

Workflow Engines
Lovelier than you expect
and more diverse than
you think!

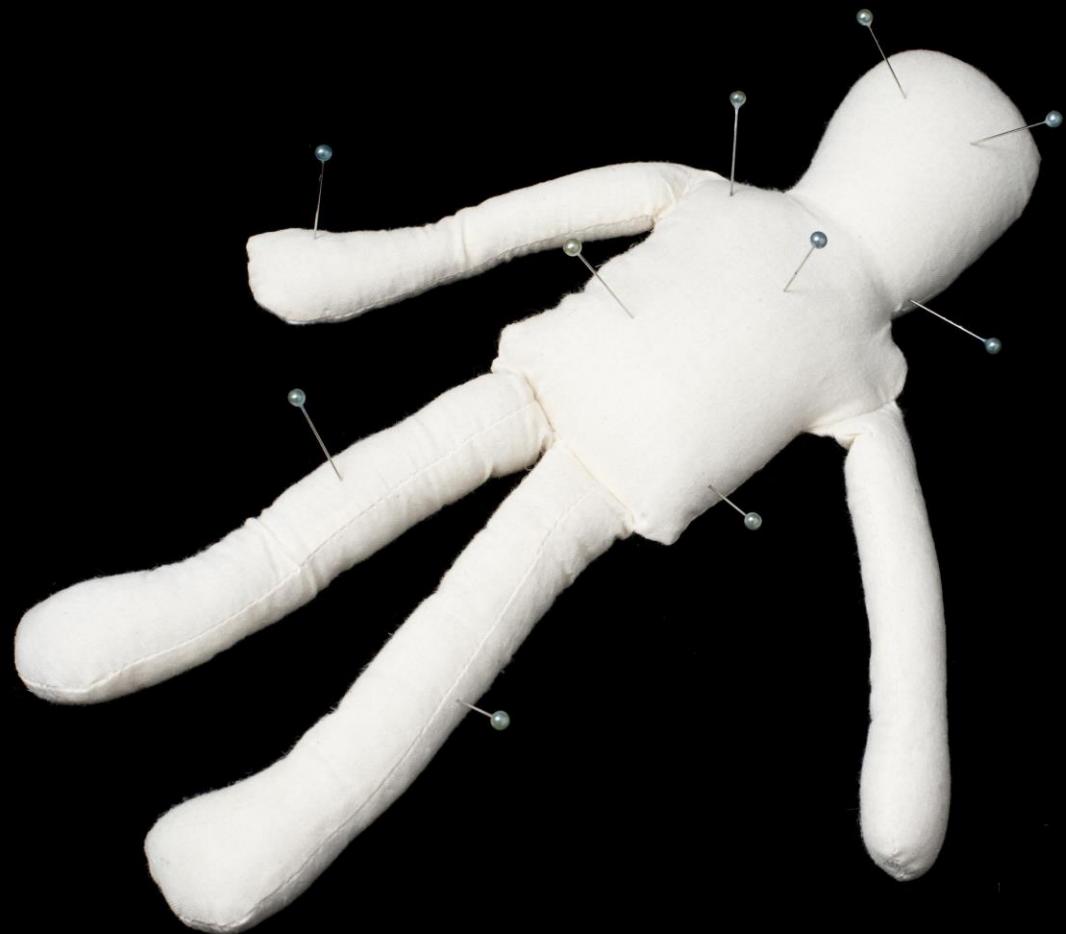
@berndruecker



Workflow Engines...

Do you mean BPM?

Wrong Perception of „BPM“ (Business Process Management)



Google for „BPM Frameworks“

BPM Capability Framework | BPM in the Digital Age
digital-bpm.com

Datei:BPM-Framework.png – Wikipedia de.wikipedia.org

Enterprise BPM framework
ariscommunity.com

Enterprise BPM Framework
slideshare.net

Enterprise BPM framework
ariscommunity.com

Enterprise BPM Framework
slideshare.net

Part 13: Enterprise BPM
blogs.sap.com

The BPM-D Process Framework – The Proces...
researchgate.net

An Exploration into Future Business Process Manag...
link.springer.com

Business Process Management
ventum-consulting.com

Enterprise BPM Framework
slideshare.net

Business Process Management Framework for Ana...
ebrary.net

Part 10: Enterprise BPM framework; The matu...
blogs.sap.com

History SAP BPM Framework - [PDF Doc...
documents.pub

BPM Industry Framework | BPM Partners
bpmpartners.com

Class Notes: Considerin...
bptrends.com

Business process management - Wikipedia en.wikipedia.org

BPM, BPM Training, BPM Training in India...
silverfirconsulting.com

The Business Performance Management (BPM) Frame...
artim.consulting

VBE & VO Integral Business Pro...
researchgate.net

Google for „low code“

Google search results for "low code".

Search filters: Creative-Commons-Lizenzen.

Image 1 (circled in red): A person sitting at a desk working on a laptop, with a thought bubble showing a brain, representing low-code/no-code tools.

Image 2 (circled in red): A screenshot of the Verge3D software interface showing a 3D scene with objects and a camera view.

Image 3 (circled in red): A screenshot of the Arduino IDE showing a sketch with code and a breadboard simulation.

Image 4 (circled in red): A screenshot of the Drupal 8 interface with a green arrow pointing to the "Configuration" menu.

Image 5 (circled in red): A diagram titled "Drupal's long-term growth obstacles" by Dries Buytaert, listing challenges like "Political control and fully decentralized governance", "Complexity", and "Market fragmentation".

Image 6 (circled in red): A screenshot of the Semaforo code editor showing multiple tabs of code.

Image 7 (circled in red): A screenshot of the Verge3D workflow interface.

Image 8 (circled in red): A yellow road sign with a red diagonal slash over the text "Dummerstorf Pankelow".

Image 9 (circled in red): A yellow road sign with a red diagonal slash over the text "Gägelow Jamel".

Image 10 (circled in red): A screenshot of the Délectronique software interface.

Image 11 (circled in red): A screenshot of the Cimaware software interface.

Image 12 (circled in red): A screenshot of the AWS Lambda interface.

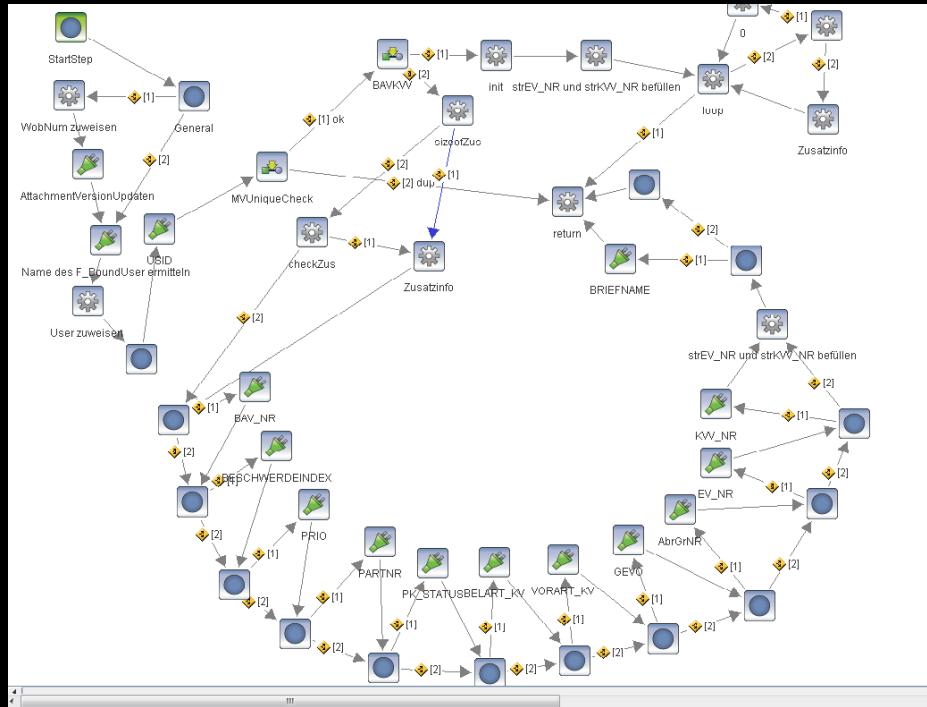
Image 13 (circled in red): A screenshot of the Microsoft App Studio interface.

Image 14 (circled in red): A screenshot of the Excel repair software interface.

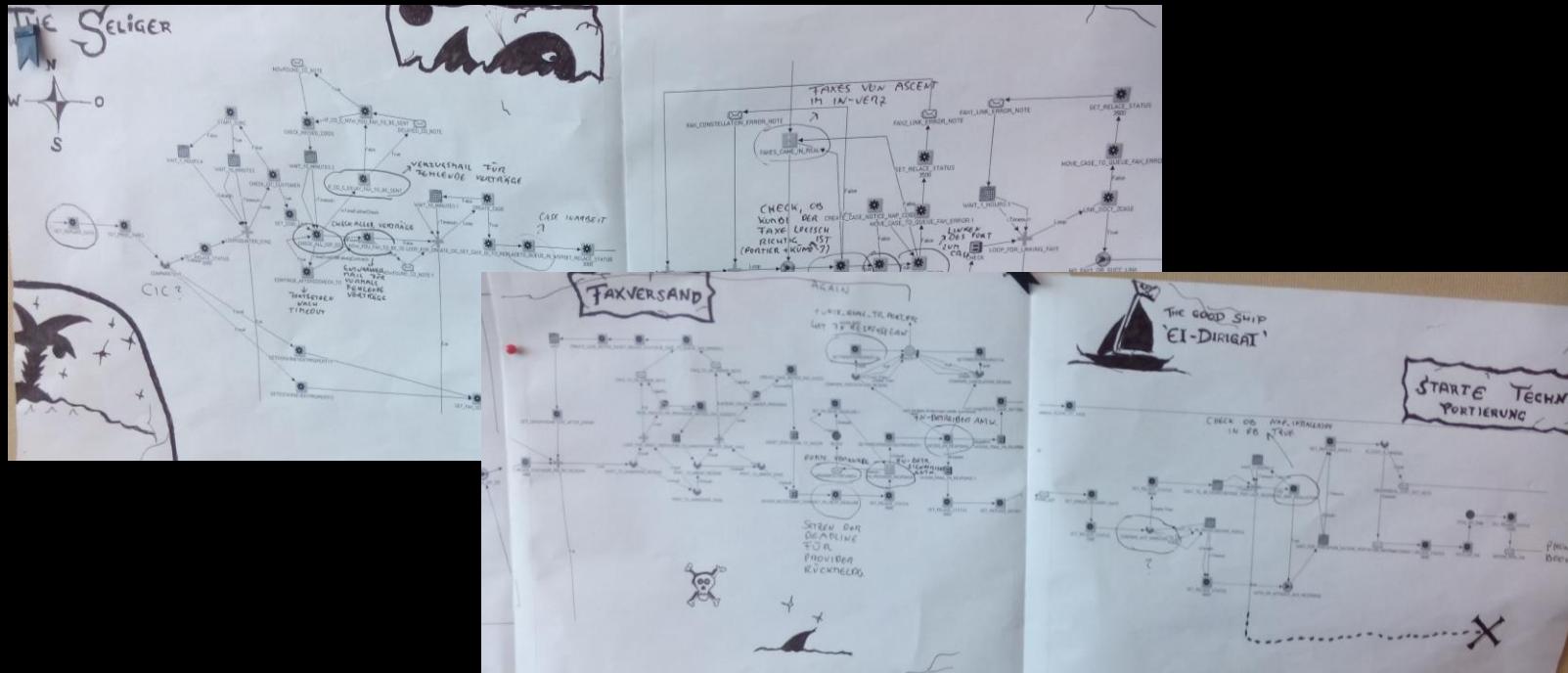
Image 15 (circled in red): A screenshot of the International Small Business Journal.

Image 16 (circled in red): A screenshot of the Codecademy interface.

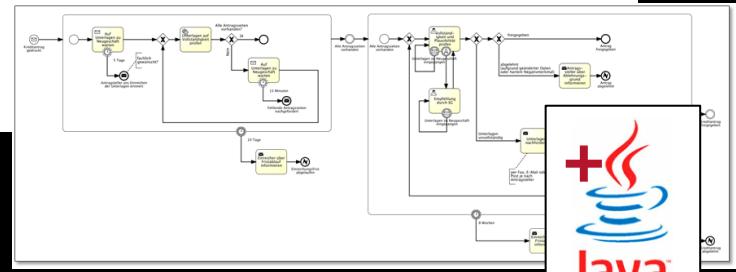
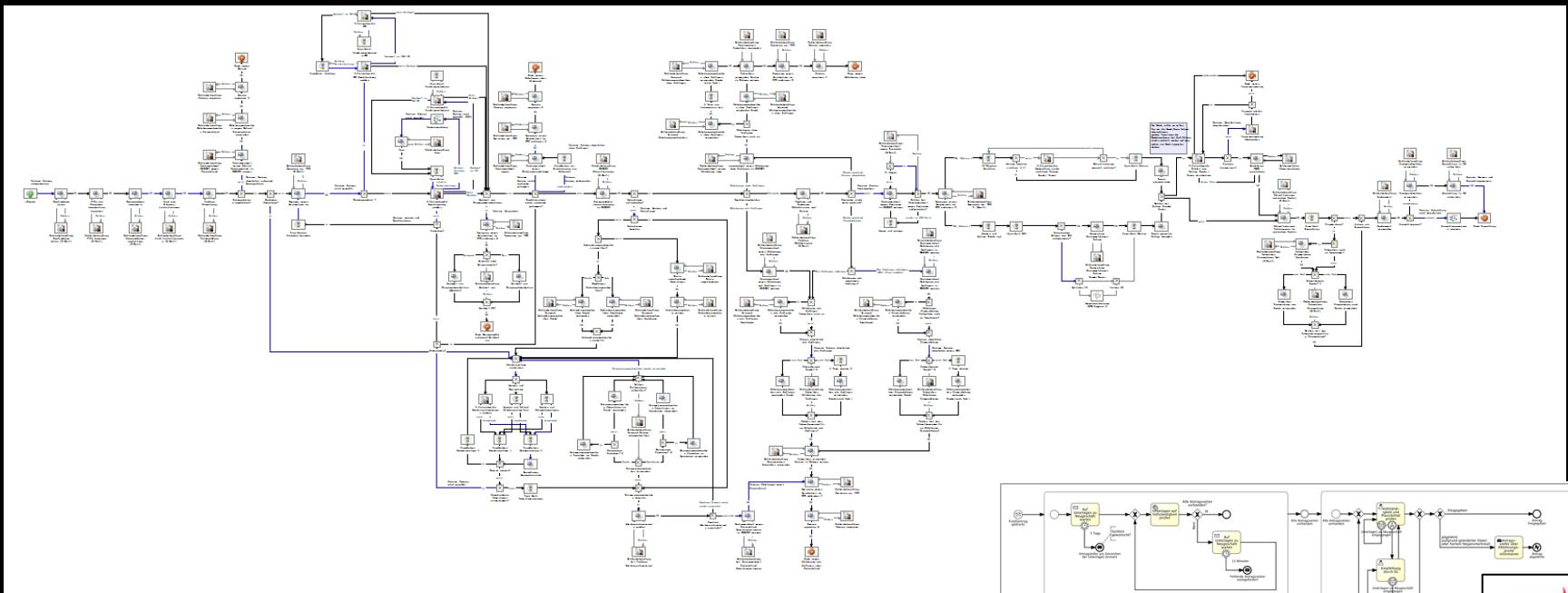
Models From the Wild...



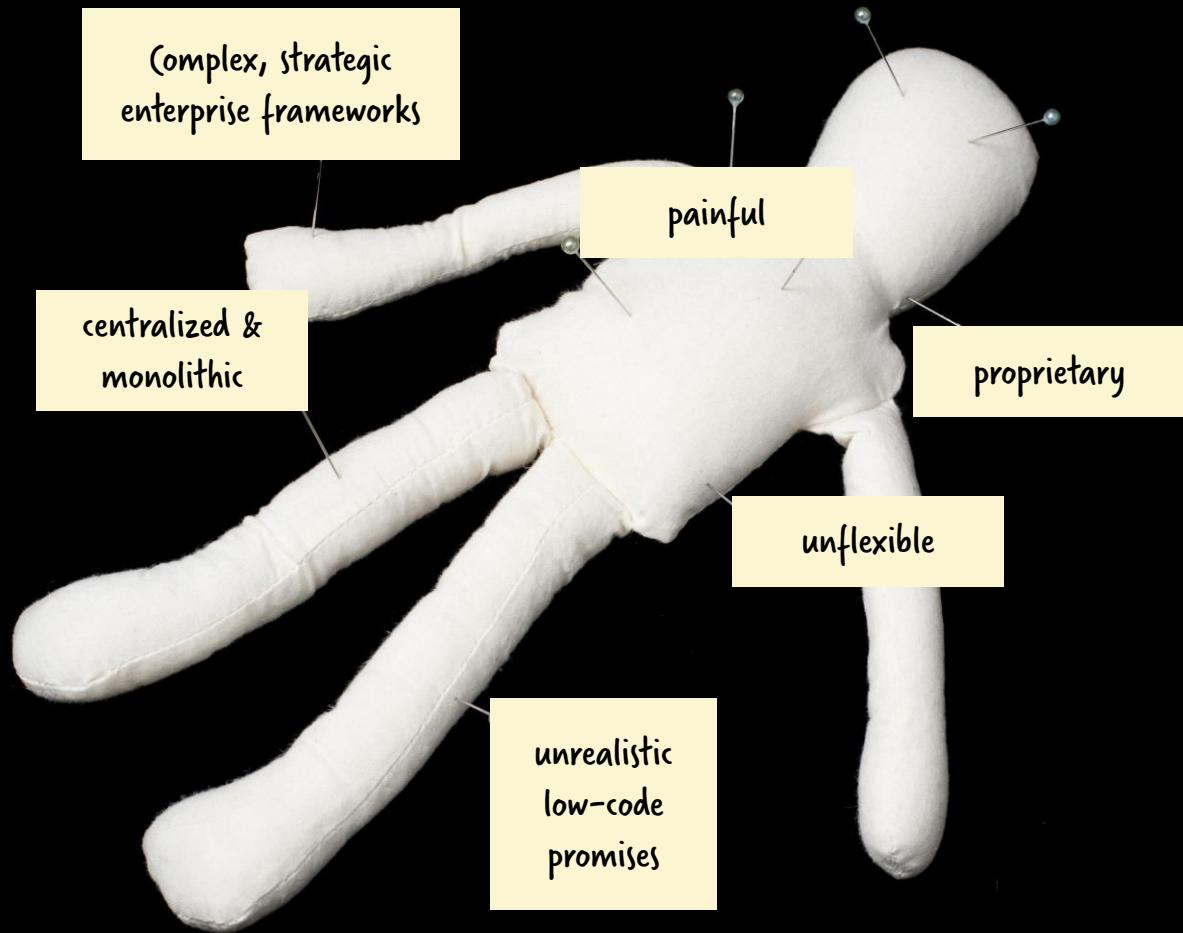
Models From the Wild...



