

Apache Camel  
How to go from EIPs to Production  
by Claus Ibsen  
Principal Software Engineer, FuseSource

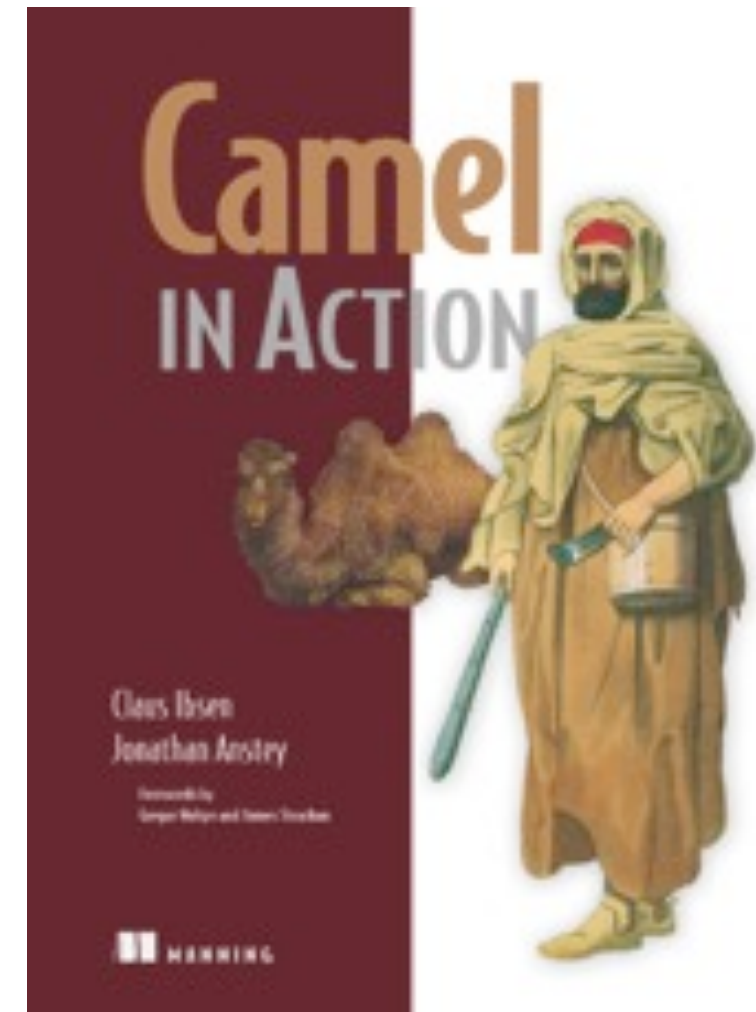
**FuseSource**  
A Progress Software Company

# Agenda

- Who is Claus Ibsen?
- What is Apache Camel?
- A little example
- Whats included in the box?
- Running Camel
- Live Demos
- Q and A

# Who is Claus Ibsen?

- Principal Software Engineer at FuseSource
  - Full time Apache Camel hacker
- Apache Camel committer for 3 years
  - Camel Project Lead
  - 3.5 years working with Camel
- Author of Camel in Action book
- Contact
  - Twitter: @davsclaus
  - Blog: <http://davsclaus.blogspot.com>
  - Email: [cibsen@fusesource.com](mailto:cibsen@fusesource.com)



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

# My Employer

- FuseSource - <http://fusesource.com>

The screenshot shows the FuseSource website homepage. At the top, the FuseSource logo is displayed as "A PROGRESS SOFTWARE COMPANY". To the right, the tagline reads "The experts in open source integration and messaging". A navigation menu includes links for PRODUCTS, DOWNLOADS, SERVICES, COMMUNITY, DOCUMENTATION, RESOURCES, and ABOUT US. Below the menu, there are links for "Login | Register | Buy Now | Download". The main content area features a large banner for "CamelOne" with a cartoon camel illustration and the text "CamelOne MAY 24-26, 2011 • WASHINGTON, DC". A "Learn More >>" button is positioned next to the banner. To the right of the banner is a red box with the text "GET ENTERPRISE SUBSCRIPTION". Below the banner are four columns of content: "DOWNLOADS" (Certified distributions based on ServiceMix, ActiveMQ, Camel and CXF, with a "GET STARTED" button), "GET INVOLVED" (Register and join our community, with a "JOIN NOW" button), "GET EDUCATED" (Webinars, videos, virtual training, on-site training, with a "GET EXCITED" button), and "CUSTOMER STORIES" (featuring the Sabre Holdings logo). At the bottom, there are two sections: "News & Events" and "What FuseSource Is Saying". The "News & Events" section includes a post titled "Registration for CamelOne is Open" with a sub-headline "CamelOne will be held on May 24-26 in Washington DC. Review the agenda and register today!". The "What FuseSource Is Saying" section includes a post titled "FuseSource hosts first CamelOne 2011 Event in Washington DC" with a sub-headline "Fellow Camel riders, If you are a resident of Washington DC or plan on pitching your tents there in...".

# Why the name Camel?

- What does Camel stand for?

**C**oncise  
**A**pplication  
**M**essaging  
**E**xchange  
**L**anguage

<http://camel.apache.org/why-the-name-camel.html>



# Why the name Camel?

- The reason for the Camel name



*Camel is easy to remember and type*

<http://camel.apache.org/why-the-name-camel.html>

# The birth of Apache Camel

- Camel's parents



# The birth of Apache Camel

- First commit

**r519901 | jstrachan | 2007-03-19 11:54:57 +0100  
(Mon, 19 Mar 2007) | 1 line**

**Initial checkin of Camel routing library**



- Apache Camel 1.0 released June 2007



# The birth of Apache Camel

- My initial commit

**r640963 | davsclaus | 2008-03-25 21:07:10 +0100  
(Tue, 25 Mar 2008) | 1 line**

**Added unit test for mistyped URI**

## Top-3 Committers

4074 Claus Ibsen  
2073 Willem Ning Jiang  
1316 James Strachan

**git shortlog -ns**

# Agenda

- Who is Claus Ibsen?
- **What is Apache Camel?**
- A little example
- Whats included in the box?
- Running Camel
- Live Demos
- Q and A

# What is Apache Camel

- Quote from the web site
  - <http://camel.apache.org>

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

# What is Apache Camel

- Why do we need integration?
  - Your apps are build using different tech stacks
  - Critical for your business to integrate
- Why Integration Framework?
  - Framework do the heavy lifting
  - Focus on business problem
  - Not "reinventing the wheel"



# What is Apache Camel

- What is Enterprise Integration Patterns?



System A

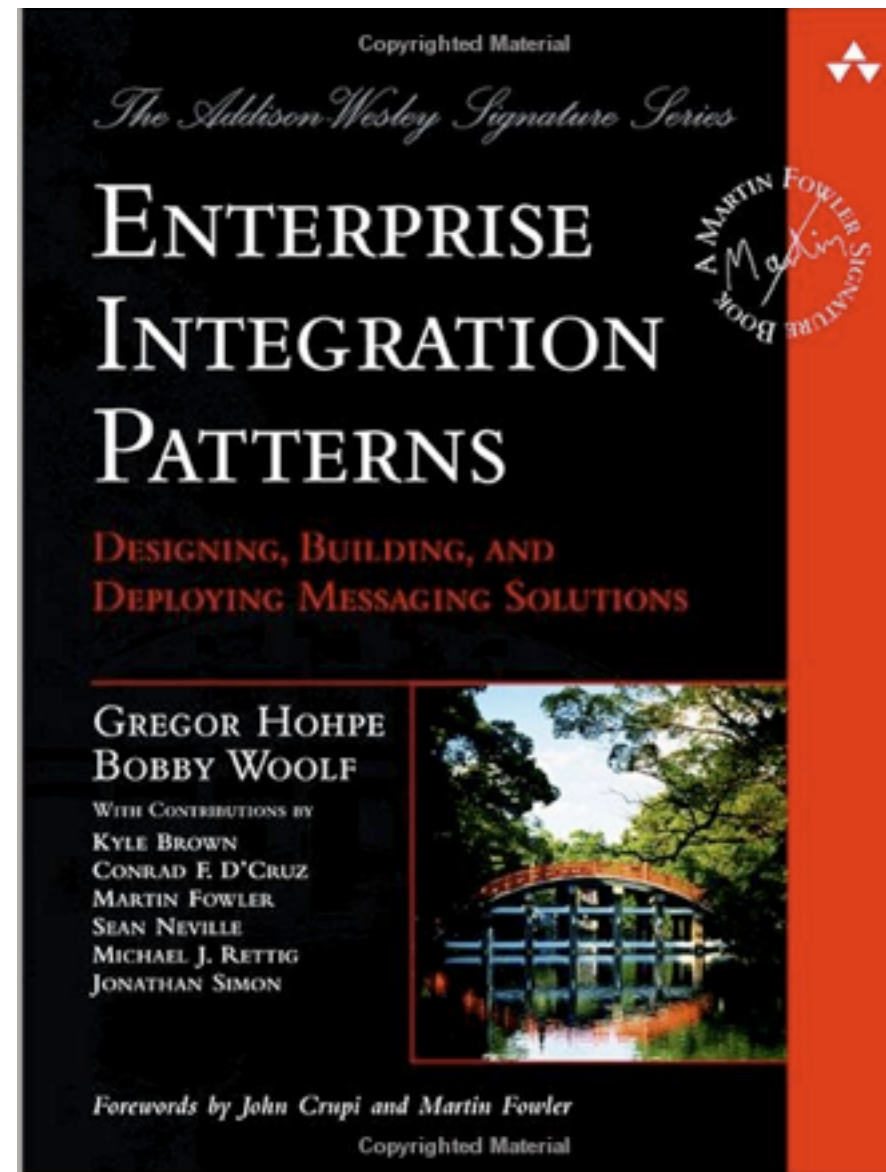


System B



# What is Apache Camel

- What is Enterprise Integration Patterns?



