

# Day 3 – Enhanced Integration

## Exercises for SAP Build Process Automation

### Contents

Goals .....	2
Prerequisites .....	2
Scenario Overview .....	3
Creating the queues.....	4
Creating the RDP .....	6
Creating the BTP Destination.....	10
Creating the BPA Project.....	12
Creating the Integration Suite artefacts .....	17
<b>Configure the definitionId</b> .....	18
<b>Configure the IFlow</b> .....	19
Testing / Expected Result.....	22

## Goals

- Understand how to use SAP Build Process Automation to review event exceptions
- Understand how to use a Dead Message Queue
- Understand how to setup a Rest Delivery Point

## Prerequisites

- Complete all activities in day 1 & 2  
You access and use the same broker you setup previously as well as the simulator to push events for testing
  - Have access to an active SAP Build Process Automation Instance
1. Have access to an active Integration Suite/Cloud Integration tenant
- Have access to the SAP BTP cockpit and the necessary roles to create BTP destinations

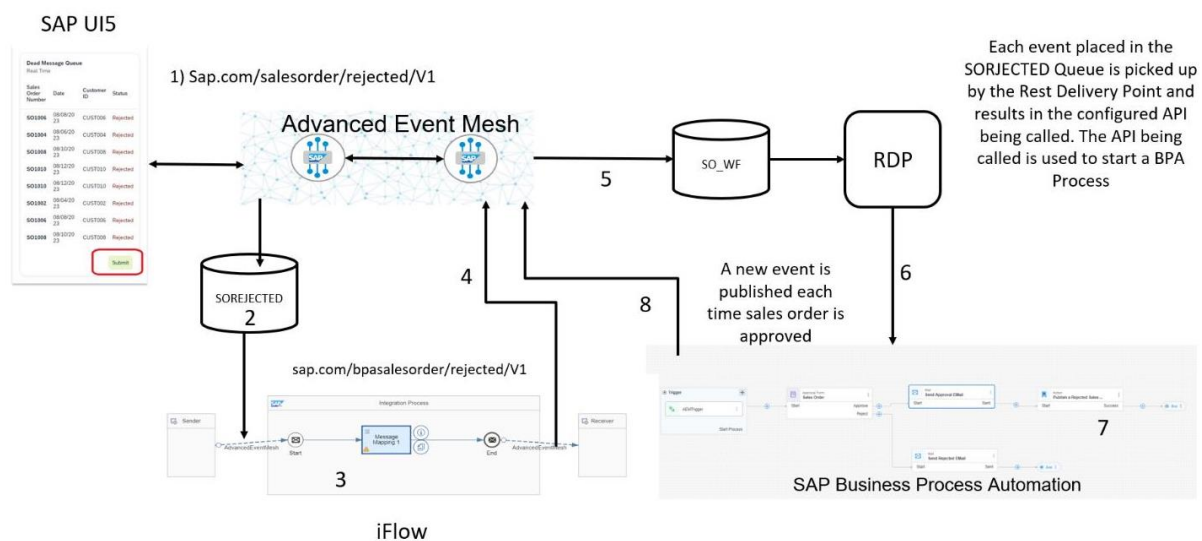
## Scenario Overview

In the world of Event Driven Asynchronous messaging, sometimes events cannot be successfully processed by a consumer and as a result, they need to be dealt with on an exception basis. As a result, there is built in capability within the broker referred to as a Dead Messages Queue. Essentially, messages can be placed into a special queue where they can later be reviewed and properly dealt with. Should you wish to read more on the concept of Dead Message Queues, please refer to the following link.

[Link to blog](#)

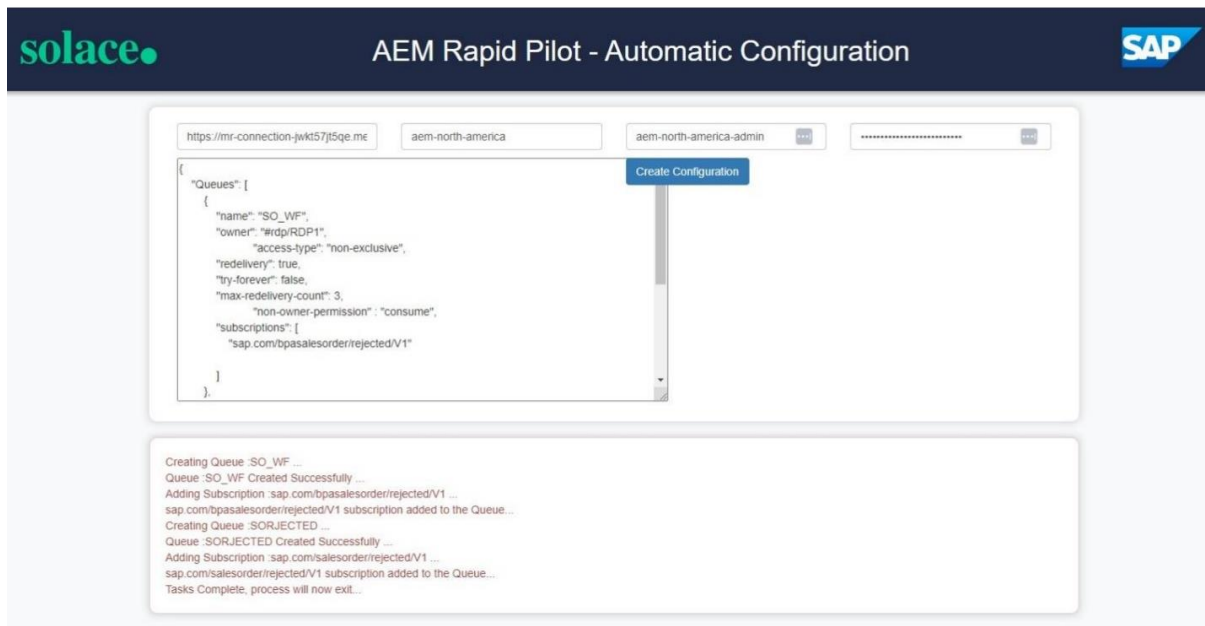
In our scenario, we will artificially create a situation where messages cannot be delivered to the endpoint. As a result, they end up in the Dead Message Queue and the application shown below has an integration card on it called "Dead Message Queue". This card is a very simple Queue browser. It displays the messages without removing them from the Queue unless you hit the submit button. The steps and diagram below walk through the exact flow you will be implementing. In the following diagram, you can see the flow you are about to implement.

1. The user decides to investigate the item displayed in the dead message queue so they hit the submit button which causes the message to be published on the topic shown.
2. A queue that you will create called SOREJECTED that has a subscription to attract these events.
3. An iFlow in SAP Integration Suite/Cloud Integration is listening on the SOREJECTED queue for these events.
4. The iFlow is responsible for transforming the message into a different format that can be used later by the BPA API.
5. The SO\_WF queue is attracting events with this new format.
6. A rest delivery point will use the information in the event to call the API for starting the BPA process.
7. The BPA Process will place an entry in the Inbox for Approval
8. Once the SalesOrder is approved via the Form, it will be re-published for processing which triggers an updated on the original screen that started the entire process.



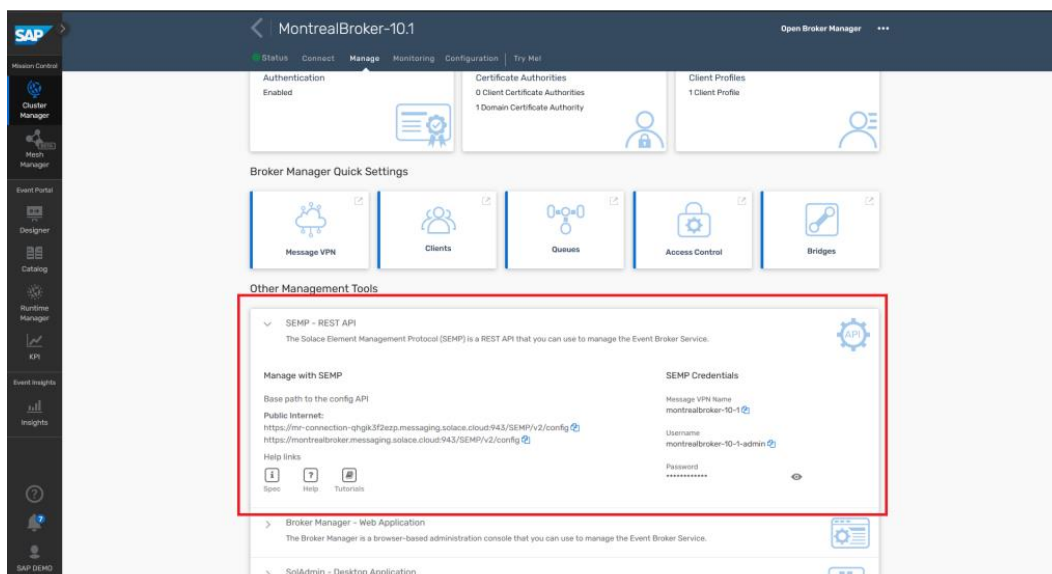
## Creating the queues

If you have already done the SAP Integration Suite exercises the following tool will already be known to you. It can be accessed [here](#)



It is a sample application written in CAP that has the nice advantage of running in our browser that we can point at our broker's API and feed some configuration files. For more information on this tool see the Exercise [“Automated AEM Broker Setup via APIs and CI/CD \(optional\)”](#). If you prefer not to use the CI/CD tool you can find In-depth introductions on how to create queues in AEM in the Integration Suite exercises as well. Either way you will find a JSON file called **BPA\_SEMP.json** in the provided material that you can open with any text editor which contains information like topic subscriptions for the 2 queues SO\_WF and SOREJECTED.