Models From the Wild...



Wrong Perception of BPM

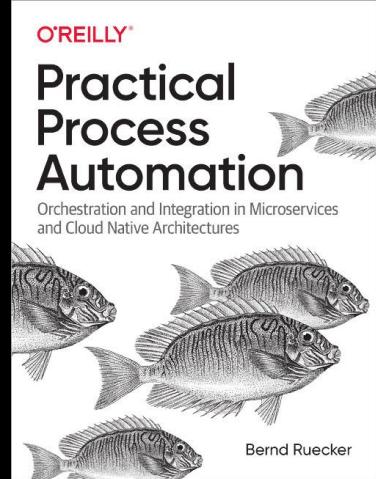


**Warning:
Contains Opinion**

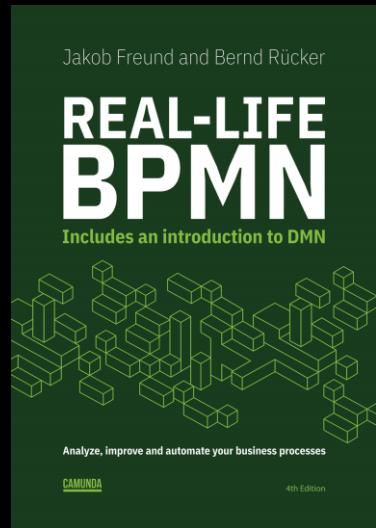


Bernd Ruecker
Co-founder and
Chief Technologist of
Camunda

mail@berndruecker.io
[@berndruecker](https://berndruecker.com)
<http://berndruecker.io/>



Jakob Freund and Bernd Rücker





” 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.

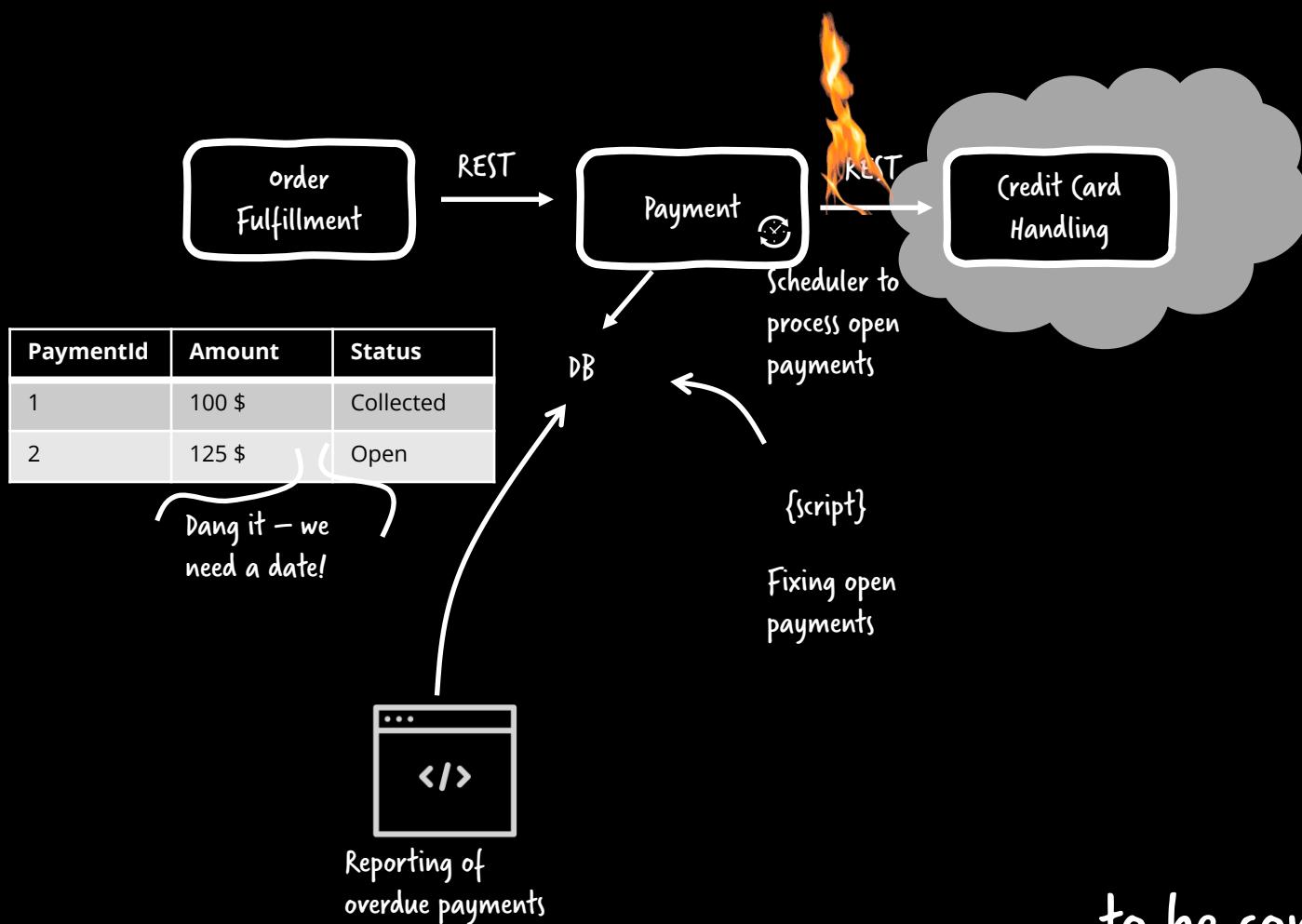
But we do know that we will need something.

We have to be able to move quickly!

(Io of a German insurance company in 2019

And you?

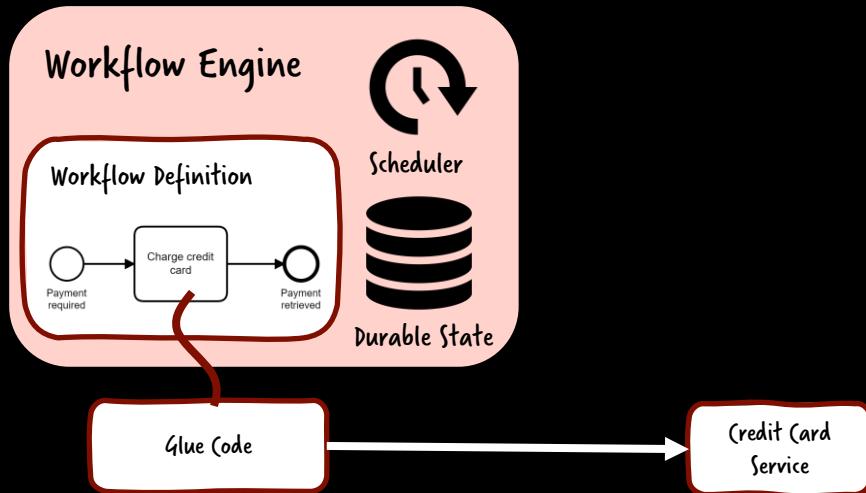




...to be continued...

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Using a workflow engine instead



Workflow Engine:

Is stateful

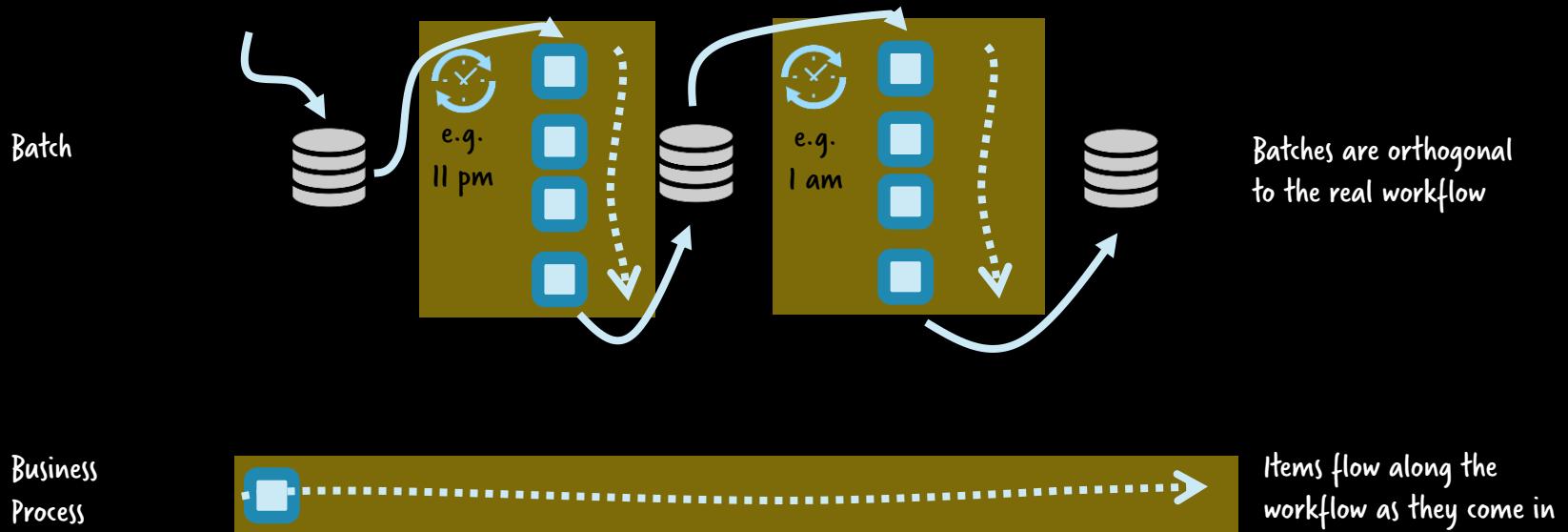
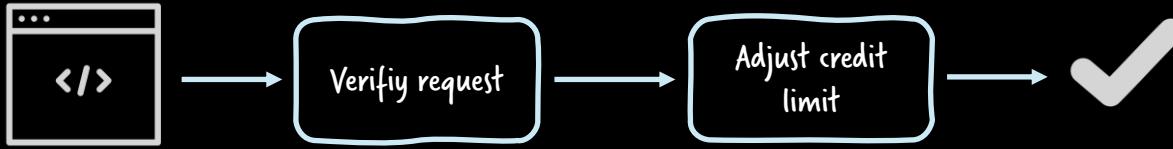
Can wait

Can retry

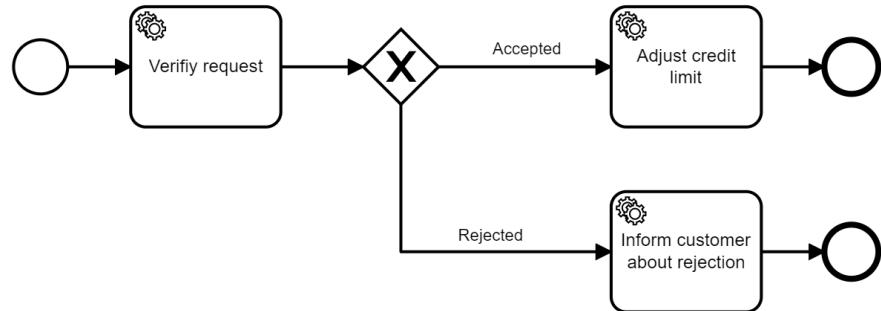
Can escalate

Can compensate

Provides visibility

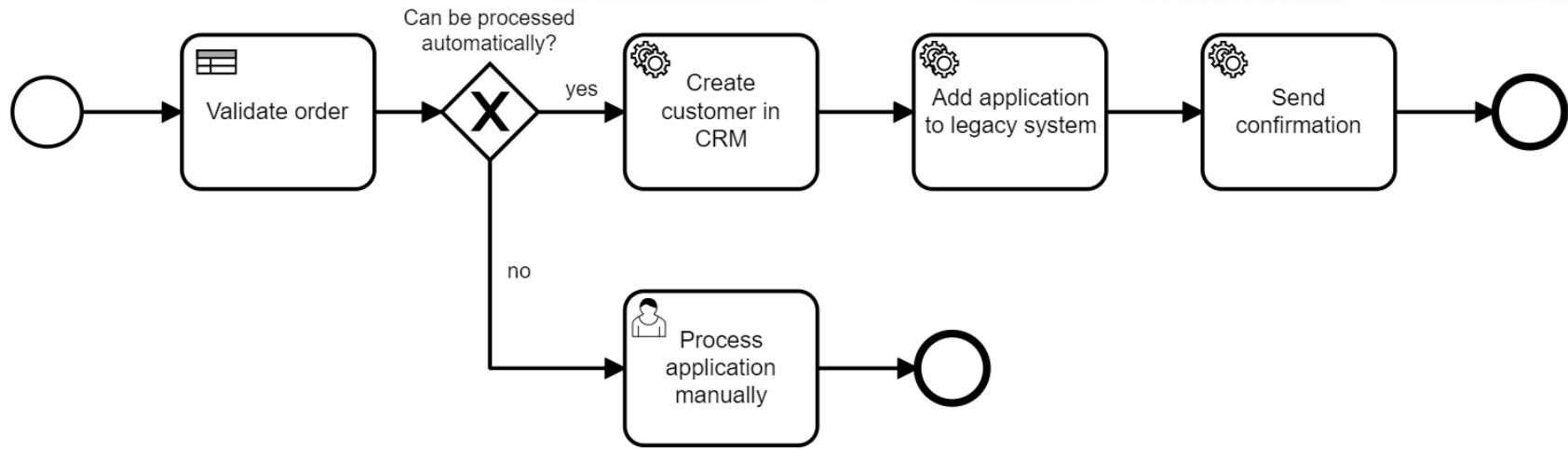


Using a workflow engine instead



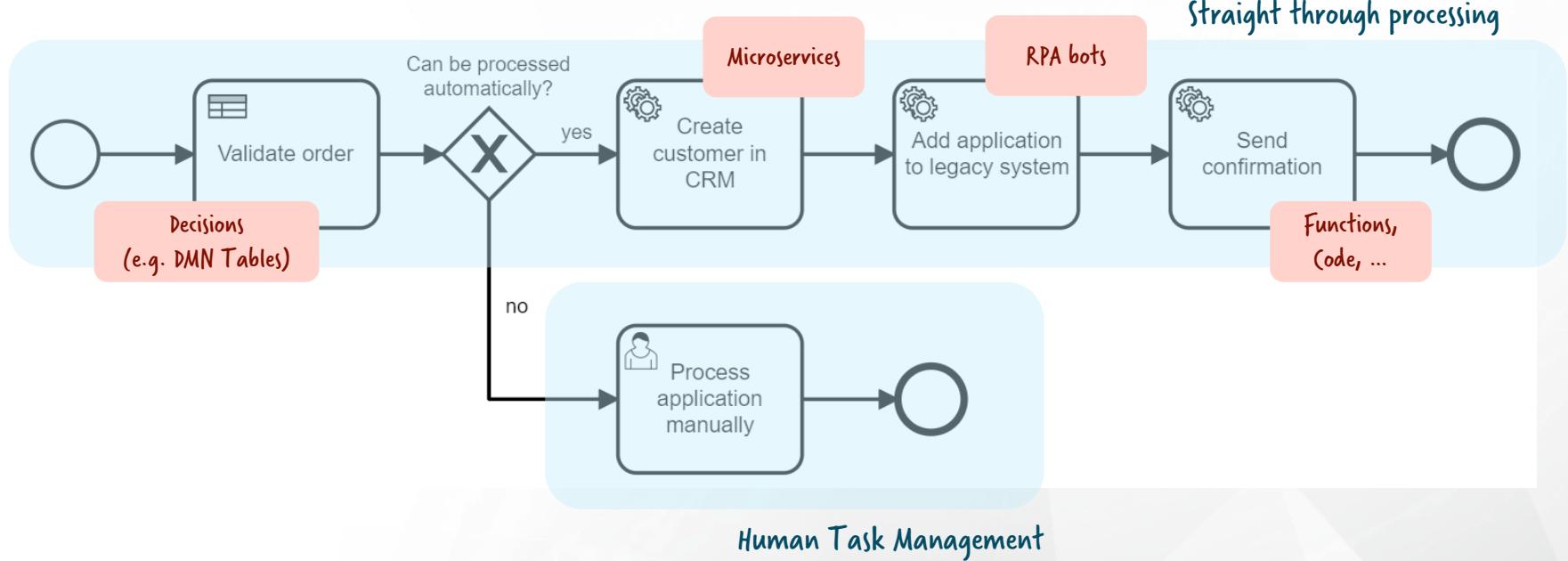
Implements the real workflow
online | faster cycle times

