Sponsorslides

INTEGRATING SYSTEMS

IN THE AGE OF

QUARKUS, KNATIVE AND KAFKA CONNECT

Peter Palaga

@ppalaga

The original reveal.js presentation this PDF was created from is available online:

http://ppalaga.github.io/presentations/200108-camel

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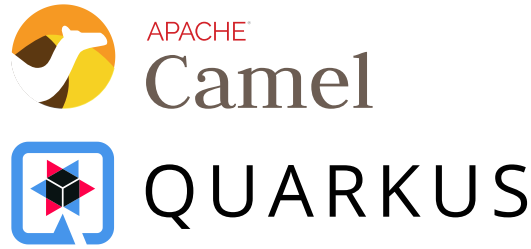

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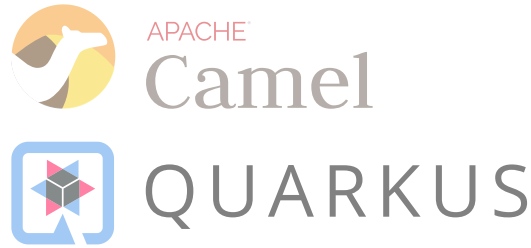

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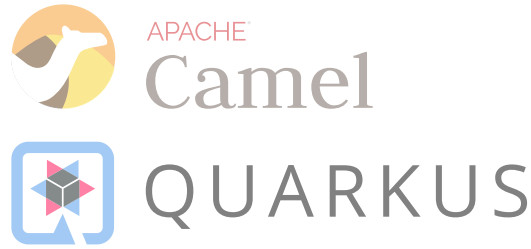


PETER PALAGA

AGENDA

- Apache Camel intro
- Camel on Quarkus
- Camel on Knative/Kubernetes
- Camel on Kafka Connect

WHAT IS APACHE CAMEL?

http://camel.apache.org/

WHAT IS APACHE CAMEL?

http://camel.apache.org/

Since 2007

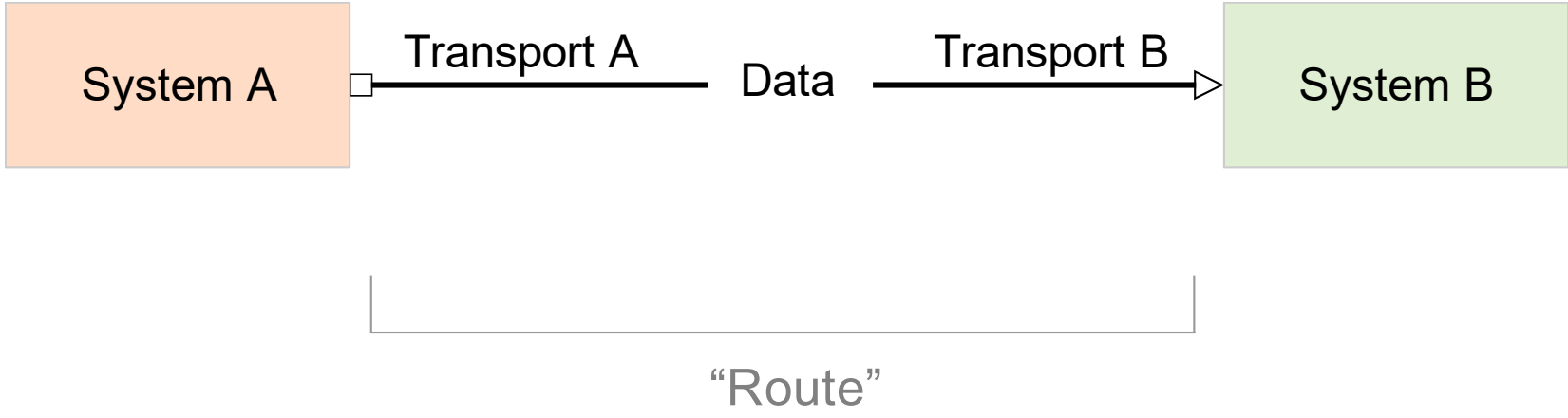
HUGE COMMUNITY

~500 contributors
~3k stars on Github
~3.9k forks on Github
~1k subscribers on the Users mailing list
~9.3k questions on StackOverFlow

Follow @ApacheCamel (new) on Twitter!

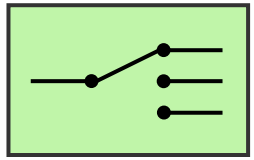
Apache Camel is...

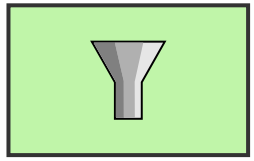
AN INTEGRATION LIBRARY

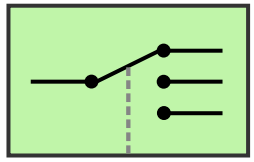


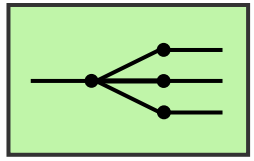
Apache Camel is based on

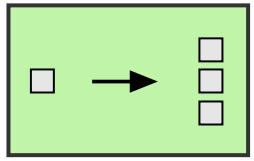
ENTERPRISE INTEGRATION PATTERNS (EIP)

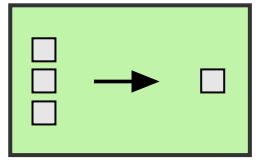

Content Based Router

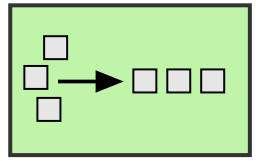

Message Filter

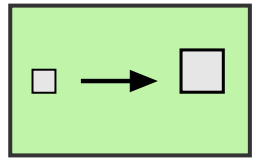

Dynamic Router

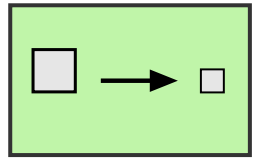

Recipient List

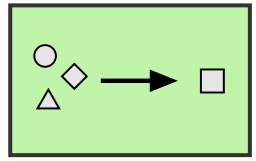

Splitter


Aggergator


Resequencer


Content Enricher


Content Filter


Normalizer

https://www.enterpriseintegrationpatterns.com/

Apache Camel can...

INTEGRATE ANYTHING

through its

~300 COMPONENTS

Filetypes:

- Plaintext, XML, HTML, CSV, JSON, ZIP, ...
- Apache Tika (MS Office, OpenDocument, ...)

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Protocols:

- AMQP, DNS, FTP, HTTP, IRC, SSH, TCP/UDP, ...
- REST, GRPC, git, ...
- IoT: CoAP, MQTT, PubNub

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Public Clouds:

- AWS: S3, SQS, Kinesis, ...
- Azure: Blob, Queue, ...
- Google: BigQuery, PubSub

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Enterprise:

- Caches: Hazelcast, Infinispan, Redis, ...
- Cassandra, MongoDB, Kafka
- JDBC, SQL, JPA, CDI, EJB, JMS, JMX, OpenTracing, OptaPlanner, Syslog,

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APIs:

- Social: Facebook, Twitter, LinkedIn
- Box, Dropbox, Google Calendar/Drive/Mail/Docs
- Salesforce, SAP, ServiceNow, FHIR
- GitHub, Jira, Telegram

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APIs:

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- Box, Dropbox, Google Calendar/Drive/Mail/Docs
- Salesforce, SAP, ServiceNow, FHIR
- GitHub, Jira, Telegram

Misc:

- Barcode
- Base64, JsonPath, Freemarker, Groovy, Mustache, Ruby
- Docker, etcd, Kubernetes, OpenShift,

Routes defined via

DOMAIN SPECIFIC LANGUAGES (DSL)

Java

```
class MyCamelRouter extends RouteBuilder {
  @Override
  public void configure() throws Exception {
    from("twitter-search:"
        + "word1,word2")
      .log("Got a tweet: ${body}")
      .to("telegram:bots");
  }
}
```

XML

```
<routes
  xmlns="http://camel.apache.org/schema/sprin
  <route id="my-route">
    <from uri="twitter-search:word1,word2"/>
    <log message="Got a tweet: ${body}"/>
    <to uri="telegram:bots"/>
  </route>
</routes>
```

Groovy, Scala, Kotlin, ...

