Oracle FLEXCUBE BPMN Process Flow Definition Guide Oracle FLEXCUBE Universal Banking Release 12.87.06.0.0 [May] [2020]

FINANCIAL SERVICES

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# 1. Introduction

## 1.1 Background

This document provides a brief idea about the BPMN components and to create new BPMN process flows using the BPMN components.

## 1.2 Difference Between BPEL and BPMN

BPEL is an XML-based language for describing a business process in which most of the tasks represent interactions between the process and external Web services. The BPEL process itself is represented as a Web service, and is realized by a BPEL engine which executes the process description. BPMN is a standard set of diagramming conventions for describing business processes. It is designed to visualize a rich set of process flow semantics within a process and the communication between independent processes. It is intended to support capture of sufficient detail to allow it to be the source of an executable process description.

## 1.3 Advantages of BPMN over BPEL

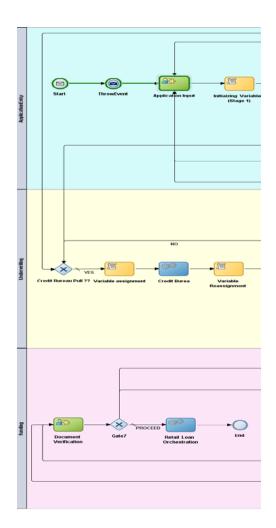
- Simple and Understandable methodology.
- BPMN provides a standard notation for modelling Business Processes that can be used and understood by all types of Business Professionals, including the business analysts who create the processes, the technical developers who create the technology that will carry out those processes and the business managers who oversee those processes.
- Business Users will be able to easily read and understand a BPMN business process diagram
- Tasks can be linked in any form (similar to "goto" in programming languages) Where as BPEL imposes more restrictions (closer to a "real" programming language).
- Structures work that needs to be done, whether this be automated or manually.
- Resembles more like a Flow Diagram (i.e) What You See is What You Get.

## 1.4 **BPMN Components**

#### **Swimlanes**

Swimlanes are used for grouping flow objects based on the roles defined within your process.





#### The None Start Event:

 $\bigcirc$ 

None events are always used to define the beginning of sub-processes.

The none start event cannot have incoming sequence flows. It can only have default out-going sequence flows.

#### The None End Event

The none end event is always used to mark the end of a sub-process and event sub-process.

### The Message Start Event





The message start event cannot have incoming sequence flows. Message start events require a default outgoing sequence flow.

To expose a process as a service, your process must begin with a message start event.

The message start event responds to a message sent to a specific process.

#### The Message End Event



The message end event is used to send a message to another process or service when the process is completed.

The message end event is always used with either a message start event or message catch event.

#### The Message Throw Event



The message throw event enables you to send a message to another process or service.

#### The Message Catch Event



The message catch event is frequently used with the message throw event to communicate with another BPMN process.

#### The Signal Start Event



The signal start event is a response to a signal broadcast to multiple processes.

Signals can be broadcast from a BPMN process using the signal throw event. Using a combination of signal throw and signal start events, you can invoke multiple processes simultaneously.

#### The Timer Start Event





The timer start event triggers the creation of a process instance based on a specific time condition.

### The Timer Catch Event



You can use timer event as boundary events on an activity. Timer events can be defined as either interrupting or non-interrupting boundary events.

#### The Error Catch Event



When a service or process fails with an error, the error catch event triggered. Similar to a catch in BPEL.

#### The Error End Event



The error end event "throws" an error, which can be captured in another part of the process.

#### The Terminate Event



The terminate end event is used to immediately terminate a process.

#### **Interactive Activities**

User	Process participants interact with your business application using User Tasks.
Complex	Uses a complex routing flow that is defined within the Human Task.



FYI	Bases assignment on the participant, role, or group defined in the swimlane. Similar to the user interactive activity, but the FYI activity does not wait until completion before continuing.
Group	Uses the group vote pattern. The assignee for this automatically set to the role/group associated with the Lane. This interactive activity can only be added to swimlanes that are assigned to roles or groups.
Initiator	The initiator pattern is used to create a process instance.
Management	Uses the management chain pattern where the assignee is set to the management chain pattern for the process participant belonging to the group or role assigned to the swim lane.

## The Manual Task



The manual task does not allow you to manipulate data objects. Data objects associated with the previous flow element are passed through as-is to the next flow element.

### The Service Task



The service task enables you to communicate with other processes and services. Process analysts can add the service task when they know that a process must invoke an external service or process.

## The Business Rule Task





Business rules are statements that describe business policies or describe key business decisions.

## The Script Task



The script task is used to change values of data objects within your process.

It is often used to set initial values of data objects at the beginning of a process.

### The Subprocesses

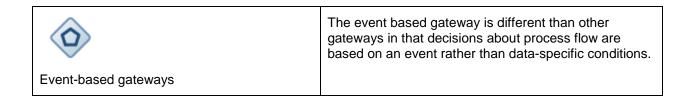


Subprocesses are contained as part of the parent subprocess. Subprocesses must begin with a start none event and must end with a none end event.

#### **Gateways**

Exclusive gateways	The exclusive gateway enables you to split your process into two or more paths. However, the process only continues down one of these paths even if multiple outgoing sequence flows are present. Exclusive gateways can have conditional outgoing sequence flows and must have at least one default outgoing sequence flow.
Inclusive gateways	The inclusive gateway enables you to split your process into two or more paths. Unlike the exclusive gateway, however, a token may flow down one or more of these paths depending on how the outgoing conditional sequence flows are evaluated.
Parallel gateways	The parallel gateway enables you to split your process into two or more paths when you want your process flow to follow all paths simultaneously. The parallel gateway is useful where your process must perform multiple tasks in parallel.
Complex gateways	The complex gateway splits a process similar to an inclusive gateway. However, it enables you to define a condition that determines if the instance can continue even if not all of the tokens have arrived at the complex gateway merge.





For more Information regarding BPMN Components Refer the Link given in the References.

## 1.5 Creating new BPMN Process

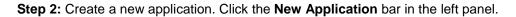
Follow the below steps to create a new process using the BPMN

## 1.5.1 Creating a BPMN Process Model

**Step 1:** Open JDeveloper Studio from the Windows Start menu. When prompted to select a role, choose the **Studio Developer**. Click OK.

👌 Select Role	x
Select the role that matches your requirements. You can also change roles using the Roles page in preferences.	
<u>R</u> ole:	
<ul> <li>Studio Developer (All Features) Includes all features.</li> </ul>	
Customization Developer Configures the product for customizing metadata.	
Database Developer     Includes only features for core database development.	8998
Java Developer     Includes only features for core Java development.	
Java EE Developer     Includes only features for core Java EE development.	-
Always prompt for role selection on startup	
OK Can	cel

Close the Daily Tips window.





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<u>File Edit View Application</u>	Refa <u>c</u> tor <u>S</u> earch <u>N</u>	<u>l</u> avigate
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Applications × Application Serve	ers	-
New Application		
Open Application		

The BPM Application wizard opens. Select BPM Application in the Application Template panel.

🕐 New Gallery					
Q					
Categories:	Items: Show All Descriptions				
Applications     Connections     Deployment Descriptors     Deployment Profiles     Diagrams     Diagram					
Help	OK Cancel				

Name the application ex: "**Demo**" and accept the default directory for storing application files (C:\JDeveloper\mywork).



O Create BPM Application	- Step 1 of 3		×
Name your application	n		F
Application Name     Project Name     Project SOA Settings	Application Name:  Demo Directory:  C:\JDeveloper\mywork\Demo Application Package Prefix:		Browse
Help	< <u>B</u> ack	<u>N</u> ext > <u>F</u> inish	Cancel

Click Next.

**Step 3:** Enter the Project Name ex: "**DemoProject**". Notice that **BPM** and **SOA** are selected as project technologies by default. Click Finish.

