SAP Plant Connectivity (PCo) Meets SAP EWM Material Flow System (MFS)
Easy Guide for Connecting External Devices to SAP MFS Using PCo Socket Agents
TABLE OF CONTENTS

GENERAL REMARKS .................................................................................................................. 3
INTRODUCTION .......................................................................................................................... 3
Some Facts about SAP Plant Connectivity (PCo) ................................................................. 3
PREREQUISITES ......................................................................................................................... 4
Necessary Technical Data of SAP EWM System ................................................................. 4
CREATION OF RFC DESTINATION .................................................................................... 4
CREATE SOURCE SYSTEM FOR SOCKET AGENT ............................................................ 5
Maintain settings for “Socket” .............................................................................................. 6
CREATE DESTINATION SYSTEM FOR SAP EWM SYSTEM ................................................ 6
Maintain settings for RFC client .......................................................................................... 7
CREATE INSTANCE OF PCO SOCKET AGENT ................................................................. 7
Tab Strip “Host” ....................................................................................................................... 8
Section “General Settings” .................................................................................................... 8
Section “Host Settings” ......................................................................................................... 8
Section “Notification Persistence” ......................................................................................... 8
Tab Strip “Query Ports” .......................................................................................................... 9
CREATE NOTIFICATION FOR PCO AGENT ........................................................................ 9
START PCO SOCKET AGENT .............................................................................................. 11
TEST RFC CONNECTIVITY FROM EWM SYSTEM TO PCO SOCKET AGENT ....... 11
ERRORS AND SOLUTIONS ................................................................................................. 12
APPENDIX - INSTALLATION OF PCO ............................................................................... 13
Planning Installation ............................................................................................................ 13
Installation Steps for Microsoft Operating System .......................................................... 13
.NET Installation ................................................................................................................... 13
Windows Services ................................................................................................................ 13
Net.Tcp Port Sharing Service .............................................................................................. 13
OPCEnum ............................................................................................................................... 13
Remote Client (Microsoft Management Console, MMC) .................................................... 13
Security Settings Windows 7 ................................................................................................ 14
First Installation of PCo ......................................................................................................... 14
Steps after first Installation of PCo ..................................................................................... 14
GENERAL REMARKS

- Please also check for corrections for following application components:
  - SCM-EWM-MFS Material Flow System
  - MFG-PCO MII Plant Connectivity (replaces component MDS)
- You must refer to the system and development prerequisites specified in the documents.
- If you need additional help for the implementation after reading this document, you should request SAP remote-consulting (see SAP note 83020).
- The complimentary Customer Support of SAP will not support errors that are caused by modifications of the SAP standard system or by customer development (see SAP note 7).

INTRODUCTION

SAP Extended Warehouse Management contains functions and features for controlling material flow in your warehouse. This functionality is delivered with the EWM component ‘Material Flow System’ (MFS). An important part of a working material flow system is the robust and fast data exchange between EWM MFS and external data sources like process logic controllers (PLC), rack feeders etc. For this purpose SAP provides SAP Plant Connectivity (PCo). This paper describes how you can setup PCo agents for transferring data between EWM and the outside world.

Some Facts about SAP Plant Connectivity (PCo)

SAP Plant Connectivity was developed using Microsoft’s C# programming language and uses functionality of the DotNet framework. PCo allows connecting external data sources with various types of target systems like SAP EWM, SAP Business Suite, SAP Manufacturing Execution (ME), and SAP Manufacturing Integration and Intelligence (MII). PCo provides agents that are able to connect mentioned SAP target systems as destinations with different external data sources:

![Diagram of Plant Connectivity](image)

This paper focuses on connecting EWM material flow system (MFS) with the warehouse data sources using the socket agent of PCo. But PCo allows you also to connect weighing systems of the warehouse with EWM using different PCo agent types. Installation of PCo is described in the appendix of this document. If you are more interested in getting information about the various possibilities that PCo offers, please have a look at the following documents:
SAP Plant Connectivity (PCo) Meets SAP EWM Material Flow System (MFS)

