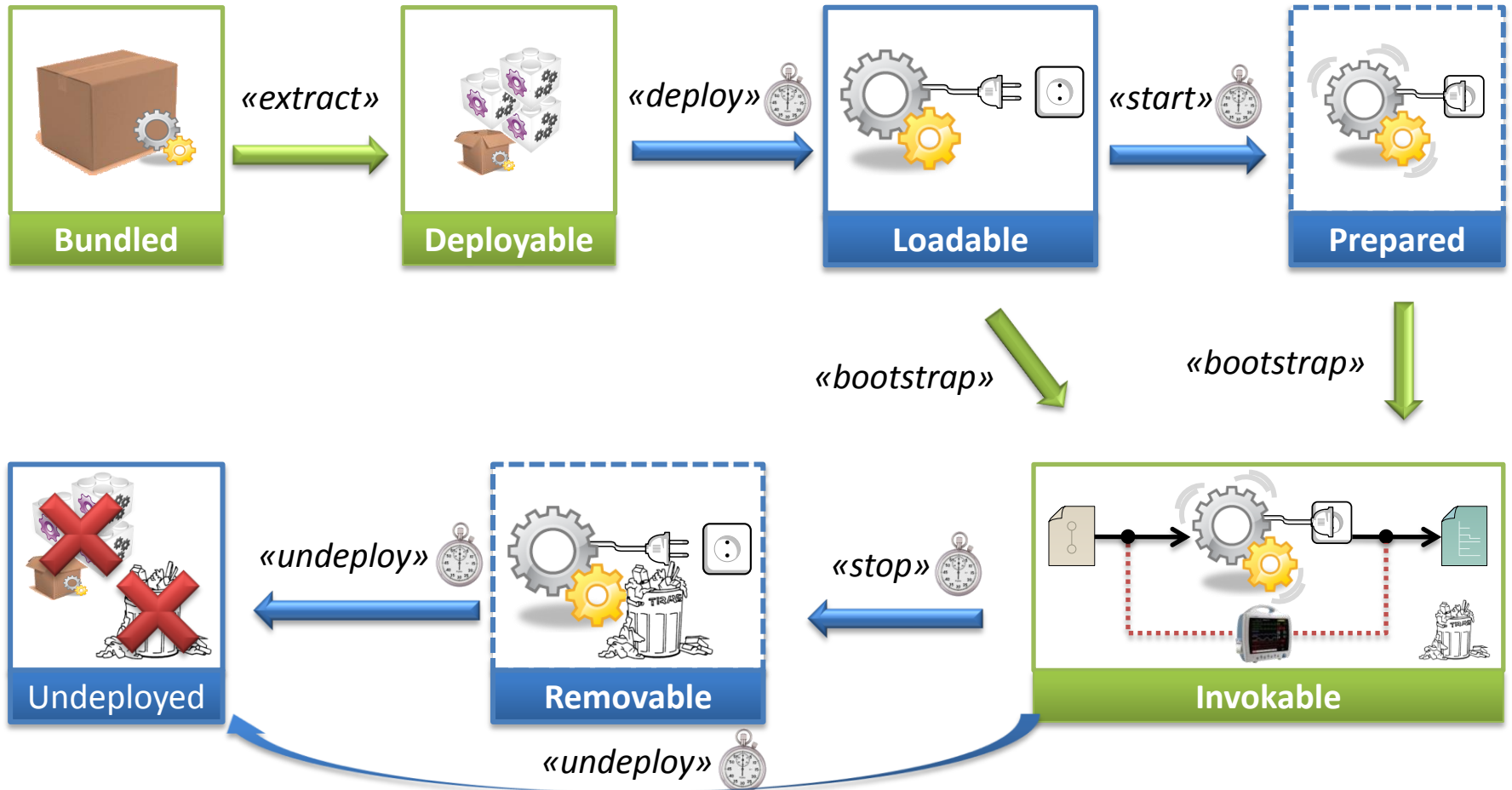
Introduction



Introduction (II)



Tool Life-cycle



Developing the Tool Wrapper (I)

- **Tool Wrapper API:**
 - *Tool Management API:* Set of capabilities for controlling the life-cycle of the tool.
 - *Tool Invocation API:* Set of mechanisms for the invocation of tool type specific functionalities at runtime.
- Developed as a **Java plug-in framework.**

Developing the Tool Wrapper (II)

Tool Management API (I)

- **Set of capabilities for controlling the life-cycle of the tool:**
 - *Deployment*: Responsible for the installation of the tool in the host machine once the tool requirements are met.
 - *Undeployment*: Responsible for the clean-up of the resources used in the host machine.
 - *Start*: Responsible for the booting of the tool, if required*.
 - *Stop*: Responsible for the termination of the tool, if required*.
- Each capability is defined as an **independent** software artifact.
 - Deployment/undeployment capabilities are **mandatory**.
 - Start capability is **optional**.
 - Stop capability **only** has to be provided **if** the start capability is implemented.

* *The tool requires to keep state among consecutive method invocations.*

Developing the Tool Wrapper (III)

Tool Management API (II)

- One input parameter: the path where the tool package has been unpacked.
- Implementation choices:
 - **Java application** (plug-in).
 - **Shell script** (wrapped by a plug-in):
 - Bound to the specific OS
 - Can execute:
 - Internal commands
 - Well-known predefined external commands
 - Third-party tools included in the tool package (located in the **lib** directory)
 - Dependent *modules* specified in the *package descriptor*.

