

CamelOne 2013

June 10-11 2013

Boston, MA



Getting Started with Apache Camel

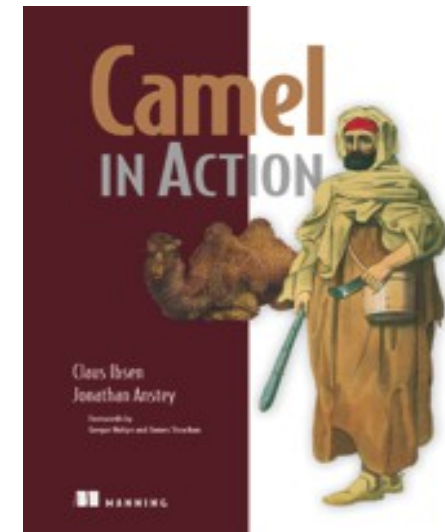
Agenda

- What is Apache Camel?
- A little Example
- Riding Camel
- What's in the Camel box?
- Deploying Camel
- Creating new Camel Projects
- Q and A

Your Speaker



- Principal Software Engineer at Red Hat
- Apache Camel
 - 5 years working with Camel
- Author of Camel in Action book
- Contact
 - EMail: cibsen@redhat.com
 - Twitter: [@davsclaus](https://twitter.com/davsclaus)
 - LinkedIn: [davsclaus](https://www.linkedin.com/in/davsclaus)
 - Blog: <http://davsclaus.com>



What is Apache Camel?

- Quote from the website

Apache Camel is a
powerful Open Source
Integration Framework
based on known
Enterprise Integration Patterns

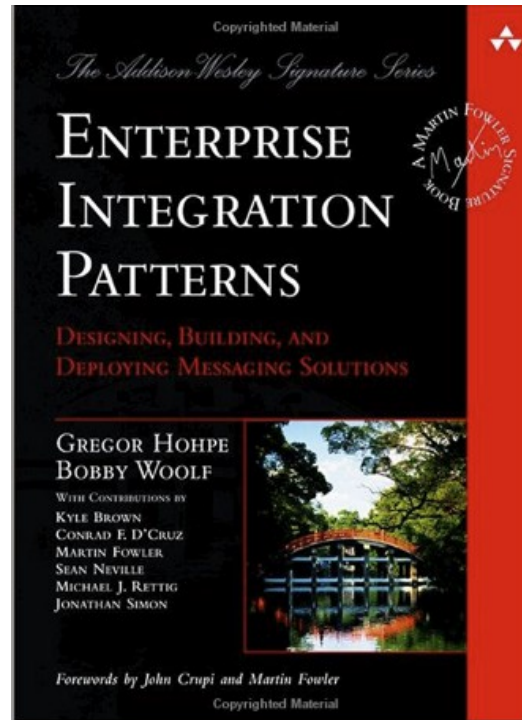
What is Apache Camel?

- Why do we need integration?
 - Critical for your business to integrate
- Why Integration Framework?
 - Framework do the heavy lifting
 - You can focus on business problem
 - Not "reinventing the wheel"



What is Apache Camel?

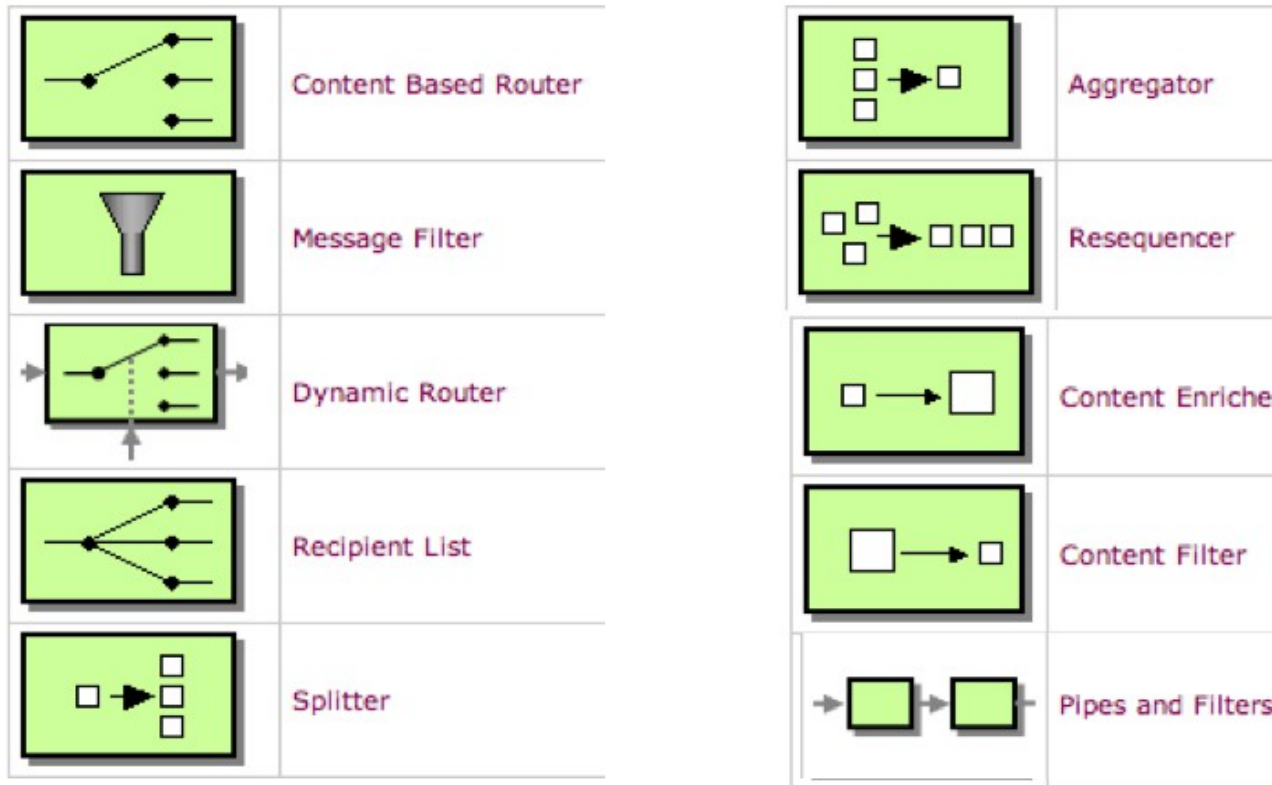
- What is Enterprise Integration Patterns?



It's a book

What is Apache Camel?

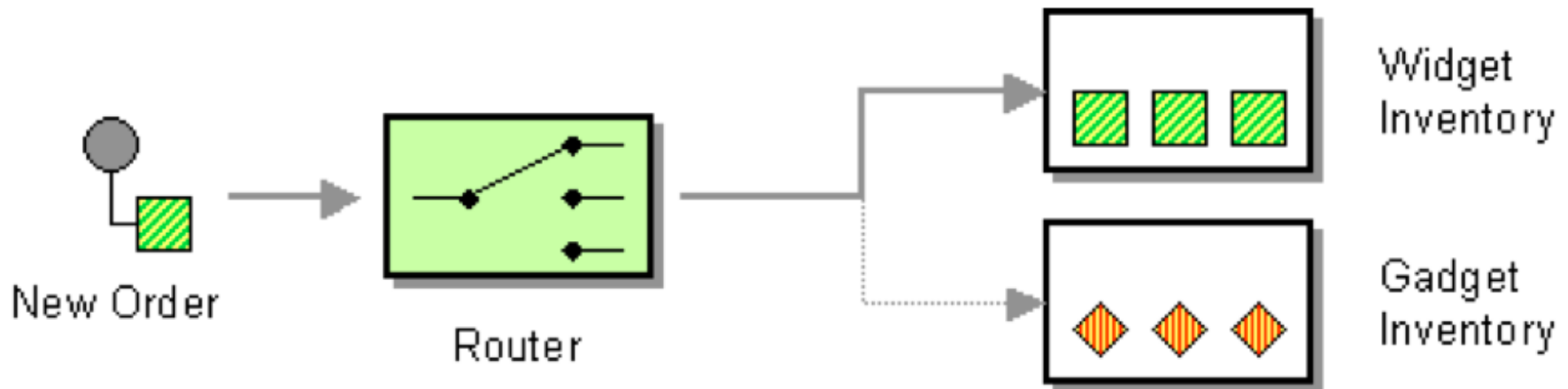
- Enterprise Integration Patterns



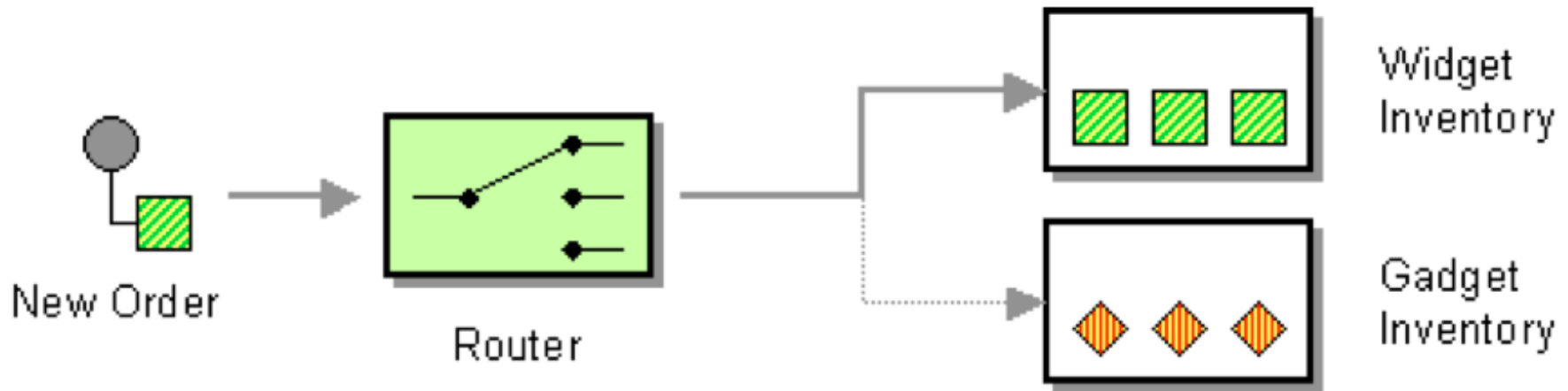
<http://camel.apache.org/eip>

What is Apache Camel?

