Michael Greifeneder

# OSGi

## The Next Generation Java Service Platform

SOA - The Java Way
or
My classpath is killing me

Bilder von Peter Kriens “W-JAX Keynote 2007” und
Neil Bartletts “Getting Started with OSGi”

# Inhalt

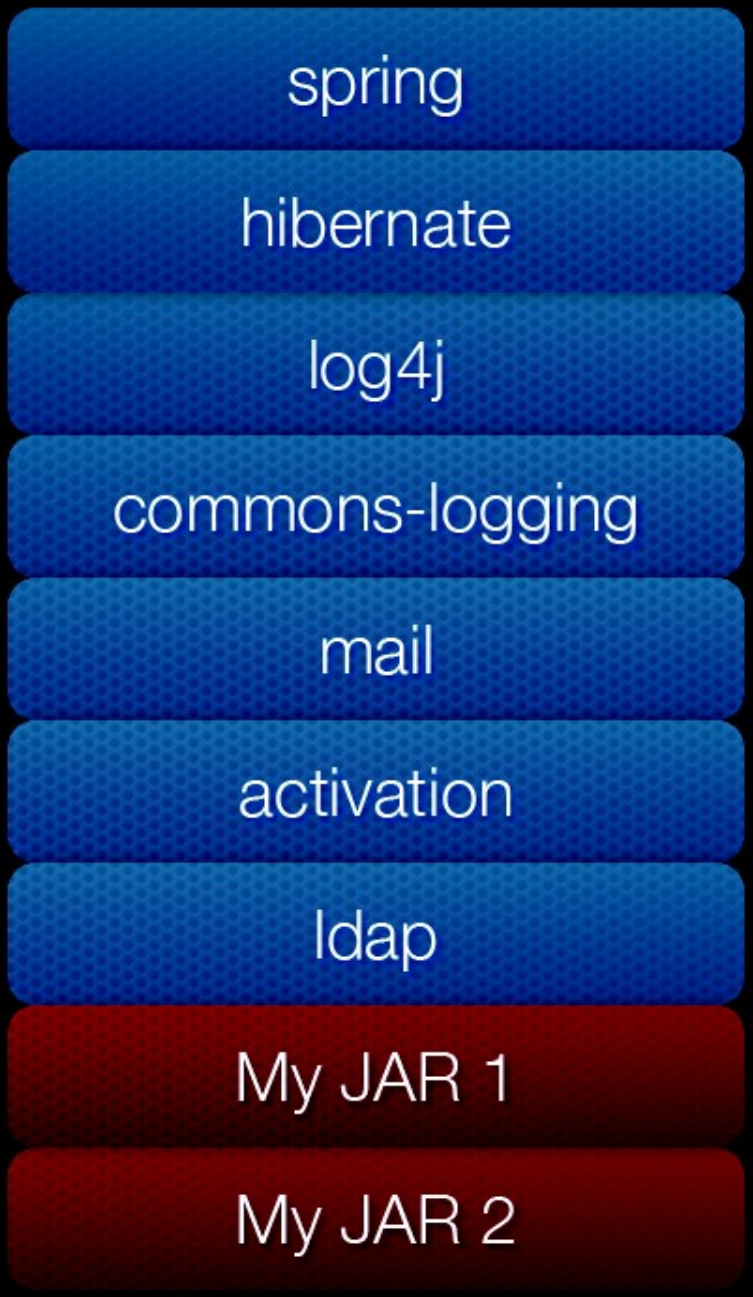
- Problem
- OSGi
- SOA
- Tools

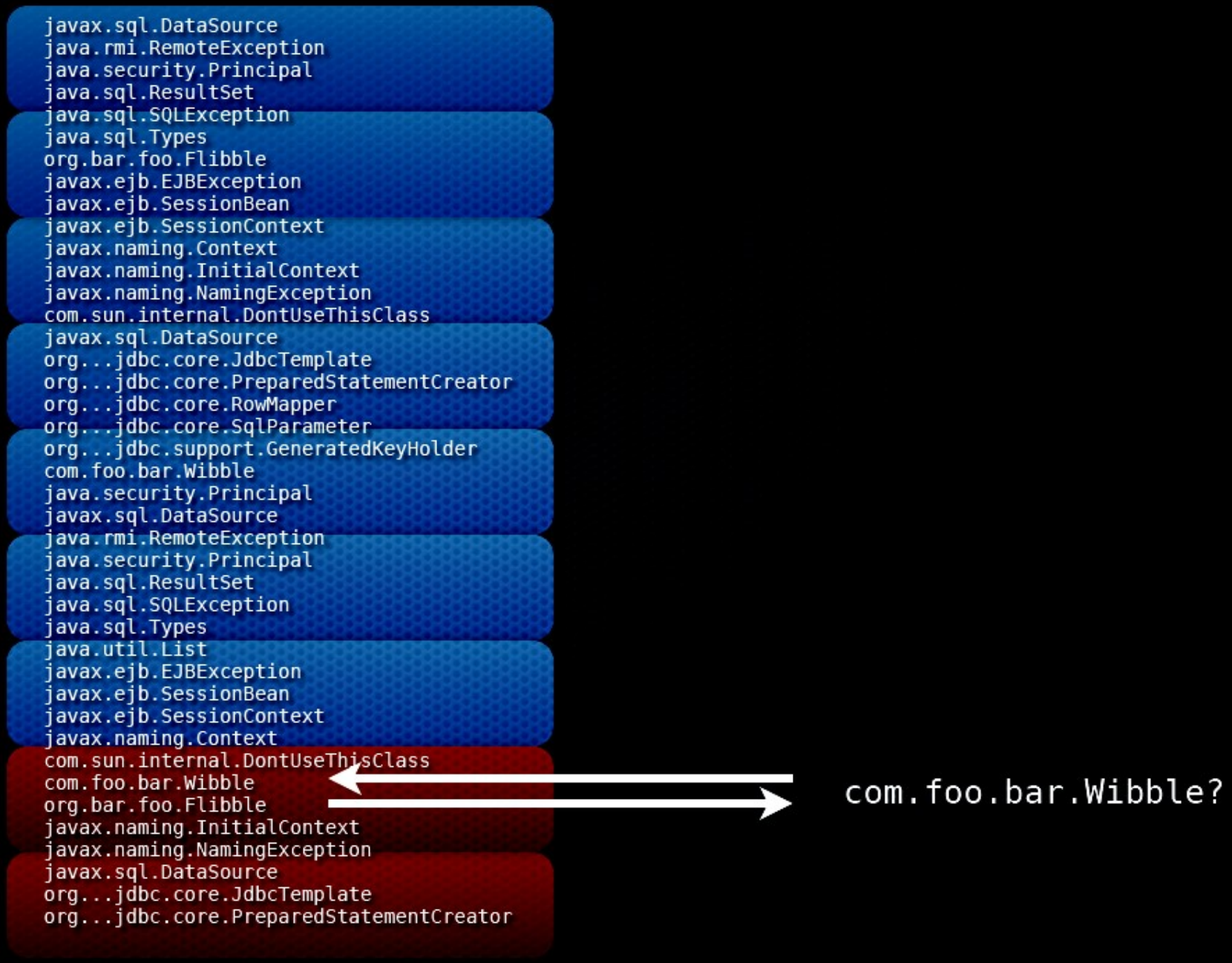
# Warum OSGi?

