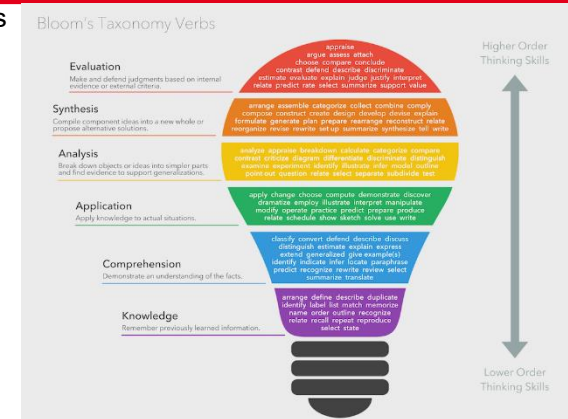


Master Software Technology Business Process Technology – [06] Workflows using Camunda

Bloom's Taxonomy Verbs
by [Fractus Learning](#),
Lizenz: CC-BY-SA 4.0

Learning Goals

- ✓ Understand Workflows in Camunda
- ✓ Model and execute workflows using Camunda
- ✓ Compare using Web Services in WS-BPEL and Camunda-based Workflows



Agenda

Camunda background

Camunda module structure according to the WfMC schema

Camunda workflow modeling

- WS-SOAP-based Web Service usage
- ReSTful Web Service usage

Integrated Tool Example: Camunda

Java-based BPM-/BRM-/Workflow Management-System

- Open Source (camunda.org)
- Very successful also in big enterprises (usually Enterprise Version)
- One founder (Bernd Rücker) studied Master ST @ HFT Stuttgart

The screenshot displays the Camunda tasklist web application. On the left, under 'Our Management Team', there are four team members listed with their photos, names, titles, and short biographies. A red box highlights 'Master ST @ HFT Stuttgart' next to Bernd Rücker. On the right, the 'camunda tasklist' interface is shown, featuring a sidebar with navigation links like 'My Tasks (1)', 'Inbox (0)', and 'Unclaimed Group Tasks'. The main area displays a list of tasks with columns for Name, Process, Created, Due, and Actions. A detailed view of a task is shown, including a BPMN diagram and a list of assigners.

Our Management Team

Jakob Freund, Co-CEO and Head of Sales

Bernd Rücker, Co-CEO and Head of Consulting

Robert Gimbel, Head of Product

Daniel Meyer, Technical Project Lead

Master ST @ HFT Stuttgart

camunda tasklist

My Tasks (1)

Inbox (0)

UNCLAIMED GROUP TASKS

Accounting (0)

Management (0)

Sales (0)

camunda BPM Administrators (0)

COLLEAGUES

Peter Meier (0)

Mary Anne (0)

John Doe (0)

Name Process Created Due Actions

Assign Approver invoice receipt Aug 23, 2013 4:08:32 PM

Assign Approver invoice receipt Aug 23, 2013 4:05:47 PM

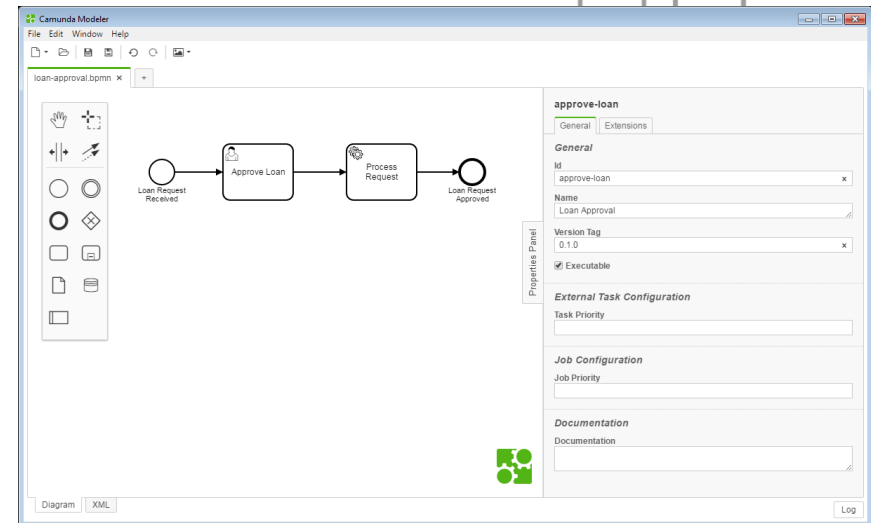
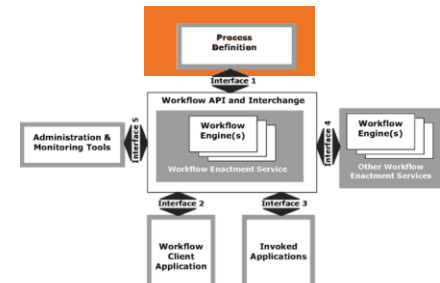
Assign Approver invoice receipt Aug 23, 2013 3:34:53 PM

