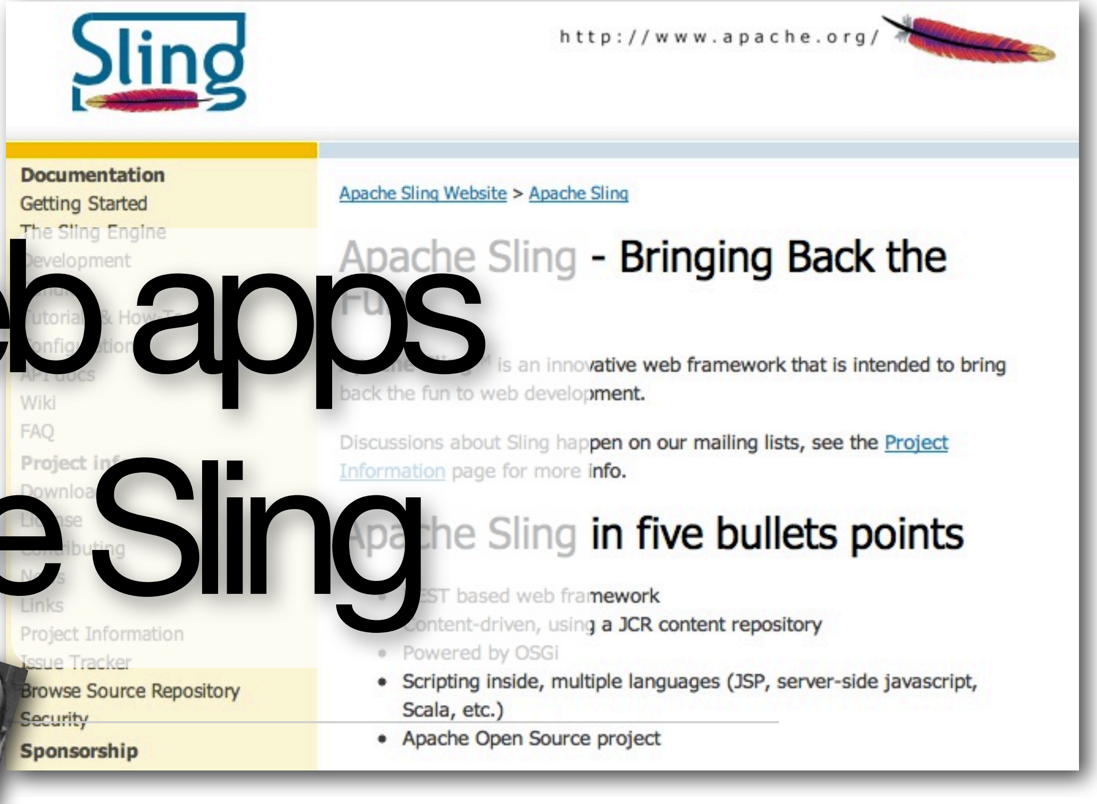
RESTful web apps with Apache Sling



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Development
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Apache Sling Website > Apache Sling

Apache Sling - Bringing Back the Fun

"Apache Sling" is an innovative web framework that is intended to bring back the fun to web development.

Discussions about Sling happen on our mailing lists, see the Project Information page for more info.

Apache Sling in five bullets points

- REST based web framework
- Content-driven, using a JCR content repository
- Powered by OSGi
- Scripting inside, multiple languages (JSP, server-side javascript, Scala, etc.)
- Apache Open Source project

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Lausanne, May 2013

slides revision: 2013-05-30

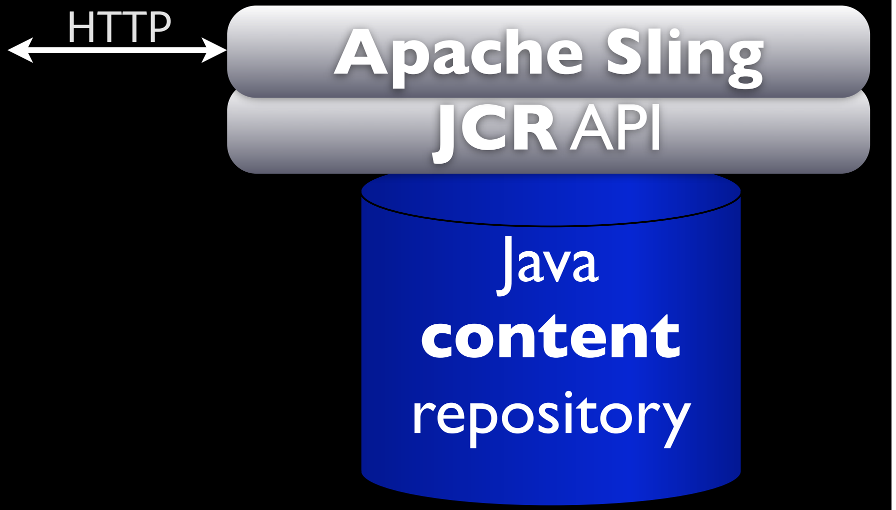
everything is

content

Everything is content!

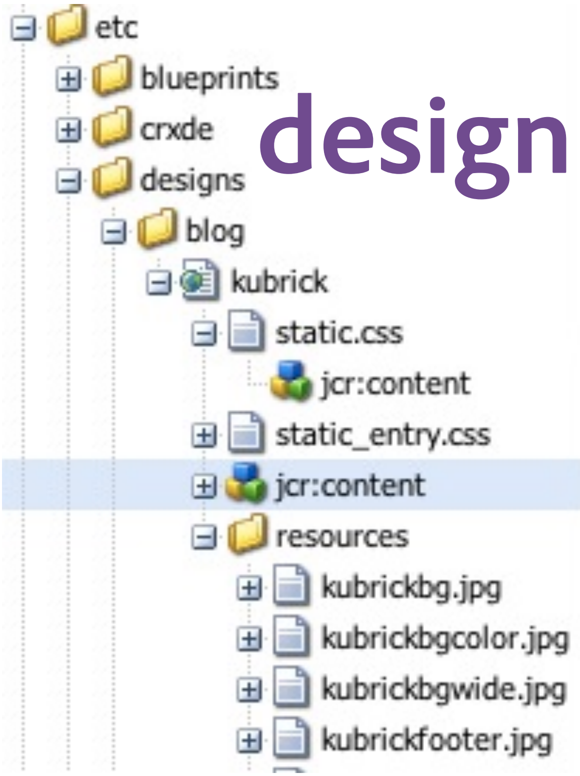
Any app that requires more than *curl* as a *minimal* client should have a good reason.

Let's build an intelligent Web server.



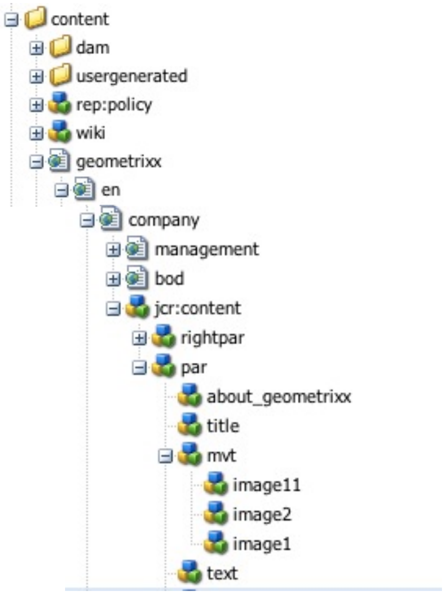
Content?

