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# Custom Joule Skill & Agent in SAP Build E-Way Bill Agent

Configuration & User Guide

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This document contains 2 sections. Each section covers different information about this template content package.

1. **Overview:** In this section, you will get quick overview of the use case, what are high-level components used and how the template works in nutshell. Prerequisite section provides information of different services of SAP Business Technology Platform that are required to use this template.
2. **Configuration Guide** It contain sections which will guide you to setup your (a) SAP Business Technology Platform Account with destination, user roles etc., (b) Links and steps to set up Joule studio and Joule (c) Import and configure the template using SAP Build Process Automation - Joule studio

**Note:**

- This agent and documentation are intended for Business use. The content is designed to support real business scenarios and enterprise integrations.
- This documentation does not provide a full end-to-end setup guide for all SAP Business Technology Platform services. It assumes that the IT administrator responsible for setup has prior experience with SAP Business Technology Platform and related services. The configuration steps outlined in this document must be followed as described.
- This content is provided to accelerate enterprise solution implementation. Customers are expected to adapt and extend the agent, skills, and configurations based on their specific business requirements. Users should have a basic understanding of SAP Build Process Automation and its capabilities to effectively customize and operate the solution.

## Overview

This document provides technical and configuration details required to set up and run the **E-Way Bill Joule Agent**. The intended audience for this document includes IT administrators, developers, and functional experts responsible for configuring SAP Business Technology Platform, SAP Build, and SAP S/4HANA integrations.

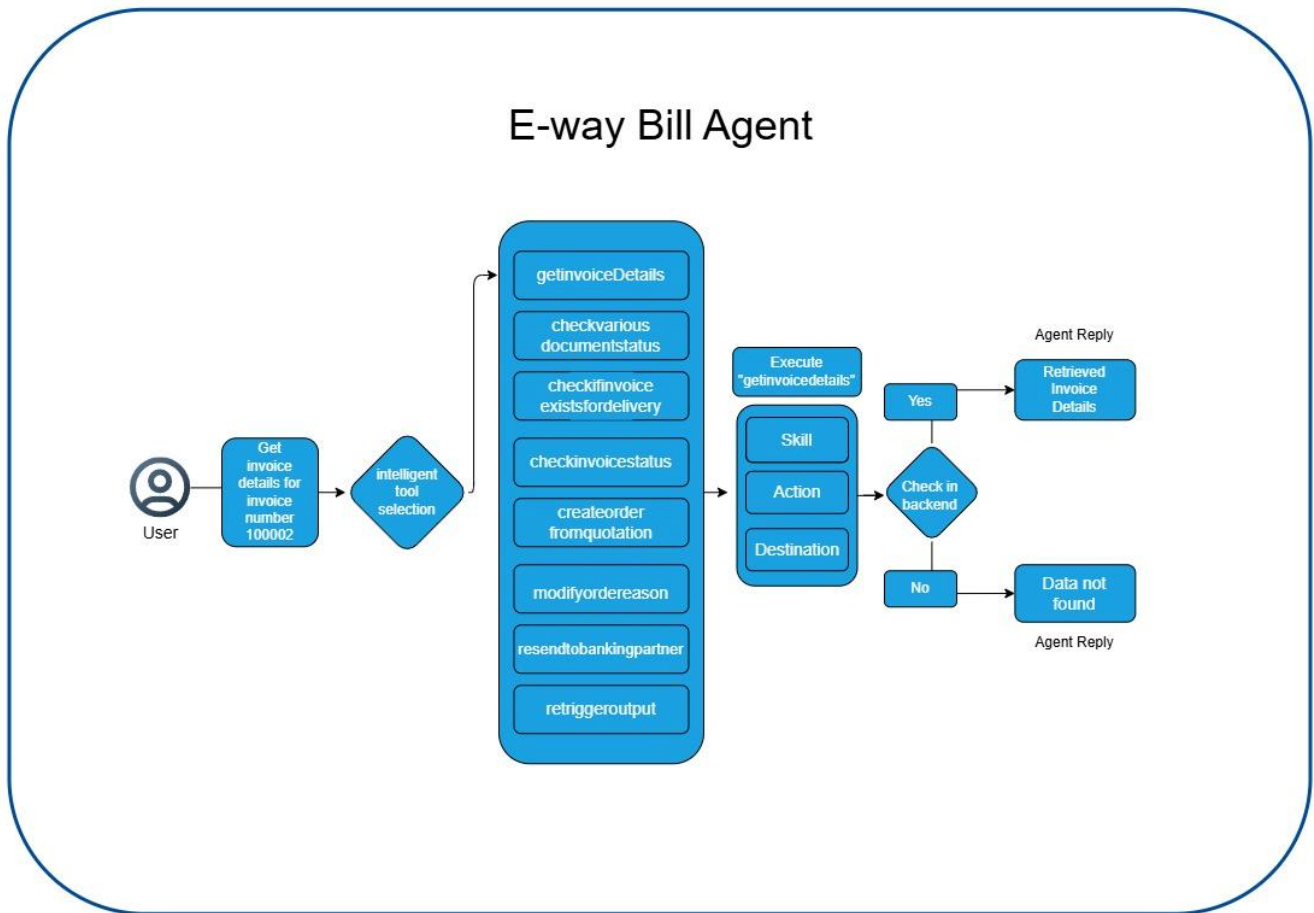
The **E-Way Bill Joule Agent** addresses a common business challenge where operational teams need to verify document conversions and statuses such as whether a quotation has been converted into an order, whether an order has an associated delivery or invoice, and what the current e-invoice or IRN status is. These checks are traditionally manual, time-consuming, and error-prone.