Workflow engines orchestrate

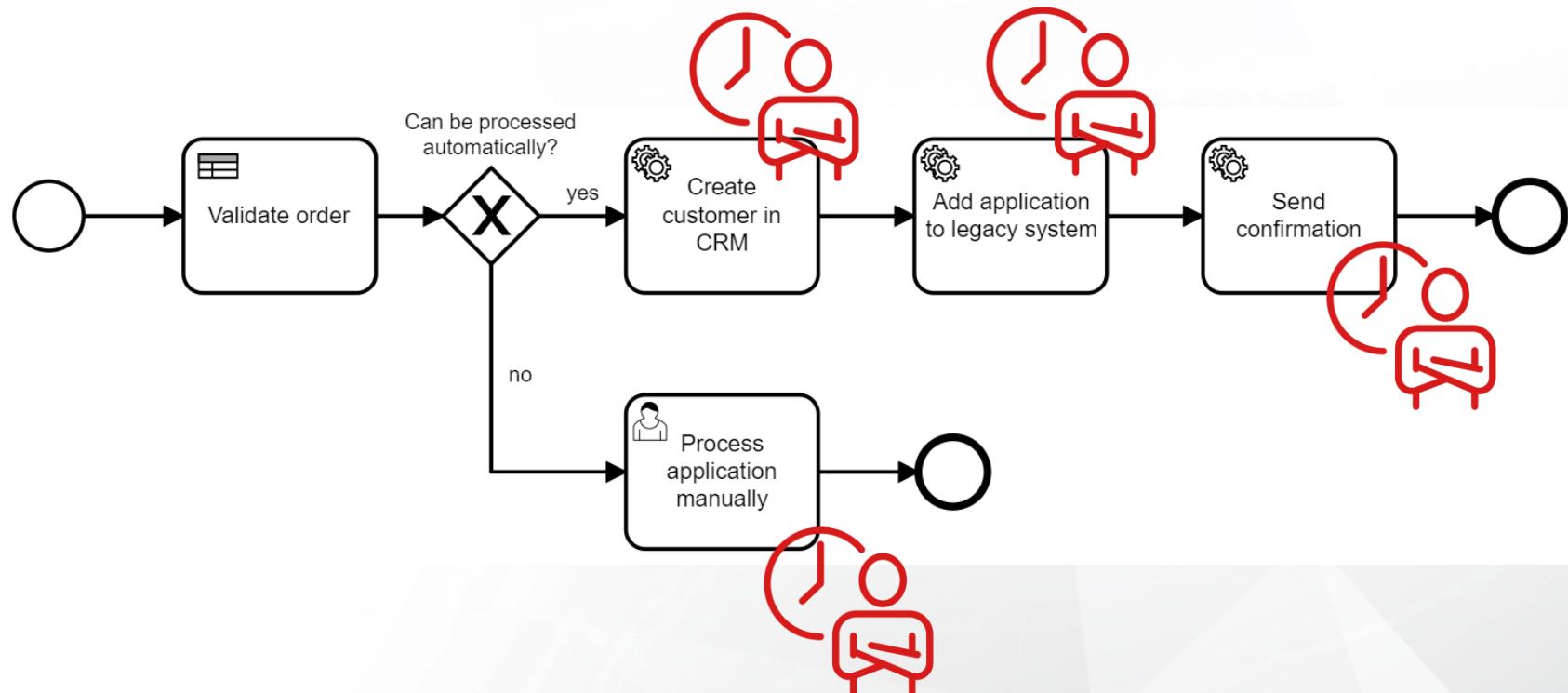


Workflow engines orchestrate anything

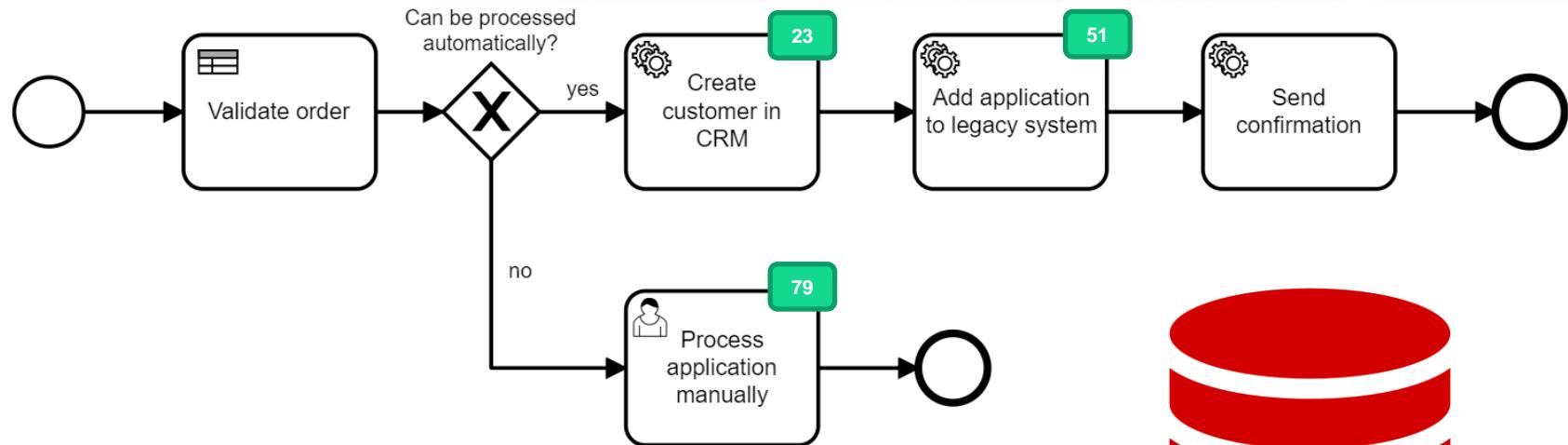
orchestrate ...



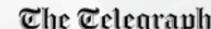
The challenge are long running tasks = waiting



A workflow engine persists 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	  

Another interesting Example

DB

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My Bahn

Search ✓ Select ✓ **Ticket & reservation** Payment Check & book Confirmation

Ticket and reservation

How would you like to receive your ticket?

Digital ticket
Save it as a PDF or load it in the DB Navigator app

Please note:
Only valid for the passenger stated (and accompanying passengers if applicable). Not transferable. You must present your ID to the ticket inspector on the train.

Order and receive
ticket by post **5,90 EUR**
Postage

You aren't travelling?

Ticket for another person
You have to login for this service

Our tip: reserve a seat now.

Reservation of 1 seat **4,50 EUR**

Proceed

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Die Bahn **DB**

OnlineTicket

Fahrkarte ICE
Gültigkeit: 06.11.2005 - 07.11.2005
Normalpreis (Einzelne Fahrt)
Klassen: Erw.: 1, mit 1 BC(60) Kinder: 0
vor: Köln
nach: Ulm
über: VIA: (ICE-K* LMP UL)
Hinweis: am 06.11.2005
Umtausch/Erstattung ab dem 1. Geltungstag: 15 Euro.

Hinweis: Dieses Ticket ist nicht einsatzbereit!

Barcode

GBCD 1234 WXYZ 1 GEF1 0A 06.11.2005

Hinweis: Zertifikat: Zertifikat kurz: Gültig ab:
Hier Mustermensch Ausweis Auftragsnummer: **BahnCard 1234 ZAB234**

Ihre Reiseverbindung und Reservierung Hinweise am 06.11.2005

Reise	Status	Zeit	Gleis	Reservierung	Fahrt	Zertifikat
Köln Hbf	ab 13:54	6			ICE 519	siehe oben
Ulm Hbf	an 17:06	2				

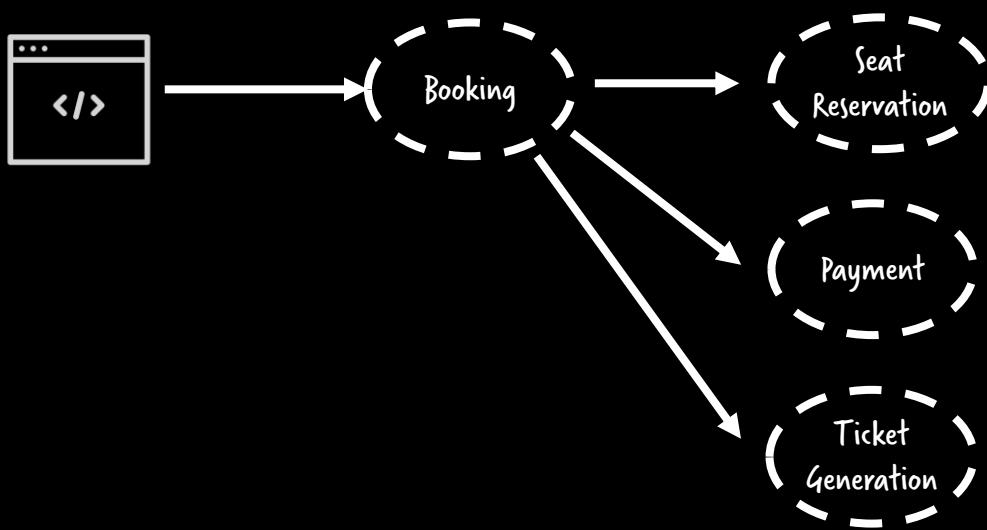
Hinweise:

- Die Fahrkarte muss ausgedruckt vorliegen und gilt nur zusammen mit dem beim Kauf angegebenen gültigen Ausweis-ID (BahnCard, Konditionen, BahnCard 1234).
- Die Kartennummer wird bei der Kontrolle zu Prüfzwecken in ein Kontrollzettel eingespielt.
- Bei der Kontrolle kann auch ein anderer Zettel als in der Reservierung angegebener Zettel benutzt werden, der die Geltungsdaten gültig (ggf. Aufpreis für endende Weg erforderlich).
- Bei Fragen und Problemen wenden Sie sich bitte an die in Ihrer Auftragserfassung angegebene Servicestelle.
- Das Online-Ticket darf nur für den unter "Fahrer/in" angegebenen Reisenden benutzt werden.
- Das Online-Ticket darf nur für den unter "Fahrer/in" angegebenen Reisenden benutzt werden.
- Wenn Ihr Ticket die City-Option beinhaltet, gilt diese nur am Ankunftstag der Hinreise bzw. am Abfahrtstag der Rückfahrt (Reisetage wie unter "Reisezeitraum" sind nicht relevant). Die City-Option ist nicht auf andere Zettel für die vor Ort gekauften Tickets übertragbar.
- Es gelten die Beförderungsbedingungen der DB AG sowie innerhalb von Verkehrsverbünden/Tarifgemeinschaften deren jeweilige Bestimmungen.

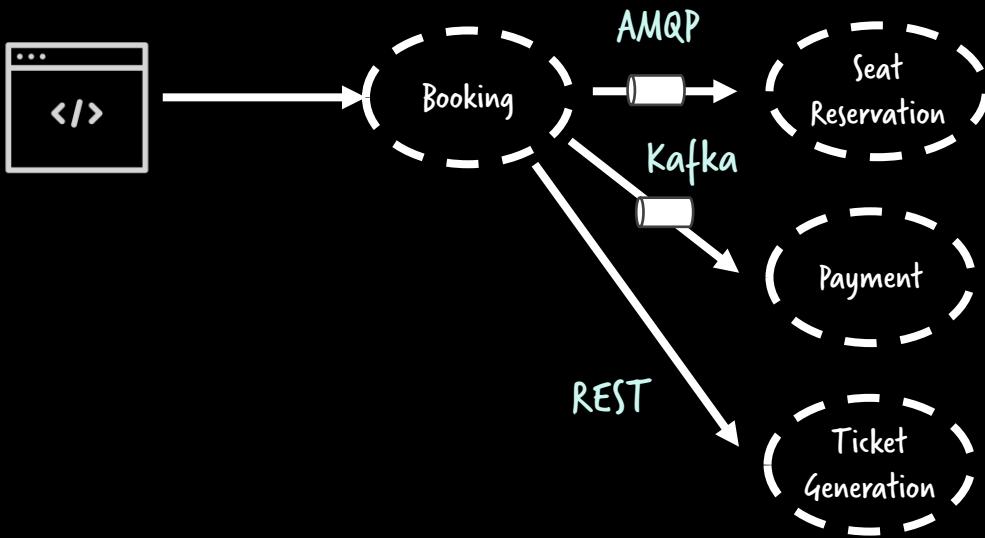
Wir danken Ihnen für Ihre Buchung und wünschen Ihnen eine angenehme Reise!

27/07/07 Seite 1 / 1

Example



Architecture



Example

Check & book

Confirmation

sync

The diagram illustrates the synchronization process between the 'Check & book' and 'Confirmation' stages of a ticket booking. A red curved arrow labeled 'sync' points from the 'Check & book' stage to the 'Confirmation' stage. A large white arrow points from the 'Check & book' stage to the 'Confirmation' stage.

Check & book (Left):

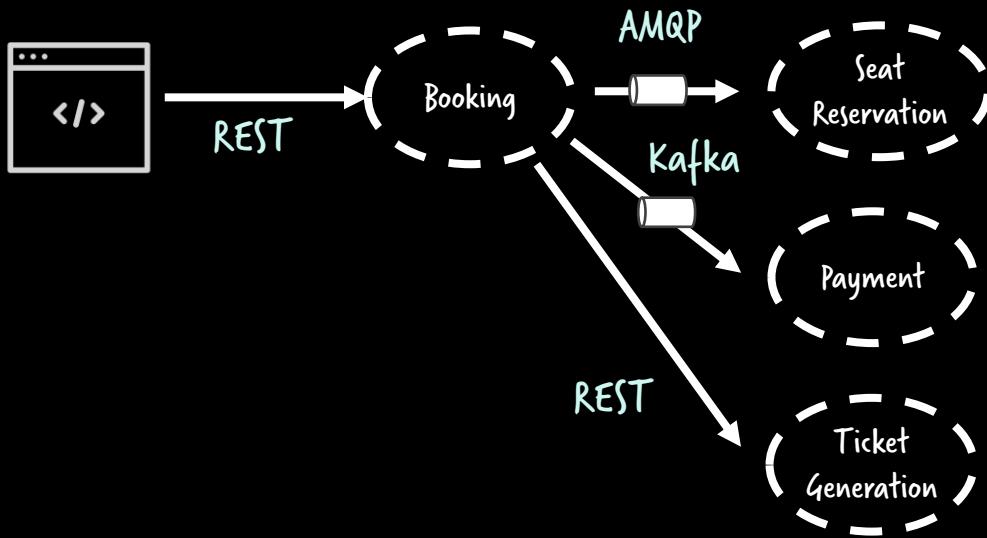
- Ticket and reservation:** Shows a journey from Berlin Hbf to München Hbf on Mo, 09.09.2019, with departure at 15:37 and arrival at 20:42.
- How would you like to receive your ticket?**
 - Digital ticket:** Selected option. Description: Save it as a PDF or load it in the DB Navigator app.
 - Please note:** Only valid for the passenger stated (and accompanying passengers if applicable). Not transferable. You must present your ID to the ticket inspector on the train.
 - Order and receive ticket by post:** Alternative option.
- You aren't travelling?** Option to buy a ticket for another person.
- Our tip: reserve a seat now.** Option to reserve a seat for 4,50 EUR.