**Its a book**

# What is Apache Camel

- Camel and EIP



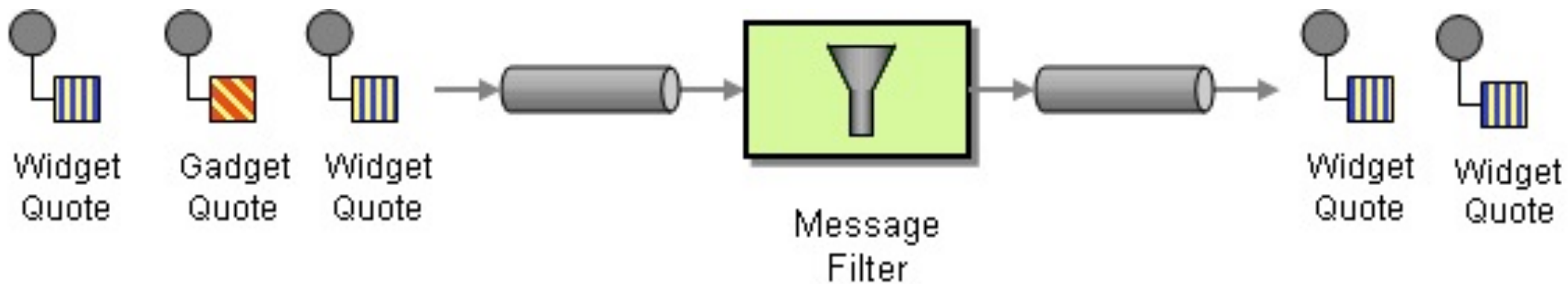
Apache  
ActiveMQ



WebSphereMQ

# What is Apache Camel

- Camel and EIP



# What is Apache Camel

- Camel and EIP

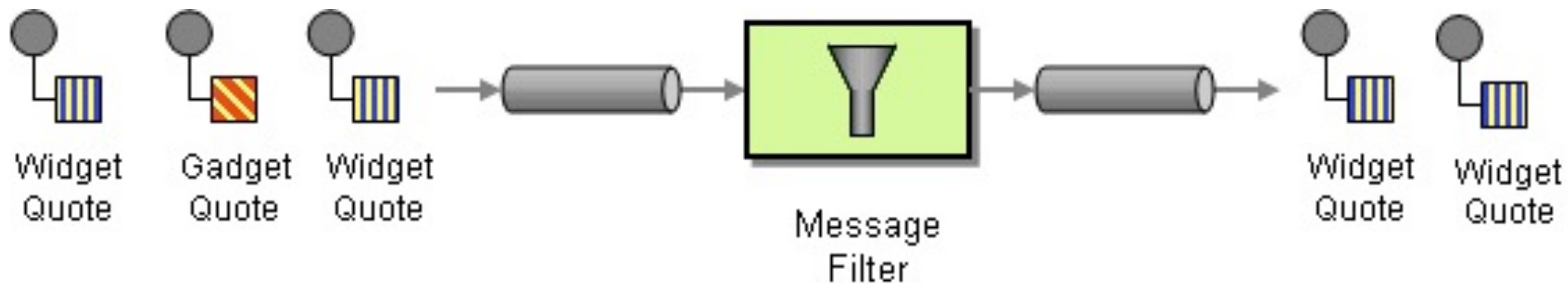


from  
A



send to  
B

filter  
message



# What is Apache Camel

- Camel and EIP



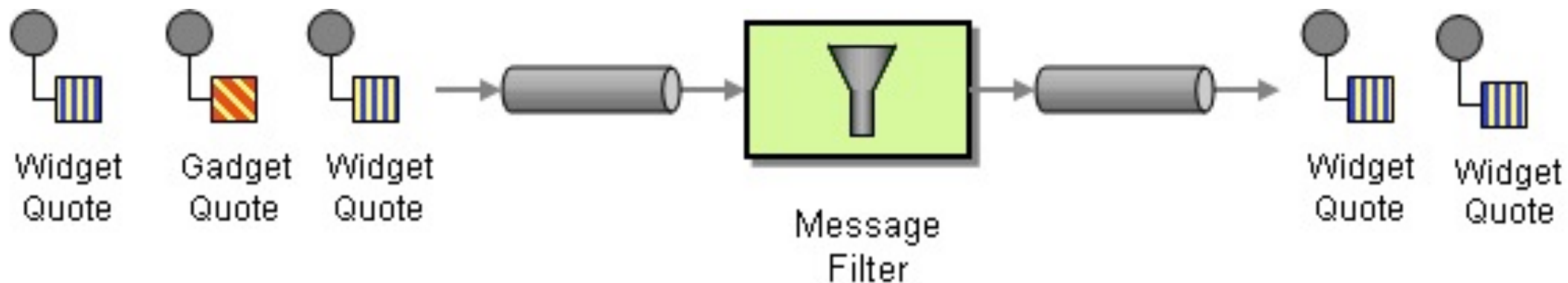
from(A)



filter(predicate)



to(B)





# What is Apache Camel

- Camel and EIP

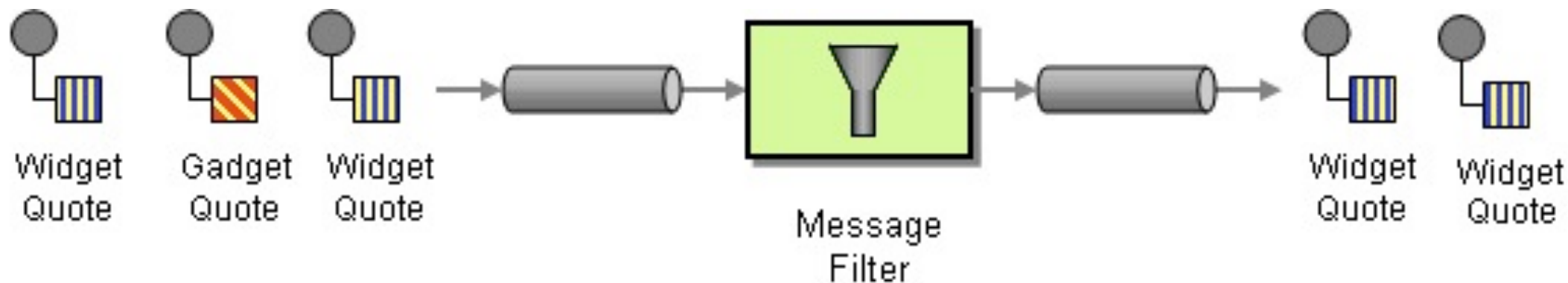


from(A)



.to(B)

.filter(isWidget)

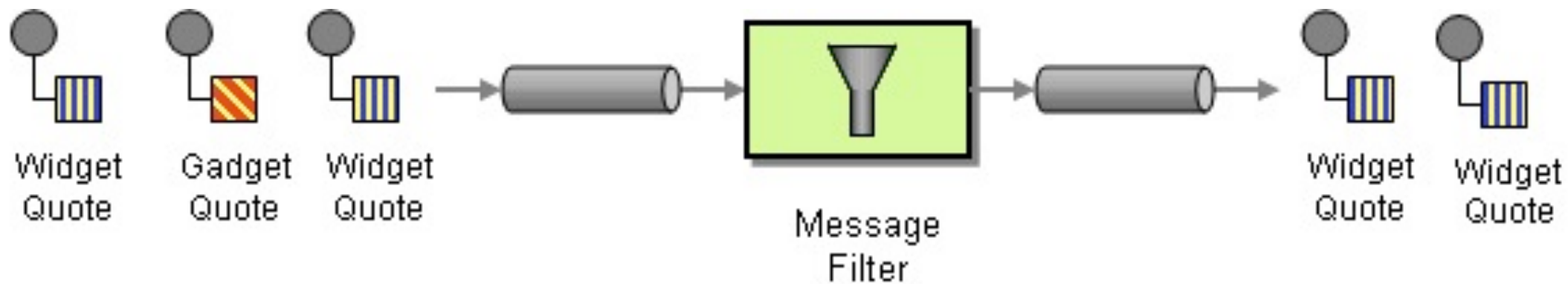


# What is Apache Camel

- Camel and EIP



`from(A).filter(isWidget).to(B);`



# What is Apache Camel

- Camel and EIP



```
isWidget = xpath("/quote/product = 'widget');
```

```
from(A).filter(isWidget).to(B);
```

# What is Apache Camel

- Camel and EIP

```
Endpoint A = endpoint("activemq:queue:quote");
```

```
Endpoint B = endpoint("mq:quote");
```

```
Predicate isWidget = xpath("/quote/product = 'widget'");
```

```
from(A).filter(isWidget).to(B);
```

# What is Apache Camel

- Filter Route

```
public void configure() throws Exception {  
    Endpoint A = endpoint("activemq:queue:quote");  
    Endpoint B = endpoint("mq:quote");  
    Predicate isWidget = xpath("/quote/product = 'widget'");  
  
    from(A).filter(isWidget).to(B);  
}
```



