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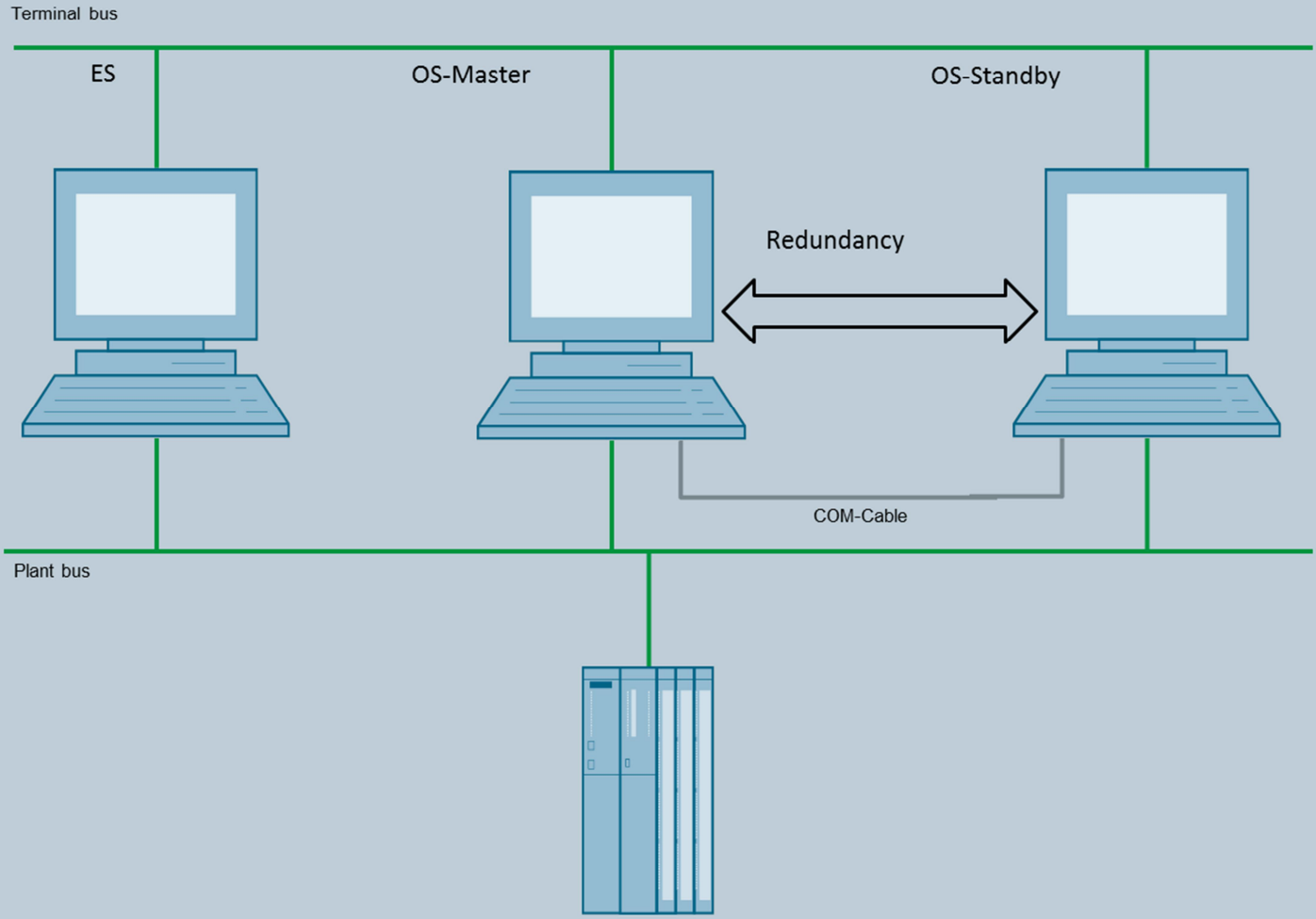

Application description • 05/2015

SIMATIC PCS 7 Minimal Configuration

SIMATIC PCS 7 V8.1

https://support.industry.siemens.com/cs/ww/en/view/24023824

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1 Overview of the minimal configuration

There are various constellations possible when utilizing the engineering station in process mode as an operator station or multiple operator stations with as few PCs as possible. The following versions were selected according to their feasibility and usefulness in the context of PCS 7.

The configurations shown here also include descriptions of solutions with configurations that do not differ significantly from each other.

In general, particular functionality criteria must be considered when using the engineering PC as an OS, because the OS project must be closed when performing certain activities. This will also be discussed in more detail below.

1.1 ES/OS single-user system

The smallest of all configurations only requires one PC station.

Figure 1-1

Process mode / functionality

Since version 6.1 of PCS 7, the OS project can also be compiled when the runtime is activated (change compilation). Thus, the operator and archiving functions are given permanently.

Note The description and configuration instructions for this configuration can be found in chapter 3 "ES/OS single-user system".

Alternatives / variations

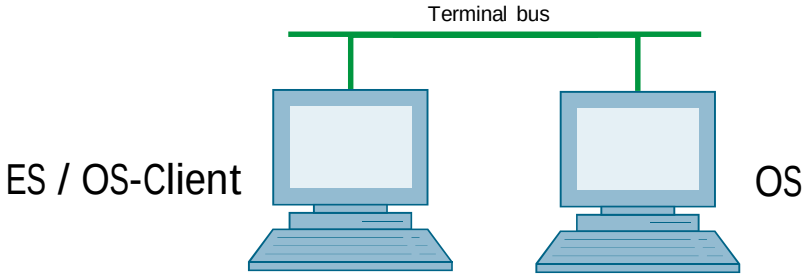
The complete SIMATIC PCS 7 BOX package is also a good alternative.
It combines the AS, OS and ES in a compact PC system. A PROFIBUS interface is also integrated to connect the distributed process I/O.

