Server-side OSGi with Apache Sling

Felix Meschberger

Day Management AG

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About Felix Meschberger

> Senior Developer, Day Management AG

> fmeschbe@day.com

> http://blog.meschberger.ch

> VP Apache Sling

> Apache Felix

> Apache Jackrabbit

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Agenda

> **Apache Sling**

> Why OSGi ?

> What parts of OSGi ?
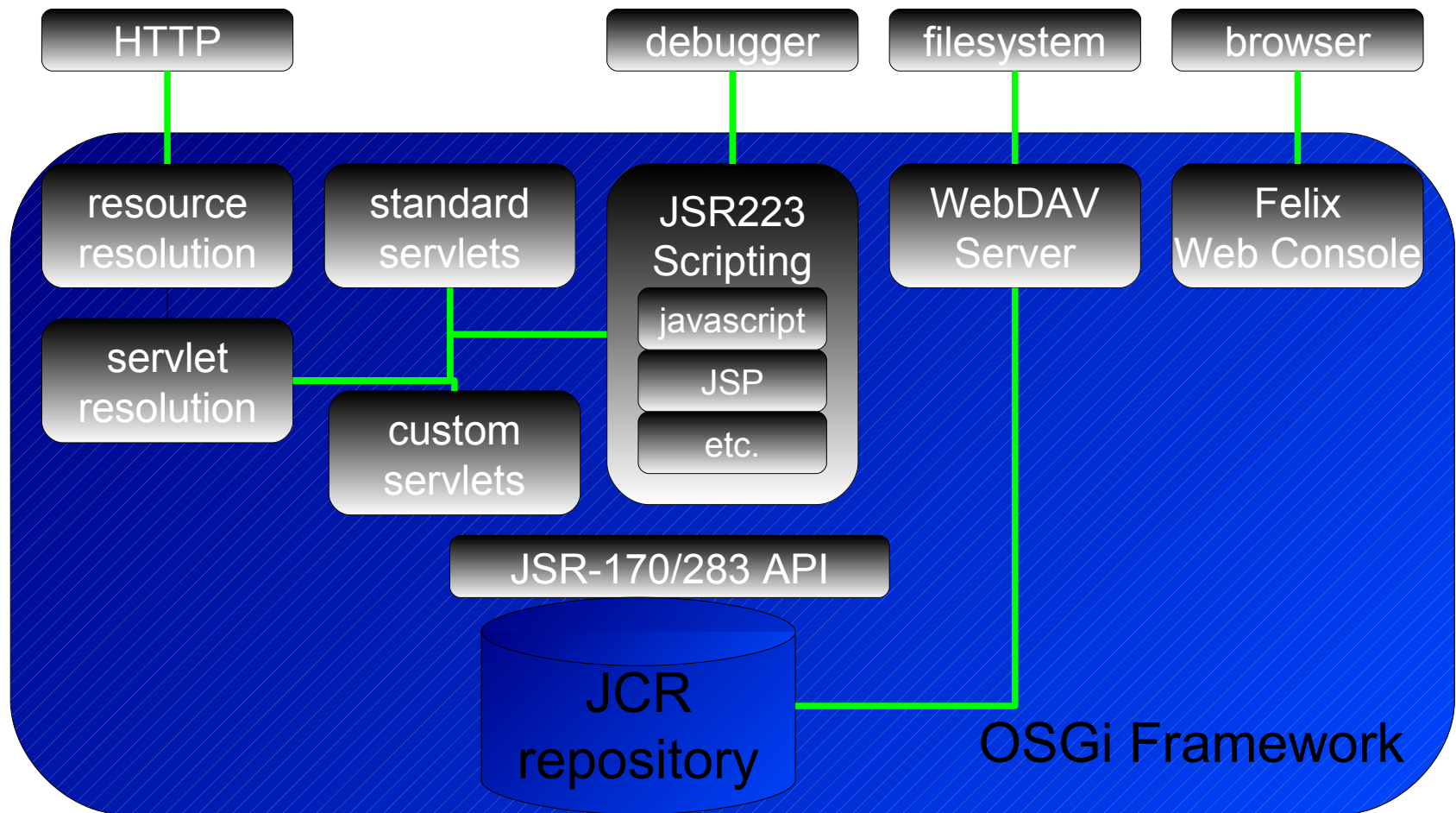
> Advantages and Problems

> Demo

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Apache Sling

> REST based web framework

> Content-driven (JCR, JSR-170/283)