# What is Apache Camel

- Filter Route - Java DSL

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

public class FilterRoute extends RouteBuilder {

    public void configure() throws Exception {
        Endpoint A = endpoint("activemq:queue:quote");
        Endpoint B = endpoint("mq:quote");
        Predicate isWidget = xpath("/quote/product = 'widget'");

        from(A).filter(isWidget).to(B);
    }
}
```

# What is Apache Camel

- Filter Route - Java DSL

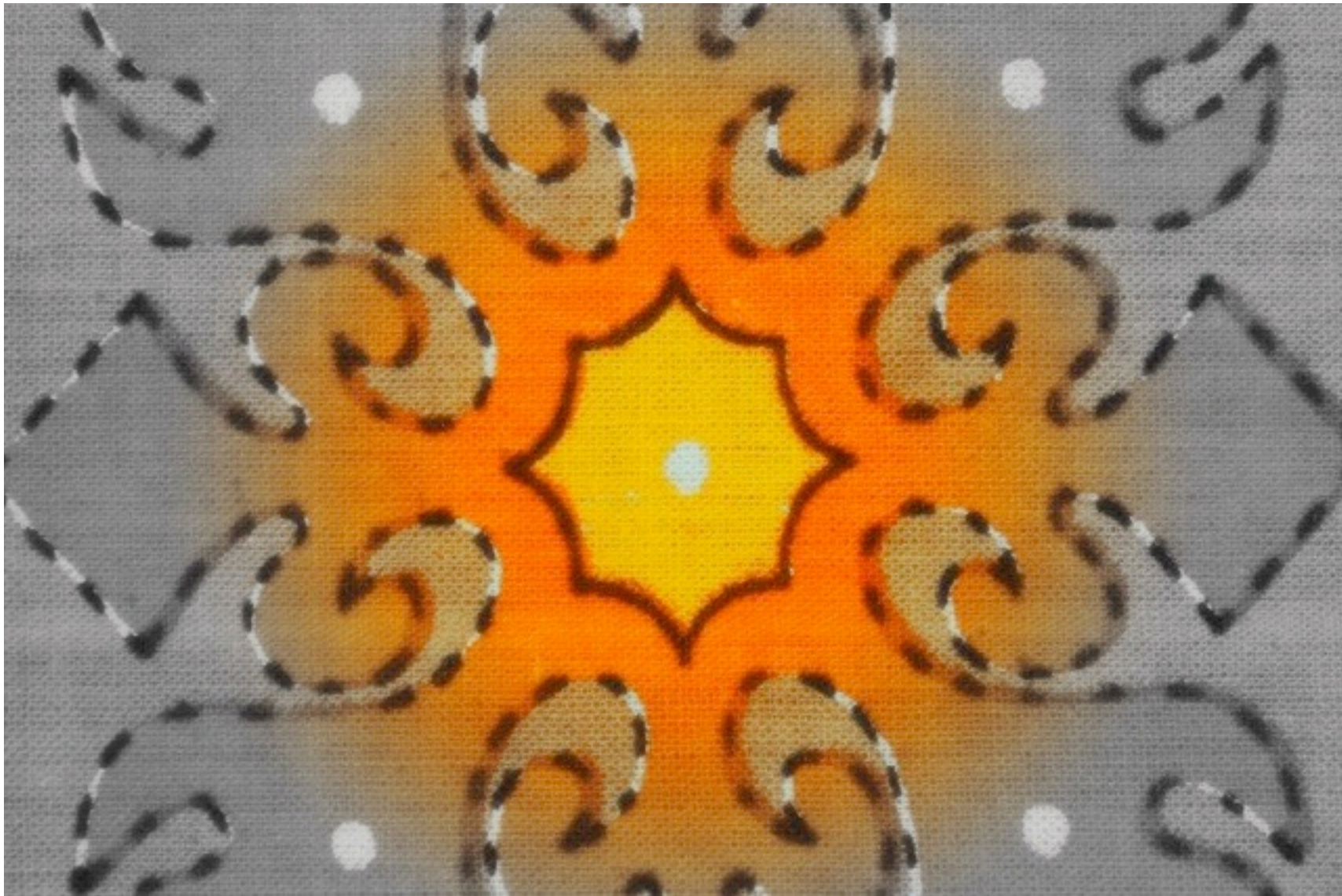
```
import org.apache.camel.builder.RouteBuilder;

public class FilterRoute extends RouteBuilder {

    public void configure() throws Exception {
        from("activemq:queue:quote")
            .filter().xpath("/quote/product = 'widget'")
                .to("mq:quote");
    }
}
```

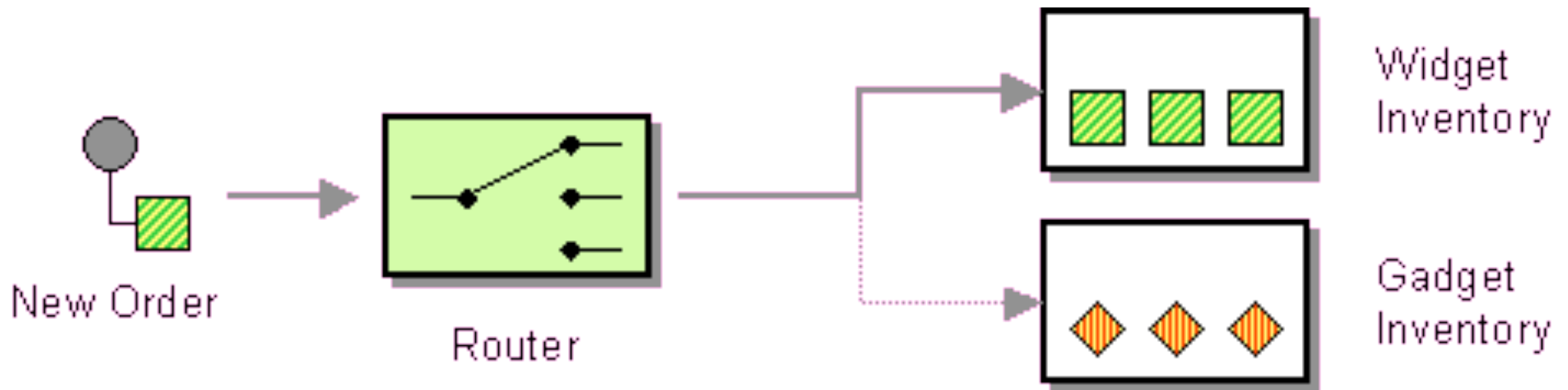
# What is Apache Camel

- Lets look at the most famous pattern



# What is Apache Camel

- Content Based Router



# What is Apache Camel

- Content Based Router - XML DSL

```
<camelContext>
  <route>
    <from uri="activemq:NewOrders" />
    <choice>
      <when>
        <xpath>/order/product = 'widget' </xpath>
        <to uri="activemq:Orders.Widgets" />
      </when>
      <otherwise>
        <to uri="activemq:Orders.Gadgets" />
      </otherwise>
    </choice>
  </route>
</camelContext>
```



# What is Apache Camel

- Content Based Router - Java DSL

```
from("activemq:NewOrders")  
  .choice()  
    .when().xpath("/order/product = 'widget'")  
      .to("activemq:Orders.Widget")  
    .otherwise()  
      .to("activemq:Orders.Gadget");
```

# What is Apache Camel

- Endpoints as URIs

use file instead

```
from("file:inbox/orders")  
  .choice()  
    .when().xpath("/order/product = 'widget'")  
      .to("activemq:Orders.Widget")  
    .otherwise()  
      .to("activemq:Orders.Gadget");
```

# What is Apache Camel

- Endpoints as URIs

parameters

