Welcome to

2. Starting out with Camel

KEA System Integration F2020 10 ECTS

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Slides are available as PDF, kramse@Github

2-starting-out-camel-system-integration.tex in the repo security-courses

Plan for today

Starting out with Camel

- Java recap, Java tools needed
- Book chapters and examples
- Running Camel - using Maven

Exercises

- Book examples from chapters 1 and 2
- Various sites and trying out Camel

Reading Summary

Camel book chapter 1:Meeting Camel

Camel book chapter 2: Routing with Camel

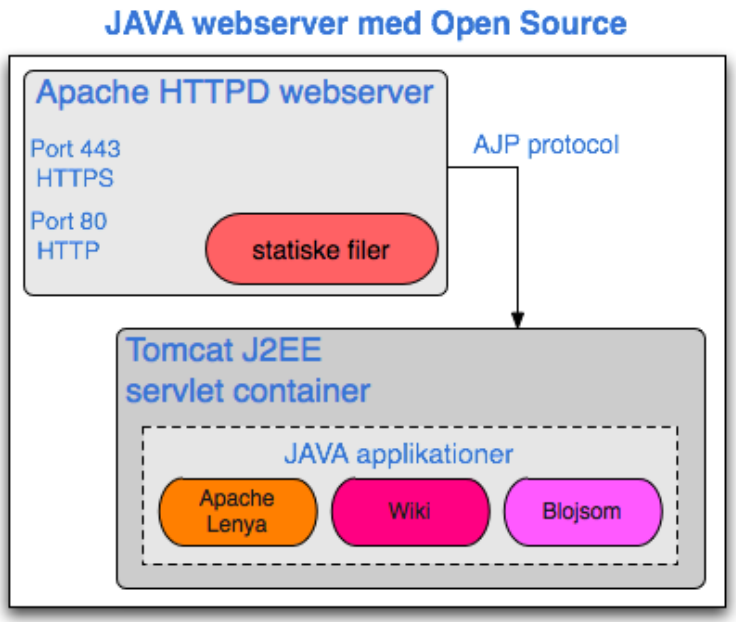
Browse / skim this:
Not put into the lecture plan, but if the concepts presented today seems hard, lookup on wikipedia:

Java, Java virtual machine,
`https://en.wikipedia.org/wiki/Apache_Ant`,
`https://en.wikipedia.org/wiki/Apache_Maven`

Todays Agenda - approximate time plan

- 45m Working with Java, introducing some tools, configure those tools on your machines
- 45m Get the repository from the book, large download, investigate contents
- 10:00 Break 15m
- 45m Chapter 1 presented and discussed
- 45m Get up and running with the book examples
- 11:45 Lunch Break
- 45m Chapter 2 presented and discussed
- 45m Chapter 2 presented and discussed
- 14:00 Break 15m
- 45m Work with small examples, make Camel download from FTP and HTTP

Java Recap



- Java is a virtual machine environment
- Java Runtime Environment (JRE) / Java Development Kit (JDK)

Java Environment Variables

- `JAVA_HOME` points to the JDK installation path
  Typical value:

  ```
  export JAVA_HOME=/usr/lib/jvm/java-11-openjdk-amd64/
  ```

  add that to your profile `.profile`, `bashrc` or similar on Windows
- We did that last time for running Apache Tomcat
- `CLASSPATH` the search path for libraries

Make and install programs from source

```
./configure;make;make install
```

Many open source programmer where distributed as a tar file, tape archive

Most programs would use Makefile and auto tools, as shown above

- configure software - check operating system, features and libraries
- build the software - compile and link
- install software - copy files often putting binaries in `/usr/local/bin`

Java Make Tool Ant

> Apache Ant is a Java library and command-line tool whose mission is to drive processes described in build files as targets and extension points dependent upon each other. The main known usage of Ant is the build of Java applications. Ant supplies a number of built-in tasks allowing to compile, assemble, test and run Java applications. Ant can also be used effectively to build non Java applications, for instance C or C++ applications. More generally, Ant can be used to pilot any type of process which can be described in terms of targets and tasks.

```
hlk@debian-lab:~$ ant -v
Apache Ant(TM) version 1.10.5 compiled on August 27 2018
Trying the default build file: build.xml
```

- Apache Ant
- `https://ant.apache.org/`

Java tools Needed for Camel Maven

> Apache Maven is a software project management and comprehension tool. Based on the concept of a project object model (POM), Maven can manage a project's build, reporting and documentation from a central piece of information.

```
hlk@debian-lab:~$ mvn -v
Apache Maven 3.5.4 (1edded0938998edf8bf061f1ceb3cfdeccf443fe; 2018-06-17T20:33:14+02:00)
Maven home: /home/user/projects/system-integration/apache-maven-3.5.4
Java version: 11.0.6, vendor: Debian, runtime: /usr/lib/jvm/java-11-openjdk-amd64
```

- Maven - mvn command
- `https://en.wikipedia.org/wiki/Apache_Maven`

Software Requirements - amended!

