



PUBLIC  
2023-08-19

# Integration Services for SAP Warehouse Robotics

# Content

- 1 Overview . . . . . 3**
- 2 Prerequisites . . . . . 4**
  - 2.1 System Requirements . . . . . 4
- 3 Business Configurations . . . . . 6**
  - 3.1 Install CR Syncer . . . . . 6
  - 3.2 Install Warehouse Robot Controller . . . . . 7
  - 3.3 Install Robot Adapter . . . . . 8
- 4 Security . . . . . 9**

# 1 Overview

Integration services for SAP Warehouse Robotics is an on-premise product. You can use it to integrate SAP Warehouse Robotics and physical robots to move handling units (HUs) from source storage bins to destination storage bins in a warehouse.

You can use integration services for SAP Warehouse Robotics in the following ways:

- To deploy the required services in the Kubernetes environment per edge node
- To receive warehouse orders assigned from SAP Warehouse Robotics
- To report robot statuses and warehouse order processing statuses to SAP Warehouse Robotics
- To store warehouse orders and warehouse tasks locally to allow a robot to process warehouse tasks in case of intermittent network
- To integrate with physical robots to move the handling units in a warehouse

## Components of Integration Services for SAP Warehouse Robotics

Integration services for SAP Warehouse Robotics consists of the following components:

- Custom resource (CR) synchronization module (Syncer)
- Warehouse robot controller
- Robot adapter

The CR Syncer is responsible for synchronizing robots, robot commands, and warehouse orders. The warehouse robot controller and robot adapter work together to process robot tasks using the following steps:

1. The warehouse robot controller receives warehouse orders and robot commands from SAP Warehouse Robotics.
2. The warehouse robot controller calls the robot adapter to create robot tasks.
3. The robot adapter sends robot tasks to the physical robot for processing.
4. The robot adapter tracks the robot task status and reports the status changes to the warehouse robot controller.

## Related Information

[Install CR Syncer \[page 6\]](#)

[Install Warehouse Robot Controller \[page 7\]](#)

[Install Robot Adapter \[page 8\]](#)

## 2 Prerequisites

Before installing integration services for SAP Warehouse Robotics, you need to make the following preparations:

1. You have an edge node with a running Kubernetes cluster deployed.  
For more information about preparing the Kubernetes environment, see the how-to guide in SAP Note [3329638](#).
2. You have installed Helm.  
For more information, see [Installing Helm](#).
3. You have valid [Repository Based Shipment Channel](#) credentials, required for enabling the download of the Helm charts and container images for the integration services.  
Then you have added the Repository-Based Shipment Channel (RBSC) Helm repository to your Helm client using the following command:

```
helm repo add wi-helm <sap-rbsc-helm-repo> --username <your-user-name>
helm repo update
```

For more information, see [Repository Based Shipment Channel Endpoints](#).

4. You are authorized to use the *Onboard Robots - Integration Services* app in SAP Warehouse Robotics.  
Then you have created an edge node and a robot in the *Onboard Robots - Integration Services* app.  
An edge node can host multiple components to deliver commands and warehouse orders to robots and to update robot statuses for the physical robots.  
For more information about creating an edge node and a robot, see [Onboard Robots - Integration Services](#).
5. You've created the *wr-edge-system* namespace in the Kubernetes cluster.

### 2.1 System Requirements

#### Hardware Requirements

Integration services for SAP Warehouse Robotics specify the following hardware requirements for each edge node:

- At least 8 GB RAM
- At least 4 CPUs
- CPU: x86-64-based architecture

## Supported Operating System

Tested Linux distribution: Ubuntu Desktop 20.04 LTS x64 (x86 64-bit)

### i Note

Untested versions of Linux may have slight differences. But you need to perform the testing in your own environment.

## Kubernetes

Supported Kubernetes version: 1.21.10 and above

### i Note

To deploy the Docker images on an edge node for integration services for SAP Warehouse Robotics, you must have a Kubernetes cluster with Docker as a container runtime.

Other distributions or vendors of Kubernetes may be compatible with integration services for SAP Warehouse Robotics, but you should perform the testing in your own environment.

