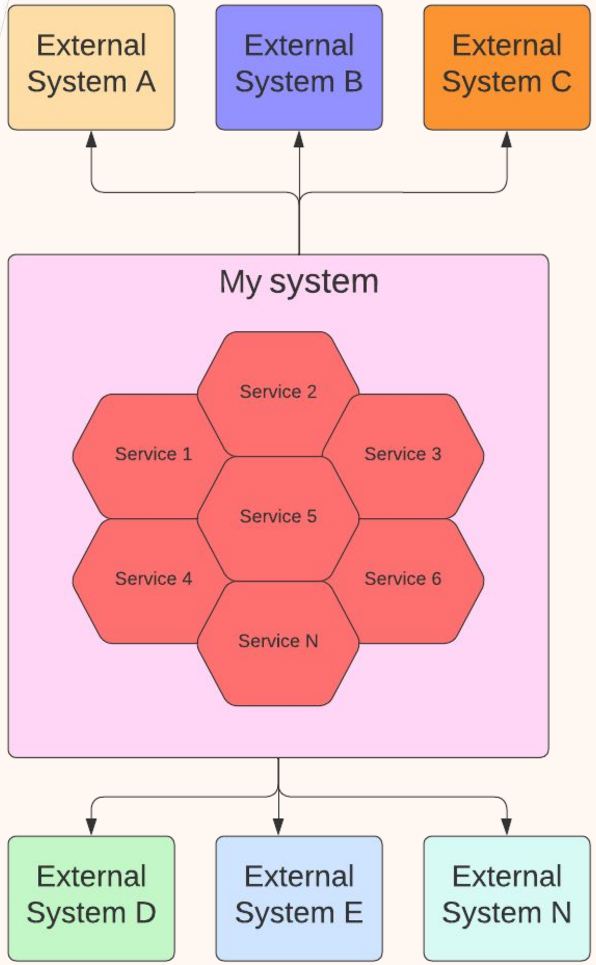
Connecting disparate systems in a lightweight way

Zineb Bendhiba

Devoxx Morocco October 2023

Integration challenges



Zineb Bendhiba

- Senior Software Engineer at Red Hat
- Apache Camel PMC
- International Speaker
- 15+ years professional software development experience
- Speak English, French, Moroccan Darija, Arabic
- Cadi Ayyad University Alumn
- https://zinebbendhiba.com

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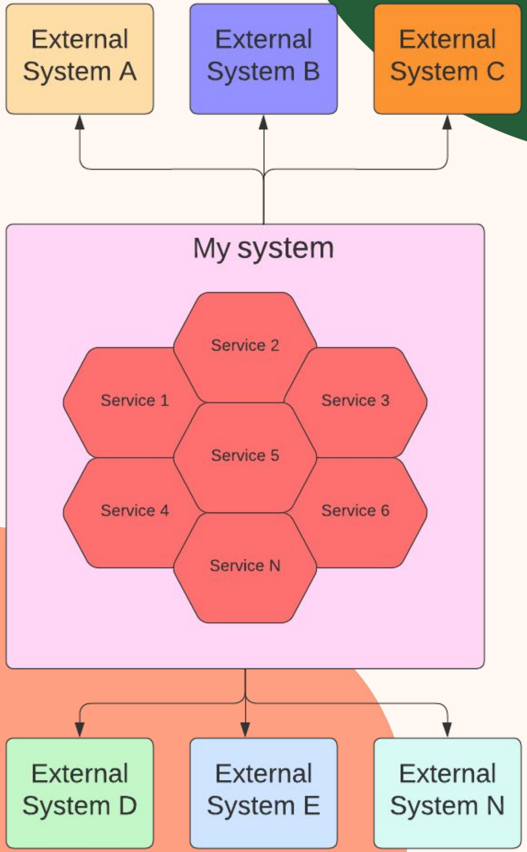
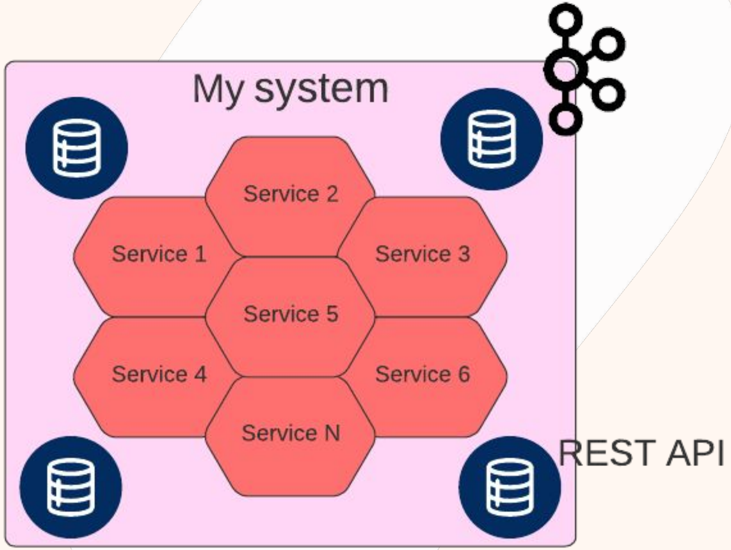
Connecting to disparate systems



Challenge #1 : Connecting to disparate systems



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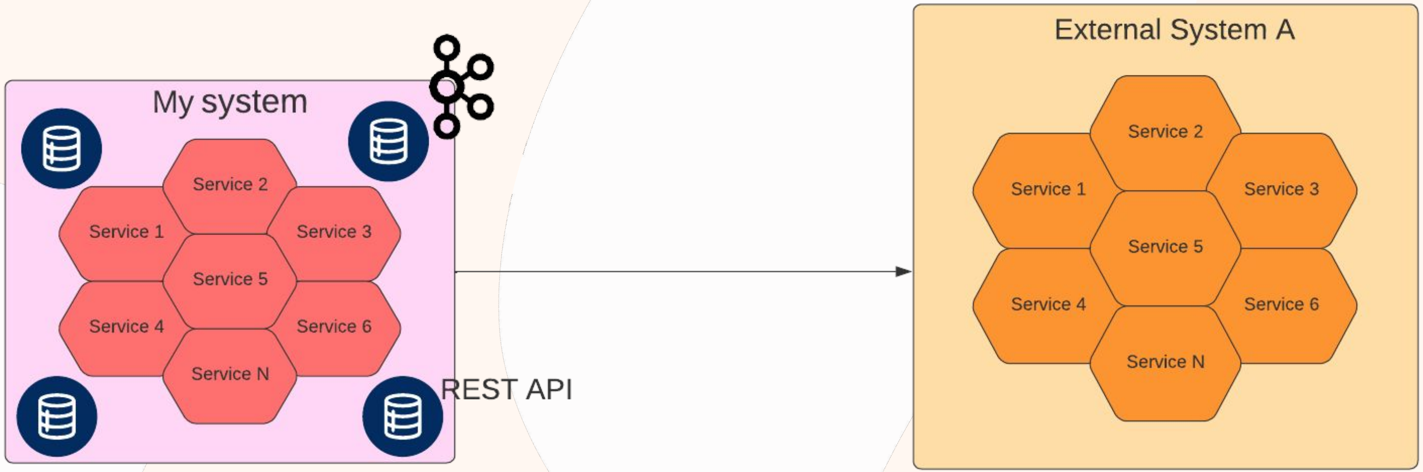