Confirmation (Right):

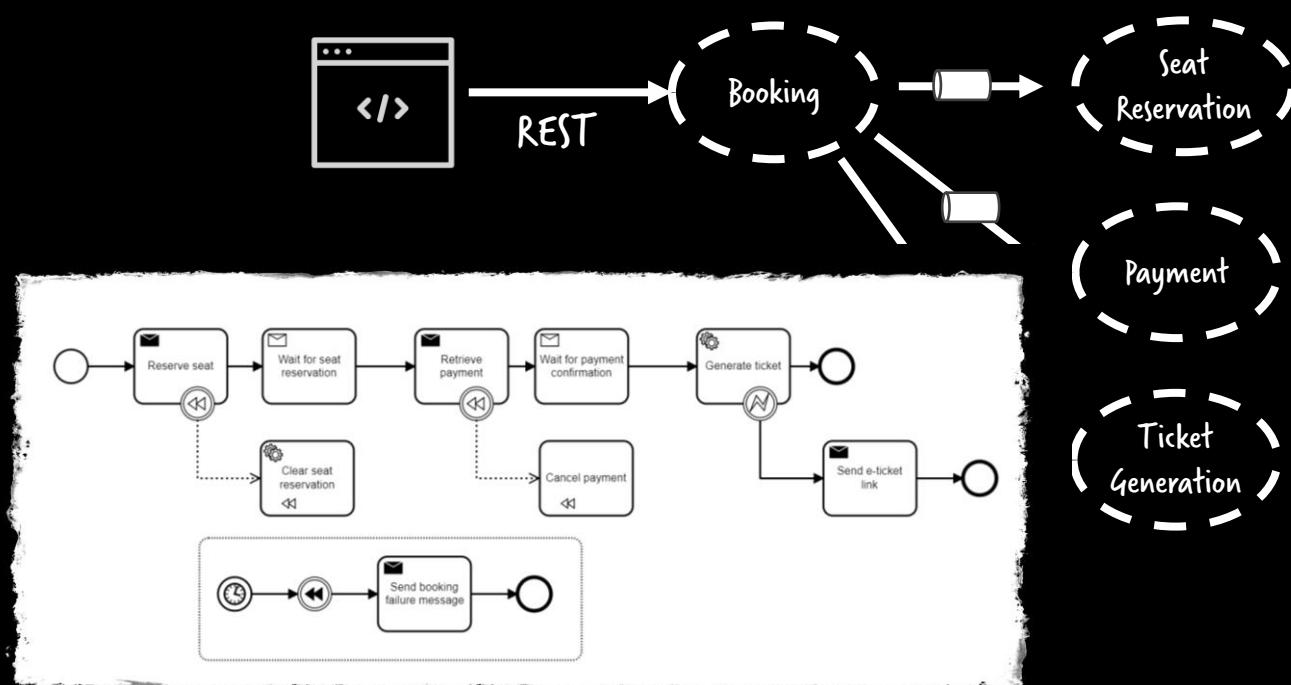
- Jahns Bahn DB OnlineTicket**
- Fahrkarte ICE:**
 - Gültigkeit: 06.11.2005 - 07.11.2005
 - Normalpreis (Einzelne Fahrt)
 - Klasse: 1
 - Erw.: 1, mit 1 BC(60) Kinder: 0
 - Von: Köln
 - Nach: München
 - Über: VIA: (ICE-K* LMP UL)
 - Hinweis: am ICE
 - Umtausch/Erstattung ab dem 1. Geltungstag: 15 Euro.
- Reiseverbindung und Reservierung Hinweise am 06.11.2005:**

Zeit	Status	Ziel	Preis	Fahrt	Zertifikat
ab 13:54			75,90	ICE 519	siehe oben
an 17:06	ab	2			
- Wichtig:**
 - Die Fahrkarte muss ausgedruckt vorliegen und gilt nur zusammen mit dem beim Kauf angegebenen gültigen Ausweis-ID (BahnCard, Kreditkarte, EC-Karte).
 - Die Kartennummer wird bei der Kontrolle zu Prüfzwecken in ein Kontrollzettel eingespielt.
 - Bei einer Reiseverbindung, die über mehrere Züge führt, ist der Geltungszeitraum gültig (ggf. Aufpreis für endende Zug erforderlich).
 - Bei Fragen und Problemen wenden Sie sich bitte an die in Ihrer Auftragserfassung aufgeführten Beratungsstellen.
 - Das Online Ticket gilt nur für den unter "Fahrer/in" angegebenen Reisenden, sondern nur über www.bahn.de oder die Servicestraße.
 - Wenn Ihr Ticket die City-Option beinhaltet, gilt diese nur am Ankunftstag (der Hinheit bzw. am Abfahrtstag der Rückfahrt (Reisezeit wie unter Preisangabe)). Die City-Option ist nicht auf andere Zeiten für die vor Ort gekauften Tickets übertragbar.
 - Es gelten die Bedingungsbestimmungen der DB AG sowie innerhalb von Verkehrsverbünden/Tarifgemeinschaften deren jeweilige Bestimmungen.
- BahnCard 1234 ZAB234**

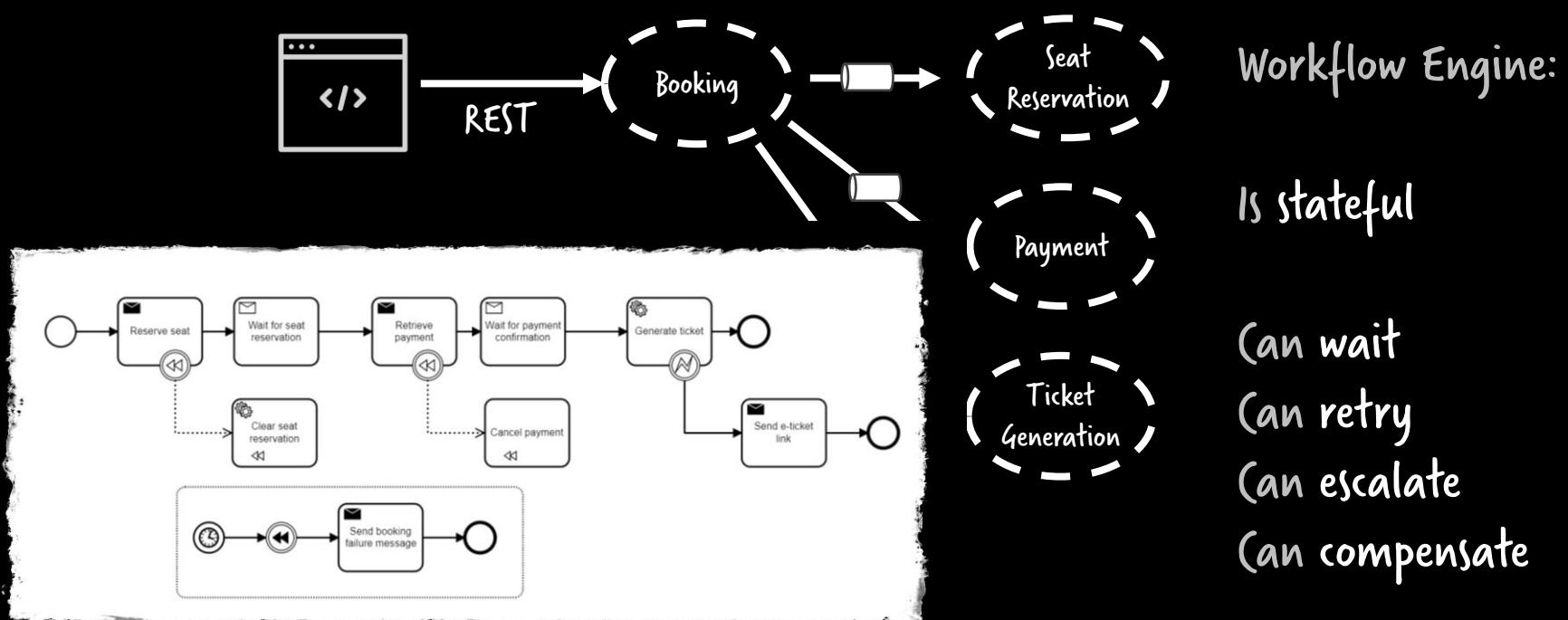
That is hard to implement



Process automation can help



Process automation can help

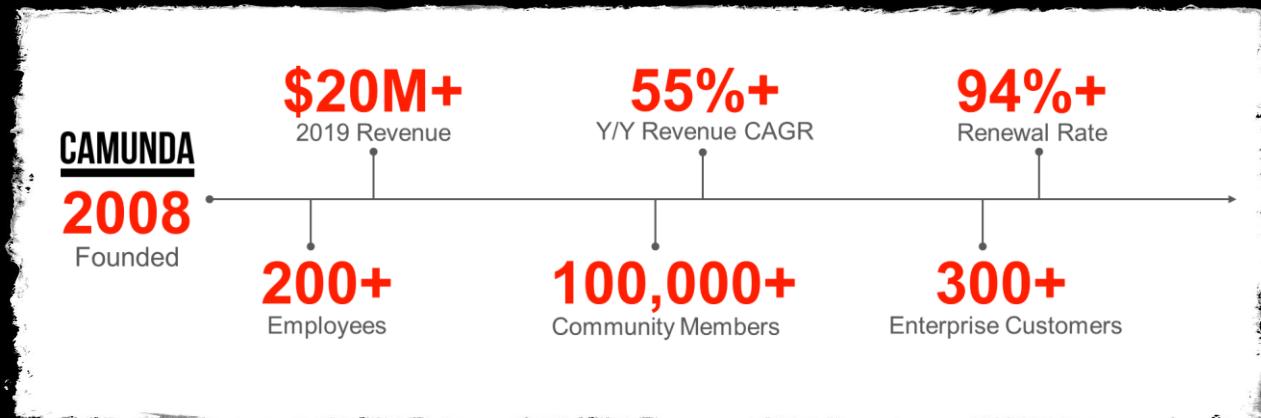


Live hacking



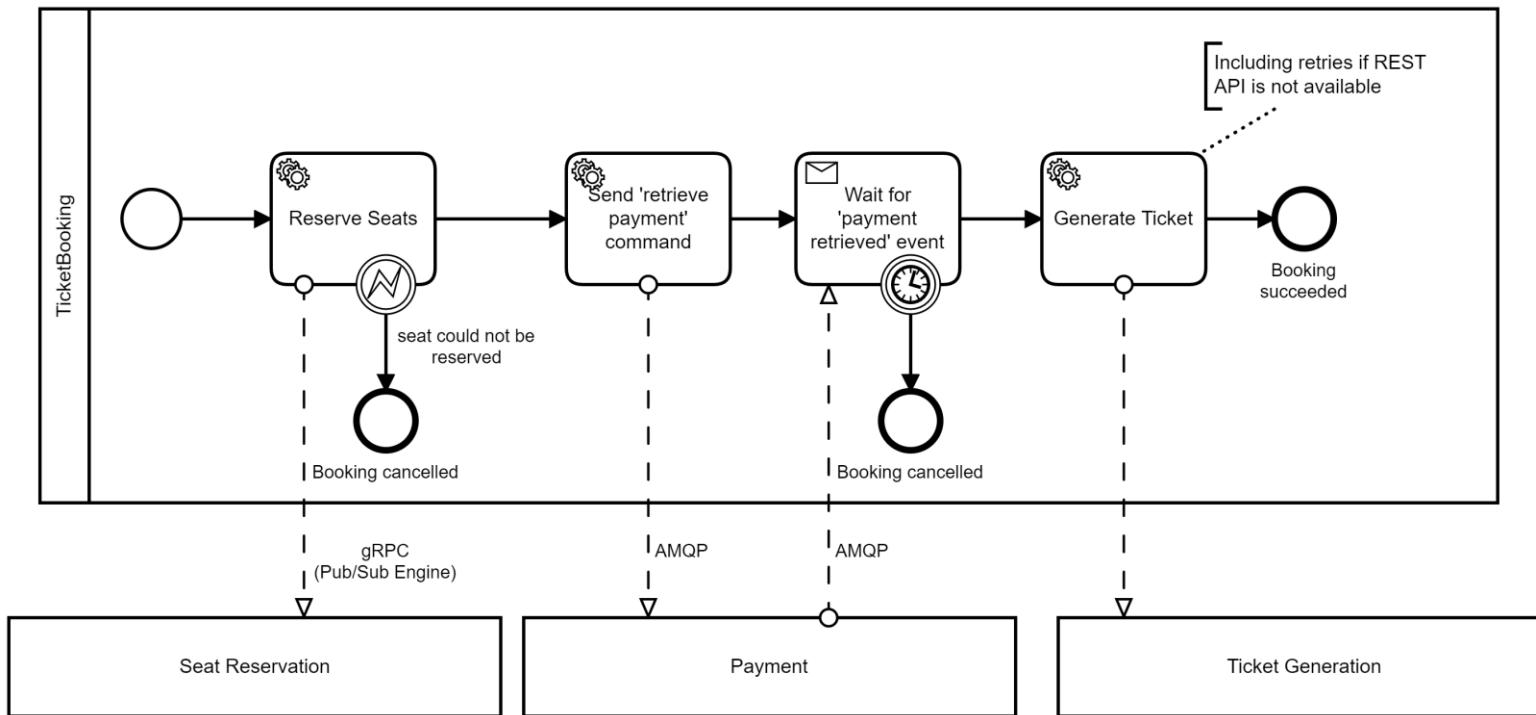
Camunda

- Source-Available & Developer Friendly
- Supports BPMN
- Mature tooling, widely adopted
- on-prem or cloud
- <http://camunda.com/>





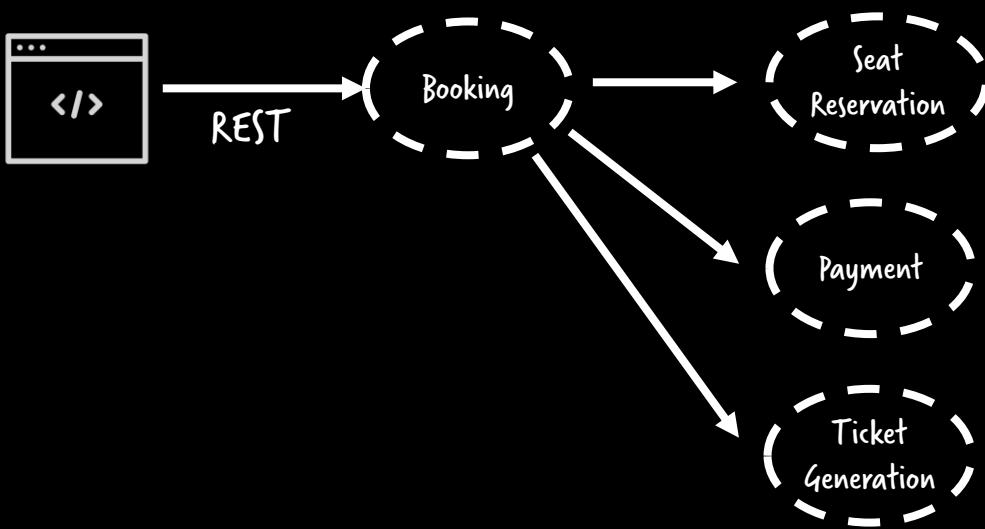
berndruecker / ticket-booking-camunda-cloud



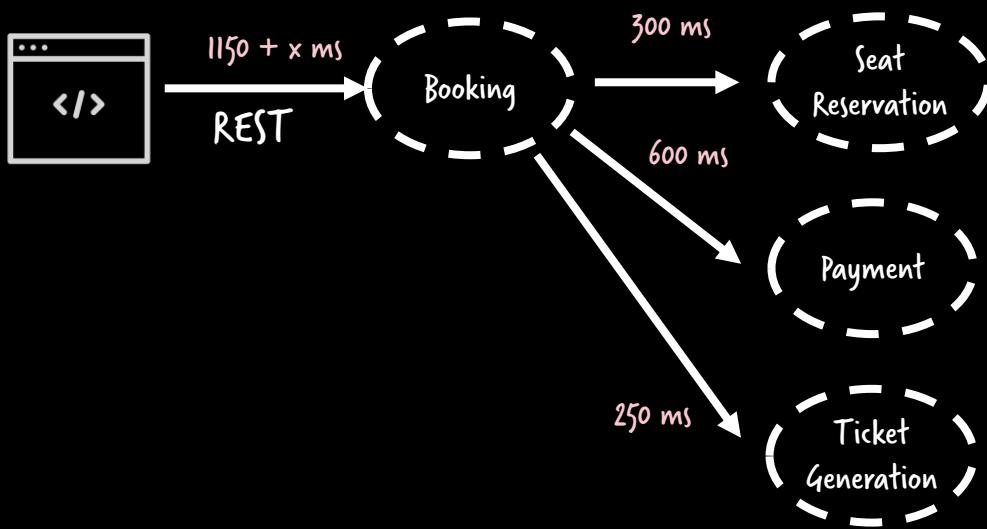
But...



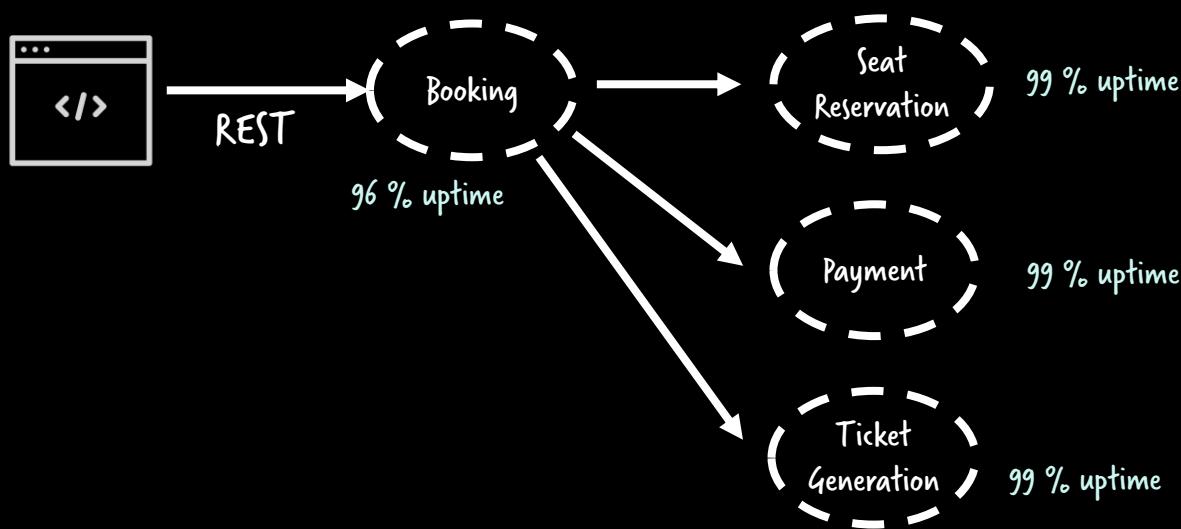
Weaknesses



Weaknesses: Latency creep



Weaknesses: Availability erosion



And...



