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# Camel

## Integrate everything

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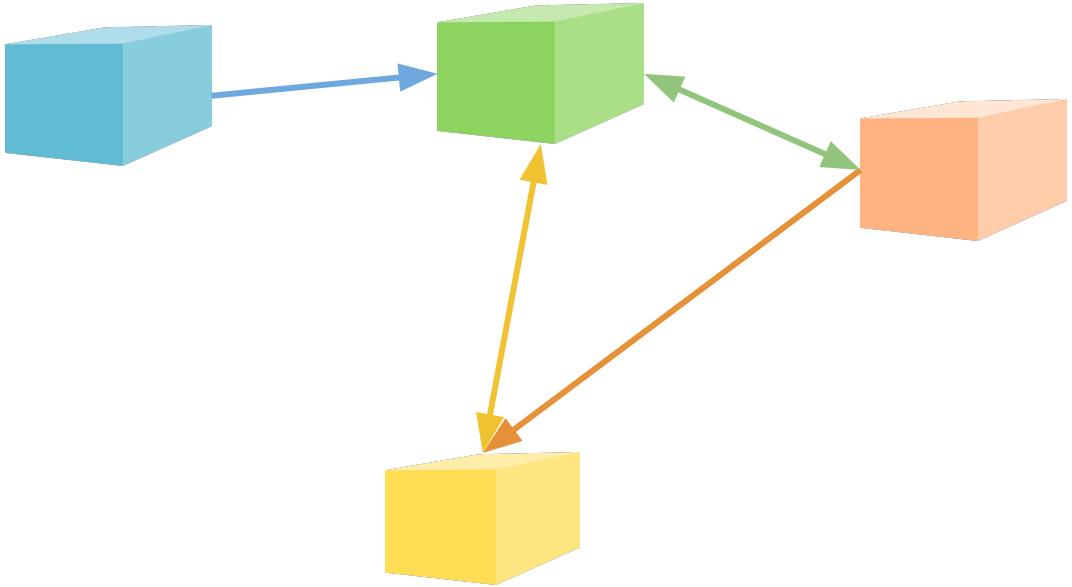
@zregvart

