Deep dive into SAP Cloud Platform Workflow Management – Model Investment Approval Workflow
DEV-264

Exercises / Solutions
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THE BEST RUN **SAP**

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SAP Cloud Platform Workflow Management has Workflow capability, enable developers to model workflow based on BPMN 2.0 using SAP Cloud Platform Business Application Studio and deploy to Cloud platform accounts. A workflow consists of different activities, events and gateways. It provides fine granular REST/oData APIs to integrate with different line of business applications.

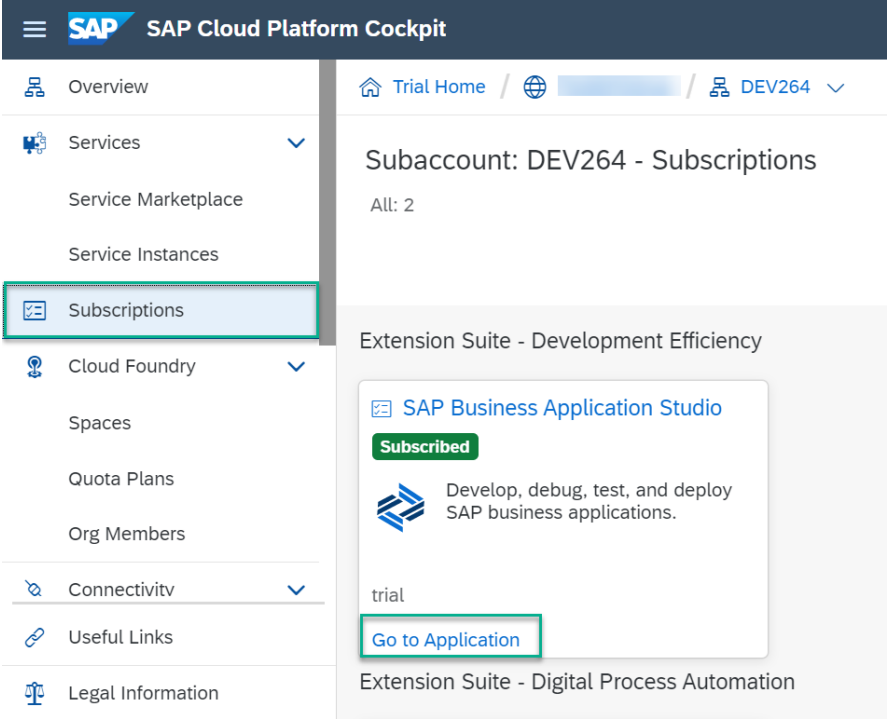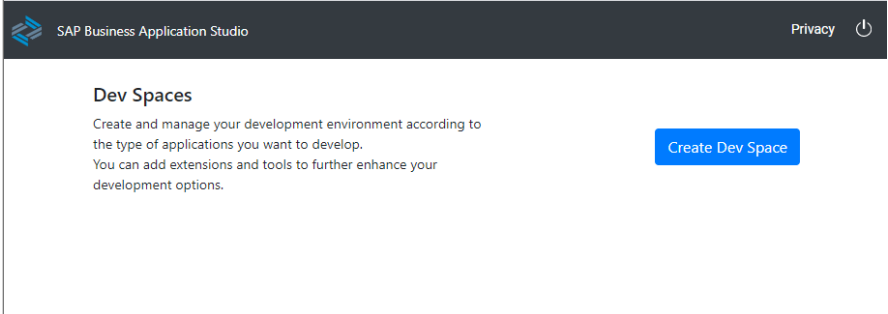## SAP Cloud Platform Workflow – the bigger picture
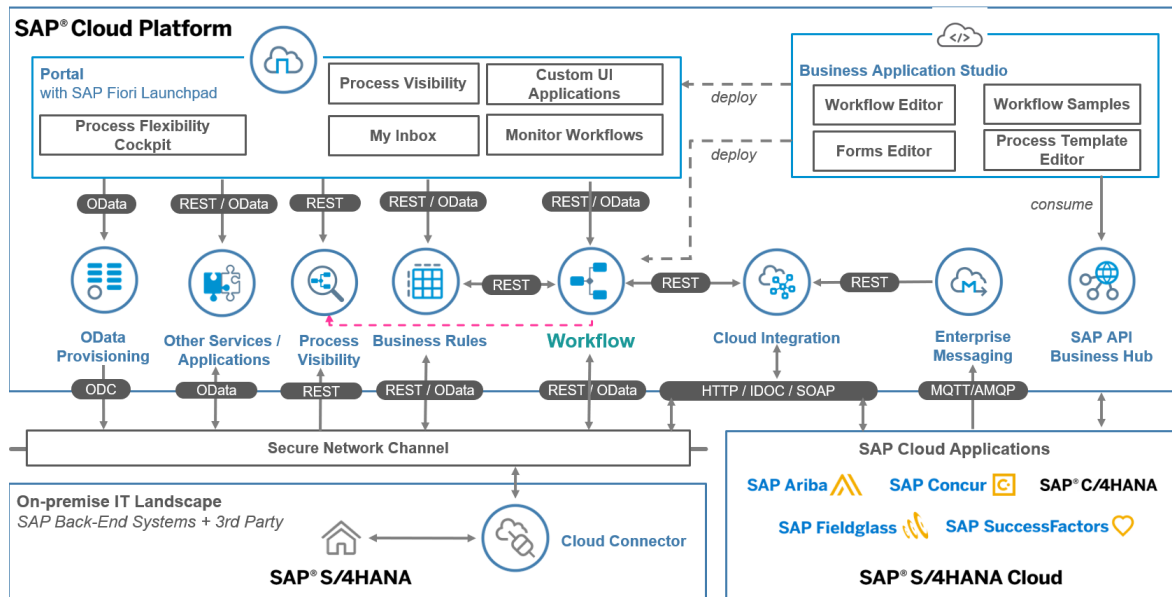
SCENARIO

The scenario is an Investment Approval Workflow. A requestor creates a request for approval and Approver can decide Approve or Reject. A rejection enables the requestor to modify the request and submit or cancel the request.
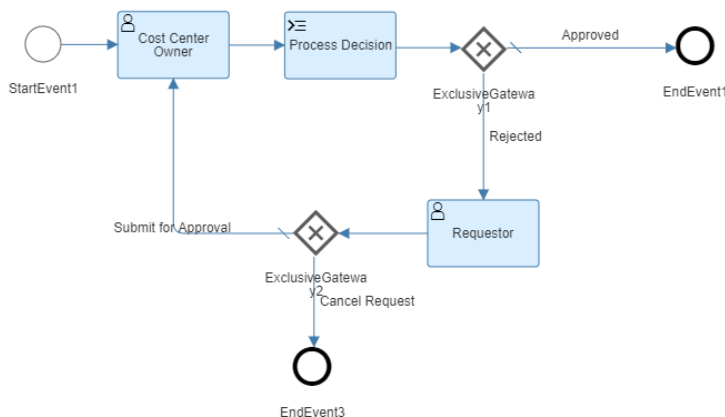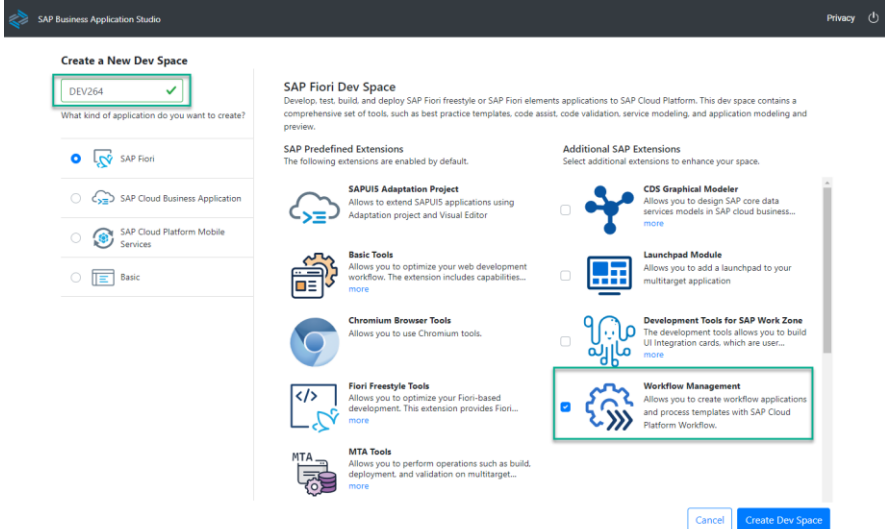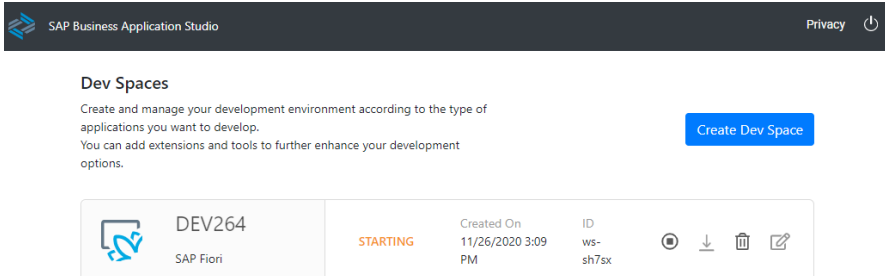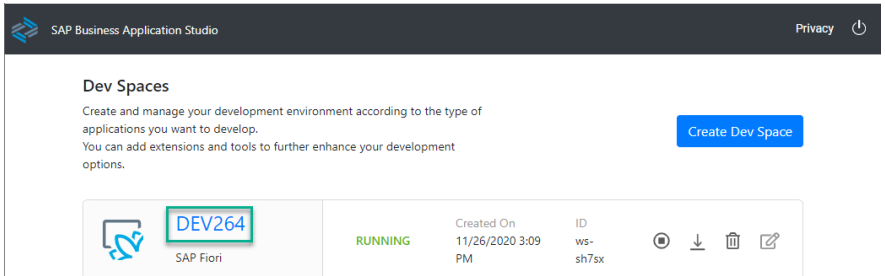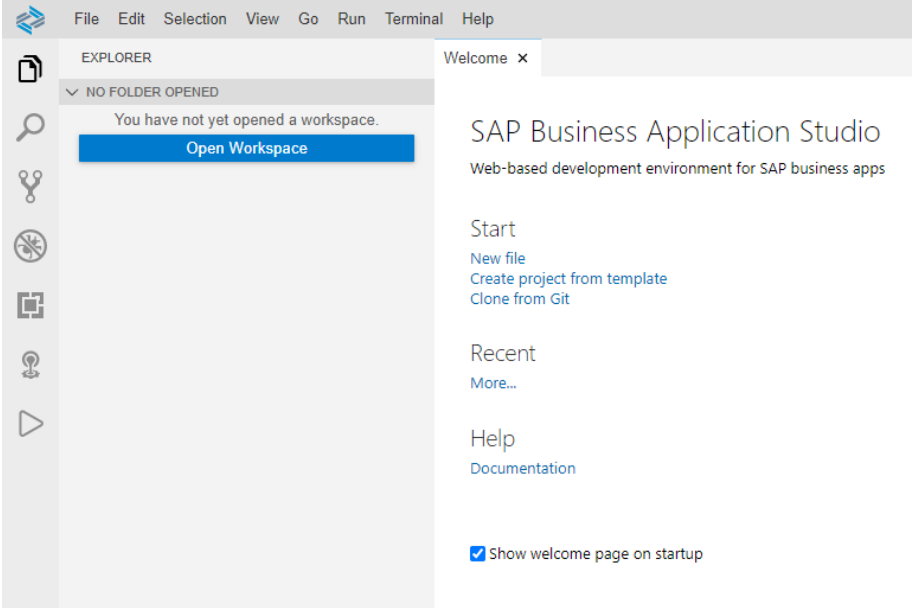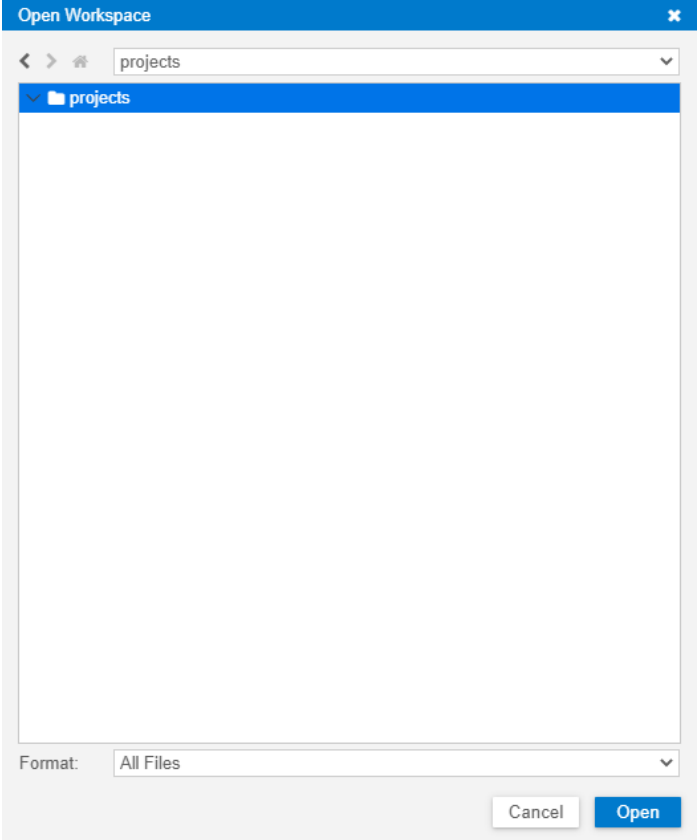