select all / deselect all tasks or use ctrl + click to select multiple.

Camunda: Structure according to the WfMC reference model

Camunda Modeler

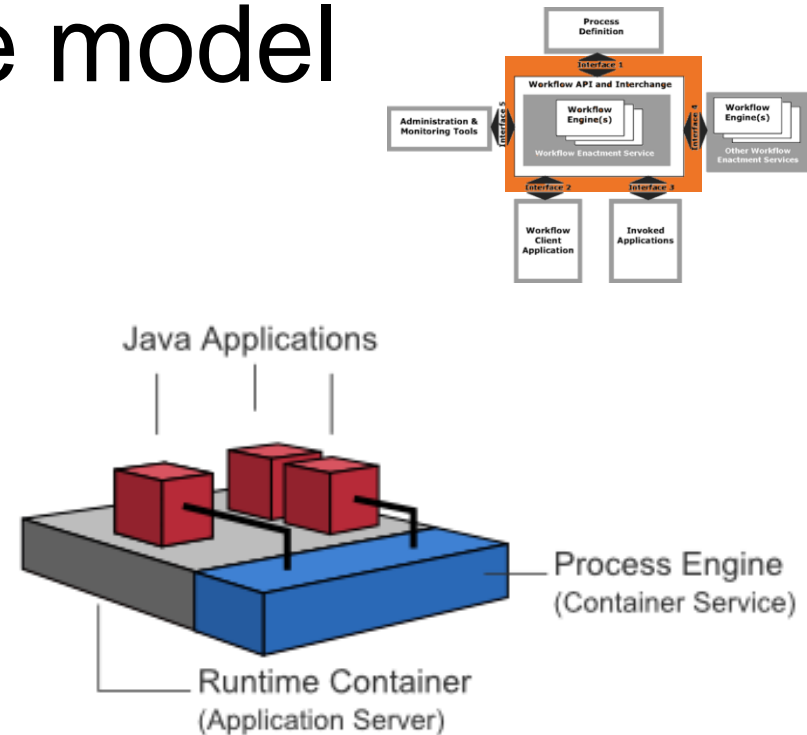
- Standalone Tool
- File based, export of .bpmn files
- BPMN 2.0 and CMMN/DMN modelling
- Properties pane on the right hand side
- Coded functionality usually by integrating with Eclipse and Maven



Camunda: Structure according to the WfMC reference model

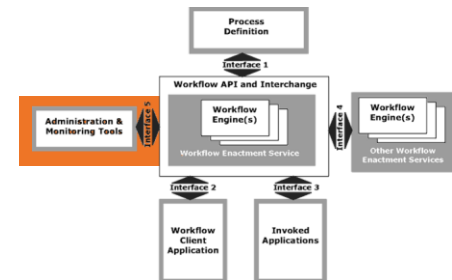
Camunda Workflow engine

- Java-based
- Runs sharing the Web container (e.g. Apache Tomcat) with the application(s)
 - Alternative Embedded Mode: integrated with application
 - Alternative Remote Mode: separate compute node



