DevNation

D A Y: **Modern App Dev**

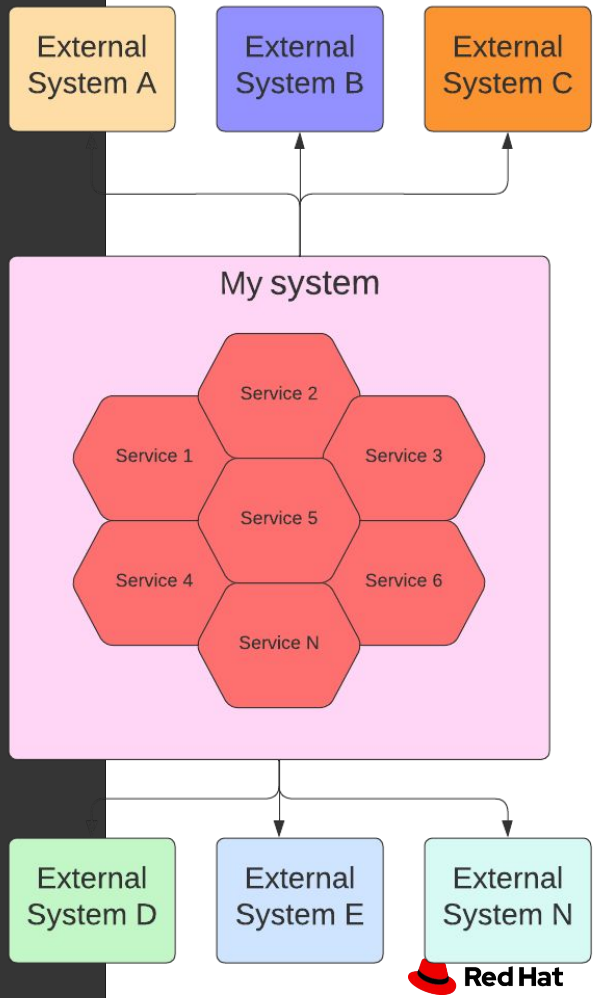
December 12, 2023

Red Hat Developer

Zineb Bendhiba

Connecting disparate systems in a lightweight way

Integration Challenges

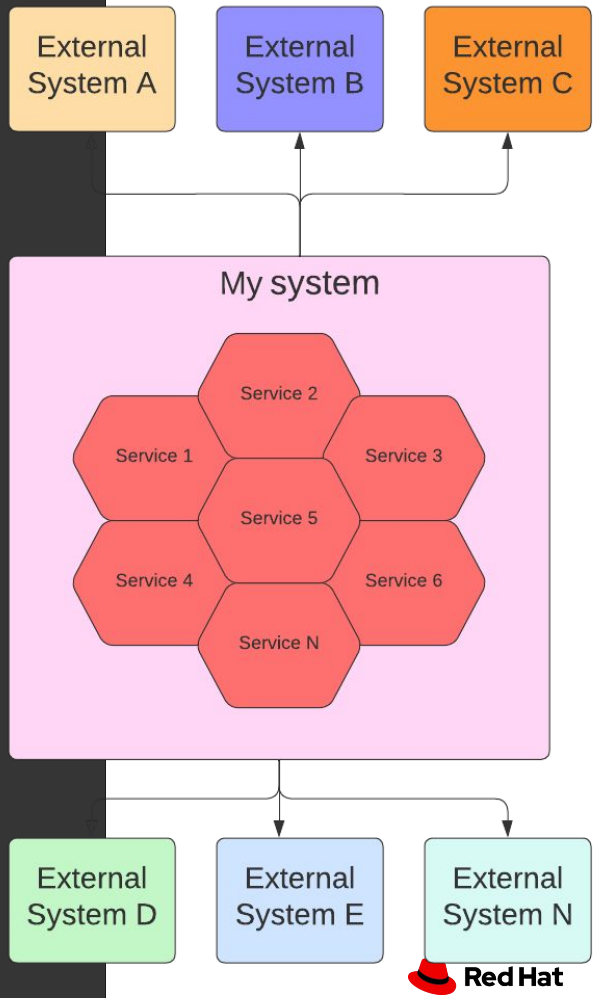


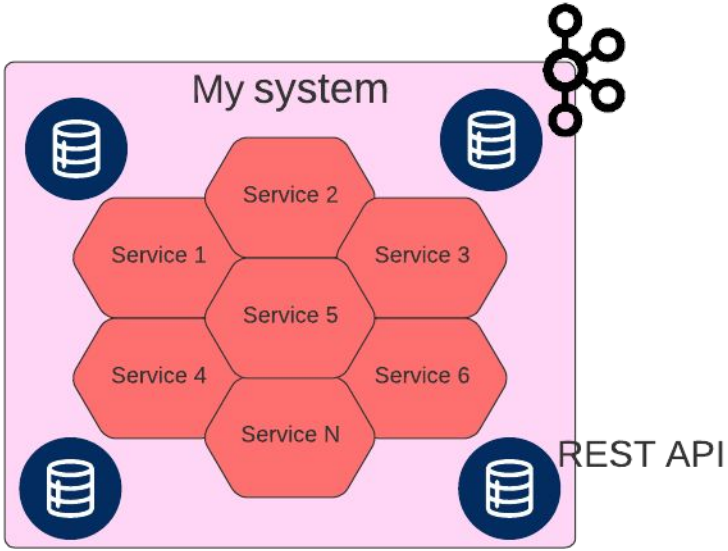
Zineb Bendhiba

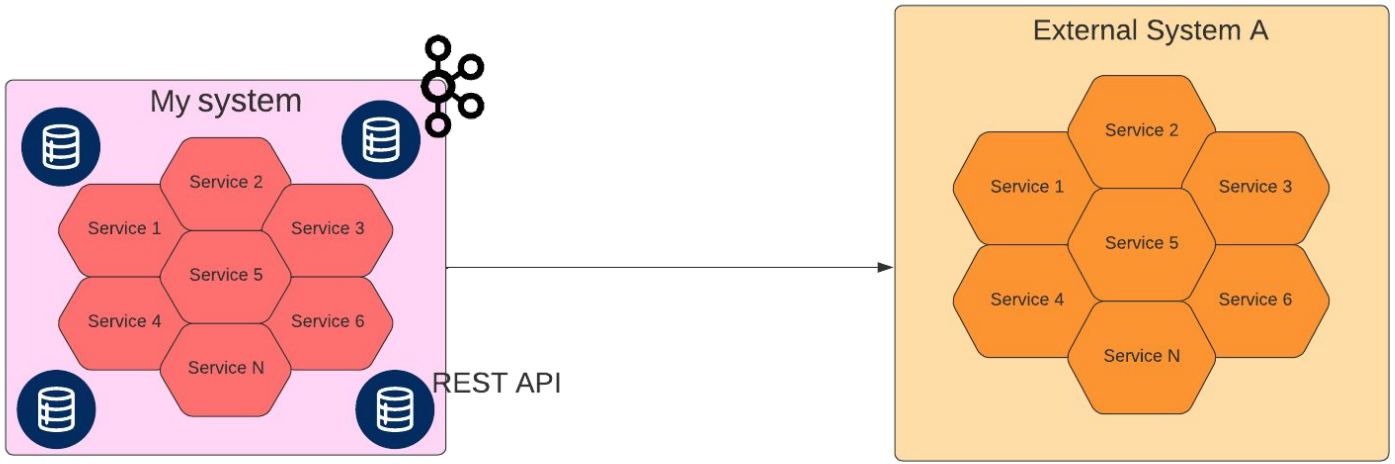
- Senior Software Engineer
- Apache Camel PMC
- International Speaker
- 15+ years professional software development experience
- Speak English, French, Moroccan Darija, Arabic
- https://zinebbendhiba.com
- @ZinebBendhiba