# The Humble JAR File

# Typical Java Application


JAR
HELL


spring
hibernate
log4j
commons-logging
mail
activation
ldap
My JAR 1
My JAR 2


javax.sql.DataSource
java.rmi.RemoteException
java.security.Principal
java.sql.ResultSet
java.sql.SQLException
java.sql.Types
org.bar.foo.Flibble
javax.ejb.EJBException
javax.ejb.SessionBean
javax.ejb.SessionContext
javax.naming.Context
javax.naming.InitialContext
javax.naming.NamingException
com.sun.internal.DontUseThisClass
javax.sql.DataSource
org...jdbc.core.JdbcTemplate
org...jdbc.core.PreparedStatementCreator
org...jdbc.core.RowMapper
org...jdbc.core.SqlParameter
org...jdbc.support.GeneratedKeyHolder
com.foo.bar.Wibble
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java.security.Principal
java.sql.ResultSet
java.sql.SQLException
java.sql.Types
java.util.List
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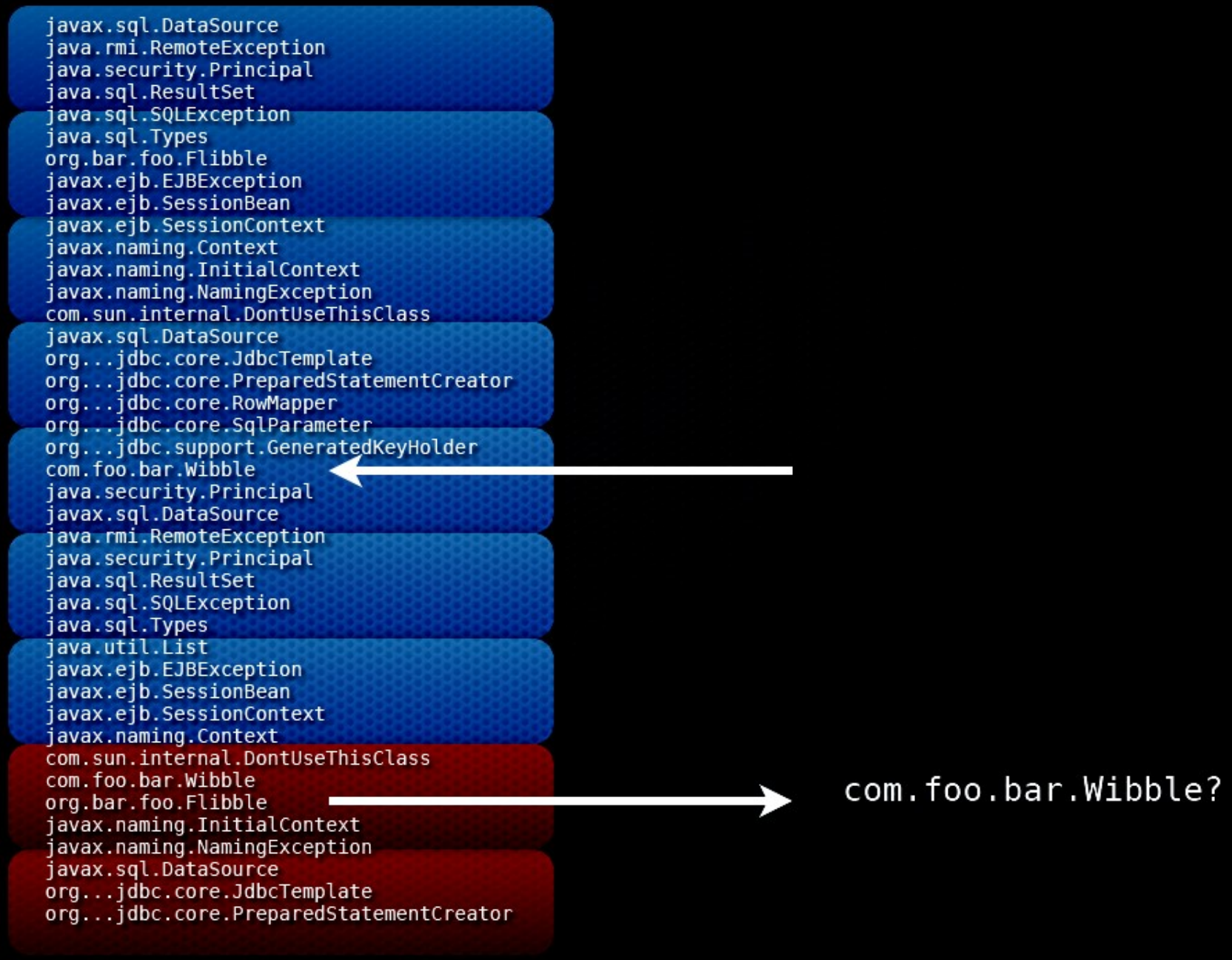
