SAP Business Technology Platform | EXTERNAL

Setup Guide

Intelligent Processing of Invoices without Purchase Orders using SAP Workflow Management or SAP Build Process Automation

THE BEST RUN SAP

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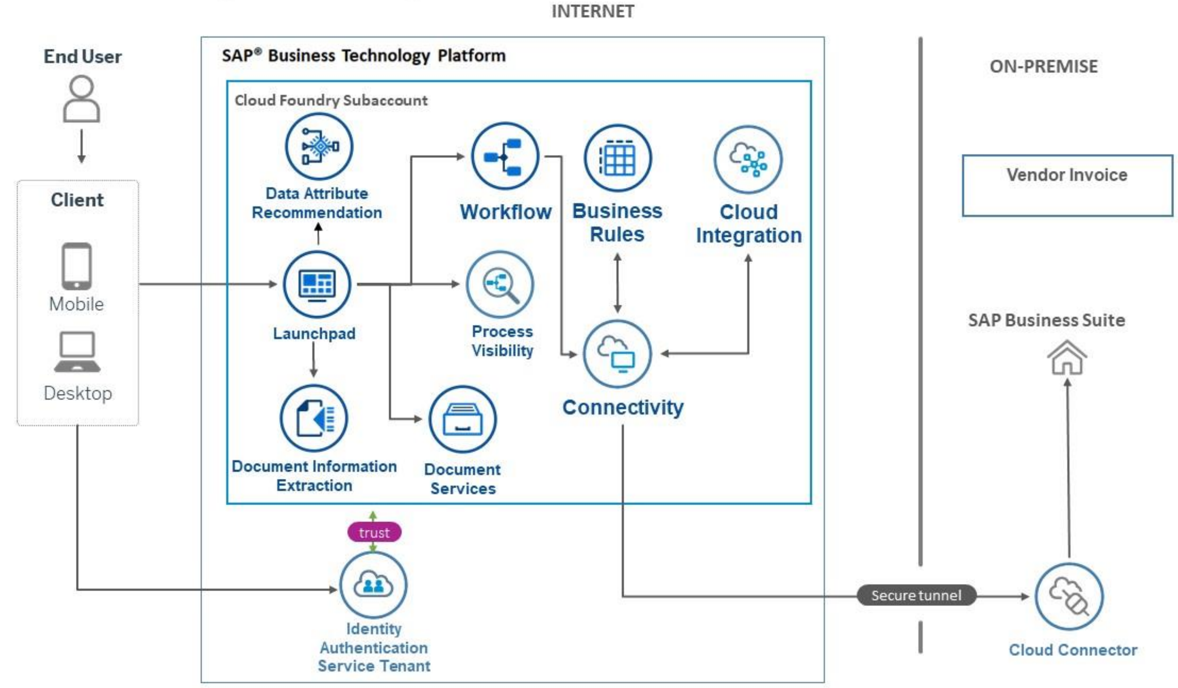
Overview

This document provides information about configuration steps to consume the Live Process Package Intelligent Processing of Invoices without Purchase Orders. The main audience of this document are technical IT Administrators and Developers.

This content package enables SAP ERP customers to automate approvals for invoices without purchase orders using SAP Build Process Automation or SAP Workflow Management without additional development in SAP ERP. Salient features of this content package are

- Plug and Play with SAP ERP without additional development.
- Net new process variants can be configured in a low-code no-code approach.
- Agent determination achieved in any of the following ways - using Business Rules, or SAP ERP, or external systems.
- Validate Line item attributes using Business Rules.
- Achieve process visibility with key process performance indicators out-of-the-box.
- Determine which process variant to trigger and whom to assign the approval tasks using Business Rules
- Pre-built integration content to call the RFC in SAP ERP from SAP Workflow Management.
- Line Item data validated using Business Rules before approval.
- Approvers are determined using a Business Rule / external system.
- Processor and approvers are notified via email.
- Approvers have two decision options (Approve, Reject), and based on the decision, the next approval step will be created or terminate the approval process.
- Vendor Invoice will be updated in SAP ERP.

SAP ERP – Intelligent Processing of Invoices without Purchase Orders



Intelligent Processing of Invoices without Purchase Orders application helps customer to post Invoice data into ERP, and check and display an existing invoice. For creation and change of the invoice, customers can enable approval process before updating in SAP ERP. The application provides flexibility in choosing process variants depending on attributes like *Post Invoice, Check Invoice, Plant, Tax Calculation* etc. When a Non-PO vendor invoice is created or changed in the application, pre-configured Process Variants are triggered in SAP Workflow Management or SAP Build Process Automation.