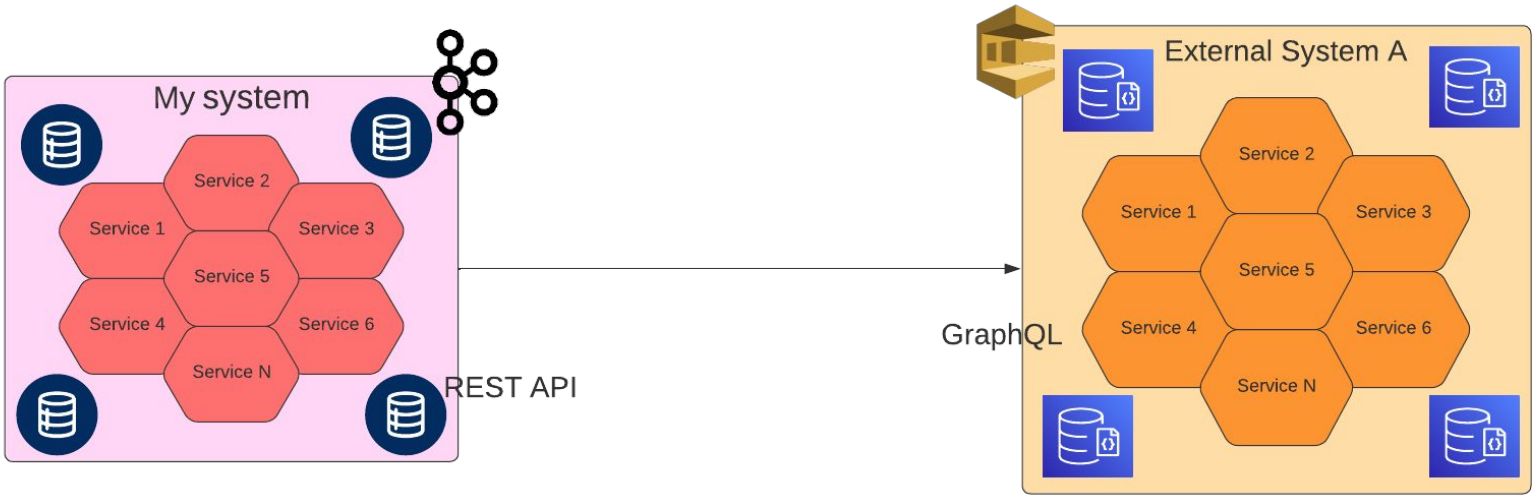
Challenge #1

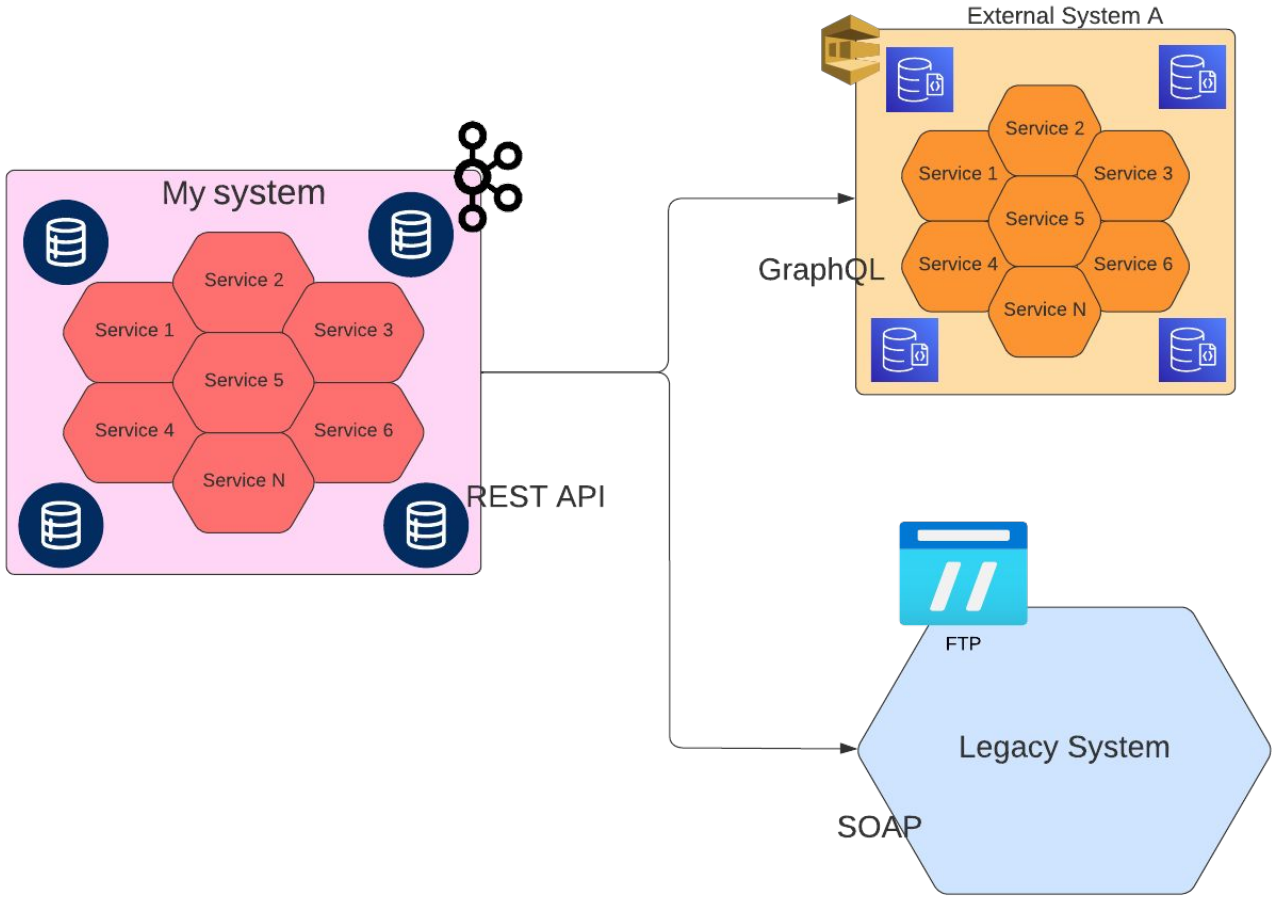
Connecting to disparate systems



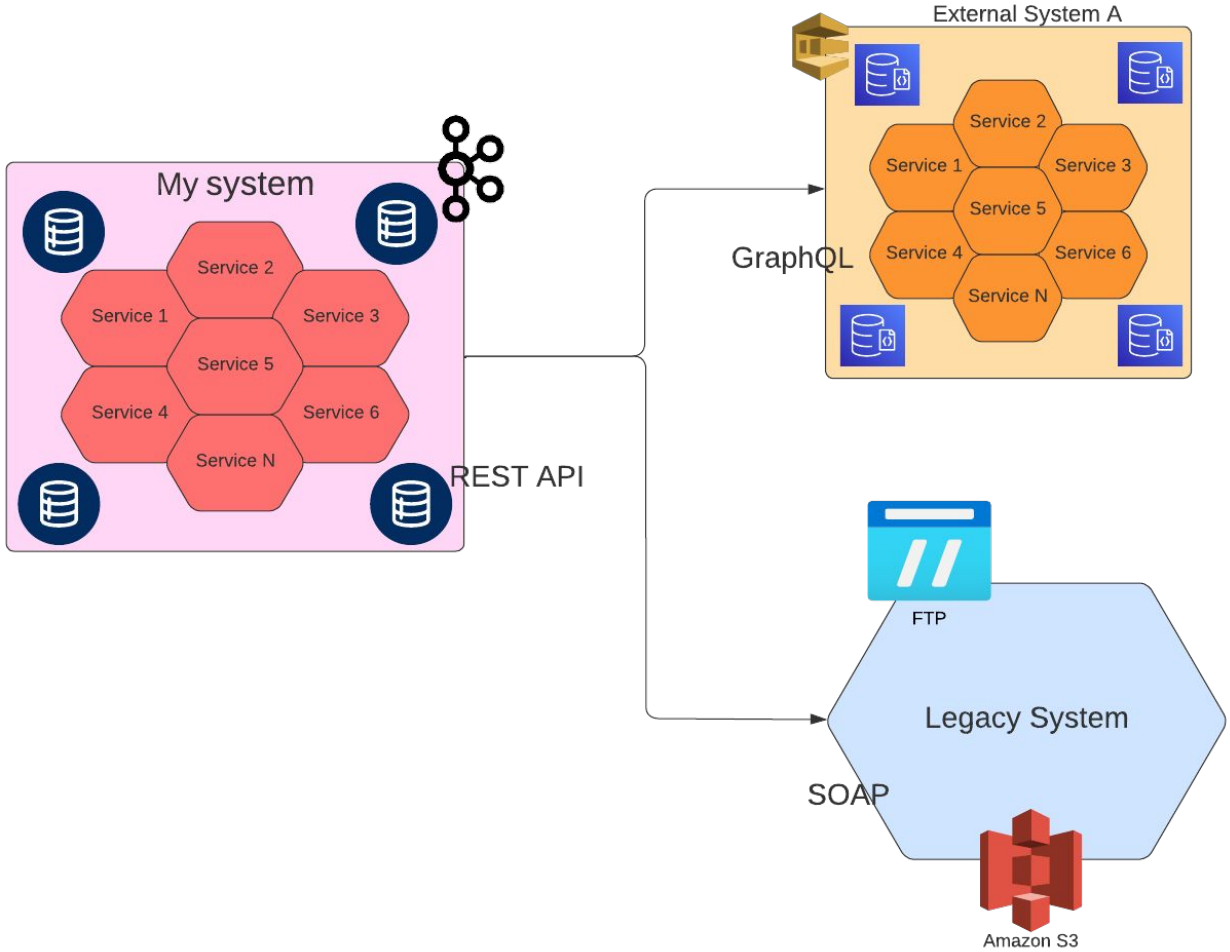

My system
Service 1
Service 2
Service 3
Service 4
Service 5
Service 6
Service N
REST API


My system
Service 2
Service 1
Service 3
Service 5
Service 4
Service 6