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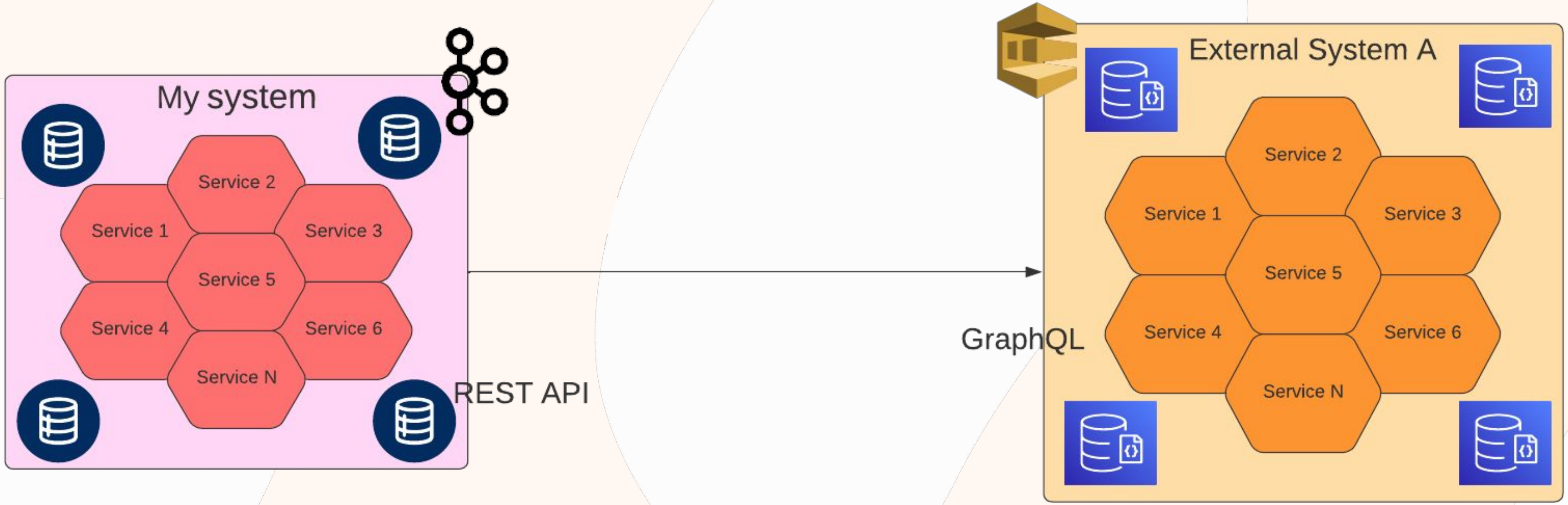

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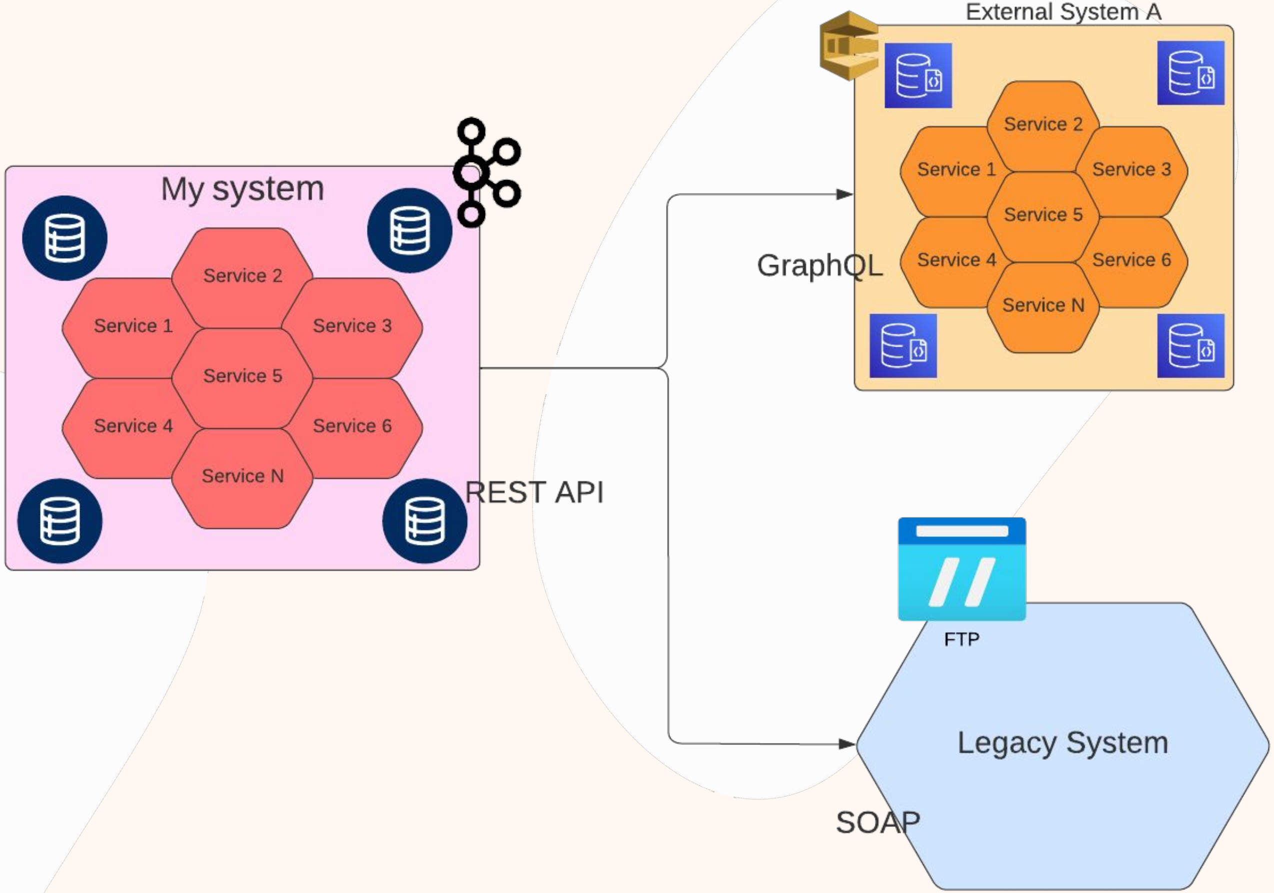

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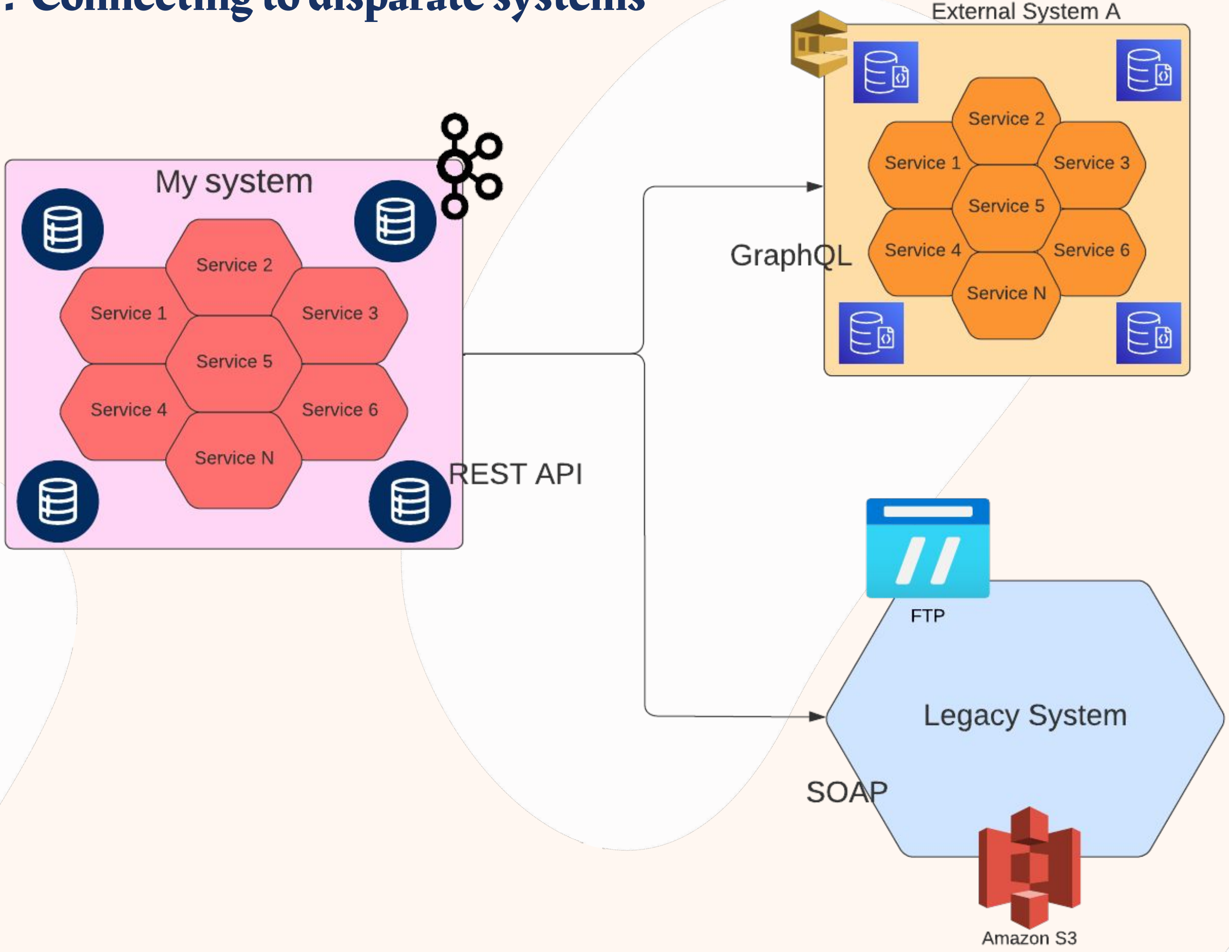