We will need some details from your AEM service again to connect the configuration tool with your AEM service. Let's head to our Advanced Event Mesh Console and go to Cluster Manager, select the service that you want to connect your Integration Suite flows to and go to the "Manage" tab. Take a note of the connectivity details underneath "SEMP - REST API" (click on the section to open it up)



Copy & paste the URL, vpn name, admin username and password into the config tool:

The screenshot shows the Solace AEM Rapid Pilot - Automatic Configuration tool. At the top, there are input fields for the URL (rg.solace.cloud:943/SEMP/v), VPN name (montrealbroker-10-1), admin username (montrealbroker-10-1-admin), and a password field. A "Create Configuration" button is visible. Below these fields is a large text area containing a JSON configuration payload. The JSON payload is as follows:

```
{
  "subscriptions": [
    {
      "name": "CiSalesOrderNotificationProcessed",
      "type": "exclusive",
      "owner": "solace-cloud-client",
      "subscriptions": [
        {
          "name": "sap.com/salesorder/create/V1/>"
        }
      ]
    }
  ]
}
```

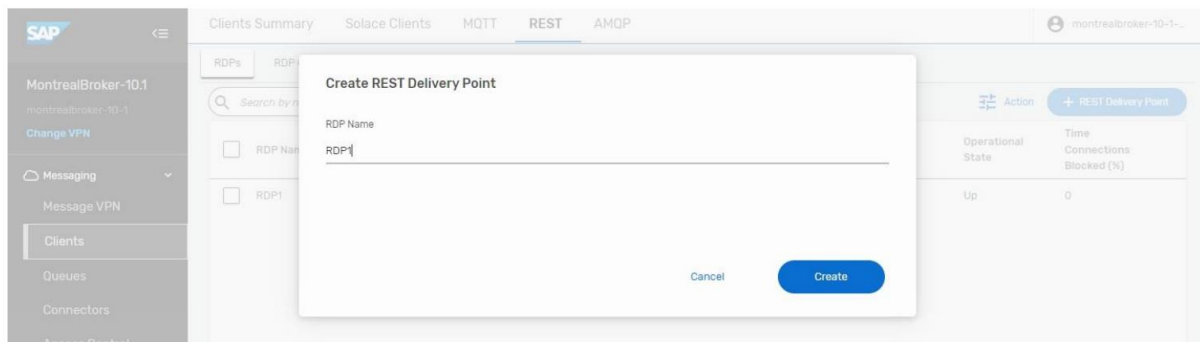
Please download the configuration file provided to you together with the content packages and copy & paste the content into the "Config JSON Payload" input field. Hit "Create Configuration" to apply this config to your broker. If all went well, you should see the following 2 queues in your AEM broker:

The screenshot shows the SAP AEM console interface. The left sidebar contains navigation links: AEM\_CommunityCentral, aem\_communitycentral, Change VPN, Messaging, Message VPN, Clients, Queues (highlighted), Connector Wizards, Access Control, Telemetry, Replay, and Bridges. The main content area is titled "Queues" and contains a table of queue information. The table has columns for Queue Name, Incoming, Outgoing, Access Type, Partition Count, Messages Queued (%), Messages Queued (msgs), and Messages Queued (MB). Two rows are highlighted with a red border: SORJECTED and SO\_WF.

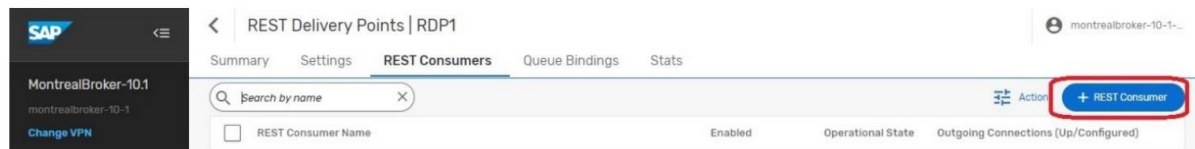
Queue Name	Incoming	Outgoing	Access Type	Partition Count	Messages Queued (%)	Messages Queued (msgs)	Messages Queued (MB)
#cluster:80ff4c21fc76000a667adcfe0...	On	On	Exclusive	0	0	0	0
#telemetry-Tracing	Off	On	Non-Exclusive	0	0	0	0
BusinessPartner	On	On	Exclusive	0	9.916	7.42	0
FromScratch	On	On	Exclusive	0	0	0	0
RAP_OnlineShop	On	On	Exclusive	0	1	0.0005	0
SORJECTED	On	On	Exclusive	0	0	0	0
SO_WF	On	On	Non-Exclusive	0	0	0	0
Tracing	On	On	Exclusive	0	134	0.0686	0
ZBusinessPartner	On	On	Exclusive	0	32	0.0204	0

## Creating the RDP

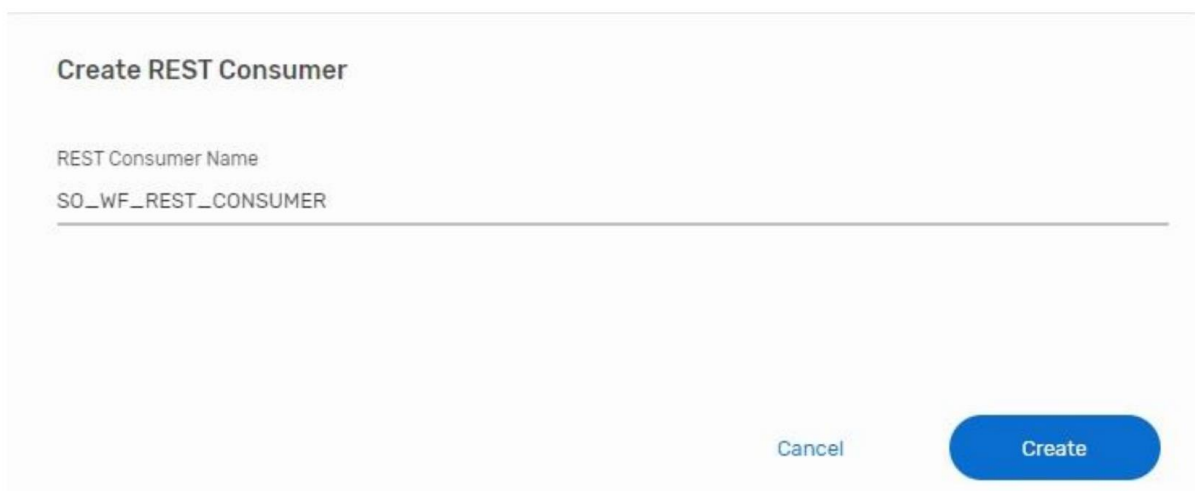
Navigate to the "Clients" tab as shown on the left and then click the + Rest Delivery Point Button. The name of the RDP should be "RDP1"



You will now create a Rest Consumer that will be the target for your Events.



Enter "SO\_WF\_REST\_CONSUMER" and press "Create".



To fill out the information we need to get the authentication information for the Rest Consumer.

From the BTP Cockpit, we need to find the service key for the BPA Service. Navigate to the subaccount where you can find the BPA service. From there, click on the "Instances and Subscriptions" and navigate to the 3 "..." at the end.

Subaccount: USEASTBPA - Instances and Subscriptions

All: 3

Search [ ] All Services [v] All Plans [v] All Statuses [v]

Subscriptions (1) Instances (1) Environments (1)

Applications to which your subaccount is currently subscribed

Application	Plan	Created On	Changed On	Status	
SAP Build Process Automation	standard	12 Sept 2023	16 Oct 2023	Subscribed	...

