Tales from the OSGi trenches

Adobe CQ5: a real-life OSGi case study

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What?

Share our **experience using OSGi** (Apache Felix) as the foundation of **Adobe CQ5**.

More than five years working with OSGi, very **high impact** on developers, customers, service people, *mostly* in a **positive** way.

OSGi is **no silver bullet** either.

What?

the

GOOD

the

BAD

the

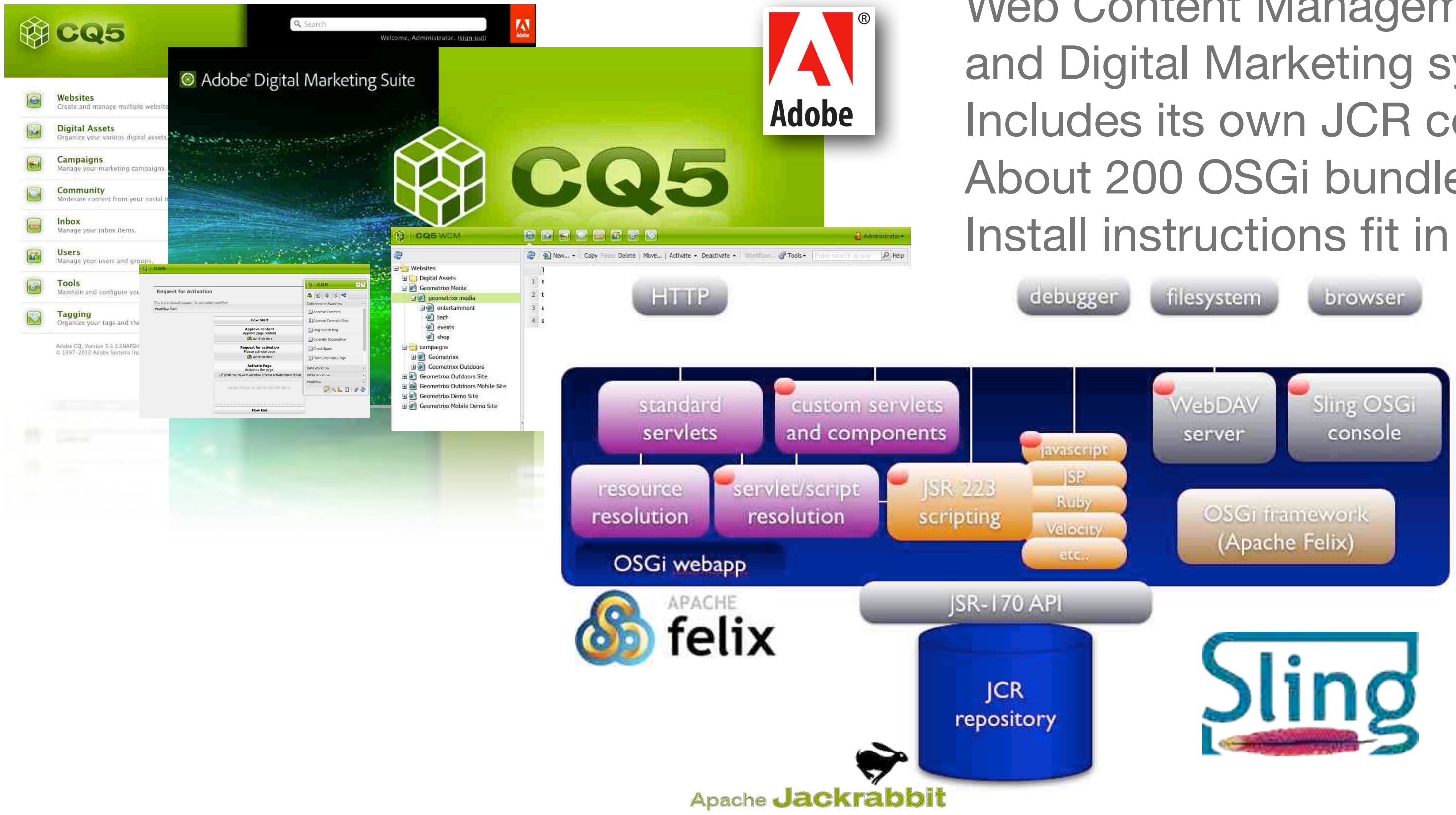
UGLY

Just my own, **personal opinion** as a software developer...

symbols by ppdigital , o0o0xmods0o0oon and clarita, on morguefile.com

Trenches?