The Joule Agent interacts with SAP S/4HANA on-premise system through a CAP service as a middleware and secured using OAuth 2.0 client-credentials authentication. Based on the user's natural language query, the agent identifies the intent, invokes the appropriate Joule Skill, retrieves data from SAP systems,

and returns a business-friendly response. Where required, the agent requests user confirmation before executing follow-up actions such as retriggering invoice outputs.

If you're new to Joule Studio or want to explore how AI agents can augment business workflows, this example provides a practical, ready-to-use scenario.

**Solution flow :**



The business user requests e-invoice details for a specific invoice using a natural language prompt.

**Example Prompt:** Please find the e-invoice details for invoice number 100002.

- The user submits the request to the E-Way Bill Joule Agent. The agent analyzes the prompt and identifies that e-invoice detail retrieval is required.
- The agent refers to the tools available and invokes the getEInvoiceDetails tool, which is designed to retrieve e-invoice information based on free text user input.

- The tool maps the user query to the appropriate CAP service endpoint with OData parameters and calls the SAP S/4HANA On-Premise system through the CAP service as middleware.
- SAP S/4HANA On-Premise system returns the e-invoice data for invoice number 100002 as a response.

The agent consolidates the response and displays all available e-invoice details to the user in a business-friendly format, without requiring manual navigation in SAP systems.

## Business Value & Benefits

The E-Way Bill Joule Agent delivers significant business value by simplifying and accelerating access to quotation, order, delivery, and invoice information across SAP systems.

### Key Business Value:

- Eliminates manual navigation across multiple SAP transactions to check document statuses.
- Centralizes quotation, order, delivery, and invoice queries into a single conversational interface.
- Provides real-time access to SAP S/4HANA data using natural language.
- Reduces dependency on technical SAP expertise for routine operational checks.

### Key Benefits:

- Faster task completion by automating document status checks and validations.
- Improved operational efficiency by reducing manual lookups and errors.
- Better decision making through immediate visibility into e-invoice and IRN statuses.
- Guided next best actions such as retriggering invoice outputs or resending documents after user confirmation.
- Reduced effort for operational and finance teams, lowering turnaround time from hours to minutes.

By leveraging agent tools and SAP S/4HANA integrations, the agent improves productivity, accuracy, and user experience for supply chain and finance operations.

## Prerequisites

For this E-Way Bill Joule Agent to run successfully the following prerequisites are needed.

- Joule Studio in SAP Build

Follow the setup guide [here](#) based on your tenant configuration.

NOTE: If you need additional help with these prerequisites (such as setting up SAP Build Process Automation and SAP Build Work Zone), you can run the Discovery Center mission: [Setup Joule Studio for a BTP Enterprise Account](#).

- SAP S/4HANA On-Premise system
- SAP Business Technology Platform (BTP) account
- SAP CAP application deployed on SAP BTP acting as backend middleware
- OAuth 2.0 enabled for API access
- Required authorizations to access SAP S/4HANA OData services

## Backend Agent Setup Instructions

### 1. Get the Code

- Download the backend CAP service ZIP file from E-Way Bill Agent dependencies.
- Extract the ZIP file.
- Open the extracted project in your preferred code editor.