Create BPM Application	- Step 2 of 3				×
Name your project			0101010101010101	<sup>019</sup> 0101010101	5
Application Name     Project Name	<u>P</u> roject Name: Dir <u>e</u> ctory:	DemoProject C:\JDeveloper\mywork\D	Demo\DemoProject		Bro <u>w</u> se
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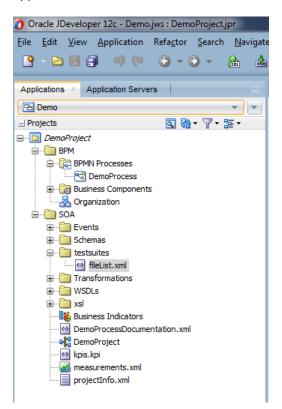
Click Next.

Step 4: Choose any composite which is required for the design.



O Create BPM Application	- Step 3 of 3	×
Configure SOA settir		
Application Name.     Project Name     Project SOA Settings	Composite Name: DemoProject Start from:  Stantard Composite Start from: Composite With BPEL Process Composite With BPEL Process Composite With Jubyrocess Composite With Audiator Composite With BPNN Process Composite With BPNN Process Composite With Business Rule Composite With Spring	
Help	Customizable	ncel

**Step 5:** In the upper left corner of the JDeveloper Studio window, you see the **Navigator panel**. This contains two tabs that will be important to you as you perform this tutorial: The **Application Navigator** tab and the **BPM Project Navigator** tab. Currently the Application Navigator tab is selected by default. You can see the **Demo** application appearing in the drop-down list just above the panel and the **DemoProject** appearing as the parent node within the panel. The fact that it appears in italics indicates that there are unsaved changes.



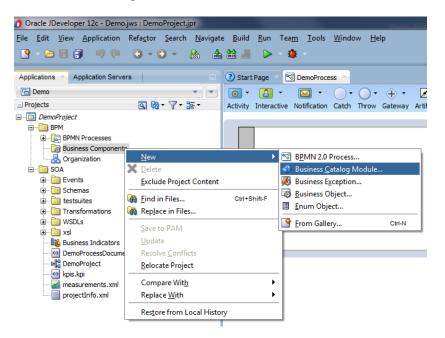


Click the Save All icon on the main toolbar.

### 1.5.2 Creating the business object

Step 6: Now you will create a business object capable of storing multiple pieces of data.

Business objects are stored in modules within the Business Catalog. In the BPM Project Navigator, expand the **DemoProject** node. Right click on Business Components and select **New** > **Business Catalog Module** 



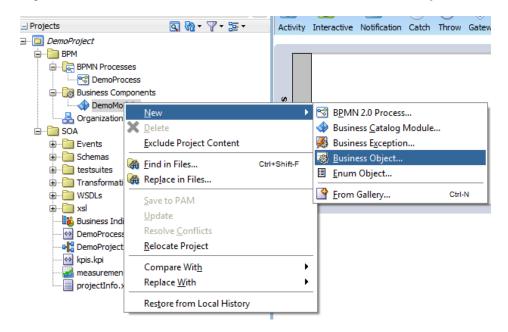
When prompted to name the new module, enter the desired name ex: "**DemoModule**" and click OK.

Create Module	
Module: DemoModule	
Help	OK Cancel

The **DemoModule** module now appears beneath the Business Catalog node.



⑦ Oracle JDeveloper 12c - Demo.jws : DemoProject.jpr : C:\JDe
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🖻 Demo 🔹 💌
🖃 Projects 💽 🖓 🕶 🍸 🕶
□ 🛅 DemoProject
BPM
🖨 🕞 BPMN Processes
DemoProcess
🖨 📷 Business Components
DemoModule
🖮 🛅 SOA
🕀 💼 Events
🗄 🖳 Schemas
testsuites
Transformations
DUSDLs
Business Indicators
DemoProcessDocumentation.xml
kpis.kpi
measurements.xml
projectInfo.xml



Right click the **DemoModule** module and select **New > Business Object**.



In the Create Business Object window, enter desired Name ex: "**BusinessObject**" and accept **DemoModule** as the Destination Module and check the check box and Click on the Search Icon.

Create Business Object	In Address Tables, or address that	<b>— X —</b> )
Business Object		
Name:	BusinessObject	
Destination Module:	DemoModule	<b>Q</b>
Based on External Schema		9
Based on External Schen	na	OK Cancel

On click of Search Icon the following window appears, now click on the Icon at right most Corner to browse the location of the **xsd** that is to be loaded. For example **txn.xsd** in this project is loaded. After loading the **xsd**, it prompts for the copy of the **xsd** to the project. Click Ok. So that the **xsd** is copied to the project.

Note : In order to load txn.xsd file, need to plae it under schemas folder.

O Type Chooser	×
	*
Vype Explorer È→ Project Schema Files È→ ♣ txn.xsd	
Ivpe:           Show Detailed Node Information	
<u>Н</u> еlp ОК Са	ncel

Ex: C:\JDeveloper\mywork\Demo\DemoProject\SOA\Schemas



After loading the xsd, window should appear like the below and select the xsd and Click Ok.



Transaction XSD →

👌 Type Chooser			x
			*
Image: Type Explorer         Type Explorer         Image: Type Explorer         Image: Type Explorer         Image: Type Explorer         Type Explorer         Image: Type Explorer         Type Explorer         Type Explorer         Image: Type Explorer         Image: Type Explorer         Ty			
Iype:       {http://fcubs.iflex.com}transaction         Show Detailed Node Information			
Help	OK	Ca	ancel

Click OK again and Save all.

## 1.5.3 Creating a new process

**Step 6:** To create a **new** process within this project, first click the **BPM Project Navigator** tab. Then right click on Processes and select **New** > **Process**.



Bemo       Image: Contract of the second secon	Applications × Application	In Servers	? St	art Page ×
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□     testsuit (@a Keplace in Files       □     Save to PAM       □     Update       □     Resolve Conflicts       □     Belocate Project       □     Compare With       □     Replace With	Events		ft-F	Business Object
action     Action       action     Resolve ⊆onflicts       action     Bcomo?       action     Bcomo?       action     Compare With       action     Replace With	fileLi			
	🕀 📄 xsl	Resolve <u>C</u> onflicts		Samples & Demos
	DemoPre	Compare Wit <u>h</u>	•	
		Replace <u>W</u> ith Res <u>t</u> ore from Local History	•	

In the BPM Process wizard, select the Asynchronous Service pattern.

### Click Next.

O BPMN 2.0 Process Wizar	rd	×
BPMN 2.0 Process W	fizard	
Definition	Name: DemoProcess	۲
<u>Arguments</u>	Description:	۲
<ul> <li><u>Initial Implementation</u></li> <li><u>Advanced</u></li> </ul>		
	Directory: C:\JDeveloper\mywork\Demo\DemoProject\SOA\processes	۹,
	Type:	
	S Asynchronous Service Creates a process with an asynchronous interface definition	Î
	Start End	
	Synchronous Service	
Help	<back next=""> Enish Car</back>	ncel

Since we will add the inputs later Click finish.

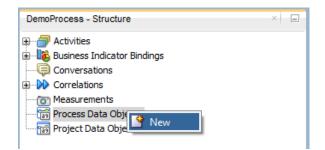


BPMN 2.0 Process Wiza	rd	<b>X</b>
Arguments		
<u>Definition</u> Arguments	Input Output Arguments Definition	<b></b>
Initial Implementation     Advanced	Name	Туре
Help	< <u>B</u> ack <u>N</u> ext	> <u>F</u> inish Cancel

## 1.5.4 Creating the data objects

**Step 7:** When a process has been given focus, a detailed outline of its structure appears in the Structure pane in the **lower left corner** of the JDeveloper window.