BTW...we are hiring!
jobs-basel@adobe.com



Web Content Management and Digital Marketing system.
Includes its own JCR content store.
About 200 OSGi bundles.
Install instructions fit in a tweet.

www.adobe.com/products/cq.html
http://jackrabbit.apache.org
http://felix.apache.org
http://sling.apache.org

Built on **Apache Sling**, **Apache Felix** and **Apache Jackrabbit**

What we use from OSGi

Bundles (using Maven plugins)

Lifecycle, Service Tracker

Configurations and Felix Web Console

Declarative Services (using Maven plugins)

Sling's **installer** module (like fileinstall, using JCR)

Log, HTTP, Event services, JMX

Famous quotes

the short version

Famous Quotes, #2

*“Each (OSGi) bundle can serve as a **micro application**, having it's own lifecycle, having it's own citizens and each bundle can **carefully decide** which objects to **expose** to the outside world”*

Peter Rietzler

http://peterrietzler.blogspot.com/2008/12/is-osgi-going-to-become-next-ejb-bubble.html

Famous Quotes, #4

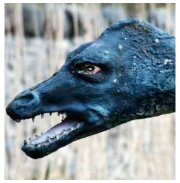
*"The **lifecycle model** of OSGi makes **life complicated**. Actually, tracking services and managing all the aspects of what to do when services come and go is **nasty**"*

Peter Rietzler

http://peterrietzler.blogspot.com/2008/12/is-osgi-going-to-become-next-ejb-bubble.html

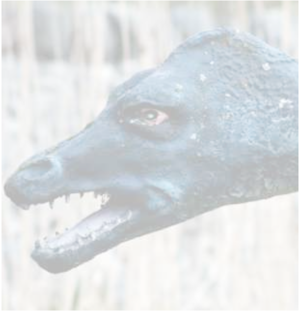
Famous Quotes, #6

*“OSGi makes "**impossible**" things **easy**: hot deploy/upgrade, service discovery, ... and **trivial** things **hard**: hibernate, tag libraries, even deploying a simple war!” But, for the first time in my career, I see **software reusability that works**: service reusability.*



