

Agile RESTful Web Development



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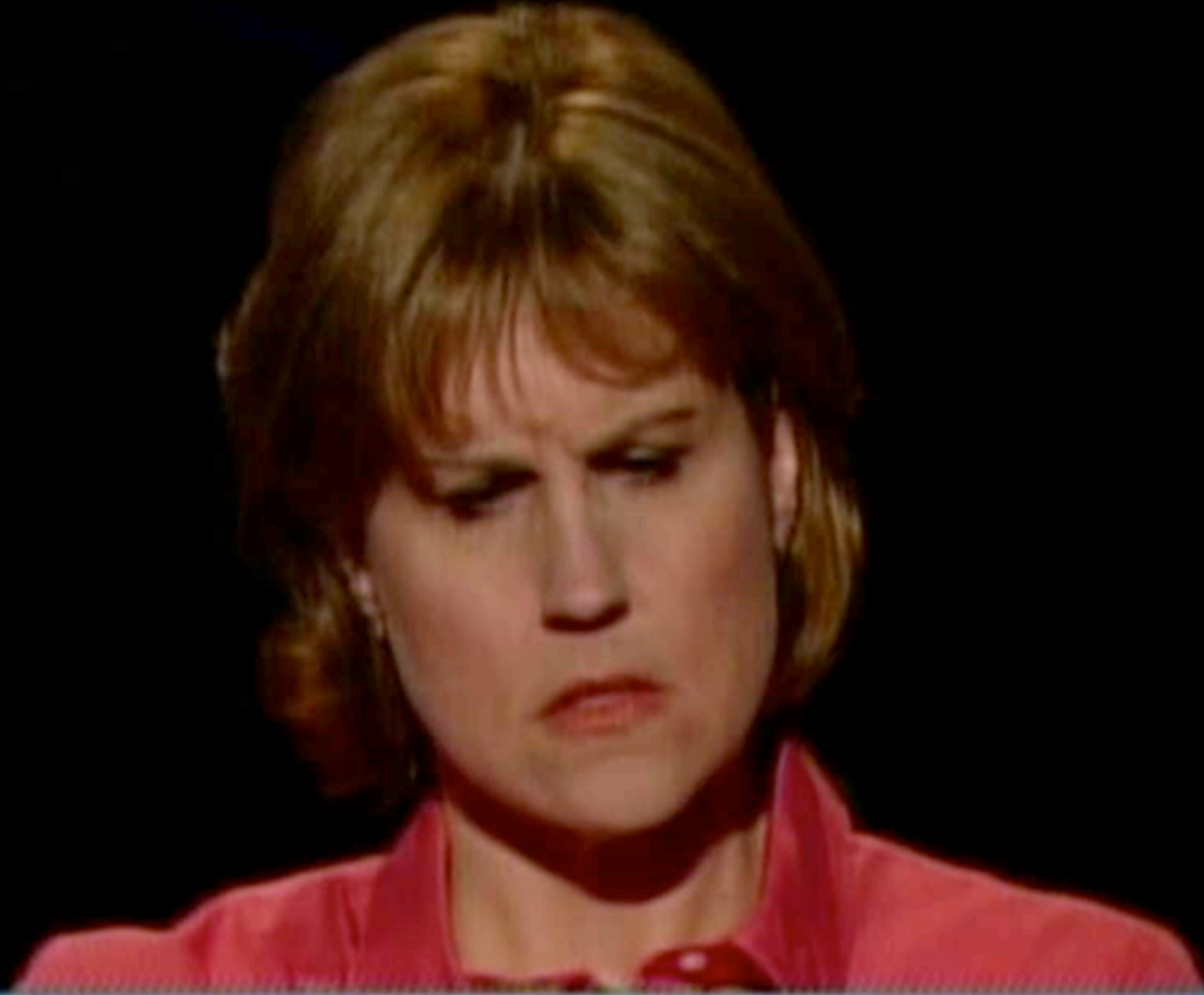
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Jugs - Agenda

REST in 15 minutes

Meet Apache Sling

demo & code



What is REST?