Prerequisite
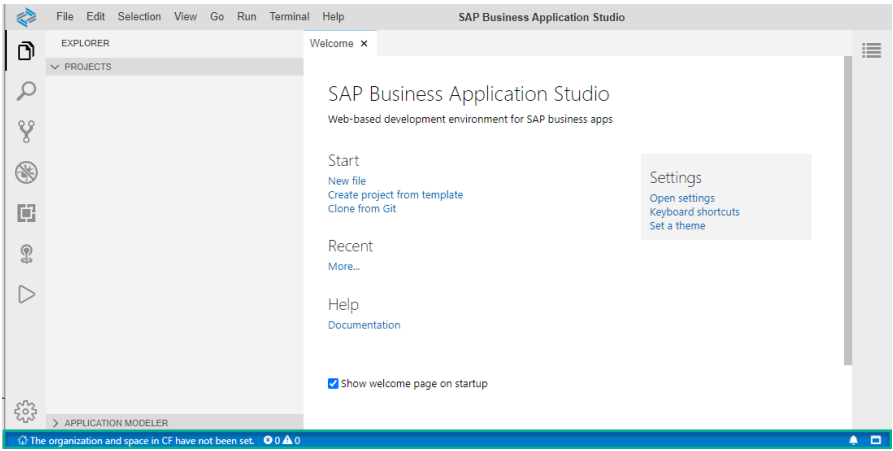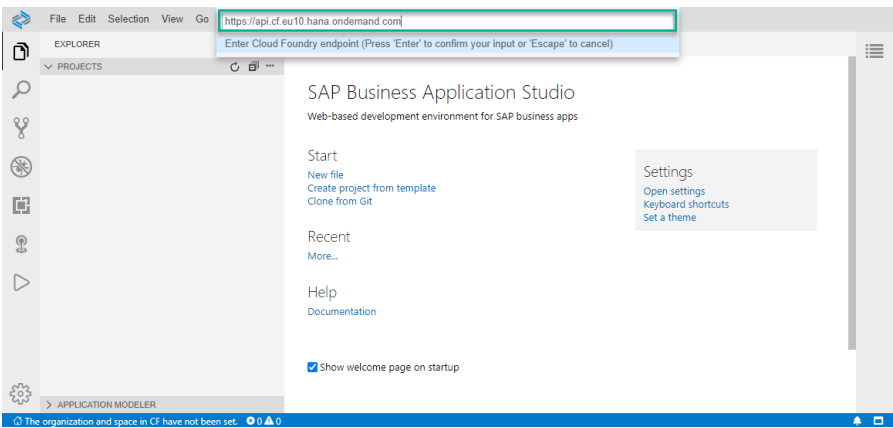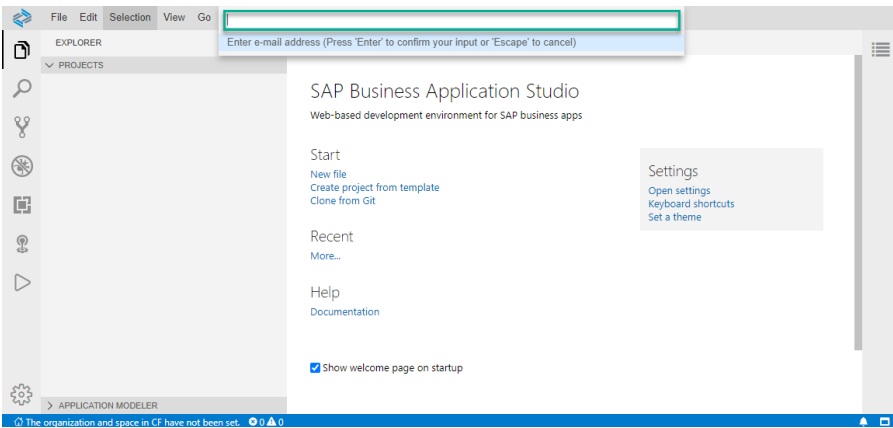
Please setup your SAP Cloud Platform Trial account using setup guide.
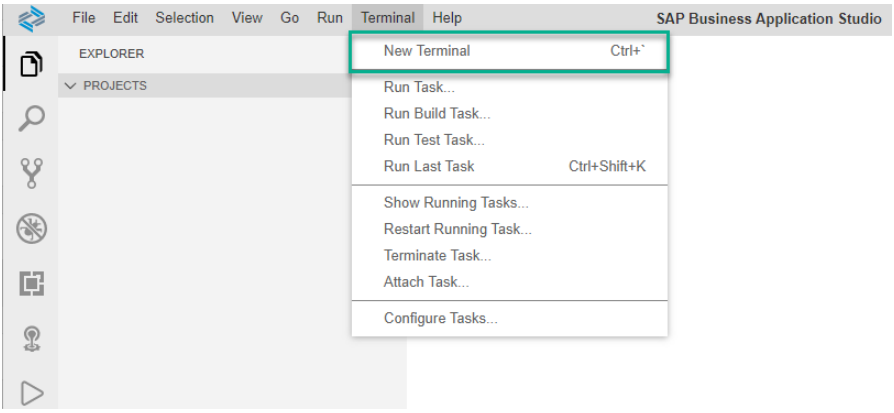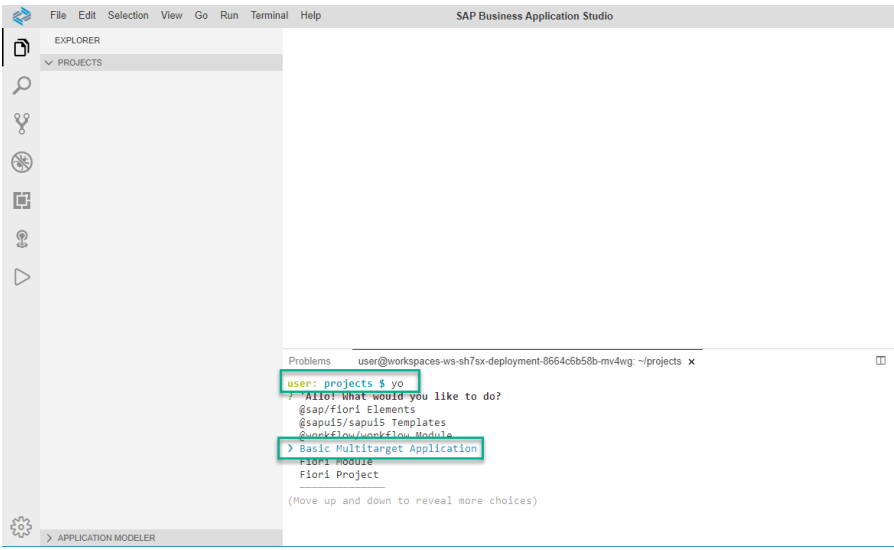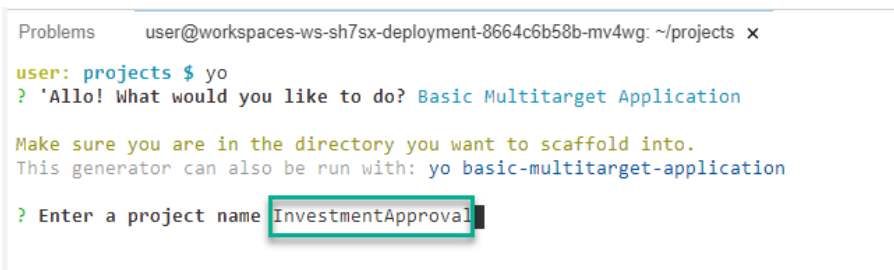
MODEL WORKFLOW – INVESTMENT APPROVAL WORKFLOW