Account executive/Invoice processor, Approvers, Procurement Team are the target users of the user interfaces explained in this document

Required SAP Business Technology Platform Services

The following SAP BTP services are required to consume the content package to Manage Invoices without Purchase Order in SAP ERP 6.0 and above:

- SAP BTP Cloud Foundry Runtime
- SAP Workflow Management or SAP Build Process Automation
- SAP Business Application Studio
- SAP Integration suite
- SAP Cloud Portal service / SAP Launchpad service
- SAP Document Management Service
- Document Information Extraction (optional)
- Data Attribute Recommendation (optional)
- SAP Cloud Identity Services - Identity Authentication (optional)
  (or equivalent Identity and Authentication service)

Setup and Configuration

The Intelligent Processing of Invoices without Purchase Orders content package requires SAP Build Process Automation or SAP Workflow Management subscription or a CPEA contract. Based on which service you plan to use, follow the appropriate section to configure either SAP Build Process Automation or SAP Workflow Management

Configure SAP Build Process Automation

Follow the setup and configuration section of SAP Build Process Automation:

1. Subscribe to SAP Build Process Automation (Standard Plan)
2. Configure Destinations for Live Process Projects
    a. Import Package Destination
    b. Business Rules Destination to support start and step conditions
3. [Optional] Configure SAP Launchpad Service for SAP Build Process Automation

Configure Process Automation Destination

A HTTP destination is required in the BTP subaccount where SAP Build Process Automation is subscribed. Create a destination with name "sap_process_automation_service" with the following configuration if it doesn't exist already. Please refer how to create a HTTP destination OAuth 2.0 Authentication (client credentials).

Name	sap_process_automation_service
Type	HTTP
Proxy Type	Internet
Authentication	OAuth2ClientCredentias
URL	<"endpoints"."api">
Client ID	<"uaa":"clientis">
Client Secret	<"uaa":"clientsecret">
Token Service URL	<"uaa":"url">/oauth/token

Note: While creating the service instance for SAP Build Process Automation service, make sure that at least the required scopes are assigned (help documentation to enable technical authentication to access the SAP Build Process Automation APIs). If the scopes are not assigned, you can also update the service instance with the required scopes.

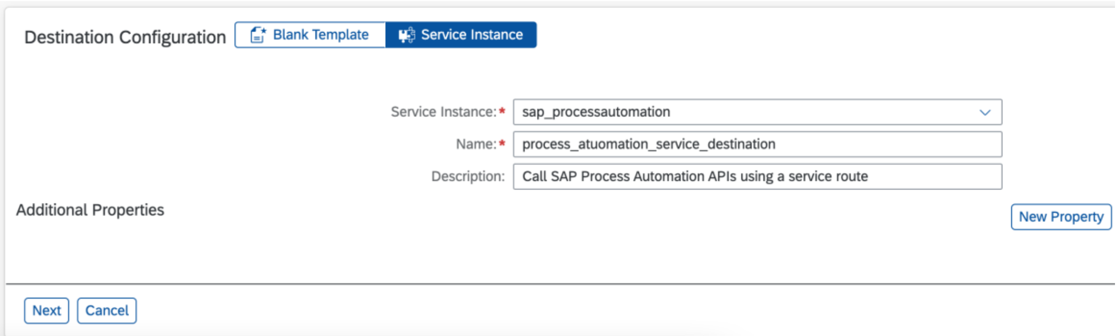
Configure OAuth2ClientCredentials SAP Build Process Automation Destination

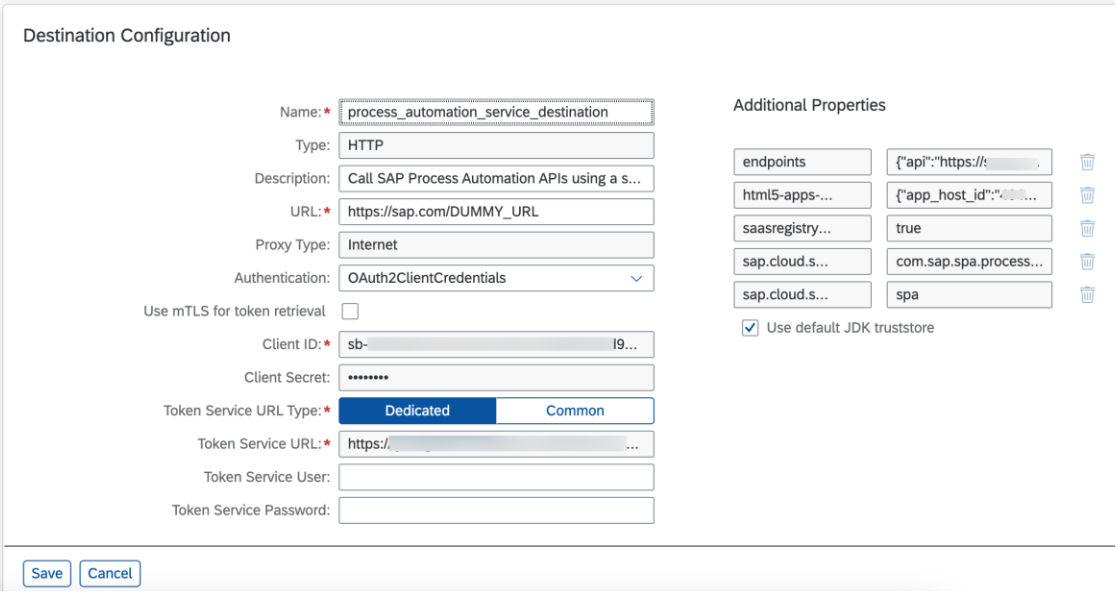
(Service Instance)

Ignore this step if there is already a destination using SAP Build Process Automation service instance created.

Create new destination to call SAP Build Process Automation APIs using a service route from SAP UI5 component. For more details, follow the help document:

https://help.sap.com/viewer/cca91383641e40ffbe03bdc78f00f681/Cloud/en-US/685f383cebb54c009b2fac633b32c90f.html.





