



PUBLIC

Configuration of ABAP Push Channels TCP for Material Flow System in Extended Warehouse Management - Use Material Flow System with ABAP Push Channels TCP

How-To Guide

THE BEST RUN



TYPOGRAPHIC CONVENTIONS

Type Style	Description
<i>Example</i>	Words or characters quoted from the screen. These include field names, screen titles, pushbuttons labels, menu names, menu paths, and menu options.
	Textual cross-references to other documents.
Example	Emphasized words or expressions.
EXAMPLE	Technical names of system objects. These include report names, program names, transaction codes, table names, and key concepts of a programming language when they are surrounded by body text, for example, SELECT and INCLUDE.
Example	Output on the screen. This includes file and directory names and their paths, messages, names of variables and parameters, source text, and names of installation, upgrade and database tools.
Example	Exact user entry. These are words or characters that you enter in the system exactly as they appear in the documentation.
<Example>	Variable user entry. Angle brackets indicate that you replace these words and characters with appropriate entries to make entries in the system.
EXAMPLE	Keys on the keyboard, for example, F2 or ENTER.

DOCUMENT HISTORY

Document Version	Date	Description
1.0	2020.04.01	First official release of this guide for SAP S/4HANA
1.1	2022.10.12	Added information on secured communication for SAP S/4HANA 2022 or later

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1 BUSINESS SCENARIO

1.1 Introduction

The Extended Warehouse Management (EWM) component of SAP S/4HANA contains functions and features for controlling material flow in your warehouse. This functionality is delivered with the material flow system (MFS) of EWM. An important part of a working MFS is the robust and fast data exchange between MFS in EWM and external data sources such as programmable logic controllers (PLCs) or rack feeders. For this purpose, SAP provides ABAP Push Channel (APC) TCP as an integral part of SAP NetWeaver. This guide describes how you can configure EWM to directly communicate with PLCs.

2 BACKGROUND INFORMATION

2.1 SAP ABAP Push Channel

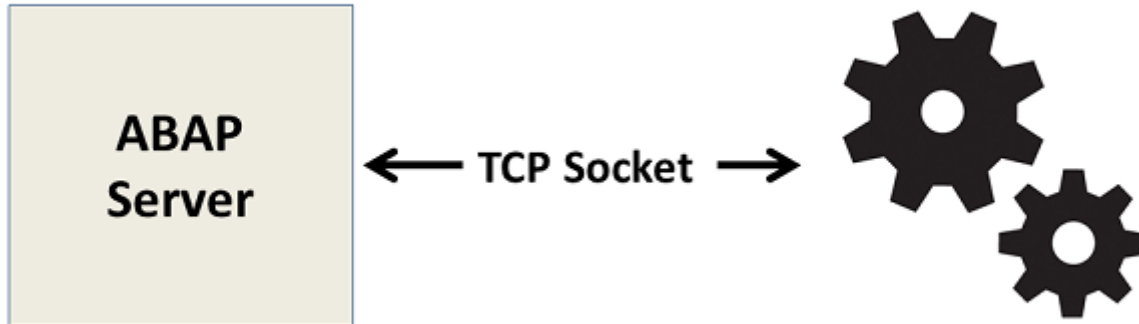
APC is a technology for full-duplex communication with the ABAP server. The “push” in APC emphasizes that you can use this technology to push messages to the client even if the client has not sent a request. APC supports two APC connection types, which refer to the underlying communication protocol:

- **WebSockets**
The WebSocket protocol is used for communication according to IETF standard RFC 6455. The WebSocket protocol is supported by the most commonly used Web browsers.
- **TCP sockets**
Native TCP/IP packets are used for communication. This allows communication with embedded systems and programmable logic controllers (PLC) that do not support the WebSocket protocol.

The ABAP server can act as a client or server. The communication partner can be, for example, a Web browser, another ABAP server, or a PLC. The following figure shows an ABAP server and a Web client communicating using the WebSocket protocol:



The figure below shows an ABAP server and a PLC communicating using native TCP/IP:



The ABAP server also supports seamless integration of the ABAP Messaging Channels (AMC) technology in APC scenarios (also referred to as collaboration between APC and AMC). This allows you to realize one-to-many (1: n) communication using APC connections.

