Apache Camel

Enterprise Integration and Data Workflow Made Easy
by Matthew Tyler

Source Material Credits

Claus Ibsen - Principal Software Engineer, RedHat, author of *"Camel in Action"* (a must read)

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Agenda

- What is Apache Camel?
- Features and Benefits
- Deployment Options
- Some Examples
- Q and A

What is Camel?

What is Apache Camel?

From the Apache Camel Web site:

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

What is Integration?

- 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"
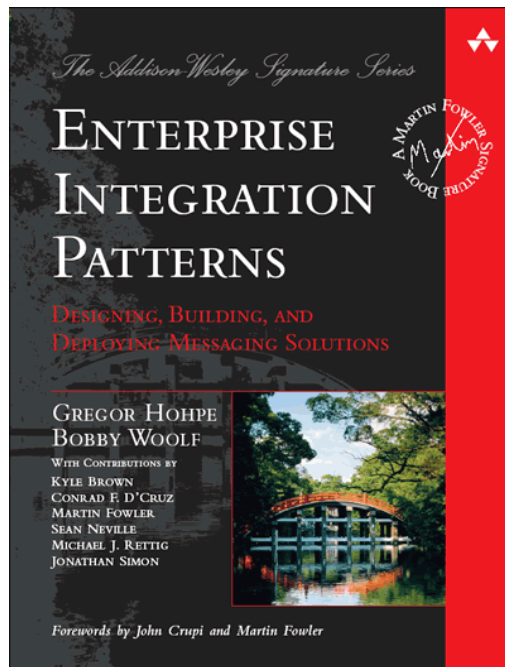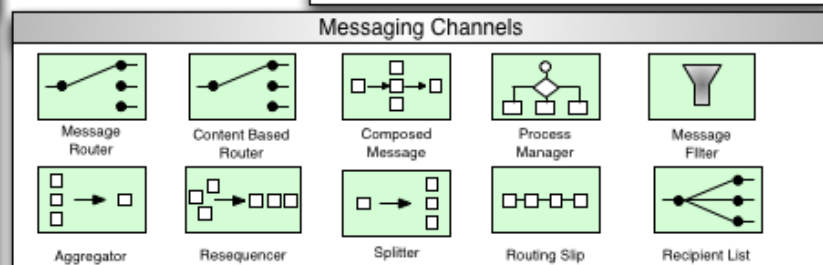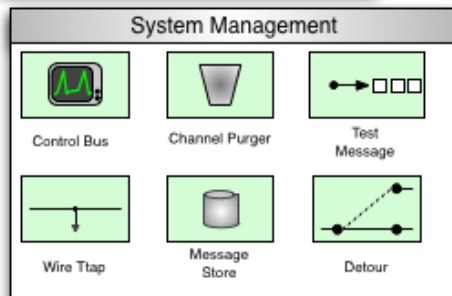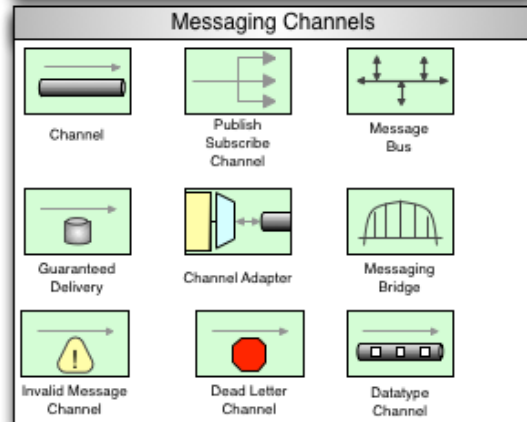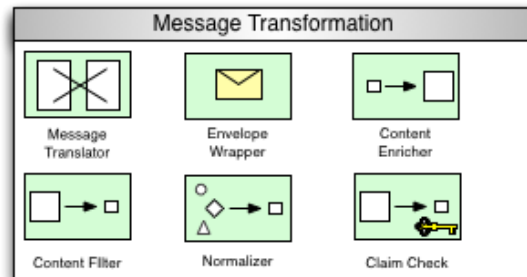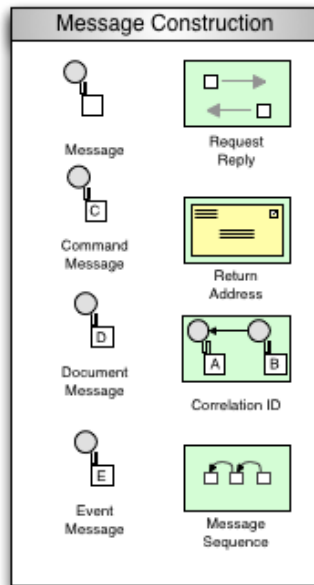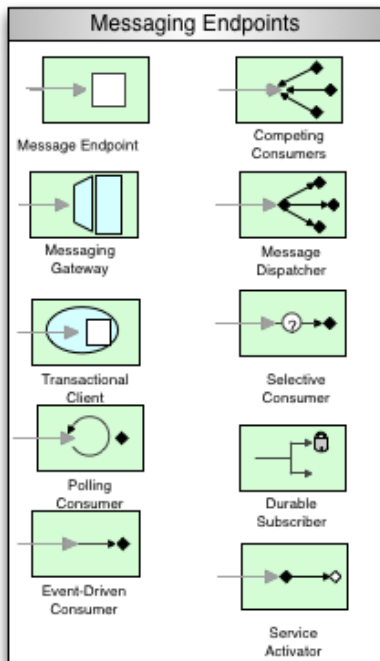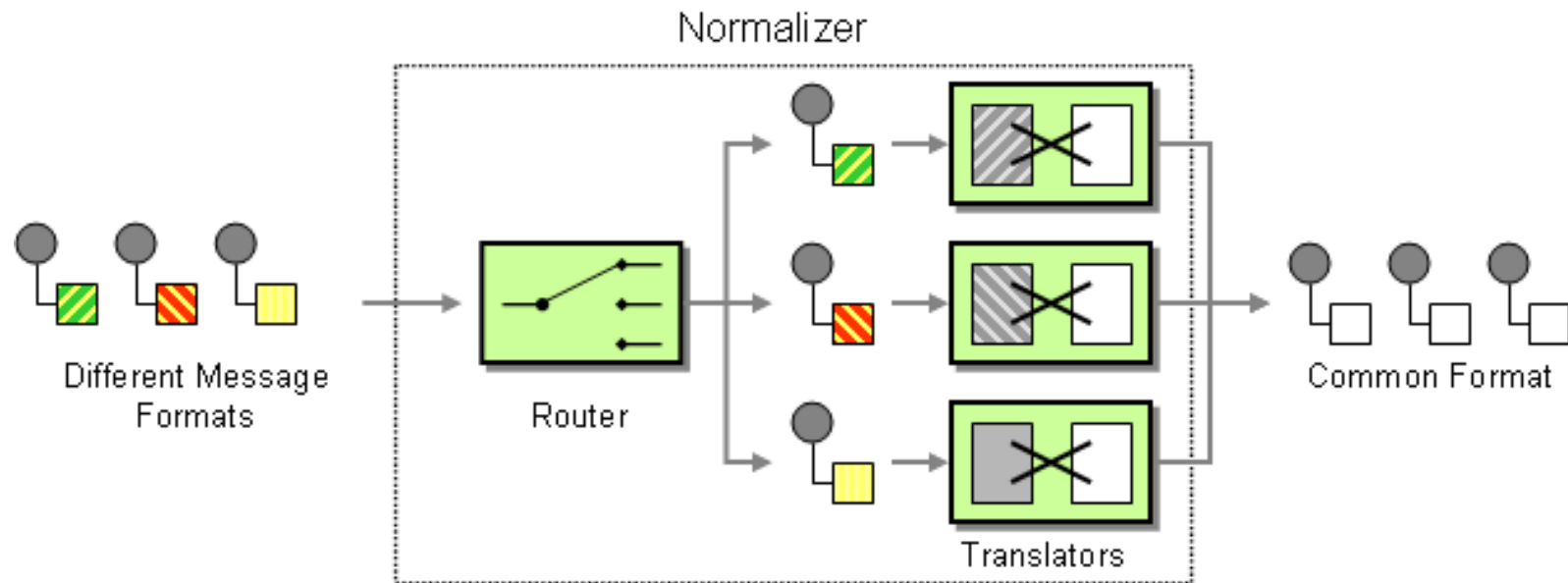- But really, why do we need integration?

When do you need it?

Use Camel to integrate disparate systems that speak different protocols and data formats

What is Enterprise Integration Patterns?

