

# 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](#)

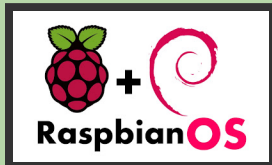
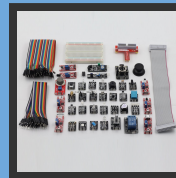
[speaker notes](#)

# ME, MYSELF AND I



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- twitter: [@peterkir](#)
- 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"

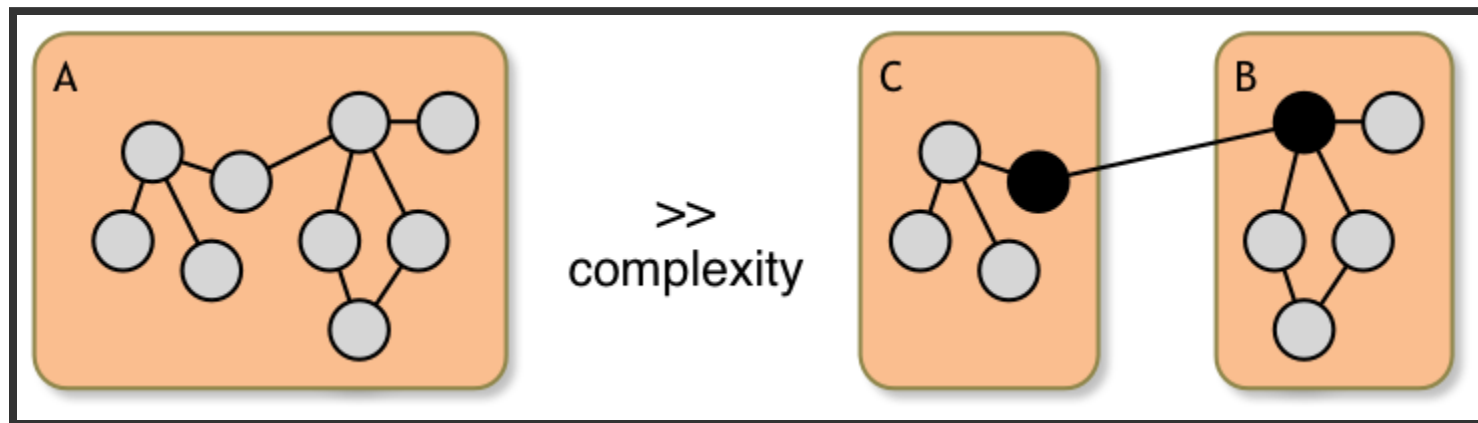
# TECHNOLOGY

# JAVA LANGUAGE

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

# OSGI MODULARITY

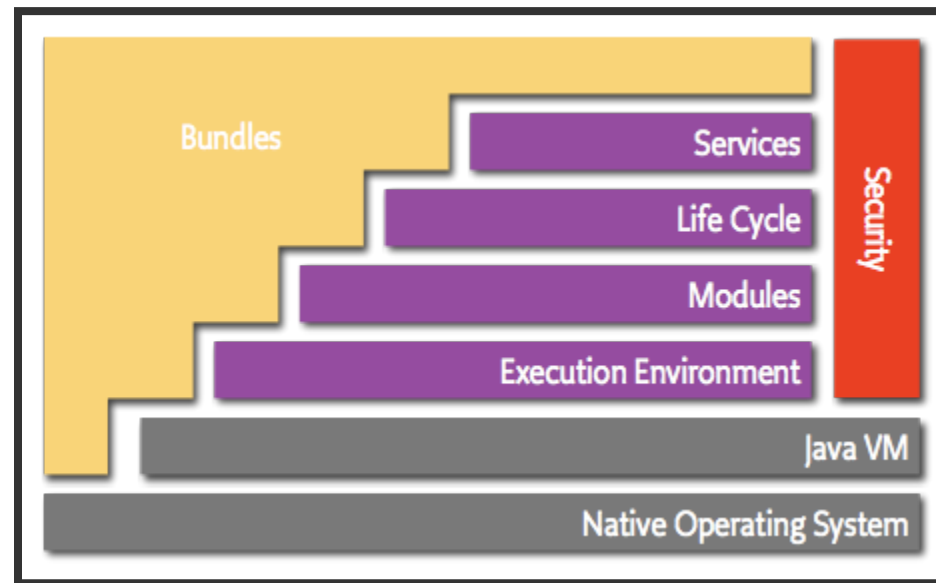
## DIVIDE AND CONQUER





# OSGI ARCHITECTURE

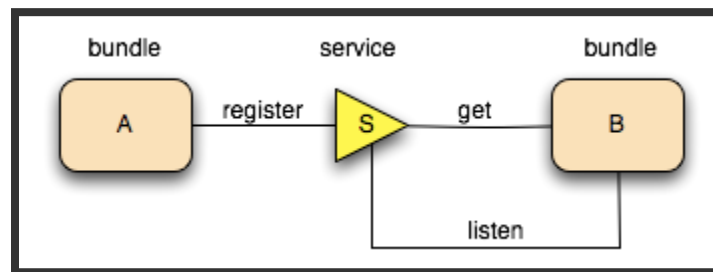
## MODULAR AND LAYERED ARCHITECTURE



# OSGI SERVICES

DECLARATIVE SERVICES & CONFIGURATION

SERVICE REGISTRY VIA BROKER PATTERN





Community

you are invited

Programming  
Model

best practice,  $\mu$ service-based development model

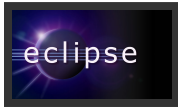
Tool Chain

OSGi programming model over all the stages of  
development

Education

tutorials and examples

