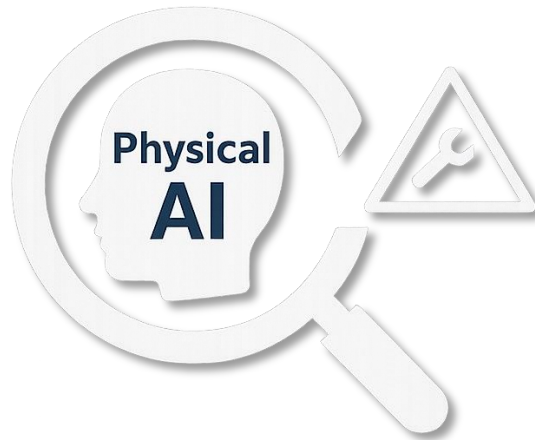


# MAO WAREHOUSE AGENT



PUBLIC

## Custom Joule Skill & Agent in SAP Build MAO Warehouse Agent

Configuration & User Guide

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



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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

The **MAO Warehouse Agent** is a Joule-powered, multi-agent warehouse automation solution built on **SAP Build Process Automation**. It resolves **Empty Bin Exceptions** and **Alternate Bin suggestions** in SAP EWM through a fully conversational, guided interface eliminating the need for warehouse operators to manually navigate multiple SAP transactions.

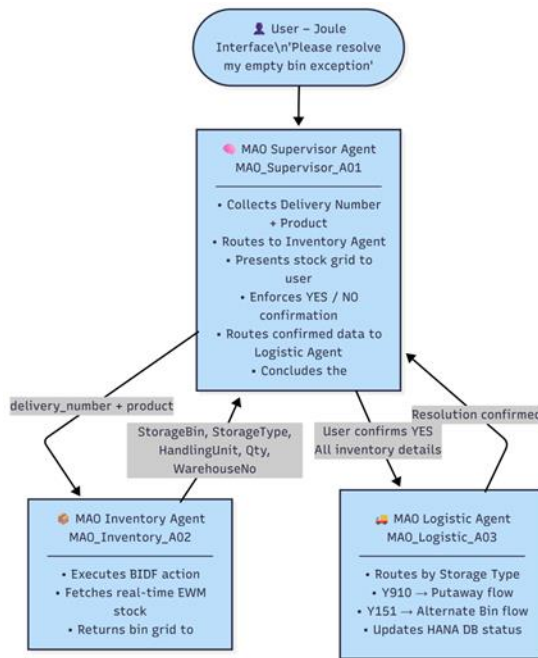
The solution is composed of **three coordinated Joule agents** that operate as a parent-child hierarchy:

Agent	Identifier	Role
MAO Supervisor Agent	MAO_Supervisor_A01	Orchestrator: controls conversation flow and coordinates child agents
MAO Inventory Agent	MAO_Inventory_A02	Retrieves real-time bin and stock availability from SAP EWM
MAO Logistic Agent	MAO_Logistic_A03	Executes warehouse operations (putaway, wave release, picking)

Solution flow:



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The Solution flows is as follows:

1. User submits a natural language Empty Bin Exception request via the Joule interface. Example: "Please resolve my empty bin exception."
2. The MAO Supervisor Agent (MAO\_Supervisor\_A01) receives the query and asks the user to provide the Delivery Number and Product required for resolution.
3. The Supervisor Agent invokes the MAO Inventory Agent (MAO\_Inventory\_A02), passing the Delivery Number and Product as inputs.
4. The Inventory Agent executes the BIDF action once per request using the Delivery Number as Refdocno — this blocks and unblocks the necessary bins in SAP EWM to ensure inventory integrity.
5. The Inventory Agent calls skill MAO\_Inventory\_A02\_J01 using the Product to fetch real-time stock from the SAP EWM Physical Stock Products OData API. It evaluates the first valid record where Storage Type is Y151 or Y910, HandlingUnitExternalID is not null, and stock quantity is greater than zero.
6. The Inventory Agent returns the stock details — Storage Bin, Available Stock Quantity, Warehouse Number, Storage Type, and Handling Unit — back to the Supervisor Agent.
7. The Supervisor Agent presents the stock details to the user in a structured grid and requests explicit confirmation: YES or NO.
8. If the user responds NO, the conversation is closed and no action is taken. If the user responds YES, the Supervisor Agent invokes the MAO Logistic Agent (MAO\_Logistic\_A03) with the full inventory details.
9. The Logistic Agent determines the execution path based on Storage Type:
  - Storage Type Y151 (Alternate Bin): Executes Wave Release via skill MAO\_Logistic\_A03\_J03,

followed by Picking Creation via skill MAO\_Logistic\_A03\_J02. Updates HANA database status to "Ready for Picking". Returns: "Your Empty Bin Exception Has Been Resolved Successfully."

- Storage Type Y910 (Empty Bin / GR Zone): Creates a Putaway Task via skill MAO\_Logistic\_A03\_J01, confirms the Putaway task (verifying Tostat = "C"), executes Wave Release, and updates HANA database status to "Ready for Picking". Returns: "Empty Bin Has Been Resolved."

