

CAMUNDA

Process Automation in Modern Architectures

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@berndruecker**

Agenda & Housekeeping

- Introduction (15 minutes)
- Get started (25 minutes)
- Hands-on exercise (15 minutes)
- Break (05 minutes)

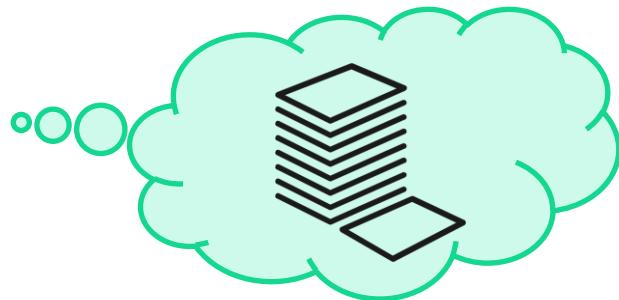
- Implementation and architecture (40 minutes)
- Hands-on exercise (15 minutes)
- Break (05 minutes)

- Use cases (40 minutes)
- Wrap-up and Q&A (20 minutes)

Let's talk about „onboarding“

Boring!

No!
Think of bank account
opening...



No! Think Post-COVID.



Banks need automated and
digitalized processes

BS Bingo!

But hey, how often do you
open a bank account?

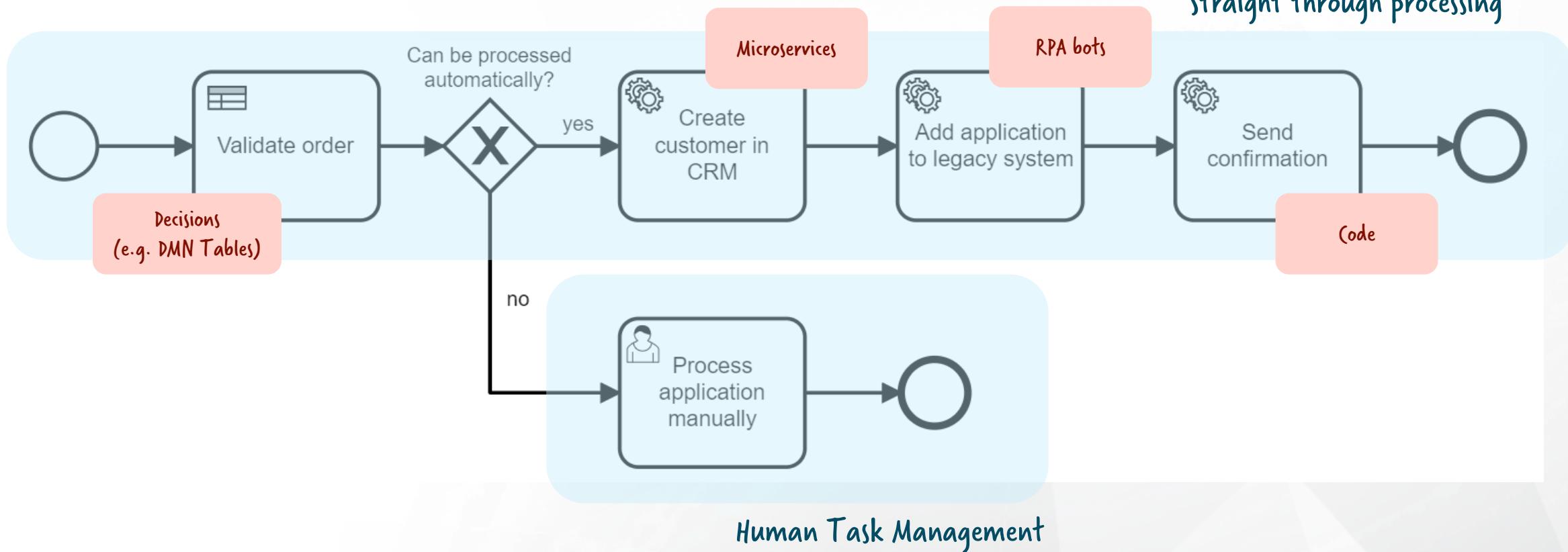
Millions of process
instances per day for a
global customer.

oh...

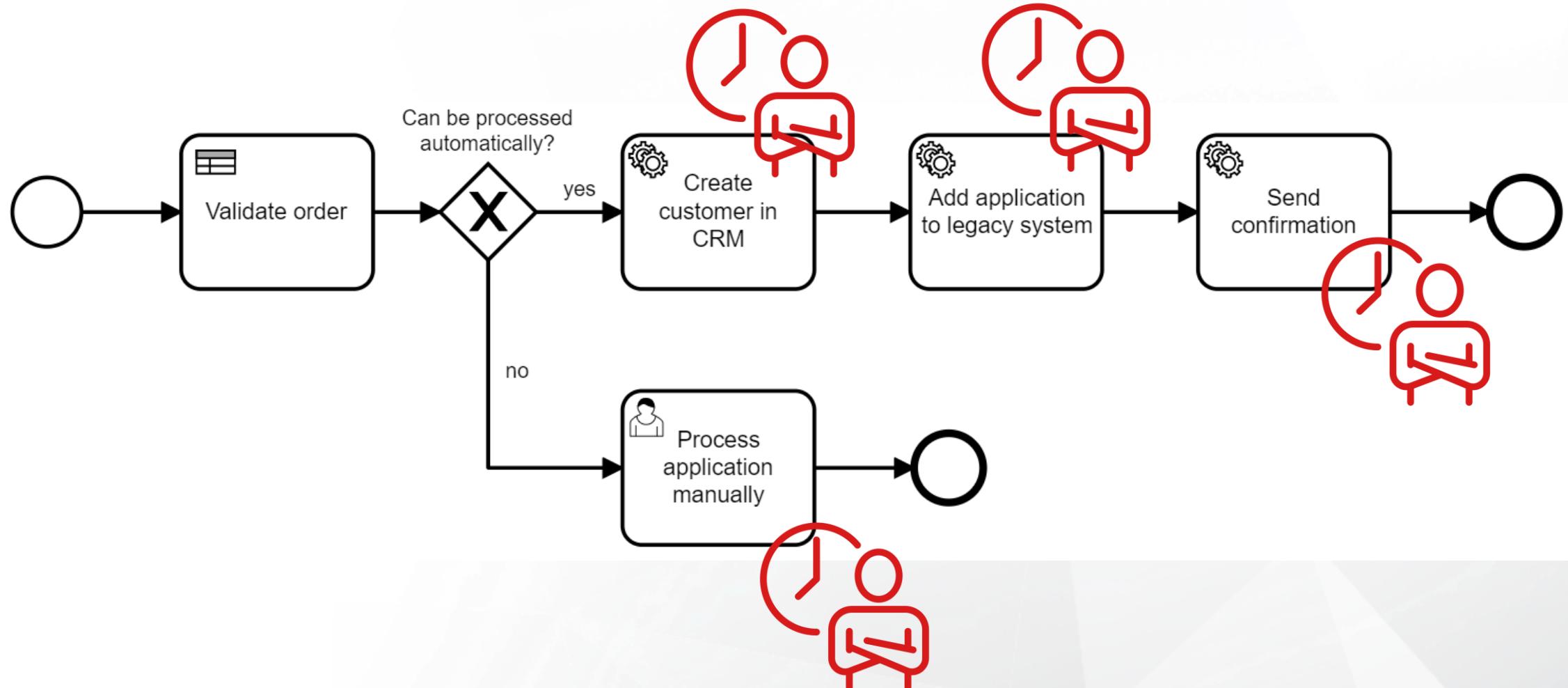
And yes, they tried Event-Driven-
Architecture, let's come back to that later...

A sample business process for onboarding

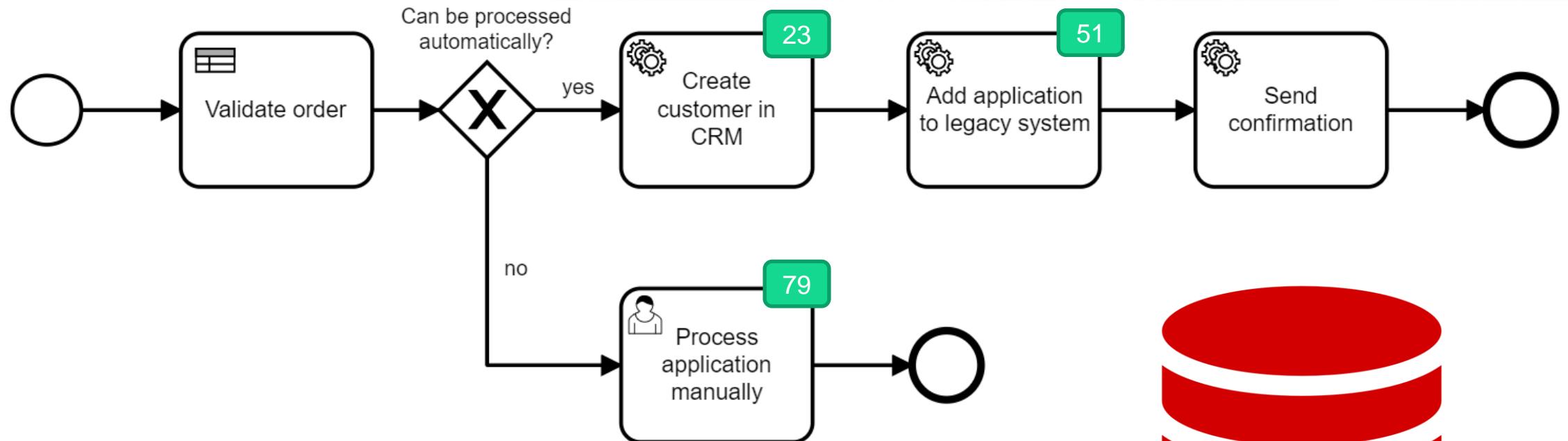
orchestrate ...



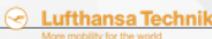
The challenges: waiting / long running tasks



What the workflow engine can do: Persistent state

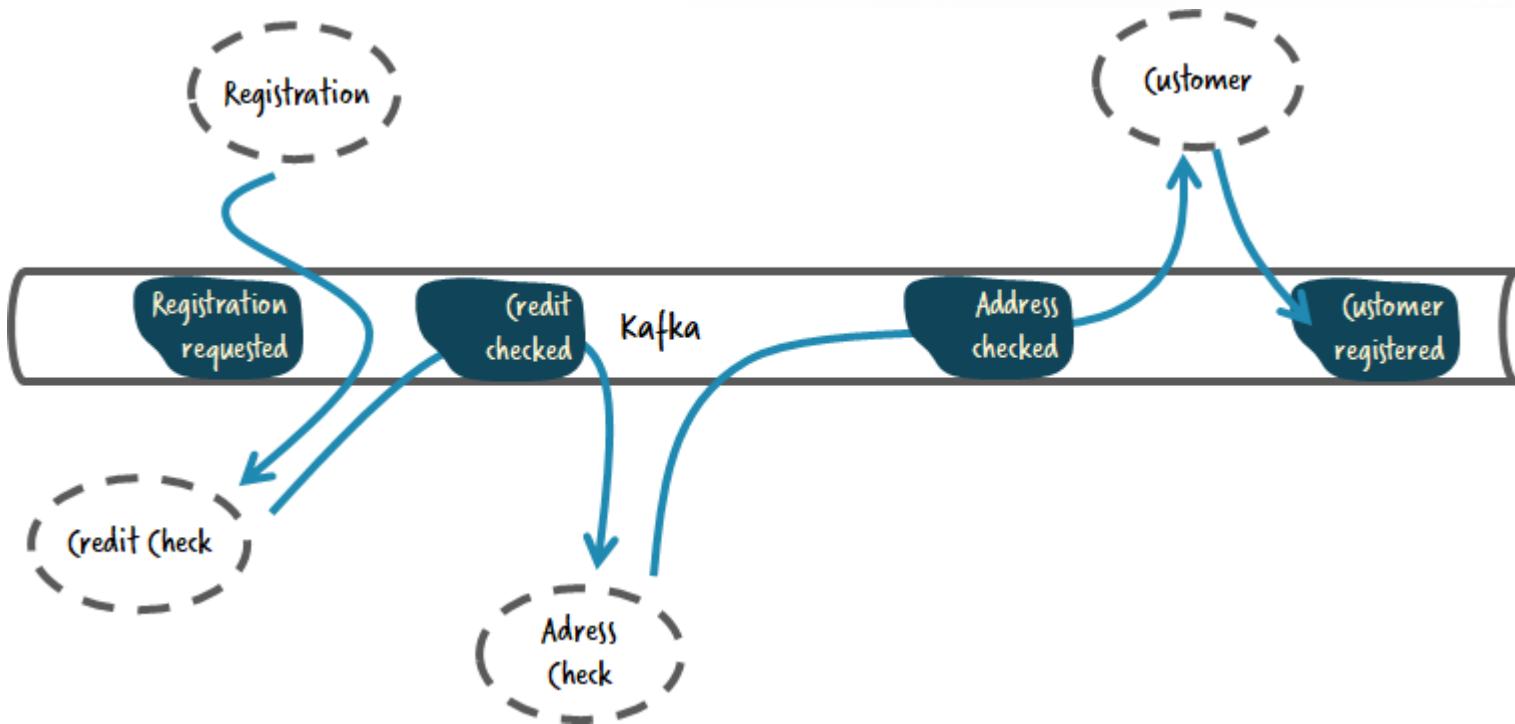


Many use cases (real-life examples)

Industry	Pilot	Lighthouse	Broadscale	Sample Clients
Cross-Industry	Approvals Employee Onboarding Credit Check	Microservices Orchestration Centralized Workflow Platform High Throughput	E2E Process Automation Legacy BPM Replacement Cloud Native Applications IT Service Orchestration	  
Banking & Finance	Asset Management	Customer Onboarding Loan Origination & Decisioning ATM Provisioning	Enterprise Platform Development Trading Risk Management / Fraud Detection	   
Insurance	Audit	Customer Onboarding Claim Service & Settlement Policy Underwriting & Contracts	Integrated KYC Core System Automation Risk Management / Fraud Detection	    
Telecommunication	Online Systems Integration	New Product Delivery Cell Tower Provisioning Order Management	Contracting, Upgrading, Termination OSS & BSS Open Network Automation Platform (ONAP)	     
Media & Entertainment	Website Content Delivery System Process Fallout	Subscription Management Licensing Content Distribution	Digital Supply Chain New Product Development Fraud Management	   
Manufacturing & High Tech	Application prototype	Order Execution Payments Servicing Research & Development	Embedded Workflow Automation Customer Service Supply Chain	  

Modern architectures

<https://www.infoworld.com/article/3391592/how-to-tame-event-driven-microservices.html>



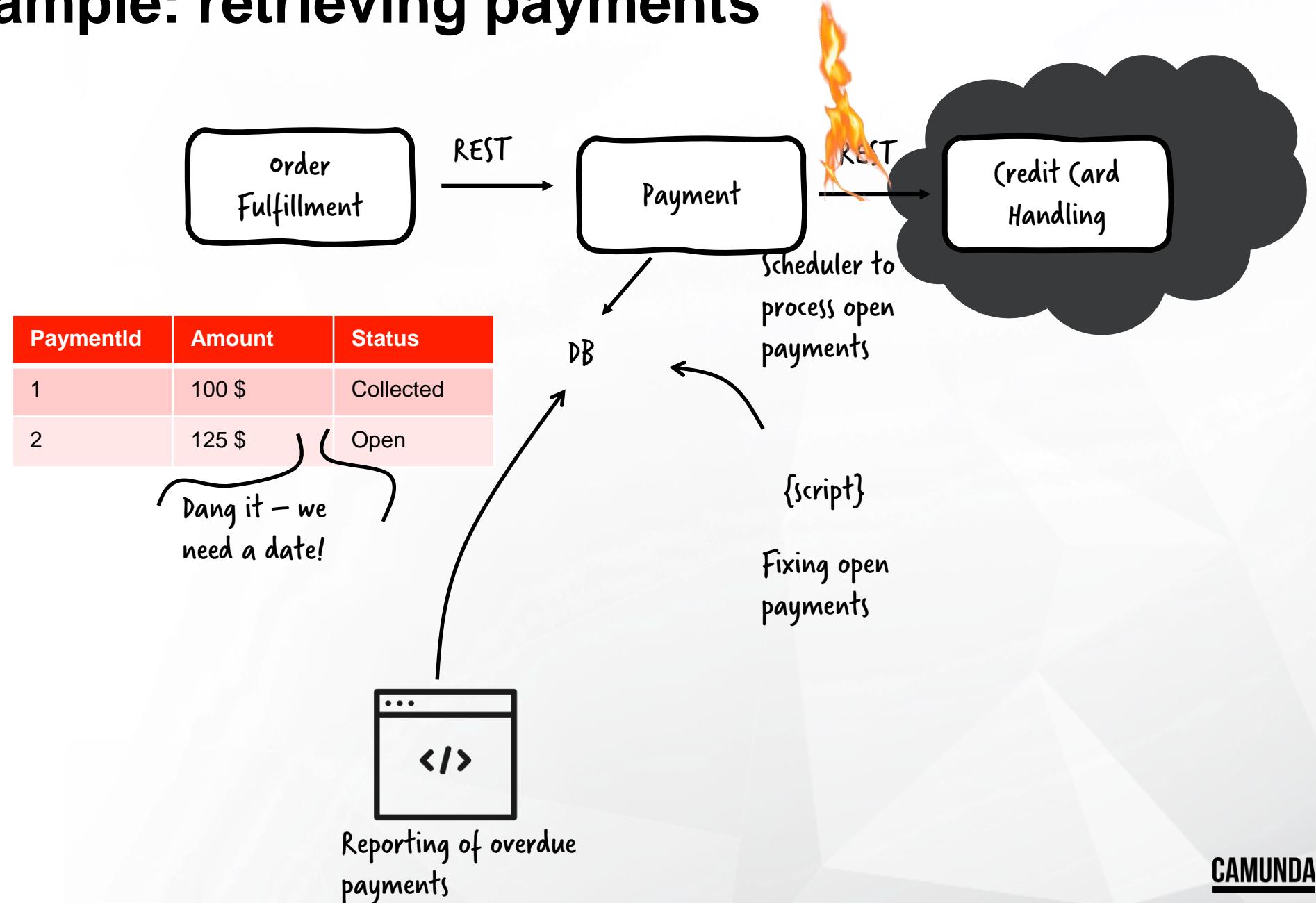
- Microservices
- Cloud-Native
- Distributed
- Event-Driven
- Reactive
- ...

Let's discuss that later, we need to do some basics first!

Discussion

- Do you use process automation?
- How do you think it could help you?

Another example: retrieving payments





”

Software is
eating the
world.