Explanation	Screenshot
1. Select **Subscriptions** in your Sub Account and you see the subscribed applications. 2. Select **SAP Business Application Studio** and click **Go to Application**. SAP Cloud Platform Business Application Studio will be opened in new browser window. Skip steps 3 to 7 If you have already created a dev space with Workflow Management extension.	
Create Workspace 3. Click **Create Dev Space** button.	
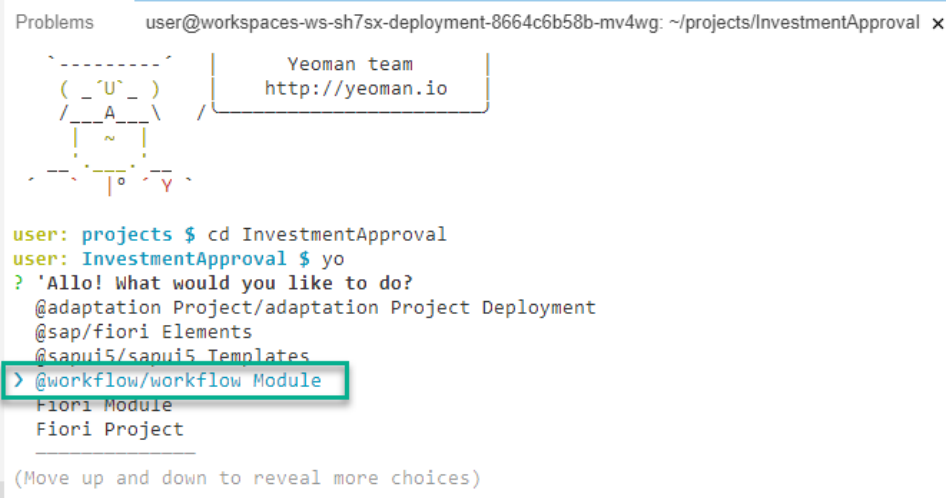
Explanation	Screenshot
4. Enter Dev Space 5. Select **Workflow Management** from Additional SAP Extensions. 6. Click **Create Dev Space**	
7. Setting up the Dev Space will take couple of minutes and show the status as **STARTING**. Wait until the status changing to **RUNNING**.	
8. Click your Dev Space.	
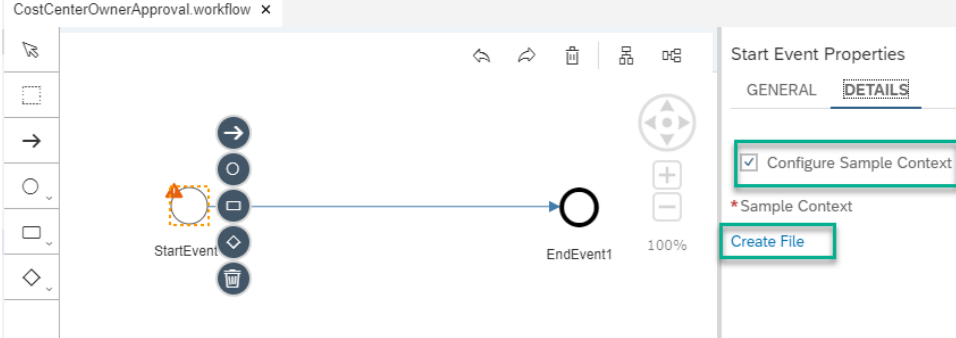
Explanation	Screenshot
9. Click **Open Workspace**.	
10. Select **Projects** and click **Open** button.	
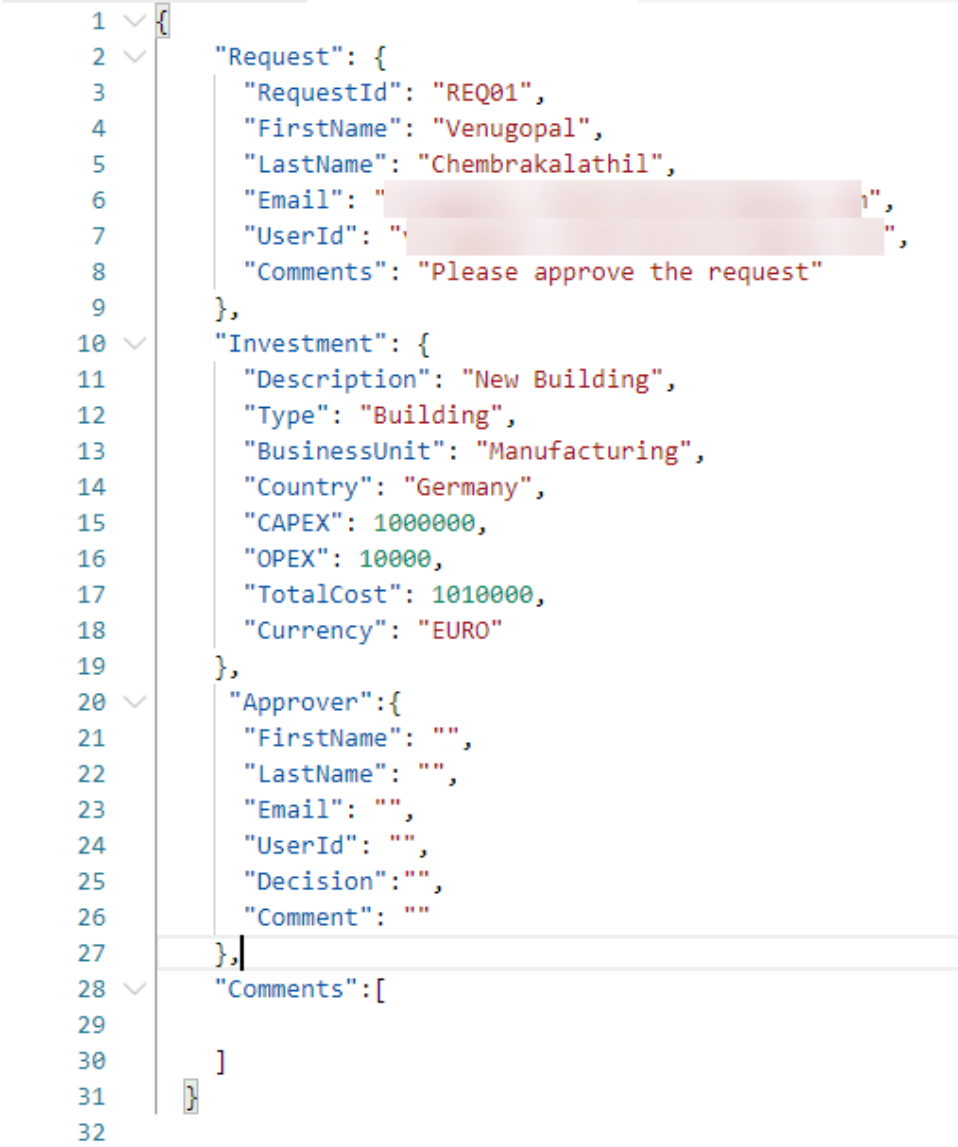
Explanation	Screenshot
Configure Cloud Foundry End Point 11. Click the message in the bottom to configure the endpoint for deployment.	
12. Select the **Cloud Foundry Endpoint**. The URL might vary depends on which data center you are using. Europe -eu10 US – us10 Singapore – ap21	
12. Enter your **e-mail** address used as your user in in Cloud Platform. 13. Subsequently enter your **password**, Cloud Platform Trial **Sub Account** and Cloud Foundry **Space**.	
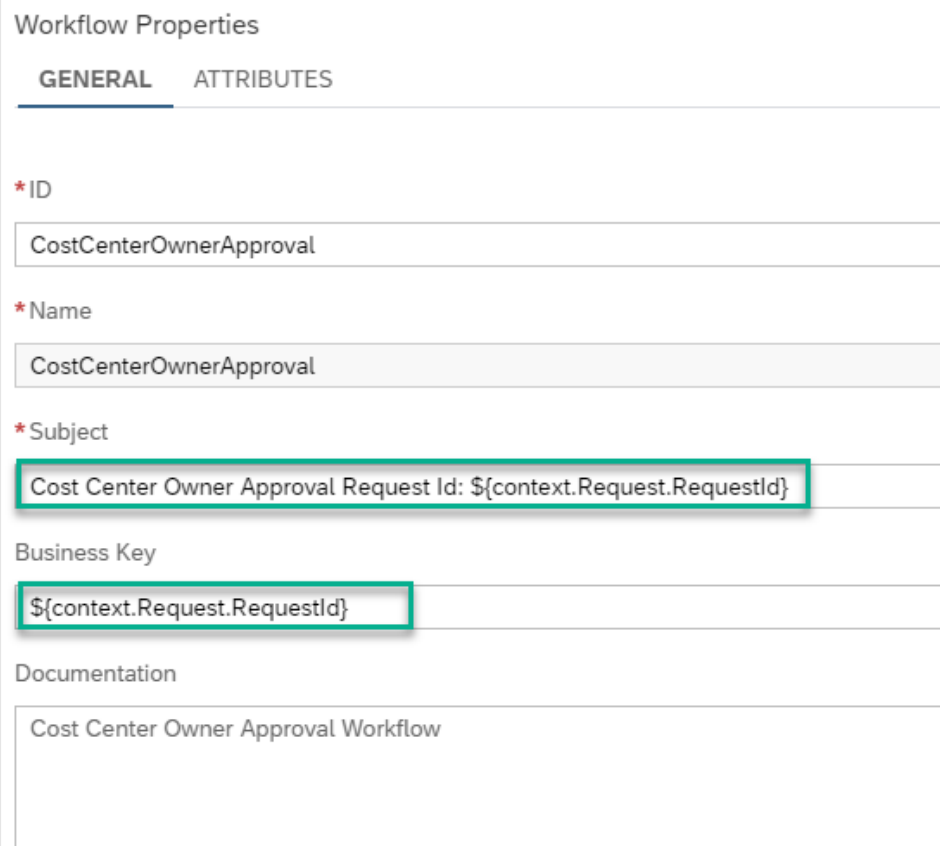
Explanation	Screenshot
Create Multi Target Application Project 14. Select Terminal→New Terminal	
15. In the Terminal make sure you are in the projects directory. 16. Type **yo** and press enter key. 17. Select project type as **Basic Multitarget Application** by using up/down arrow key.	
18. Enter the **project name** for eg: InvestmentApproval.	