Service N
REST API
External System A
Service 2
Service 1
Service 3
Service 5
Service 4
Service 6
Service N

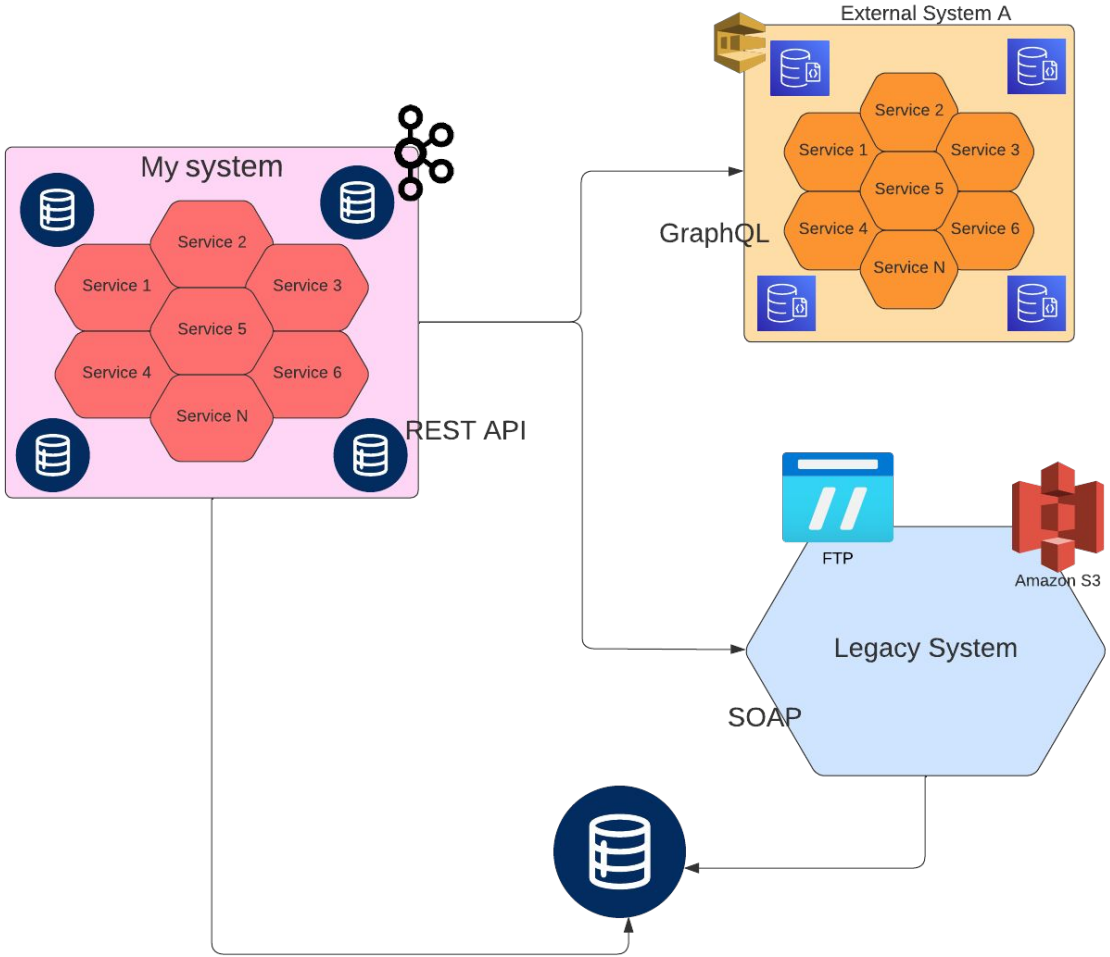

My system
Service 1
Service 2
Service 3
Service 4
Service 5
Service 6
Service N
REST API
GraphQL
External System A
Service 1
Service 2
Service 3
Service 4
Service 5
Service 6
Service N