- SAP Library Plant Connectivity 2.3
- SAP Plant Connectivity 2.2 Wire to the Outside World for SAP Business Suite-Applications – Learn the Basics (SCN Document)
- SAP Plant Connectivity 2.2 Wire to the Outside World for SAP Business Suite-Applications – Quick Start (SCN Document)

PREREQUISITES

Necessary Technical Data of SAP EWM System

For the next steps it is necessary to get technical data about SAP Business Suite system which shall be connected with PCo:

- SAP Gateway-Host machine name
  - RFC gateway is installed on a machine of your SAP system landscape. This machine acts as Gateway Host’, and allows establishing RFC connections between PCo and SAP systems.
- Description of SAP Gateway Service
  - Either enter name of SAP gateway service or enter port number, in case gateway service isn't defined in service file.
- Definition SAP Router
  - SAP Router allows communication through firewall. Enter parameters of SAP Router - Parameter in following format: /H/hostname/S/portnumber/H/
- Logon information SAP EWM System:
  - Address of SAP application server
  - System number of SAP EWM system
  - Client
  - Name and password of SAP user which is used for RFC communication and execution of SAP EWM
  - System ID, message Server, and logon group (in case load balancing is used for maintaining PCo target system of SAP EWM system)

CREATION OF RFC DESTINATION

Unique link between PCo agent instance and SAP EWM system is established via corresponding RFC destination. To create the RFC destination start transaction SM59 in the SAP System and chose folder TCP/IP connections. Create a new entry. Switch to tab strip Technical Settings. Maintain following entries:

- Activation type: Choose option Registered Server Program
- Registered Server Program: Enter Program ID
  - Same Program ID also has to be maintained in corresponding PCo agent instance (tab strip „Query Ports“, section „RFC Server Settings“, field „Program ID“)
- Start type of external program: Choose option Default Gateway Value
- CPI-C timeout: Choose option Default Gateway Value
- Gateway options: Enter system data of your SAP Gateway system as field values for Gateway Host and Gateway Service
SAP Plant Connectivity (PCo) Meets SAP EWM Material Flow System (MFS)

For the moment no additional settings have to be maintained.

- Tab strip Logon & Security provides settings to enable secure network communication (SNC)

CREATE SOURCE SYSTEM FOR SOCKET AGENT

Start PCo Management console. Push button “Add Source System”:

Popup “Add Source System” appears
- Choose type “Socket Agent”
- Maintain name and description for PCo source system for PLC

Press “OK” and save changes. System switches to tab strip “Socket”. The entry for new source system appears in sections “Source Systems”:
SAP Plant Connectivity (PCo) Meets SAP EWM Material Flow System (MFS)

Maintain settings for “Socket”
Remove flag “Remove Terminator When Receiving Data”. Don’t change default values of other parameters:

Save your changes.

Remark:
Further details about creating source system are described in chapter “Socket Source System” of SAP documentation for PCo 2.2.

CREATE DESTINATION SYSTEM FOR SAP EWM SYSTEM

Push button “Add Destination System”:

Popup “Add Destination System” appears:
- Choose type “RFC Destination”
- Maintain name and description for PCo destination for PLC

Press “OK” and save changes. Entry for new destination appears in sections “Destination Systems”:
System switches to tab strip “RFC Client Settings”.

**Maintain settings for RFC client**

Enter data of your EWM system for which you created RFC destination before:
- Application Server: see transaction SM59
- SAP router: Leave blank
- System number: EWM system number
- Client: Logon client of EWM system
- User: SAP logon user
- Password: SAP logon password for assigned SAP user
- Type: “SAP EWM”

Don’t change default values of other parameters. Save changes.