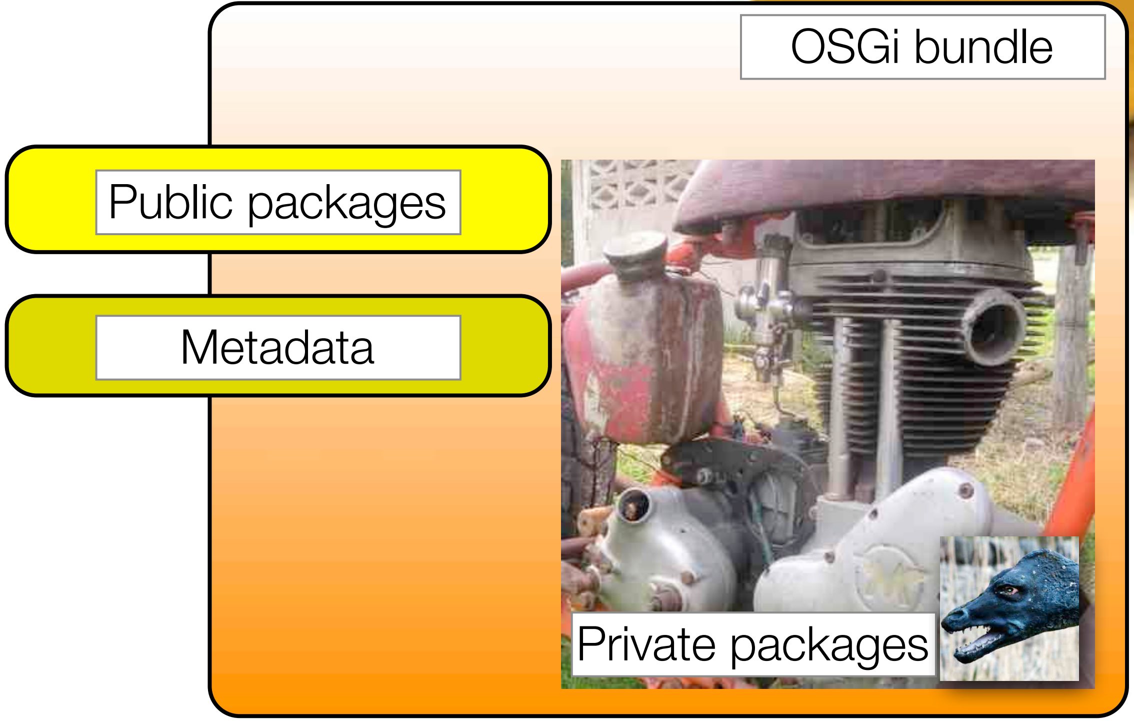
Filippo Diotalevi

The Good



Modularity

Classloading distinct from class visibility.



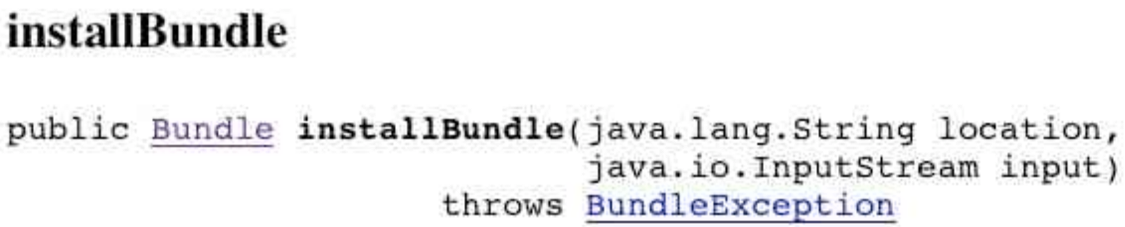
OSGi bundles as reusable components.
Dynamic setup and updates that work.
At last!

Matchless picture: Alvimann on morguefile.com

Declarative Services

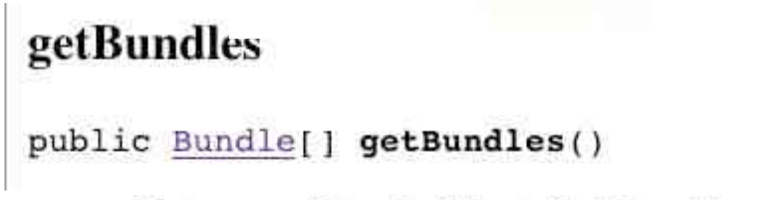
```
/** Servlet that implements GET and POST access
 *  to our Storage component, mounted on /store
 *  by default, path can be changed by configura
 */
@SuppressWarnings("serial")
@Component(metatype=true)
@Service(value=Servlet.class)
@org.apache.felix.scr.annotations.Properties({
    @Property(name=CoreConstants.SERVLET_METHOD_PROP,
            value={"POST", "GET"}, propertyPrivate=true),
    @Property(name=CoreConstants.SERVLET_PATH_PROP, value="/store")
})
public class StorageServlet extends HttpServlet {

    @Reference
    Storage storage;
```

Clean OSGi APIs



installBundle

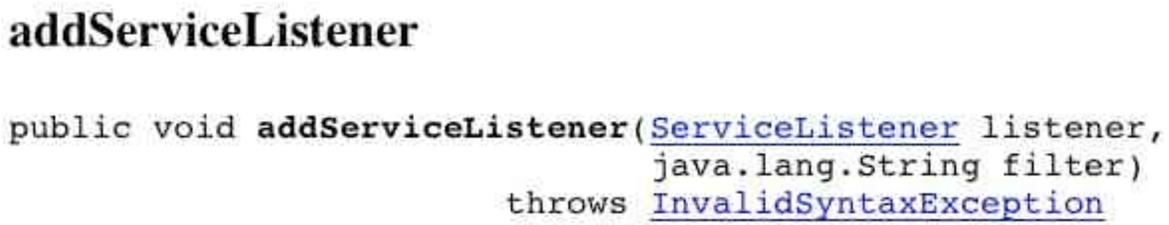
```
public Bundle installBundle(java.lang.String location,
                            java.io.InputStream input)
                     throws BundleException
```



