OSGi™ Community Event 2011

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1O Things to know you are doing OSGi in the wrong way

Mentor/J

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Speaker's bio

- Reach me at :
  - jerome@javaxpert.com
- Works as freelance/writer for Mentor/J
- Architect/Trainer around
  - Java/J2EE/OSGi technologies
- SCJP2 certified
- Jboss architect certified (2003)
- Works with Java since 1996...

Introduction

- This talk looks to different problems
  - Design
  - Development
  - Deboging
- Brings solutions
- Using a Pattern like layout
  - Problem
  - Solution

Item 1 : start levels

```
osgi.bundles=org.eclipse.equinox.common@2:start, \
org.eclipse.core.jobs@4:start,\
org.eclipse.equinox.registry@4:start,\
org.eclipse.core.runtime.compatibility.registry,\
org.eclipse.equinox.preferences@4,\
org.eclipse.core.contenttype@4,\
org.eclipse.core.runtime@4:start,\
org.eclipse.update.configurator@3:start, \
```

Item1 : start levels Introduction

- Your application starts using start level facility of your shell :
  - Introducing new bundles is a nightmare
  - Debuging is tedious
  - Once again you must fully master all runtime dependencies of your application....
- This solution is weak
  - No robustness
  - Like sitting on a bomb …

Item1 : start levels
Solution

- Using any provisioning mechanism
    - Felix File-Install for simple use cases/ embedded contexts
    - Apache Ace for larger infrastructures
- Delegate dependencies assembly to Declarative Services
- Mix start level with File Install is a very efficient solution
    - Just put this single bundle in your start level configuration
    - Configure bundles start with File Install

Item 2:bad logging usage Introduction

- Context :
  - Embedding Log4J or Slf4J with Logback
  - Logging 10 to 20 messages per method call
- Effects :
  - Impact on performance even with isDebugEnabled() calls
  - Huge log files
    - ==> I/O may be very inefficient on mobile devices
    - Who never encountered filesystem full in production ?

Item2 :bad logging usage Solution

- Use LogService
    - Implement a LogReader and isolate it into a separate bundle
    - Activate the bundle into your shell when needed
- Use EventService
    - To provide statistics
        - user request handled
        - Data saved
        - File printed
        - ….
    - Consume these events into another bundle
- Advantage
    - Flexible/performance

Item3:Require-Bundle Introduction

- Require-Bundle should not be supported
- Very few use-cases suited to such keyword
- Goes against the SOA approach
  - No dynamism
  - No way to change the implementation of the required service
  - Very static way to declare dependencies
  - You are tied to one specific version of this bundle...
- Seems to be a hack regarding the whole approach

Item3:Require-Bundle Solution

- Import-Package is your friend...
- Declarative Services enables a very flexible and dynamic way to inject dependencies at runtime
- Please think in a services oriented way...

Item 4:Versioning Introduction

- Import-Package specifying :
  - no version clauses
  - Or coupling against trunk versions
- Implies :
  - What works now won't work in the next weeks
  - How to do unitary & integration testing in such context?
  - Beware of red buttons and cloudy weather in your Hudson reports ...

Item 4:Versioning Solution

- Use strict versioning
  - Prefer ranges to strict version number
  - Use and understand OSGi ISO proposal
    - Version is a 4 digits string
      - Major.minor.sub.discriminant
      - 1.0.0.1
    - Enables you (an engine!!!) to really compare versions
      - Far from stupid Maven strings
      - What can you do (as an engine) with a 1.2.5.FINAL version number ?
      - No natural (and easy to implement) order relationship

Item 5:Spring-DM usage Introduction

- Spring-Dm enables to do OSGi like programming with POJOs
  - Relies on ApplicationContext & BeanFactory standard Spring patterns
  - Code showing OSGi services as Spring beans
  - May use XML / annotation
- Implies
  - No easy way to do natural OSGi stuff (how to get a BundleContext instance?)
  - Application bootstrapping becomes tricky
    - Because of threads launched by Spring D-M
  - Spring XML has a very strong impact
    - I/O
    - Memory footprint of the beans context