Apache Camel is...

RUNNABLE ON

Apache Camel is...

RUNNABLE ON

Standalone

Apache Camel is...

RUNNABLE ON

Standalone

Spring Boot

Apache Camel is...

RUNNABLE ON

Standalone

WHY CAMEL ON QUARKUS?

Java slow to boot and memory intensive for containers and serverless

WHAT IS

QUARKUS

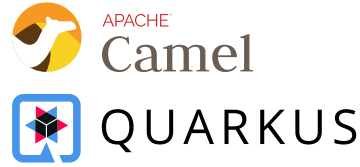
?

QUARKUS

Supersonic, subatomic Java!

An intro

CAMEL QUARKUS



- Incubated inside Quarkus
- Now https://github.com/apache/camel-quarkus
- ~50 components supported as of v1.0.0-M2
- Available via code.quarkus.io

CAMEL QUARKUS DEMO

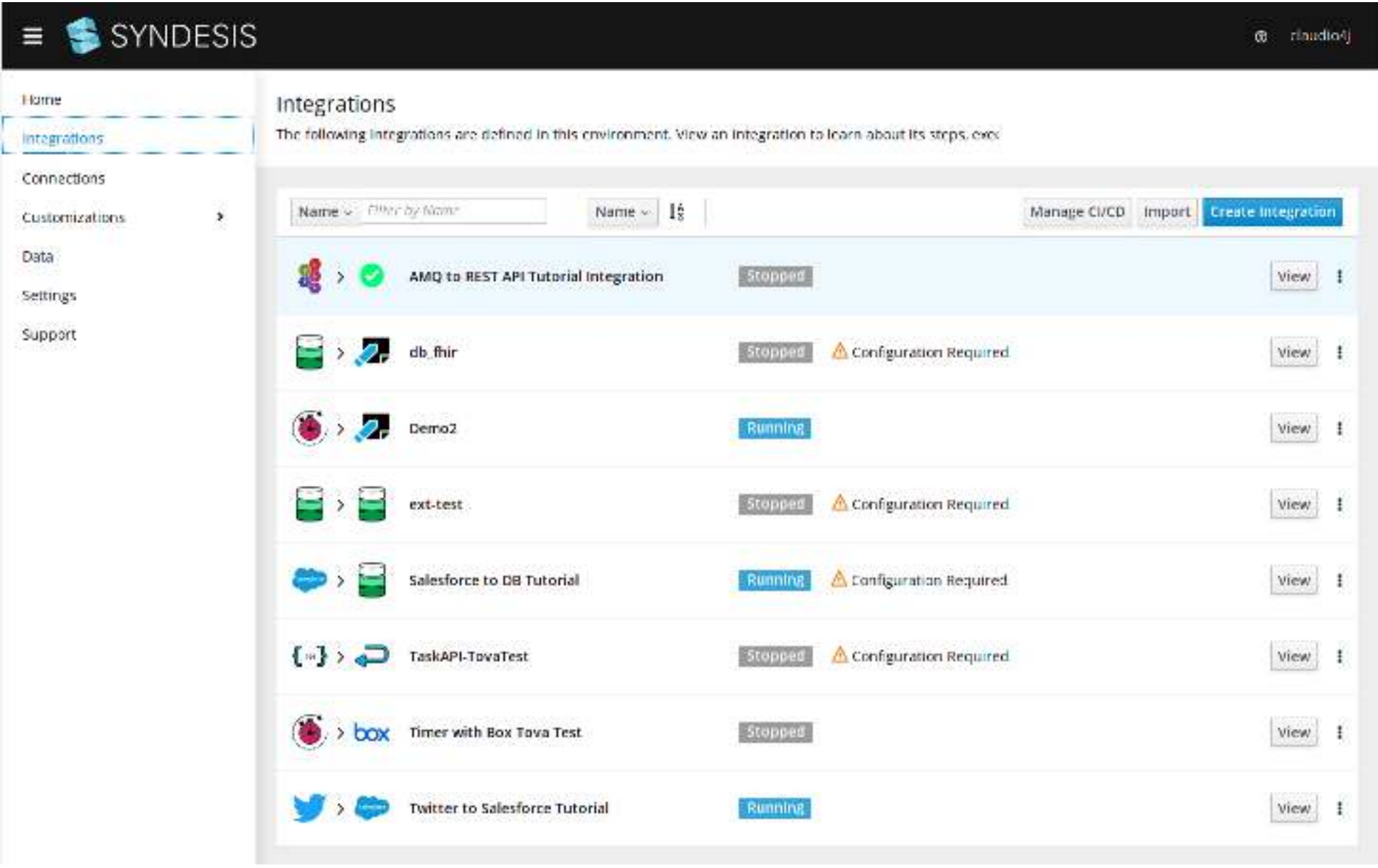
Demo code:
github.com/ppalaga/camel-quarkus-cnorris-demo

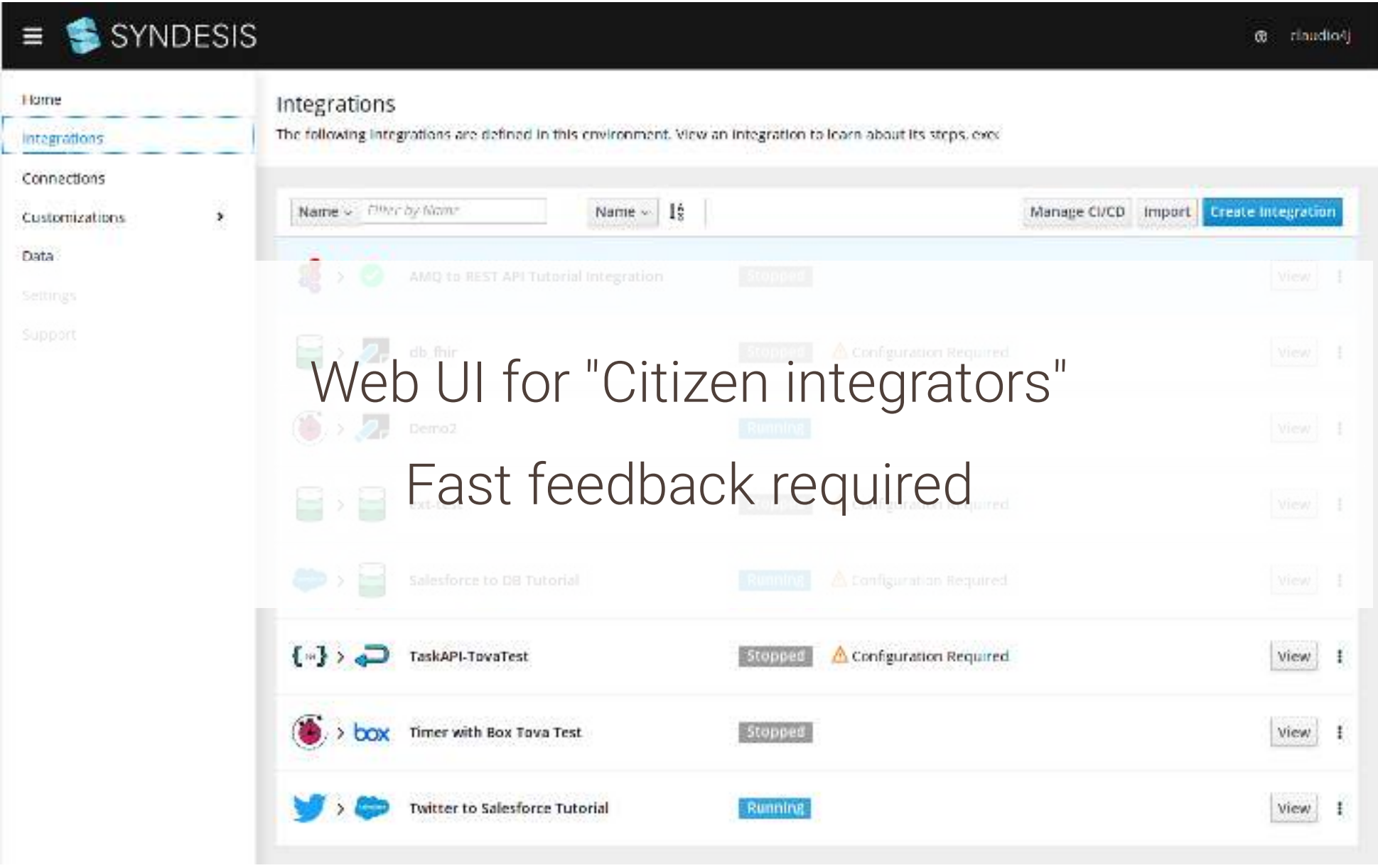
CAMEL QUARKUS LINKS

- Project starter code.quarkus.io
- User guide
- Examples

CAMEL ON KUBERNETES AND KNATIVE

HOW FAST CAN YOU (RE-)DEPLOY ON KUBERNETES?


