Kogito

Powering Business Automation in the Cloud

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What are cloud-native applications?

“Cloud native technologies empower organizations to build and run scalable applications in modern, dynamic environments such as public, private, and hybrid clouds. Containers, service meshes, microservices, immutable infrastructure, and declarative APIs exemplify this approach.

These techniques enable loosely coupled systems that are resilient, manageable, and observable. Combined with robust automation, they allow engineers to make high-impact changes frequently and predictably with minimal toil.”

Cloud Native Computing Foundation (CNCF)

What are cloud-native applications?

- Small, independent, and loosely coupled services
  - Microservices
- Container based
- Allows rapidly iteration to deliver business value
- Private, public, and hybrid clouds
- Scalable, resource efficient

Cloud Native Applications Architecture

Operators

Serverless

SaaS

KNative

Service Mesh

Cloud Vendor Services

OpenShift / Kubernetes

Kogito

Kogito Cloud Native Building Blocks

- Runtimes
- Add-ons
- Services
- Operator

Kogito Runtimes

Automagically REST!

- Kogito resources
  - BPMN
  - DMN
  - Serverless Workflow
    i. JSON
    ii. YAML

Kogito Runtimes

Quarkus

Spring Boot

Kogito Add-ons

Kogito Runtimes - Add-ons

- Building blocks
  - Choose and pick the ones that are relevant to your service
- Maven dependencies
- Codegen integration
- Runtime specific dependencies:
  - Quarkus
  - SpringBoot

```
<dependency>
    <groupId>org.kie.kogito</groupId>
    <artifactId>kogito-cloudevents-quarkus-addon</artifactId>
</dependency>
```

Management add-on

- Retrieve process nodes
- Abort an active process instance
- Cancel or re-trigger a node instance, or trigger a new node instance
- Retrieve error details for a process instance, or skip or re-trigger a failed node instance

Management add-on

DELETE	/management/processes/{processId}/instances/{processInstanceId}
GET	/management/processes/{processId}/instances/{processInstanceId}/error
GET	/management/processes/{processId}/instances/{processInstanceId}/nodeInstances
POST	/management/processes/{processId}/instances/{processInstanceId}/nodeInstances/{nodeInstanceId}
DELETE	/management/processes/{processId}/instances/{processInstanceId}/nodeInstances/{nodeInstanceId}
POST	/management/processes/{processId}/instances/{processInstanceId}/nodes/{nodeId}
POST	/management/processes/{processId}/instances/{processInstanceId}/retrigger
POST	/management/processes/{processId}/instances/{processInstanceId}/skip
GET	/management/processes/{processId}/nodes

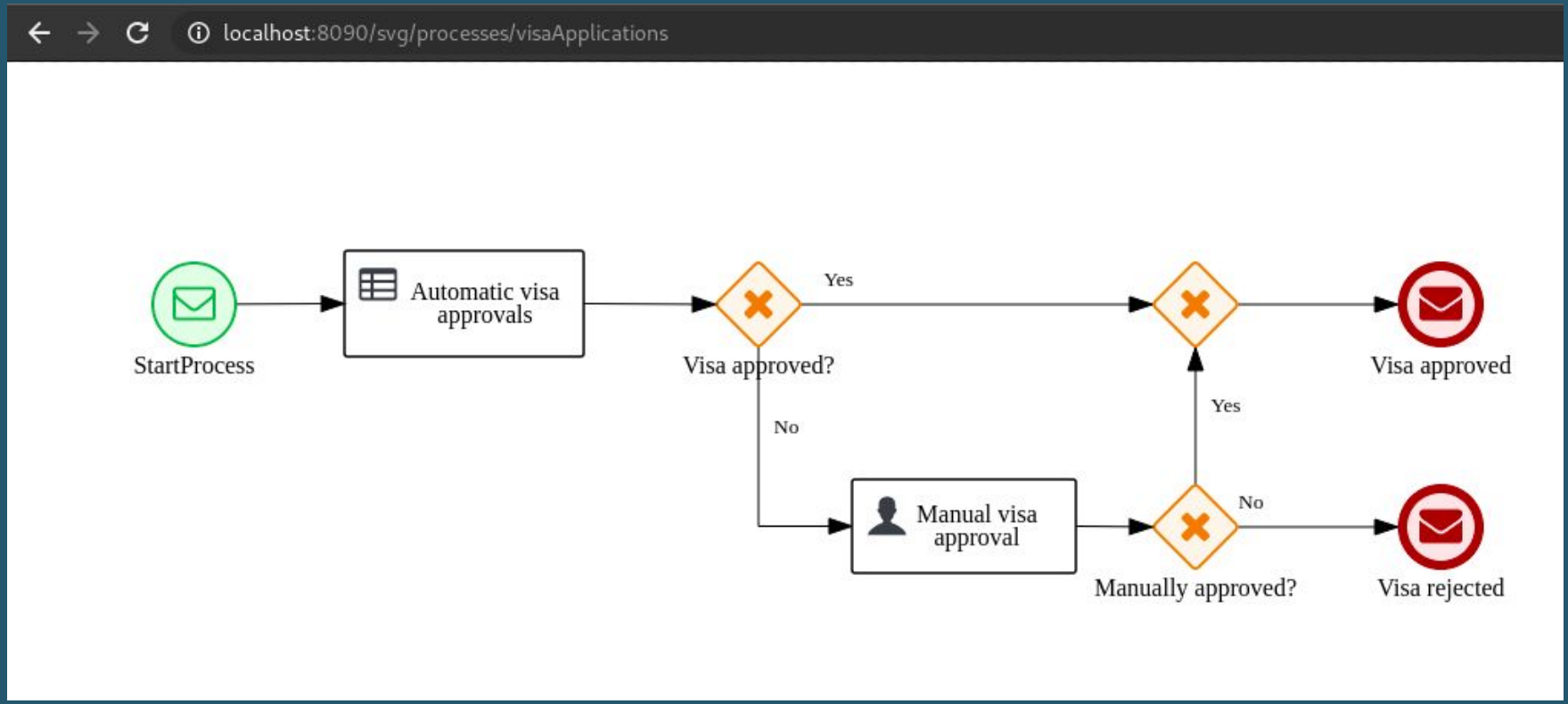
Persistence add-ons

- Infinispan
- MongoDB
- File system

- Disclaimer: Persist your process state while it is running!