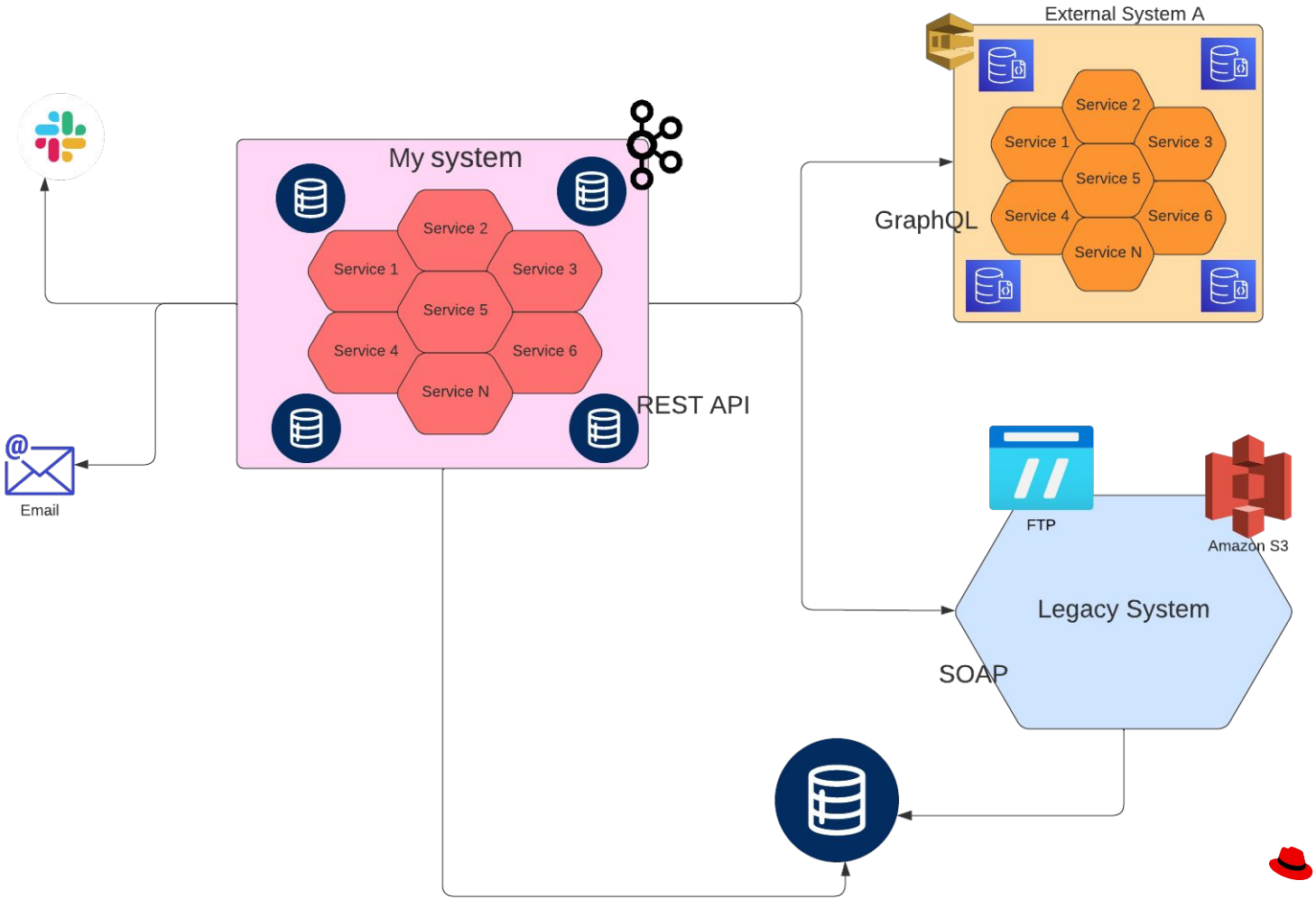

External System A
Service 2
Service 1
Service 3
Service 5
Service 4
Service 6
Service N
GraphQL
My system
Service 2
Service 1
Service 3
Service 5
Service 4
Service 6
Service N
REST API
FTP
Legacy System
SOAP

Red Hat

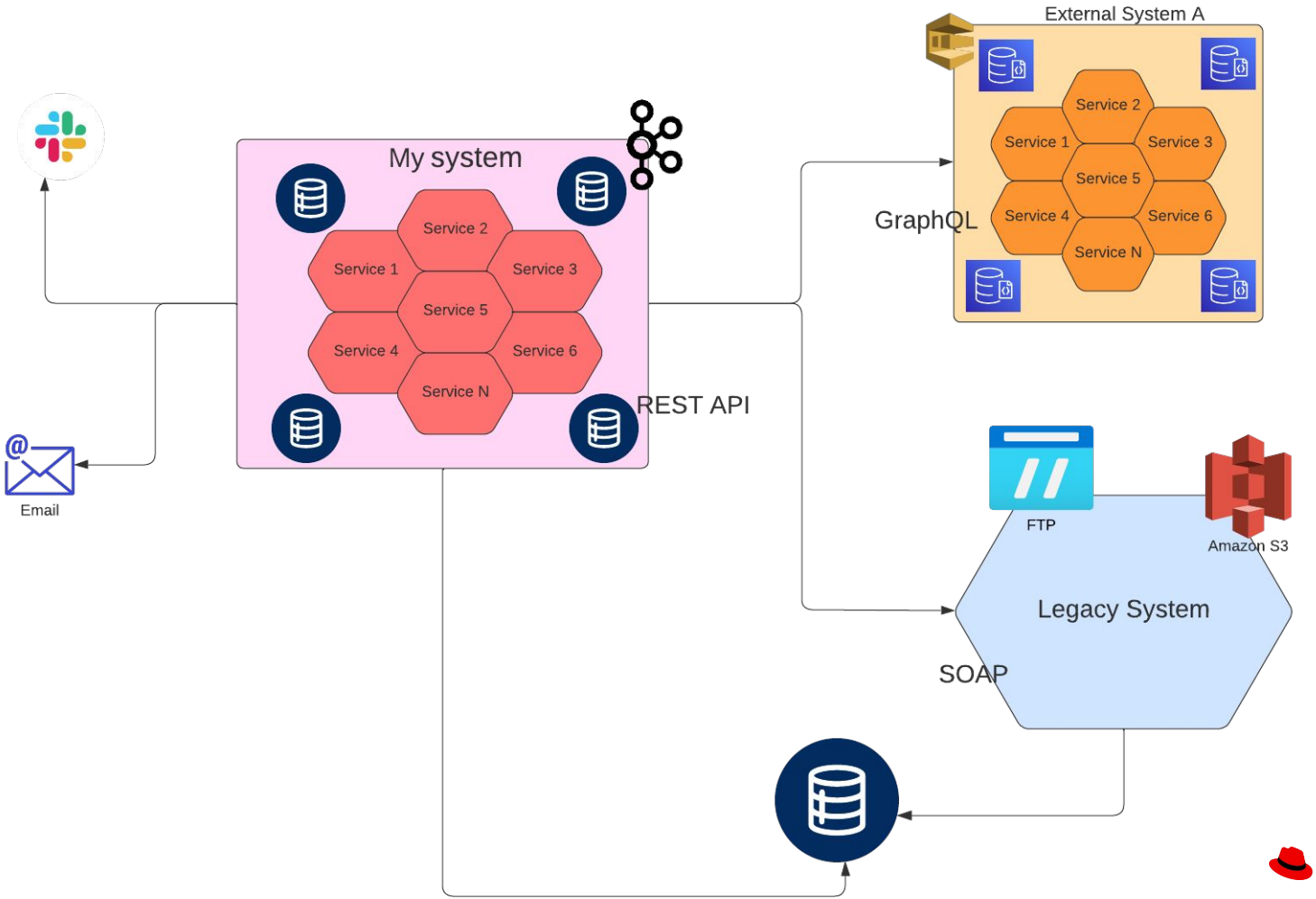

External System A
Service 2
Service 1
Service 3
Service 5
Service 4
Service 6
Service N
GraphQL
My system
Service 2
Service 1
Service 3
Service 5
Service 4
Service 6
Service N
REST API
FTP
Legacy System
SOAP
Amazon S3

Red Hat


External System A
Service 2
Service 1
Service 3
Service 5
Service 4
Service 6
Service N
GraphQL
My system
Service 2
Service 1
Service 3
Service 5
Service 4
Service 6
Service N
REST API
FTP
Amazon S3
Legacy System
SOAP


External System A
Service 2
Service 1
Service 3
Service 5
Service 4
Service 6
Service N
GraphQL
My system
Service 2
Service 1
Service 3
Service 5
Service 4
Service 6
Service N
REST API
Email
FTP
Amazon S3
Legacy System
SOAP