Right click on Process Data Objects in the Structure pane and select New.



In the Create Data Object popup, enter the Name and click the ellipses button to open another window to search for complex data types.



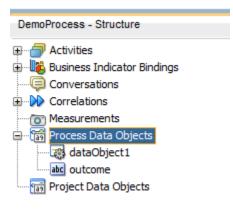
🕜 Cre	ate Data Object		×
Name:	dataObject1		
Type:	abc string		-
	✓ Auto initialize	string	
Help		OK	Cancel

select BusinessObject from the list of components appearing below. Click OK.

👌 Browse Types	×
Find:	3
1999 int	Ă
Second Se	
1999 decimal	
999 long <> duration	
iii base64Binary	
999 byte	
999 short float	
time BusinessObject	
BusinessModule.BusinessObject	
Нејр ОК С	ancel

Back in the Create **Data Object** window, click OK again. The data object now appears in the **Structure pane**.

Create another process data object of type String to hold the Outcome.





## 1.5.5 Adding a ADF BC Service Adapter



Step 8: Copy the Flexcube\_interface.wsdl

wsdl

to Project Location

Name	Date modified	Туре	Size
퉬 businessCatalog	9/7/2012 4:25 PM	File folder	
🌗 businessParameter	9/7/2012 4:13 PM	File folder	
🌗 classes	9/7/2012 4:13 PM	File folder	
퉬 config	9/7/2012 4:13 PM	File folder	
🌗 lib	9/7/2012 4:13 PM	File folder	
🌗 processes	9/7/2012 5:24 PM	File folder	
\mu resources	9/7/2012 4:13 PM	File folder	
퉬 SCA-INF	9/7/2012 4:13 PM	File folder	
퉬 simulations	9/7/2012 4:13 PM	File folder	
퉬 testsuites	9/7/2012 4:13 PM	File folder	
퉬 xsd	9/7/2012 4:15 PM	File folder	
퉬 xsl	9/7/2012 4:13 PM	File folder	
activityGuide.agdl	9/7/2012 4:13 PM	AGDL File	1 KI
\min composite.xml	9/7/2012 5:14 PM	XML Document	1 KI
default.bpmn	9/7/2012 4:13 PM	BPMN File	5 KI
DemoProcess.componentType	9/7/2012 5:24 PM	COMPONENTTYP	1 K
DemoProcess.wsdl	9/7/2012 5:24 PM	Web Service Descr	3 KI
DemoProcessDocumentation.xml	9/7/2012 5:24 PM	XML Document	2 KE
DemoProject.jpr	9/7/2012 4:24 PM	JPR File	17 KI
Flexcube_interface.wsdl	8/21/2012 2:06 PM	Web Service Descr	2 KI
measurementActions.xml	9/7/2012 5:24 PM	XML Document	1 KI
🖀 measurements.xml	9/7/2012 5:24 PM	XML Document	1 KE
💼 organization.xml	9/7/2012 5:24 PM	XML Document	1 KE

Now go to composite.xml drag and drop the ADF-BC Service Adapter from the Component Palette.



Start Page 🔰 📲 DemoProject 🗧		DemoProject	1.1.1			-
	work in the second		SOA			
Exposed Services	Components	External References	Concernance -			
			Components A BPEL Process	BPMN Process	Business Rule	Case Management
			Human Task Technology	Mediator	Spring	Subprocess
			ADF-8C	42	<b>8</b> 28	BAM
( · & )	DemoProcess			6	ම	Q
DemoProcess.servi Operations			DemoProcess - Properties			
start end			· Q. Find			
end			General			
			Name:	De	moProcess	
			Author:	Ē		
			E Advanced			
			Simulation			

Name the Adapter as <Process\_Name>\_client\_ep.

Create ADF-BC Serv	ice	×
ADF-BC Service		55
Create an ADF-BC se	rvice.	
<u>N</u> ame:	RetailLending_dient_ep	]
<u>Type</u> :	Service 💌	
WSDL URL:		1 🔁 🔅
Port Type:		
Callback Port Type:		
✓ copy wsdl and its	s dependent artifacts into the project.	
Help	OK	Cancel

Now Load the Flexcube\_interface.wsdl from the project location.



👌 WSDL Chooser							×
Application Server	File System	Oracle Enterprise Repository	Project Libraries	SOA-MDS	UDDI	WSIL	
Location:		oper \mywork \Demo \E	emoProject\SO	A	•	000	
Home	File Name: Fle		iles (*.wsdl)	e interface world			
Help						ОК	Cancel
O Create ADF-	-BC Service						x

Create ADF-BC Servi	ice	
ADF-BC Service Create an ADF-BC service	rvice.	<b>55</b>
<u>N</u> ame:	RetailLending_dient_ep	
Type:	Service	
WSDL URL:	C:\JDeveloper\mywork\Demo\DemoProject\SOA\Flexcube_interface.wsdl	۵ 🏟
Port Type:	initate_ptt	•
<u>C</u> allback Port Type:	No Callback	-
copy wsdl and its	dependent artifacts into the project.	
Help	OK	Cancel

Click OK

## 1.5.6 Adding the Created ADF-BC Adapter to the Process

Step 9: Double Click the Start Event a Property Window Appears.

ela composite.xm/ × Composite.xm/ ×	<-	
		🦧   🛅 Layout   🛕 Show Warnings   🔍
Start	Send End	
Properties - Start		×
Basic Implementation		
Implementation Type: 💿 Message		
Message Exchange		
Type: 😡 Define Interface		<b>•</b>
Conversation:	nced	
Define Interface		
Arguments Definition		<b>+</b> ∕ ×
Name	Туре	
Operation Name: start		
💱 Data Associations	Correlations	og Handlers
Message Headers	Service Properties	
Help		OK Cancel

Step 10: Now Change the Type as Use Interface and Click the



👌 Properties - Start	X
Basic Implementation	
Implementation Type: S Message	<b></b>
Message Exchange	
Type: 🙀 Use Interface	•
Conversation: <ul> <li>Default</li> <li>Advanced</li> </ul>	
Use Interface	
Reference:	٩, 🖉
Operation:	-
2010 Data Associations Di Correlations	Log Handlers
Message Headers Service Properties	
Help	OK Cancel

Select the Adapter from the Window

👌 Service		x
Search:		
Search Results:		
····· @ RetailLending_client_ep		
1		
Help	ОК	ancel
[		

Click OK.

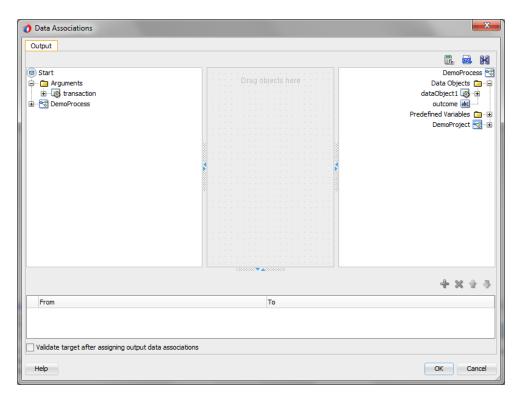


Properties - Start		X
Basic Implementation		
Implementation Type: 🙆 M	essage	•
Message Exchange		
Type: 🙀 Use Int	erface	▼
Conversation: 💿 Default	Advanced	
Use Interface		
Reference: RetailLending	_dient_ep	🧠 🧳
Operation: initiate		•
🗱 Data Associations	D <u>Correlations</u>	Log Handlers
Cartering Message Headers	Service Properties	
Help		OK Cancel
пер		OK Cancel

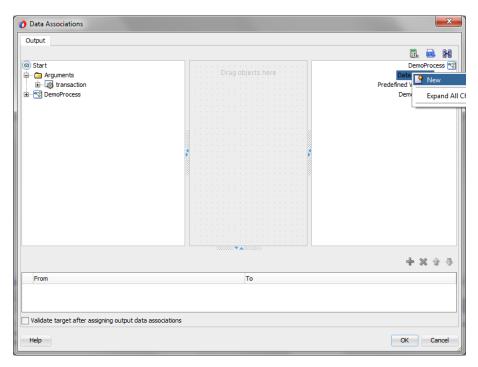
## 1.5.7 Assigning Inputs to the Start Node in the Process

Step 11: Click Data Associations to map the output for the Start node.