Item 5 : Spring D-M Solution

- Use standard OSGi facilities & patterns
  - Declarative Services
  - Provisioning
  - Library wrapping

Item 6:Not using bnd ? Introduction

- Developement made using any mechanism (PDE on Eclipse) without control of the MANIFEST.MF file ?
    - Application is out of control
    - Maintenance will be very hard
    - Beware of shortcuts used by some developers

Item 6:Not using bnd ? Solution

- Use it !!!
  - Integration with Maven/ANT/Eclipse/intelliJ Idea
  - Directly or through a layer like the excellent BndTools for Eclipse
- Why ?
  - The only tool reflecting the OSGi norm spirit
  - Provides quick & standard answer to the most common problems

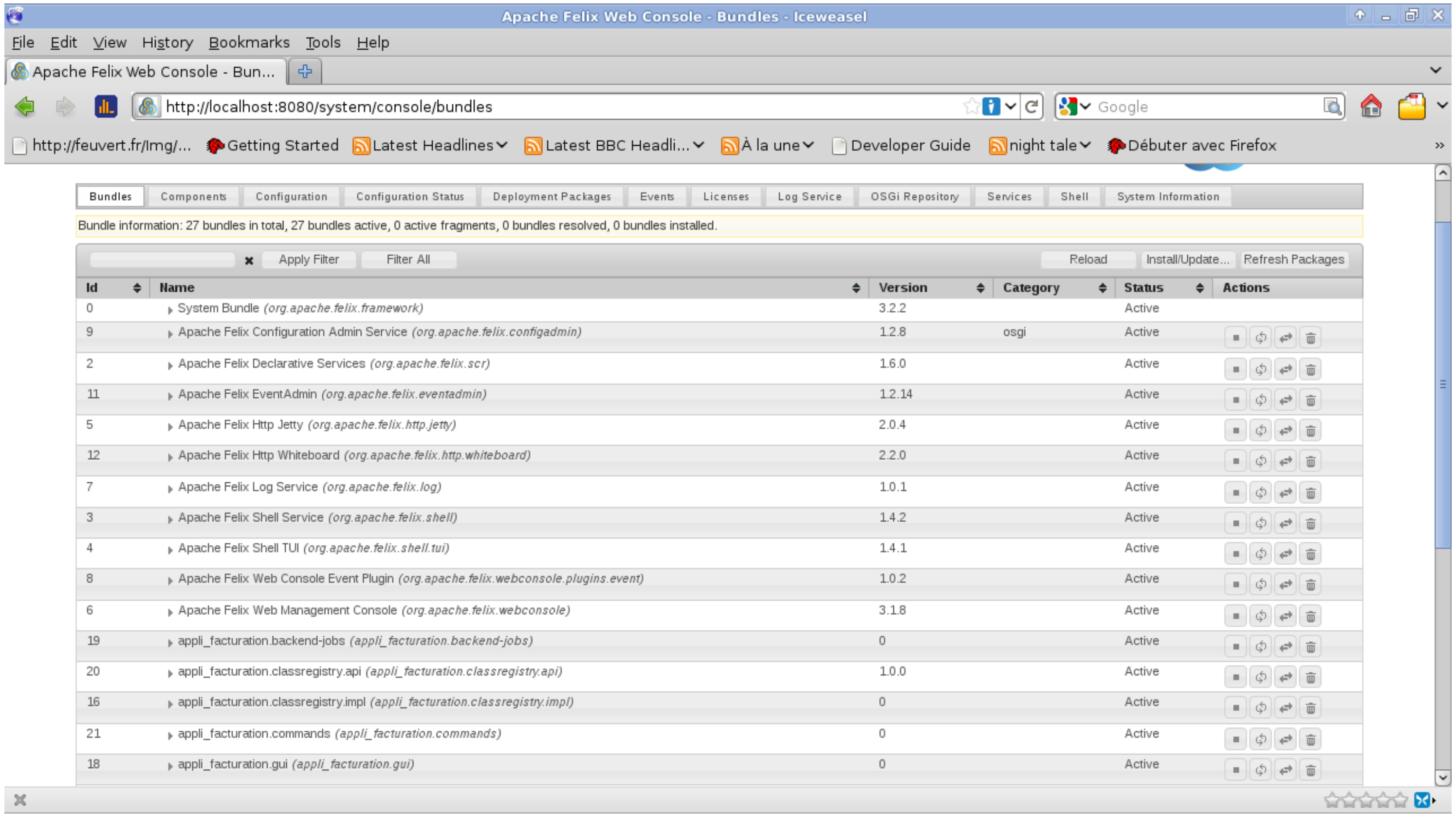
Item 7:Not using Web-Console ? Introduction

