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What does low-code mean to you and the software you build?

Bernd Ruecker
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Was bedeutet Low-Code für dich und die Software, die du baust?

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41%

Shadow IT is mainstream

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> Business technologists - formerly “shadow IT” - now account for 41% of employees who conceptualize, design, develop, test and produce technology.

> 47% of boards have moved digital-business budgets into business functions (away from a central IT budget).
> 81% of IT leaders say business technologists are more involved in technology innovation now than two years ago.

Source: Gartner.
“Top Strategic Technology Trends for 2022: Hyperautomation” (18 Oct 2021);
“Practice Consensus Decision Making to Improve the Quality of Software Investment Strategies” (2024).

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no-code/low-code

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There will be no-code/low-code.

There will be no-code/low-code.
Let us shape how it looks –

There will be no-code/low-code.
Let us shape how it looks –
before business does without IT.

But how?


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“We need to speed up our bank account opening. **Others do this in minutes, we need 3 days!**

The as-is situation

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The problem: disconnected local automations

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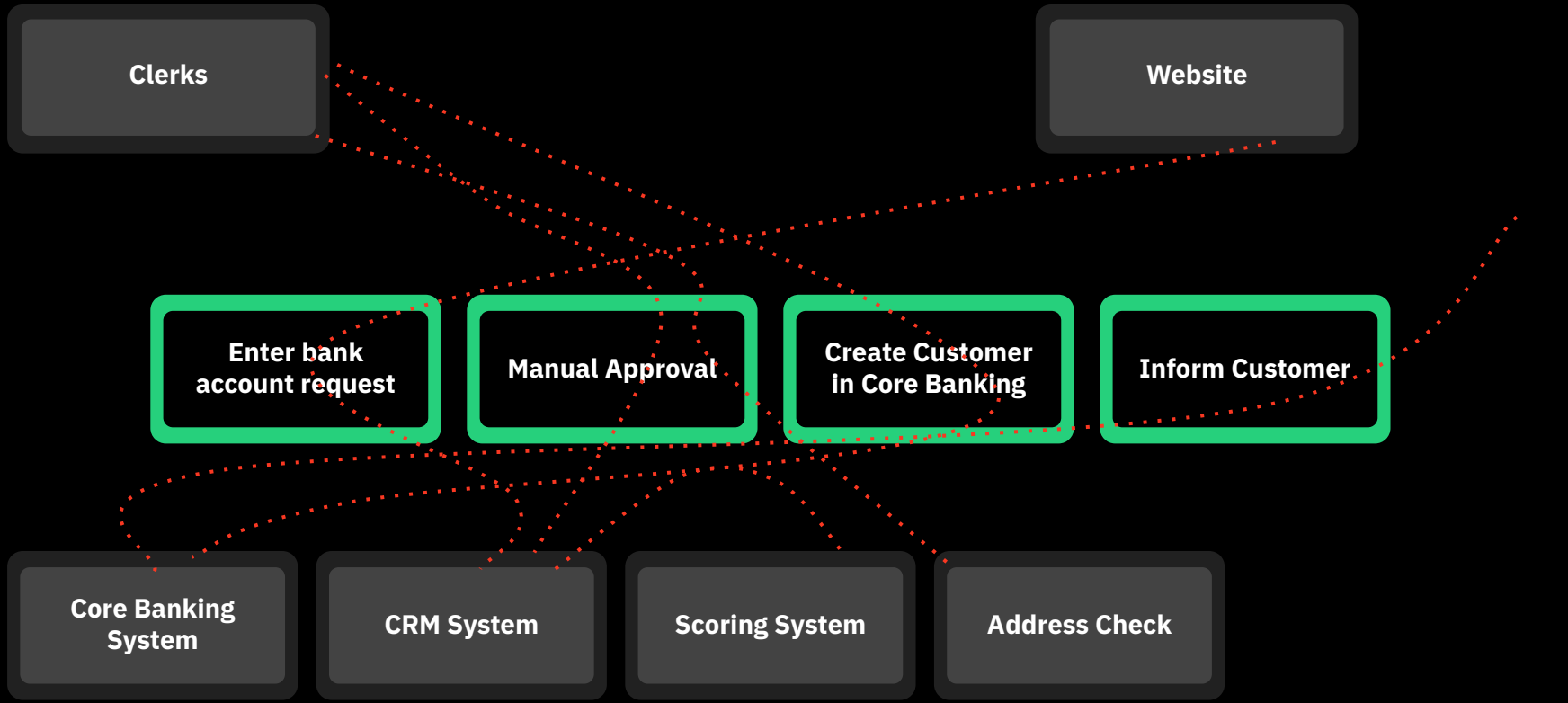

Leads to...

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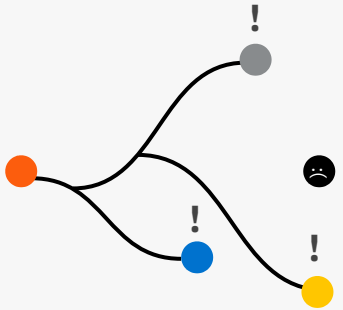
1. **A broken end-to-end automation**

   Local automations are not integrated with one another, the end-to-end process is not fully automated.

2. **Lack of understanding**

   The end-to-end process is not fully visible and key metrics are hard to track.



3. **Lack of flexibility**

   Changing the end-to-end process is difficult since it leads to potential changes in many different systems.

Adding process orchestration

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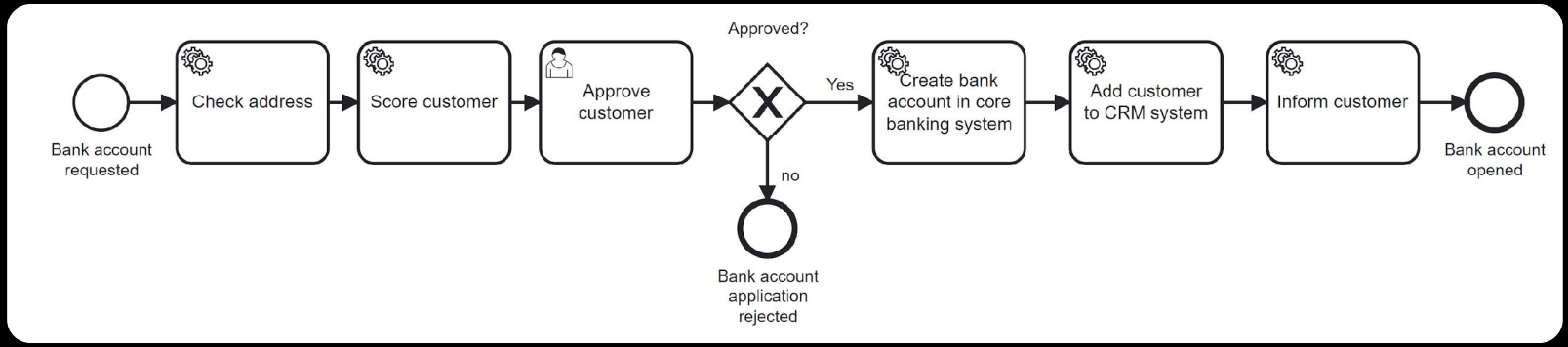
Clerks

Website



Core Banking System

CRM System

Scoring System

Address Check

Task vs. process automation

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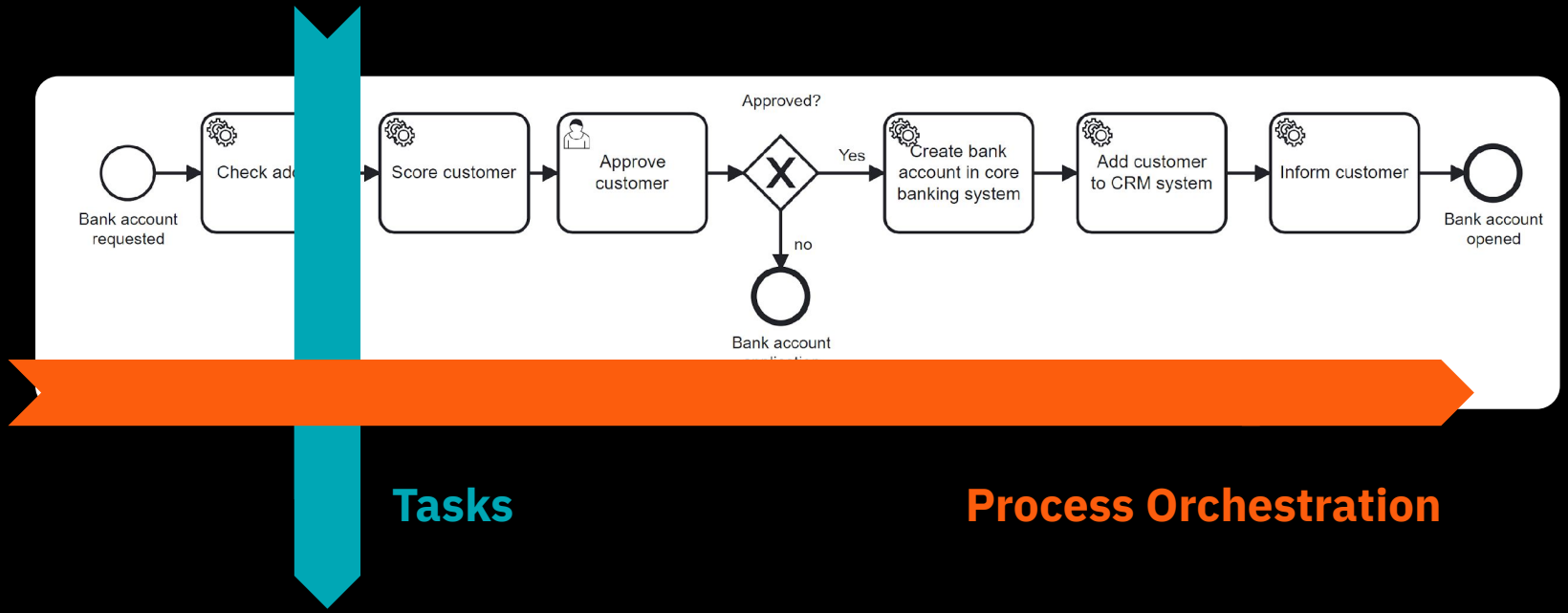

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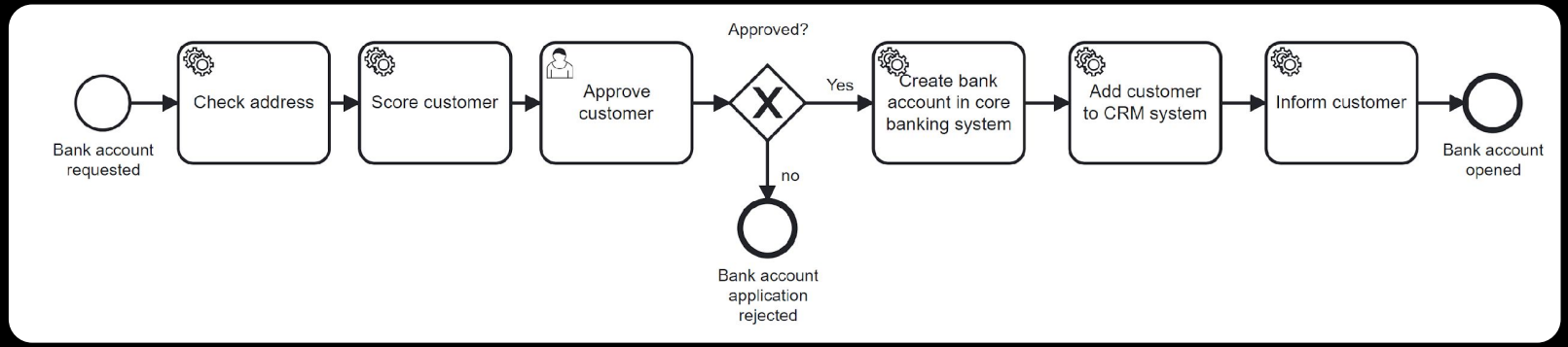
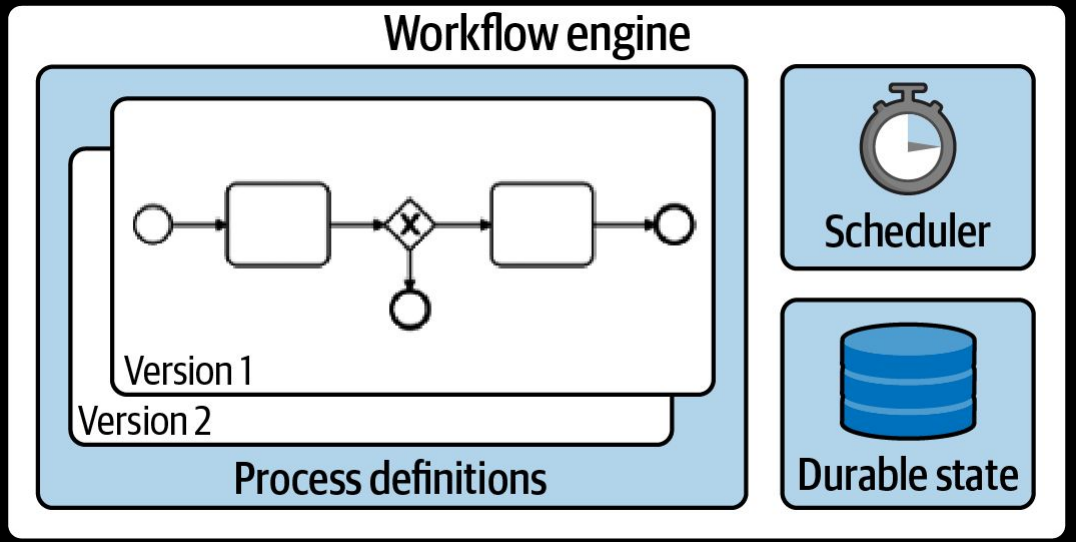

Bank account requested
Check address
Score customer
Approve customer
Approved?
Yes
no
Bank account application rejected
Create bank account in core banking system
Add customer to CRM system
Inform customer
Bank account opened


Workflow engine
Version 1
Version 2
Process definitions
Scheduler
Durable state

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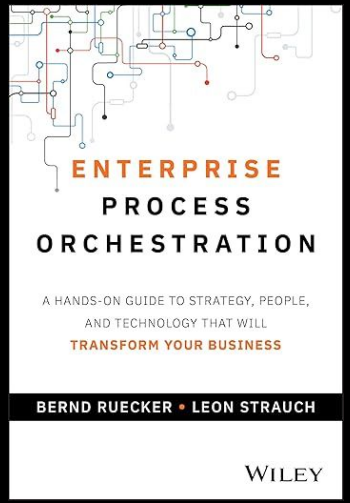
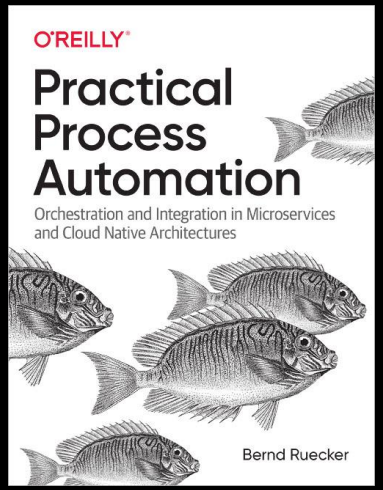
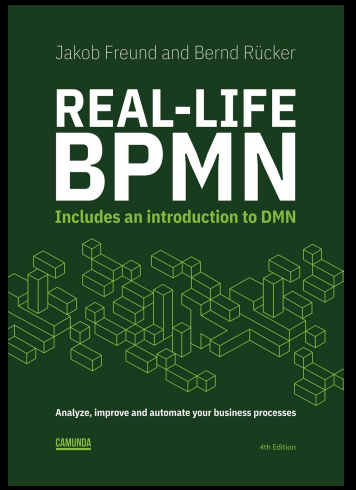






Once upon a time...