Messaging Endpoints

- Message Endpoint
- Competing Consumers
- Messaging Gateway
- Message Dispatcher
- Transactional Client
- Selective Consumer
- Polling Consumer
- Durable Subscriber
- Event-Driven Consumer
- Service Activator

Message Construction

- Message
- Request Reply
- Command Message
- Return Address
- Document Message
- Correlation ID
- Event Message
- Message Sequence

Message Transformation

- Message Translator
- Envelope Wrapper
- Content Enricher
- Content Filter
- Normalizer
- Claim Check

Messaging Channels

- Channel
- Publish Subscribe Channel
- Message Bus
- Guaranteed Delivery
- Channel Adapter
- Messaging Bridge
- Invalid Message Channel
- Dead Letter Channel
- Datatype Channel

System Management

- Control Bus
- Channel Purger
- Test Message
- Wire Tap
- Message Store
- Detour

Messaging Channels

- Message Router
- Content Based Router
- Composed Message
- Process Manager
- Message Filter
- Aggregator
- Resequencer
- Splitter
- Routing Slip
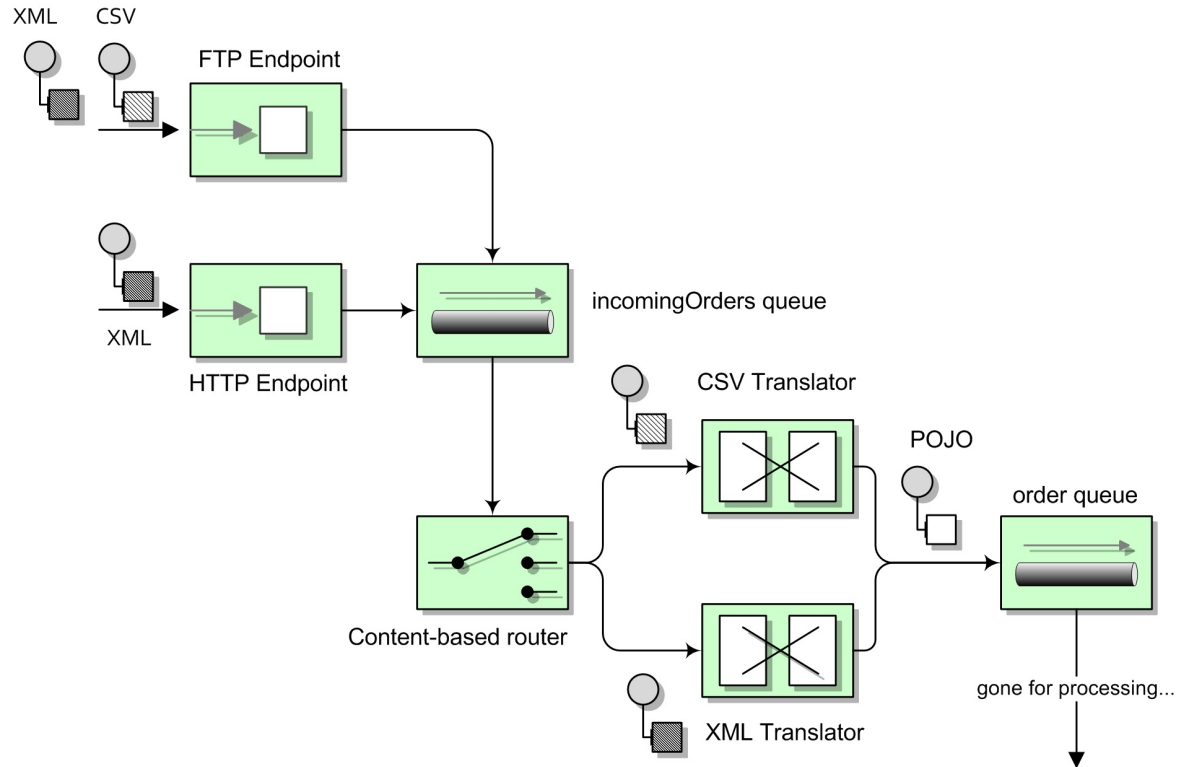- Recipient List

