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SIMATIC PCS 7 Open OS Architectures

SIMATIC PCS 7 V9.0 / PCS 7 Open OS

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Preface

Application objective

SIMATIC PCS 7/OPEN OS enables PCS 7-compliant integration of external systems and controllers into the PCS 7 OS. All available WinCC channels can be used for the connection.

This document is intended to help you choose an architecture based on the number of inputs and outputs, the level of system availability, and the network topologies required.

Core contents of this application

This document describes the basic structure of SIMATIC PCS 7/OPEN OS architectures and components. In addition to the mentioned architectures, various options and configured versions are also displayed. SIMATIC PCS 7 is a highly scalable process control system with numerous topologies based on redundancy and optional hardware and software functions.

Validity:

SIMATIC PCS 7 V9.0 with the technology component PCS 7/OPEN OS

Delimitation

The hardware and software lists described in this document are sample configurations only. The architectures can also be replicated with alternative hardware. The main PCS 7 components are listed. Further required periphery like: Network cables, power supply, monitor, keyboard, mouse, are not included in the lists and must be purchased separately. The components of the external systems are also not listed.

Information on project engineering with PCS 7/OPEN OS can be found in the document "Integration of external systems with SIMATIC PCS 7/OPEN OS" on the download page of this article:

<https://support.industry.siemens.com/cs/ww/en/view/49740087>

Standard architectures with SIMATIC PCS 7 can be found in the article:

<https://support.industry.siemens.com/cs/ww/en/view/32201963>

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1 Simple systems

The following architecture examples only consider the PCS 7/OPEN OS side. However, these can easily be extended by a PCS 7 automation system and a PCS 7 project. For a better overview, the configuration examples are shown as examples with an OPC connection (the OPC server must be available on the third-party system side), but they also apply to the same extent to all other WinCC channels.

1.1 Standalone system with SIMATIC PCS 7/OPEN OS

The single-user system with PCS 7/OPEN OS can integrate individual controllers into a PCS 7 OS without a PCS 7 AS project. For this you need a computer on which both the PCS 7 Engineering System and the PCS 7 Operator System can be operated.

Figure 1-1

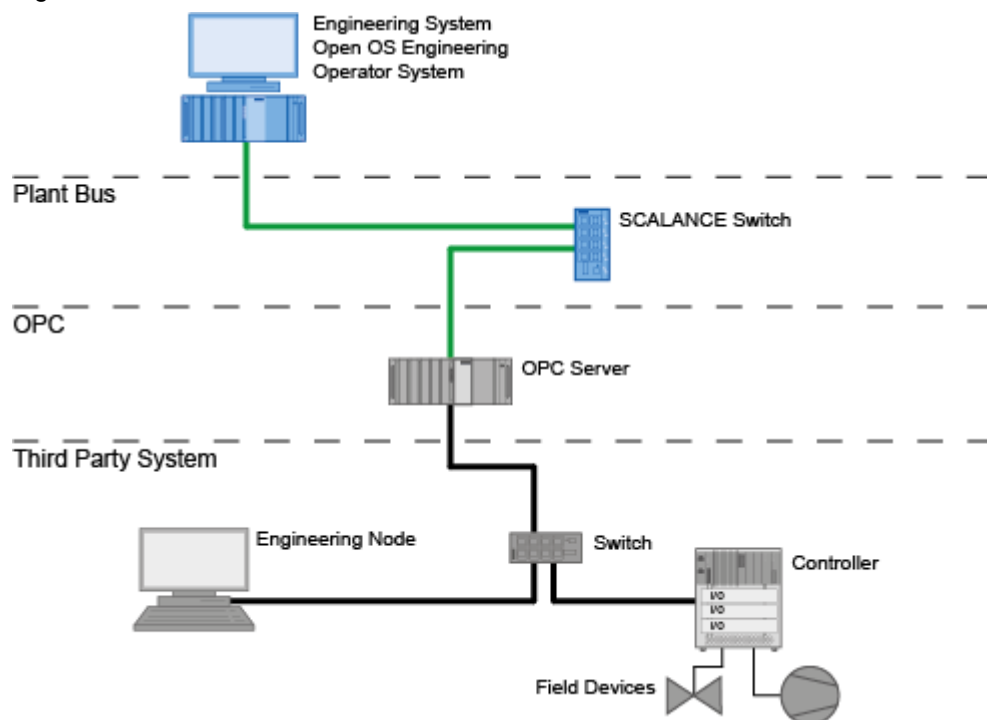


Table 1-1

Product number	Description	Quantity
Engineering system		
6ES7 660-7.....-....	PCS 7 INDUSTRIAL WORKSTATION IPC547G	1
6EQ2001-1XX58-3BA5	SIMATIC PCS 7/OPEN OS, Software Engineering Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks.	1
System bus		
6GK5 208-0BA10-2AA3	MANAGED IE Switch SCALANCE X208 10/100MBIT/S	1

1.2 Standalone system with SIMATIC PCS 7/OPEN OS

The configuration includes a PCS 7 OS Single Station and a PCS 7 Engineering Station. The main advantage of the division is that engineering and operation are possible at the same time.