Configure SAP Workflow Management

Manage Non-PO Vendor Invoice content package requires SAP Workflow Management subscription or a CPEA contract. Follow the setup and configuration section of SAP Workflow Management.

https://help.sap.com/viewer/6f55baaf330443bd8132d071581bbae6/Cloud/en-US/d7910e2bf7f64afc9d0eb21b0cc9e84d.html

Configure Workflow Email Destination

Configure workflow email destination. For more information on configuring destination, see configure workflow email destination.

Configure Workflow Destination

To start the item process variant, you need to maintain a destination for the Workflow with the following parameters:

Name	Workflow
Type	HTTP
Proxy Type	Internet
Authentication	OAuth2ClientCredentials
URL	https://api.workflow.<region-host>.hana.ondemand.com/workflow-service/rest
Client ID	<ClientID>
Client Secret	<clientSecret>
Token Service URL	<uaa.url>/oauth/token

Please refer help documentation how to get URL, ClientID, Client Secret and Token Service URL. For more information refer to how to create a HTTP destination and how to use Workflow APIs.

Configure Business Rules Destination

An HTTP destination is required in the Cloud Foundry account where SAP Workflow Management is subscribed. Configure destination with details as shown below. Please make sure the URL formatted as {rule_runtime_url}/rules-service. Please refer how to create a HTTP destination and how to access business rules APIs using OAuth 2.0 Authentication (client credentials)

Name	BusinessRules
Type	HTTP
Proxy Type	Internet
Authentication	OAuth2ClientCredentials
URL	<rule_runtime_url>/rules-service
Client ID	<Client ID>
Client Secret	<Client Secret>
Token Service URL	<uaa.url>/oauth/token

Please refer help documentation how to get URL, Client ID, Client Secret and Token Service URL. For more information refer to how to create a HTTP destination and how to access business rules APIs using OAuth 2.0 Authentication (client credentials).

Configure OAuth2ClientCredentials Business Rules Destination (Service Instance)

Create new Destination to call Business Rules Service APIs using a Service route from SAP UI5

Component.

- Click New Destination.
- Select Service Instance as Destination Configuration.
- Select Service Instance as BusinessRules.
- Enter Name as BusinessRules_CFLP and click Next button.
- Click Save button.

Configure OAuth2ClientCredentials Workflow Destination (Service Instance)

Create new Destination to call Workflow Service APIs using a Service route from SAP UI5 Component.

- Click New Destination.
- Select Service Instance as Destination Configuration.
- Select Service Instance as Workflow.
- Enter Name as Workflow_CFLP and click Next button.
- Click Save button

Configure Document Management Service Repository

SAP Document Management service, in short Document Management, is the content management solution on the Cloud Foundry environment of SAP Business Technology Platform. For the Non-PO Vendor Invoice live process package, you need to subscribe to 'Document Management, integration option' in order to upload the invoice and other supporting documents for the approval process.

Create and configure root Document Management Service repository by following the steps described in Initial Setup for Document Management, Integration Option and Connect to Document Management, Repository Option Using API (incl. Prerequisites).

Save generated Repository ID from the response to be used the destination configuration as described in the next section.

Configure Document Management Destination

Configure a Document Management Service destination with the following parameters.

Name	bpmworkflowruntime_attachments
Type	HTTP
Proxy Type	Internet
Authentication	OAuth2ClientCredentials
URL	<endpoints.ecmservice.url>/browser/<Repository_ID>/root/

Client ID	<Client ID>
Client Secret	<Client Secret>
Token Service URL	<uaa.url>/oauth/token

Populate Client ID and Client Secret with the values from the Service Key created on the previous step (see Create Service Keys Using the Cockpit).

To make sure that the users can upload and view the document, assign the roles "SDM_Admin" or "SDM_User" to the users.

Configure Document Information Extraction [Optional]

Document Information Extraction in cloud foundry environment helps you to automate the extraction of relevant information from the incoming invoices using OCR and machine learning capabilities. Once the machine learning model is enriched to identify your vendor and employee, it can automatically match the invoice to the enriched data.

Note: that this is an optional service for the live process package.

Name	DocumentInfoExtraction
Type	HTTP
Proxy Type	Internet
Authentication	OAuth2ClientCredentials
URL	<url>+<swagger> [Example - https://aiservices-dox.cfapps.sap.hana.ondemand.com /document-information-extraction/v1/]
Client ID	<Client ID>
Client Secret	<Client Secret>
Token Service URL	<uaa.url>/oauth/token

Note: The following role collection - Document_Information_Extraction_UI_End_User is required to access the Document Information Extraction UI. For more information please refer to the following help guide - User Guide for Document Information Extraction UI

Configure Data Attribute Recommendation [Optional]

Data Attribute Recommendation in cloud foundry environment helps you to automate the account assignment for new line-items of the incoming invoices using classification and machine learning capabilities. Once the machine learning model is enriched to identify your accounts, it can automatically predict for the invoice the corresponding accounts to assign the line-items to.

Note: that this is an optional service for the live process package.

Before configuring the connection, it's necessary to train the Data Attribute Recommendation (DAR), since it's a generic machine learning service for business purposes. Additionally, it's needed to train with customer specific data, to get appropriate recommendations, for GL-Accounts, Cost Centers, Business Areas and Profit Centers, existing in customer systems.