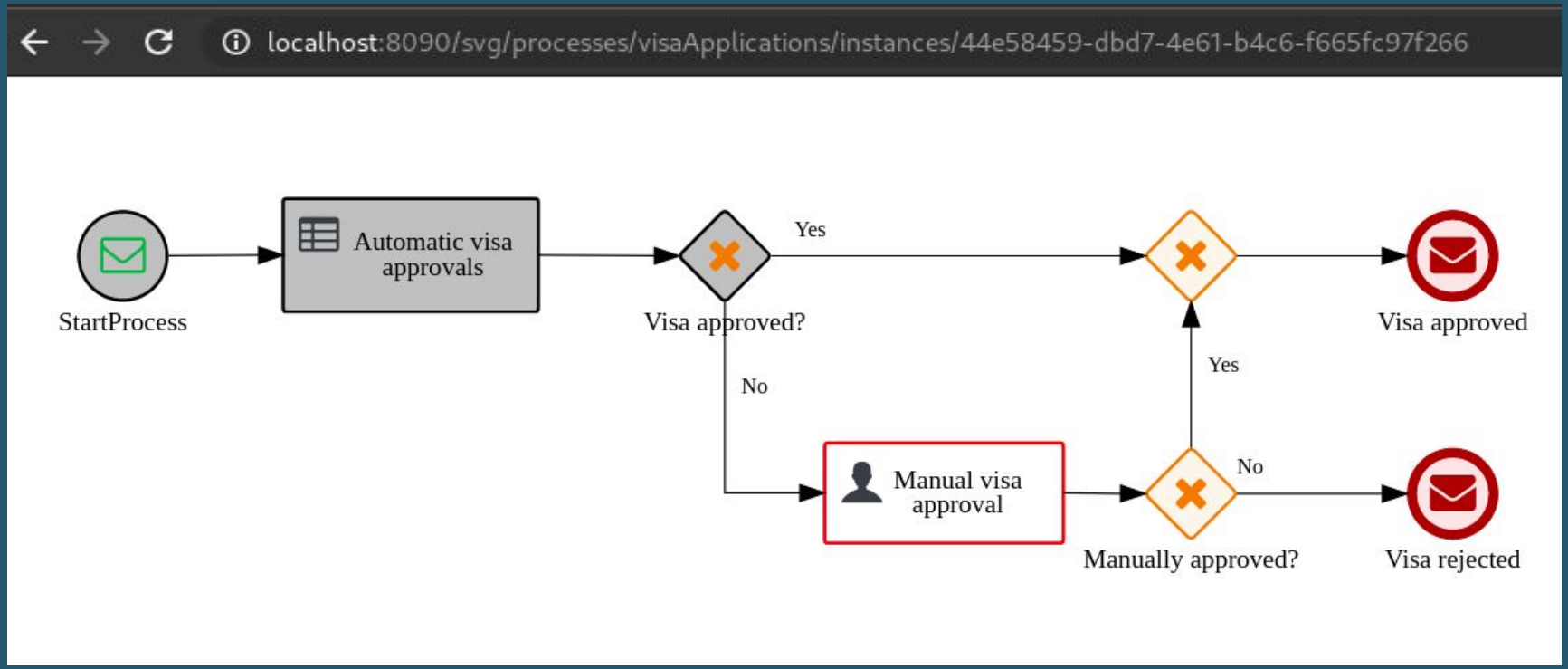
Kogito Runtimes - Process SVG

Process SVG add-on



Kogito

Process SVG add-on



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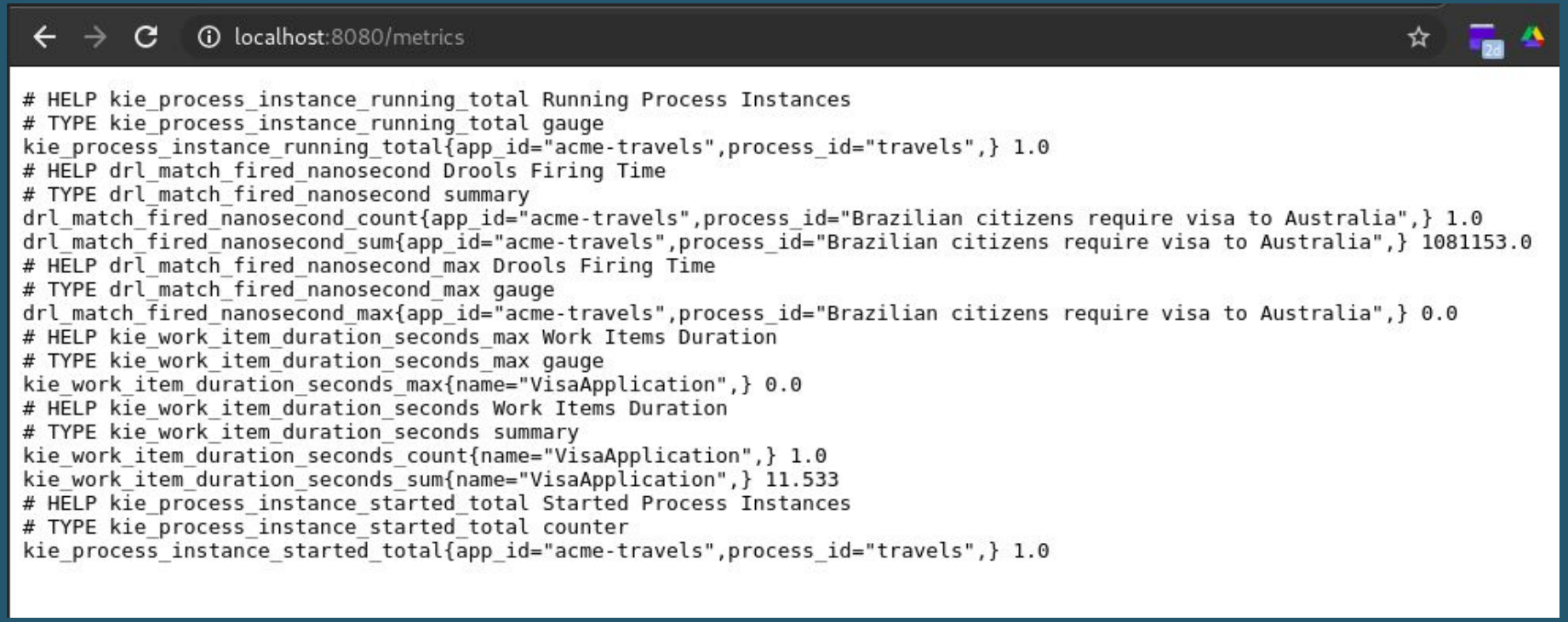
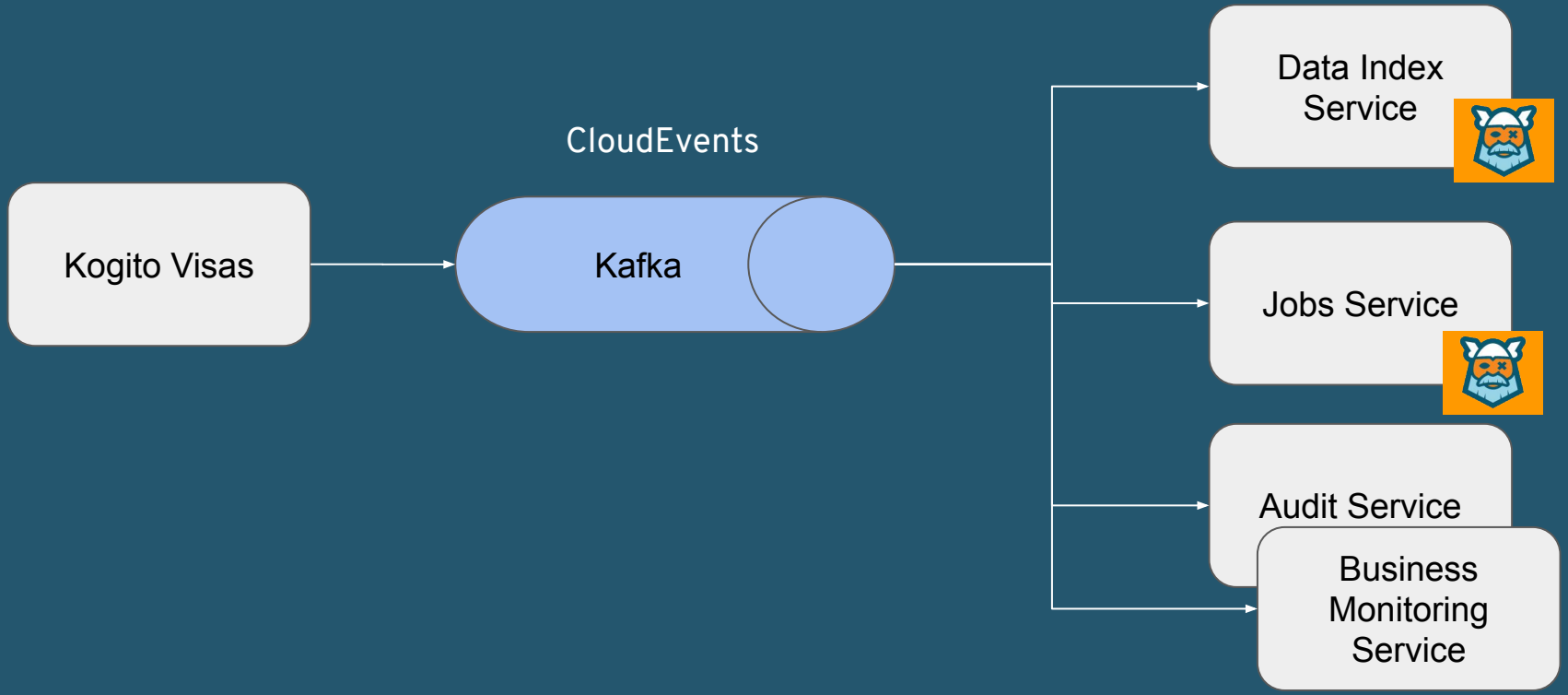
Prometheus Monitoring add-on