Explanation	Screenshot
| 19. Use **cd InvestmentApproval** to move the new project directory.<br><br>20. Type **yo** again in the newly created project directory. | Problems    user@workspaces-ws-sh7sx-deployment-8664c6b58b-mv4wg: ~/projects/InvestmentApproval ✕<br><br>? Enter a project name InvestmentApproval<br>The project will be generated in the /home/user/projects/InvestmentApproval directory.<br>    create InvestmentApproval/.gitignore<br>The project has been generated.<br><br>```
      _-----_
     |       |
     |--(o)--|        Bye from us!
     `---------´        Chat soon.
     ( _´U`_ )        Yeoman team
     /___A___\   /   http://yeoman.io
      |  ~  |
    __'.___.'__
  ´   `  |° ´ Y `
```<br>user: projects $ cd InvestmentApproval<br>user: InvestmentApproval $ yo█ |
| 21. Select **@workflow/workflow Module** from the list using up/down arrow keys. | Problems    user@workspaces-ws-sh7sx-deployment-8664c6b58b-mv4wg: ~/projects/InvestmentApproval ✕<br><br>```
     `---------´          Yeoman team
     ( _´U`_ )        http://yeoman.io
     /___A___\   /
      |  ~  |
    __'.___.'__
  ´   `  |° ´ Y `
```<br>user: projects $ cd InvestmentApproval<br>user: InvestmentApproval $ yo<br>? 'Allo! What would you like to do?<br>  @adaptation Project/adaptation Project Deployment<br>  @sap/fiori Elements<br>  @sapui5/sapui5 Templates<br>❯ @workflow/workflow Module<br>  Fiori Module<br>  Fiori Project<br>  ─────────────<br>(Move up and down to reveal more choices) |

Explanation	Screenshot

22. Enter the following
 	
Module Name: InvestmentApprovalWorkflow
 	
Workflow Name: CostCenterOwnerApproval
 	
Workflow Description: Cost Center Owner Approval Workflow
 	
Overwrite mta.yaml: y
	``
	Problems user@workspaces-ws-sh7sx-deployment-8664c6b58b-mv4wg: ~/projects/InvestmentApproval ×
	
	      /___A___\ /‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾'
	
		~ |
		     '__'.___.'__'
		   ' '
			º Y '
			
			user: projects $ cd InvestmentApproval
			user: InvestmentApproval $ yo
			? 'Allo! What would you like to do? @workflow/workflow Module
			
			Make sure you are in the directory you want to scaffold into.
			This generator can also be run with: yo @workflow/workflow-module
			
			? Module Name InvestmentApprovalWorkflow
			? Workflow Name CostCenterOwnerApproval
			? Workflow Description Cost Center Owner Approval Workflow
			 conflict mta.yaml
			? Overwrite mta.yaml? (ynaxdH) y
			>> overwrite
			``

Configure Sample Context 23. The new workflow is opened in the workflow editor. 24. Select the **Start event** and Select **DETAILS** section of Start Event properties. 25. Check **Configure Sample Context**. 26. Click link **Create File.**	CostCenterOwnerApproval.workflow × Start Event Properties GENERAL DETAILS ☑ Configure Sample Context *Sample Context Create File StartEvent EndEvent1 100%
27. Enter Name as **Sample Investment** A new file is opened a default sample context.	

Explanation	Screenshot
| 28. Copy and paste the content from the file Sample Investment.json shared in the Git repository.<br><br>Please replace **FirstName, LastName, Email, UserId** with your details. User Id is your cloud platform trial user id.<br><br>The context has three Elements.<br><br>**Request**: Requestor info including Request Id<br><br>**Investment**: Details about the investment<br><br>**Approver**: Cost Center Approver details. | ```json
{
    "Request": {
        "RequestId": "REQ01",
        "FirstName": "Venugopal",
        "LastName": "Chembrakalathil",
        "Email": "                              ",
        "UserId": "                              ",
        "Comments": "Please approve the request"
    },
    "Investment": {
        "Description": "New Building",
        "Type": "Building",
        "BusinessUnit": "Manufacturing",
        "Country": "Germany",
        "CAPEX": 1000000,
        "OPEX": 10000,
        "TotalCost": 1010000,
        "Currency": "EURO"
    },
    "Approver":{
        "FirstName": "",
        "LastName": "",
        "Email": "",
        "UserId": "",
        "Decision":"",
        "Comment": ""
    },
    "Comments":[