```
from("file:inbox/orders?delete=true")  
  .choice()  
    .when().xpath("/order/product = 'widget'")  
      .to("activemq:Orders.Widget")  
    .otherwise()  
      .to("activemq:Orders.Gadget");
```

# What is Apache Camel

## ■ Summary

- Integration framework
- Enterprise Integration Patterns (EIP)
- Routing (using DSL)
- Easy configuration (endpoints as URIs)
- No heavy specification
- No container dependency
- Payload agnostic
- A lot of components



# Agenda

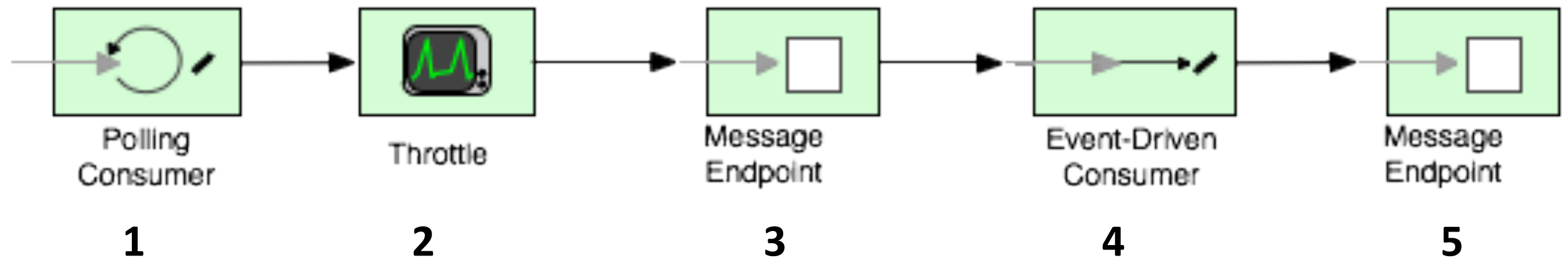
- Who is Claus Ibsen?
- What is Apache Camel?
- **A little example**
- Whats included in the box?
- Running Camel
- Live Demos
- Q and A

# A little example

- Based on community user (Gunnar Hillert)
  - <http://hillert.blogspot.com/2009/09/camellos-discovering-apache-camel-ii.html>
- Goals
  - 1) Pickup files from a directory
  - 2) Make sure we only pickup 3 files per 30 seconds
  - 3) Store into JMS queue
  - 4) Listen on JMS queue
  - 5) And upload file to FTP server

# A little example

## ■ Goals using Enterprise Integration Patterns



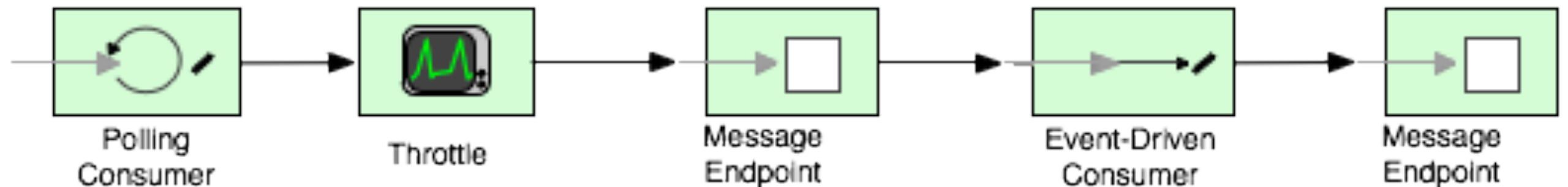
## ■ Goals

- 1) Pickup files from a directory
- 2) Make sure we only pickup 3 files per 30 seconds
- 3) Store into JMS queue
- 4) Listen on JMS queue
- 5) And upload file to FTP server



# A little example

- Goals using Enterprise Integration Patterns



**from** **throttle** **to** **from** **to**

- Goals

- 1) Pickup files from a directory
- 2) Make sure we only pickup 3 files per 30 seconds
- 3) Store into JMS queue
- 4) Listen on JMS queue
- 5) And upload file to FTP server

# A little example

- Camel Route in XML DSL

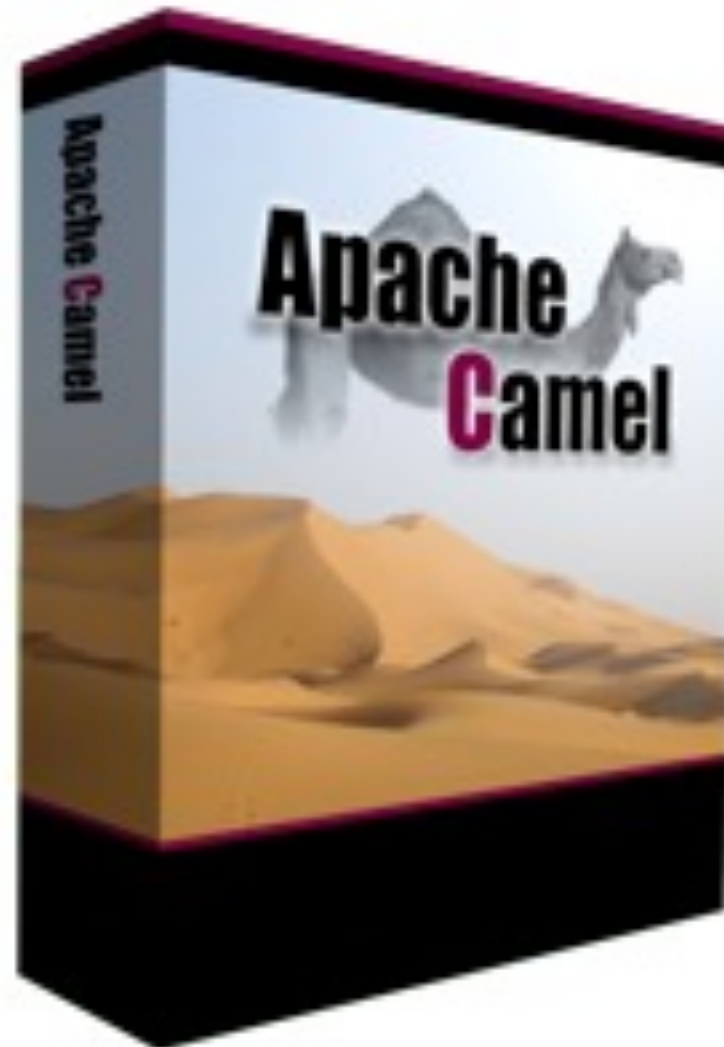
```
<camelContext>
  <route>
    <from uri="file:camellos/inbox?move=.done"/>
    <throttle maximumRequestsPerPeriod="3"
              timePeriodMillis="30000">
      <to uri="activemq:queue:camellos"/>
    </throttle>
  </route>
  <route>
    <from uri="activemq:queue:camellos"/>
    <to uri="ftp://admin:secret@localhost:3333"/>
  </route>
</camelContext>
```

# Agenda

- Who is Claus Ibsen?
- What is Apache Camel?
- A little example
- **Whats included in the box?**
- Running Camel
- Live Demos
- Q and A

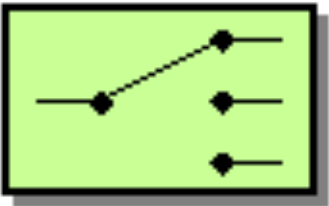
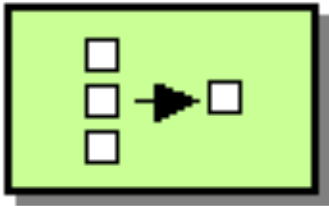
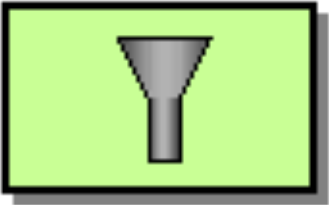
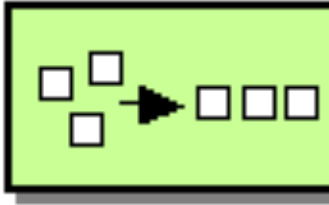
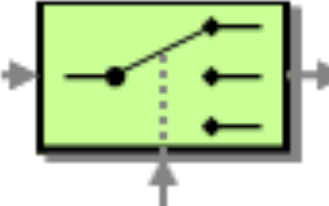
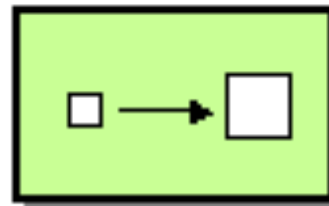
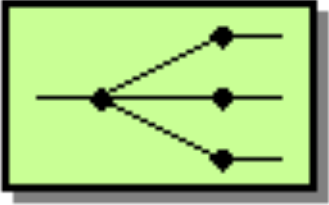
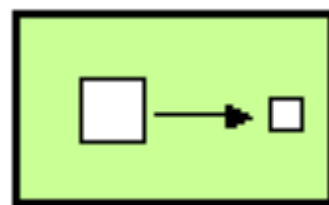
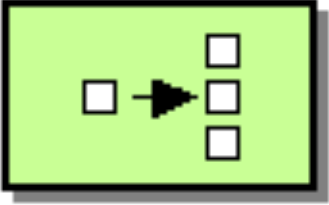
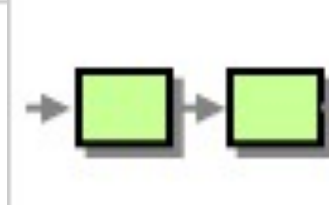
# Whats included in the box?

- Highlights of some of the features  
( there is much more )



# Whats included in the box?

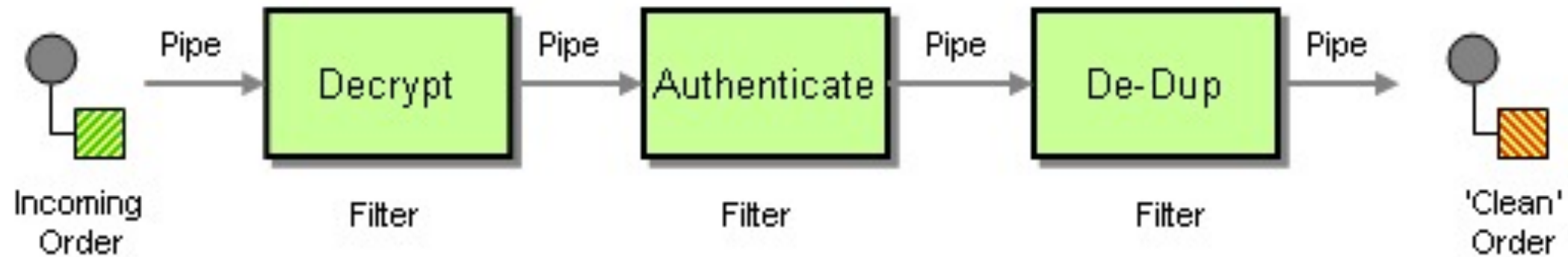
- 50 Enterprise Integration Patterns

	Content Based Router		Aggregator
	Message Filter		Resequencer
	Dynamic Router		Content Enricher
	Recipient List		Content Filter
	Splitter		Pipes and Filters

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

# Whats included in the box?

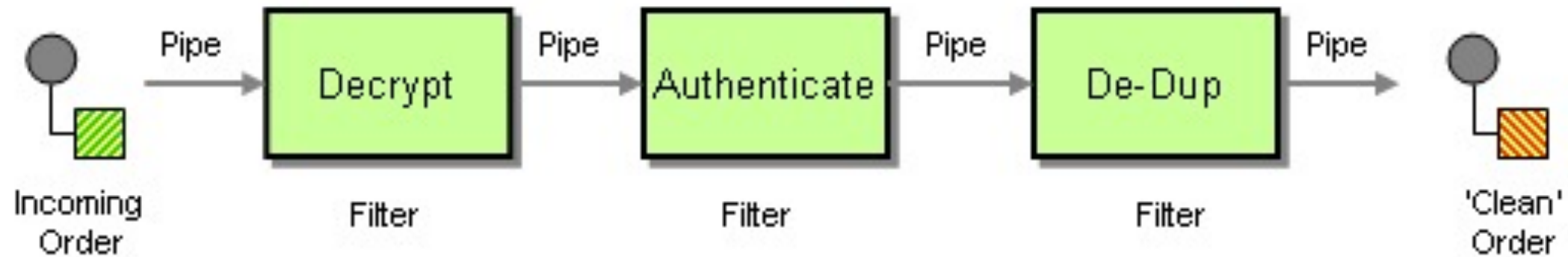
- Pipes and Filters EIP