Camunda: Structure according to the WfMC reference model

Camunda Cockpit



- Monitoring processes & instances
- Tracing the current status

Camunda Cockpit Processes Decisions Deployments Reports Demo Demo

Dashboard » Processes » Invoice Receipt

Information Filter

Definition Version: 2

Definition ID: invoice:2:480d4031-054c-11e6-adb9-86658bdf3f07

Definition Key: invoice

Definition Name: Invoice Receipt

Tenant ID: null

Semantic Version: null

Deployment ID: 47fe731e-054c-11e6-adb9-86658bdf3f07

Instances Running:
• current version: 6
• all versions: 12

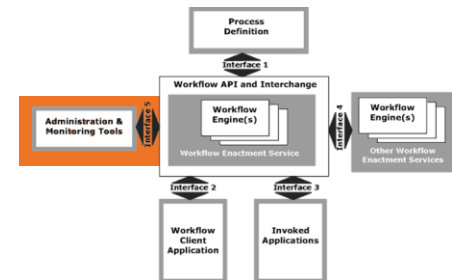
Process Instances Called Process Definitions Job Definitions

State	ID	Start Time	Business Key
●	912fae6a-175c-11e6-93dc-0242644791c7	2016-05-11T11:41:42	
●	915251ec-175c-11e6-93dc-0242644791c7	2016-05-06T11:41:42	
●	9139246d-175c-11e6-93dc-0242644791c7	2016-04-27T11:41:42	
●	496e086c-054c-11e6-adb9-86658bdf3f07	2016-04-18T11:59:48	
●	499e407e-054c-11e6-adb9-86658bdf3f07	2016-04-13T11:59:49	
●	497b27ef-054c-11e6-adb9-86658bdf3f07	2016-04-04T11:59:48	

Camunda: Structure according to the WfMC reference model

Camunda Admin

- Account and Rights Management



Camunda Admin Users Groups Tenants Authorizations System Demo Demo

Dashboard > Authorizations

Application

Authorization

Decision Definition

Deployment

Filter

Group

Group Membership

Process Definition

Process Instance

Task

Group Authorizations

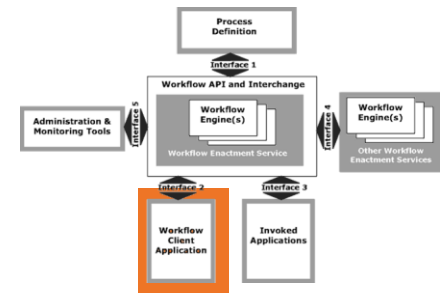
Type	User / Group	Permissions	Resource Id	Action
ALLOW	accounting	READ	accounting	Edit Delete
ALLOW	camunda-admin	READ	camunda-admin	Edit Delete
ALLOW	camunda-admin	ALL	*	Edit Delete
ALLOW	management	READ	management	Edit Delete
ALLOW	sales	READ	sales	Edit Delete