Instances (1)

Service instances created in: Cloud Foundry | Kyma/Kubernetes | Other environments

Instance	Service	Plan	Runtime En...	Scope	Credentials	Status	
SOLACEBPA	SAP Build Process Automation	standard	Cloud Foun...	SOLACEDEVBP...	1 key	Created	View

To the right of the service key, you should again see 3 "." where you can click "View". This will display the service key.

Subaccount: USEASTBPA - Instances and Subscriptions

All: 3

Search [ ] All Services [v]

Subscriptions (1)

Applications to which your subaccount is currently subscribed

Application	Status	
SAP Build Process ...	Subscribed	>

Instances (1)

Service instances created in: Cloud Foundry | Kyma/Kubernetes | Other environments

Instance	Status	
SOLACEBPA	Created	>

Environments (1)

Environment instances created in this subaccount.

Name	Status	
useastbpa-p8xih3g...	Created	>

SOLACEBPA

Instance ID: 737dae08-62f6-47fc-9e51-065e04c5139c

Service: SAP Build Process Automation (process-automation-service)

Plan: standard

Runtime Environment: Cloud Foundry

Scope: SOLACEDEVBP...

Status: Created

Created On: 12 Sept 2023

Changed On: 12 Sept 2023

Bound Applications (0) Service Keys (1) Labels (0)

Create

Name	Status	
No bound applications.		

Service Keys (1)

Create

Name	Status	
BPAServiceKey	Created	View

Labels (0)

No labels assigned to this instance. Click 'Add' to assign labels.

The service key has all the information you need. In this screenshot, copy from the Service Key as shown in this screenshot to configure the oAuth authentication. Pay attention to the detail that outlines the necessary information to be added to the Token URL.

Notice there is no visible spot for clientsecret, once you place this screen into Edit mode, you will see a "change client secret". Use this option to enter the secret.

### Service Key from BTP

Notice that the URL used for "Token Endpoint URL" needs to have "/oauth/token" appended to the end.

Next you will create the connection between the Rest Consumer and the Queue that it will use. Select Queue Bindings and then click the "+Queue Binding".

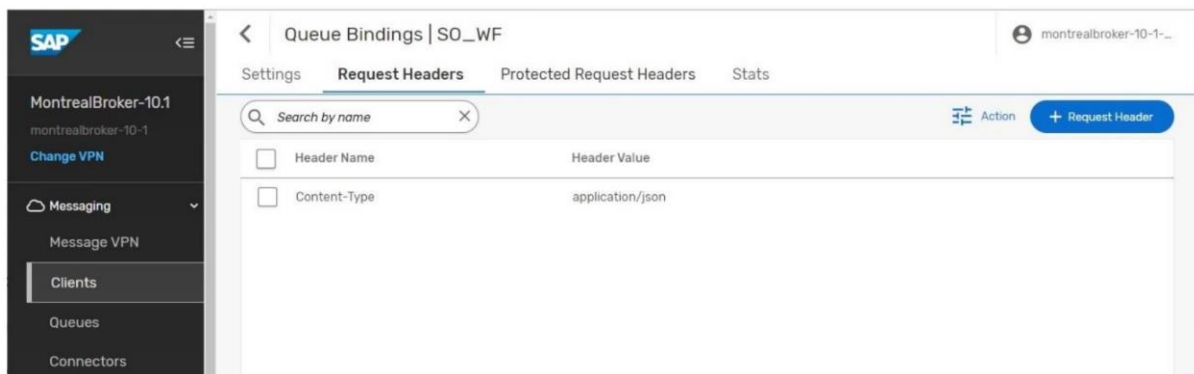
From the dropdown, select the previously created Queue "SO\_WF".

This is where you will enter the remainder of the endpoint...aka the endpoint for creating the Workflow Instances. This should be the same so you can use the same value "/workflow/rest/v1/workflow-instances".

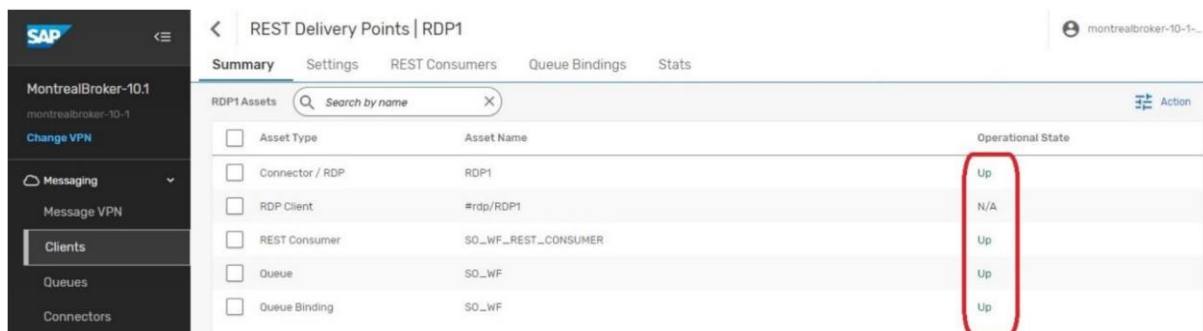


!--- IMPORTANT ---!

The type of content that we will send to the API is of JSON format. In order to indicate this, we need to create a request header called "Content-Type" and set the value to "application/json".

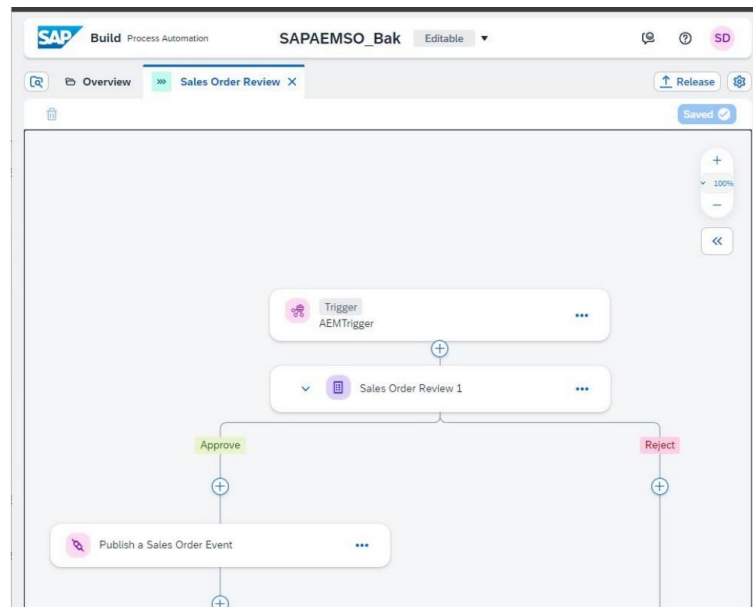


At this point, you should have a functioning RDP. The operational status on the screen should say Up for all components except for the RDP Client. If any of them indicate "Down", you will need to Troubleshoot, go back and double check your settings. There is also a Stats link that you can use to see the Error Messages. A common issue is "TLS Enabled".



## Creating the BTP Destination

The business process that we will deploy is activated by an API Trigger which can be seen in the diagram and the last step of the process is the publishing of an event. This process uses a Rest Call to the broker that is encapsulated in the SAP BPA "Action" which can be seen in the screenshot immediately following the "Approve" action.



This "Action" component needs to be associated with a destination. To create the destination, you will need "REST" connectivity information from your broker. Navigate to your AEM Cloud Console, you will select the Cluster Manager and then you will select your broker. From there, you will select the "Connect" option at the top. On this screen, make sure that the "View By" is set to Protocol as the first step. From there, expand the REST protocol and everything you need to create the destination will be visible.

The screenshot shows the 'Connect' page in the SAP AEM Cloud Console for 'MontrealBroker-10.1'. The page is titled 'Connect Using a Supported Client Library'. The 'View by' dropdown is set to 'Protocol'. The 'REST' protocol is expanded, showing a list of client libraries. The 'Solace REST Messaging API' is selected, and the 'Connection Details' are displayed. The details include the Username, Password, Secured REST Host, and Public Internet URL.