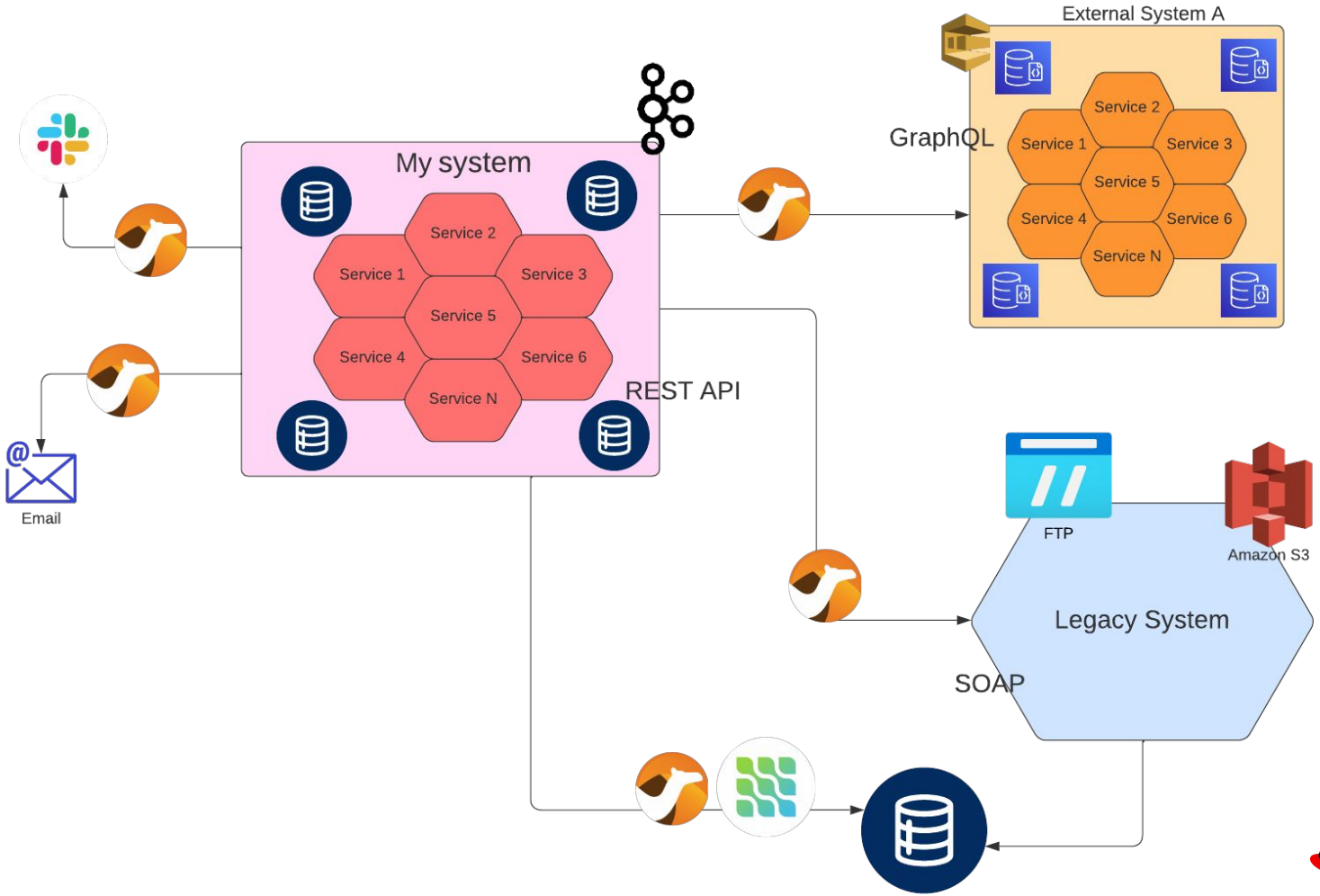
Red Hat


External System A
Service 2
Service 1
Service 3
Service 5
Service 4
Service 6
Service N
GraphQL
My system
Service 2
Service 1
Service 3
Service 5
Service 4
Service 6
Service N
REST API
Email
FTP
Amazon S3
Legacy System
SOAP

Red Hat

Apache Camel can set you free

Red Hat


External System A
GraphQL
Service 1
Service 2
Service 3
Service 4
Service 5
Service 6
Service N
My system
REST API
Email
FTP
Amazon S3
Legacy System
SOAP

What is Apache Camel ?