SYNDESIS
Home
Integrations
Connections
Customizations
Data
Settings
Support
Integrations
The following integrations are defined in this environment. View an integration to learn about its steps, exec
Name
Filter by Name
Name
Manage CI/CD
Import
Create Integration
AMQ to REST API Tutorial Integration
Stopped
View
db_fhir
Stopped
Configuration Required
View
Demo2
Running
View
ext-test
Stopped
Configuration Required
View
Salesforce to DB Tutorial
Running
Configuration Required
View
TaskAPI-TovaTest
Stopped
Configuration Required
View
Timer with Box Tova Test
Stopped
View
Twitter to Salesforce Tutorial
Running
View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Name
Filter by Name
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Manage CI/CD
Import
Create Integration
AMQ to REST API Tutorial Integration
Stopped
View
db_fhir
Stopped
Configuration Required
View
Demo2
Running
View
Salesforce to DB Tutorial
Running
Configuration Required
View
TaskAPI-TovaTest
Stopped
Configuration Required
View
Timer with Box Tova Test
Stopped
View
Twitter to Salesforce Tutorial
Running
View
Web UI for "Citizen integrators"
Fast feedback required

CAMEL K DEMO

CAMEL K INTERNALS

- `kamel` client side binary
  - github.com/apache/camel-k/releases
- Camel K Operator

WHAT IS KUBERNETES OPERATOR?

- An Application Management concept
- Does what a human operator would have to do
  - Based on declarative input

WHAT IS KUBERNETES OPERATOR?

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- Does what a human operator would have to do
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- A pattern

WHAT IS KUBERNETES OPERATOR?

- An Application Management concept
- Does what a human operator would have to do
  - Based on declarative input

- A pattern
- (Ex-)CoreOS Operator Framework

A Kubernetes Operator

HOW IT WORKS

A Kubernetes Operator

HOW IT WORKS

A running container

A Kubernetes Operator

HOW IT WORKS

A running container

- Monitors the cluster via Kubernetes API

A Kubernetes Operator

HOW IT WORKS

A running container

- Monitors the cluster via Kubernetes API
- Reacts:
  - Add/remove/modify resources (pods/services/custom CRDs)
  - Scale up/down
  - Call endpoints of the running applications

A Kubernetes Operator

HOW IT WORKS

A running container

- Monitors the cluster via Kubernetes API
- Reacts:
  - Add/remove/modify resources (pods/services/custom CRDs)
  - Scale up/down
  - Call endpoints of the running applications
- Implements **custom logic**

Kubernetes

CUSTOM RESOURCE DEFINITIONS (CRD)

Built-in resources

- pods, services, ...
- `oc create`, `oc get`, `oc delete`

CRDs

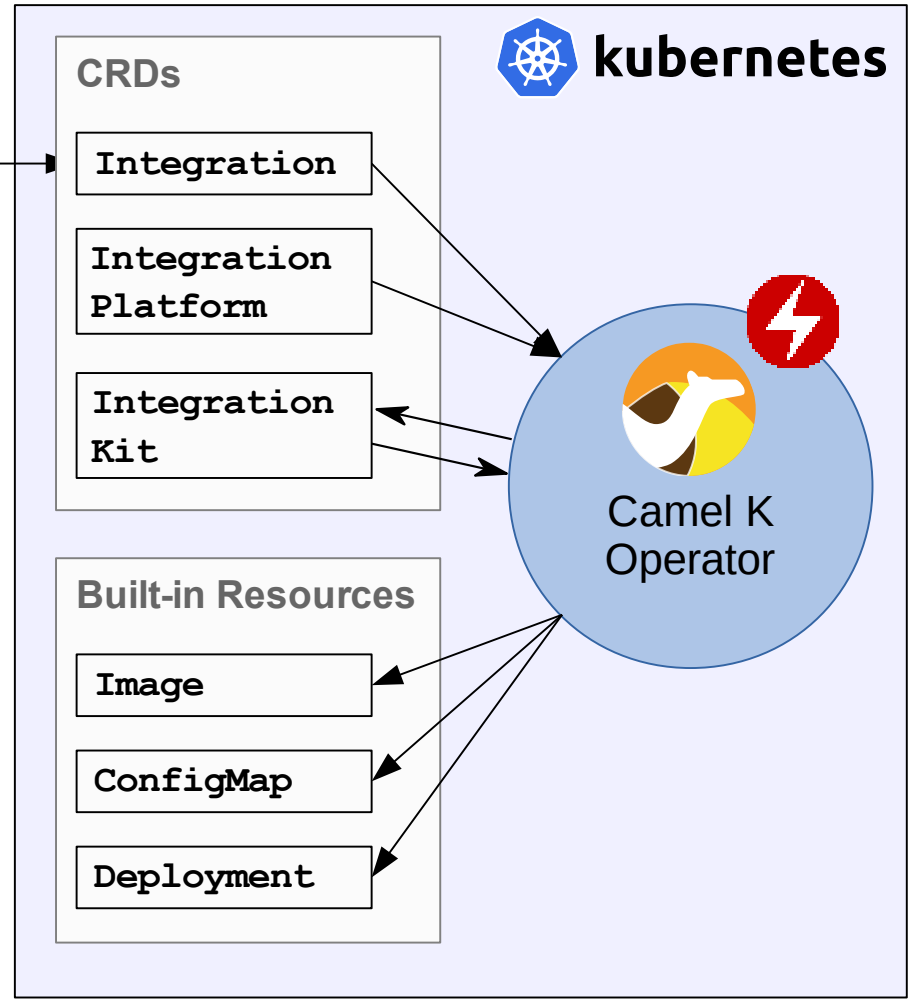
- Extend the cluster model
- `oc create`, `oc get`, `oc delete`
- Declarative input for operators

CAMEL K OPERATOR

routes.groovy

```
from("twitter-search:"
 + "word1,word2")
 .log('Got a tweet: ${body}')
 .to("telegram:bots");
```

kamel



~4 seconds for the simplest routes

Apache Camel K

IMAGE RESOLUTION (1/2)

Collect Maven dependencies based on

- DSL used (Groovy, XML, Java, Kotlin, JavaScript, YAML)
- Camel components used in the routes

Camel K

IMAGE RESOLUTION (2/2)

- Based on the found dependency set
  - Either take an available Image (buildless deploy)
  - Or build a new image

Camel K

IMAGE RESOLUTION (2/2)

- Based on the found dependency set
  - Either take an available Image (buildless deploy)
  - Or build a new image

- Route definition not a part of the image
  - Mounted to the container as a ConfigMap

CAMEL ON KNATIVE

WHAT IS KNATIVE?

https://knative.dev

WHAT IS KNATIVE?

- Building blocks for Serverless applications

https://knative.dev

WHAT IS KNATIVE?

- Building blocks for Serverless applications
- CRDs and operators

https://knative.dev

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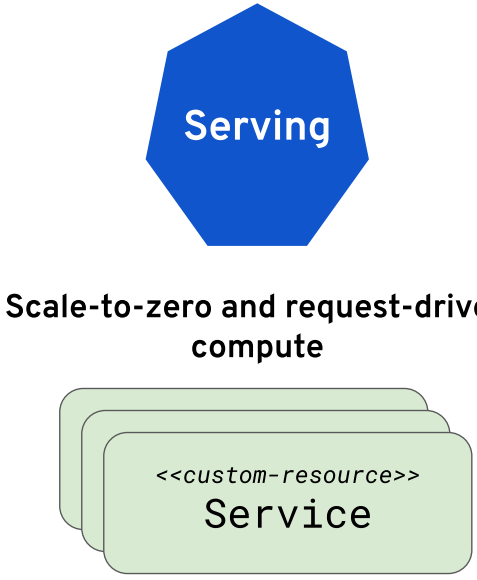


https://knative.dev

WHAT IS KNATIVE?

