

BPMN 2.0

The Flowable story



- ▶ Ante Klisovc - Team lead i developer sa dugogodišnjim iskustvom razvoja u **.Net**-u. Započeo je karijeru sa razvojem custom enterprise aplikacijama i usmjerio karijeru prema izradama aplikacija u teškoj industriji.

- ▶ Simon Šporer - Tech lead i developer sa dugogodišnjim iskustvom razvoja u **Javi**, od jednostavnih do enterprise level aplikacija. Radi već nekoliko godina u Serengetiju gdje vodi projekte, podučava i mentorira mlađe naraštaje.





Business Process Model and Notation

Business Process Model and Notation is a graphical representation for specifying business processes in a business process model. Business Process Management Initiative developed BPMN, which has been maintained by the Object Management Group since the two organizations merged in 2005

5 osnovnih kategorija grafičkih elemenata:

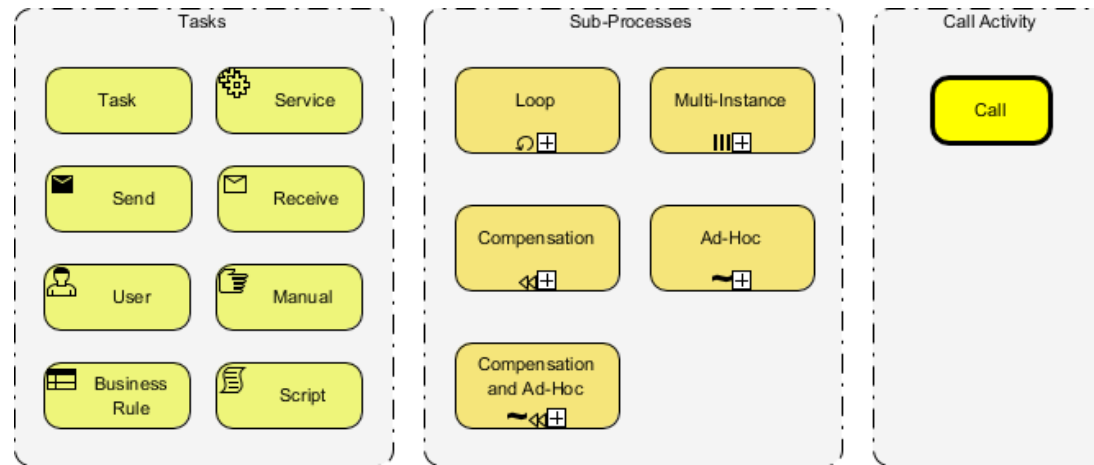
- ▶ Objekti za kreiranje toka procesa
- ▶ Objekti za povezivanje elemenata
- ▶ Podatkovni elementi
- ▶ Elementi za grupiranje
- ▶ Artefakti

Tri skupine objekata za kreiranje toka procesa:

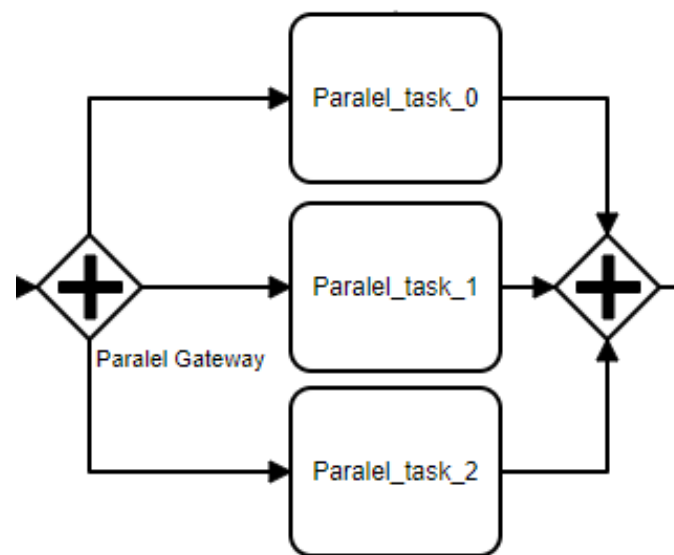
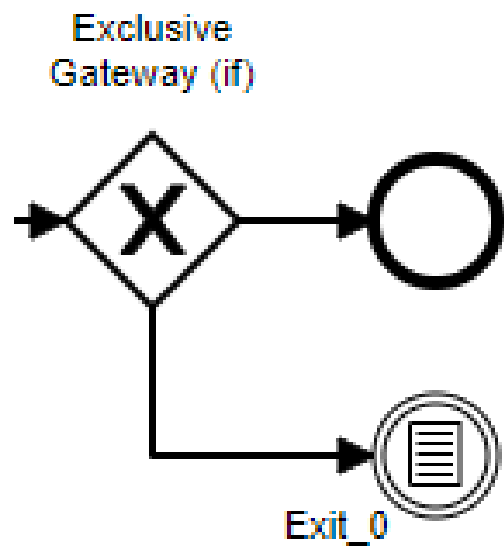
► Događaji (engl. Events) -