```
from("file:inbox")  
  .pipeline()  
  .to("bean:decrypt")  
  .to("bean:authenticate")  
  .to("bean:deDup");
```

# Whats included in the box?

- Pipes and Filters EIP



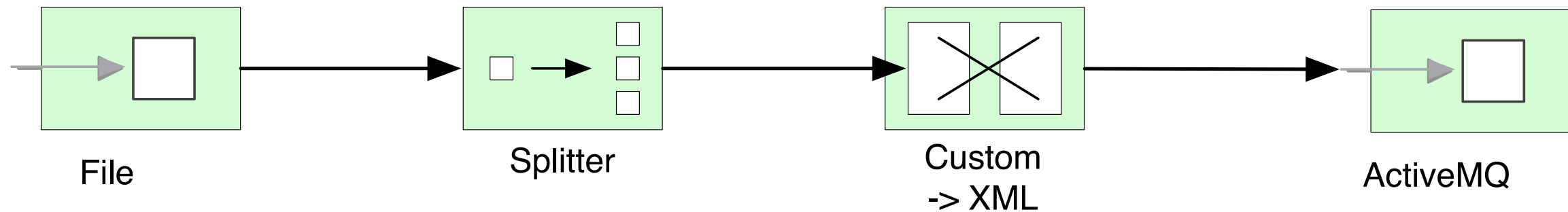
```
from("file:inbox")  
  .to("bean:decrypt")  
  .to("bean:authenticate")  
  .to("bean:deDup");
```

*pipeline() is default mode in Camel and can usually be omitted*



# Whats included in the box?

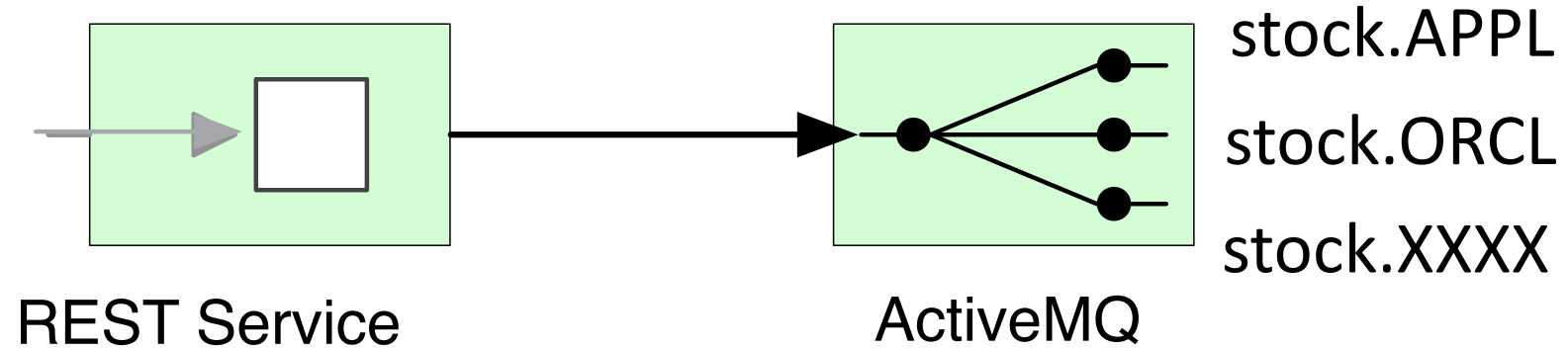
- Splitter EIP



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

# Whats included in the box?

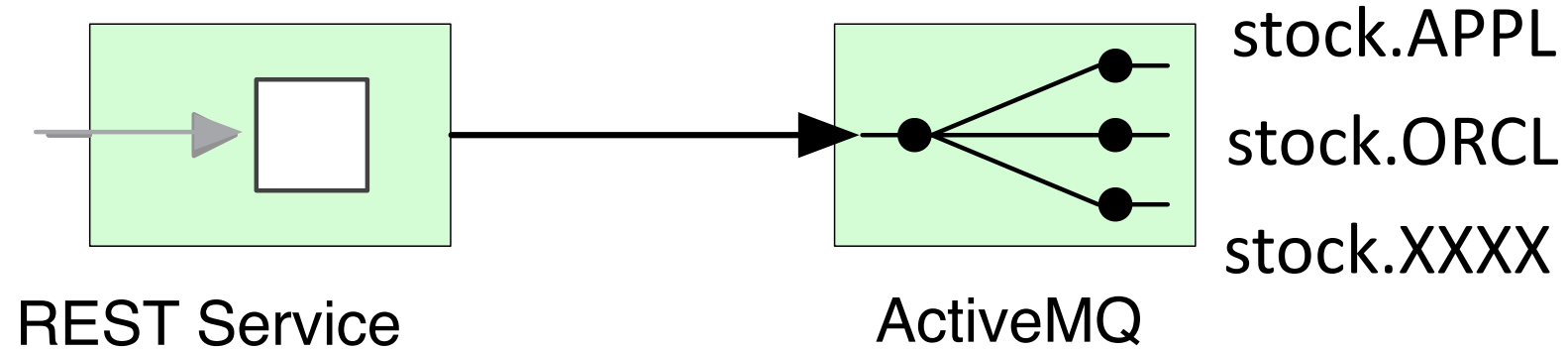
- Recipient List EIP



```
from("restlet:http:localhost:9080  
    /stock/${symbol}?restletMethods=post")  
    .recipientList()  
    .simple("activemq:stocks.${header.symbol}");
```

# Whats included in the box?

## ■ Recipient List EIP



```
from("restlet:http:localhost:9080  
/stock/{symbol}?restletMethods=post")  
.recipientList()  
.simple("activemq:stocks.{header.symbol}");
```

```
curl -X POST -d "120" "http://localhost:9080/stock/ORCL"
```

# Whats included in the box?

- 80 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

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

# Whats included in the box?

- 80 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

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

# Whats included in the box?

- 19 Data Formats

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

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

# Whats included in the box?

- 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>



# Whats included in the box?

- DSL in multiple flavors

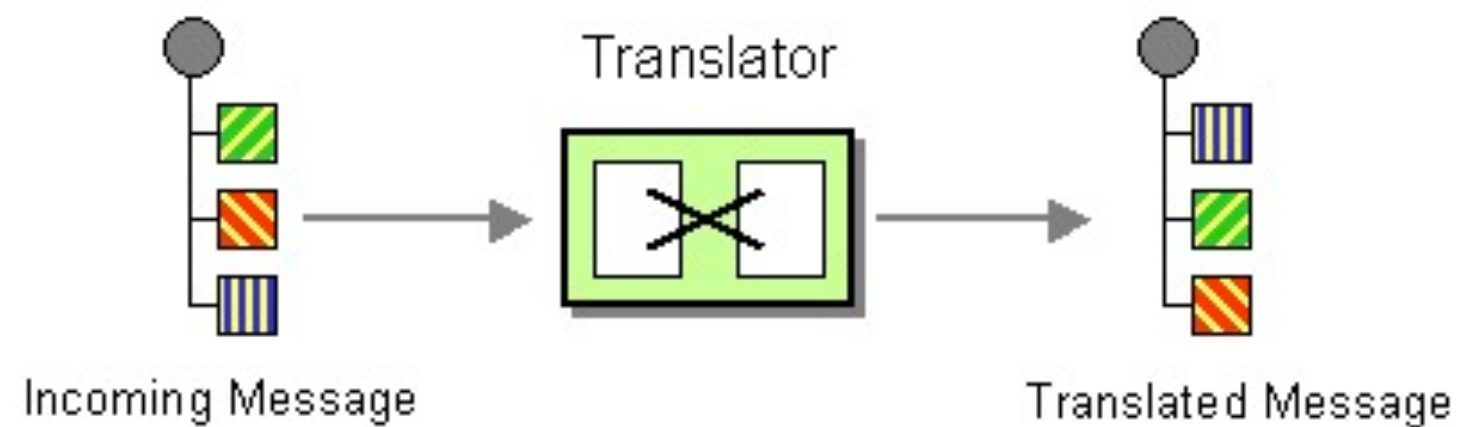
```
<route>
  <from ref="A" />
  <filter>
    <xpath>/quote/product = 'widget' </xpath>
    <to ref="B" />
  </filter>
</route>
```

Java  
from(A).filter(isWidget).to(B);

Scala  
from(A) filter(isWidget) --> B

# Whats included in the box?

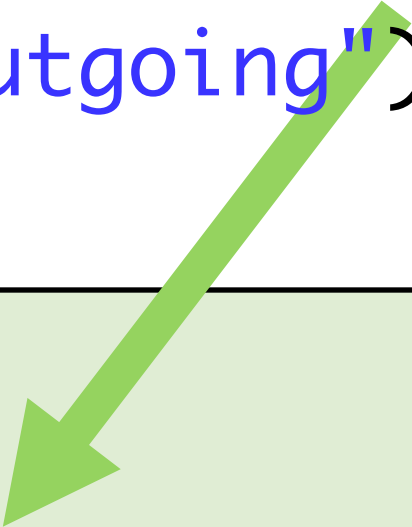
- Bean as Message Translator



# Whats included in the box?

- Bean as Message Translator

```
from("activemq:Incoming").  
    beanRef("myBeanName", "someMethod").  
    to("activemq:Outgoing");
```