Create new authorization +

Camunda: Structure according to the WfMC reference model

Camunda Tasklist

- Generic Client to claim tasks generated from the process
- Start processes

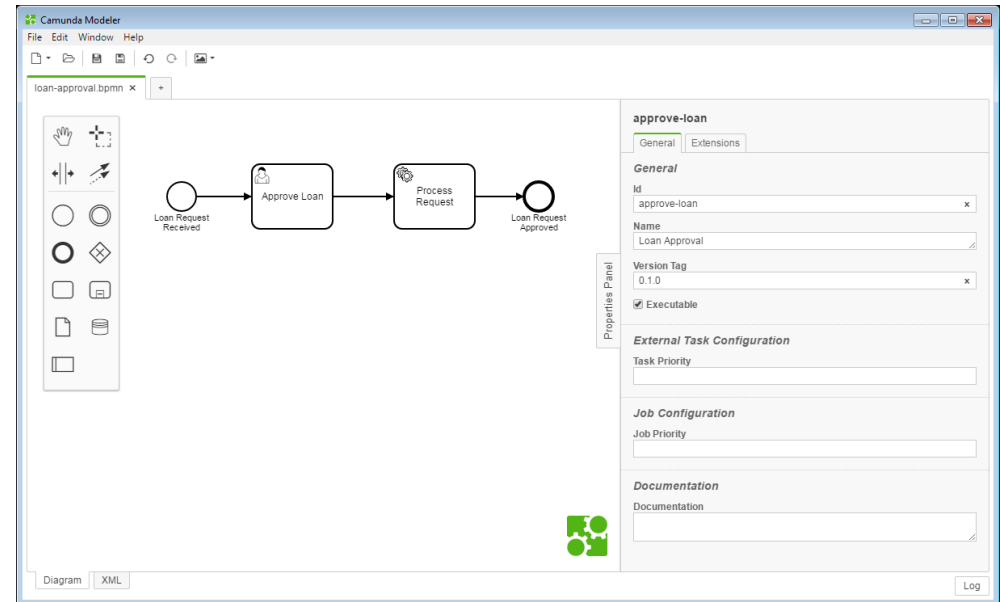


The screenshot shows the Camunda Tasklist interface. On the left, there's a sidebar with 'My Tasks (4)' and a list of tasks. The main area displays a 'Review Invoice' task. The task details include 'Invoice Receipt', 'Due in 2 days, created a minute ago', 'Invoice Amount: 10.99', and 'Invoice Number: PSACE-5342'. The task is assigned to 'Demo Demo'. The right panel shows the 'Review Invoice' form with fields for 'Invoice Document' (invoice.pdf), 'Creditor' (Papa Steve's all you can eat), 'Amount' (10.99), 'Invoice Category' (Travel Expenses), and 'Invoice Number' (PSACE-5342). There's a checkbox for 'Could you clarify the invoice?' and buttons for 'Save' and 'Complete'.

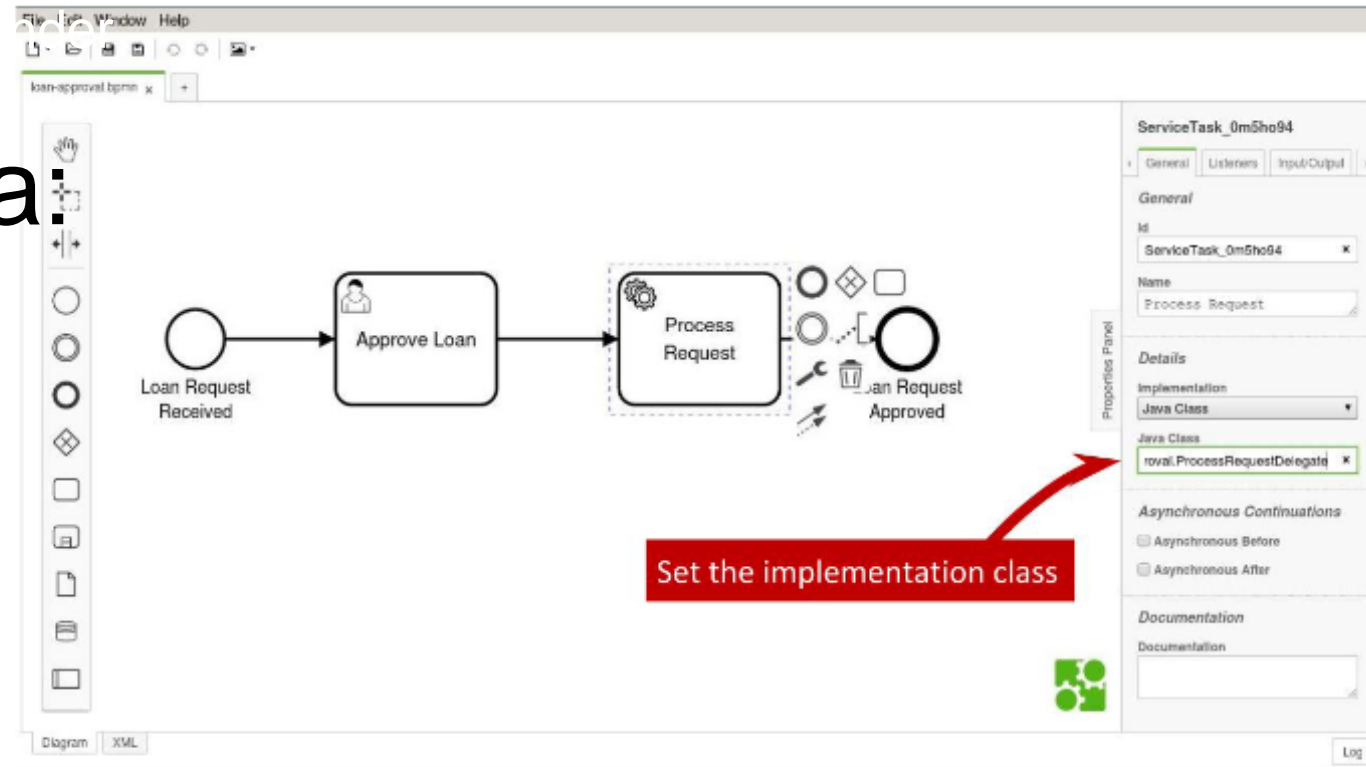
Camunda: getting started

Steps:

