JUMPSTART IOT
IN JAVA WITH OSGI ENROUTE
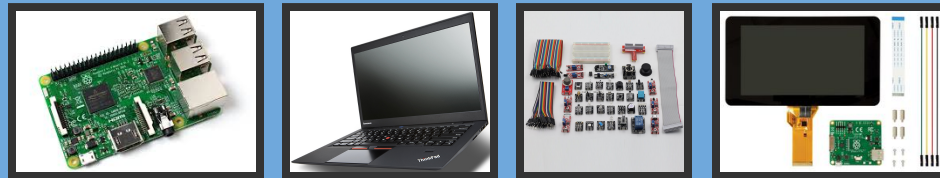
created by Peter Kirschner for Java Forum Stuttgart

A4, Schiller-Saal, July 07, 2016 - 12:15 to 13:00
printable version

ME, MYSELF AND I

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- github: peterkir/jfs2016

INGREDIENTS

click on the ingredients to get more info

MOTIVATION

WHY IOT IN JAVA WITH OSGI?

"**IoT** is dealing with **constant catastrophic failures**"

"The **Dynamic Module System** for Java"

"**Java and OSGi** are industry robust and proven technologies"

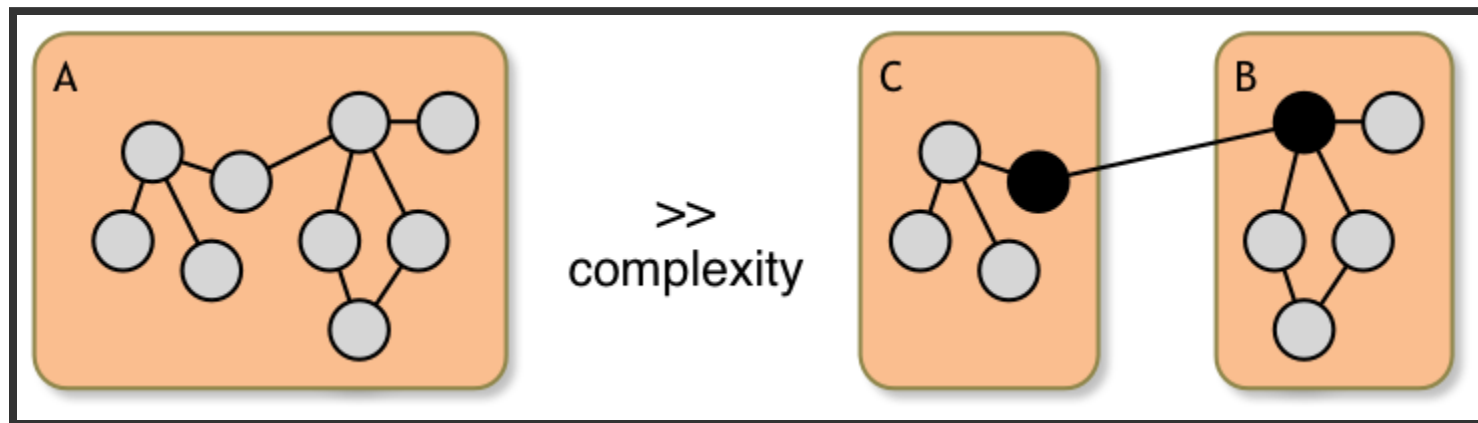"**continuous evolution** - no revolution"

TECHNOLOGY

JAVA LANGUAGE

- Java SE 8 release in 2014
- Language feature improvements
  - Lambda expressions
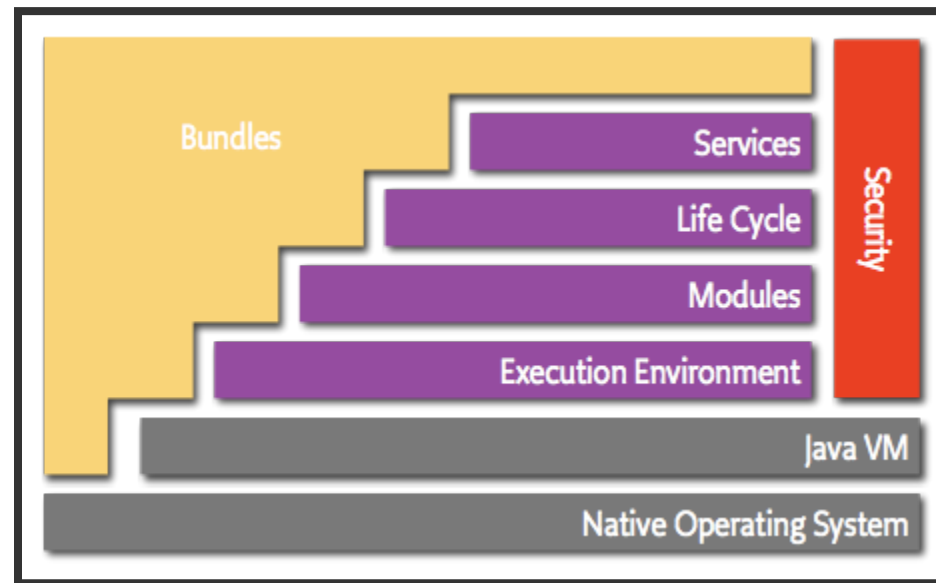 - Stream API improvements
- Java Mission Control