EIP - Content Based Router
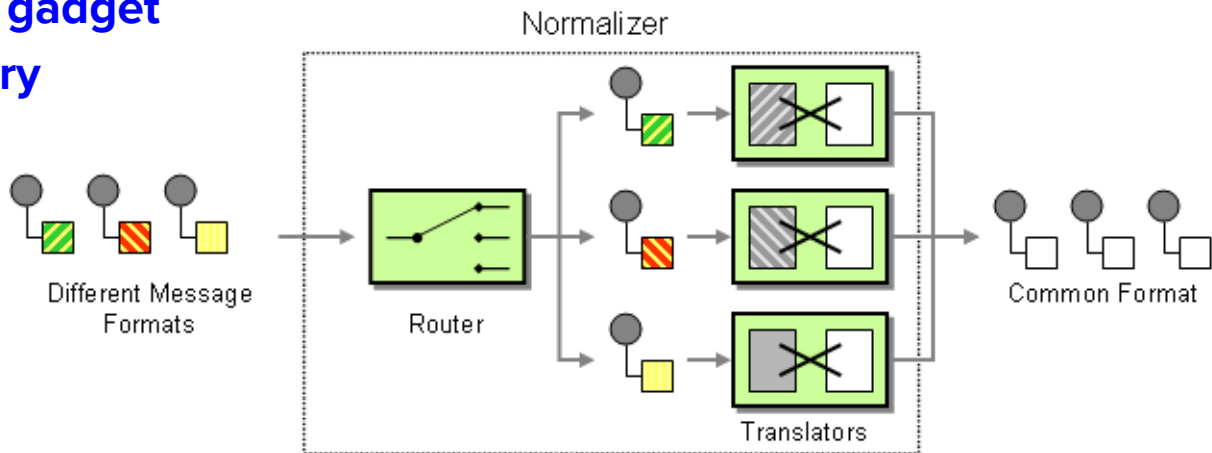
EIP - Order Processing

Logical Description

from **newOrder**
   choice
      when **isWidget** to **widget**
      when **isGadget** to **gadget**
      otherwise to **inquiry**

Different Message Formats

Router

Normalizer

Translators

Common Format

Java DSL

```java
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();
```

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>
```

Components and Patterns

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

http://camel.apache.org/enterprise-integration-patterns.html

"What is it" 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

Features &
Benefits

Features

- Enterprise Integration Patterns (EIPs)
- Domain Specific Language to write "flows" or "routes"
- Large collection of adapters/components for legacy systems, B2B, and SaaS
- Strong Unit test/Integration test framework
- Expression languages
- Data Formats
- Tooling with JBoss Developer Studio

Open Source

- Apache Camel is 100% open source
- JBoss Fuse (built with Camel and other Apache projects) is 100% open source
- Vibrant communities
  - Mailing lists
  - Code commits
  - Issue trackers
  - Visible community members
  - Blogging, books, social media

"I cannot understand the benefit of Apache Camel as a lot of code is required"

Benefits

- Significantly reduces the amount of code required to achieve complex integrations
- Comes with all the tooling **"built-in"** that provides:
  - Connection handling
  - Retry logic
  - Distributed transactions
  - Logging
  - Remote management

Six organizations studied Telecommunications, IT, shipment and logistics, and document management

Conducted by RedHat

RedHat Study

- 51.5% more applications integrated per year
- 40.8% fewer FTEs per application integration
- 62.8% less downtime related to integration
- 18.1% improved performance
- 34.2% less costly than previous middleware integration solution stackres

"Apache Camel doesn't do what ESB X does"

Camel is not an ESB

- Pick the right tool (architecture) for the job!
- Not forced into expensive, mountainous suites of applications
- If you want to compare ESBs, don't compare with Camel
- For ESB, look at JBoss Fuse

Table 1.15. Sustainable power of individual animals in good condition

Animal	Typical weight kN (kgf)	Pull-weight ratio	Typical pull N (kgf)	Typical working speed m/s	Power output W	Working hours per day	Energy output per day MJ
Ox	4.5 (450)	0.11	500 (50)	0.9	450	6	10
Buffalo	5.5 (50)	0.12	650 (65)	0.8	520	5	9.5
Horse	4.0 (400)	0.13	500 (50)	1	500	10	18
Donkey	1.5 (150)	0.13	200 (20)	1	200	4	3
Mule	3.0 (300)	0.13	400 (40)	1	400	6	8.5
Camel	5.0 (500)	0.13	650 (65)	1	650	6	14

Source: Adapted from Carruthers, I. Rodriquez, M. 1992. Tools for Agriculture, a guide to appropriate equipment for small holder farmers. I.T., C.T.A., Intermediate Technology Publication, U.K.

Deployment

Deployment Options

- Standalone
- Spring (Boot, WAR)
- OSGi (Karaf/FUSE, Blueprint)
- JEE (CDI)
- Guice
- Easy to custom integrate with any container

Some Examples

Examples From Camel Distribution

More questions than answers?