Note The ES/OS single-user system can also be extended with the functionality of the PCS 7 OS Web Server. You can find the corresponding instructions in chapter 7 "Expansion with the PCS 7 OS Web Option".

1.2 ES/OS client and OS server

With an additional PC station as an OS server, the ES can be used as an OS client. This receives access to the data of the OS server in process mode and visualizes them.

Figure 1-2



Process mode / functionality

In PCS 7, the OS server may be used for operator functions when not more than four OS clients are connected. In this example, if the server malfunctions, the complete OS functionality fails. Besides this, the OS client must be terminated for OS project changes occurring at a later stage. But the OS server keeps on working permanently when compiling/loading changes.

Note The description and configuration instructions for this configuration can be found in chapter 4 "ES/OS client and OS server".

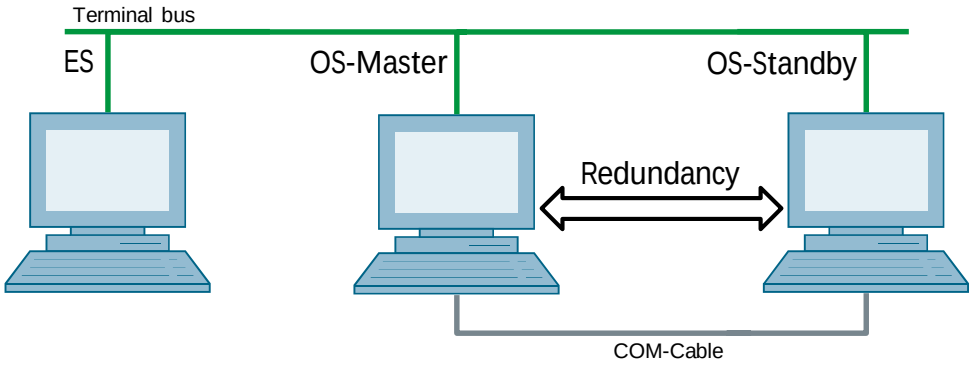
Alternatives / variations

An advantage of this configuration is the possibility to connect additional clients to the OS server in a relatively simple and inexpensive manner.

1.3 ES, Master OS and Standby OS

Three PC stations are required for the PCS 7–compliant implementation of OS redundancy. Then, the ES fulfills exclusively engineering tasks and during operation it only serves for testing OS functions.

Figure 1-3



Process mode / functionality

Since the ES is not involved in the process mode, the operator functions of the two OS single stations are permanently available. The OS remains active, even during complete loading of project changes. The redundancy ensures mutual synchronization, both when online and after the failure of one of the two partners.

The COM connection (RS 232 connecting cable) serves for the optimization of internal server to server communication.

As from PCS 7 V7.0, a separate Ethernet connection (free on-board or additional network adapter) can be used for redundancy connection as an alternative to the COM connection.

Note The description and configuration instructions for this configuration can be found in chapter 5 "ES, Master OS and Standby OS".

Alternatives / variations

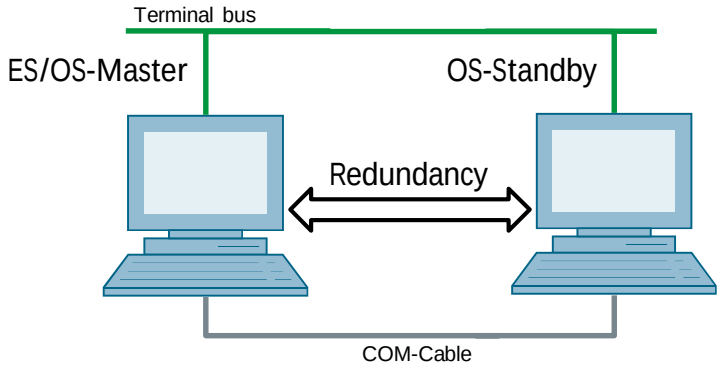
For the low-maintenance systems primarily mentioned in this document, one can often omit having a permanently present ES. When a temporary ES is rented for configuring, commissioning and project changes.

In this example, the conceivable expansion with additional OS clients is not readily possible because the two OSs are not installed with a server operating system.

1.4 Master ES/OS and Standby OS

In this configuration with two redundant OS single stations, one of the two stations also serves as a simultaneous ES, which saves the need for a separate third station.

Figure 1-4



Process mode / functionality

In this example both PC stations work in process mode as redundant OS single stations that balance off each other both in operation and after a failure of one of the two partners. This is also relevant for later OS project changes, which require the Master OS to be exited. In this case, the Standby OS takes over the master role. It keeps on working permanently while compiling/loading changes and updates the redundancy partner after it returns.

The COM connection (RS 232 connecting cable) is used to optimize the internal communication between the two OS single stations.

As from PCS 7 V7.0, a separate Ethernet connection (free on-board or additional network adapter) can be used for redundancy connection as an alternative to the COM connection. For a complete loading, the runtime and OS must be turned off and closed on both stations. During this time, no OS functionalities are available.