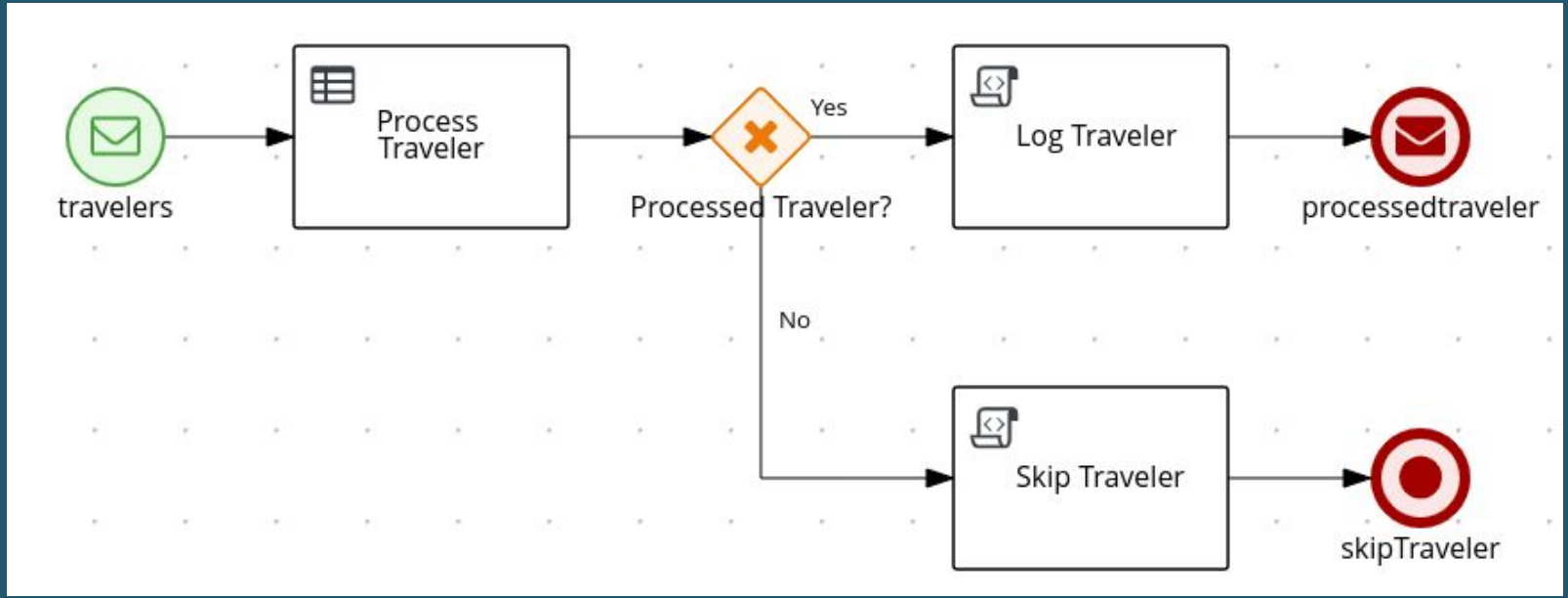
Reactive Messaging add-on



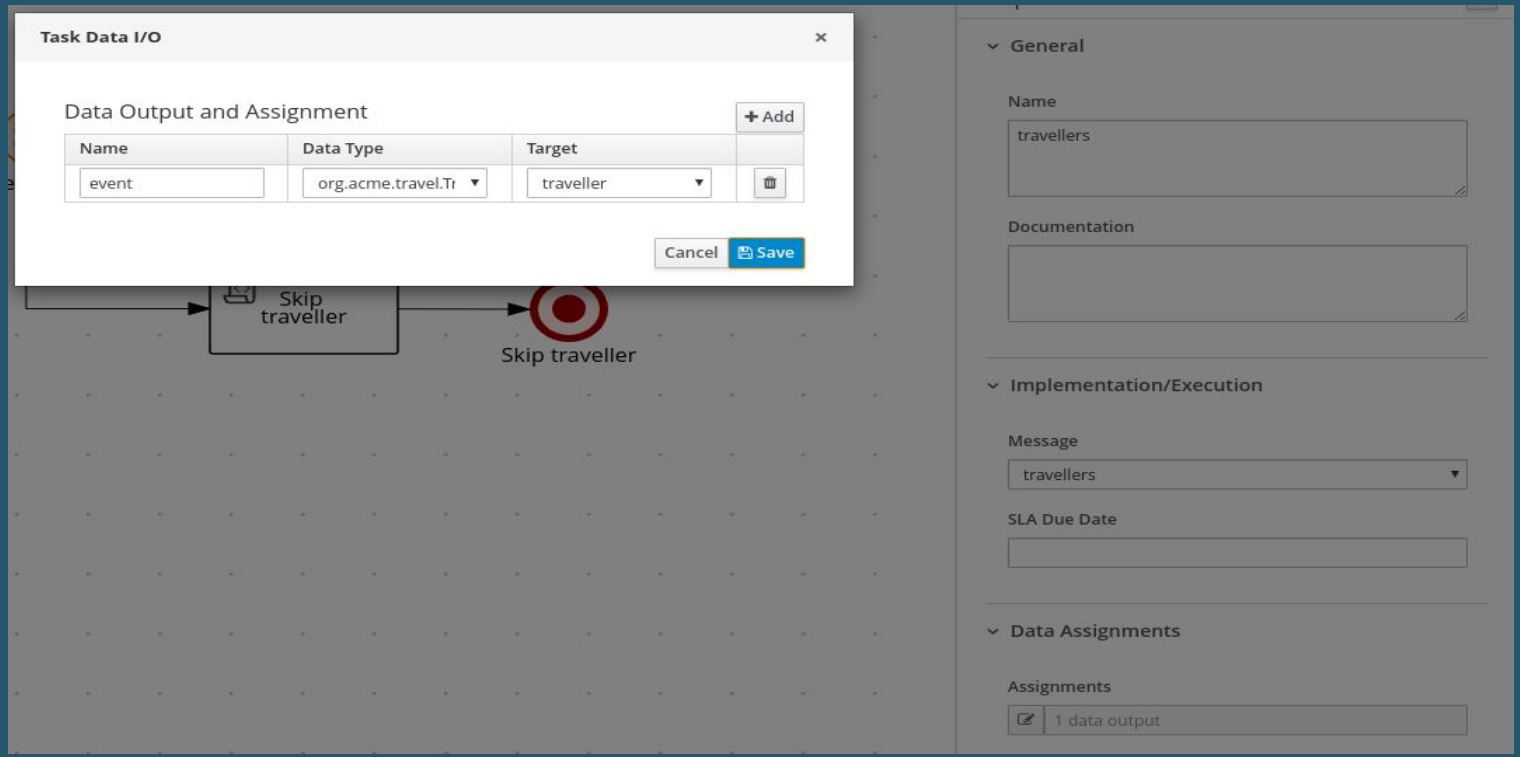
Kogito Runtimes - Reactive Messaging

- Events
  - Process Instance Event
  - User Task Event
  - Process Variables Event

BPMN Messages and Cloud Events



BPMN Messages and Cloud Events



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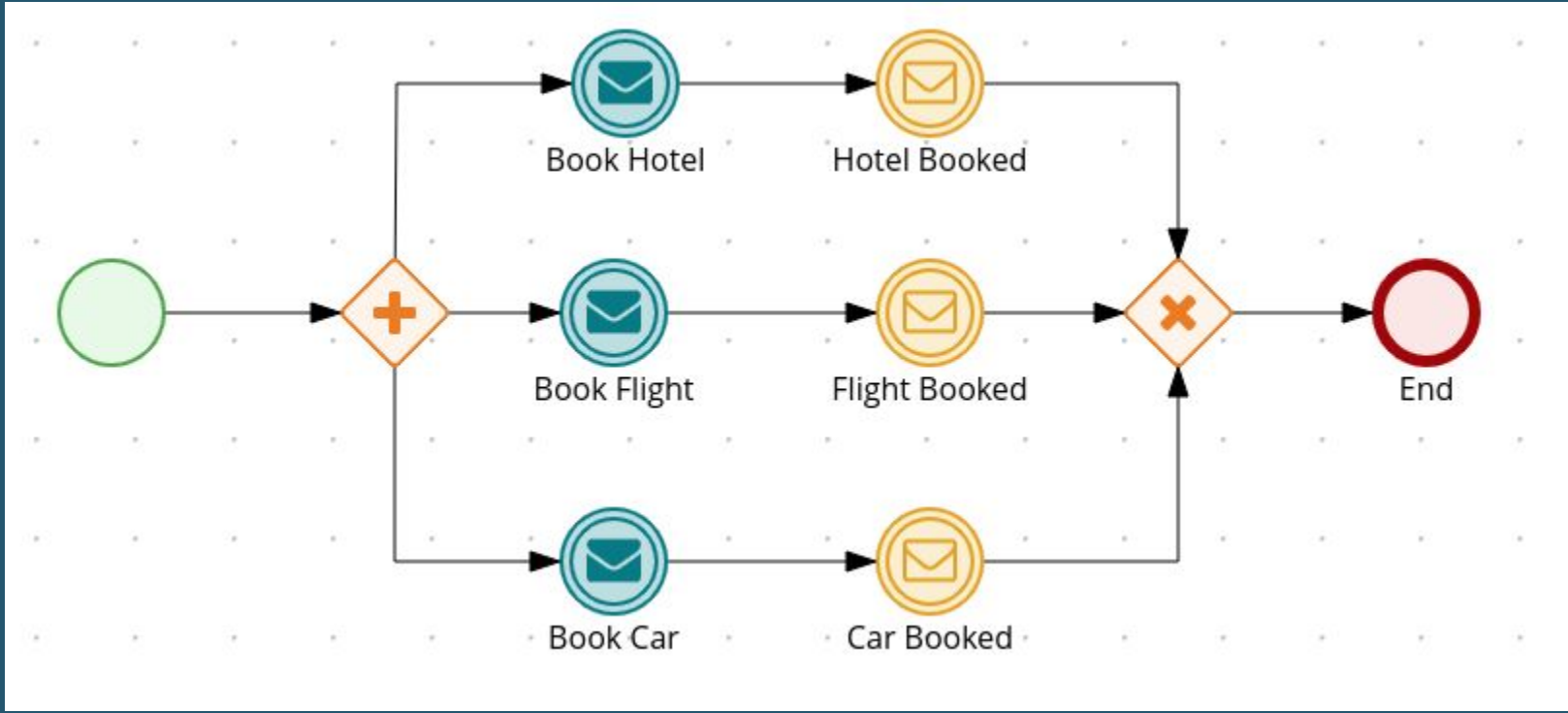
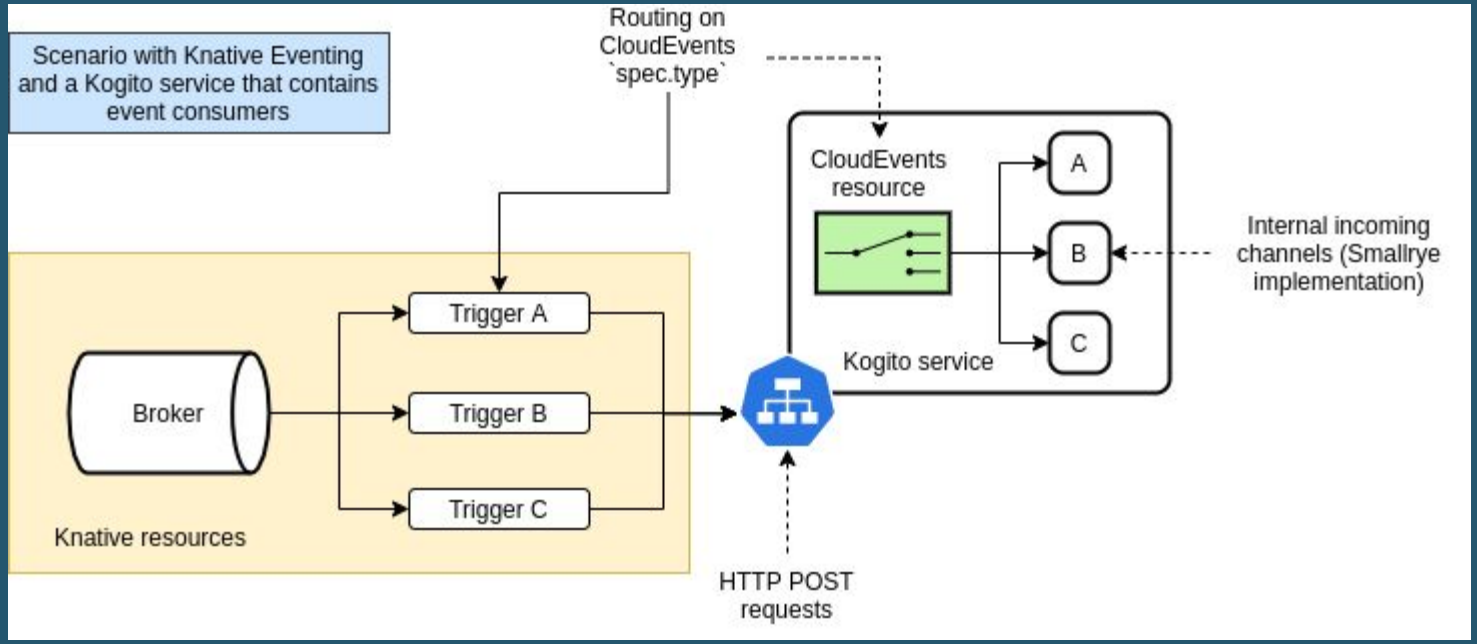
Cloud Events add-on