> “ ...the zero-code suite will only let you write code the way the vendor want you to write code. Very often that is their own weird scripting language in tiny property panels which leads to the antipattern death-by-properties-panel. You have to do backflips to allow for the authoring of “normal code”, e.g. in Java.

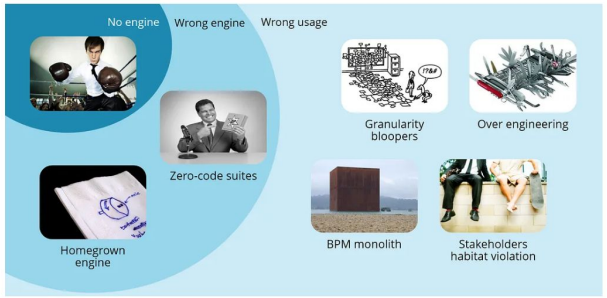
Medium Search

berndruecker

The 7 sins of workflow

Bernd Rücker 10 min read · Feb 28, 2017

381 2



Over the past 15 years while doing hundreds of workflow projects I found the following 7 sins as typical glitches in workflow related projects.

So let’s go over these sins one by one.

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Pro code approach

Hook in process orchestration into professional software development.

“Developer friendly”

Example

https://github.com/berndruecker/customer-onboarding-camunda-8-springboot/

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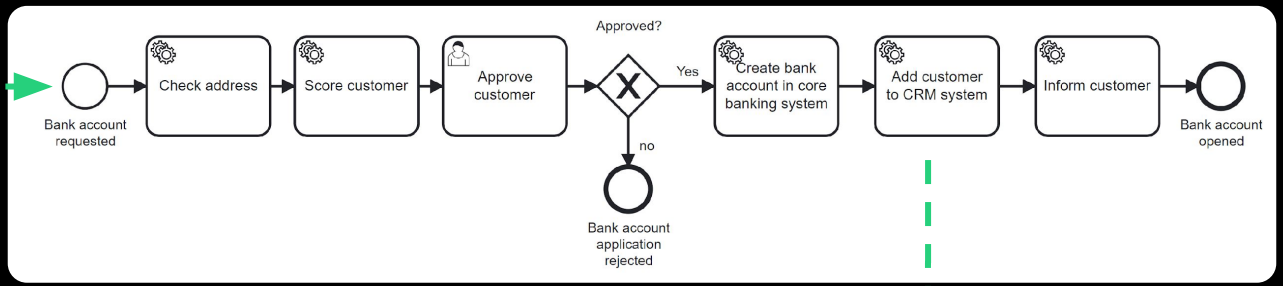
```java
@PutMapping("/customer")
public ResponseEntity<CustomerOnboardingResponse> onboardCustomer(ServerWebExchange exchange) {
  HashMap<String, Object> variables = new HashMap<~>();
  variables.put("automaticProcessing", true);
  variables.put("someInput", "yeah");

  client.newCreateInstanceCommand() //
        .bpmnProcessId("customer-onboarding") //
        .latestVersion() //
        .variables(variables) //
        .send().join();
  return ResponseEntity.status(HttpStatus.ACCEPTED).build();
}
```

Your code to provide a REST endpoint



Your code to implement the REST call

```java
@JobWorker(type = "addCustomerToCrm")
public void addCustomerToCrmViaREST(final ActivatedJob job) {
    String request = "someData";
    restTemplate.put(ENDPOINT_CRM, request);
}
```

Skipping the orchestration engine?

Workflow-Engine? Die bauen wir selbst…

22. Juni 2009 von Bernd Rücker

Eigene Workflow-Engines zu bauen scheint nach wie vor ein angesagtes Thema zu sein. Auch wir sind mit der Fragestellung gerade bei verschiedenen Kunden konfrontiert. Warum man im Jahr 2009 immer noch eigene Engines baut ist mir ein Rätsel, ich will auch kurz sagen warum.

Denn als ich neulich im Zuge der Wochenendplanung die Zitty durchblätterte viel mir der kleine Cartoon zu unserer Linken in die Hände. Und mir drängte sich sofort der Vergleich zu Workflow-Engines auf, auch wenn dies aus sozial-psychologischer Sicht vielleicht bedenklich ist 😉

Fragt man Projekte warum sie Workflow- bzw. Process-Engines selbst bauen möchten hört man häufig:

- "Wir haben nur ganz einfache Anforderungen, einen ganz simplem Zustandsautomat. Da ist eine Workflow-Engine Overkill."
- "Wir müssen die Engine in die eigene Anwendung einbauen."
- "Wir haben Produkt x evaluiert und es passt einfach nicht"

Klingt ja soweit auch ganz plausibel, oder? Ich möchte den Argumente jedoch ganz kurz ein paar Gedanken widmen:

Wir haben nur ganz einfache Anforderungen

Mit jedem eingesetzten Produkt oder Framework steigt natürlich die Komplexität. Auch ist die Lernkurve mancher Workflow-Engines nicht gerade flach, gar keine Frage. Ich habe es jedoch schon so oft gesehen, dass mit einem einfachen Zustandsautomaten gestartet wird, meist dann so irgendwie eine Entät/Tabelle pro "Prozessinstanz" mit einer Spalte, die den Zustand angibt. Denn Persistenz und eine Datenbank braucht man ja sowieso.

Aber Moment, wenn ich Wartezustände habe, brauche ich dann nicht auch Timeouts oder Eskalationen?

Oder möchte ich nicht vielleicht von einem Zustand in einen Folgezustand "gehen", wobei ich eine Entscheidung treffen muss (also ein datenbasiertes exklusives Gateway in BPMN)?

Naja, ok, das bauen wir schon auch irgendwie in den eigenen Zustandsautomat ein. Die Softwareentwicklung hat ja auch vor der Existenz von Workflow-Engines funktioniert. Werkelt man also weiter vor sich hin, möchte

Neue Einträge
- Schritt für Schritt - BPM für den Mittelstand
- Workflow-Engine? Die bauen wir selbst…
- Wow, was für ein Ereignis!
- 4. Process Solutions Day: Ein kurzer Rückblick
- BPMN 2.0
- Gutes Feedback von der Jax
- Prozessdokumentation: "Warum nicht einfach Visio?"
- "Oft erleben wir, dass die Tekkies mit dem Businesskram nichts anfangen wollen"
- BPM in der Sinnkrise - Was soll das?
- Befragung: Was bringen BPM-Tools wirklich?

Tags
Allgemein BAM BPEL BPM BPM-Software BPMN BPM und Business Rules Business Rules camunda live Drools EPK ESB Fachartikel JAX jBPM jobs Netzwerk OOP process engine Process Hosting Prozessautomatisierung Prozessmodelle Prozessmodellierung prozessoptimierung Rule Engine Slidecast SOA Softwareentwicklung studenten Vortrag W-Jax Workflow

Archiv
- Juni 2009
- Mai 2009
- April 2009
- März 2009
- Februar 2009
- Januar 2009
- Dezember 2008
- November 2008

Solution architecture example

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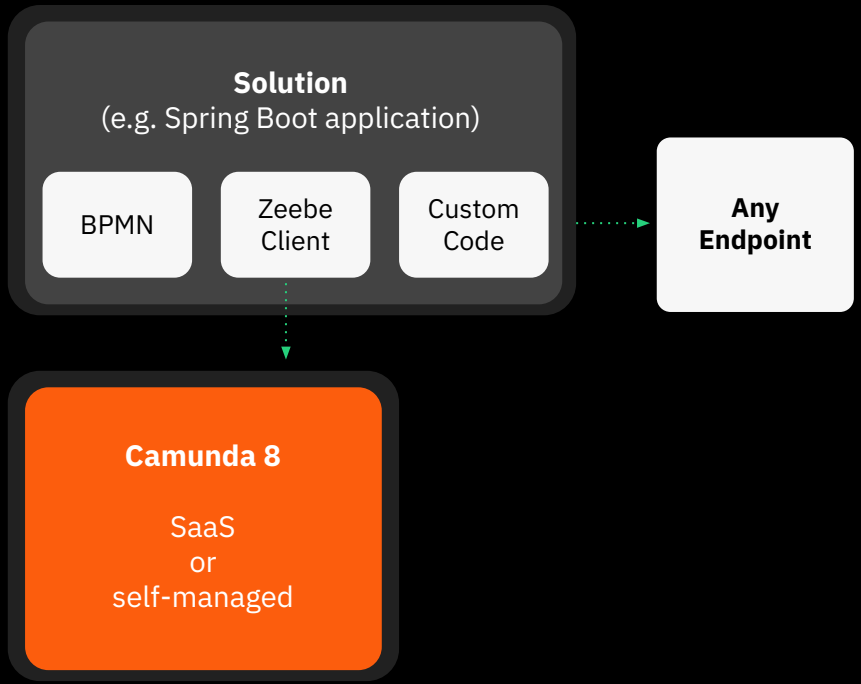


Supports any programming language

- Clients for Java, C#, NodeJS, Go, … available
- Natively integrates into your stack

Runs anywhere

- Available as a SaaS service
- Manage it yourself (in your own cloud, your datacenter, your laptop)

Camunda **Operate** | Dashboard | Processes | Decisions

Filters

Process

Name: Customer Onboarding (Si...

Version: 2

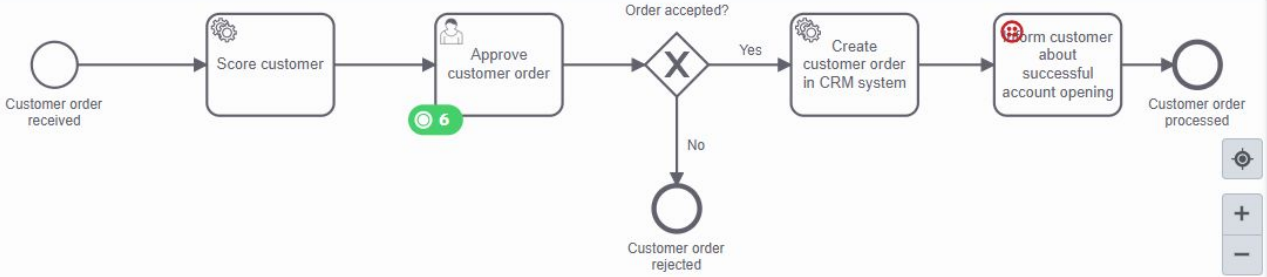
Flow Node: Search by Process Flow Node

Instance States

- [x] Running Instances
  - [x] Active
  - [ ] Incidents
- [ ] Finished Instances
  - [ ] Completed
  - [ ] Canceled

Reset Filters

Customer Onboarding (Simple)



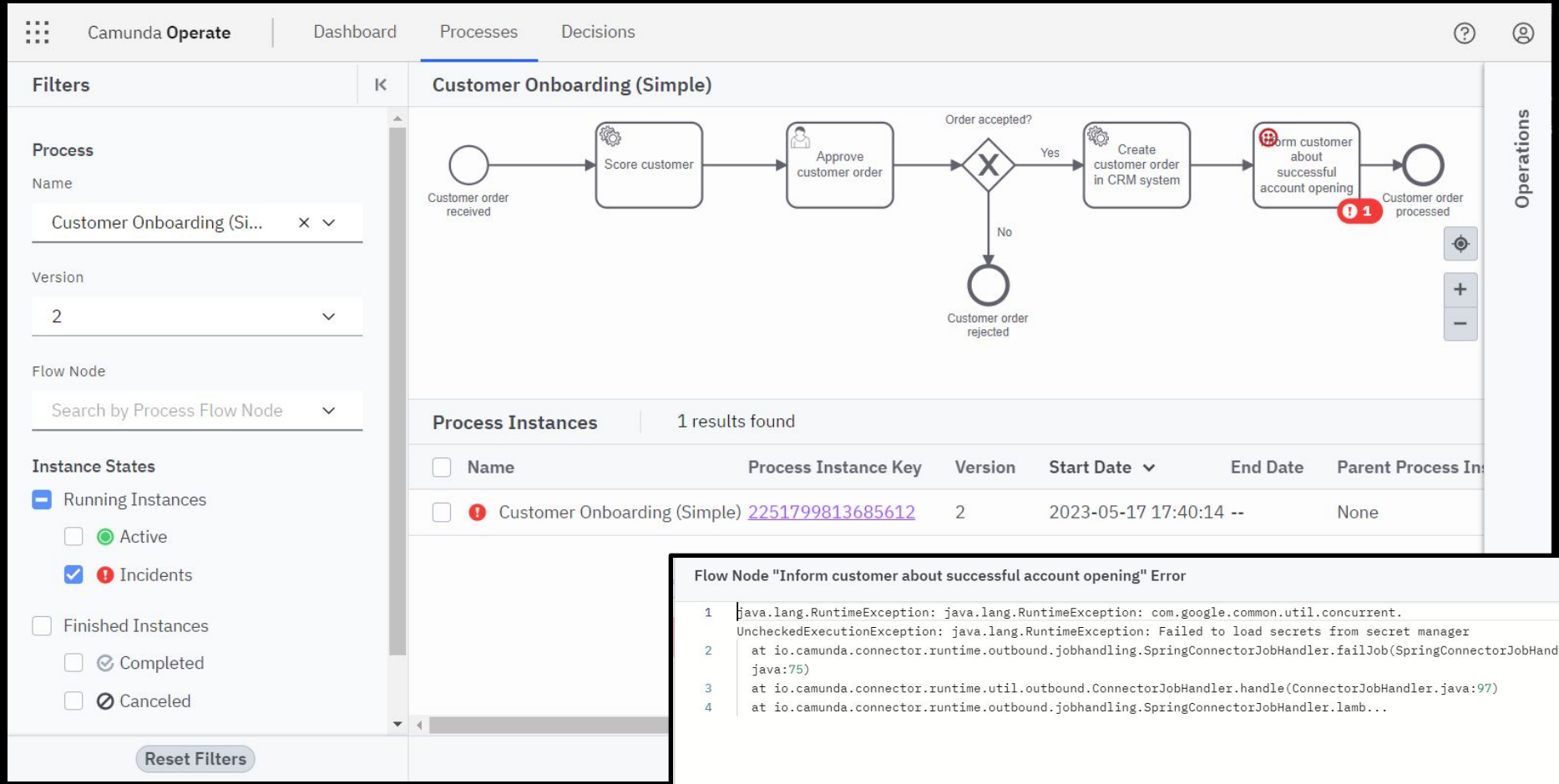
Process Instances

6 results found

Name	Process Instance Key	Version	Start Date	End Date	Parent Process
Customer Onboarding (Simple)	4503599627370990	2	2023-05-17 17:41:54	--	None
Customer Onboarding (Simple)	2251799813685807	2	2023-05-17 17:41:54	--	None
Customer Onboarding (Simple)	2251799813685798	2	2023-05-17 17:41:54	--	None
Customer Onboarding (Simple)	4503599627370975	2	2023-05-17 17:41:54	--	None
Customer Onboarding (Simple)	4503599627370960	2	2023-05-17 17:41:54	--	None