- Download + Install
(done in the LVIS)
- Create a project
- Model a simple process using BPMN 2.0
(<https://docs.camunda.org/get-started/bpmn20/>) or take one modeled in Signavio (<https://docs.camunda.org/get-started/cycle/roundtrip-signavio/>)
- Deploy to Camunda Engine + Test
- [Extend by HTML-Forms
- Extend by Custom Java Code]



Camunda: Java Method Calls



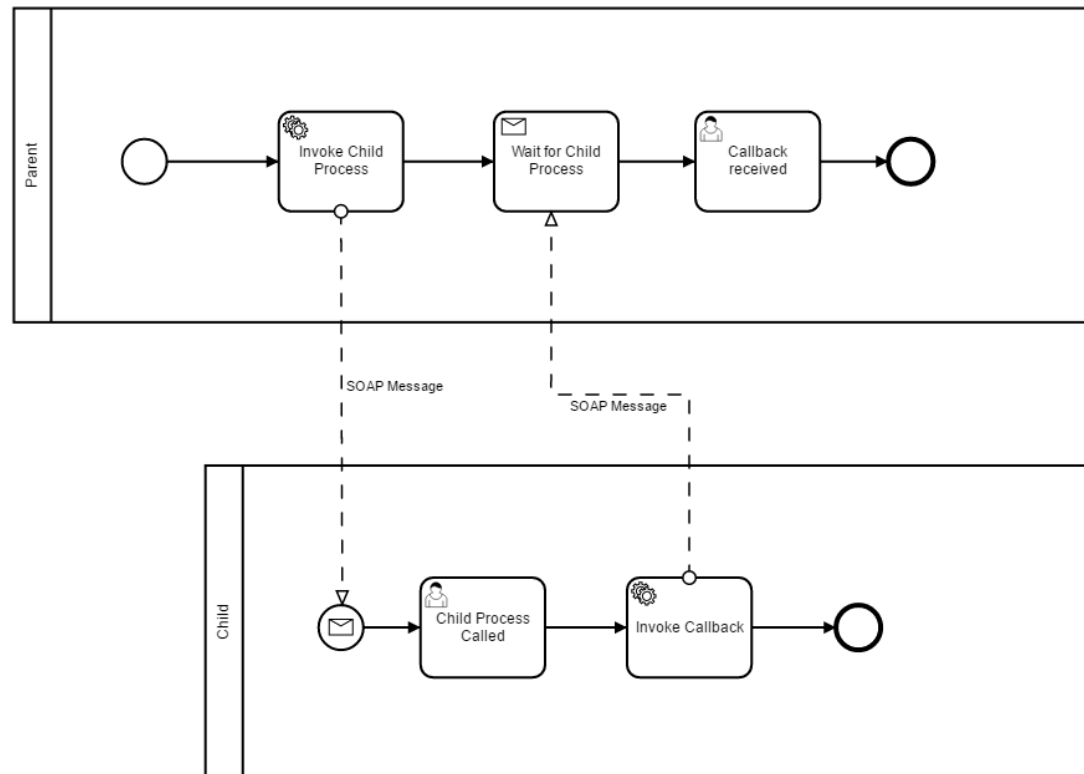
```
package org.camunda.bpm.getstarted.loanapproval;
```

```
import java.util.logging.Logger;  
import org.camunda.bpm.engine.delegate.DelegateExecution;  
import org.camunda.bpm.engine.delegate.JavaDelegate;
```

```
public class ProcessRequestDelegate implements JavaDelegate {  
    private final static Logger LOGGER = Logger.getLogger("LOAN-REQUESTS");
```

```
    public void execute(DelegateExecution execution) throws Exception {  
        LOGGER.info("Processing request by " +  
            execution.getVariable("customerId") + "...");
```