Note

This configuration does not provide the entire PCS 7 functionality, since the design of the redundancy is done by means of WinCC tools.

The appropriate restrictions during process mode and the differences in the system behavior can be found together with the description and configuration instructions in chapter 6 "Master ES/OS and Standby OS".

Alternatives / variations

For a PCS 7–compliant implementation of OS redundancy, it is recommended to use three PC stations. With the change in the licensing scheme concept, PCS 7 V8.0 will require the same amount of license packages for this. The implementation of redundancy with two PC stations is associated with some limitations (see chapter 6.1 "Configuration description") and only saves you one computer (hardware and Windows license), when compared to the PCS 7–compliant implementation with a separate ES and two redundant OS single stations (see chapter 1.3 "ES, Master OS and Standby OS").

Note The ES/OS single-user system can also be extended with the functionality of the PCS 7 OS Web Server. You can find the corresponding instructions in chapter 7 "Expansion with the PCS 7 OS Web Option".

2 General/optional system settings

The system settings relevant for configuration are proposed in the following section.

2.1 Bus connection of the PC stations

System bus

In the ES as well as in each server, a network card is used in "Configured mode" for the system bus. On this network card, only the ISO protocol is enabled for Windows. If a CP1623 exists, it is used for access to the system bus. The parameter assignment is done in SIMATIC NetPro and in the HW Config

Terminal bus

Except for the configuration with only one ES/OS single-user system, all other PC stations are otherwise also linked to the terminal bus. The required second network card by the ES and the server is here set to "PG mode". This card is not configured in SIMATIC NetPro and in the HW Config PCS 7 finds this network access via the computer name or the specified path for the target machine that needs to be entered in the object properties of the PC station. For this network card, only the TCP/IP protocol (no ISO) is activated in Windows.

Client PC stations are generally equipped with only one network card, with which they are connected to the terminal bus. For this network card, only the TCP/IP protocol (no ISO) is activated in Windows.

2.2 Autostart of WinCC

The step instructions in this document specify that the OS project is opened in WinCC Explorer of the OS servers and clients for the purpose of activating the runtime.

This should be mostly avoided in the system, since there are generally no configuration licenses(RC licenses) on the OSs. If the WinCC Explorer is open for longer than two hours, WinCC switches to Demo mode and must be completely closed (incl. runtime) and reopened for further configuration steps.

To activate the runtime automatically when the computer starts without having to open WinCC explorer, one can configure an automatic start for the project.

In conjunction with SIMATIC NET 2005 Edition (as from WinCC V6.0 SP3), the WinCC tool "AutoStartRT" should be configured in "Set configuration console PC station" in order to configure the WinCC automatic start:

https://support.industry.siemens.com/cs/ww/en/view/23061262

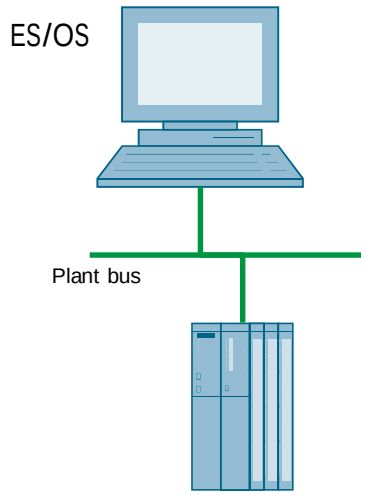
3 ES/OS single-user system

3.1 Configuration description

The single-user system is the smallest possible configuration. Both the ES and the OS functionalities are provided by the same PC.

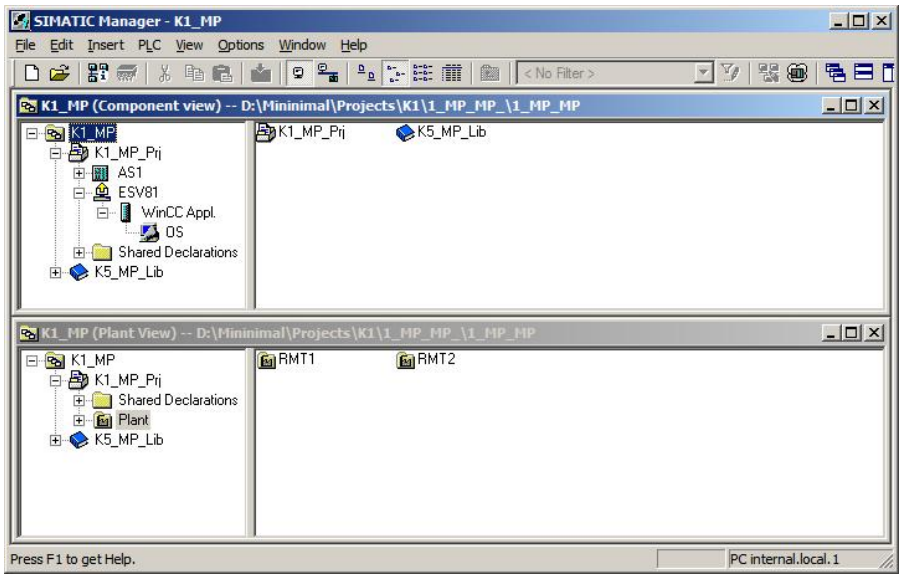
Hardware assembly

Figure 3-1



PCS 7 configuration

Figure 3-2



3.2 Required hardware and software licensing

Hardware

The following hardware is recommended for this configuration and can be ordered via the Siemens mall. Your selected operating system and SIMATIC PCS 7 system software is preinstalled on the PC station in its relevant scope.