The following software is required to run the examples:

- JDK 8, I used OpenJDK 11 on Debian 10
- Maven 3.5 or better, I used `apache-maven-3.5.4`
- Apache Camel 2.20.1 or better, I used `apache-camel-2.24.3`
- Apache Camel itself can be downloaded from its official website: `http://camel.apache.org/download.html`
- All the examples can be run using Maven.

Start Cloning

- Work in groups of two
- First I will show the process, then you
- Only have one laptop downloading, then the other
- Clone Git repository
- Start the maven command, it will download other files etc.

Running Maven

```
user@Projects:~$ tail -5 .bashrc

# Add Maven to PATH
PATH="$HOME/bin:$PATH:$HOME/user/projects/system-integration/apache-maven-3.5.4/bin"

export PATH
user@Projects:~$ which mvn
/home/user/projects/system-integration/apache-maven-3.5.4/bin/mvn
```

- Download Maven and "install it", as shown above I unpacked version 3.5.4 and pointed my `PATH` to the directory
- Maven uses a `pom.xml` file - project object model (POM)
- This file lists requirements for dependencies etc.
- Since we will be using other versions, lets change this file

Maven pom changes

To use the later versions of the tools Maven and Camel change this:

```
user@Projects:camelinaction2$ git diff
diff --git a/pom.xml b/pom.xml
index d9b1b160..7d512cd1 100644
--- a/pom.xml
+++ b/pom.xml
@@ -12,7 +12,7 @@
   <inceptionYear>2015</inceptionYear>

   <prerequisites>
-    <maven>3.5.0</maven>
+    <maven>3.5.4</maven>
   </prerequisites>

   <developers>
@@ -58,7 +58,7 @@
     <activemq-version>5.15.7</activemq-version>
     <activemq-karaf-version>5.13.8</activemq-karaf-version>
-    <camel-version>2.25.0</camel-version>
+    <camel-version>2.24.3</camel-version>
```

Clone the repository from the book

- We need to run examples from the book
- The source code for the examples in this book is available online at GitHub: `https://github.com/camelinaction/camelinaction2`
- Clone this repository - about 22Mb
- Should take very little time, 2-5 minutes
- `git clone https://github.com/camelinaction/camelinaction2.git`

Inside a project - chapter 1

```
hlk@debian-lab:camelinaction2$ ls
LICENSE    appendixA  chapter2  chapter4   chapter6    chapter8   chapter10  chapter12
chapter14  chapter16  chapter18  chapter20 errata.txt  mvnw.cmd   README.md  chapter1
chapter3  chapter5   chapter7   chapter9   chapter11   chapter13  chapter15  chapter17
chapter19  docs mvnw   pom.xml
```

Chapter 1: file-copy example

```
hlk@debian-lab:~/projects/system-integration/camelinaction2/chapter1/file-copy$ find data/
data/
data/outbox
data/outbox/message1.xml
data/inbox
data/inbox/message1.xml
```

- We want to run the command for Maven to download tools, and *do stuff*
- `mvn compile exec:java`
- This might take some time!
- Note: this is a two step process, so split into `mvn compile` and `exec:java` if you have trouble running

Success Compile

```
hlk@debian-lab:~/projects/system-integration/camelinaction2/chapter1/file-copy$ mvn compile
[INFO] Scanning for projects...
[INFO]
[INFO] ----------------< com.camelinaction:chapter1-file-copy >----------------
[INFO] Building Camel in Action 2 :: Chapter 1 :: File Copy Example 2.0.0
[INFO] --------------------------------[ jar ]---------------------------------
[INFO]
[INFO] --- maven-resources-plugin:2.4.3:resources (default-resources) @ chapter1-file-copy ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 1 resource
[INFO]
[INFO] --- maven-compiler-plugin:3.6.1:compile (default-compile) @ chapter1-file-copy ---
[INFO] Nothing to compile - all classes are up to date
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 1.270 s
[INFO] Finished at: 2020-02-17T07:08:02+01:00
[INFO] ------------------------------------------------------------------------
```