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My Bahn

Search ✓ Select ✓ **Ticket & reservation** Payment Check & book Confirmation

Ticket and reservation

How would you like to receive your ticket?

Digital ticket
Save it as a PDF or load it in the DB Navigator app

Please note:
Only valid for the passenger stated (and accompanying passengers if applicable). Not transferable. You must present your ID to the ticket inspector on the train.

Order and receive
ticket by post **5,90 EUR**
Postage

You aren't travelling?

Ticket for another person
You have to login for this service

Our tip: reserve a seat now. ➤ Questions concerning reservation?

Reservation of **4,50 EUR**

Back **Proceed**

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Meine Bahn **Logout**

Hinweis

Sehr geehrte Kundin, sehr geehrter Kunde!

Bei der Verarbeitung Ihrer Anforderung ist ein Fehler aufgetreten.
Vermutlich haben Sie mehrmals den gleichen Button angeklickt oder eine Funktion aus zwei Fenstern heraus doppelt aufgerufen.
Bitte beachten Sie, daß unsere Seiten nur aus einem einzelnen Browser-Fenster heraus bedienen sollten.
Wir entschuldigen uns für die Unannehmlichkeiten.

Deutsche Bahn AG

Weiter

Can your company
leverage your
hipster architecture?

You need to
change **business**
processes and
customer
experience!



Redesign your business process accordingly!

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My Bahn

Search ✓ Select ✓ **Ticket & reservation** Payment Check & book Confirmation

Ticket and reservation

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Please note:
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Order and receive ticket by post 5,90 EUR Postage

Total 75,90 EUR

You aren't travelling?

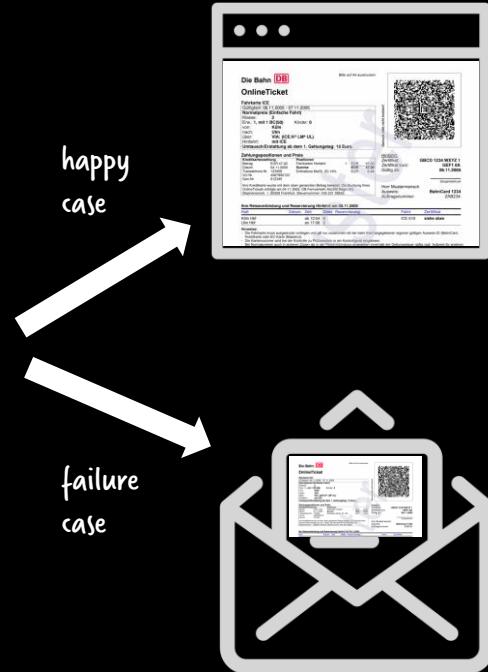
Ticket for another person
You have to login for this service

Our tip: reserve a seat now. [Questions concerning reservation?](#)

Reservation of 1 seat 4,50 EUR

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Redesign your business process accordingly!

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My Bahn

Search ✓ Select ✓ Ticket & reservation Payment Check & book Confirmation

Ticket and reservation

How would you like to receive your ticket?

Digital ticket
Save it as a PDF or load it in the DB Navigator app

Please note:
Only valid for the passenger stated (and accompanying passengers if applicable). Not transferable. You must present your ID to the ticket inspector on the train.

Order and receive
ticket by post 5,90 EUR Postage

Total 75,90 EUR

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Ticket for another person
You have to login for this service

Our tip: reserve a seat now. Questions concerning reservation?

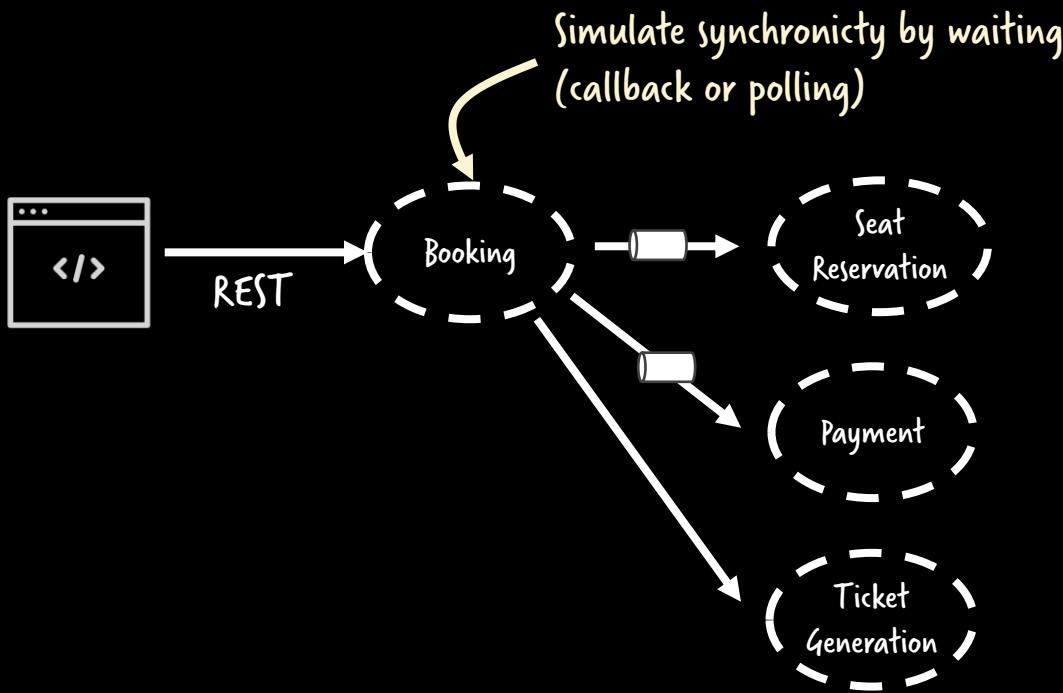
Reservation of 1 seat 4,50 EUR

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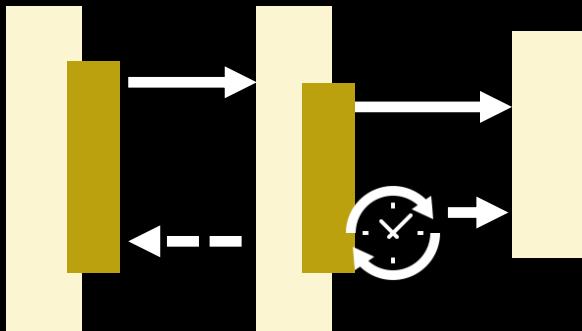