*Marc Andreessen,
Entrepreneur &
Investor
2011 in „The Wall
Street Journal“*

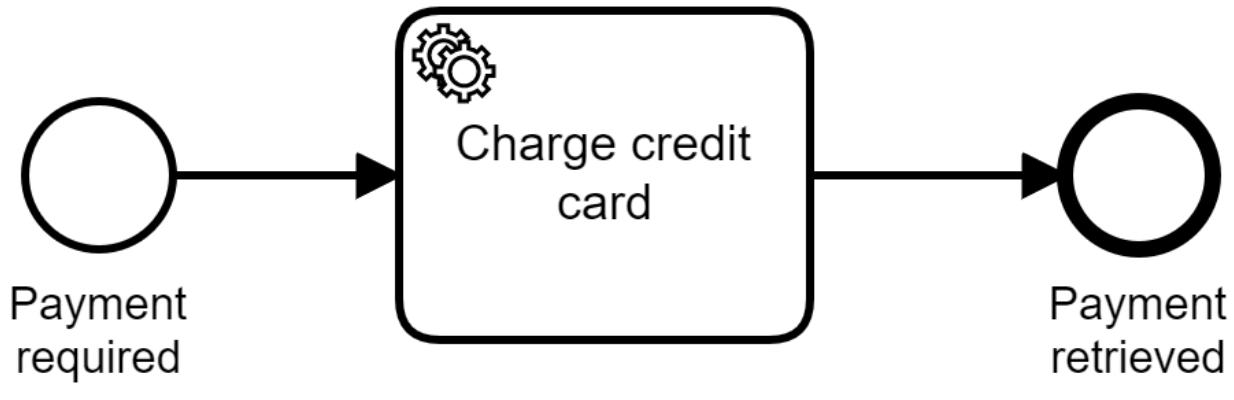
Change is the only constant

→ *Agility*

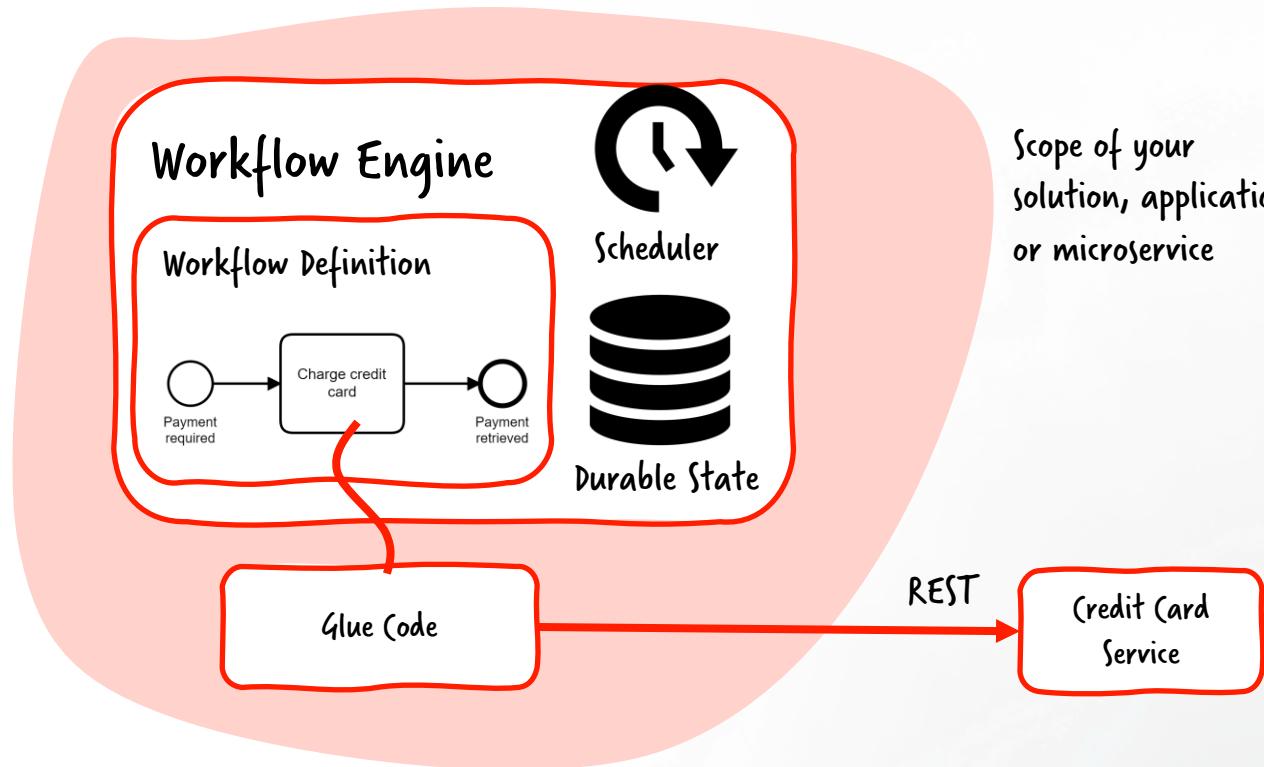
” We don't know what we will need tomorrow.
But we do know that we will need something.
We have to be able to move quickly!

(CIO of a German insurance company in 2019)

Using a workflow engine instead



Using a workflow engine instead



Workflow Engine:

Is stateful

Can wait

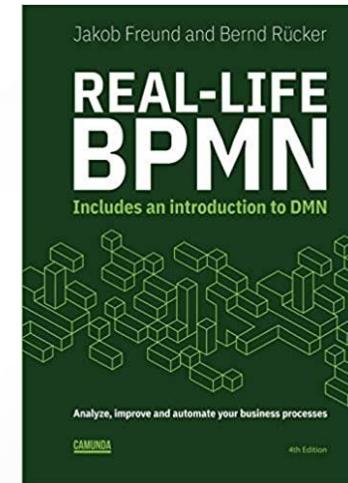
Can retry

Can escalate

Can compensate

Provides visibility

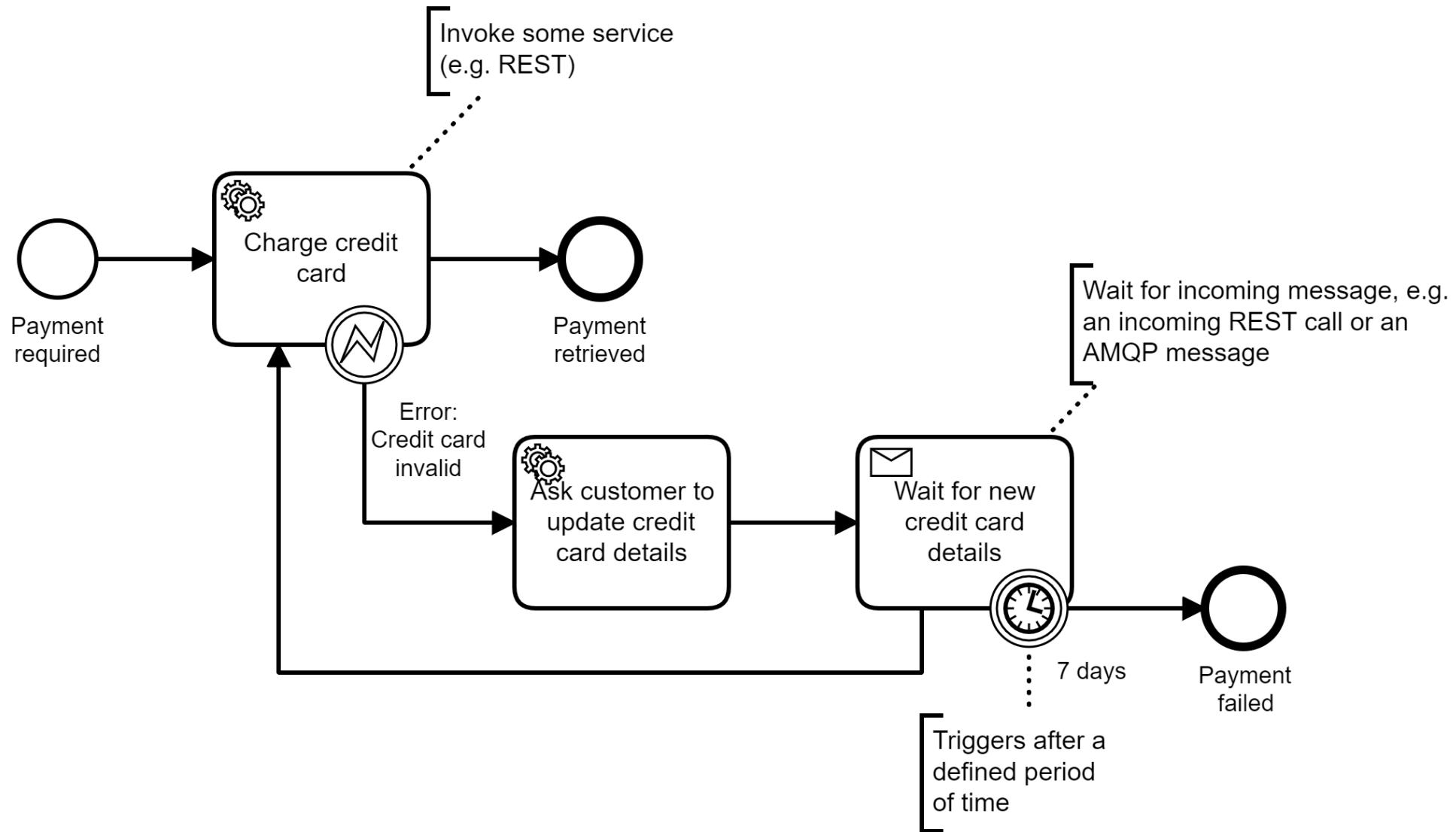
BPMN = Business Process Model and Notation



- ISO Standard
- Executable
- Visual that is understandable by different stakeholders
- XML / file based



This design also allows to tackle more complexity

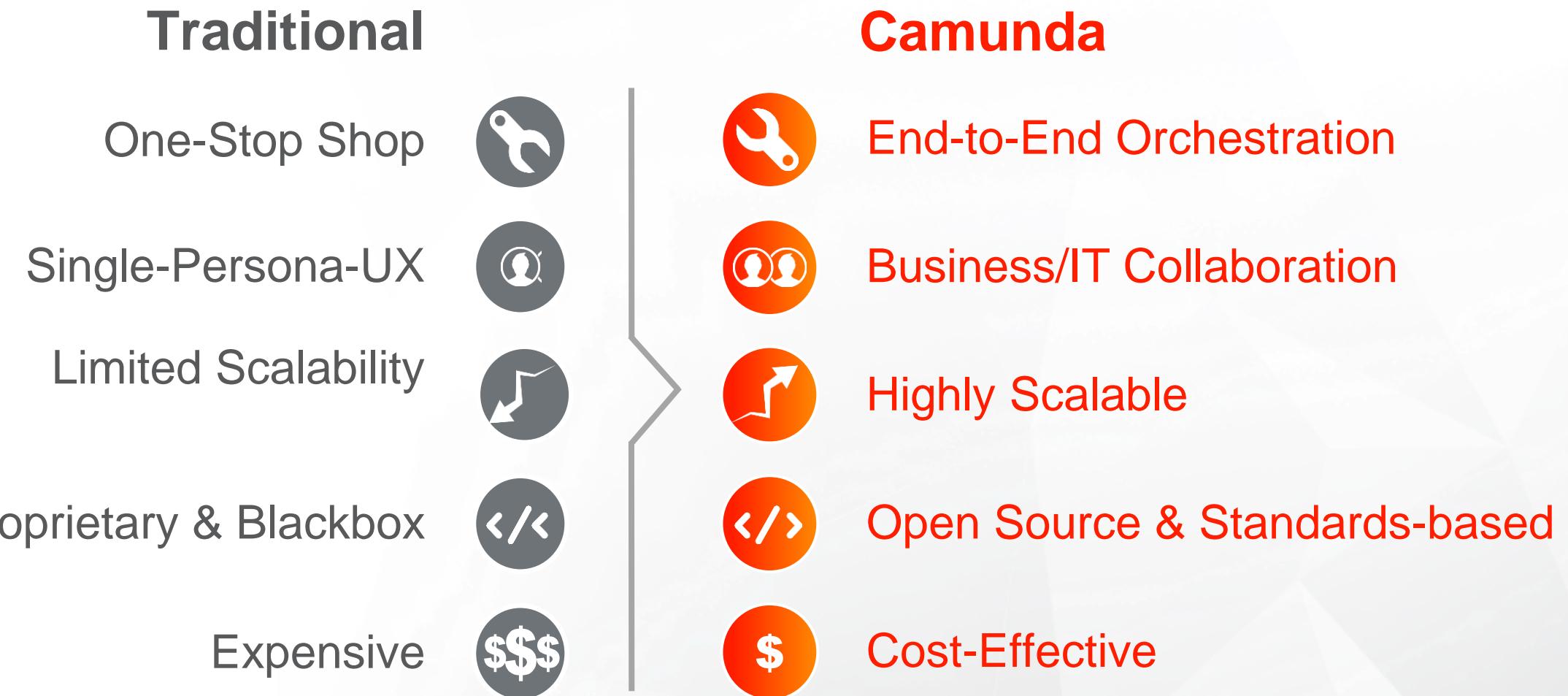


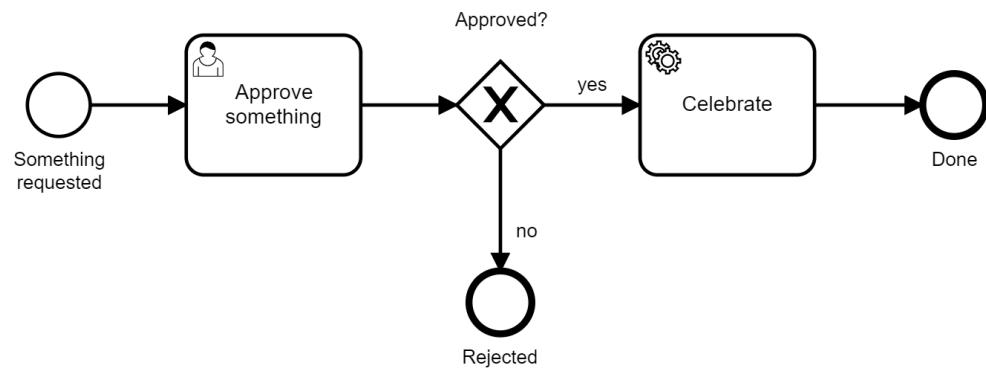
Camunda

- Open Source
- Supports BPMN
- Mature tooling, widely adopted
- Used in demo & lab



Camunda Differentiators

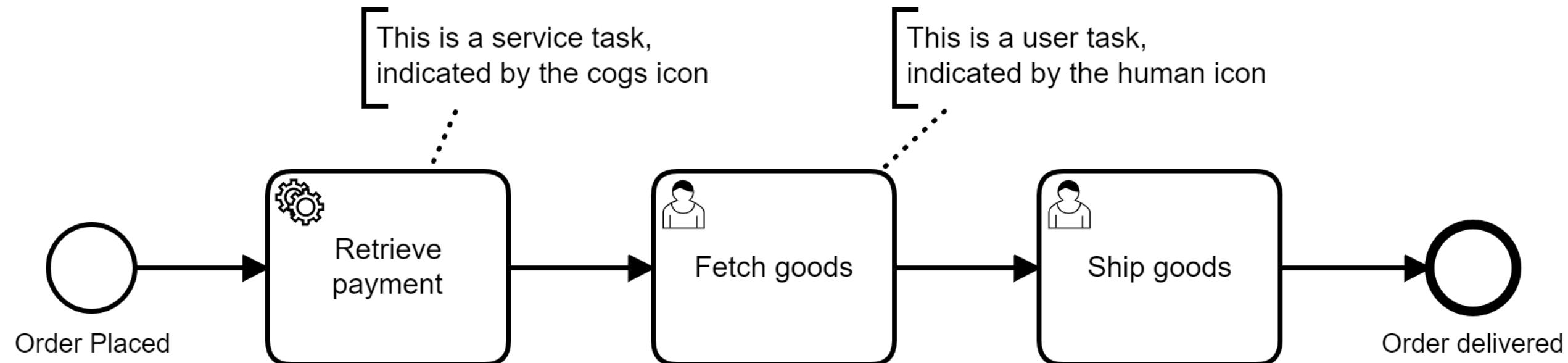




Benefits of process automation

- **Visibility**: Understand how your business processes run
- **Agility**: Be able to rapidly change and adapt your business processes
- **Confidence**: Make sure your business processes run exactly how you want them to run
- **Cost-Effectiveness**: Automate your business in highly efficient and cost-effective way
- **Scale**: Enable your business processes to handle unexpected problems or demand

Human & Service Tasks



Tasklist example

My Tasks

My Group Tasks (7)

Accounting

John's Tasks

Mary's Tasks

Peter's Tasks

All Tasks

Filters

Filter Tasks

7

Prepare Bank Transfer

Invoice Receipt

Due in 21 hours, Created 6 days ago

50

Invoice A... 900

Invoice Nu... BOS-43934

Approve Invoice

Invoice Receipt

Due in 21 hours, Created 6 days ago

50

Invoice A... 30

Invoice Nu... GPFEV3232323

Prepare Bank Transfer

Invoice Receipt

Due a day ago, Created 8 days ago

50

Invoice A... 900

Invoice Nu... BOS-43934

Approve Invoice

Invoice Receipt

Due a day ago, Created 8 days ago

50

Invoice A... 30

Invoice Nu... GPFEV3232323

Tasks

Prepare Bank Transfer

Invoice Receipt

Set follow-up ...

in 21 hours

Details

Accounting

Claim

Form

History

Diagram

Description

Please prepare the bank transfer for the following invoice

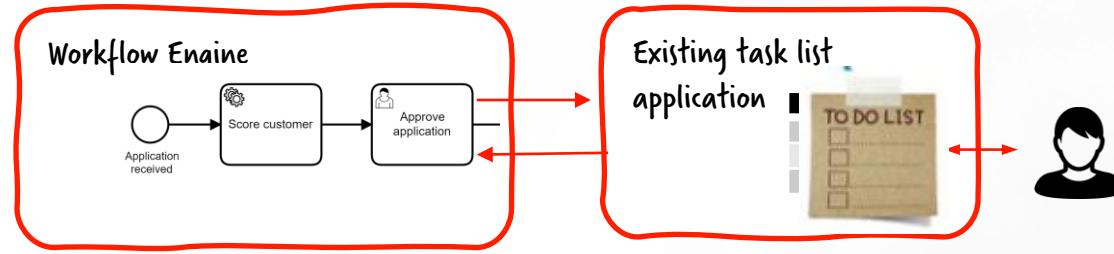
Invoice Document [invoice.pdf](#)Creditor Bobby's Office SuppliesAmount 900Invoice Number BOS-43934Approved by demo

Task Form

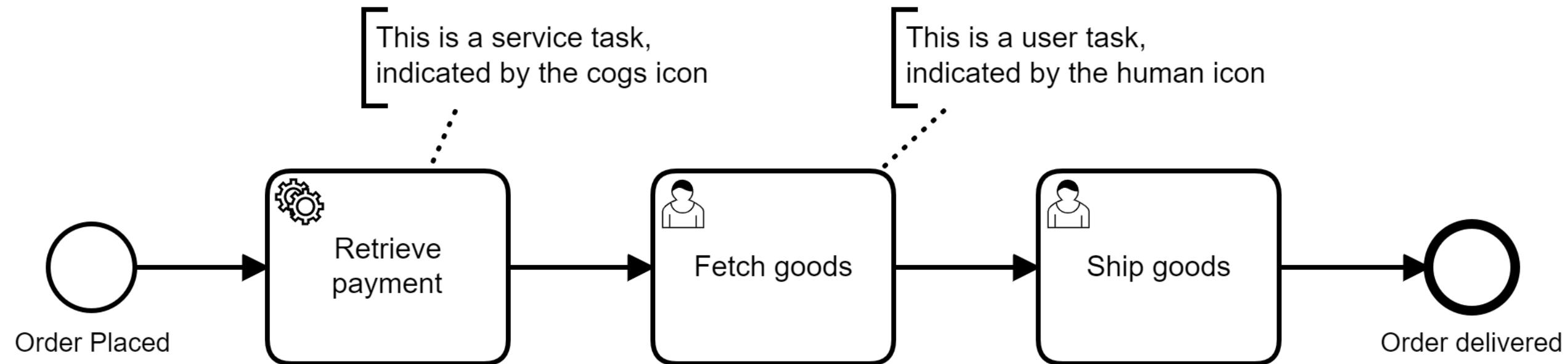
Save

Complete

Pretty common: Custom task list applications



Service Tasks

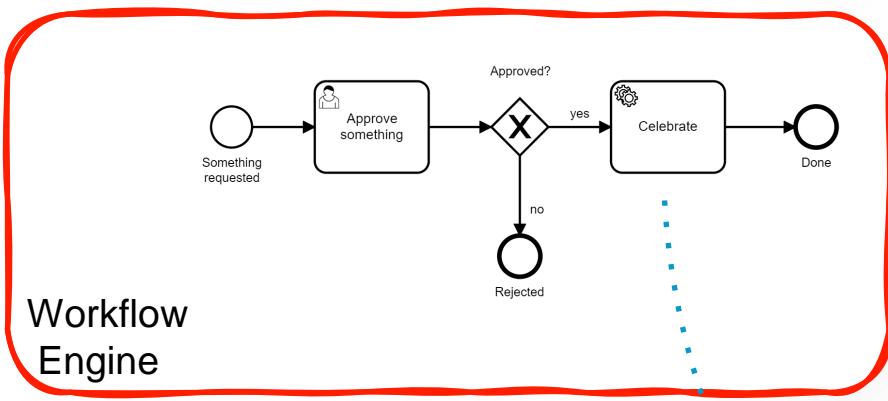


How to wire up a Service Task?