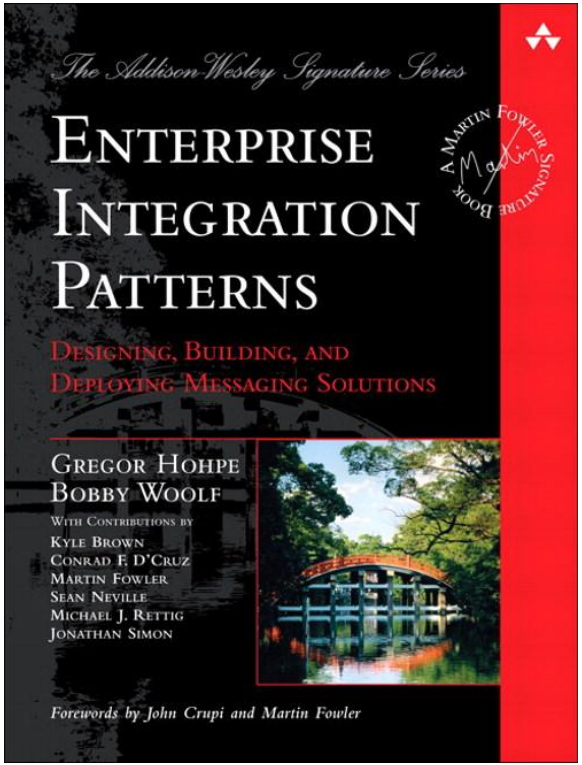
# System integration



# Integration patterns

Book by Gregor Hohpe and Bobby Woolf

Common patterns and best practices

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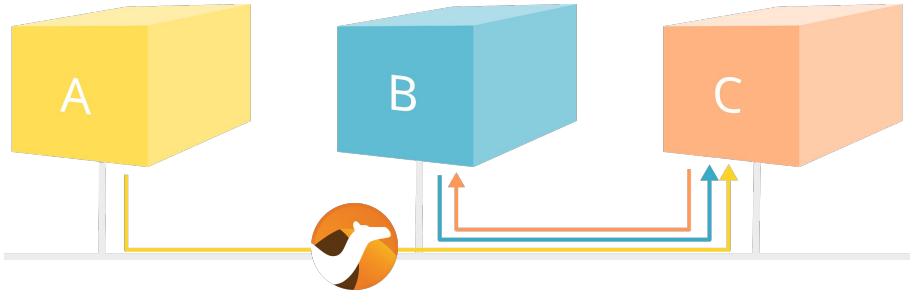
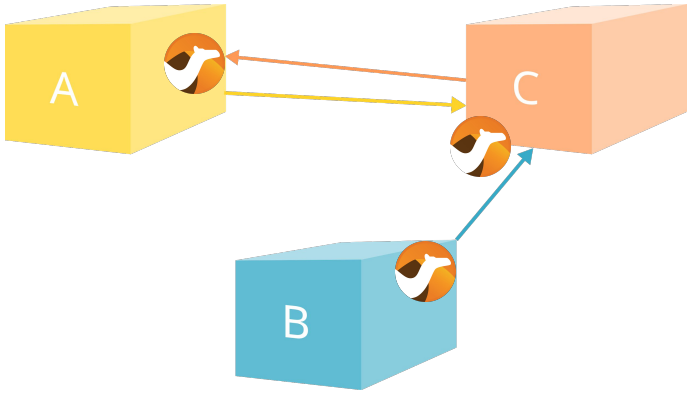
# Not invented here




Enterprise Service Bus (ESB)

Microservices



# Apache Camel

Integrates with ~300 different systems using best practice patterns

Developed in Java, needs Java Virtual Machine to run

Actually an acronym: Concise Application Message Exchange Language

11 year anniversary coming this July

CC Image courtesy of University of Liverpool Faculty of Health & Life Sciences

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# Concepts

| | |
|---|---|
| Patterns | how to reuse integration best practices |
| Components | how to integrate with systems |
| Endpoints | how to integrate with specific systems |
| Data transformation | how to adapt data |
| Route | how to define the flow of data |

# Patterns

Aggregate

Circuit breaker

Delay

Dynamic routing

Enrich

Failover

Filter

Idempotency

Load balancing

Marshall/Unmarshall

Multicast

Resequence

⁂Saga⁂

Service call

Split

Throttle

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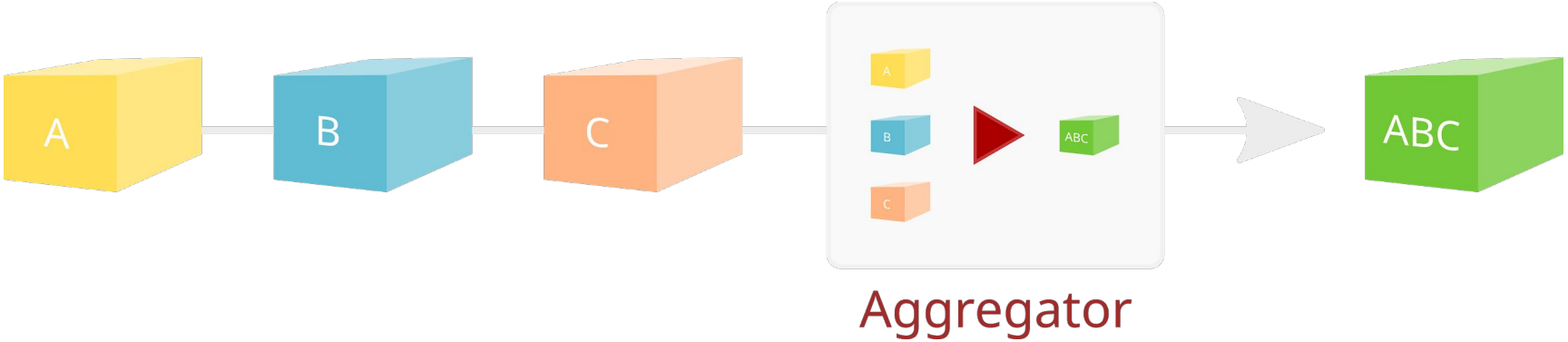
# Aggregate pattern