everything



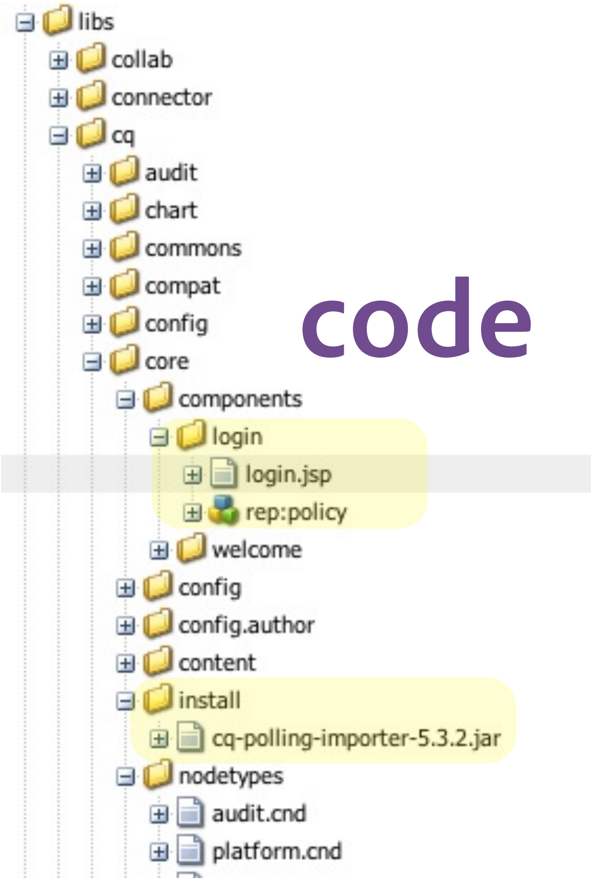
```
etc
  blueprints
  crxde
  designs
    blog
      kubrick
        static.css
          jcr:content
        static_entry.css
        jcr:content
        resources
          kubrickbg.jpg
          kubrickbgcolor.jpg
          kubrickbgwide.jpg
          kubrickfooter.jpg
```

design



```
content
  dam
  usergenerated
  rep:policy
  wiki
  geometrixx
    en
      company
        management
        bod
        jcr:content
          rightpar
          par
            about_geometrixx
            title
            mvt
              image11
              image2
              image1
            text
```

website

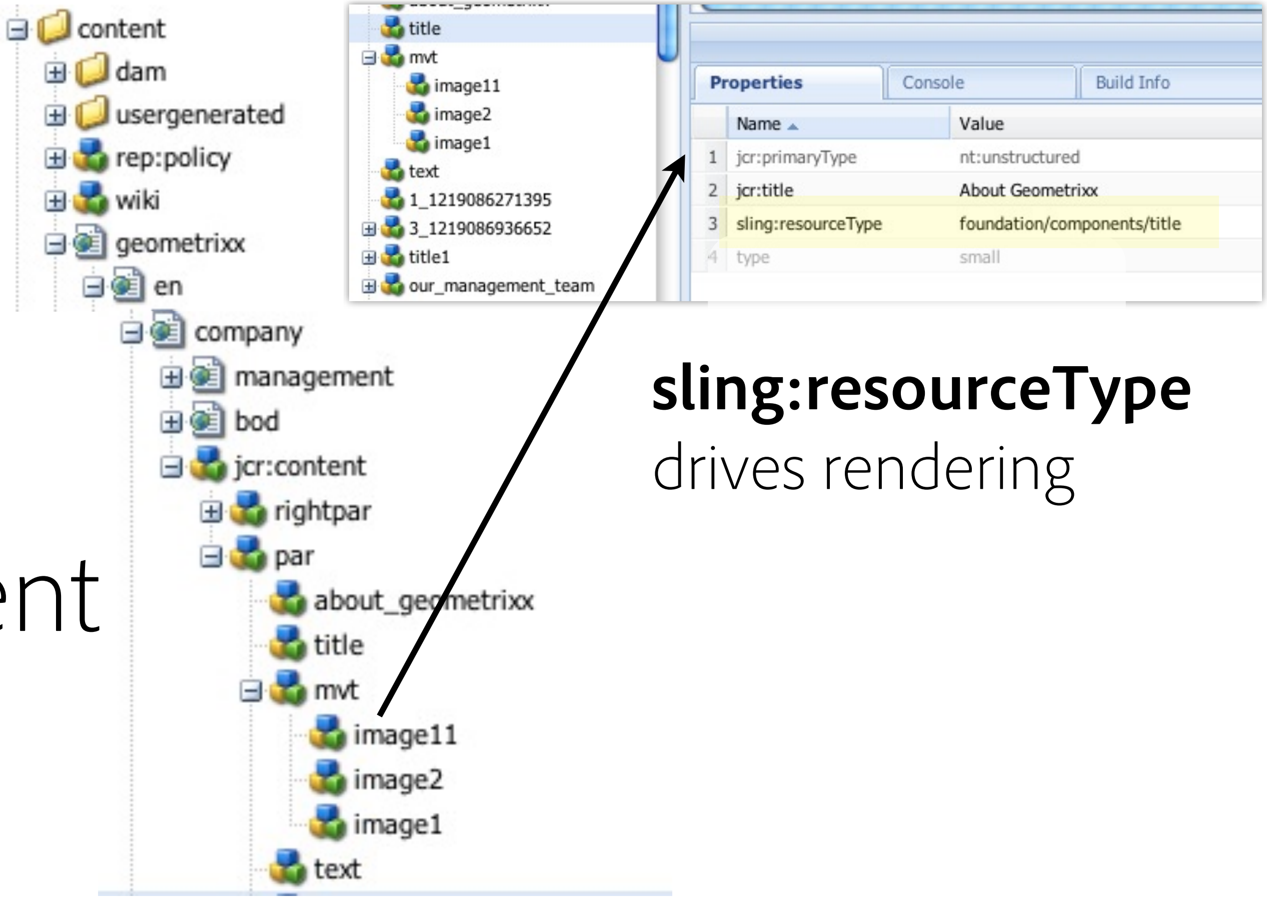


```
libs
  collab
  connector
  cq
    audit
    chart
    commons
    compat
    config
    core
      components
        login
          login.jsp
          rep:policy
        welcome
      config
      config.author
      content
      install
        cq-polling-importer-5.3.2.jar
      nodetypes
        audit.cnd
        platform.cnd
```