> Powered by OSGi

> Scripting inside (Java Scripting, JSR-223)

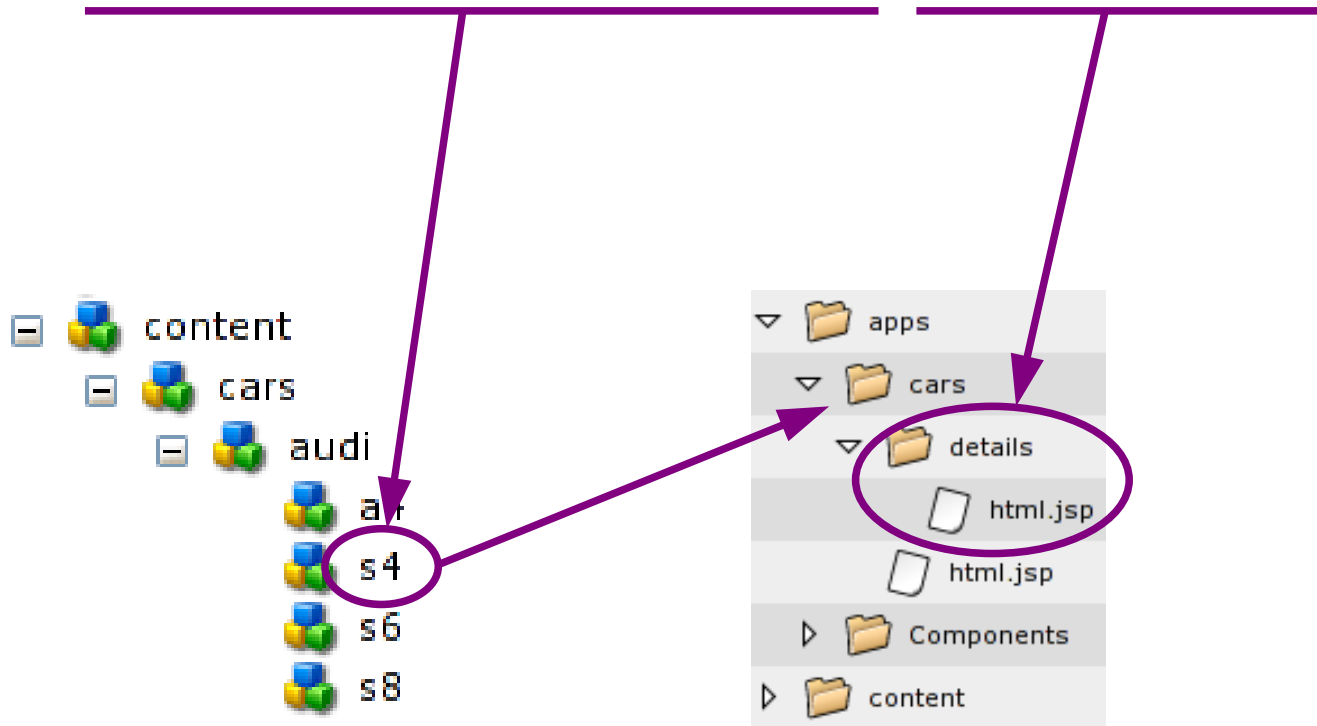> Apache Open Source Projekt (http://sling.apache.org)

Sling Architecture

Sling URL Decomposition

/content/cars/audi/s4.details.html

Sling is RESTful

> URLs map to Resources
  – Items in the JCR Repository
  – Files in the Filesystem
  – Content of Bundles
> HTTP Methods map to Script Names
  – e.g. cars/POST.jsp
  – GET for reading only
  – Dilution: POST allowed for any changes (Create, Update, Delete)
> Content Negotiation
  – Request URL extension
  – Accept request header currently ignored

Sling is Object Oriented Web

> Resources are the Object

> Resources maintained in Resource Tree

> Resources accessed by path in the Resource Tree

> Request Method, Extension and Selectors define „Method" to call

> Resources are typed:

  – Resource Type

  – Resource Super Type

  – „Root Type": sling/servlet/default

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Functionality Out-Of-the-Box

> Default Implementations for GET
  – Plain Text
  – JSON
  – XML

> Default Implementation for POST
  – Create, Update, Modify content
  – Extensible

Sling in Action

> Day Communiqué 5 (http://www.day.com/cq5)

> Sakai 3 (http://www.sakaiproject.org)