► Aktivnosti (engl. Activities) -



- ▶ Grananja (engl. Gateways) -postoji više vrsta



Objekti za povezivanje elementa

Sequence Flows



Messages Flows

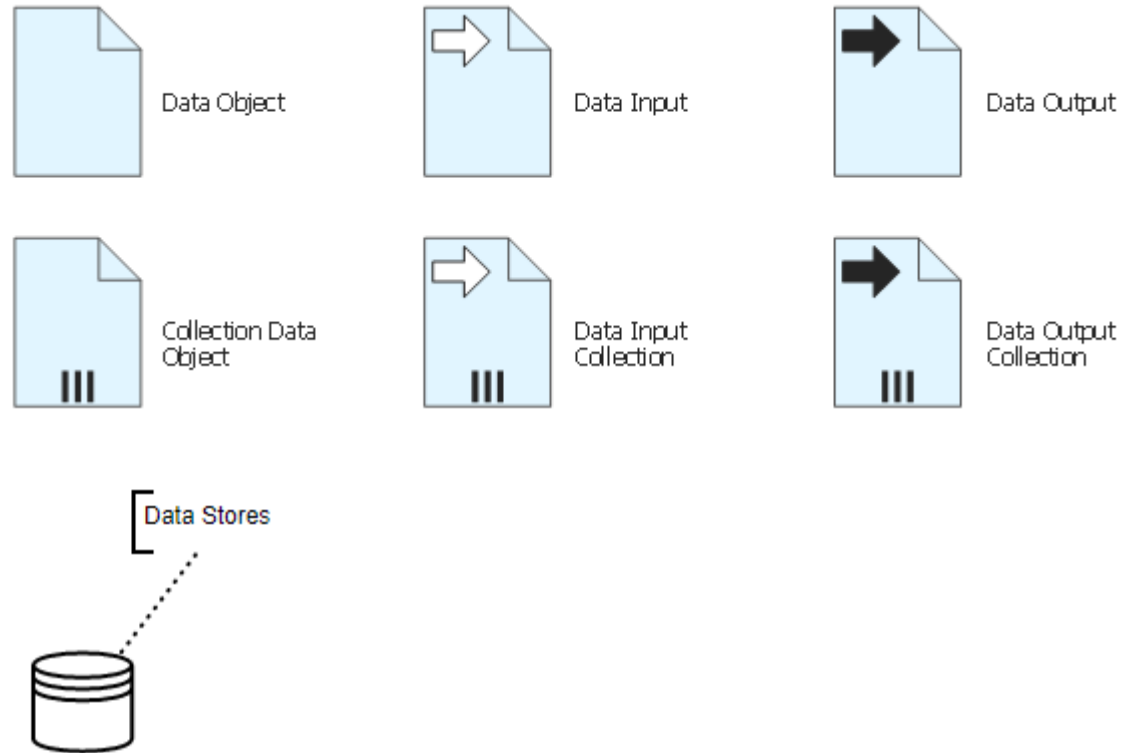


Associations



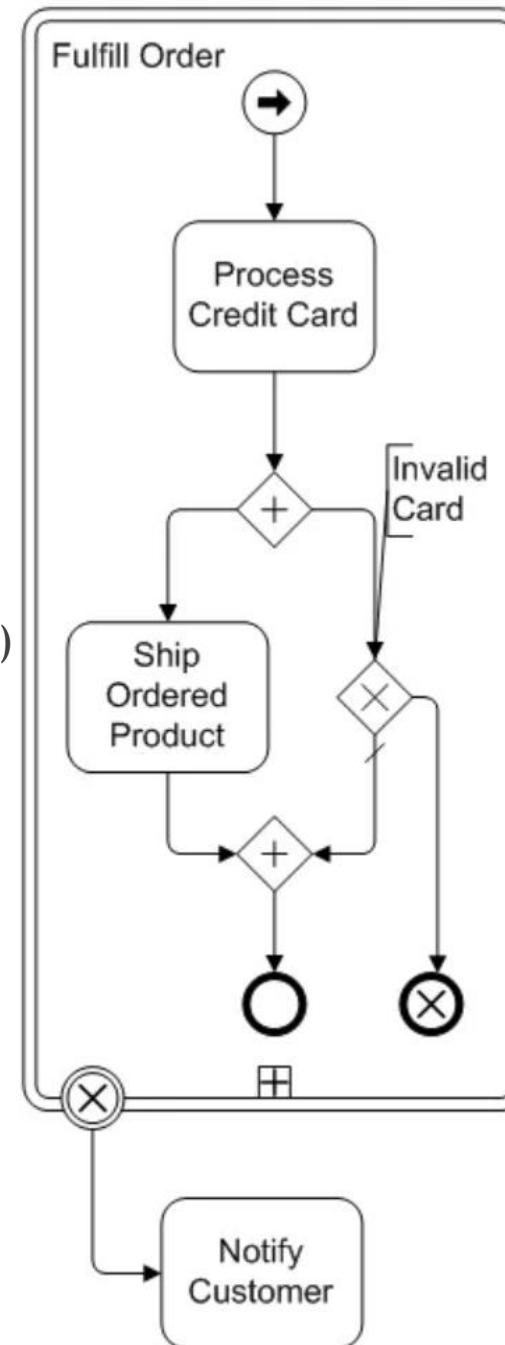
- ▶ Sekvencijski tok
- ▶ Tok sa porukom
- ▶ Asocijativni tok

Podatkovni elementi






























































BPM događaji

- ▶ Međudogađaji - intermediate i boundary event
- ▶ Cancel event
 - ▶ Cancel end event (unutar taska)
 - ▶ Cancel boundary event (pozicionirani na granici taska)
- ▶ 60 vrsta događaja



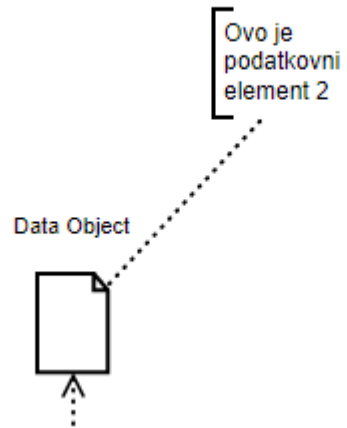
Vrste događaja - Events

| | | | | | | | | |
|-------------------|---|---|---|---|---|--|---|---|
| None |  | | | | | | | |
| Message |  |  |  |  |  |  |  |  |
| Timer |  |  |  |  |  |  | | |
| Conditional |  |  |  |  |  |  | | |
| Link | | | |  | | |  | |
| Signal |  |  |  |  |  |  |  |  |
| Error | |  | | |  | | |  |
| Escalation | |  |  | |  |  |  |  |
| Termination | | | | | | | |  |
| Compensation | |  | | |  | |  |  |
| Cancel | | | | |  | | |  |
| Multiple |  |  |  |  |  |  |  |  |
| Multiple Parallel |  |  |  |  |  |  | | |