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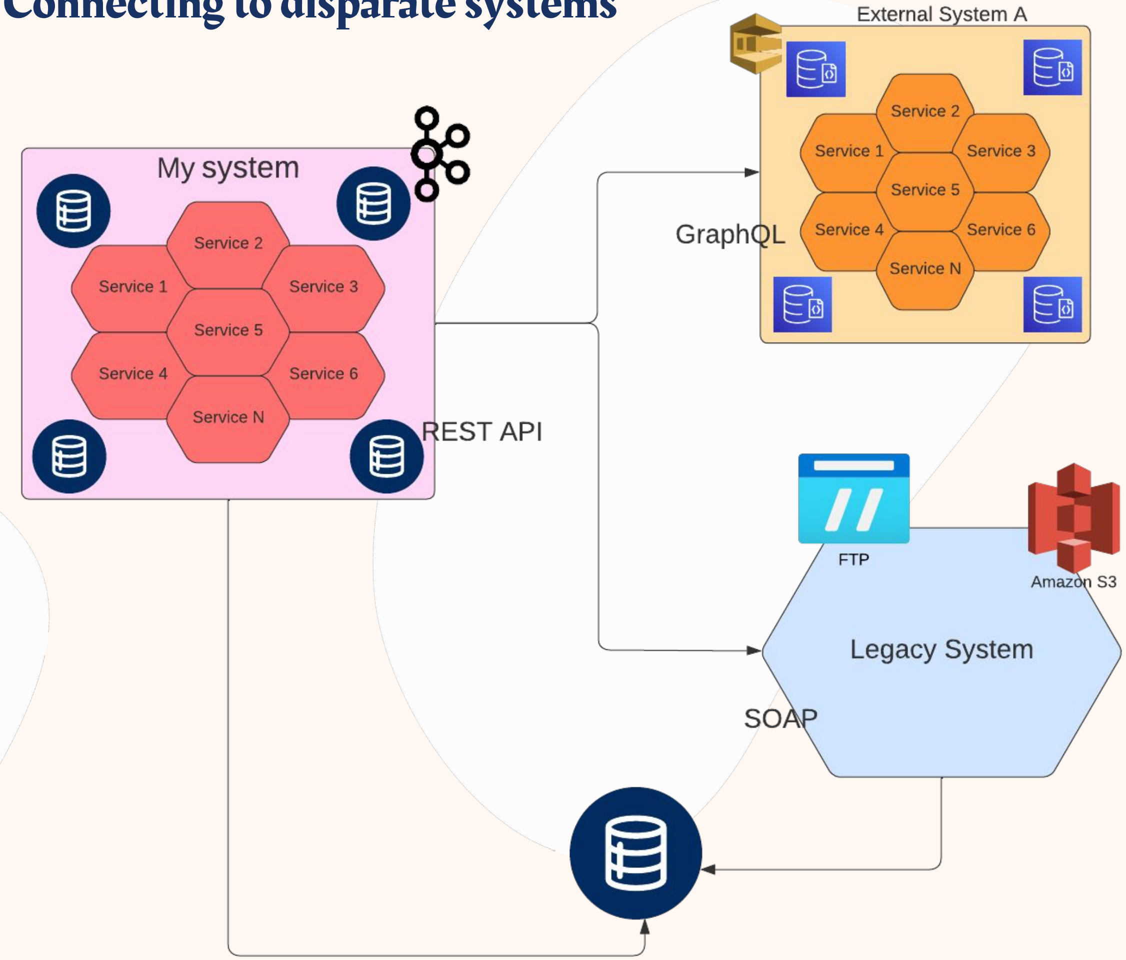