### 2. Check Python Version

- Ensure Python 3.10 or higher is installed:
- **Command:** `python --version`
- Note: For more information you can go through README.md

#### Prerequisites:

Place the OpenAPI spec file (Z\_EINVOICE\_MODEL\_SRV.openapi3.json) generated from sap-eway-bill-cap/docs/ into the root of the Python project directory. The agent loads it at startup.

### 3. Create & Activate Virtual Environment

- Create the virtual environment:
- **Command:** `python -m venv venv`
- Activate it:
- **Windows:** `venv\Scripts\activate`
- **Mac / Linux:** `source venv/bin/activate`

## 4. Install Dependencies

**Command:** pip install -r requirements.txt

## 5. Configure Environment

- Rename .env.example to .env
- Update the following values: AICORE\_CLIENT\_ID, AICORE\_CLIENT\_SECRET, AICORE\_AUTH\_URL, AICORE\_RESOURCE\_GROUP, AICORE\_BASE\_URL, client\_id, client\_secret, auth\_url, CAP\_BASE\_URL

## 6. Run the Application

### CAP Service (Node.js) - Run First

- **Command:** cds watch --profile hybrid
- The CAP service (EWayBillingService) starts
- Exposes the endpoints under /eway-billing-service

### Python Agent - Run After CAP is Up

- **Command:** python server.py
- Exposes a single endpoint:

POST /ewayagent

## 7. Agent Behavior

- When POST /ewayagent is triggered with a user query and sessionid
- The agent selects and invokes one of the 8 tools based on the query
- The agent maintains conversation memory per session using sessionid
- Results are returned as JSON to be displayed in Joule

## Deployment & Destination Configuration

### 1. CAP Deployment to Cloud Foundry

- Command: npm run build
- Command: npm run deploy
- Note the assigned Cloud Foundry app route URL after deployment.

- Note: npm run bind is for local hybrid testing only, not required for Cloud Foundry deployment.

**Command: npm run bind**

## 2. Create BTP Destination

- In SAP BTP Cockpit:
- Create a Destination pointing to the deployed **Python agent** URL
  - Type: HTTP
  - URL: Python agent Cloud Foundry app route
  - Authentication: As required (OAuth / Basic / NoAuth)
- Create a Destination for the **SAP S/4HANA On Premise** system
  - Update the destination name in package.json (S4H\_BACKEND) to match the name you set here

## 3. Joule Studio Integration

- Reference the created BTP Destination (pointing to the Python agent) in Joule Studio.
- The agent will invoke:
- POST /ewayagent

through the destination.

# Configuration Guide

This section describes the configuration steps required to set up the E-Way Bill Joule Agent. It includes the necessary configurations in the SAP Business Technology Platform cockpit, destination setup, user role configuration, and details of services and artifacts used by the agent.

The configuration ensures secure connectivity between SAP Build Joule Studio and SAP S/4HANA using OAuth-protected OData services, enabling the Joule Agent to retrieve and process business document data.

## Setup Business Technology Platform Cockpit

### Configure SAP S/4HANA Destination

This content package can be used with SAP S/4HANA On-Premise system. Destination can be created accordingly.

NOTE: The destination points to the SAP S/4HANA On-Premise system and is used internally by the CAP service (EWayBillingService). CAP acts as the middleware that fetches data from the On-Premise system and exposes it to the Python agent via action endpoints.

Destination Property	Value
Name	<Destination Name>
Type	HTTP
URL	https://<host>/odata/v4/EWayBillingService
Client ID	<Client ID>
Client Secret	<Client Secret>
Token Service URL	<Token Service URL>
Proxy Type	Internet
Authentication	OAuth2ClientCredentials

- **NOTE:** The Client ID, Client Secret, and Token Service URL are obtained from the **SAP BTP XSUAA service instance** bound to the CAP application. These credentials are generated via a service key and maintained in the SAP BTP destination for secure system-to-system authentication.
- The /oauth/token needs to be appended manually in Token service URL when configuring destination.

## Additional Properties:

Additional Property	Value
HTML5.DynamicDestination	true
HTML5.Timeout	6000
WebIDEEEnabled	false
sap.applicationdevelopment.actions.enabled	true
sap.processautomation.enabled	true

**NOTE:** Make sure the API used in this template is exposed with the correct communication scenario to the communication user.