10. The Supervisor Agent concludes the conversation after receiving the resolution confirmation from the Logistic Agent.

## Business Value & Benefits -

- Resolves Empty Bin Exceptions and Alternate Bin suggestions entirely through a single Joule conversational interface — no manual SAP transaction navigation required.
- Three-agent orchestration (Supervisor, Inventory, Logistic) operates in a strict, stateful sequence with full state preservation across interactions
- Dual-scenario warehouse execution — autonomously handles both Y910 (Empty Bin / GR Zone putaway) and Y151 (Alternate Bin picking) workflows
- Real-time stock availability fetched live from SAP EWM Physical Stock Products OData API using product-based lookup
- Priority-based bin selection — Y151 is checked before Y910; first valid record with a non-null Handling Unit and quantity greater than zero is used
- Confirmation-gated execution — no logistics operation is triggered without explicit user confirmation (YES / NO)
- Single-execution safety controls — each action (BIDF, Putaway creation, Wave Release) executes exactly once per request to prevent duplicate warehouse tasks
- Automated HANA database status update marks resolved exceptions as "Ready for Picking"
- Reduces Mean Time to Resolve (MTTR) for warehouse exceptions and lowers dependency on experienced warehouse staff
- Supported Industries: Retail, Consumer Products, Wholesale Distribution, Automotive, Industrial Machinery, Chemicals, High Tech, Life Sciences

## Prerequisites --

### SAP Joule Studio & BTP

- Joule Studio configured in SAP Build (refer to the setup guide for your tenant).  
NOTE: If you need additional help with prerequisites such as setting up SAP Build Process Automation and SAP Build Work Zone, you can run the Discovery Centre mission:  
*Setup Joule Studio for a BTP Enterprise Account.*
- Ability to create BTP Destinations in the subaccount cockpit.
- Network connectivity from BTP to the STC system for destinations.

- Confirm the actions/API endpoint is reachable and returns HTTP 200 with a valid JSON payload.
- No authentication credentials are required for the external service (API key, OAuth token).
- SAP S/4HANA (On-Cloud) accessible from SAP BTP.

Backend Service from ABAP side APIs and payloads

#### 1. API 1 – Marking BDF (Custom)

```
{
  "Lgnum": "1010", // Warehouse Number
  "Refdocno": "80000835", // Delivery Number
  "Exccode": "BDF"
}
```

---

#### 2. API 2 – Stock Check (Standard) (GET)

##### - For Alternate Bin:

```
?$filter=(EWMWarehouse eq '1010'
and Product eq '483/484'
and EWMStorageType eq 'Y151'
and EWMStockType eq 'F2'
and EWMStorBinIsBlockedForRemoval eq false)
```

##### - For Empty Bin:

```
?$filter=(EWMWarehouse eq '1010'
and Product eq '481/482'
and EWMStorageType eq 'Y910'
and EWMStockType eq 'F2'
and EWMStorBinIsBlockedForRemoval eq false)
```

---

#### 3. API 3 – Putaway Creation (Standard)

```
{
  "EWMWarehouse": "1010", // Warehouse Number
  "IsHandlingUnitWarehouseTask": true,
  "SourceHandlingUnit": "800237", // HU received from Stock API
  "WarehouseProcessType": "Y114", // Warehouse Process Type
  "EWMStockType": "F2"
}
```

---

#### 4. API 4 – Putaway Confirmation (Custom)

```
{
```



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```
"Tanum": "100003560", // Warehouse Task Received from Putaway creation API
"Lgnum": "1010" // Warehouse Number
}
```

#### 5. API 5 – Wave Release (For AlterNet Bin and Empty Bin Scenario) (Custom)