Camunda: WS-SOAP-based Web Service Invocation



Camunda: WS-SOAP-based Web Service Invocation (2)

```
@WebService(name = "ProcessInvocationService")
public class ProcessInvocation {
    public static final String CALLBACK_URL = "callbackURL";
    public static final String CALLBACK_CORRELATION_ID = "callbackCorrelationId";
    public static final String PAYLOAD = "payload";

    @Inject
    private RuntimeService runtimeService;

    public void invokeProcess(String processDefinitionKey, String callbackUrl, String
correlationId, String payload) {
        Map<String, Object> variables = new HashMap<String, Object>();
        variables.put(CALLBACK_URL, callbackUrl);
        variables.put(CALLBACK_CORRELATION_ID, correlationId);
        variables.put(PAYLOAD, payload);
        runtimeService.startProcessInstanceByKey(processDefinitionKey, variables);
    }
}
```

Camunda: Integrating Web Service Invocation into the Process

Parent.bpmn

```
<serviceTask id="ServiceTask_1"  
activiti:expression="#{processInvocationClient.invokeProcess('inter-  
process-communication-ws-child', execution)}" name="Invoke child  
process" />
```

Child.bpmn

```
<serviceTask id="ServiceTask_1"  
activiti:expression="#{processCallbackClient.invokeProcessCallback(payload,  
execution)};" name="Invoke callback">
```

Camunda: Web Service Invocation Code Example

@Named

```
public class ProcessInvocationClient {
```

```
    public static final String CORRELATION_ID_PREFIX = "correlationIdForInvocationOf_";
```

```
    public static final String SAMPLE_PAYLOAD_PREFIX = "sample-payload-";
```

@Inject

```
    ServiceRegistry serviceRegistry;
```

```
    public void invokeProcess(String processDefinitionKey, DelegateExecution execution) {
```

```
        // lookup service URL
```

```
        URL wsdlLocation = serviceRegistry.getWsdlLocation(processDefinitionKey);
```

```
        // prepare CXF client
```

```
        ProcessInvocationService service = new ProcessInvocationService_Service(wsdlLocation)
```

```
            .getProcessInvocationServicePort();
```

```
        // generate callback URL and correlation ID
```

```
        String callbackUrl = serviceRegistry.getWsdlLocation("inter-process-communication-ws-parent").toString();
```

```
        String correlationId = UUID.randomUUID().toString();
```

```
        // store correlation ID
```

```
        execution.setVariable(CORRELATION_ID_PREFIX + processDefinitionKey, correlationId);
```