Right-click **Data Objects**, on RHS and add a variable **g\_Output**. **g\_Output** will be used as a global variable which will be updated in all the activities throughout the process.





👌 Cre	🕜 Create Data Object 📃 💌		
Name:	g_output		
Type:	abc string	-	
	<>> duration	-	
	iii base64Binary		
Help	199E float		
	999 byte		

👌 Browse Types	×
Find:	
999 int	
📀 boolean	
99E double	
999 decimal	
🖄 dateTime	
999 long	
♦ duration	
base64Binary	long
99E float	
999 byte	
999 short	
🖄 date	
🖄 time	
BusinessObject	
string	
Help	OK Cancel

Click OK

Now Map the Out Argument of the Start node to the g\_output global variable.



🜔 Data Associations		X		
Output		<b>. .</b>		
Start  Arguments  Arguments  Arguments  DemoProcess	Drag objects here	DemoProcess Control Co		
		Predefined Vanables 🦲 내		
From: transaction	To: g_output	🖪 🕂 🗙 🕆 🕹		
From	То			
🗐 🐼 transaction 🔯 g_output				
Validate target after assigning output data associations				
Help		OK Cancel		

Step 12: Set the End Node as None by selecting implementation type as none.

Properties - End			
Basic Implementation			
Implementation Type: O None	•		
Force commit after execution			
Help OK Can	cel		



## 1.5.8 Adding a Throw Event to the Process

**Step 13:** Drag and Drop the Message Throw Event from Events Pane in Component Palette to the Process. Or

Go to Window - > Components - > Events

Oracle IDeveloper 12 :: Demospra; Demospra; ECVID       File     Edd       Yew     Application       Refagior     Sarch       Non-     Edd       Yew     Application		
Applications - Application Servers	Start Page - all AnnaProtect -	Resources
🔁 Demo 👻 👻	• • • • • • •	(9 • Qr. Name
Projects 🔄 🔯 • 🖓 • 🐲 •	Activity Interactive Notification Catch Throw Gateway Artifacts	J My Catalogs
Constructed     Construction     Co	Start End	(a) IDE Connections
a) Application Resources 山 Data Controls 尚 Resent Files 山 Vorking Sets	🛦 trabilit.tenii.menos	Business Catalog
DemoProcess - Structure	Cesager Synchronic Collection History	Rules
	Messages - Log Build - Issues - Simulations Documentation	Services
🗈 🚰 Activities 🖶 🙀 Business Indicator Bindings		Types
Conversations	A Decryption File Location Project	XsdTxmXsd
s: DB Concestons (masseserents Rescues Data Objects (masses) (	Success! Build completed with 0 errors, 0 warnings, 0 infes	
	Curve Issues: DemoProcess Duild	

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te <u>B</u> uild	l <u>R</u> un Tea <u>m</u> <u>I</u> ools <u>W</u> indow <u>H</u> elp					
a 🚵 🍶	▶ • ∰ •				Q+ (Search	
? Sta	rt Page 🛛 🖓 DemoProject 👋 🗺 DemoProcess 🍝		Components ×	Resources		
· 🛞	/ 🚨 * 🛛 🔍 🔾 • 🕀 * 📈 *	Q Search	Q.* (			
Activit	/ Interactive Notification Catch Throw Gateway Artifacts		BPM Analytic			
			Error	Message	Ivone	Signai
			۲	-		-
12			Timer			
DemoProcess			Throw Events			
L L				$\bigcirc$		
ē	Start End		Message	None	Signal	
-			Start Events			
						۲
			Message	None	Signal	Timer
			End Events			
			R	8	$\bigcirc$	
			Error	Message	None	Signal
			0	, acouge	i vor fic	orgi itili
			<u> </u>			
			Gateways     Artifacts			
4						



A Properties window appears. Now select the implementation as **Use Interface** and type as Synchronous. The Throw Event will be automatically implemented.

Properties - ThrowEver	ıt	<b></b>
Basic Implementation		
Implementation Type:	Message	•
Force commit after exe	cution	
Message Exchange		
Type: 🙀 Use I	nterface	▼
Conversation: <ul> <li>Defaul</li> </ul>	t 🔾 Advanced	
Use Interface		
Type: OAsynchi	onous 💿 Synchronous	
Reference:		🧠 🏈
Operation:		-
Error:		S. 4
💸 Data Associations	DD Correlations	Log Handlers
Message Headers	Service Properties	
Help		OK Cancel

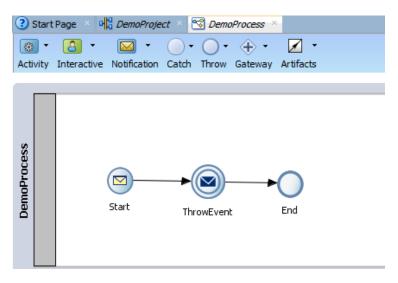
Select the reference as RetailLending\_Client\_ep.

👌 Properties -	ThrowEvent	×
Basic Implem	nentation	
Implementation	Type: 🔘 Message	<b></b>
Force commi	it after execution	
Message Exch	lange	
Type:	🐝 Use Interface	•
Conversation:	: <ul> <li>Default  </li></ul> <li>Advanced</li>	
Use Interfac	te	
Type:	O Asynchronous ( ) Synchronous	
Reference:	RetailLending_client_ep	🔍 🏈
Operation:	initiate	-
Error:		S. 11
Data Associ	tiations DO Correlations	Log Handlers
* Message He	eaders Service Properties	
Help		OK Cancel



Click OK.

Now our Process Look Likes this





## 1.5.9 Creating and Implementing Human Tasks

**Step 14:** Expand the Activities pane in the Component Palette and from the Interactive section, click and drag a User activity, dropping it onto the sequence flow between Throw and End events.

Components ×	Resources		
Q,* (			(
BPM Analytic			
Activities			
Activity	Business Rule	Call	Event Subprocess
		1	<b>1</b>
Manual	Receive	Script	Send
<b>(#</b> )	<b>E</b>	<b>2</b>	
Service	Subprocess	Update	
Interactive			
<b>2</b> ¥	<b>.</b>	<b>_</b> ₽⇔	
Complex	FYI	Group Vote	Initiator
•2	<u>a</u>		
Management	User		
Notification			
			2
TM	Mail	SWS	Heer

The **user task** properties window will be opened. In the basic tab enter an appropriate name and then go to **implementation tab** and click add Icon of the **Human Task** column.



👌 Properties - UserTas	k	x
Basic Implementation		
Implementation Type:	B User Task	-
Human Task:	💠 🔃 🔍	. 🥔 🛛
😑 Human Task Attribute	25	
Title: 📓 Plain Tex	t 👻	f <sub>x</sub>
Priority: 📃 Literal	•	) 🥢 🛛
Re initiate		
Advanced		
🗱 Data Associations	Difference Correlations	
Help	ОК С	ancel

Create **human task** window is opened, Change the Name and title accordingly, Click on the add Icon and map **parameter** and **outcome** target respectively and Check the editable field in the parameter slab.