org...jdbc.core.PreparedStatementCreator
com.foo.bar.Wibble?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java.rmi.RemoteException
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java.sql.SQLException
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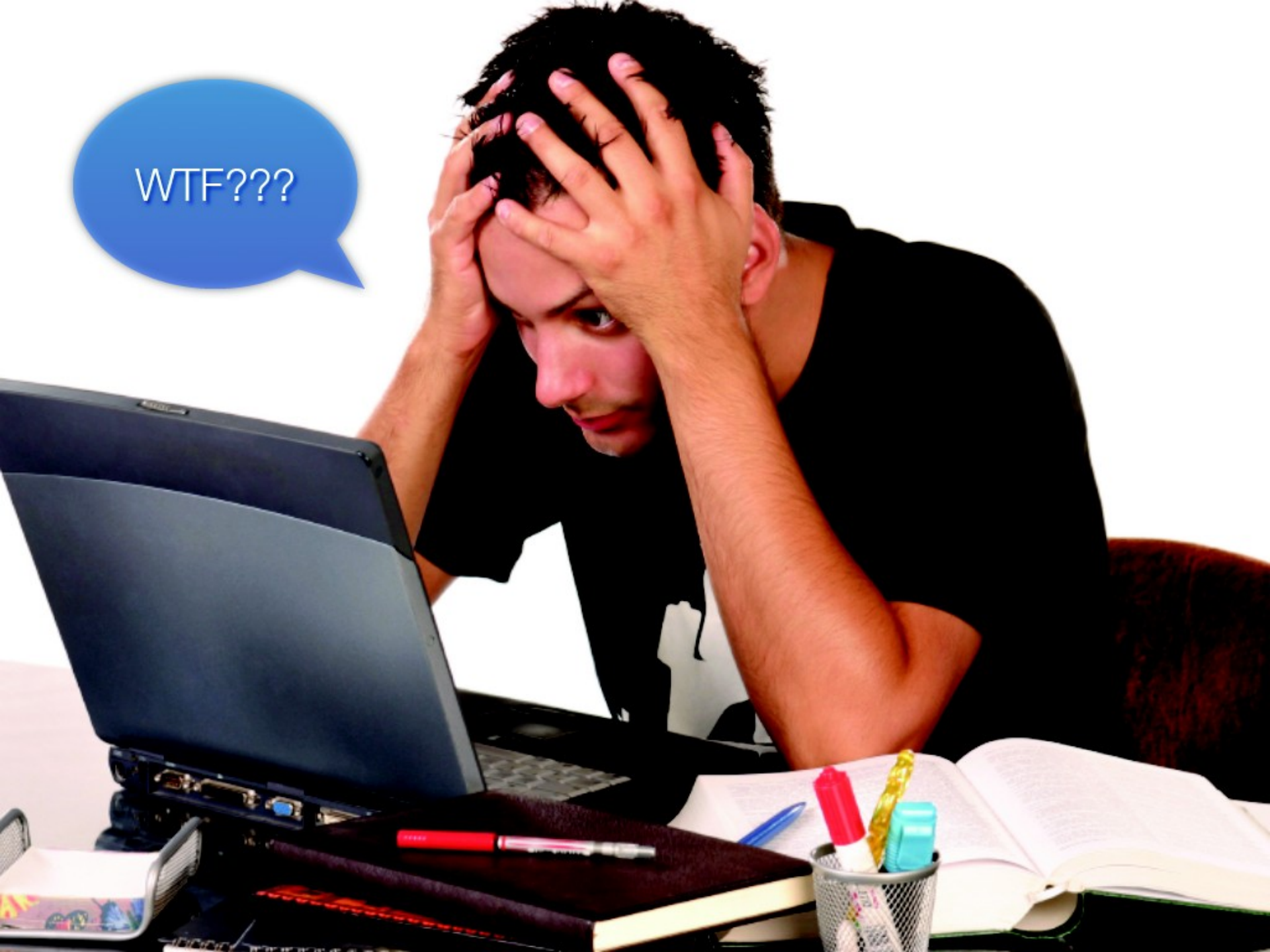
javax.sql.DataSource
org...jdbc.core.JdbcTemplate
org...jdbc.core.PreparedStatementCreator
com.foo.bar.Wibble?

Im besten Fall:

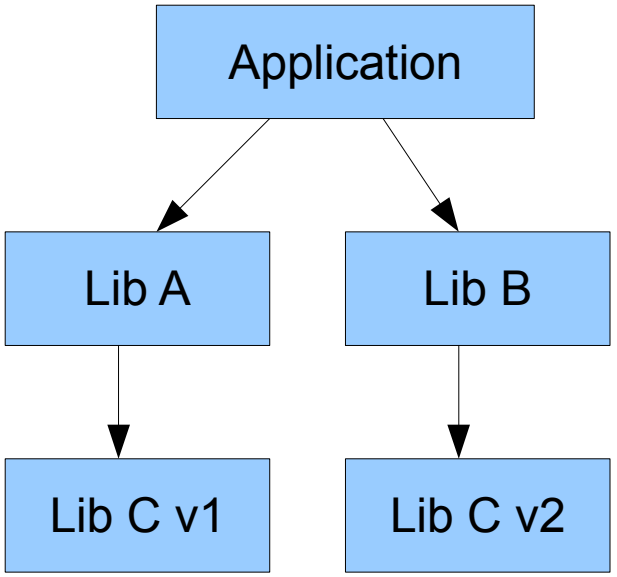
```
mike@aphrodite:~/tmp/screenshot$ java org.bar.foo.Flibble
Exception in thread "main" java.lang.NoSuchMethodError: com.foo.bar.Wibb
le.start()V
        at org.bar.foo.Flibble.main(Flibble.java:7)
mike@aphrodite:~/tmp/screenshot$
```

Aber auch dieses Verhalten möglich:

```
mike@aphrodite:~/tmp/screenshot$ java org.bar.foo.Flibble
Now doing something completly different...HA!!!
mike@aphrodite:~/tmp/screenshot$
```


WTF???