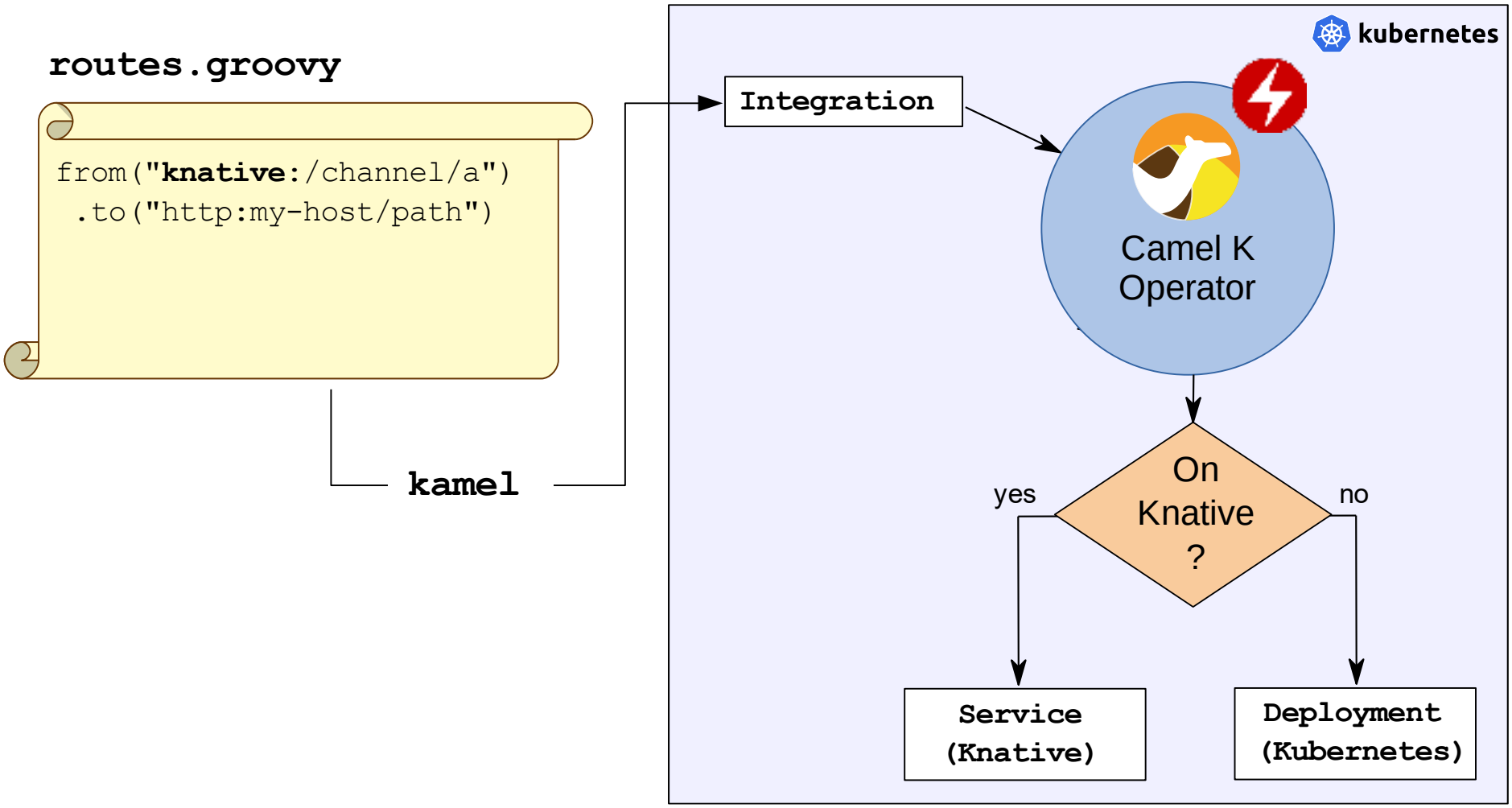
- Building blocks for Serverless applications
- CRDs and operators

Scale-to-zero and request-driven compute

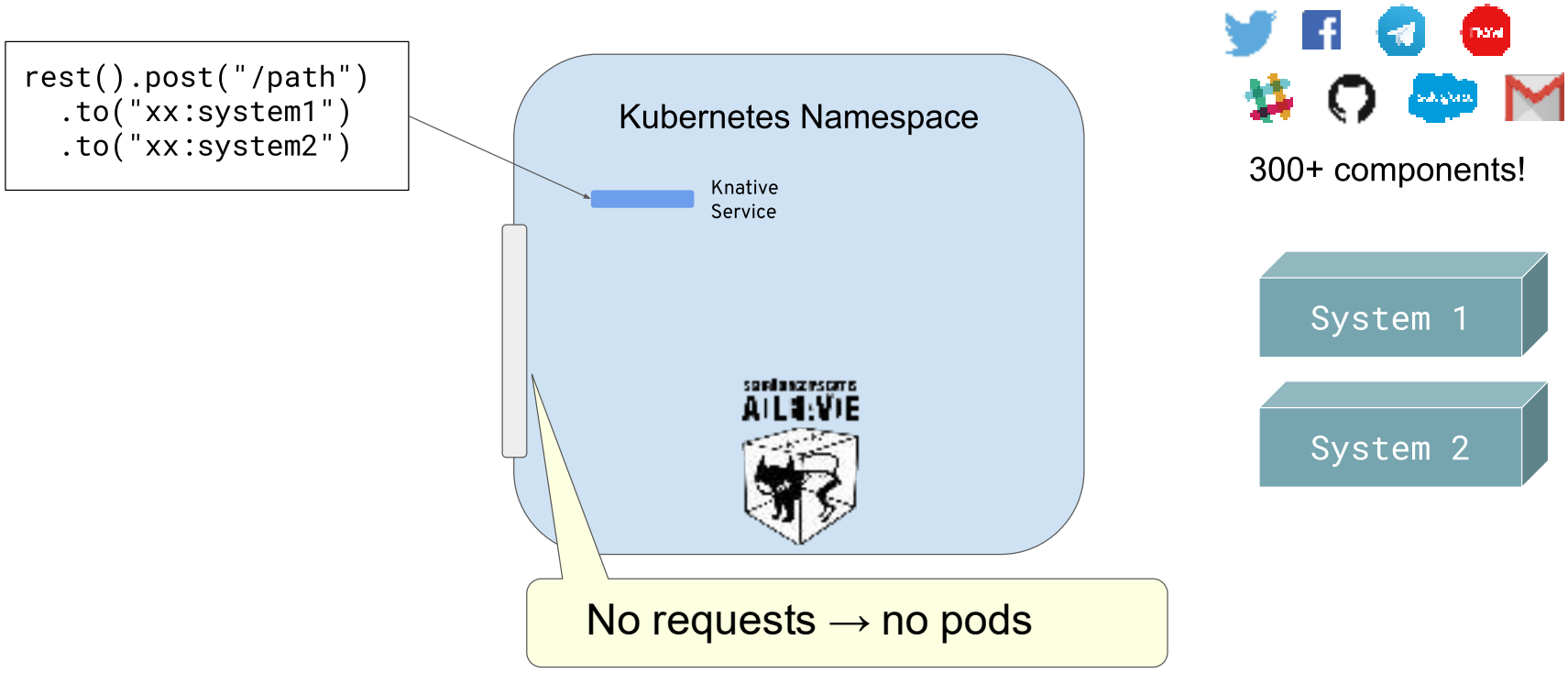
Event binding and delivery for messaging style integration