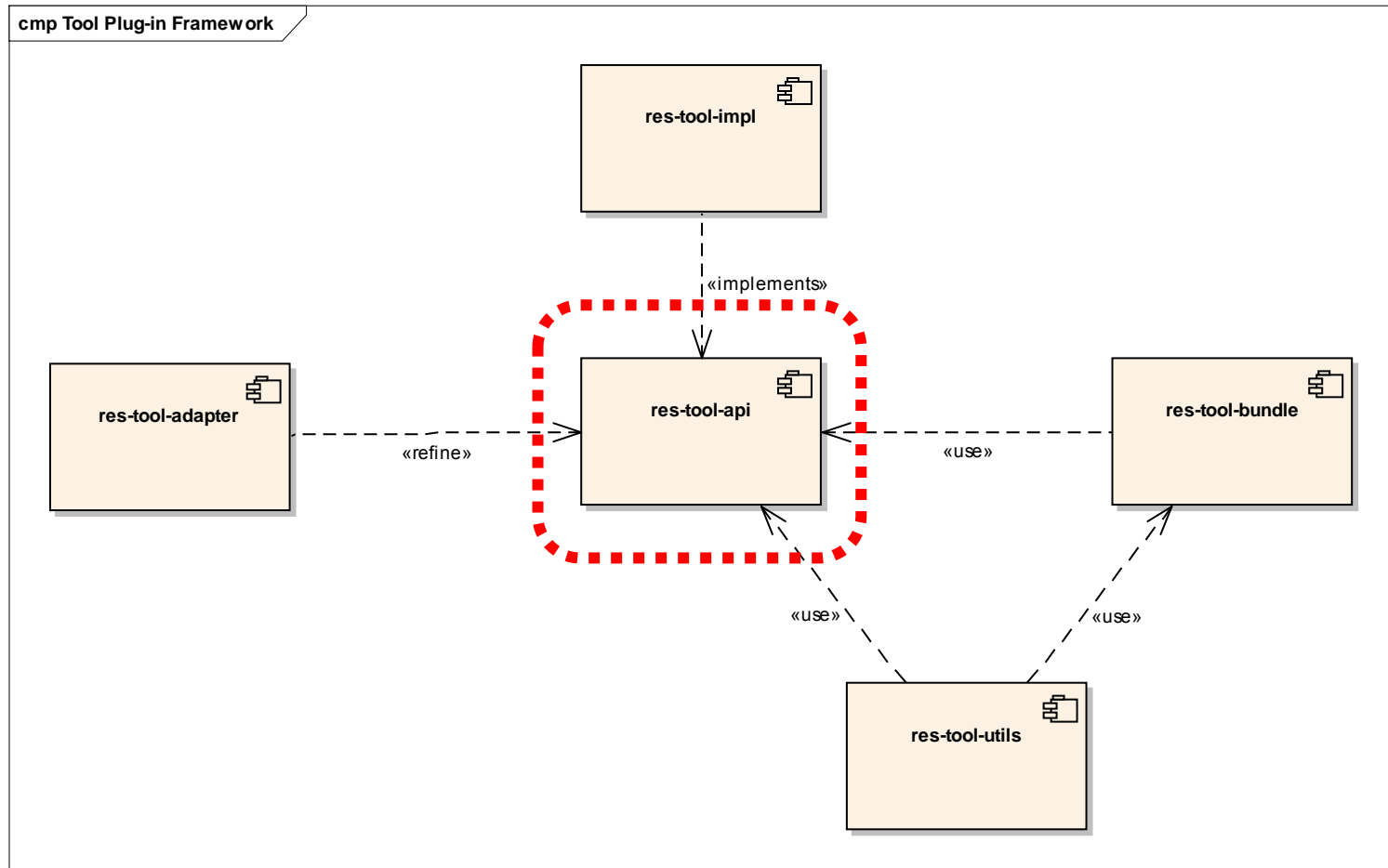
Developing the Tool Wrapper (IV)

Tool Invocation API

- **Set of mechanisms for the invocation of tool type specific functionalities at runtime.**
- Functionalities defined in two levels:
 - *Common level*: Introspection & validation operations.
 - *Domain specific level*: Tool type specific business logic operations.