# Components

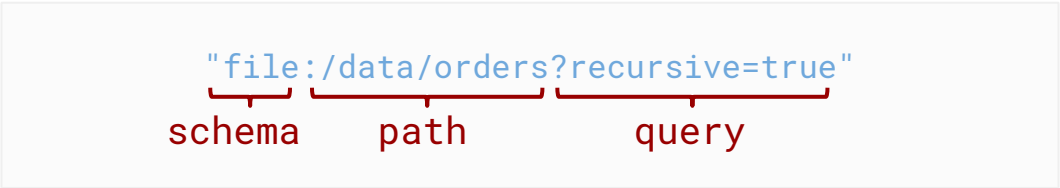
**~300** systems/technologies you can integrate with

HTTP, message systems, APNS, Amazon *, AS2, Box, Braintree, Cassandra, CMIS, Consul, CouchDB, DNS, Docker, ElasticSearch, Facebook, File system, FTP *, GIT, GitHub, Google *, Hadoop, Hipchat, HL7, Kafka, Kubernetes, LDAP, LinkedIn, Mail, MongoDB, Nagios, OData, Openshift, Printer, REST, RSS, Salesforce, Scheduling, ServiceNow, SIP, Slack, SMS, SOAP, Solr, Spark, Splunk, SSH, SQL, Telegram, Twitter, Weather, Websocket, XMPP, Yammer, Zookeeper

# Endpoints

One component can have many endpoints

Endpoints can receive (*consume*) or send (*produce*)




Endpoint URI

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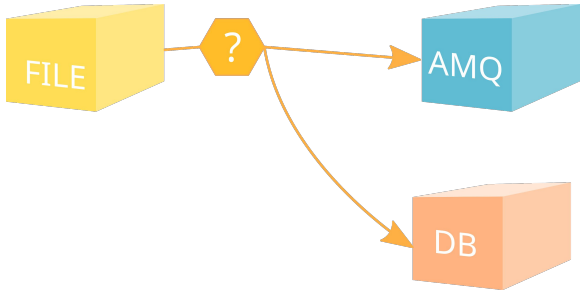
# Routes




Route defines the flow of data

```
from("file:/data/orders")
  .unmarshal().json()
  .choice()
    .when()
      .jsonpath("$.[?(@.backorder==true)]")
      .to("sjms:queue:back_orders")
    .otherwise()
      .to("sql:INSERT INTO ORDERS...")
```

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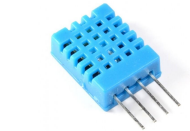
```xml
<route>
  <from uri="file:/data/order" />
  <unmarshal>
    <json />
  </unmarshal>
  <choice>
    <when>
      <jsonpath>$...</jsonpath>
      <to uri="sjms:queue:..." />
    </when>
    <otherwise>
      <to uri="sql:INSERT..." />
    </otherwise>
  </choice>
</route>
```

```java
from("file:/data/orders")
 .unmarshal()
   .json()
 .choice()
   .when()
     .jsonpath("$...")
     .to("sjms:queue:...")
   .otherwise()
     .to("sql:INSERT...")
```

# Demo



DHT11 + ESP8266

MQTT

"25,67"

mosquitto

MQTT

"25,67"

Convert
to JSON

API

elasticsearch

# Runtime

Include in your own application: use as a library

Within standalone runtimes: Camel Main, Spring Boot, Vert.x

Application server: JEE - Wildfly or OSGI - Apache Karaf

# Camel and IoT

Data coming from various devices, in various formats over various protocols

**IoT is an integration problem**

## On device

Constrained

Low power

Specialised

## At the edge

Connectivity

Messaging

Computing


## At scale

Distribution

Scheduling

Insights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# IoT components in Camel