Therefore, a model needs to be trained in DAR, with Invoice data as input and the four accounts as classification output. A corresponding dataset-schema could have the attributes, as shown in the following json-structure (double click to open the whole object). You could use different attributes to train the model, but in this case, you have to adjust the delivered Start-UI and Rework-UI, because both are depending on the DAR, with exactly this structure.

To figure out how to use DAR, check out the documentation. It might also help you to have a look at the tutorials, to run a complete process with DAR and see the interaction with it.

```
{
            "features": [
                {
                    "label": "BUKRS",
                    "type": "CATEGORY"
                },
                {
                    "label": "BELNR",
                    "type": "CATEGORY"
                },
                {
                    "label": "GJAHR",
                    "type": "NUMBER"
                },
                {
                    "label": "BUZEI",
                    "type": "CATEGORY"
                },
                {
                    "label": "BUZID",
                    "type": "CATEGORY"
                },
                {
                    "label": "AUGDT",
                    "type": "CATEGORY"
                },
                {
                    "label": "AUGCP",
                    "type": "CATEGORY"
                },
                {
                    "label": "AUGBL",
                    "type": "CATEGORY"
                },
                {
                    "label": "BSCHL",
                    "type": "CATEGORY"
                },
                {
                    "label": "KOART",
                    "type": "CATEGORY"
                },
                {
                    "label": "UMSKZ",
                    "type": "CATEGORY"
                },
                {
                    "label": "ZUMSK",
                    "type": "CATEGORY"
                },
                {
                    "label": "SHKZG",
```

To get recommendations corresponding to your system-data, you have to train the model with data out of your system. DAR requires this training-data in a csv-file. To use the structure before as dataset-schema, you need to provide all the features and labels of the schema as fields in the training-data (csv). The first line of the file should contain the exact field-names as header-row.

To extract this invoice-data out of your system, you might use the following sql-command. In general, it's expected to get better predictions, the closer the training-data is to the real productive data and the more current it is. Therefore it's also recommended to re-train the model in some regularity (for example after some months) with the newest data. For more information about Invoice data as training data, have a look at these best practices.

```
SELECT
t2~BUKRS as BUKRS, t2~BELNR as BELNR, t2~GJAHR as GJAHR,
t2~BUZEI as BUZEI, t2~BUZID as BUZID, t2~AUGDT as AUGDT, t2~AUGCP as AUGCP,
t2~AUGBL as AUGBL, t2~BSCHL as BSCHL, t2~KOART as KOART, t2~UMSKZ as UMSKZ,
t2~ZUMSK as ZUMSK, t2~SHKZG as SHKZG, t2~PRCTR as PRCTR, t2~GSBER as GSBER,
t2~MWSKZ as MWSKZ, t2~WRBTR as WRBTR,
t2~LIFNR as LIFNR, t2~HKONT as HKONT, t2~KOSTL as KOSTL,
t1~BLART as BKPF_BLART,
t1~BUDAT as BKPF_BUDAT,
t1~WAERS as BKPF_WAERS,
t1~STBLG as BKPF_STBLG
from BKPF as t1 INNER JOIN BSEG as t2
ON t1~BELNR = t2~BELNR AND t1~GJAHR = t2~GJAHR
AND t1~BUKRS = t2~BUKRS WHERE t1~AWTYP IN ('BKPF', 'BKPFF')
AND BUZEI = 1
order by GJAHR descending
```

Hint: You could use the 'BKPF_BUDAT'-field to filter only for the most current data, typically you take the last 6 months to one year, depending on how many records are in your system.

After successfully training and deploying the model, note down the model_name and maintain it accordingly in the following Destination, to connect the delivered content to it.

Name	DataAttributeRecommendation
Type	HTTP
Proxy Type	Internet
Authentication	OAuth2ClientCredentials
URL	<url>+<model_name> (of your trained model) [Example - https://aiservices-dar.cfapps.sap.hana.ondemand.com/inference/api/v3/model/<model_name>]
Client ID	<Client ID>
Client Secret	<Client Secret>
Token Service URL	<uaa.url>/oauth/token