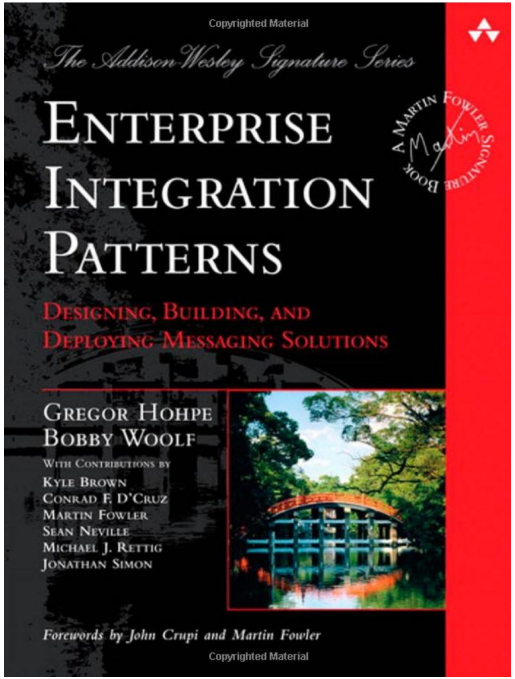
Red Hat

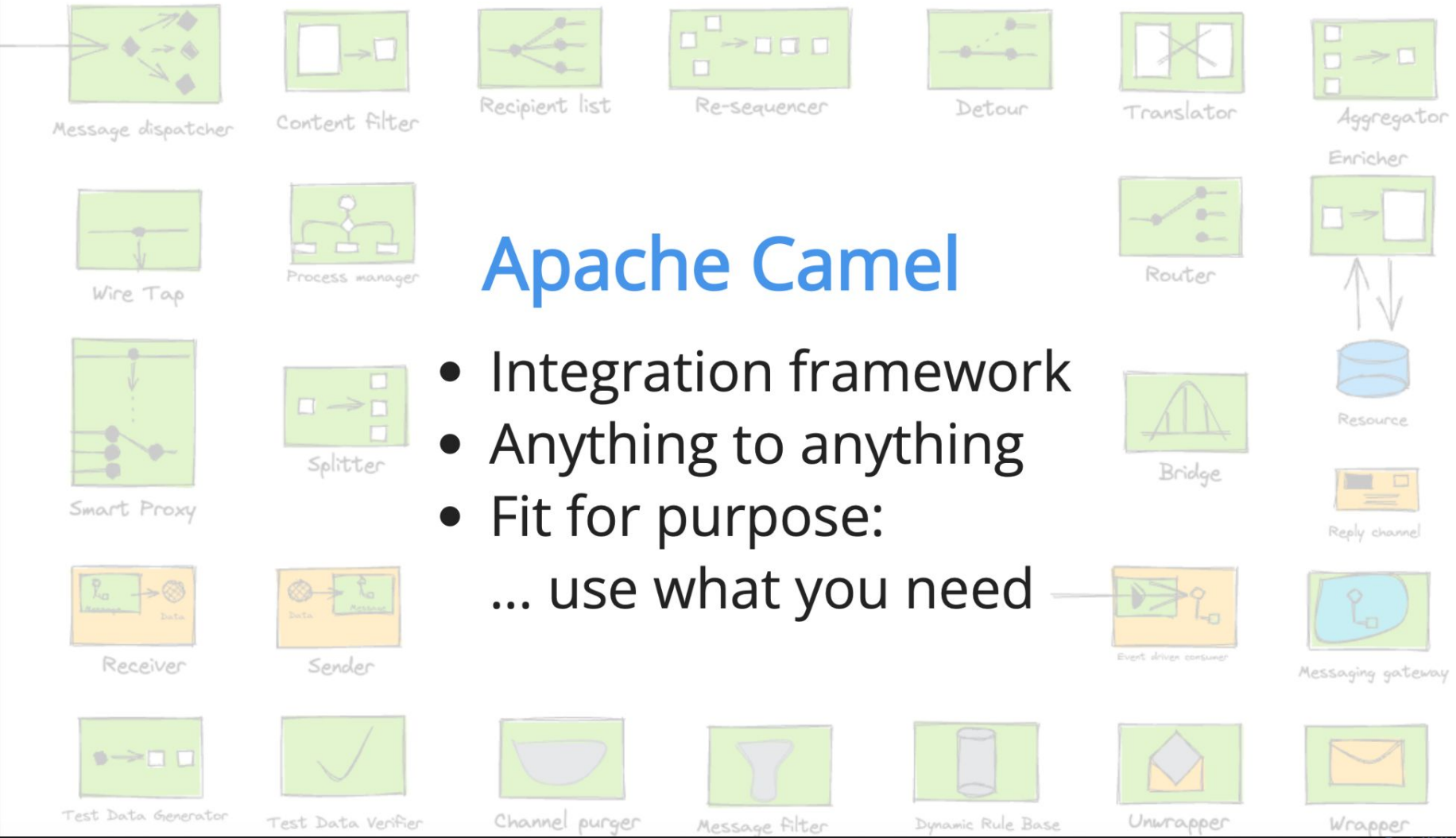
Apache Camel is an **Open Source**

Integration Framework

Entreprise patterns

Emergent
“Design patterns” best practices



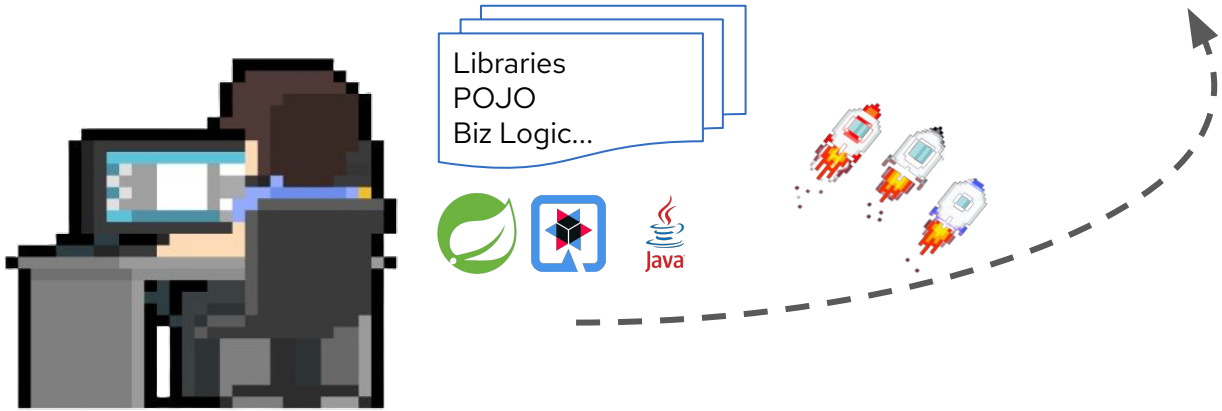


Apache Camel

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

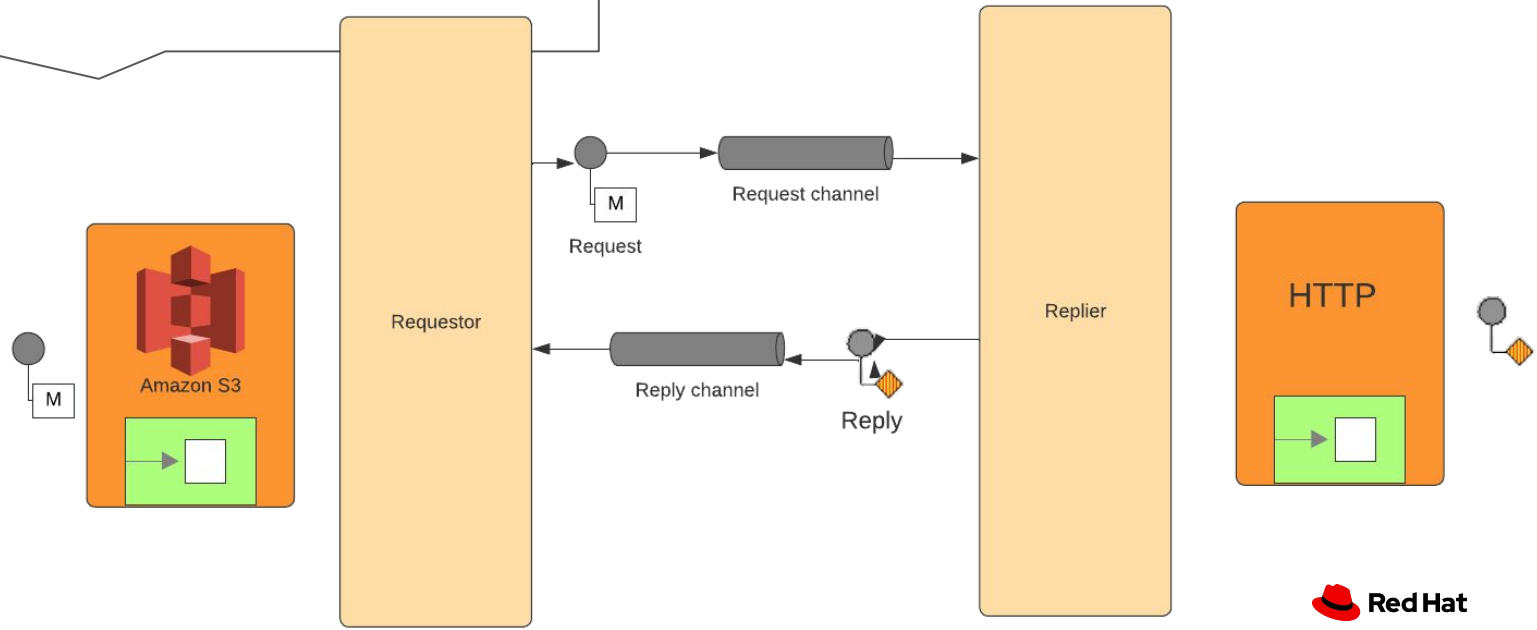
Apache Camel: Domain Specific Language (DSL)

```
from("aws2-s3:bucketName")
    .to("http:my-host/api/path")
```



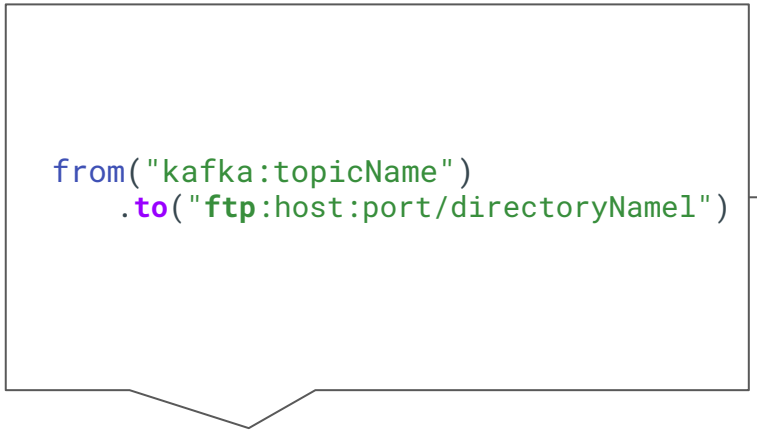
Apache Camel: Domain Specific Language (DSL)

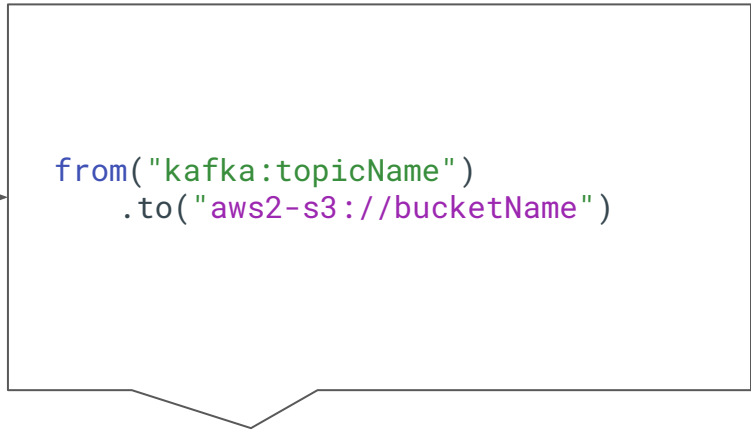
```
from("aws2-s3:bucketName")
    .to("http:my-host/api/path")
```



Red Hat

Apache Camel: Domain Specific Language (DSL)





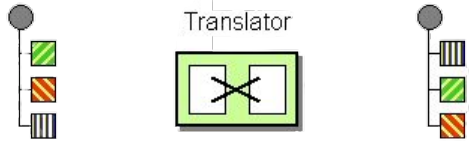
Libraries
POJO
Biz Logic...