Operations

 | 8.3.0-alpha1


Camunda Operate
Dashboard
Processes
Decisions
Filters
Process
Name
Customer Onboarding (Si...
Version
2
Flow Node
Search by Process Flow Node
Instance States
Running Instances
Active
Incidents
Finished Instances
Completed
Canceled
Reset Filters
Customer Onboarding (Simple)
Customer order received
Score customer
Approve customer order
Order accepted?
Yes
No
Create customer order in CRM system
Inform customer about successful account opening
1
Customer order processed
Customer order rejected
Operations
Process Instances
1 results found
Name
Process Instance Key
Version
Start Date
End Date
Parent Process In
Customer Onboarding (Simple)
2251799813685612
2
2023-05-17 17:40:14
--
None
Flow Node "Inform customer about successful account opening" Error
1 java.lang.RuntimeException: java.lang.RuntimeException: com.google.common.util.concurrent.
UncheckedExecutionException: java.lang.RuntimeException: Failed to load secrets from secret manager
2 at io.camunda.connector.runtime.outbound.jobhandling.SpringConnectorJobHandler.failJob(SpringConnectorJobHandler
java:75)
3 at io.camunda.connector.runtime.util.outbound.ConnectorJobHandler.handle(ConnectorJobHandler.java:97)
4 at io.camunda.connector.runtime.outbound.jobhandling.SpringConnectorJobHandler.lamb...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“We need to speed up our bank account opening. Others do this **in minutes,** we need 3 days!

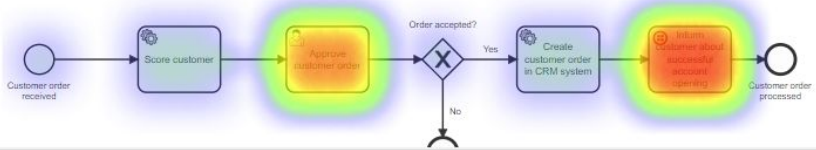
Process performance overview

Edit | Delete | Share | Enter Fullscreen | Auto Refresh

0	5 hours	5 hours	100%	75%
0 Target 200	0ms Target 1 day	0ms Target 1 week	0% 100%	0% Target 99%

Which process steps take too much time? (To Do: Add Target values for these pr...

Heat: Duration - Avg



Is my process within control?

Date and Time displayed in local timezone: Europe/Berlin

Changing tasks

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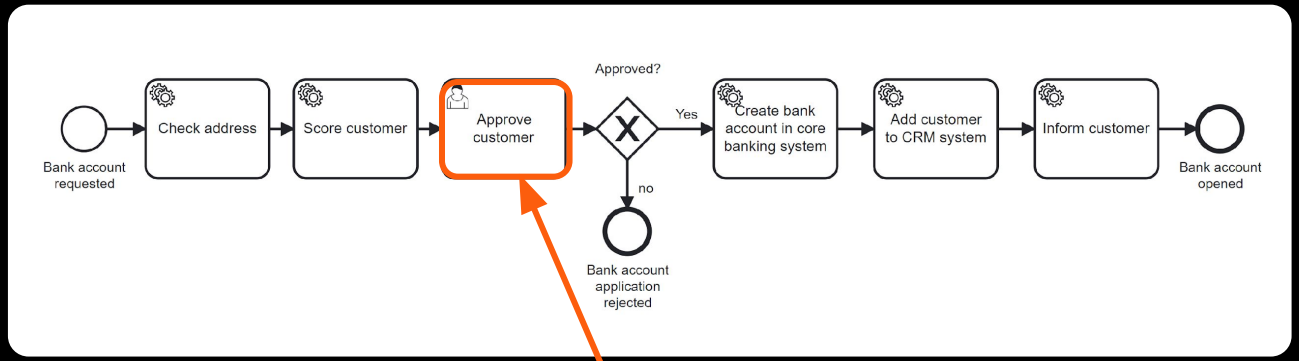

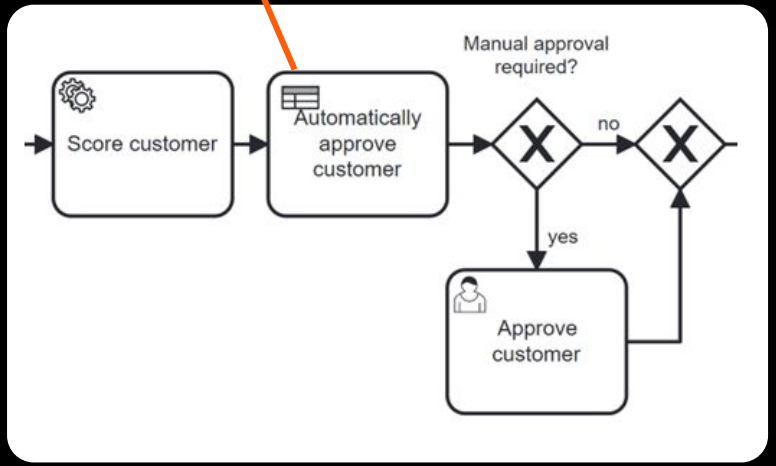

Decision table in DMN

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Account auto-approval | **Hit policy:** First

	When KYC score integer	And Country risk category string	And PEP (politically exposed person) boolean	And Sanctions / watchlist hit boolean	And Overdraft to income ratio number	And All required documents complete boolean	Then Approval result string
1	-	-	-	true	-	-	"MANUAL_REVIEW"
2	-	-	true	-	-	-	"MANUAL_REVIEW"
3	-	"HIGH"	-	-	-	-	"MANUAL_REVIEW"
4	< 50	-	-	-	-	-	"MANUAL_REVIEW"
5	-	-	-	-	-	false	"MANUAL_REVIEW"
6	-	-	-	-	> 2	-	"MANUAL_REVIEW"
7	>= 75	"LOW","MEDIUM"	false	false	<= 1.5	true	"AUTO_APPROVE"
8	-	-	-	-	-	-	"MANUAL_REVIEW"

Who does such changes?

Developers?

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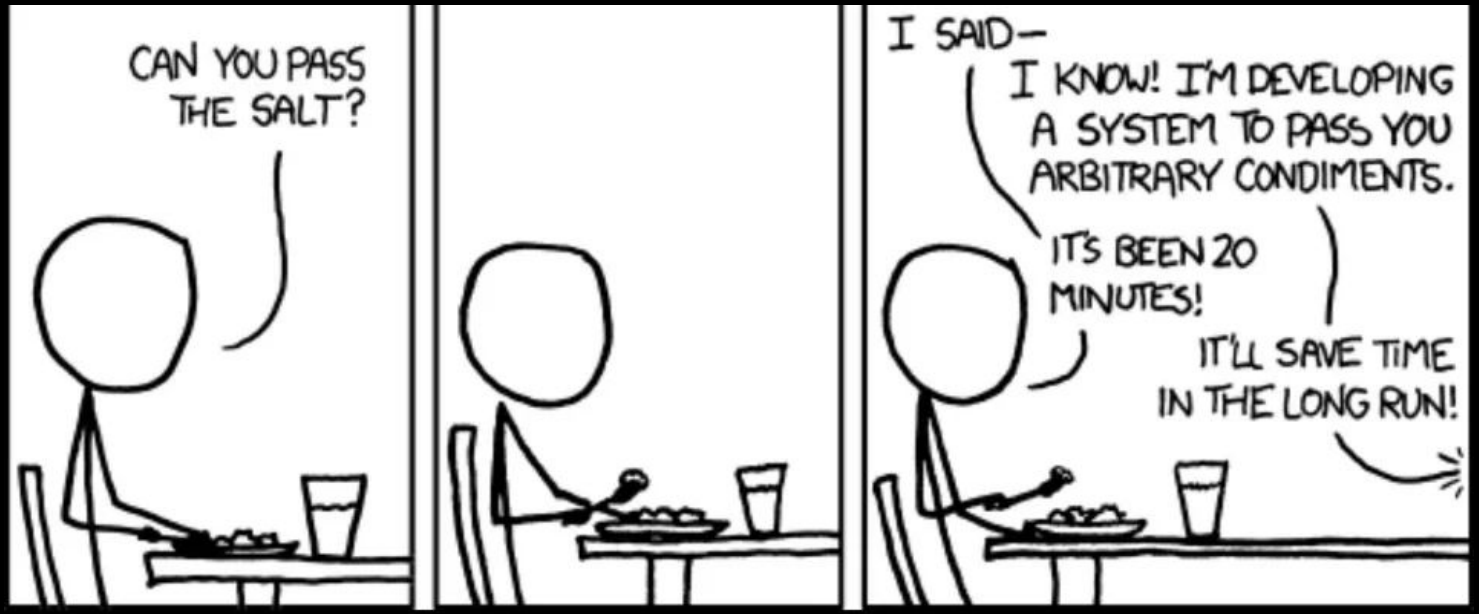

A sad story

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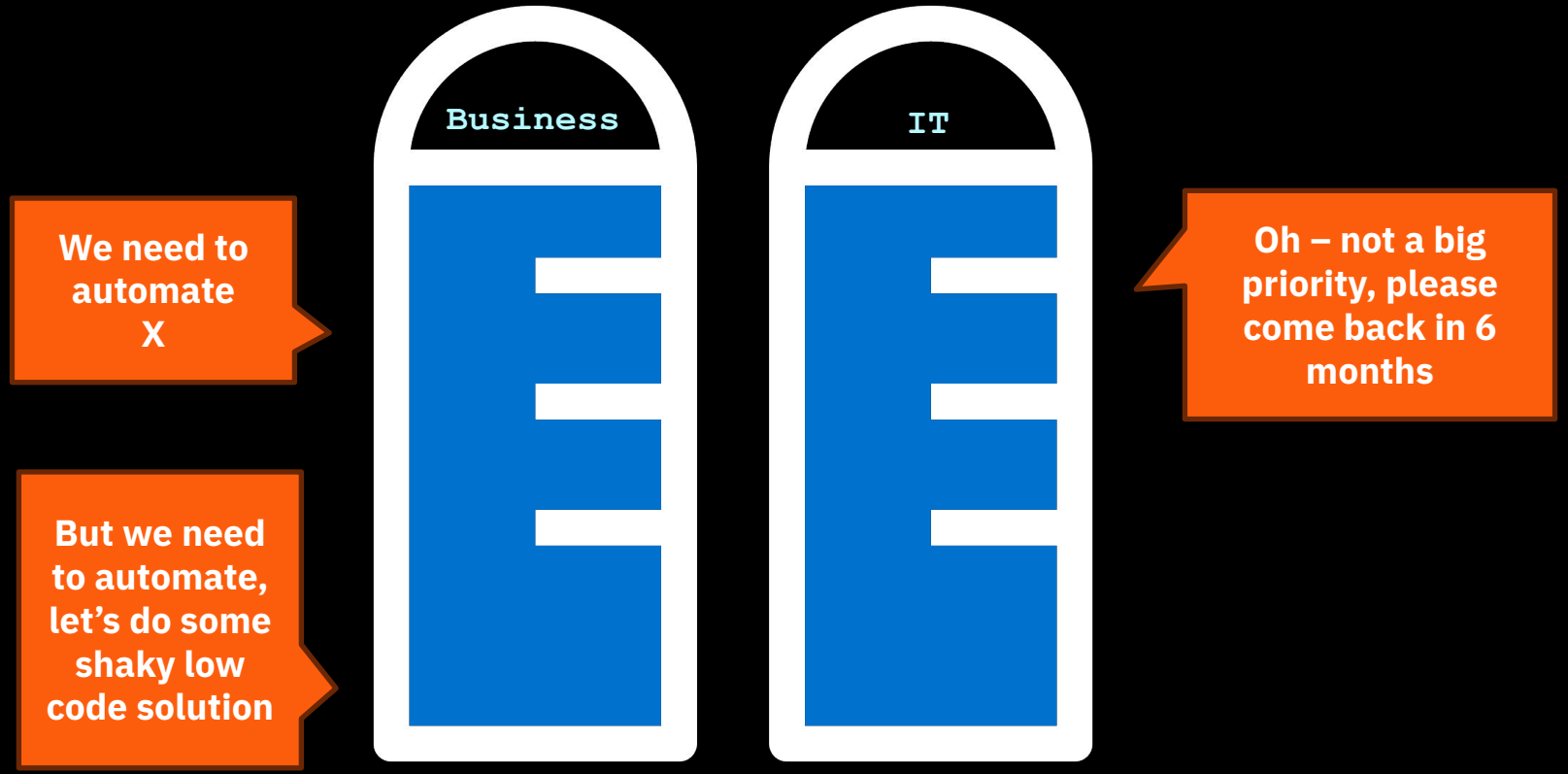

Business vs. IT?

