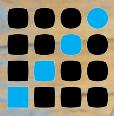


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APACHE SLING & FRIENDS TECH MEETUP
10-12 SEPTEMBER 2018

Apache Sling Scripting Reloaded

Radu Cotescu, Karl Pauls – Adobe



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Who
are we?



Who are we: Mr. Scripting



- Computer Scientist @ Adobe, Basel, Switzerland
- Member of the Apache Sling PMC
- Main contributor for the HTL implementation
- Initiator of the Apache Sling Validation Framework (adaptTo 2014)

Who are we: Mr. Classloader

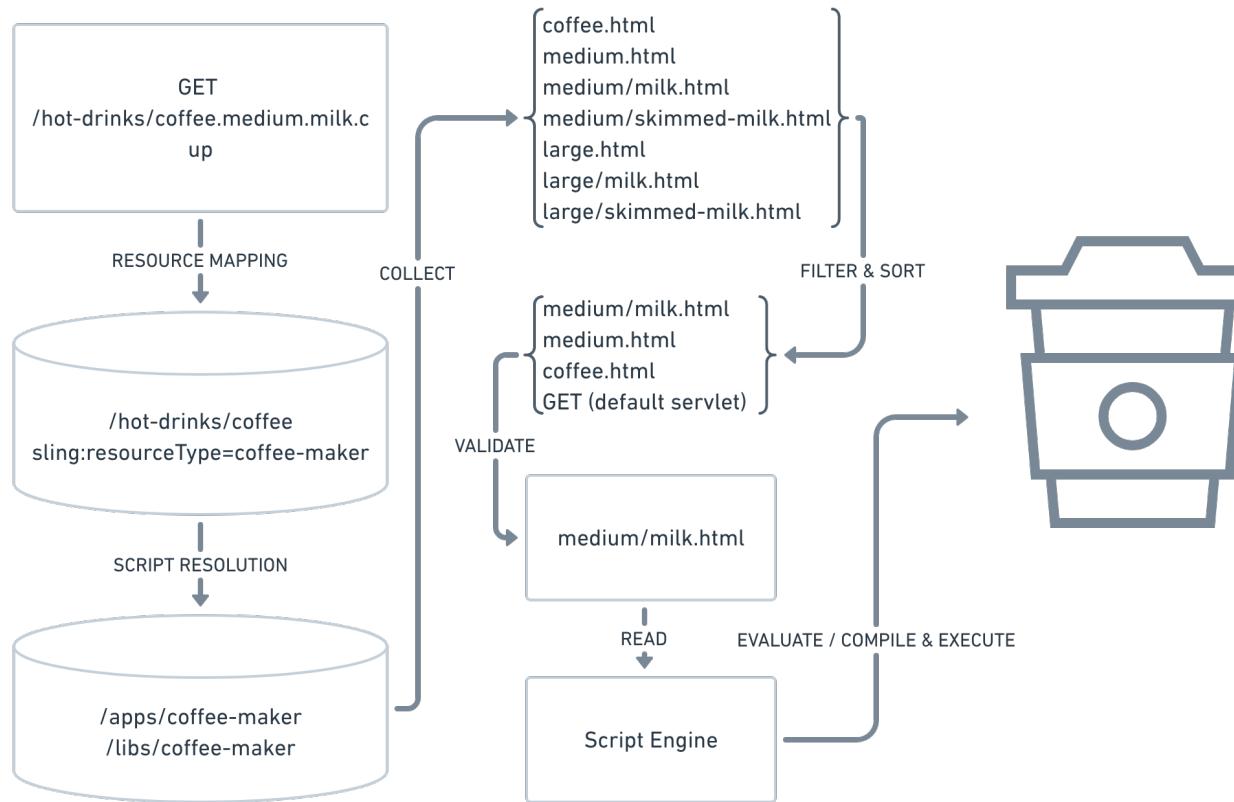


- Computer Scientist @ Adobe, Basel, Switzerland
- Member of the Apache Software Foundation
- PMC Member Apache Felix and Sling (VP Apache Felix)
- Co-Author OSGi in Action



Scripting

A simplified view





Versioning and dependencies

- There is no standard way of defining either.
- Adobe's Core Components use resource type versioning by path conventions.
- Dependencies can only be checked at runtime (but not enforced).
- What happens if your evil colleagues delete a component you were delegating to? Or worse, if they change the whole markup?

Performance



- Each script requires two trips to the persistence layer when first compiled, only to read the script.
- Sling needs to maintain some caches to keep things snappy.



Performance

“There are only two hard things in Computer Science: cache invalidation and naming things.” -- Phil Karlton

 **Leon Bambrick**
@secretGeek

There are 2 hard problems in computer science: cache invalidation, naming things, and off-by-1 errors.