- Depends on the tool
- Basic options
 - Reference code
 - Pub/Sub to the workflow engine
 - Connectors



Pub/sub glue code (aka workers)

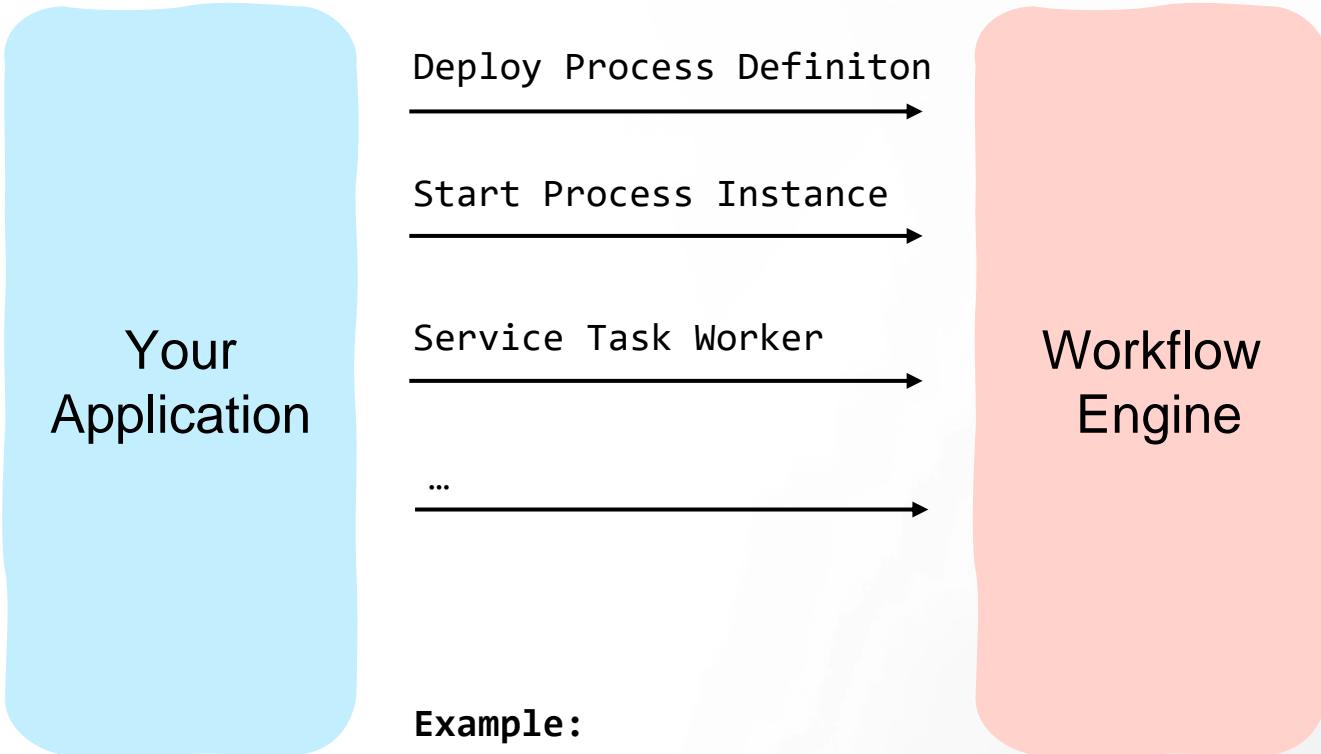


publish-subscribe,
protocol of
workflow

```
const config = {  
  baseUrl: "http://localhost:8080/engine-rest",  
  use: logger  
};  
  
// create a Client instance with custom configuration  
const client = new Client(config);  
  
// create a handler for the task  
const handler = async ({ task, taskService }) => {  
  // get task variable 'defaultScore'  
  const something = task.variables.get("something");  
  
  // do the business logic  
  console.log(`Yeah, '' + something + '' was approved and can now be ordered! Please celebrate accordingly!`);  
  
  // complete the task  
  try {  
    await taskService.complete(task);  
  } catch (e) {  
    console.error(`Failed completing service task, ${e}`);  
  }  
};  
  
client.subscribe("celebrate", handler);
```

Do whatever you need to do (e.g. also call a REST API, send a message, ...)

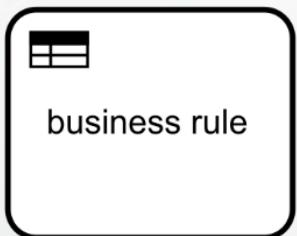
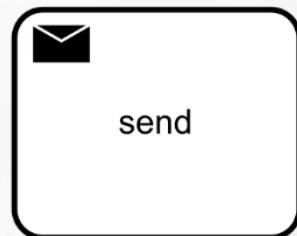
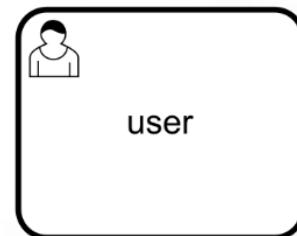
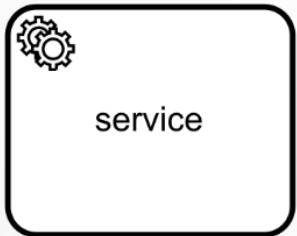
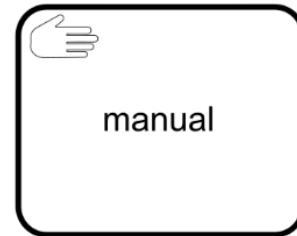
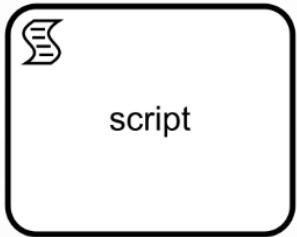
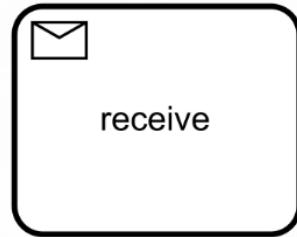
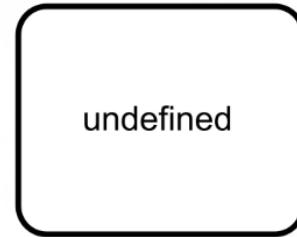
Workflow Engine API



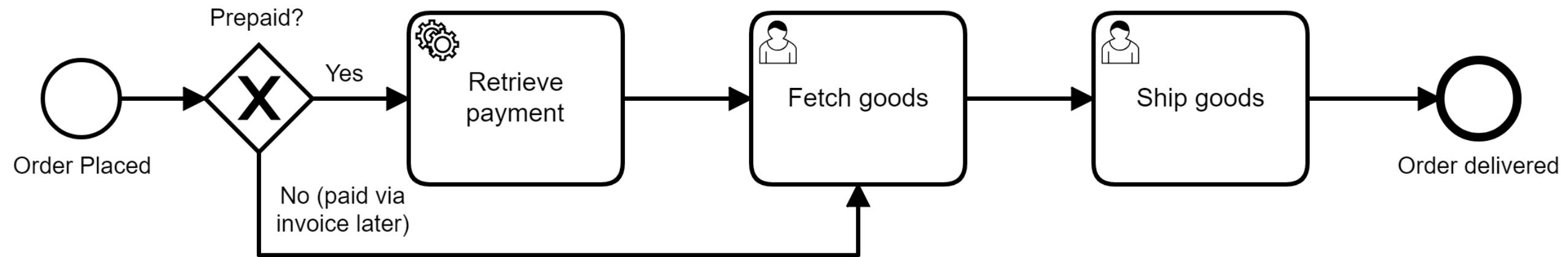
Example:

```
curl \
-H "Content-Type: application/json" \
-X POST \
-d '{"variables": {"something" : {"value" : "Cake", "type": "String"} }}' \
http://localhost:8080/engine-rest/process-definition/key/OReillyDemo/start
```