	👌 Create I	Human Tas	k			x	1	) Browse Data Objects 📃	
	General							ag Data Objects to Parameters table and Outcome Target	
l	Name:	Application	Entry		Priority: 3 (normal)		l fi	ield (or use CTRL+I/CTRL+O).	
	Title:	Application	Entry						
l	Outcomes:	APPROVE,R	REJECT			_ 🔍			
۱	Pattern:	Simple	-					🔋 DemoProcess I 🧰 Data Objects	
1		Performer:	<ul> <li>Current la</li> </ul>	ne participant 🔘	) Previous lane particip	ant		🕂 🗤 🛺 dataObject1	
l			Exd	ude previous partic	ipants			in itcome ⊡ g_output	
I			Exd	ude previous partic	ipant in current task		÷		
	Parameters	:		+ ×				- 🔄 DemoProject	
	Parameter		Name	Туре	Editable				
l	transaction	1	dataObject1	Der Module.B	Busine 🗸 🗸				
	Outcome ta	rget:	outcome		<b>/</b> + 4			Help Close	
	Help				ОК	Cancel			

Click OK and click on Data Associations in the User Task properties window.

👌 Properties - UserTask	x
Basic Implementation	
Implementation Type: B User Task	-
Human Task: 🔄 ApplicationEntry	<i>~</i>
Human Task Attributes	
Title: 🔊 Plain Text 🔻	
Priority: 🔲 Literal 💌	<i>~</i>
Re initiate	
Advanced	
🗱 Data Associations 🤌 🕪 Correlations 📄 Log Handlers	
Help OK Car	ncel



Oata Associations		<b>—</b> ×-
Input Output		
DemoProcess  Data Objects  Data Object  Dat	Drag objects here	Live (2004) UserTask (2004) Arguments (2004) transaction (2004) execData (2004) execData (2004) (2004)
From: dataObject1	To: transaction	🛃 🕂 🗙 🕁 🥾
From	To transaction	
Validate target after assigning input data ass	ociations	OK Cancel

Click Ok in **User Task** properties window.

Role properties window appears.

Role properties	
Name:	Process Owner 🔻 🗣
Translucent background:	<b>4</b>
Image:	۹. 🏈
Help	OK Cancel

Add New Name

Role		-	×
Name:	Application Input		
Help		ОК	Cancel

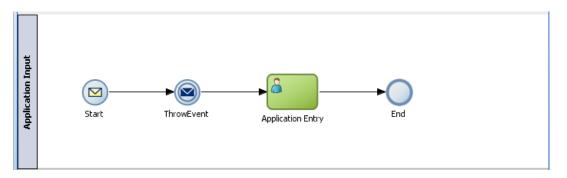


► Role			
Name:	pplication Input		x
Help	]	OK Cancel	New
_	Translucent background:	4	
	Help	OK	Cancel

Add a Name to the **Role** Click Ok and Save all.

Role properties	
Name:	Application Input 🔹 🕂
Translucent background:	A 100 A 1
Image:	۹ 🏈
Help	OK Cancel

Now our Process Look Likes this:



## 1.5.10 How to get the Conversation Id

To get the infra generated conversation id in the process, the below steps needs to be performed in the **first human task** of the process.

This conversation id is considered as **Application Number in each process**. Conversation id will be **unique** for each task.



**Step 1:** On double click on the first human task, you will get the below property window.

In property window, go to the implementation tab and click on the highlighted data association.

Properties - UserTask
Basic Implementation
Implementation Type: 🔯 User Task
Human Task: 🛛 ApplicationEntry
Human Task Attributes
Title: Plain Text
Priority: 🔲 Literal 💌 🖉
Re initiate
Advanced
🗱 Data Associations 🥔 DN Correlations 🔳 Log Handlers
Help OK Cancel



Data Associations      Input     Output      DemoProcess      Data Objects      DemoProject      DemoProject      DemoProject	Drag objects here	UserTask (a Arguments ) transaction execData (a) (b)
From: dataObject1	To: transaction	<b>.</b> + × + •
From	To To transaction	
Validate target after assigning input data associations		OK Cancel

On clicking the data association, the below input/output window will be opened.

**Step 2:** Drag the highlighted expression icon to the target (**txnld**) then Expression builder window will get opened.

Input Output		
월 DemoProcess - Data Objects - 문화 Data Objects - 문화 Data Objects - 문화 Data Objects - 문화 Data Object - 문화 DemoProject	Drag objects here	UserTask @ Arguments
rom: dataObject1	To: transaction	🔜 🕂 🗙 🕆 🕄
From	То	
🖥 🥵 dataObject 1	🐯 transaction	



Expression builder window.

Txpression Builder	
Mode: 👔 Simple Exp. 🔻	
Build an expression by typing directly into the Expression field and	d/or insert fragments from the fragment editors below the Expression field.
Expression:	S (2)
	Insert Into Expression
Variables	Functions
Comprocess	string
🗈 🐻 dataObject1	f() contains
and outcome	f() endsWith
g_output     Predefined Variables	f() length
DemoProject	f() lowerCase
	f() startsWith
	f() substring
	<u>f()</u> substring
Content Preview:	
contains(value, s)	
Description:	A
contains(string, string) : boolean	
This function returns true if the first argument string	contains the second argument string, and otherwise returns
Help	OK Cancel

Change Mode to XPath Exp.

Add the "ora:getConversationId()" function from the BPEL Xpath Extension Function list



Txpression Builder	<b>X</b>
Mode: 📴 XPath Exp. 💌	
Build an expression by typing directly into the Expression field, using Ctrl+ fragment editors below the Expression field.	Space for XPath assistance if available, and/or insert fragments from the
Expression:	S (2)
ora:getProcessId()	
\land Insert In	to Expression
Variables	Functions
DenoProcess Data Objects Set dataObject1 Set outcome Set outcome Set outcome DenoProject	BPEL XPath Extension Functions         f(i) integer         f(i) getProcessVersion         f(i) getProcessURL         f(i) getProcessURL         f(i) getProcessId         f(i) getPreference         f(i) areHodes
Content Preview:	
ora:getProcessId()	
Description: This function returns the id of the current BPEL process. The signatu	
Help	OK Cancel

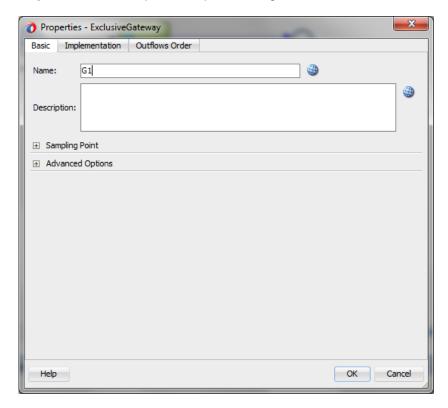
Finally Expression will be added in data association window.

Data Associations Input Output		
Input Output		
S DemoProcess		UserTask 👩
🔄 Demorrocess		Arguments 🛅 🖷
a dataObject1		transaction 🐻 😑
abc outcome	· · · · · · · · · · · · · · · · · · ·	
		bxnId abc
···· 🛅 Predefined Variables		instanceId  abc
		processName abc
		branchCode 🔤
		moduleCode 🔤
		currentUser and
		txnComment 🔤 ·····
		uiXml abc ·····
		stage 🔤
		taskOutcome abc
		operation abc
		realm abc
		transactionData <>>> 🕀
		additionalFields 🚷 🕀
		documents 🚸 🗄
rom: ora:getProcessId()	To: transaction.txnIdentification	on.txnId 📃 🖶 🐈 🏠 🖓
From	То	
ataObject1	transaction	
, ora:getProcessId()	abc transaction.txnIdentification	txnId
Validate target after assigning input data	associations	
yonaare target arter assigning liiput uata	0390000010	
Help		OK Cancel



### 1.5.11 Adding Gateways to the Process

Step 15: Expand the **gateway pane** in the **Component Palette** and click and drag a **Exclusive gateway**, dropping it onto the sequence flow between **Appenty**(humantask) and **End events**.