getBundles

```
public Bundle[] getBundles()
```

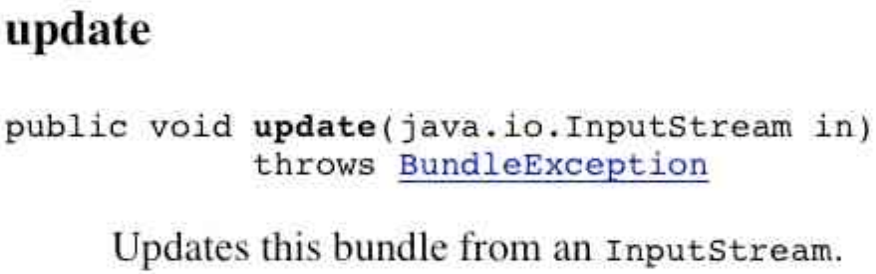
Returns a list of all installed bundles.



addServiceListener

```
public void addServiceListener(ServiceListener listener,
                               java.lang.String filter)
                        throws InvalidSyntaxException
```

Just a few
basic examples...



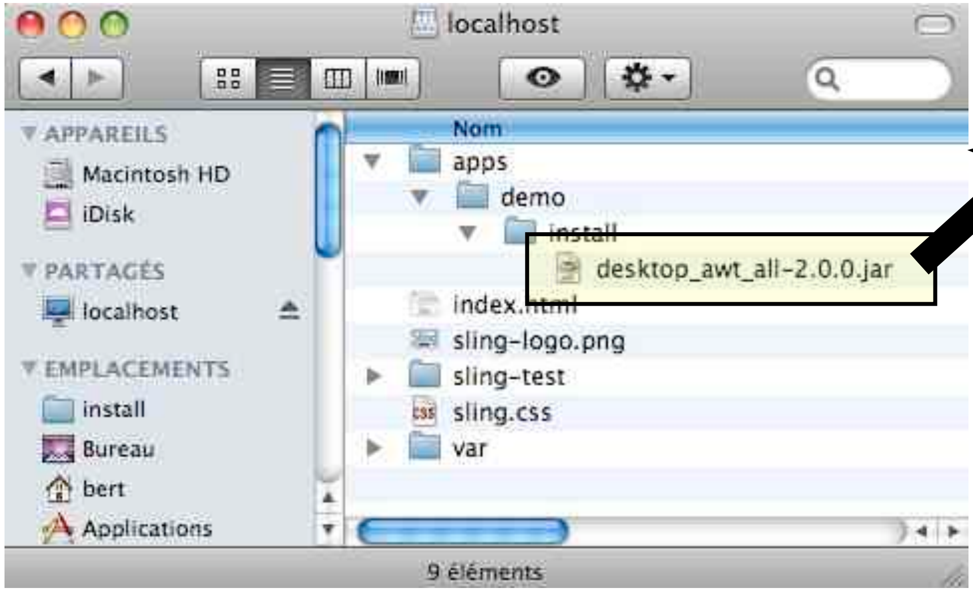
update

```
public void update(java.io.InputStream in)
            throws BundleException
```

Updates this bundle from an `InputStream`.

