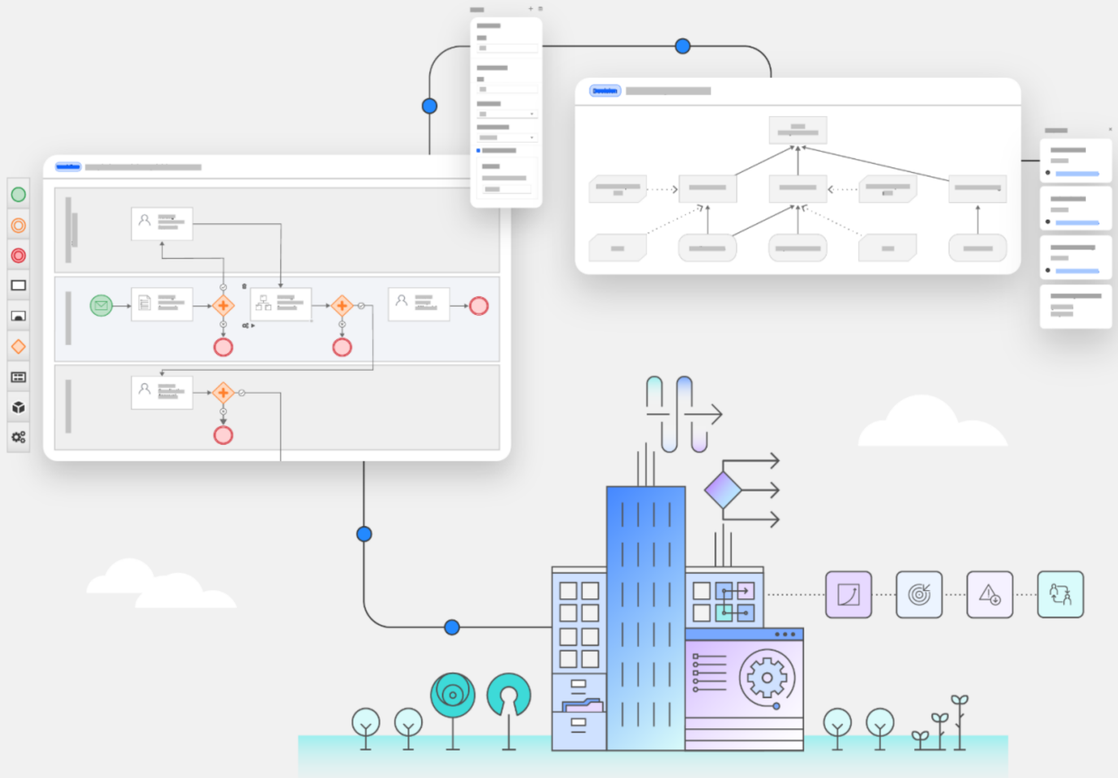
IBM Business Automation Manager Open Editions

Skills Academy Introduction



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Course Outline

Day 1 – Lab Environment

Students become familiar with the various lab environments used throughout the course, prep for labs, etc.

Day 2 - Decisions

Students will focus on ***decision management*** concepts, with focus on tools, projects, languages, testing, and best practices

Day 3 - Process

Students will focus on ***process management*** concepts, with focus on tools, projects, languages, testing, and best practices

Day 4 – Open Discussion

Students will have the opportunity to have open discussions with instructors on any BAMOE concept, as well as prep for the final examination.

What will you learn?

BEFORE

Students start out with a basic knowledge of developing applications with Java and Kubernetes, with a basic understanding of business automation concepts, such as stateless decision and stateful process management.

AFTER

Upon completion of this course, Students will achieve advanced level skills around design, implementation, testing, and deployment of stateless decision services, stateful process services, as well as deployment and execution of applications using a common Kubernetes provider, such as Red Hat OpenShift.

Day 1:

Lab Environment

This is a self-paced activity which enables the student to provision their lab environments and test various aspects of the BAMOE platform.

Students will be able to reserve their own virtual machines, which are pre-configured for BAMOE development, as well as build, deploy, and test example applications to an OpenShift cluster.

This is a pre-requisite activity required to be completed prior to attending Day 2 and Day 3 lab activities.

Student Environment

- ✓ RHEL 9
- ✓ JDK 17
- ✓ Git & Maven Command Line Interface
- ✓ Chrome Browser
- ✓ VS Code IDE + BAMOE Developer Tools
- ✓ Course Labs
- ✓ Example Applications
- ✓ Direct access to BAMOE Runtime Environment (OpenShift)

Lab Environment

- ✓ RHEL 9
- ✓ OpenShift 4.14
- ✓ BAMOE Maven Repository
- ✓ BAMOE Canvas
- ✓ BAMOE Management Console
- ✓ PostgreSQL database
- ✓ Kafka cluster
- ✓ Keycloak (OIDC)
- ✓ CI/CD Pipeline for building BAMOE apps

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Day 2:

Stateless Decisions

The first full day of onsite training is focused on the decisions side of the BAMOE offering. As a chargeable component of the BAMOE offering, **IBM Decision Manager Open Edition (DMOE)** is targeted at developers and business users tasked with building reusable decision services, based on business rules or decision models.