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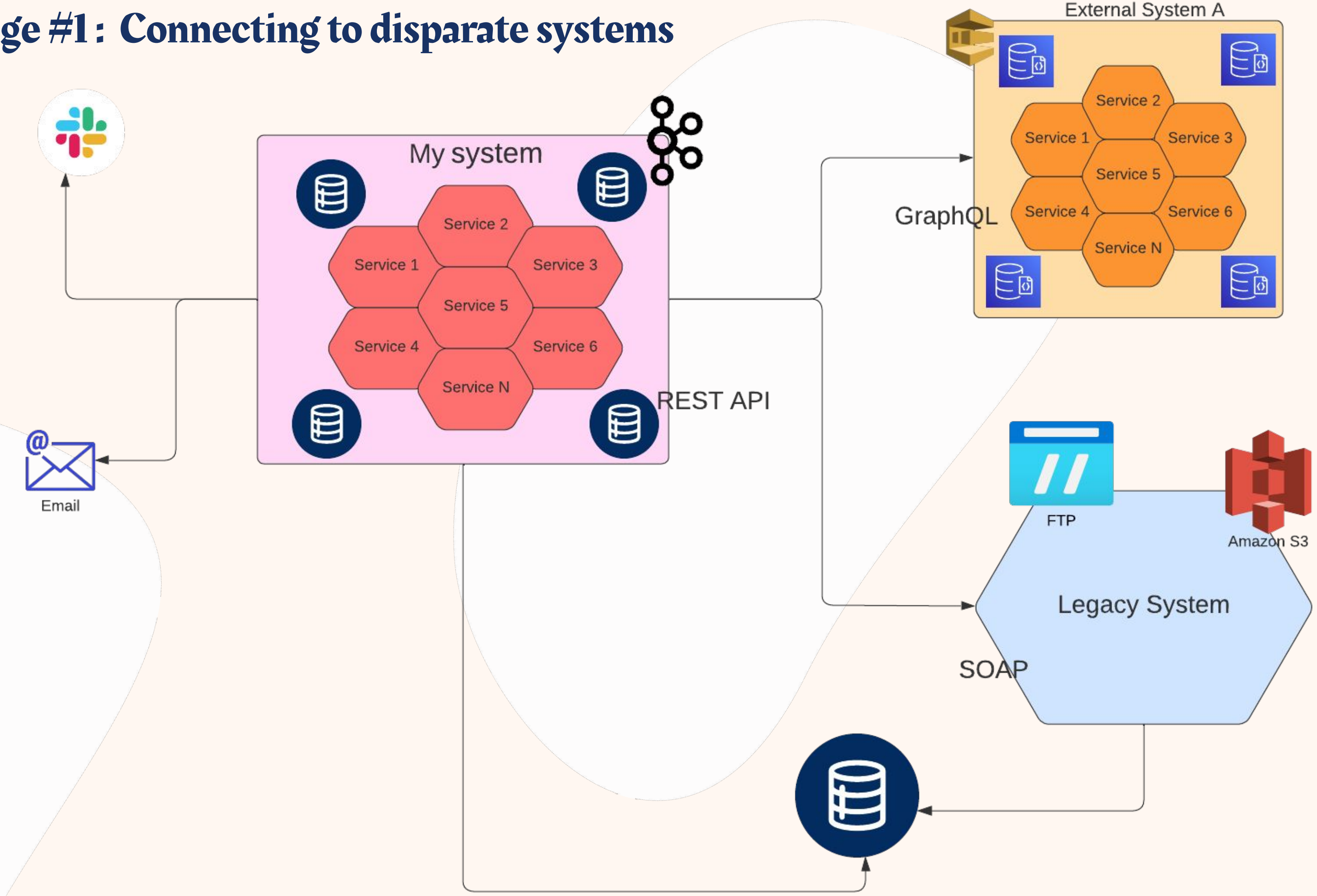
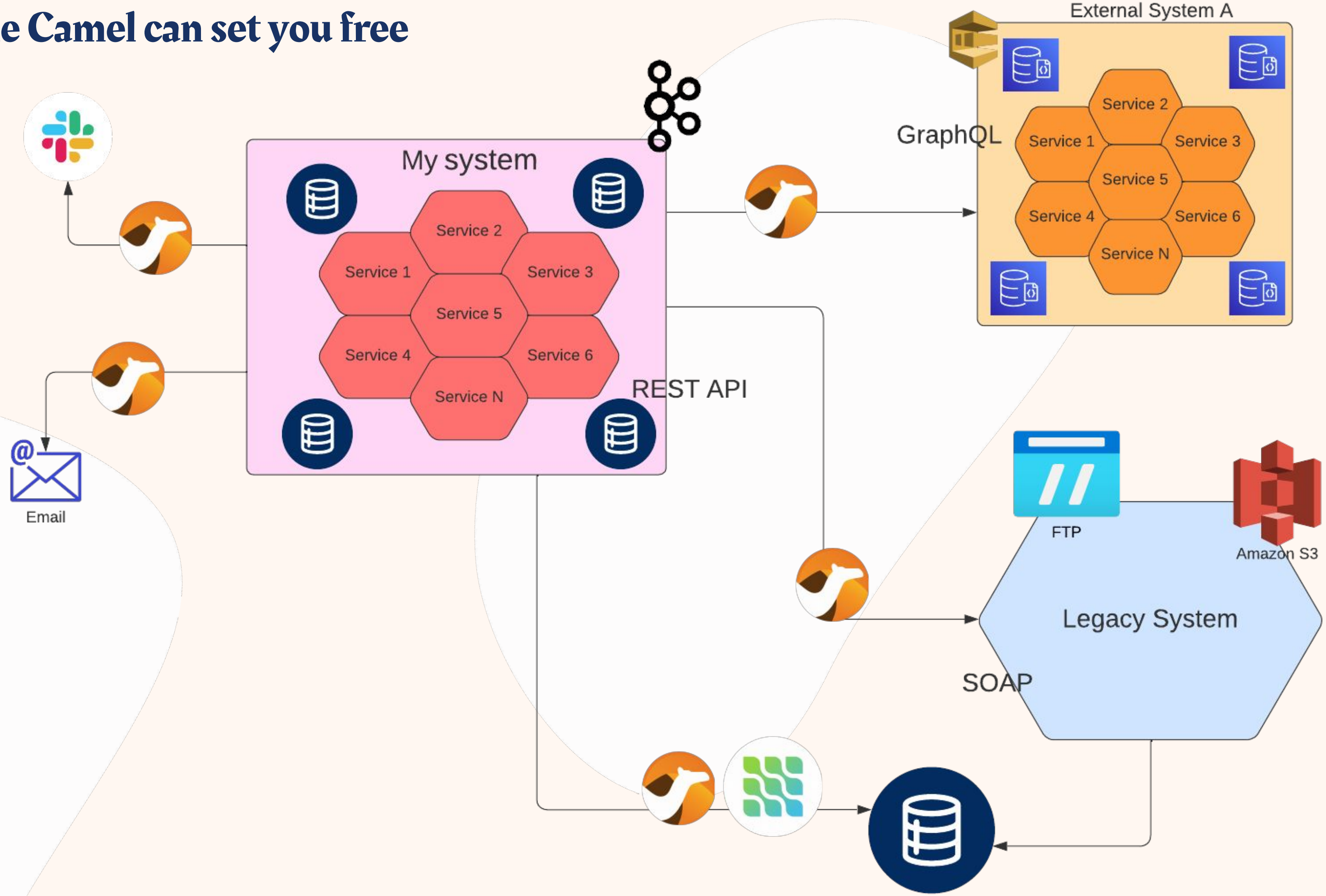


Apache Camel can set you free

Apache Camel can set you free



What is Apache Camel ?

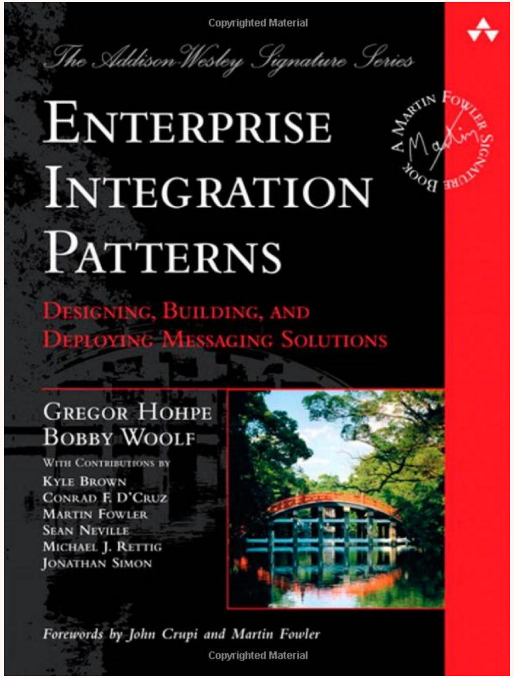
Apache Camel is an **Open Source**

Integration Framework

Entreprise patterns

Emergent

“Design patterns” best practices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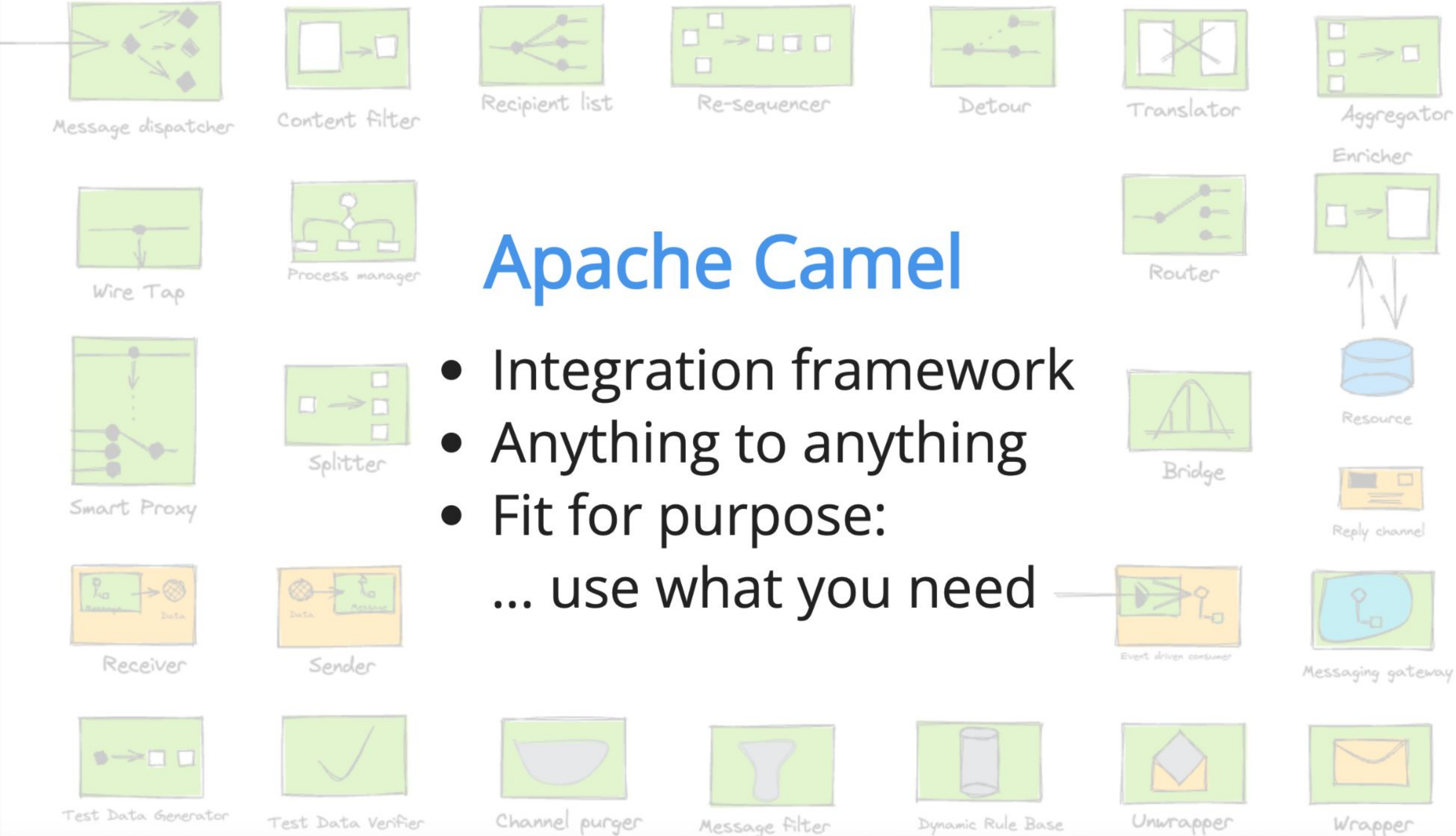
Apache Camel