## CAP Service Details

The CAP service exposes business-oriented OData v4 APIs under the **EWayBillingService** namespace and acts as a middleware between the Joule Agent and the SAP S/4HANA On Premise system.

Note: For any requirements related to CAP service backend dependencies for SAP E-Way Bill Agent, please reach out to : **SAP\_BTP\_AI\_AUTO@infosys.com**

- **Service Name:** EWayBillingService
- **Technology:** SAP CAP (OData v4)
- **Deployment Platform:** SAP BTP (Cloud Foundry)
- **Integrated Backend:** SAP S/4HANA On Premise
- **Security:** OAuth 2.0 via SAP BTP XSUAA

## Prerequisites

Import external service .edmx file in srv/external and then run the below command:

**Command:** `cds import <file.edmx>`

To convert the CSN file from the above command to an OpenAPI spec, run the below command (to be utilized in sap-eway-bill-python):



**Command:** cds compile srv --service all -o docs --to openapi

## User Roles Configuration

To access and use the E-Way Bill Joule Agent, the users need to have the roles as described [here](#).

## Services used:

There are eight Action projects used in this E-Way Bill Agent. They use different APIs/Services.

NOTE: The following APIs are exposed by the custom CAP service (EWayBillingService) and internally consume SAP S/4HANA Utilities OData services.

Action Project Name	Service Used	Purpose
getInvoiceDetails (action)	/zeinvoice_statSet	Retrieve e-invoice details using the invoice number.
checkInvoiceStatus (action)	/checkInvoiceStatus	Fetch the IRN and e-invoice status for a specific invoice.
checkIfInvoiceexistsforDelivery (action)	/CheckIfInvoiceExists	Verify whether an invoice exists for a given delivery number.
checkvariousdocumentstatus (action)	/checkQuotationStatus	Check quotation conversion, transmission, and invoice generation status.
retriggeroutput (action)	/retriggeroutput	Retrigger invoice output after user confirmation.
CreateOrderFromQuotation (action)	Utility Action (No API call)	Confirm sales order creation from a quotation.
modifyorderreason (action)	Utility Action (No API call)	Update the order reason.
Resendtobankingpartner (action)	Utility Action (No API call)	Resend order details to the banking partner.

## Artifacts in the Agent:

Type	Name	Description
Joule Skill	Get E-Invoice Details	Retrieve e-invoice details by invoice number.
Joule Skill	Get Invoice Status	Check IRN and invoice status for a specific invoice.
Joule Skill	Check Invoice Exists for Delivery	Verify invoice existence for a given delivery number.
Joule Skill	Check Quotation to Order Status	Check quotation conversion, transmission, and invoice generation status.
Joule Skill	Retrigger Invoice Output	Retrigger invoice output upon user confirmation.
Joule Skill	Create Order from Quotation	Confirm sales order creation from a quotation.
Joule Skill	Modify Order Reason	Update the order reason.
Joule Skill	Resend Order to Banking Partner	Resend order details to the banking partner.
Joule Agent	E-Way Bill Agent	AI agent that orchestrates Joule Skills to retrieve and manage e-invoicing and document status information.
Environment Variable	AICore_Client_ID	Client ID used to authenticate the application with SAP AI Core services.
Environment Variable	Client_ID	OAuth Client ID is used by the CAP application for authentication using client-credentials flow.
Environment Variable	Hana_Cloud_Host	Defines the host address of the SAP HANA Cloud

		database used by the CAP service.
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## Setup Content Package

### Import Custom Joule Agent

All imported custom agents are available in SAP Build Store. To know more about the SAP Build Store visit [SAP Build Process Automation Store](#).

This template can be downloaded from the SAP Build Store:

1. Navigate to the **Store** option in your SAP Build Lobby.
2. Select the **Project Type** filter as “Joule Agent and Skill”
3. In the Search bar type “**E-Way Bill Agent**”
4. Select the “Create from Template” button to add the template into your lobby.
5. Once the creation is complete, navigate to the Lobby to find the “**E-Way Bill Agent**” project is available for use.

## Configuration & Modification

Once the Joule Skill & Agent project is added into the lobby, it can be run directly without any modification.

If required, Joule Skills used within the project can be modified, or the agent configuration can be updated to adjust instructions, additional context, or behavior. This includes modifying skill descriptions, updating prompts, or adjusting how the agent orchestrates the available Joule Skills.