Tooling Overview

- ✓ Maven project creation for decisions
- ✓ BAMOE Dev Tools, using VS Code
- ✓ BAMOE Canvas

Drools Rule Language (DRL)

- ✓ Using the DRL editor (VS Code)
- ✓ Basic syntax, rule structure, algorithms
- ✓ RuleUnits, classic mode, globals, dsl, etc.
- ✓ Accumulators, queries, etc.

Decision Modeling & Notation (DMN)

- ✓ Using the DMN Editor (VS Code, Canvas)
- ✓ Decision Requirements Diagrams (DRD)
- ✓ Modeling & Importing Input Data
- ✓ Decision Nodes – Decision Tables
- ✓ Other Decision Nodes, including
  - ✓ Literal Expressions
  - ✓ Contexts
  - ✓ Relations
  - ✓ Functions
  - ✓ Invocations
  - ✓ Lists

Orchestration via Stateless Workflow (BPMN)

- ✓ Using BPMN-based orchestration of internal business rule tasks (DRL/DMN)
- ✓ Using BPMN-based strait-through-processing (STP) to orchestrate external decision services

Integration

- ✓ Event-based decisioning using Kafka
- ✓ Implement listeners
- ✓ How to generate REST API from DRL
- ✓ How to generate REST API from Java
- ✓ Integration of classic mode engine
- ✓ Securing REST API endpoints

Testing Concepts

- ✓ VS Code IDE test scenarios
- ✓ Canvas DMN Runner
- ✓ REST API testing
- ✓ Running tests from CI/CD pipelines

Day 3:

Stateful Processes

The second full day of training is focused on the stateful process side of the BAMOE offering. As a chargeable component of the BAMOE offering, **IBM Process Automation Manager Open Edition (PAMOE)** is targeted at developers and business users tasked with building reusable business process services, based on stateful BPMN.

Tooling Overview

- ✓ Maven project creation for decisions
- ✓ BAMOE Dev Tools, using VS Code
- ✓ BAMOE Canvas
- ✓ BAMOE Management Console
- ✓ BAMOE Forms Generation Tool

Business Process Modeling & Notation (BPMN)

- ✓ Using the BPMN editor (VS Code, Canvas)
- ✓ Basic use of standard BPMN nodes
- ✓ Mapping inputs/outputs/process variables
- ✓ Using sub-processes, including exception handling and callabacks
- ✓ Persistence nodes, such as human tasks and timers
- ✓ Event-based processes, using Kafka

Integration

- ✓ How to generate REST API from BPMN
- ✓ Implement listeners
- ✓ Implementing work-item handlers
- ✓ Implementing forms
- ✓ Securing REST API endpoints
- ✓ How to use GraphQL
- ✓ Role management

Testing Concepts

- ✓ VS Code IDE test scenarios
- ✓ REST API testing
- ✓ Running tests from CI/CD pipelines

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Day 4:

Open Discussion

The final day of training is offered as offered as an optional component, oriented towards addressing student questions on the course labs, topics not covered in the training, or for discussions regarding best practices.

Students will also be in required to complete a final exam lab, at their leisure, either during this session or anytime within the next 30 days after completion of this course. Students will be required to complete the final exam to get certification credit for the course.