- Route CloudEvent types to specific BPMN message events in the process
- Codegen glues producer and consumer code to specific node in the process
- Enabler for easily integrating with external systems.
  - Example: Using Kogito to orchestrate multiple services

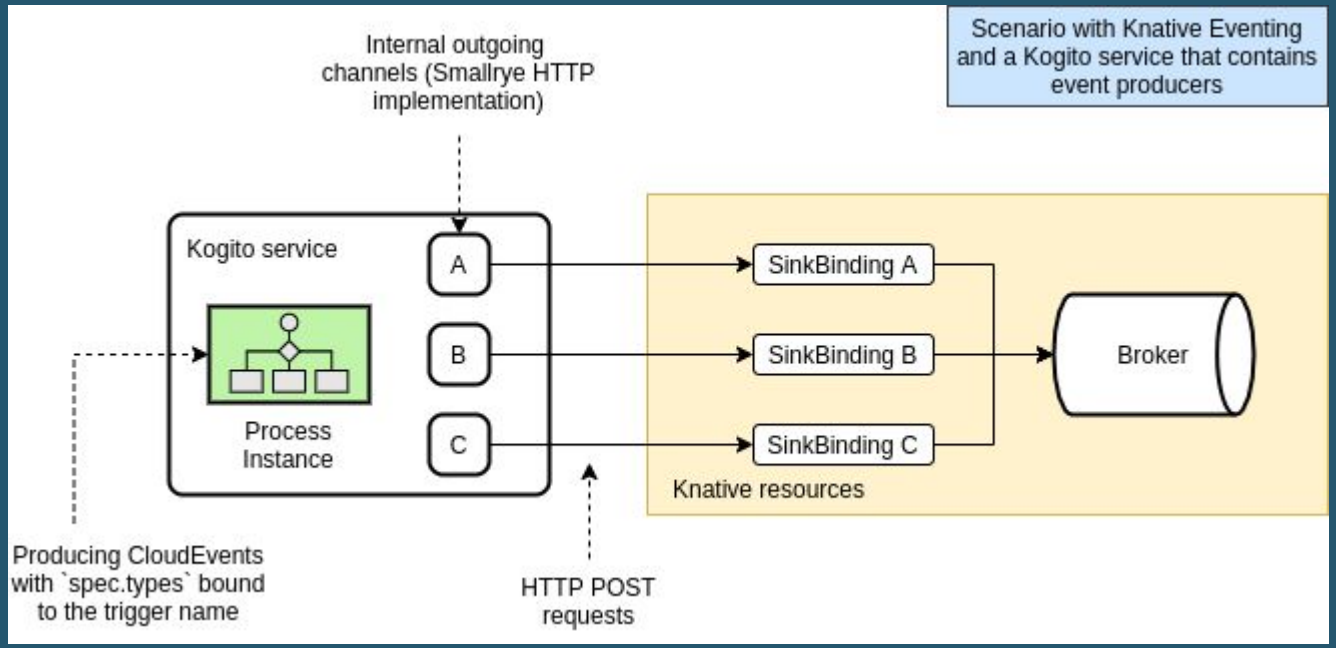
Cloud Events add-on



KNative Eventing add-on

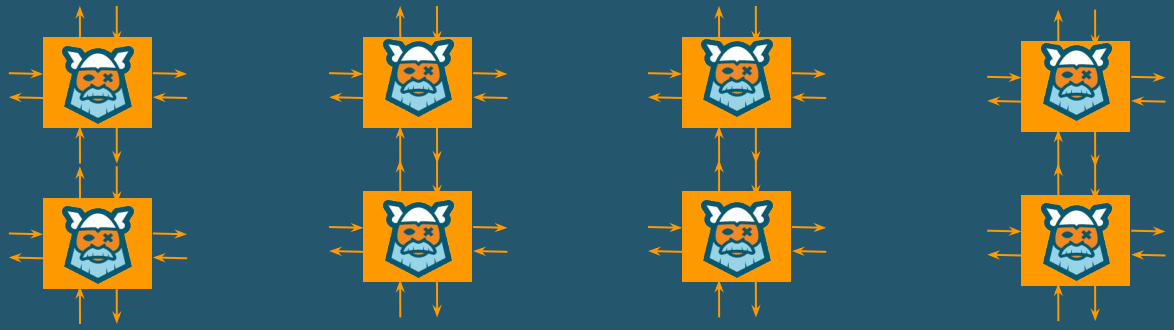


KNative Eventing add-on



Kogito Services

Kogito - Scaling to multiple services



Travels Service

Visa Service

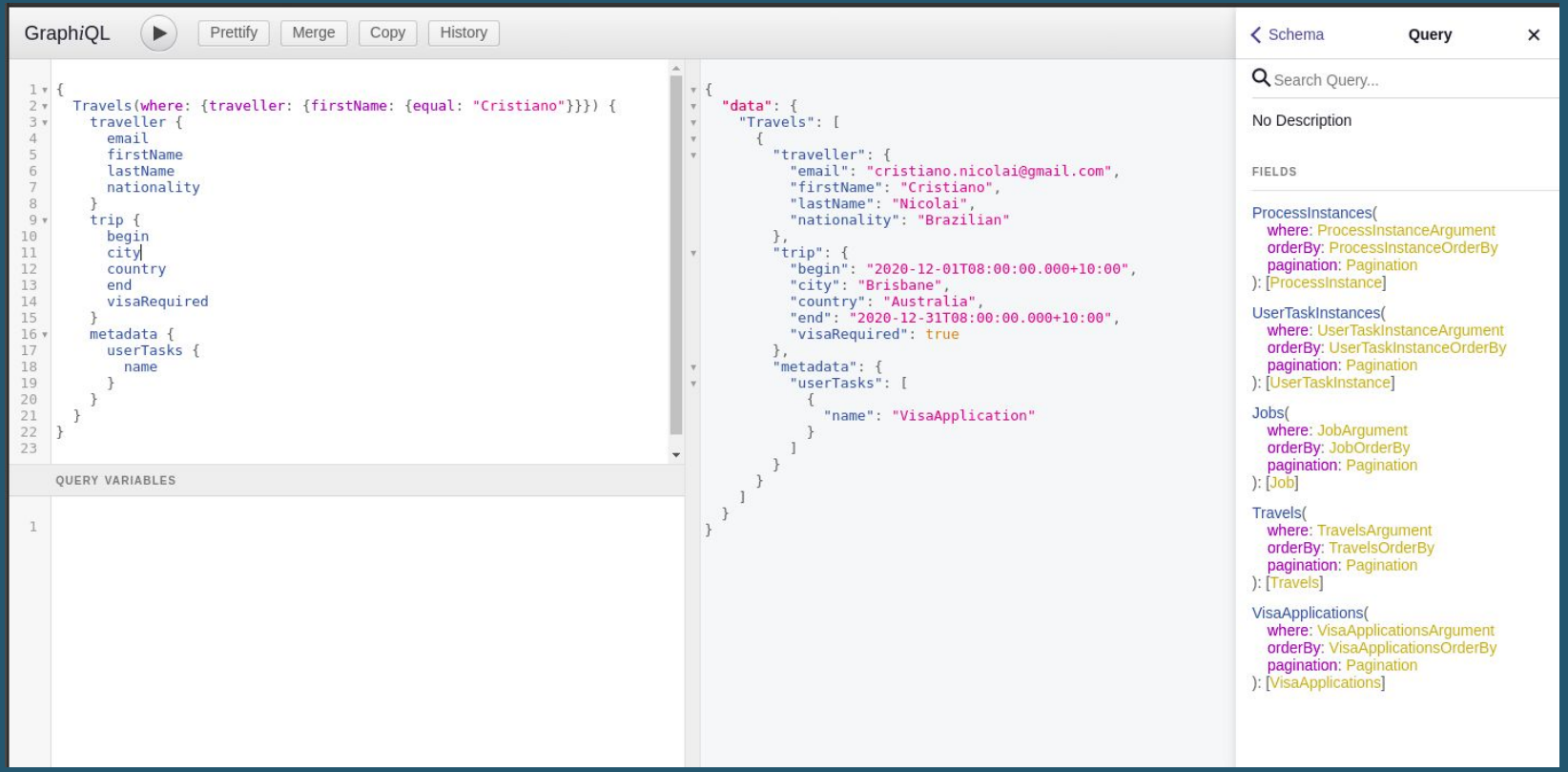
Customer Service

Notification Service

Data Index

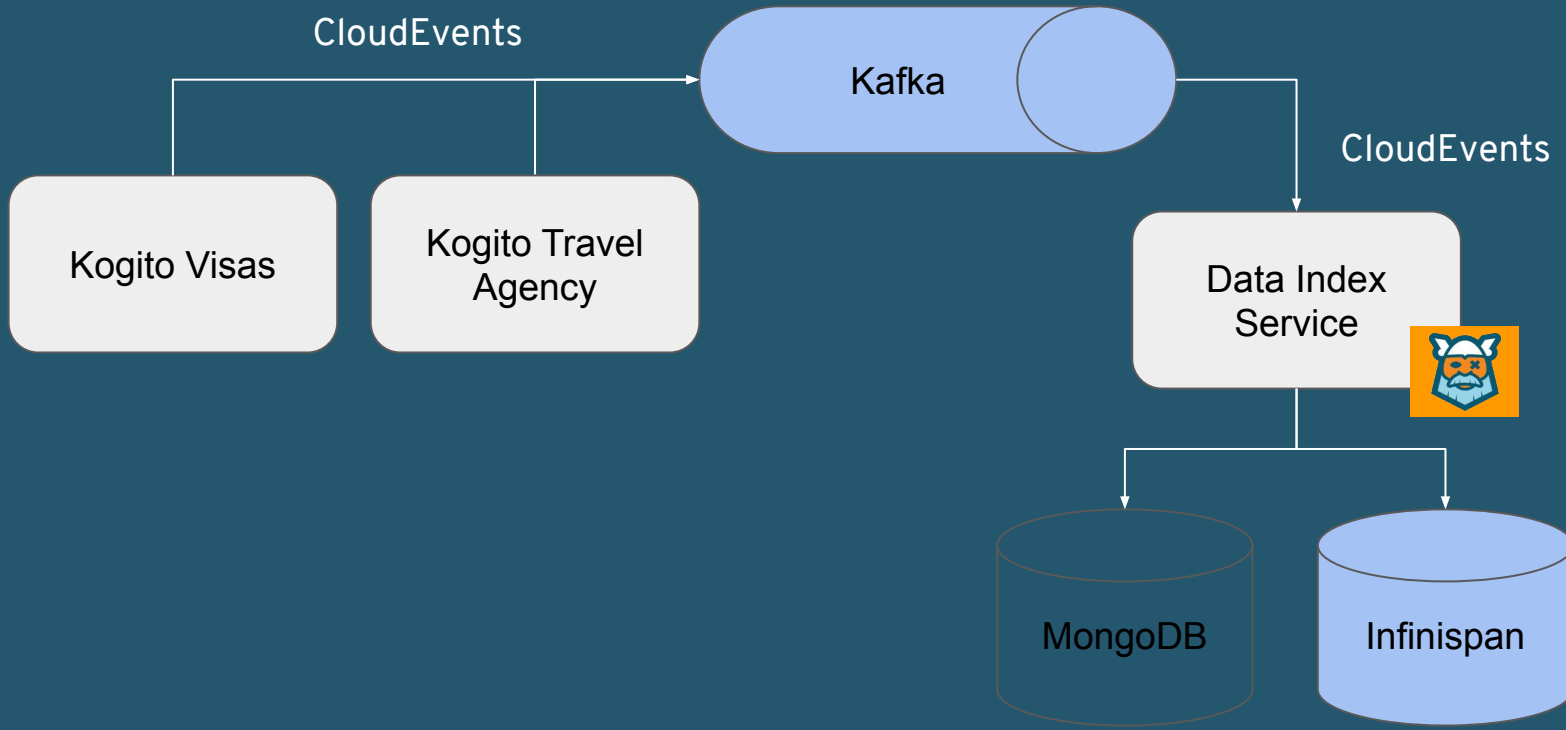
- Distinct focus on domain data
- Flexible data structure
- Distributable and cloud-ready format
- Infinispan-based persistence support
- Message-based communication with Kogito runtime (Apache Kafka, CloudEvents)
- Powerful querying API using GraphQL