Properties window opens if required change the name and click OK.

Step 16: Expand the Events pane in the Component Palette and from the End events section, click and drag a Terminate, dropping it onto the Process editor.

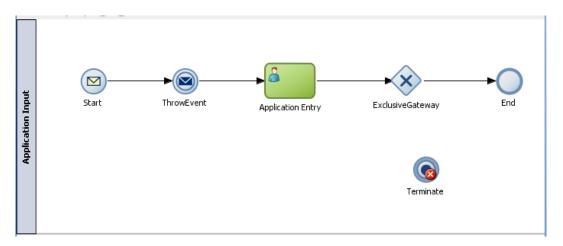
Properties window opens if required change the name and click OK.



👌 Propertie	s - End1	×	
Basic Imp	lementation		
Name:	End1		
Description:		۲	
Is Draft:			
+ Advance	d Options		
Help		OK Cancel	

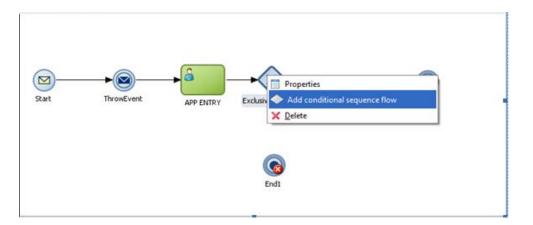


Now our Process looks likes this:

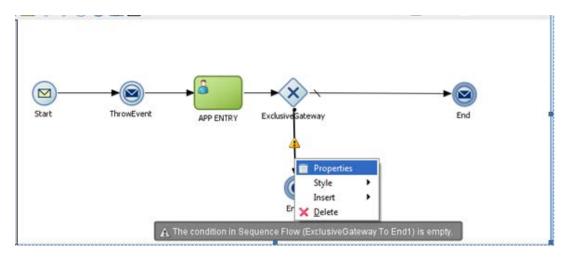


Right click on the **gateway** and select the **Add Conditional Sequence** flow, and connect the gateway to the **Terminate event**.





Right click on the Sequence flow, and select properties.



The **Sequence flow property** window will be opened, enter the name if required and go to properties tab, Click on the Expression Builder.



Transition from Activity: 'Exclusive Gateway' to Act Description Properties	tivity: 'Terminate'
Type	
Condition	<b>▼</b> ]
(	
Expression:	
Simple Exp.   XPath Exp.	
	Ē.
Help	OK Cancel

And Build the condition for the sequence flow by selecting the object from the list and click **insert into expression** or by dragging and drop the **object** in the expression tab.

🕐 Expression Builder	
Mode: 📝 Simple Exp. 💌	
Build an expression by typing directly into the Expression field and/or insert	fragments from the fragment editors below the Expression field.
Expression:	S (2)
outcome="CANCEL"	
∧ Insert Int	o Expression
Variables	Functions
DemoProcess	string
E 🔁 Data Objects	f() contains
······································	f() endsWith
主 📲 😨 _output	f() length
🗄 \cdots 🛅 Predefined Variables	f() lowerCase
😟 🗺 DemoProject	f() startsWith
	f() substring
	f() substring
Content Preview:	
outcome	
Description:	
Data Object	
Help	OK Cancel

Click Ok and again Click OK.

Click Save All.

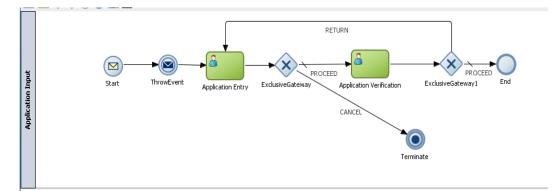


Create another user activity and implement the humantask properties.(follow the same steps as done for the useractivity (**Application Entry**)).

Create another gateway event and connect the conditional end to the first human task(app entry).

Click Save all.

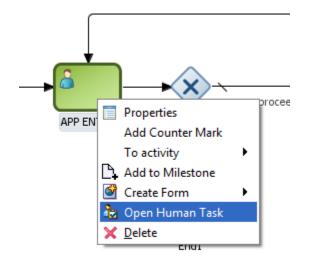
Now the process looks like this:



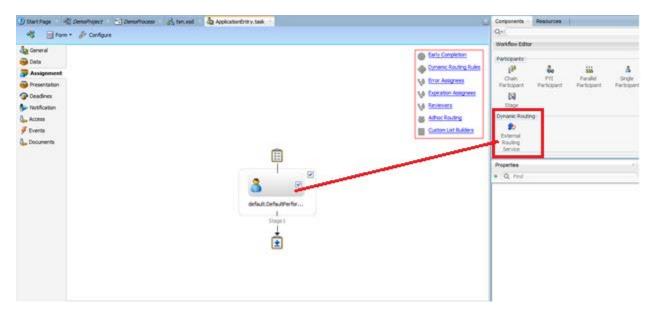


## 1.5.12 Mapping Flexcube Roles to Human Task

Step 17: Right click on the human task and select Open Human Task, it opens in new tab.



Click Assignment tab and click Edit Icon.



Drag and drop the External Routing Service as mentioned in above figure.



🕐 Use External Routing	
Participants and routing defined by external service Fully qualified name of class used for External Rout Cass Name:	e that dynamically determines the participants in the workflow ting
Define Properties that will be used with the routing	service 🕂 💥
Name	Value
Help	OK Cancel

now enter the class name as (com.ofss.fcc.bpel.cac.FCBPELTaskAssignmentComponent).

👌 Use External Routing	×
Participants and routing defined by extern Fully qualified name of class used for Exter Class Name: com.ofss.fcc.bpel.cac.FCBPt Define Properties that will be used with the	ELTaskAssignmentComponent
	+ ×
Name	Value
Help	OK Cancel

Enter the **name** and select by **expression** from the select box and click on +beside it.

<sup>100</sup>The name specified here is Case sensitive.



Use External Routing	×
Fully qualified name of class used f	external service that dynamically determines the participants in the workflow or External Routing c.FCBPELTaskAssignmentComponent
Define Properties that will be used	+ ×
Name functionId	Value By Expression
Help	OK Cancel

Select the stage from the **task:payload** and Click insert into expression and Click OK.

Expression Builder	×
Build an expression by typing directly into the Expression field, using Ctrl+5 fragment editors below the Expression field.	Space for XPath assistance if available, and/or insert fragments from the
Expression:	S 🕲 🗋
/task:task/task:payload/ns1:transaction/ns1:txnIden	tification/n#1:stage
🔥 Insert Int	o Expression
Schema	Functions
<pre></pre>	String Functions
Content Preview: /task:task/task:payload/ns1:transaction/ns1:txnIdentification/ns1:stage	
Description:	
Help	OK Cancel

Add another element and likewise map the branchcode and click ok .



🕐 Use External Routing	×
Fully qualified name of class use	by external service that dynamically determines the participants in the workflow d for External Routing .cac.FCBPELTaskAssignmentComponent
Define Properties that will be us	+ ×
Name	Value
functionId	/task:task/task:payload/ns1:transaction/ns1:txnIdentificati
branchCode	By Expression 🕶 hs1:txnIdentification/ns1:branchCode
Help	OK Cancel

Click ok

Click Yes and Save all.

Repeat the same steps for every human task in the process.



## 1.5.13 Creating and Implementing system tasks

Step 18: Drag and Drop BPEL Process to the Composite.xml

P A Service Call can be **Implemented** by **Service Adapters** also.