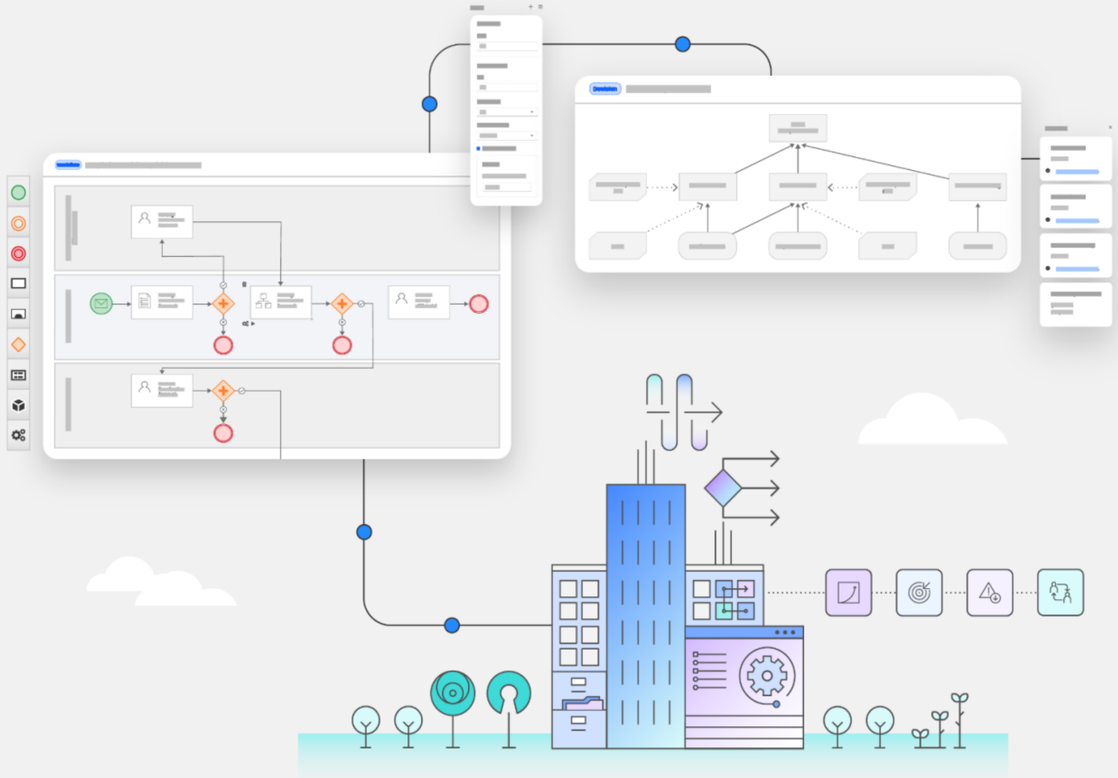
Open Discussion

- ✓ Tooling discussion
- ✓ Decision automation topics
- ✓ Process Automation topics
- ✓ Governance
- ✓ Best Practices
- ✓ Technical challenges and roadblocks

Final Examination

- ✓ Requirements provided both in verbal and written form
- ✓ To be completed and submitted within 30 days of onsite course completion
- ✓ Required for course certification and credit

What is IBM Business Automation Manager Open Editions (BAMOE)?



IBM Business Automation Manager Open Editions

→ A foundational platform for creating business automation solutions for the Hybrid Cloud.

Designed for the Open Cloud:

Red Hat OpenShift

kubernetes

Enterprise offering

IBM Business Automation Manager Open Editions

IBM Decision Manager Open Edition

IBM Process Automation Manager Open Edition

Open-Source foundation

Apache KIE

Drools jBPM Kogito

Decision Manager Open Edition

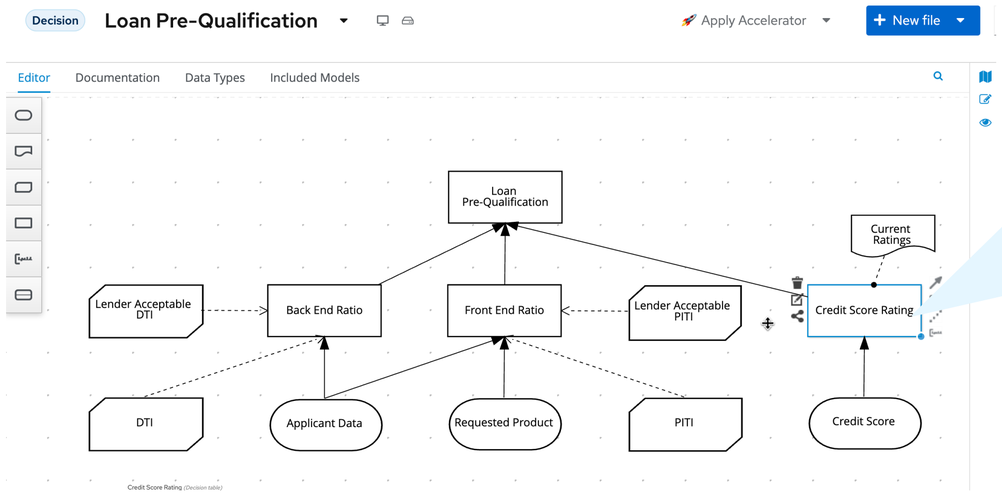
Decisions with DMN

- ✓ Are optimal for creating comprehensive, illustrative, and stable decision flows
- ✓ Free of vendor lock-in
- ✓ Graphical Decision Modeling
- ✓ FEEL Expression Language
- ✓ DMN v1.5 compliance (DMN TCK)

Highly performant and flexible rules automation with DRL & XLS

- ✓ Provide the most flexibility for defining rules and other technicalities of rule behavior
- ✓ Compatibility between v7, v8, v9
- ✓ XLS: template keys and values for creating rule templates; Provide fields and options for acceptable input;
- ✓ Simple to very complex use cases
- ✓ Salience, hit policies, real-time validation, and more

DMN



Credit Score Rating *(Decision table)*

Decision table

U	Credit Score.FICO *(number)*	Credit Score Rating *(Credit_Score_Rating)*	Rule Description
1	>= 750	"Excellent"	Excellent credit score per current guidance
2	[700..750)	"Good"	Good credit score per current guidance
3	[650..700)	"Fair"	Fair credit score per current guidance
4	[600..650)	"Poor"	Poor credit score per current guidance
5	< 600	"Bad"	Bad credit score per current guidance

DRL

```
rule ”Is the credit score high enough"

ruleflow-group ”credit-check"
when
 ....
then
...
end
```

Spreadsheet (Excel) Decision Tables

RuleSet	org.kie.kogito.queries
Unit	LoanUnit
Import	org.kie.kogito.queries.LoanApplication
Queries	query FindApproved $l: /loanApplications[approved] end query FindNotApprovedIdAndAmount /loanApplications[!approved, $id: id, $amount : amount] end
Notes	

RuleTable LoanRule			
CONDITION	CONDITION	CONDITION	ACTION
$l: /loanApplications			
applicant.age $param	deposit $param	amount $param	modify($l) { setApproved($param) };
age	**deposit**	**amount**	**approved?**
>= 20	< 1000	<= 2000	true
>= 20	< 1000	> 2000	false
>= 20	>= 1000	<= maxAmount	true
>= 20	>= 1000	> maxAmount	false
< 20			false

