



Feature Model, Where Art Thou?

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Agenda

- Requirements
- Model
- Building Blocks
- Demo
- Outlook
- Q & A



Requirements

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Why the Feature Model

- Provisioning model, but then better
- Focus on the Architect, Designer
- Requirements at Sling
- Prototype maturing
- ...Karaf, Eclipse, Subsystems, Bnd...



Requirements

- Easily authorable via text file
- 1:1 mapping of File \longleftrightarrow Feature
- Declarative Requirements and Capabilities
- Inheritance
- API Whitelisting
- Extensible format
- Compose an application

[1] <https://github.com/apache/sling-org-apache-sling-feature/blob/master/requirements.md>

Feature Files

- JSON
 - ID
 - Variables
 - Bundles
 - Configurations
 - Capabilities, Requirements
 - Custom Content
 - Can be published in Maven
-
- Tooling and Runtime support in Sling, others can support too



Model

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Features

```
{  
  "#": "A key that starts with a hash is a comment",  
  "id": "org.apache.sling:my.app:feature:optional:1.0",  
  "variables": {  
    "cfgvar": "somedefault",  
    "xyz-ver": "1.2.3"  
  },  
  "framework-properties": {  
    "foo": 1,  
    "org.osgi.framework.storage": "${tempdir}",  
    "org.apache.felix.scr.directory": "launchpad/scr"  
  },  
}
```


Features (cont.)

```
"configurations": {  
  "my.pid": {  
    "foo": 5,  
    "bar": "${cfgvar}",  
  
    "# The tempdir variable is not specified at the variables section":  
    "# It needs to be provided at launch, otherwise the launch will stop.",  
  
    "tempdir": "${tempdir}",  
  
    "number:Integer": 7  
  },  
  "my.factory.pid~name": {  
    "a.value": "yeah"  
  }  
}
```

Features (cont.)

```
"bundles": [  
  {  
    "id": "org.apache.sling:security-server:2.2.0",  
    "#": "This is the relative start order inside the feature",  
    "start-order": 5  
  },  
  {  
    "id": "org.apache.sling:another-bundle:2.1.0",  
    "#": "OSGi start level is also supported",  
    "start-level": 20,  
    "configurations": {  
      "#": "This configuration only gets applied when this bundle is resolved",  
      "org.apache.sling.somepid": {  
        "dbuser": "${dbuser}",  
        "dbpass": "${dbpass}"  
      }  
    }  
  }  
],
```


Features (cont.)

```
"includes":  
  {  
    "id": "org.apache.sling:sling:9",  
    "removals": {  
      "configurations": [],  
      "bundles": [],  
      "framework-properties": []  
    }  
  }  
}
```

Features (cont.)

```
"requirements": [  
  {  
    "namespace": "osgi.contract",  
    "directives": {  
      "filter": "(&(osgi.contract=JavaServlet)(version=3.1))"  
    }  
  },  
],  
"capabilities": [  
  {  
    "namespace": "osgi.implementation",  
    "attributes": {  
      "osgi.implementation": "osgi.http",  
      "version:Version": "1.1"  
    },  
    "directives": {  
      "uses": "javax.servlet,javax.servlet.http,org.osgi.service.http.context"  
    }  
  },  
],
```


API Whitelisting with Regions

OSGi Framework



Custom Metadata

- Features can contain custom metadata
 - Text, JSON, or Artifact (IDs)
- Processed by plugins on feature merge and execution
 - Default provided for repointit and content-packages