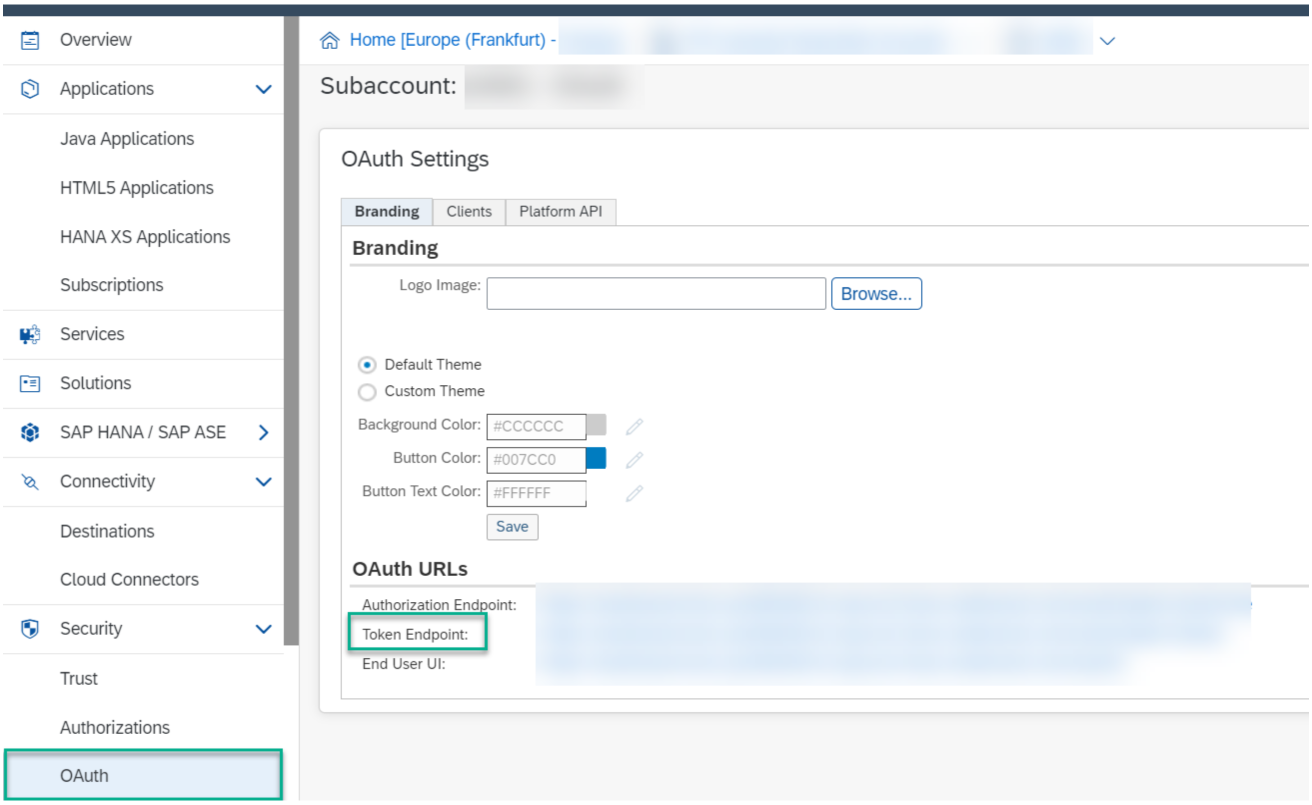
Configure Integration Destination

A HTTP destination is required in the Cloud Foundry account where SAP Workflow Management is subscribed.

Name	CPI
Type	HTTP
Proxy Type	Internet
Authentication	Basic Authentication **OR** OAuth2ClientCredentials
URL	<runtime.url>
Username **OR** Client ID	
Password **OR** Client Secret	
Token Service URL	<oauth.url.for.clientCredentials>

Refer to this link [how to get your Integration tenant runtime url](#).

If you would like to use OAuthClientCredentials flow, then create an OAuth client in SAP Integration Neo tenant and enter Client ID and Client Secret. Token Service Url is available in your SAP Integration Neo account as showed below.



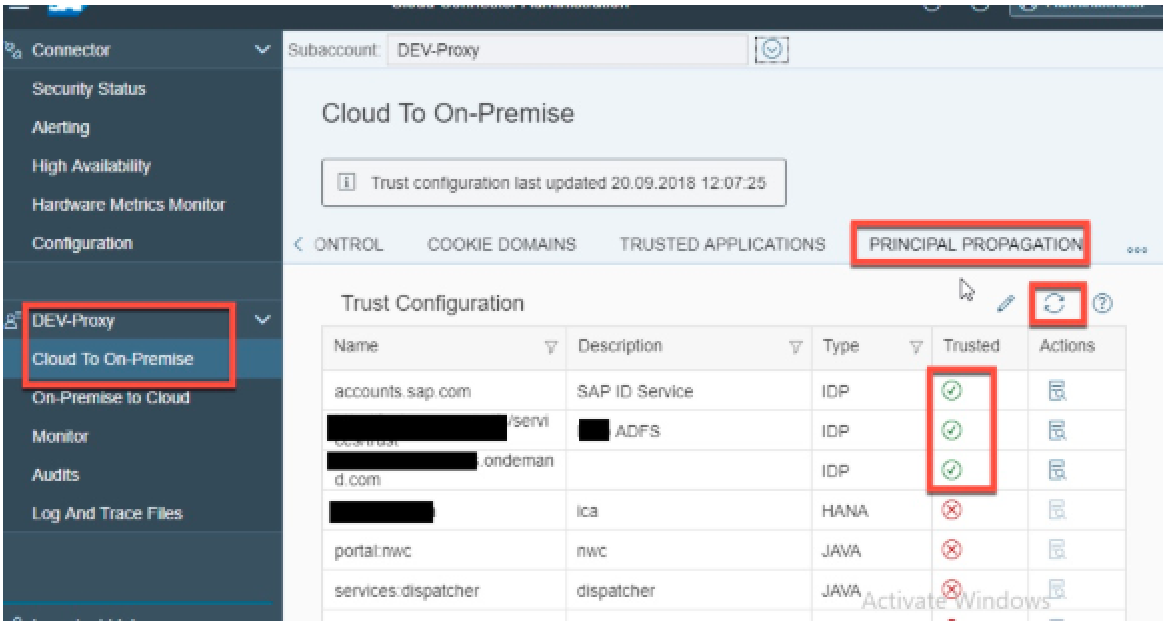
Assign the required roles to your OAuth client (oauth_client_<client ID>).