- EIP - Content Based Router

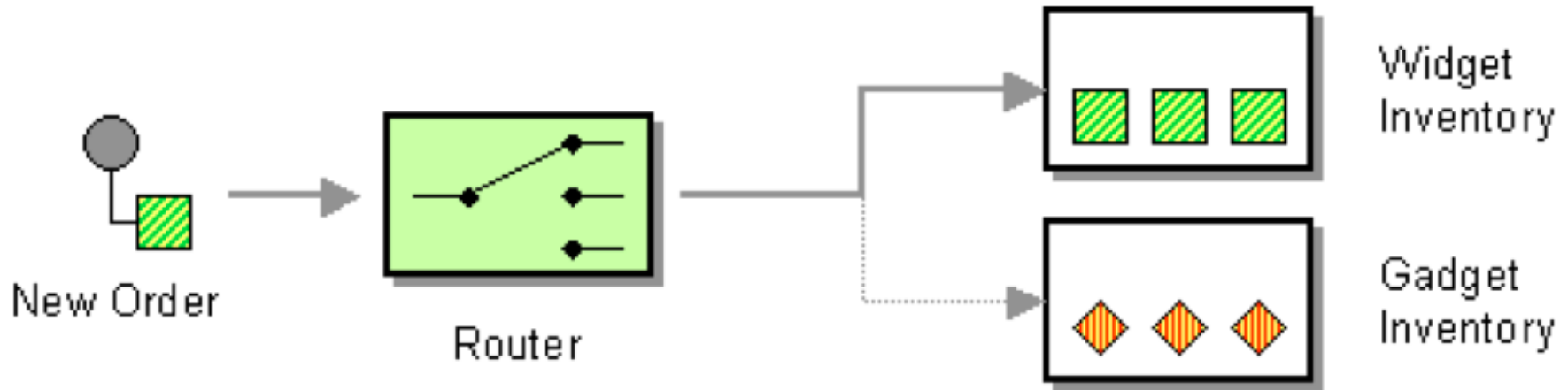


What is Apache Camel?



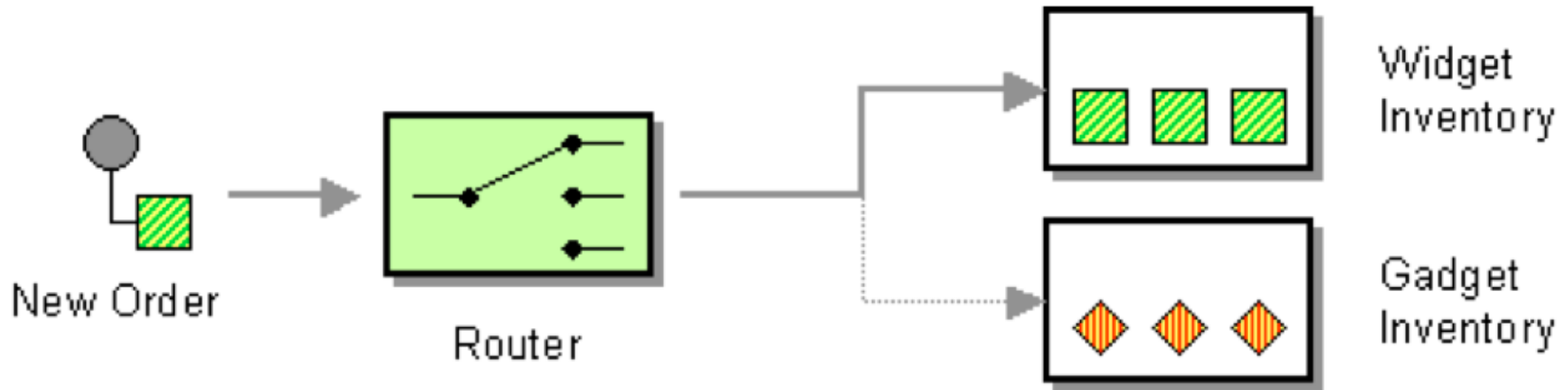
from `newOrder`

What is Apache Camel?



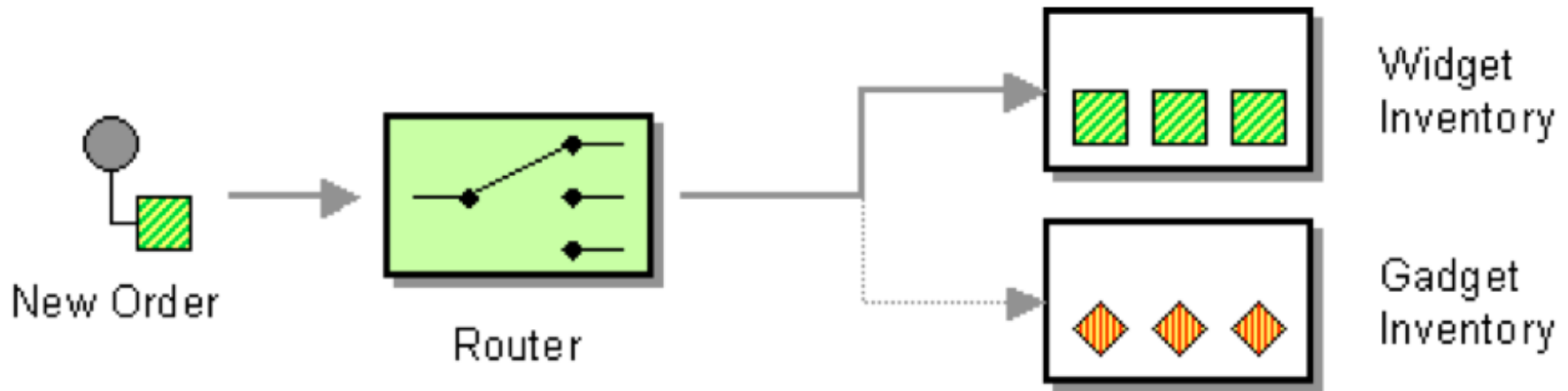
from `newOrder`
choice

What is Apache Camel?



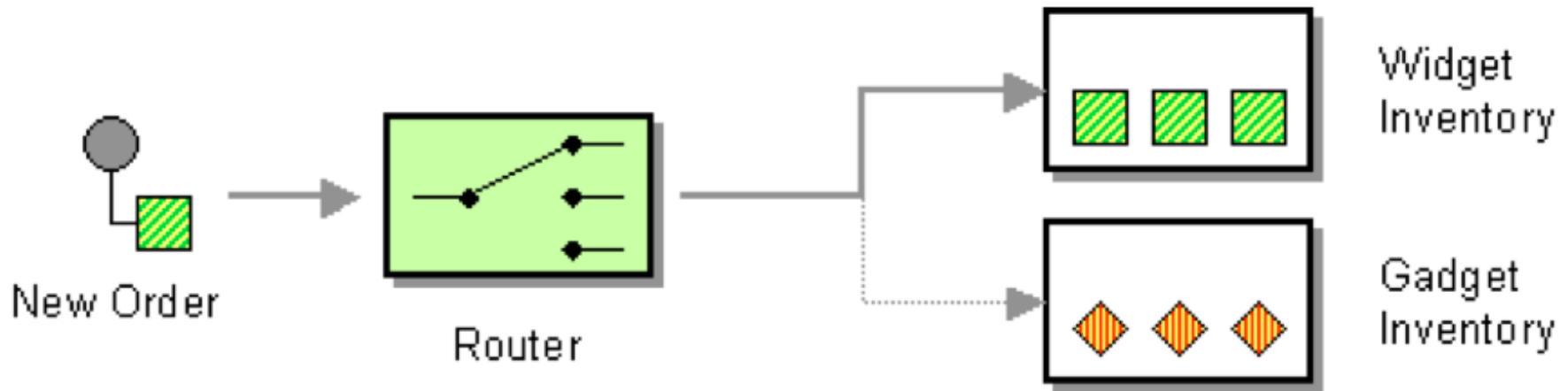
```
from newOrder  
  choice  
    when isWidget to widget
```

What is Apache Camel?



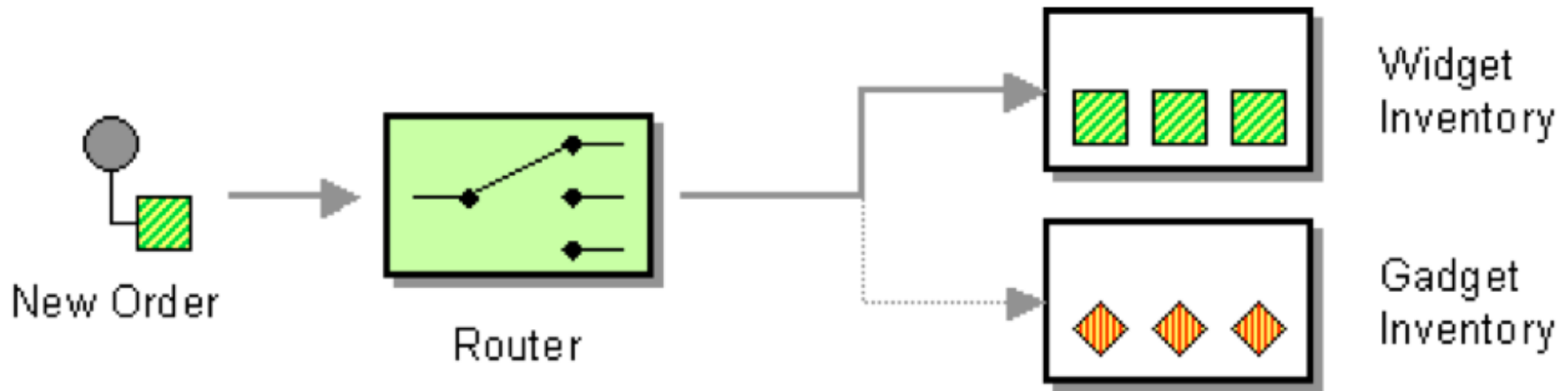
```
from newOrder
  choice
    when isWidget to widget
    otherwise to gadget
```

What is Apache Camel?