Process Automaton Manager Open Edition

Stateless Workflows

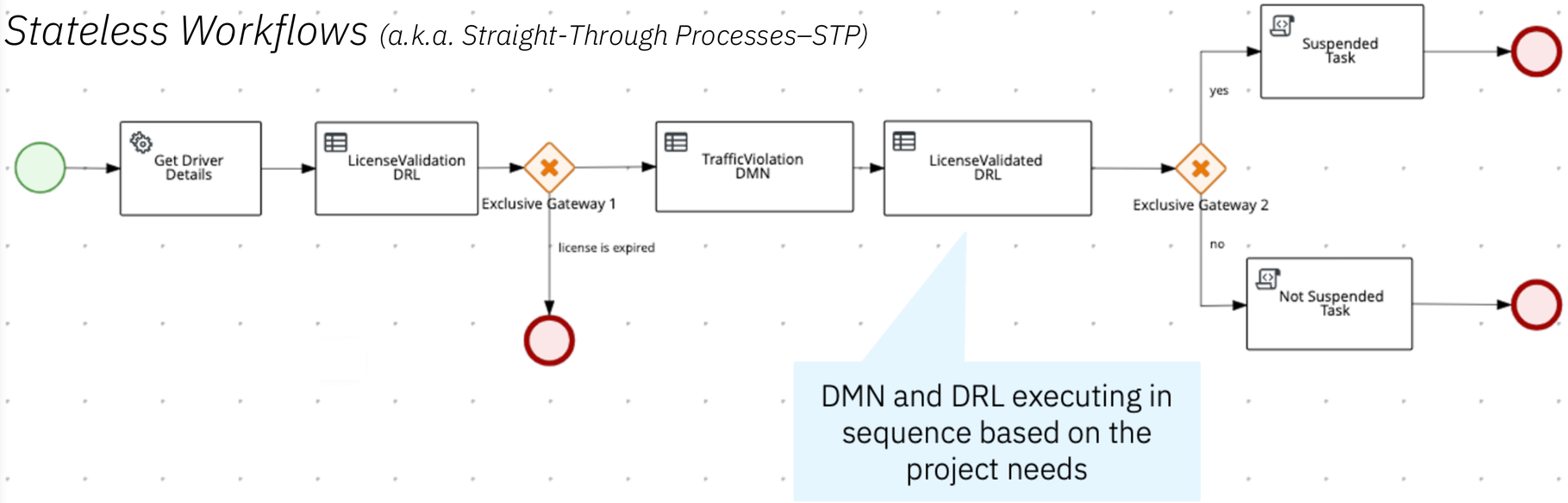
- ✓ Are optimal for creating stateless, straight-through-processing workflows
- ✓ Free of vendor lock-in
- ✓ Graphical Process Modeling
- ✓ Based on open standard: BPMN
- ✓ Executes in one transaction, does not have data persistence, timers or human tasks;

Stateful Workflows

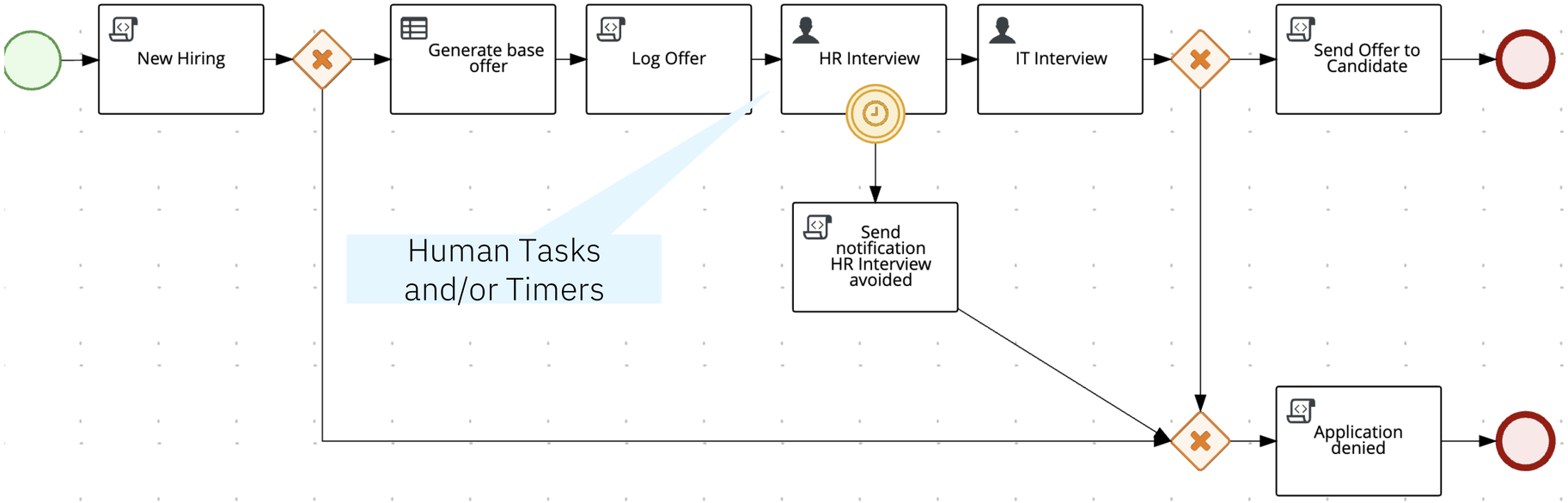
Are optimal for creating stateful , complex business processes