# Was fehlt?

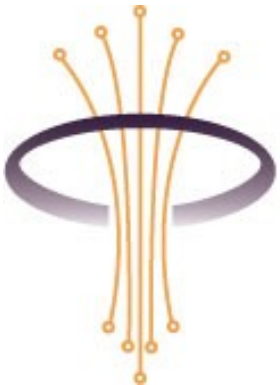



- Sinnvoller Name für Jar
- Version
- Abhängigkeiten
- Verstecken von internen Klassen
- Late Binding, Dynamics

# OSGi

- Ursprünglich “Open Service Gateway Initiative” für Embedded Systems
- Heute: Dynamic Module System For Java
- Eclipse basiert seit Version 3.0 auf OSGi.
- OSGi Alliance definiert Spezifikation seit '99
  - Mitglieder: Nokia, IBM,...
  - Aktuelles Release 4.1

http://www.osgi.org



OSGi™ Alliance

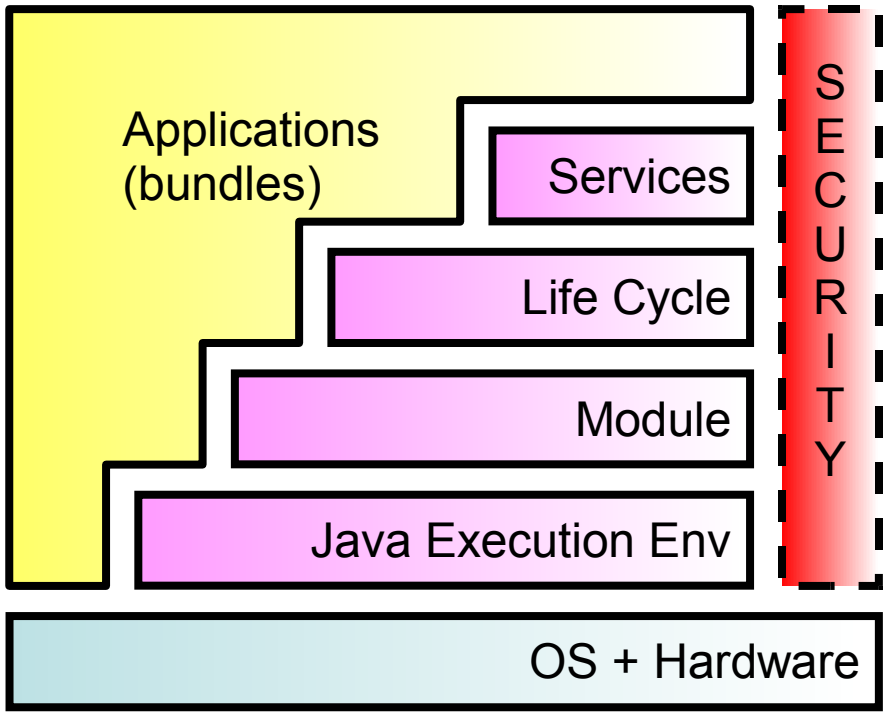
# Implementierungen


- Equinox
  - Unterbau für Eclipse, Common Public License
    http://www.eclipse.org/equinox/


- Apache Felix
  - Apache License, http://felix.apache.org
- Makewave Knopflerfish
  - BSD style license, http://www.knopflerfish.org/
  - GUI und Web-Console

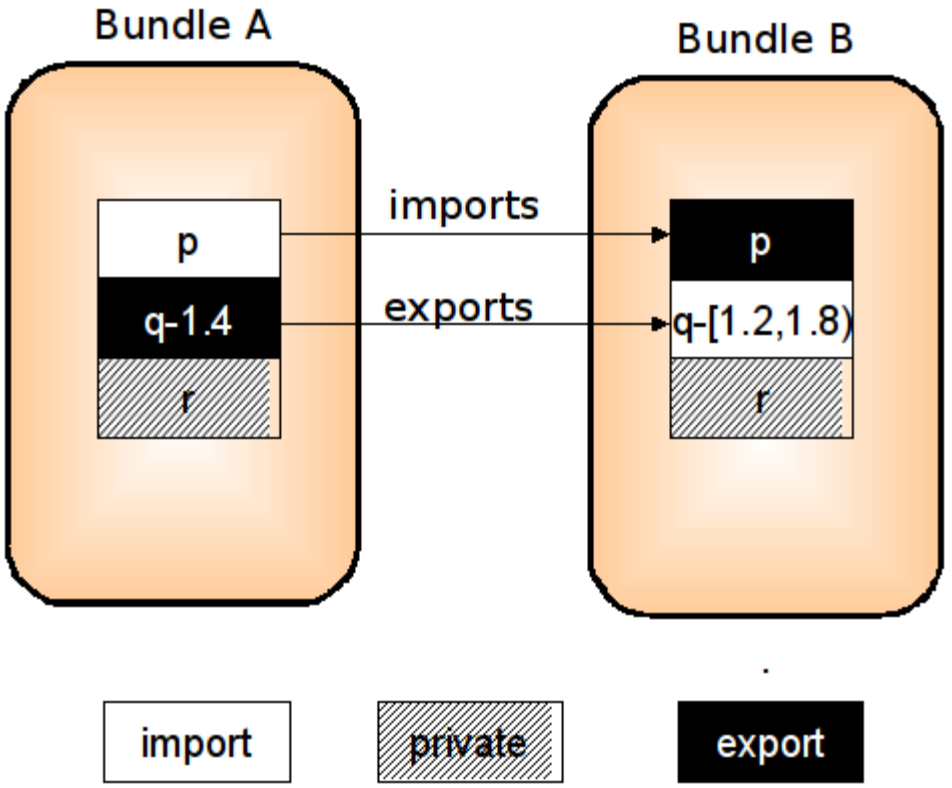
# Framework

- L0: Execution Environment
  - Profile definieren Minimum: Mobile, J2SE, EE
- L1: Modules
- L2: Life Cycle Management
- L3: Service Registry