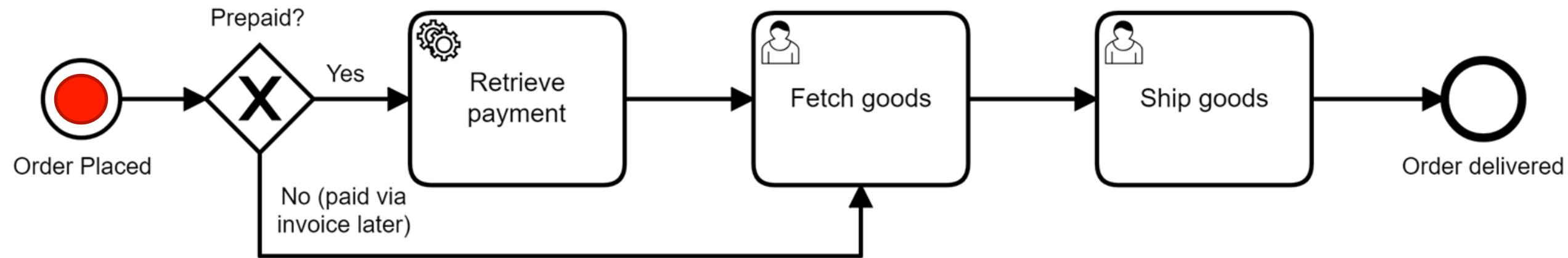
More task types



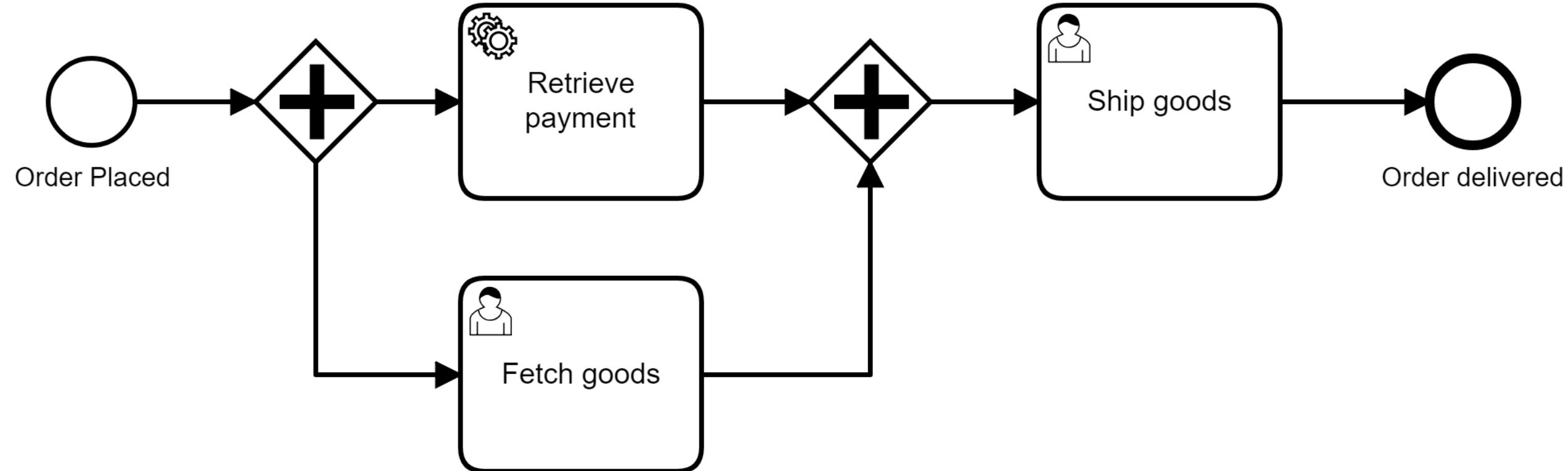
XOR Gateway



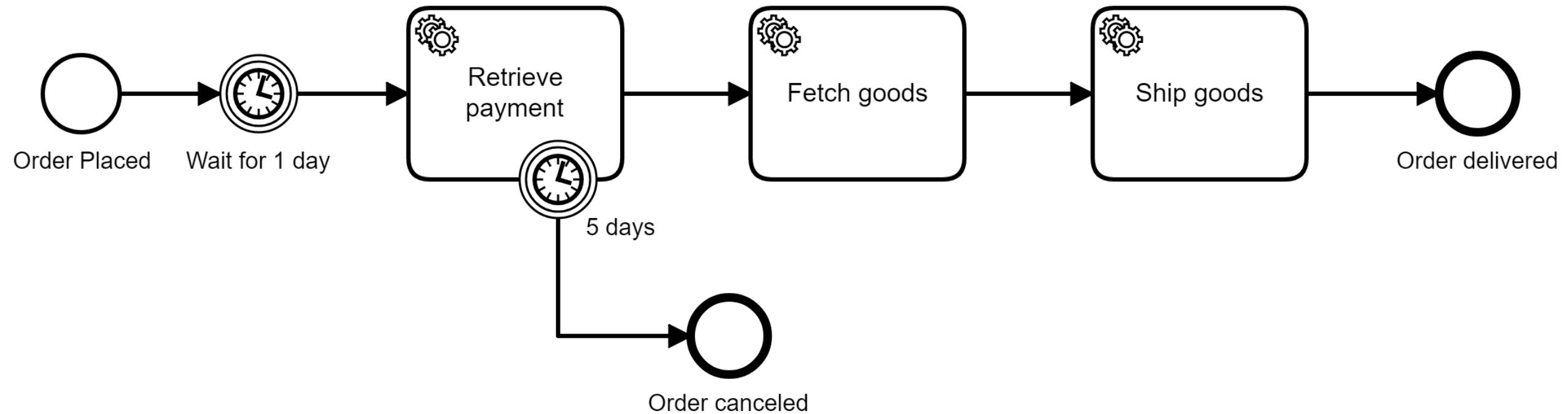
The „token“ – a concept from the spec



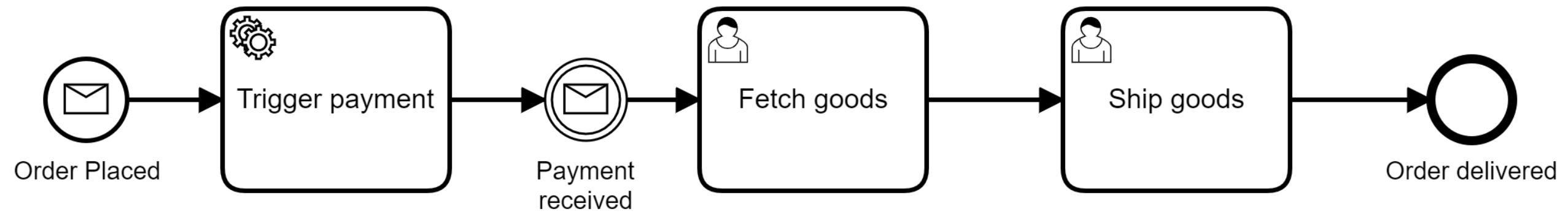
AND Gateway



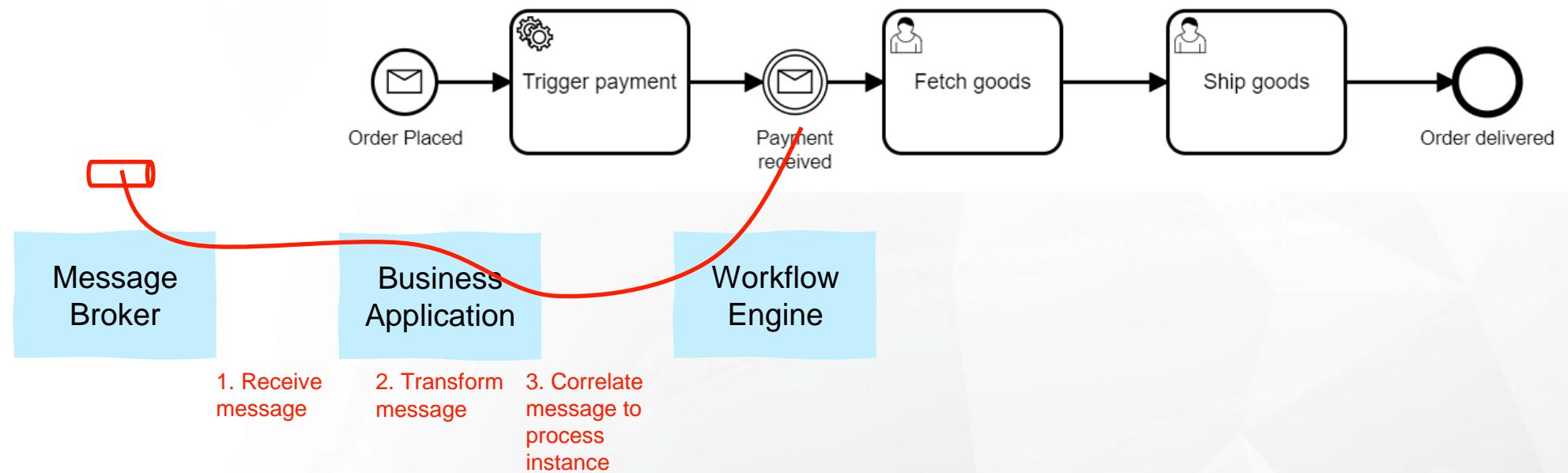
Timer



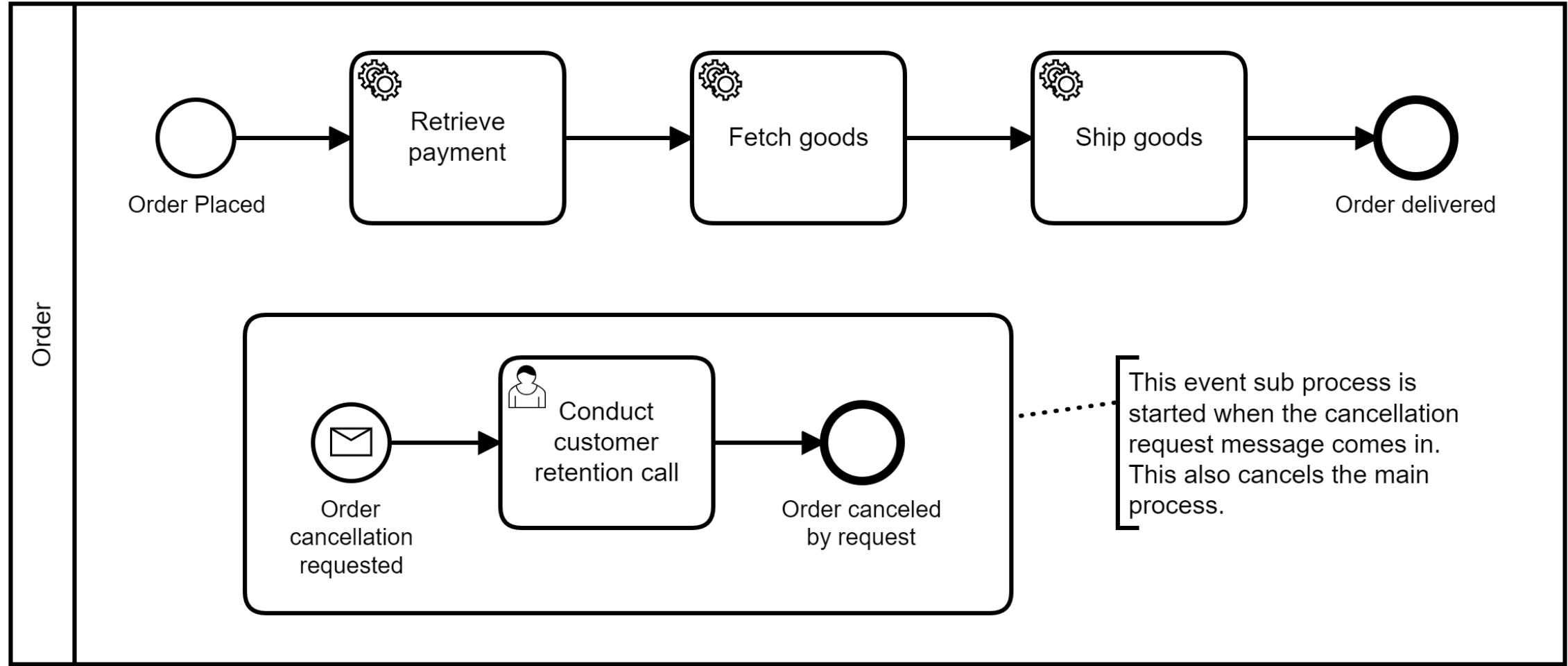
Message Events



Messages vs. Messages



There is more, e.g. the event subprocess



Lab 1: Execute Your First BPMN Process

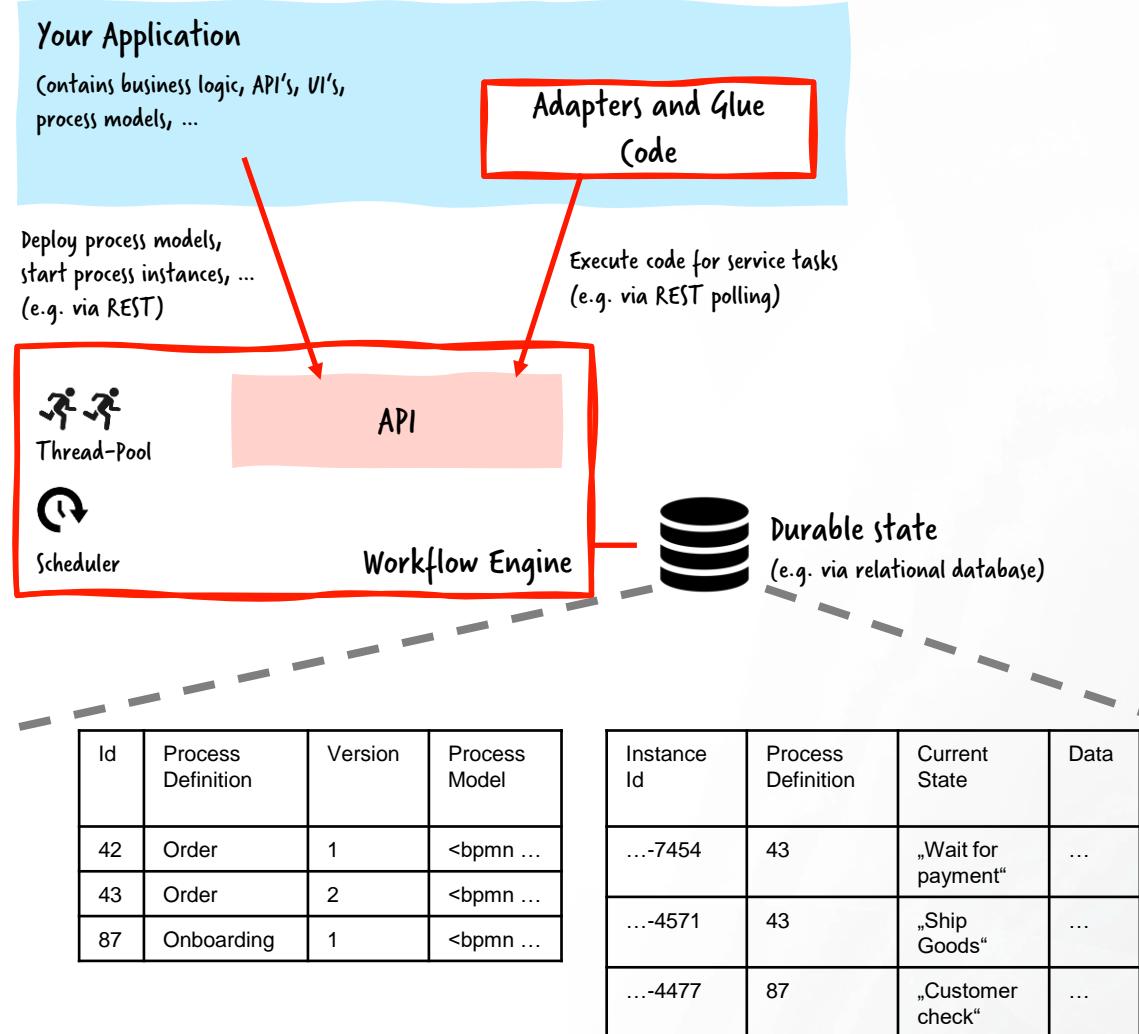
<https://github.com/berndruecker/oreilly-training-process-automation>



A close-up photograph of a white ceramic cup filled with coffee. The coffee has a layer of frothy milk on top, featuring a delicate latte art design resembling a leaf or fern. The cup sits on a matching saucer, which is placed on a light-colored wooden table with visible planks. The lighting is warm and focused on the cup.

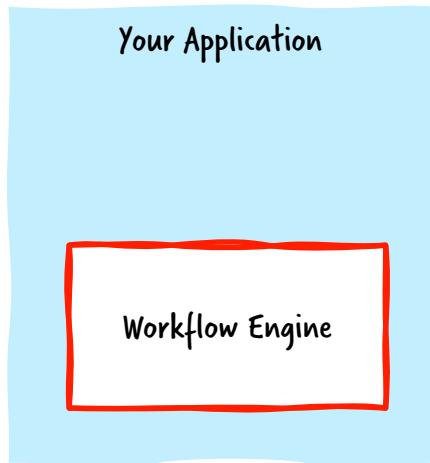
Break: 5 Minutes

Architecture

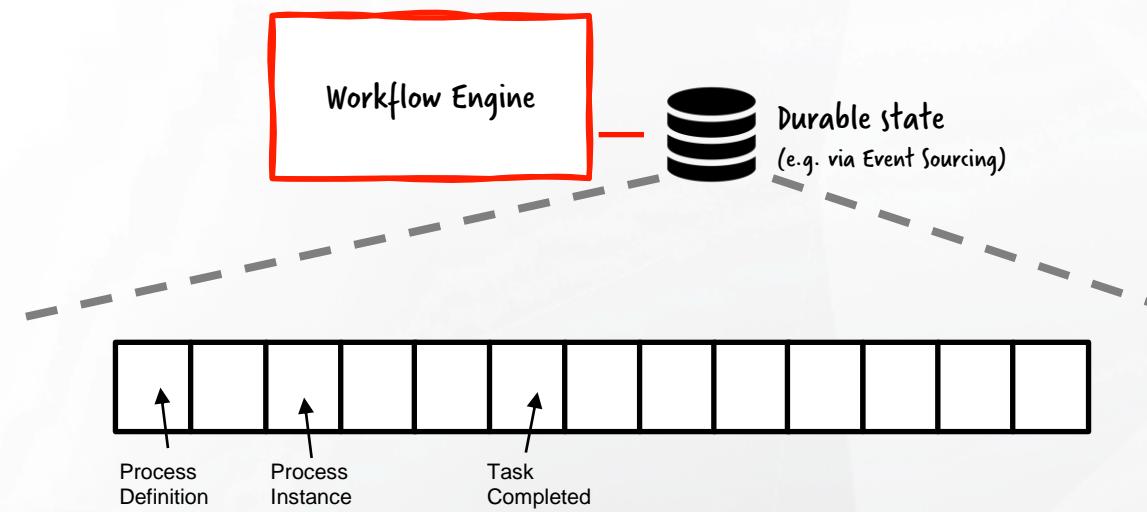


Variations possible, e.g.

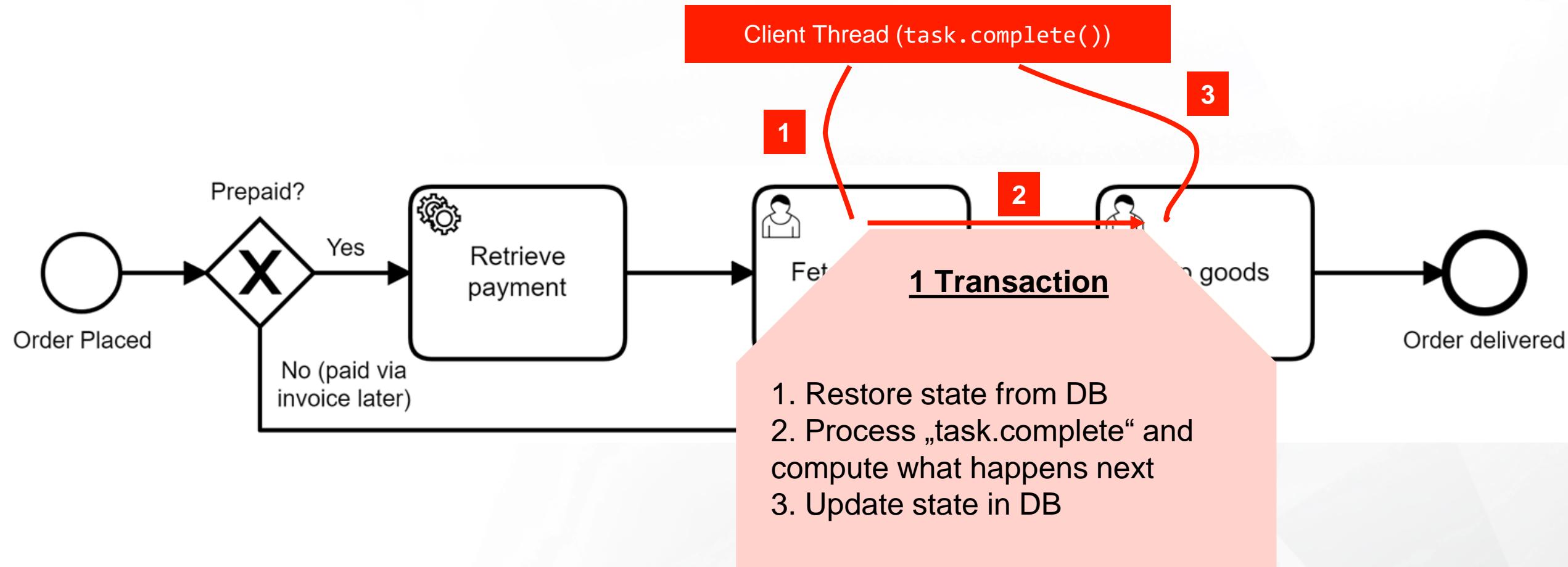
Embeddable workflow engine



other storage options:

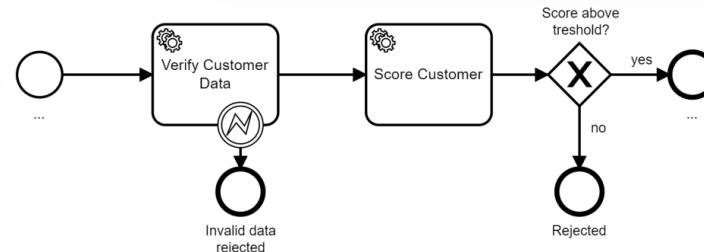


Threading & transactions



Data Patterns

Customer onboarding Service



Valida data:
References

Key	Value
customerId	42

Valida data:
Temporary simple data

Key	Value
validated	true

Complex Data Alternative 1:
Serialization

Key	Value
customer	{ "id": 42, "name": "bernd" }

Complex Data Alternative 2:
Externalized context

Key	Value
customerId	42

Requires own entity or table,
under your control:

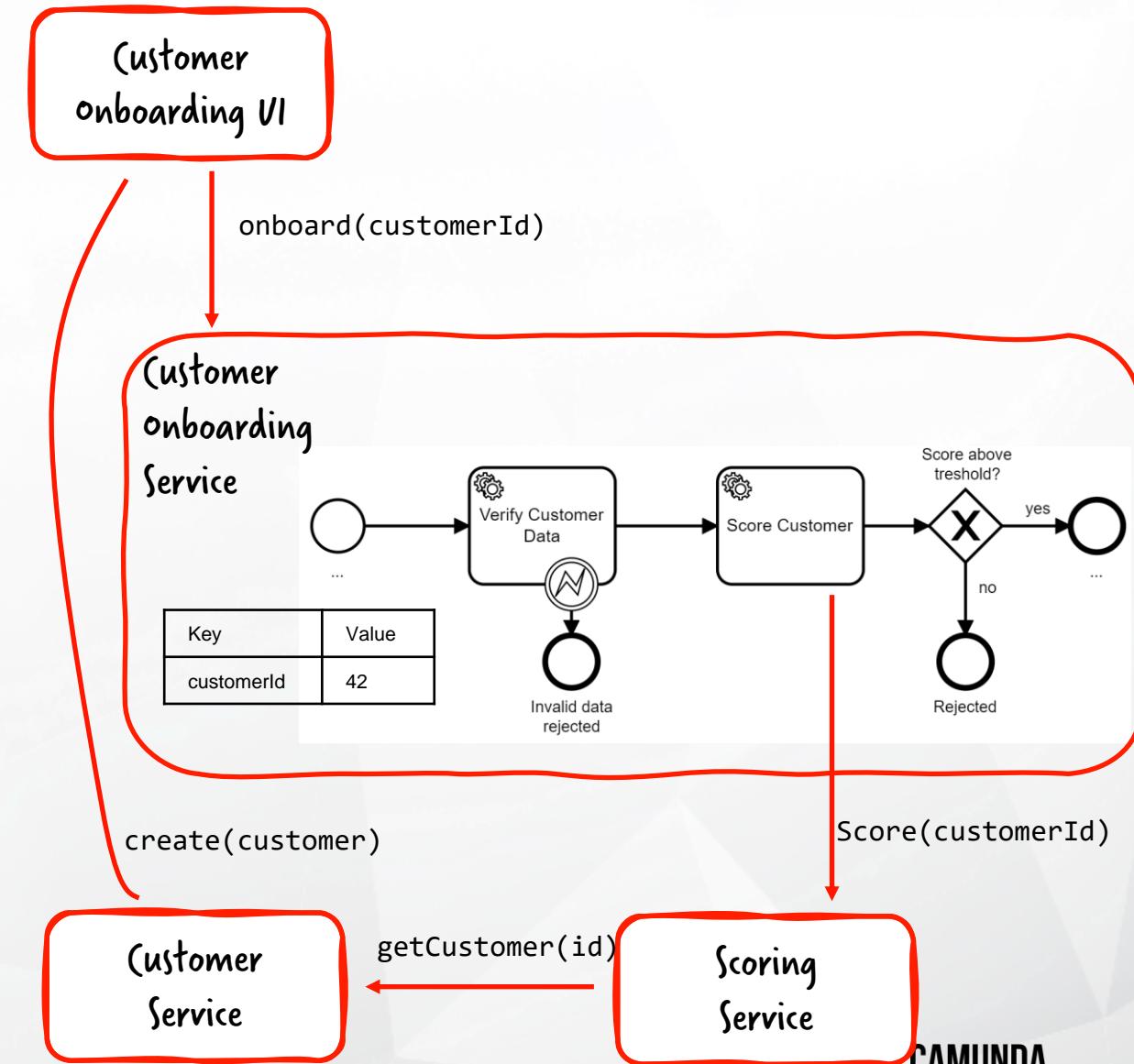
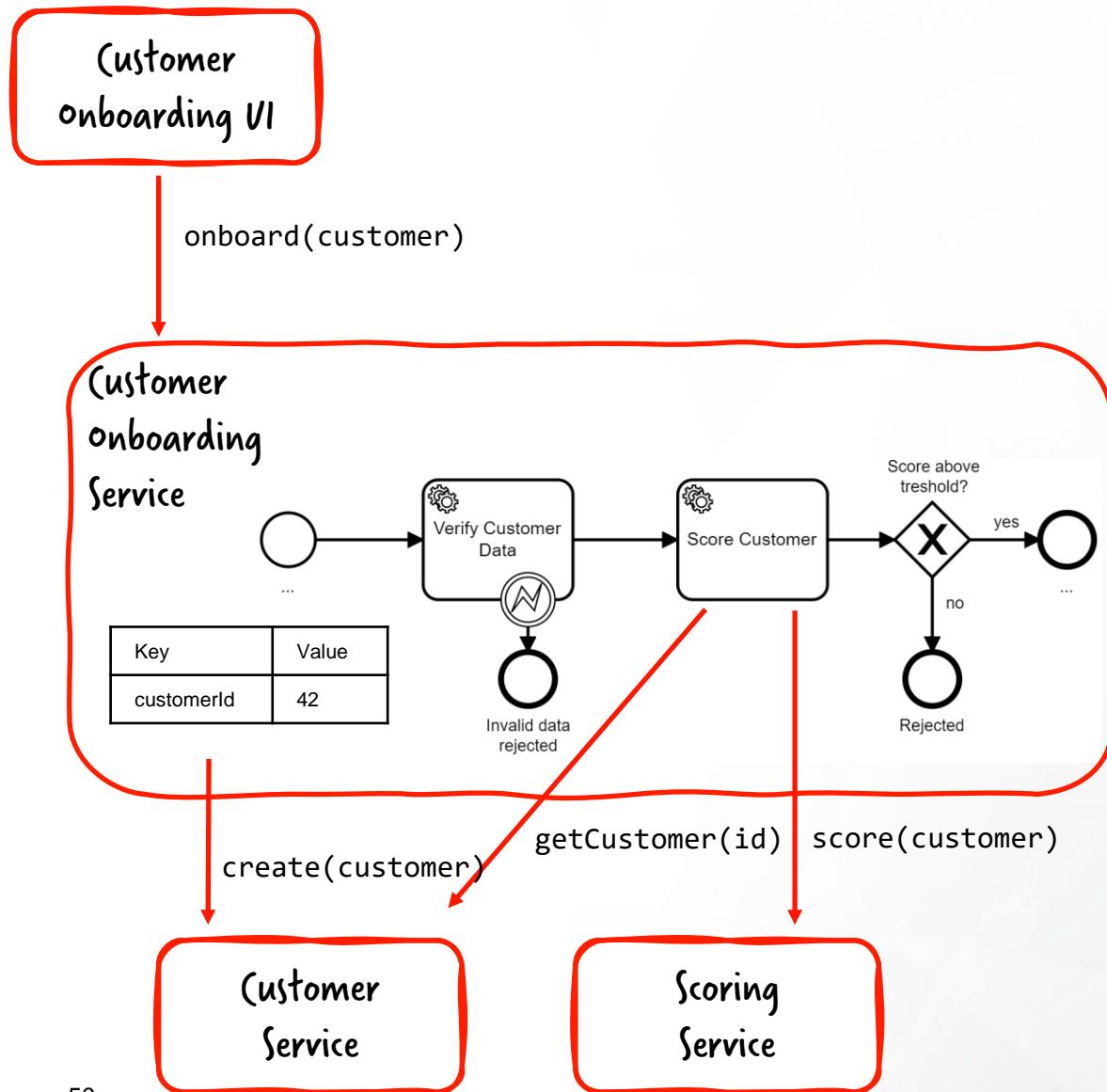
Id	Name
42	Bernd