Table 3-1

Station	Product label	Operating system	System bus transition
1 x ES/OS	SIMATIC PCS 7 ES/OS IPC847D BCE	Windows 7	RJ45 network card
	SIMATIC PCS 7 ES/OS IPC847D IE	Windows 7	CP1623

Software licensing

The following section lists the software/license package required for this configuration selection.

In the selected configuration as a single-user system, the number of POs is limited to a maximum of 2000 units.

Table 3-2

Component	Software/license package
ES/OS	• SIMATIC PCS 7 ES Single Station (incl. 250 AS/OS runtime PO) • SIMATIC PCS 7 AS runtime license • SIMATIC PCS 7 OS runtime license (max. 2000 PO)

3.3 Step-by-Step configuration

Note The following instructions have been created based on Windows 7 and PCS 7 V8.1.

A CP1623 is used as an example for the system bus transition.

3.3.1 ES configuration

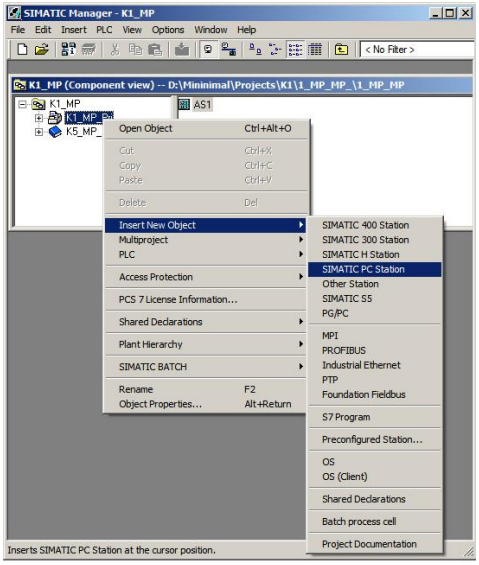
Creating the multiproject

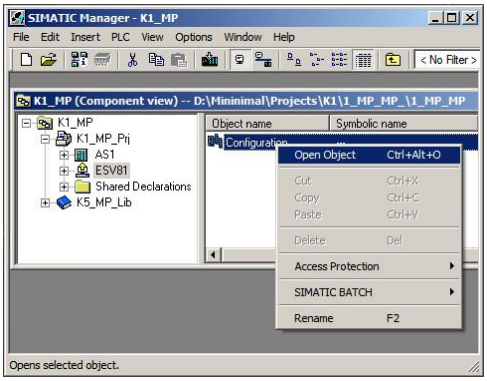
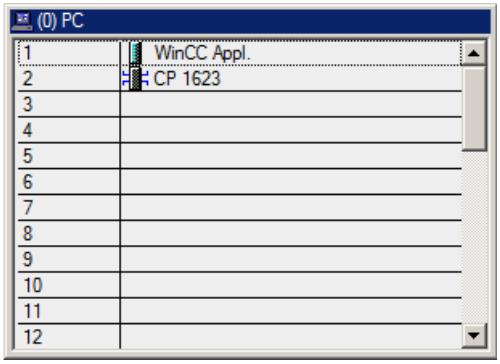
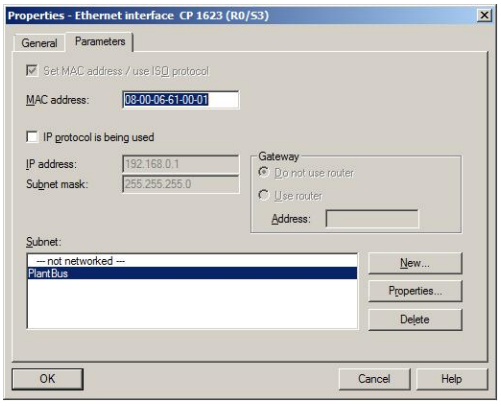
As a basis for the following instructions, the station must be physically connected according to Figure 4-1(page 11). A multiproject must be also created on the ES, where the hardware and software of the AS are already configured.

Creating a PC station

The PC station is created in the PCS 7 project the PC station that represents both the ES and the OS.

Table 3-3

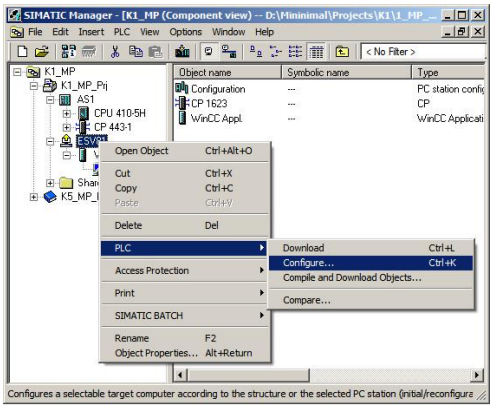
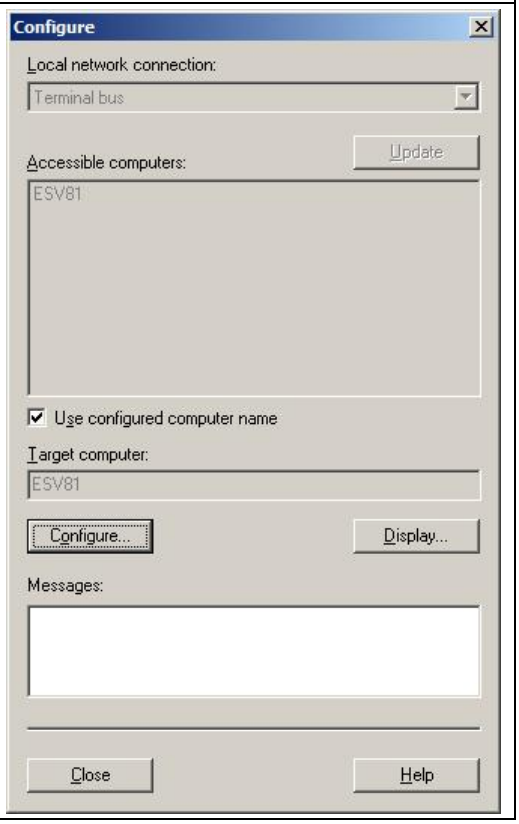
Step	Activity	Screenshot
1.	Open the shortcut menu of the project in the component view and add a new PC station via "Insert New Object > SIMATIC PC station". Change the name of the PC station to match the name of the local computer on the network.	