https://knative.dev

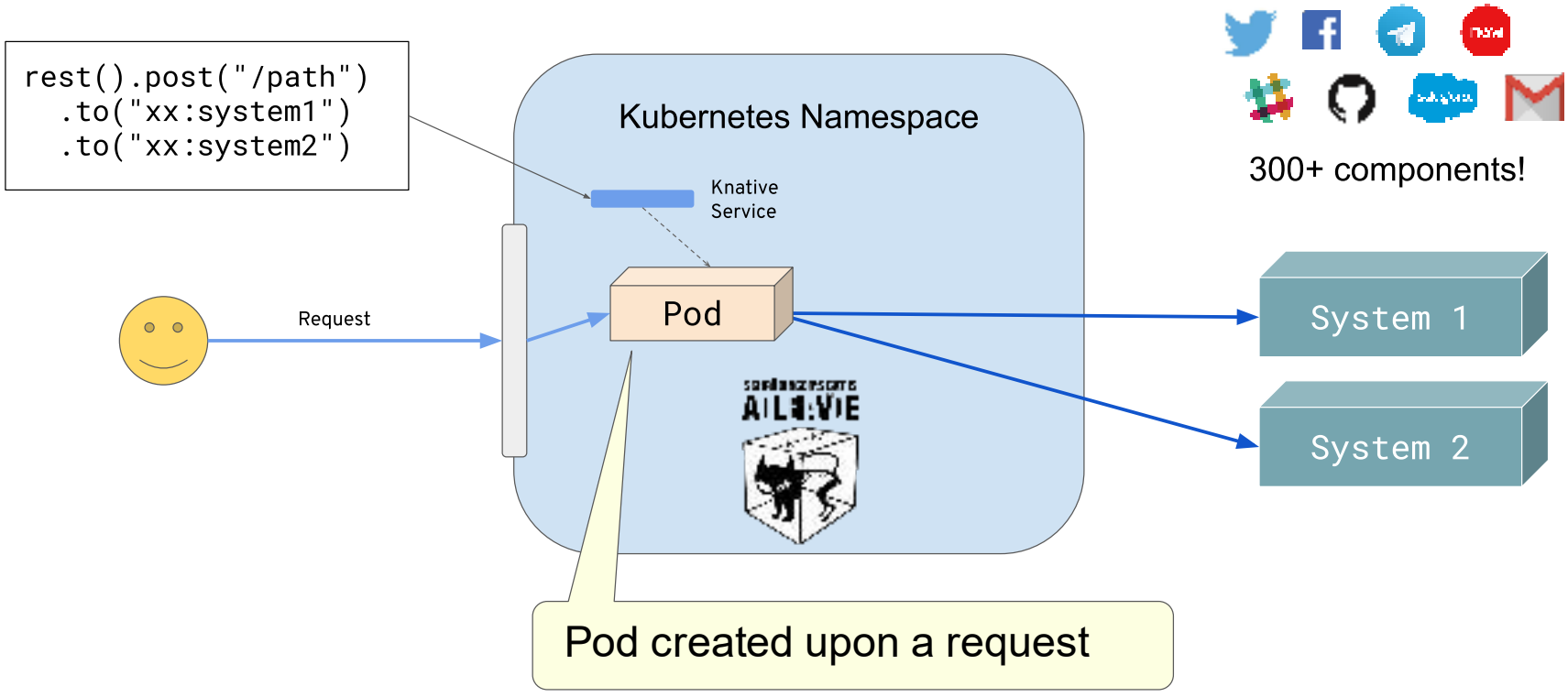
KNATIVE SERVING (1/2)



KNATIVE SERVING (2/2)



KNATIVE SERVING (2/2)



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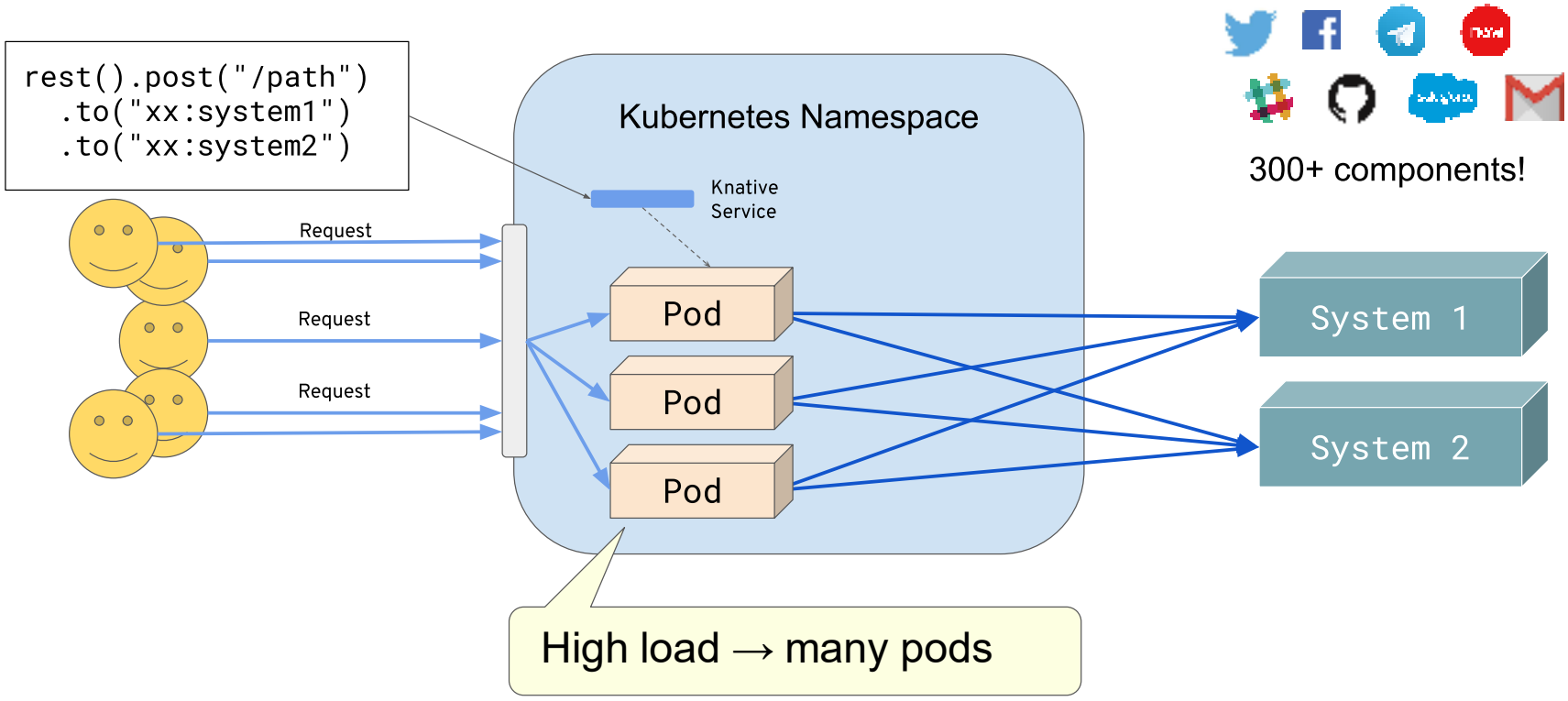
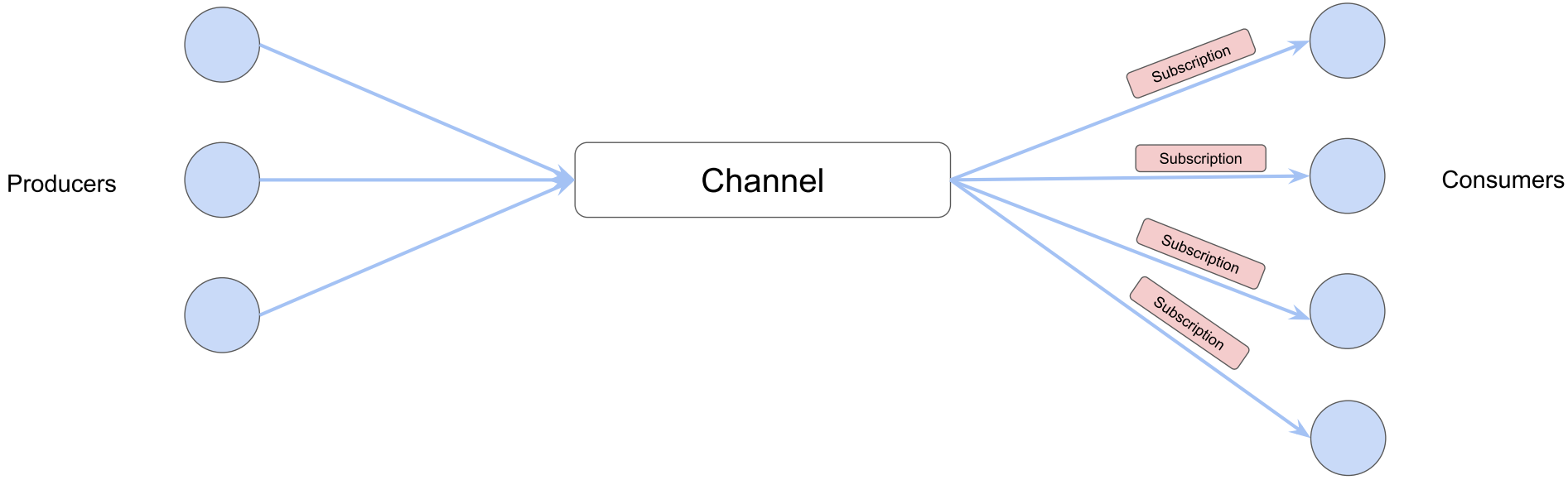