4:20 PM - Jan 1, 2010

721 likes 1,142 people are talking about this

 **Mathias Verraes**
@mathiasverraes

There are only two hard problems in distributed systems: 2. Exactly-once delivery 1. Guaranteed order of messages 2. Exactly-once delivery

8:40 PM - Aug 14, 2015

5,356 likes 7,186 people are talking about this

 **Phillip Bowden**
@pbowden

there's two hard problems in computer science: we only have one joke and it's not funny.

10:45 PM - May 20, 2014

1,193 likes 982 people are talking about this

Reality check



1. What are scripts actually: content or code?
2. Are scripts authored or developed?
3. Can scripts be used freely or do they have constraints?



Reality check

If scripts are **code**, why do we treat them differently?

Reality check

```
package javax.script;
```

```
import java.util.Map;
```

```
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```

```
/* Extended by classes that store results of compilations... State
```

```
/* might be stored in the form of Java classes, Java class files or scripting
```

```
/* language opcodes... The script may be executed repeatedly
```

```
without reparsing.
```

Code:

```
/* Each <code>CompiledScript</code> is associated with a <code>ScriptEngine</code> -- A call to an <code>eval</code>
 * method of the <code>CompiledScript</code> causes the execution of the script by the
 * <code>ScriptEngine</code>... Changes in the state of the <code>ScriptEngine</code> caused by execution
 * of the <code>CompiledScript</code> may visible during subsequent executions of scripts by the engine.
```

```
/*
```

```
@authoredBy("Rafael M. G. de Souza")
```

```
* @since 1.6
```

```
*/
```

```
public abstract Object eval(Map<String, Object> context)
```

```
/* Execute the programmatic in this code fragment into <code>Object</code> object
 * @param context A <code>ScriptContext</code> that is used in the same way as
 * the <code>ScriptEngine</code> passed to the <code>eval</code> methods of
 * <code>ScriptEngine</code>.
 * @return The value returned by the script execution, if any... Should return <code>null</code>
 * if no value is returned by the script execution.
```