Elementi za grupiranje

| Pool A | | Lane 2 | |
|--------|--------|--------|--|
| Lane 1 | Lane 4 | | |
| Lane 3 | | | |

Artefakti

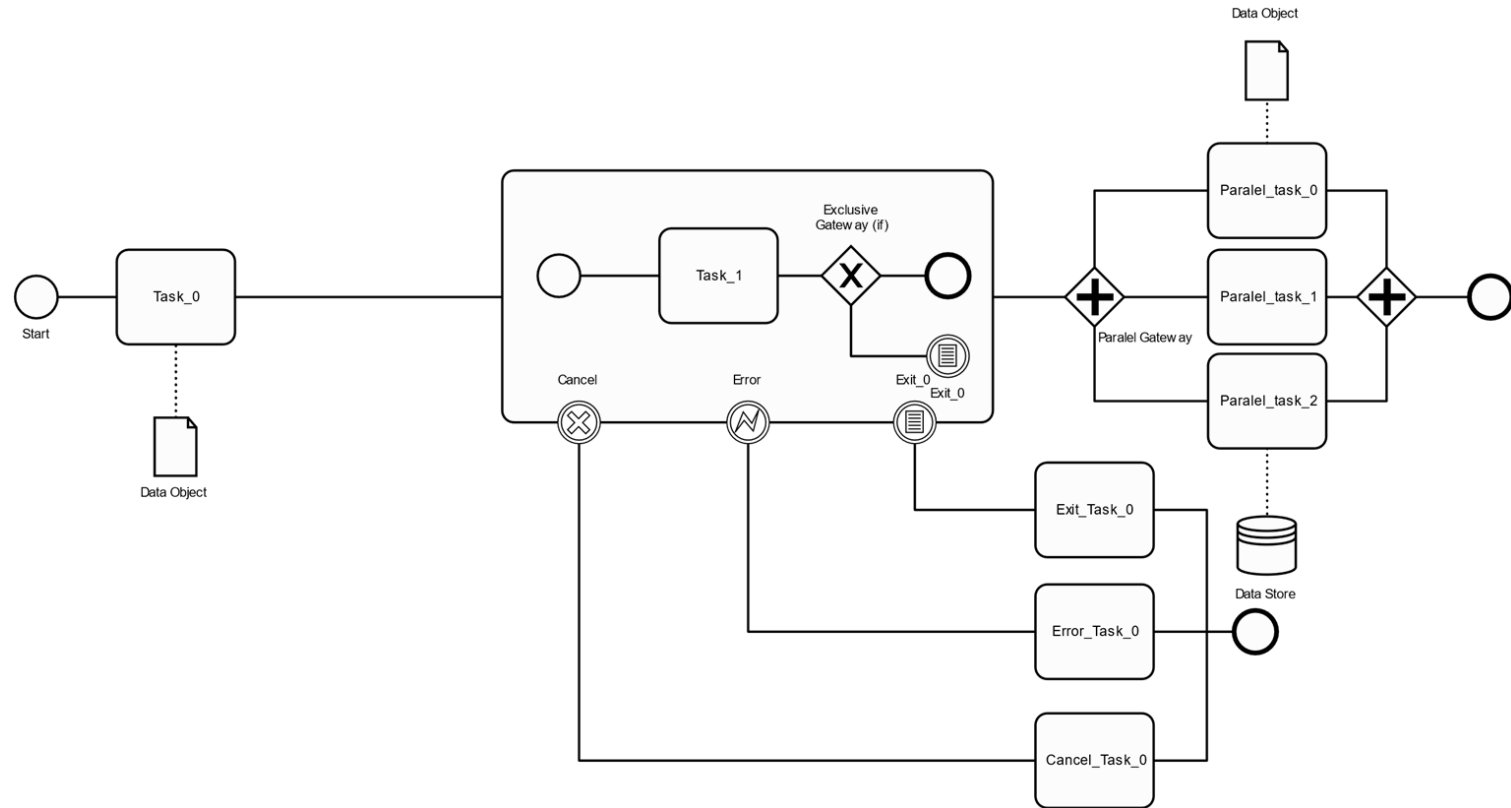


Tekstualna Anotacija



Grupa

Primjer grafikona



```
<?xml version="1.0" encoding="UTF-8" ?>
<bpmn:definitions xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:bpmn="http://www.omg.org/spec/BPMN/20100524/MODEL" xmlns:bpmndi="http://www.omg.org/spec/BPMN/20100524/DI"
  <bpmn:process id="Process_Odyhj97" isExecutable="false">
    <bpmn:subProcess id="SubProcess_0sgk4co">
      <bpmn:incoming>SequenceFlow_02o08s9</bpmn:incoming>
      <bpmn:outgoing>SequenceFlow_13u4se3</bpmn:outgoing>
      <bpmn:task id="Task_0gkfw7" name="Task 1">
        <bpmn:incoming>SequenceFlow_04f6nra</bpmn:incoming>
        <bpmn:outgoing>SequenceFlow_12gf5r2</bpmn:outgoing>
      </bpmn:task>
      <bpmn:startEvent id="StartEvent_0guvrdq">
        <bpmn:outgoing>SequenceFlow_04f6nra</bpmn:outgoing>
      </bpmn:startEvent>
      <bpmn:sequenceFlow id="SequenceFlow_04f6nra" sourceRef="StartEvent_0guvrdq" targetRef="Task_0gkfw7" />
      <bpmn:exclusiveGateway id="ExclusiveGateway_1dh6a17" name="Exclusive Gateway (if)">
        <bpmn:incoming>SequenceFlow_12gf5r2</bpmn:incoming>
        <bpmn:outgoing>SequenceFlow_16k6qfa</bpmn:outgoing>
        <bpmn:outgoing>SequenceFlow_079cwde</bpmn:outgoing>
      </bpmn:exclusiveGateway>
      <bpmn:sequenceFlow id="SequenceFlow_12gf5r2" sourceRef="Task_0gkfw7" targetRef="ExclusiveGateway_1dh6a17" />