KNATIVE EVENTING

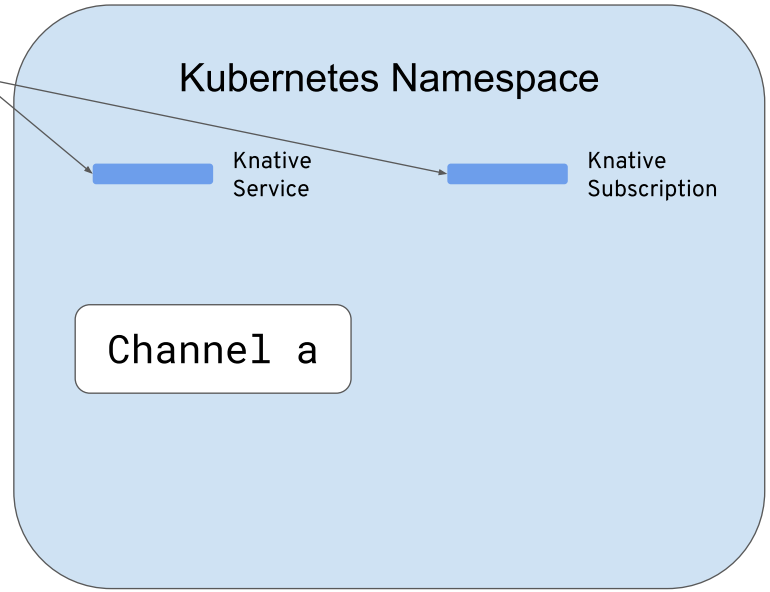


https://cloudevents.io

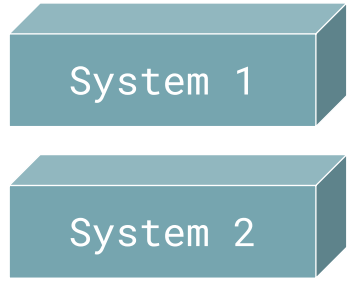
Camel as

KNATIVE EVENT CONSUMER

```
from("knative:channel/a")
  .to("xx:system1")
  .to("xx:system2")
```



300+ components!



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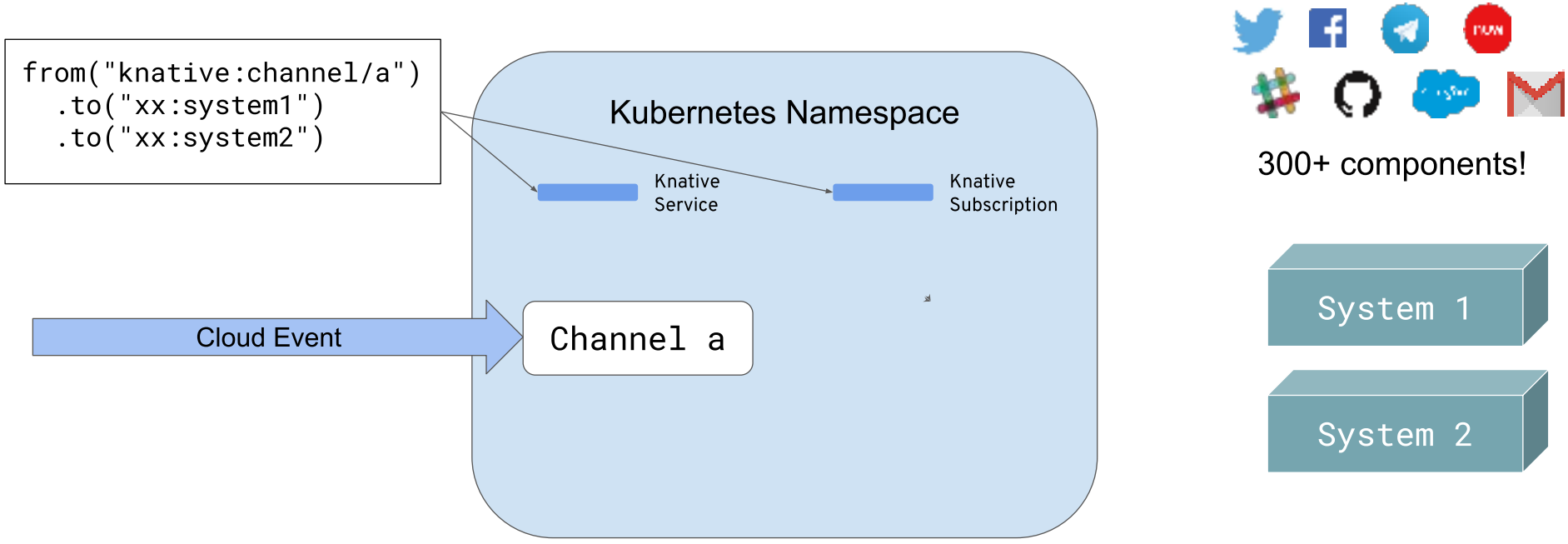

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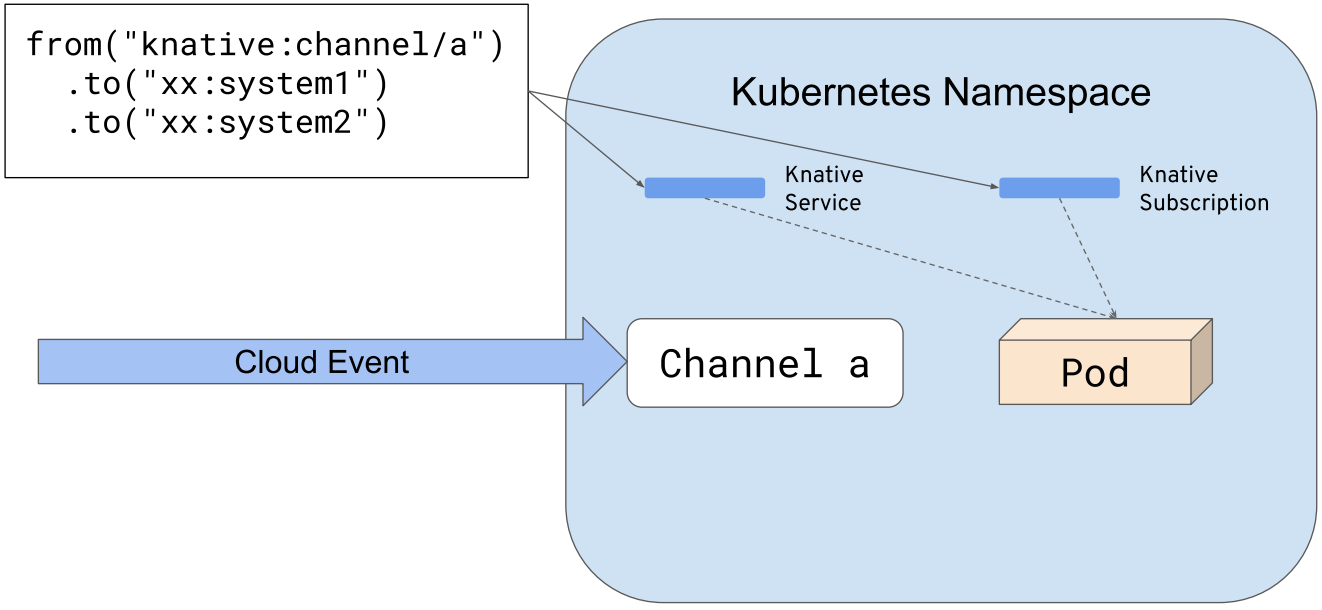