code

Website Content

/content
/geometrixx
/en
/company
/jcr:content
/par
/title

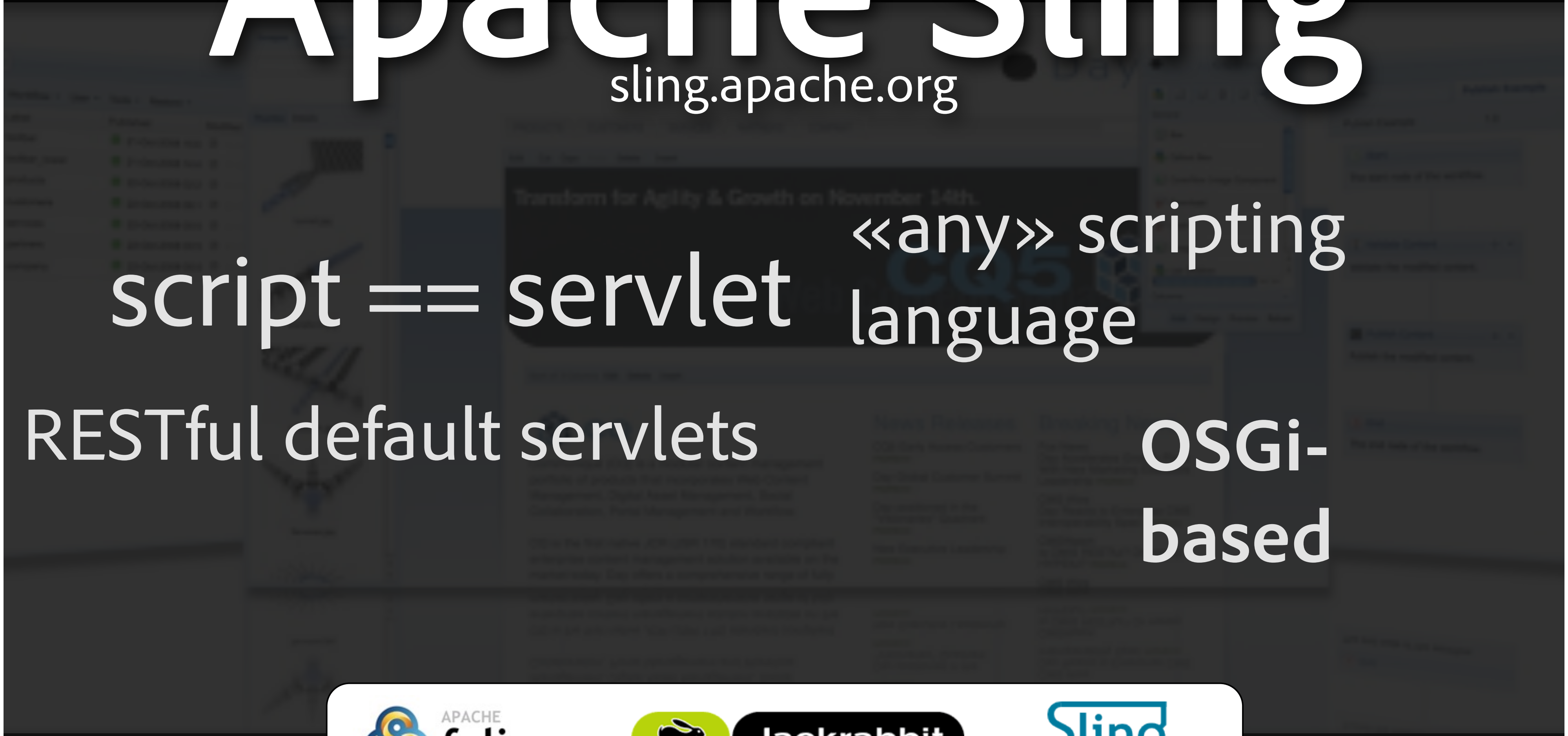


	Name ▲	Value
1	jcr:primaryType	nt:unstructured
2	jcr:title	About Geometrixx
3	sling:resourceType	foundation/components/title
4	type	small