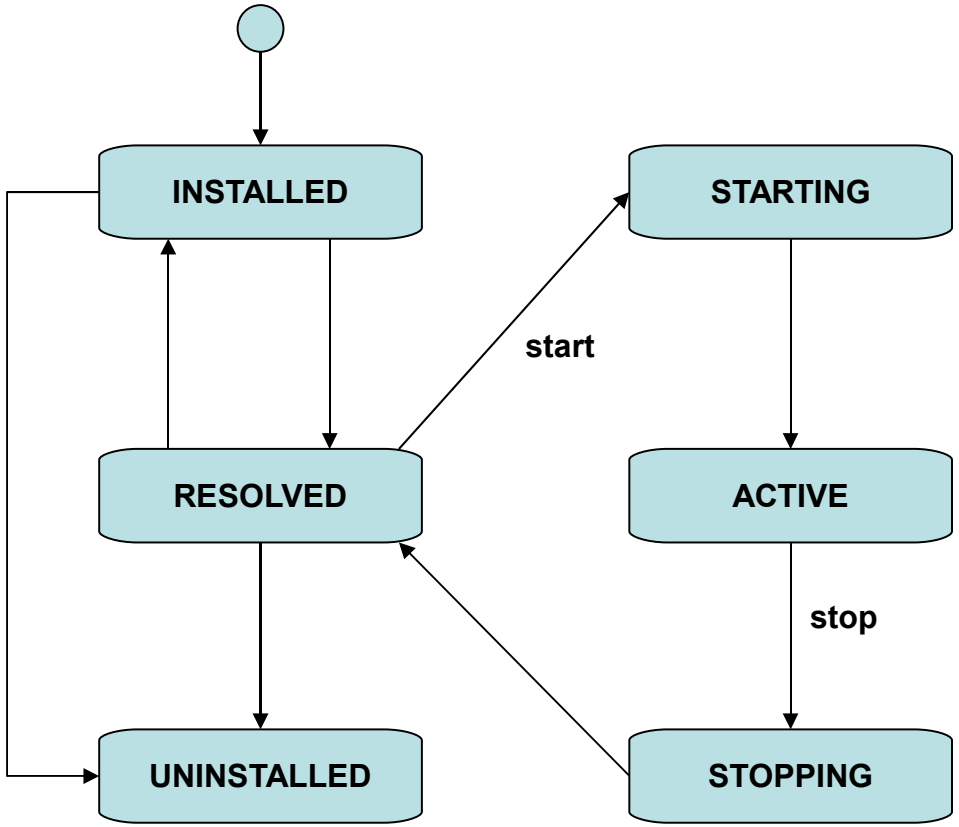
# Modules

- Modularisierung durch Bundles
- Eigene Classloader
- Schutz von Packages
- Versionierung