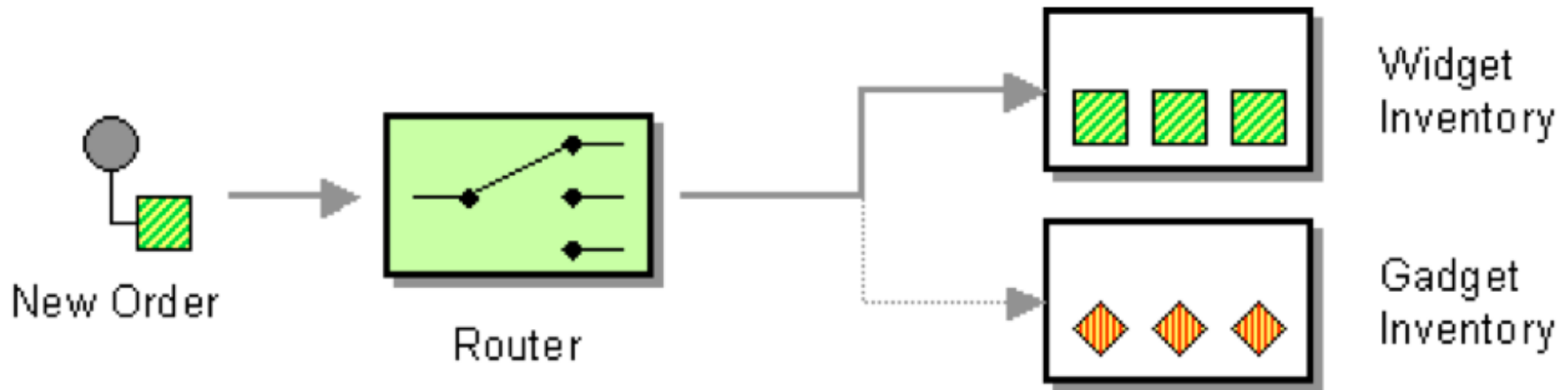
```
from(newOrder)
  choice
    when(isWidget) to(widget)
    otherwise to(gadget)
```

What is Apache Camel?



```
from(newOrder)
    .choice()
    .when(isWidget).to(widget)
    .otherwise().to(gadget);
```

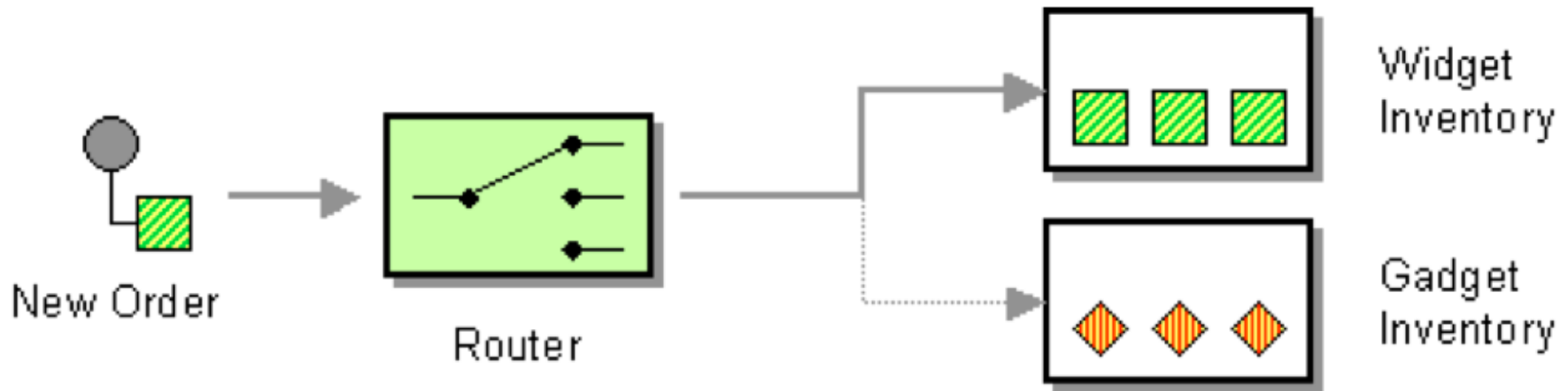
What is Apache Camel?



```
Endpoint newOrder = endpoint("activemq:queue:newOrder");
```

```
from(newOrder)  
  .choice()  
    .when(isWidget).to(widget)  
    .otherwise().to(gadget);
```

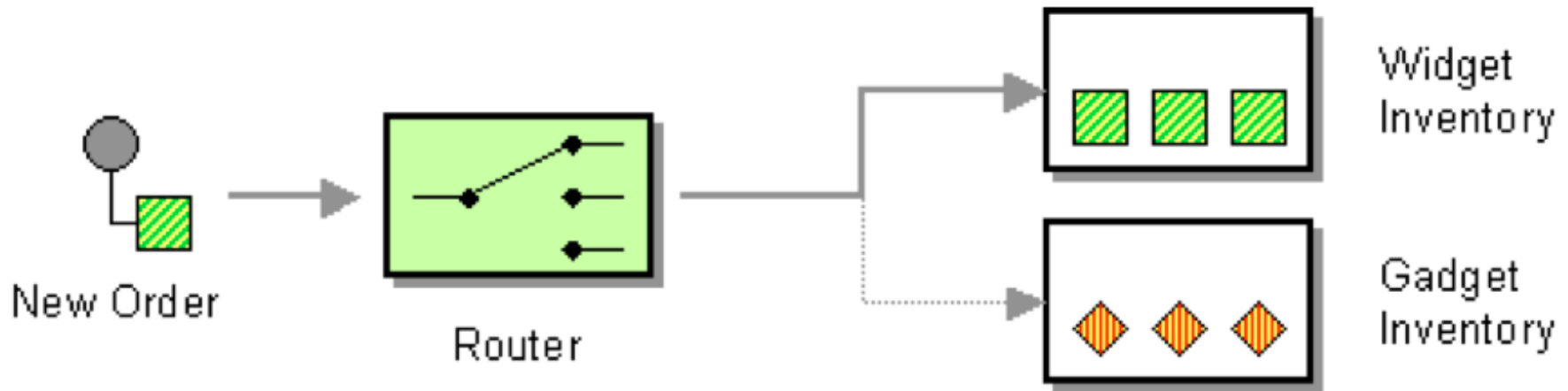
What is Apache Camel?



```
Endpoint newOrder = endpoint("activemq:queue:newOrder");  
Predicate isWidget = xpath("/order/product = 'widget'");
```

```
from(newOrder)  
  .choice()  
    .when(isWidget).to(widget)  
    .otherwise().to(gadget);
```


What is Apache Camel?



```
Endpoint newOrder = endpoint("activemq:queue:newOrder");  
Predicate isWidget = xpath("/order/product = 'widget'");  
Endpoint widget = endpoint("activemq:queue:widget");  
Endpoint gadget = endpoint("activemq:queue:gadget");
```

```
from(newOrder)  
  .choice()  
    .when(isWidget).to(widget)  
    .otherwise().to(gadget);
```

What is Apache Camel?

- Java Code

```
public void configure() throws Exception {
    Endpoint newOrder = endpoint("activemq:queue:newOrder");
    Predicate isWidget = xpath("/order/product = 'widget'");
    Endpoint widget = endpoint("activemq:queue:widget");
    Endpoint gadget = endpoint("activemq:queue:gadget");

    from(newOrder)
        .choice()
            .when(isWidget).to(widget)
            .otherwise().to(gadget)
        .end();
}
```

What is Apache Camel?

- Java Code

```
import org.apache.camel.Endpoint;
import org.apache.camel.Predicate;
import org.apache.camel.builder.RouteBuilder;

public class MyRoute extends RouteBuilder {

    public void configure() throws Exception {
        Endpoint newOrder = endpoint("activemq:queue:newOrder");
        Predicate isWidget = xpath("/order/product = 'widget'");
        Endpoint widget = endpoint("activemq:queue:widget");
        Endpoint gadget = endpoint("activemq:queue:gadget");

        from(newOrder)
            .choice()
                .when(isWidget).to(widget)
                .otherwise().to(gadget)
            .end();
    }
}
```

What is Apache Camel?

- Camel Java DSL

```
import org.apache.camel.builder.RouteBuilder;

public class MyRoute extends RouteBuilder {

    public void configure() throws Exception {
        from("activemq:queue:newOrder")
            .choice()
                .when(xpath("/order/product = 'widget'"))
                    .to("activemq:queue:widget")
                .otherwise()
                    .to("activemq:queue:gadget")
            .end();
    }
}
```

What is Apache Camel?

- Camel XML DSL

```
<route>
  <from uri="activemq:queue:newOrder" />
  <choice>
    <when>
      <xpath>/order/product = 'widget'</xpath>
      <to uri="activemq:queue:widget" />
    </when>
    <otherwise>
      <to uri="activemq:queue:gadget" />
    </otherwise>
  </choice>
</route>
```

What is Apache Camel?

- Endpoint as URIs

use file instead

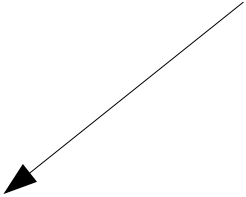
```
<route>
  <from uri="file:inbox/orders"/>
  <choice>
    <when>
      <xpath>/order/product = 'widget'</xpath>
      <to uri="activemq:queue:widget"/>
    </when>
    <otherwise>
      <to uri="activemq:queue:gadget"/>
    </otherwise>
  </choice>
</route>
```

What is Apache Camel?