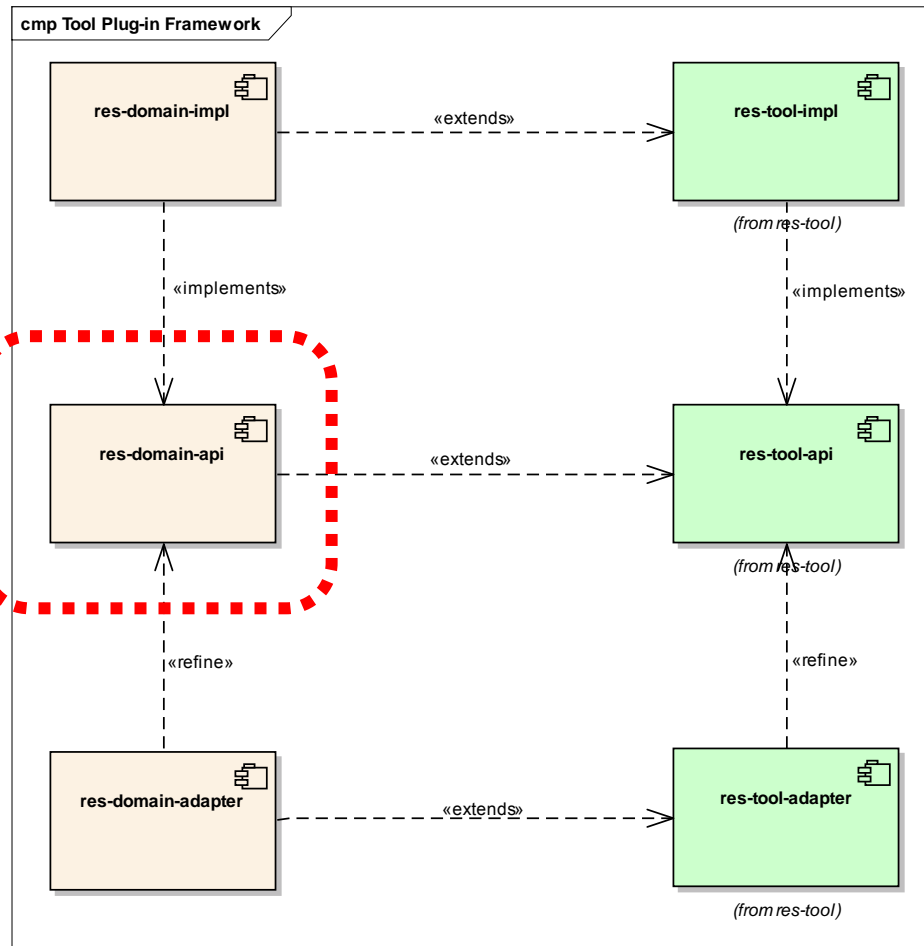
Developing the Tool Wrapper (V)

Tool Wrapper Plug-in Framework (I)



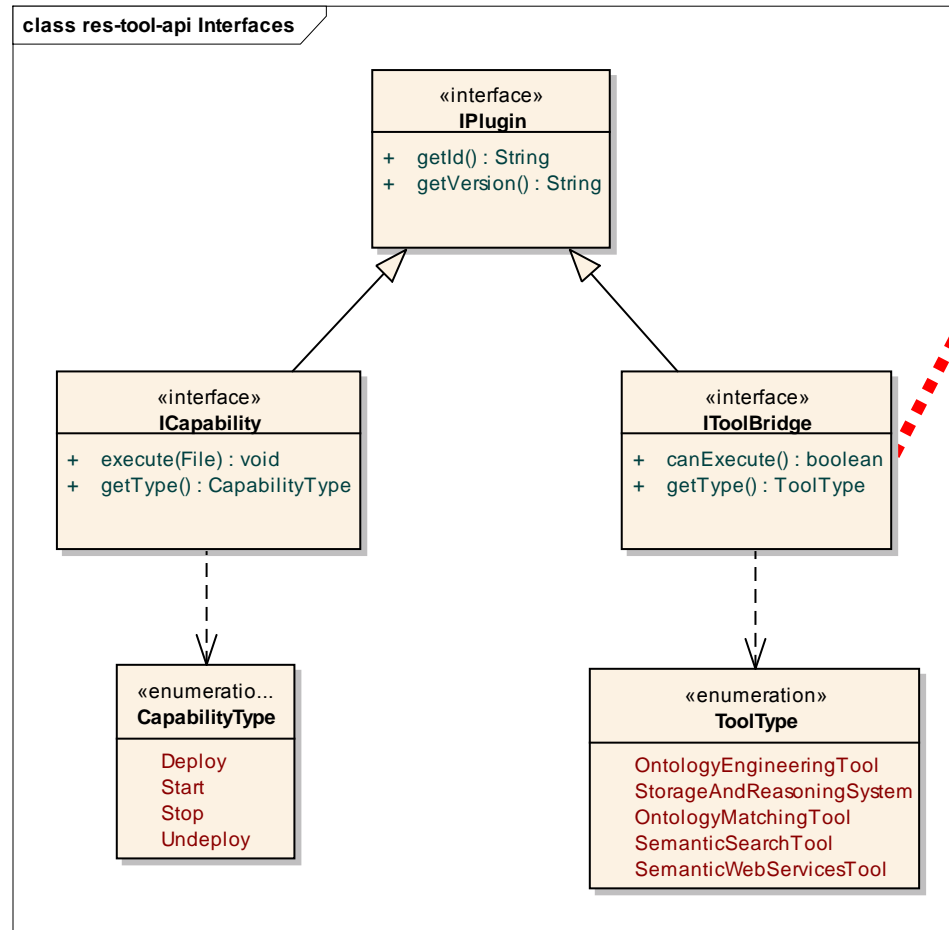
Developing the Tool Wrapper (VI)

Tool Wrapper Plug-in Framework (II)



Developing the Tool Wrapper (VII)