Figure 1-2

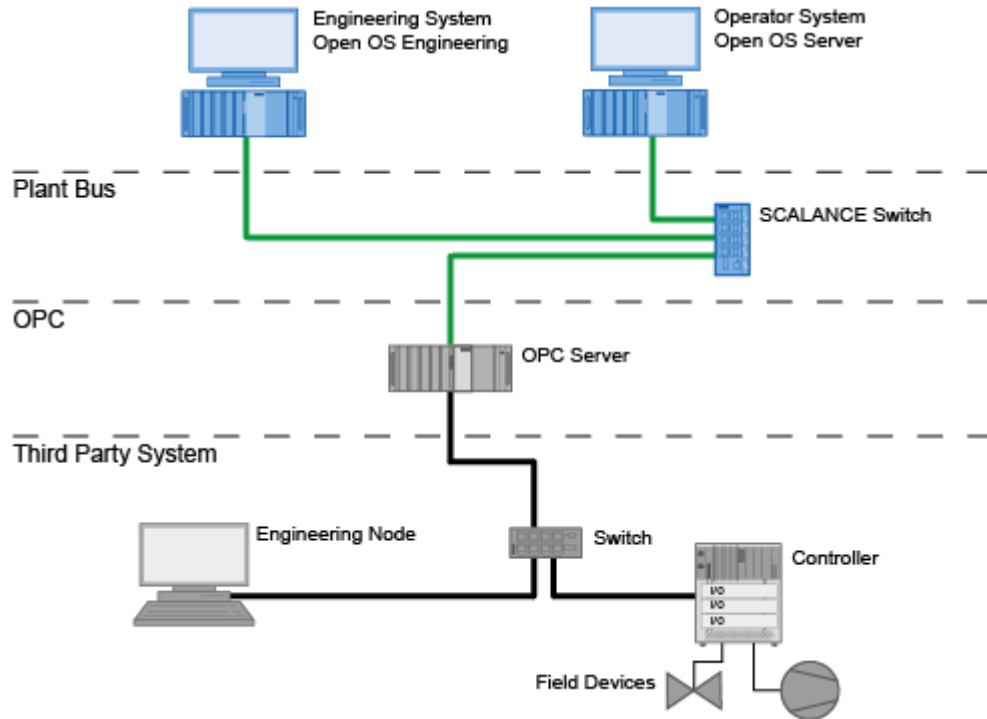


Table 1-2

Product number	Description	Quantity
Engineering system		
6ES7 660-7....-....	PCS 7 INDUSTRIAL WORKSTATION IPC547G	1
6EQ2001-1XX58-3BA5	SIMATIC PCS 7/OPEN OS, Software Engineering Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks.	1
Operator System server		
6ES7 660-7....-....	PCS 7 INDUSTRIAL WORKSTATION IPC547G	1
6EQ2001-2XX58-3BA0	SIMATIC PCS 7/OPEN OS, Software Runtime Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks.	1
System bus		
6GK5 208-0BA10-2AA3	MANAGED IE Switch SCALANCE X208 10/100MBIT/S	1

1.3 Server client (on ES) with SIMATIC PCS 7/OPEN OS

The configuration includes a PCS 7 OS server with PCS 7/OPEN OS and a PCS 7 ES with OS client. Operation and monitoring is possible both on the OS server and on the Engineering Station, which also serves as a client.