```
public class Foo {  
  
    public String someMethod(String name) {  
        return "Hello " + name;  
    }  
}
```

# Whats included in the box?

## ■ Test Kit

- camel-test JAR (JUnit)
- camel-testng JAR (TestNG)
- Supports Spring
- Easy to test
- Quick prototyping

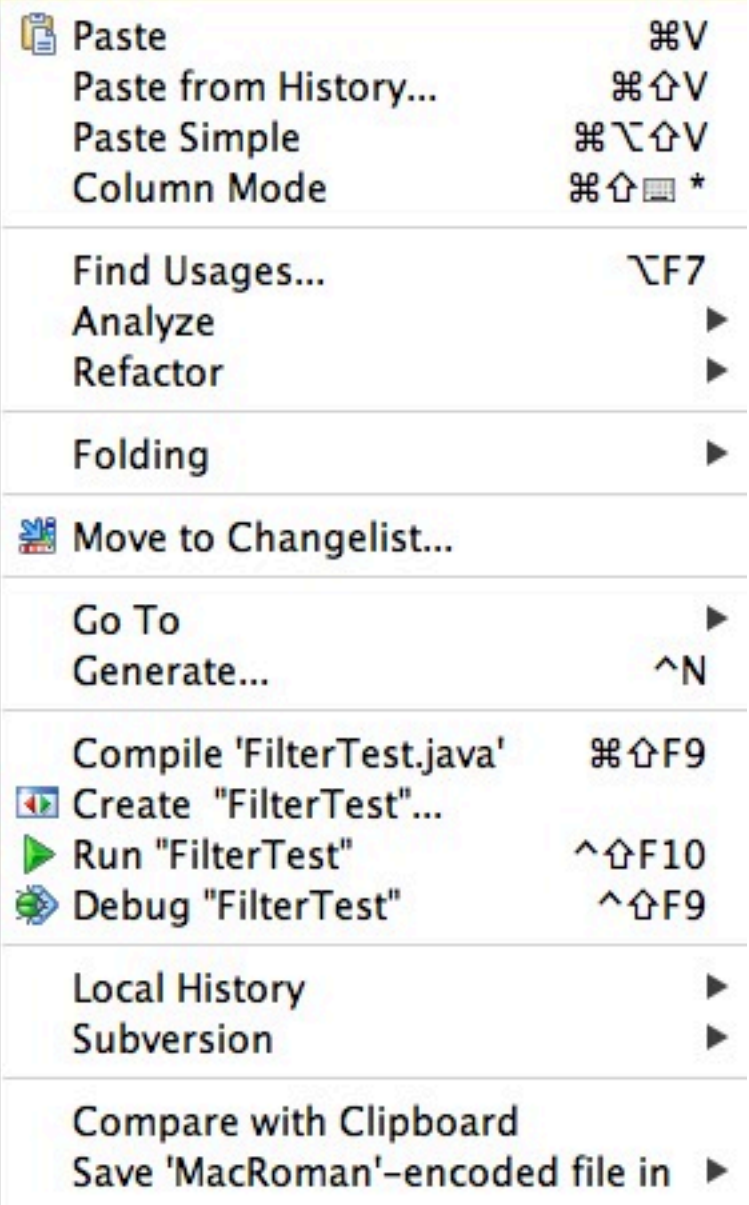




# Whats included in the box?

## ■ Test Kit from IDE

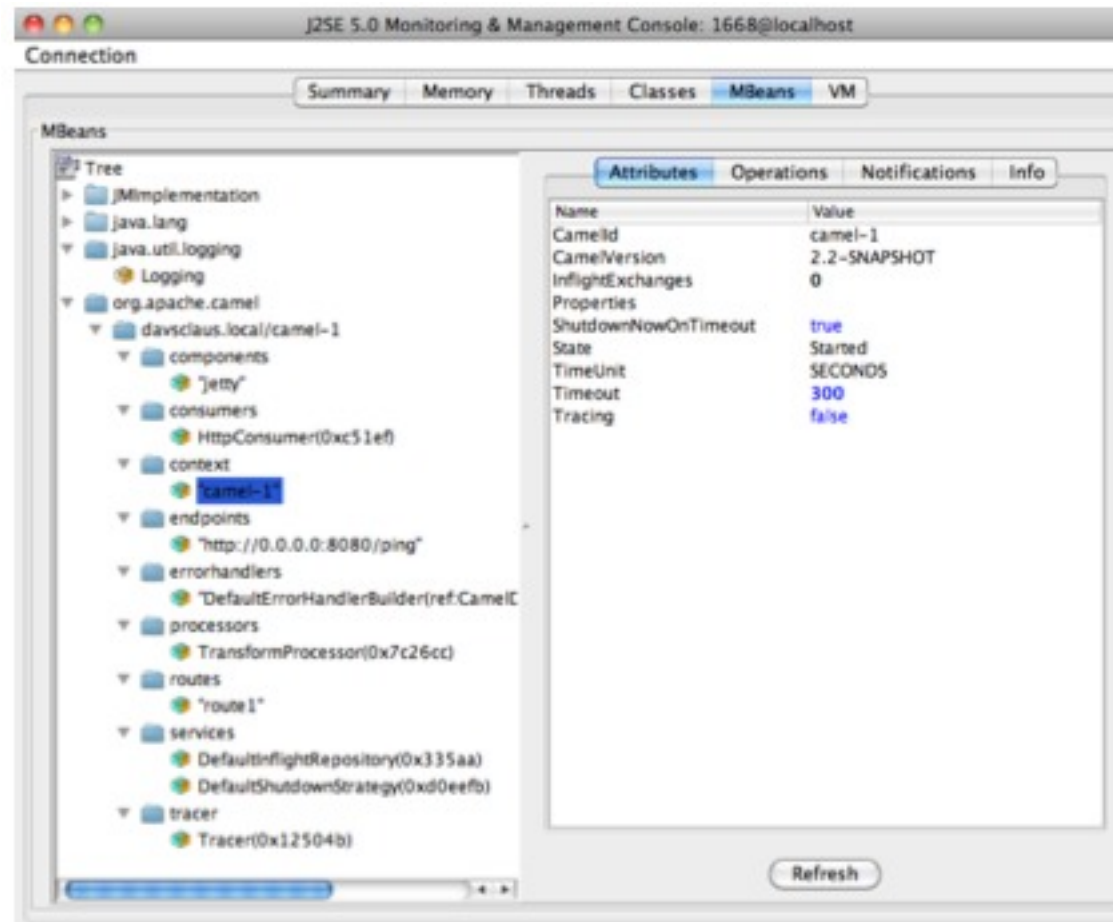
```
public class FilterTest extends CamelTestSupport {  
  
    @EndpointInject(uri = "mock:result")  
    protected MockEndpoint resultEndpoint;  
  
    @Produce(uri = "direct:start")  
    protected ProducerTemplate template;  
  
    public void testSendMatchingMessage() throws Exception {  
        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");  
            }  
        };  
    }  
}
```



# Whats included in the box?

## ■ Managed

- JMX API
- REST API



The screenshot displays the J2SE 5.0 Monitoring & Management Console. The window title is "J2SE 5.0 Monitoring & Management Console: 1668@localhost". The "Connection" tab is active, and the "MBeans" sub-tab is selected. The left pane shows a tree view of MBeans, with "camel-1" selected under the "context" folder. The right pane shows the "Attributes" tab for the selected MBean, displaying a table of attributes and their values.

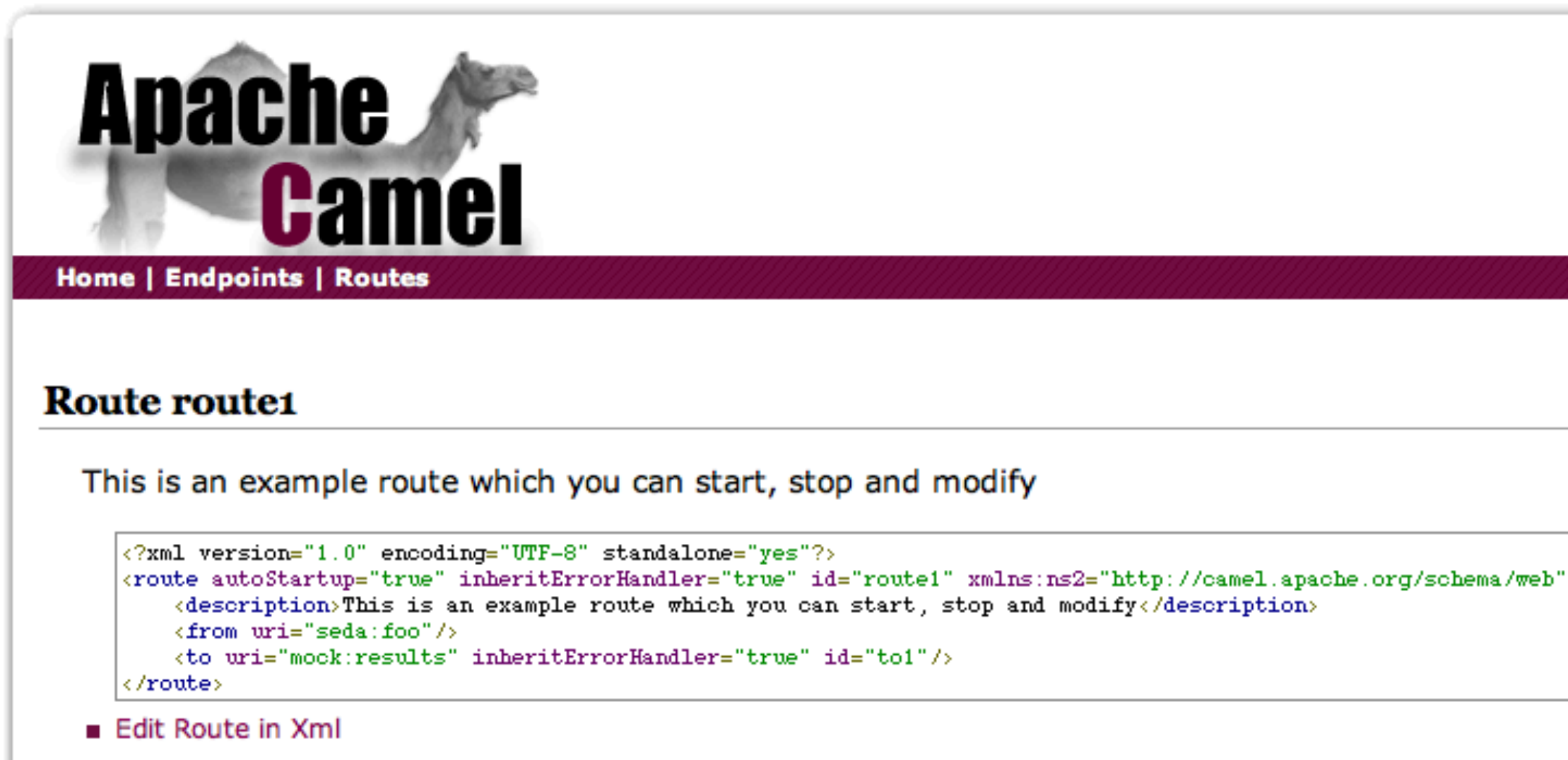
Name	Value
CamelId	camel-1
CamelVersion	2.2-SNAPSHOT
InflightExchanges	0
Properties	
ShutdownNowOnTimeout	true
State	Started
TimeUnit	SECONDS
Timeout	300
Tracing	false

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



# Whats included in the box?

- Developer Web Console



The screenshot displays the Apache Camel Developer Web Console interface. At the top, there is a header with the Apache Camel logo (a camel) and the text "Apache Camel". Below the logo is a navigation bar with links for "Home", "Endpoints", and "Routes". The main content area is titled "Route route1" and contains a description: "This is an example route which you can start, stop and modify". Below the description is a code block containing XML configuration for a route named "route1". The XML code is as follows:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<route autoStartup="true" inheritErrorHandler="true" id="route1" xmlns:ns2="http://camel.apache.org/schema/web"
  <description>This is an example route which you can start, stop and modify</description>
  <from uri="seda:foo"/>
  <to uri="mock:results" inheritErrorHandler="true" id="to1"/>
</route>
```

Below the code block, there is a list item: ■ Edit Route in Xml

# Whats included in the box?

- Fuse IDE - <http://fusesource.com/products/fuse-ide-camel/>

The screenshot displays the Fuse IDE interface for editing a Camel route. The main canvas shows a route named 'route1' with the following components:

- Start: `file:src/data?noop=true`
- Router: `choice`
- Branch 1: `when /person/city = 'London'` leading to `file:target/messages/uk`
- Branch 2: `otherwise` leading to `file:target/messages/other`

The interface includes a Palette on the right with categories like Endpoints, Routing, and Control Flow. An Outline pane on the far right shows the hierarchical structure of the route. At the bottom, the 'When' details pane shows the expression `/person/city = 'London'` and the language set to `xpath`.