- ✓ Human-driven Workflows
- ✓ Data persistence & Audit
- ✓ Business KPI's
- ✓ Saga pattern implementation using error and compensation events
- ✓ Long-running processes
- ✓ Based on data persistence, may include User Tasks, timers

Stateless Workflows *(a.k.a. Straight-Through Processes–STP)*



Stateful Workflows



Open Edition Tooling

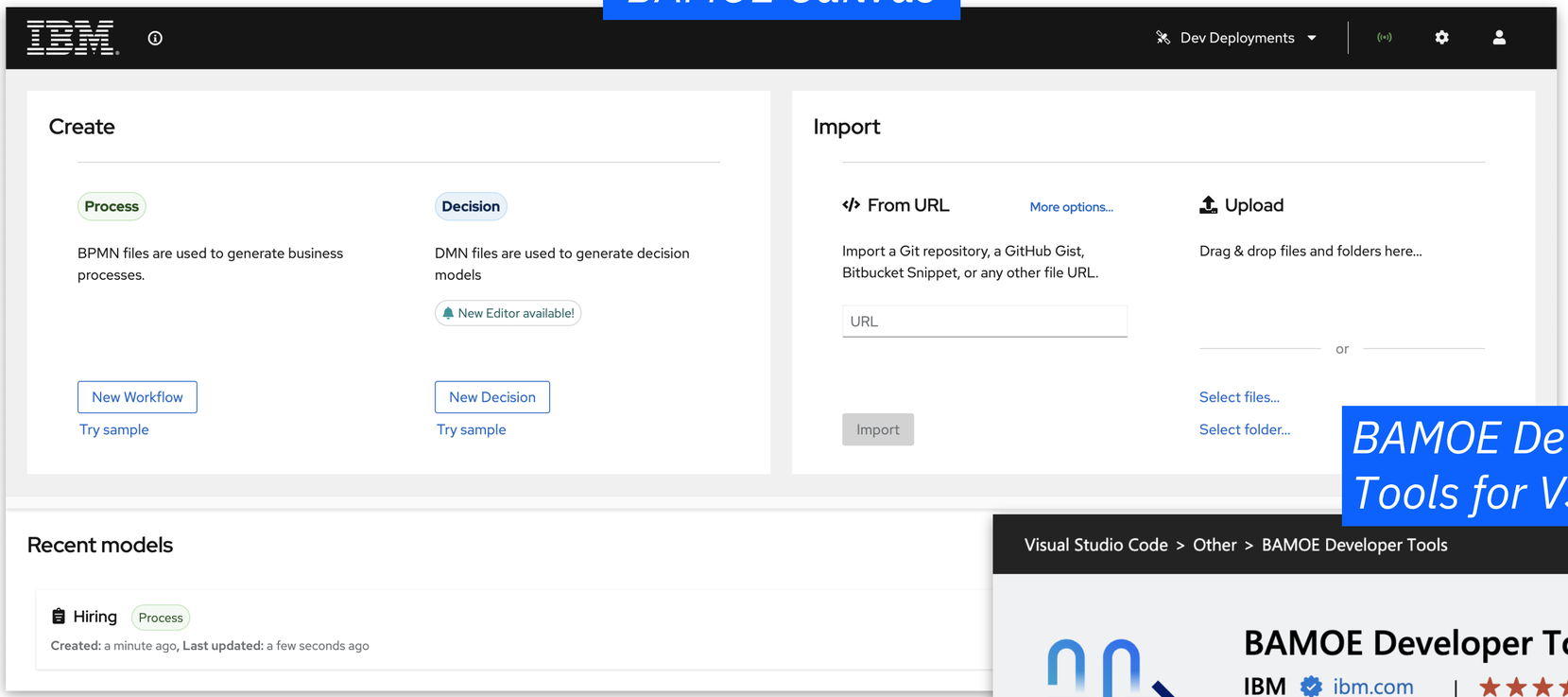
BAMOE Developer Tools

- ✓ VS Code Extensions for
  - ✓ BPMN Stateless Workflow
  - ✓ BPMN Stateful Workflow
  - ✓ BPMN Unit Tests
  - ✓ DMN Decision Models
  - ✓ DMN Unit Tests
- ✓ Graphical Process Modeling
- ✓ Graphical Decision Modeling
- ✓ Technical Rule Authoring / Testing
- ✓ Java Coding
- ✓ Maven Configuration