- Integration framework
- Anything to anything
- Fit for purpose:
  … use what you need

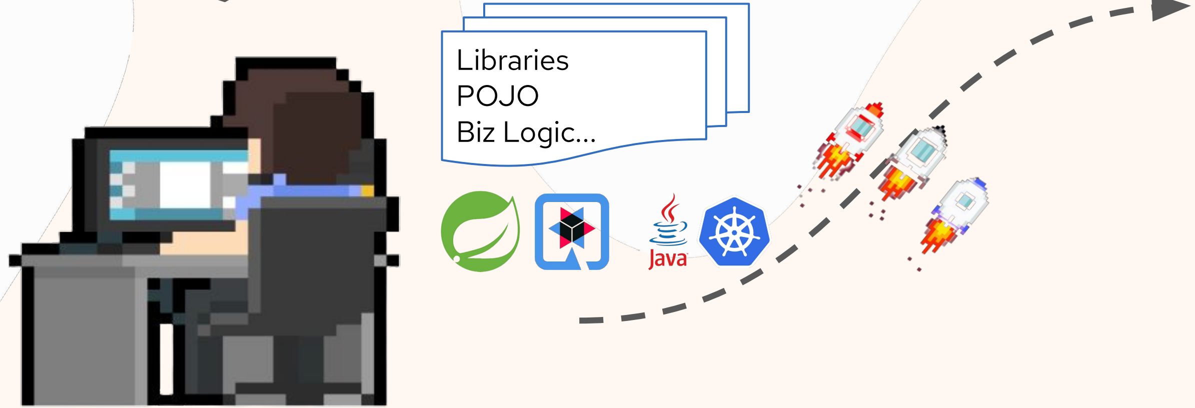


Apache Camel: Camel message Routing

Term	Meaning
Message	data transferred by a Route
Exchange	envelope; wraps the data
Endpoint	a channel, receiver or sender
Component	know-how; creates endpoints
Processor	Java API; custom logic

Apache Camel: Domain Specific Language (DSL)

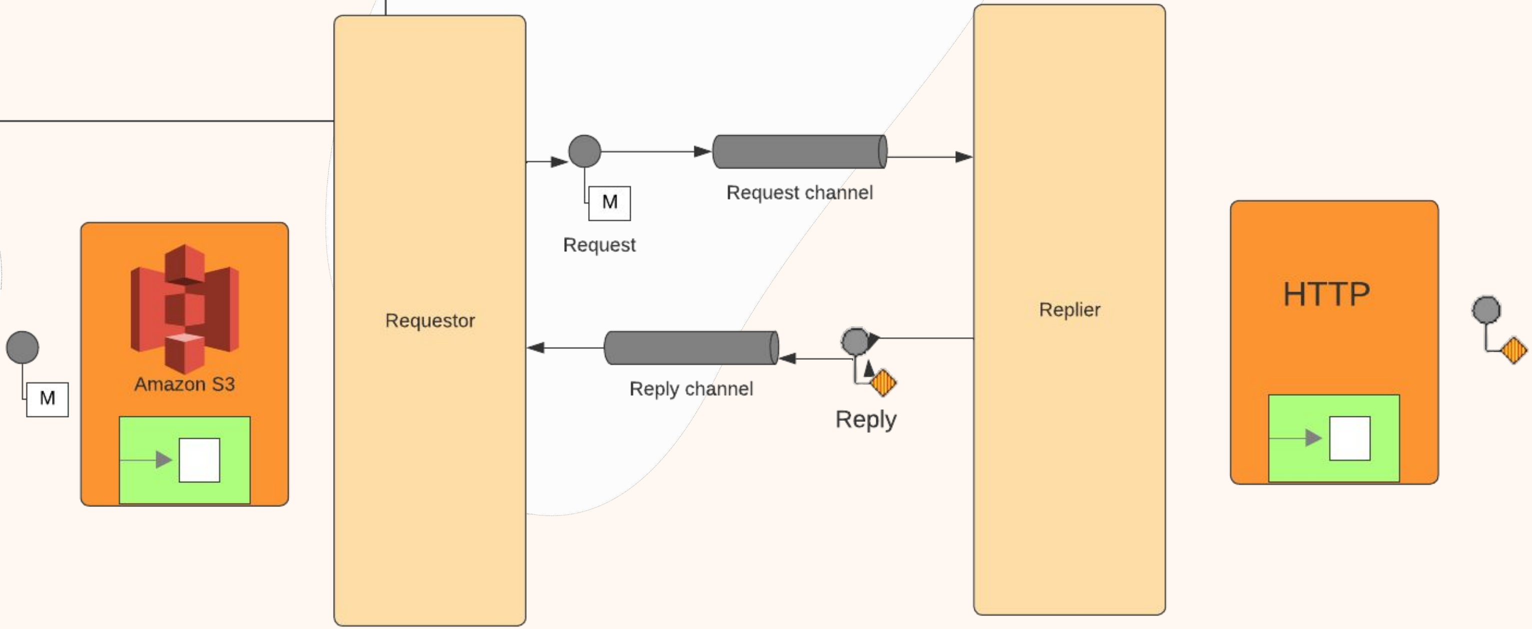
```
from(“aws-s3:myBucket”)
  .to(“http:my-host/api/path”)
```