A API

B Technology

C SOAP's arch enemy

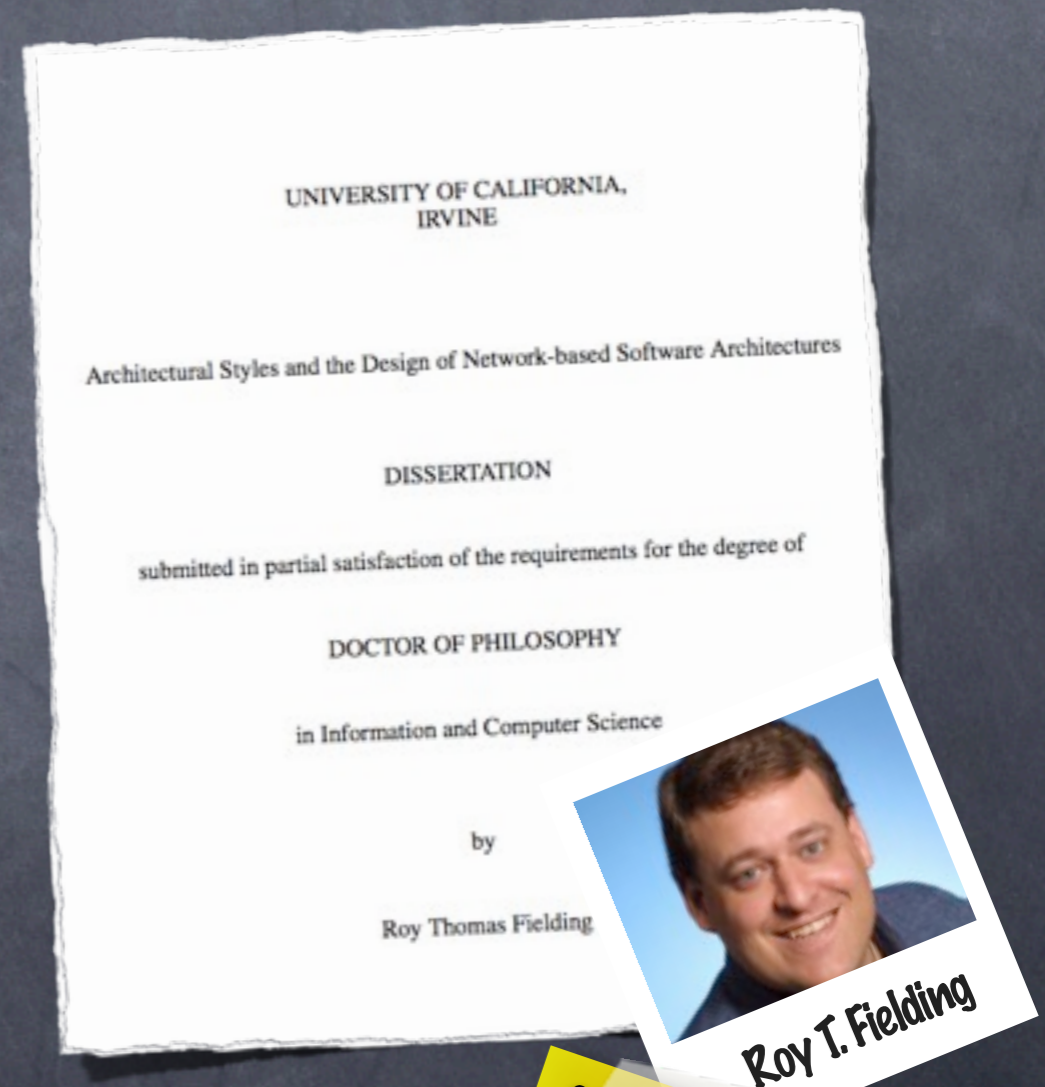
D Architectural Style

REST: An Architectural Style

One of many Architectural Styles

Architectural principles of the web, defined a posteriori

Defined through architectural constraints



Chief Scientist
at Day
Software

Styles and implementation examples

peer to peer style

REST style



Napster



the web is the only
relevant
implementation of
REST

REST ingredients

Resources

Representations of resources

Uniform interface

Hypertext and links

Stateless communication

roughly the
constraints
from Roy's thesis

Resources

give all relevant things an ID

<http://example.com/cars/models/320>

don't have to be
pretty

Representations

<http://example.com/cars/models/320.html>

<http://example.com/cars/models/320.json>

<http://example.com/cars/models/320.xml>

~~<http://example.com/cars/models/320.jsp>~~

allows
intermediaries to
understand (caches,
proxies)

Uniform interface

GET	retrieve information, possibly cached
PUT	Update or create with known ID
POST	Create or append sub-resource
DELETE	Logically remove

Uniform interface

allows
intermediaries to
understand (caches,
proxies)

check out the URL
[http://www.youtube.com/watch?
v=oHg5SJYRHA0](http://www.youtube.com/watch?v=oHg5SJYRHA0)

with method "WATCH"

Logically remove



Hypertext

Link the "things" / the resources

How?

`<link rel="some-concept" ref="/some-uri">`

hardcoded in client

NOT hardcoded in client

Why?

A special browser for each web site?