The agent and its skills are designed to be extensible, allowing partners or customers to adapt the solution according to their specific business requirements while retaining the core functionality for e-invoicing and document status checks.

In order to understand the various capabilities of Joule Studio and work with them please refer to the link:

[Create AI Capabilities | SAP Help Portal](#)

## Release and Deploy the Project

Once the E-Way Bill Joule Agent is verified by the user / modified based on user need, it has to be released and deployed into a shared environment.

- Refer to the link below to create/Share an Environment:

[Environments | SAP Help Portal](#)

- Refer to the link below to release a project:  
[Release a Project | SAP Help Portal](#)
- Refer to the link below to deploy a project:  
[Deploy a Project | SAP Help Portal](#)

After deployment, the agent becomes available for execution within the SAP Build environment.

## Test the Joule Skills And Agent in SAP Build

1. To access your projects, navigate to **Control Tower ->Tenant Configuration->Environments**.
2. Select your environment.
3. After deploying the project, the project should be seen in the Shared Environment.
4. Click on the Tab, '**Joule**'
5. Click on the button '**Launch**'

This will open the Joule launchpad where you can key in the below prompts in order to test the agent.

Prompts	Expected Result
Please find the e-invoice details for <invoice number>. e.g.- Please find the e-invoice details for invoice number 1000000000000002.	E-Invoice details for invoice number are displayed, including Invoice Number, IRN Status, IRN Comments, IRN, Valid Date, Bill Valid Date, Bill Number, Order Number (VBELN), etc.
Can you please check if an order has been created for <quotation number>? e.g.- Can you please check if an order has been created for quotation 0020000004?	The agent confirms that an order is not created for quotation number.
Can you please check if an order has been created for <quotation number>? e.g.- Please check whether an invoice exists for delivery number 80001073.	The agent confirms that order has been created for quotation number and notes that the order loan details were not sent to the banking partner, therefore transmission did not occur.
Please check whether an invoice exists for <delivery number>. e.g.- Please show me the invoice status for invoice 90000744.	The agent confirms that invoice number exists for delivery number and asks the user if they want to check the status of this invoice.
Please show me the invoice status for <invoice number>.	The agent displays the invoice status for invoice number.

e.g.- Please create an order from quotation 0020000004.	
Please modify the reason for <order number>. e.g.- Please modify the reason for order 67890.	The agent confirms whether the reason for order has been modified or not.
Please resend <order number> to the banking partner. e.g.- Please resend order 56789 to the banking partner.	The agent confirms whether the order has been sent to the banking partner or not.
Please retrigger the output for <invoice number>. e.g.- Please retrigger the output for invoice 90000744.	The agent retriggers the output for invoice after user confirmation.

**NOTE:**

1: Currently the E-Way Bill Joule Agent will be only deployed in the SAP Build environment and hence testing can also be done only in the Build Lobby. If you want to **activate the Joule in other systems** Eg: SAP S/4HANA or SAP Workzone, then click on the **settings** in 'Control Tower->Environments->< Your Shared Environment that was created>->Joule'

Here you have to switch the toggle on for '**Share Environment Capabilities**'.

The screenshot shows the 'Control Tower / Environments / Build Demos' interface. At the top right, there are buttons for 'Edit', 'Share', and 'Delete'. Below this is a table with columns for 'Last Updated:', 'Author:', 'Members:', 'Identifier:', and 'Description:'. A navigation bar includes 'Projects', 'Triggers', 'Automation Launchers', 'Agent Management', 'Alert Handlers', 'Variables', 'API Keys', 'Visibility Scenarios', 'Processes and Workflows', and 'Joule'. The 'Joule' section is active, showing 'Joule Digital Assistant' with a 'Shared' status and buttons for 'Launch', 'Refresh', and 'Settings' (highlighted with a red box). Below this is the 'Environment Capabilities' section. A 'Joule Settings' dialog box is open, displaying the text: 'Selecting this option deploys the environment's capabilities to Joule shared assistant, making them available to users who have "Execute" or "Administrator" rights for this environment.' The 'Share Environment Capabilities' toggle is turned on and highlighted with a red box. At the bottom of the dialog, the 'Apply' button is highlighted with a red box, along with a 'Cancel' button.

## Support

If you have experienced any issues or need any support related to E-Way Bill Agent with Artifact, or if you need to request the CAP service dependency used by this agent, please contact: **SAP\_BTP\_AI\_AUTO@infosys.com**