OSGI MODULARITY

DIVIDE AND CONQUER
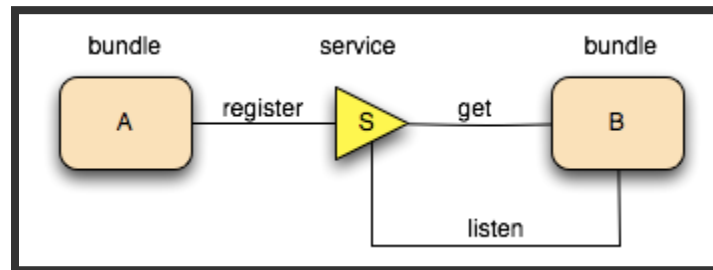
OSGI ARCHITECTURE

MODULAR AND LAYERED ARCHITECTURE

OSGI SERVICES

DECLARATIVE SERVICES & CONFIGURATION

SERVICE REGISTRY VIA BROKER PATTERN

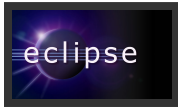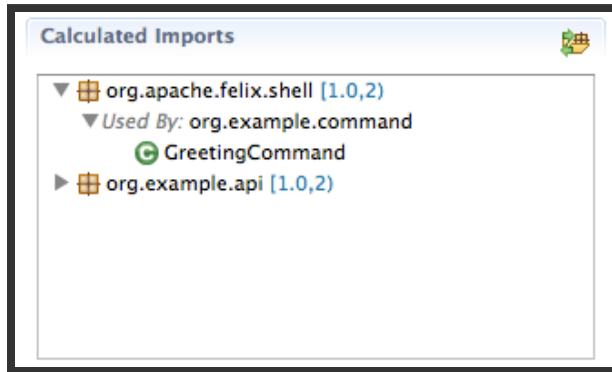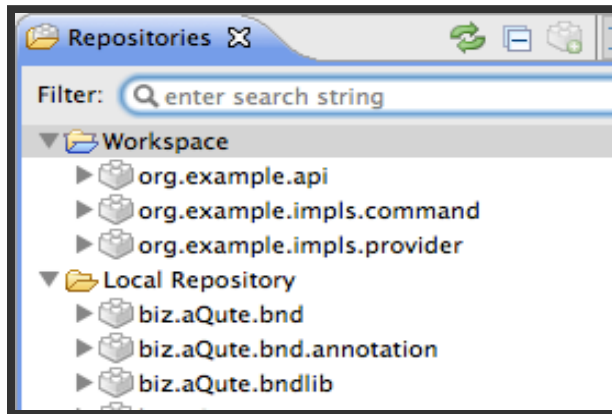| Community	you are invited
Programming Model	best practice, μservice-based development model
Tool Chain	OSGi programming model over all the stages of development
Education	tutorials and examples

TOOLS

ECLIPSE

- Eclipse Equinox is **OSGi reference implementation**
- extremly flexible and extensible plugin architecture
- Development IDE à la carte
  - JDT - Java Development Tookit
  - JSDT - JavaScript Development Tools
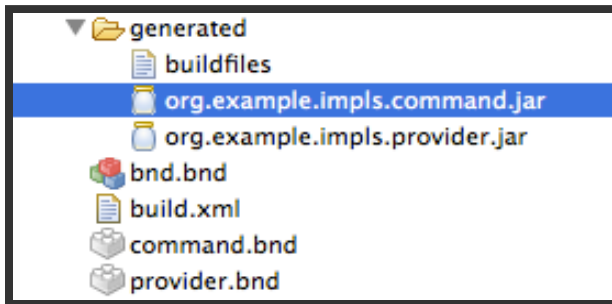 - Git, GitFlow, QuickRex, ...