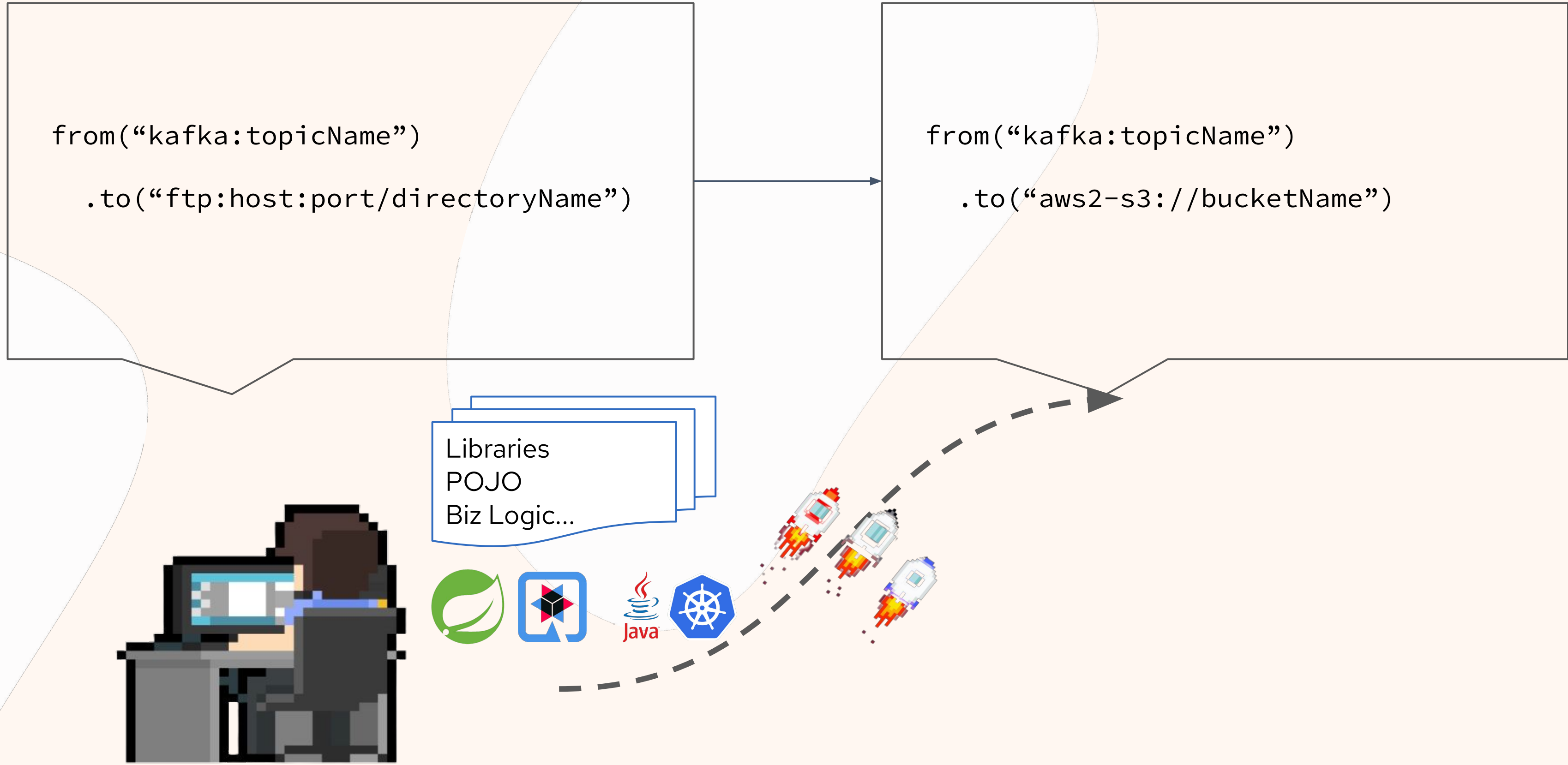
Libraries
POJO
Biz Logic...

Apache Camel: Domain Specific Language (DSL)

```
from(“aws-s3:bucketName”)
  .to(“http:my-host/api/path”)
```



Apache Camel: Domain Specific Language (DSL)



```
from(“kafka:topicName”)

  .to(“ftp:host:port/directoryName”)
```

```
from(“kafka:topicName”)

  .to(“aws2-s3://bucketName”)
```

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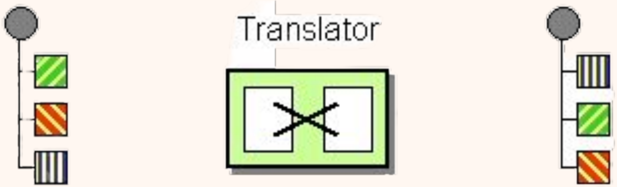
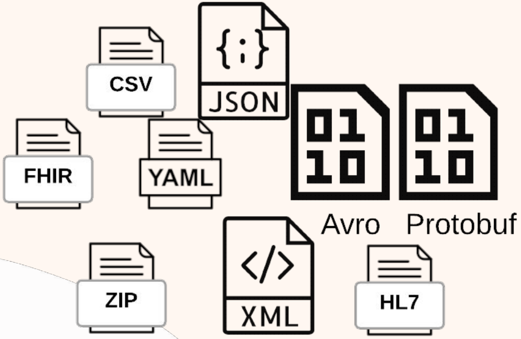
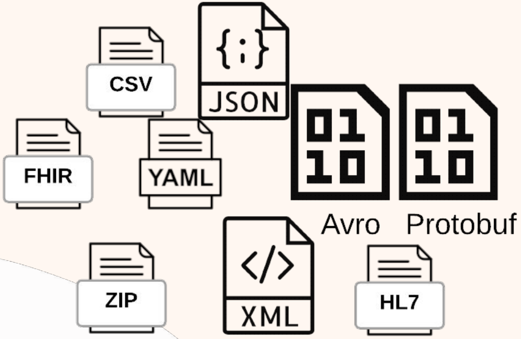
Data Transformation



Using Apache Camel Data formats



Using Apache Camel Data formats



```
from(“kafka:topic”)
  .unmarshal().json()
  .to(“http:my-host/api/path”)
```

Using Translator or Set Body

```
from("direct:cheese")
      .setBody(simple("Hello ${body}"))
      .to("log:hello");
```

```
from("direct:cheese")
      .transform(new DataType("myDataType"))
      .to("log:hello");
```

Using template based components

```
from("direct:cheese")
      .log("Received XML: ${body}")
      .to("xslt:classpath:xslt/transform.xsl")
      .log("Transformed XML: ${body}");
```

Using Processor

```
from("activemq:myQueue")

      .process(new Processor() { public void process(Exchange exchange) throws Exception{

            String payload = exchange.getIn().getBody(String.class);

            // do something with the payload and/or exchange here

            exchange.getIn().setBody("Changed body");

            }

      })

      .to("activemq:myOtherQueue");
```

Using Beans

```
from("activemq:myQueue")

      .process(new Processor() { public void process(Exchange exchange) throws Exception{

           String payload = exchange.getIn().getBody(String.class);

           // do something with the payload and/or exchange here

           exchange.getIn().setBody("Changed body");

           }

      })

      .to("activemq:myOtherQueue");
```

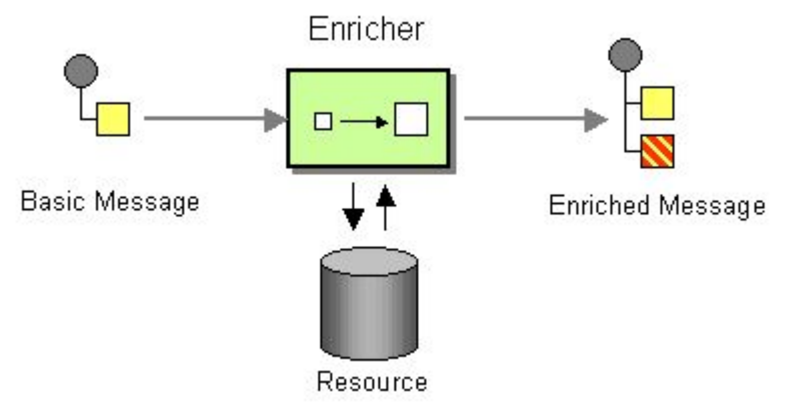
Using Bean

```
from("direct:hello")
    .to("bean:com.foo.MyBean");
```

```
package com.foo;

public class MyBean {

    public String saySomething(String input){

        return "Hello " + input;

    }

}
```

Content Enricher

```
from("seda:a")
    .to("direct:myEnrichEndpoint")
    .to("seda:b");
```