Dynamic load/unload

Just copy bundle jar to Sling's JCR repository (WebDAV)



localhost

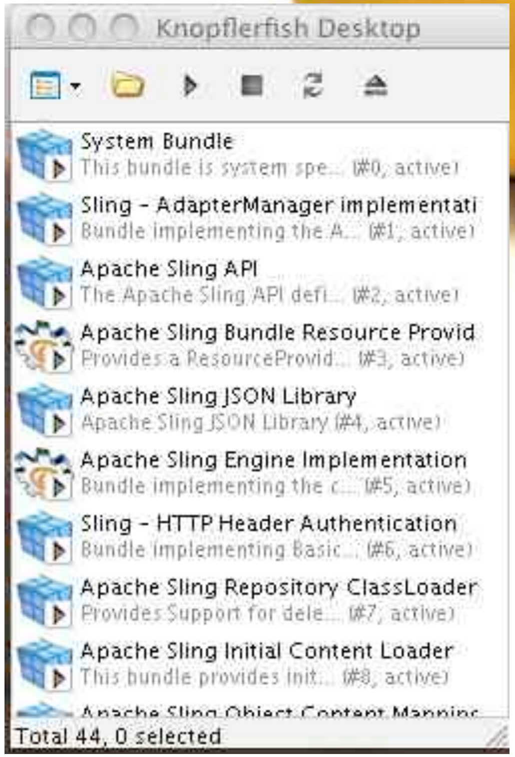
APPAREILS
- Macintosh HD
- iDisk

PARTAGÉS
- localhost

EMPLACEMENTS
- install
- Bureau
- bert
- Applications

Nom
- apps
  - demo
    - install
      - desktop_awt_all-2.0.0.jar
- index.html
- sling-logo.png
- sling-test
- sling.css
- var

9 éléments



Knopflerfish Desktop

System Bundle
This bundle is system spe... (#0, active)

Sling - AdapterManager implementati
Bundle implementing the A... (#1, active)

Apache Sling API
The Apache Sling API defi... (#2, active)

Apache Sling Bundle Resource Provid
Provides a ResourceProvid... (#3, active)

Apache Sling JSON Library
Apache Sling JSON Library (#4, active)

Apache Sling Engine Implementation
Bundle implementing the c... (#5, active)

Sling - HTTP Header Authentication
Bundle implementing Basic... (#6, active)

Apache Sling Repository ClassLoader
Provides Support for dele... (#7, active)

Apache Sling Initial Content Loader
This bundle provides init... (#8, active)

Apache Sling Object Content Mapping

Total 44, 0 selected

Bundle activated and started.

(using Sling's installer module)

Plugins for everything

Servlets

Content editors based on JCR node properties

Mime-type based handlers

Debugging/monitoring tools

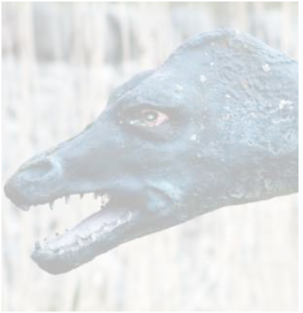
Content renderers and decorators

Legacy integration gateways

Mail and messaging services

etc, etc...