Components ×	Resources		
Q.+ (			
SOA			
Components			
2		<b></b>	2
BPEL Process	BPMN	Business Rule	Case
	Process		Management
۵.	*	2	6
Human Task	Mediator	Spring	Subprocess
Technology			
<u>ی</u>	÷	<b>1</b>	÷
ADF-BC	AQ	B2B	BAM
**	缁	8	8
Coherence	Database	Direct	EJB
	<u>6</u>	° <b>1</b>	3
File	FTP	Healthcare	HTTP
÷ČČ,	*	ŝ	÷
JMS	LDAP	MFT	MQ
÷	1	83	<b>6</b>
MSMQ	REST	SOAP	Socket
UMS			
Applications			

Drag and drop the BPEL process in the composite.xml as follows.



3 Start Page × Page → Page DemoProject × S DemoProcess × B tor	n.xsd ×		Components ×	Resources
🖌 🕼 🖶 👘 🙆 🔯 I 🕅 🦉 🖉 🖓		DemoProject	Q.*	
Exposed Services	Components	External References	SOA	
RetailLending_client Operations: intilate	Process		Components BPEL Process BPEL Process Coherence Coherence	BPMN Process Mediator AQ Batabase
			الله MS الله	CDAP
			MSMQ UMS Applications	REST

A Window appears Rename the Process with Desired name ex: RetailLoanOrchestrationBPEL.

💩 Create BPE	L Process
	s cess is a service orchestration, based on the BPEL specification, used to describe/execute a ocess (or large grained service), which is implemented as a stateful service.
BPEL 1.1 Sp	pecification O BPEL 2.0 Specification
<u>N</u> ame:	RetailLoanOrchestrationBPEL
Namespace:	http://xmlns.oracle.com/Demo/DemoProject/RetailLoanOrchestrationBPEL
Template:	😹 Asynchronous BPEL Process 🔹 🥥
Ser <u>v</u> ice Name:	retailloanorchestrationbpel_client
	Expose as a SOAP service
	Input: [http://xmlns.orade.com/Demo/DemoProject/RetailLoanOrchestrationBPEL}process
	Qutput: [xmlns.oracle.com/Demo/DemoProject/RetailLoanOrchestrationBPEL}processResponse]
Help	OK Cancel

Click the **Input** and **Output** and chose the element type.

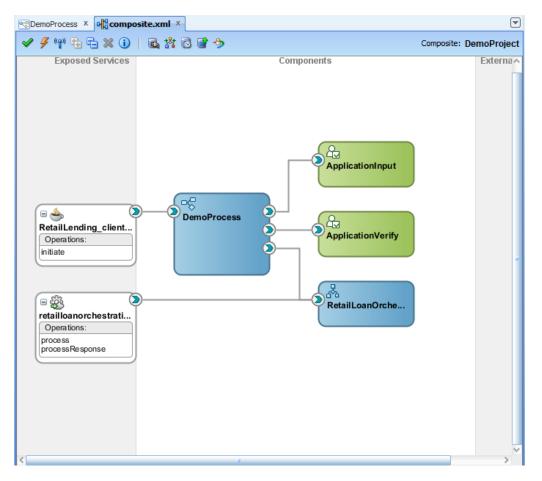


Type Chool	oser	and the second value of th			×
Type Exc Type Exc Type Exc Type Exc Proje	olorer ect Schema Application& Application Application TaskStateM	EntryPayload.xsd EntryWorkflowTa: /erificationPayloa /erificationWorkfl /achine.xsd	sk.xsd d.xsd		
Type:	ailed Node :	Information		OK	Cancel
	s is a service o		n the BPEL specification ented as a stateful serv		xecute a business
O BPEL 2.0 Speci	ification 💿 BF	EL 1.1 Specification			
General In M	lemory SOA				
<u>N</u> ame:	RetailLoanOr	chestrationBPEL			
Namespace:	http://xmlns	.oracle.com/Demo/De	moProject/RetailLoanOr	chestrationBPEL	
Directory:	C:\JDevelop	er \mywork \Demo \Den	oProject\SOA\BPEL		Q
Template Type:	<u>     W</u> eb Ser	vice OREST Servic	e O <u>N</u> o Service		
Template:	😹 Asynchr	onous BPEL Process			- I I I I I I I I I I I I I I I I I I I
Service Name:	retailloanord	hestrationbpel_client			
	Expose a	s a SOAP service			
	<u>D</u> elivery:	async.persist			▼ @
	Transaction:				- 3
	Input: {ht	p://fcubs.iflex.com}t	ansaction		Q
	<u>O</u> utput: {ht	p://fcubs.iflex.com}t	ansaction		Q
Help					OK Cancel

Click Ok

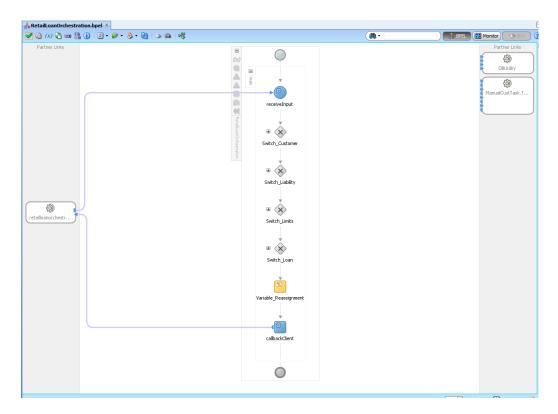
Now the Composite.xml looks like this





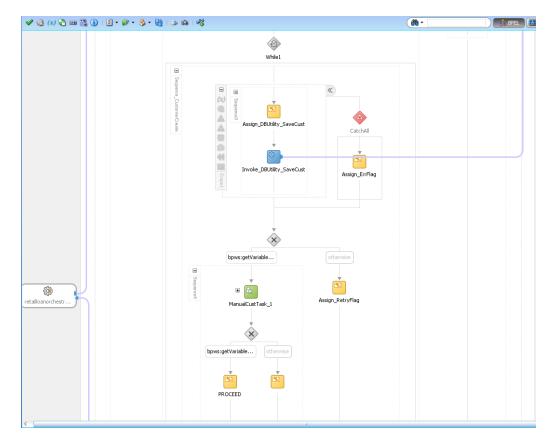
The RetailLoanOrchestration.bpel looks like this after Implementation.





In each Switch node of RetailLoanOrchestration.bpel process DButility Bpel process is called if it fails a manual retry task is initiated to book the RetailLoan





Now go to the Process and add a Service Task from component palette.



🔡 Component Pale × 🙀 × 📮
врм
ee 📀
– Default
Activity
🚓 Business Rule
Call
Event Subprocess
C Manual
Receive
[ Script
醛 Send
Service
Subprocess
- Interactive
Complex Complex
🛃 FYI
Comp Group
Initiator
Paragement
3 User

Window appears as below:

Properties - ServiceTask		×
Basic Implementation		
Implementation Type: 👩 Ser	vice task	•
Force commit after execution	n	
Message Exchange		
Type: []] Not Implemented		•
8X Data Associations	DD <u>Correlations</u>	Log Handlers
* Message Headers	Service Properties	
Help		OK Cancel
<u>c</u>		

Now Select type as Service Call and click the



Properties - ServiceTask		
Basic Implementation		
Implementation Type: 👸 S	ervice task	•
Force commit after execu	tion	
Message Exchange		
Type: 🥵 Service	Call	▼
Conversation: <ul> <li>Default</li> </ul>	Advanced	
Service Call		
Service:		🏈
Operation:		-
Stata Associations	DD <u>Correlations</u>	Log Handlers
* Message Headers	Service Properties	
Help		OK Cancel

Window appears as below from that select the service **RetalLoanOrchestrationBPEL** which is listed.