sling:resourceType
drives rendering

Apache Sling

sling.apache.org



script == servlet

«any» scripting language

RESTful default servlets

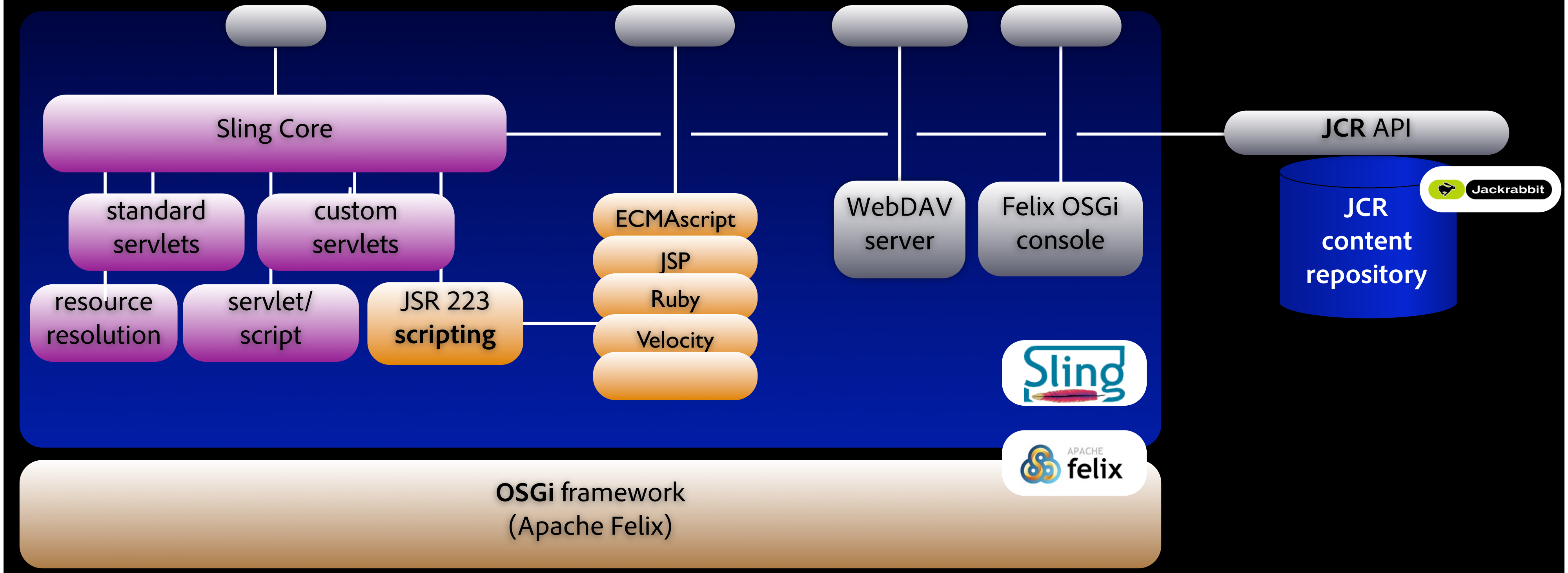
OSGi-based

APACHE felix

Jackrabbit

Sling

Sling Architecture Overview



Sling Core

standard servlets

custom servlets

resource resolution

servlet/ script

JSR 223 **scripting**

ECMAscript

JSP

Ruby

Velocity

WebDAV server

Felix OSGi console

JCR API

JCR content repository

Jackrabbit

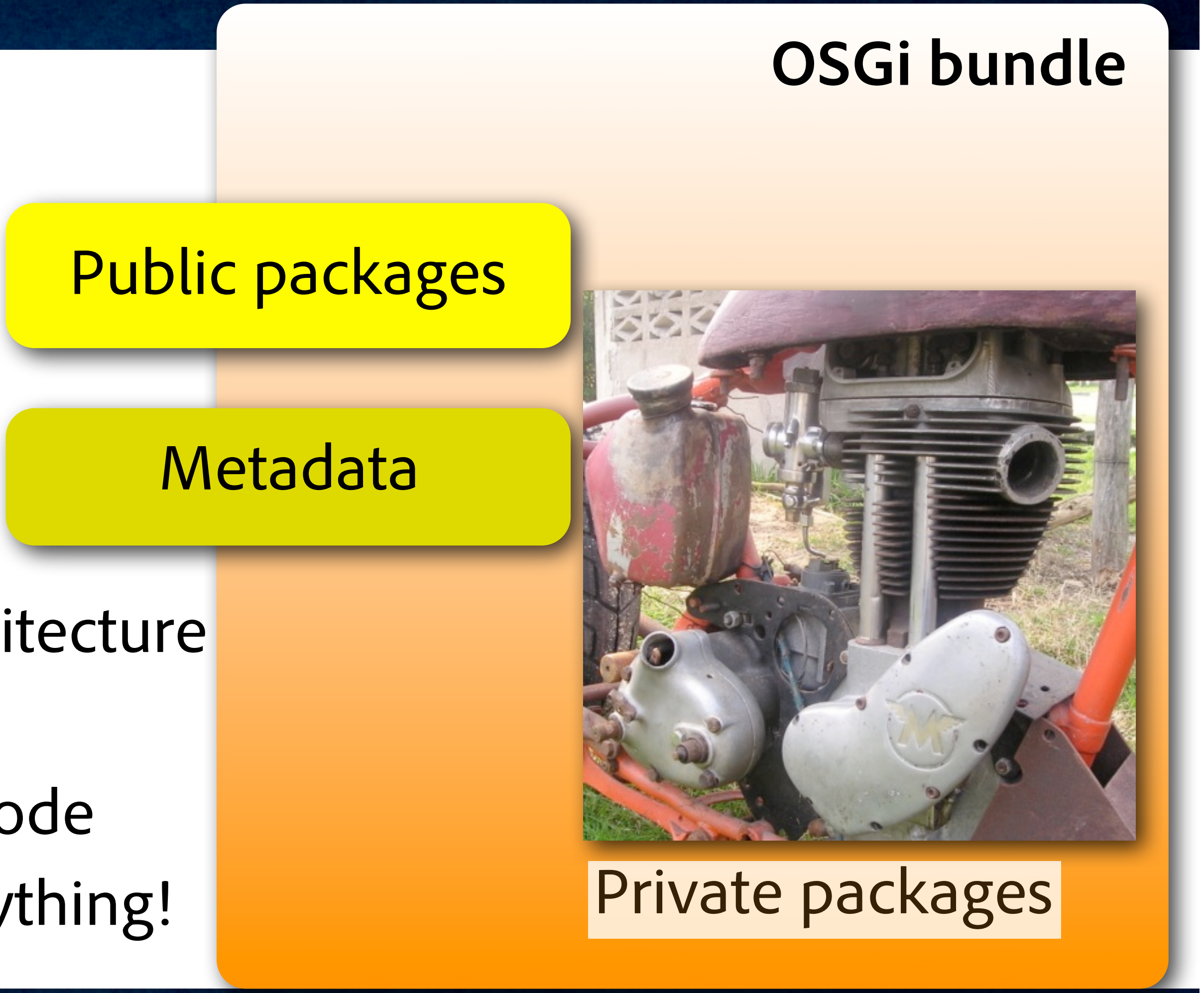
Sling

APACHE felix

OSGi framework
(Apache Felix)

Sling is based on OSGi

OSGi Alliance


OSGi bundle

Public packages

Metadata

Private packages

In-JVM **Service-based** architecture

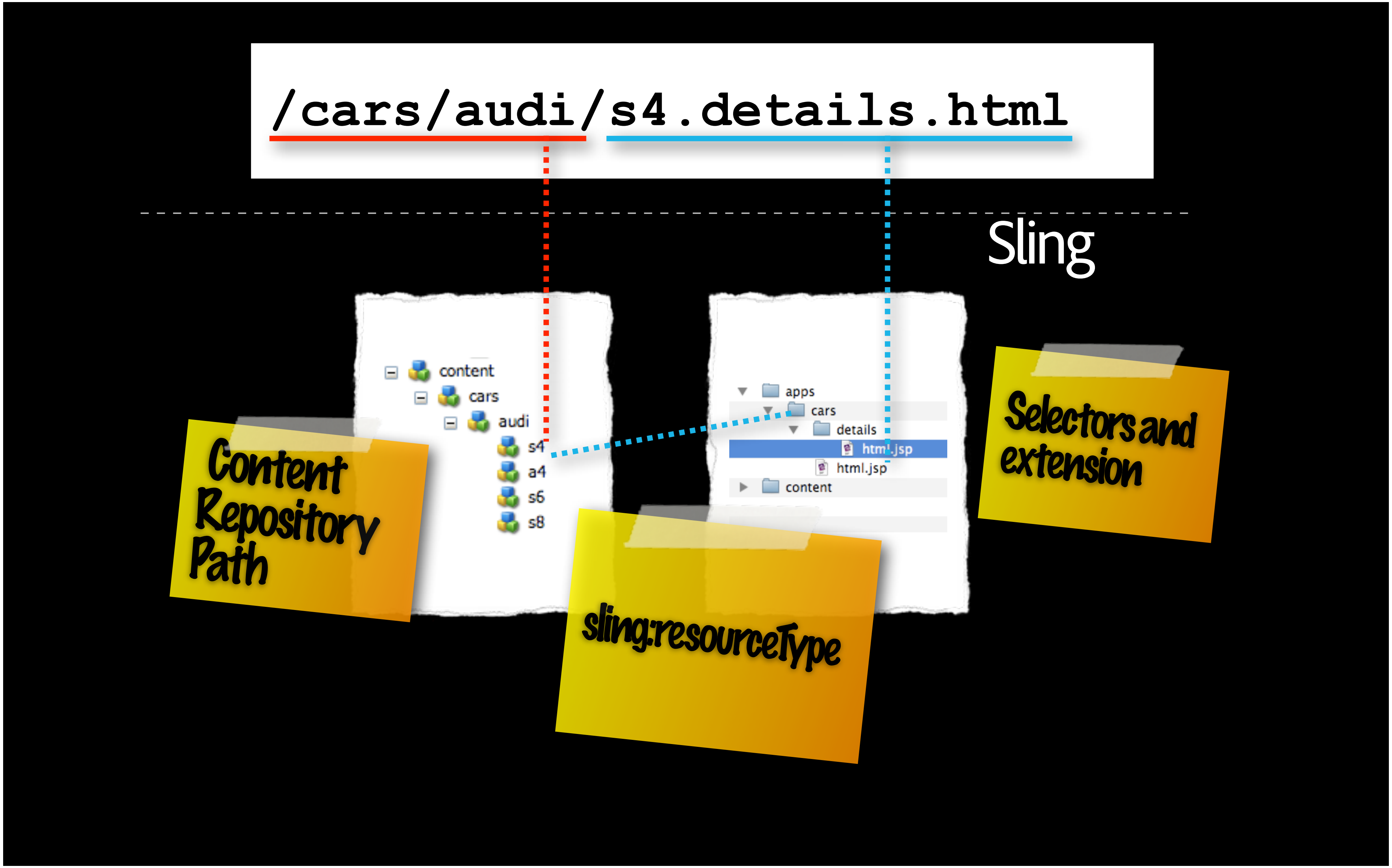
Extreme **modularity**

Fosters **better structured** code

Dynamic **plugins** - for everything!

Matchless picture: Alvimann on morguefile.com

Clean URLs with Sling: «Reclaiming the Web»