Java

Red Hat

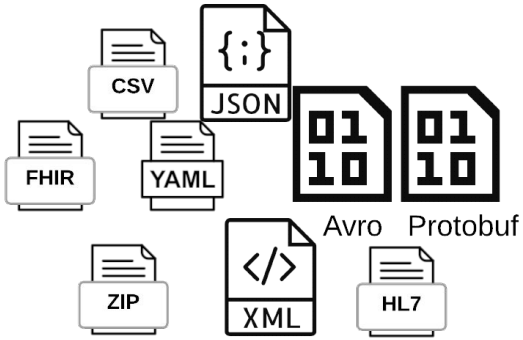
Challenge #2

Data Transformation



Red Hat

Using Apache Camel Data formats




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

Red Hat

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");
```

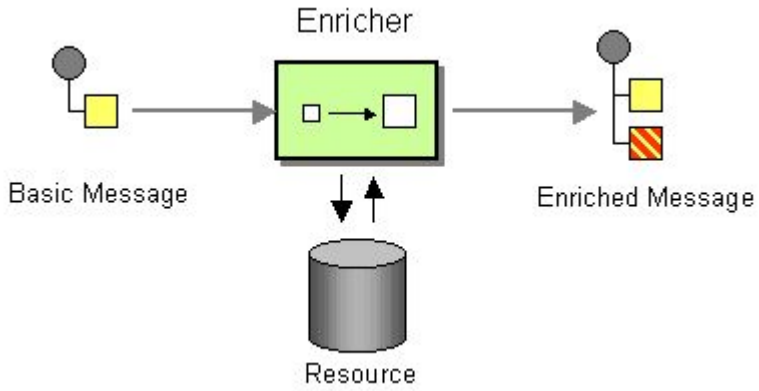
Using Beans

```
from("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");
```

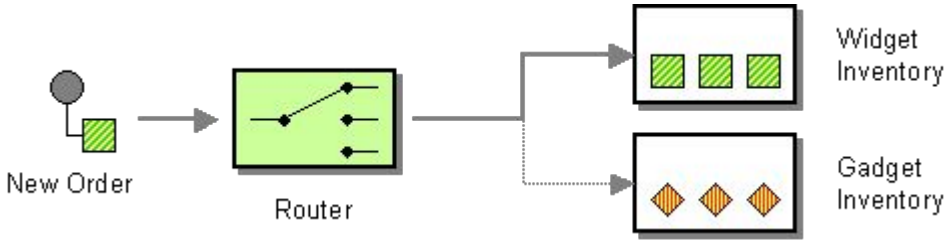


Challenge #3

Routing Messages

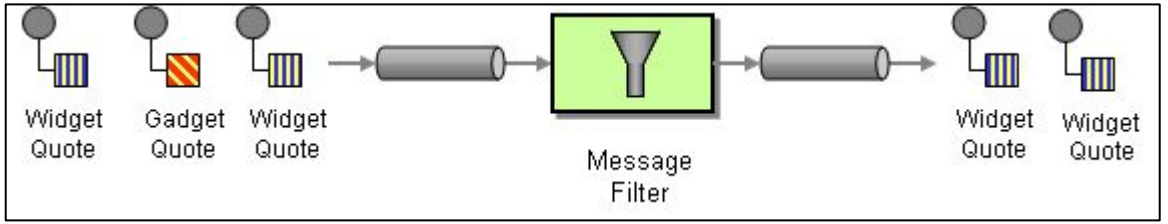
Content Based Router

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



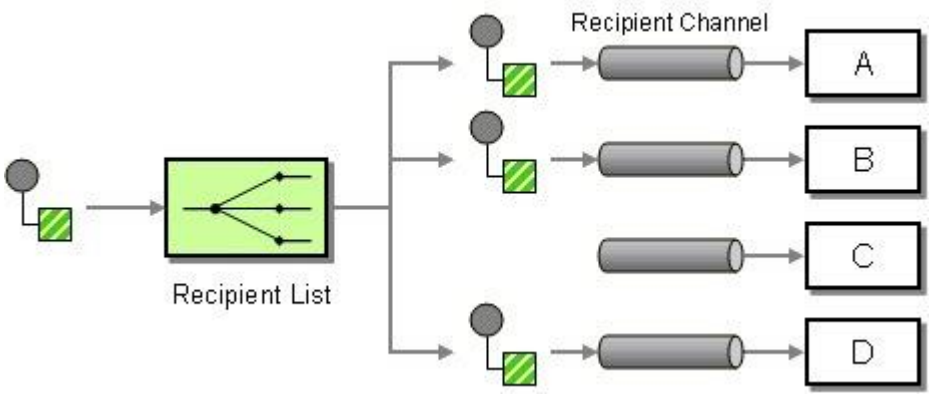
Message Filter

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



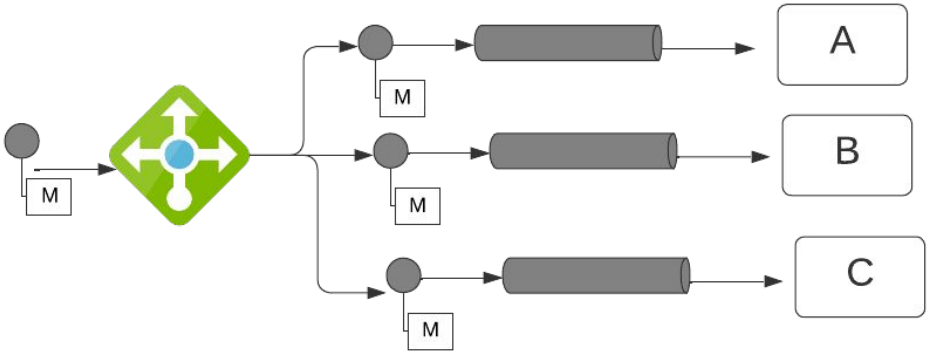
Recipient List

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



Load Balancer

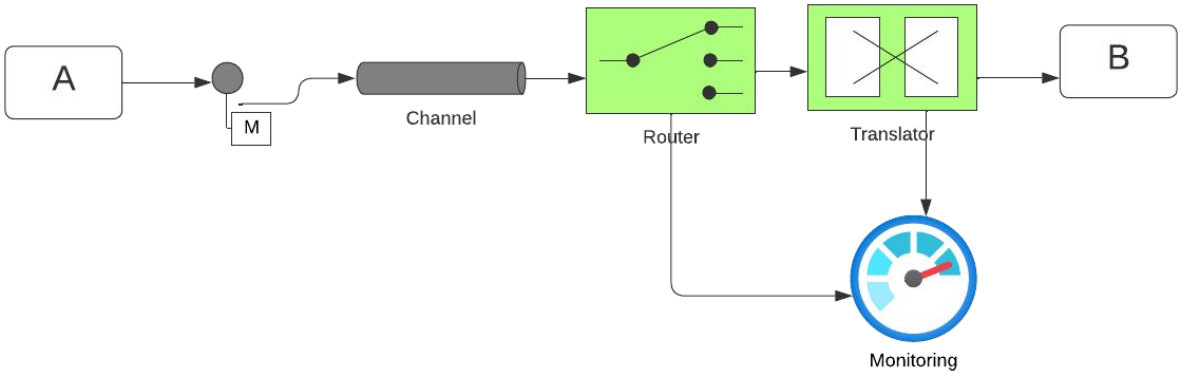
```
from("direct:start")
      .loadBalance().roundRobin()
      .to("mock:x", "mock:y", "mock:z");
```



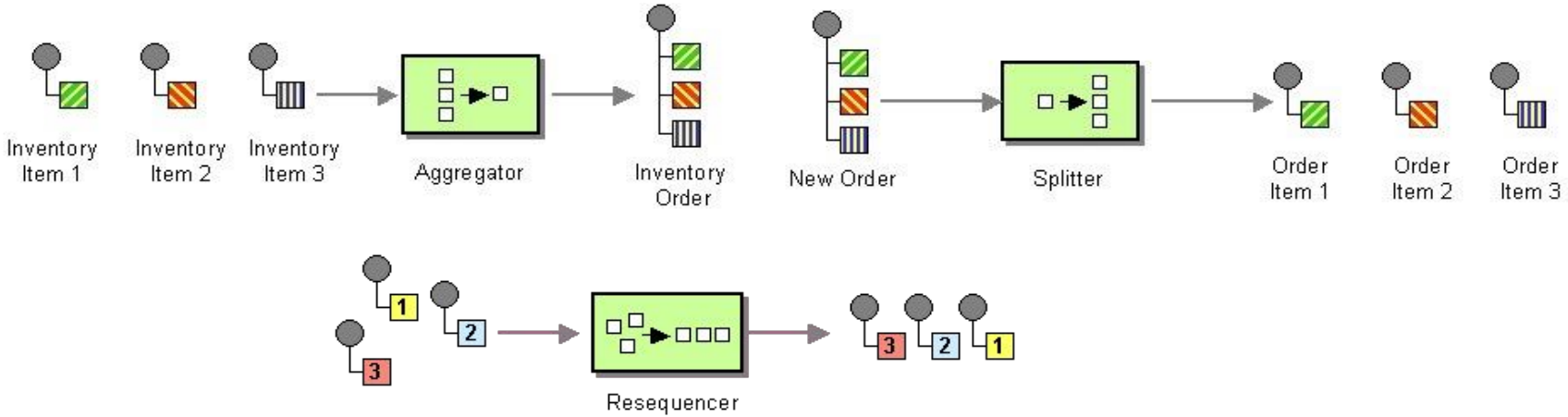
Red Hat

Idempotent Receiver

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



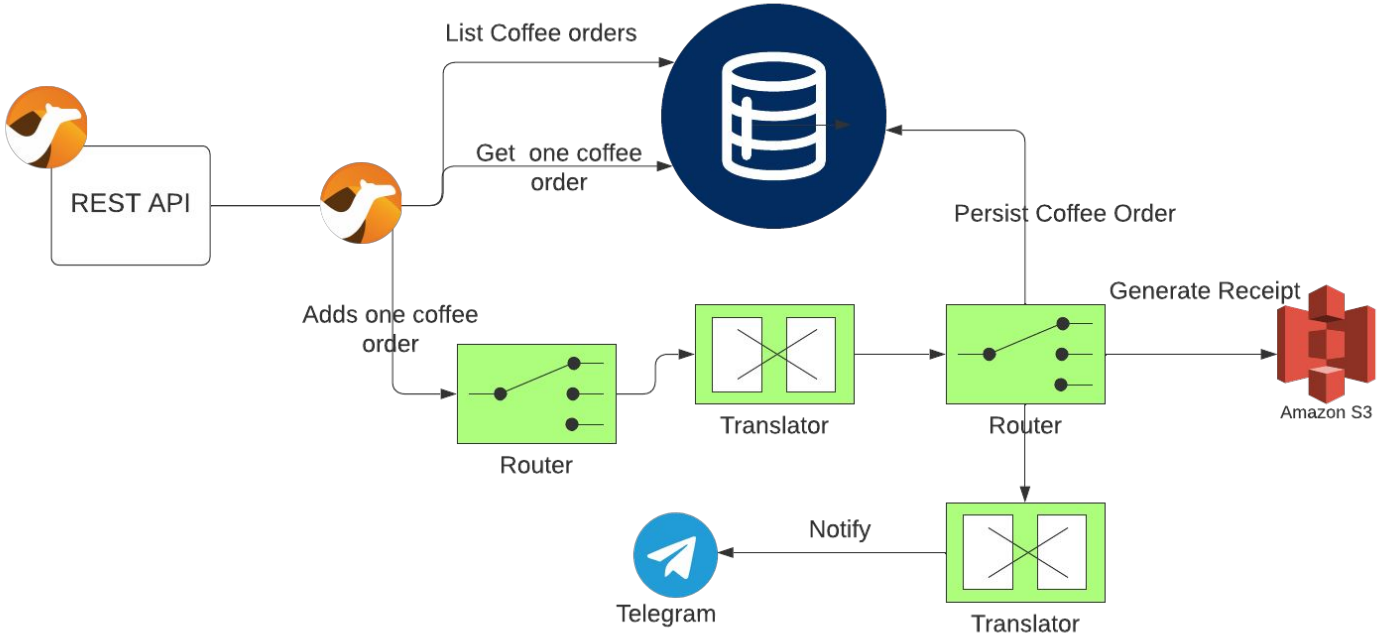
Using others EIPs



Red Hat

Demo #1

Demo #1



Additional challenges

Red Hat

Challenge #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");
```