Client Libraries	Connection Details
<b>Solace REST Messaging API</b> REST <a href="#">Get Started</a>	<b>Connection Details</b> Username: <a href="#">solace-cloud-client</a> Password: <a href="#">3cp5h4j5rcv9776rrtt0oos20</a> Secured REST Host: <a href="#">https://mr-connection-qh9k3f2ezp.messaging.solace.cloud:9443</a> Public Internet: <a href="#">https://montrealbroker.messaging.solace.cloud:9443</a>

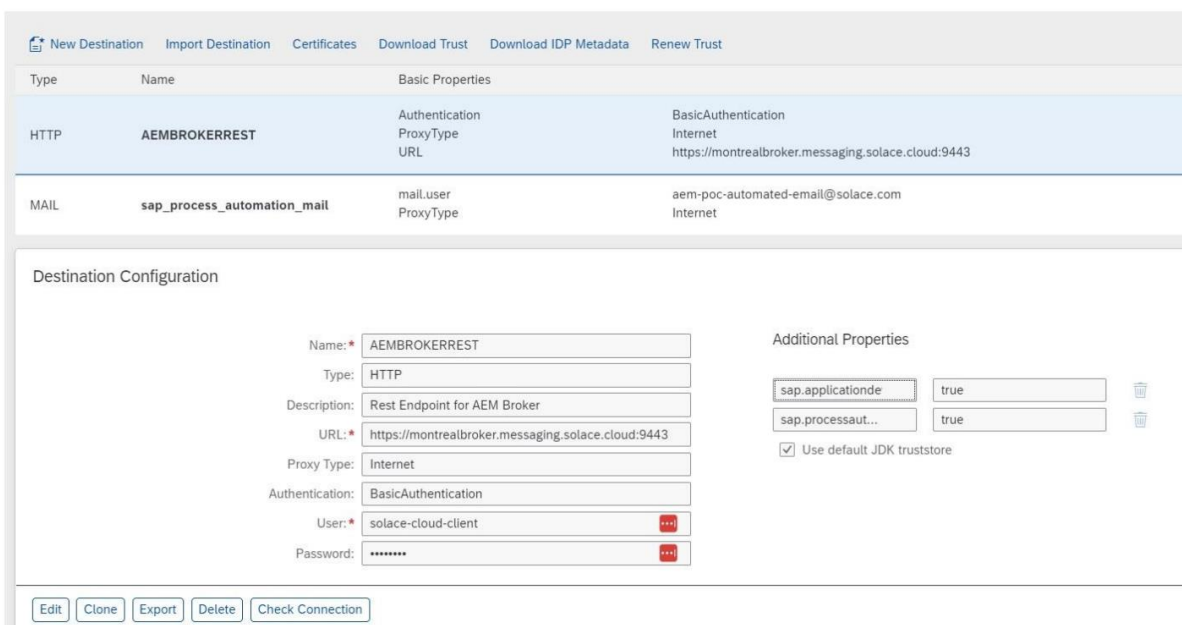
With this information navigate to your BTP Cloud Cockpit -> Destinations -> New Destination. The Name of this destination is AEMBROKERREST but if you have established naming conventions in your landscape feel free to choose a name yourself.



Type	Name	Basic Properties
HTTP	AEMBROKERREST	Authentication ProxyType URL BasicAuthentication Internet https://montrealbroker.messaging.solace.cloud:9443

You will populate the Destination information as shown below and you will add two properties that are both set to true.

- sap.applicationdevelopment.actions.enabled – true
- sap.processautomation.enabled – true



Type	Name	Basic Properties
HTTP	AEMBROKERREST	Authentication ProxyType URL BasicAuthentication Internet https://montrealbroker.messaging.solace.cloud:9443
MAIL	sap_process_automation_mail	mail.user ProxyType aem-poc-automated-email@solace.com Internet

Destination Configuration
 

Name: \* AEMBROKERREST  
 Type: HTTP  
 Description: Rest Endpoint for AEM Broker  
 URL: \* https://montrealbroker.messaging.solace.cloud:9443  
 Proxy Type: Internet  
 Authentication: BasicAuthentication  
 User: \* solace-cloud-client  
 Password: \*\*\*\*\*

Additional Properties
 

sap.applicationde

true

sap.processaut...

true

☒ Use default JDK truststore

Edit

Clone

Export

Delete

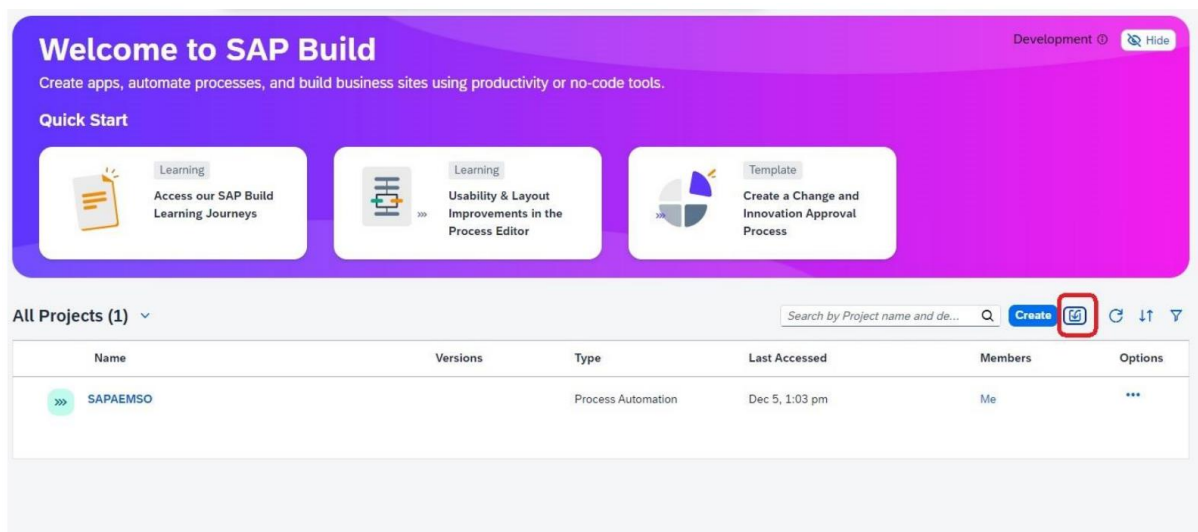
Check Connection

## Creating the BPA Project

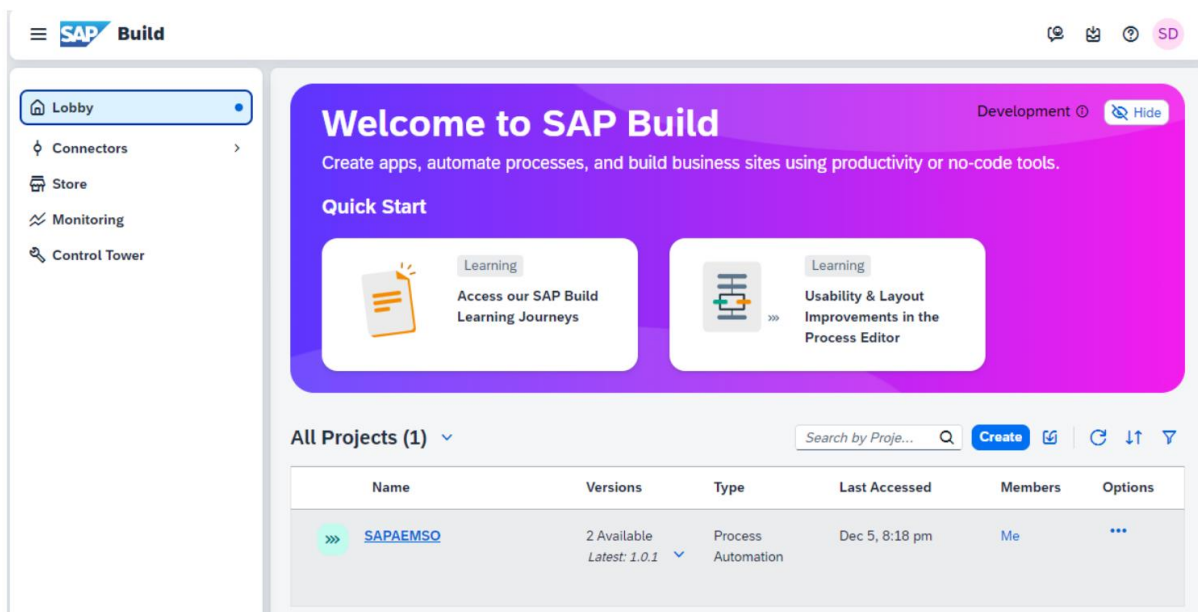
For the SAP BPA setup, we will be importing 1 File that contains several components:

- 11 Artifacts
- 1 Trigger
- 1 Dependency for the Action Group that represents the action group
- a project of type "Process Automation"