2.1.1 More Information

This guide focuses on connecting the MFS of EWM with PLCs.

For more information about the various possibilities that ABAP channels offer, see SAP Library for SAP NetWeaver on SAP Help Portal at <http://help.sap.com/nw75>.

3 PREREQUISITES

SAP S/4HANA 1610 and higher with a properly configured MFS

For information about setting up an MFS, see <http://help.sap.com/s4hana> under *Product Assistance* → *Enterprise Business Applications* → *Supply Chain* → *Warehousing* → *Extended Warehouse Management (EWM)* → *Material Flow System (MFS)* → *Setting Up the Material Flow System*.

3.1 Logon Information for EWM

For the next steps you need to get the following logon information for the SAP S/4HANA system:

- Address of SAP application server
- SAP S/4HANA system number
- Client
- Name and password of SAP user to use for incoming PLC requests and execution of follow-on actions based on the requests in SAP S/4HANA

We recommend that you use a technical communication user.

- System ID, message server, and logon group in case load balancing is needed during the start of the communication with PLCs to map the connection to the application server with the lowest load

4 STEP-BY-STEP PROCEDURES

The following steps are required to configure EWM:

1. Creating the Remote Function Call Destination
2. Specifying the Remote Function Call Destination per Programmable Logic Controller
3. 4.3 Specifying the Host Information of the Programmable Logic Controllers

4.1 Creating the Remote Function Call Destination

A synchronous Remote Function Call (sRFC) that uses APC TCP is used during the start of a communication channel in EWM to connect to a PLC acting as a TCP/IP socket server. This sRFC is in place to realize a context and user switch to achieve the following:

- A dedicated technical user/password can be specified who is used for incoming messages. Thus, this user can be equipped with necessary authorizations and can be monitored easily.
- By specifying a target system group with load balancing, the system automatically reacts on system load during channel start. Moreover, in case of downtimes, the communication can automatically be moved from one application server to another one if multiple application servers are available in the specified logon group.

Create the RFC destination as follows:

1. Start transaction `SM59` in the SAP system.
2. Choose the *ABAP Connections* folder and create a new entry.
3. Choose the *Technical Settings* tab.
4. In the *Target System Settings* screen area, select *Yes* for the *Load Balancing* radio button.
5. For the following steps, use the logon information listed in chapter 3.1:
 - a. In the *Target System* field, enter the current EWM system.
You must not use a different target system than your EWM system.
 - b. Enter details in the *Msg. Server* and *Group* fields.
In the *Group* field, you can use a dedicated logon group for MFS processes. We recommend that you enter a logon group containing multiple application server instances.

The steps above are shown in the following figure:

RFC Destination EWMCLNT001_MFS

RFC Destination	EWMCLNT001_MFS	
Connection Type	3 ABAP Connection	Description

Description

Description 1	MFS RFC Connection used During Channel Start
Description 2	
Description 3	

Administration **Technical Settings** Logon & Security Unicode Special Options

Target System Settings

Load Balancing Status

Load Balancing ☒ Yes ☐ No

Target System

Msg. Server

Group

Save to Database as

Save as ☒ Host ☐ IP Address

Gateway Options

Gateway Host	<input type="text"/>	Delete
Gateway service	<input type="text"/>	

6. Choose the [Logon & Security](#) tab and specify the language, client, user, and password of the user mentioned in chapter 3.1.

4.2 Specifying the Remote Function Call Destination per Programmable Logic Controller

After creating the RFC destination, for each PLC you must specify which communication layer and which RFC destination should be used, as follows:

1. Start transaction `/SCWM/MFS_PLC` in the SAP system.
2. Choose your PLC and switch to details.
3. In the [Communication Layer](#) field, enter [SAP ABAP Push Channel TCP Socket Communication Layer](#).
4. In the [Destination](#) field, specify the RFC destination of step **Error! Reference source not found.**
5. For monitoring and analysis, we recommend that you select the [Logging](#) checkbox. However, in high throughput processes, consider deselecting the [Logging](#) checkbox to save runtime.