e.g. a Wikipedia browser that hardcodes
`http://en.wikipedia.org/wiki/{concept}`



wikipedia
browser



amazon
browser



jugs.ch
browser



blogs
browser



nzz
browser



admin.ch
browser



search.ch
browser



infoq
browser



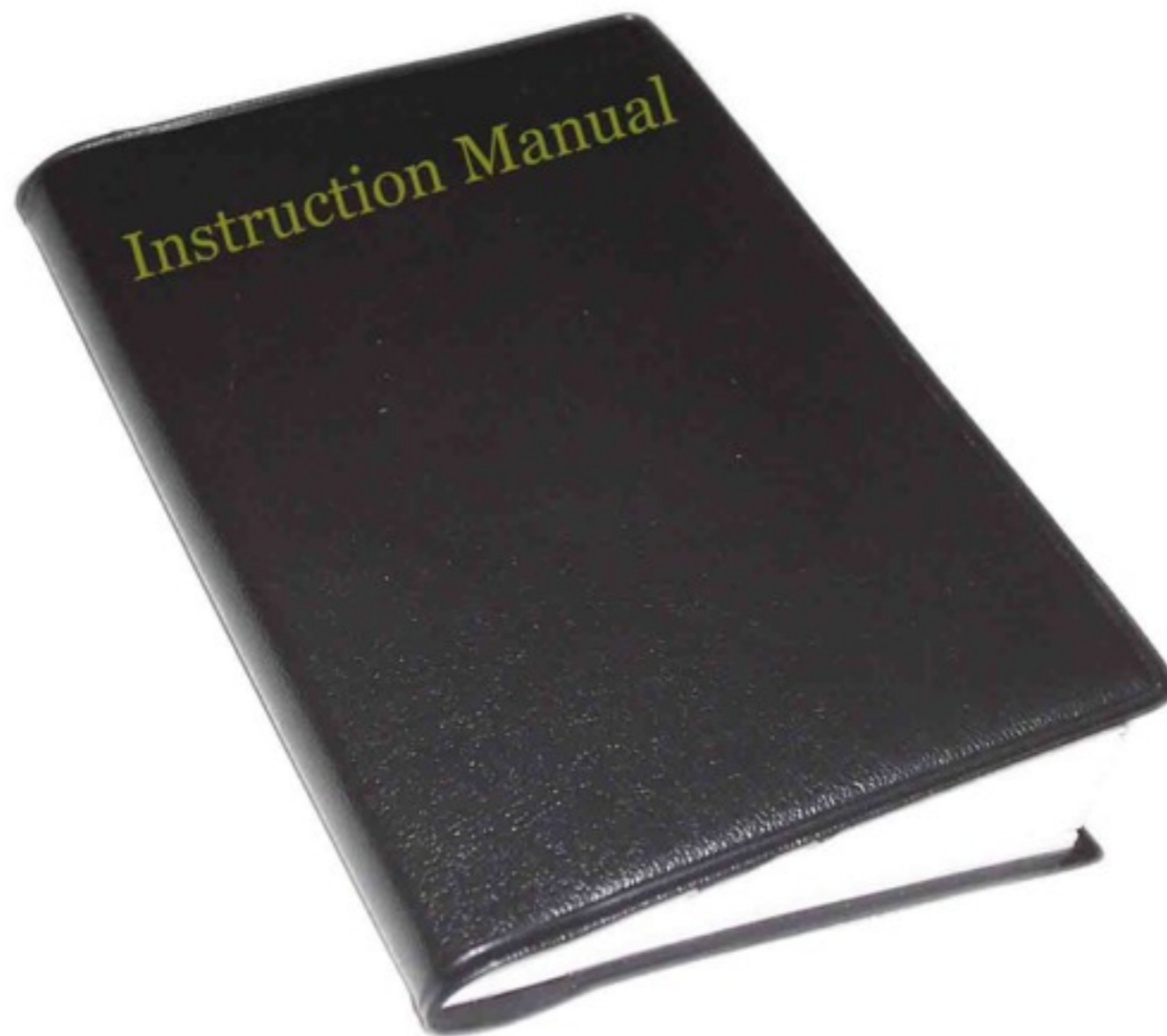
facebook
browser



gma
brow

A REST API must not define fixed
resource names or hierarchies (an obvious
coupling of client and server). Servers
must have the freedom to control their
own namespace.





**If you need this
it's (probably) not REST**

Stateless communication

state is kept on the client, no server-side application state

requests are self-contained

scalability ✓

intermediaries ✓

client

server

GET /customer/1234/orders

<link rel="..." ref="/orders/123456789"></link>

update software
reboot

POST /orders/123456789

RPC-style modelling vs. REST-style modelling

**many operations
few instances**

OrderManagementService
+ getOrders() + submitOrder() + getOrderDetails() + getOrdersForCustomers() + updateOrder() + addOrderItem() + cancelOrder()

CustomerManagementService
+ getCustomers() + addCustomer() + getCustomerDetails() + updateCustomer() + deleteCustomer()

**few operations
many instances**

<<interface>> Resource
GET PUT POST DELETE

/orders
GET - list all orders PUT - unused POST - add new order DELETE - unused

/orders/{id}
GET - get order details PUT - update order POST - add item DELETE - cancel order

/orders/{id}/submit
GET - unused PUT - unused POST - submit order DELETE - unused

/customers
GET - list all customers PUT - unused POST - add new customer DELETE - unused

/customers/{id}
GET - get customer details PUT - update customer POST - unused DELETE - delete customer

/customers/{id}/orders
GET - get all orders for customer PUT - unused POST - add order DELETE - cancel all customer orders

Why again?

proven scalability

proven to evolve

proven cross-platform

Relevant for me?