      <bpmn:endEvent id="EndEvent_0lt5ucx">
        <bpmn:incoming>SequenceFlow_16k6qfa</bpmn:incoming>
      </bpmn:endEvent>
      <bpmn:sequenceFlow id="SequenceFlow_16k6qfa" sourceRef="ExclusiveGateway_1dh6a17" targetRef="EndEvent_0lt5ucx" />
      <bpmn:sequenceFlow id="SequenceFlow_079cwde" sourceRef="ExclusiveGateway_1dh6a17" targetRef="IntermediateThrowEvent_1d09ts4" />
      <bpmn:intermediateCatchEvent id="IntermediateThrowEvent_1d09ts4" name="Exit_0">
        <bpmn:incoming>SequenceFlow_079cwde</bpmn:incoming>
        <bpmn:conditionalEventDefinition>
          <bpmn:condition xsi:type="bpmn:tFormalExpression" />
        </bpmn:conditionalEventDefinition>
      </bpmn:intermediateCatchEvent>
    </bpmn:subProcess>
    <bpmn:boundaryEvent id="BoundaryEvent_0e6ikdh" name="Error" attachedToRef="SubProcess_0sgk4co">
      <bpmn:outgoing>SequenceFlow_1durzw5</bpmn:outgoing>
      <bpmn:errorEventDefinition />
    </bpmn:boundaryEvent>
    <bpmn:boundaryEvent id="BoundaryEvent_0rng798" name="Exit_0" attachedToRef="SubProcess_0sgk4co">
      <bpmn:outgoing>SequenceFlow_1hf9u9b</bpmn:outgoing>
      <bpmn:conditionalEventDefinition>
        <bpmn:condition xsi:type="bpmn:tFormalExpression" />
      </bpmn:conditionalEventDefinition>
    </bpmn:boundaryEvent>
    <bpmn:startEvent id="StartEvent_13t144h" name="Start">
      <bpmn:outgoing>SequenceFlow_18cngbv</bpmn:outgoing>
    </bpmn:startEvent>
    <bpmn:task id="Task_0mx6li2" name="Task 0">