Data Index - GraphQL



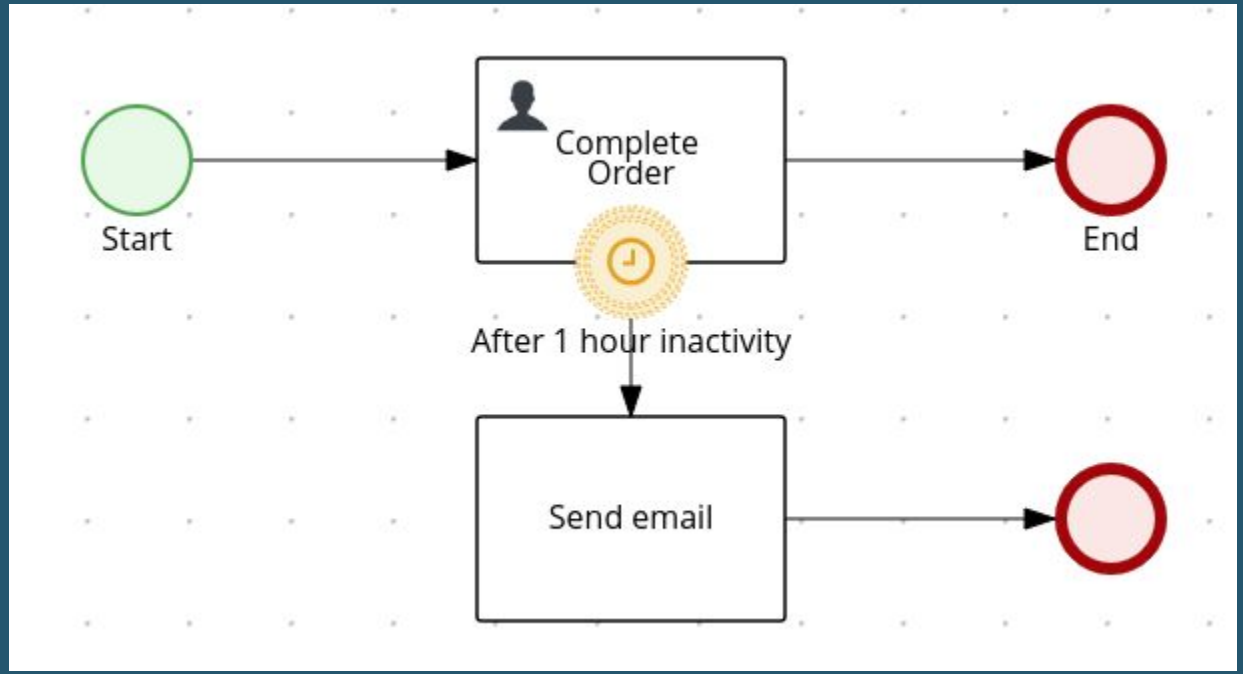
Kogito

Data Index - Architecture

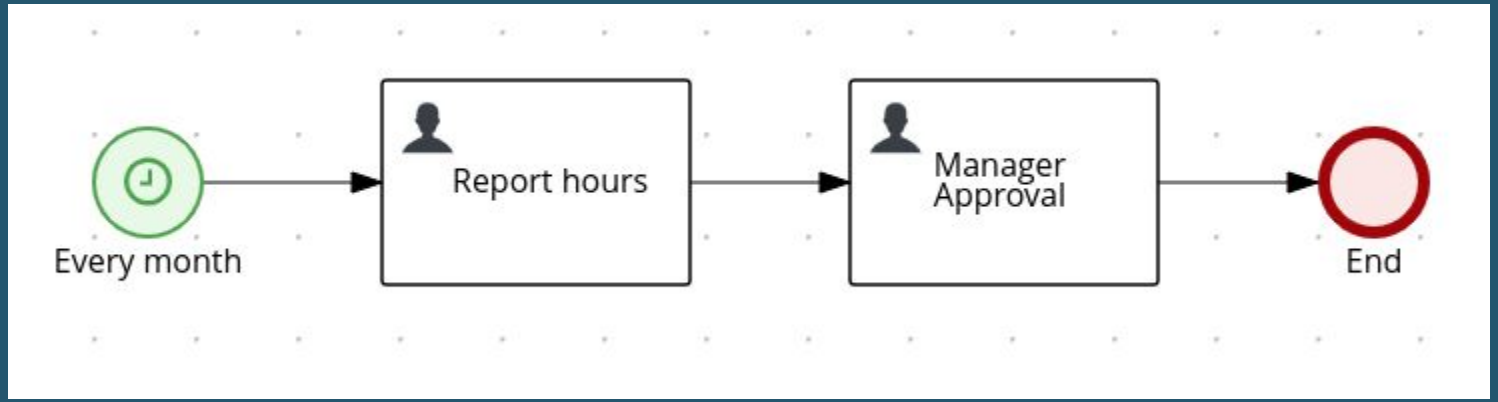


Data Index - Summary

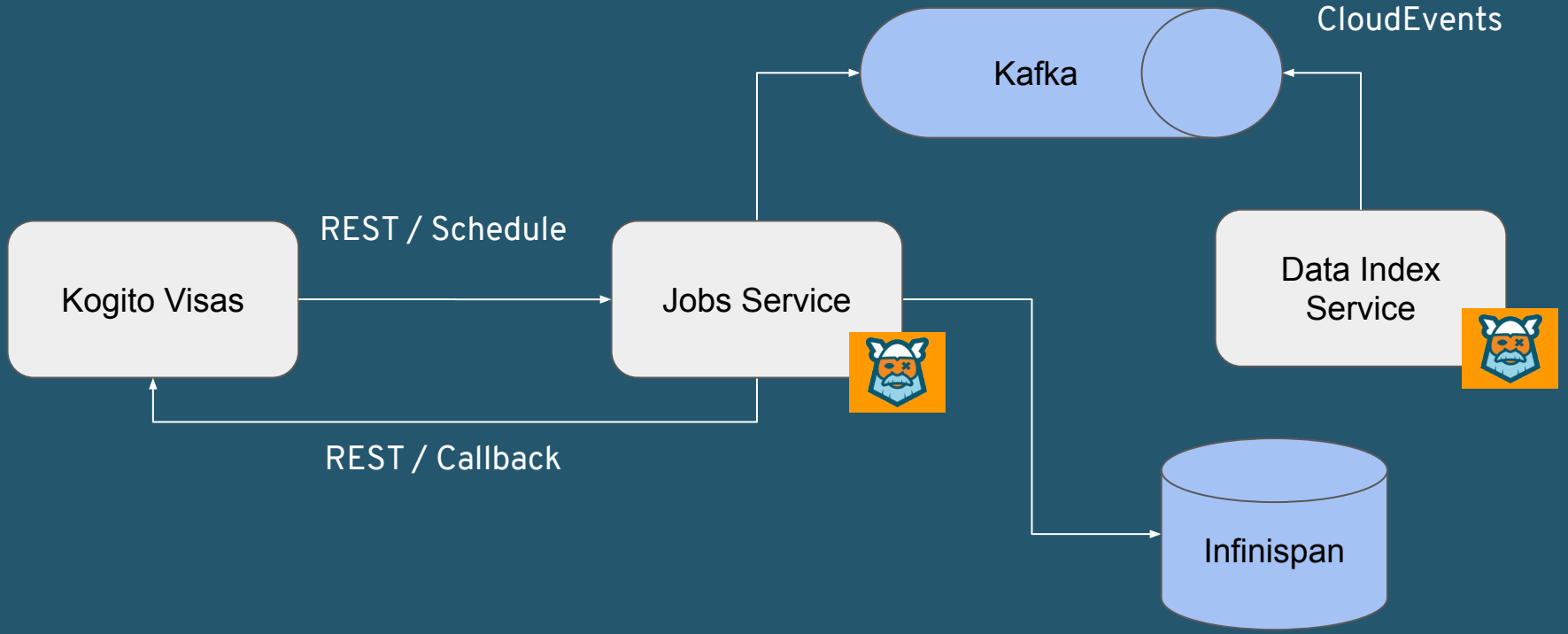
Jobs Service



Jobs Service



Jobs Service - Architecture



Jobs Service - Summary

- Distributions
  - Quay.io image
  - Runner JAR
  - Operator

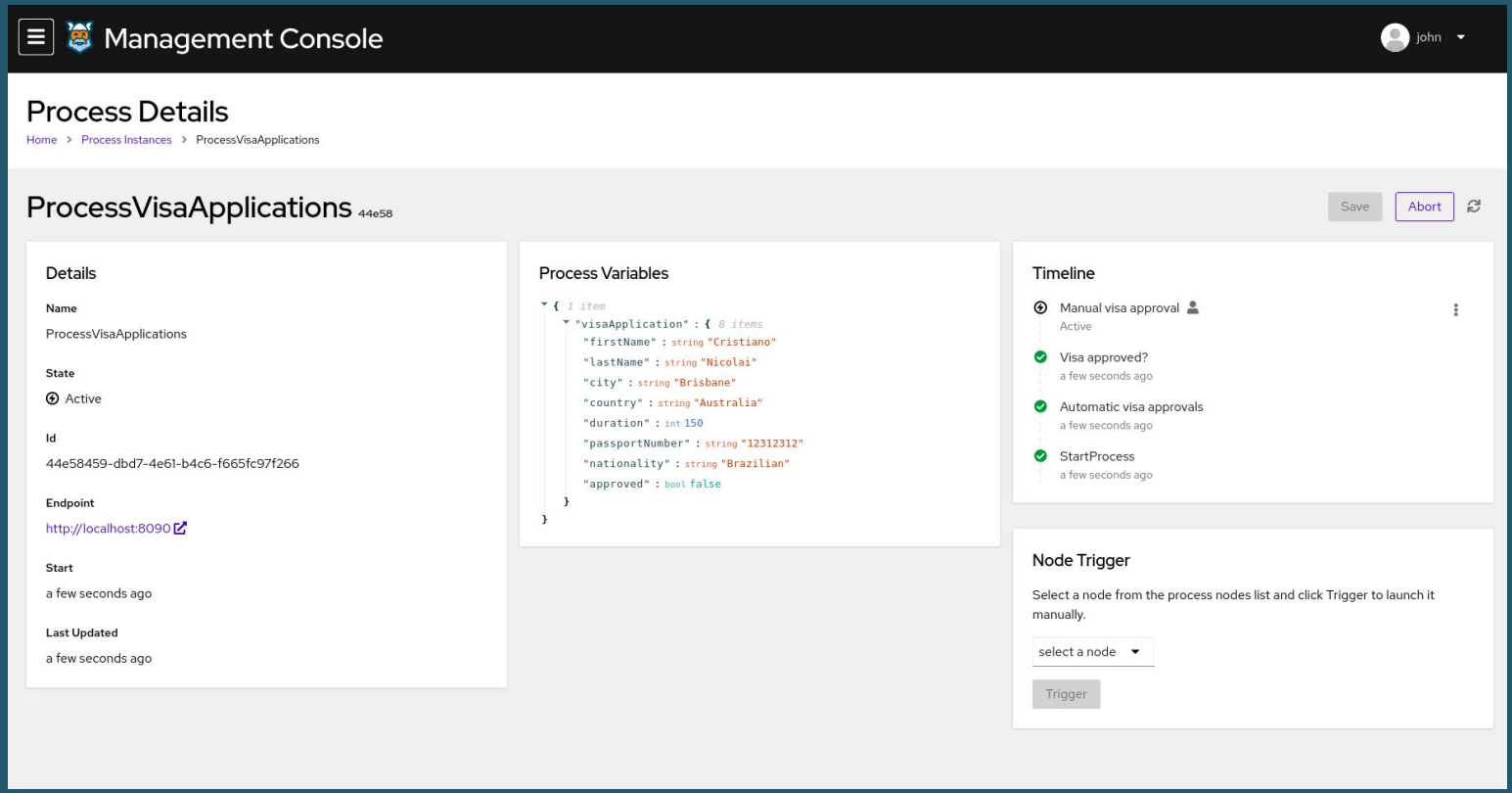
Process Management

- How to support process operation?
- Bring visibility about status?
- Have an overview about all runtimes deployed?
- Tooling to support fixing any issues during the execution of the process?

Management Console

- List process instances