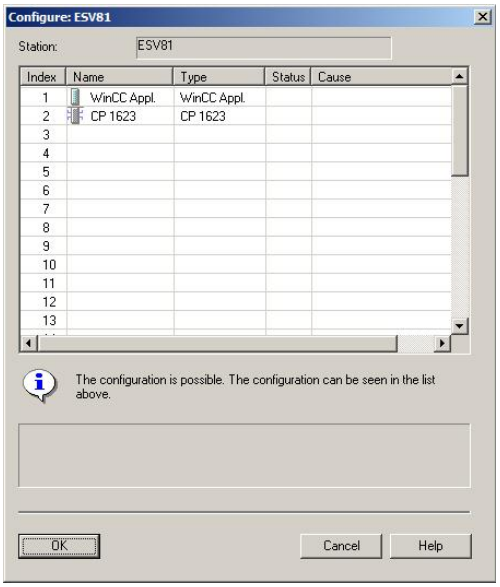
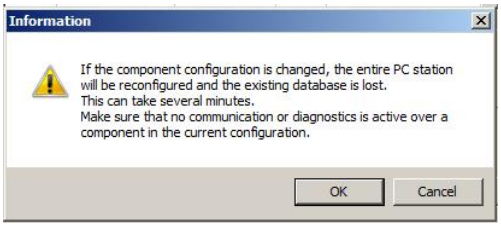
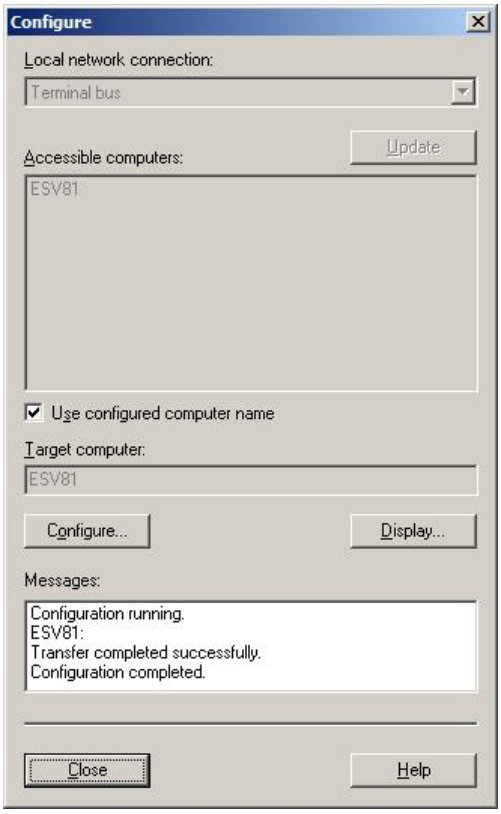
Step	Activity	Screenshot
2.	Open the HW Config of the PC station via the shortcut menu.	
3.	From the object catalog (View > Catalog) insert a "WinCC application" and a network card of the type "CP1623".	
4.	Select the system bus from "Subnet" or set this by pressing the "New..." button. Assign the corresponding MAC address to the CP1623. Deactivate the check box "IP protocol is being used". Click the "OK" button to confirm the settings.	
5.	Save and compile the configuration via the menu command: "Station > Save and compile..." Close the HW Config	

Configuring the PC station

The function "Configure PC station" transfers project configurations to one or more target stations.

Table 3-4

Step	Activity	Screenshot
1.	Configure the Station Configuration Editor of the ES. To do this, select the PC station of the ES and then choose "PLC > Configure..." in the shortcut menu.	
2.	Select the PC to be configured from "Accessible computers:". **NOTE** If you have chosen the option "Identical PC name PC station name" via "Object properties", the target PC to be configured appears directly in the component configurator. Use the "Show" button to display the current configuration of the PC station. Click on the "Configure…" button.	