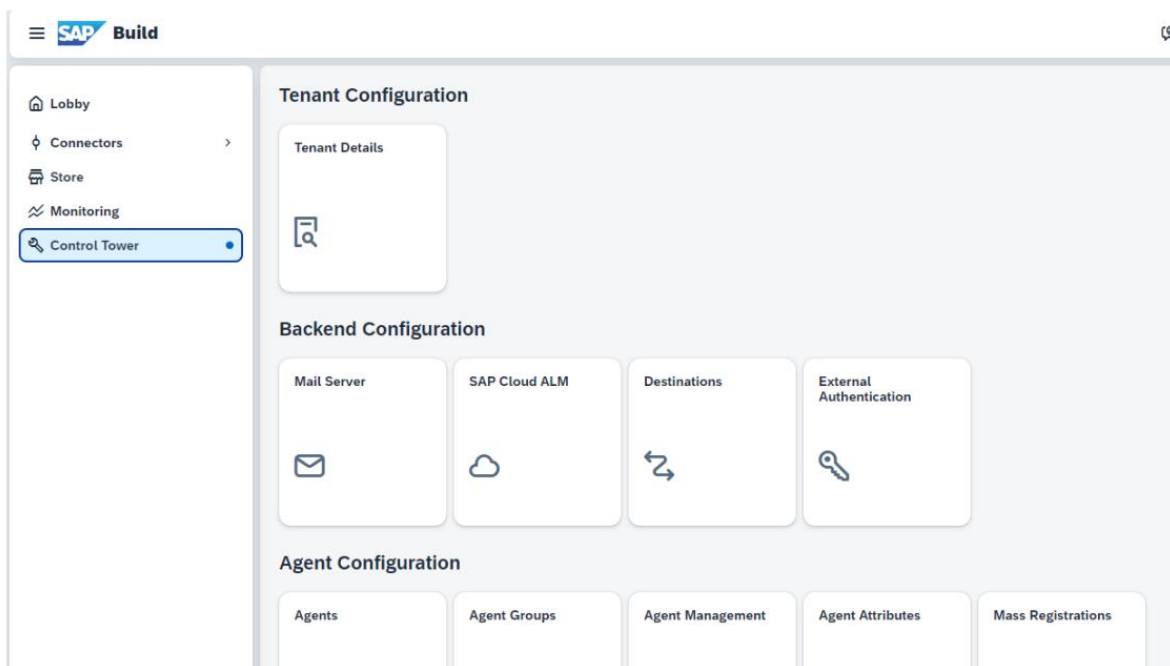
We will import the **SAPAEMSO\_3.1.0.mtar** file. Select the import option which is highlighted by the red square. When prompted, select the SAPAEMSO\_3.1.0.mtar file for import. Once it's successfully imported, you will see 1 project listed as per the screenshot below



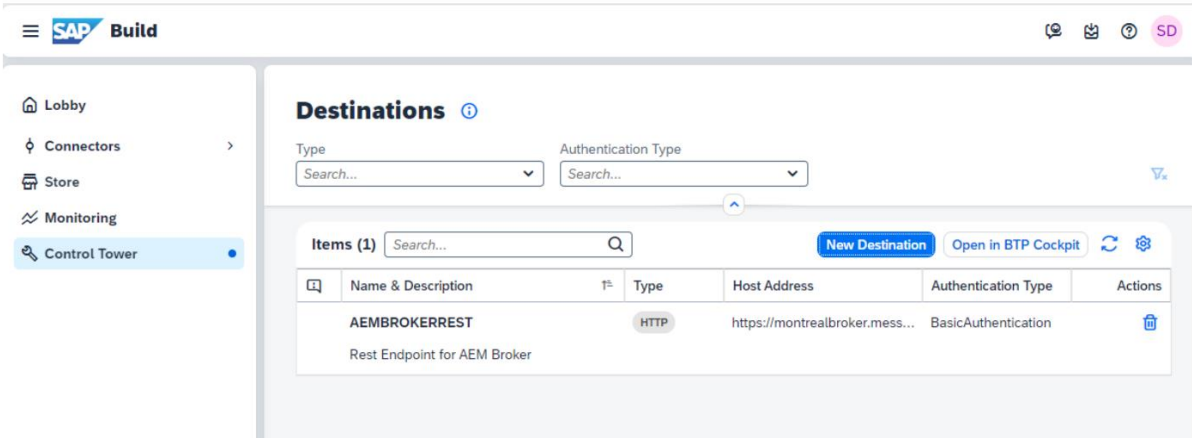
To deploy the BPA project, you need to associate the project with the Destination that you have already created in BTP. The deployment process will ask you to select a Destination, so you need to register the destination with the BPA tooling. Expand the menu options on the top left.



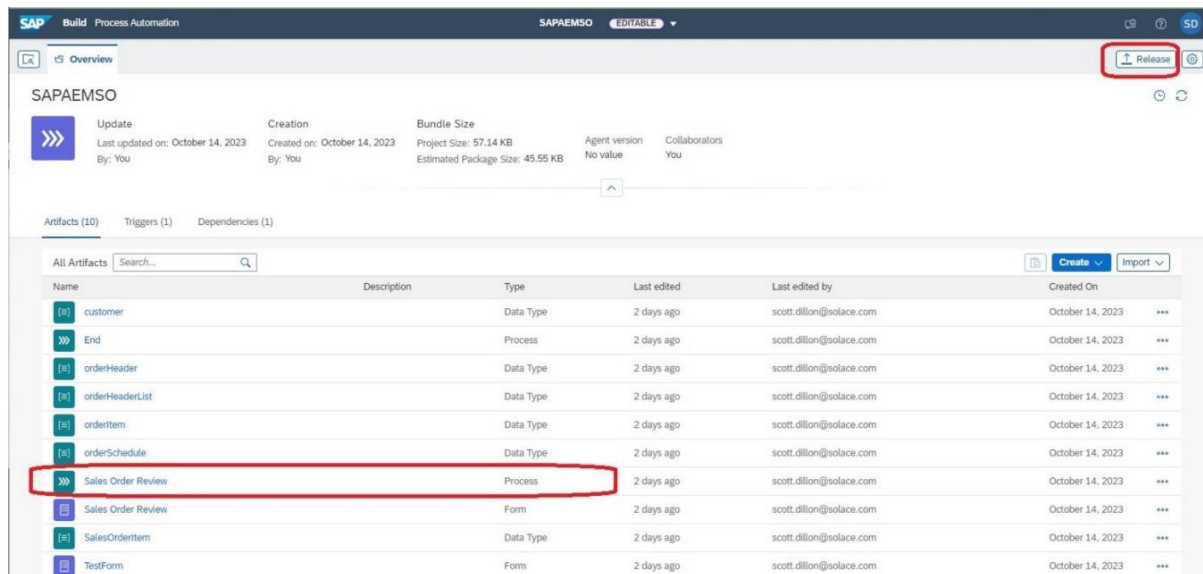
Click on the Control Tower and Select Destinations



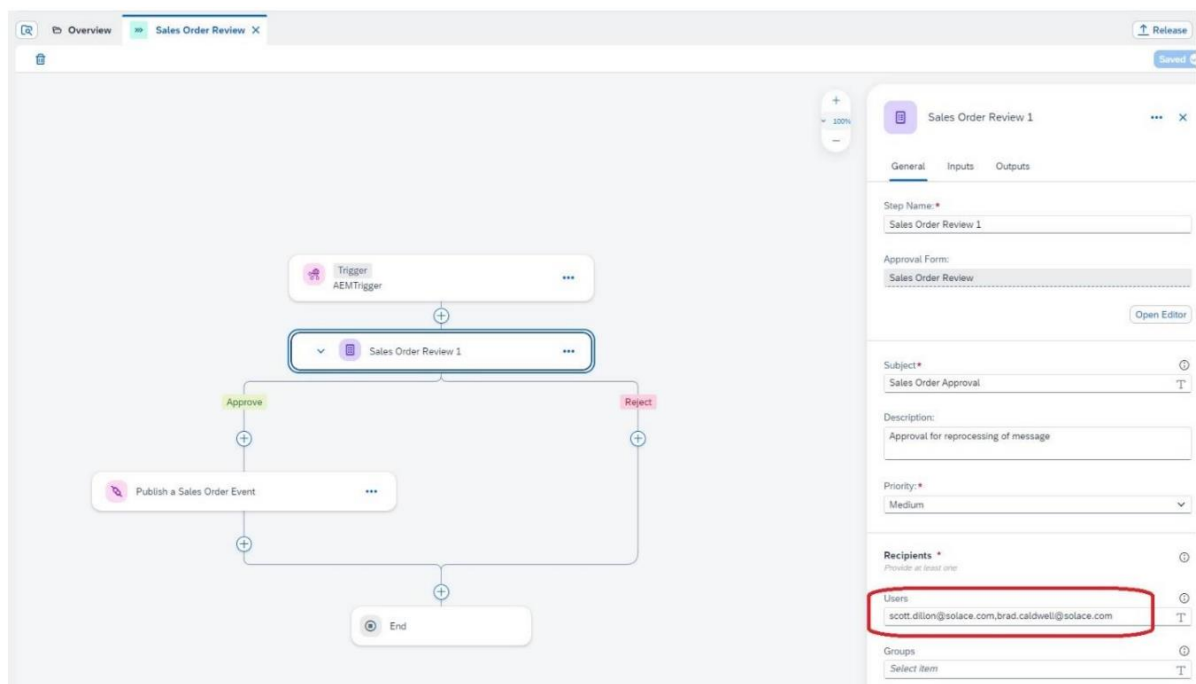
When you click "New Destination", you should see the Destination you created in BTP called "AEMBROKERREST", if you don't, you have not specified the properties correctly and you will need to investigate. Select the Destination and you should see it populate in the UI. Now, we can deploy the project.