REST for the Enterprise?



The Internet vs. The Enterprise

One is a gigantic, uncontrollable anarchy of heterogeneous systems with varying quality that evolve independently and constantly get connected in new and unexpected ways.

The other is a worldwide, publicly accessible series of interconnected computer networks that transmit data by packet switching using the standard Internet Protocol (IP).

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What's Sling?

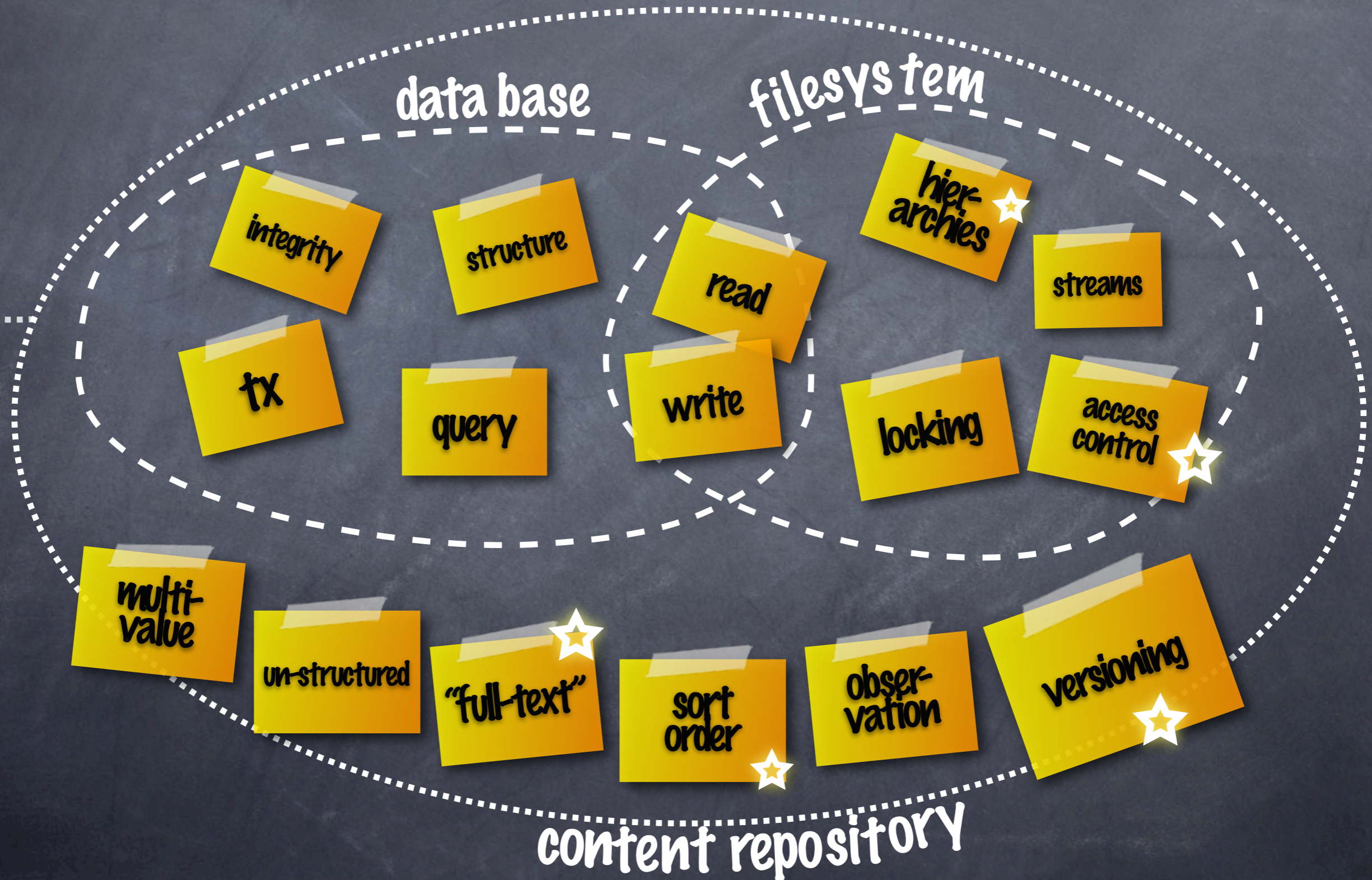
"Apache Sling is a RESTful web framework that uses a Java Content Repository to store and manage content."

just graduated
~~in Apache~~
~~incubator~~

What's JCR?

"The API should be a standard, implementation independent, way to access content bi-directionally on a granular level within a content repository." ?

Best of both worlds.