- How to diagnose weird problems at runtime ?
  - Unmet dependencies
  - Receivers listening on bad topics (typo in the name spelling)
- Logging ?
  - Performance impact
  - What to do with many traces not appearing (because of code not invoked) ?

Item 7:Not using Web-Console ? Solution

- Use it !!!
- How ?
  - Add a few bundles
  - Type in an url into your web browser and that's it !!!
- Moreover...
  - It's an open system (plugins like architecture)
  - It's free
  - Very low footprint and weak requirements
  - You get an easy way to monitor your system
  - CPU
  - memory
- But
  - Beware on mobile devices , the NIO stack may not be available on your JVM

Item 7 : Web-Console bundles list & states


Apache Felix Web Console - Bundles - Iceweasel

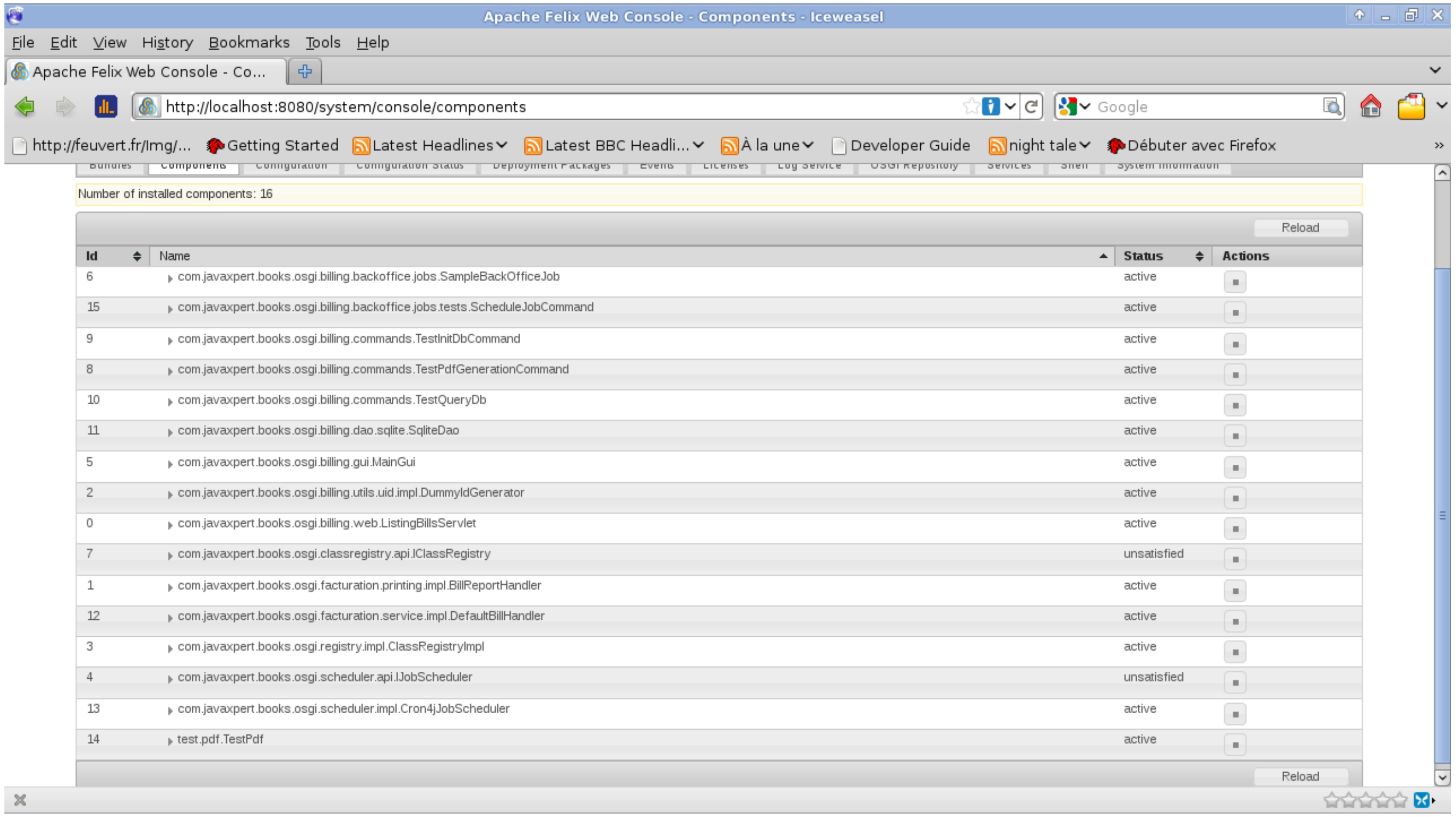
http://localhost:8080/system/console/bundles