/cars/audi/s4.details.html

Sling

Content Repository Path

sling:resourceType

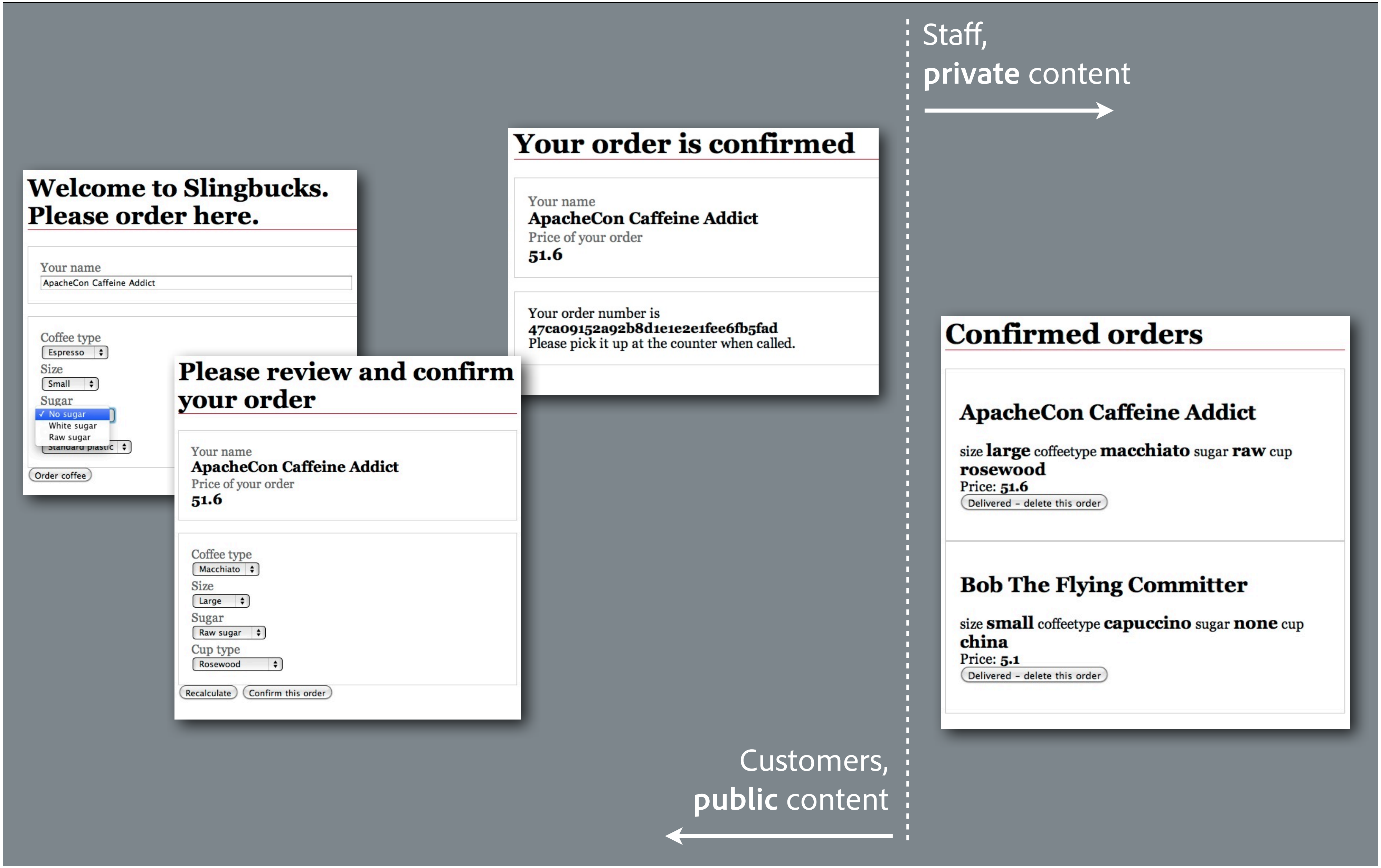
Selectors and extension

Sling Sample Application

Slingbucks

a RESTful coffee shop

Slingbucks Application Flow



Welcome to Slingbucks. Please order here.

Your name
ApacheCon Caffeine Addict

Coffee type
Espresso

Size
Small

Sugar
✓ No sugar
White sugar
Raw sugar

Standard plastic

Please review and confirm your order

Your name
ApacheCon Caffeine Addict
Price of your order
51.6

Coffee type
Macchiato

Size
Large

Sugar
Raw sugar

Cup type
Rosewood

Your order is confirmed

Your name
ApacheCon Caffeine Addict
Price of your order
51.6

Your order number is
47ca09152a92b8d1e1e2e1fee6fb5fad
Please pick it up at the counter when called.

Confirmed orders

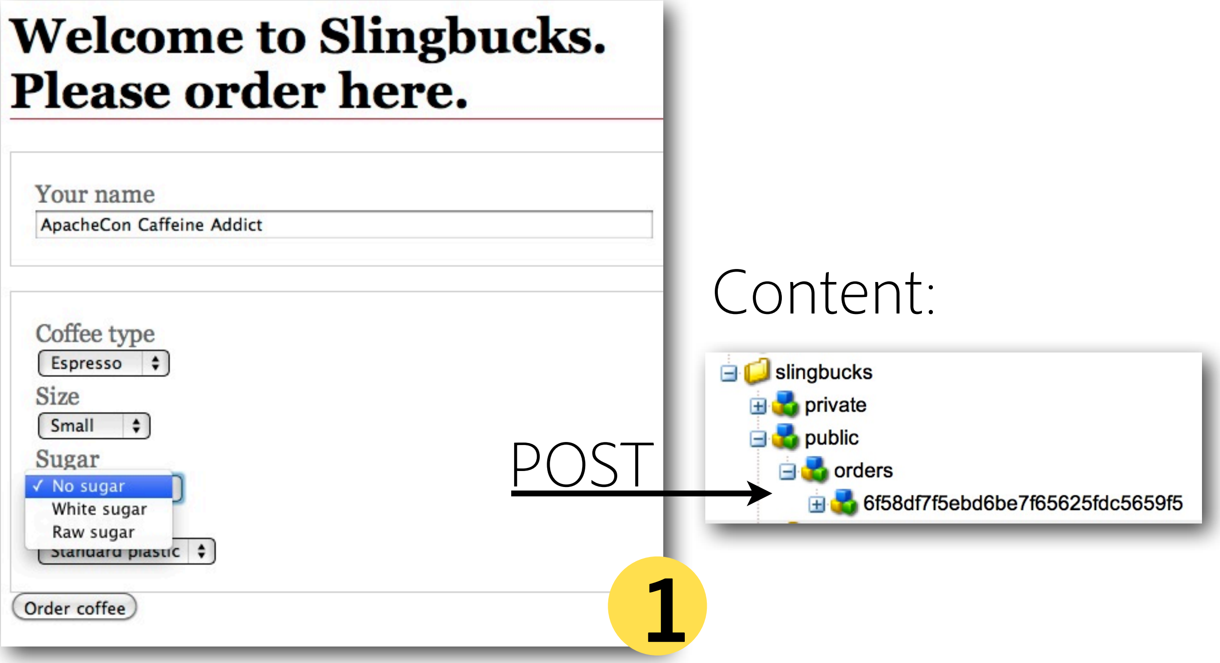
ApacheCon Caffeine Addict

size **large** coffeetype **macchiato** sugar **raw** cup **rosewood**
Price: **51.6**

Bob The Flying Committer

size **small** coffeetype **capuccino** sugar **none** cup **china**
Price: **5.1**

Slingbucks use cases: **Order Coffee**



Welcome to Slingbucks. Please order here.

Your name: ApacheCon Caffeine Addict

Coffee type: Espresso

Size: Small

Sugar: ✓ No sugar

Content:

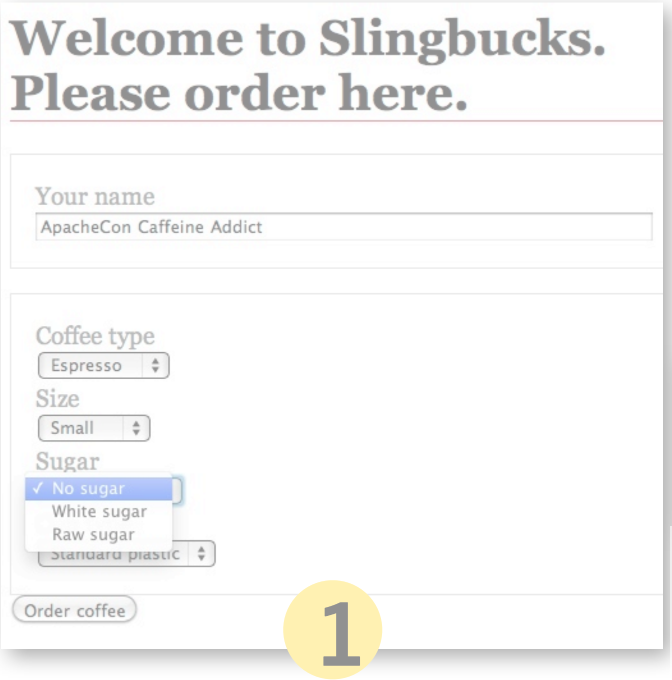
```
slingbucks
  private
  public
    orders
      6f58df7f5ebd6be7f65625fdc5659f5
```

Display **order form** with configurable options.
Customer **submits order.**
Redisplay order for **confirmation** with hard to guess ID.

Slingbucks use cases: **Confirm Order**

Redisplay order form.

Customer either **modifies** and **recalculates** price, or **confirms** order.



Welcome to Slingbucks. Please order here.