BNDTOOLS FEATURES 1/2

automated import package analysis including versioning

powerful OSGi bundle repository management
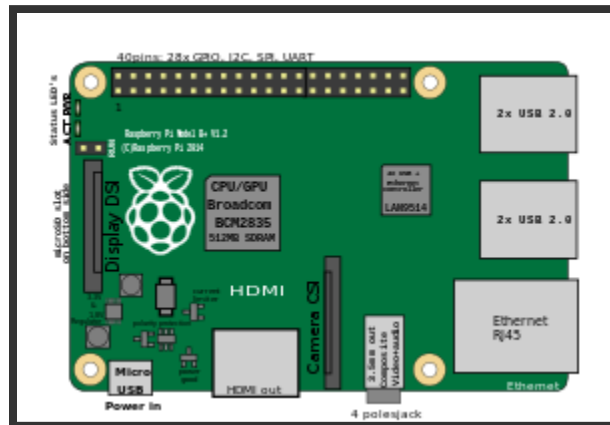
BNDTOOLS FEATURES 2/2

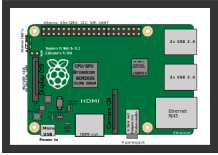instant Jar bundle creation

```
@Component(provide = SampleApi.class)
public class ExampleComponent {
    // TODO
}
```

annotation based Declarative Service implementation
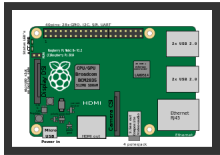
SETUP RASPI

ONE-TIME PREPARATION

login via ssh on your Raspi

```
pi@kipi3_01:~ $ java -version
java version "1.8.0_65"
Java(TM) SE Runtime Environment (build 1.8.0_65-b17)
Java HotSpot(TM) Client VM (build 25.65-b01, mixed mode)
pi@kipi3_01:~ $ curl https://bndtools.ci.cloudbees.com\
> /job/bnd.master/719/artifact/dist/bundles/\
> biz.aQute.jpm.run/biz.aQute.jpm.run-3.0.0.jar >jpm.jar
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 1680k  100 1680k    0     0   285k      0  0:00:05  0:00:05 --:--:--  349k
pi@kipi3_01:~ $ sudo java -jar jpm.jar init
Home dir      /var/jpm
Bin  dir      /usr/local/bin
pi@kipi3_01:~ $ jpm version
3.0.0.201509101330
pi@kipi3_01:~ $ sudo jpm install -f biz.aQute.remote.main
pi@kipi3_01:~ $
```

LAUNCH JPM AGENT FOR REMOTE CONNECTION

```
pi@kipi3_01:~ $ sudo bndremote -a
Listening for transport dt_socket at address: 1044
```

Now we are ready to rumble!

DEVELOPER PC SETUP

- download and install latest Java 8 SDK
- download and unzip Eclipse IDE

- install bndtools inside Eclipse

- Check-out github example repo

- **OR** follow the enRoute IoT tutorial

IDEFIX INSTALLER

Use IDEfix installer with pre-configured product and
project setups

MIND THE GAP

Oracle JDK license forbids distribution by 3rd parties, so
download and install it in advance!

DEPLOYMENT

DEPLOYMENT

- comment the "remote" instruction indside bndrun file

```
#-runremote: \
#    raspberry;\
#        jdb=1044; \
#        host=<ipAddress>; \
#        shell=1
#-runpath
```

- export the jar from the bndrun file (top right)
- copy exported jar to Raspi
- execute it with

```
sudo java -jar <all-in-one-bundle>
```

? QUESTIONS ?

AND WHERE TO GO FROM HERE ...

- use the enRoute web-site for the full IoT tutorial
- use the bnd usergroup to ask on problems
- get in touch - have fun with your RasPi and IoT

CREDITS FOR

- OSGi Alliance

- Neil Bartlett, BJ Hargrave, Peter Kriens, Tim Ward

- and all other OSGi, bnd/bndtools commiter and contributors

- REVEAL.JS - HTML presentations by Hakim El Hattab

BND AND BNDTOOLS RESOURCES

- BND
- Usergroup
- Source on Github
- Continuous Builds from Cloudbees
- website
- bug reports/source code on GitHub
- continuous build on cloudbees
- usergroup in GoogleGroups

STANDARD REFERENCES

- OSGi specifications

- LDAP search filter syntax

- Semantic Versioning 2.0.0