Press buttons “Check Connection” and “Simulate System Call” to check proper logon to EWM system:
Connection check and simulation of system call return success messages

**Remark:**
Further details about creating source system are described in chapter “Destination System: RFC Client Settings Tab” of SAP documentation for PCo 2.2.

**CREATE INSTANCE OF PCO SOCKET AGENT**

Push button “Add Agent Instance”:
Popup “Add Agent Instance” appears:
- Choose source system you previously created
- Maintain name and description for agent instance

Press “OK” and save changes. System switches to tab strip “Host”.

Tab Strip “Host”

Section “General Settings”
For the first connectivity tests choose log level “Verbose” to record messages of all log levels. Then you get enough information for diagnosis of connectivity problems between PCo agent and EWM system. Once stable connection has been achieved please set log level to “Error”. This improves performance of PCo.

Section “Host Settings”
Here you can determine if the PCo agent is executed as a Windows service or a Windows process (EXE). Windows processes require that corresponding user is logged in the system. They stop when user logs out. Windows services don’t require that corresponding user is logged in. Because PCo agents should run for a very long time it is favorable to run them as Windows services: Deactivate checkbox “Run Host as an Executable”.

If you don’t want to assign a special user name as service user you can keep default value for service user name (“\localsystem”). Otherwise maintain user name and user password.

Choose service start mode “Automatic” instead of default value “Manual”. Start mode “Automatic” forces starting of PCo agent instance when the operating system starts. This is very helpful after operating system has to be restarted.

Section “Notification Persistence”
For PCo socket agents that connect SAP EWM MFS with external data sources it isn’t necessary to allow notification persistence at PCo side. Therefore checkbox “Use persistent store for notification” shall remain empty:
Keep default values for “Startup Settings” and “Performance Settings”. Switch to tab strip “Query Ports”.

**Tab Strip “Query Ports”**

Activate checkbox “SAP EWM RFC Server”

- Parameter “Program ID”: Enter value of your program ID which is defined for your RFC destination (“NN_MFS_PCO_CONN”)
- Parameter “SAP Gateway Host” and “SAP Gateway Service”: Enter corresponding values of your RFC destination

Save settings: Entry for new PCo agent instance appears in section “Agent Instances”

Press button “Test Gateway Registration”: Testing gateway registration returns success message.

**Remark:**
Further details about creating source system are described in chapter “Agent Instance” of SAP documentation for PCo 2.2.

**CREATE NOTIFICATION FOR PCO AGENT**

Mark your PCo agent instance and press button “Add notification”:

Popup “Add Notification” appears:
- Make sure that the agent instance name is equal to the marked PCo agent.
• Maintain name and description for notification

![Add Notification](image1.png)

Press “OK”. Now the notification appears as child node under selected PCo agent instance:

![Agent Instances](image2.png)

**Figure 1: New Notification for PCo Agent MFS_PLCL_AGENT**

Keep notification node marked and assign the destination that should get the notifications: Switch to tab strip “Destinations”. Press button to add a new destination for the notification:

![Add Destination](image3.png)

Popup “Add Destination” appears:
- Choose the destination that you maintained before as destination system type.
- Add a name and description for your destination to which the notifications are sent to

Press ‘OK’. Save your changes.
Remark:
Further details about creating source system are described in chapter “Notification” of SAP documentation for PCo 2.2.

START PCO SOCKET AGENT
Mark your PCo agent instance and press button “Start Agent Instance”:

Status icon of PCo agent instance changes from red square to green triangle

Check PCo log files:
- Switch to tab strip “Log”
- Press “Refresh” button
- Search for log entries indicating errors (column “Event Type”: value “Error”)

TEST RFC CONNECTIVITY FROM EWM SYSTEM TO PCO SOCKET AGENT
Log on to EWM system
- Make sure that you chose application server you entered as value for “Gateway Host”
- Toggle between current application server and other application servers via transaction SM51
Choose your RFC destination (type: “T” [TCP/IP])
- Execute transaction SM59 or follow Easy Access menu path Tools -> Administration -> Administration -> Network -> RFC Destinations
Press button “Connection Test” (Ctrl+F3)