Your name
ApacheCon Caffeine Addict

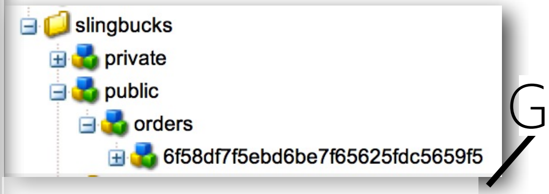
Coffee type
Espresso

Size
Small

Sugar
✓ No sugar
White sugar
Raw sugar

Standard plastic

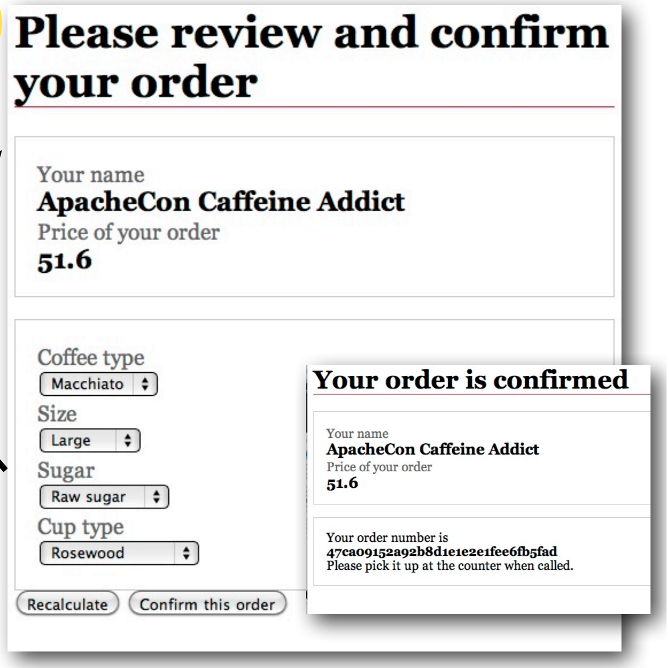
Content:



GET

POST

2



Please review and confirm your order

Your name
ApacheCon Caffeine Addict
Price of your order
51.6

Coffee type
Macchiato

Size
Large

Sugar
Raw sugar

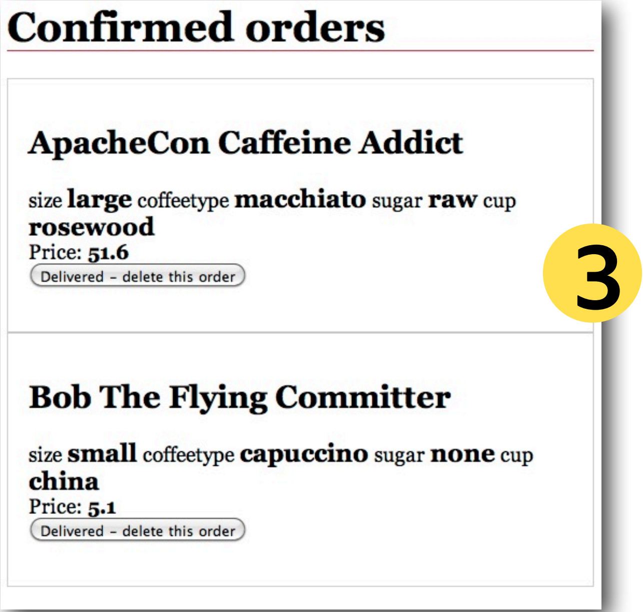
Cup type
Rosewood

Your order is confirmed

Your name
ApacheCon Caffeine Addict
Price of your order
51.6

Your order number is
47ca09152a92b8d1e1e2e1fee6fb5fad
Please pick it up at the counter when called.

Slingbucks **Process Order** use case and content



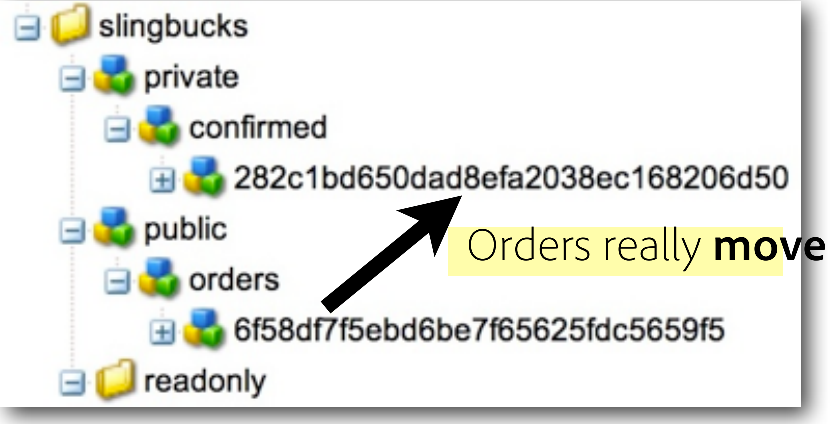
Confirmed orders

ApacheCon Caffeine Addict

size **large** coffeetype **macchiato** sugar **raw** cup **rosewood**
Price: **51.6**

Bob The Flying Committer

size **small** coffeetype **capuccino** sugar **none** cup **china**
Price: **5.1**



```
slingbucks
  private
    confirmed
      282c1bd650dad8efa2038ec168206d50
  public
    orders
      6f58df7f5ebd6be7f65625fdc5659f5
  readonly
```

Orders really **move**!

Confirmed order **moves** under **/private**, for Slingbucks staff

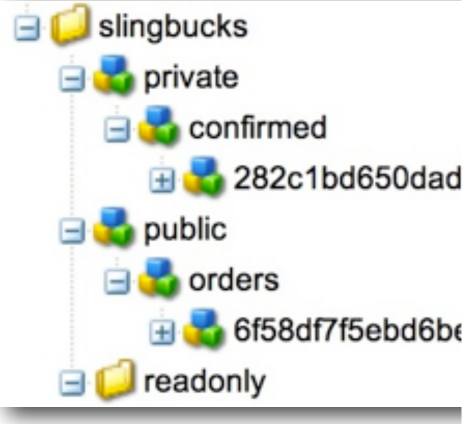
App displays a **list** of confirmed orders to staff.

Staff **delivers** order and **deletes** it from list.

Slingbucks Resources Design

Object-oriented design?

No: everything is content: we want **RESTful resources.**



- slingbucks
  - private
    - confirmed
      - 282c1bd650dad
  - public
    - orders
      - 6f58df7f5ebd6be
  - readonly

New order form:
http://slingbucks.com/public/orders.html

Order editing and confirmation (example):
http://slingbucks.com/public/orders/544da609.html

Price of an order:
Same but ending with **.price.html** selector

List of confirmed orders:
http://slingbucks.com/private/confirmed.html

Security/ACLs
Meaningful URLs
1:1 JCR path mapping

Sling gets the Web!