# Whats included in the box?

- Error Handling
  - Errors happen



# Whats included in the box?

- Error Handling
  - Try ... Catch style

```
from("activemq:incoming")
  .doTry()
    .marshal().jaxb()
    .to("mq:QueueWithXmlMessages")
  .doCatch(Exception.class)
    .to("activemq:error")
  .end();
```

# Whats included in the box?

- Error Handling
  - Dead Letter Channel EIP

```
errorHandler(  
    deadLetterChannel("activemq:error")  
);  
  
from("activemq:incoming")  
    .marshal().jaxb()  
    .to("mq:QueueWithXmlMessages");
```

# Whats included in the box?

- Error Handling
  - Dead Letter Channel EIP w/ Redelivery

```
errorHandler(  
    deadLetterChannel("activemq:error")  
        .maximumRedeliveries(5)  
        .redeliveryDelay(5000)  
);
```

```
from("activemq:incoming")  
    .marshal().jaxb()  
    .to("mq:QueueWithXmlMessages");
```

# Agenda

- Who is Claus Ibsen?
- What is Apache Camel?
- A little example
- Whats included in the box?
- **Running Camel**
- Live Demos
- Q and A



# Running Camel

- Deployment Strategy
  - No container dependency
  - Lightweight
  - Embeddable
- Deployment Options
  - Standalone
  - WAR
  - Spring
  - J2EE
  - JBI
  - OSGi
  - Cloud

## Known Containers

Apache ServiceMix  
Apache ActiveMQ  
Apache Tomcat  
Jetty  
JBoss  
IBM WebSphere  
Oracle WebLogic  
Oracle OC4j  
Glassfish  
Google App Engine  
Amazon EC2  
... others

# Running Camel

- Java Application

```
CamelContext context = new DefaultCamelContext();  
context.addRoutes(new MyRouteBuilder());  
context.start();
```

- Spring Application

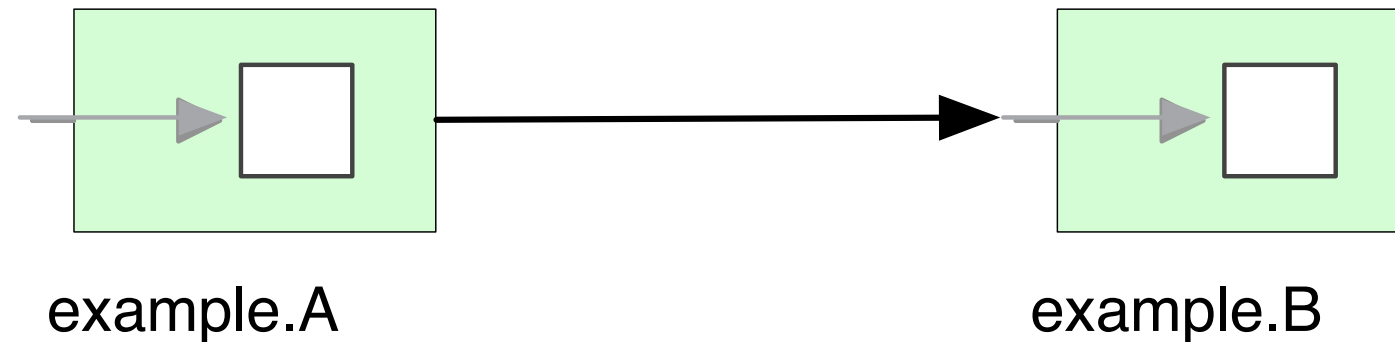
```
<beans xmlns="http://www.springframework.org/schema/beans">  
  
  <camelContext xmlns="http://camel.apache.org/schema/spring">  
    <route>  
      <from uri="file:/orders"/>  
        ...  
      </route>  
    </camelContext>  
  
</beans>
```

# Agenda

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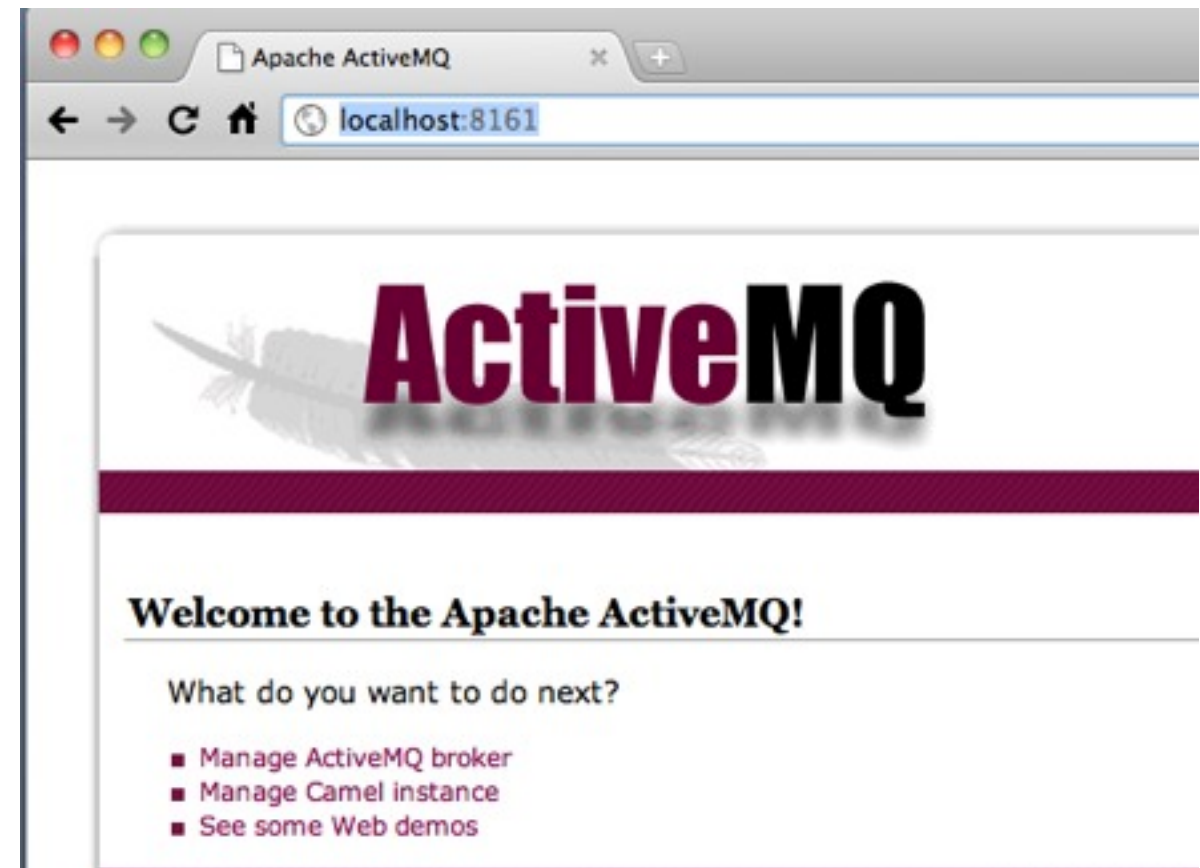
# Live Demo 1