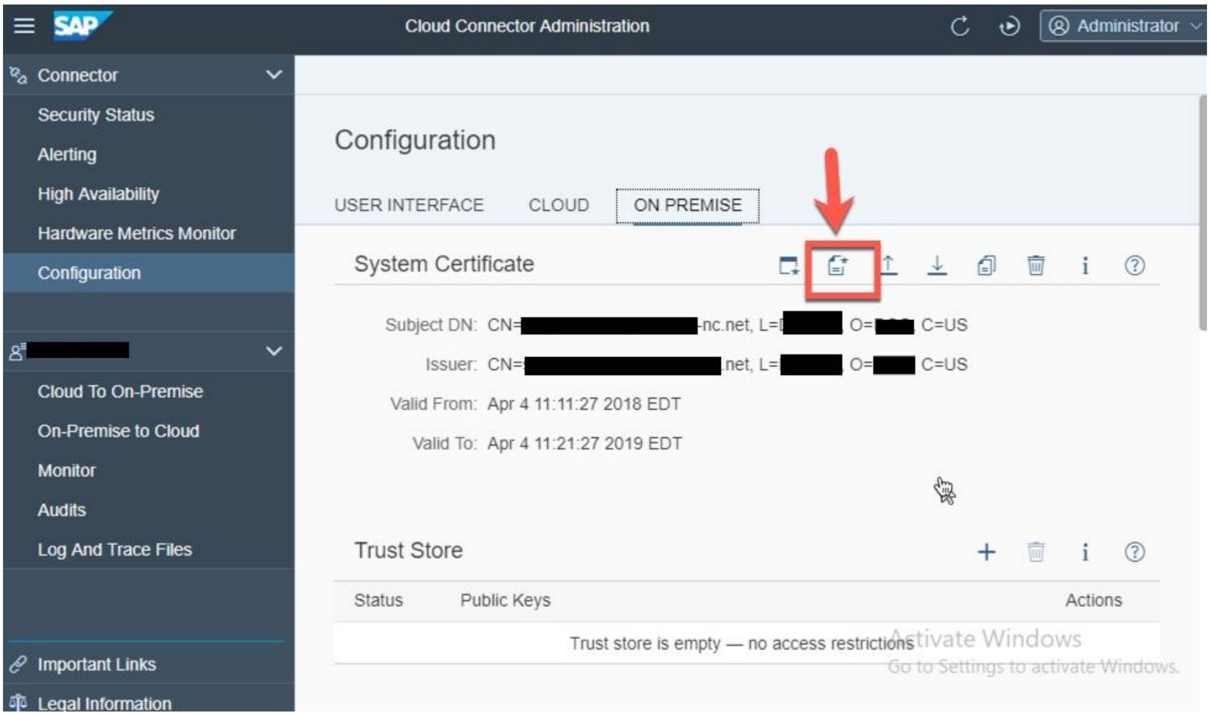
Configure SAP ERP Destination

Create an RFC destination with the following properties in the Neo account where SAP Integration service is subscribed. Please refer how to create an RFC destination for the Neo Environment.

Name	<ANYNAME> Note: You can name it as you wish but maintain the destination name in the integration flow configuration.
Type	RFC
Proxy Type	OnPremise
User	<ECCUSER>
Password	
Repository User	
Repository Password	
Location ID	<uaa.url>/oauth/token
Additional Property	Name: jco.client.ashost Value: <abapServerHost> Name: jco.client.client Value: <client id> Name: jco.client.sysnr Value: <systemNumber>

For implementing Principal propagation customer needs to synchronize the IDP in SAP cloud connector, create the destination of type IDP and import the self-signed CA certificates.





Follow these steps in the SAP ERP (ECC) to enable Principal propagation

1. Import Cloud Connector (SCC) System certificate in STRUSTSSO2 transaction under SSL Server Standard. This established the trust between the backend and SCC
2. Maintain subject, issuer, cert rule parameter details in default profile – RZ10 transaction
3. Create the rule-based mapping using sample X.509 certificate – CERTRULE transaction
4. Restart ICM

Configure Cloud Connector

Configure your SAP Integration Suite account and ERP system in Cloud Connector to enable secure tunnel for RFC calls. Please refer the help documentation to configure Cloud Connector.

Customer needs to expose the Following BAPI's in cloud connector to be able to access the function modules

- BAPI_GL_ACC_GETLIST
- BAPI_COMPANYCODE_GETLIST
- MMPUR_UI_GET_SUPPLIERS
- BAPI_BUSINESSAREA_GETLIST
- BAPI_PROFITCENTER_GETLIST
- BAPI_COSTCENTER_GETLIST
- /SAPNEA/SMAPI_PLANT_GETLIST
- RFC_READ_TABLE
- BPAR_C_FI_TERM_OF_PAYMENT_KEY
- BAPI_CONTROLLINGAREA_FIND
- FI_TAX_SERVICES_CALCULATE
- BAPI_ACC_DOCUMENT_POST
- BAPI_ACC_DOCUMENT_CHECK
- BAPI_VENDOR_GETDETAIL
- BAPI_COMPANYCODE_GETDETAIL
- BAPI_USER_GETLIST
- BAPI_EXCHRATE_GETCURRENTRATES

Import, Configure and Deploy Integration Content

This live process content package requires **SAP Integration Suite** to create, modify and release Non-PO Vendor Invoice line items. An integration content package **SAP Build Process Automation Integration with SAP ERP – Invoice** is available in SAP API Business hub to integrate SAP Build Process Automation or SAP Workflow Management with SAP ERP. The following Integration models are available in this package. All integration models are using RFC Adapter to call the required APIs in SAP ERP.