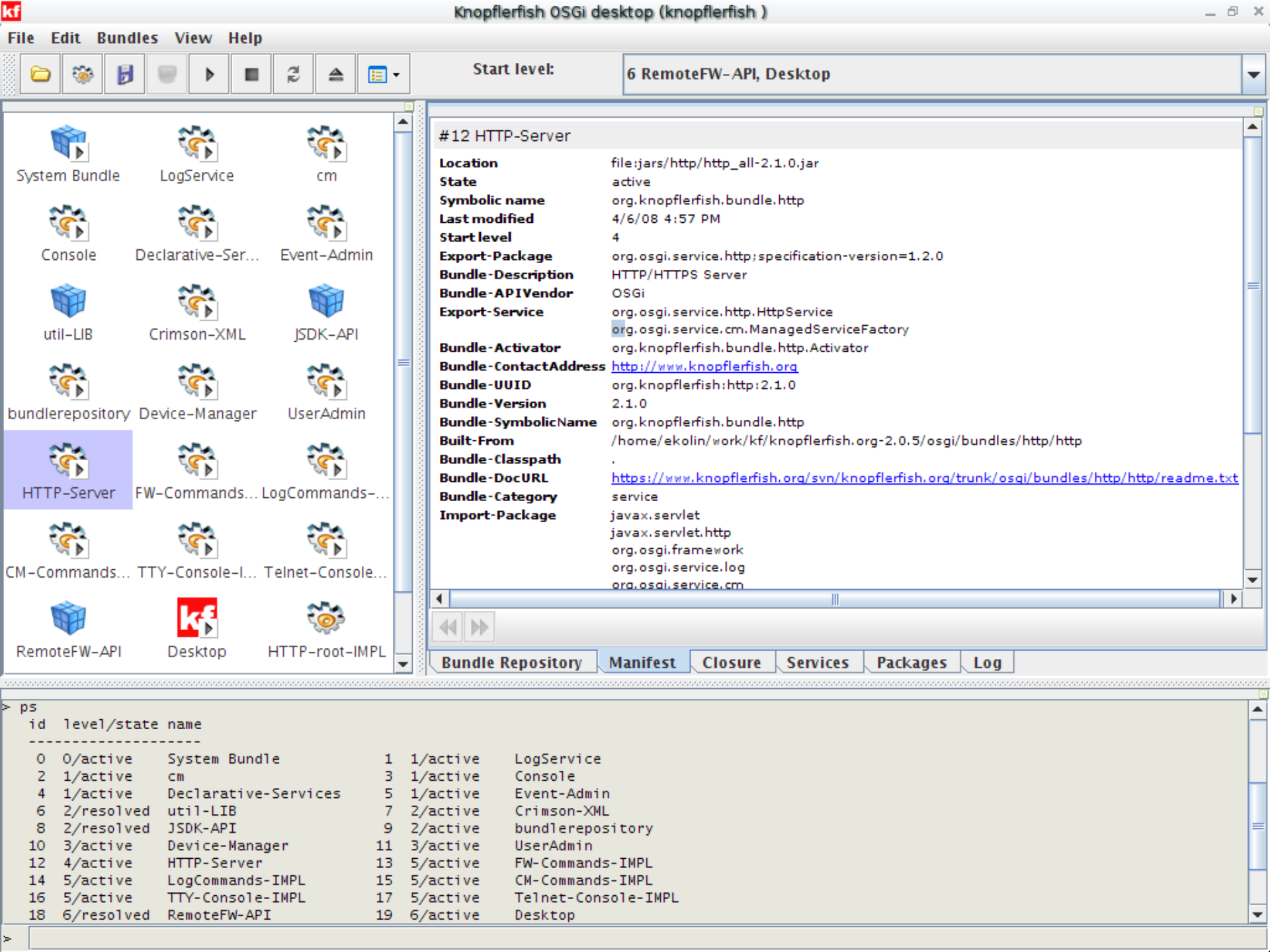
# Lifecycle

- Jedes Bundle hat Lifecycle
- Bundle Manager ist Teil der Spezifikation



# Metadaten

- META-INF/MANIFEST.MF
  - Bundle-Name: test.movieservice
    Bundle-SymbolicName: test.movieservice
  - Bundle-Version: 1.0.0.SNAPSHOT
  - Export-Package: test.movieservice
  - Import-Package: test.dto
  - BundleActivator:
    test.movieservice.BundleActivator


Knopflerfish OSGi desktop (knopflerfish )
File Edit Bundles View Help
Start level:
6 RemoteFW-API, Desktop
System Bundle
LogService
cm
Console
Declarative-Ser...
Event-Admin
util-LIB
Crimson-XML
JSDK-API
bundlerepository
Device-Manager
UserAdmin
HTTP-Server
FW-Commands...
LogCommands-...
CM-Commands...
TTY-Console-I...
Telnet-Console...
RemoteFW-API
Desktop
HTTP-root-IMPL
#12 HTTP-Server
Location file:jars/http/http_all-2.1.0.jar
State active
Symbolic name org.knopflerfish.bundle.http
Last modified 4/6/08 4:57 PM
Start level 4
Export-Package org.osgi.service.http;specification-version=1.2.0
Bundle-Description HTTP/HTTPS Server
Bundle-APIVendor OSGi
Export-Service org.osgi.service.http.HttpService
org.osgi.service.cm.ManagedServiceFactory
Bundle-Activator org.knopflerfish.bundle.http.Activator
Bundle-ContactAddress http://www.knopflerfish.org
Bundle-UUID org.knopflerfish:http:2.1.0
Bundle-Version 2.1.0
Bundle-SymbolicName org.knopflerfish.bundle.http
Built-From /home/ekolin/work/kf/knopflerfish.org-2.0.5/osgi/bundles/http/http
Bundle-Classpath .
Bundle-DocURL https://www.knopflerfish.org/svn/knopflerfish.org/trunk/osgi/bundles/http/http/readme.txt
Bundle-Category service
Import-Package javax.servlet
javax.servlet.http
org.osgi.framework
org.osgi.service.log
org.osgi.service.cm
Bundle Repository
Manifest
Closure
Services
Packages
Log
> ps
id level/state name
0 0/active System Bundle
1 1/active LogService
2 1/active cm
3 1/active Console
4 1/active Declarative-Services
5 1/active Event-Admin
6 2/resolved util-LIB
7 2/active Crimson-XML
8 2/resolved JSDK-API
9 2/active bundlerepository
10 3/active Device-Manager
11 3/active UserAdmin
12 4/active HTTP-Server
13 5/active FW-Commands-IMPL
14 5/active LogCommands-IMPL
15 5/active CM-Commands-IMPL
16 5/active TTY-Console-IMPL
17 5/active Telnet-Console-IMPL
18 6/resolved RemoteFW-API
19 6/active Desktop
>

# Probleme

- Jars müssen angepasst werden
  - Metadaten
- Libraries, die eigene Classloader verwenden
  - z.B.: Hibernate
- Dynamik der Bundles und Services schwerer zu handhaben

# Services - SOA?

- “SOA ist doch was mit Webservices, oder?”