## Helm

The minimum required version of Helm is v.3.0.0.

## Network Requirements

The edge node needs to have a fixed IP address, so the Kubernetes cluster can be assessed after a reboot.

The edge node, the Kubernetes cluster, and the container runtime of the cluster must have access to the public network. If you use a proxy to access the public network, ensure that the proxy can be accessed in the edge node, Kubernetes cluster, and the container runtime of the cluster.

# 3 Business Configurations

To install integration services for SAP Warehouse Robotics, perform the following steps:

1. [Install CR Syncer \[page 6\]](#)
2. [Install Warehouse Robot Controller \[page 7\]](#)
3. [Install Robot Adapter \[page 8\]](#)

## 3.1 Install CR Syncer

Custom resource (CR) synchronization module (Syncer) can synchronize robots, robot commands, and warehouse orders between SAP BTP and edge nodes.

### Prerequisites

Ensure that your Helm repository is up to date. If necessary, update the Helm repository using the following command:

```
helm repo update
```

### Procedure

To install the CR Syncer using the Helm chart, perform the following steps:

1. Open the [Onboard Robots - Integration Services](#) app in SAP Warehouse Robotics, and obtain the bootstrap token for the edge node.
2. Install the Helm chart using the following command:

```
helm upgrade --install wr-edge wi-helm/wr-edge --namespace wr-edge-system \
--set imageCredentials.registry=<sap-rbsc-docker-registry> \
--set imageCredentials.username=<sap-rbsc-docker-registry-user> \
--set imageCredentials.password=<sap-rbsc-docker-registry-access-token> \
--set bootstrapToken=<bootstrap-token>
```

If you want to use a proxy, add the following additional parameters to the command above:

```
--set httpsProxy=<your_http_proxy> \
--set noProxy=<your_no_proxy> \
```

### i Note

- Use the backslash (\) properly to concatenate the command.
- If you use a proxy, the `noProxy` parameter is required. You should at least bypass the following objects:
  - IP addresses for the edge nodes, pods, and services
  - Local host: `127.0.0.1`, `localhost`
  - The domain name system: `*.svc.cluster.local`
- The separator "," in `noProxy` should be escaped as "\",

After you install the CR Syncer, retrieve the robot details using the following command:

```
kubectl get robot -A -o yaml
```

Note down the values for the fields `name` and `namespace`. These fields are used as the robot UUID, and tenant ID in the commands for the robot controller and the robot adapter.

## Next Step

[Install Warehouse Robot Controller \[page 7\]](#)

## 3.2 Install Warehouse Robot Controller

The warehouse robot controller can translate warehouse orders and robot commands into robot tasks that can be processed by robots.

### Prerequisite

You have installed the CR Syncer.

For more information, see [Install CR Syncer \[page 6\]](#).

Ensure that your Helm repository is up to date. If necessary, update the Helm repository using the following command:

```
helm repo update
```

## Procedure

Install the warehouse robot controller with the following command:

```
helm upgrade --install wr-robot-controller wi-helm/wr-robot-controller --  
namespace wr-edge-system \  
--set tenantid=<tenant-id> \  
--set imageCredentials.registry=<sap-rbsc-docker-registry> \  
--set imageCredentials.username=<sap-rbsc-docker-registry-user> \  
--set imageCredentials.password=<sap-rbsc-docker-registry-access-token>
```

## Next Step

[Install Robot Adapter \[page 8\]](#)

## 3.3 Install Robot Adapter

The robot adapter can send commands to robots, and track the robot statuses and robot task statuses.

To integrate integration services for SAP Warehouse Robotics with your physical robots, your robot vendor is supposed to implement and install the robot adapter. For more information, see the how-to guide [Developer Guide for Robot Adapter](#) in the attachment of the SAP Note [3329638](#).

# 4 Security

## Encryption

The Persistence Service doesn't use encryption.

## Certification

In an edge node, a credential-installer service is responsible for requesting the self-signed certificates from Kyma.

The communication between an edge node and Kyma is based on the custom resource (CR) synchronization module (Syncer) service via the certification.