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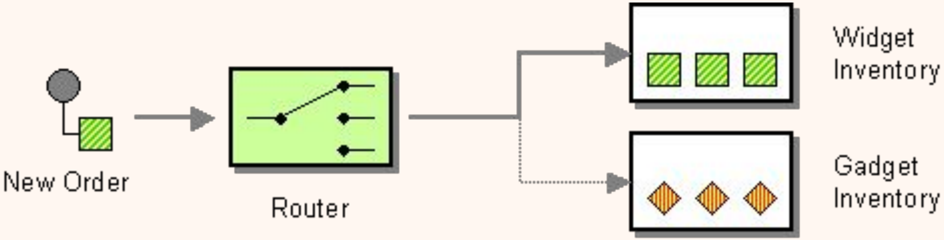
Routing Messages

Content Based Router

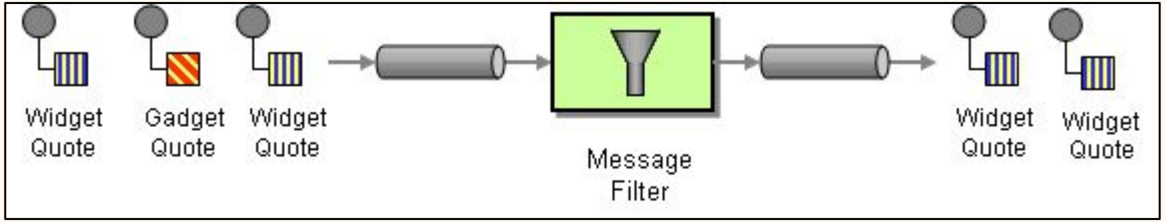
```
from("seda:a").choice()
      .when(header("foo").isEqualTo("bar")).to("seda:b")
      .when(header("foo").isEqualTo("cheese")).to("seda:c")
     .otherwise().to("seda:d");
```



Message Filter

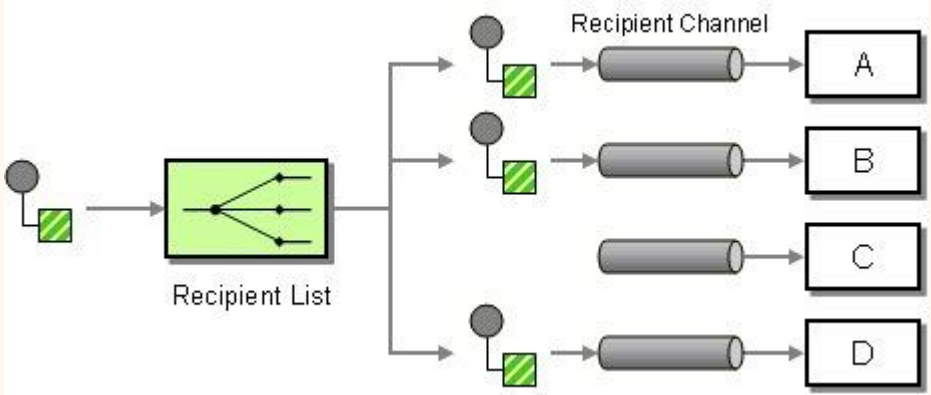
```
from("seda:a")

      .filter(header("foo").isEqualTo("bar")).to("seda:b");
```



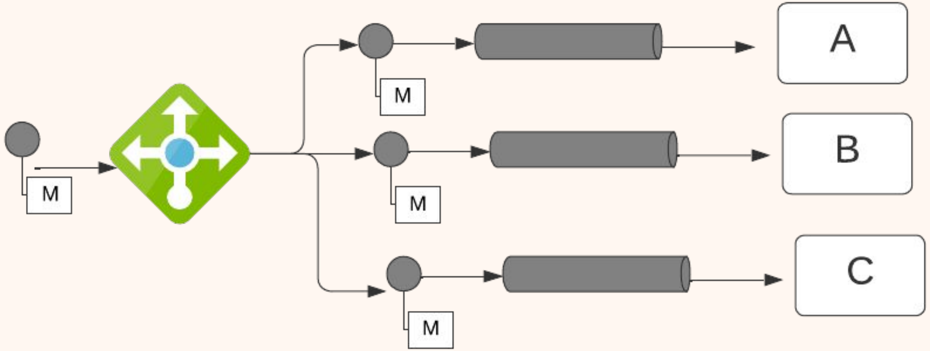
Recipient List

```
from("seda:a")
    .to("seda:b", "seda:c", "seda:d");
```



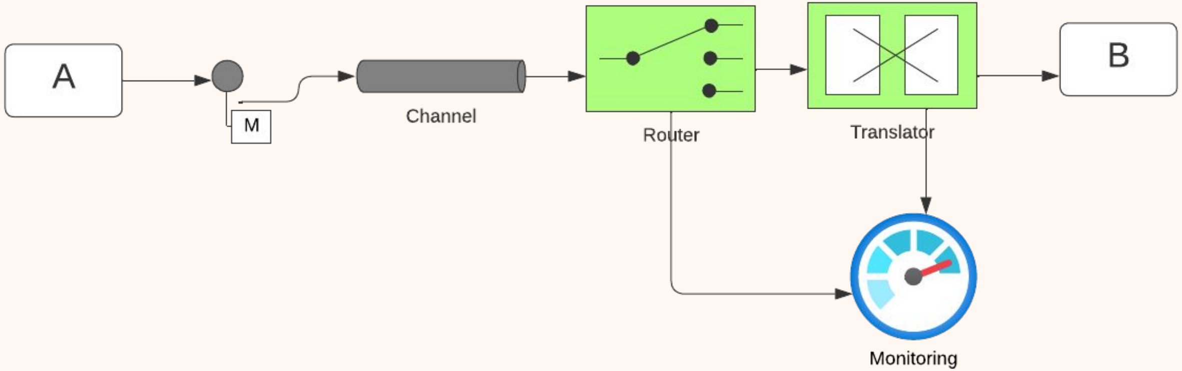
Load Balancer

```
from("direct:start")
    .loadBalance().roundRobin()
          .to("mock:x", "mock:y", "mock:z");
```

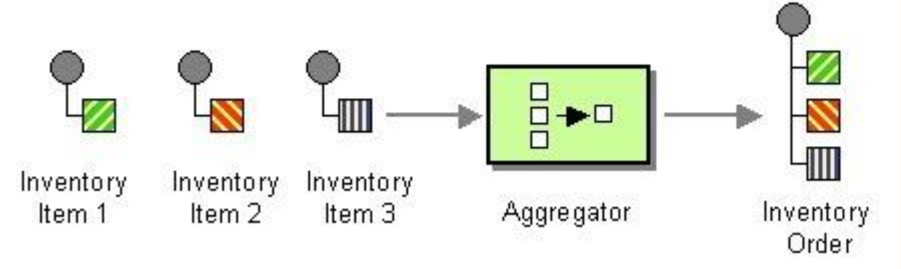


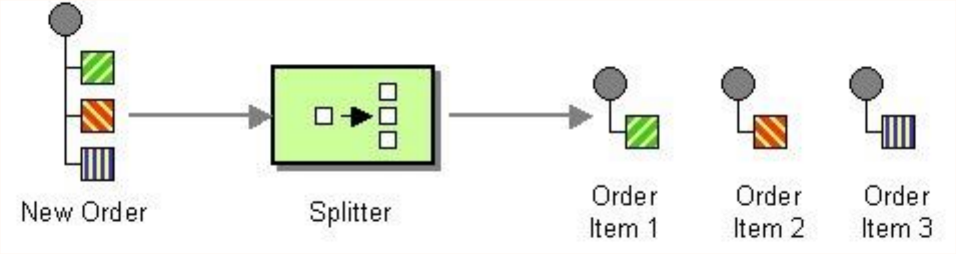
Idempotent Receiver

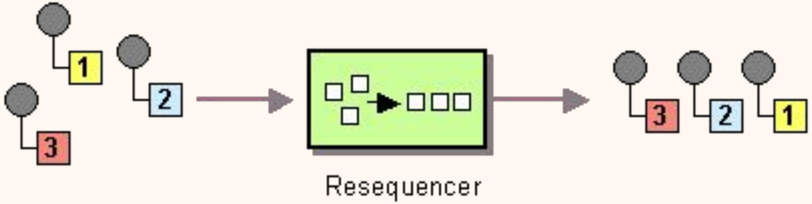
```
from("direct:performInsert")
      .idempotentConsumer(header("id")).idempotentRepository("insertDbIdemRepo")
      // once-only insert into database
      .end()
```