“Data First!”

aka “schemaless”

JCR supports
“structure first” as
well.
(but that’s missing the point)

Known compliant Repositories

* using third party connector



Apache Jackrabbit




Oracle XML DB



Exo ECMS Platform



Microsoft Sharepoint



OpenText Livelink



Day CRX




IBM FileNet P8



Xythos Repository



Alfresco ECM



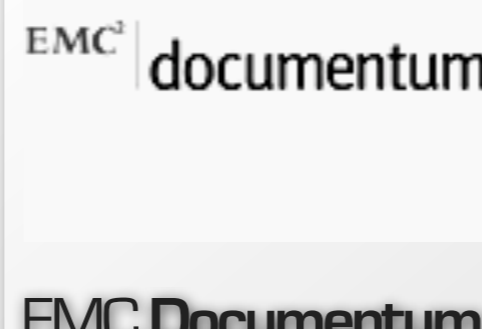
Vignette V7



Interwoven Repository



IBM CM



EMC Documentum

+hundreds of TCKs registered

How many RDBMS vendors do you need?

Some known JCR Applications



BEA Portal



Sun OpenPortal



JBoss Portal



Oracle Portal



Fast Enterprise Search

magnolia WCMS

Alfresco ECMS

Apache Sling

Mindquarry Collaboration

Day Communique DAM

Spring Framework

Day Communique Collab

Apache Cocoon

QSLabs Compliance

Day Communiqué WCMS

Apache Tapestry

Apache James

Artifactory Maven Proxy

medic-2-medic mapofmedicine

IBM FileNet WebSiteManager

GX WebManager

Exo ECMS Platform

TYPO3 v5.0 WCM

Nuxeo ECM

InfoQ Online Community

Hippo CMS

Liferay Enterprise Portal

Percussion Rhythmix

QuickWCM WCMS

Jahia Framework

Sakai E-learning

Sourcemix Sourcemix

Lutece Portal

Some known JCR Applications



BEA Portal



Sun OpenPortal



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Fast Enterprise Search

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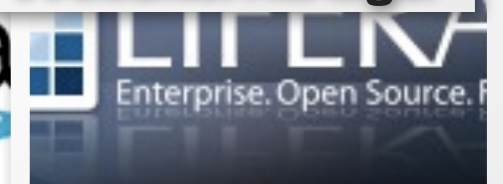
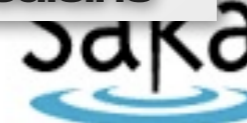
medic-2-medic mapofmedicine

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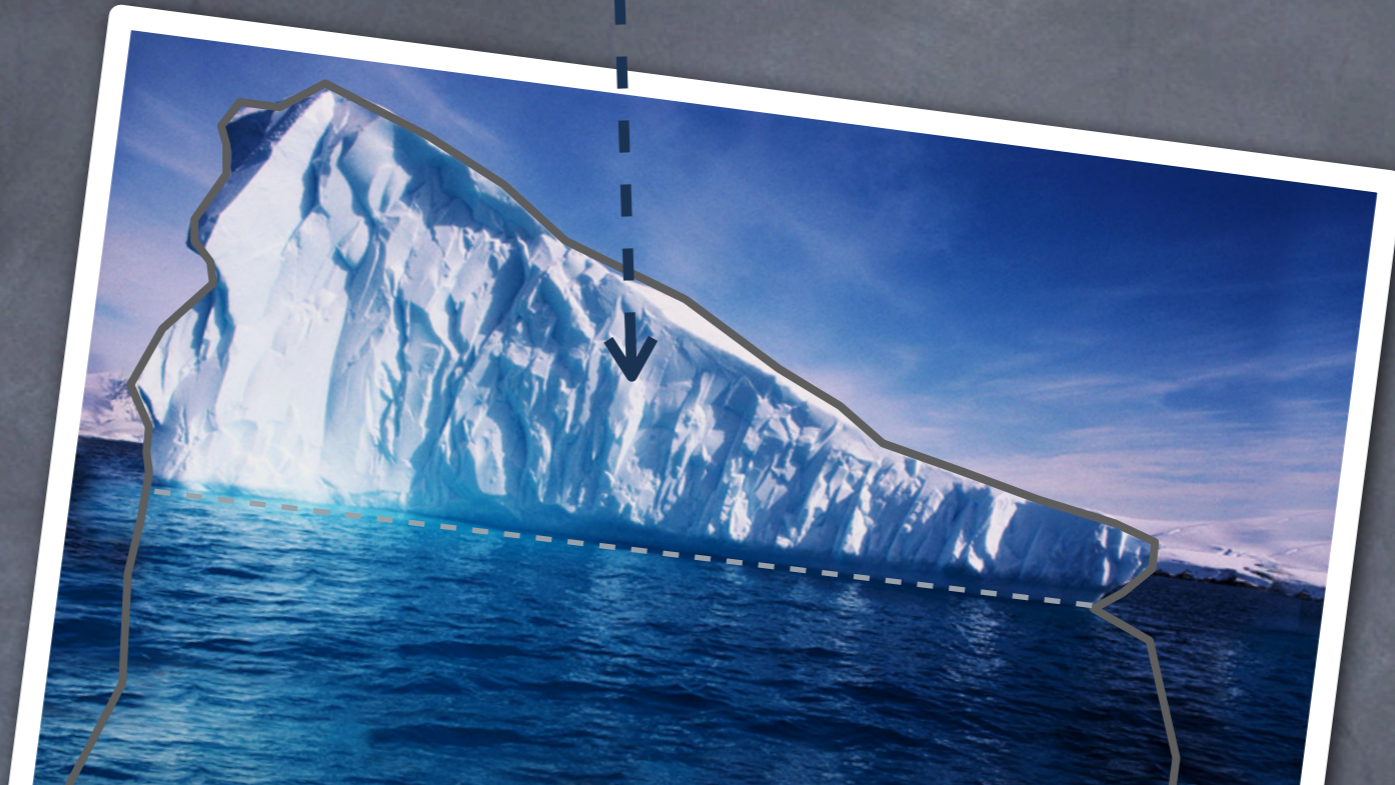
QuickWCM WCMS