Bundle information: 27 bundles in total, 27 bundles active, 0 active fragments, 0 bundles resolved, 0 bundles installed.

Id	Name	Version	Category	Status	Actions
0	System Bundle *(org.apache.felix.framework)*	3.2.2		Active	
9	Apache Felix Configuration Admin Service *(org.apache.felix.configadmin)*	1.2.8	osgi	Active	
2	Apache Felix Declarative Services *(org.apache.felix.scr)*	1.6.0		Active	
11	Apache Felix EventAdmin *(org.apache.felix.eventadmin)*	1.2.14		Active	
5	Apache Felix Http Jetty *(org.apache.felix.http.jetty)*	2.0.4		Active	
12	Apache Felix Http Whiteboard *(org.apache.felix.http.whiteboard)*	2.2.0		Active	
7	Apache Felix Log Service *(org.apache.felix.log)*	1.0.1		Active	
3	Apache Felix Shell Service *(org.apache.felix.shell)*	1.4.2		Active	
4	Apache Felix Shell TUI *(org.apache.felix.shell.tui)*	1.4.1		Active	
8	Apache Felix Web Console Event Plugin *(org.apache.felix.webconsole.plugins.event)*	1.0.2		Active	
6	Apache Felix Web Management Console *(org.apache.felix.webconsole)*	3.1.8		Active	
19	appli_facturation.backend-jobs *(appli_facturation.backend-jobs)*	0		Active	
20	appli_facturation.classregistry.api *(appli_facturation.classregistry.api)*	1.0.0		Active	
16	appli_facturation.classregistry.impl *(appli_facturation.classregistry.impl)*	0		Active	
21	appli_facturation.commands *(appli_facturation.commands)*	0		Active	
18	appli_facturation.gui *(appli_facturation.gui)*	0		Active	

File Edit View History Bookmarks Tools Help
Bundles Components Configuration Configuration Status Deployment Packages Events Licenses Log Service OSGi Repository Services Shell System Information
Apply Filter
Filter All
Reload
Install/Update...
Refresh Packages