Challenge #5

Error Handling

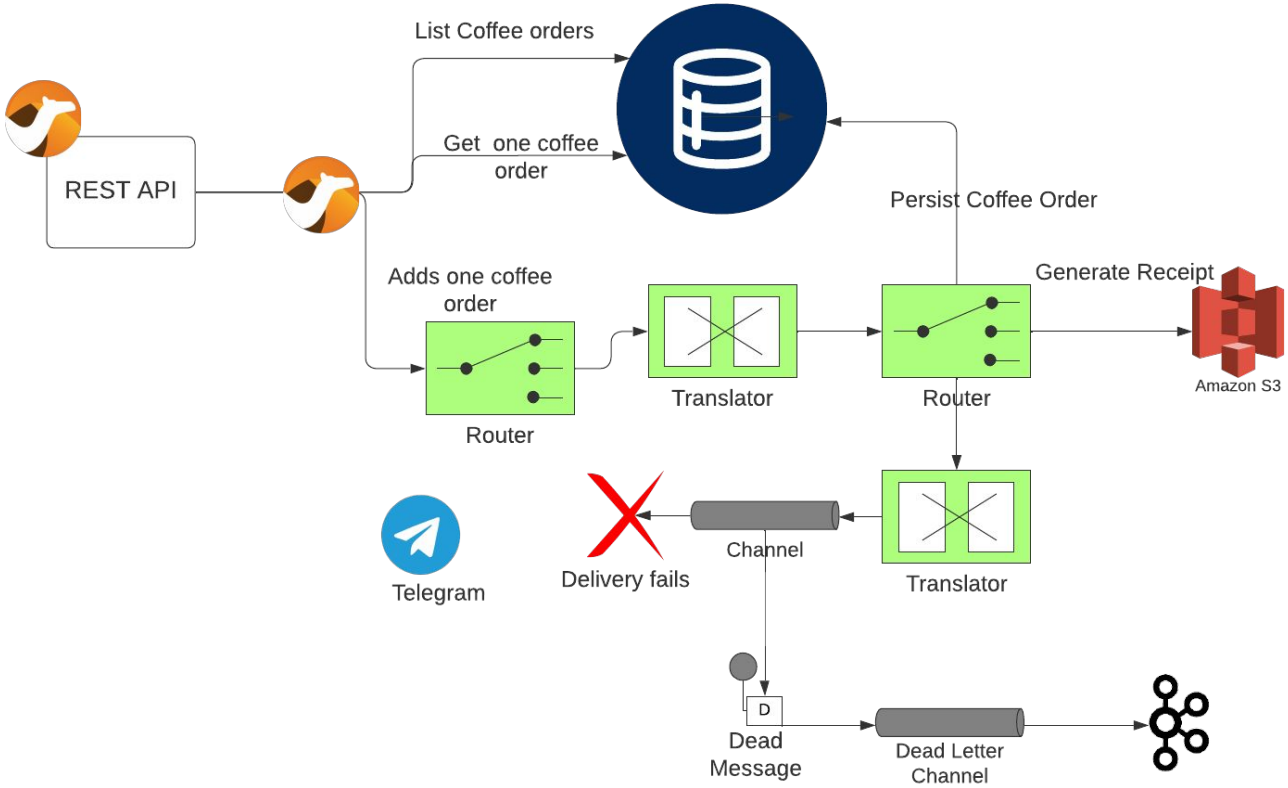
Error Handler: Dead Letter Queue

```
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

Red Hat

Demo #2



Red Hat

Thank you


linkedin.com/company/red-hat


youtube.com/user/RedHatVideos


facebook.com/redhatinc


twitter.com/RedHat

Red Hat