      <bpmn:incoming>SequenceFlow_18cngbv</bpmn:incoming>
      <bpmn:outgoing>SequenceFlow_02o08s9</bpmn:outgoing>
      <bpmn:property id="Property_lu5qkvu" name="__targetRef_placeholder" />
      <bpmn:dataInputAssociation id="DataInputAssociation_lpi4t31">
        <bpmn:sourceRef>DataObjectReference_0qsm16f</bpmn:sourceRef>
        <bpmn:targetRef>Property_lu5qkvu</bpmn:targetRef>
      </bpmn:dataInputAssociation>
      <bpmn:dataInputAssociation id="DataInputAssociation_14t461m">
        <bpmn:sourceRef>DataObjectReference_0qsm16f</bpmn:sourceRef>
        <bpmn:targetRef>Property_lu5qkvu</bpmn:targetRef>
      </bpmn:dataInputAssociation>
    </bpmn:task>
    <bpmn:sequenceFlow id="SequenceFlow_18cngbv" sourceRef="StartEvent_13t144h" targetRef="Task_0mx6li2" />
    <bpmn:sequenceFlow id="SequenceFlow_02o08s9" sourceRef="Task_0mx6li2" targetRef="SubProcess_0sgk4co" />
    <bpmn:boundaryEvent id="BoundaryEvent_1d5yvyx" name="Cancel" attachedToRef="SubProcess_0sgk4co">
      <bpmn:outgoing>SequenceFlow_14n40mv</bpmn:outgoing>
      <bpmn:cancelEventDefinition />
    </bpmn:boundaryEvent>
    <bpmn:parallelGateway id="ExclusiveGateway_1ku4lox" name="Parallel Gateway">
      <bpmn:incoming>SequenceFlow_13u4se3</bpmn:incoming>
      <bpmn:outgoing>SequenceFlow_1adm7ga</bpmn:outgoing>
      <bpmn:outgoing>SequenceFlow_13ugabk</bpmn:outgoing>
      <bpmn:outgoing>SequenceFlow_189nk64</bpmn:outgoing>
    </bpmn:parallelGateway>
  </bpmn:process>
</bpmn:definitions>
```