Import the Content package to your SAP Integration Suite tenant.
To be able to import and deploy integration flows, you need the **AuthGroup.IntegrationDeveloper** role assigned in your tenant.

Import Prepackaged Integration content using SAP Integration Suite

- Access your SAP Integration Tenant management node. Please refer [help documentation]() on how to get Tenant management node address.

- Please refer help documentation on how to [import content packages]().

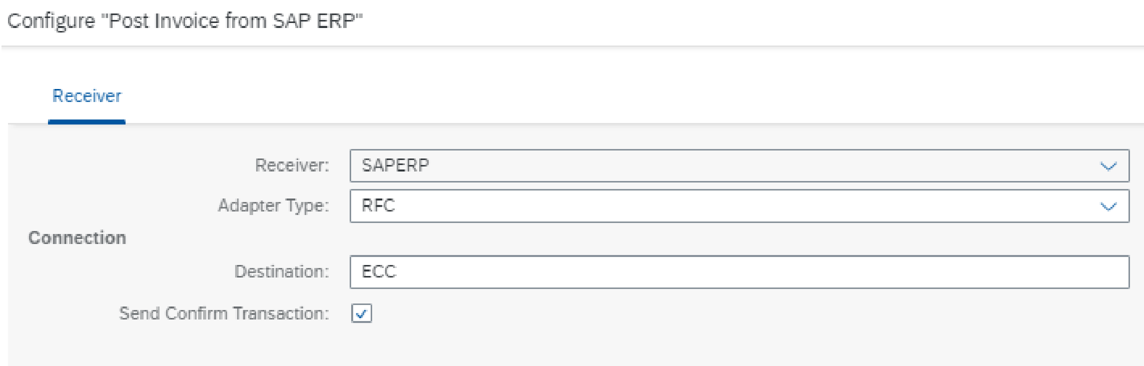
- View all pre-packaged integration flow under **Discover->Integration**

- Search content package **'SAP Build Process Automation Integration with SAP ERP – Invoice'**
- Click on the package SAP Workflow Management Integration with SAP ERP – Invoice

- Click **Copy** to import the Integration content package to your workspace.

- Navigate to **Design** to open the imported content package.

- For each Integration models, select Externalized Parameters, set configured value as RFC Destination created in the section **Configure SAP ERP Destination**



- Deploy the integration model

These Integration models are used from the Live Process content package **Manage Invoices without Purchase Order.**

Import, Configure and Deploy SAPUI5 Content

Setup SAPUI5 Application

Import SAPUI5 Content

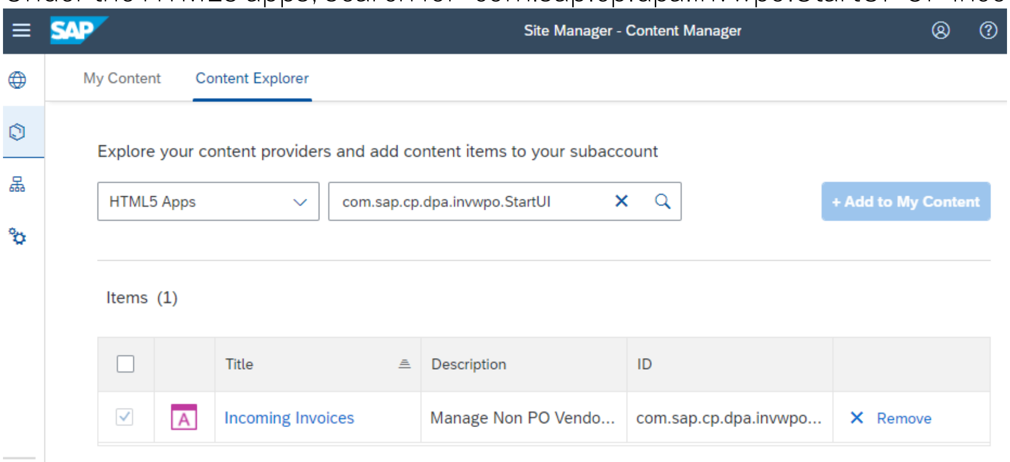
The Manage Invoices without Purchase Order content package requires an SAPUI5 application to manage incoming invoices and for the approval process.

The deployable file is attached as an additional artifact - **Manage Invoice without Purchase Order Application**
Deploy the file to use the application.