Rule of thumb:

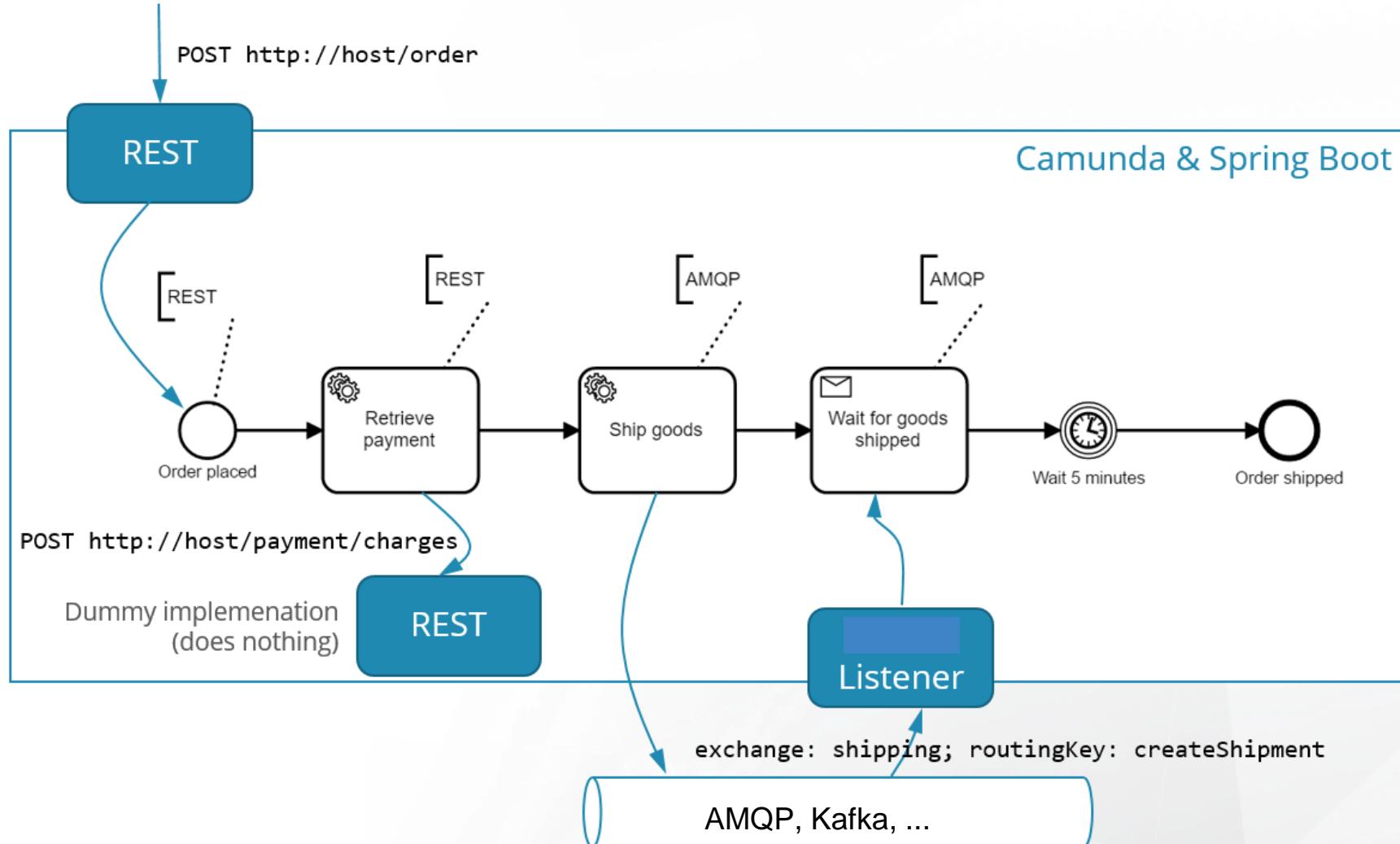
The workflow engine is not a data store!
As less data as possible

See also <https://camunda.com/best-practices/handling-data-in-processes/>

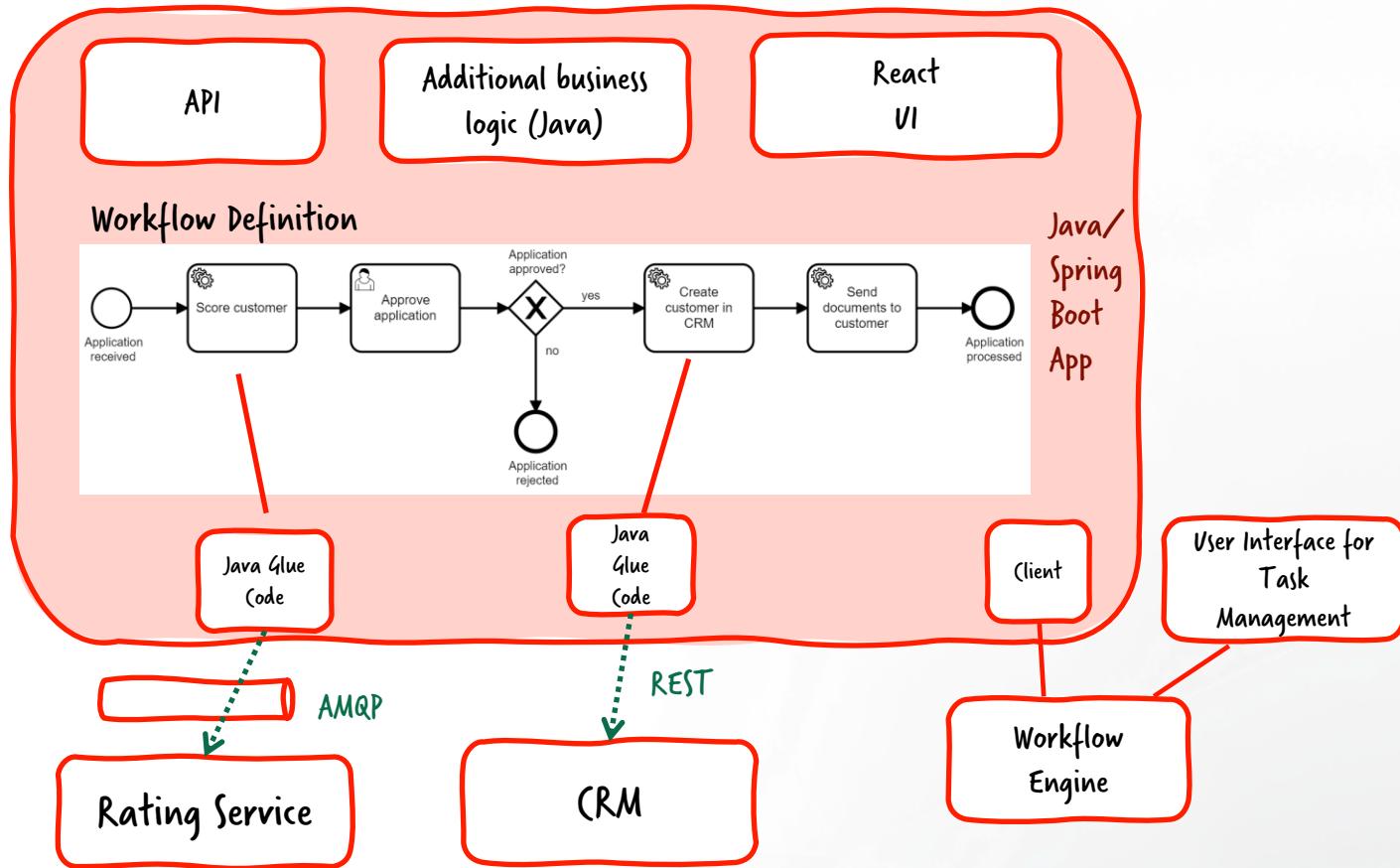
Data Flow



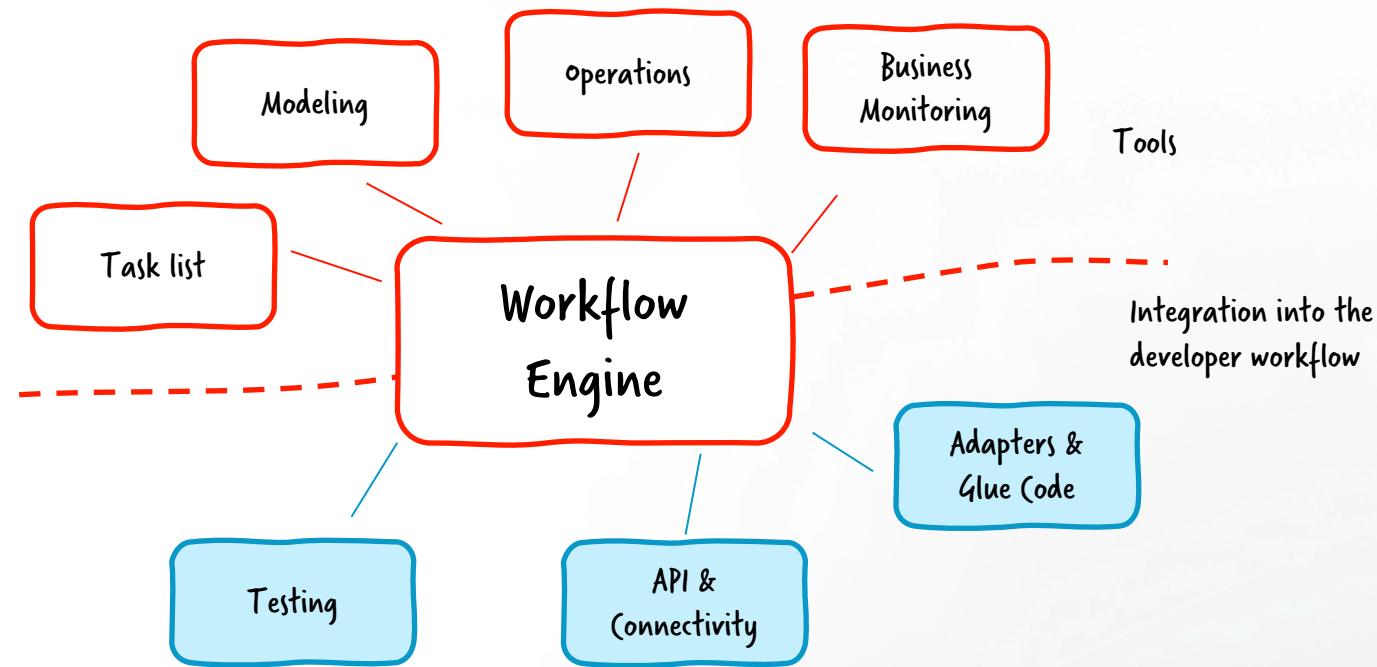
A typical technical stack



Example architecture



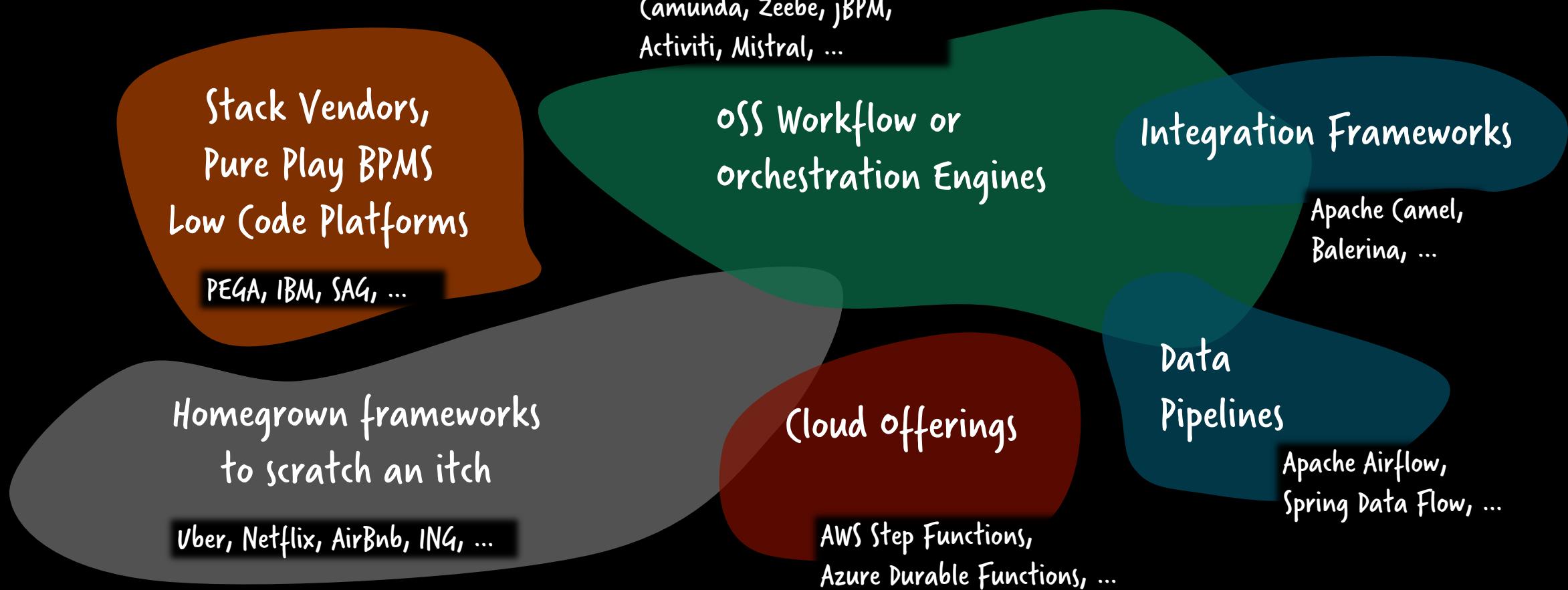
The typical process automation tool stack

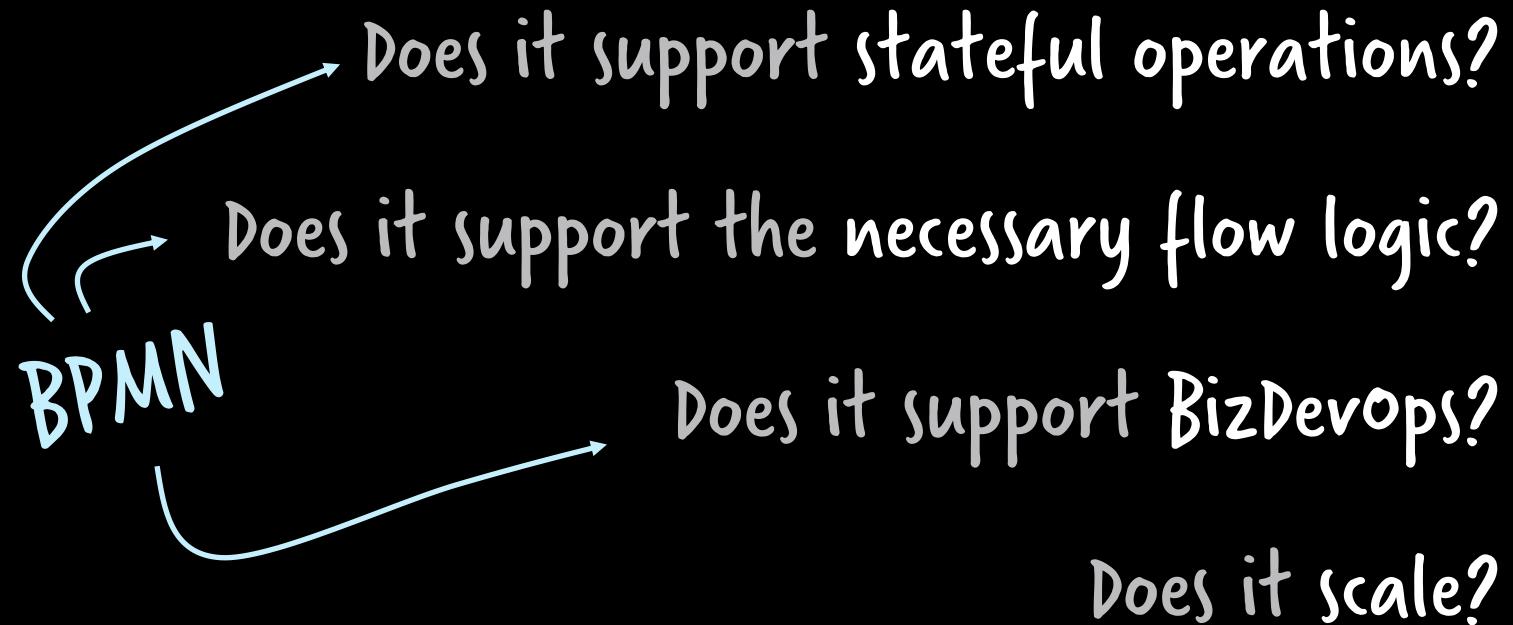


Thoughts on the state machine | workflow engine market



Thoughts on the state machine / workflow engine market





Lab 2: Add A Service Task

<https://github.com/berndruecker/oreilly-training-process-automation>



A close-up photograph of a white ceramic cup filled with coffee. The coffee has a layer of frothy milk on top, featuring a delicate latte art design resembling a leaf or fern. The cup sits on a matching saucer, which is placed on a light-colored wooden table with visible planks. The lighting is warm and focused on the cup.