  - Search by status and business key
  - Agregation by parent process
  - Bulk Operations
    - Abort/Skip/Retry
- View process details
  - Abort instance
  - Navigation between parent/child processes
  - Re/Trigger a node in the process
  - Timeline
    - View nodes in error
      - Retry or Skip
- Jobs management
- Domain Explorer
  - View and find processes based on domain data
  - Allows for creating domain specific views to easily find related processes

Management Console - Process Details



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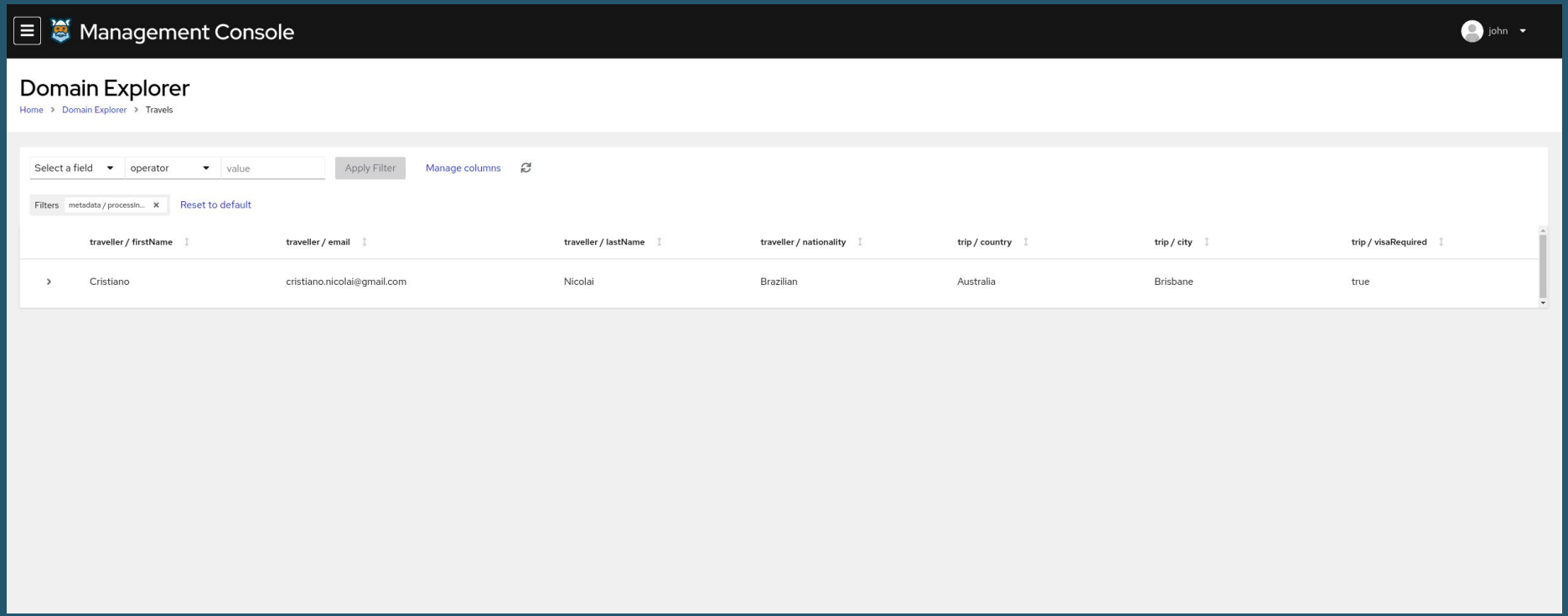
Management Console - Domain Explorer