Figure 1-3

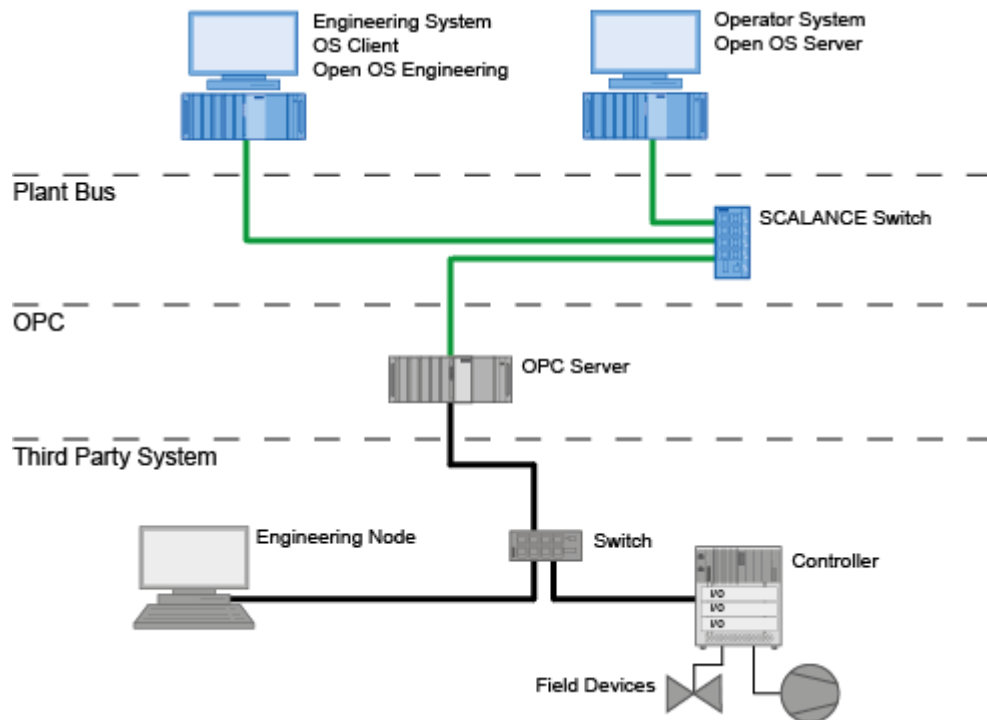


Table 1-3

Product number	Description	Quantity
Engineering system		
6ES7 660-7....-....	PCS 7 INDUSTRIAL WORKSTATION IPC547G	1
6EQ2001-1XX58-3BA5	SIMATIC PCS 7/OPEN OS, Software Engineering Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks.	1
6ES7658-2CX58-0YH5	SIMATIC PCS 7, OS Software Client V9.0	1
Operator System server		
6ES7 660-7....-....	PCS 7 INDUSTRIAL WORKSTATION IPC547G	1
6EQ2001-2XX58-3BA0	SIMATIC PCS 7/OPEN OS, Software Runtime Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks.	1
System bus		
6GK5 208-0BA10-2AA3	MANAGED IE Switch SCALANCE X208 10/100MBIT/S	1

1.4 Server-Client with SIMATIC PCS 7/OPEN OS

The configuration includes a PCS 7 client/server architecture with multiple clients and PCS 7/OPEN OS. With this architecture it is possible to operate and monitor larger systems.