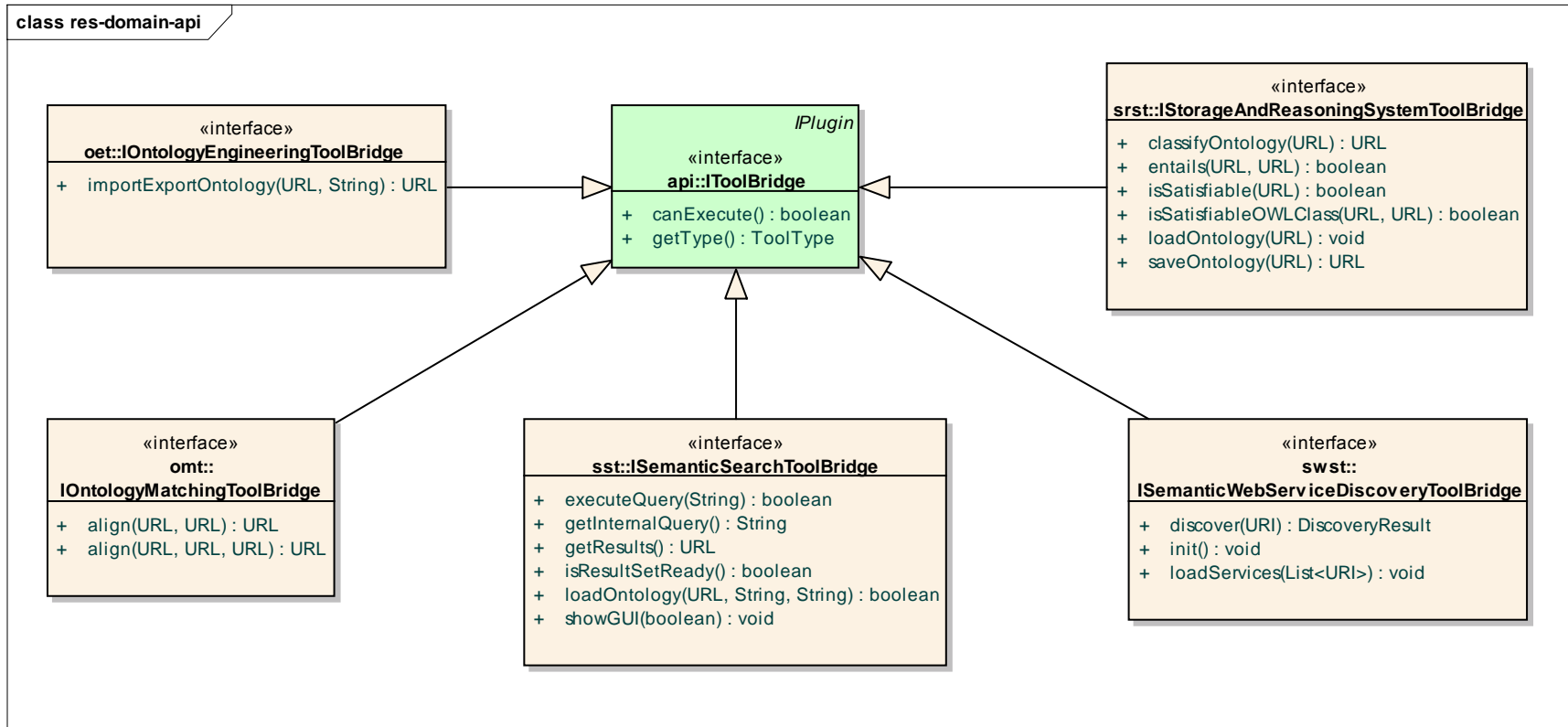
Development API (I)



**Tool
Invocation API
(Common Ops.)**

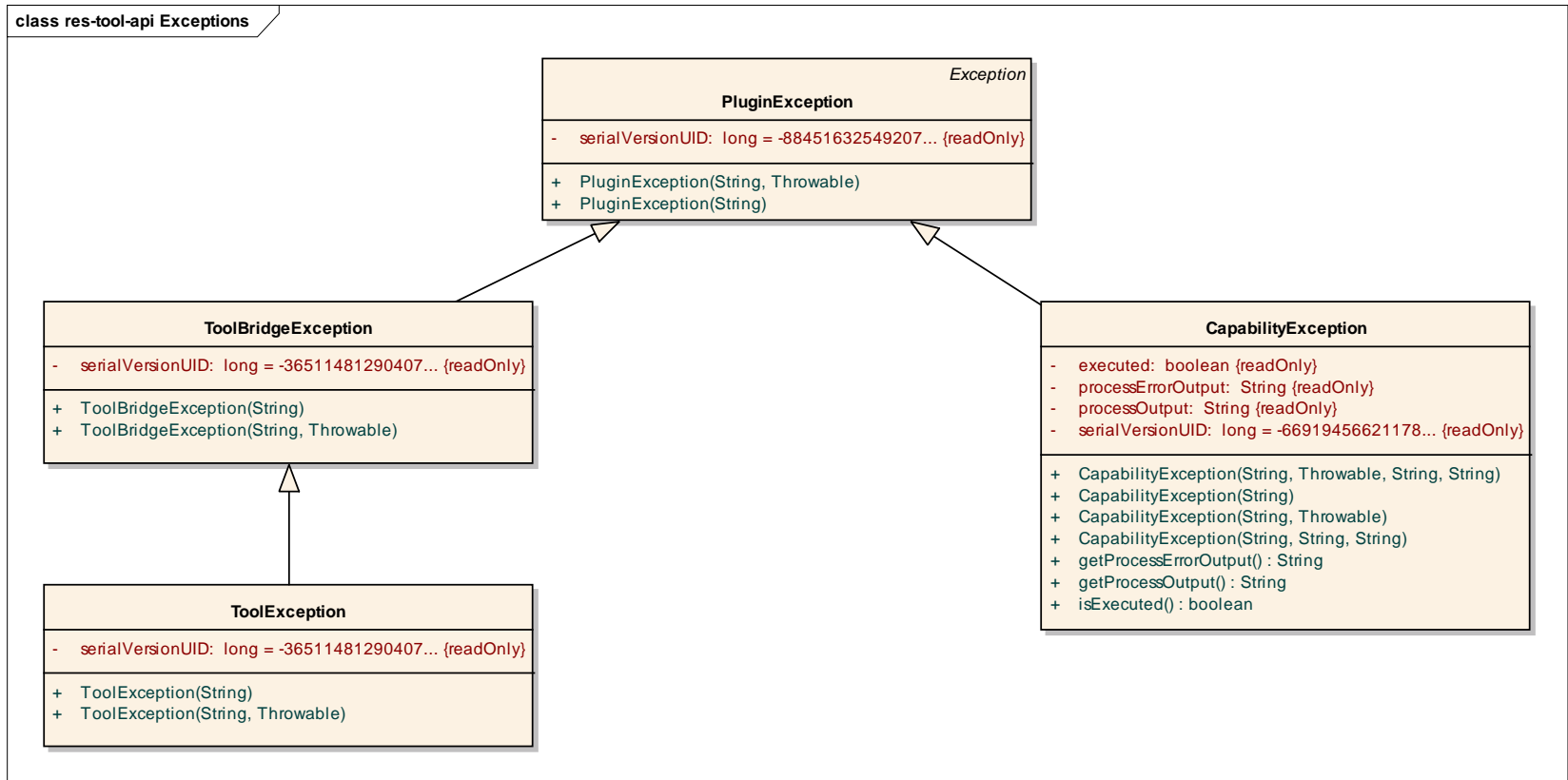
Developing the Tool Wrapper (VIII)