CoAP

Eclipse Kura

Eclipse Milo (OPC UA): client, server

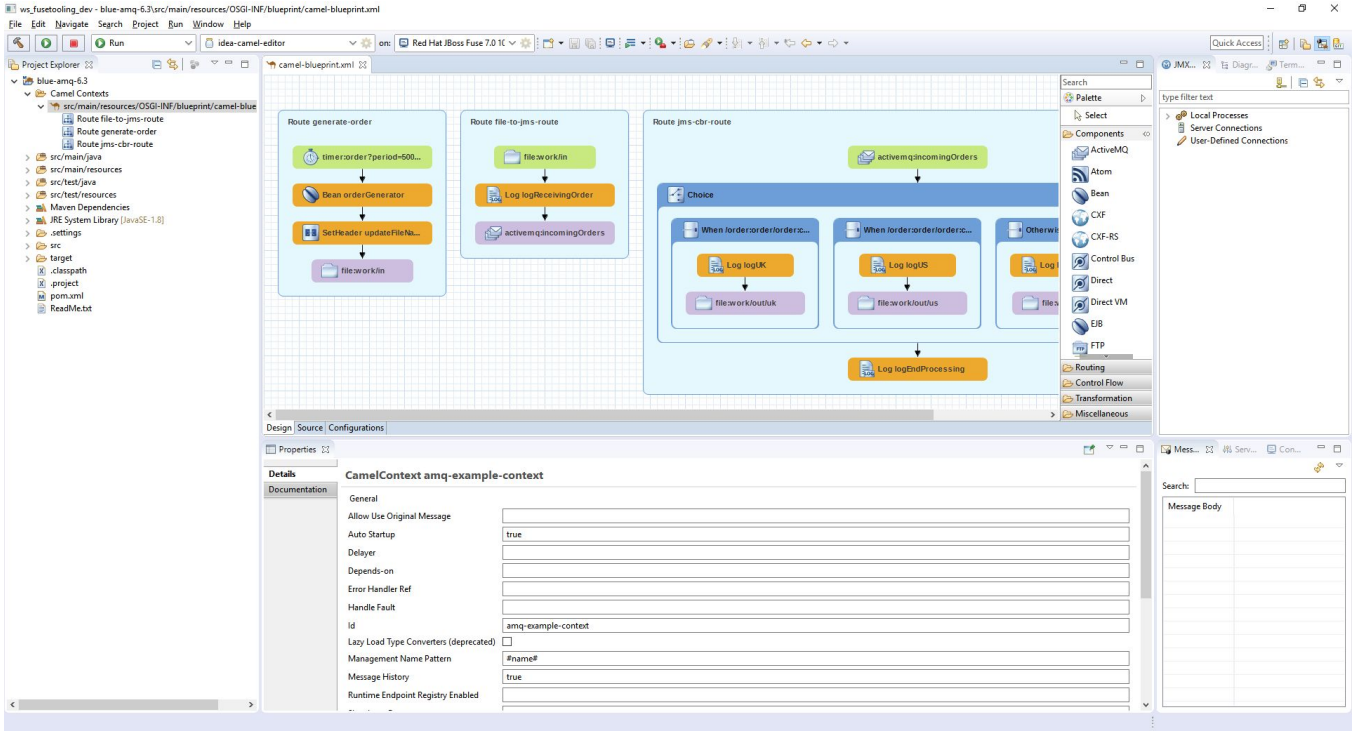
IEC 60870: client, server

MQTT (Eclipse Paho, FuseSource MQTT client, *JMS and Apache ActiveMQ)