```
{
"Lgnum": "1010", // Warehouse Number
"Refdocno": "80000836" // Delivery Number
}
```

#### Deployment & Destination

- Create a BTP Destination pointing to the CF app route (Type: HTTP, appropriate Authentication).
- In Joule Studio, reference the destination — the agent will invoke POST /api/invoke through it.
- Select the appropriate Shared Environment and the Destinations to deploy the Agent onto Build Work Zone.

## Configuration Guide --

This section describes the configuration steps required to set up the SAP Troubleshooter Agent.

### Setup Business Technology Platform Cockpit

Configure SAP Build Process Automation Destination To access the process automation capability of SAP Build, you can configure the destination. Please create destination as stated below:

Destination Property	Value
Name	SAPPHIRE_CAPM , S4_TCOE_BACKEND
Type	HTTP
Proxy Type Internet	Internet
Authentication	No Authentication (or OAuth2ClientCredentials if secured)

NOTE: All destination values shown above are placeholders. Actual system specific values must be maintained in the SAP BTP cockpit.

### Additional Properties:

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

### User Roles Configuration

To access this template, the users need to have the roles as described [here](#).

### Services used: --

There is 6 Action project used in this template.

Action Project Name	Service Used	Purpose
BIDF	/sap/opu/Odata/SAP/ZMAO_PUTAWAY_CONFIRM_SRV/ZMAO_Bin_Exception_CodeSet	- POST operation is to be performed before performing the inventory checkups in order to handle the Bin block and unblock logic for stock removal and

		putaways
MAO_Inventory_Stock	/sap/opu/odata4/sap/api_whse_physstockprod/srvd_a2x/sap/whsephysicalstockproducts/0001/WarehousePhysicalStockProducts	- Get operation is performed in order to fetch the Inventory data for the particular product number and get details on its available stocks in the specified BIN.
MAO_Putaway_confirm	/sap/opu/odata/sap/ZMAO_PUTAWAY_CONFIRM_SRV/ZMAO_Bin_Exception_CodeSet	- POST operation to be performed to post the delivery number and created warehouseTask number to confirm the PutAway request.

MAO_CAP_HANACL OUD_ACTION	warehouse-dashboard-srv.cfapps.eu10-004.hana.ondemand.com/odata/v4/warehouse/FulfillmentOrders	<p>- POST operation performed to push the updated records in the HANA Database</p> <p>- Get Operation performed to Fetch the records from the HANA Database</p>
MAO_PUTAWAY_ACTION	/sap/opu/odata4/sap/api_warehouse_order_task_2/srvc_a2x/sap/warehouse_order/0001/WarehouseTask	- Post operation is to be performed to create the WarehouseTask number for the product.
MAO_Picking_request_creation	/sap/opu/odata/SAP/ZMAO_PUTAWAY_CONFIRM_SRV/ZMAO_WAVE_releaseS	- POST is to be performed to create and confirm the new

		PickRequest number for the product.
--	--	-------------------------------------

## Artifacts in the Agent:

Type	Name	Identifier	Description
Joule Agent	MAO Supervisor Agent	MAO_Supervisor_A01	Parent orchestrator agent. Collects Delivery Number and Product from the user, coordinates the Inventory and Logistic child agents in sequence, presents the stock grid, enforces YES / NO confirmation, and concludes the conversation.
Joule Agent	MAO Inventory Agent	MAO_Inventory_A02	Executes the BIDS action using the Delivery Number, fetches real-time stock availability from SAP EWM using the Product, and returns structured bin-level inventory details to the Supervisor Agent.
Joule Agent	MAO Logistic Agent	MAO_Logistic_A03	Execution agent that autonomously routes and runs the correct warehouse workflow based on Storage Type — Putaway creation and Wave Release for Y910, or Wave Release and Picking creation for Y151 — and updates the HANA database on completion.
Joule Skill	MAO_Supervisor_A01_J01	MAO_Supervisor_A01_J01	Supervisor coordination skill — orchestrates the full conversation flow, collects delivery number and product, presents inventory results, and routes to child agents.
Joule Skill	MAO_Inventory_A02_J01	MAO_Inventory_A02_J01	Fetches available stock for a product from SAP EWM via the Physical Stock Products OData API.
Joule Skill	MAO_Logistic_A03_J01	MAO_Logistic_A03_J01	Checks Storage Type and creates the Putaway Task in SAP EWM — used in the Y910 Empty Bin flow.
Joule Skill	MAO_Logistic_A03_J02	MAO_Logistic_A03_J02	Fetches and displays logistics execution data from the database —

			used for Picking Creation in the Y151 Alternate Bin flow.
Joule Skill	MAO_Logistic_A03_J03	MAO_Logistic_A03_J03	Creates a new warehouse task for an alternate bin by performing Wave Release — used in the Y151 Alternate Bin flow.

## 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 “MAO Warehouse Agent” or “MAO\_Supervisor\_A01”, “MAO\_Inventory\_A01”, “MAO\_Logistic\_A03”
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 “MAO Warehouse Agent” or “MAO\_Supervisor\_A01”, “MAO\_Inventory\_A01”, “MAO\_Logistic\_A03” 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.

However, if you need to modify Joule skills that are used within the project or want to modify the agent, with its instructions/additional context or other fields, you can do so.

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 agent is verified by the user / modified based on user need, it must release 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:



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## 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 to agent.
6. You can also deploy your Agent by selecting Your Shared Environment and your destinations and deploy your Joule agent over the Build Work Zone.

Prompts	Expected Result
Hey Joule Can You Resolve my empty bin exception ?	Sure, To proceed forward please provide me with - Delivery Number - Product
Hi I'm facing some errors regarding a record, Can you fix its Empty bin ?	Sure, To proceed forward please provide me with - Delivery Number - Product
Joule can you help me resolve my empty bin for the delivery number – XXX and product – XXX	Sure, Here is the Inventory details for the mentioned record ---- Would you like to proceed with Logistic Agent?
Hey joule can you resolve my error with the delivery number – XXX and product – XXX	Sure I Can , Here is the Inventory details for the mentioned record ---- Would you like to proceed with Logistic Agent?

### NOTE:

1: Currently the 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 Work zone, then click on the **settings** in 'Control Tower->Environments-><Your Shared Environment that was created>->Joule'

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



## Support:

For support related to your agent please contact: **SAP BTP AI AUTO@infosys.com**