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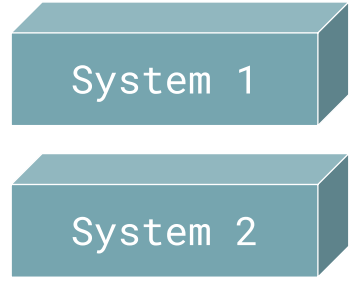

Camel as

KNATIVE EVENT CONSUMER

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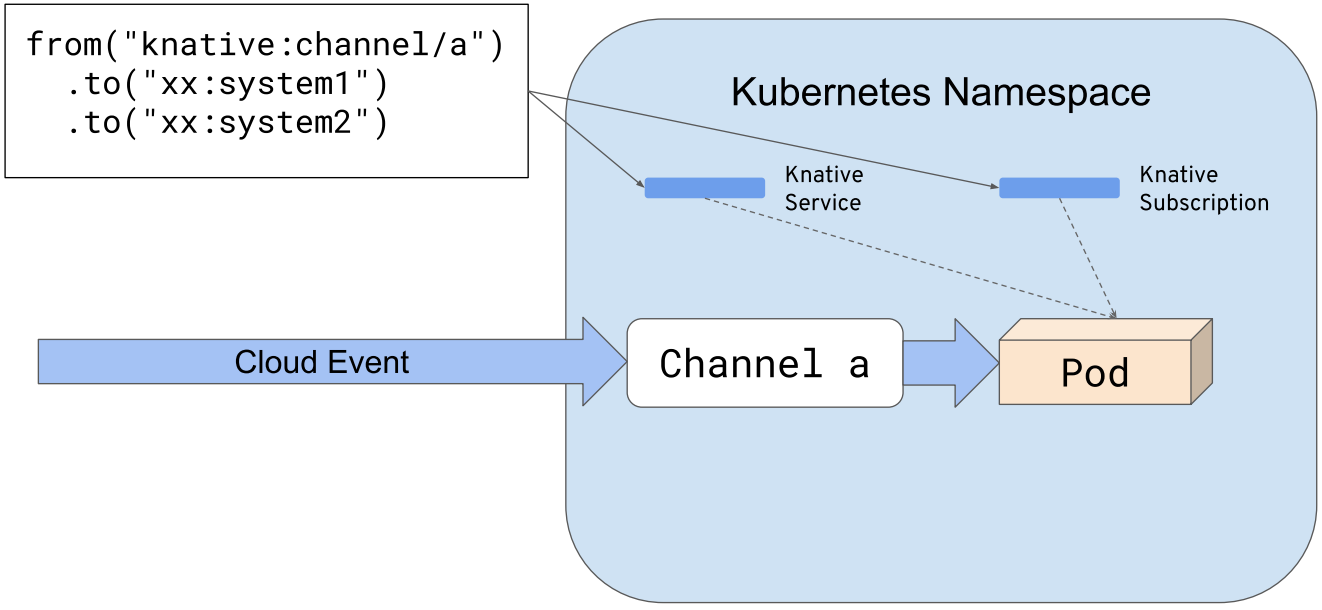

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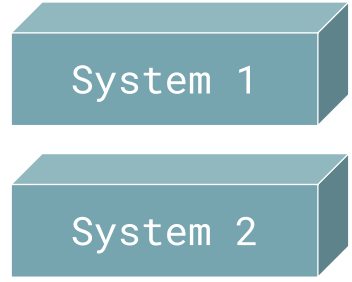

Camel as

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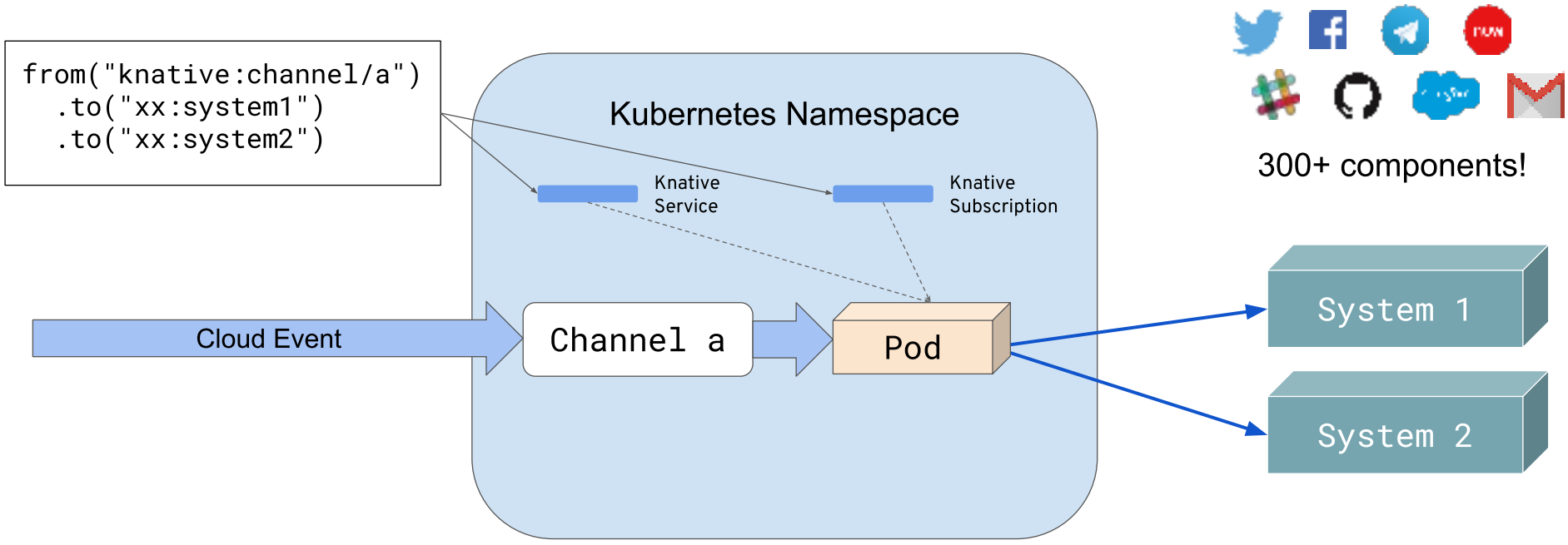
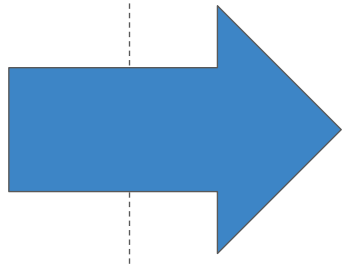


Camel as

KNATIVE EVENT SOURCE

```
from("timer:tick?period={{period}}")
  .to("xx:my-system")
  .unmarshal().json()
  .transform("custom")
  .to("knative:endpoint/sink")
```



Knative Event Source

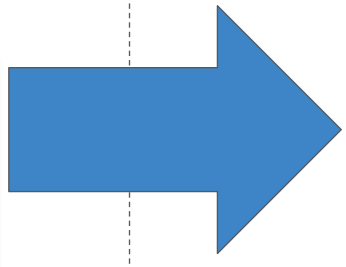
```
kamel run routes.groovy
```

Camel as

KNATIVE EVENT SOURCE

New: a pure `kubectl` / `oc` variant

```
apiVersion: sources.eventing.knative.dev/v1alpha1
kind: CamelSource
metadata:
  name: bot-source
spec:
  source:
    flow:
      from:
        uri: telegram:bots
        parameters:
          authorizationToken: xxx
  sink:
    apiVersion: messaging.knative.dev/v1alpha1
    kind: InMemoryChannel
    name: mychannel
```