The Bad



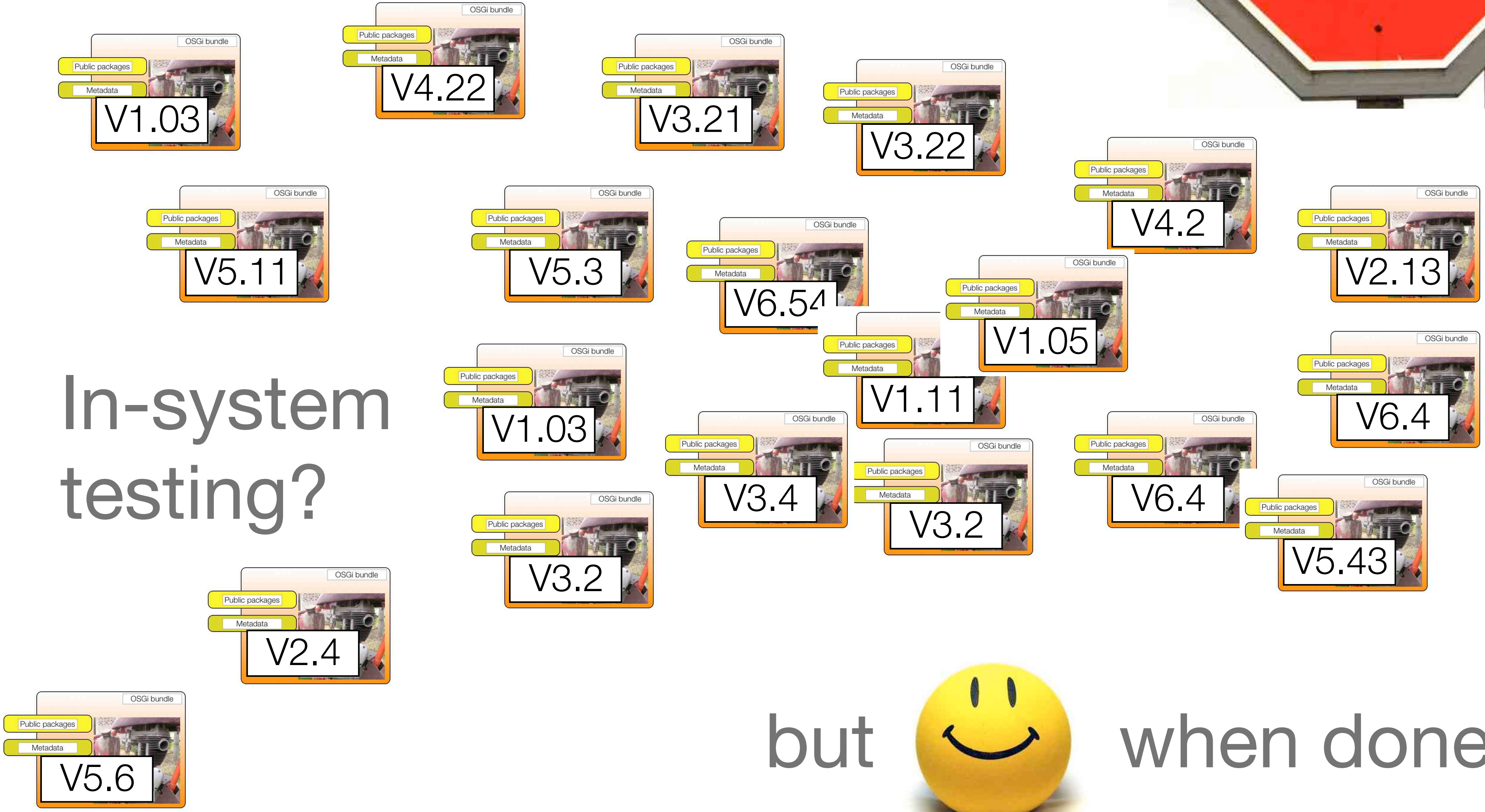
Granularity?

How many bundles? Services?
CQ5: about 200 bundles, 1000 services

How to handle “implementation details” libraries.
Extra bundles or private packages?

Strict version management required.
Are we there yet?

Integration testing...



In-system testing?

but when done!

Testing options

Unit testing

JUnit,
TestNG,
Mocks,
etc..

Necessary but usually not sufficient. Mocks can be painful

In-framework testing

Pax Exam,
Sling testing tools,
etc.

Relatively new tools, can be slow

Integration testing

Start application and test it “from the outside”. See Apache Sling’s launchpad/testing module

Much slower but ok for actual integration testing

I want my...