Jahia Framework

Sakai E-learning

Sourcemix Sourcemix

Lutece Portal



JCR-Weatherforecast



2009

-5°

2010

-8°

2011

-12°

JCR 2.0



<http://www.day.com/jsr283>



A node is a resource

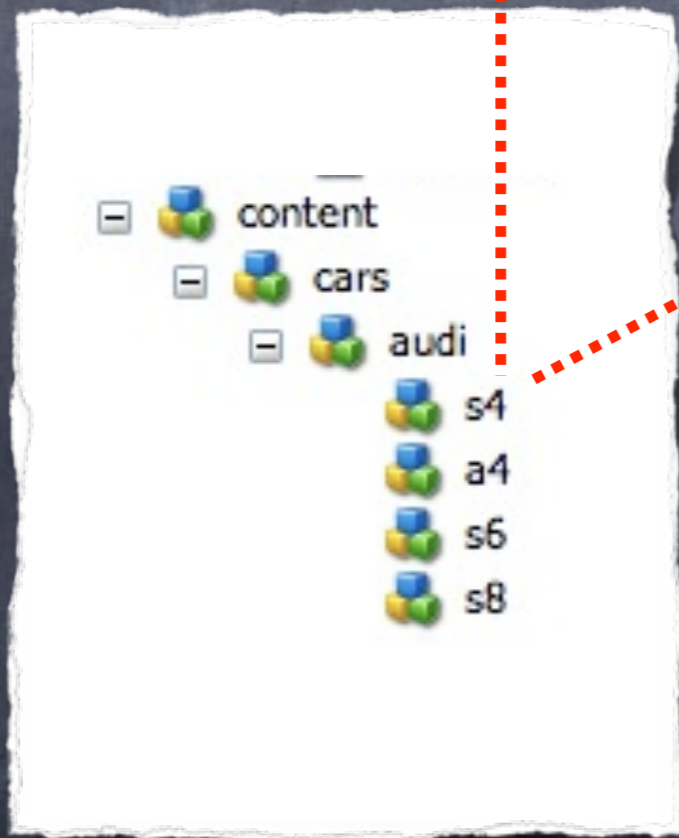
GET /cars/audi/s4.txt

```
http://localhost:7402/cars/audi/s4.txt
http://localhost:7402/cars/audi/s4.txt
Apple Yahoo! Google Maps YouTube Wikipedia News (81) Popular
** Resource dumped by PlainTextRendererServlet**
Resource path:/content/cars/audi/s4
Resource metadata: {sling.resolutionPath=/content/cars/audi/s4,
sling.resolutionPathInfo=.txt}

** Resource properties **
engine: V 8 front engine
jcr:primaryType: nt:unstructured
power: 254 kW
```