Figure 1-4

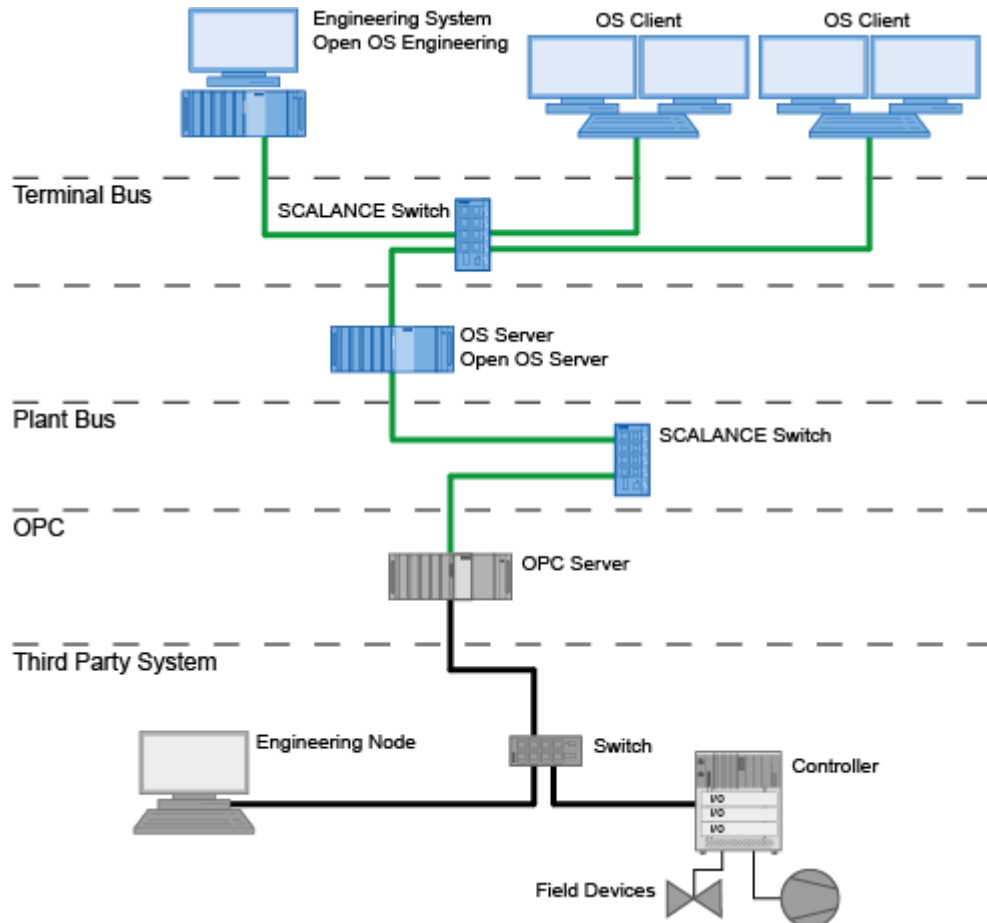


Table 1-4

Product number	Description	Quantity
Engineering system		
6ES7 660-7....-....	PCS 7 INDUSTRIAL WORKSTATION IPC547G	1
6EQ2001-1XX58-3BA5	SIMATIC PCS 7/OPEN OS, Software Engineering Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks.	1
Operator System server		
6ES7 660-7....-....	PCS 7 INDUSTRIAL WORKSTATION IPC547G	1
6EQ2001-2XX58-3BA0	SIMATIC PCS 7/OPEN OS, Software Runtime Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks.	1

Product number	Description	Quantity
Operator System client		
6ES7 660-7.....-....	PCS 7 INDUSTRIAL WORKSTATION IPC547G	2
6ES7658-2CX58-0YH5	SIMATIC PCS 7, OS Software Client V9.0	2
Terminal bus		
6GK5 208-0BA10-2AA3	MANAGED IE Switch SCALANCE X208 10/100MBIT/S	1
System bus		
6GK5 208-0BA10-2AA3	MANAGED IE Switch SCALANCE X208 10/100MBIT/S	1

2 Redundant systems

The following architecture examples only consider the PCS 7/OPEN OS side. However, these can easily be extended by a PCS 7 automation system and a PCS 7 project. For a better overview, the configuration examples are shown as examples with an OPC connection (the OPC server must be available on the third-party system side), but they also apply to the same extent to all other WinCC channels.

Redundant OS servers with SIMATIC PCS 7/OPEN OS and redundant OPC servers

If two OPC servers are used, this is often referred to as redundant OPC servers. In reality, there are two OPC servers that publish the same data budget without synchronizing with each other.

If two OPC servers are used, a connection to one of the OPC servers is set up for each OS server. The communication monitoring in the servers must be realized by an additional script.