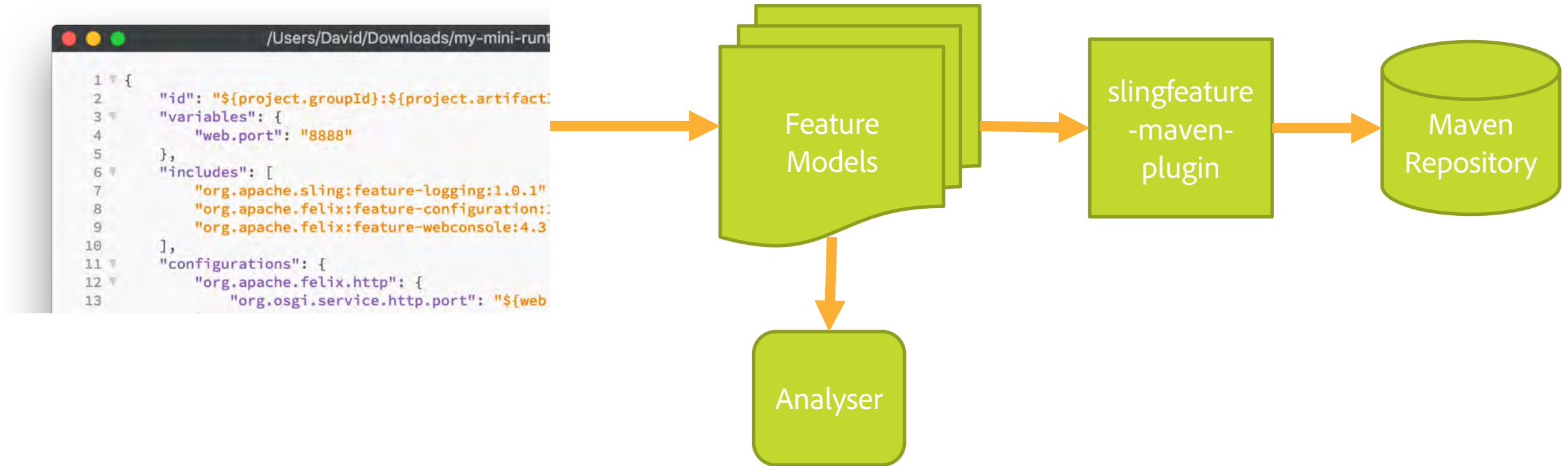
```
"repointit:JSON|true": [  
    "create path (sling:Folder) /libs",  
    "create path (sling:Folder) /apps"  
]  
,  
"content-packages:ARTIFACTS|true": [  
    "org.apache.sling.org.foo.bar:zip:0.0.34"  
]
```