Break: 5 Minutes

Use Cases

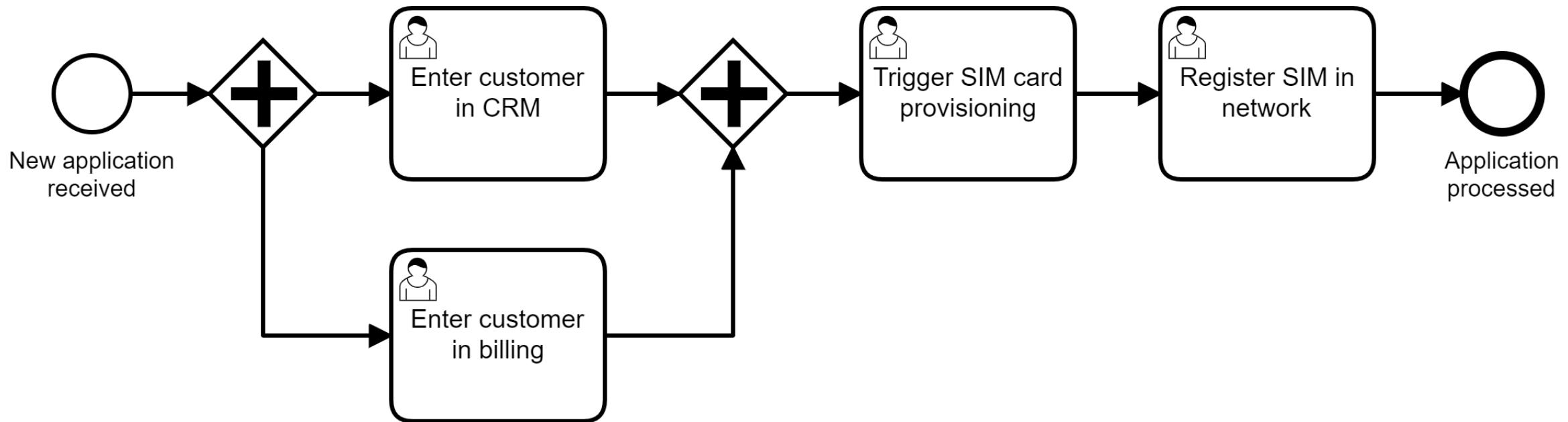
There are many use cases & terms for process automation:

- Business: End-to-End Business Processes, Straight-Through-Processing, Human Task Management
- Tech/Business: Orchestration, Saga Pattern
- Tech: Stateful retrying, Messaging Patterns, Outbox, ...

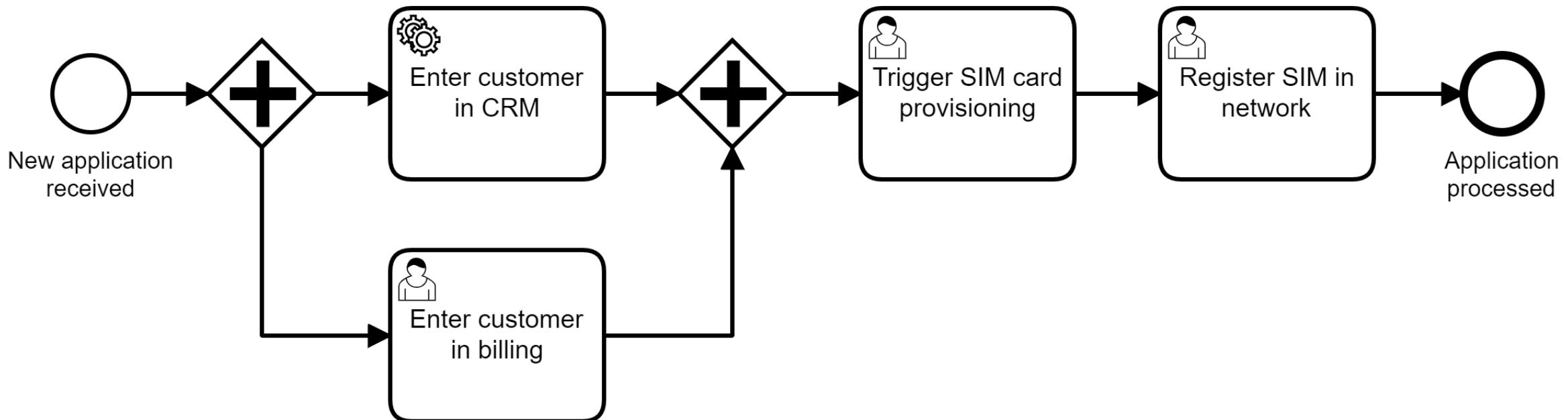
Customer onboarding again – but Telco this time



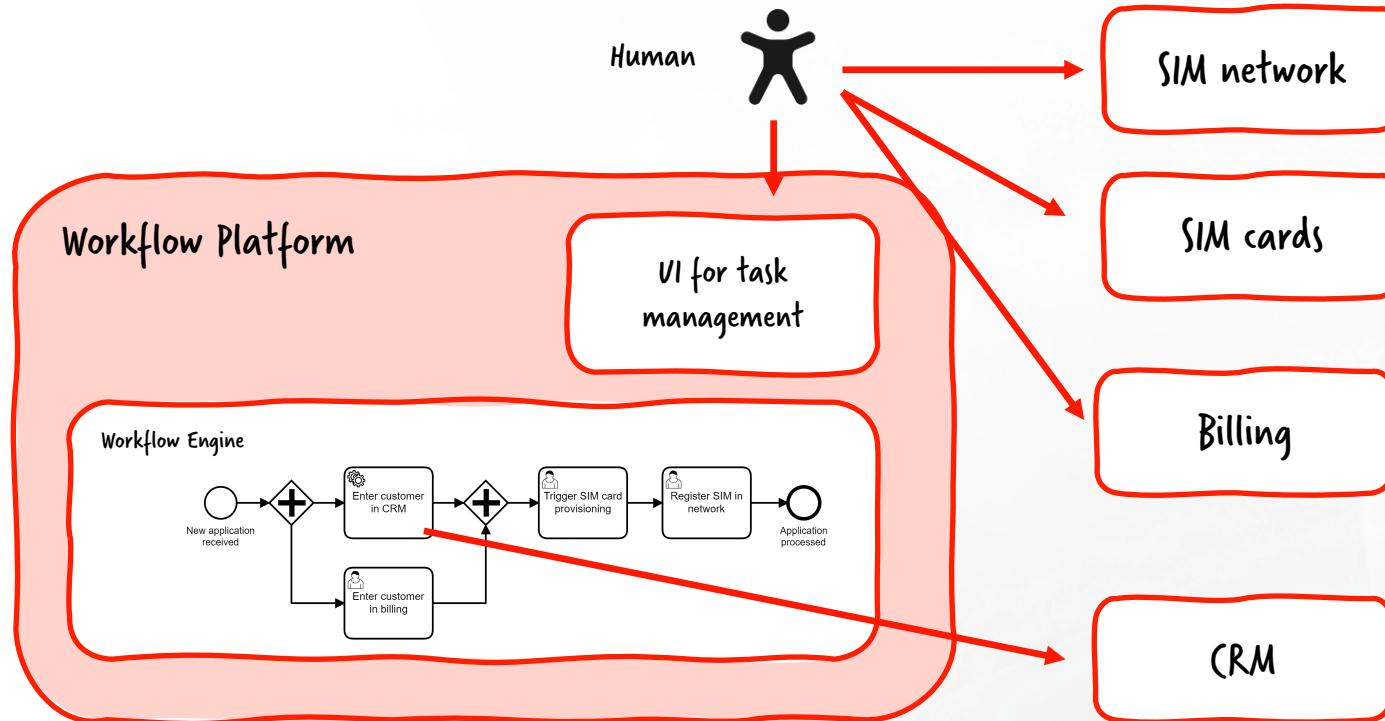
Orchestrate Humans = Human Task Management



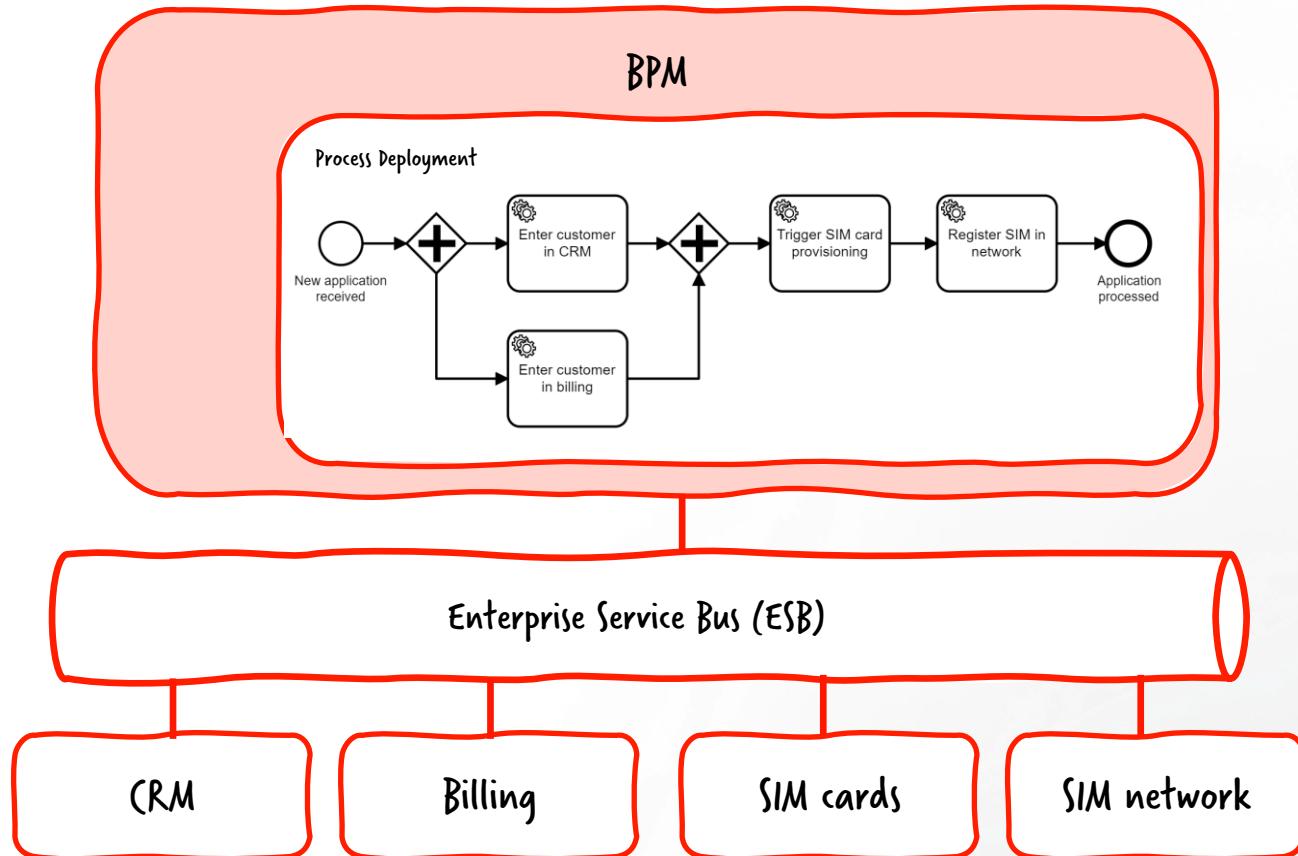
Orchestrate Applications or Services



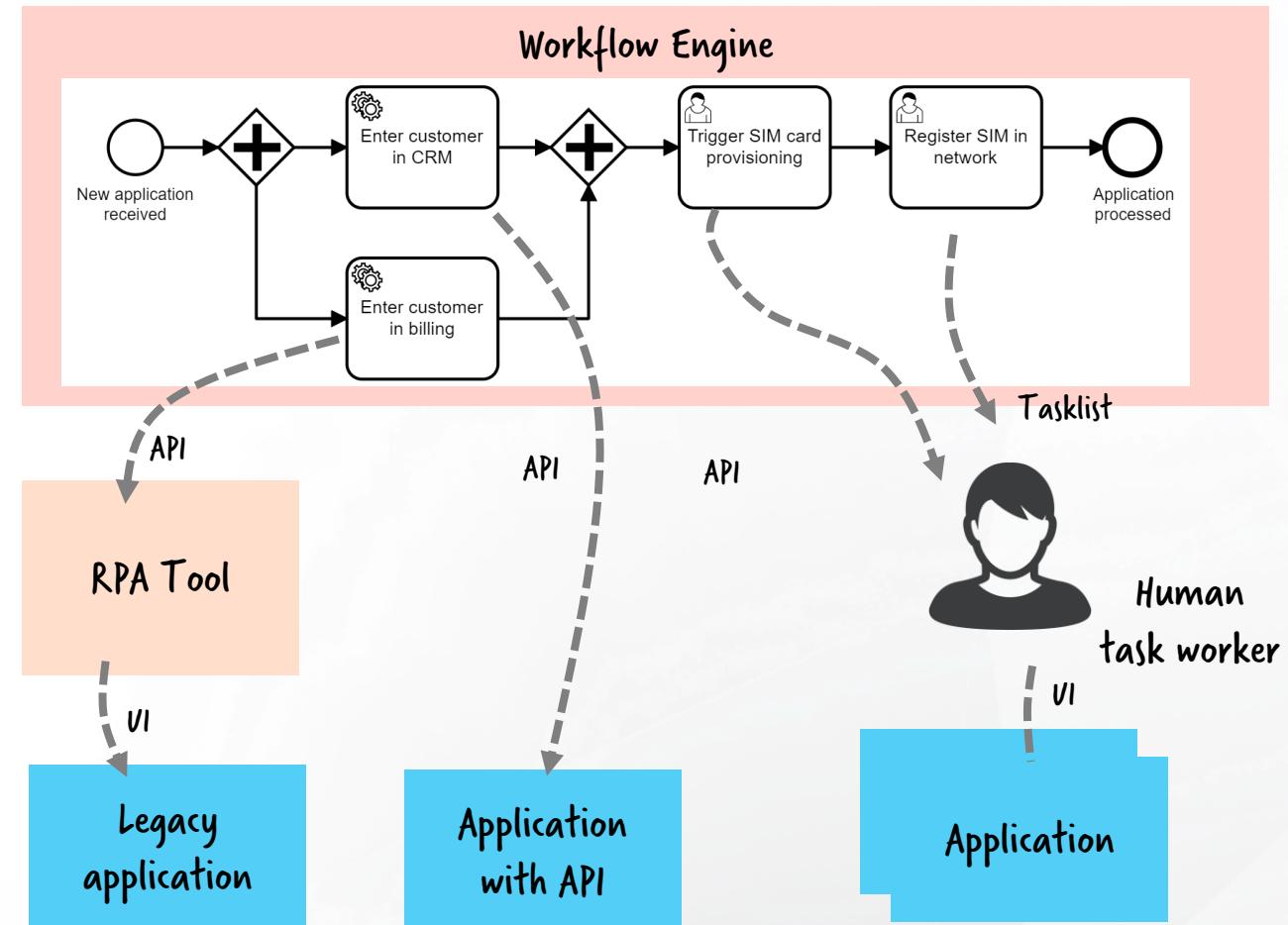
Orchestrate Applications or Services



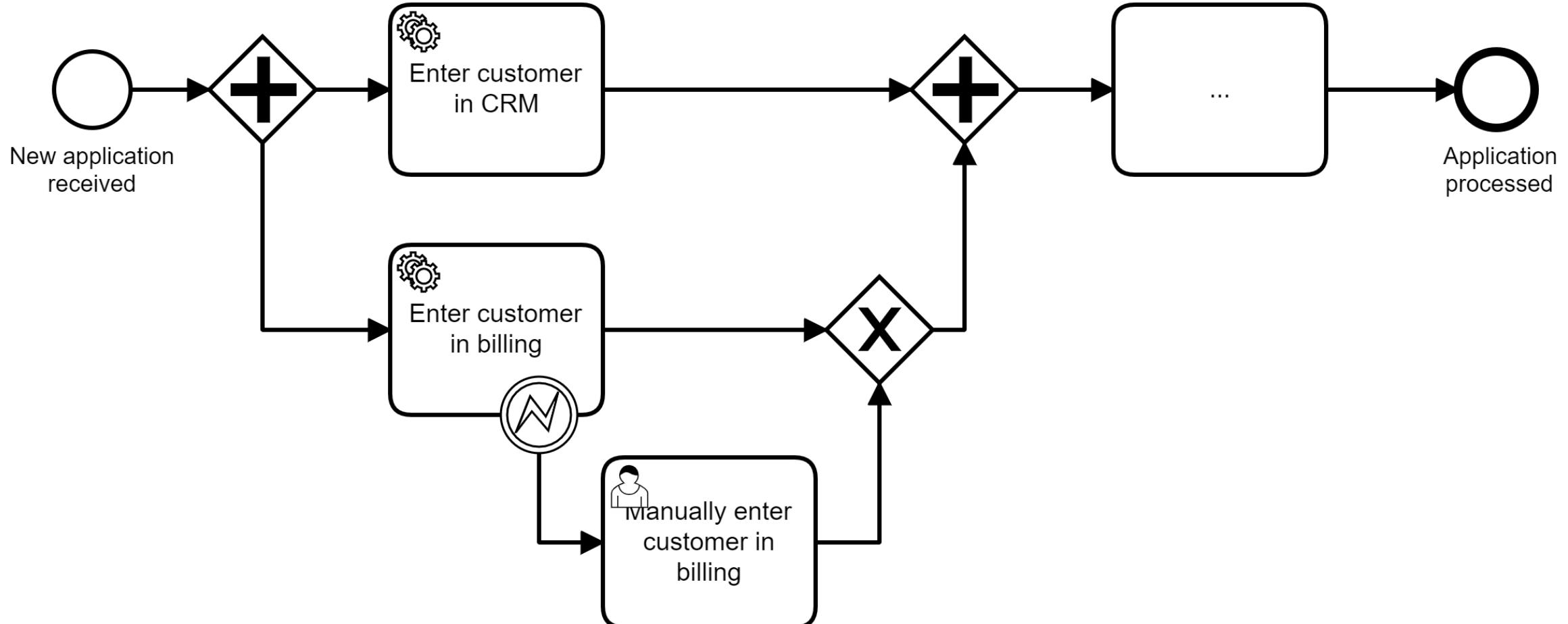
SOA



Orchestrate RPA bots



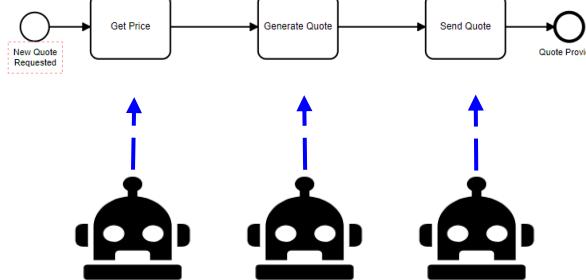
Human as „fallback“



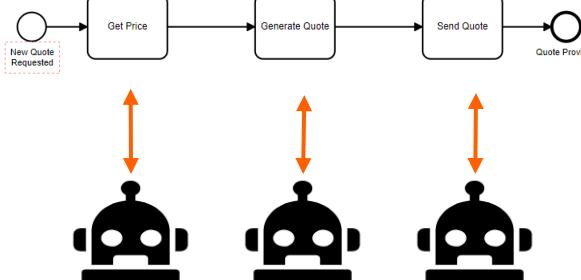
Change components without changing the orchestration