Development API (II)



Developing the Tool Wrapper (IX)

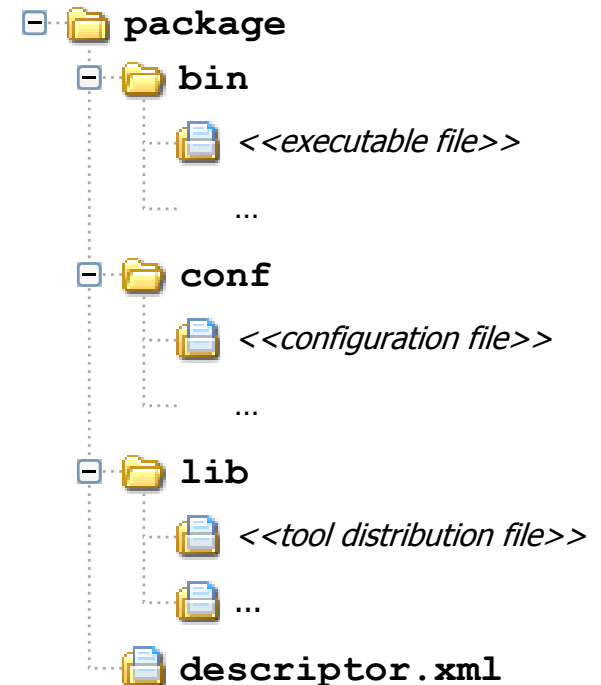
Development API (III)



Packaging the Tool Wrapper (I)

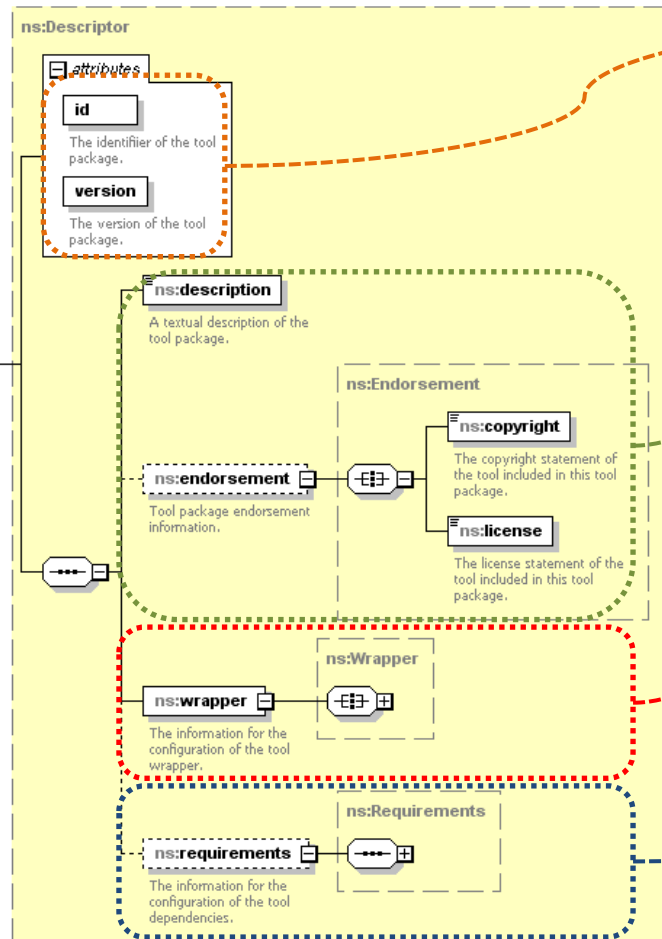
Bundle Structure

- ZIP file



Packaging the Tool Wrapper (II)