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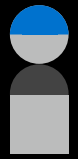
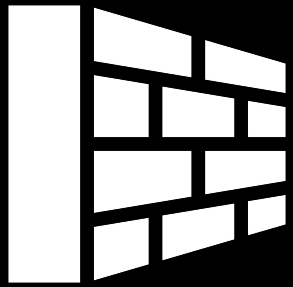


Business Person



Java Developer

Diversity of roles

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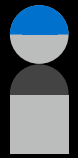
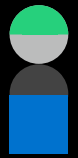
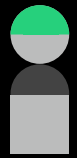


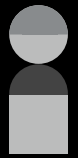
Business Person



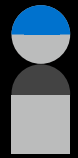
Citizen Developer



Consultant or **Power User**



Bot Developer



Low-code Developer

Junior Developer

Senior Developer

Principal Developer

Process != process

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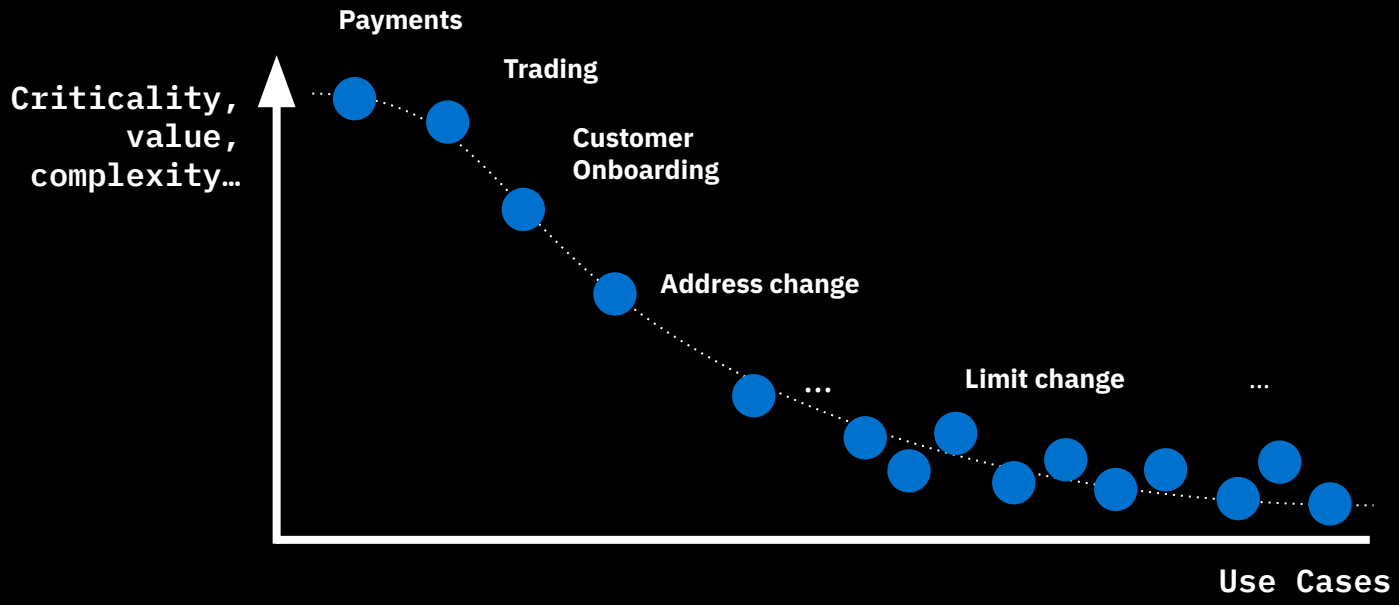

Categorize your use case

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Red
Professional Development

- high complexity
- high criticality
- compliance and regulatory requirements

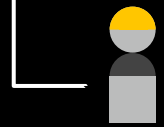
- version control
- automated testing
- CI / CD

Professional Developer

Yellow
Guided

- medium complexity
- medium criticality

- some governance required
- some guidance necessary



Anything in between

Green
Do it yourself

- simple
- local automations with little criticality

- no governance or quality assurance

Citizen Developer

Inspired also by https://www.forrester.com/blogs/how-shell-led-a-citizen-developer-movement/

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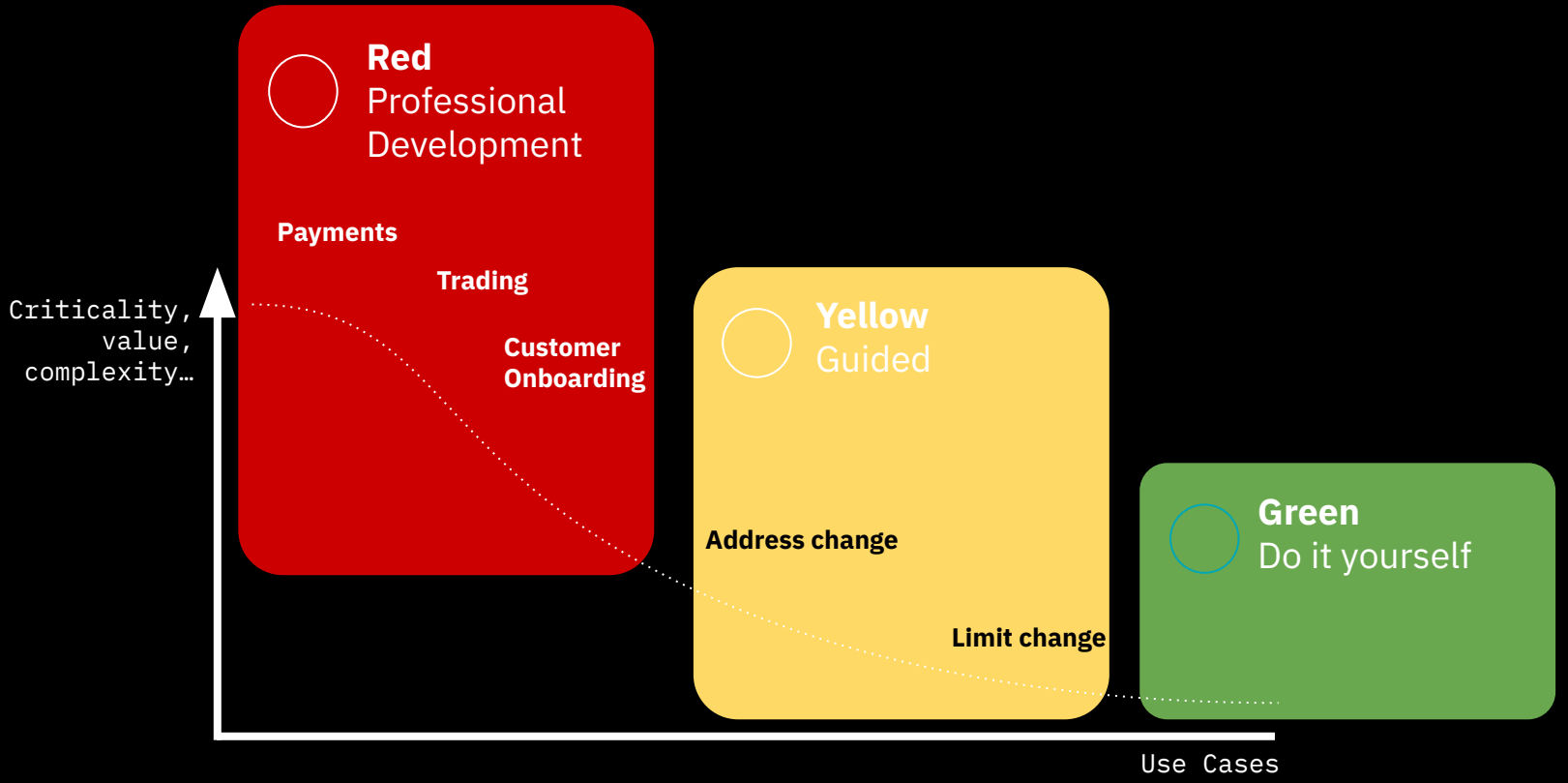
Red
Professional Development
Payments
Trading
Customer Onboarding
Yellow
Guided
Address change
Limit change
Green
Do it yourself
Criticality, value, complexity…
Use Cases

Enabling more roles to participate

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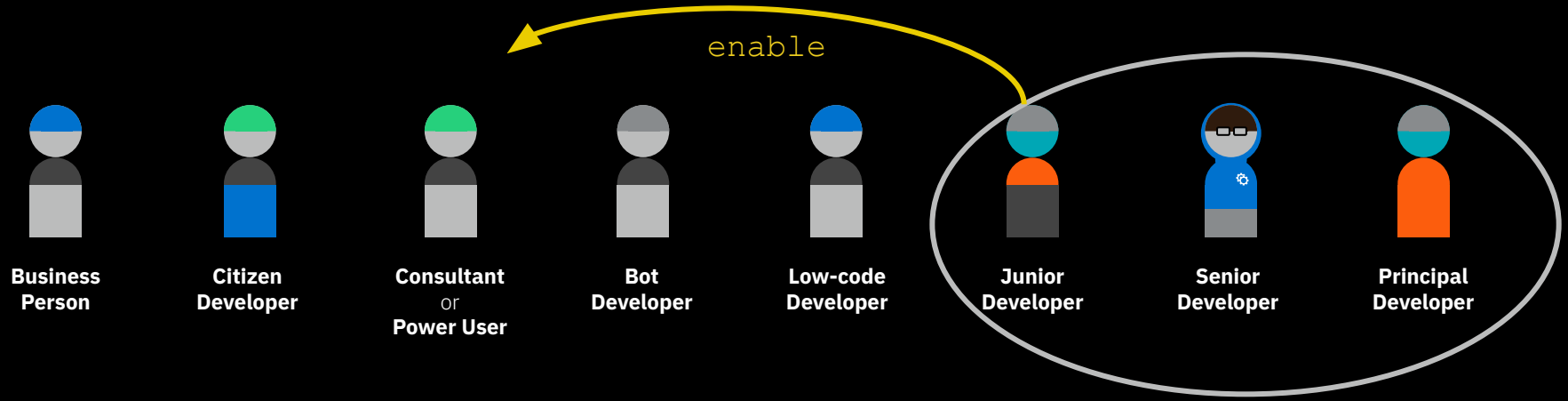

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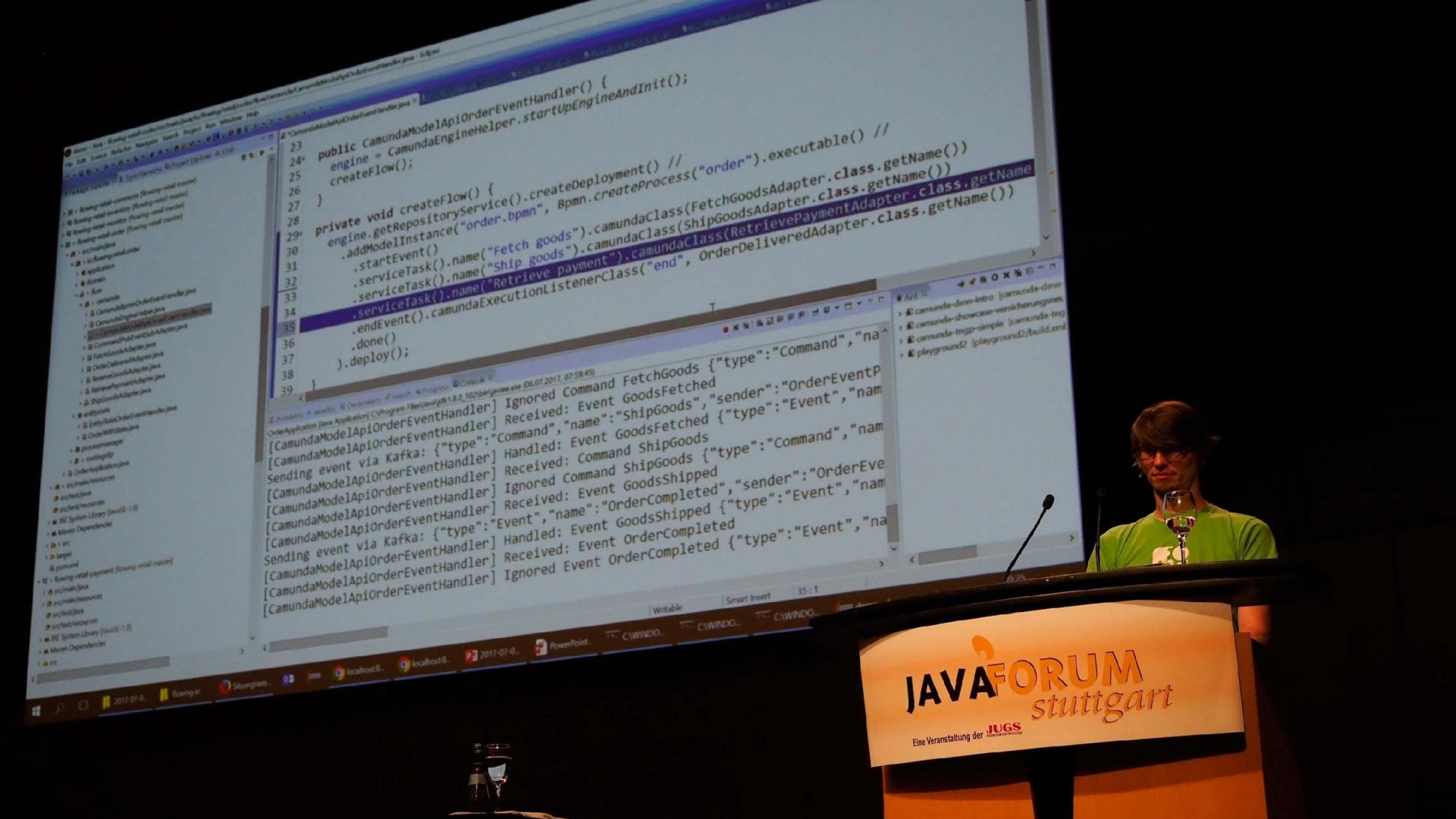
Low code as accelerator and enabler*

*for use cases with **low** to **medium** complexity
- **not** for **core processes**

Low code?


public CamundaModelApiOrderEventHandler() {
engine = CamundaEngineHelper.startUpEngineAndInit();
createFlow();
}
private void createFlow() {
engine.getRepositoryService().createDeployment() //
.addModelInstance("order.bpmn", Bpmn.createProcess("order").executable() //
.startEvent()
.serviceTask().name("Fetch goods").camundaClass(FetchGoodsAdapter.class.getName())
.serviceTask().name("Ship goods").camundaClass(ShipGoodsAdapter.class.getName())
.serviceTask().name("Retrieve payment").camundaClass(RetrievePaymentAdapter.class.getName())
.endEvent().camundaExecutionListenerClass("end", OrderDeliveredAdapter.class.getName())
.done()
).deploy();
}
[CamundaModelApiOrderEventHandler] Ignored Command FetchGoods {"type":"Command","na
[CamundaModelApiOrderEventHandler] Received: Event GoodsFetched
Sending event via Kafka: {"type":"Command","name":"ShipGoods","sender":"OrderEventP
[CamundaModelApiOrderEventHandler] Handled: Event GoodsFetched {"type":"Event","nam
[CamundaModelApiOrderEventHandler] Received: Event GoodsFetched
[CamundaModelApiOrderEventHandler] Ignored Command ShipGoods
[CamundaModelApiOrderEventHandler] Received: Event GoodsShipped
Sending event via Kafka: {"type":"Event","name":"OrderCompleted","sender":"OrderEve
[CamundaModelApiOrderEventHandler] Handled: Event GoodsShipped {"type":"Event","nam
[CamundaModelApiOrderEventHandler] Received: Event OrderCompleted
[CamundaModelApiOrderEventHandler] Ignored Event OrderCompleted {"type":"Event","na
JAVAFORUM stuttgart
Eine Veranstaltung der JUGS