Result list containing transfer data and transfer times appears:
In case RFC connection can’t be established RFC connection check fails:

**ERRORS AND SOLUTIONS**

Check that following issues don’t appear:

- PCo agent instance is inactive/stopped
  - Restart PCo agent instance via PCo Management Console
- Log file of PCo agent instance contains errors
- PCo error message text in PCo log contains phrase “registration.. not allowed”
  - This indicates insufficient security settings for external programs
  - System administrator has to adjust settings
  - Useful hints for setting up proper registration are listed in SAP note 1789575
- Current application server isn’t used as “Gateway Host” in RFC destination and PCo agent instance
  - Start transaction “SM51” and double-click on appropriate application server entry in result list
APPENDIX - INSTALLATION OF PCO

During installation of PCo 2.2 you can choose either a complete installation of PCo or mark certain components that you want to install. Following components are included:

- Management Console
- Management Service
- Connectivity Framework
- Remote Client (required for usage of MMC - Microsoft Management Console)
- PCo agents

For our purposes a complete installation of PCo should be executed.

Planning Installation
PCo requires one of following Microsoft operating systems:

- Microsoft Windows XP Professional, at least service pack 2 (32 bit)
- Microsoft Windows Vista (32 bit)
- Microsoft Windows 7 (32 bit)
- Microsoft Windows Server 2003, at least service pack 1 (32 bit or 64 bit)
- Microsoft Windows Server 2008 (32 bit or 64 bit)

In case 64 bit operating systems are used PCo has to be executed in 32 bit mode.
In case installation of PCo is executed on operating systems Windows XP or Windows Server 2003 system user has to be logged on as local administrator. When operating systems like Windows 7, Vista, or Windows Server 2008 are used, execute installation with administrator privileges.

Installation Steps for Microsoft Operating System
Before PCo is installed please execute following activities for the Microsoft operation system:

.NET Installation
Install Microsoft .NET framework version 3.5 SP1 before you install PCo. Operating systems Windows 7 and Windows 2008 Server already contain.NET framework and therefore no separate installation is necessary.

Windows Services
Note the following sections for specific Windows services:

Net.Tcp Port Sharing Service
Activate Windows service Net.TCP Port Sharing Service. Per default this service is set to inactive.

OPCEnum
Set Windows service OPCEnum to startup type Automatic for systems with Windows 7 as operating system. In case this Windows service is inactive after system start, activate it manually.

Remote Client (Microsoft Management Console, MMC)
Usage of Remote Client MMC Snap Ins requires installation of MMC in version 3.0. This MMC version is included in following operation systems:

- Windows Server 2003 R2, Windows Server 2003 SP2
- Windows Vista
- Windows Server 2008
- Windows XP SP3.
Download installation files from Microsoft homepage if you use operating systems Windows XP SP2 and Windows Server 2003 SP1.

**Security Settings Windows 7**

![Local Security Policy Settings for MS Windows 7](image)

**First Installation of PCo**
First installation of PCo is quite simple. Execute following steps:

- Start installation program
  - Dialog screen of SAP front-end installer appears
- Choose *Next*
- On next screen select option to install all components
- Choose *Next*
  - Set installation path
- Confirm value for installation path or change setting by pressing *Browse*.
- Choose *Next*. Installation procedure starts.
- After installation is successfully finished, press *Next*.

**Steps after first Installation of PCo**
Key feature of PCo 2.2 is the use of license keys for productive usage. If no valid license key is entered, PCo runs in demo mode: after a period of 30 minutes, PCo stops all active instances of the PCo agent. Also a red message in the menu bar of the PCo management console indicates that PCo is running without a valid license. All features of PCo are available in demo mode. Running PCo in demo mode is sufficient for all samples that are part of our set of documents.
Figure 3: License Key Dialog