From RPA to API

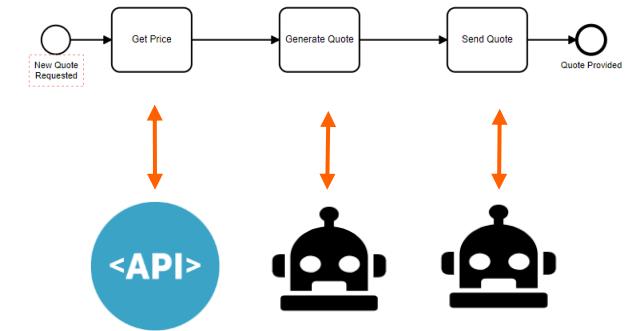
Stage 1 - Visibility



Stage 2 - Orchestration



Stage 3 - Modernization

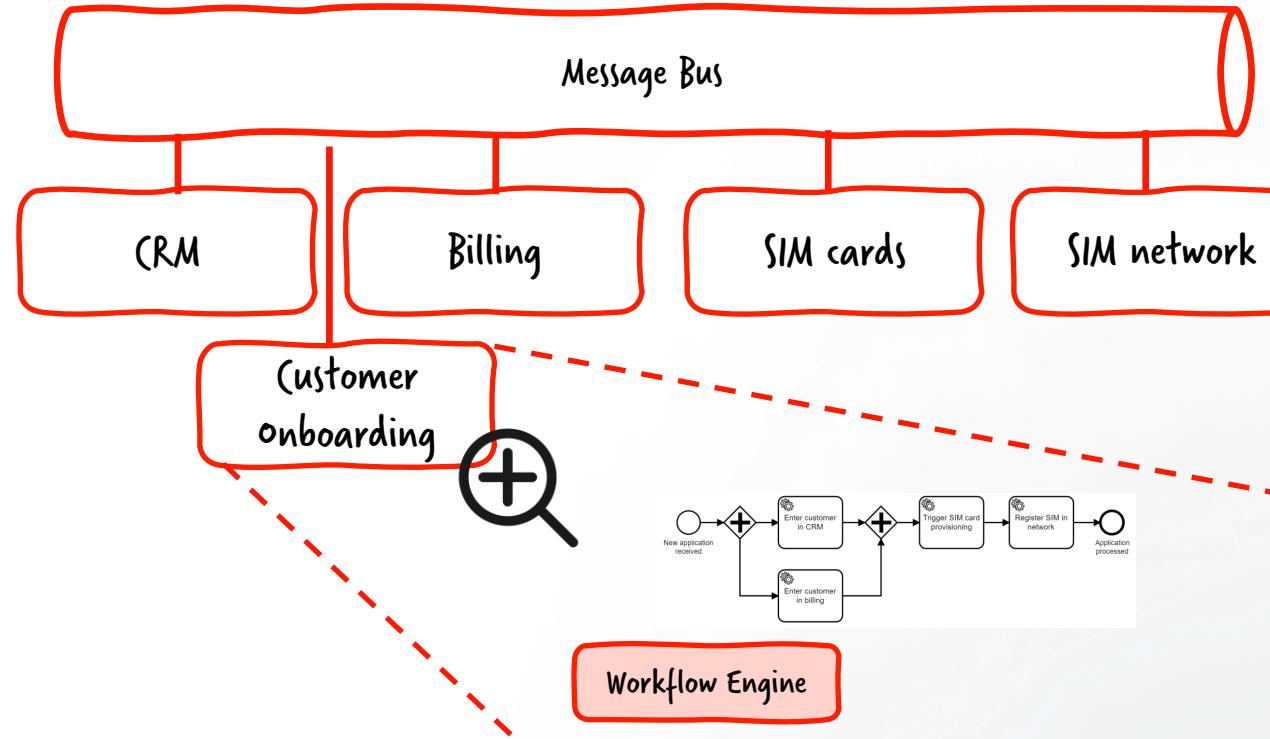


Short-term (Days / Weeks)

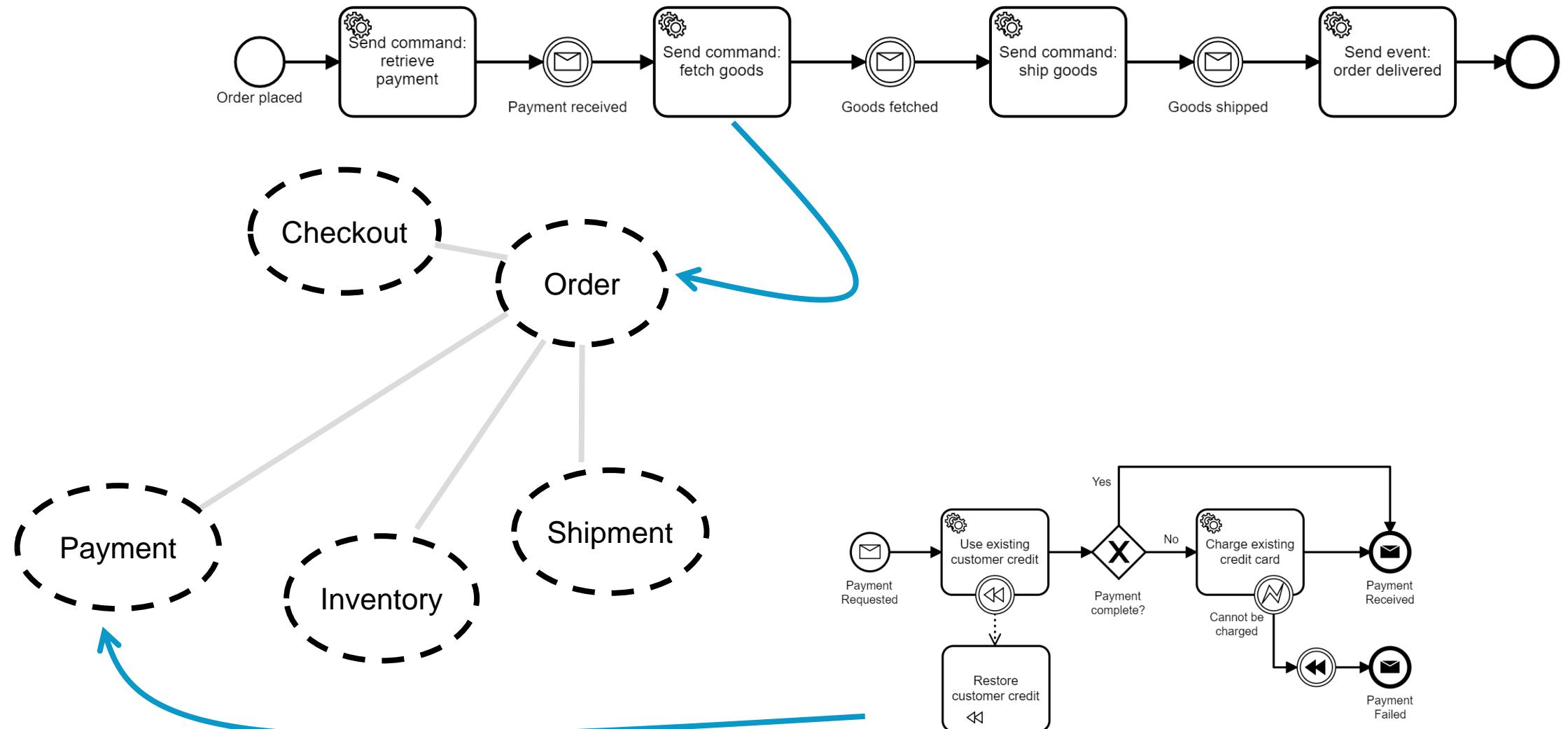
Mid-term (Weeks / Months)

Long-term (Months / Years)

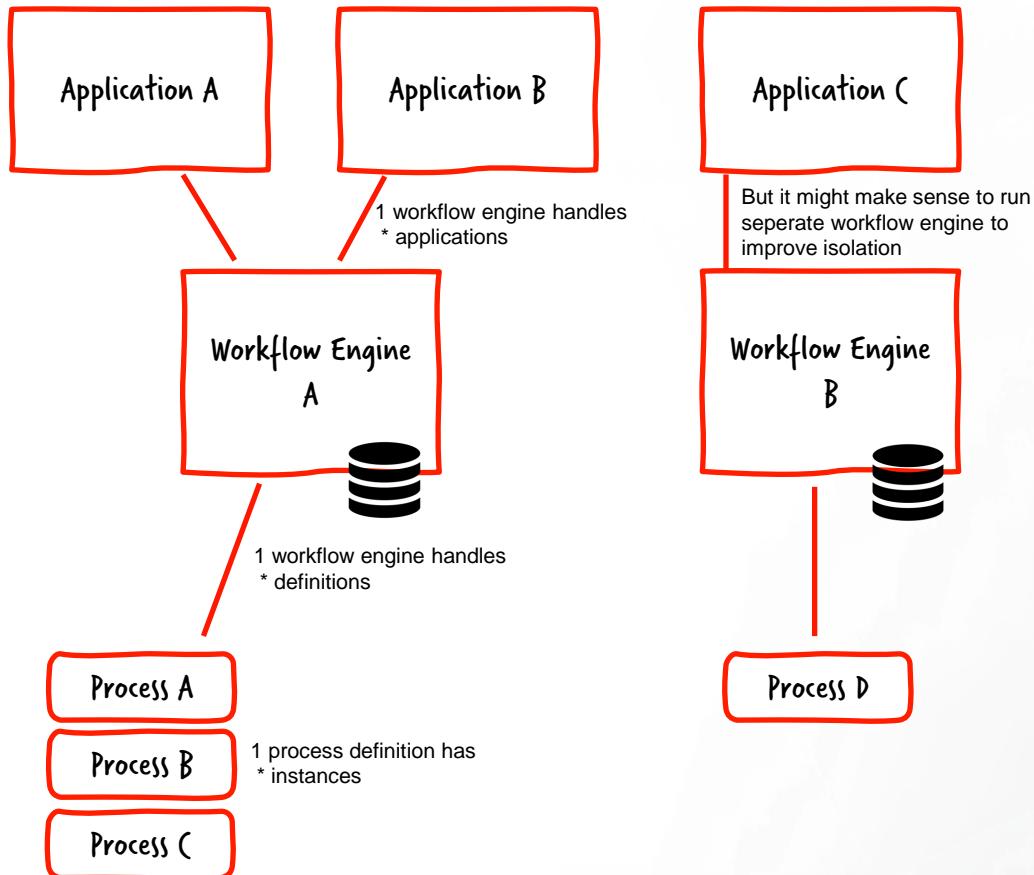
Orchestrate Microservices



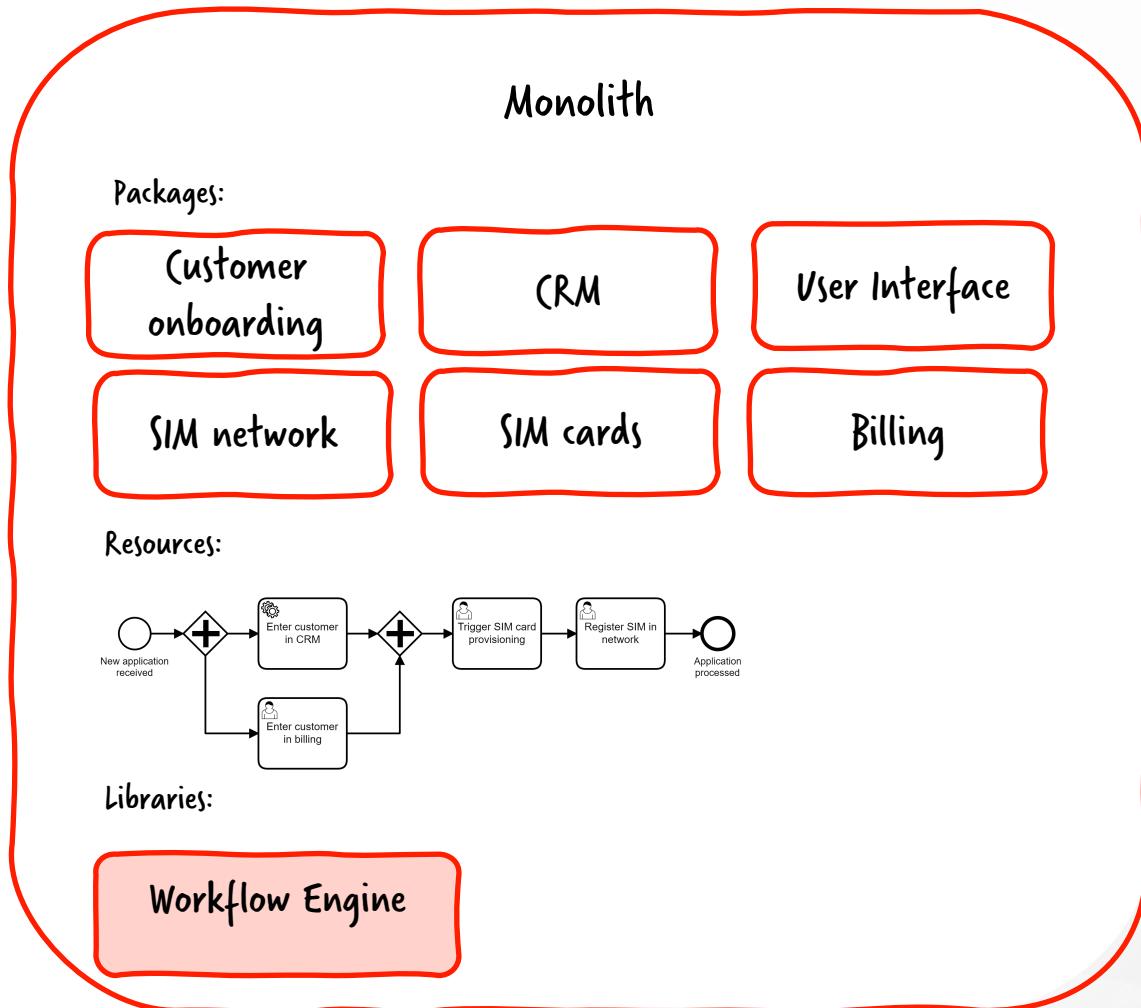
Every Service Owns Its Workflow (Engine)