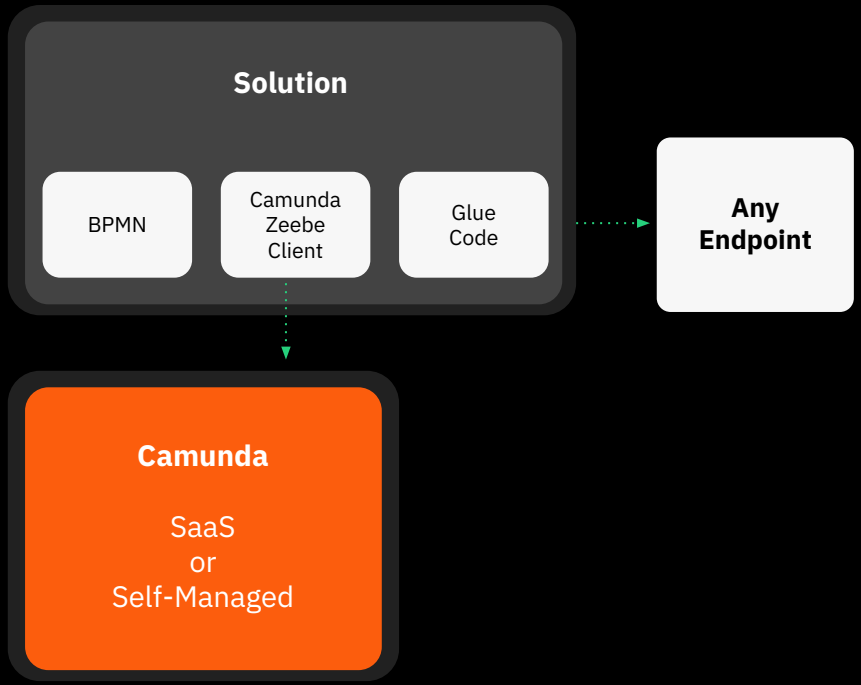
Low-code as an accelerator

CAMUNDA

Dial-in low-code as much as you need

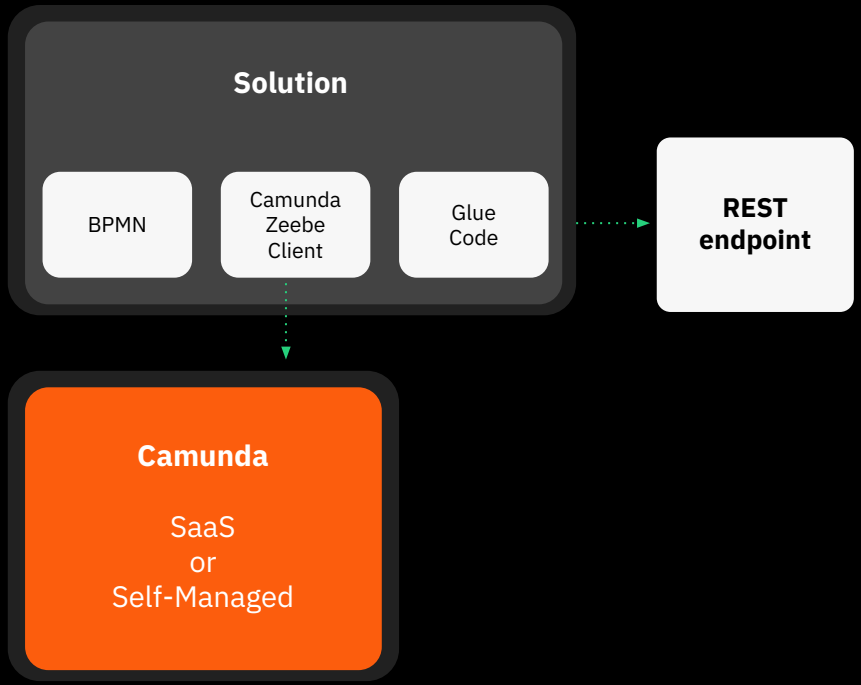
Solution architecture example

CAMUNDA



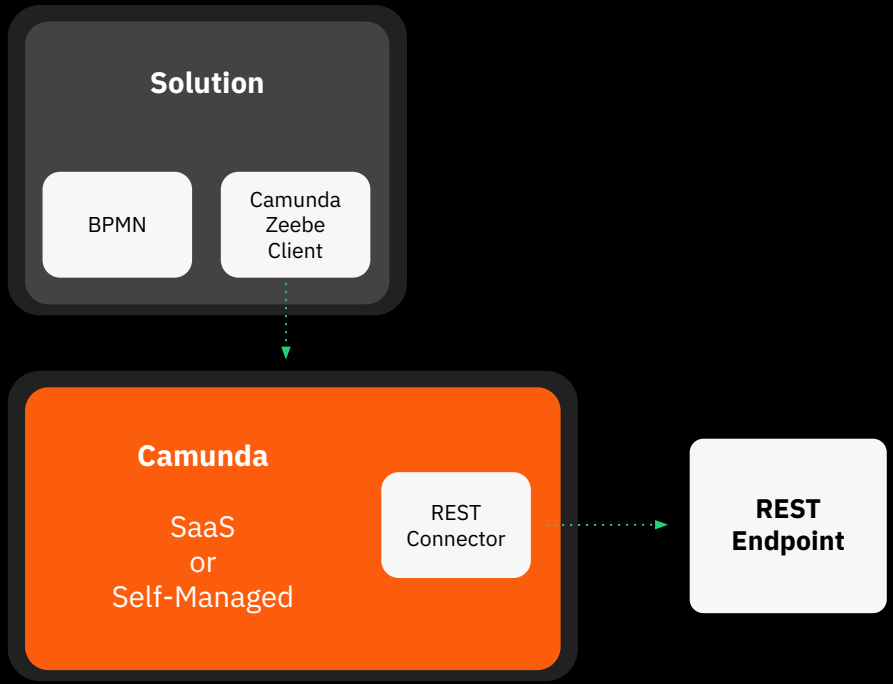
Solution architecture example

CAMUNDA



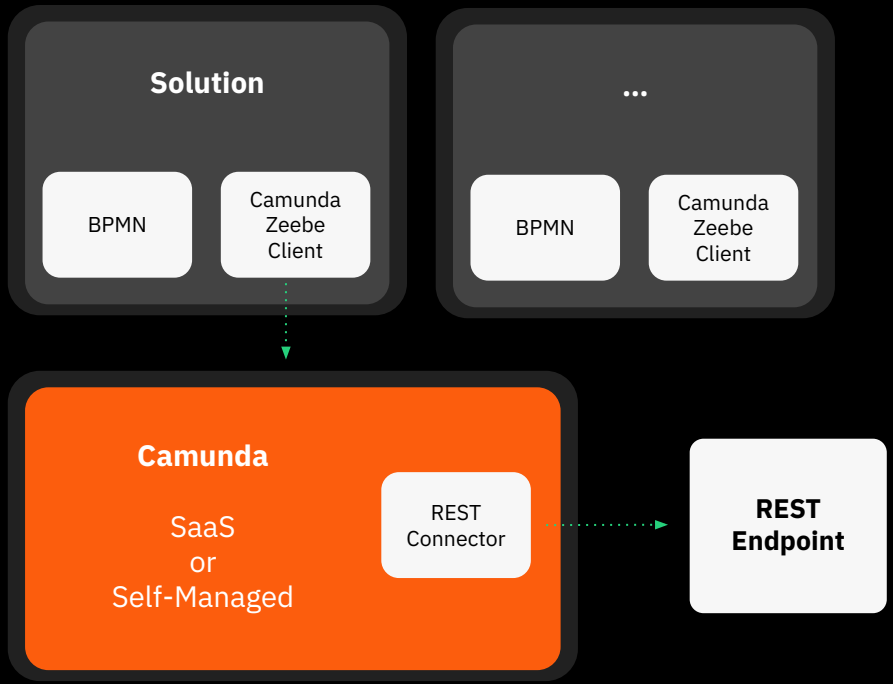
Solution architecture example with connector

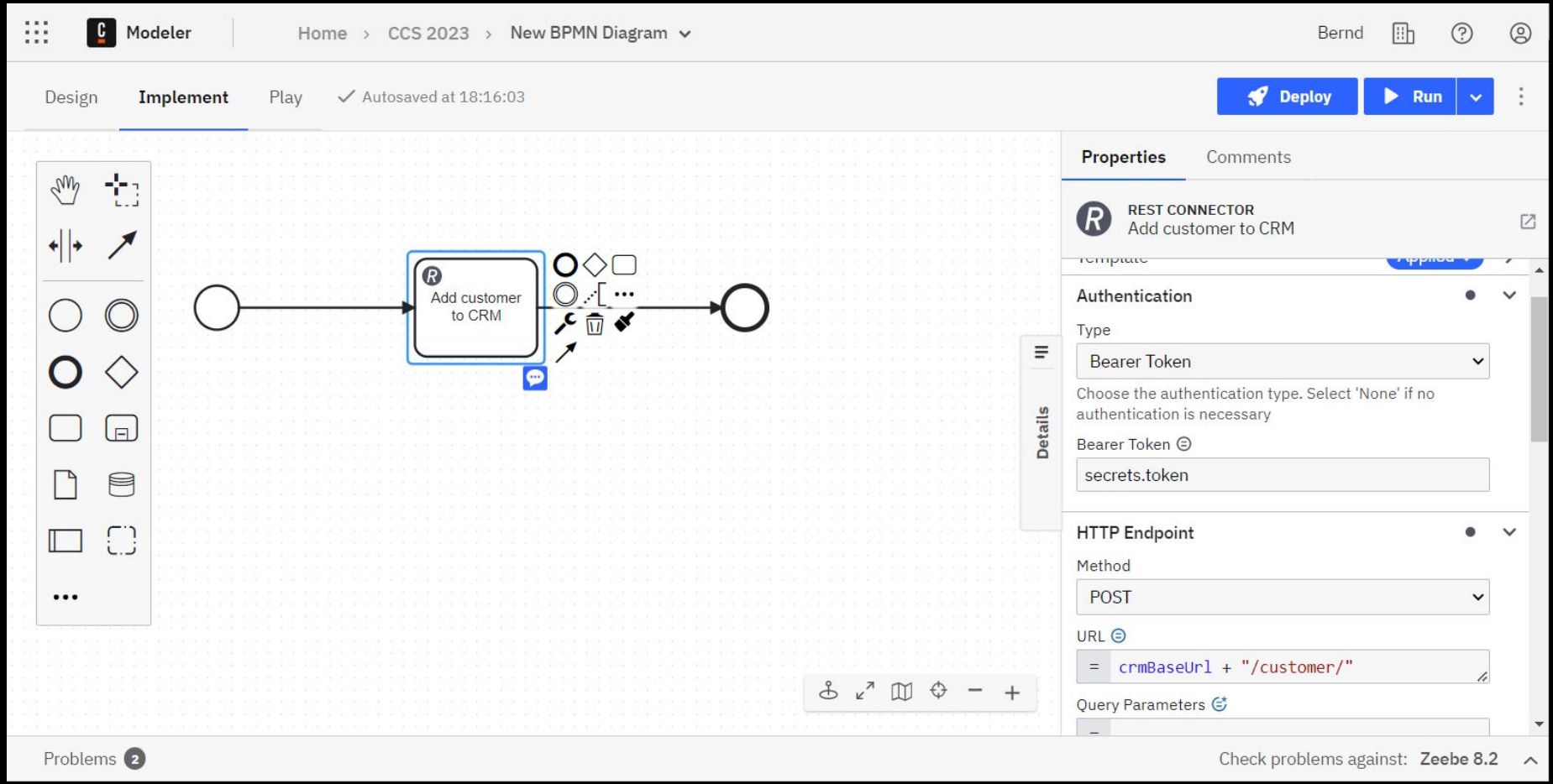
CAMUNDA



Solution architecture example with connector

CAMUNDA

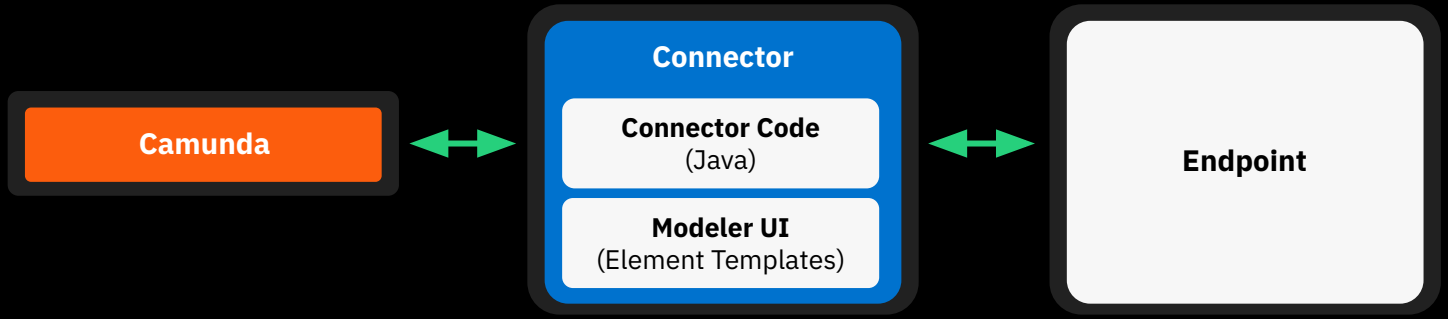



Modeler
Home
CCS 2023
New BPMN Diagram
Bernd
Design
Implement
Play
Autosaved at 18:16:03
Deploy
Run
Add customer to CRM
Properties
Comments
REST CONNECTOR
Add customer to CRM
Authentication
Type
Bearer Token
Choose the authentication type. Select 'None' if no authentication is necessary
Bearer Token
secrets.token
HTTP Endpoint
Method
POST
URL
= crmBaseUrl + "/customer/"
Query Parameters
Details
Problems 2
Check problems against: Zeebe 8.2

OK – what's a connector?