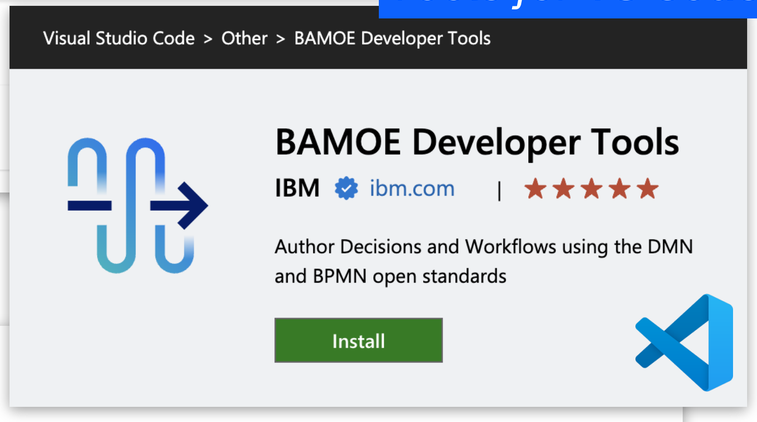
BAMOE Canvas

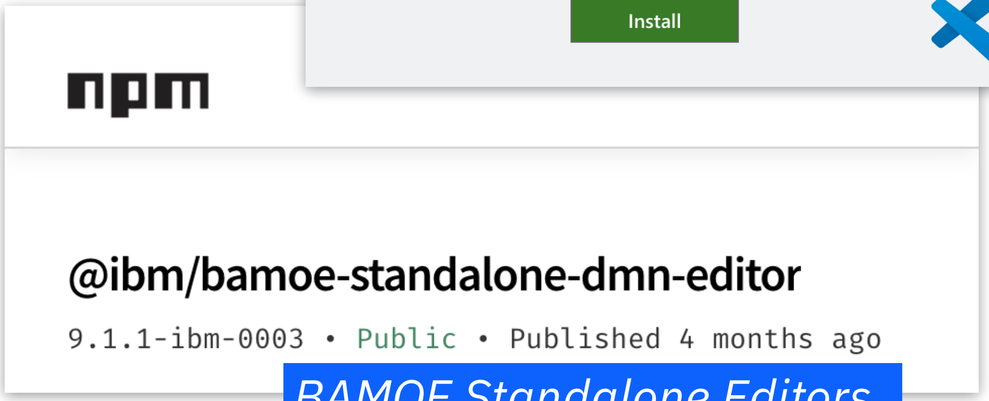
- ✓ Lightweight web-based
- ✓ Runs in browser client
- ✓ Graphical Process Modeling
- ✓ Graphical Decision Modeling
- ✓ Direct GIT Repository Access
- ✓ DMN Testing (*no deploy*)
- ✓ Accelerators for provisioning

BAMOE Canvas



BAMOE Developer Tools for VS Code



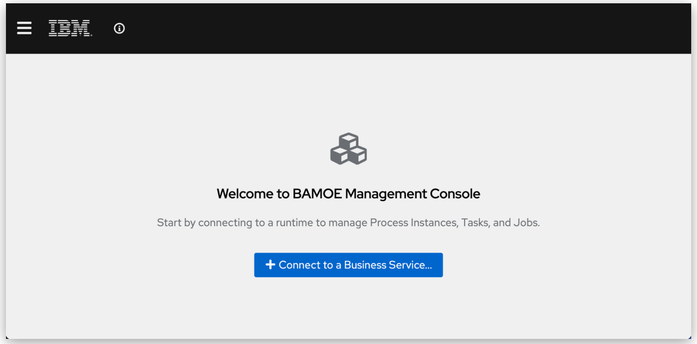


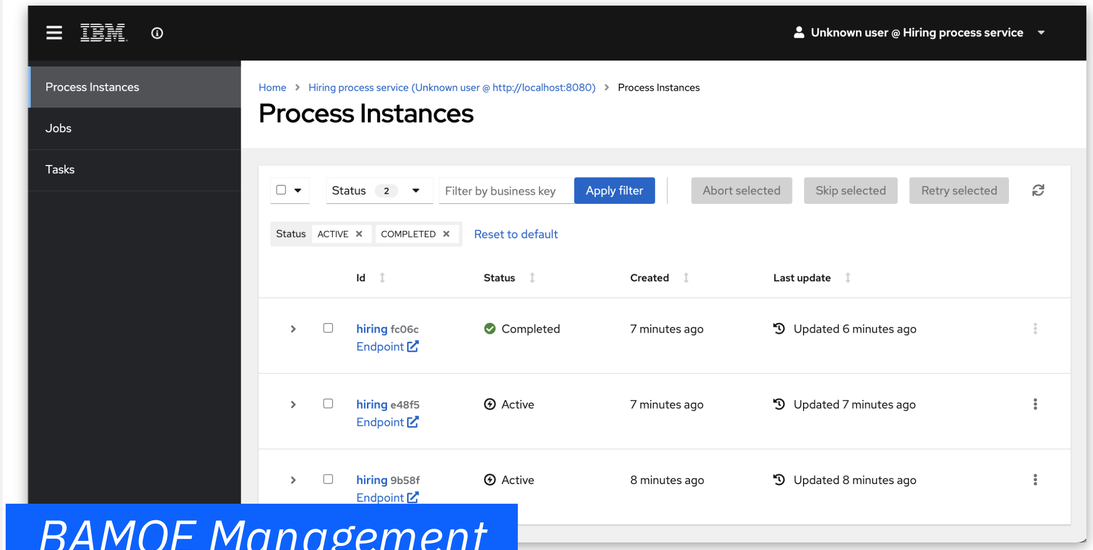
BAMOE Standalone Editors

Open Edition Tooling

BAMOE Process Management

- ✓ Management Console
  - ✓ Process Management
  - ✓ Task Management
  - ✓ Job Management
- ✓ OpenAPI Rest API
  - ✓ Full Process Management API
  - ✓ Full Swagger UI
  - ✓ Multiple Runtime Support
- ✓ GraphQL API
  - ✓ Full featured access via GraphQL
  - ✓ GraphQL Console