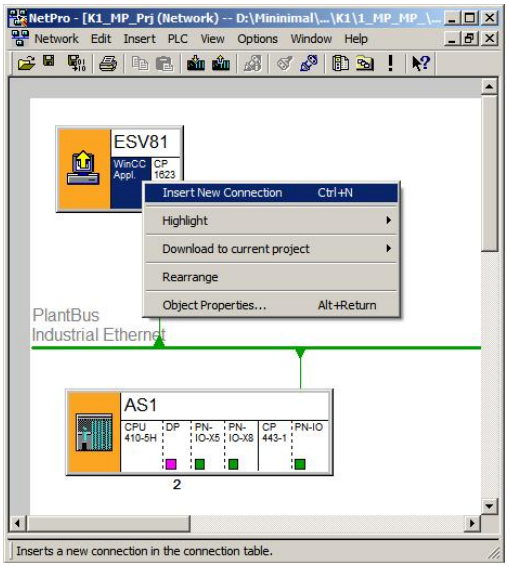
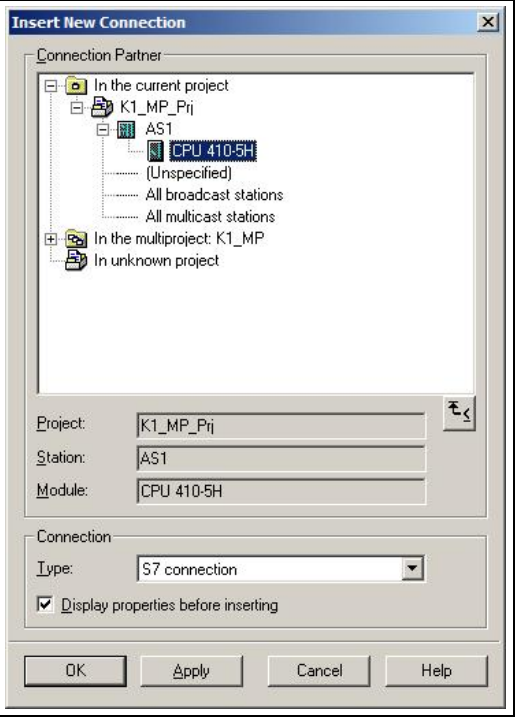
Step	Activity	Screenshot
3.	In the window that appears you will see how the PC station is configured. Click the "OK" button to confirm this.	
4.	Confirm the information dialog by clicking the "OK" button.	
5.	In the bottom window you will then see the message: "Transfer completed successfully." Close the configuration dialog.	

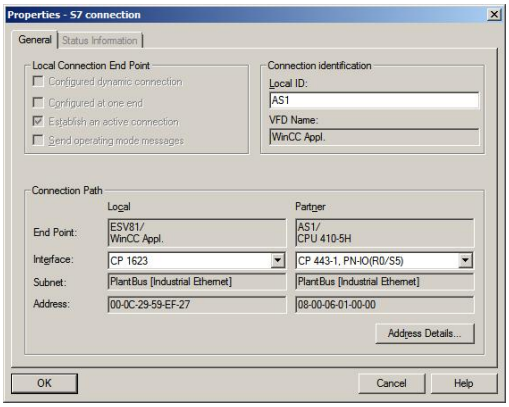
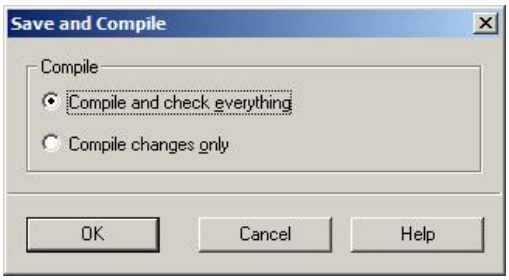
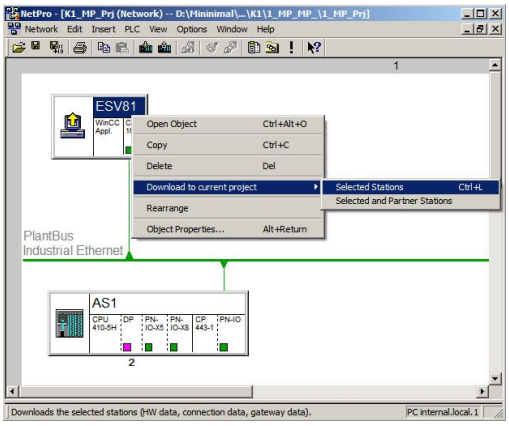
Configuring and loading AS-OS communication

In the following section, the connection is configured with NetPro and loaded in the stations.

Note In case of a granular station configuration, the subnets of the individual sub-projects must be first merged.

Table 3-5

Step	Activity	Screenshot
1.	Open NetPro. Select the WinCC application of the ES and open the shortcut menu. Select "Insert New Connection".	
2.	Select the CPU of the AS in the "Connection Partner" window. Make sure that an "S7 connection" is selected under "Connection". Click the "OK" button to confirm the selection.	

Step	Activity	Screenshot
3.	Under "Connection identification" in the "General" tab, change the "Local ID:" to a descriptive name, such as AS1. Click the "OK" button to confirm the entry.	
4.	Save and compile via :"Network > Save and Compile...". Select "Compile and check everything". Click the "OK" button to confirm the selection.	
5.	Select the ES and download the connection via the shortcut menu: "Download to current project > Selected Stations". Download the AS in the same way. Then close NetPro.	