Item 7 : Web-Console displaying components

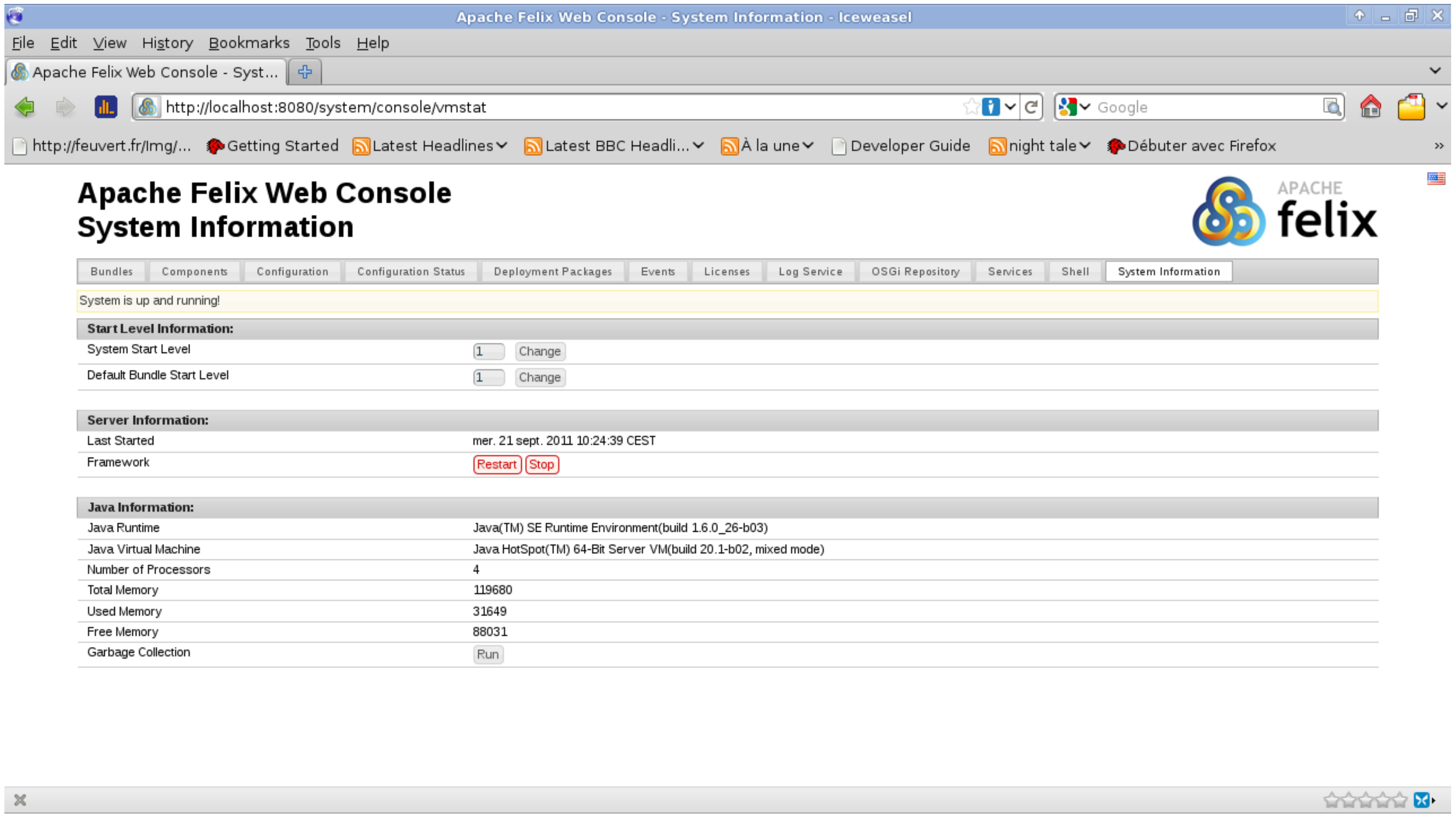


Apache Felix Web Console - Components - Iceweasel
File Edit View History Bookmarks Tools Help
Apache Felix Web Console - Co...
http://localhost:8080/system/console/components
Google
http://feuvert.fr/Img/... Getting Started Latest Headlines Latest BBC Headli... À la une Developer Guide night tale Débuter avec Firefox
Bundles Components Configuration Configuration Status Deployment Packages Events Licenses Log Service OSGi Repository Services Shell System Information
Reload