The steps above are shown in the following figure:

Change View "Maintain PLC": Details

Warehouse No.

PLC

Maintain PLC

CommunicationLayer

Destination

Sending FM

Starting FM

Stopping FM

FM Status

☒ Logging

4.3 Specifying the Host Information of the Programmable Logic Controllers

For each communication channel defined for your PLCs, you must specify the corresponding host address (usually its IP address) and port. EWM connects as a socket client to the socket server at the specified address.

Maintain the communication channel settings as follows:

1. Start transaction /SCWM/MFS_CCH in the SAP system.
2. Choose your PLC and communication channel and enter the host and port information.

The steps above are shown in the following figure:

Change View "Maintain Communication Channel": Overview

Warehouse No.

Maintain Communication Channel

PLC	Comm.chan.	Host	Port
PLC	1	10.18.165.110	5000

4.3.1 Using Secured Communication

With SAP S/4HANA 2022 or later, you can use secured communication for MFS telegram communication using APC TCP. For more information, see SAP Note [3132199](#).

4.3.2 Using SAProuter

Usually, EWM directly connects to PLCs using APC TCP. If you need intermediate middleware, for example, for network topology reasons, you can use SAProuter. You can use SAProuter, for example, to cross network borders in your system landscape. To achieve this, you must set up SAProuter and specify a SAProuter string as the host for your communication channel. You must specify the port of the PLC separately in the [Port](#) field.

An example SAProuter string connection:

Host: /H/10.17.114.127/S/3299/H/10.29.45.78

Port: 9870

This example SAProuter string contains the SAProuter's IP address followed by its port, which is 3299 by default. The second IP address belongs to the PLC.

Note:

If SAP Notes [2670337](#) and [2825912](#) are not implemented in your system, the port must also be part of the SAProuter string. Accordingly, the *Port* field must remain empty.

For more information on SAProuter, see <http://help.sap.com/s4hana> under *Product Assistance* → *Enterprise Technology* → *ABAP Platform* → *Application Server ABAP – Infrastructure* → *Components of Application Server ABAP* → *SAProuter*.

4.4 Troubleshooting

- RFC destination defined in step **Error! Reference source not found.** is not functional
 - a. Start transaction `SM59` in the SAP system.
 - b. Choose your RFC destination and select *Connection Test*.
 - c. Check the details in the *Msg. Server* and *Group* fields.
 - d. Select *Remote Logon* to check user credentials.
 - e. If logon fails, verify the user and password.
- Connection to PLC cannot be established
 - a. Start transaction `/SCWM/MON` for your warehouse number and monitor.
 - b. Choose *Material Flow System* → *Communication Channel* to query your communication channels.
 - c. Select a communication channel and choose the *Start Channel* method under *More Methods*.
If there are issues, an application log like the one below is displayed:

Ty...	Message Text	LTxt
	Start date/time 15.09.2015 15:21:18,8610130	
	Process ID 125562 of server ldiEWM	
	Transaction ID 55EC54DB2343A7C8E10000000A60BC2E (root context ID 8CDCD4A843...	
	Triggering start of communication channel PLC 1	
	Host 10.18.165.110 and port 05000 are used	
	Connection refused by server (ICM_HTTP_CONNECTION_REFUSED)	
	Data transfer to communication layer of PLC PLC failed (Connection refused by server (I...	
	End date/time 15.09.2015 15:21:19,2305850 (duration 369,572 ms)	

- d. If the PLC cannot be reached, verify that the host address maintained in step 0. can be reached with operating system means such as ping.
For information about prerequisites and error resolution, see SAP Note [2343224](#).
- e. If there are other error messages, check the Customizing for communication channels, for example, telegram length and end character, in Customizing for *Extended Warehouse Management* under *Material Flow System (MFS)* → *Master Data* → *Communication Channel* → *Define Communication Channel*.

5 FURTHER INFORMATION

See <http://help.sap.com/s4hana> under *Product Assistance* → *Enterprise Business Applications* → *Supply Chain* → *Warehousing* → *Extended Warehouse Management (EWM)* → *Material Flow System (MFS)*.

We recommend that you check SAP Note [1914127](#) to deal with MFS performance.

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