- Endpoint as URIs

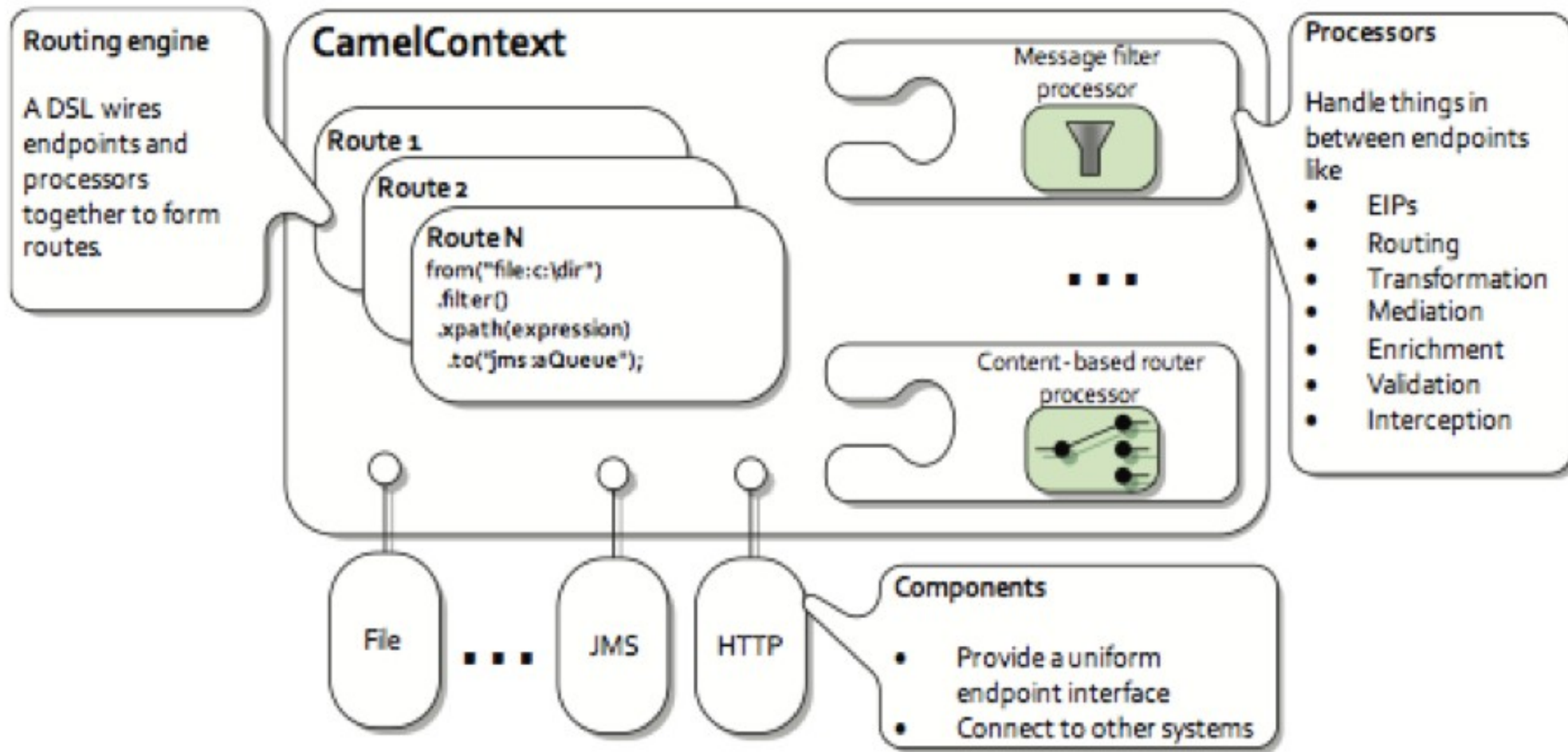
parameters

```
<route>
  <from uri="file:inbox/orders?delete=true" />
  <choice>
    <when>
      <xpath>/order/product = 'widget'</xpath>
      <to uri="activemq:queue:widget" />
    </when>
    <otherwise>
      <to uri="activemq:queue:gadget" />
    </otherwise>
  </choice>
</route>
```



What is Apache Camel?

- Camel's Architecture



What is Apache Camel?

120+ Components

activemq	cxfrs	flatpack	jasypt
activemq-journal	cxfrs	freemarker	javaspace
amqp	dataset	ftp/ftps/sftp	jbi
atom	db4o	gae	jcr
bean	direct	hdfs	jdbc
bean validation	ejb	hibernate	jetty
browse	esper	hl7	jms
cache	event	http	jmx
cometd	exec	ibatis	jpa
crypto	file	irc	jt/400

What is Apache Camel?

120+ Components

language	properties	seda	stream
ldap	quartz	servlet	string-template
mail/imap/pop3	quickfix	sip	test
mina	ref	smooks	timer
mock	restlet	smpp	validation
msv	rmi	snmp	velocity
nagios	rnc	spring-integration	vm
netty	rng	spring-security	xmpp
nmr	rss	spring-ws	xquery
printer	scalate	sql	xslt

What is Apache Camel?

- Summary
 - Integration Framework
 - Enterprise Integration Patterns (EIP)
 - Routing (using DSL)
 - Easy Configuration (endpoint as uri's)
 - Payload Agnostic
 - No Container Dependency
 - A lot of components



Agenda

- What is Apache Camel?
- **A little Example**
- Riding Camel
- What's in the Camel box?
- Deploying Camel
- Creating new Camel Projects
- Extending Camel
- Q and A

A Little Example

- File Copier Example

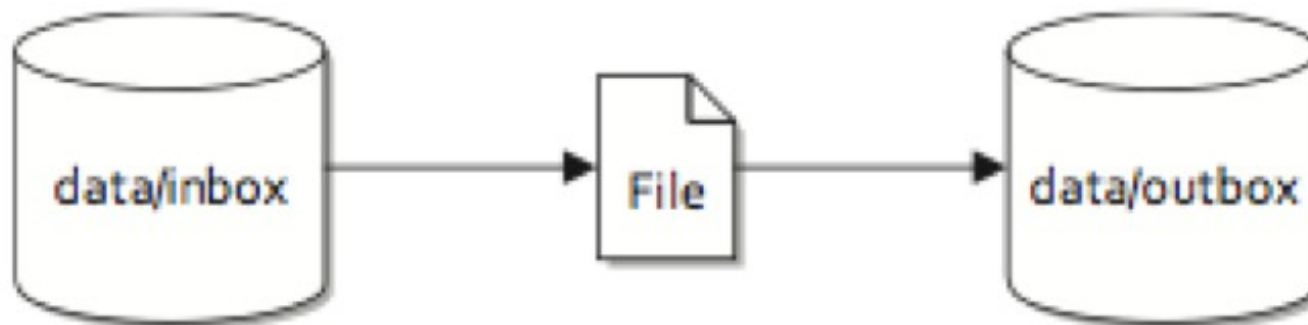


Figure 1.2 Files are routed from the `data/inbox` directory to the `data/outbox` directory.

A Little Example

- File Copier Example

Listing 1.2 Routing files from one folder to another with Apache Camel

```
public class FileCopierWithCamel {
    public static void main(String args[]) throws Exception {
        CamelContext context = new DefaultCamelContext();
        context.addRoutes(new RouteBuilder() {
            public void configure() {
                from("file:data/inbox?noop=true")
                    .to("file:data/outbox");
            }
        });
        context.start();
        Thread.sleep(10000);
        context.stop();
    }
}
```

1 Routes files from inbox to outbox

A Little Example

- File Copier Example

Listing 1.2 Routing files from one folder to another with Apache Camel

```
public class FileCopierWithCamel {  
    public static void main(String args[]) throws Exception {  
        CamelContext context = new DefaultCamelContext();  
        context.addRoutes(new RouteBuilder() {  
            public void configure() {  
                from("file:data/inbox?noop=true")  
                    .to("file:data/outbox");  
            }  
        });  
        context.start();  
        Thread.sleep(10000);  
        context.stop();  
    }  
}
```

1 Routes files from
inbox to outbox

A Little Example

- File Copier Example

Listing 1.2 Routing files from one folder to another with Apache Camel

```
public class FileCopierWithCamel {
    public static void main(String args[]) throws Exception {
        CamelContext context = new DefaultCamelContext();
        context.addRoutes(new RouteBuilder() {
            public void configure() {
                from("file:data/inbox?noop=true")
                    .to("file:data/outbox");
            }
        });
        context.start();
        Thread.sleep(10000);
        context.stop();
    }
}
```

1 Routes files from inbox to outbox

A Little Example

- File Copier Example

Listing 1.2 Routing files from one folder to another with Apache Camel

```
public class FileCopierWithCamel {  
    public static void main(String args[]) throws Exception {  
        CamelContext context = new DefaultCamelContext();  
        context.addRoutes(new RouteBuilder() {  
            public void configure() {  
                from("file:data/inbox?noop=true")  
                    .to("file:data/outbox");  
            }  
        });  
        context.start();  
        Thread.sleep(10000);  
        context.stop();  
    }  
}
```