Success Execute Java - shortened for slide

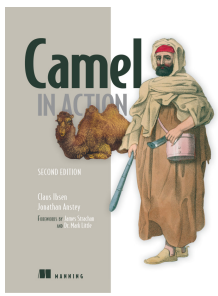
```
hlk@debian-lab:~/projects/system-integration/camelinaction2/chapter1/file-copy$ mvn exec:java
[INFO] Scanning for projects...
[INFO]
[INFO] ----------------< com.camelinaction:chapter1-file-copy >----------------
[INFO] Building Camel in Action 2 :: Chapter 1 :: File Copy Example 2.0.0
[INFO] --------------------------------[ jar ]---------------------------------
[INFO]
[INFO] --- exec-maven-plugin:1.2.1:java (default-cli) @ chapter1-file-copy ---
[ion.FileCopierWithCamel.main()] DefaultCamelContext  INFO  Apache Camel 2.24.3 (CamelContext: camel-1) is starting
[ion.FileCopierWithCamel.main()] FileEndpoint         INFO  Using default memory based idempotent repository with cache max size: 10
[ion.FileCopierWithCamel.main()] DefaultCamelContext  INFO  Route: route1 started and consuming from: file://data/inbox?noop=true
[ion.FileCopierWithCamel.main()] DefaultCamelContext  INFO  Total 1 routes, of which 1 are started
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 11.908 s
[INFO] Finished at: 2020-02-17T07:11:18+01:00
[INFO] ------------------------------------------------------------------------
```

Success Execute Java - new files

```
$ find data/
data/
data/outbox
data/outbox/message1.xml
data/outbox/message2.txt
data/inbox
data/inbox/message1.xml
data/inbox/message2.txt
```

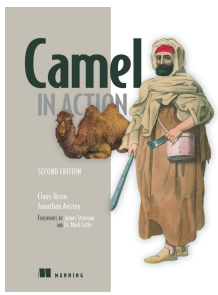
- Try adding a new file using editor, and re-run
  `echo "some data" > data/inbox/message2.txt`

Chapter 1



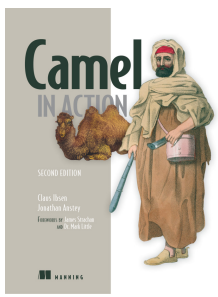
- Meeting Camel
- Introducing Camel:
  What is Camel?, Why use Camel?
- Getting started:
  Getting Camel, Your first Camel ride, Camel's message model, Message, Exchange
- Camel's architecture:
  Architecture from 10,000 feet, Camel concepts
- Your first Camel ride, revisited

Chapter 2



- Routing with Camel
- Introducing Rider Auto Parts
- Understanding endpoints
  Consuming from an FTP endpoint, Sending to a JMS endpoint
- Creating routes in Java
  Using RouteBuilder, Using the Java DSL
- Defining routes in XML
  Bean injection and Spring, The XML DSL, Using Camel and Spring

Chapter 2, cont



- Endpoints revisited
  Sending to dynamic endpoints, Using property placeholders in endpoint URIs, Using raw values in endpoint URIs, Referencing registry beans in endpoint URIs
- Routing and EIPs
  Using a content-based router, Using message filters, Using multicasting, Using recipient lists, Using the wireTap method
- Summary and best practices

File Transfer Pattern Revisited

- Unix has a saying, *Everything is a file*
- With modern computers and networks, we have URIs and can access files remotely
- Example URIs, `http://www.example.com/index.html`, `smb://workgroup;user:password@server/share/folder/file.txt`

Camel Examples

We can try using Camel

- Downloading files from FTP or HTTP sites
- Put them in a local directory
- Work with small examples, make Camel download from FTP and HTTP
- Hint:
- `https://camel.apache.org/components/latest/ftp-component.html`
- `https://camel.apache.org/components/latest/http-component.html`

Download from FTP or HTTP

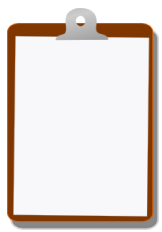
- What are some differences between these?
- Which one do you prefer as programmers?
- Which one is easier to implement in the network
  Hint: FTP uses dynamic ports - look it up
- Running a service, consider if you are providing data - which would you choose
  Hint: security history of FTP

Actual example

- Go to the web page of the RFC editor `https://www.rfc-editor.org/retrieve/bulk/`
- Read about the possibilities for downloading in bulk
- Pros and cons of using rsync, FTP, HTTP, tgz/zip
- Using Camel or rsync, rsync described at `https://www.rfc-editor.org/retrieve/rsync/`

Lesson in system integration, lots of different possibilities exist ☺

For Next Time



Think about the subjects from this time, write down questions

Check the plan for chapters to read in the books

Visit web sites and download papers if needed

Retry the exercises to get more confident using the tools