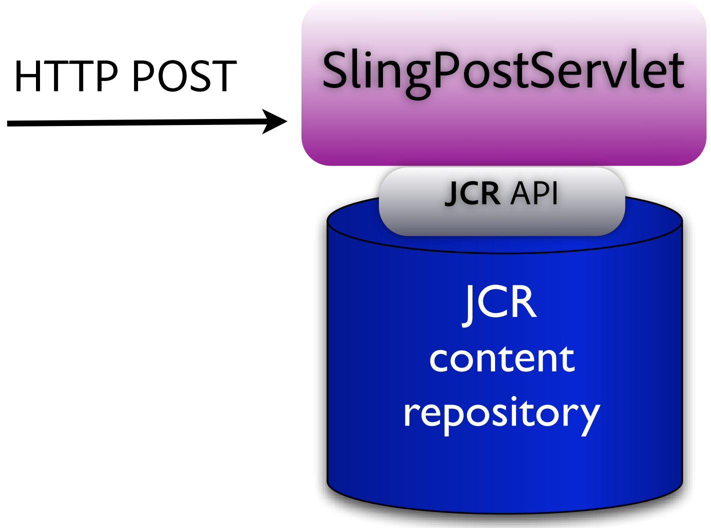
all you need is curl

or any other HTTP client

The SlingPostServlet

```
$ curl -D -
-F "customerName=Bob The Geek"
-F sling:resourceType=slingbucks/order
-F lastModified=""
-F opt_coffeetype=capuccino
-F opt_size=medium
-F opt_sugar=raw
-F opt_cup=rosewood
http://u:pwd@slingserver/content/slingbucks/public/orders/

HTTP/1.1 201 Created
Location: /slingbucks/public/orders/117936075d4de452cbba5b468
```



HTTP POST

SlingPostServlet

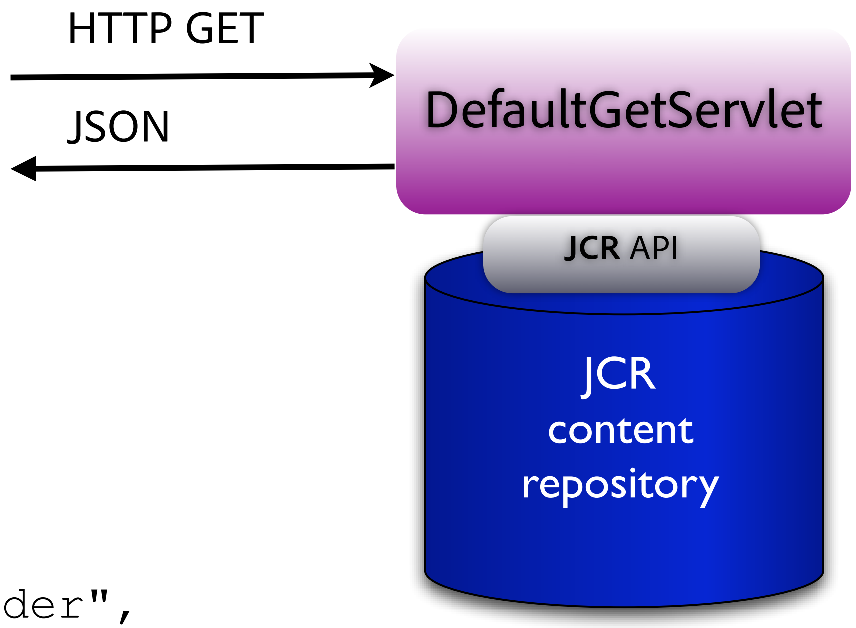
JCR API

JCR content repository

Default JSON GET servlet

```
$ curl http://localhost:8080/content
/slingbucks/public/orders
/fad01d62ca54209a1405e3b.tidy.json

{
  "opt_size": "small",
  "customerName": "Bob the Geek",
  "opt_coffeetype": "espresso",
  "opt_sugar": "none",
  "sling:resourceType": "slingbucks/order",
  "opt_cup": "plastic",
  "lastModified": "Nov 01 2010 18:31:01",
  "jcr:primaryType": "nt:unstructured"
}
```



Slingbucks Sample App

code

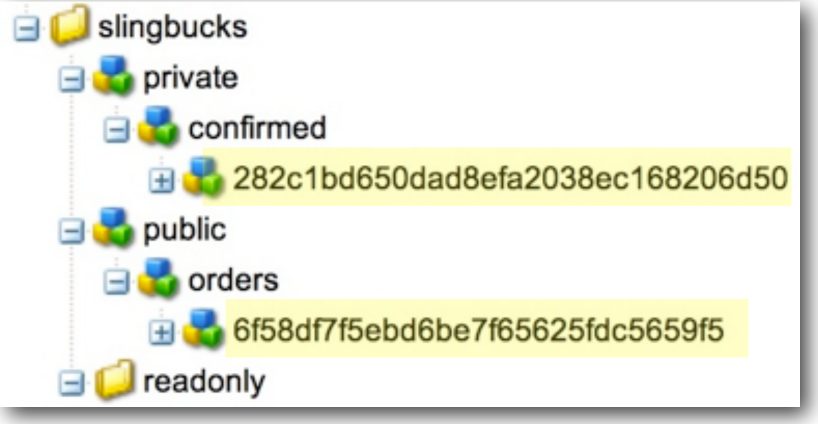
Just two OSGi **services**
and a few presentation **scripts**

Writing lots of code?
Maybe you shouldn't

Code: OSGi plugin for hard to guess node names

```
/** OSGi SCR instantiates this and registers as Service */
@Component
@Service
public class HexNodeNameGenerator
implements org.apache.sling..NodeNameGenerator {

  @Override
  /** Sling calls this when creating a node */
  public String getNodeName(
      SlingHttpServletRequest request,
      String parentPath, ...)
  {
    ...if path is in slingbucks tree:
    return computeHardToGuessName();
    ...else return null
```



```
slingbucks
  private
    confirmed
      282c1bd650dad8efa2038ec168206d50
  public
    orders
      6f58df7f5ebd6be7f65625fdc5659f5
  readonly
```

maven-scr-plugin processes

Code: watch repository to move confirmed orders

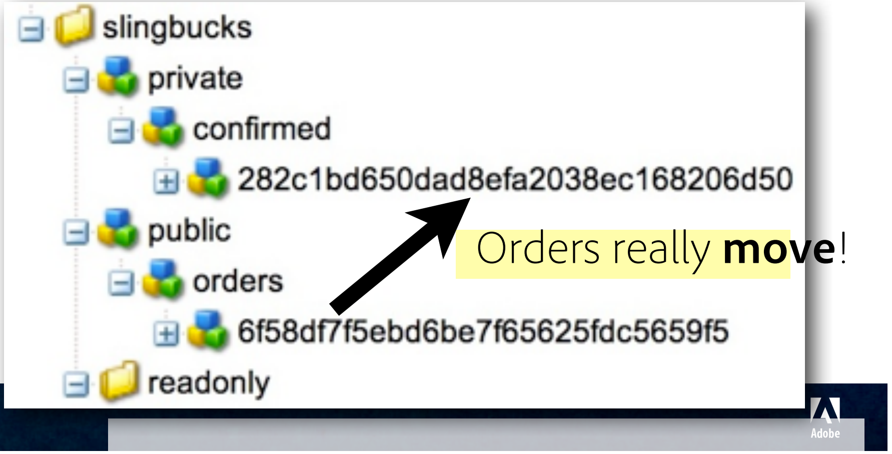
```
/** OSGi SCR instantiates this */
@Component
public class ConfirmedOrdersObserver
implements EventListener, Runnable {

  /** OSGi SCR provides this */
  @Reference
  private SlingRepository repository;

  /** OSGi SCR calls this at startup */
  protected void activate(ComponentContext ctx){
        // Register with repository
        // to callback our onEvent method
        // on changes under /content/slingbucks/orders
        ...
```

Two Java methods in a Component

```
public void onEvent(EventIterator it) {
  while (it.hasNext()) {
    if(path.endsWith(«orderConfirmed») {
          ... if orderConfirmed property is true:
          ... move node under private/
          confirmed
          ... using
          session.getWorkspace().move(....
```

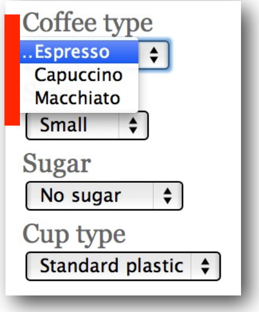


```
⊟ slingbucks
  ⊟ private
    ⊟ confirmed
      ⊞ 282c1bd650dad8efa2038ec168206d50
  ⊟ public
    ⊟ orders
      ⊞ 6f58df7f5ebd6be7f65625fdc5659f5
  ⊟ readonly
```

Orders really **move**!