Bundle Descriptor (I)

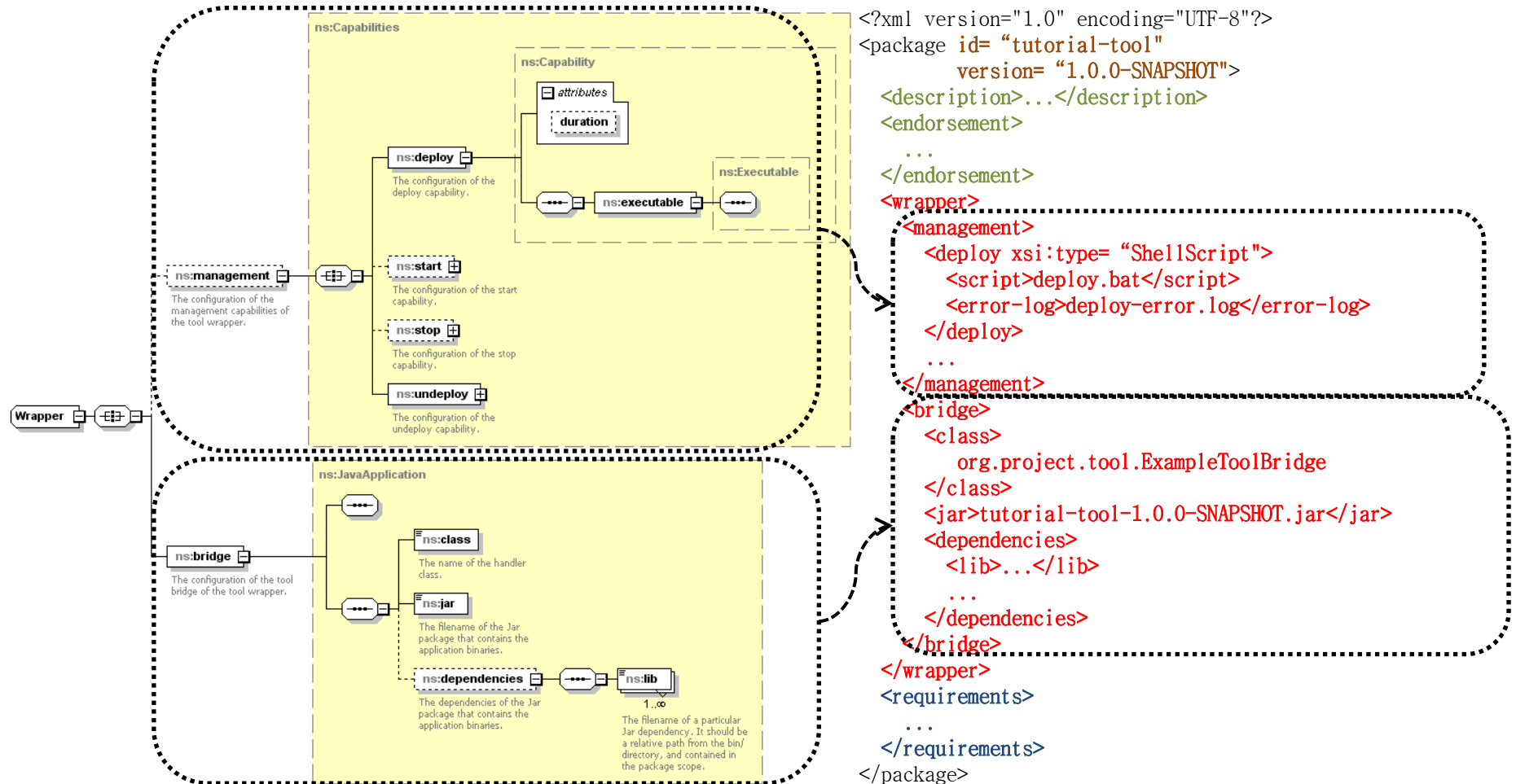


```

<?xml version="1.0" encoding="UTF-8"?>
<package id="tutorial-tool"
        version="1.0.0-SNAPSHOT">
  <description>
    This should be the tool description.
  </description>
  <endorsement>
    <copyright>
      This should be the tool copyright
      statement.
    </copyright>
    <license>
      This should be the tool license.
    </license>
  </endorsement>
  <wrapper>
    ...
  </wrapper>
  <requirements>
    ...
  </requirements>
</package>
    
```

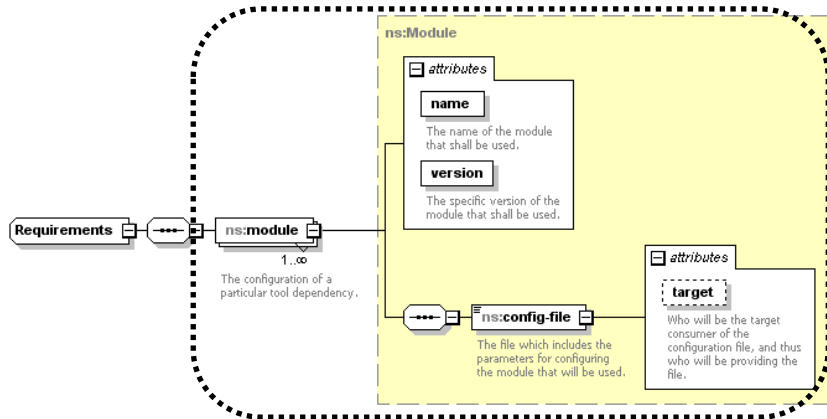

Packaging the Tool Wrapper (III)