Properties - ServiceTask	23
Basic Impleme 👌 Service	
Implementation Search:	•
Force commit Search Results:	
Message Excha	
Type:	-
Conversation:	
Service Call	
Service:	🏈
Operation:	-
हेन्द्रे <u>Data Associa</u>	
* Message He	
Help OK Cancel	
Help	Cancel

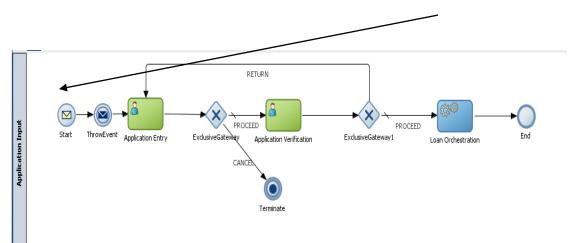
Click Data association



State Objects       Drag objects here         Image: State Objects       Drag objects here         <	D. 📾 H
	ServiceTask ( Arguments - trensaction 🖓 - 🔅
From: dataObject1 To: transaction	🔜 🕂 🗙 🕁 🗏
From To	
ataObject1 🐉 transaction	

Map the **data association** and click ok.

Now the process looks like this:

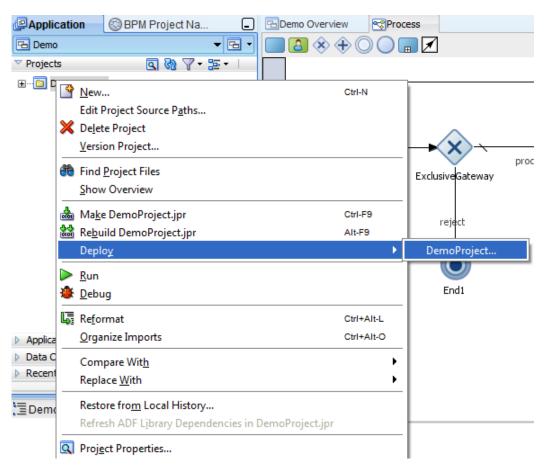




# 1.6 **Deploying the Process**

Step 19: Deploy the **DemoProject**.

In the Application Navigator, right click DemoProject and select Deploy > DemoProject...



The Deploy **DemoProject** wizard opens.

In the **Deployment Action** page of the wizard, select Deploy to Application Server and click Next.



Deploy DemoProject	
Deployment Action	
Deployment Action	Select a deployment action from the list below.
Deploy Configuration Summary	Deploy to Application Server Deploy to SAR
	Deploy this archive to SOA configured Application server(s)
Help	< <u>Back</u> Next > Einish Cancel

In the **Deploy Configuration** page, click the **Overwrite any existing** composites with the same revision IDcheckbox and click Next.

🕹 Deploy DemoProject	
Deploy Configuration	0101010101010101010101010
Deployment Action	ି ସ୍କୃଷ୍ଣ DemoProject
Deploy Configuration	Composite Revision ID
Select Server	Project: DemoProject
O Summary	Current Revision ID: 1.0
	New Revision ID: 1.0
	✓ Mark composite revision as default.
	✓ Overwrite any existing composites with the same revision ID.
	Use the following SOA configuration plan for all composites:
< >>	Browse
Help	< <u>B</u> ack <u>N</u> ext > Einish Cancel



Click Next.

In the Select Server page, select **server**(**RUNNING WITH SOA**) and click Finish. Deployment will begin.

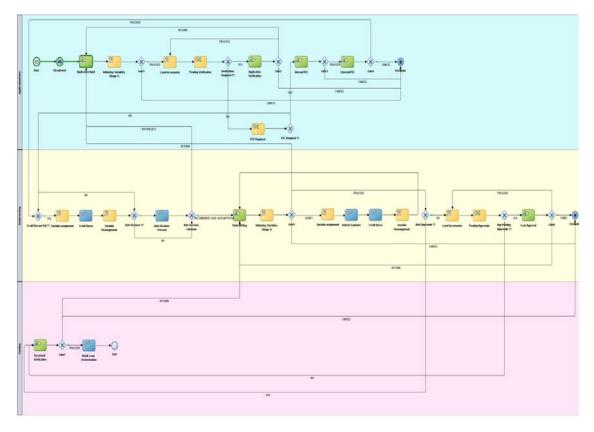
🛬 Deploy DemoProject		×
Select Server	01	
Deployment Action     Deploy Configuration     Select Server     SOA Servers     Summary	Application Servers: arun IntegratedWebLogicServer (domain unconfigured) ARUN nish SOARND1 localhost	<b>2</b>
Help	< <u>B</u> ack <u>N</u> ext > <u>F</u> inish	Cancel

Click Finish. You will see a message in the jdeveloper as **Deployment Finished**.



## 1.7 Retail Lending BPMN Process

## 1.7.1 Retail Lending BPMN Process Flow Diagram



## 1.7.2 Guidelines followed in Retail Lending Process flow

txn. xsd

single data object named transactioninput which contains the transaction.xsd

is used throughout the Process Flow to map the Inputs and Outputs.

- Global Fault Handling Standard are maintained across the Process Flow.
- The Fault Handling is done separately in another BPEL Process called **RetalLoanOrchestrationBPEL**.
- Swimlanes are used to differentiate the different Stages in the Process.



- Usage of Flexcube\_interface.wsdl wsdl to initiate the Process rather than using other wsdl files.
- **com.ofss.fcc.bpel.cac.FCBPELTaskAssignmentComponent** class is used in all Human Tasks to map the Flexcube Roles .
- Naming Conventions are followed as per the Retail Lending Flow Diagram.
- The DBUtility Call and Manual Retry Task are done separately in RetalLoanOrchestrationBPEL BPEL Process.



## 1.7.3 Naming Conventions Followed in Retail Landing Process Flow

#### **Processes**

- RetailProcess(BPM)
- RetailLoan OrchestrationBPEL(BPEL)

#### RetailProcess(BPM)

#### Human Tasks:

- ApplicationInput
- ApplicationVerify
- InternalKYCTask
- ExternalKYCCkeck
- UnderWriting
- UnderWriting\_Approval
- FinalVerification

#### **Business Rules:**

- VerifyAppRules
- KYCRules
- LoanApprovalRules

#### **Exposed Services:**

• RetailLending\_client\_ep

#### **External Reference:**

- VehicleEvaluater
- CreditBureau
- SelectDecisionDBAdapter

Task Name/Event Name	Input	Output
Start Event	-	transactioninput
ThrowEvent	transactioninput	-
User Tasks(all )	transactioninput	transactioninput
VerifyAppRules	VRule_IN	VRule_ OUT
KYCRules	KYC_IN	KYC_OUT



LoanApprovalRules	UnderWrite_IN	UnderWrite_ OUT
Credit Burea	ExCreditBureau_IN	ExCreditBureau_OUT
Auto Decision Process	AutoDecision_IN	AutoDecision_OUT
Vehicle Evaluater	VEvaluator_IN	VEvaluator_OUT

OUTCOME	String
ExternalCreditBureau	String
AutoDecisionReqd	String
AutoDecisionOutput	String

## RetailLoan OrchestrationBPEL(BPEL)

#### Human Tasks:

ManualCustTask

#### Exposed Services:

• retailloanorchestration\_client\_ep

#### **External Reference:**

DBUtility

Task Name/Event Name	Input	Output
RetailLoan OrchestrationBPE L	inputvariable	outputvariable
DBUtility	Invoke_DBUtility_Sav eCust_initiate_InputV ariable_1	Invoke_DBUtility_SaveC ust_initiate_OutputVaria ble



# 1.8 Acronyms and Abbreviations

RL	Retail Lending
BPMN	Business Process Model and Notation
BPEL	Business Process Execution Language
SOA	Service-Oriented Architecture

# 1.9 <u>References</u>

Retail Loan Origination Oracle FLEXCUBE Universal Banking Release 12.0 [May] [2012]

http://docs.oracle.com/cd/E14571\_01/doc.1111/e15176/model\_bus\_procs\_bpmpd.htm





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