# SOA
# mit Webservices
# und XML

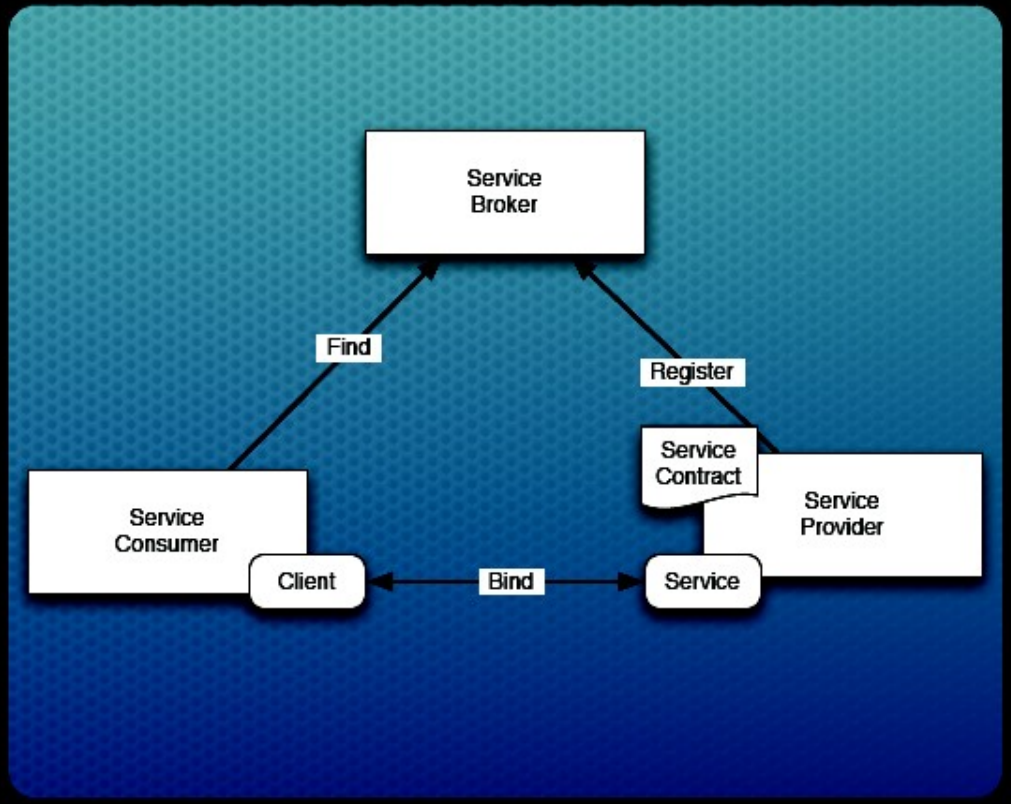

http://www.flickr.com/photos/psd/114552560/in/set-72057594085366895/

# Services - SOA?

- Webservices bieten Dienste im Netz an und greifen über das Netz auf andere Services zurück.
  XML dient als Lingua Franka zwischen verschiedenen Plattformen
- Die OSGi Service Platform stellt Services innerhalb einer Java VM zur Verfügung

# SOA for the JVM

- Broker = OSGi Service Registry
- Service = Java Object
- Client = Java Object
- Contract = Interface



# Services

- System Services
  - Log Service, Preferences Service, Configuration Admin Service, User Admin Service, ...
- Protocol Services
  - HTTP Service , UPnP Service, ...
- Other
  - XML Parser Service, ...

# Services

- Manuelle Registrierung

```
class X implements BundleActivator {
  public void start(BundleContext context) {
     DbService s = new MyDbService();
     context.registerService(
        DbService.class.getName(), s);
  }

}
```

# Services

- Manuelle Verwendung

```
ServiceReference ref =
   context.getServiceReference(
      DbService.class.getName());
if (ref != null) {
   DbService s = context.lookup(ref);
   if (s != null) {
      s.callDbService();
   }
}
```