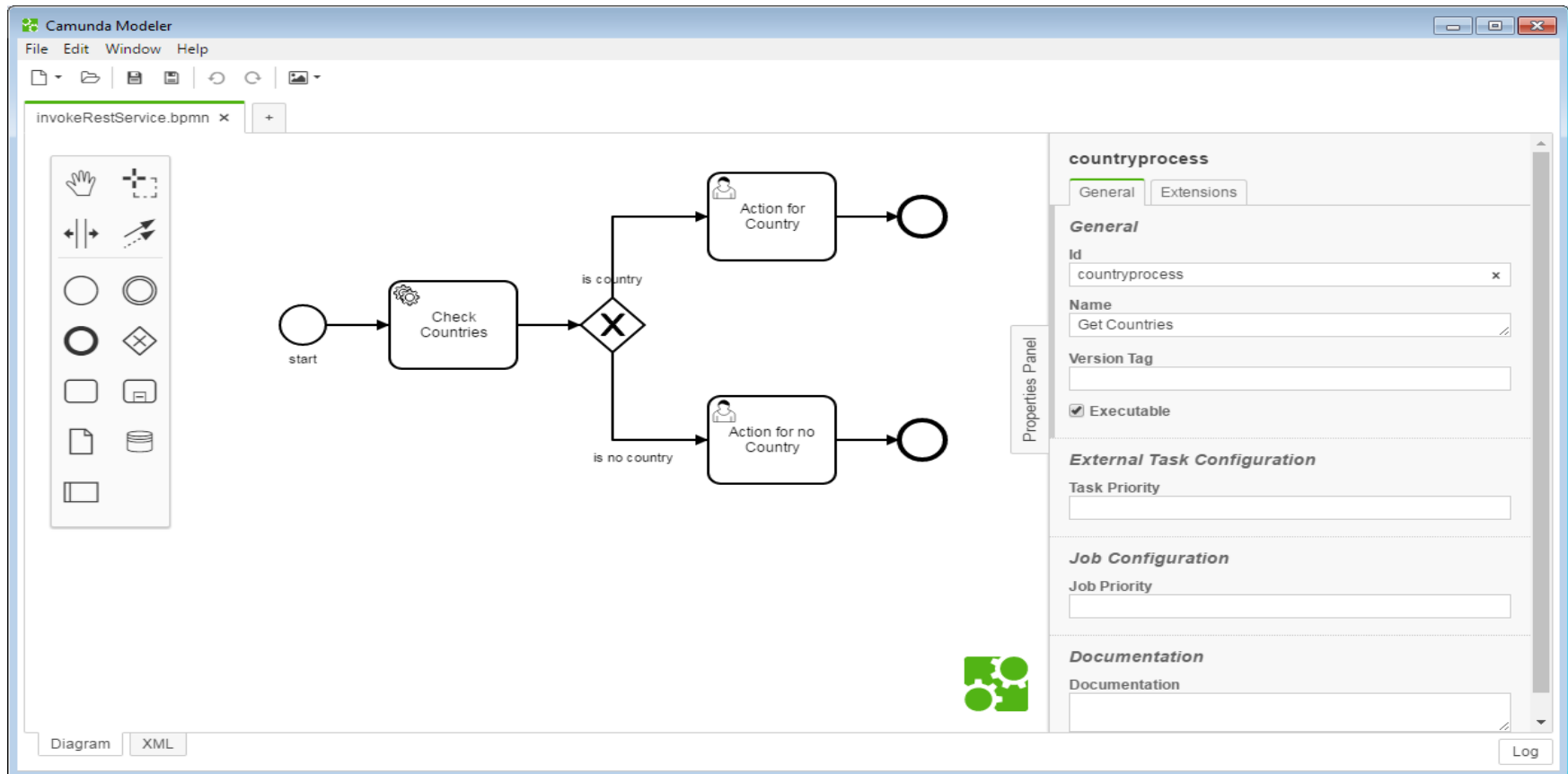
```
        // call service
```

```
        service.invokeProcess(processDefinitionKey, callbackUrl, correlationId, SAMPLE_PAYLOAD_PREFIX + correlationId);
```

```
    }
```

```
}
```

Camunda: ReSTful Web Service Invocation



Camunda: ReSTful Web Service Invocation

```
public class ProcessRequestDelegate implements JavaDelegate {
    private final static Logger LOGGER = Logger.getLogger("LOAN-REQUESTS");
    public void execute(DelegateExecution execution) throws Exception {
        LOGGER.info("Processing request by " + execution.getVariable("authorId") + "...");
        HttpClient vClient=HttpClient.newBuilder()
            .connectTimeout(Duration.ofSeconds(20))
            .followRedirects(Redirect.NORMAL).version(Version.HTTP_1_1).build();
        HttpRequest vRequest=HttpRequest.newBuilder()
            .headers("Content-Type", "application/json").timeout(Duration.ofSeconds(20))
            .uri(URI.create(aBaseUri+sAuthorsResourcePath+"/"+vAuthorId.toString()))
            .build();
        try {
            BodyHandlers.ofString());
            if(vResponse.statusCode()==HttpServletResponse.SC_NOT_FOUND) {
                execution.setVariable("authorData", null);}
            else {execution.setVariable("authorData", vResponse.body());}
        } catch (IOException | InterruptedException e) {
            execution.setVariable("authorData", null);
        }
    }
}
```

Summary

- ✓ Camunda background presented
- ✓ Camunda module structure according to the WfMC schema explained
- ✓ Camunda workflow modeling incl. WS-SOAP-based and ReSTful Web Service usage explained in examples

Questions? Questions!

**THANK YOU VERY MUCH FOR
YOUR ATTENTION!**