```
*/
```

```
/* @throws ScriptException if an error occurs.
```

```
/* @throws NullPointerException if context is null.
```

```
*/
```

```
public abstract Object eval(ScriptContext context) throws ScriptException;
```



Apache Sling Scripting Reloaded



Apache Sling Scripting Reloaded

Core principles:

1. pack scripts into OSGi bundles
2. define the resource types as versioned capabilities, with versioned requirements (Java APIs, other resource types to which scripts delegate or which scripts extend)
3. allow the platform to do what it's made to: wire things

Apache Sling Scripting Reloaded

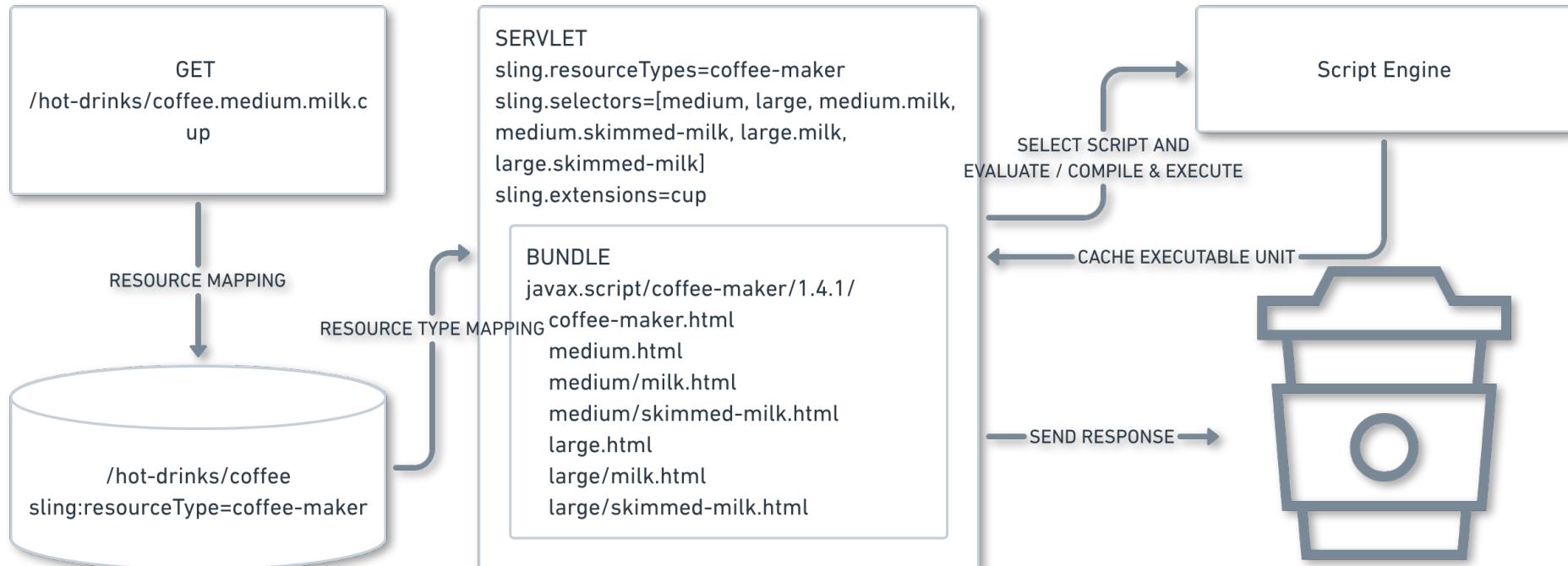
Capability - Describing a feature or function of the Resource when installed in the Environment. A capability has attributes and directives.

Requirement - An assertion on the availability of a capability in the Environment. A requirement has attributes and directives. The filter directive contains the filter to assert the attributes of the capability in the same Namespace.

<https://osgi.org/specification/osgi.core/7.0.0/framework.module.html#framework.module.dependencies>

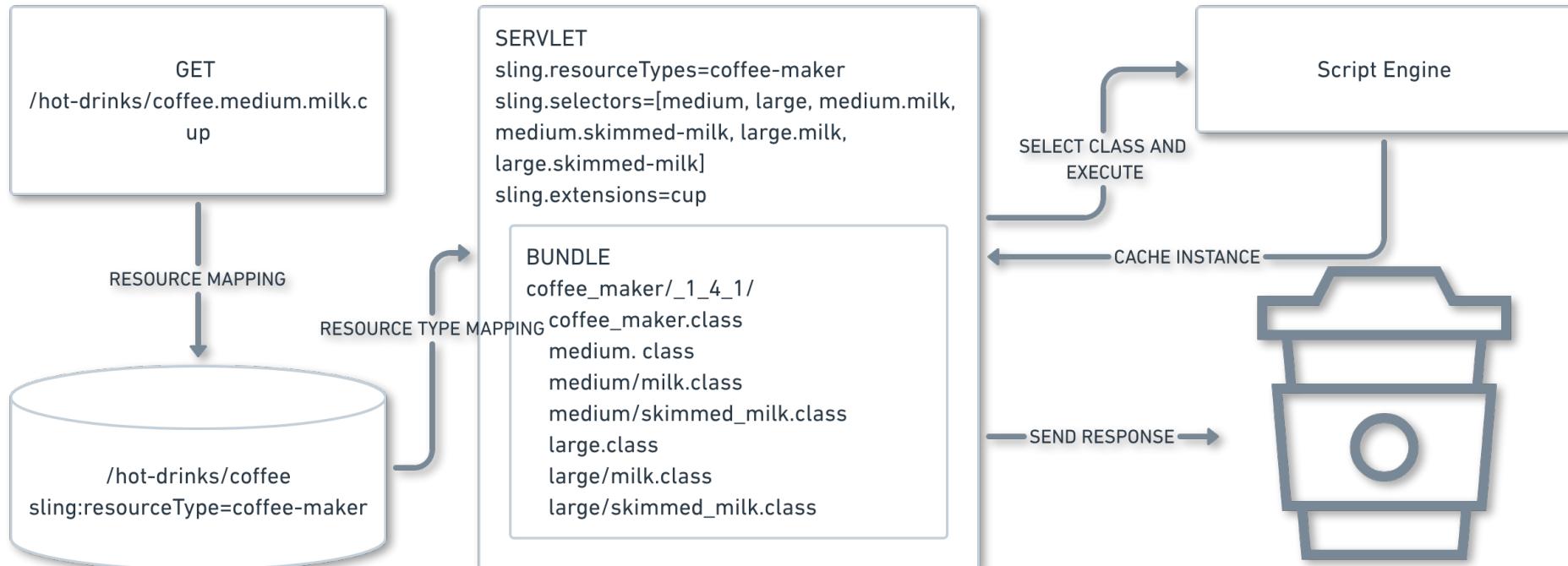
What's different?

Option 1: scripts packed as bundle entries



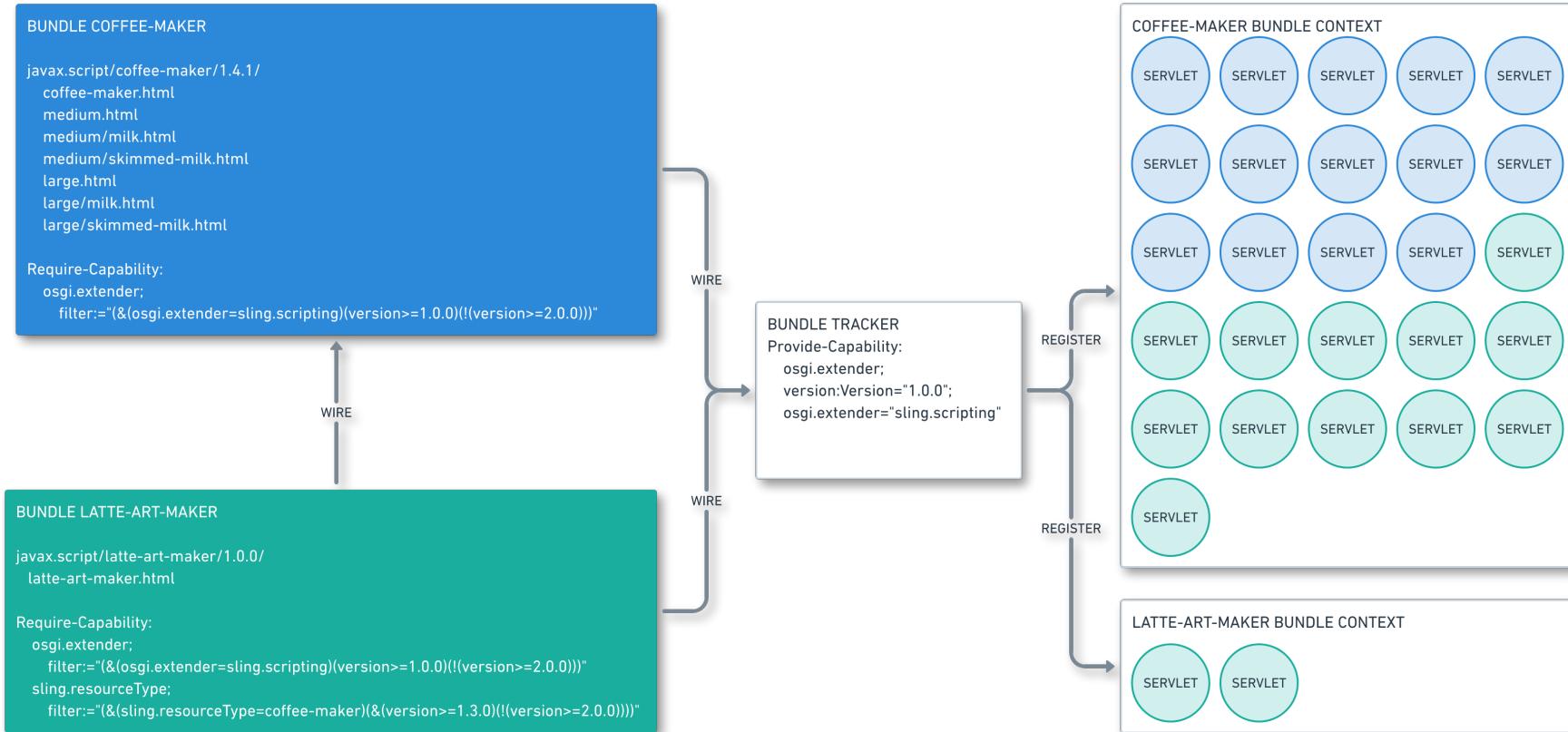
What's different?

Option 2: precompiled scripts





How?





Sure, but how?

1 Provide-Capability / Script -> 1 Servlet / Script

Provide-Capability