Figure 2-1

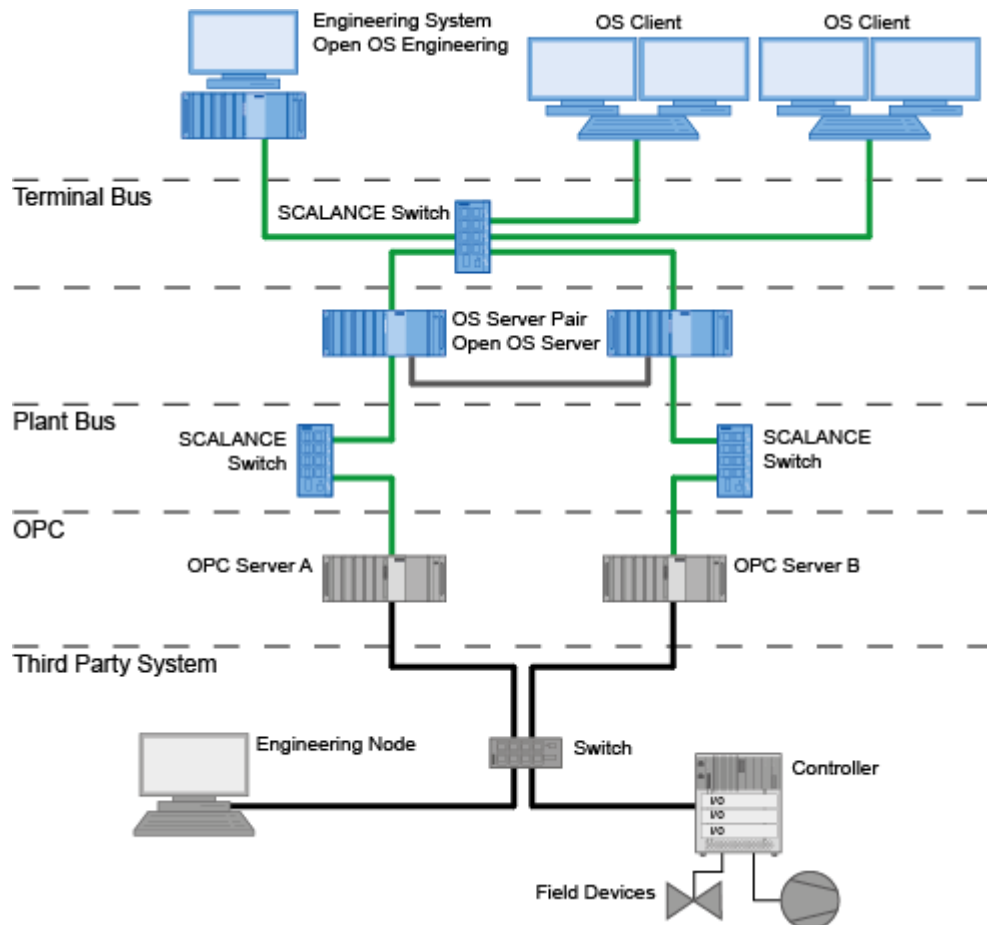


Table 2-1

Product number	Description	Quantity
Engineering system		
6ES7 660-7....-....	SIMATIC PCS 7 INDUSTRIAL WORKSTATION IPC547G	1
6EQ2001-1XX58-3BA5	SIMATIC PCS 7/OPEN OS, Software Engineering Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks.	1
Operator System server		
6ES7 660-7....-....	SIMATIC PCS 7 INDUSTRIAL WORKSTATION IPC547G	2
6ES7652-3BA58-2YH0	SIMATIC PCS 7, OS Software Server Redundancy V9.0 (PO 100)	2
6EQ2001-2XX58-3BA0	SIMATIC PCS 7/OPEN OS, Software Runtime Component Option V9.0 Note: The redundant monitoring of the OPC servers must be carried out with a script. The number of OS-POs can be increased at a later time by PowerPacks.	2
Operator System client		
6ES7 660-7....-....	SIMATIC PCS 7 INDUSTRIAL WORKSTATION IPC547G	2
6ES7658-2CX58-0YH5	SIMATIC PCS 7, OS Software Client V9.0	2
Terminal bus		
6GK5 208-0BA10-2AA3	MANAGED IE Switch SCALANCE X208 10/100MBIT/S	1
System bus		
6GK5 208-0BA10-2AA3	MANAGED IE Switch SCALANCE X208 10/100MBIT/S	2

3 SIMATIC PCS 7 systems with PCS 7/OPEN OS

When planning a SIMATIC PCS 7 system with PCS 7/OPEN OS, two starting situations are distinguished:

1. An existing PCS 7 system will be expanded with PCS 7/OPEN OS.
2. A new plant will be built with PCS 7 and PCS 7/OPEN OS.

Depending on the initial situation, you will need different software packages. You can therefore choose from the following variants:

Extending an existing SIMATIC PCS 7 plant with PCS 7/OPEN OS

Table 3-1

Product number	Description
Engineering System (Extension)	
6EQ2001-1XX58-3BA5	SIMATIC PCS 7/OPEN OS, Software Engineering Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks.
Operator System Server (Extension)	
6EQ2001-2XX58-3BA0	SIMATIC PCS 7/OPEN OS, Software Runtime Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks.
Operator System Client (Extension)	
6ES7658-2CX58-0YH5	SIMATIC PCS 7, OS Software Client V9.0 Note: The PCS 7 standard software is already installed on the existing systems.

Planning a new SIMATIC PCS 7 plant with PCS 7/OPEN OS

Table 3-2

Product number	Description
Engineering system (new planning)	
6EQ2001-1XX58-3BA5	SIMATIC PCS 7/OPEN OS, Software Engineering Component Option V9.0 Note: The software package contains the PCS 7 OS configuration software. The number of OS-POs can be increased at a later time by PowerPacks.
6ES7658-1AX58-0YB5	SIMATIC PCS 7, AS Engineering V9.0
Operator System Server (replanning)	
6EQ2001-2XX58-3BA0	SIMATIC PCS 7/OPEN OS, Software Runtime Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks.
Operator System Client (replanning)	
6ES7658-2CX58-0YH5	SIMATIC PCS 7, OS Software Client V9.0

3.1 SIMATIC PCS 7 Standalone system with PCS 7/OPEN OS

In this architecture, a single PCS 7 workstation with PCS 7/OPEN OS is represented. Engineering and runtime are executed on the same system.