> Tuberculosis Project

> Idium Web (http://www.idium.no/no/idium_web)

http://cwiki.apache.org/SLING/who-is-using-sling-.html

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> **Why OSGi ?**

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Requirements for Sling

> Modular and Extensible System
> Declared Dependencies
> Intermodule Communication
> Lightweight Framework

Variants

> Do It Yourself
  - Well, don't we have other problems to solve ? ;-)
> Spring (before Spring DM)
  - First Favourite due to declarative nature
  - Systems not really dynamic
  - Static application descriptor
> OSGi
  - Perfect match to all requirements

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OSGi Elements Used

> Framework

> Configuration Admin Service

> Meta Type Service

> Declarative Services

> Event Admin Service

> Log Service

> HTTP Service

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Launching Sling

> Standalone or Web Application

> Small Footprint Launcher (~30K)

> Framework in its own ClassLoader

> Restart of Framework

> Update of Framework

> Application is Container Agnostic

- Interaction only within the OSGi Framework

- Http Service implementation is the key

Configuration Admin Service

> Provides an API to manage Configurations

> Provides functionality to pass configuration to consumers

> Hides persistance problems

> Uses in Sling

   – Web Console configuraition editor

   – JCR Install updates through repository

Metatype Service

> Descriptor to generate GUI for Configuration Management

> Use in Sling

- Descriptor generated by Maven SCR Plugin
- Configuration Admin GUI in Web Console supports Metatype Service descriptors

Declarative Services

> Replace boiler-plate code by descriptors
  - Service Registration
  - Configuration support
  - Service Access
> Dependency Injection
> One of many OSGi Core Extensions:
  - Apache Felix Dependency Manager (Predecessor)
  - Apache Felix iPOJO (Successor)
  - Blueprint (OSGi Compendium Specification R 4.2)
  - Peaberry

Event Admin Service

> Whiteboard Pattern oriented eventing

> Support for synchronous and asynchronous events

> Uses in Sling

    – Base Mechnism to implement Job Scheduling

    – Extended to allow for event distribution in Cluster

Log Service

> Sling's own implementation

> Based on SLF4J API

> Provides

   – OSGi LogService

   – SLF4J Logging

   – Commons Logging

   – Log4F Logging

> Dynamically Configurable (by Configuration Admin Service)

> Log Levels and Log Format per Logger

> Multiple Log Files with size and time rotation

Http Service

> Registering Servlets (and Resources) dynamically

> Real Implementation
  – Includes Servlet Container

> Bridged Implementation
  – Used for Web Application Launcher
  – Bridges Servlet Container to OSGi

> Implementation transparent to registered Servlets

Extensions

> Apache Felix Web Console

- Extensible Web Based Management
- Jquery UI Based (as of Version 3.0)

> Maven SCR Plugin

- Generates
  ➜ Declarative Services Descriptors
  ➜ Metatype Service Descriptors
- Supports
  ➜ JavaDoc Tags (@scr.component, etc.)
  ➜ Java 5 Annotations (@Component, etc.)

> JCR Install

- Deploy Bundles via JCR Repository
- Deploy Configuration Admin configurations via JCR Repository

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Advantages

> Declared Dependencies

> Better Isolution through explicit exports and private classes

> Classloader Isolation

> Extensibility built-in, not built-atop

> Dynamism

Problems

> Steep Learning Curve
  - OSGi Specifications Themselves
  - Modularization vs. Monolithic

> Uptime vs. Startup Time

> Legacy Specs und ClassLoader
  - JDBC, XML, etc.

> Scripting und ClassLoader
  - BundleClassLoaderProxy approach

> Application Packaging
  - CRX Content Packages (Day proprietary)
  - Karaf features (Sling provides feature.xml)

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> **Demo**

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Demo: 15 Minutes

> Commandline launch

> Web Console

> Show WebDAV

> Dummy Content

> Create Scripts and have it render

    – ESP

    – Groovy

    – JSP

Links

> Apache Sling – The JCR (Web) Application Framework
  http://sling.apache.org

> Apache Felix – OSGi Framework and Compendium Service implementations
  http://felix.apache.org

> Apache Jackrabbit – The JCR (JSR-170/283) Reference Implementation
  http://jackrabbit.apache.org

> Day Developer's Home
  http://dev.day.com

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Questions

Thank you very much !

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Felix Meschberger

Day Management AG

http://www.day.com

fmeschbe@day.com