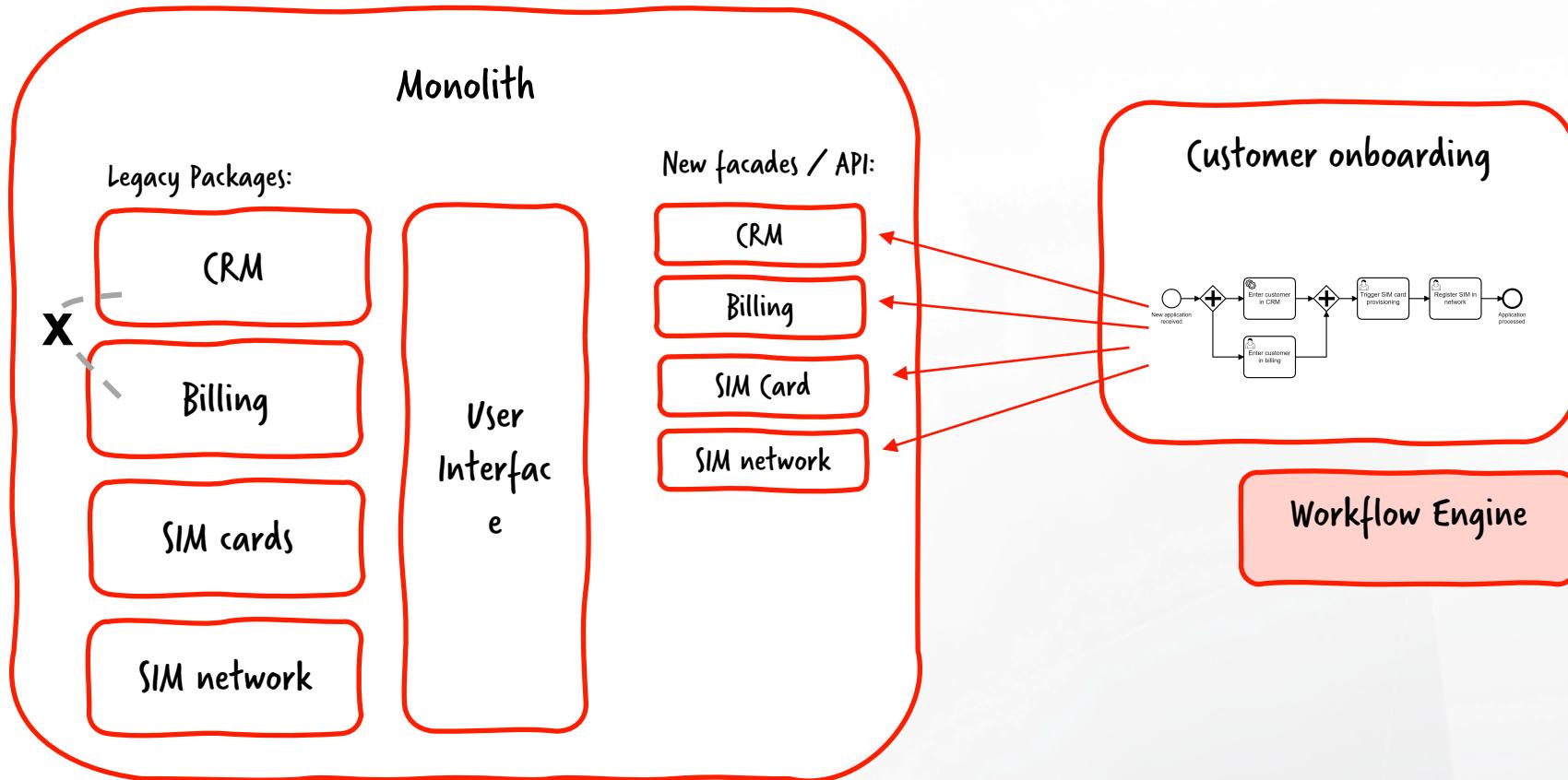
Cardinalities



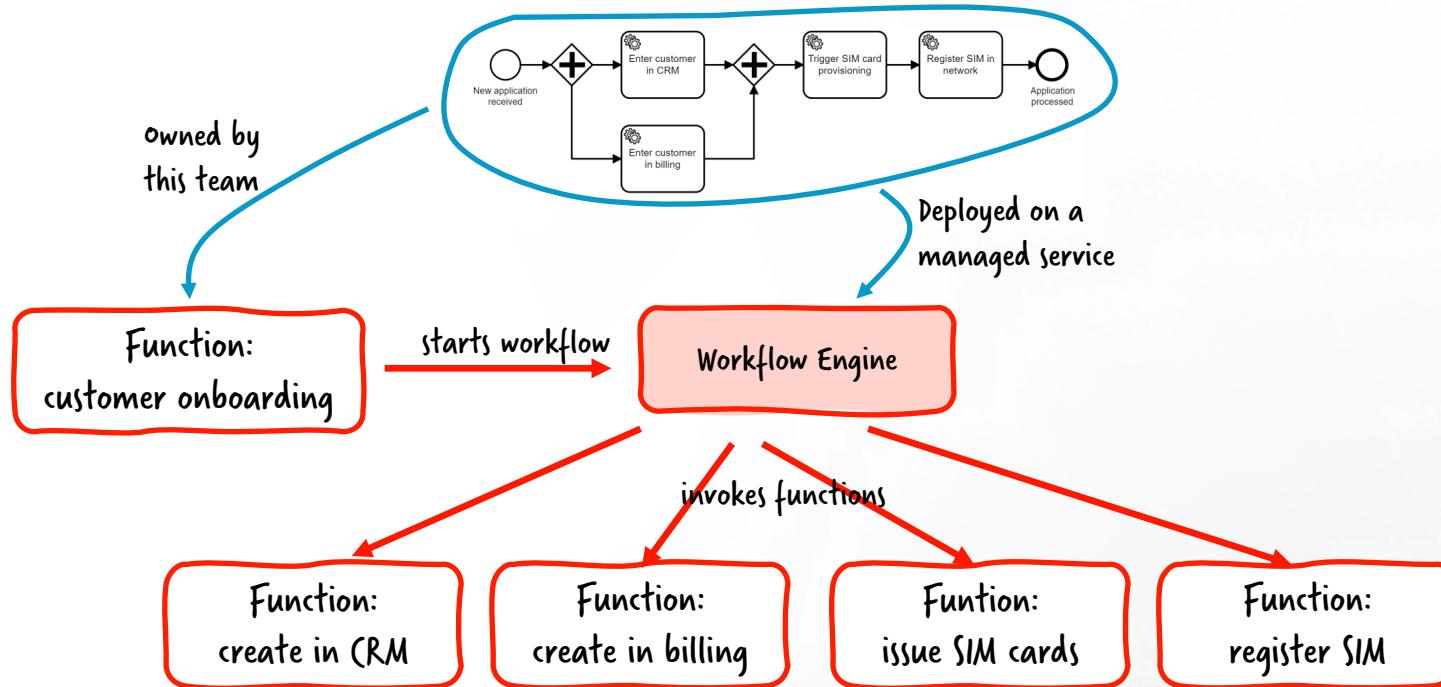
Orchestrate the monolith



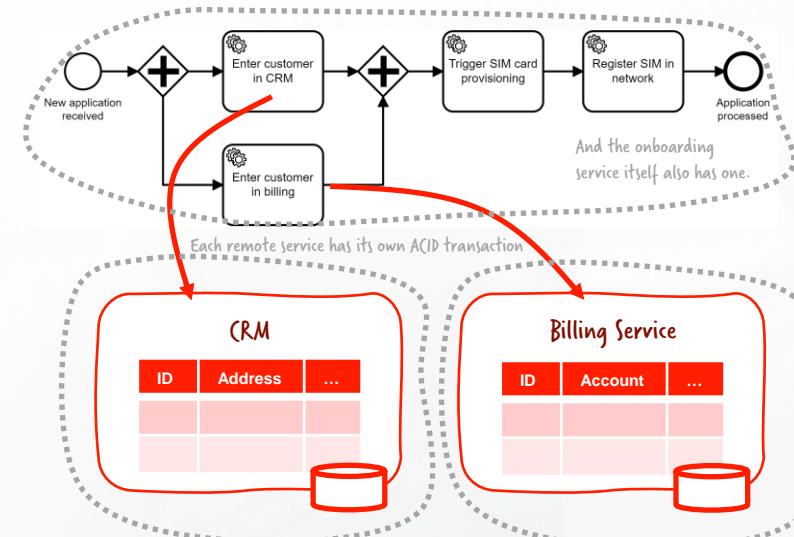
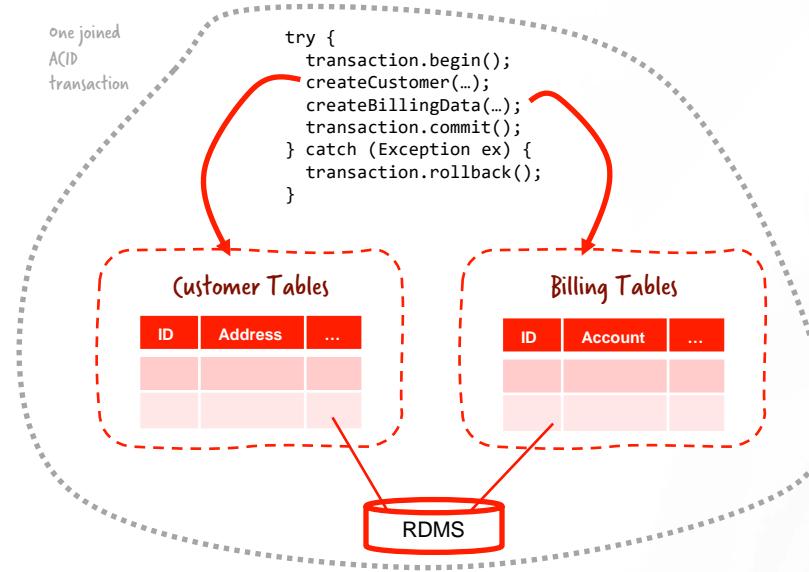
Deconstruct The Monolith



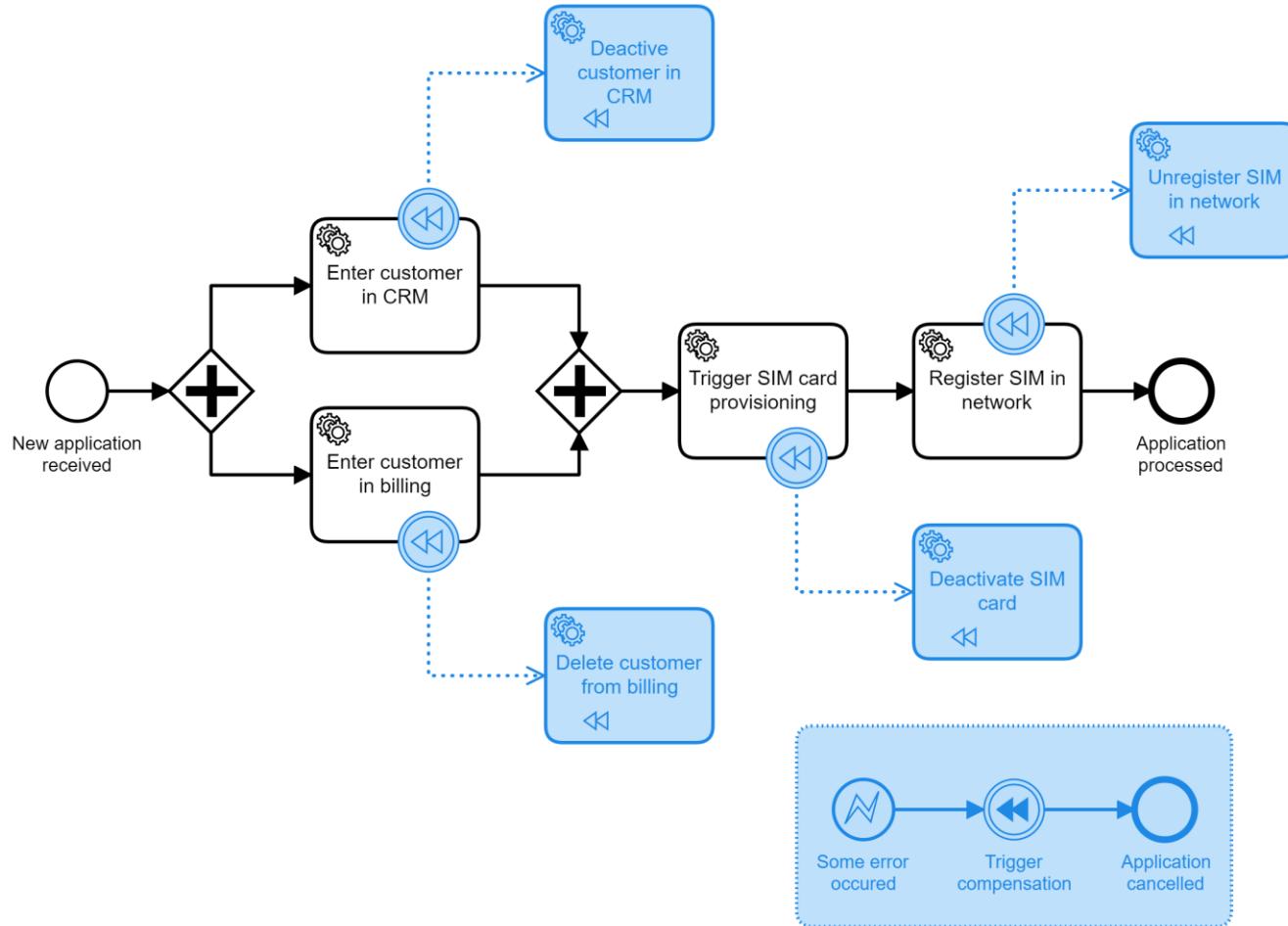
Orchestrate Functions



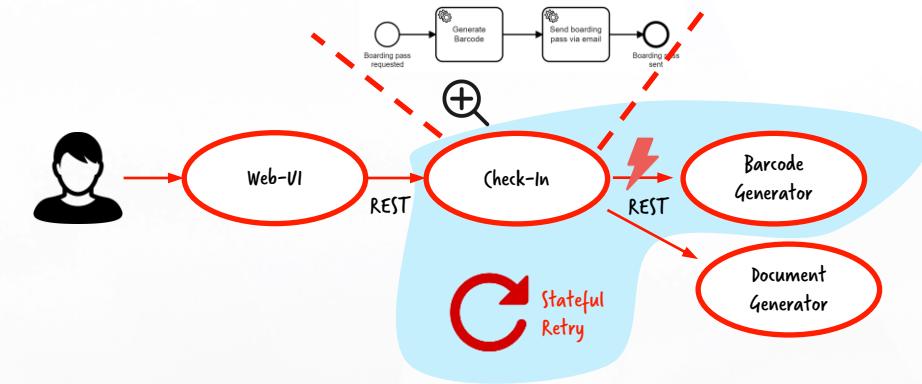
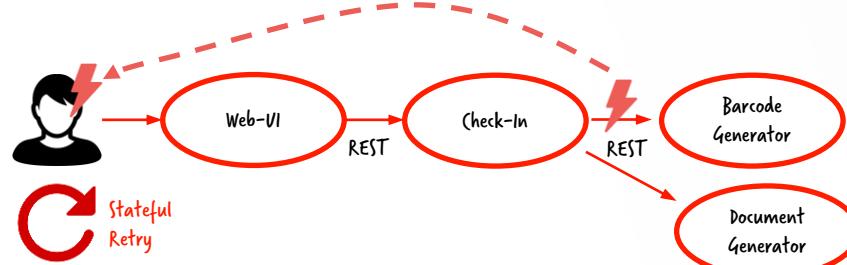
ACID transactions and microservices



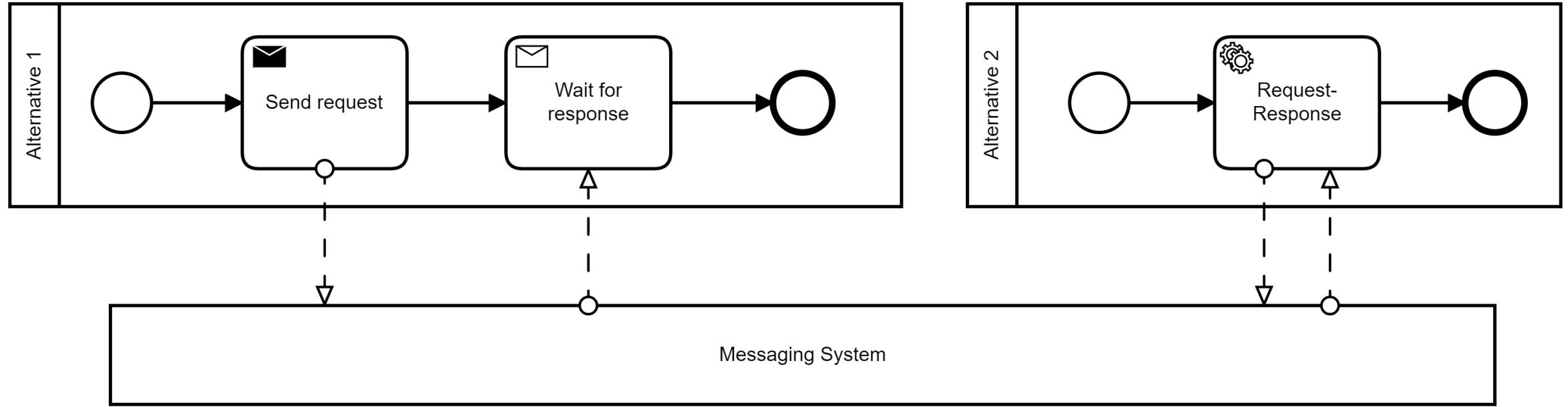
Saga pattern in BPMN



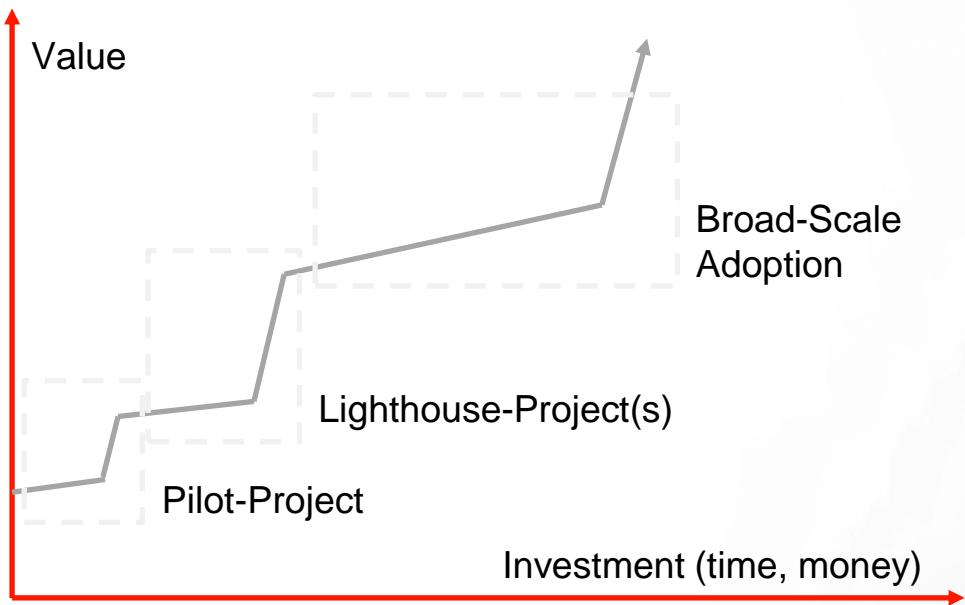
Synchronous communication



Asynchronous communication



Get going



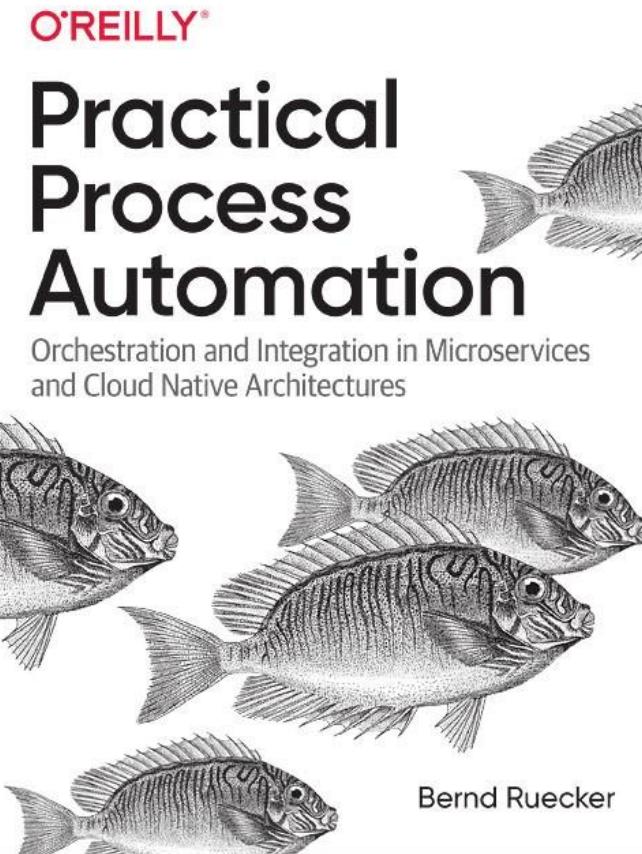
There is more...

- Business-IT-Collaboration / BizDevOps
- Process Visibility, also for heterogenous environments
- Process automation as a service / Cloud
- ...



Some Pointers

- Talks: <https://berndruecker.io/>
- Get Started Guides, e.g. Camunda:
<https://docs.camunda.org/get-started/>
- Book: <https://learning.oreilly.com/library/view/practical-process-automation/9781492061441/>
- Blog: <https://blog.bernd-ruecker.com/>
- Feel free to reach out: mail@berndruecker.io



Thank you for attending!