- ▶ Light-weight business process engine napisan u Javi.
- ▶ <https://www.flowable.org>
- ▶ <https://github.com/flowable/flowable-engine>



IDM – Identity Management

The screenshot shows the 'Users' management page in Flowable. It includes a search bar, a 'Create user' button, and a table of matching users. The table lists one user: 'admin' with email 'admin' and name 'Test Administrator'. A 'Select an action' dropdown is visible at the top right of the table.

| ID | Email | Name |
|--------------------------|-------|--------------------|
| <input type="checkbox"/> | admin | Test Administrator |

Task App

The screenshot shows a task instance for 'Provide vacation information'. It includes a 'Complete' button, a 'Show details' button, and input fields for 'Name', 'Vacation starting from', 'Vacation until', and 'Remarks'. The task is assigned to 'Test Administrator' and has a due date of 'February 13th 2017'.

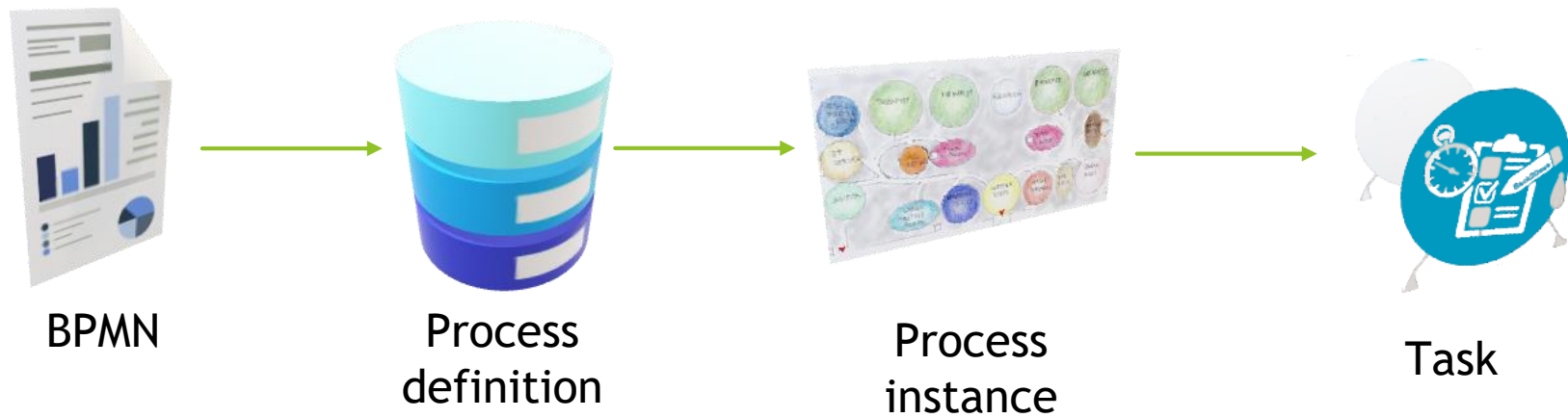
Modeler

The screenshot shows the 'Modeler' interface with a BPMN diagram. A 'Palette' on the left lists various BPMN elements like Start Events, Activities, and Gateways. The 'Modeling canvas' in the center contains a task element labeled 'Provide vacation information'. A 'Properties panel' on the right shows configuration options for this task, such as 'Name', 'Asynchronous', and 'Execution listeners'.

Admin

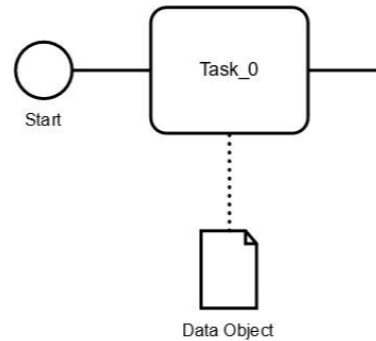
The screenshot shows the 'Admin' interface with configuration options for 'Process API Endpoint configuration' and 'Form API Endpoint configuration'. Each configuration section includes a description, a table of properties (Name, Server address, Context root, Username, Description, Server port, REST root), and an 'Actions' panel with 'Edit REST endpoint' and 'Check REST endpoint' buttons.

Konzept - core engine



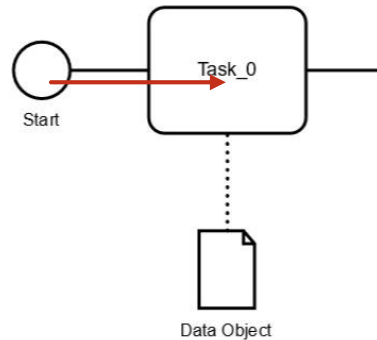
RepositoryService

```
RepositoryService repositoryService =  
processEngine.getRepositoryService();  
repositoryService.createDeployment()  
.addClasspathResource („primjer.bpmn20.xml").deploy();
```



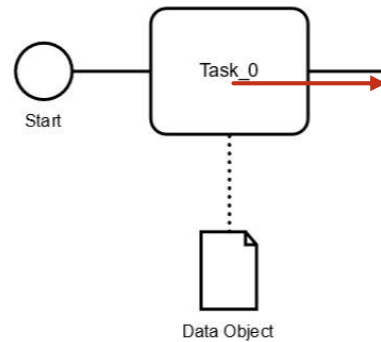
RuntimeService

```
RuntimeService runtimeService =  
processEngine.getRuntimeService();  
  
Map<String, Object> variables = new HashMap<String,  
Object>();  
  
ProcessInstance processInstance =  
runtimeService.startProcessInstanceByKey("primjer",  
variables);
```