## ■ ActiveMQ and Camel

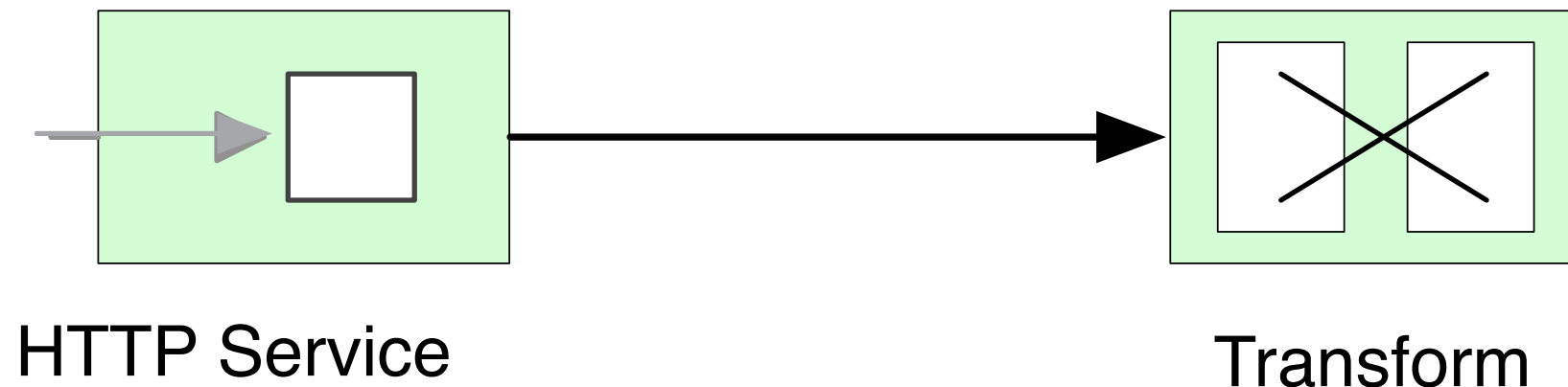


To start ActiveMQ: `bin/activemq start`

WebConsole: <http://localhost:8161/>



## ■ Groovy Script



```
groovy mycamel.groovy  
curl http://localhost:8080
```

- Groovy Script (mycamel.groovy)

```
import org.apache.camel.builder.RouteBuilder
import org.apache.camel.impl.DefaultCamelContext

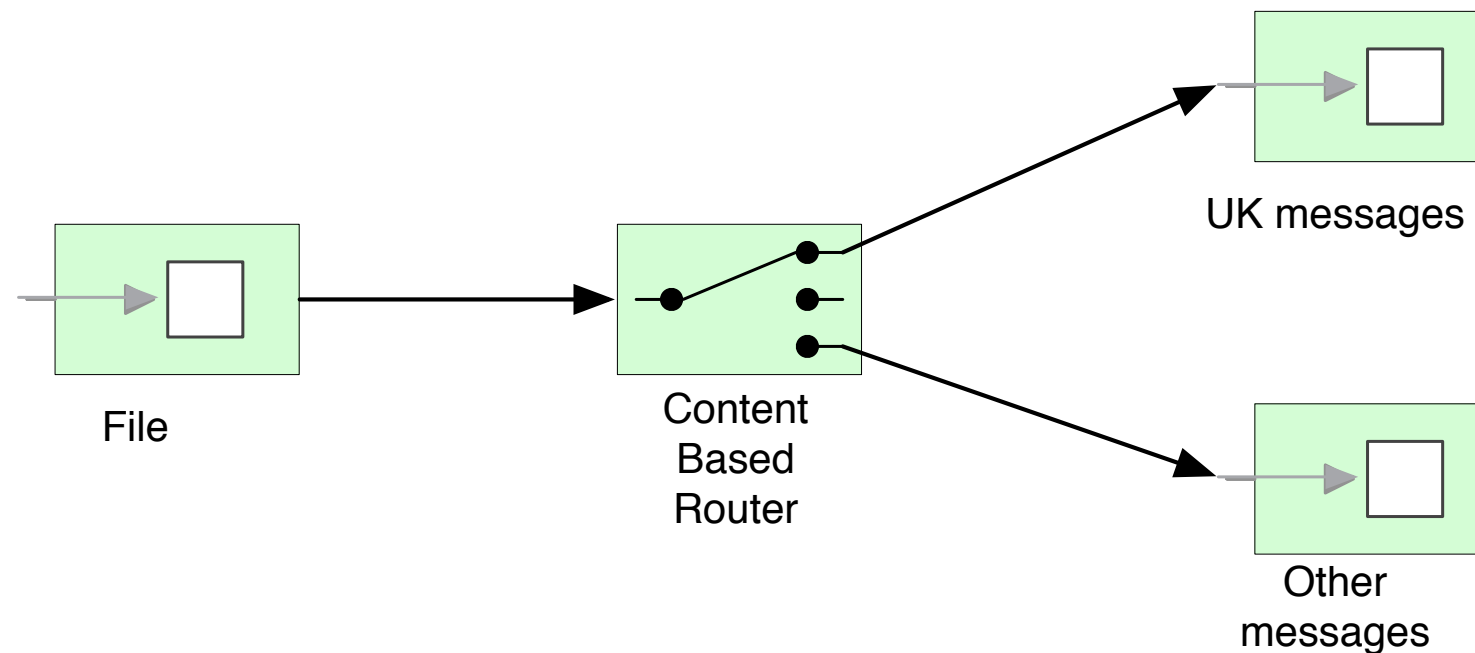
@Grab(group="org.apache.camel",module="camel-core",version="2.7.1")
@Grab(group="org.apache.camel",module="camel-jetty",version="2.7.1")
@Grab(group="org.slf4j",module="slf4j-jdk14",version="1.6.1")
class MyRouteBuilder extends RouteBuilder {
    void configure() {
        from("jetty:http://localhost:8080/")
            .to("log:input")
            .transform(constant("Hello from Groovy\n"))
    }
}
```

- Groovy Script (mycamel.groovy - cont.)

```
...  
def camelContext = new DefaultCamelContext()  
camelContext.addRoutes(new MyRouteBuilder())  
  
camelContext.start()  
System.console().readLine()  
camelContext.stop()
```



- Create new Project using Maven



```
mvn archetype:generate  
(camel-archetype-spring)  
mvn eclipse:eclipse  
mvn camel:run
```

# Live Demo 3

- Create new Project using Maven

The screenshot displays the Apache Camel IDE interface. On the left, the Project Explorer shows a Maven project structure with a 'bar' directory containing 'src/main/resources/camel-context.xml'. The main workspace shows a route diagram with the following components: a 'file:src/data?no' endpoint, a 'choice' router, an 'otherwise' processor, a 'log' processor, a 'when /pe' processor, and another 'log' processor. The console at the bottom shows the following output:

```
/System/Library/Java/JavaVirtualMachines/1.6.0.jdk/Contents/Home/bin/java (May 19, 2011 4:09:29 PM)
[pache.camel.spring.Main.main()] DefaultTypeConverter INFO Loaded 157 type converters in 0.
[pache.camel.spring.Main.main()] FileEndpoint INFO Endpoint is configured with noop
[pache.camel.spring.Main.main()] FileEndpoint INFO Using default memory based idemp
[pache.camel.spring.Main.main()] SpringCamelContext INFO Route: route1 started and consum
[pache.camel.spring.Main.main()] SpringCamelContext INFO Total 1 routes, of which 1 is st
[pache.camel.spring.Main.main()] SpringCamelContext INFO Apache Camel 2.7.1 (CamelContext
[1] thread #0 - file://src/data] route1 INFO UK message
[1] thread #0 - file://src/data] route1 INFO Other message
```

# Agenda

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# More Information

- Where do I get more information?
  - Apache Camel Website
    - <http://camel.apache.org>

- **Overview**
  - Home
  - Download
  - Getting Started
  - FAQ

## Getting Started

First you need to **Download** the Camel distribution; or you could grab the **Source** and try **Building** it yourself.



### Great introduction article

The best introduction to Camel is in fact an article posted at dzone. We strongly suggest you go read the article: [Apache Camel: Integration Nirvana](#) great article to learn what Camel is and has a good use case example.

# More Information

- Where do I get more information?
  - Join the Mailinglist
    - <http://camel.apache.org/mailling-lists.html>
  - Try the IRC-room
    - <http://camel.apache.org/irc-room.html>
  - Use the Search Box
    - **Search**
    - 
    -
  - Checkout the Camel Articles
    - <http://camel.apache.org/articles.html>
  - Run Camel Examples
    - <http://camel.apache.org/examples.html>





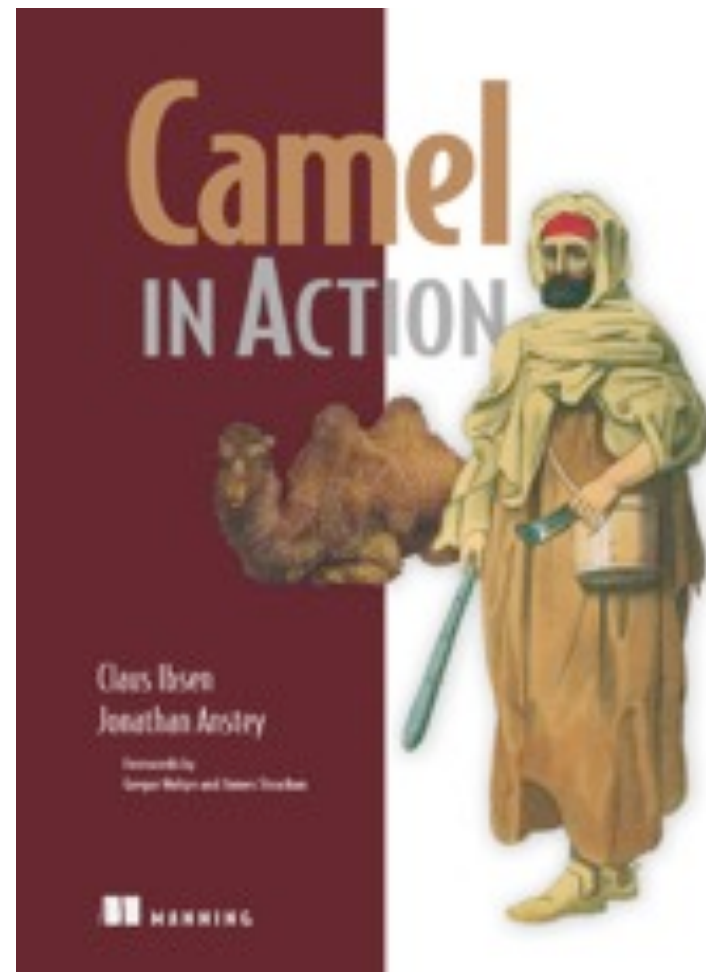
# More Information

- FuseSource - <http://fusesource.com>

The screenshot shows the FuseSource website homepage. At the top, the FuseSource logo is displayed as "A PROGRESS SOFTWARE COMPANY". To the right, the tagline reads "The experts in open source integration and messaging". A navigation menu includes links for PRODUCTS, DOWNLOADS, SERVICES, COMMUNITY, DOCUMENTATION, RESOURCES, and ABOUT US. Below the navigation, there are links for "Login | Register | Buy Now | Download". The main content area features a large banner for "CamelOne" with a cartoon camel illustration and the text "MAY 24-26, 2011 • WASHINGTON, DC". A "Learn More >>" button is positioned next to the banner. To the right of the banner is a red box with the text "GET ENTERPRISE SUBSCRIPTION". Below the banner are four columns of content: "DOWNLOADS" (Certified distributions based on ServiceMix, ActiveMQ, Camel and CXF, with a "GET STARTED" button), "GET INVOLVED" (Register and join our community, with a "JOIN NOW" button), "GET EDUCATED" (Webinars, videos, virtual training, on-site training, with a "GET EXCITED" button), and "CUSTOMER STORIES" (featuring the Sabre Holdings logo). At the bottom, there are two sections: "News & Events" with a post titled "Registration for CamelOne is Open" and "What FuseSource Is Saying" with a post titled "FuseSource hosts first CamelOne 2011 Event in Washington DC".

# More Information

- The definitive Camel guide
  - Camel in Action book: <http://manning.com/ibsen>



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