What's a connector?

CAMUNDA



Multi Layer Coding Experience

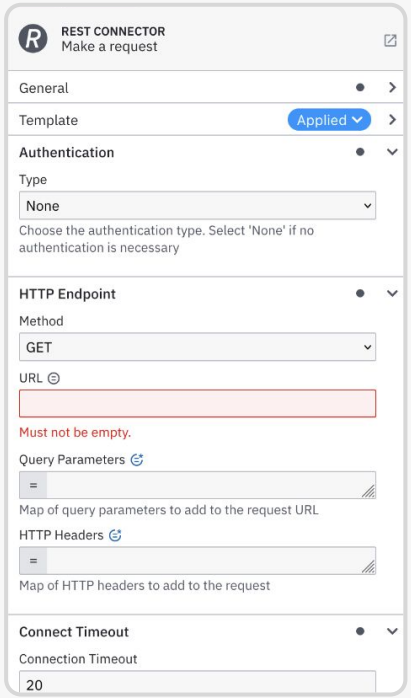
CAMUNDA

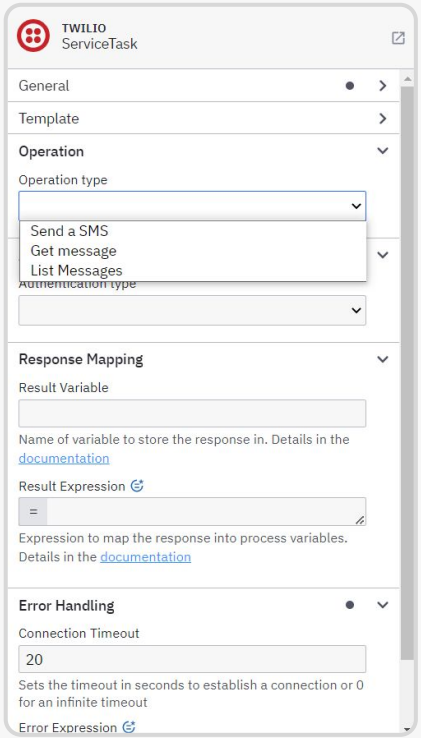
Pro code → **Protocol connector** → **Generic system connector** (requires JSON configuration of REST connector) → **Specific capability connector** (requires JSON configuration)

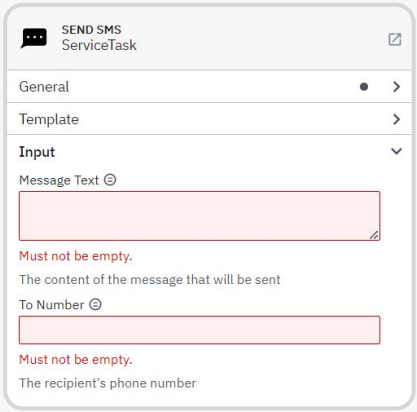
```
@JobWorker(type = "call-rest")
public Map executeRestCall(final ActivatedJob job
    HttpRequest request = HttpRequest.newBuilder(
            .uri(URI.create("https://someUrl.org/
            .GET()
            .build();

    HttpResponse<String> response = send(request)

    return newVariable("response", response);
}
```

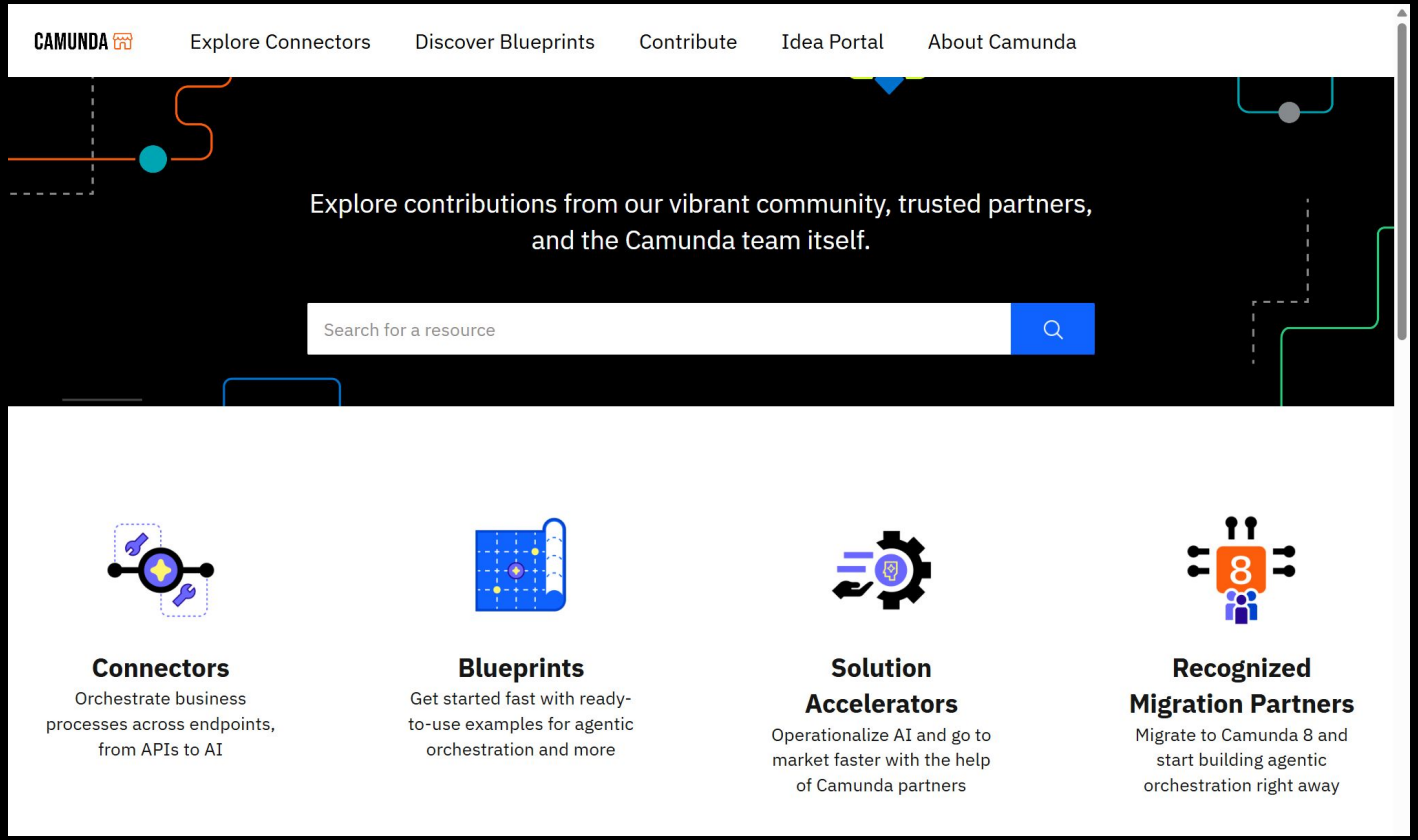






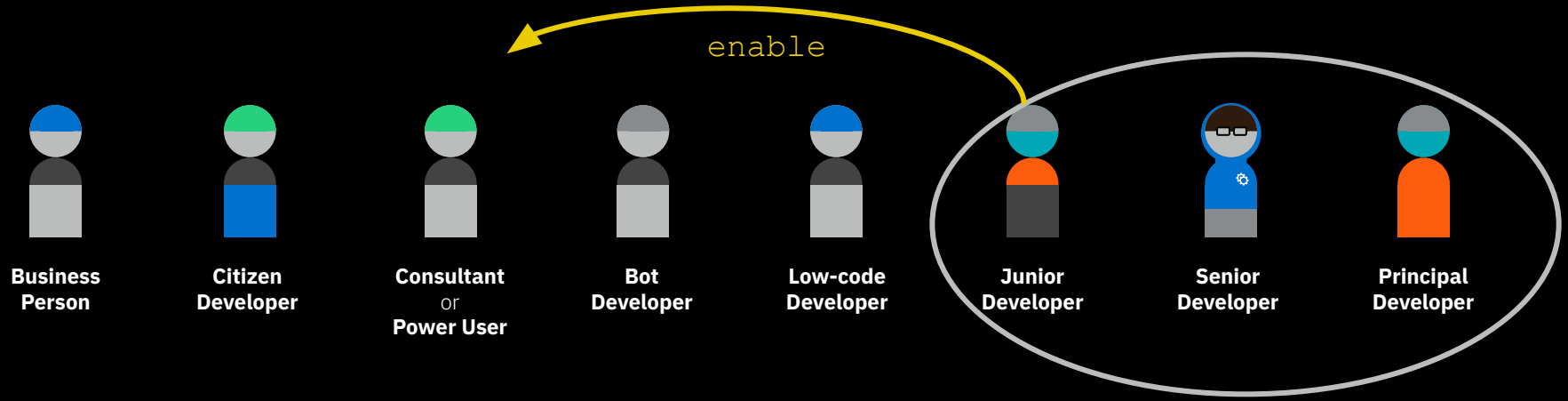
Marketplace

CAMUNDA

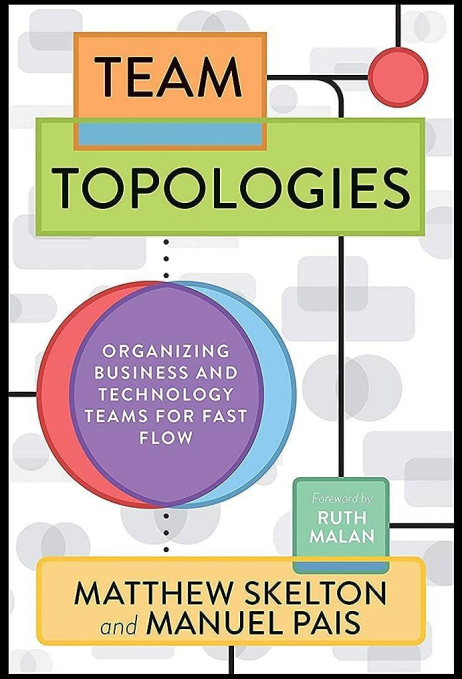


Enabling more roles to participate

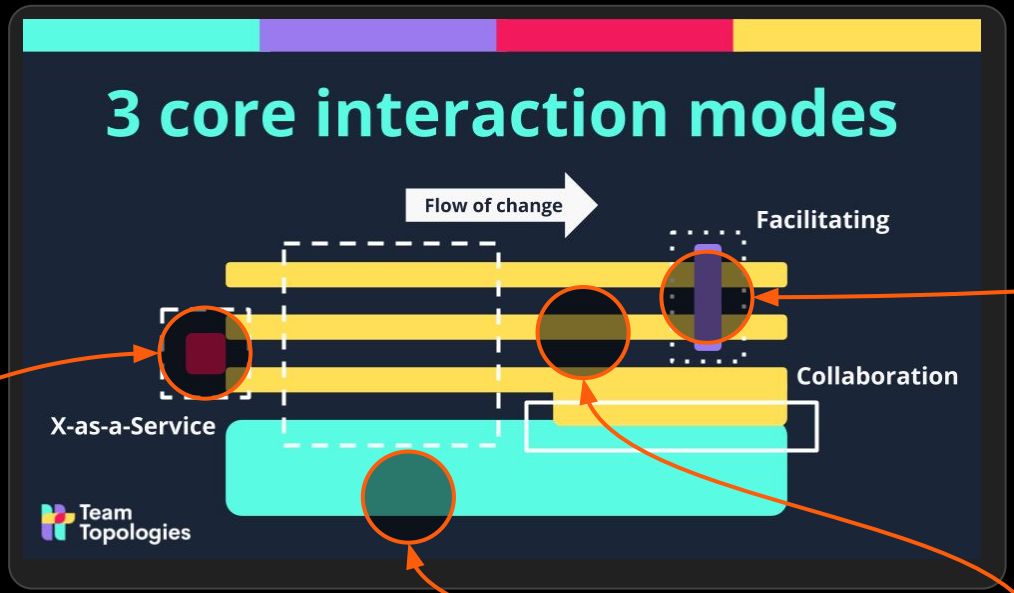
CAMUNDA



CAMUNDA


TEAM
TOPOLOGIES
ORGANIZING BUSINESS AND TECHNOLOGY TEAMS FOR FAST FLOW
Foreword by
RUTH MALAN
MATTHEW SKELTON
and MANUEL PAIS