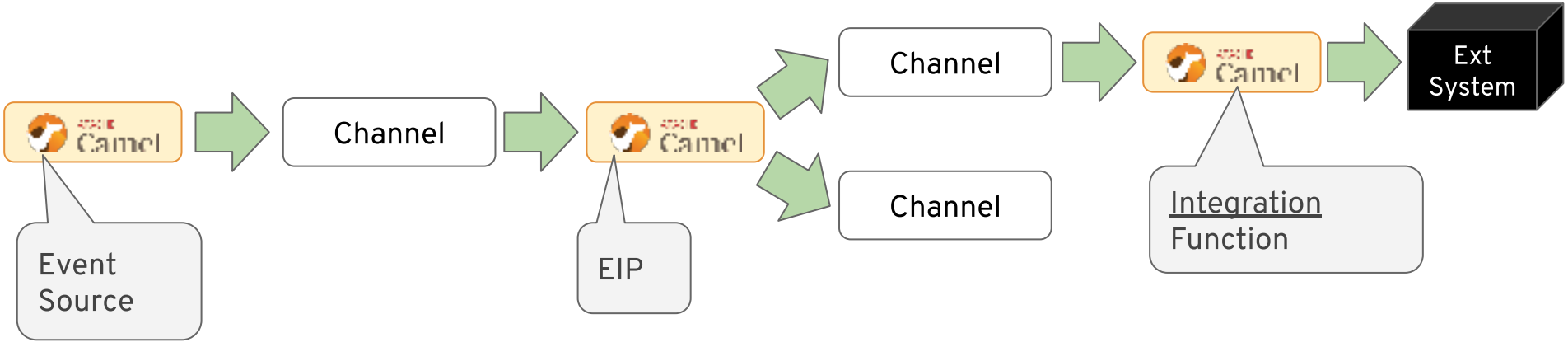


Knative Event Source

Camel

ROLES IN KNATIVE EVENTING

300+ components!



CAMEL KAFKA CONNECTOR

WHAT IS

APACHE KAFKA?

- A stream-processing platform
- Distributed, scalable, fault-tolerant, fast

Apache Kafka offers

SEVERAL APIs

Apache Kafka offers

SEVERAL APIs

- **Producer API** - publish records to topics

Apache Kafka offers

SEVERAL APIs

- **Producer API** - publish records to topics
- **Consumer API** - subscribe to topics to consume records

Apache Kafka offers

SEVERAL APIs

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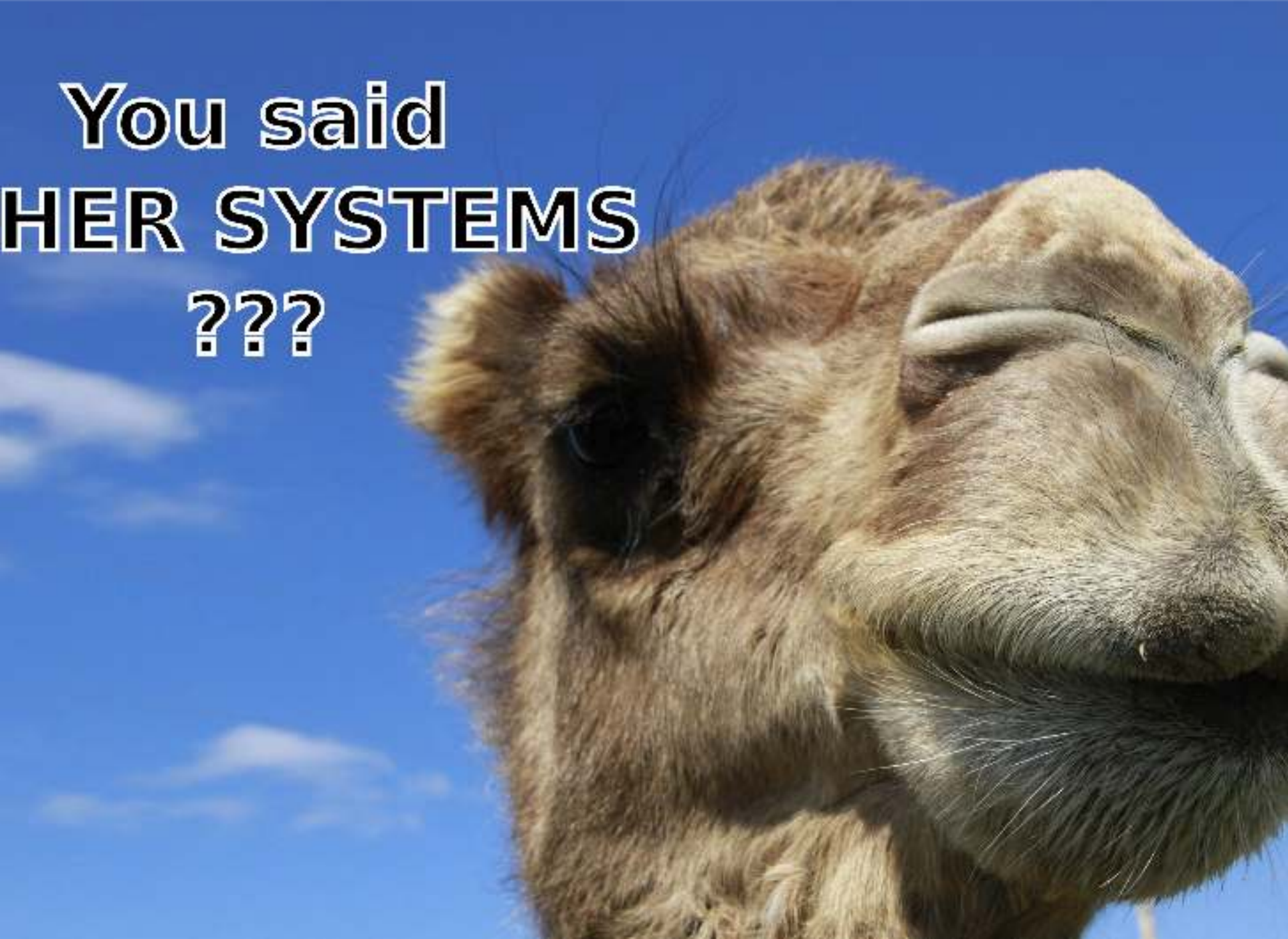
- **Streams API** - act as a stream processor/transformer

Apache Kafka offers

SEVERAL APIs

- **Producer API** - publish records to topics
- **Consumer API** - subscribe to topics to consume records
- **Streams API** - act as a stream processor/transformer
- **Connector API** - for streaming data between Apache Kafka and other systems


You said
HER SYSTEMS
???

Apache Kafka

CONNECTOR API

a.k.a. Kafka Connect

Apache Kafka

CONNECTOR API

a.k.a. Kafka Connect

- A framework to write Connectors

Apache Kafka

CONNECTOR API

a.k.a. Kafka Connect

- A framework to write Connectors
- A runtime to run them

CAMEL KAFKA CONNECTOR

CAMEL KAFKA CONNECTOR

- Sink

CAMEL KAFKA CONNECTOR

- Sink
- Source

CAMEL KAFKA CONNECTOR

- Sink
- Source

to exchange data with 300+ Camel components

CAMEL KAFKA CONNECTOR

- Sink
- Source

to exchange data with 300+ Camel components

with minimal config

CAMEL KAFKA CONNECTOR

DEMO

WRAP UP

WRAP UP

- Apache Camel - an integration lib with 300+ connectors

WRAP UP

- Apache Camel - an integration lib with 300+ connectors
- Supersonic subatomic on Quarkus

WRAP UP

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- Producer/Consumer/Router, scale to zero on Knative

WRAP UP

- Apache Camel - an integration lib with 300+ connectors
- Supersonic subatomic on Quarkus
- Producer/Consumer/Router, scale to zero on Knative
- Streaming data from/to Kafka using Camel Kafka Connect

APACHE®
Camel

- https://camel.apache.org
- Chat: https://gitter.im/apache/camel
- Mailing list: dev@camel.apache.org
- Follow @ApacheCamel

Feedback and contributions are welcome!