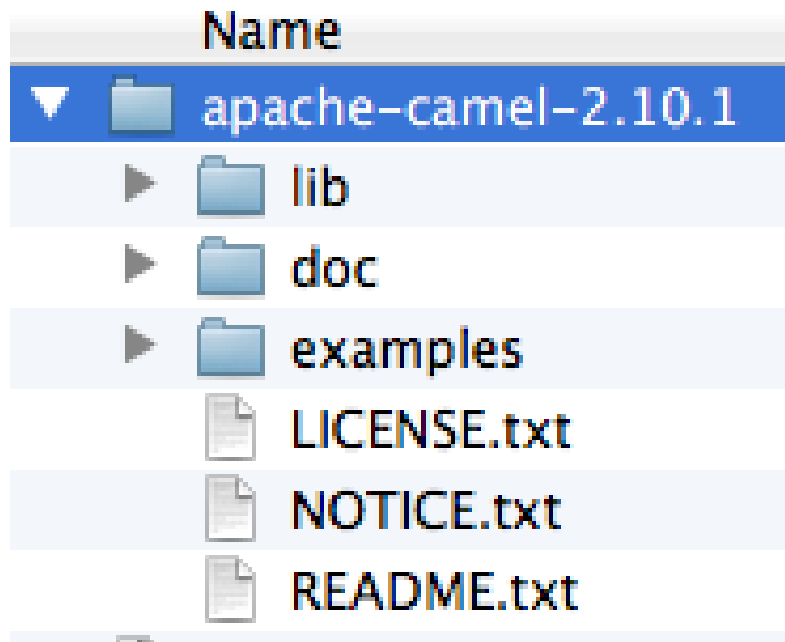
1 Routes files from inbox to outbox

Agenda

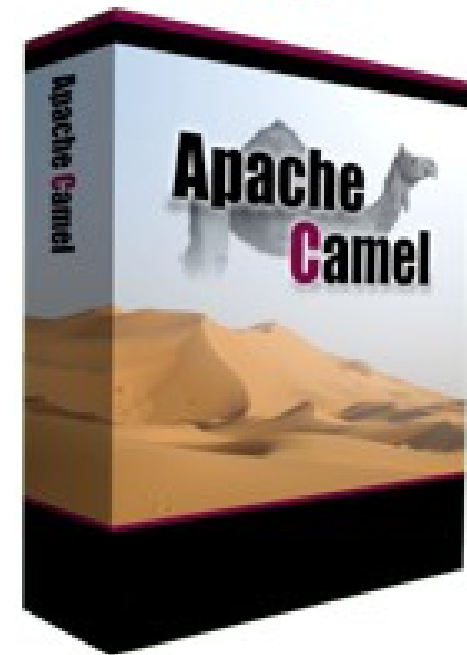
- What is Apache Camel?
- A little Example
- **Riding Camel**
- What's in the Camel box?
- Deploying Camel
- Creating new Camel Projects
- Q and A

Riding Camel

- Downloading Apache Camel
 - zip/tarball (approx 14mb)



**Download it
Today!**



<http://camel.apache.org>

Riding Camel

- Using Command Shell
 - Requires: Apache Maven

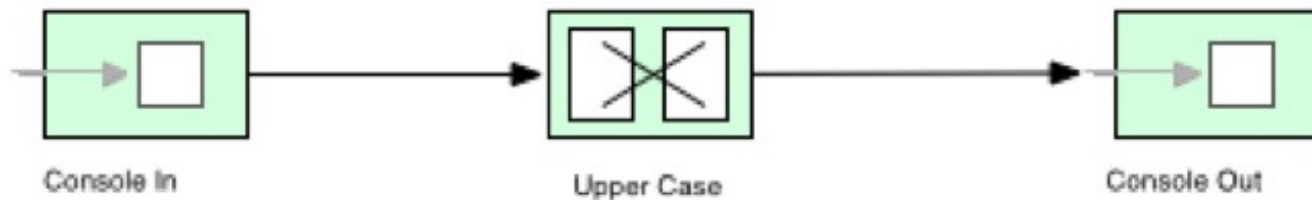
```
1. java
-----
davsclaus:~/Downloads/apache-camel-2.10.1/examples/camel-example-console$ mvn compile exec:java
[INFO] Scanning for projects...
[INFO]
[INFO] -----
[INFO] Building Camel :: Example :: Console 2.10.1
[INFO] -----
[INFO] --- maven-bundle-plugin:2.3.7:cleanVersions (versions) @ camel-example-console ---
[INFO]
[INFO] --- maven-remote-resources-plugin:1.3:process (default) @ camel-example-console ---
[INFO]
[INFO] --- maven-resources-plugin:2.4.3:resources (default-resources) @ camel-example-console ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 4 resources
[INFO] Copying 3 resources
[INFO]
[INFO] --- maven-resources-plugin:2.4.3:resources (default) @ camel-example-console ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 4 resources
[INFO] Copying 3 resources
[INFO]
[INFO] --- maven-compiler-plugin:2.5.1:compile (default-compile) @ camel-example-console ---
```

- From Eclipse



Riding Camel

- Console Example



```
<camelContext xmlns="http://camel.apache.org/schema/spring">
  <route>
    <from uri="stream:in?promptMessage=Enter something: "/>
    <transform>
      <simple>${body.toUpperCase()}</simple>
    </transform>
    <to uri="stream:out"/>
  </route>
</camelContext>
```

- cd examples/camel-example-console
- mvn compile exec:java

Riding Camel

- More examples ...

```
davsclaus:~/Downloads/apache-camel-2.10.1$ ls examples/  
README.txt  
camel-example-aggregate  
camel-example-bam  
camel-example-cafe  
camel-example-console  
camel-example-cxf  
camel-example-cxf-blueprint  
camel-example-cxf-osgi  
camel-example-cxf-proxy  
camel-example-cxf-tomcat  
camel-example-docs  
camel-example-etl  
camel-example-gae  
camel-example-gauth  
camel-example-guice-jms  
camel-example-jms-file  
camel-example-jmx  
camel-example-loadbalancing  
camel-example-loan-broker  
camel-example-management  
camel-example-osgi  
camel-example-osgi-rmi  
camel-example-pojo-messaging  
camel-example-reportincident  
camel-example-reportincident-wssecurity  
camel-example-route-throttling  
camel-example-servlet-tomcat  
camel-example-simplejirabot  
camel-example-spring  
camel-example-spring-javaconfig  
camel-example-spring-jms  
camel-example-spring-security  
camel-example-spring-ws  
camel-example-spring-xquery  
camel-example-ssh  
camel-example-tracer  
camel-example-twitter-websocket  
pom.xml
```

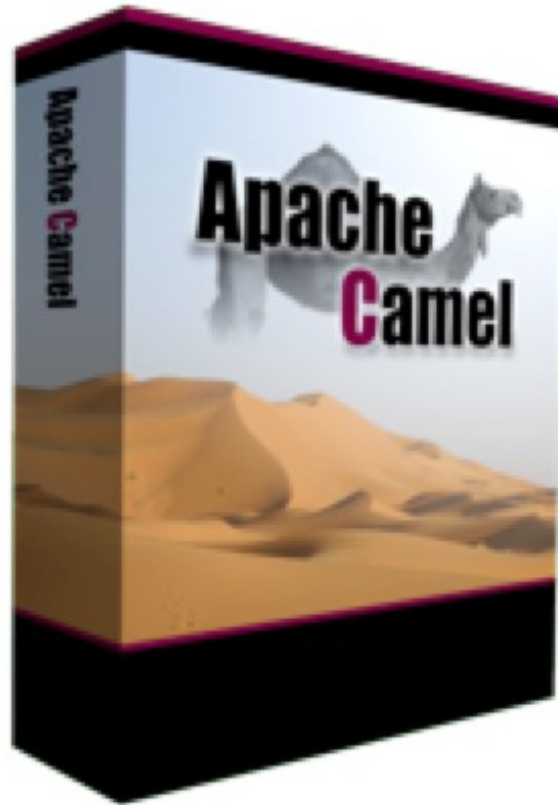
... and further details at website.

<http://camel.apache.org/examples>

Agenda

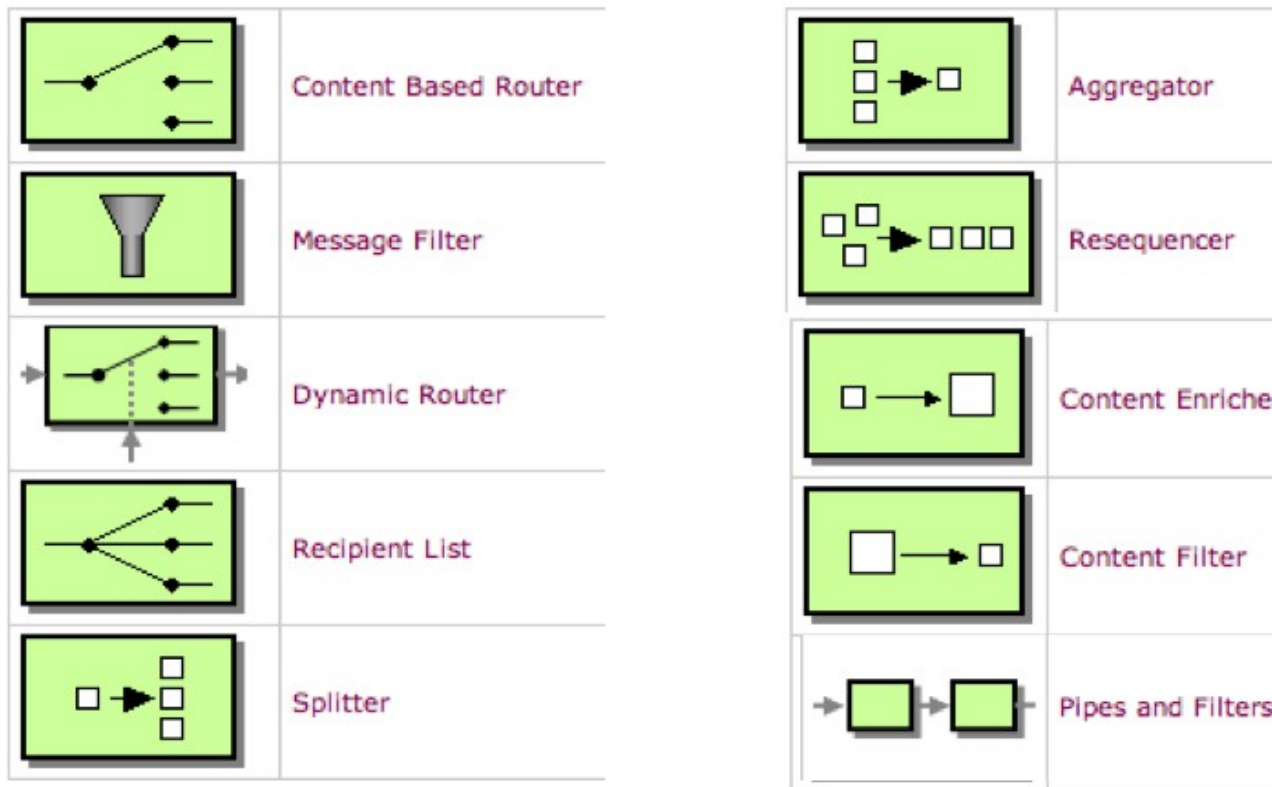
- What is Apache Camel?
- A little Example
- Riding Camel
- **What's in the box?**
- Deploying Camel
- Creating new Camel Projects
- Q and A

What's in the box?