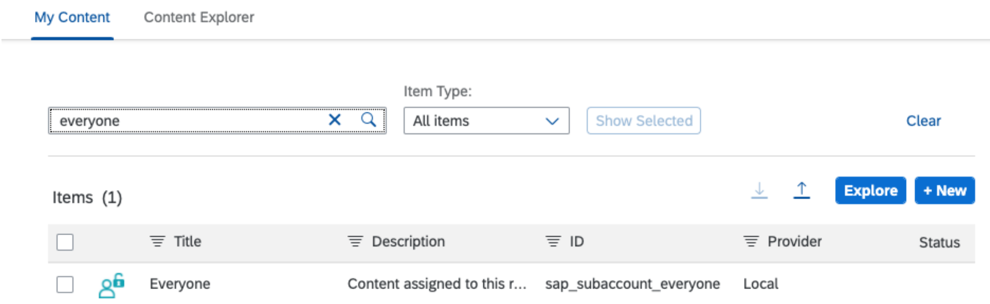
Configure SAP Central Fiori Launchpad Site

If you plan to use SAP Launchpad service, then configure [SAP Central Fiori Launchpad Site with Workflow Applications] using help documentation.
Perform the following steps to add the Vendor Onboarding app as a tile in the launchpad site:

- Open SAP Launchpad site manager application.
- Select Content Manager
- Go to Content Explorer tab.
- Under the HTML5 apps, search for ‘com.sap.cp.dpa.invwpo.StartUI’ Or ‘Incoming Invoices’

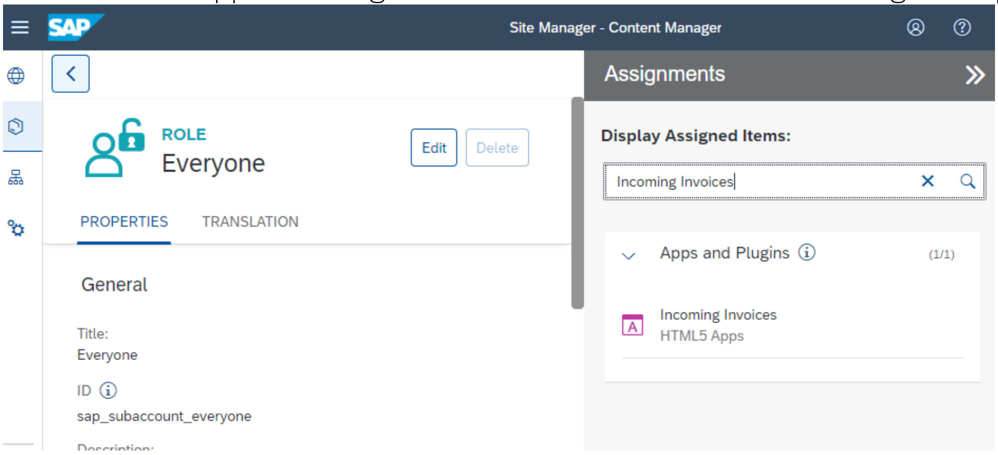


- Select the app from the result and click ‘Add to My Content’ button to include the UI5 component.
- Go to My Content tab, and search for the role to which you want to add the app (for example, the default role called everyone).



- Click the role from the result table and navigate into it.

- Click the Edit button.
- Search for the app ‘Incoming Invoices’ and click the + button to assign the app to the role.



- Save the changes to enable the app permission based on user role.
- You can either create a new group and add the Incoming Invoices app to that group or you can add the Incoming Invoices app to an existing group.

Please refer help documentation to know more about configuring start UI tile on Central Fiori Launchpad.

Import, Configure and Deploy Header Workflow

Deploy the Header Workflow

The header workflow deployable content is attached to the Workflow Management Content package as an additional artifact - Header Process. Deploy the workflow to use this content package.

Non-PO Vendor Invoice Header Process – This header workflow provides a generic approval process for vendor invoice creation in SAP ERP with invoice validations. Validations of the invoice are done against SAP ERP and by using business rules.

The header workflow determines process variants depending on Cost Objects. An Invoice cost object is a combination of invoice's item fields, specifically, a combination of cost center, profit centre, business area and plant.

For vendor invoice creation one header workflow can call multiple process variants for approval process depending on invoice cost objects. If invoice validation fails or approval process is declined or mentioned as not responsible by approver, a rework task will be assigned to the initiator of the Invoice Posting.

Import and Activate the Value Help Business Rules

The Business Rule – Polices for Non-PO Vendor Invoice Search Help contains rules to assist in value help used in Manage Invoices application.

It is attached to the workflow management content package in the sources as a zip file - Value Help Policies.

Learn how to import and activate the business rules by following the instructions here.

Appendix

Determining approvers through External Service

The workflow management content provides the option to determine approvers based on External Service instead of the Business Rule – Determine Approvers.

To determine approvers through an external service the following steps need to be implemented by the consumer

- Create an integration flow with HTTP Adapter as Sender
- Set the Address for Request Processing as /wfm/invoicewopo/determineApprovers

  Note: the endpoint is fixed and coupled with the workflow
- Input payload structure


```
{
  "Vocabulary":[
    {
      "InvoiceDetails":{
        "CompanyCode":"",
        "CostCenter":"",
        "ApprovalLevel":"",
        "CurrencyKey":"",
        "PaymentTerms":"",
        "PaymentMethod":"",
        "GLAccount":"",
        "VendorCode":"",
        "ExchangeRate":"",
        "ProfitCenter":"",
        "BusinessArea":"",
        "ThresholdInvoiceAmount":""
      }
    }
  ]
}
```


- Output payload header

  Content-Type: application/json

- Output payload


```
{
  "Result":[
    {
      "ApproverDetails":{
        "DueDurationReference":"", //"Task" OR "Workflow"
        "TaskDueDuration":1, //Duration type integer
        "Email":"user@example.com", //EMAIL
        "UnitOfTime":"h", // Can be one of the following – Y/M/D/h/m
        "UserId":"", //UserID
        "IsApprovalRequired":true,
        "UserGroup":"" //GroupID
      }
    }
  ]
}
```