Bundle Descriptor (II)



Packaging the Tool Wrapper (IV)

Bundle Descriptor (III)



```

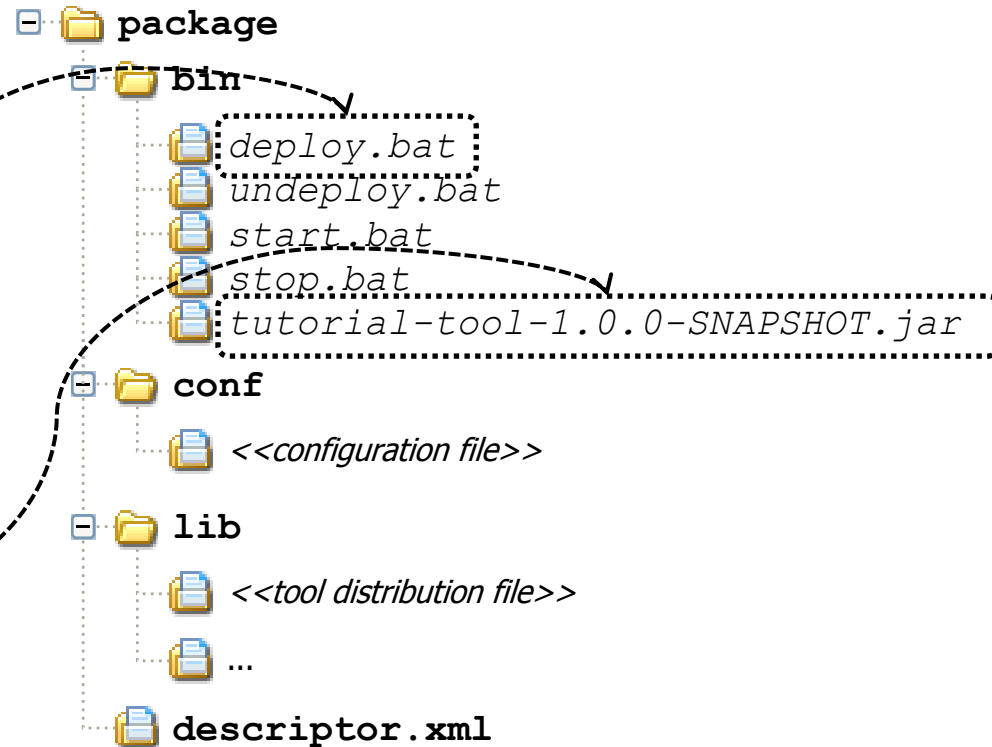
<?xml version="1.0" encoding="UTF-8"?>
<package id="tutorial-tool"
        version="1.0.0-SNAPSHOT">
  <description>...</description>
  <endorsement>
    ...
  </endorsement>
  <wrapper>
    ...
  </wrapper>
  <requirements>
    <module name="mysql" version="5.x">
      <config-file target="platform">
        mysql.properties
      </config-file>
    </module>
    <module name="apache-tomcat" version="6.x">
      <config-file target="wrapper">
        tomcat.properties
      </config-file>
    </module>
  </requirements>
</package>

```

Packaging the Tool Wrapper (V)

Bundle population (I)

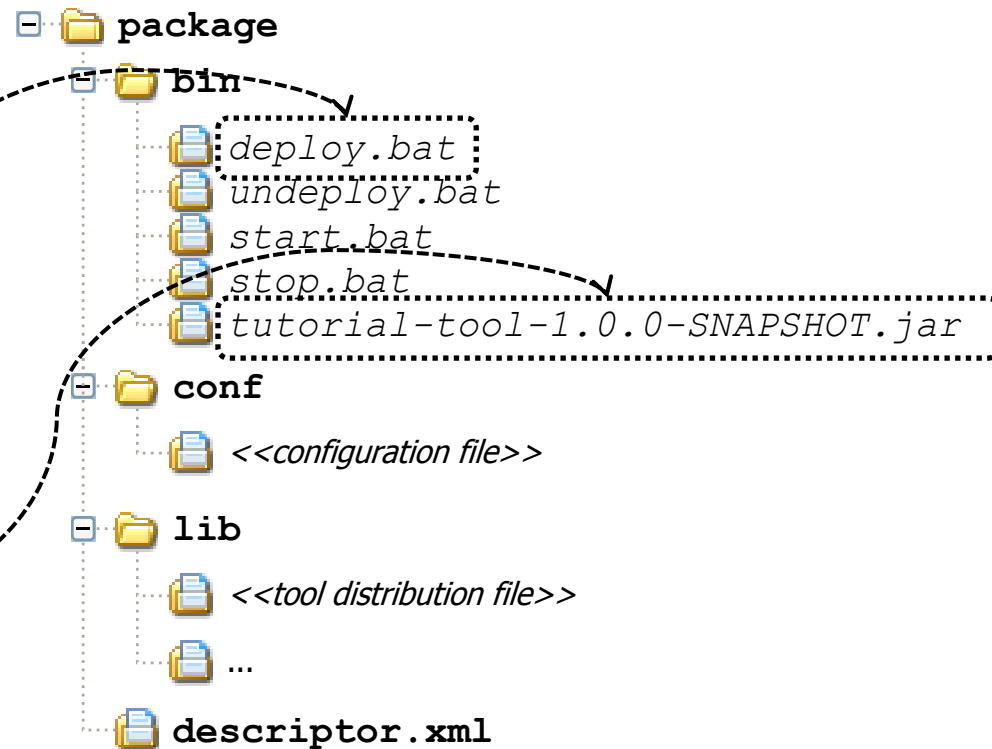
```
<?xml version="1.0" encoding="UTF-8"?>
<package id="tutorial-tool"
  version="1.0.0-SNAPSHOT">
  <description>...</description>
  <endorsement>
  ...
</endorsement>
<wrapper>
  <management>
    <deploy xsi:type="ShellScript">
      <script>deploy.bat</script>
      <error-log>deploy-error.log</error-log>
    </deploy>
    ...
  </management>
  <bridge>
    <class>
      org.project.tool.ExampleToolBridge
    </class>
    <jar>tutorial-tool-1.0.0-SNAPSHOT.jar</jar>
    <dependencies>
      <lib>...</lib>
      ...
    </dependencies>
  </bridge>
</wrapper>
<requirements>
  ...
</requirements>
</package>
```