Spring Guice

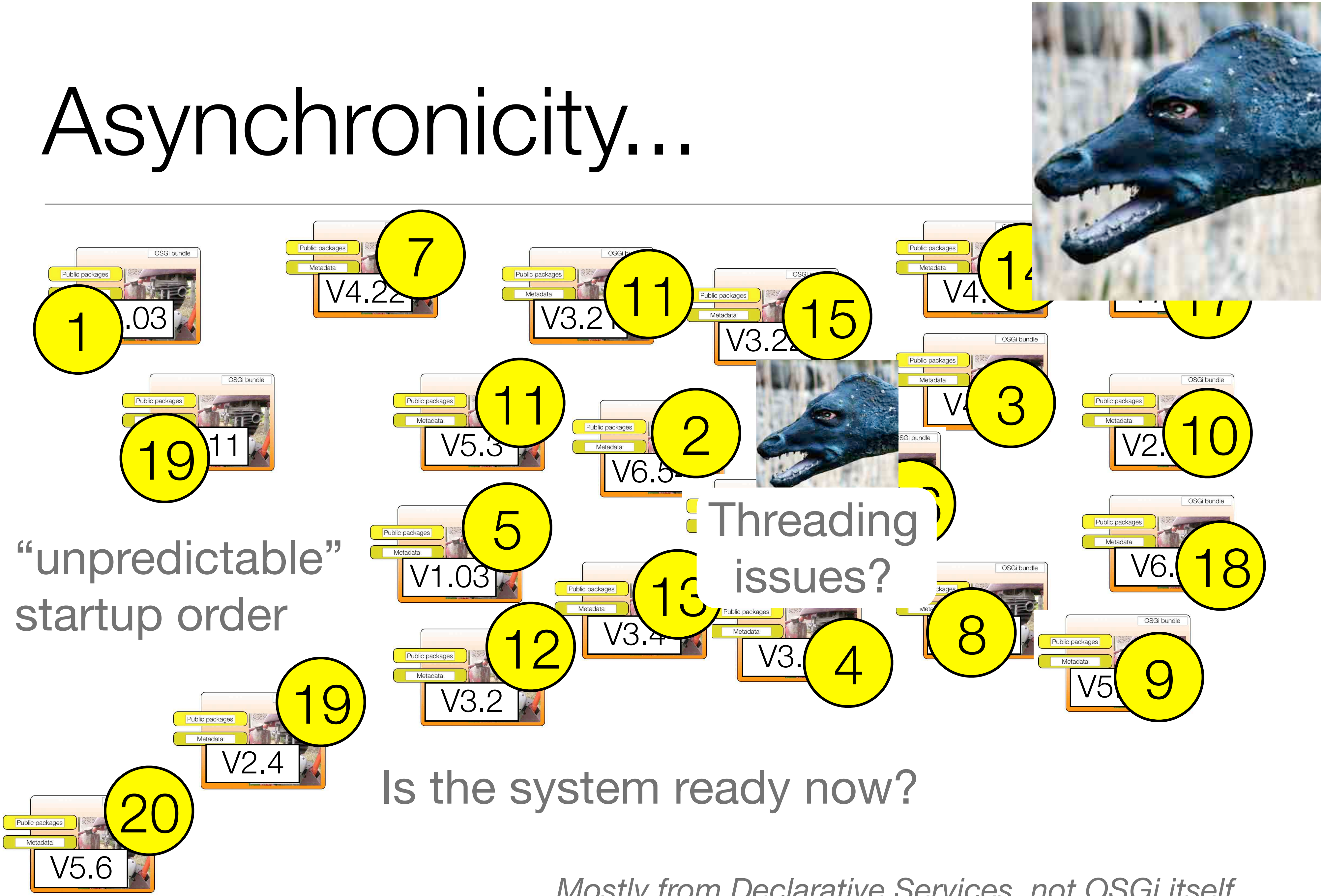
App Server

J2EE

do you *really* need it?

The Ugly

Asynchronicity...