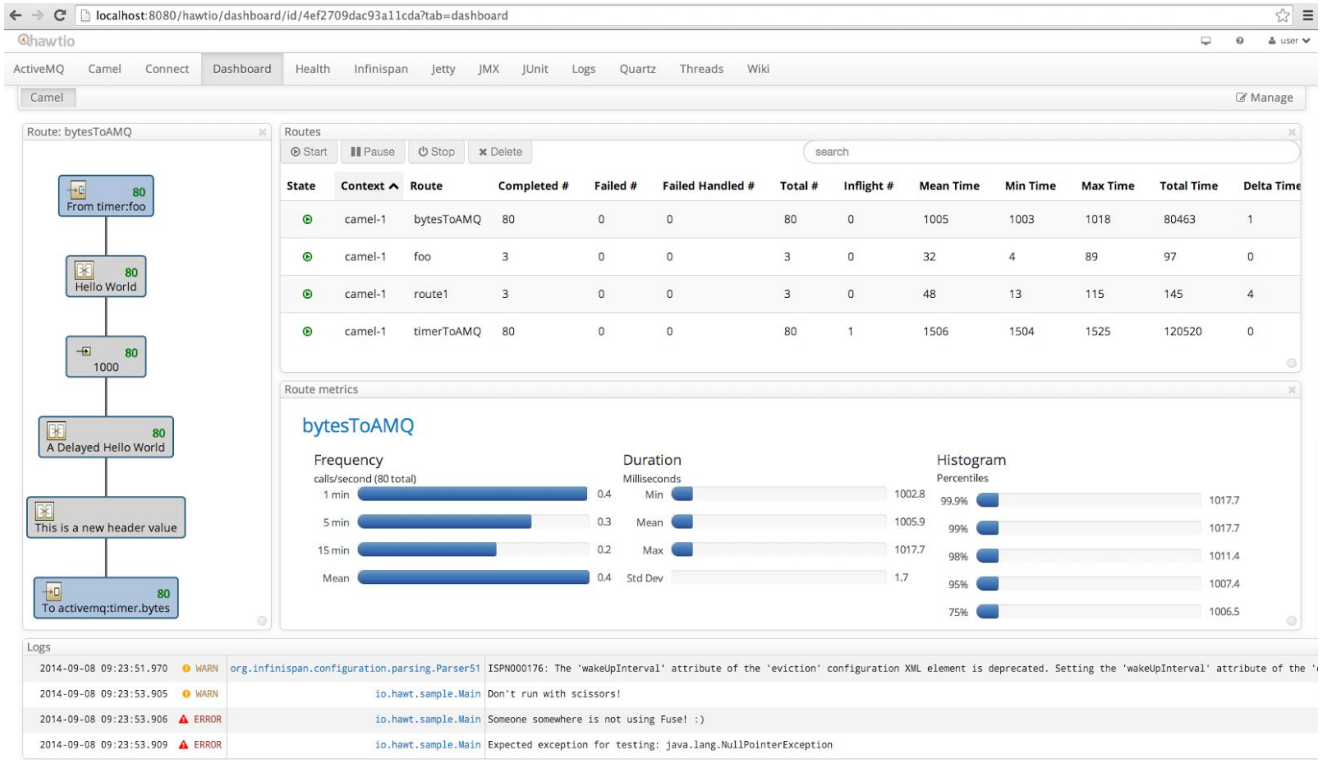
PubNub

SNMP

# JBoss Camel Developer Tools



# Hawt.io

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# More tooling

Camel IDEA plugin

Camel LSP server (Eclipse IDE, Visual Studio Code, Eclipse Che)

Route test coverage

# Camel community

~400 contributors

63 comitters (~15 companies)

31 PMC members

~120 releases

~1000 subscribers on users@ mailing list

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# Resources

Camel website and the new documentation on GitHub

Books: Camel in Action 2nd edition (⭐free IoT chapter⭐), Apache Camel Developer's Cookbook, Camel Design Patterns, Apache Camel Essentials

IRC #apache-camel on Freenode

Gitter https://gitter.im/apache/apache-camel

Mailing list users@camel.apache.org


Thank you!
Questions?
Photo by nastya from Pexels