CAMUNDA

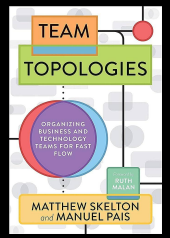


Center of Excellence

Fraud detection

Camunda + x

Bank Account Opening



Stream-aligned team

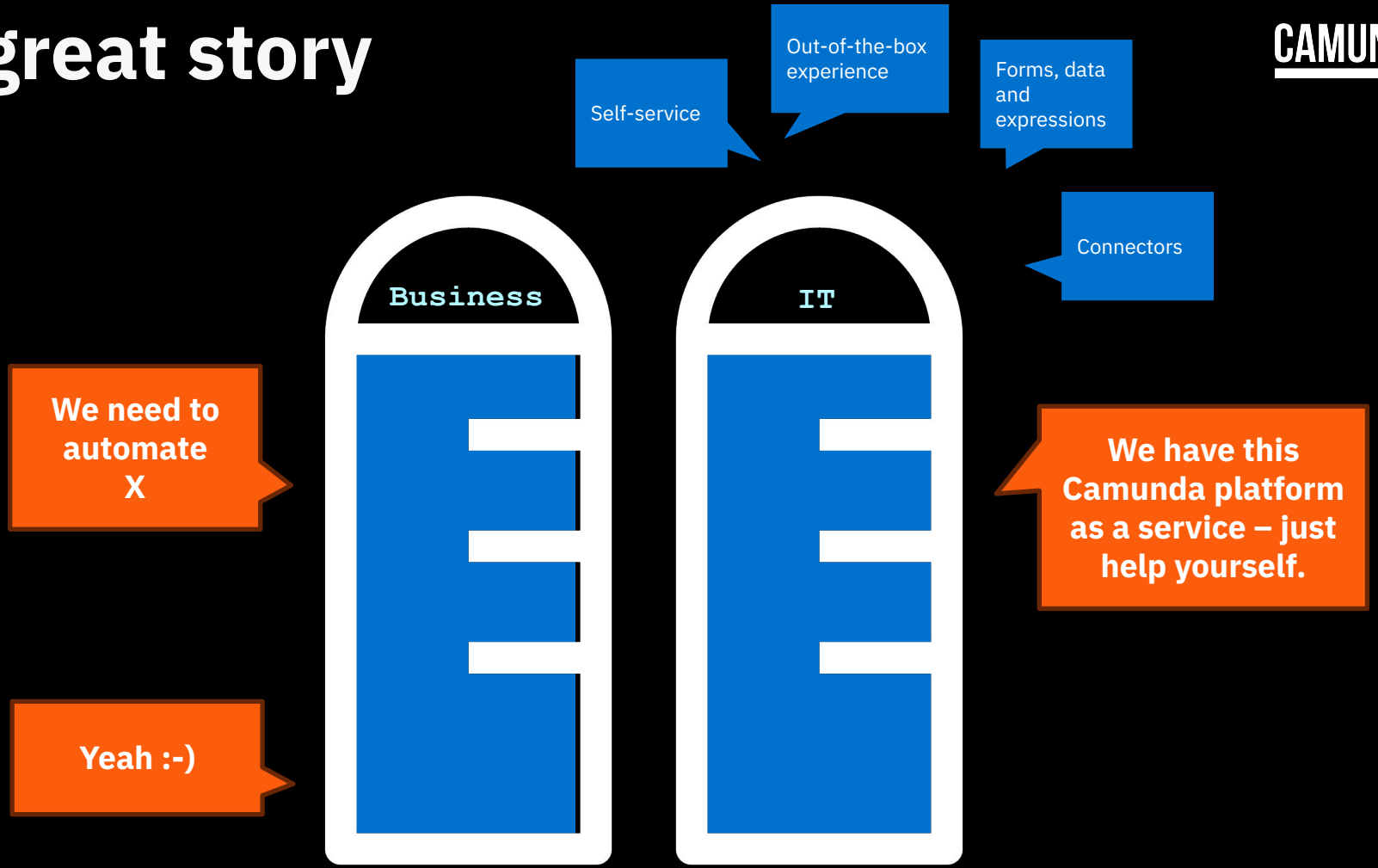
Enabling team

Complicated Subsystem team

Platform team

A great story

CAMUNDA



A fundamental transformation

CAMUNDA

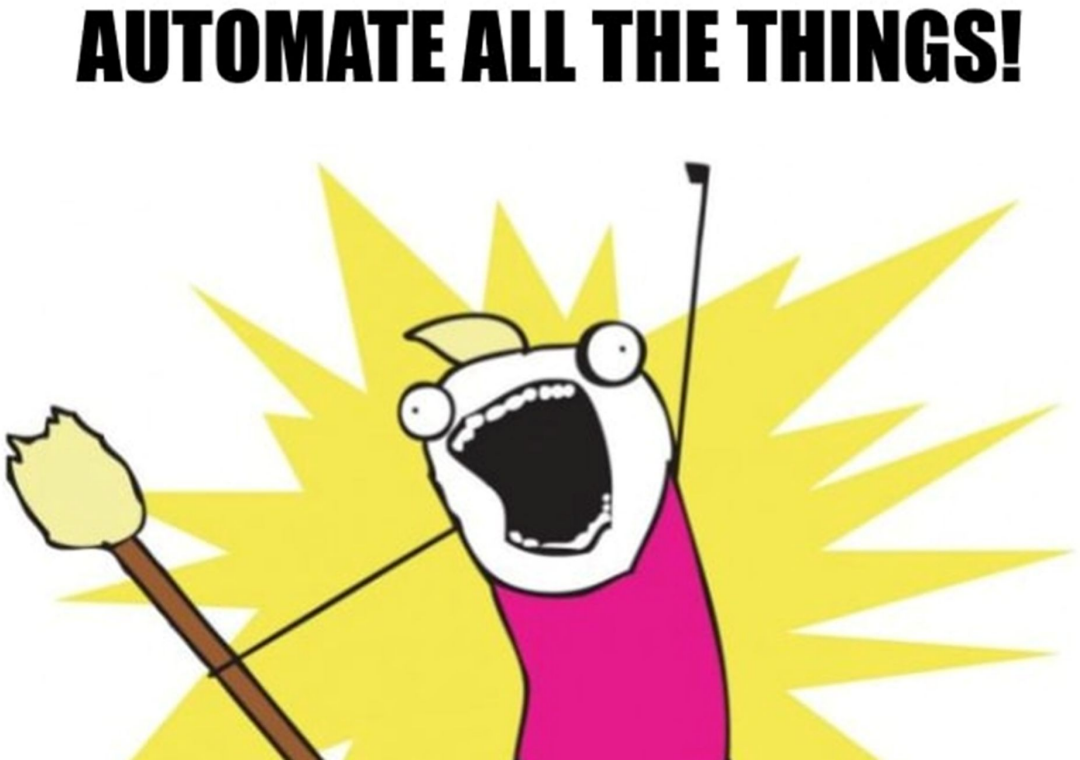
> “Agentic AI systems are poised to not only become the backbone of the knowledge economy but will completely redefine how organizations operate and compete.”
>
> FORRESTER®

Now comes AI....

CAMUNDA

Now comes AI....

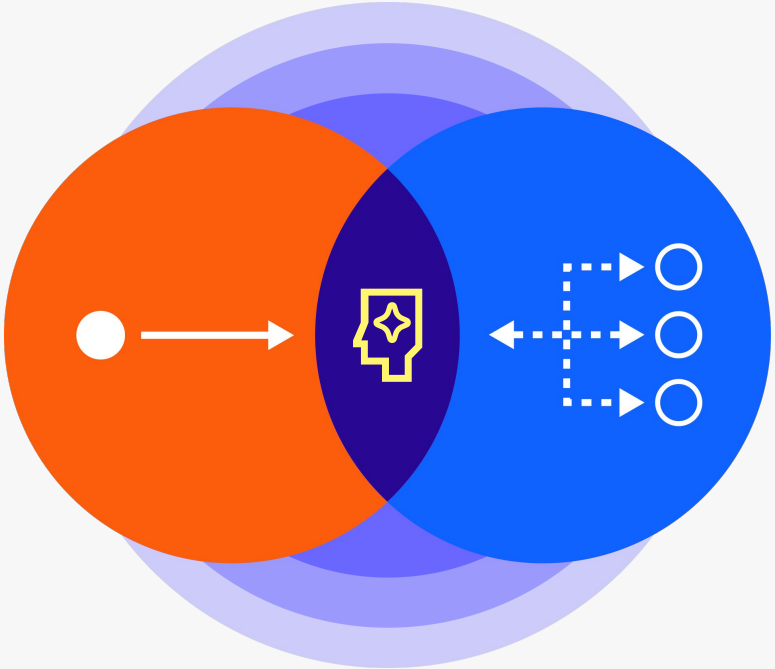
CAMUNDA



Agentic Orchestration

CAMUNDA

Deterministic Orchestration



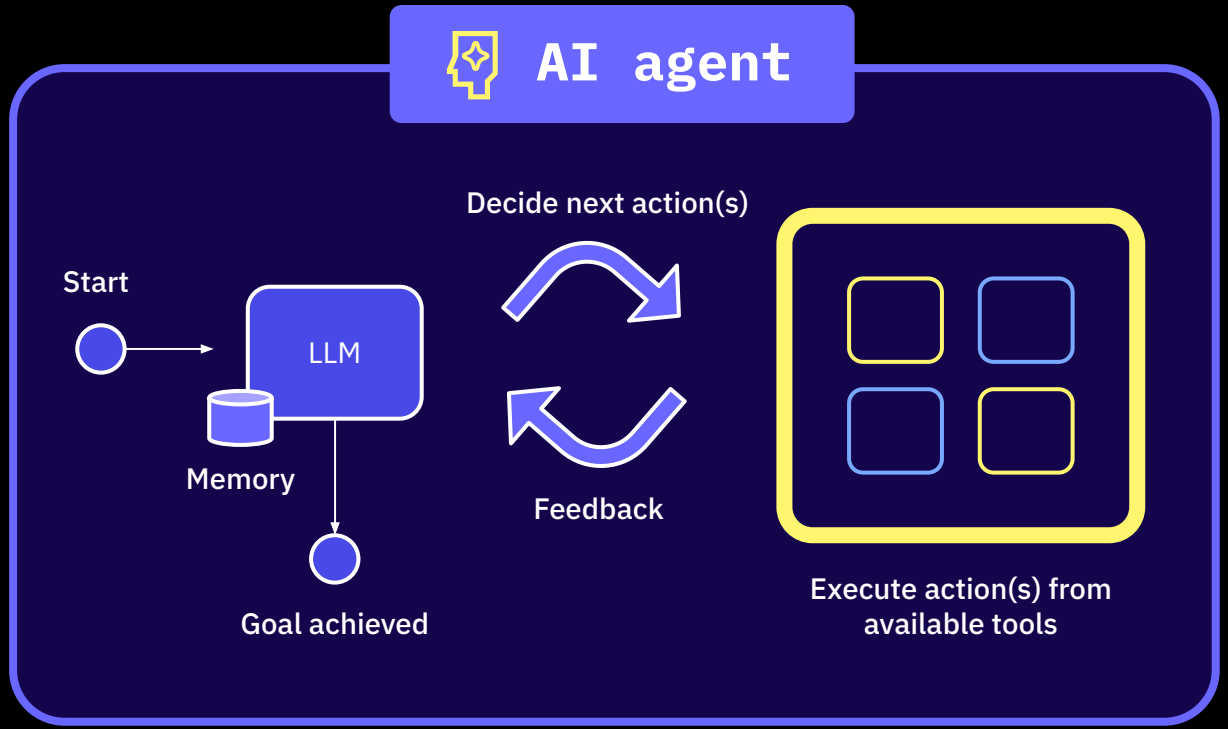
Dynamic Orchestration

Dramatically increase the value of Agents with strict guardrails + autonomous knowledge work.

AI Agents

CAMUNDA

Perform **multiple steps** to achieve a *complex goal.* They orchestrate!