Packaging the Tool Wrapper (V)

Bundle population (I)

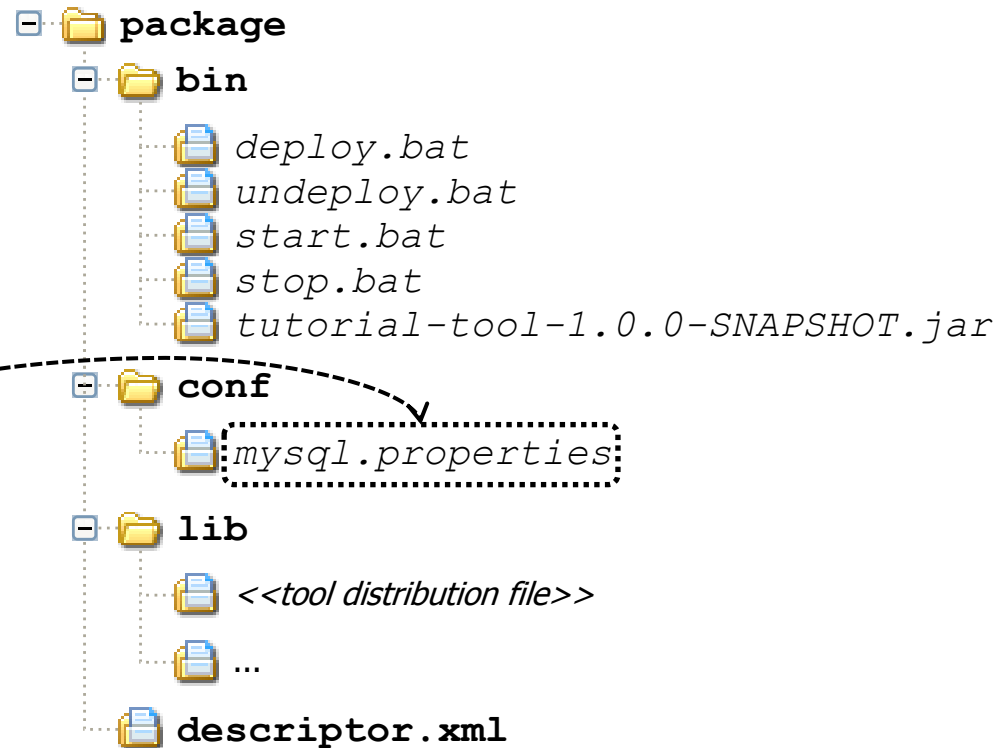
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<?xml version="1.0" encoding="UTF-8"?>
<package id="tutorial-tool"
  version="1.0.0-SNAPSHOT">
  <description>...</description>
  <endorsement>
  ...
</endorsement>
<wrapper>
  <management>
    <deploy xsi:type="ShellScript">
      <script>deploy.bat</script>
      <error-log>deploy-error.log</error-log>
    </deploy>
    ...
  </management>
  <bridge>
    <class>
      org.project.tool.ExampleToolBridge
    </class>
    <jar>tutorial-tool-1.0.0-SNAPSHOT.jar</jar>
    <dependencies>
      <lib>...</lib>
      ...
    </dependencies>
  </bridge>
</wrapper>
<requirements>
  ...
</requirements>
</package>
```



Packaging the Tool Wrapper (VI)

Bundle population (II)

```
<?xml version="1.0" encoding="UTF-8"?>
<package id="tutorial-tool"
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  <description>...</description>
  <endorsement>
    ...
  </endorsement>
  <wrapper>
    ...
  </wrapper>
  <requirements>
    <module name="mysql" version="5.x">
      <config-file target="platform">
        mysql.properties
      </config-file>
    </module>
    <module name="apache-tomcat" version="6.x">
      <config-file target="wrapper">
        tomcat.properties
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    </module>
  </requirements>
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```



**Doubts, comments,
questions??**



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