    ]
}
``` |

Explanation	Screenshot
29. Select the **GENERAL** Tab from Workflow Properties. 30. Enter the following **Subject**: Cost Center Owner Approval Request Id: ${context.Request.RequestId} **Business Key**: ${context.Request.RequestId}	Workflow Properties **GENERAL** ATTRIBUTES *ID CostCenterOwnerApproval *Name CostCenterOwnerApproval *Subject Cost Center Owner Approval Request Id: ${context.Request.RequestId} Business Key ${context.Request.RequestId} Documentation Cost Center Owner Approval Workflow

Explanation	Screenshot
31. Select **ATTRIBUTES** and add the following Attributes. Please copy the Context Path of each of this attribute from the attached Workflow Context Attributes JSON file. 32. Click **Add** button to add an attribute.	**Workflow Properties** GENERAL ATTRIBUTES Add Delete Move Up Move Down <table><tr><th>ID</th><th>Label</th><th>Type</th><th>Value</th></tr><tr><td>ApproverEmail</td><td>Approver Email</td><td>String</td><td>${context.Approv...</td></tr><tr><td>Decision</td><td>Decision</td><td>String</td><td>${context.Decision}</td></tr><tr><td>Approver</td><td>Approver</td><td>String</td><td>${context.Approv...</td></tr><tr><td>Currency</td><td>Currency</td><td>String</td><td>${context.Investm...</td></tr><tr><td>TotalCost</td><td>Total Cost</td><td>String</td><td>${context.Investm...</td></tr><tr><td>OPEX</td><td>OPEX</td><td>String</td><td>${context.Investm...</td></tr><tr><td>CAPEX</td><td>CAPEX</td><td>String</td><td>${context.Investm...</td></tr><tr><td>Country</td><td>Country</td><td>String</td><td>${context.Investm...</td></tr><tr><td>InvestmentType</td><td>Investment Type</td><td>String</td><td>${context.Investm...</td></tr><tr><td>BusinessUnit</td><td>Business Unit</td><td>String</td><td>${context.Investm...</td></tr><tr><td>LastName</td><td>Last Name</td><td>String</td><td>${context.Reques...</td></tr><tr><td>FirstName</td><td>First Name</td><td>String</td><td>${context.Reques...</td></tr><tr><td>RequesterId</td><td>Requester ID</td><td>String</td><td>${context.Reques...</td></tr><tr><td>RequestId</td><td>Request ID</td><td>String</td><td>${context.Reques...</td></tr></table>

Explanation	Screenshot
33. Before start modeling, please **drag and drop** the **EndEvent1** towards the right side of the editor to keep some space between **Start and End Event**. 34. Select the **StartEvent**, use the speed button and select **User Task.** A user task is added to the workflow model.	
35. Select the newly Added User Task. 36. Using the speed button add a **Script Task**.	
37. Select the newly Added Script Task. 38. Using the speed button add an **Exclusive Gateway**.	

Explanation	Screenshot
39. Select a **User Task** from the palette. 40. Drag and drop the **User Task** just below the **Exclusive Gateway**.	
41. Use **Sequence Flow** from Exclusive Gateway to the new User Task.	

Explanation	Screenshot
42. Select **User Task2** and choose **Exclusive Gateway**.	
43. Select newly added **Exclusive Gateway** and choose **Sequence Flow** from the speed button.	
44. Drag and drop to **User Task1.**	

Explanation	Screenshot
45. Select **Exclusive Gateway2** and choose **End Event** from speed button.	
46. The workflow model sequence modeling has completed. Do necessary formatting if required.	

Explanation	Screenshot
47. Select **User Task1** and **User Task Properties**. 48. Under **GENERAL** section, change the Name as **Cost Center Owner.**	
49. Select **DETAILS** section and set the following. **Subject**: Investment Request ${context.Request.RequestId} **Users**: Your Cloud Platform User Id (email id)	

Explanation	Screenshot
Create Workflow Forms 50. Select **USER INTERFACE** section. 51. Change the type as **Form**. 52. Click the link **Create File**. A popup window is available now to enter Form details.	User Task Properties GENERAL DETAILS USER INTERFACE ATTRIBUTES *Type Form Form Details *File Name Create File Select *ID *Revision