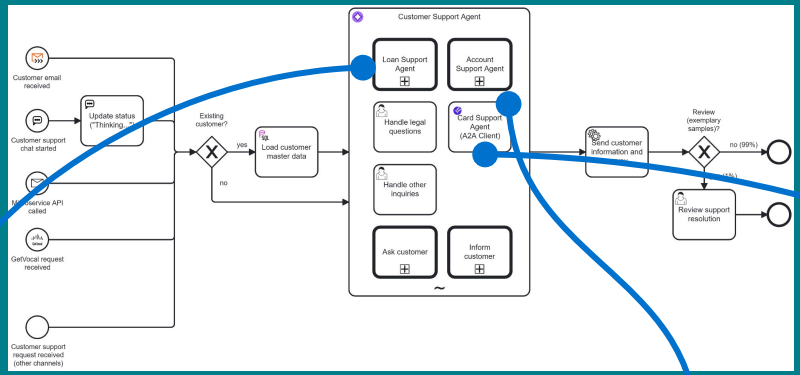


Live demo

Demo

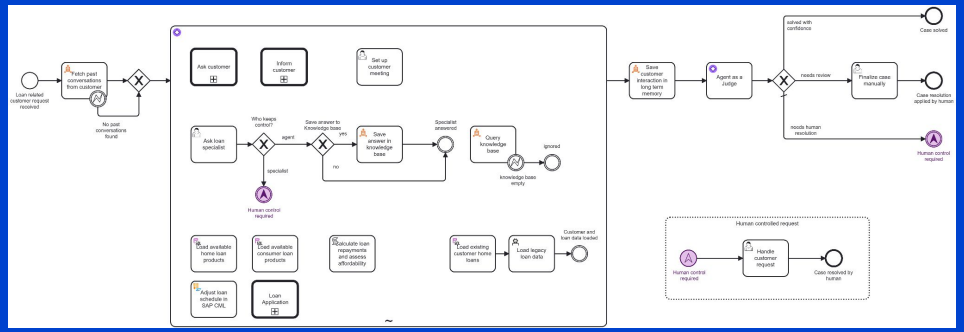
CAMUNDA

L3: Banking Support Agent

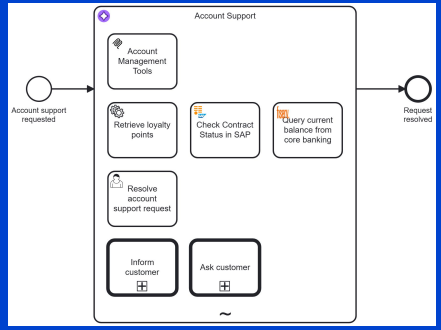


Invocations via BPMN, API, A2A, …

L4: Loan Support Agent



L4: Account Support Agent



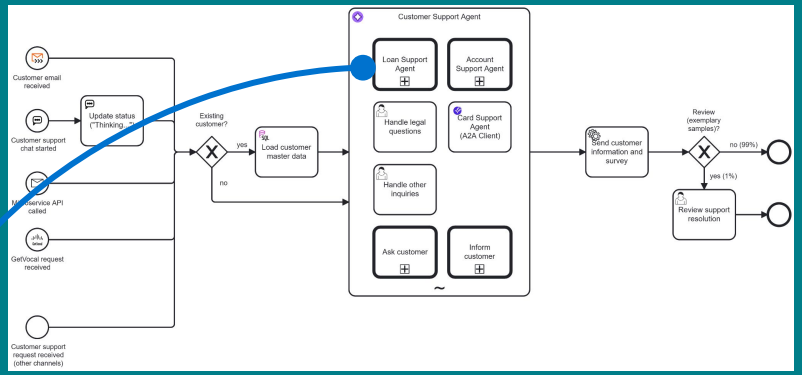
L4: Card Support Agent

LangChain

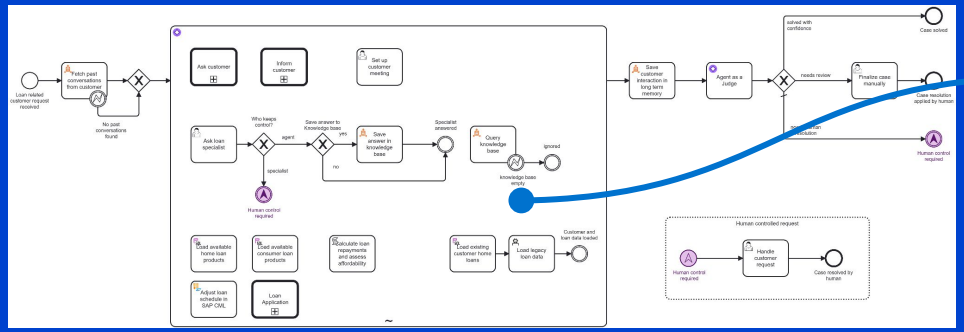
Demo

CAMUNDA

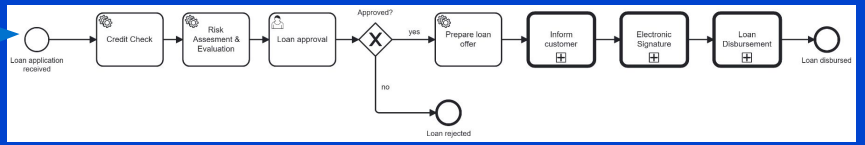
L3: Banking Support Agent



L4: Loan Support Agent



L4: Loan Application Process



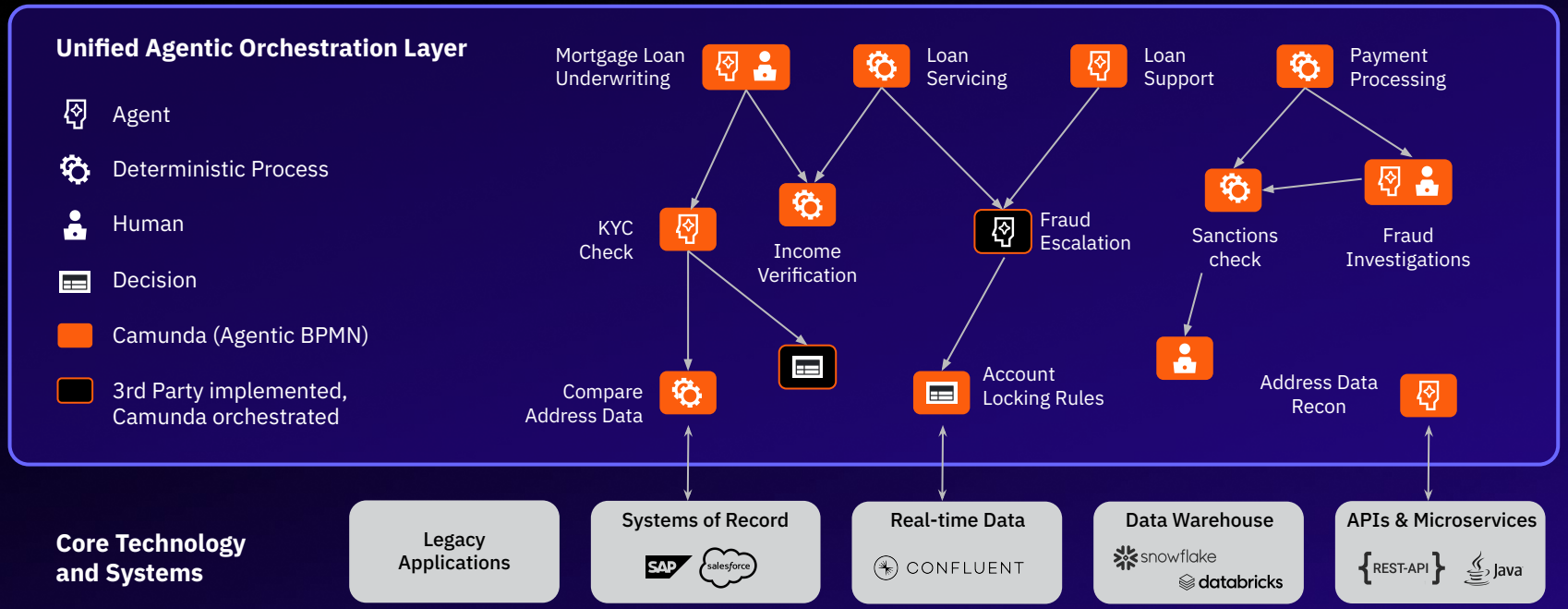
Enterprise Agentic Automation

CAMUNDA

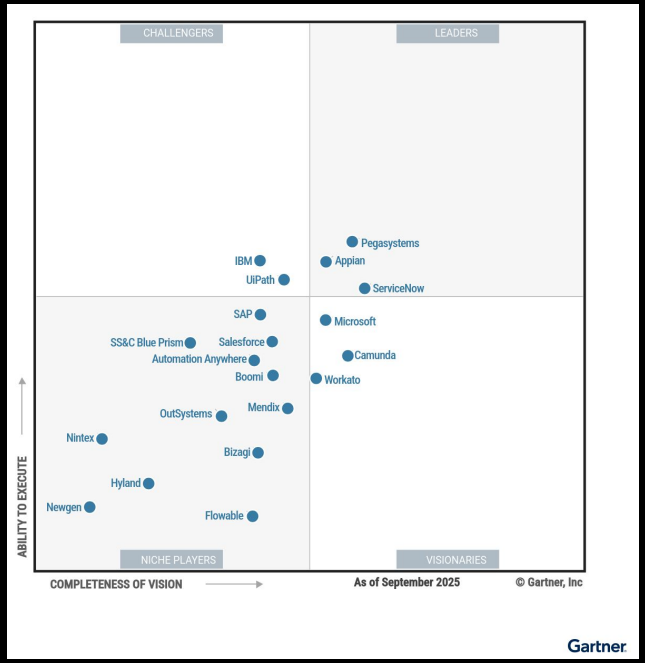
Agentic Engagement
(Customers & Employees)

Multimodal, Omnichannel, Mobile

Digital Twin, Personalized, Proactive, Predictive, Relevant



CAMUNDA



Camunda recognized as a Visionary in the Gartner® Business Orchestration and Automation Technologies (BOAT) Magic Quadrant™

Gartner, "Magic Quadrant™ for Business Orchestration and Automation Technologies," Saikat Ray, Tushar Srivastava, Marc Kerremans, Arthur Villa, Cathy Tornbohm, Sachin Joshi, 15 October 2025. Magic Quadrant is a registered trademark and service mark of Gartner, Inc. and/or its affiliates in the U.S. and internationally, and is used herein with permission. All rights reserved.

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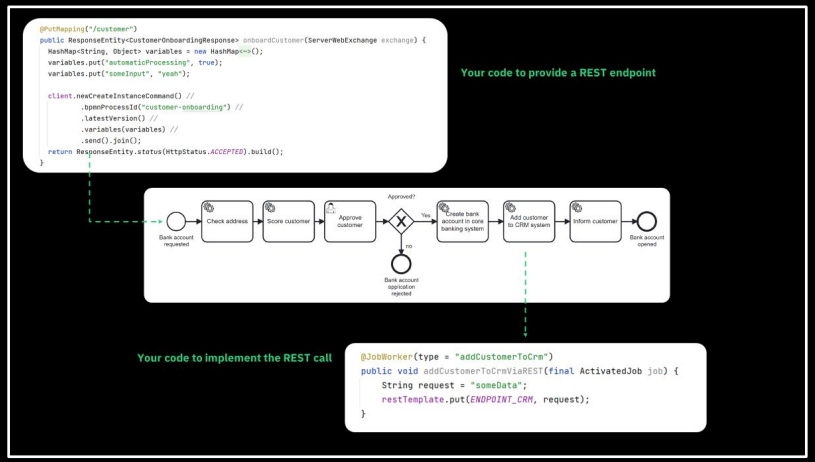
Street credibility

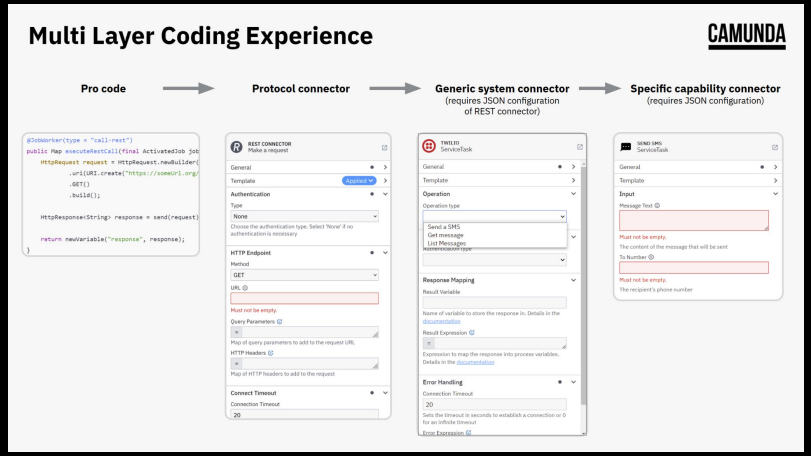
CAMUNDA

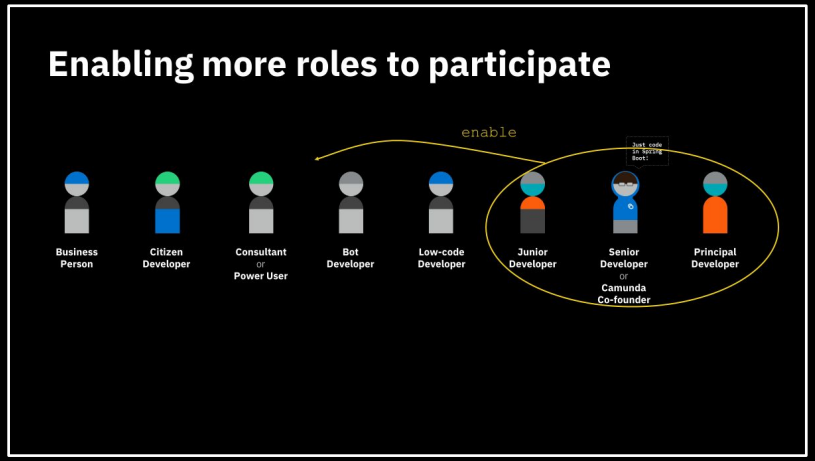
> “ Developer speed and efficiency has increased, as they are able to partner more easily with business users to make changes as needed to processes, which are in turn more transparent and easily tracked. It also has increased collaboration between developers and the business users, who were eager to have their expertise positively represented in their processes.

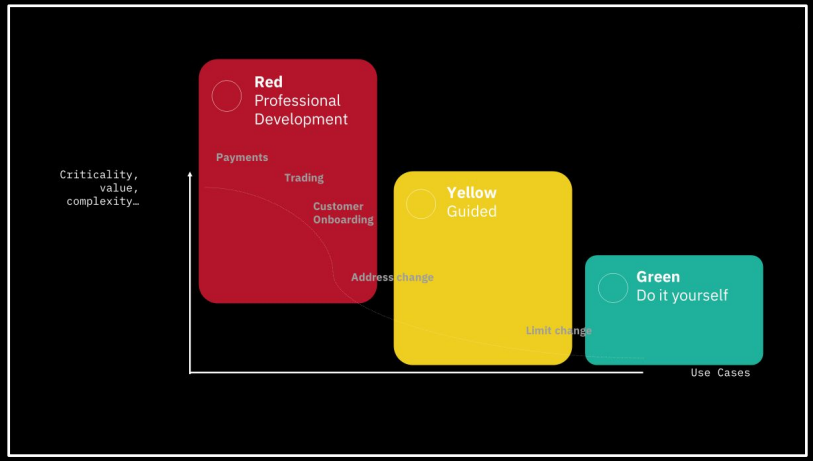
PROVINZIAL
Die Versicherung der Sparkassen

https://camunda.com/de/case-study/provinzial-holding-ag/


@PutMapping("/customer")
public ResponseEntity<CustomerOnboardingResponse> onboardCustomer(ServerWebExchange exchange) {
HashMap<String, Object> variables = new HashMap<>();
variables.put("automaticProcessing", true);
variables.put("someInput", "yeah");
client.newCreateInstanceCommand() //
.bpmnProcessId("customer-onboarding") //
.latestVersion() //
.variables(variables) //
.send().join();
return ResponseEntity.status(HttpStatus.ACCEPTED).build();
}
Your code to provide a REST endpoint
Bank account requested
Check address
Score customer
Approve customer
Approved?
Yes
no
Bank account application rejected
Create bank account in core banking system
Add customer to CRM system
Inform customer
Bank account opened
Your code to implement the REST call
@JobWorker(type = "addCustomerToCrm")
public void addCustomerToCrmViaREST(final ActivatedJob job) {
String request = "someData";
restTemplate.put(ENDPOINT_CRM, request);
}


Multi Layer Coding Experience
CAMUNDA
Pro code
Protocol connector
Generic system connector
(requires JSON configuration of REST connector)
Specific capability connector
(requires JSON configuration)
@JobWorker(type = "call-rest")
public Map executeRestCall(final ActivatedJob job
HttpRequest request = HttpRequest.newBuilder(
.uri(URI.create("https://someUrl.org/
.GET()
.build();
HttpResponse<String> response = send(request)
return newVariable("response", response);
}
REST CONNECTOR
Make a request
General
Template
Authentication
Type
None
HTTP Endpoint
Method
GET
URL
Must not be empty.
Query Parameters
HTTP Headers
Connect Timeout
Connection Timeout
20
TWILIO
ServiceTask
General
Template
Operation
Operation type
Send a SMS
Get message
List Messages
Response Mapping
Result Variable
Result Expression
Error Handling
Connection Timeout
20
SEND SMS
ServiceTask
General
Template
Input
Message Text
Must not be empty.
To Number
Must not be empty.


Enabling more roles to participate
enable
Business Person
Citizen Developer
Consultant or Power User
Bot Developer
Low-code Developer
Junior Developer
Senior Developer or Camunda Co-founder
Principal Developer


Red
Professional Development
Payments
Trading
Customer Onboarding
Yellow
Guided
Address change
Limit change
Green
Do it yourself
Criticality, value, complexity…
Use Cases

CAMUNDA

Developers — shape automation!

Surf the low-code wave, don’t sink in it.

CAMUNDA

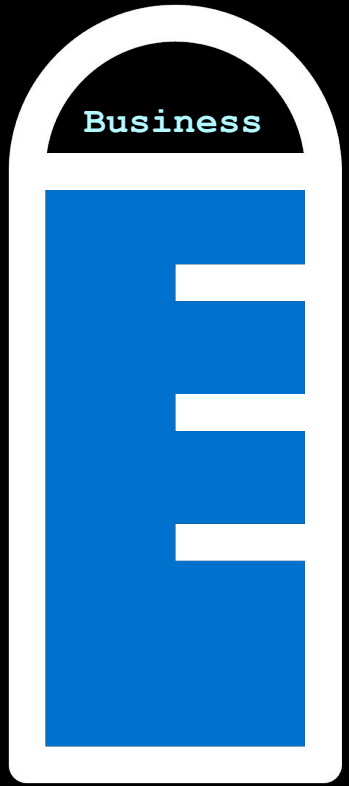
“Technology leaders must lay the foundation for process orchestration”

Quelle: Forrester – Agentic AI Is The Next Competitive Frontier

Otherwise...

CAMUNDA

We need to automate X



No problem! Just buy our stuff...

Thank You

Bernd Ruecker
Co-Founder and Chief Technologist
bernd.ruecker@camunda.com

in

Gets your own hands on Camunda and try pro code, low code & no code:
docs.camunda.io

Learn more at **camunda.com**