Using others EIPs

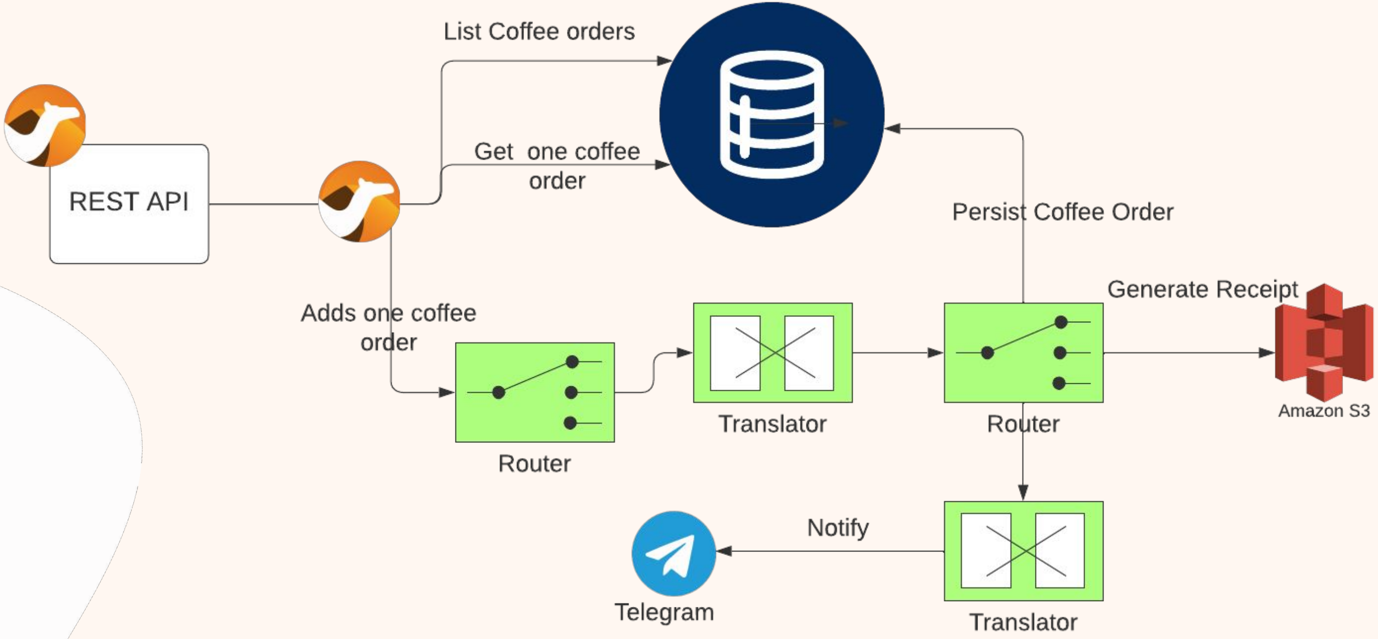






Demo #1

Demo #1



List Coffee orders
REST API
Get one coffee order
Persist Coffee Order
Generate Receipt
Adds one coffee order
Translator
Router
Router
Amazon S3
Notify
Telegram
Translator

Additional Challenges

4

Logging

Logging

- Logging Components
- Log EIP
- Customizing logs and format
- Masking sensitive information

```
from("activemq:orders")
      .to("log:com.mycompany.order?level=DEBUG&groupSize=10")
      .to("bean:processOrder");
```

```
from("direct:start")
      .log("Processing ${id}")
      .to("bean:foo");
```

5

Error Handling

Error Handler: Dead Letter Queue

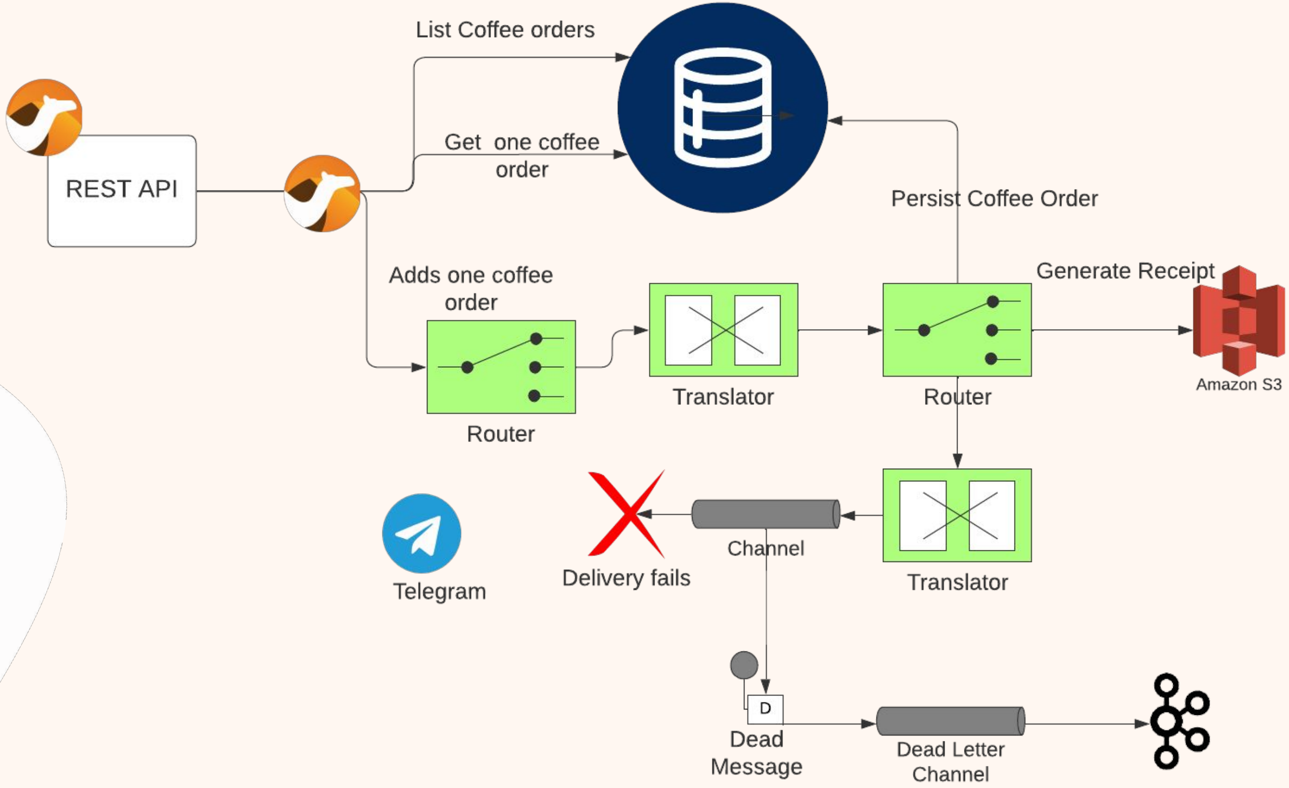
```
from("direct:start")
      .to("direct:invalidEndpoint"); // This will trigger an error

      // Configure the Dead Letter Channel (DLC) to handle errors
      errorHandler(deadLetterChannel("direct:errorQueue")
            .maximumRedeliveries(3) // Maximum number of redelivery attempts
            .redeliveryDelay(1000) // Delay between redelivery attempts
            .logExhausted(true) // Log if redelivery attempts are exhausted
            );

      // Define the DLC route to handle failed messages
      from("direct:errorQueue")
            …;
```

Demo #2

Demo #2


List Coffee orders
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Generate Receipt
Translator
Router
Router
Amazon S3
Telegram
Delivery fails
Channel
Translator
D
Dead Message
Dead Letter Channel

شكرا

Thank You