TaskService

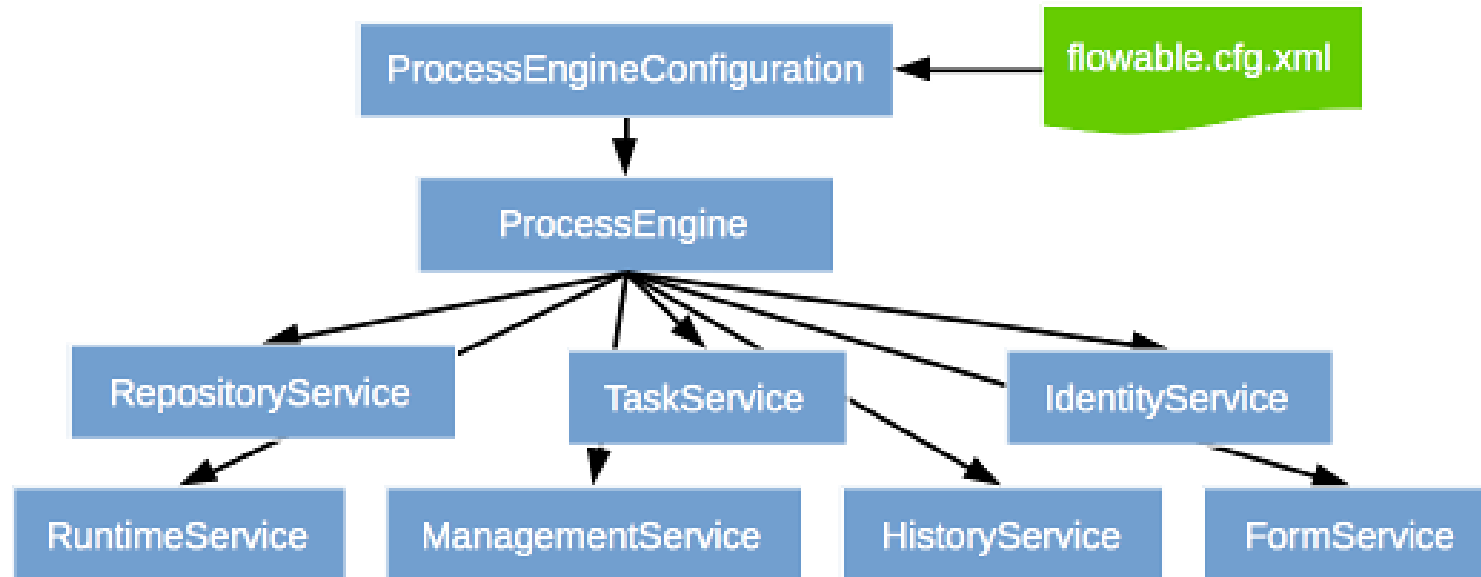
```
TaskService taskService = processEngine.getTaskService();  
variables = new HashMap<String, Object>();  
variables.put("approved", true);  
taskService.complete(task.getId(), variables);
```



Java Delegate

```
package org.flowable;  
  
import org.flowable.engine.delegate.DelegateExecution;  
import org.flowable.engine.delegate.JavaDelegate;  
  
public class CallExternalSystemDelegate implements JavaDelegate {  
    public void execute(DelegateExecution execution) {  
        ...  
    }  
}
```

Services



Strengths

Gotovo rješenje
Dinamičko generiranje
procesa

Weakness

Kompleksnost
konfiguracije

Opportunities

Vlastita aplikacija na
bazi gotovog engine-a

Threats

Bazira se na hibernate
query-ima



Reference

- ▶ <https://camunda.com/bpmn>
- ▶ <https://www.flowable.org/documentation.html>