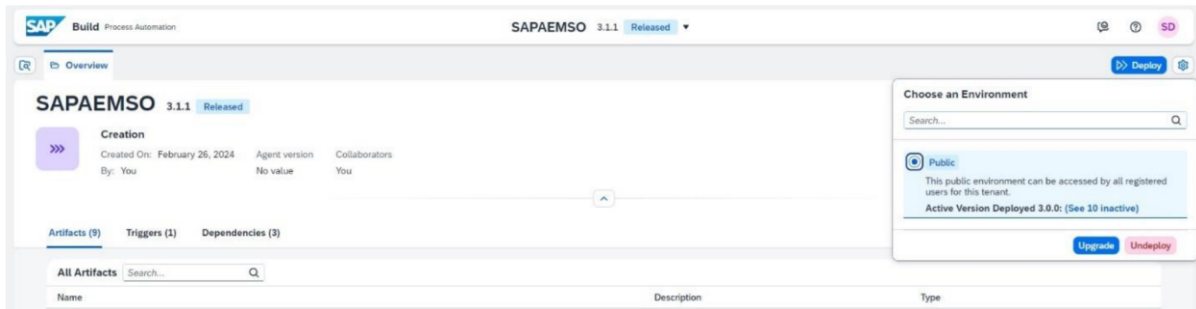
Head back to the Lobby and Click on the SAPAEMSO project. Prior to releasing the project, we must make a small change to the project. Let's start by clicking on the "Sales Order Review" Process.



In the business process, we must indicate which users will have the notification delivered to their inbox. Click on the Approval Form for Sales Order. You will see properties appear on the right side of the screen. Specify the userid of users who should have the notification sent to their inbox. In the screenshot you will see 2 mail addresses separated by comma. In this case the email address is the userid. In some case it might not be. If you deploy your project and do not see any items appearing in your inbox, you might have not specified the correct id. Once you have made the change, we now need to release and deploy the project. Click the "Release" option in the upper right.



Once the project is released, you should see the Deploy Button. Press it to reveal a new feature that will ask you to select an environment. Select the "Public" environment and press "Upgrade". Note, in my case, I have several versions already deployed, so if it's the first deployment, it might not say "upgrade" as in the screenshot.



Here you must select your destination for the action. If your destination is not in the dropdown, something has not been configured properly in the settings of the project.

## Define Variables

"AEMBROKERREST" in "SAPAEMSO 3.1.1"

Data type: Destination

Set new value

Use existing value

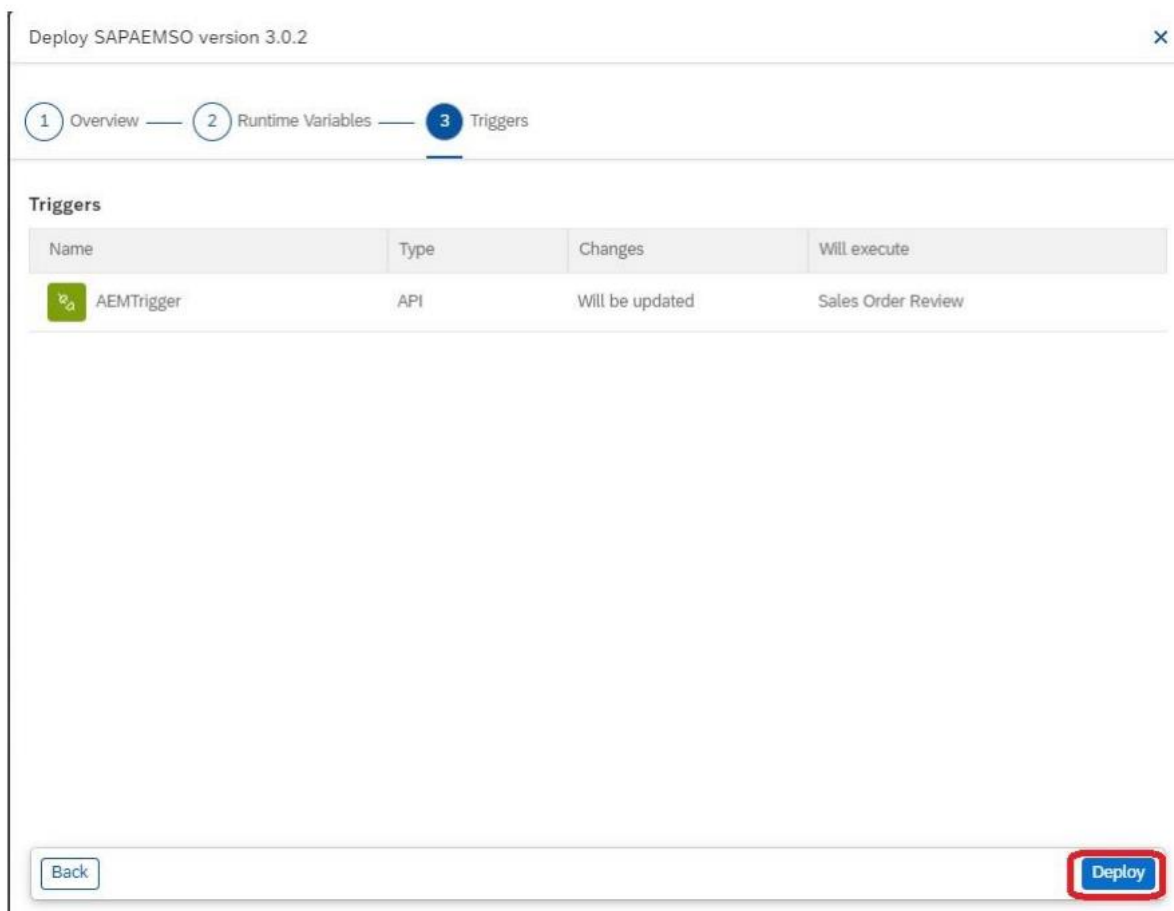
Destination:

AEMBROKERREST

X

▼

This is the last step to deploy your business process, click Deploy.



You should now see "Deployed" and "Active" on the top left of the screen and your process should now be running.

SAP Build Process Automation

SAPAEMSO 3.0.2 **DEPLOYED**

Overview

Undeploy

SAPAEMSO 3.0.2 **DEPLOYED** **ACTIVE**

>>>

Update

Last updated on: October 16, 2023

By: You

Creation

Created on: October 14, 2023

By: You

Bundle Size

Project Size: 60.27 KB

Agent version

No value

Collaborators

You

Artifacts (10)

Triggers (1)

Dependencies (1)

All Artifacts

Search...

Name	Description	Type
[dt] customer		Data Type
[xp] End		Process
[dt] orderHeader		Data Type
[dt] orderHeaderList		Data Type
[dt] orderItem		Data Type



## Creating the Integration Suite artefacts

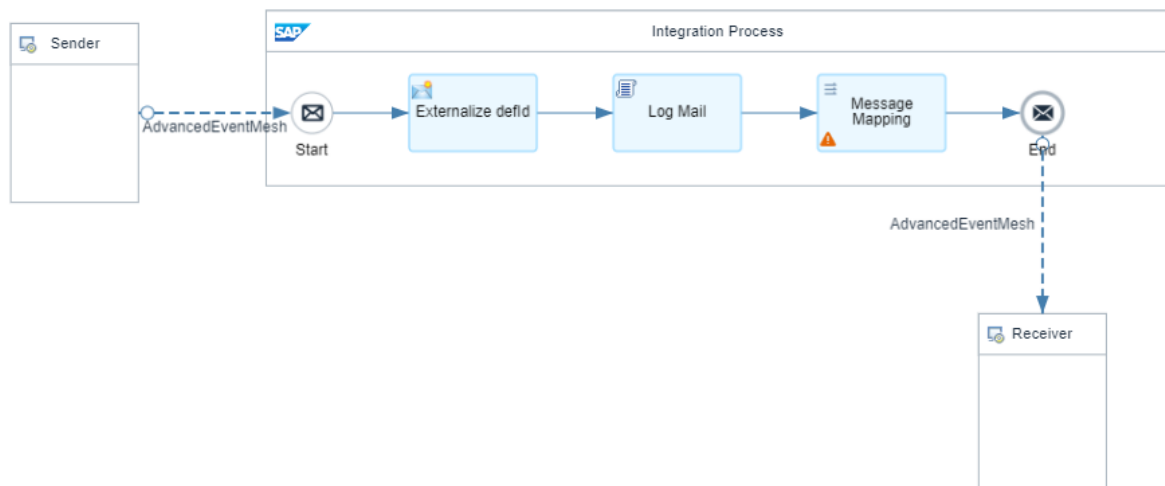
In the Business Process Automation scenario, we will activate an instance each time a record from the Dead Message Queue is submitted for review. The Sales Order Event from the Queue will need to be augmented with some additional metadata that is required for the BPA API.