53. Enter the following. **Name**: CostCenterOwner **Revision**: 1.0 54. Click **Create** button. You can see the Forms Editor opened to model the new task UI.	New Form *Name CostCenterOwner *ID costcenterowner *Revision 1.0 Type Task Form Create Cancel
55. Click **Add Section**. A section contains set of Fields. 56. Update the **Label / Title** of the section as **Request**	CostCenterOwner ID: costcenterowner Revision: 1.0 Type: Task Form FIELDS DECISIONS Add Field Add Section Add Subsection Add Collection Cut Copy Paste Label/Title Type Context Path Request Section

Explanation	Screenshot
57. Select Request and click **Add Field** to add the following fields. Copy the Context Path from the attached file CostCenterOwnerApprovalTask 	CostCenterOwner ID: costcenterowner Revision: 1.0 Type: Task Form FIELDS DECISIONS Add Field Add Section Add Subsection Add Collection Cut Copy Paste Label/Title Type Context Path Request Section ID String ${context.Request.RequestId} First Name String ${context.Request.FirstName} Last Name String ${context.Request.LastName} Comments String ${context.Request.Comments}

Fields table (step 57):

Label	Type	Context Path
ID	String	${context.Request.RequestId}
First Name	String	${context.Request.FirstName}
Last Name	String	${context.Request.LastName}
Comments	String	${context.Request.Comments}

Explanation	Screenshot
58. Add a new Section **Investment**. 59. Add the following Fields. Copy the Context Path from the attached file CostCenterOwnerApprovalTask	CostCenterOwner ID: costcenterowner Revision: 1.0 Type: Task Form FIELDS DECISIONS Add Field Add Section Add Subsection Add Collection Cut Copy Paste Label/Title Type Context Path Request Section Invesement Section Business Unit String ${context.Investment.BusinessUnit} Type String ${context.Investment.Type} Country String ${context.Investment.Country} CAPEX Float ${context.Investment.CAPEX} OPEX Float ${context.Investment.OPEX} Total Cost Float ${context.Investment.TotalCost} Currency String ${context.Investment.Currency}

Fields table (step 59):

Label	Type	Context Path
Business Unit	String	${context.Investment.BusinessUnit}
Type	String	${context.Investment.Type}
Country	String	${context.Investment.Country}
CAPEX	Float	${context.Investment.CAPEX}
OPEX	Float	${context.Investment.TotalCost}
Currency	String	${context.Investment.Currency}

Explanation	Screenshot
60. Select section **Investment**. 61. Click Add **Section**.	CostCenterOwner FIELDS DECISIONS Add Field **Add Section** Add Subsection Add Collection Cut Copy Paste ⌄ 🗑 Label/Title — Type — Context Path ⌄ Request — Section 　ID — String ⌄ — ${context.Request.RequestId} 　First Name — String ⌄ — ${context.Request.FirstName} 　Last Name — String ⌄ — ${context.Request.LastName} 　Comments — String ⌄ — ${context.Request.Comments} › Invesement — Section
62. Change the **Label/Title** of the section as **Approver Comment**. 63. Click **Add Field**.	CostCenterOwner FIELDS DECISIONS **Add Field** Add Section Add Subsection Add Collection Cut Copy Paste ⌄ 🗑 Label/Title — Type — Context Path ⌄ Request — Section 　ID — String ⌄ — ${context.Request.RequestId} 　First Name — String ⌄ — ${context.Request.FirstName} 　Last Name — String ⌄ — ${context.Request.LastName} 　Comments — String ⌄ — ${context.Request.Comments} › Invesement — Section ⌄ Approver Comment — Section 　My Label — String ⌄ — ${context.path.to.property}

Explanation	Screenshot
64. Update the **Label/Title** of the new Field as **Comment**. 65. Update the **Context Path** ${context.Approver.Comment}	
66. Select the **Comment** field. 67. Select **Control** as **Text Area**. 68. Select **Height** as **Medium.**	

Explanation	Screenshot
69. Add a new Section. Click **Add Section.**	
70. Update **Label/Title** of the newly added Section as **Comments History.** 71. Click **Add Collection.**	

Explanation	Screenshot