# TOOLS

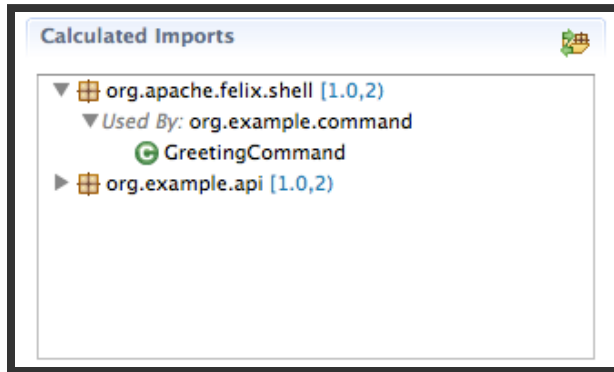


# ECLIPSE

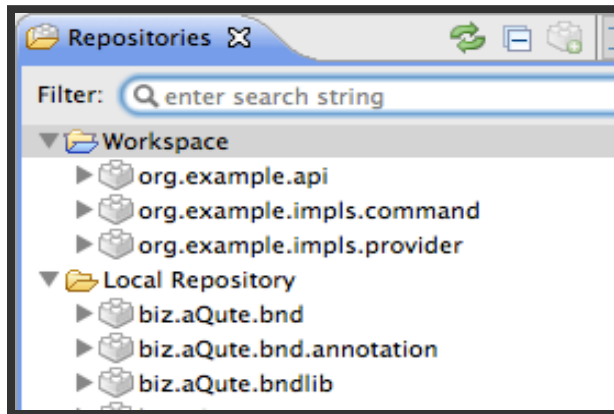
- Eclipse Equinox is **OSGi reference implementation**
- extremely flexible and extensible plugin architecture
- Development IDE à la carte
  - JDT - Java Development Toolkit
  - JSDT - JavaScript Development Tools
  - Git, GitFlow, QuickRex, ...



# BNDTOOLS FEATURES 1/2



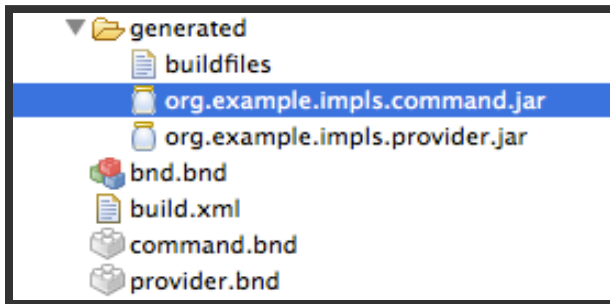
automated import package analysis including versioning



powerful OSGi bundle repository management



# BNDTOOLS FEATURES 2/2

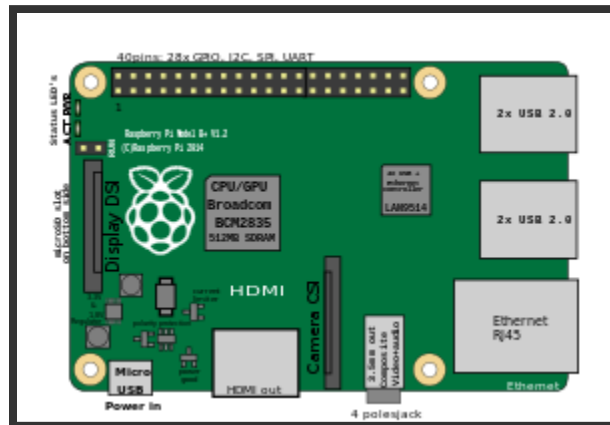


instant Jar bundle creation

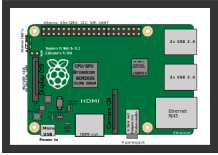
```
@Component(provide = SampleApi.class)
public class ExampleComponent {
    // TODO
}
```

annotation based Declarative  
Service implementation

# SETUP RASPI



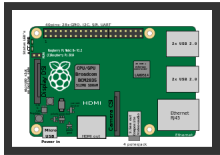




# ONE-TIME PREPARATION

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 inside 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