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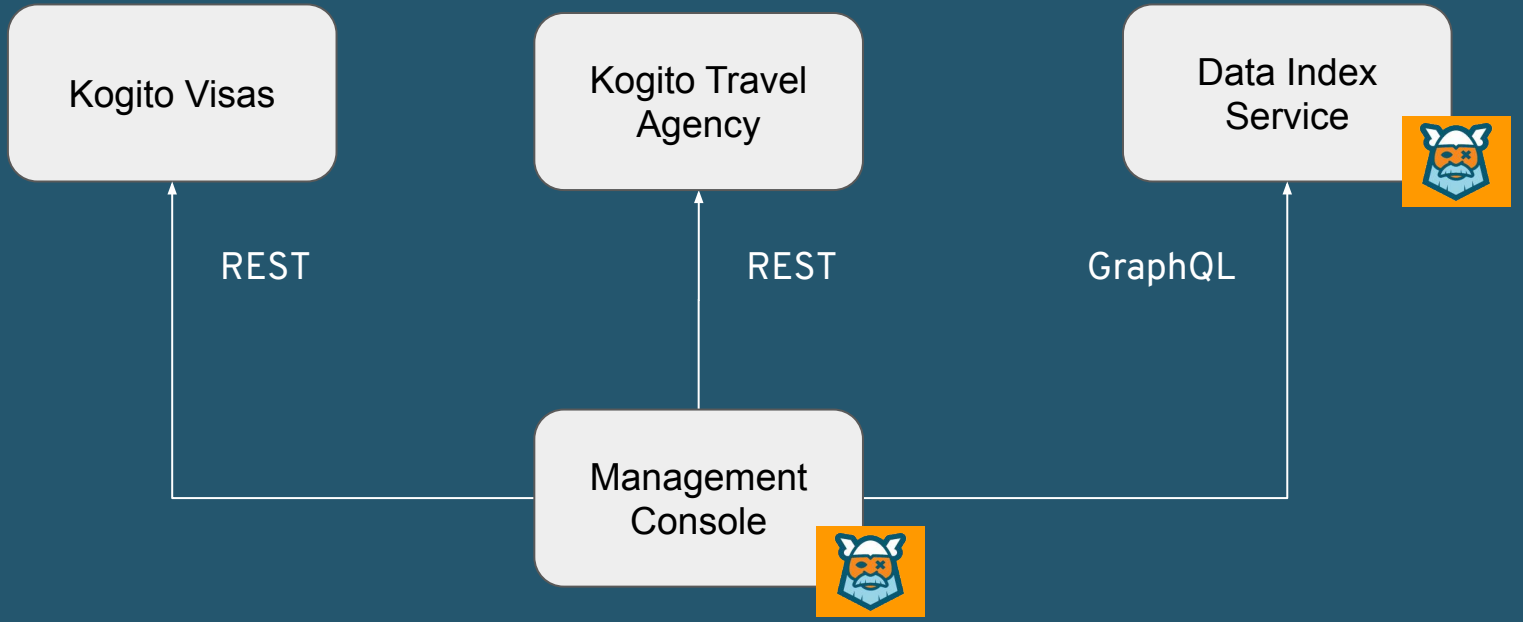
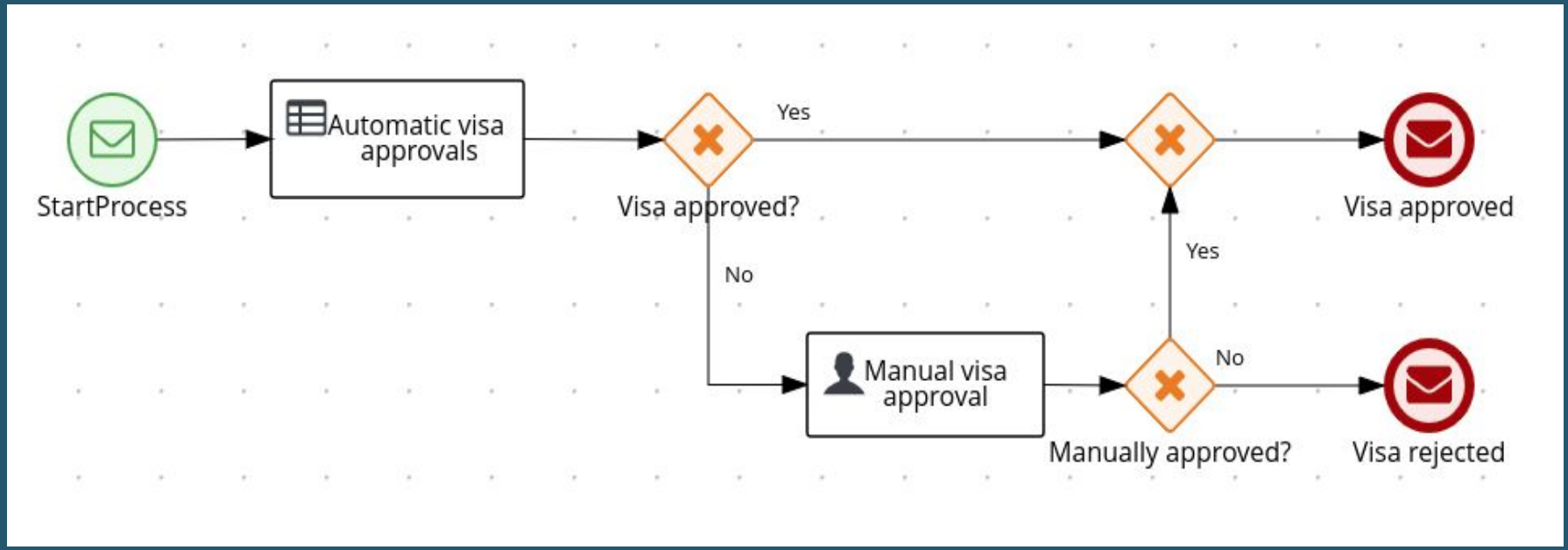
Management Console - Architecture