What's in the box?

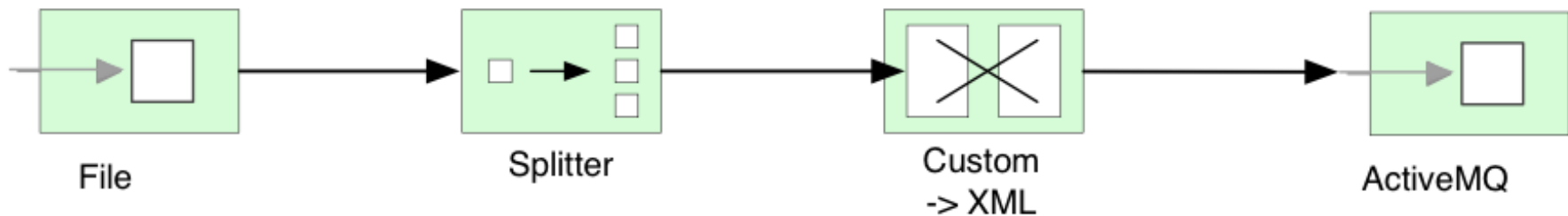
- Enterprise Integration Patterns



<http://camel.apache.org/eip>

What's in the box?

- Splitter EIP



```
from("file:inbox")
    .split(body().tokenize("\n"))
    .marshal(customToXml)
    .to("activemq:line");
```

What is Apache Camel?

120+ Components

activemq	cxfrs	flatpack	jasypt
activemq-journal	cxfrs	freemarker	javaspace
amqp	dataset	ftp/ftps/sftp	jbi
atom	db4o	gae	jcr
bean	direct	hdfs	jdbc
bean validation	ejb	hibernate	jetty
browse	esper	hl7	jms
cache	event	http	jmx
cometd	exec	ibatis	jpa
crypto	file	irc	jt/400

What is Apache Camel?

19 Data Formats

<u>bindy</u>	<u>protobuf</u>
castor	serialization
<u>csv</u>	soap
crypto	syslog
dozer	tidy markup
flatpack	xml beans
gzip	xml security
hl7	<u>xstream</u>
<u>jaxb</u>	zip
<u>json</u>	

<http://camel.apache.org/data-format.html>

What is Apache Camel?

15 Expression Languages

BeanShell	Python
EL	Ruby
Groovy	Simple
JavaScript	SpEL
JSR 223	SQL
OGNL	XPath
MVEL	XQuery
PHP	

<http://camel.apache.org/languages.html>

What is Apache Camel?

5+ DSL in multiple languages

- Java DSL
- XML DSL (Spring and OSGi Blueprint)
- Groovy DSL
- Scala DSL
- Kotlin DSL (work in progress)

What is Apache Camel?

Test Kit

- camel-test
- camel-test-spring
- camel-test-blueprint
- camel-testng

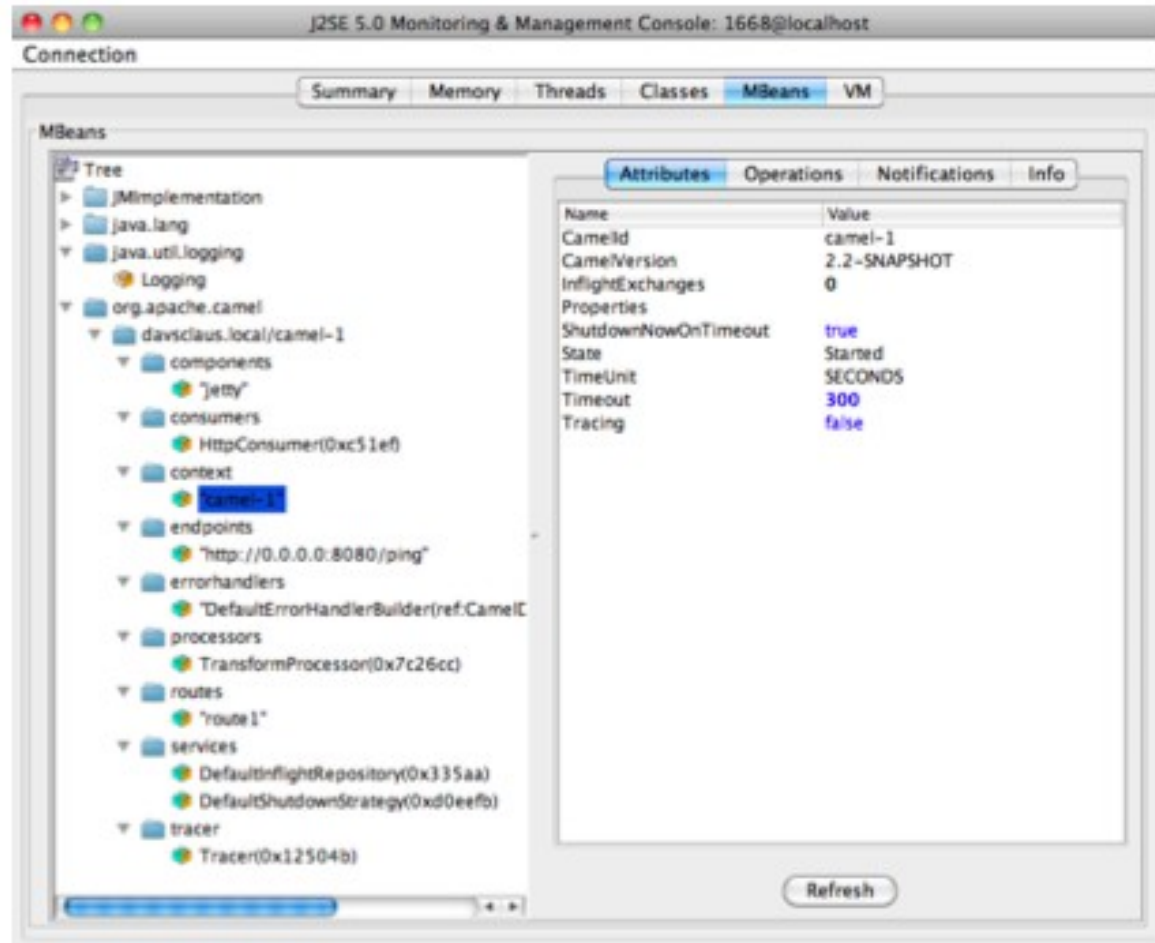
```
public class FilterTest extends CamelTestSupport {  
  
    @EndpointInject(uri = "mock:result")  
    protected MockEndpoint resultEndpoint;  
  
    @Produce(uri = "direct:start")  
    protected ProducerTemplate template;  
  
    public void testSendMatchingMessage() throws Exception {  
        resultEndpoint.expectedBodiesReceived("<matched/>");  
  
        template.sendBodyAndHeader("<matched/>", "foo", "bar");  
  
        assertMockEndpointsSatisfied();  
    }  
  
    @Override  
    protected RouteBuilder createRouteBuilder() {  
        return new RouteBuilder() {  
            public void configure() {  
                from("direct:start")  
                    .filter(header("foo").isEqualTo("bar"))  
                    .to("mock:result");  
            }  
        };  
    }  
}  
  
// END SNIPPET: example
```



What is Apache Camel?

Management

- JMX



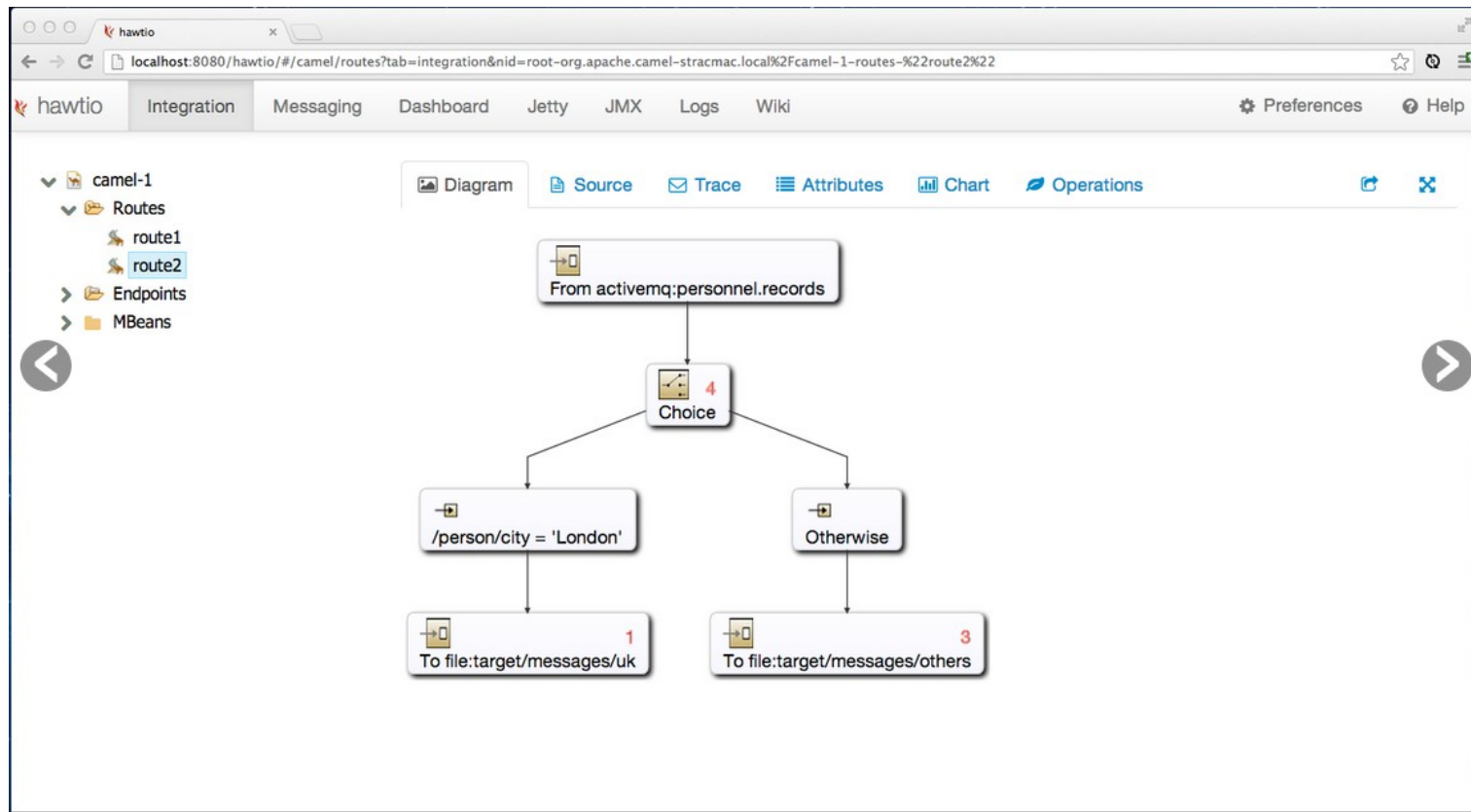
The screenshot displays the J2SE 5.0 Monitoring & Management Console. The title bar reads "J2SE 5.0 Monitoring & Management Console: 1668@localhost". The "Connection" section is active, and the "MBeans" tab is selected. The left pane shows a tree view of MBeans under the "org.apache.camel" package, with "camel-1" selected. The right pane shows the "Attributes" tab for the selected MBean, displaying the following data:

Name	Value
CamelId	camel-1
CamelVersion	2.2-SNAPSHOT
InflightExchanges	0
Properties	
ShutdownNowOnTimeout	true
State	Started
TimeUnit	SECONDS
Timeout	300
Tracing	false

A "Refresh" button is located at the bottom right of the console window.

What is Apache Camel?

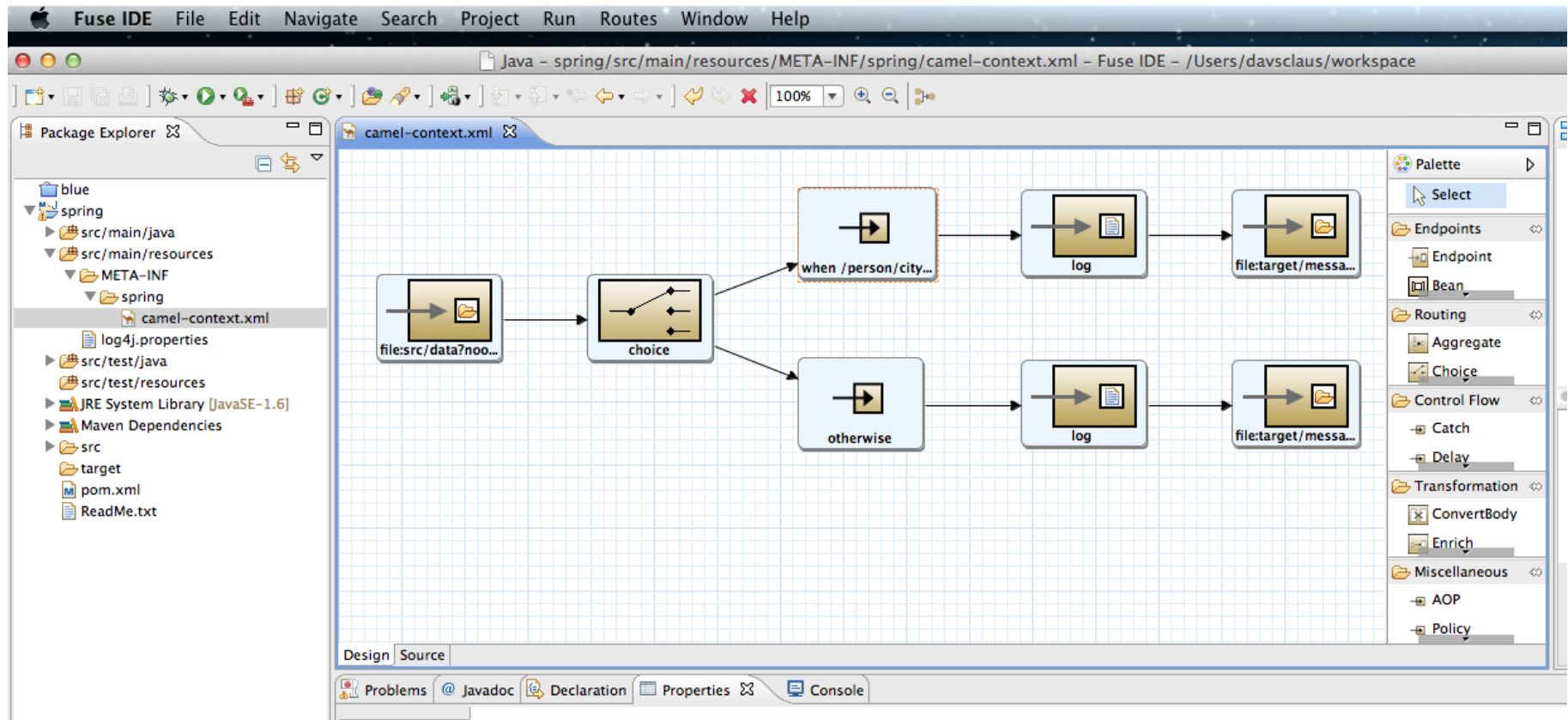
Tooling – Web console - HawtIO



<http://hawt.io>

What is Apache Camel?

Tooling – Eclipse Plugin – Fuse IDE



<http://github.com/fusesource/fuseide>

Agenda

- What is Apache Camel?
- A little Example
- Riding Camel
- What's in the Camel box?
- **Deploying Camel**
- Creating new Camel Projects
- Extending Camel
- Q and A

Deploying Camel

- Deployment Strategy
 - No Container Dependency
 - Lightweight & Embeddable
- Deployment Options
 - Standalone
 - WAR
 - Spring
 - JEE
 - OSGi
 - Cloud

Known Containers

Apache ActiveMQ
Apache ServiceMix
Apache Tomcat
Fuse ESB / Fuse MQ
Glassfish
IBM WebSphere
JBoss AS
Jetty
Oracle OC4j
Oracle WebLogic
Amazon EC2
Google App Engine
Rack space
... others

Camel as a Client

- Java Client Application (no routes)
- Example
 - Upload a file to a FTP server

```
CamelContext context = new DefaultCamelContext();
ProducerTemplate template = context.createProducerTemplate();

String data = ...
String fileName = ...

String uri = "ftp://myserver?username=foo&password=secret";
template.sendBodyAndHeader(uri, data, Exchange.FILE_NAME, fileName);
```

Agenda

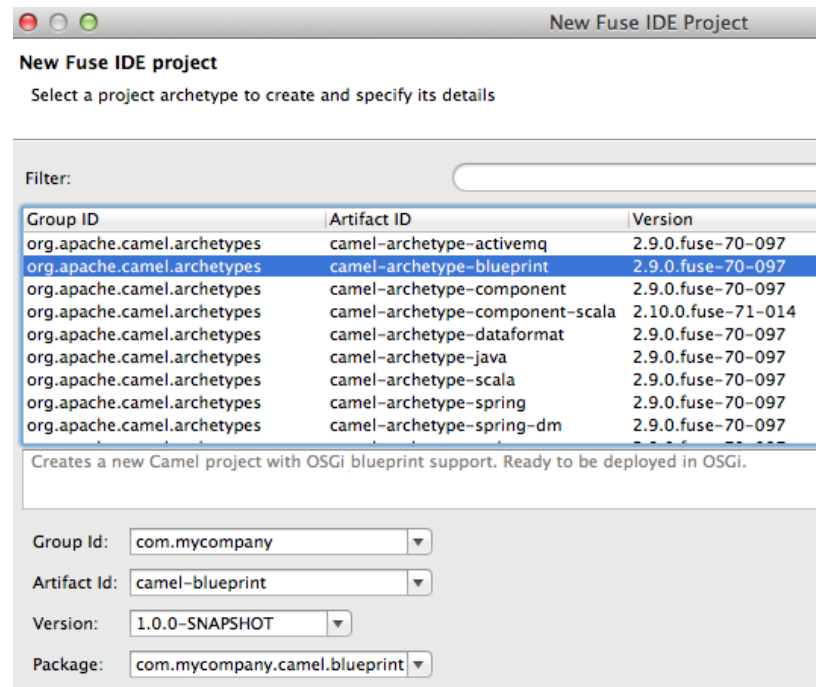
- What is Apache Camel?
- A little Example
- Riding Camel
- What's in the Camel box?
- Deploying Camel
- **Creating new Camel Projects**
- Q and A

Creating new Camel Projects

- Using Command Shell

```
mvn archetype:generate
```

- From Eclipse



Creating new Camel Projects

- Maven Archetypes

camel-archetype-activemq
camel-archetype-blueprint
camel-archetype-component
camel-archetype-dataformat
camel-archetype-java
camel-archetype-scala
camel-archetype-spring
camel-archetype-spring-dm
camel-archetype-web
camel-archetype-webconsole