User-agent

Repository



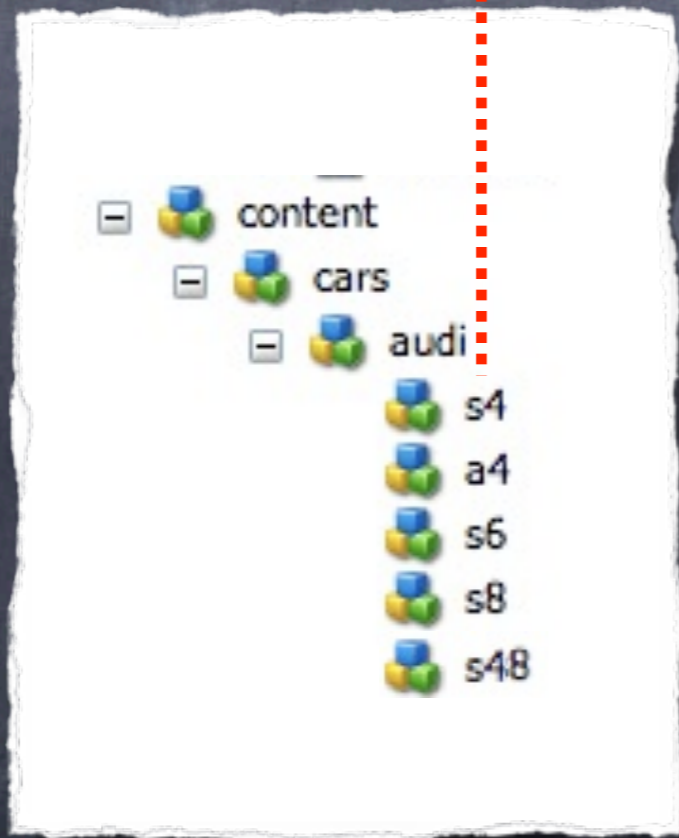


A node is a resource

POST /cars/audi/s48

write

User-agent
Repository



Your content
is your web
server

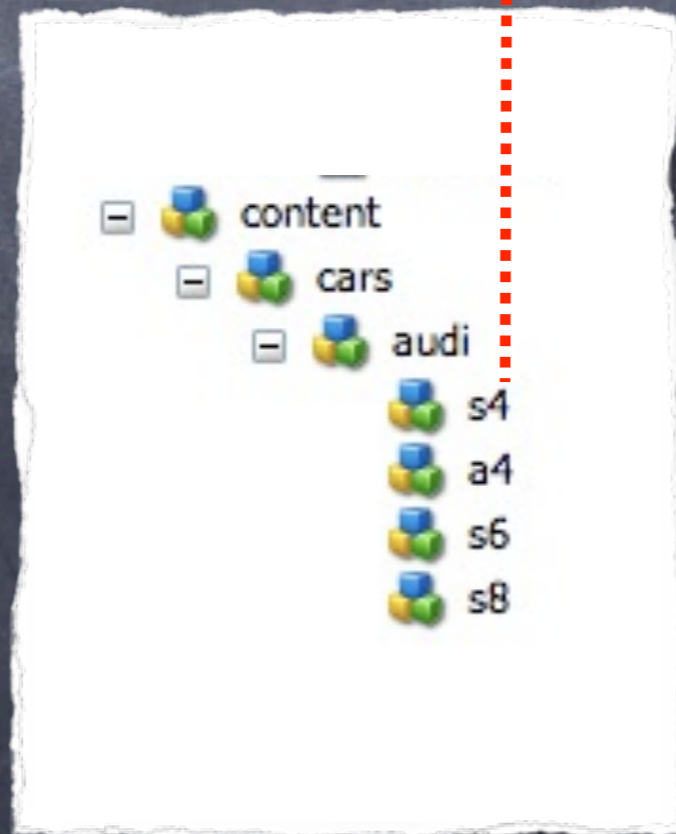


Web apps and Sling scripting

/cars/audi/s4.details.html

User-agent

Repository



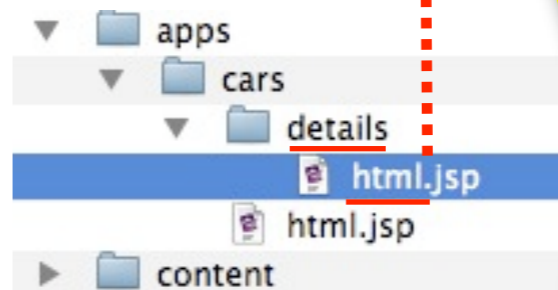
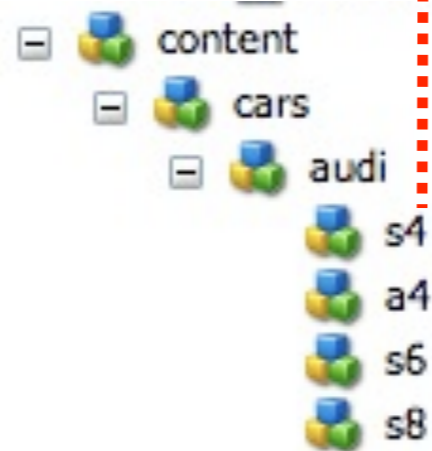


Web apps and Sling scripting

/cars/audi/s4.details.html

User-agent

Repository



1 file needed

Convention over configuration

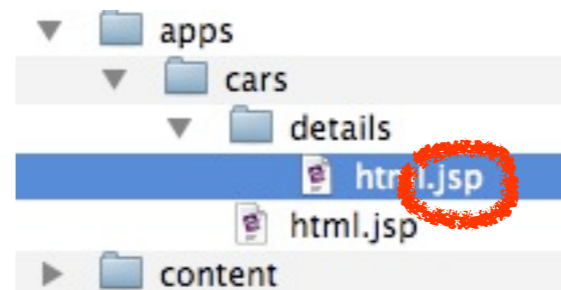
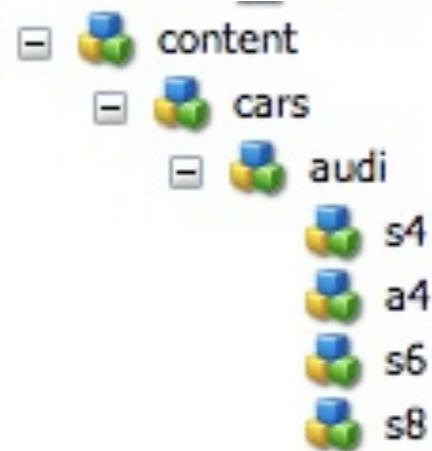