BAMOE Management Console

BAMOE REST and GraphQL APIs

Hiring Business Service API 9.1.2-ibm-0006

OAS 3.0

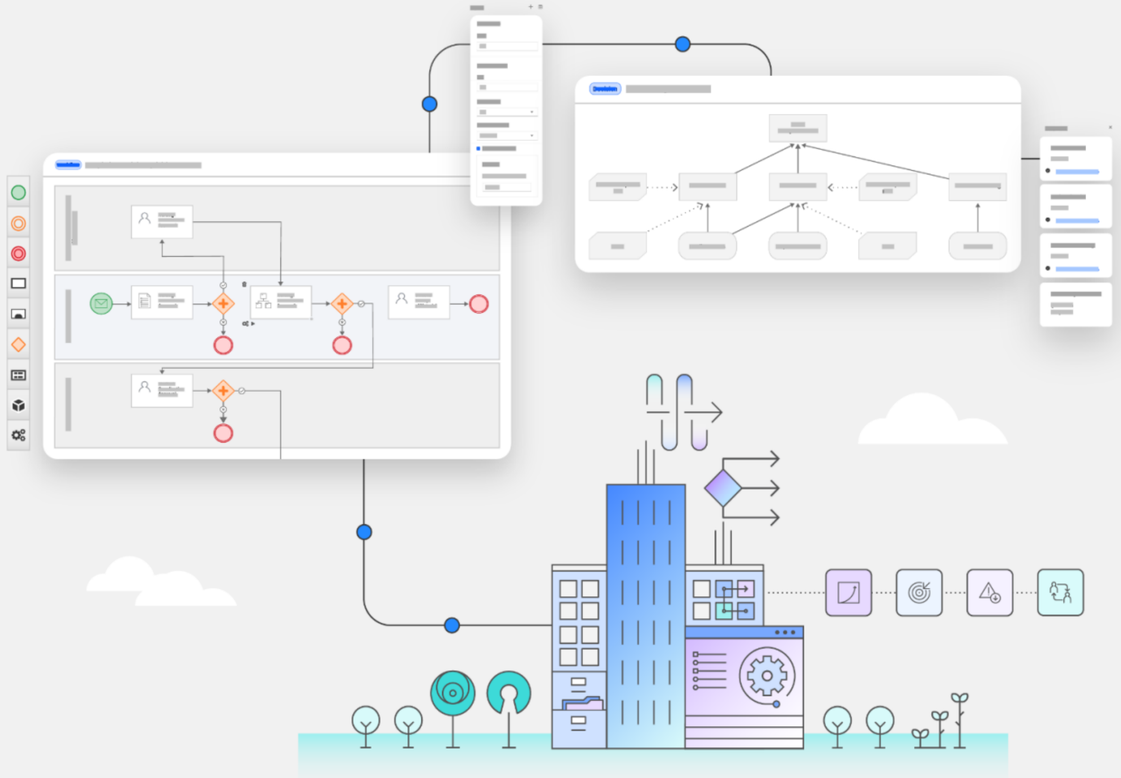
Process Instance Management Resource

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

User Tasks Resource

GET	/usertasks/instance
GET	/usertasks/instance/{taskId}

IBM Business Automation Manager Open Editions Architecture



Decision Manager Open Edition

Local Developer Workstation

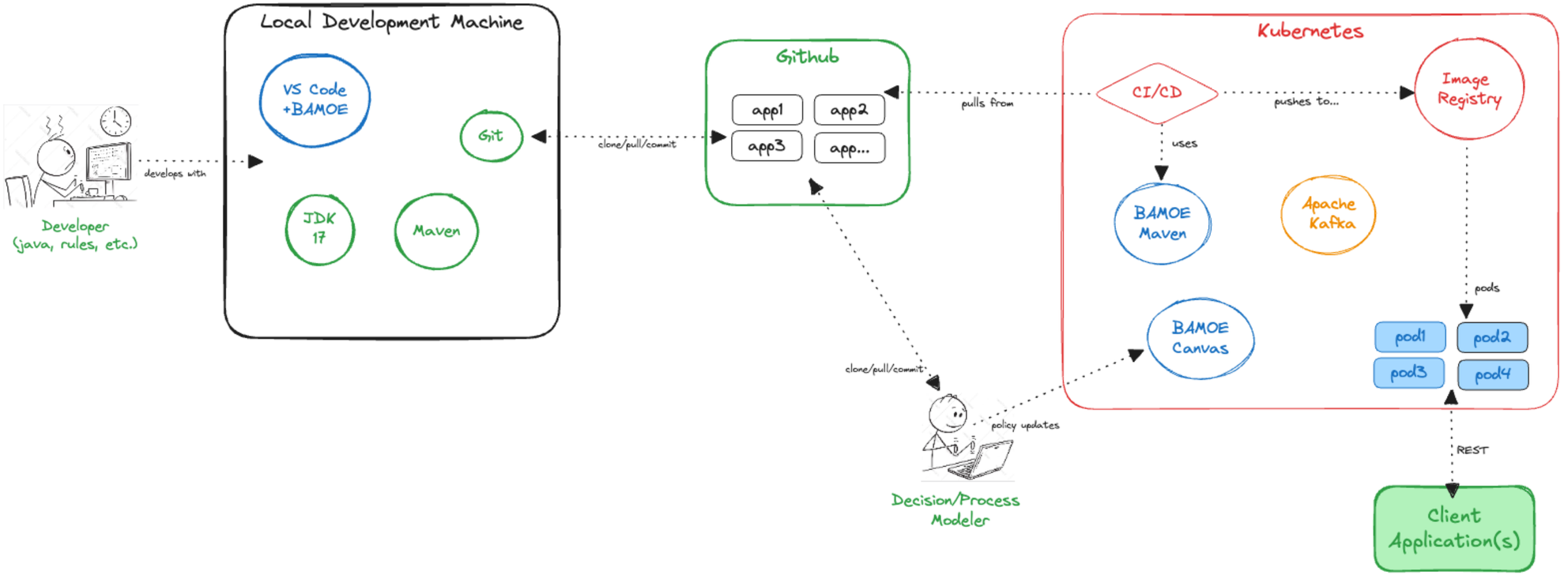
- ✓ For Developers, use VS Code
- ✓ All developer tasks, including
  - ✓ Maven configuration
  - ✓ Properties
  - ✓ Technical Rules (DRL)
  - ✓ STP Workflows
  - ✓ Java Code