If you have completed the Integration Suite exercises you will already have the necessary artefacts available in your Integration Suite tenant. If you have not completed these exercises, you can follow the section [“Download and import the template IFlow package”](#) in the Integration Suite exercises to get ready for this exercise.

The IFlow relevant for this scenario is **SalesOrderToBPAPiFlow**, which will connect to the Advanced Event Mesh and pull in all orders that have been submitted for processing from the UI5 application. Technically, the iFlow connects to a Queue that you will create on the broker. Once the Sales Order event is received, it will be routed through the mapping and then published onto a new topic with the augmented schema.

AEM-Rapid-Pilot /	
<b>AEM-Rapid-Pilot</b>	
Header	Overview
Artifacts (5)	Documents
Comments	Tags
<input type="checkbox"/>	Name
<input type="checkbox"/>	Type
<input type="checkbox"/>	AEM From Scratch
<input type="checkbox"/>	Created
<input type="checkbox"/>	AEMBussinesPartnerAddressCheck
<input type="checkbox"/>	Business Partner address checking flow, uses SAP BTP's Data Quality Management service for geo-location data to check and correct addresses in Business Partner events. Unmodified
<input type="checkbox"/>	AEMLegacyOutputAdapter
<input type="checkbox"/>	Legacy adapter iflow for processing events and writing them into a file over SFTP for legacy system import. Unmodified
<input type="checkbox"/>	AEMSalesOrderNotification
<input type="checkbox"/>	Sales Order email notification flow. Unmodified
<input type="checkbox"/>	SalesOrderToBPAPiFlow
<input type="checkbox"/>	Created

You can either open the IFlow or head directly into the “Configure” menu.



## Configure the definitionId

In the Configuration under the "More" tab you will see the parameter "definitionId". This is the unique ID of the Business Process Automation process that we will be activating. This ID will be taken from the BPA environment. Within the BPA environment, navigate to the Monitor section, find your business process and you will find the ID that needs to be entered. (\*\* Go see the next screenshot to see specific details on how to find ID\*\*) Once you have modified the ID, be sure to hit Save at the bottom.

Configure "SalesOrderToBPaiFlow"

Sender Receiver **More**

Type: All Parameters

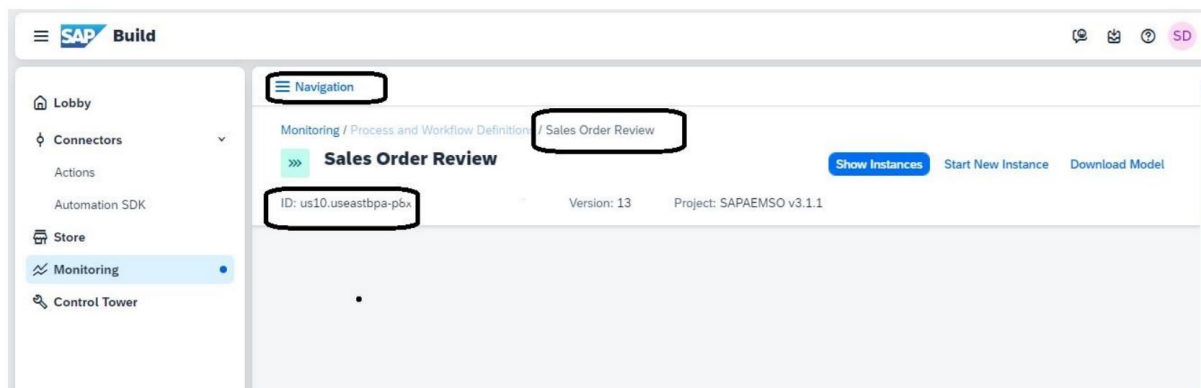
definitionId: tenant.sapaemsoaem.test

Navigate Back to the SAP Business Process Automation Environment temporarily. From the Business Process environment, navigate to the "Monitoring" section. To find this, simply click on the SAP Icon at the top to reveal the main menu. From there, on the left side, Click "Monitoring" and then "Processes and Workflows".

The screenshot shows the SAP Build Monitoring dashboard. The left sidebar contains the navigation menu with the following items: Lobby, Connectors, Actions, Automation SDK, Store, Monitoring (selected), and Control Tower. The main area is titled 'Monitor' and contains several widgets. The 'Process and Workflow Instances' widget shows 0 Failed today. The 'Automation Jobs' widget shows 0 Failed today. The 'Acquired Events' widget shows 0 Errors today. The 'Automation Overview' widget shows 0 Errors today. The 'Automation Concurrent Quota Usage Today' widget shows Simultaneous execution Unattended 0/0 and Simultaneous execution Attended 0/0. The 'Manage' section contains three widgets: 'Processes and Workflows' (3 Deployed), 'Visibility Scenarios' (0 Deployed), and 'Business Rules' (0 Deployed).

You should now see the "Sales Order Review" process listed and right below it you should see the ID. This is the ID you want to copy and paste into the iFlow mapping section. You will take the ID and you will use it in the iFlow to uniquely identify the Workflow to be started. Essentially, the API from SAP is very generic. You call the API with the ID of the workflow to be started with the payload and

voila, you can start the process. \*\*\* If for some reason, the Sales Order Review process is not visible, select "Navigation" at the top to select Sales Order Review.



## Configure the IFlow

In the configuration under the Sender and Receiver tab you will find the necessary fields to connect to the AEM Service.

You only need to configure one (either Sender or Receiver), the other will pull the same values.

Configure "SalesOrderToBPaiFlow"

**Sender** Receiver More

**Connection**

Sender: Sender

Adapter Type: AdvancedEventMesh

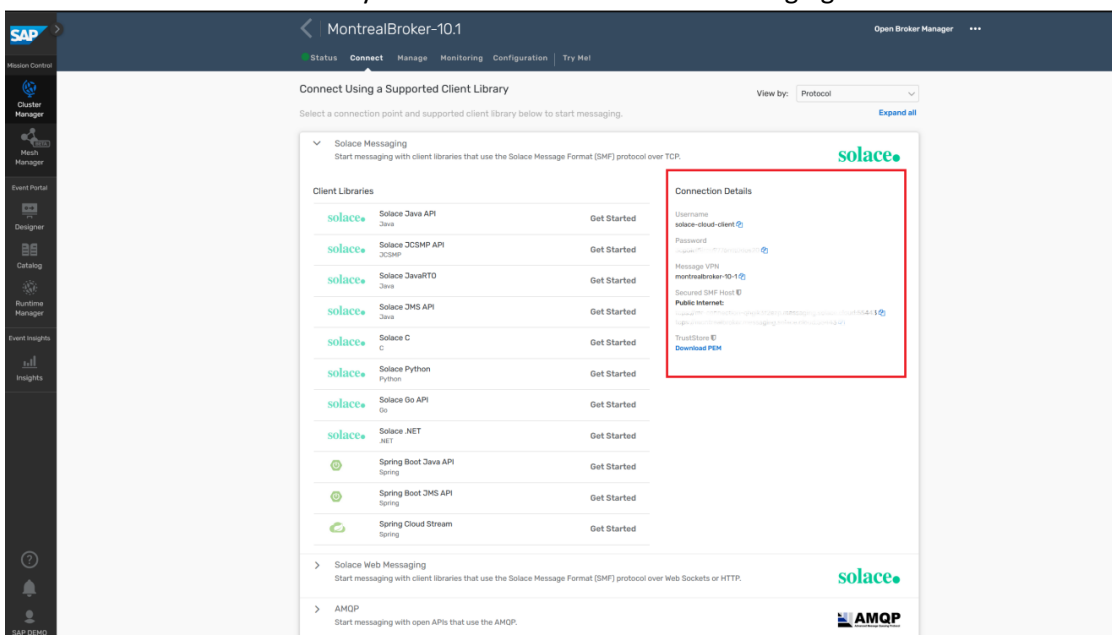
Host: tcps://mr-connection-id.messaging.solace.cloud:55443

Message VPN: vpn\_name

Username: solace-cloud-client

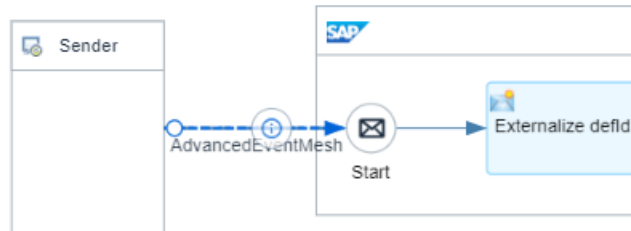
Password Secure Alias: CABrokerUserPass

If you have followed the Integration Suite exercises the information required will be the exact same SMF information you have used previously. If not, the information can be found in your AEM Console under Cluster Manager, select the service that you want to use and go to the "Connect" tab. Take a note of the connectivity details underneath "Solace Messaging".