```
sling.resourceType="latte-art-maker";  
sling.servlet.methods:List<String>="GET";  
version:Version="1.0.0"
```



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1. New add-on module to which bundles that provide scripts have to be wired explicitly
2. Reuses the already established mechanisms for registering servlets in Apache Sling
3. Allows to build more light-weight instances that can be thrown into production with very little warm-up, when using precompiled scripts (10x faster than scripts compiled from the repository for the 1st request)



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4. Provides the mechanism for deploying truly versionable scripts, with explicit dependencies, by relying on the OSGi framework
5. Removes the need of a separate ScriptCache
6. Removes additional pressure from the persistence layer
7. Simplifies instance and application upgrades
8. Maven plugin for generating requirements and capabilities



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Demo*

*or how we can embarrass ourselves if things don't work



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Future plans:

1. Enhance development workflow, similar to what script developers have now
2. Add the module to the Apache Sling Starter Application and maybe convert one of the sample apps to use bundled precompiled scripts



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Q&A

Resources

- You can find our code at: <https://github.com/apache/sling-whiteboard/tree/master/scripting-resolver>.
- <https://sling.apache.org/documentation/the-sling-engine/url-to-script-resolution.html>
- <https://sling.apache.org/documentation/the-sling-engine/servlets.html>
- Our diagrams were designed with <https://whimsical.co/flowcharts/>
- Assets licensed from <https://stock.adobe.com/>