Creating new Camel Projects

- camel-archetype-blueprint

```
<blueprint xmlns="http://www.osgi.org/xmlns/blueprint/v1.0.0"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:camel="http://camel.apache.org/schema/blueprint"
  xsi:schemaLocation="
    http://www.osgi.org/xmlns/blueprint/v1.0.0 http://www.osgi.org/xmlns/blueprint/v1.0.0/blueprint.xsd
    http://camel.apache.org/schema/blueprint http://camel.apache.org/schema/blueprint/camel-blueprint.xsd">

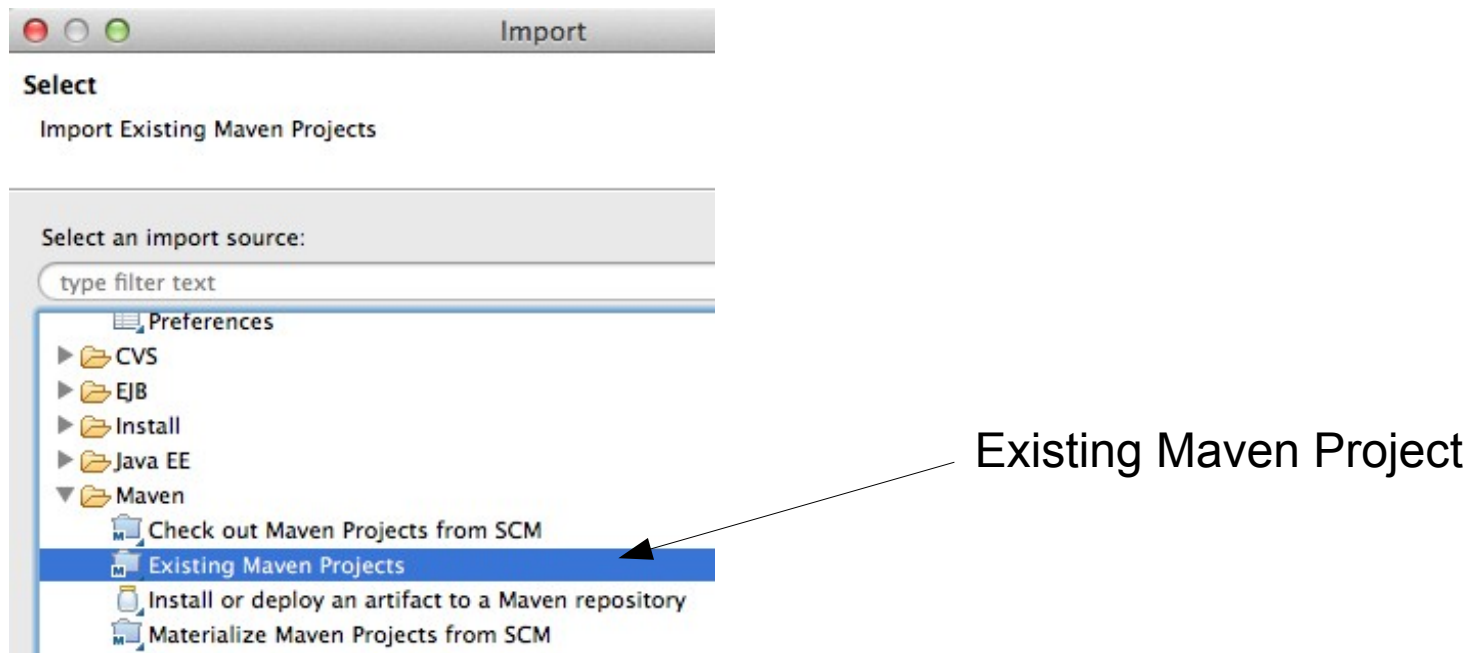
  <bean id="helloBean" class="com.foo.HelloBean">
    <property name="say" value="Hi from Camel"/>
  </bean>

  <camelContext trace="false" id="blueprintContext" xmlns="http://camel.apache.org/schema/blueprint">
    <route id="timerToLog">
      <from uri="timer:foo?period=5000"/>
      <setBody>
        <method method="hello" ref="helloBean"></method>
      </setBody>
      <log message="The message contains ${body}"/>
      <to uri="mock:result"/>
    </route>
  </camelContext>
</blueprint>
```

```
mvn install
mvn camel:run
```

Creating new Camel Projects

- Importing into Eclipse

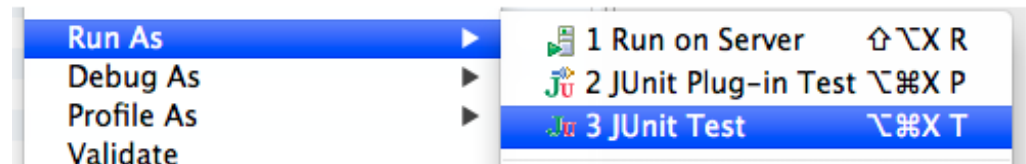


Creating new Camel Projects

- Testing Camel Projects

```
public class RouteTest extends CamelBlueprintTestSupport {  
  
    @Override  
    protected String getBlueprintDescriptor() {  
        return "/OSGI-INF/blueprint/blueprint.xml";  
    }  
  
    @Test  
    public void testRoute() throws Exception {  
        // the route is timer based, so every 5th second a message is send  
        // we should then expect at least one message  
        getMockEndpoint("mock:result").expectedMinimumMessageCount(1);  
  
        // assert expectations  
        assertMockEndpointsSatisfied();  
    }  
}
```

- ... from inside Eclipse



Agenda

- What is Apache Camel?
- A little Example
- Riding Camel
- What's in the Camel box?
- Deploying Camel
- Creating new Camel Projects
- **Q and A**

Where do I get more information?

- Best Article covering what Apache Camel is
 - <http://java.dzone.com/articles/open-source-integration-apache>

Getting Started

First you need to [Download](#) the Camel distribution; or you could grab the [Source](#) and try [Building](#) it yourself.

Then come back here and you might want to read the following documentation before continuing:

- [Longer Getting Started Guide](#)
- [Find out about Enterprise Integration Patterns](#) and how to implement them with Camel
- [Review the Architecture guide](#) to see how to build [Routes](#) using the [Java DSL](#) or [Spring based Xml Configuration](#)

Working with CamelContexts and RouteBuilders

To get started with Camel:

1. Create a [CamelContext](#).
2. Optionally, [configure components or endpoints](#).
3. Add whatever routing rules you wish using the [DSL](#) and [RouteBuilder](#) or using [Xml Configuration](#).
4. [Start the context](#).

When your application is closing you may wish to [stop the context](#)

When you are ready, why not [Walk through an Example?](#)
And then continue the walk [Walk through another example](#)
And after the walks head over to the [tutorials](#).

Working with Spring

If you use Spring as a Dependency Injection container then please refer to the [Camel Spring documentation](#).

Other Resources

We strongly suggest that you brew a cup of coffee or tea and take the 30 minutes to read one or more of the following resources:

- [Camel in Action, Chapter 1 \(direct link\)](#) free chapter 1 of the [Camel in Action book](#). Highly recommended to read to learn what Camel is and the basic Camel concepts. This is a free chapter you can download directly as a pdf (about 20 pages) and introduces you to Camel. We have been told by experience Camel end users they wished this chapter was available to them when they started learning Camel.
- [Open Source Integration with Apache Camel and How Fuse IDE Can Help](#) by Jonathan Anstey. Updated article of the [Apache Camel: Integration Nirvana](#). Great article to learn what Camel is and has a good use case example.

Overview

- [Home](#)
- [Download](#)
- [Getting Started](#)
- [FAQ](#)

Documentation

- [User Guide](#)
- [Manual](#)
- [Books](#)
- [Tutorials](#)
- [Examples](#)
- [Cookbook](#)
- [Architecture](#)
- [Enterprise Integration Patterns](#)
- [DSL](#)
- [Components](#)
- [Data Format](#)
- [Languages](#)
- [Security](#)

- [Support](#)
- [Contributing](#)
- [Discussion Forum](#)
- [Mailing Lists](#)
- [User Stories](#)
- [News](#)
- [Articles](#)
- [Site](#)
- [Team](#)
- [Camel Extra](#)

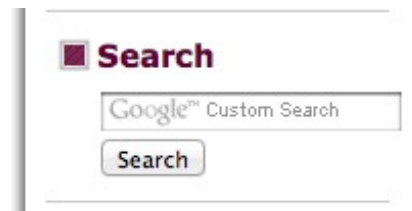
Developers

- [Developer Guide](#)
- [Source](#)
- [Building](#)

Link to article from “Getting Started”

Where do I get more information?

- Try Camel Examples
 - <http://camel.apache.org/examples.html>
- Read other blogs and articles
 - <http://camel.apache.org/articles.html>
- Use the “search box” on the Camel front page

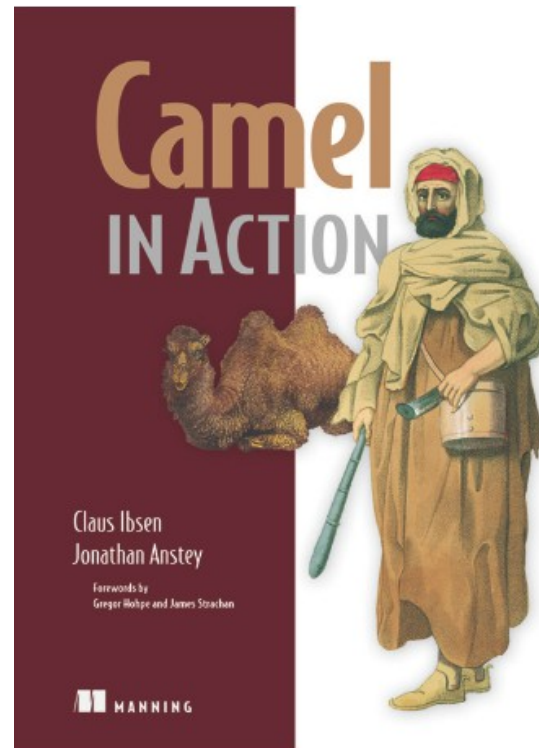


Where do I get more information?

- Use the mailing list / forum
 - <http://camel.apache.org/mailling-lists.html>
- Use stackoverflow
 - <http://stackoverflow.com/questions/tagged/apache-camel>

Where do I get more information?

- Buy the Camel in Action book



Use code ...
camel40
... for 40% discount

<http://manning.com/ibsen/>

Any Questions ?



- Contact
 - EMail: cibsen@redhat.com
 - Twitter: [@davsclaus](https://twitter.com/davsclaus)
 - LinkedIn: [davsclaus](https://www.linkedin.com/in/davsclaus)
 - Blog: <http://davsclaus.com>