Figure 3-1

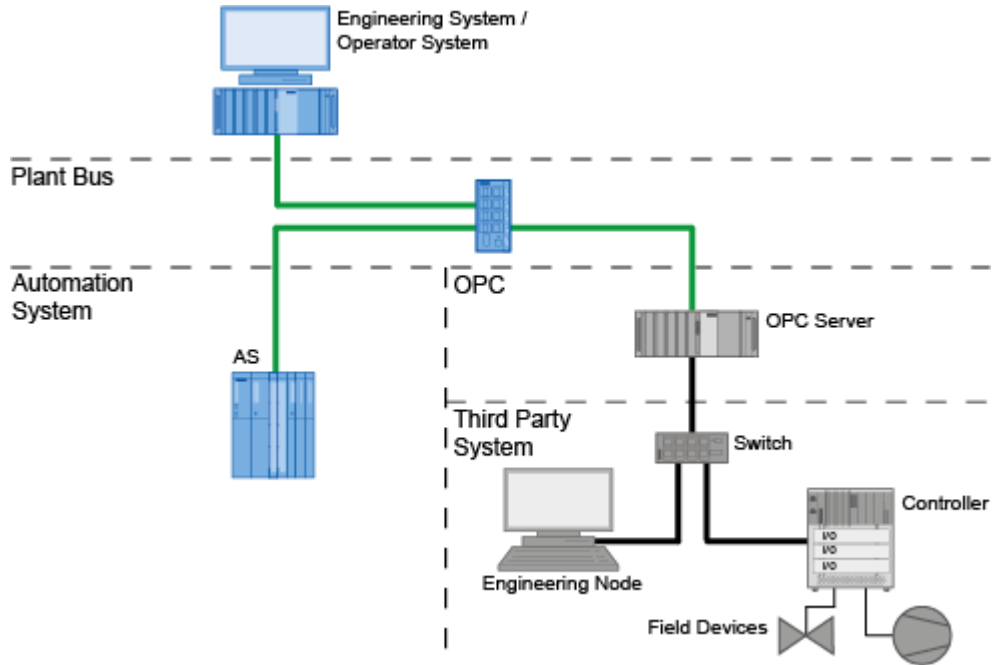


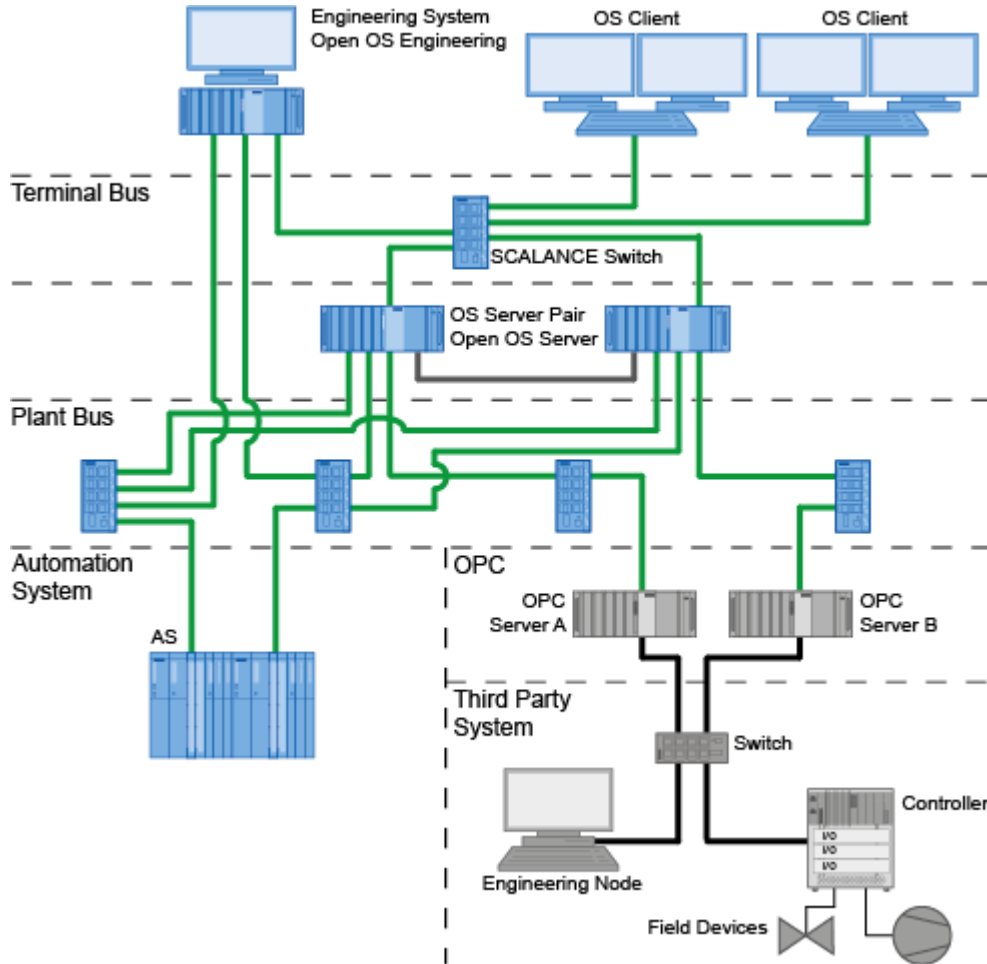
Table 3-3

Product number	Description	Quantity
Engineering System / Operator System (new planning)		
6ES7 660-7.....-.....	SIMATIC PCS 7 INDUSTRIAL WORKSTATION IPC547G	1
6EQ2001-1XX58-3BA5	SIMATIC PCS 7/OPEN OS, Software Engineering Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks.	1
6ES7658-1AX58-0YB5	SIMATIC PCS 7, AS Engineering V9.0	1
Engineering System / Operator System (Extension)		
6EQ2001-1XX58-3BA5	SIMATIC PCS 7/OPEN OS, Software Engineering Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks.	1
Automation system		
6ES7654-8.....-.....	SIMATIC PCS 7 Single AS pre-mounted and checked	1
System bus		
6GK5 208-0BA10-2AA3	MANAGED IE Switch SCALANCE X208 10/100MBIT/S	1

3.2 SIMATIC PCS 7 system with PCS 7/OPEN OS and common OS servers

In this architecture, an existing PCS 7 system was extended by PCS 7/OPEN OS. The PCS 7/OPEN OS runtime component was installed on the existing OS server.