Web apps and Sling scripting

`/cars/audi/s4.details.html`

User-agent

Repository



`.esp`

`.erb`

`.scala`



Web apps and Sling scripting

URLs do matter!

```
/cars/audi/s4.details.html
```

vs.

```
/product.jsp?id=/audi/s4
```

Addressing the "script"

Passing in "this"
(the resource)

Bonus

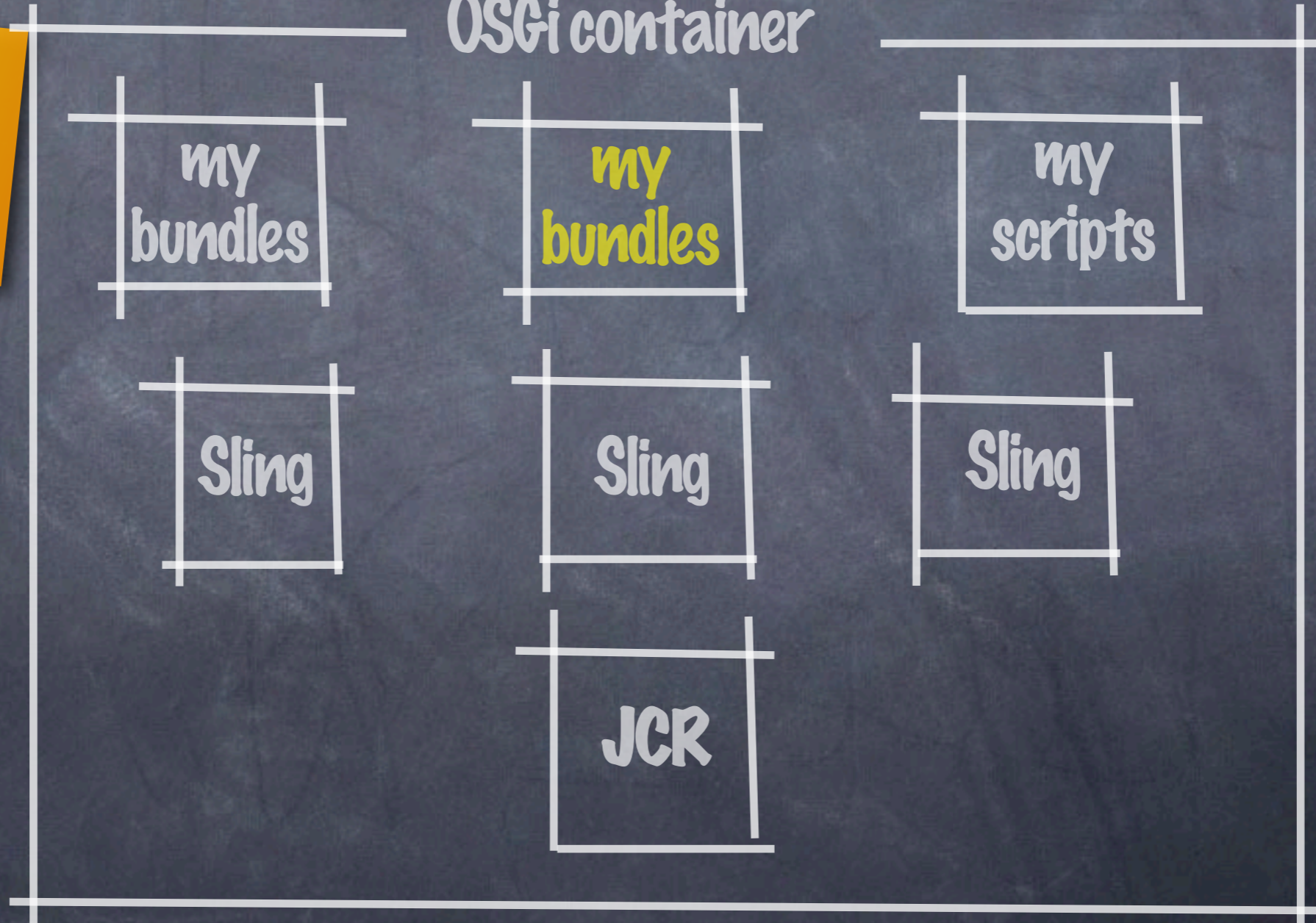


Sling is OSGi-based

(not just "enabled")

Apache Felix
OSGi container

extensible





Sling is OSGi-based

(not just "enabled")

Apache Felix
OSGi container

extensible

modular

hot deploy

my bundles

my bundles

my scripts

Sling

Sling

Sling

JCR

A landscape photograph featuring a dead, skeletal tree on the left side of a green field. In the sky, a dark, saucer-shaped object is visible, resembling a UFO. The background shows rolling green hills under a blue sky with scattered white clouds.

I WANT TO
~~BELIEVE~~ SEE

DEMO