Coffee options? defined by content -

```
"fields" : {
  "coffeetype" : {
    "jcr:title" : "Coffee type",
    "espresso" : {
      "jcr:title" : "Espresso",
      "jcr:description" : "The Italian job",
      "priceOffset" : 2.20
    },
    "capuccino" : {
      "jcr:title" : "Capuccino",
      "jcr:description" : "The one with cream on top",
      "priceOffset" : 3.40
    }
  },
  "size" : {
    "jcr:title" : "Size",
    "small" : {
      "jcr:title" : "Small",
      "jcr:description" : "1dl",
      "priceFactor" : 1
    },
    "large" : {
      "jcr:title" : "Large",
      "jcr:description" : "5dl",
      "priceFactor" : 2
    }
  }
}
```

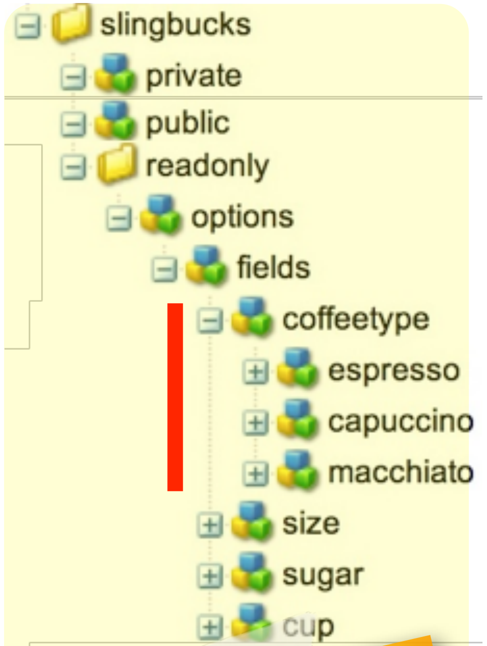


Coffee type: ..Espresso
Capuccino
Macchiato

Small

Sugar: No sugar

Cup type: Standard plastic



HTTP GET with .json extension.

POST to set values. (out of the box)

Reconfigure in-flight with curl!

Slingbucks code size

Scripts and design content:

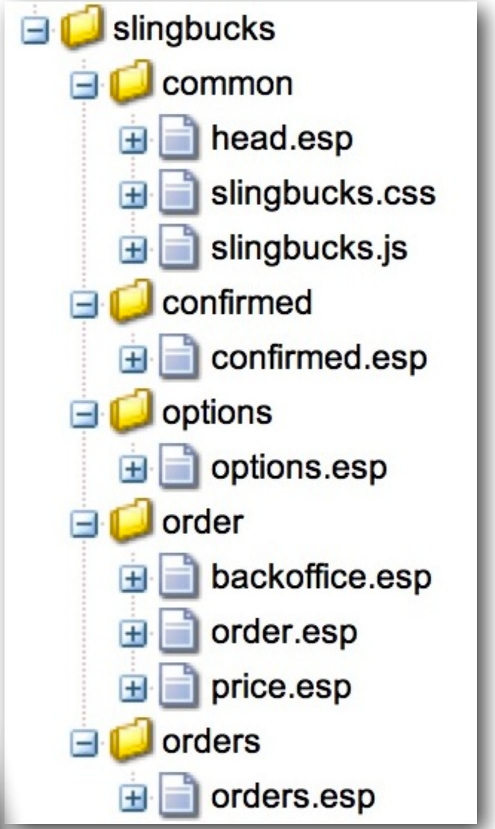
Java code: **250 lines**
3 java files

HTML representation scripts: **250 lines**
7 esp files

Initial repository **content**: **85 lines**
3 json files

Style and client-side **javascript**: **43 lines**
1 css and 1 js file

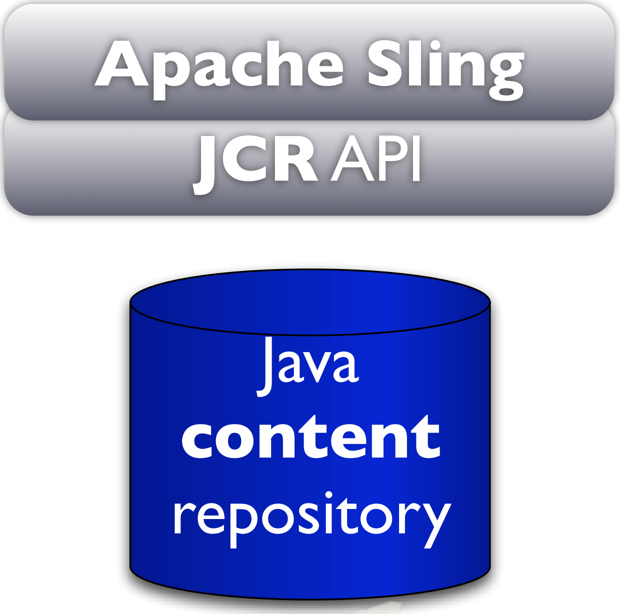
Writing lots of code?
Maybe you shouldn't



```
⊟ slingbucks
    ⊟ common
        ⊞ head.esp
        ⊞ slingbucks.css
        ⊞ slingbucks.js
    ⊟ confirmed
        ⊞ confirmed.esp
    ⊟ options
        ⊞ options.esp
    ⊟ order
        ⊞ backoffice.esp
        ⊞ order.esp
        ⊞ price.esp
    ⊟ orders
        ⊞ orders.esp
```

Did I mention this already?

everything is content!



Apache Sling

JCR API

Java **content** repository

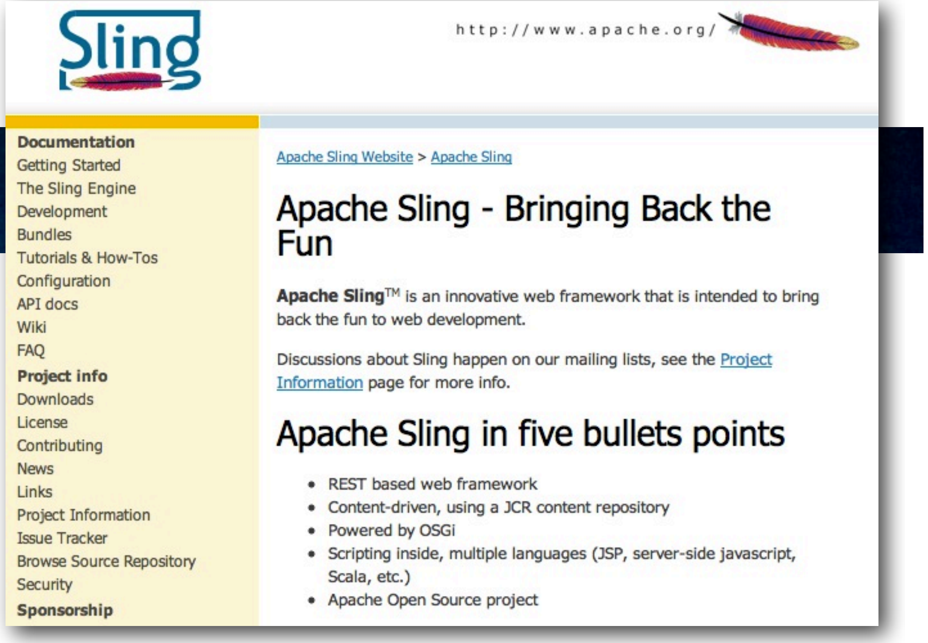
Sling design promotes RESTful applications.

Powerful out of the box HTTP services.

OSGi plugins for (most) everything.

Writing lots of code? Maybe you shouldn't

Where next?



Apache Sling Website > Apache Sling

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- Content-driven, using a JCR content repository
- Powered by OSGi
- Scripting inside, multiple languages (JSP, server-side javascript, Scala, etc.)
- Apache Open Source project

Code at **http://s.apache.org/slingbucks**

Code and community at **sling.apache.org**

OSGi info at **www.osgi.org**

Slides at **www.slideshare.net/bdelacretaz**