Example

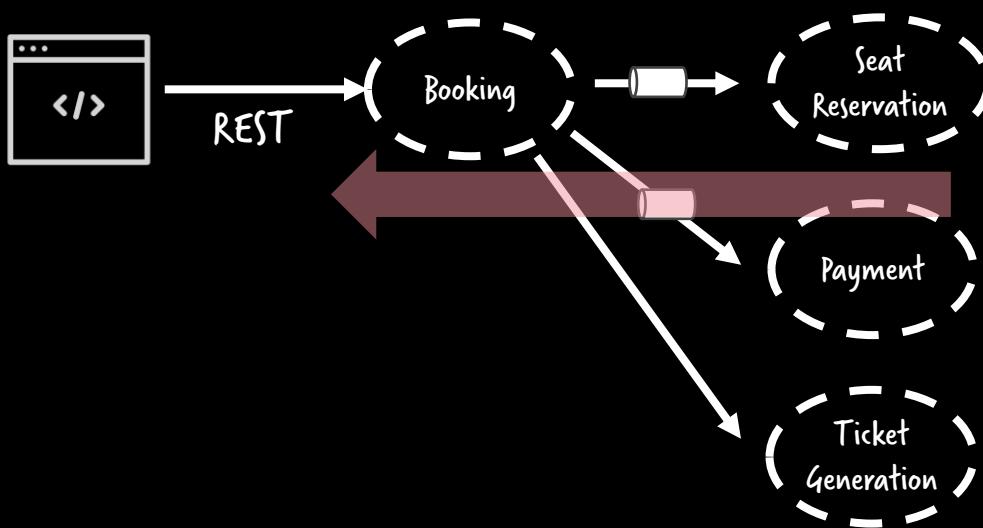


Synchronous Facade

Blocking Call

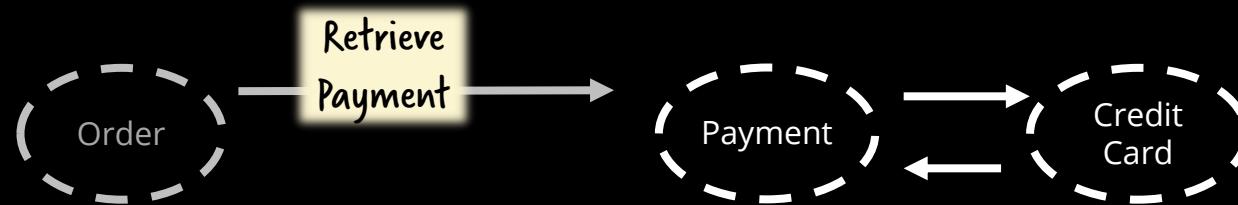


Push the facade towards the edge as far as possible

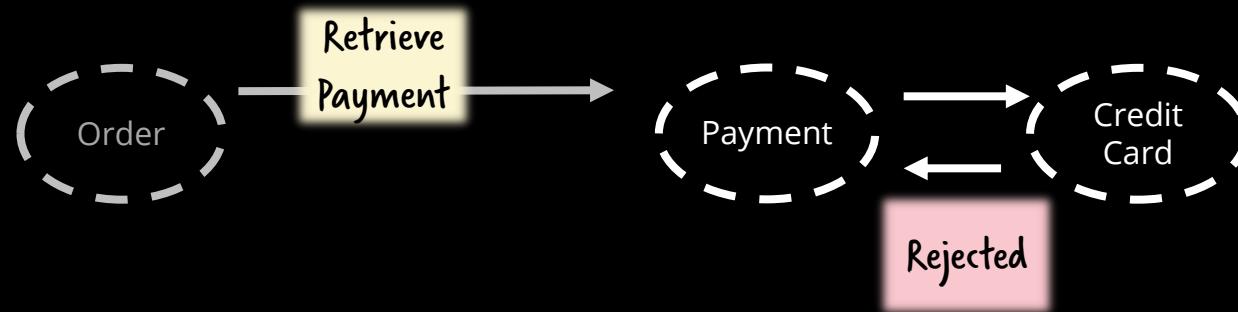


Long running services allow
to assign responsibility correctly

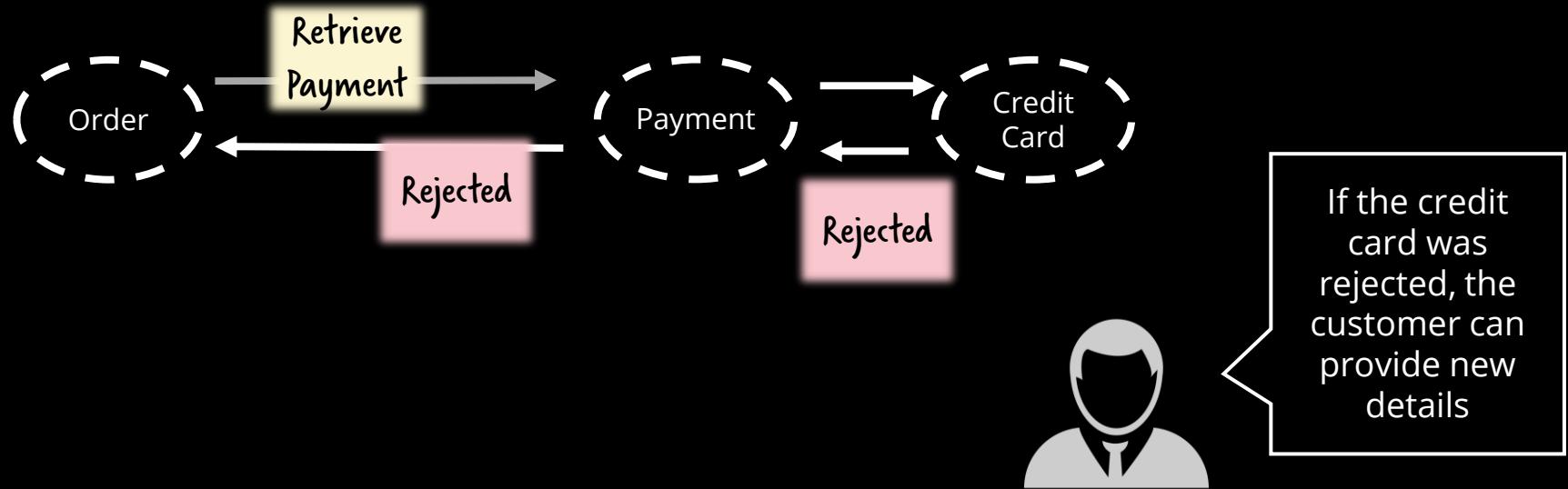
Example



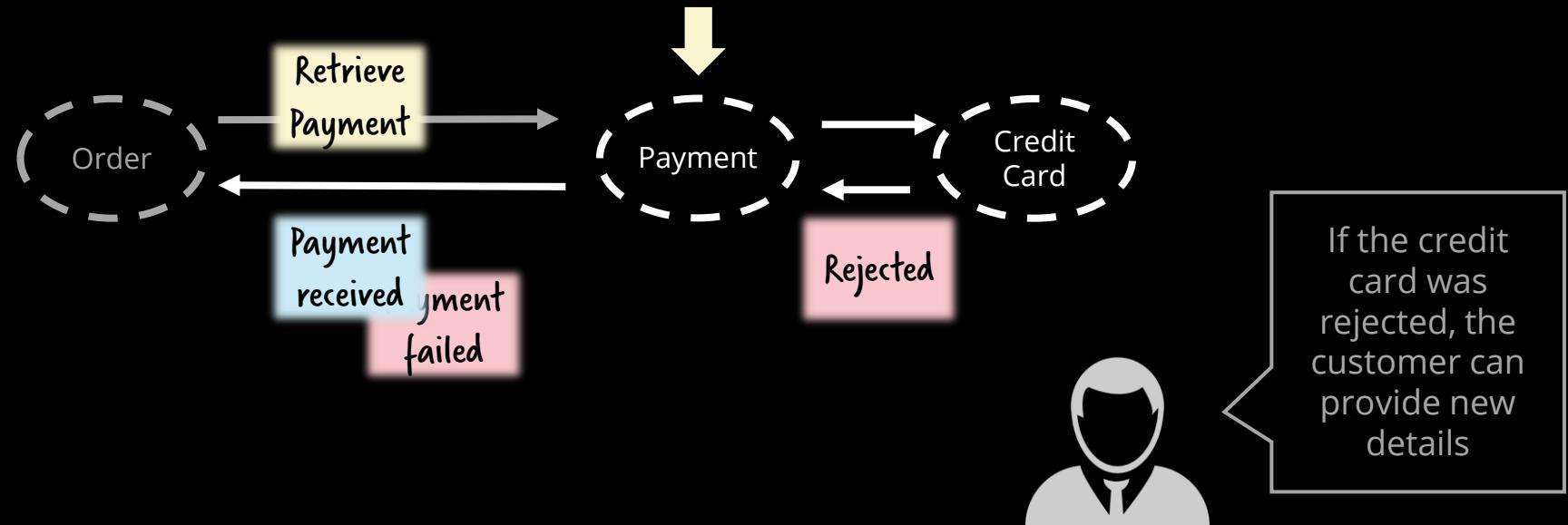
Example



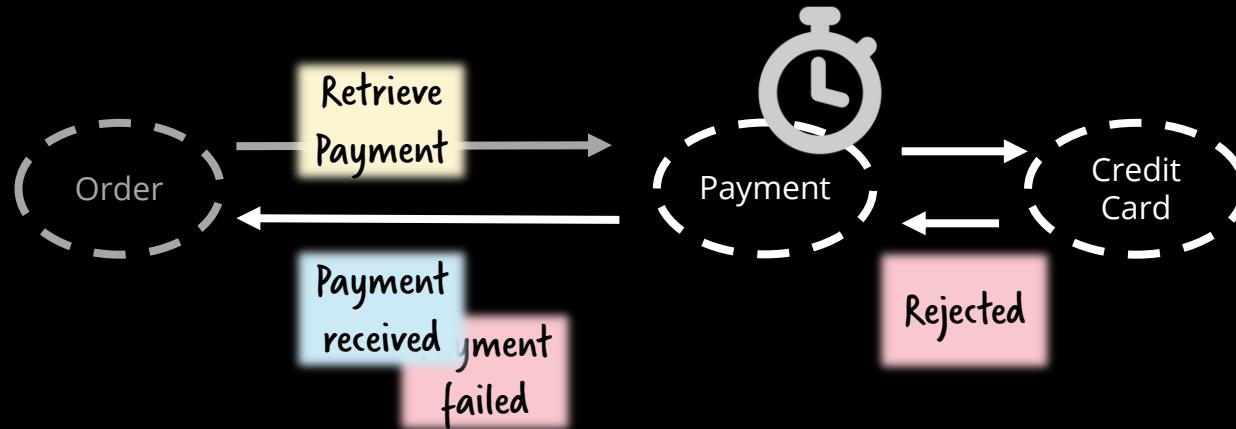
Example



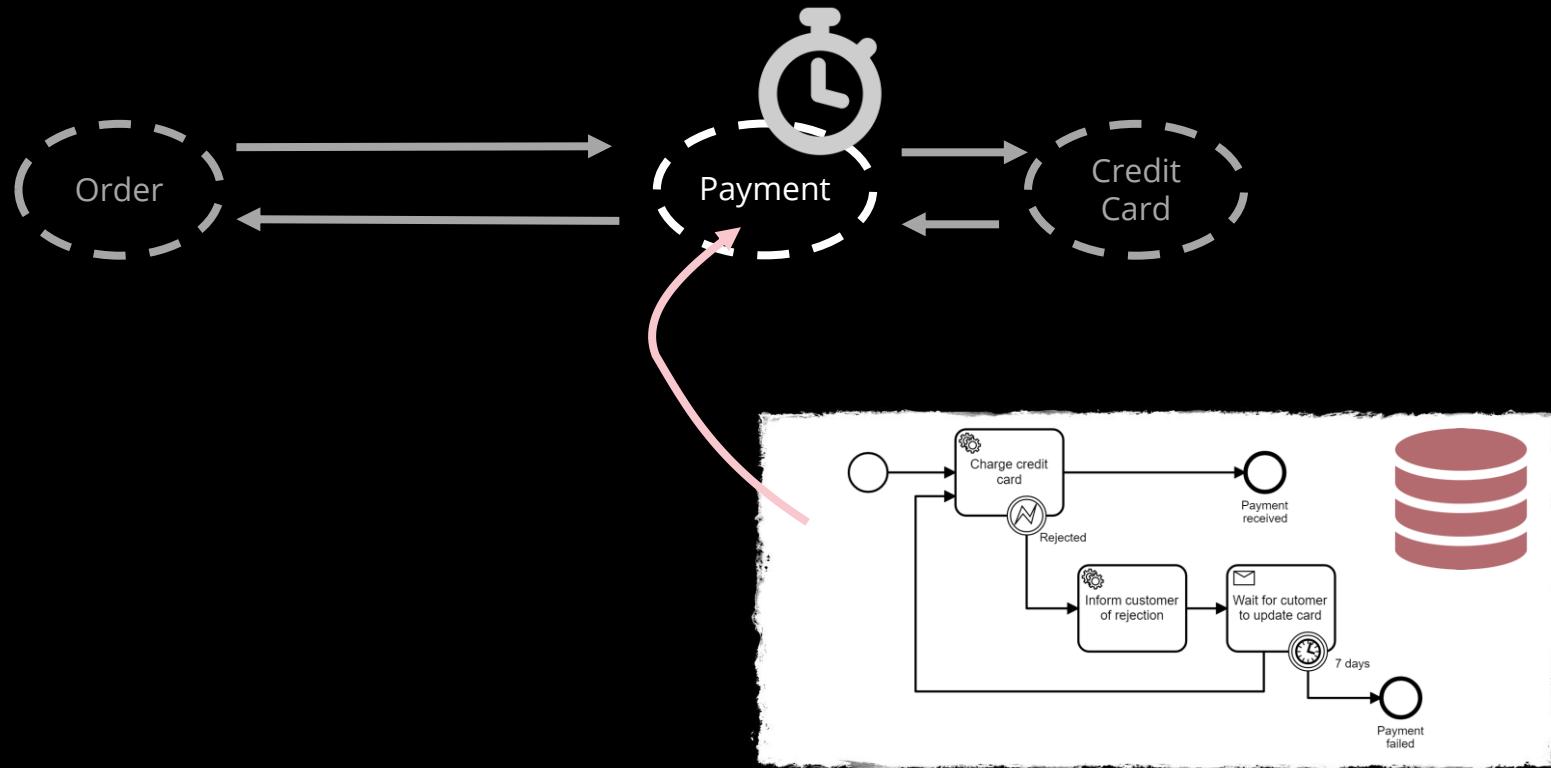
Who is responsible?



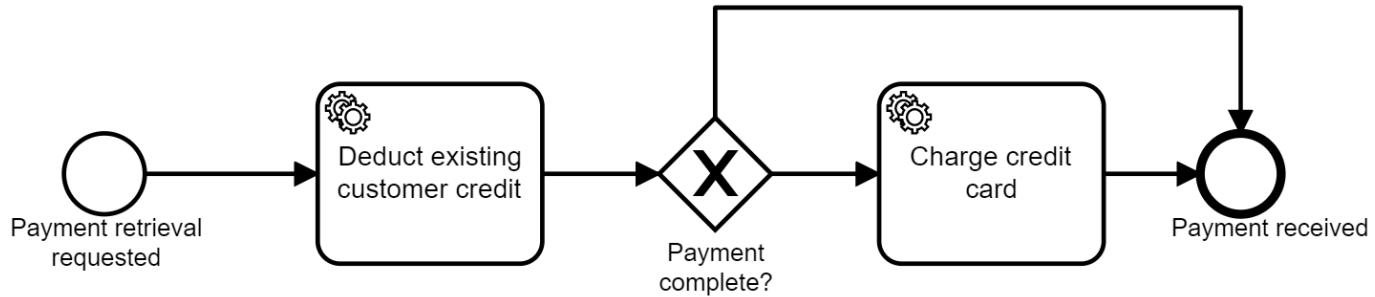
Long running services



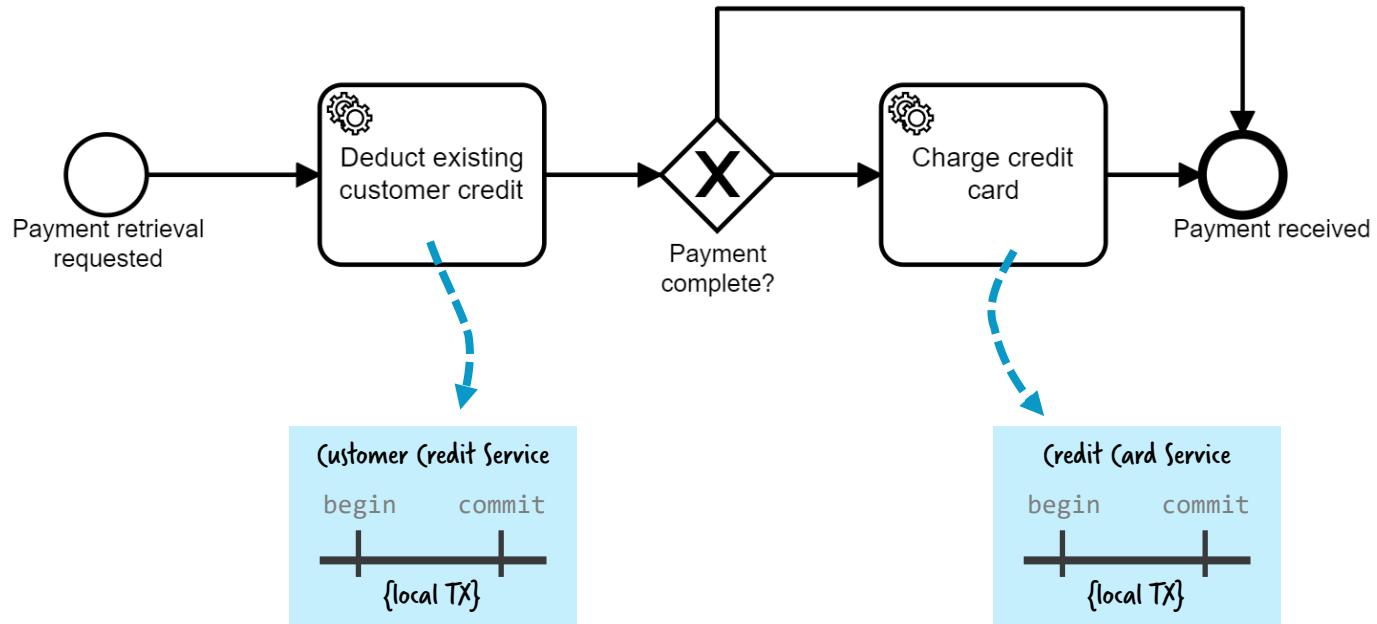
Long running services



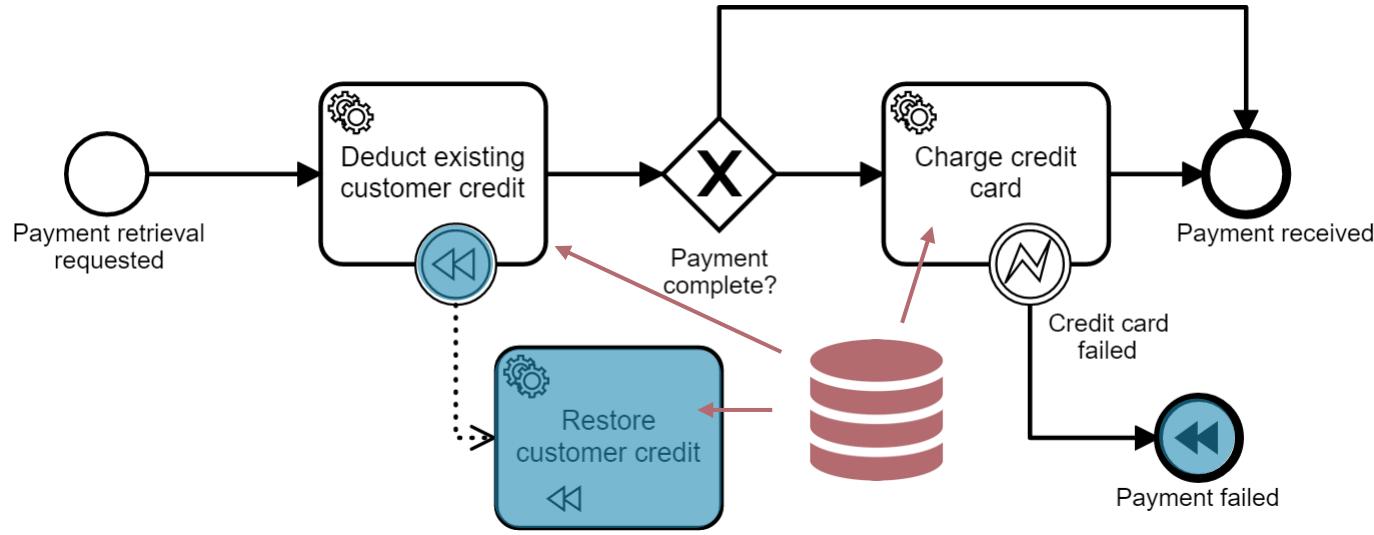
Extending Payment options



Extending Payment options



Distributed transactions using compensation *



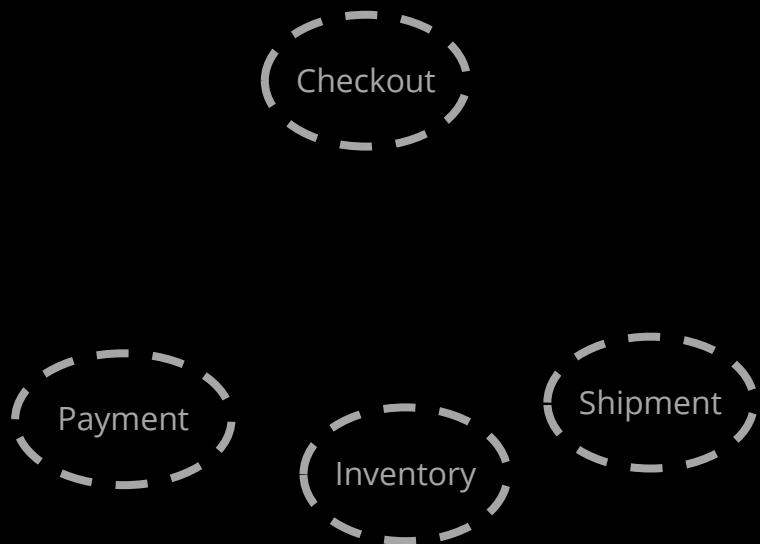
* aka saga pattern

Compensation

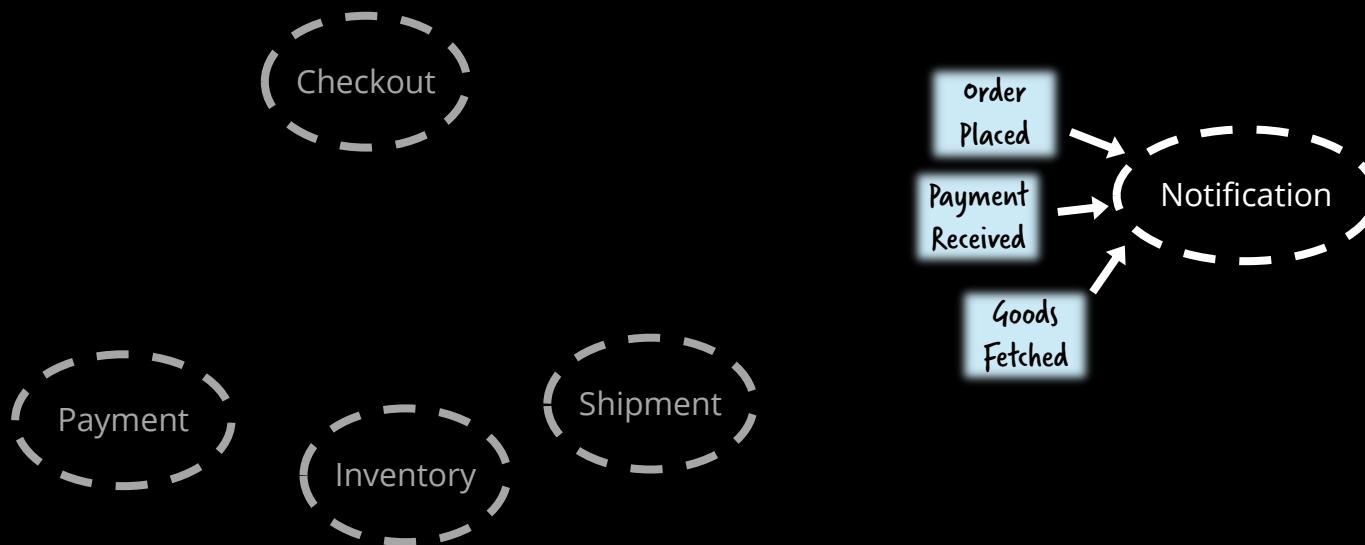
Let's talk about
Event-Driven Architecture