72. Update the **Label/Title** as **Comments**. 73. Update the **Context Path** as **${context.Comments}**.	**CostCenterOwner** ID: costcenterowner Revision: 1.0 Type: Task Form FIELDS DECISIONS Add Field Add Section Add Subsection Add Collection Cut Copy Paste ⌄ <table><tr><th>Label/Title</th><th>Type</th><th>Context Path</th></tr><tr><td>⌄ Request</td><td>Section</td><td></td></tr><tr><td>ID</td><td>String ⌄</td><td>${context.Request.RequestId}</td></tr><tr><td>First Name</td><td>String ⌄</td><td>${context.Request.FirstName}</td></tr><tr><td>Last Name</td><td>String ⌄</td><td>${context.Request.LastName}</td></tr><tr><td>Comments</td><td>String ⌄</td><td>${context.Request.Comments}</td></tr><tr><td>> Invesement</td><td>Section</td><td></td></tr><tr><td>⌄ Approver Comment</td><td>Section</td><td></td></tr><tr><td>Comment</td><td>String ⌄</td><td>${context.Approver.Comment}</td></tr><tr><td>⌄ Comments History</td><td>Section</td><td></td></tr><tr><td>Comments</td><td>Collection</td><td>${context.path.to.property}</td></tr></table>

Explanation	Screenshot
74. Select **Comments** and click **Add Field** to add the following fields. Copy the Context Path from the attached file CostCenterOwnerApprovalTask <table><tr><th>Label</th><th>Type</th><th>Context Path</th></tr><tr><td>User</td><td>String</td><td>${item.User}</td></tr><tr><td>Role</td><td>String</td><td>${item.Role}</td></tr><tr><td>Decision</td><td>String</td><td>${item.Decision}</td></tr><tr><td>Comment</td><td>String</td><td>${item.Comment}</td></tr></table>	CostCenterOwner FIELDS DECISIONS ID — String — ${context.Request.RequestId} First Name — String — ${context.Request.FirstName} Last Name — String — ${context.Request.LastName} Comments — String — ${context.Request.Comments} Invesement — Section Approver Comment — Section Comment — String — ${context.Approver.Comment} Comments History — Section Comments — Collection — ${context.Comments} User — String — ${item.User} Role — String — ${item.Role} Decision — String — ${item.Decision} Comment — String — ${item.Comment}
75. Select **DECISIONS.** 76. Click **Add.**	Sample Investment.json mta.yaml CostCenterOwnerApproval.workflow CostCenterOwner.form ✕ CostCenterOwner ID: costcenterowner Revision: 1.0 Type: Task Form FIELDS DECISIONS Add Cut Copy Paste Text ID Type To start, add a decision.

Explanation	Screenshot
77. Click **Add** and add the following Decisions. <table><tr><th>Text</th><th>ID</th><th>Type</th></tr><tr><td>Approve</td><td>approve</td><td>Positive</td></tr><tr><td>Reject</td><td>reject</td><td>Negative</td></tr></table>	
78. Select the Script Task and enter name as **Process Decision.** 79. Click **Create File** link**.**	
80. Enter file name as **manage decisions.** 81. Click **Create** button**.**	

Explanation	Screenshot
| 82. Copy and paste the scripts from the attached manage decisions.js. | ```
1
2    var lastUserTask1 = $.usertasks.usertask1.last;
3    $.context.Approver.UserId = lastUserTask1.processor;
4    $.context.Approver.decision = lastUserTask1.decision;
5
6    var decision={};
7    decision.User= lastUserTask1.processor;
8    decision.Role="Cost Center Approver";
9    decision.Decision = lastUserTask1.decision;
10   decision.Comment=$.context.Approver.Comment;
11
12   $.context.Comments.Add(decision);
13
14   $.context.Approver.UserId = "";
15   $.context.Approver.decision = "";
16   $.context.Approver.Comment ="";
``` |
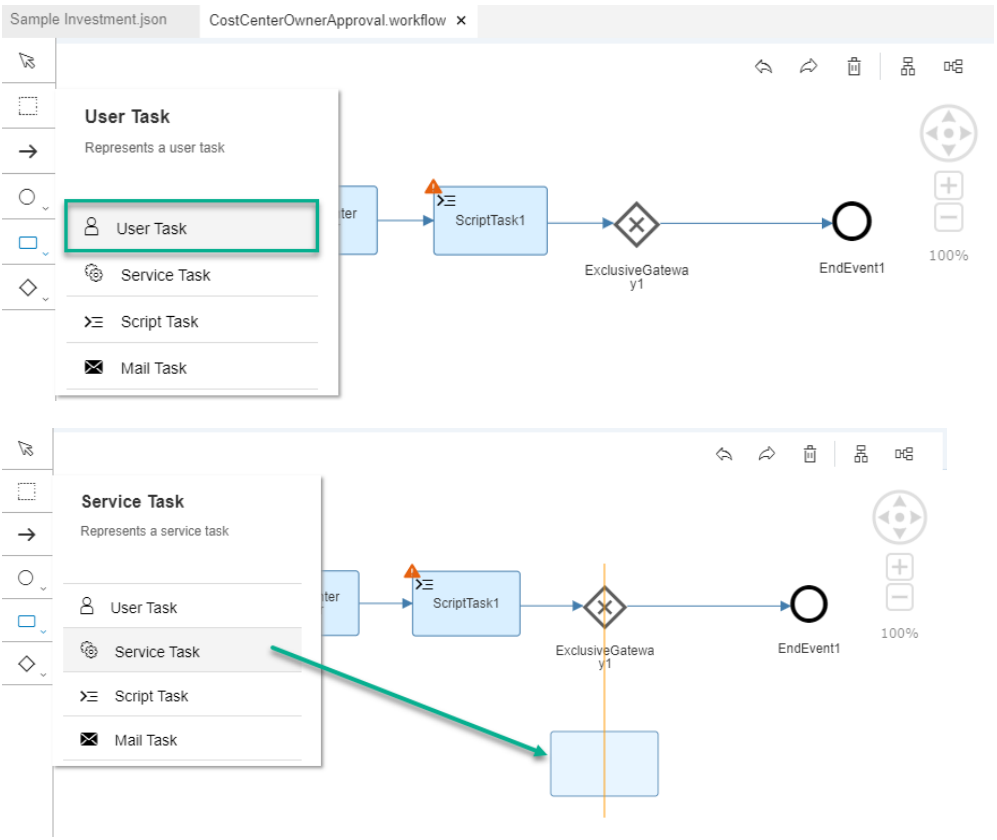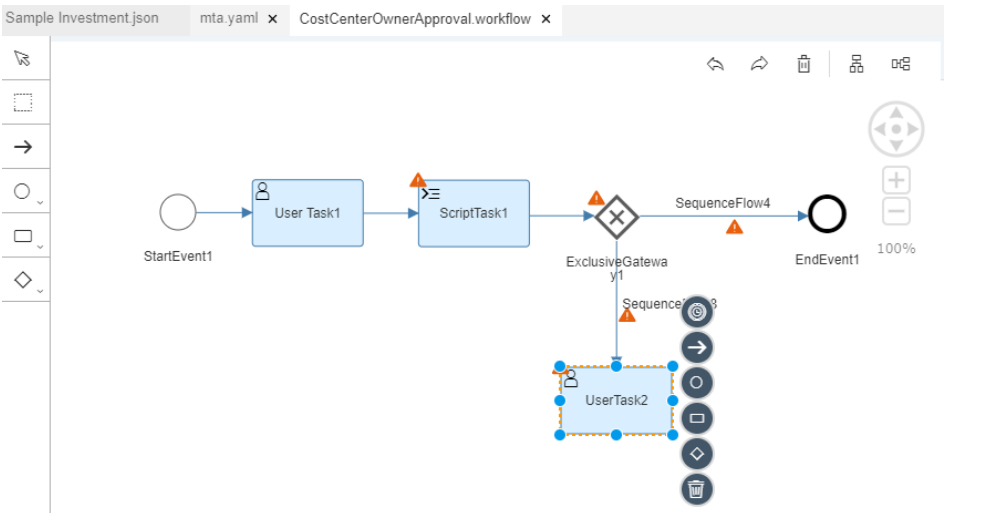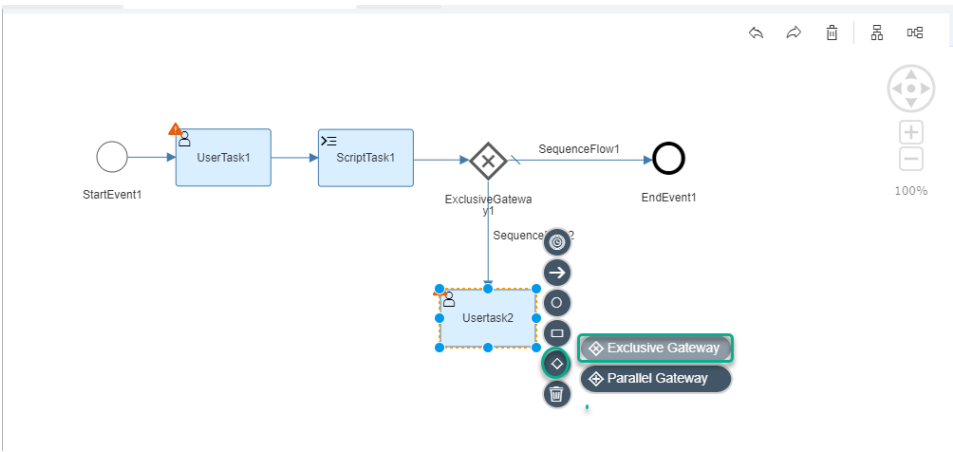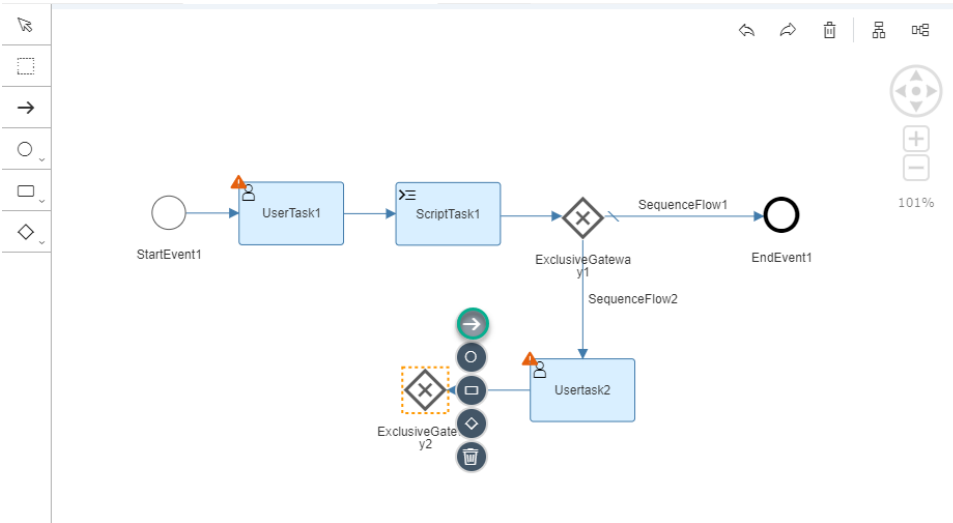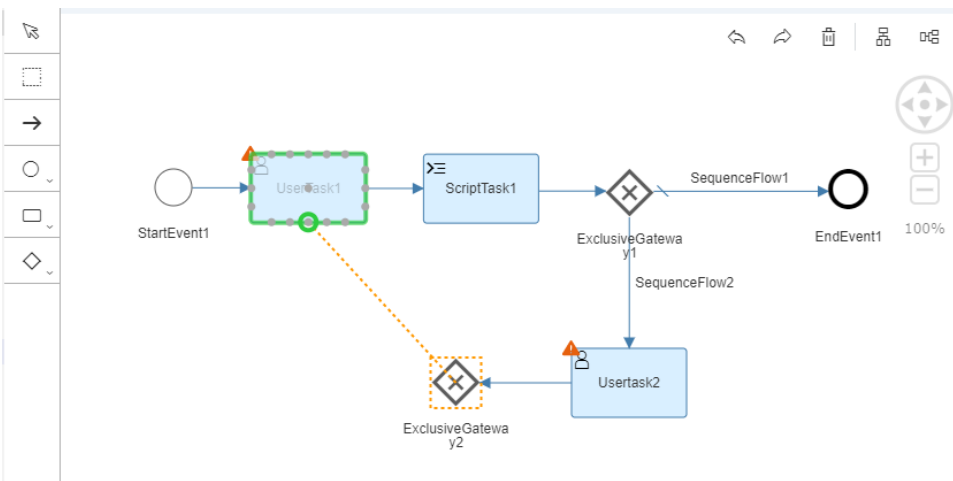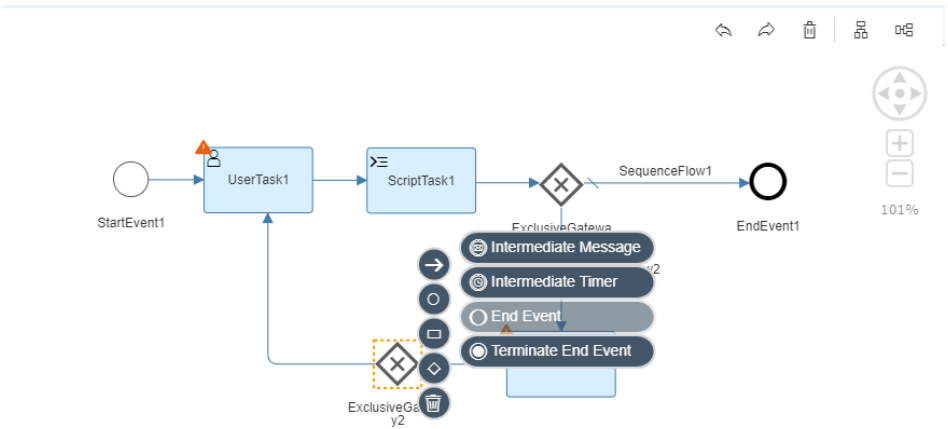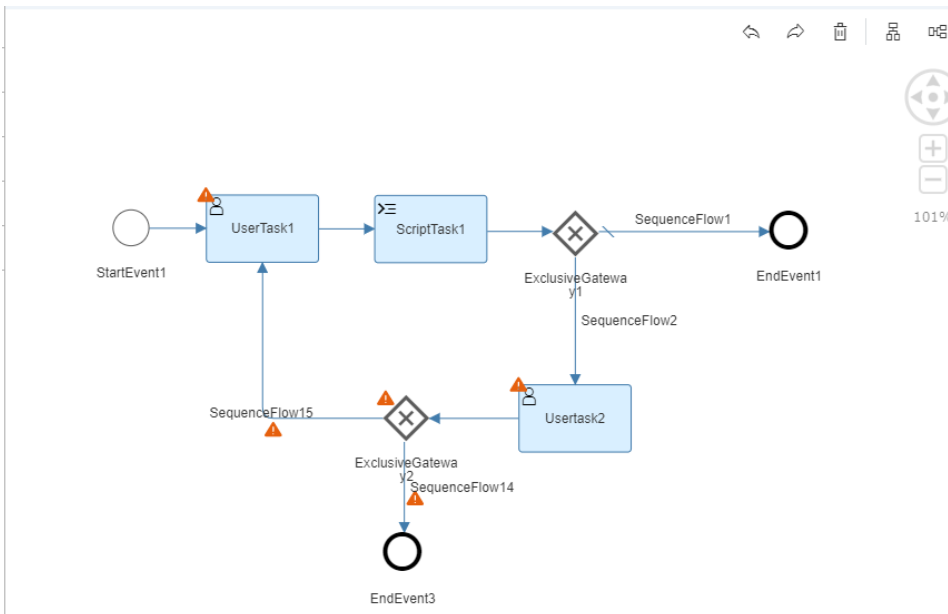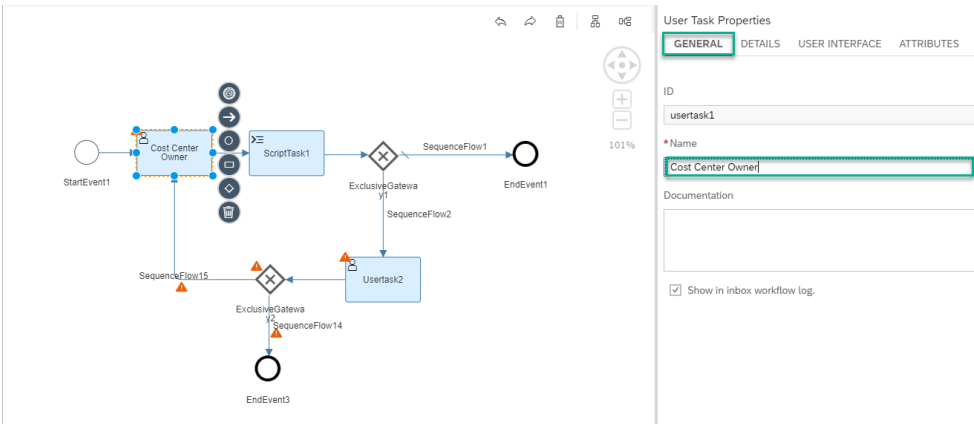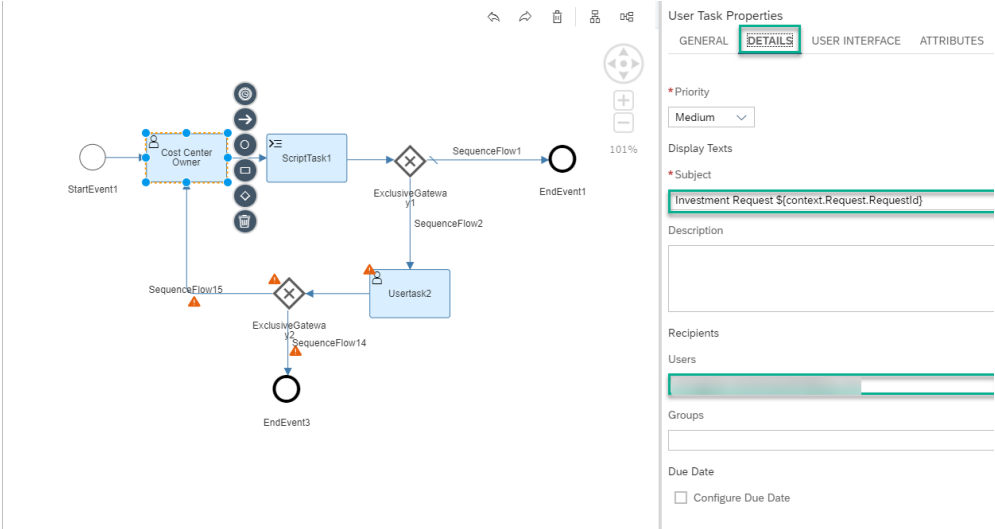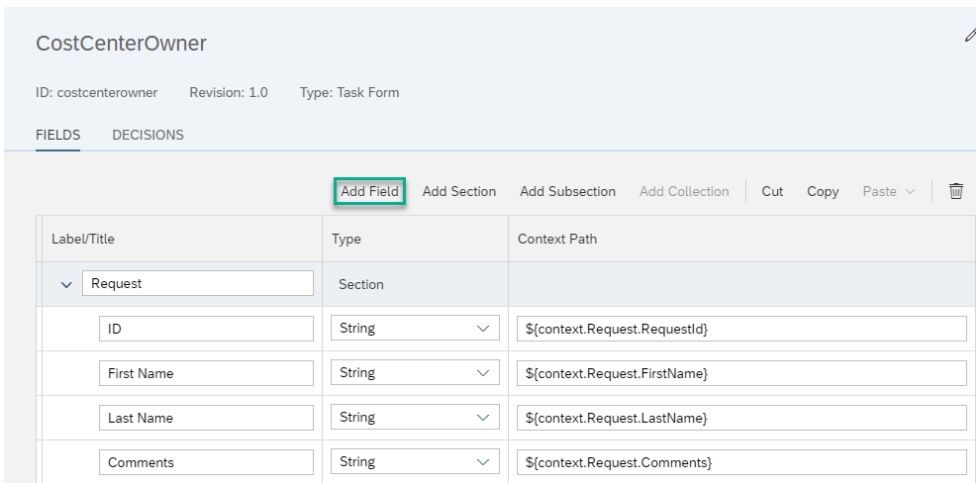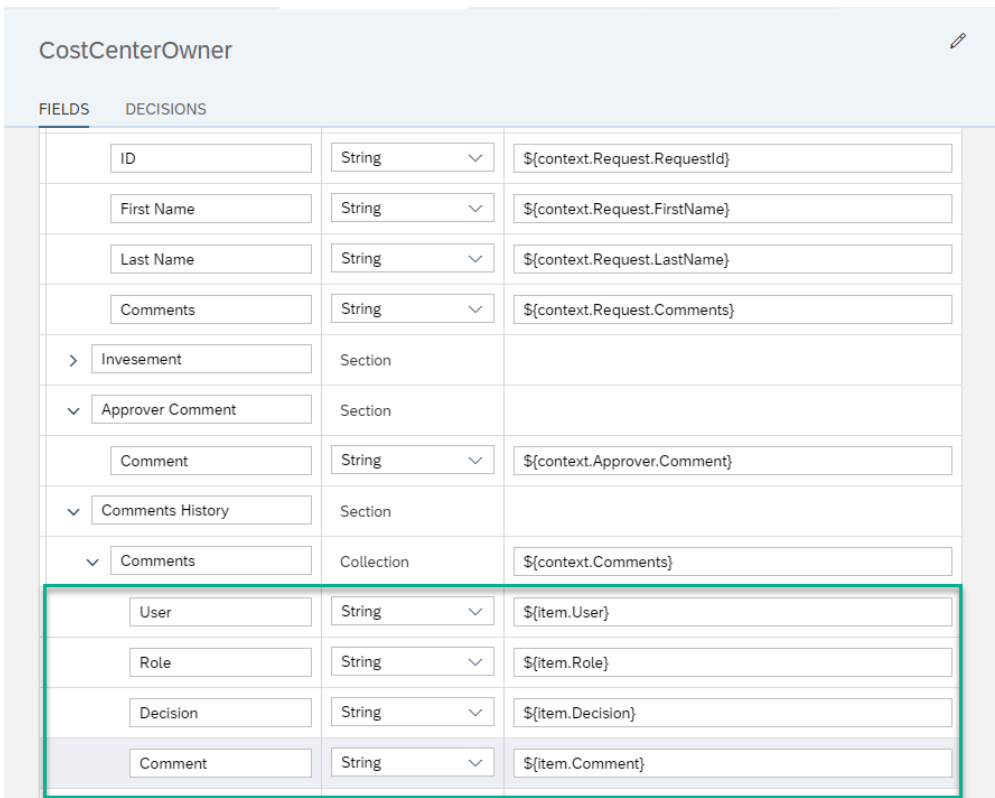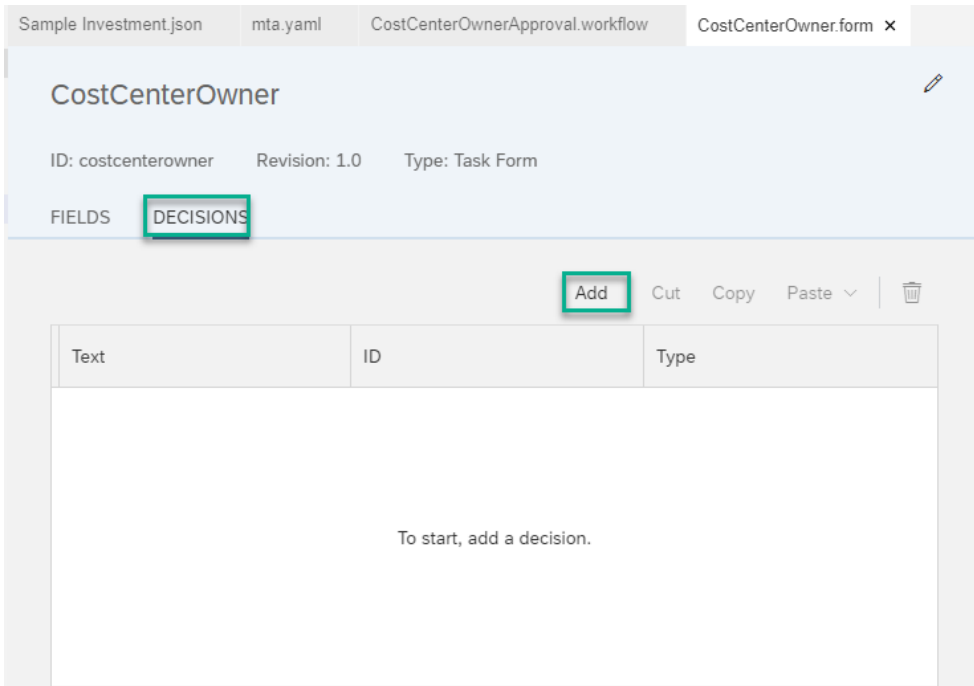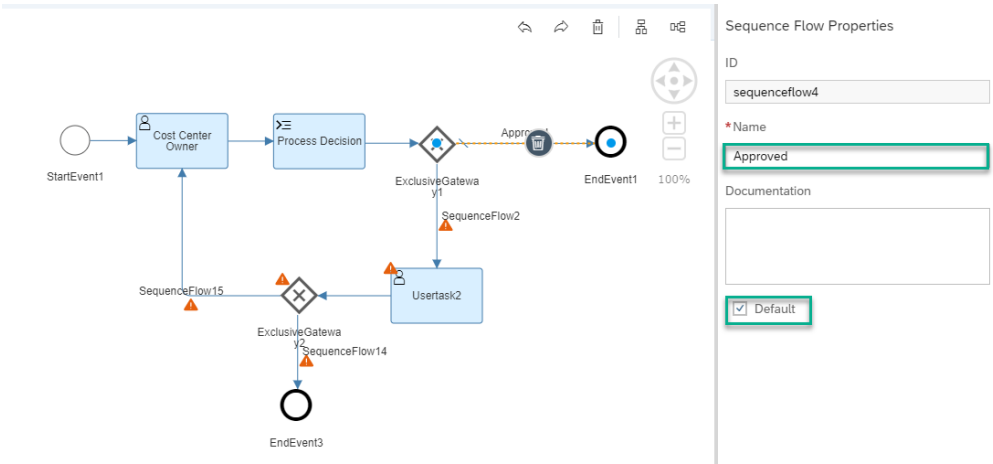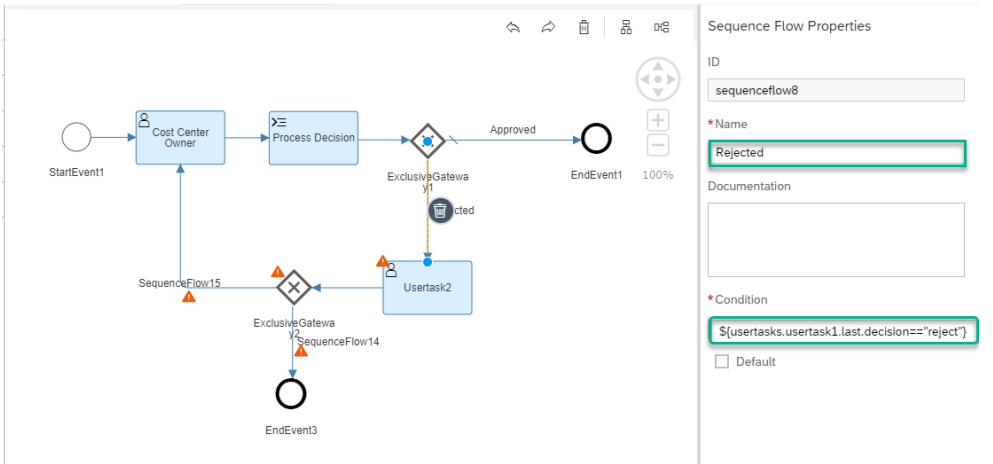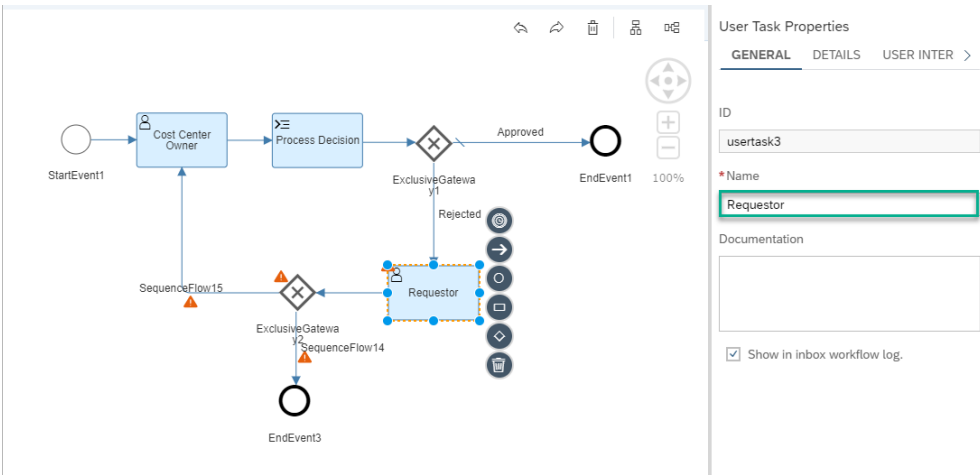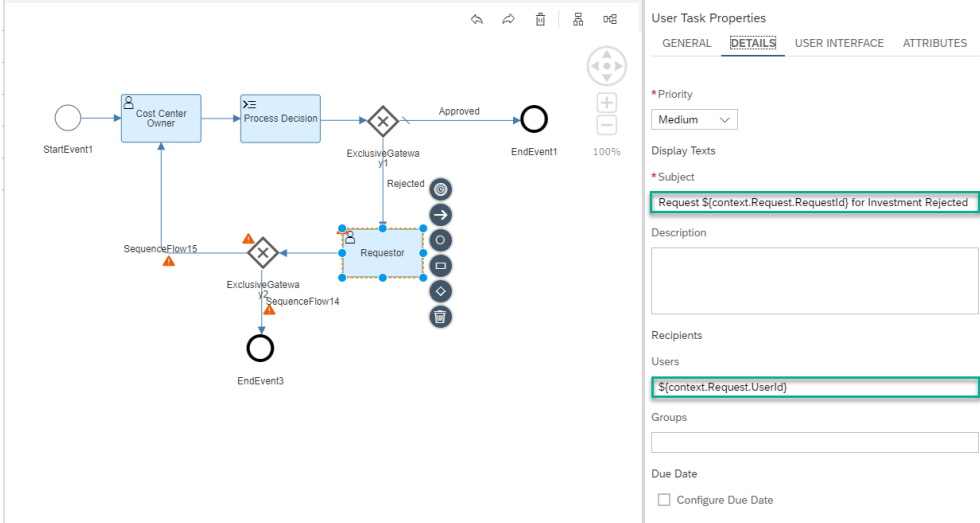| 83. Select the **sequence flow** between the **exclusive gateway** and **end event**.