Management Console

- Distributions
  - Quay.io image
  - Runner JAR
  - Operator

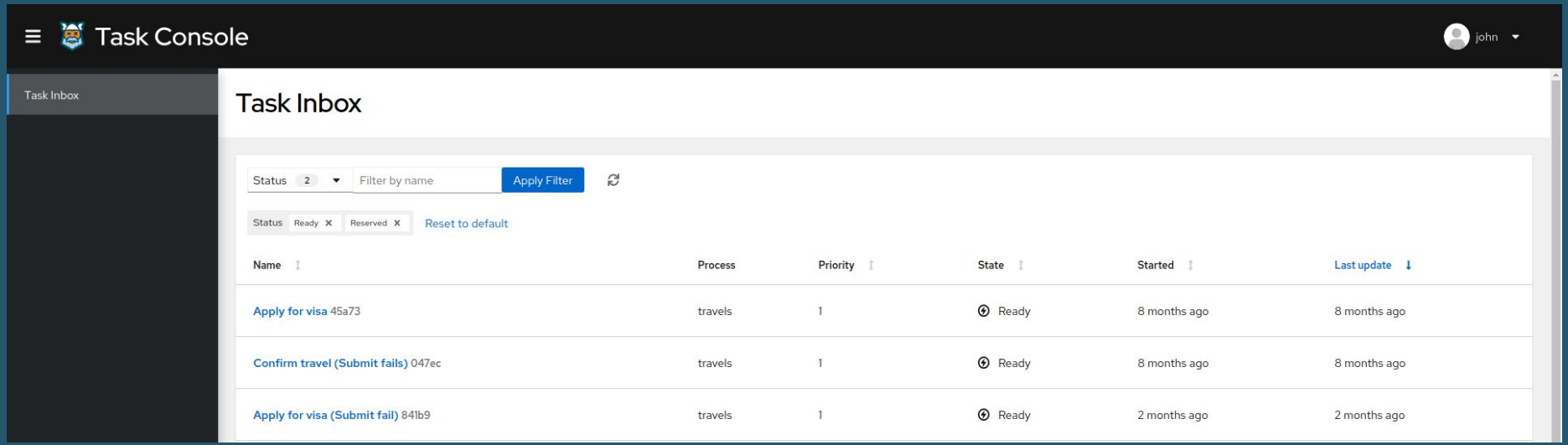
Kogito - User Tasks



Task Console

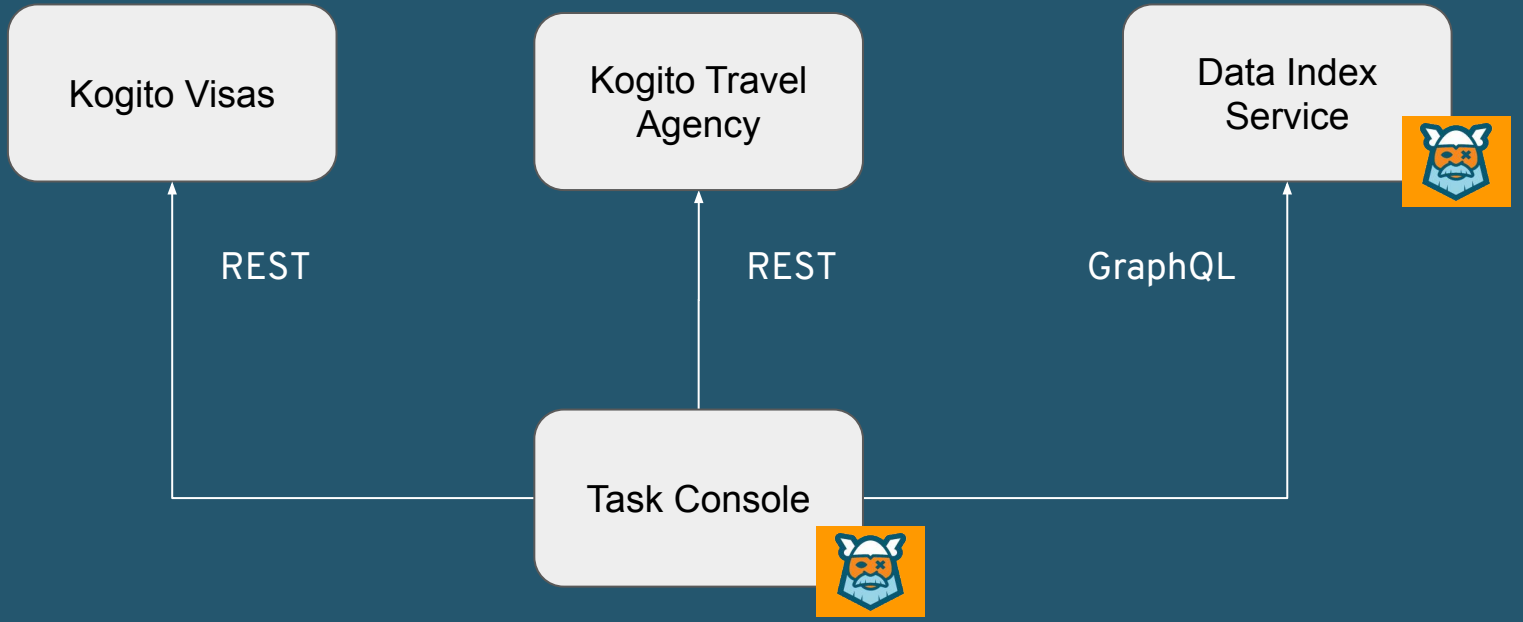
- Out of the box Task Inbox experience
- Forms generated dynamically
  - Based on JSON Schema format
- Keycloack/SSO integration
- Task Management (coming soon)
  - Delegate tasks

Task Console

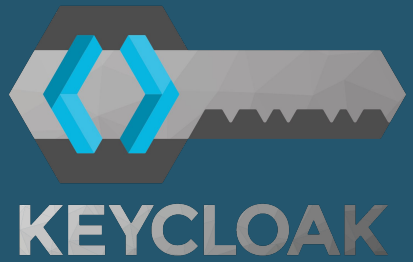


Kogito

Task Console - Architecture



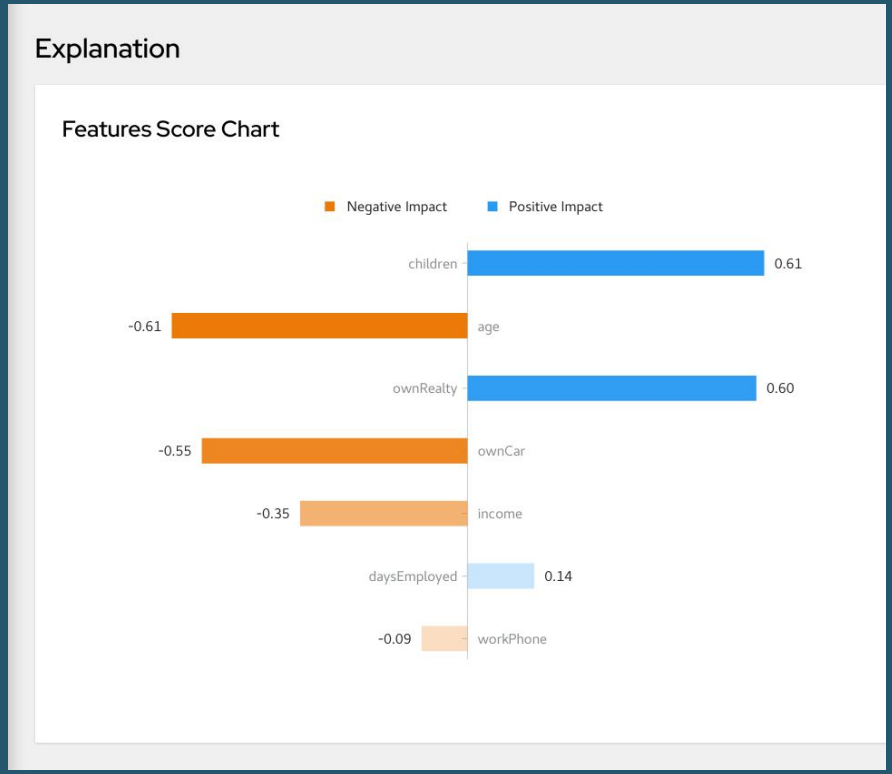
Task Console



- Distributions
  - Quay.io image
  - Runner JAR
  - Operator

Trusty AI

- Runtime Monitoring Service
- Tracing and Accountability Service
- Explanation Service



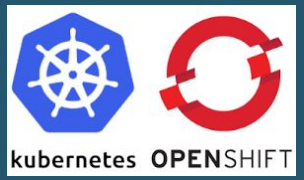
Kogito

Kogito Services Distribution

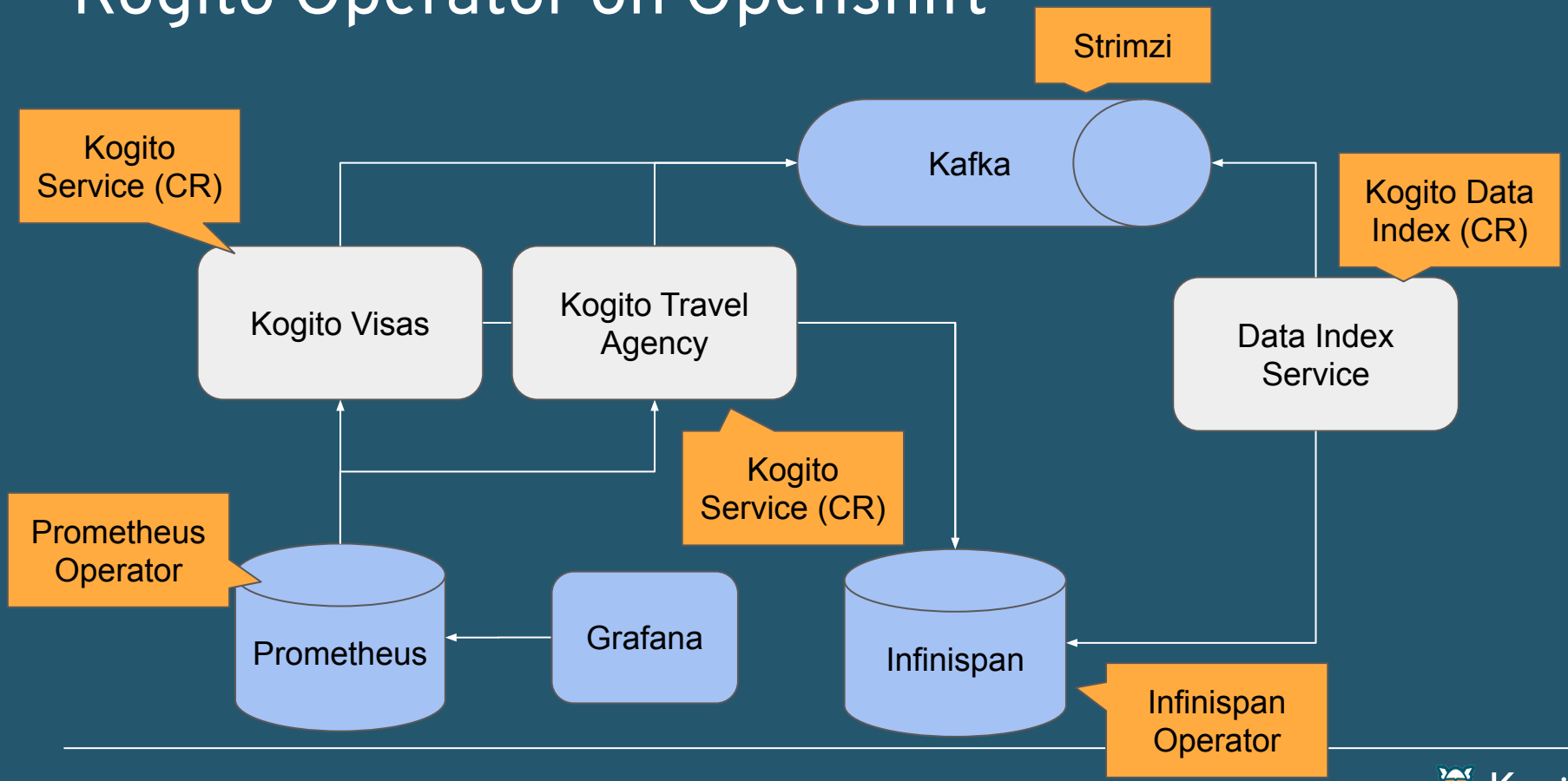
- Quay.io container image
- Runner JAR

Kogito Operator

- Deploy Kogito runtimes into OpenShift and Kubernetes
- Build runtimes from source (only on OpenShift)
- Connect every piece of infrastructure that the services and runtimes might need
- Dependency management



Kogito Operator on Openshift



Kogito

Kogito.Next

- Addons
  - Kafka persistence (experimental) - Quarkus
  - SVG process image - Spring Boot
  - OpenTracing
  - Monitoring using Micrometer
- Services
  - Automatic Task Assignment using Optaplanner

Thank you!

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@rhdevelopers

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Resources

- https://kogito.kie.org/
- https://blog.kie.org
- https://github.com/kiegroup/kogito-runtimes/blob/master/CONTRIBUTING.md
- https://operatorhub.io/operator/kogito-operator
- https://serverlessworkflow.io
- https://github.com/kiegroup/kogito-examples
- https://quarkus.io/
- https://quay.io/repository/kiegroup