MELD OSGI BUNDLES WITH JAVA MODULES

OSGI RFP 190

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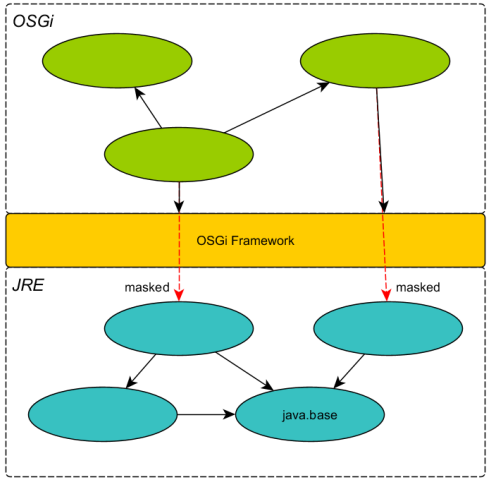
MOTIVATION

Example: My bundle requires AWT—what is the minimum Java module set?



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OVERVIEW

This talk presents RFP 190: Resource Encoding of Java Modules

1. Application Domain and Problem Statement
2. Use Cases
3. Requirements
4. Proof of Concept
5. Open Ends

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PROBLEM STATEMENT

- We want self-contained Java applications with minimal footprint
- For OSGi, we can resolve the set of required bundles
- But JRE can easily dominate the overall size
- With JPMS, we can strip down to the modules required

- How to determine which ones are required?
- R7 provides the flat list of all boot layer packages
- Removing modules from the boot layer is a trial and error process
- We need the modules as such to be visible to tools and runtime

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USE CASES

- Build a compact Docker image
- Build a self-contained, no-installation tool
- Analyze JRE footprint, bundle by bundle
- Introspect JRE at runtime
- Create hybrid app of OSGi bundles and JPMS modules

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GENERAL REQUIREMENTS

- Resolver can still be used to build consistent set of modules and bundles
  - Should not require a new tool or component
- Bundles are not forced to explicitly reference modules
  - Just as we don’t want bundles to explicitly reference bundles
- A bundle may function as a module
  - OSGi framework as a special case
- Includes third-party modules
- Best-effort JPMS validation
  - Rejects duplicate and (optionally) conflicting and cyclic modules

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RESOLVING DEPENDENCIES

- Module identity and version
- Bundle package imports to module exports
- Modules to modules
- (Optional) Module services as resources
- (Optional) Requirements to module services

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ENHANCING METADATA

- Add version range requirements for modules
- Use bundle annotations for additional JPMS module dependencies
- Replace org.osgi.framework.system.packages with module resource representations

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PROOF OF CONCEPT

- Modeling
  - Module as special kind of bundle
  - Require module as require-bundle
  - Module exports as export-package
  - Module provides as service-loader capability
  - Module uses as service-loader requirement
- Extracts of actual metadata
- Run resolver on “awt” example

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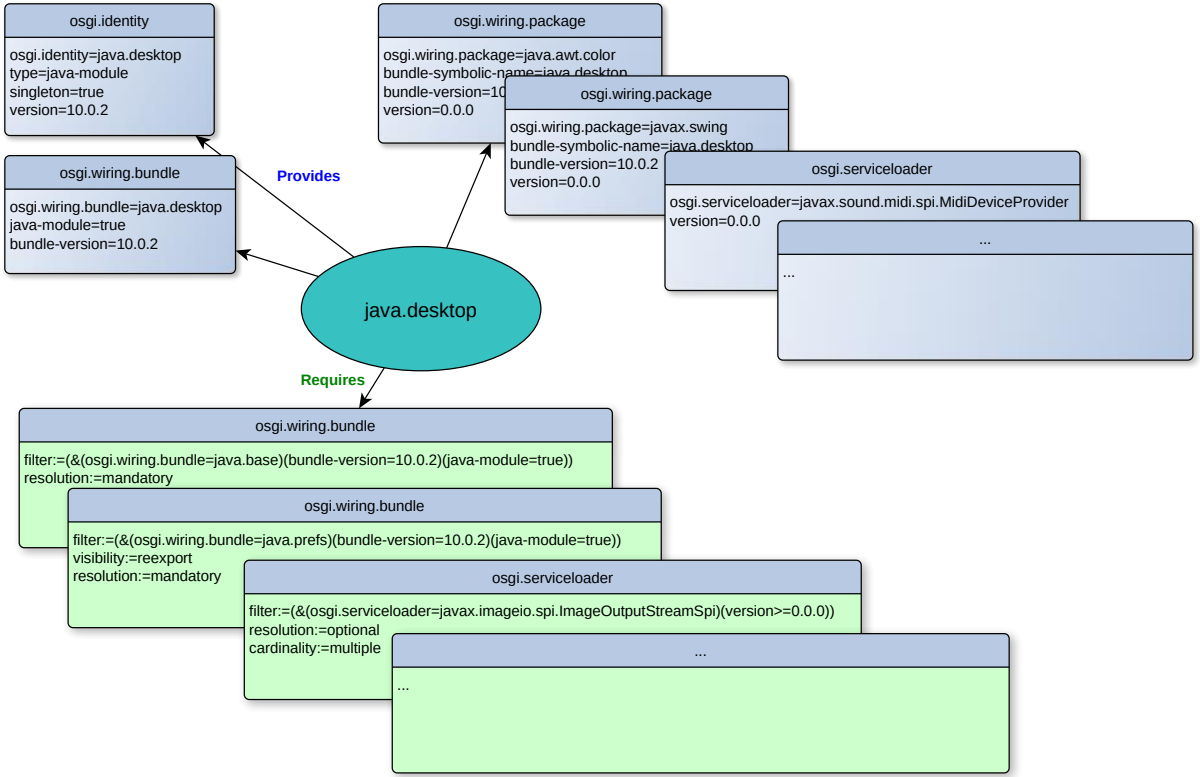
MODULE METADATA



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DEMO TEST

- org.example.awtclient 1.0.0
- osgi.wiring.package; filter:=(&(osgi.wiring.package=java.awt)(version>=0.0.0))

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THANK YOU

- Feedback welcome on https://github.com/osgi/design/blob/master/rfps/rfp-0190-Resource%20encoding%20for%20Java%20Modules.odt

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