Compiling and loading the user program

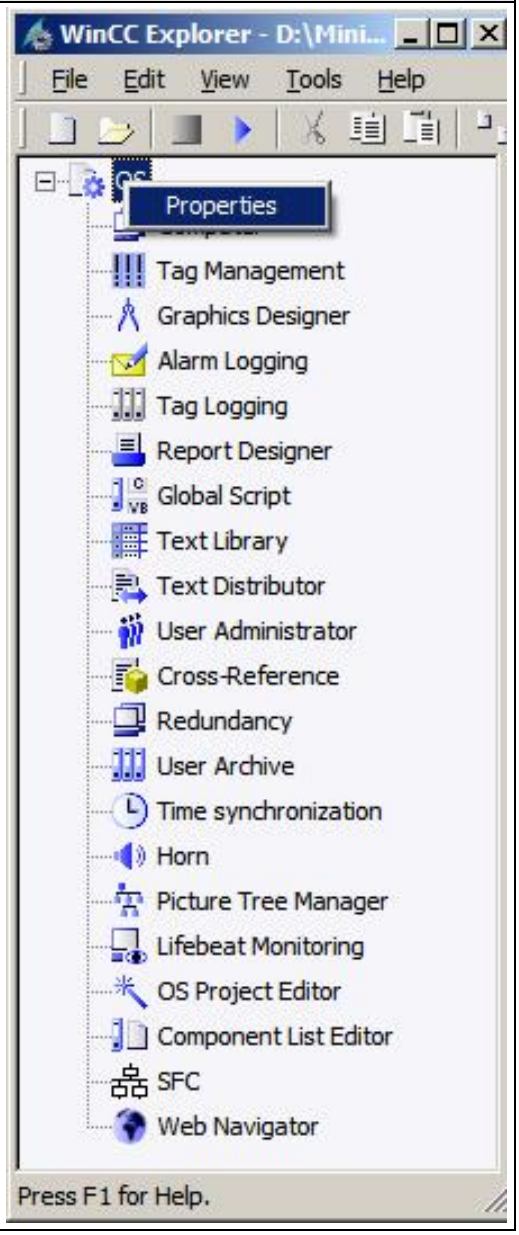
Compile the S7 program and download it to the AS.

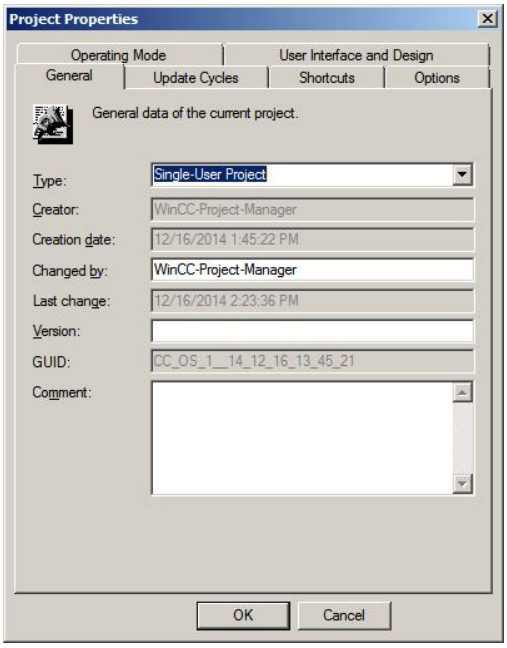
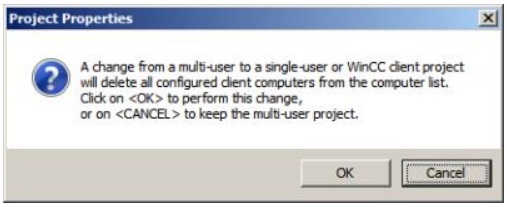
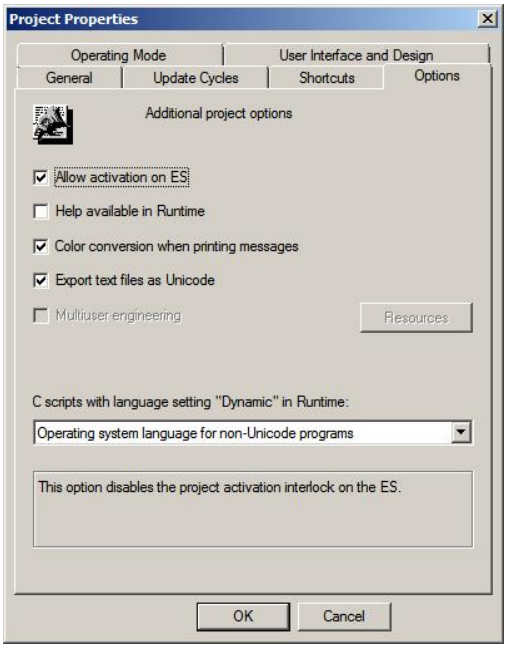
Compiling the OS project

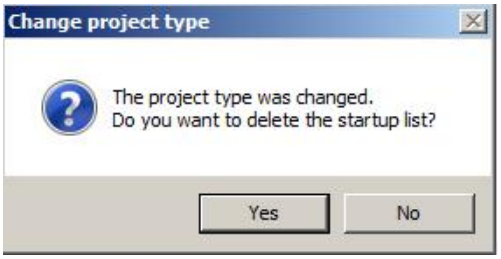
Compile the OS project in SIMATIC Manager.

3.3.2 OS configuration

Table 3-6

Step	Activity	Screenshot
1.	Open the OS project. Select the OS project in the open WinCC Explorer and select "Properties" in the shortcut menu.	

Step	Activity	Screenshot
2.	Select "Single-user project" in the "General" tab under "Type:". Confirm your selection and the displayed message by clicking the "OK" button.	 
3.	In the "Options" tab, select the option "Allow activation on the ES ".	