Decision/Process Modeler

- ✓ For Business Users, use Canvas
- ✓ All modeling tasks, including
  - ✓ BPMN Workflows
  - ✓ DMN Decision Models
  - ✓ DMN Decision Tests

Kubernetes Environment

- ✓ BAMOE Services
  - ✓ Maven Repository
  - ✓ Canvas
- ✓ Supporting Infrastructure Services
  - ✓ Kafka, OIDC
  - ✓ Container Image Registry



Process Automation Manager Open Edition

Local Developer Workstation

- ✓ For Developers, use VS Code
- ✓ All developer tasks, including
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  - ✓ Properties
  - ✓ Technical Rules (DRL)
  - ✓ STP Workflows
  - ✓ Java Code

Decision/Process Modeler

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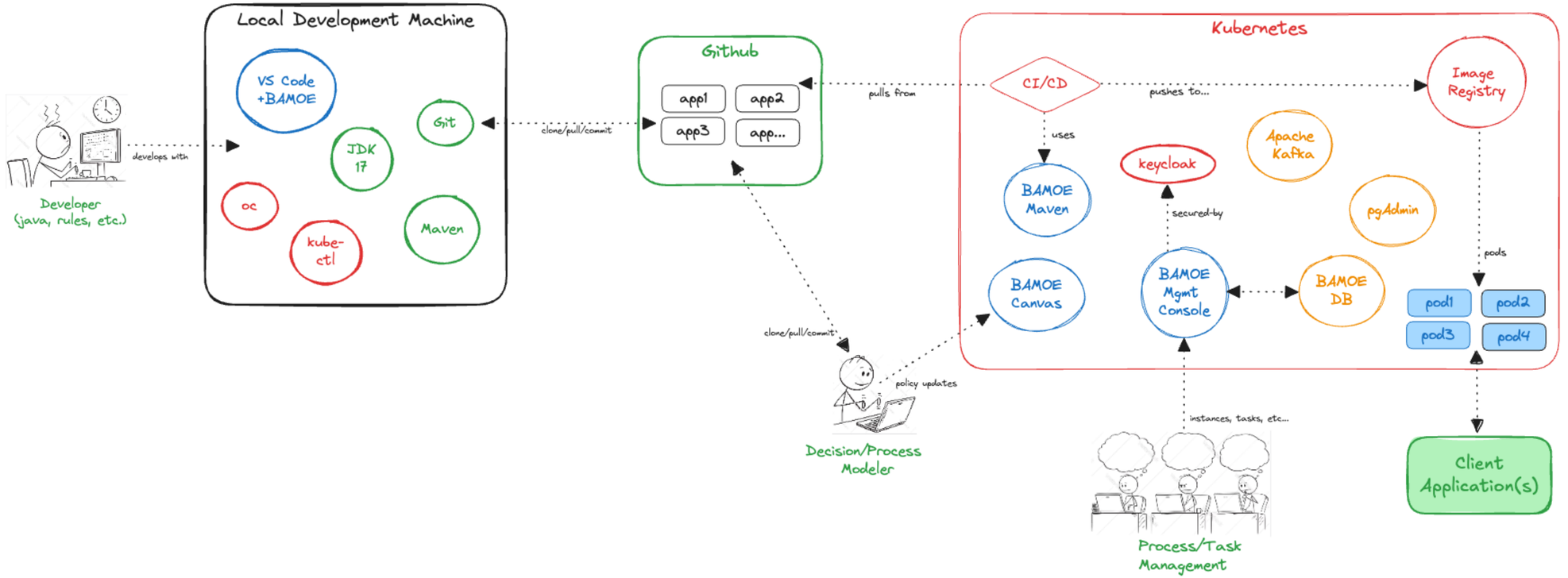
Kubernetes Environment

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- ✓ Supporting Infrastructure Services
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