Number of installed components: 16

Id	Name	Status	Actions
6	com.javaxpert.books.osgi.billing.backoffice.jobs.SampleBackOfficeJob	active	■
15	com.javaxpert.books.osgi.billing.backoffice.jobs.tests.ScheduleJobCommand	active	■
9	com.javaxpert.books.osgi.billing.commands.TestInitDbCommand	active	■
8	com.javaxpert.books.osgi.billing.commands.TestPdfGenerationCommand	active	■
10	com.javaxpert.books.osgi.billing.commands.TestQueryDb	active	■
11	com.javaxpert.books.osgi.billing.dao.sqlite.SqliteDao	active	■
5	com.javaxpert.books.osgi.billing.gui.MainGui	active	■
2	com.javaxpert.books.osgi.billing.utils.uid.impl.DummyIdGenerator	active	■
0	com.javaxpert.books.osgi.billing.web.ListingBillsServlet	active	■
7	com.javaxpert.books.osgi.classregistry.api.IClassRegistry	unsatisfied	■
1	com.javaxpert.books.osgi.facturation.printing.impl.BillReportHandler	active	■
12	com.javaxpert.books.osgi.facturation.service.impl.DefaultBillHandler	active	■
3	com.javaxpert.books.osgi.registry.impl.ClassRegistryImpl	active	■
4	com.javaxpert.books.osgi.scheduler.api.IJobScheduler	unsatisfied	■
13	com.javaxpert.books.osgi.scheduler.impl.Cron4jJobScheduler	active	■
14	test.pdf.TestPdf	active	■

Item 7 : Web-Console getting system info


Apache Felix Web Console - System Information - Iceweasel
File Edit View History Bookmarks Tools Help
Apache Felix Web Console - Syst...
http://localhost:8080/system/console/vmstat
Google
http://feuvert.fr/Img/... Getting Started Latest Headlines Latest BBC Headli... À la une Developer Guide night tale Débuter avec Firefox
APACHE felix
Bundles Components Configuration Configuration Status Deployment Packages Events Licenses Log Service OSGi Repository Services Shell System Information

Apache Felix Web Console
System Information

System is up and running!

Start Level Information:

System Start Level	1 Change
Default Bundle Start Level	1 Change

Server Information:

Last Started	mer. 21 sept. 2011 10:24:39 CEST
Framework	Restart Stop

Java Information:

Java Runtime	Java(TM) SE Runtime Environment(build 1.6.0_26-b03)
Java Virtual Machine	Java HotSpot(TM) 64-Bit Server VM(build 20.1-b02, mixed mode)
Number of Processors	4
Total Memory	119680
Used Memory	31649
Free Memory	88031
Garbage Collection	Run

Item 8:Are you really using modules ? introduction

- Do you separate API bundles from implementation ones ?
- Can you pick off any implementation bundle and put another one in place without breaking the whole system ?
  - Major benefit from the SOA approach
  - Enables early testing and suits well with Agile methods

Item 8:Are you really using modules ? Solution

- Isolate API (interfaces) from implementation
- Inject dependency over the API with any implementation

Item 9:Are you really using modules(2)

- Can you put your bundle into another shell without pulling the whole Java constellation of libraries as dependencies ?
  - Too much dependencies implies a very particular context
  - Beware of the never ending stories
    - A requires B requires C and D , C requires F and D requires.....
    - Headache warranty
  - May be sign for not reusable components

Item 9 : Are you really using modules(2) ?

- Unproper control over dependencies is the heart of this problem
- Different solutions
  - Rewrite some routines
  - Wrap some portions of libraries into dedicated bundles

Item 10 : Still don't understand versioning ?

Problem :

You think that 2.5.6.PRE-FINAL is a nice version number for your component or 3.1.2.20120223 is correct....

Item 10 : Still Don't understand versioning ?

- Solution
  - Read the excellent doc : semantic versioning
  - Use the numbering scheme as purposed by OSGi Alliance :
  - Major.minor.subminor.modifier
  - All four fields as plain numbers....
- Benefits :
- Natural ordering is so easy ….
- Or use part of this scheme :
- Major.minor.subminor is nice in practice ….

Bonus Item :How do you solve your problems ?

- Alone ?
  - Can be sufficient for most code related problems...
- With newsgroups/forums ?
  - Pragmatic way but not well suited for design/philosphical problems
- Best solution :
  - Have some OSGi lunches please refer to http://
  - Share a beer/glass of wine/ best french fries in the world (only in Lansargues – Herault - France)

Thanks !!!!

Any question at this point ? It 's up to you now...