84. In Sequence flow properties enter **Name** as Approved.

85. Check the **Default** checkbox. | |
| 86. Select **sequence flow** between the **ExclusiveGateway1** and **UserTask2**.

87. Enter **Name** as Rejected.

88. Enter the condition as ${usertasks.usertask1.last.decision=="reject"}

You may copy the condition from the attached file Exclusive Gateway Conditions. | |

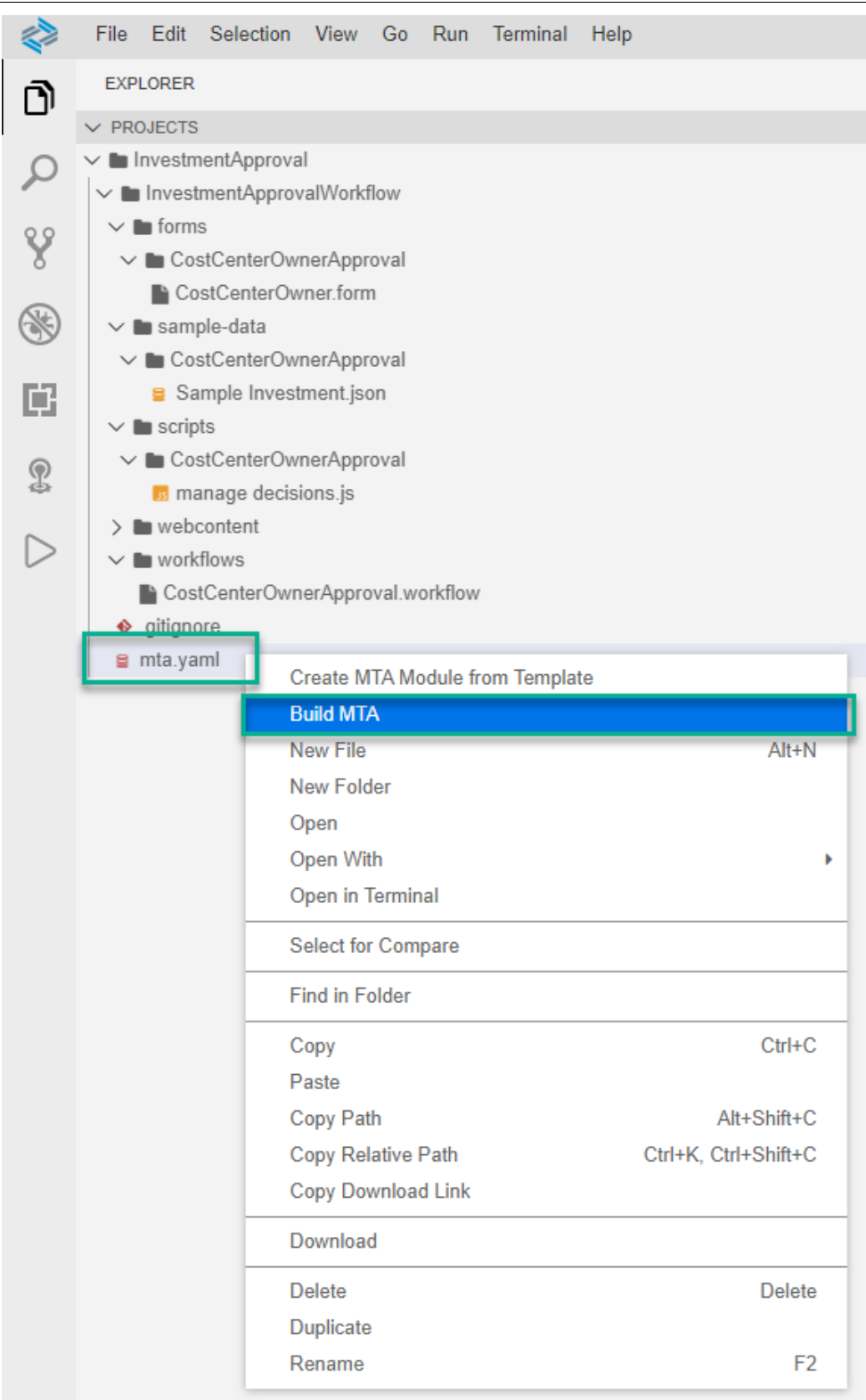| Explanation	Screenshot
89. Select **UserTask2** and in User Task Properties select **GENERAL** tab. 90. update the **Name** as Requestor.	
91. Select **Details** tab. 92. Set **Subject** as Request ${context.Request.RequestId} for Investment Rejected. 93. Set **Users** as ${context.Request.UserId}	

Explanation	Screenshot
94. Select the sequence flow between the Exclusive Gateway and Cost Center Owner user task. 95. Enter **Name** as Submit for Approval 96. Check **Default** check box.	
97. Select the **sequence flow** between the **Exclusive Gateway** and **End event**. 98. Enter **Name** as Cancel Request. 99. Enter **Condition** as ${usertasks.usertask2.last.decision=="reject"} Make sure the Requestor user task ID is usertask2. If it is different change the ID in the expression. You may copy the condition from the attached file Exclusive Gateway Conditions.	

Build and Deploy

100. Right click on **mta.yaml** file.

101. Select **Build MTA**.

> This will start the MTA build and it may take a few seconds to create the mta archive under the folder **mta_archives**.

File   Edit   Selection   View   Go   Run   Terminal   Help

EXPLORER

∨ PROJECTS

∨ 📁 InvestmentApproval
  ∨ 📁 InvestmentApprovalWorkflow
    ∨ 📁 forms
      ∨ 📁 CostCenterOwnerApproval
        📄 CostCenterOwner.form
    ∨ 📁 sample-data
      ∨ 📁 CostCenterOwnerApproval
        📄 Sample Investment.json
    ∨ 📁 scripts
      ∨ 📁 CostCenterOwnerApproval
        📄 manage decisions.js
    > 📁 webcontent
    ∨ 📁 workflows
      📄 CostCenterOwnerApproval.workflow
    ◆ gitignore
    📄 mta.yaml

Context Menu	Shortcut
Create MTA Module from Template	
Build MTA	
New File	Alt+N
New Folder	
Open	
Open With	▶
Open in Terminal	
Select for Compare	
Find in Folder	
Copy	Ctrl+C
Paste	
Copy Path	Alt+Shift+C
Copy Relative Path	Ctrl+K, Ctrl+Shift+C
Copy Download Link	
Download	
Delete	Delete
Duplicate	
Rename	F2

Explanation	Screenshot

102. Successful build will create a new folder **mta_archives** and a .mtar file.
 	
103. Select the .mtar file and right click.
 	
104. Click **Deploy MTA Archive**.
	File Edit Selection View Go Run Terminal Help
	
	EXPLORER
	∨ PROJECTS
	  ∨ ■ InvestmentApproval
	    > ■ InvestmentApprovalWorkflow
	    ∨ ■ mta_archives
	      ■ InvestmentApproval_0.0.1.mtar
	
	Deploy MTA Archive
	New File Alt+N
	New Folder
	Open
	Open With ▶
	Open in Terminal
	Select for Compare
	Find in Folder
	Copy Ctrl+C
	Paste
	Copy Path Alt+Shift+C
	Copy Relative Path Ctrl+K, Ctrl+Shift+C
	Copy Download Link
	Download
	Delete Delete
	Duplicate
	Rename F2
	
	(.gitignore, mta.yaml listed in explorer)

105. Successful deployment will show the log.	Problems Task: Deploy MTA Archive ✕ Uploading 1 files... /home/user/projects/InvestmentApproval/mta_archives/InvestmentApproval_0.0.1.mtar OK Operation ID: c443e49b-318f-11eb-a634-eeee0a8b72e6 Deploying in org "DEV264" and space "dev" Detected MTA schema version: "3" No deployed MTA detected - this is initial deployment Detected new MTA version: "0.0.1" Processing service "workflow_mta"... Creating service "workflow_mta" from MTA resource "workflow_mta"... 1 of 1 done Creating service key "InvestmentApprovalWorkflow-workflow_mta-credentials" for service "workflow_mta"... Uploading content module "InvestmentApprovalWorkflow" in target service "workflow_mta"... Deploying content module "InvestmentApprovalWorkflow" in target service "workflow_mta"... Skipping deletion of services, because the command line option "--delete-services" is not specified. Process finished. Use "cf dmol -i c443e49b-318f-11eb-a634-eeee0a8b72e6" to download the logs of the process. Terminal will be reused by tasks.

SUMMARY

You have modeled a workflow and successfully deployed in your SAP Cloud Platform trial account. In the Next hands on guide, you will Execute and Monitor the Workflow. Please see more details on SAP Cloud platform Workflow in help portal.

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