TCCM is a microservice for certification issuing, renewing, and deactivation in Kyma.

It is based on certificate manager called `cert-manager` to add certificates and certificate issuers as resource types in Kubernetes clusters and to simplify the certification process.

## Helm Charts and Docker Images

### CR Syncer and Warehouse Robot Controller

We use Repository Based Shipment Channel (RBSC) to deliver our Helm charts and Docker images for the CR Syncer and the warehouse robot controller.

RBSC is a BOM-based assembly and release service that provides commercial SAP software for automated download after a customer license check. RBSC manages customer visibility and access according to SAP product management systems.

If a repository-based shipment is enabled, you can download the products that you purchased via dedicated product repositories. For more information, see [Repository Based Shipment Channel](#).

### Robot Adapter



Your robot vendor is supposed to host the artifacts of the warehouse robot controller, and provide a secure way of installing and downloading the robot adapter.

# Important Disclaimers and Legal Information

## Hyperlinks

Some links are classified by an icon and/or a mouseover text. These links provide additional information.

About the icons:

- Links with the icon : You are entering a Web site that is not hosted by SAP. By using such links, you agree (unless expressly stated otherwise in your agreements with SAP) to this:
  - The content of the linked-to site is not SAP documentation. You may not infer any product claims against SAP based on this information.
  - SAP does not agree or disagree with the content on the linked-to site, nor does SAP warrant the availability and correctness. SAP shall not be liable for any damages caused by the use of such content unless damages have been caused by SAP's gross negligence or willful misconduct.
- Links with the icon : You are leaving the documentation for that particular SAP product or service and are entering an SAP-hosted Web site. By using such links, you agree that (unless expressly stated otherwise in your agreements with SAP) you may not infer any product claims against SAP based on this information.

## Videos Hosted on External Platforms

Some videos may point to third-party video hosting platforms. SAP cannot guarantee the future availability of videos stored on these platforms. Furthermore, any advertisements or other content hosted on these platforms (for example, suggested videos or by navigating to other videos hosted on the same site), are not within the control or responsibility of SAP.

## Beta and Other Experimental Features

Experimental features are not part of the officially delivered scope that SAP guarantees for future releases. This means that experimental features may be changed by SAP at any time for any reason without notice. Experimental features are not for productive use. You may not demonstrate, test, examine, evaluate or otherwise use the experimental features in a live operating environment or with data that has not been sufficiently backed up.

The purpose of experimental features is to get feedback early on, allowing customers and partners to influence the future product accordingly. By providing your feedback (e.g. in the SAP Community), you accept that intellectual property rights of the contributions or derivative works shall remain the exclusive property of SAP.

## Example Code

Any software coding and/or code snippets are examples. They are not for productive use. The example code is only intended to better explain and visualize the syntax and phrasing rules. SAP does not warrant the correctness and completeness of the example code. SAP shall not be liable for errors or damages caused by the use of example code unless damages have been caused by SAP's gross negligence or willful misconduct.

## Bias-Free Language

SAP supports a culture of diversity and inclusion. Whenever possible, we use unbiased language in our documentation to refer to people of all cultures, ethnicities, genders, and abilities.



© 2023 SAP SE or an SAP affiliate company. All rights reserved.

No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission of SAP SE or an SAP affiliate company. The information contained herein may be changed without prior notice.

Some software products marketed by SAP SE and its distributors contain proprietary software components of other software vendors. National product specifications may vary.

These materials are provided by SAP SE or an SAP affiliate company for informational purposes only, without representation or warranty of any kind, and SAP or its affiliated companies shall not be liable for errors or omissions with respect to the materials. The only warranties for SAP or SAP affiliate company products and services are those that are set forth in the express warranty statements accompanying such products and services, if any. Nothing herein should be construed as constituting an additional warranty.

SAP and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP SE (or an SAP affiliate company) in Germany and other countries. All other product and service names mentioned are the trademarks of their respective companies.

Please see <https://www.sap.com/about/legal/trademark.html> for additional trademark information and notices.