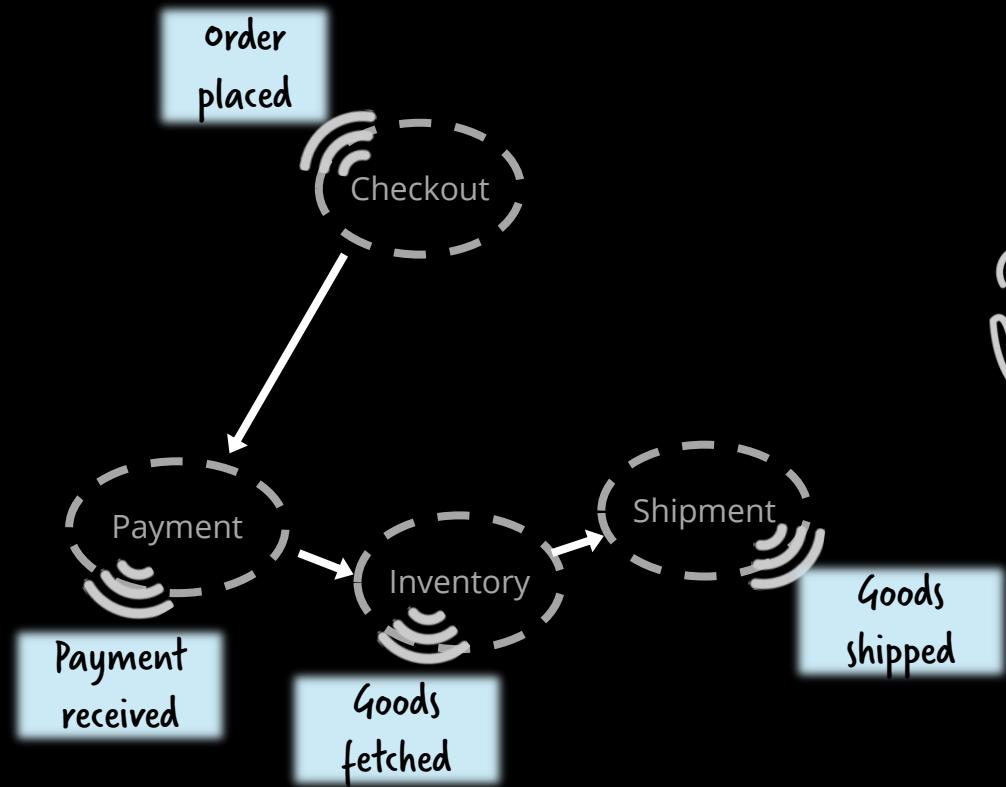
Example



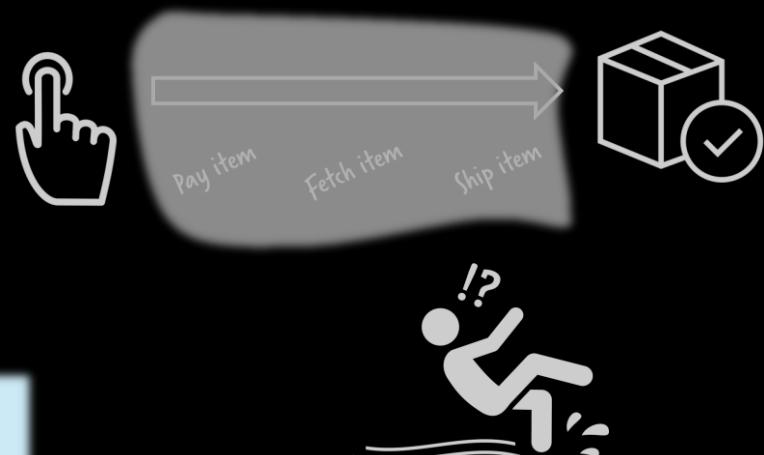
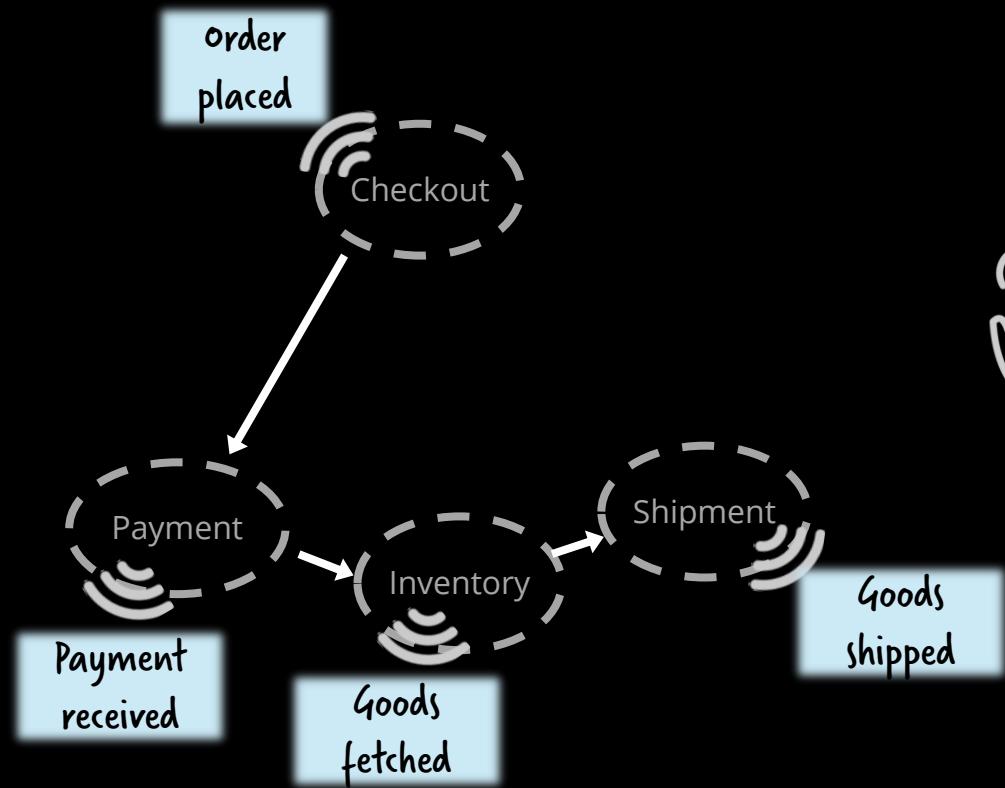
Event-driven



Peer-to-peer event chains



Peer-to-peer event chains



We were suffering from
Pinball machine Architecture



Pinball Machine Architecture



Payment

Inventory

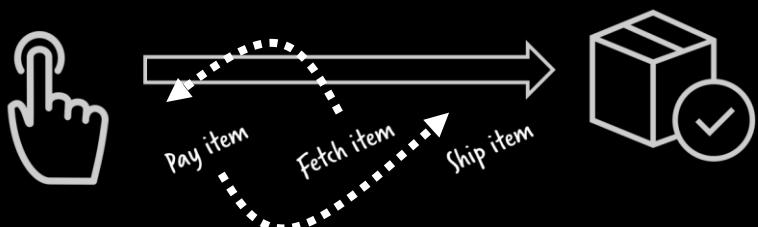
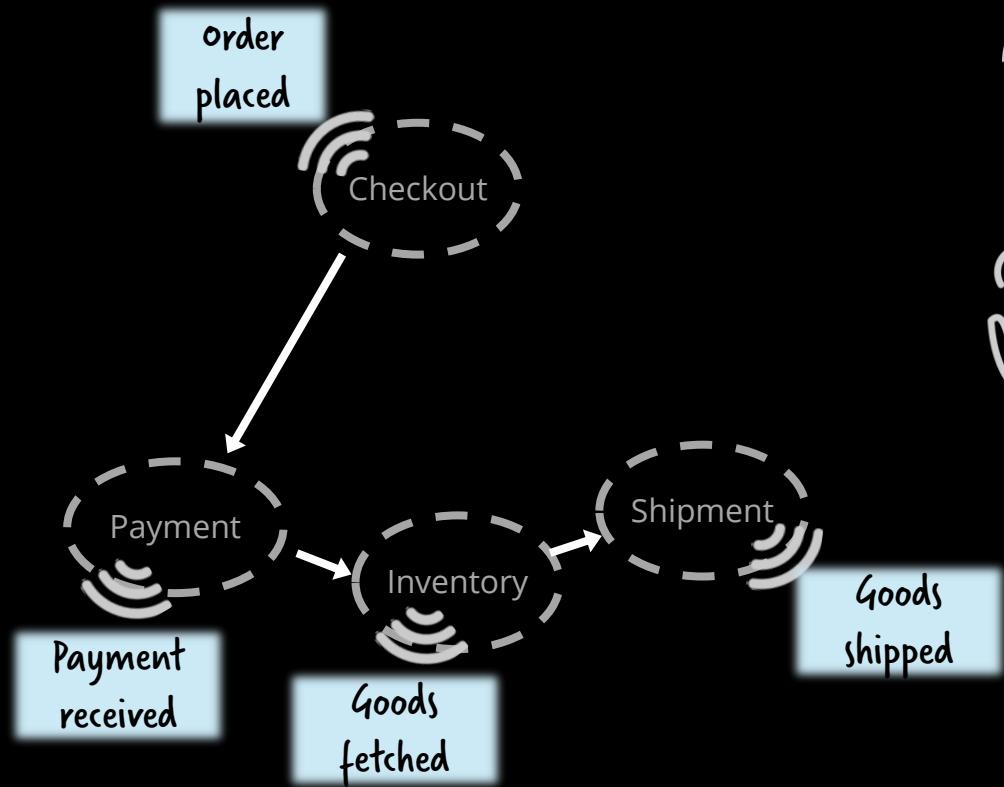
Checkout

Shipment

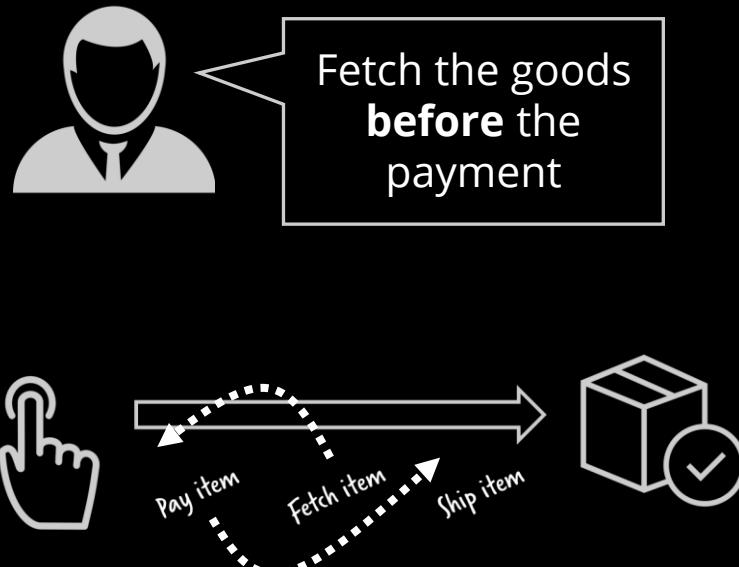
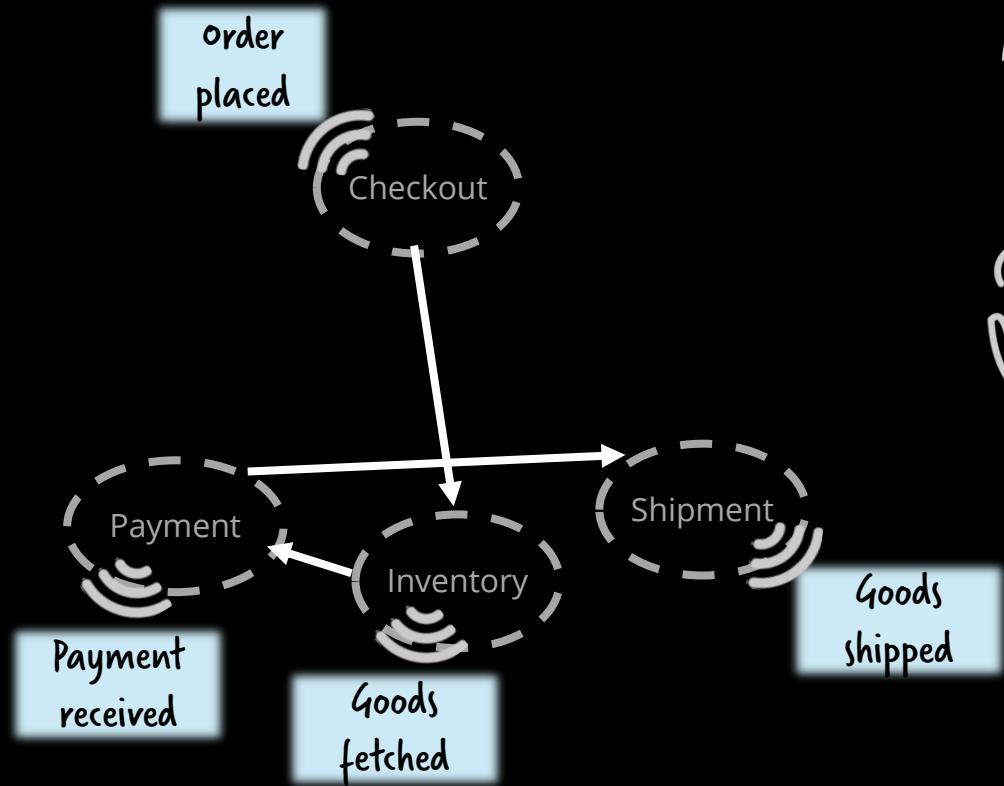
Notifica

„What the hell
just
happened?“

Peer-to-peer event chains



Peer-to-peer event chains



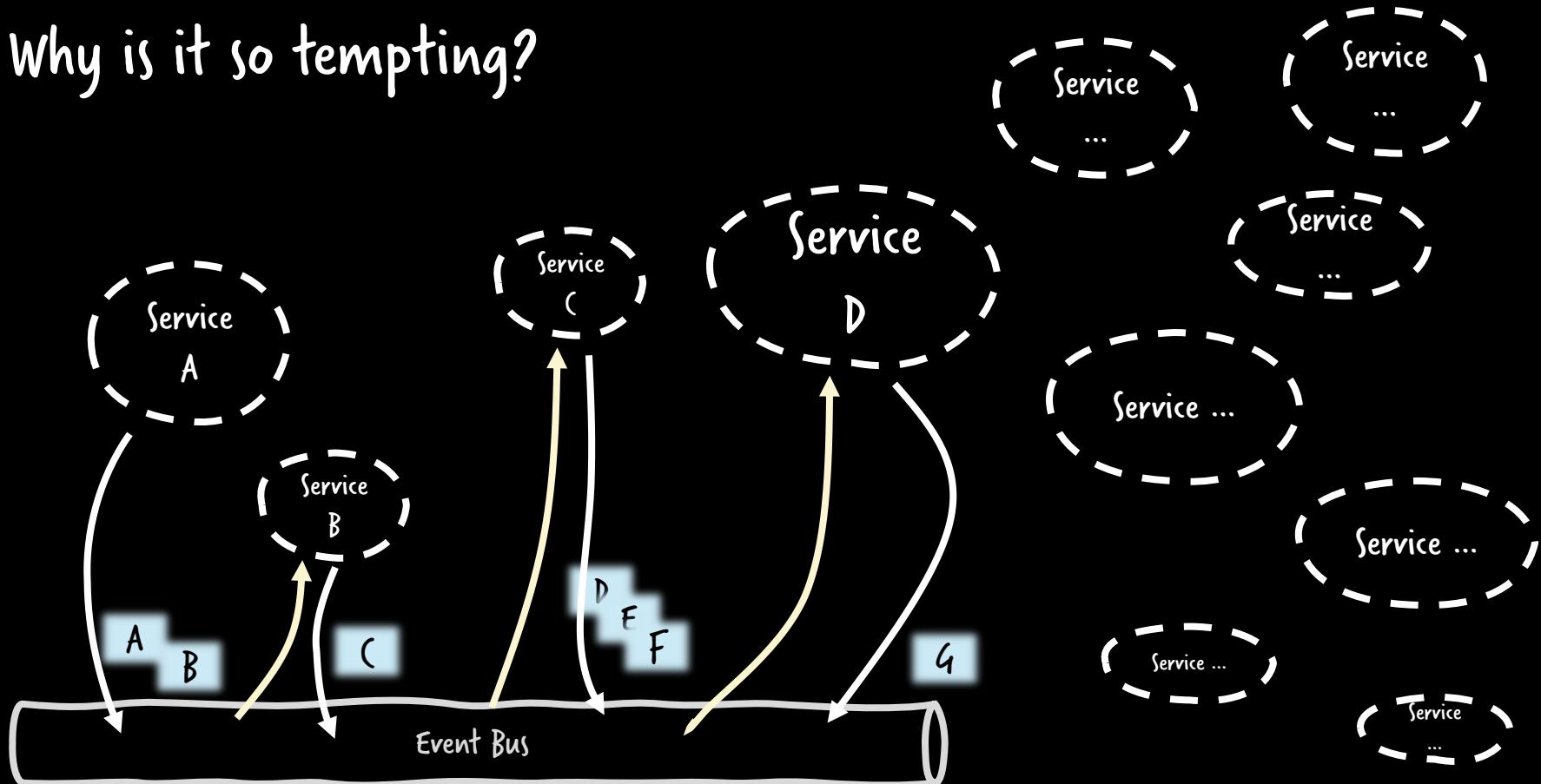
Choreography

What we wanted

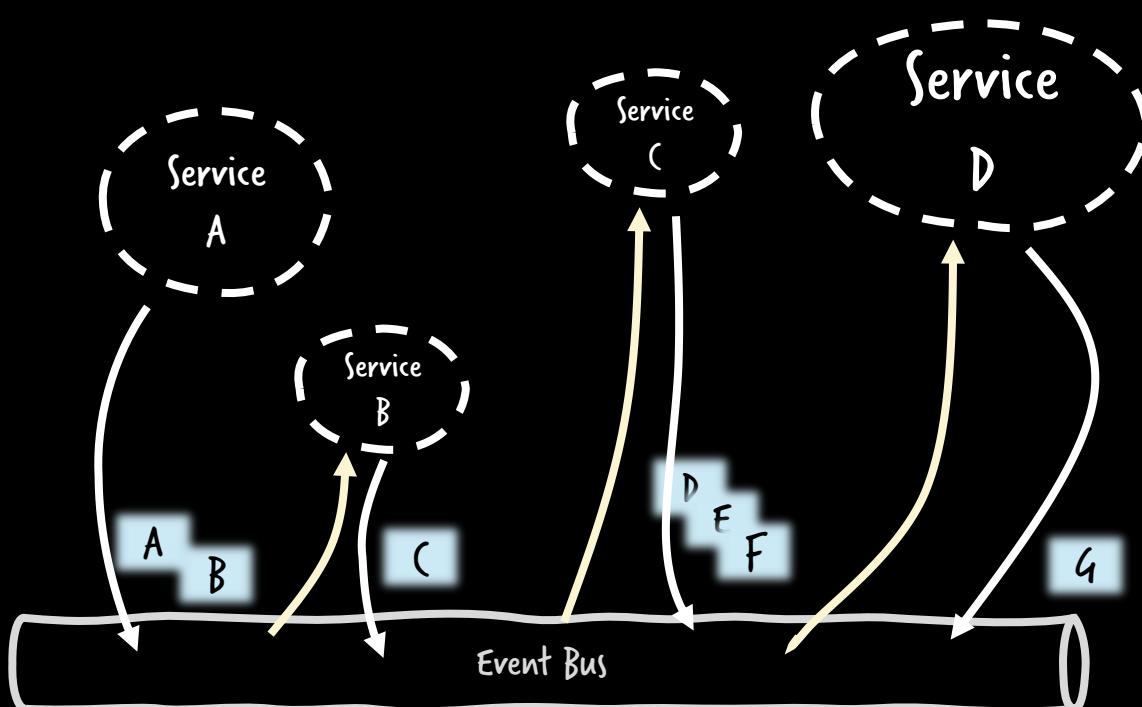


vs. what we got

Why is it so tempting?



Why is it so tempting?