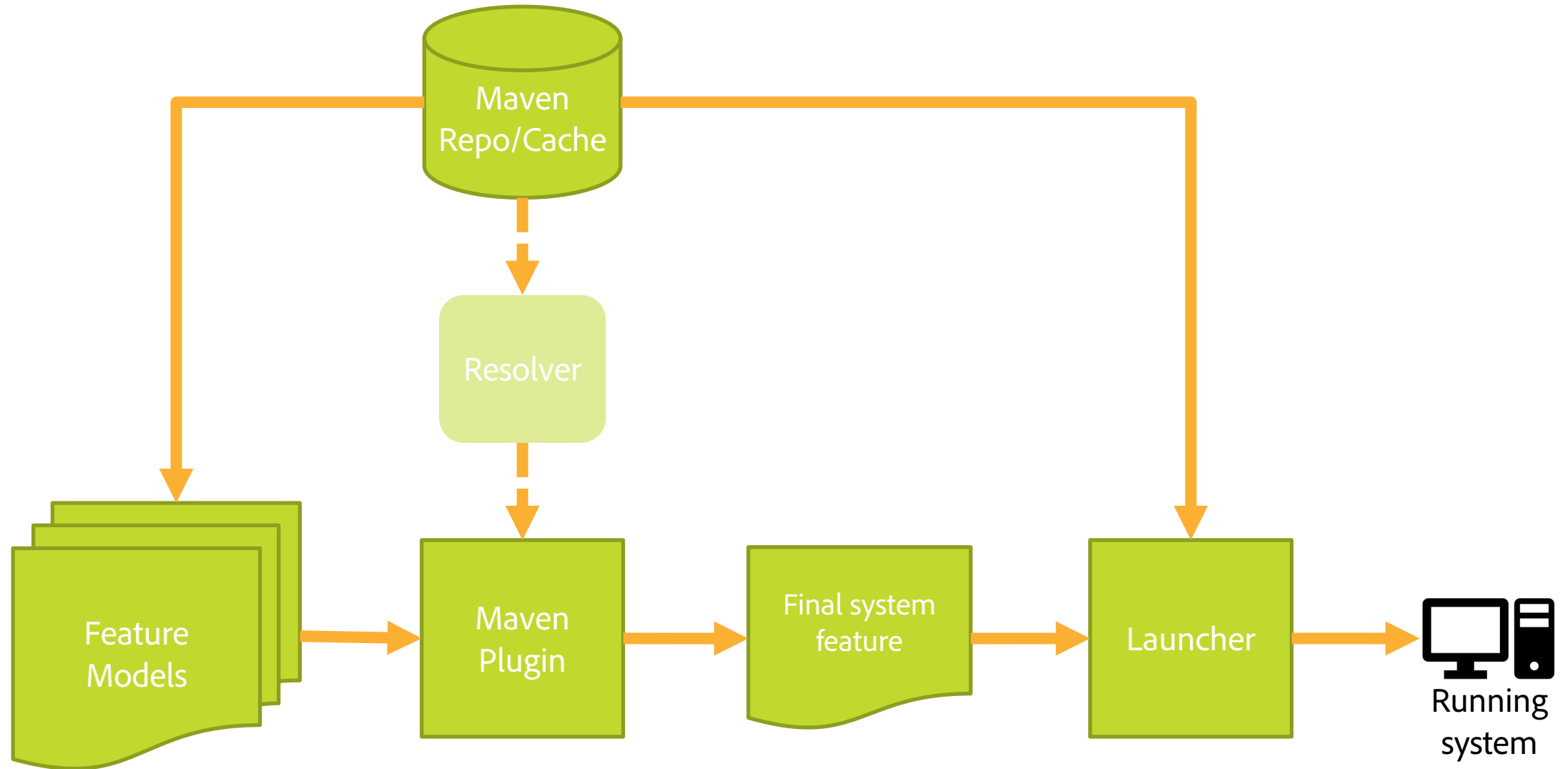

Building Blocks

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Develop and publish feature models



Create a Running System





Building Blocks Applied

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Sling Feature Maven Plugin

- Attach features in src/main/features as “.slingfeature”
- org.apache.sling:slingfeature-maven-plugin:0.2.0-SNAPSHOT
 - **attach-features**
 - Attach feature files found in the project to the projects produced artifacts. This includes features found in src/main/features as well as features produce with the aggregate-features goal.
 - **generate-resources**
 - This goal processes feature files to substitute Maven variable placeholders in feature files such as \${project.groupId}, \${project.artifactId} and \${project.version}
 - **aggregate-features**
 - Produce an aggregated feature from a list of features (a.k.a composition)

Composition

- Based on include and excludes to enable selection of different feature subsets
- Handlers can be provided to implement the logic of extension

```
<plugin>
  <groupId>org.apache.sling</groupId>
  <artifactId>slingfeature-maven-plugin</artifactId>
  <version>0.2.0-SNAPSHOT</version>
  <executions>
    ...
  </executions>
  <dependencies>
    <dependency>
      <groupId>org.apache.sling</groupId>
      <artifactId>my-feature-extension-handler</artifactId>
      <version>1.0.0</version>
    </dependency>
  </dependencies>
</plugin>
```

```
<plugin>
  <groupId>org.apache.sling</groupId>
  <artifactId>slingfeature-maven-plugin</artifactId>
  <version>0.2.0-SNAPSHOT</version>
  <executions>
    <execution>
      <id>merge-features</id>
      <phase>generate-resources</phase>
      <goals>
        <goal>aggregate-features</goal>
      </goals>
      <configuration>
        <classifier>my-aggregated-feature</classifier>
        <features>
          <directory>
            <location>${basedir}/src/main/my-features</location>
            <includes>*.json</includes>
            <excludes>exclude-me.json</excludes>
            <excludes>exclude-me-too.json</excludes>
          </directory>
          <artifact>
            <groupId>org.apache.sling</groupId>
            <artifactId>org.apache.sling.myfeatures</artifactId>
            <version>1.2.3</version>
            <type>slingfeature</type>
            <classifier>someclassifier</classifier>
          </artifact>
        </features>
      </configuration>
    </execution>
  </executions>
</plugin>
```

Launcher

Usage:

- D <arg> Set framework properties
- dao <arg> Only download required artifacts into directory
- f <arg> Set feature files
- fv <arg> Set felix framework version
- p <arg> Set home dir
- u <arg> Set repository url
- V <arg> Set variable value

```
> java -jar org.apache.sling.feature.launcher-0.1.0-SNAPSHOT.jar -f mvn:org.apache.sling/my.feature/1.0.0
```

Handlers for extension merging as well as extension execution as ServiceLoader services via classpath



Demo

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Outlook + Summary

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Outlook

- API Whitelisting
- Resolver
- Minimal Docker Containers
- OSGi Specification process, Enterprise Expert Group RFP 188 (<https://github.com/osgi/design>)



Q&A

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Acknowledgements

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