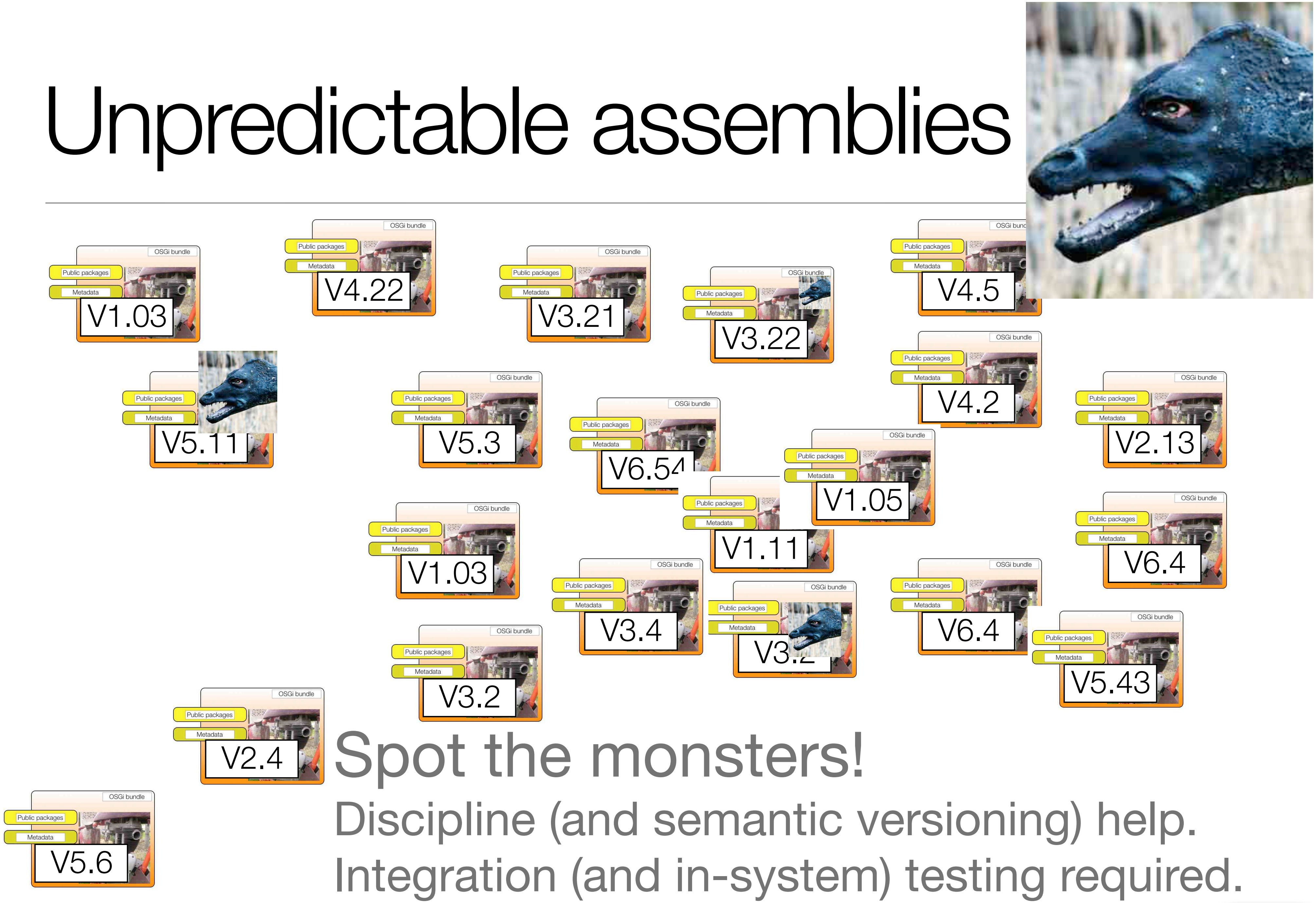
“unpredictable” startup order

Threading issues?

Is the system ready now?

Mostly from Declarative Services, not OSGi itself.

Unpredictable assemblies



Spot the monsters!

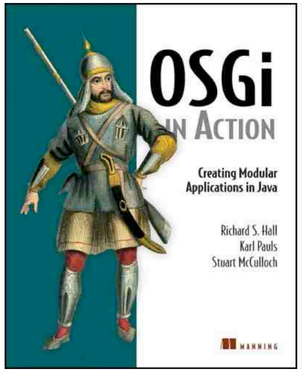
Discipline (and semantic versioning) help.

Integration (and in-system) testing required.

The Summary

My vision back in 2009...

√Developers got used to it (and read the book).


OSGi
IN ACTION
Creating Modular Applications in Java
Richard S. Hall
Karl Pauls
Stuart McCulloch
MANNING

√Frameworks and tools improved.

~~Distributed OSGi? Maybe.~~

√Customers understand OSGi and like it..

√Apache Sling paved the way.

Conclusions

BTW...we are hiring!
jobs-basel@adobe.com

- Modularity. modularity. modularity.
- OSGi fosters **better structured** code
- Dynamic **services** and **plugins** FTW!
- **Tooling** ... getting better all the time
- OSGi is often **unfamiliar** / **unusual**
- **Asynchronous behavior** can be problematic (declarative services)