Figure 3-2



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Table 3-4

Product number	Description	Quantity
Engineering system (new planning)		
6ES7 660-7.....-.....	SIMATIC PCS 7 INDUSTRIAL WORKSTATION IPC547G	1
6EQ2001-1XX58-3BA5	SIMATIC PCS 7/OPEN OS, Software Engineering Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks.	1
6ES7658-1AX58-0YB5	SIMATIC PCS 7, AS Engineering V9.0	1
6GK1704-0HB14-0AA0	SOFTNET-IE S7 REDCONNECT V14 Note: This software package is required for redundant automation systems.	2

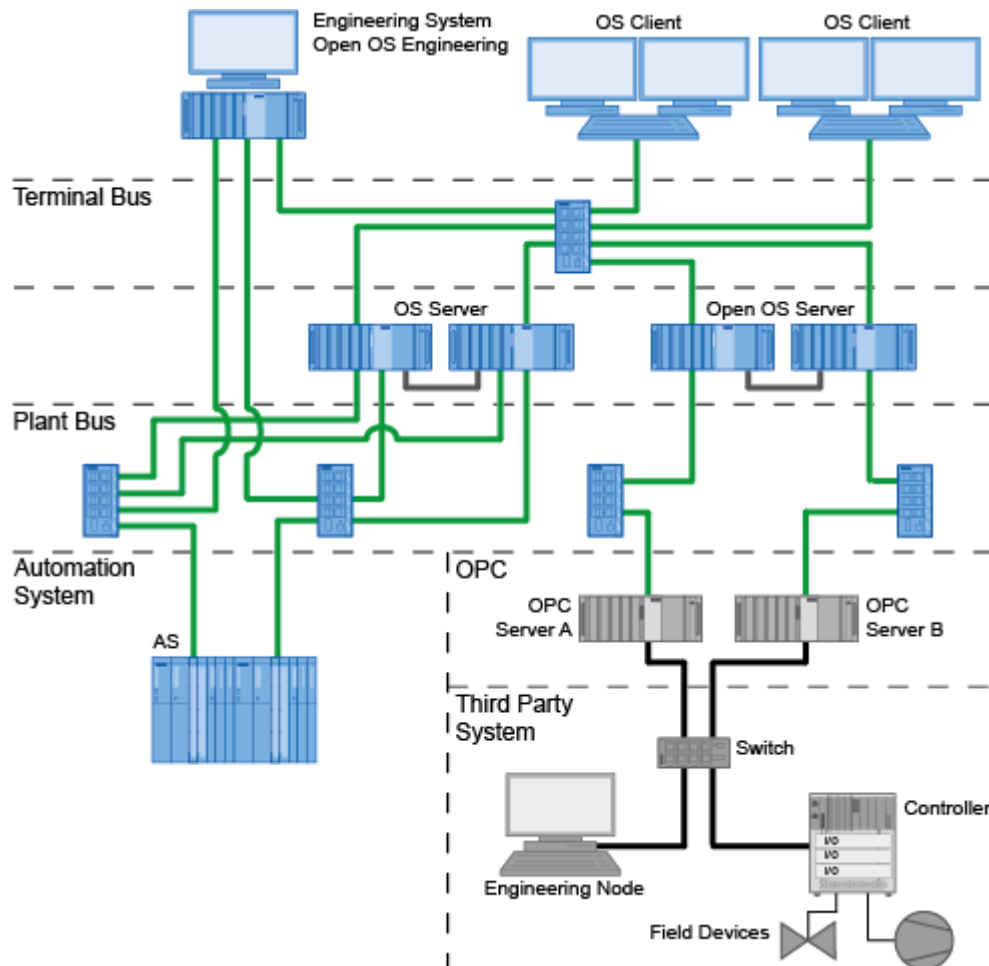
3 SIMATIC PCS 7 systems with PCS 7/OPEN OS