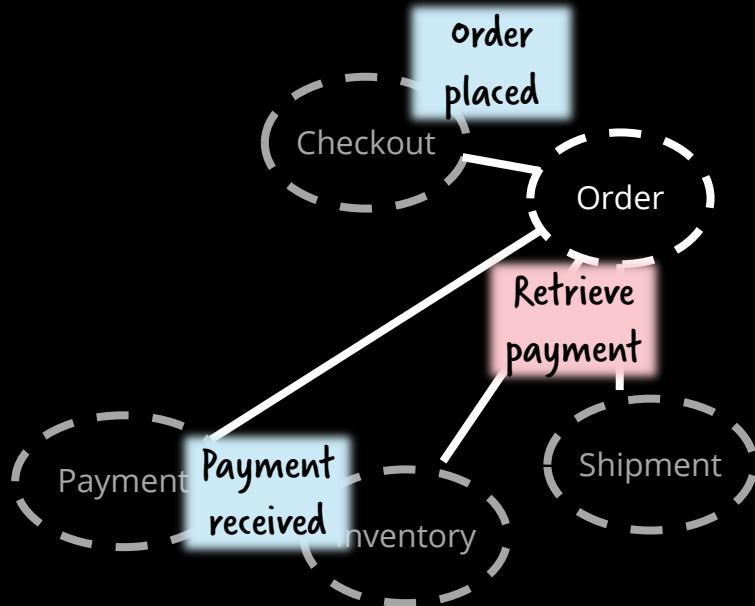
Adding is easy!

You can „buy“ a shorter initial time-to-value by choreography.

It yields in technical debt.

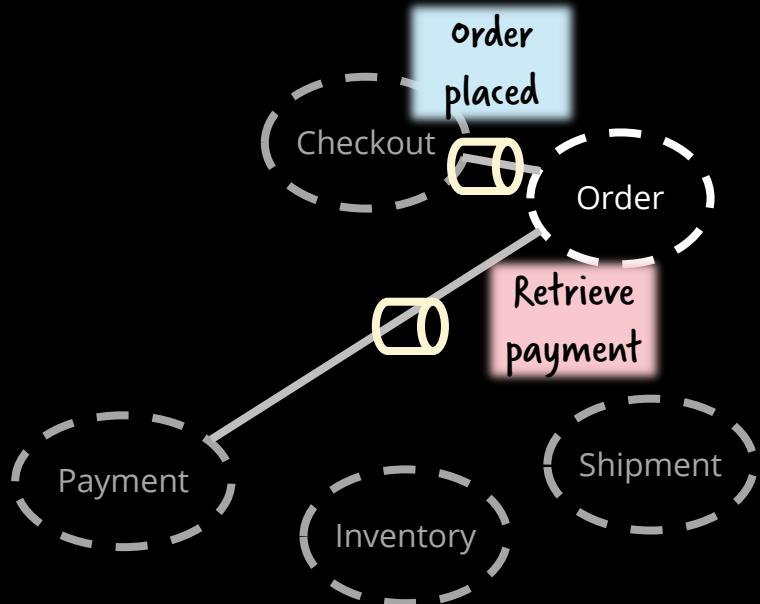


orchestration



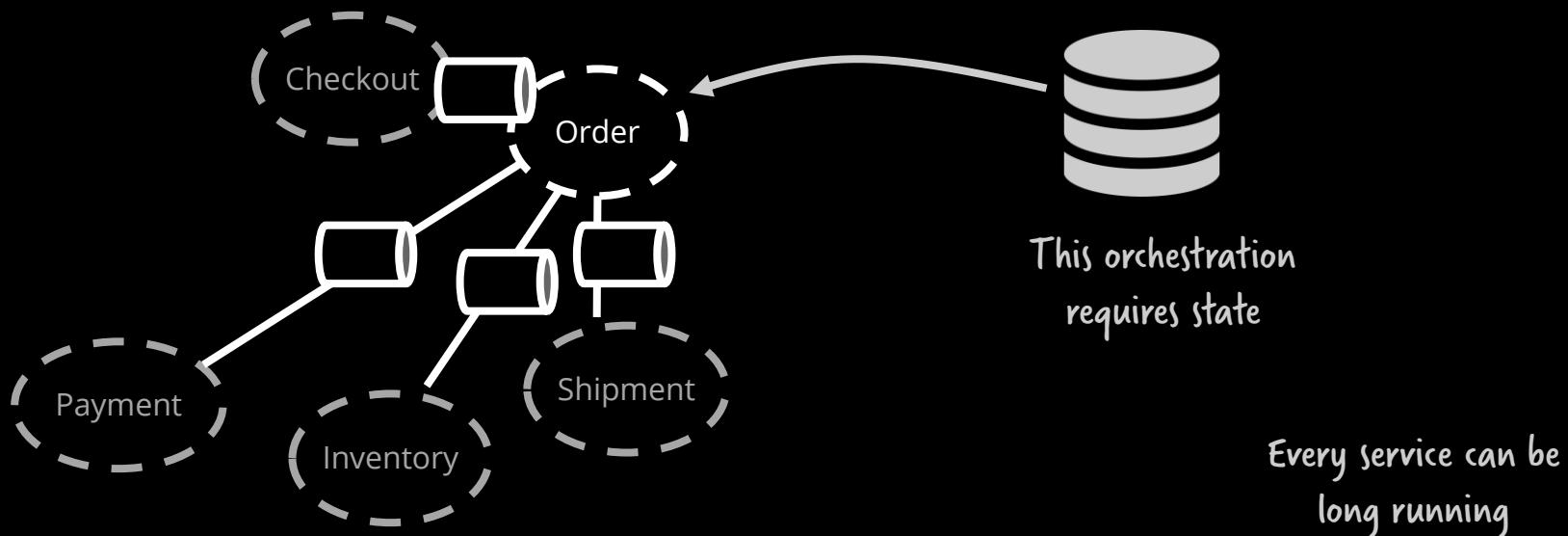
Decide about
responsibility!

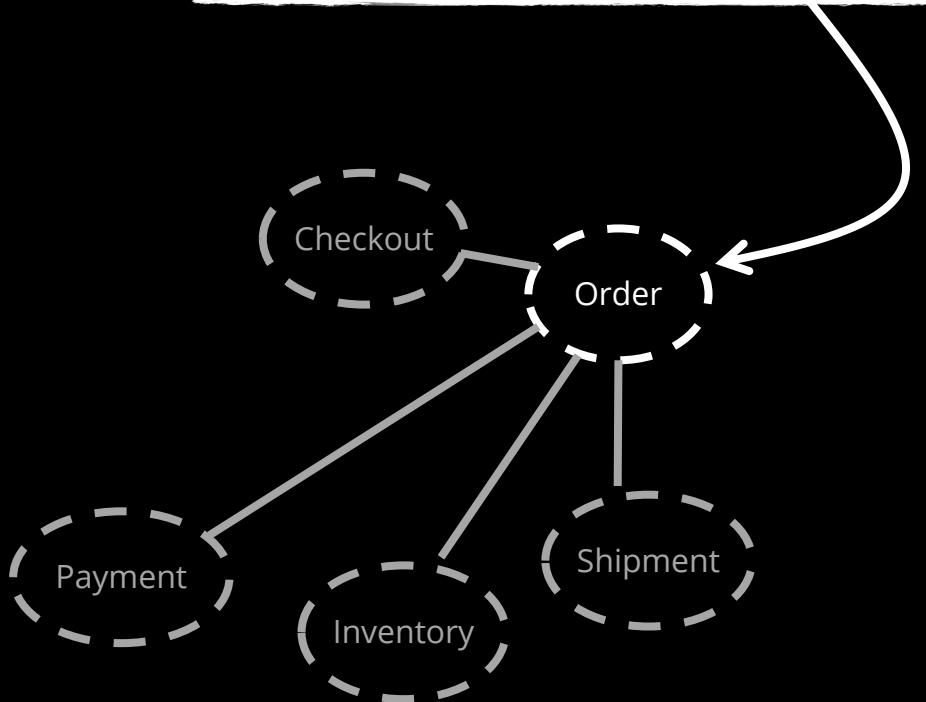
orchestration



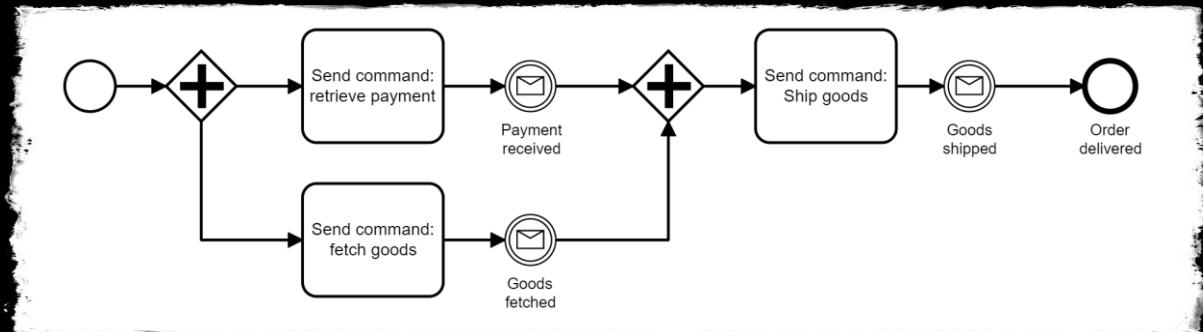
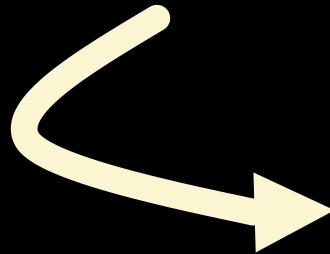
It can still be messaging!

Stateful orchestration

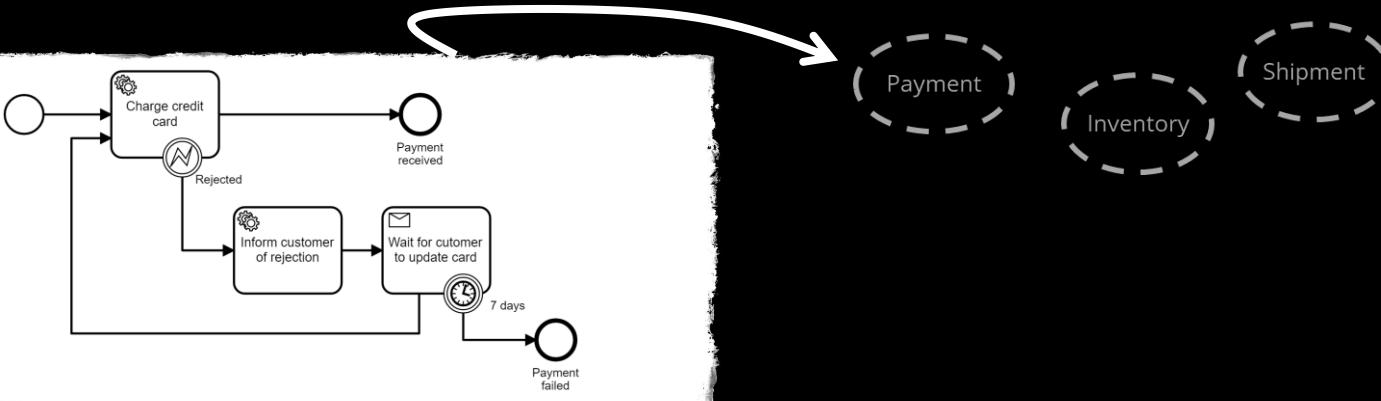
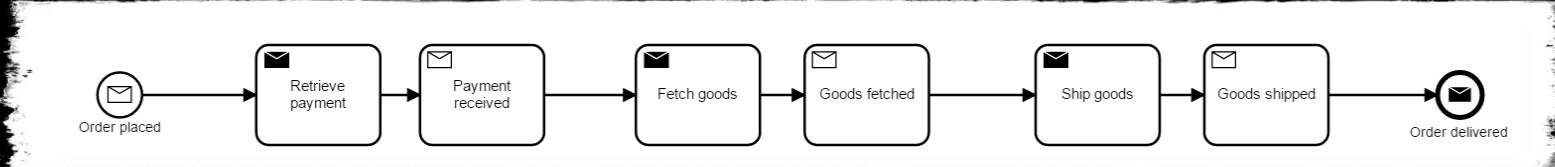




Now it is easy to change the process flow



Processes are domain logic that live inside boundaries



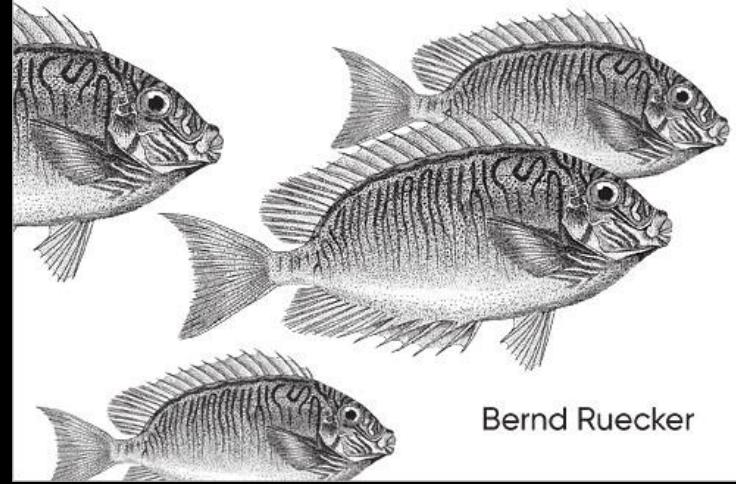
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Bernd Ruecker

Summary

- Workflow engines solve hard developer problems
- Workflow engines can orchestrate anything in a developer-friendly way
- Being able to implement long-running services improves your architecture
- Executable process models increase business agility
- Event-driven choreography is not a magic cure
- Orchestration works in harmony with modern architectures

Code, code, code...

berndruecker / flowing-retail

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Sample application demonstrating an order fulfillment system decomposed into multiple independant components (e.g. microservices). Showing concrete implementation alternatives using e.g. Java, Spring Boot, Apache Kafka, Camunda, Zeebe, ...

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106 commits 1 branch 0 releases 2 contributors Apache-2.0

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berndruecker Started to add runners for windows-cmd and docker-compose (#12 and #13) Latest commit 64909d8 3 hours ago

docs included .NET example in readme 5 months ago

kafka Started to add runners for windows-cmd and docker-compose (#12 and #13) 3 hours ago

rest fixed V6 and removed some dead code 5 days ago

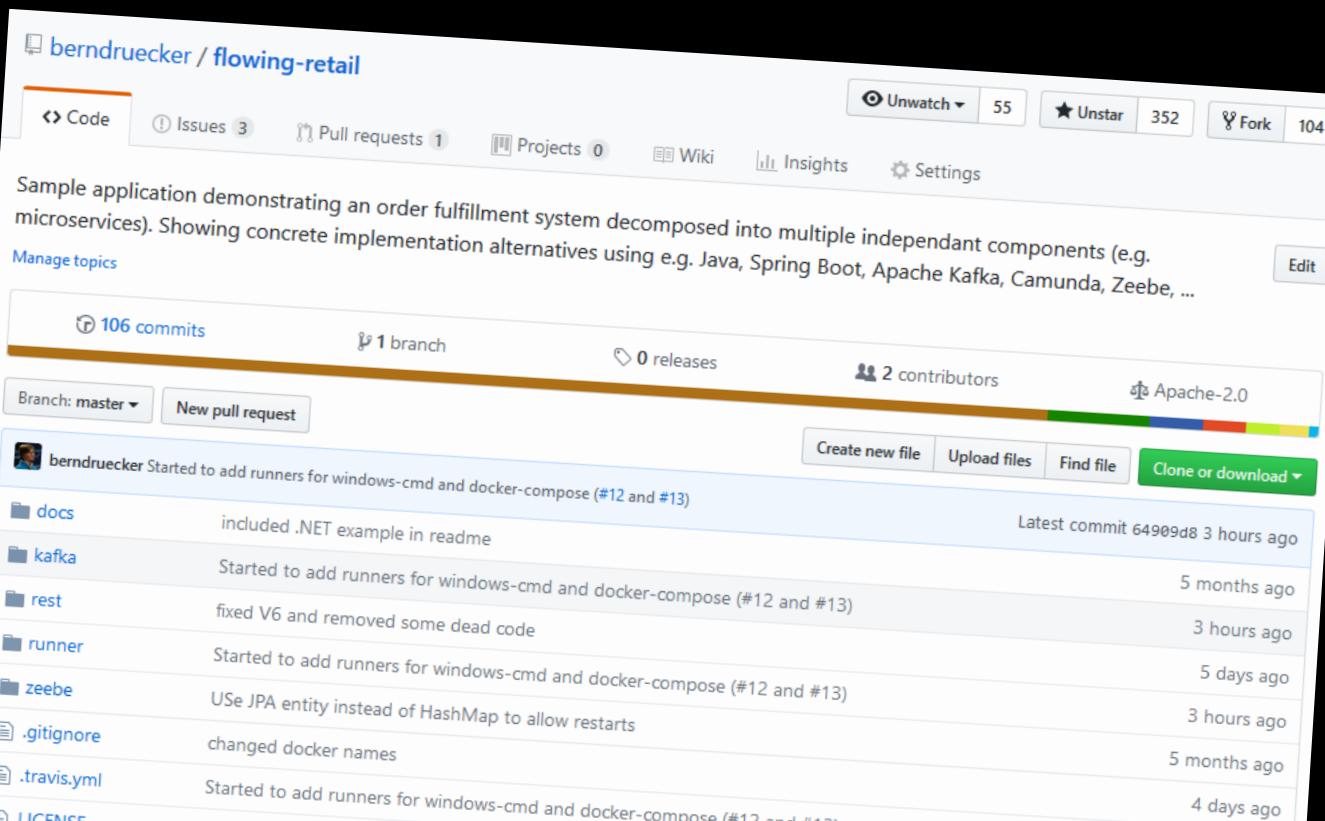
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LICENSE



Thank you!



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Slides: <https://berndruecker.io>

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