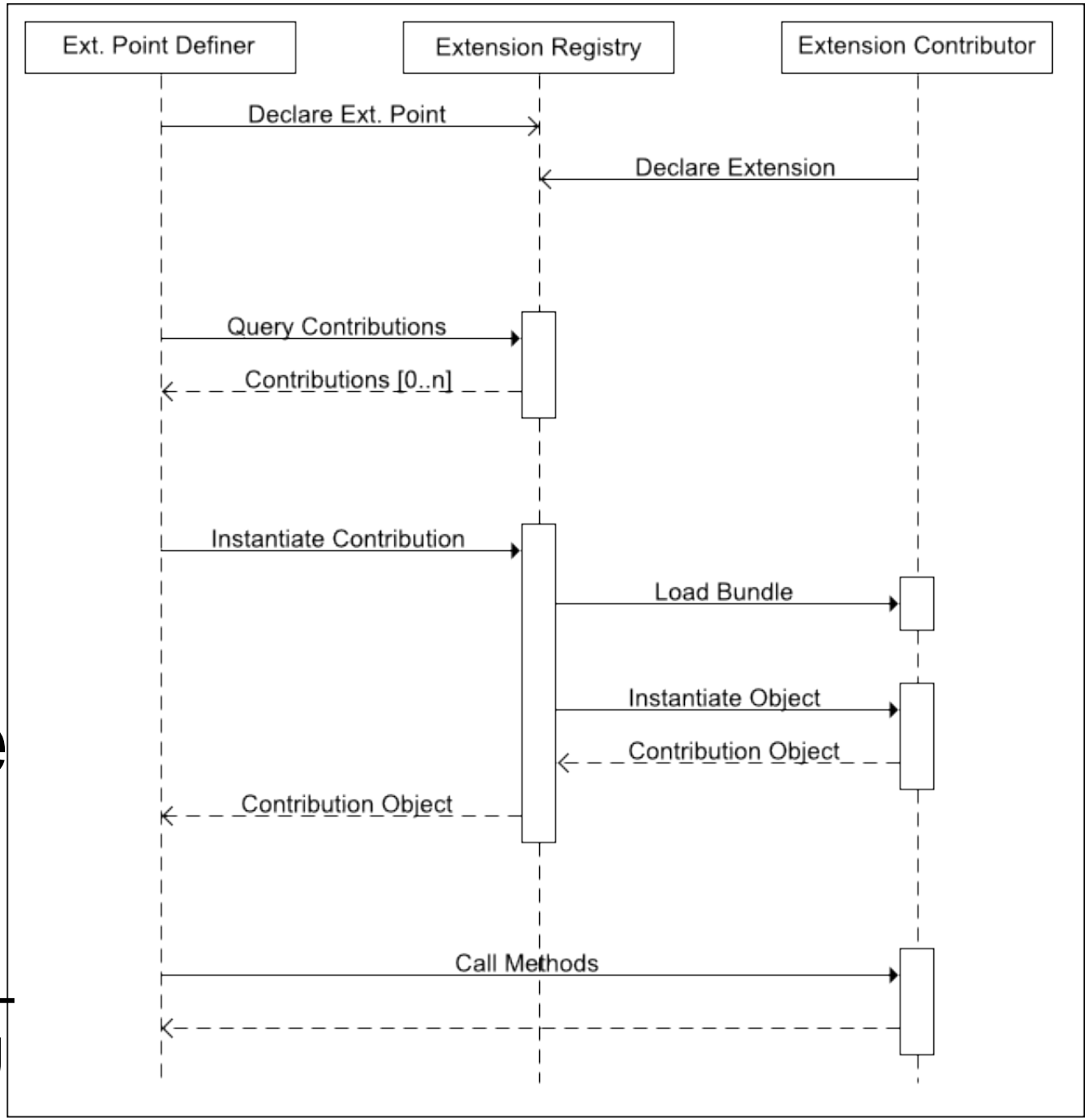
- Flexibel, aber mühsam

# Equinox-Extensions

- Extensions sind Deklarationen
- Lazy Loading
- z.B. Menüpunkte

# Declarative Services

- Deklaration in XML
- Kein Lazy Loading




http://www.eclipsezone.com/articles/extensions-vs-services/images/extensions.png

# Spring Dynamic Modules

for OSGi(tm) Service Platforms

- Wie Spring Framework unter Apache Lizenz
- Spring konfiguriert Anwendungen und kümmert sich um
  - Injektion und Deklaration von Services
  - Transaktionen
  - Logging
  - Datenbankabstraktion

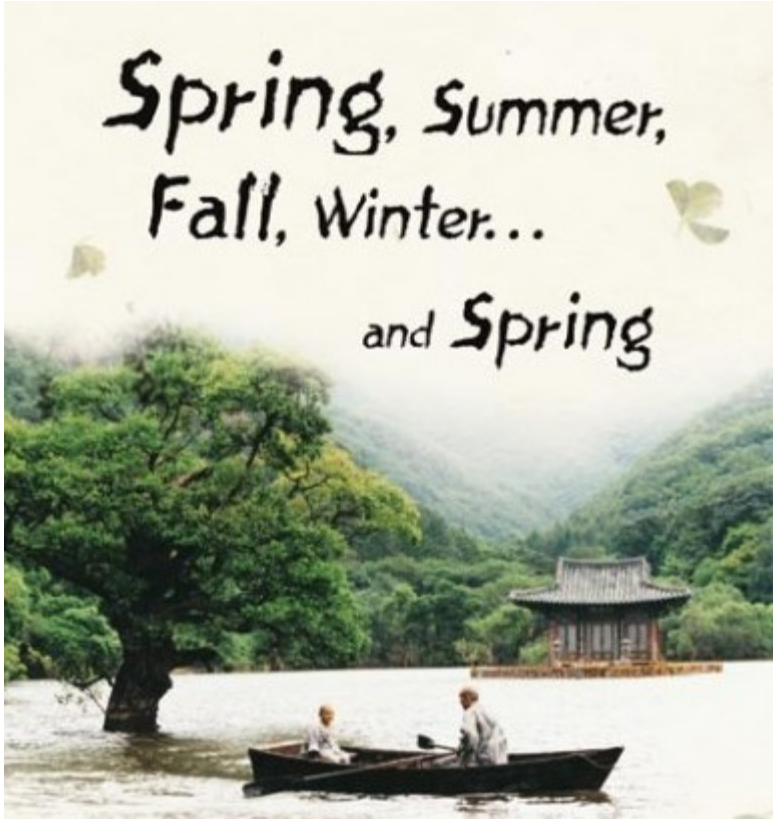
http://www.springframework.org/osgi

# Spring DM

- META-INF/spring/*-context.xml
- <osgi:reference id="db4oOsgiService" interface="com.db4o.osgi.Db4oService"/>
- <bean name="MovieServiceDb4o" class="test.movieservice.db4o.MovieServiceImpl" init-method="start" destroy-method="stop"> <property name="db4oService" ref="db4oOsgiService"></property> </bean>
- <osgi:service id="db4oMovieService" ref="MovieServiceDb4o" interface="test.movieservice.MovieService"> </osgi:service>

# PAX


- Projekte von OPS4J
- Pax-Construct:
  - Maven Plugins zum Erstellen, Builden, Verwalten und Deployen von OSGI Komponenten. Eclipse-Konfiguration
  - Verwendet Bnd - Bundle Tool
- Pax-runner
  - Erleichtert das Testen mit mehrere Implementierungen: Equinox, Felix,...
- Pax-Logging,...




**again...**

http://i9.photobucket.com/albums/a59/Heynowrcp/spring.jpg

# SpringSource Application Server

- Basiert auf OSGI. Verwendet Equinox als Unterbau.
- Alle Komponenten des Spring-Frameworks sind bereits OSGI-ready
- Basiert auf Spring Dynamic Modules
- Erweiterungen für Webentwicklung
  - Bietet spezielles Bundle-Repository
  - Deploymenthilfen (zB War File oder PAR)
- Lizensiert unter GPL

# Summary

- Modularität
- Versionierung
- Dynamik
- Services
  - Spring DM
  - Equinox Extensions
- Achtung bei noch nicht OSGi-ready Bibliotheken

# ENDE

Danke für die Aufmerksamkeit!

??? Fragen ???

Diskussion

# Links

- http://www.osgi.org/Specifications/HomePage
- http://www.aqute.biz/OSGi/Presentations
- http://www.eclipse.org/equinox-portal/getstarted.php
- http://www.eclipsecon.org/
- http://developers.sun.com/learning/javaoneonline
- http://neilbartlett.name/blog/osgibook/
- http://www.springframework.org/osgi
- http://www.infoq.com/presentations/colyer-server-side-osgi
-