Product number	Description	Quantity
Engineering System (Extension)		
6EQ2001-1XX58-3BA5	SIMATIC PCS 7/OPEN OS, Software Engineering Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks.	1
Operator System Server (replanning)		
6ES7 660-7....-....	SIMATIC PCS 7 INDUSTRIAL WORKSTATION IPC547G	2
6ES7652-3BA58-2YA0	SIMATIC PCS 7, OS Software Server Redundancy V9.0 (PO 100) Note: The number of OS-POs can be increased at a later time by PowerPacks.	2
6EQ2001-2XX58-3BA0	SIMATIC PCS 7/OPEN OS, Software Runtime Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks. The redundant monitoring of the OPC servers must be carried out with a script.	2
6GK1704-0HB14-0AA0	SOFTNET-IE S7 REDCONNECT V14 Note: This software package is required for redundant automation systems.	2
Operator System Server (Extension)		
6EQ2001-2XX58-3BA0	SIMATIC PCS 7/OPEN OS, Software Runtime Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks. The redundant monitoring of the OPC servers must be carried out with a script.	2
Operator System client		
6ES7 660-7....-....	SIMATIC PCS 7 INDUSTRIAL WORKSTATION IPC547G	2
6ES7658-2CX58-0YH5	SIMATIC PCS 7, OS Software Client V9.0	2
Automation system		
6ES7656-6C....-....	SIMATIC PCS 7 CPU 410 redundant AS pre-assembled and tested Note: The AS PO RT license can be extended in 100, 1000 or 10000 steps as required.	1
Terminal bus		
6GK5 208-0BA10-2AA3	MANAGED IE Switch SCALANCE X208 10/100MBIT/S	1
System bus		
6GK5 208-0BA10-2AA3	MANAGED IE Switch SCALANCE X208 10/100MBIT/S	4

3.3 SIMATIC PCS 7 system with separate OS and OPEN OS servers

In this architecture, an existing PCS 7 system was extended by PCS 7/OPEN OS. The external system connection is implemented here via a separate redundant server pair for OPEN OS. The PCS 7/OPEN OS runtime components were installed on these additional OS servers.

Figure 3-3



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Table 3-5

Product number	Description	Quantity
Engineering system (new planning)		
6ES7 660-7.....-.....	SIMATIC PCS 7 INDUSTRIAL WORKSTATION IPC547G	1
6EQ2001-1XX58-3BA5	SIMATIC PCS 7/OPEN OS, Software Engineering Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks.	1
6ES7658-1AX58-0YB5	SIMATIC PCS 7, AS Engineering V9.0	1
6GK1704-0HB14-0AA0	SOFTNET-IE S7 REDCONNECT V14 Note: This software package is required for redundant automation systems.	2

3 SIMATIC PCS 7 systems with PCS 7/OPEN OS

Product number	Description	Quantity
Engineering System (Extension)		
6EQ2001-1XX58-3BA5	SIMATIC PCS 7/OPEN OS, Software Engineering Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks.	1
Operator System Server (SIMATIC PCS 7)		
6ES7 660-7....-....	SIMATIC PCS 7 INDUSTRIAL WORKSTATION IPC547G	2
6ES7652-3BA58-2YA0	SIMATIC PCS 7, OS Software Server Redundancy V9.0 (PO 100) Note: The number of OS-POs can be increased at a later time by PowerPacks.	2
6GK1704-0HB14-0AA0	SOFTNET-IE S7 REDCONNECT V14 Note: This software package is required for redundant automation systems.	2
Operator System Server (SIMATIC PCS 7/OPEN OS)		
6ES7 660-7....-....	SIMATIC PCS 7 INDUSTRIAL WORKSTATION IPC547G	2
6ES7652-3BA58-2YA0	SIMATIC PCS 7, OS Software Server Redundancy V9.0 (PO 100) Note: The number of OS-POs can be increased at a later time by PowerPacks.	1
6EQ2001-2XX58-3BA0	SIMATIC PCS 7/OPEN OS, Software Runtime Component Option V9.0 Note: The number of OS-POs can be increased at a later time by PowerPacks. PowerPacks can be increased. The redundant monitoring of the OPC servers must be carried out with a script.	2
Operator System client		
6ES7 660-7....-....	SIMATIC PCS 7 INDUSTRIAL WORKSTATION IPC547G	2
6ES7658-2CX58-0YH5	SIMATIC PCS 7, OS Software Client V9.0	2
Automation system		
6ES7656-6C....-....	SIMATIC PCS 7 CPU 410 redundant AS pre-assembled and tested Note: The AS PO RT license can be extended in 100, 1000 or 10000 steps as required.	1
Terminal bus		
6GK5 208-0BA10-2AA3	MANAGED IE Switch SCALANCE X208 10/100MBIT/S	1
System bus		
6GK5 208-0BA10-2AA3	MANAGED IE Switch SCALANCE X208 10/100MBIT/S	4

4 Appendix

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4.2 Links and literature

Table 4-1

No.	Topic
\1\	Siemens Industry Online Support Fehler! Linkreferenz ungültig.
\2\	Link to this entry page of this application example https://support.industry.siemens.com/cs/ww/en/view/4974007
\3\	SIMATIC PCS 7 / Open OS Sales and Delivery Release https://support.industry.siemens.com/cs/ww/en/view/109750265
\4\	SIMATIC PCS 7 Standard Architectures http://support.automation.siemens.com/WW/view/en/32201963

4.3 Change documentation

Table 4-2

Version	Date	Modifications
V1.0	11/2012	First version
V1.1	04/2017	Removing defective Link
V1.2	05/2019	Update to SIMATIC PCS 7 V9.0