The password will need to be configured as a Secure Parameter. For more detailed instruction check out the [“Queue Setup”](#) section of the Integration Suite exercises.

The IFlow is now set up in way that pulls messages from the “SORJECTED” queue:



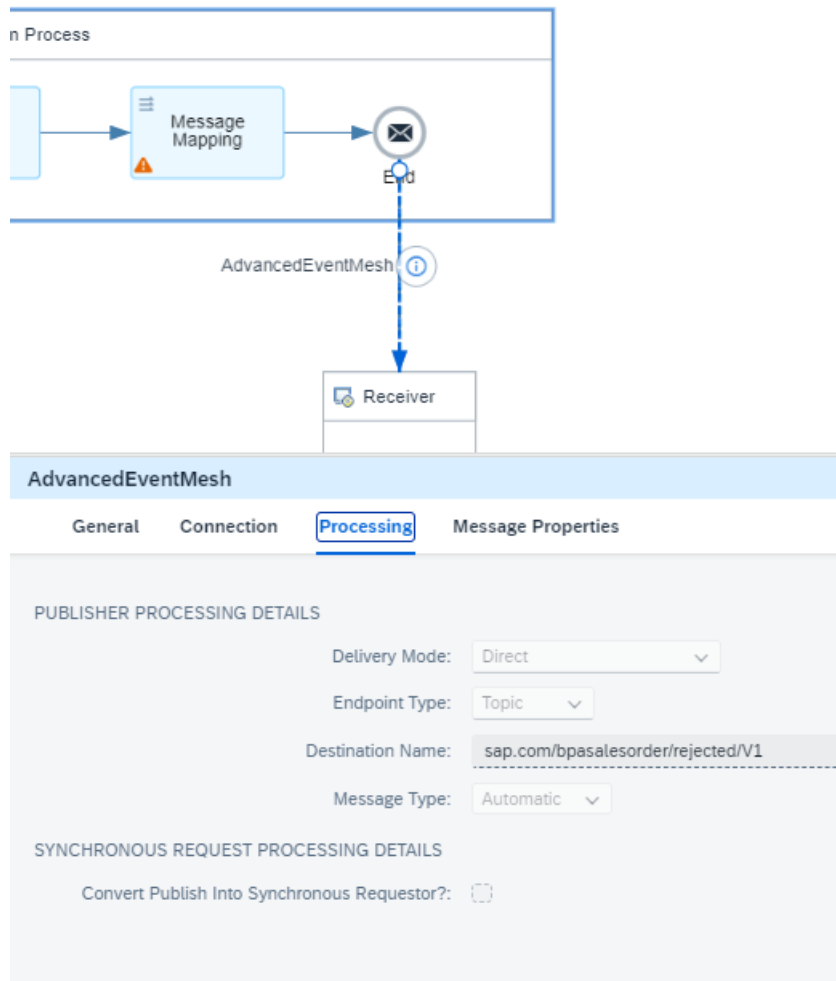
**AdvancedEventMesh**

General   Connection   **Processing**

SENDER PROCESSING DETAILS

Consumer Mode:	Guaranteed ▾
Parallel Consumers:	1
Queue Name:	SORJECTED
Selector:	
Acknowledgment Mode:	Automatic On Exchange Complete ▾
Settlement Outcome After Maximum Attempts:	Failed ▾
Maximum Message Processing Attempts:	5
Retry Interval (in ms):	1000
Maximum Retry Interval (in ms):	30000
Exponential Backoff Multiplier:	3.0

And after the mapping it will publish to a topic called "sap.com/bpasalesorder/rejected/V1". The thought here is that we still have a Sales Order but it's been formatted for the Business Process Automation API. Earlier in the exercise you setup a Queue listening for this event so it's important that these 2 topics match so that all BPA rejected sales orders get attracted into the right Queue.



Now that the IFlow is properly configured you need to deploy it. If you opened it to see inside you can hit deploy on the top right. If you are in the IFlow package you can either hit deploy after the configuration or in the context menu on the right.

AEM-Rapid-Pilot / **AEM-Rapid-Pilot** Save Export

Header Overview **Artifacts (5)** Documents Comments Tags

Name	Type	Version	Actions
<input type="checkbox"/> AEM From Scratch	Integration Flow	Draft	
<input type="checkbox"/> AEMBussinesPartnerAddressCheck Business Partner address checking flow, uses SAP BTP's Data Quality Management service for geo-location data to check and correct addresses in Business Partner events. Unmodified	Integration Flow	1.1.7	
<input type="checkbox"/> AEMLegacyOutputAdapter Legacy adapter iflow for processing events and writing them into a file over SFTP for legacy system import. Unmodified	Integration Flow	1.0.9	
<input type="checkbox"/> AEMSalesOrderNotification Sales Order email notification flow. Unmodified	Integration Flow	1.0.2	
<input type="checkbox"/> SalesOrderToBPAIfIow Created	Integration Flow	1.0.1	

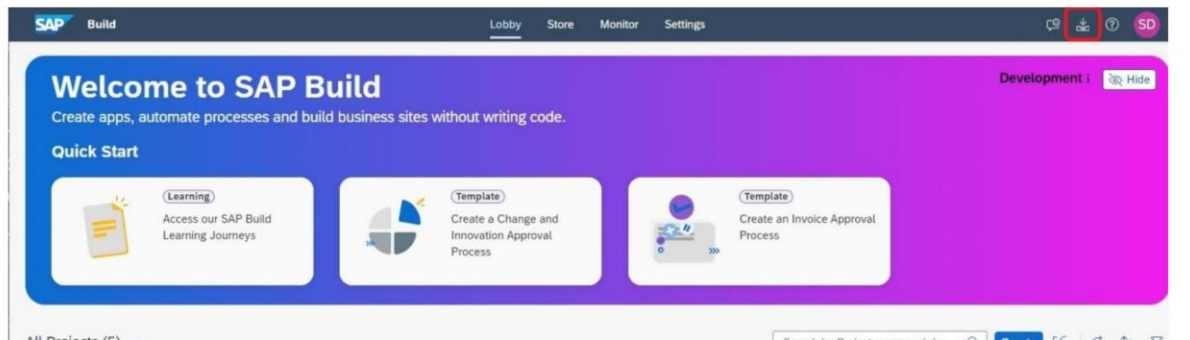
Deploy

You should now have a fully integrated scenario.

## Testing / Expected Result

Either from the Sales Order Dashboard, hit "Submit" on the "Dead Message Queue" card to send a message for review or publish an event yourself to the SORJECTED queue using the TryMe feature of your message broker. An example SO event is included in the material provided for you.

Now we to check if the event triggered a creation of an Inbox Item. From the main screen of the BPA Lobby, you can see in the upper right, a little inbox symbol...Click It.



Now you will see the form that we created to display the contents of a Sales Order Event.

**SAP My Inbox**

All Tasks (1)

Search

Sales Order Review  
sb-clone-390ed564-... Medium

**Sales Order**

**AEM RAPID PILOT - BPA Sales Order Sample**

**Sales Order Header**

Sales Order Number \*  
SO1002

Sales Type  
In-store

Date  
1691193600000

Sales Org  
SA02

Distribution Channel  
DC02

**Customer Details**

Customer  
+ Enter search term

Customer Id	Customer Name	ZipCode
CUST002	XYZ Ltd	54321

**Sales Order Items**

Order Items  
+ Enter search term

Item	Material	Material Type
ITEM002	MAT002	Service