Step	Activity	Screenshot
4.	Click on the "No" button, in order to prevent the deletion of the startup list.	
5.	Close the WinCC Explorer. **NOTE** Changes take effect only after closing and reopening the WinCC Explorer.	

3.3.3 Activating the runtime

After the OS project is closed, open it again and activate the runtime.

3.3.4 Particularities when loading the OS project changes

If the OS and ES are operated on a single PC, you have to perform a loading operation because all required data is already available. Here it's enough to run the "Compile OS" function.

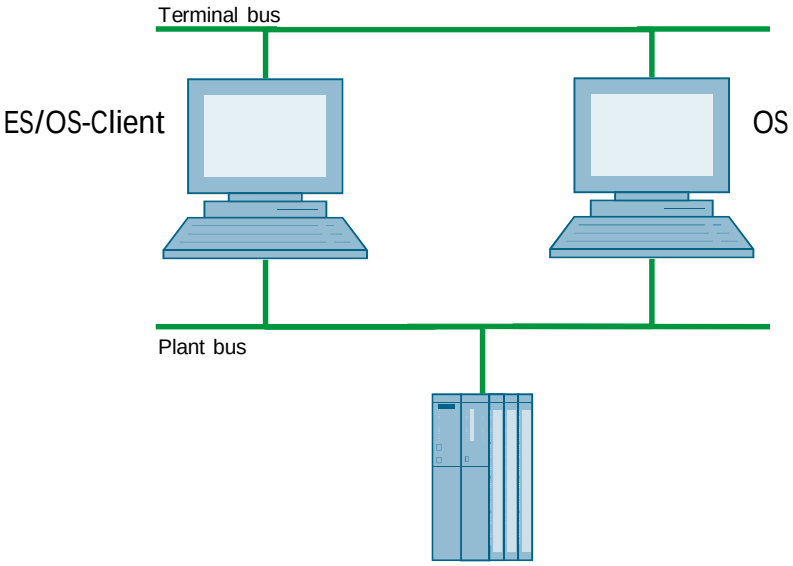
Just like the function "Download changes", you can run the function "Compile changes" in the single-user system without exiting the process mode on the OS.

4 ES/OS client and OS server

4.1 Configuration description

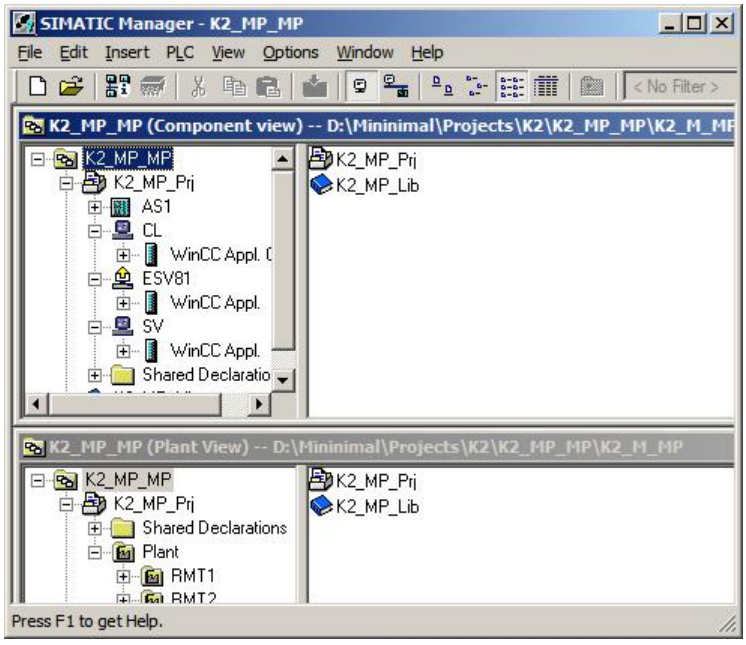
In a server-client structure with only two computers, the ES serves simultaneously as an OS client. 3 PCs should be provided in this configuration.

Figure 4-1



PCS 7 configuration

Figure 4-2



4.2 Required hardware and software licensing

Hardware

The following hardware is recommended for this configuration and can be ordered via the Siemens mall. This ensures that the appropriate amount of operating systems of your choice and SIMATIC PCS 7 system software are pre-installed on the PC stations.

Table 4-1

Station	Product label	Operating system	System bus transition
ES/OS client	SIMATIC PCS 7 ES/OS IPC847D BCE	Windows 7	RJ45 network card
	SIMATIC PCS 7 ES/OS IPC847D IE	Windows 7	CP 1623
OS server	SIMATIC PCS 7 ES/OS IPC847D BCE	Windows Server 2008 R2	RJ45 network card
	SIMATIC PCS 7 ES/OS IPC847D IE	Windows Server 2008 R2	CP 1623

Software Licensing

The following section lists the software/license packages required for this configuration selection.

An OS server can provide up to 12,000 POs with the corresponding software package, depending on the project size. In addition to engineering software, an OS client software must be also installed on the ES.

Table 4-2

Component	Software/license package
ES/OS client	• SIMATIC PCS 7 AS/OS Engineering Software V8.1 (PO unlimited) • SIMATIC PCS 7 AS Runtime License • SIMATIC PCS 7 OS Software Client V8.1
OS server	• SIMATIC PCS 7 OS Software Server V8.1 • SIMATIC PCS 7 OS Runtime License (max. 12000 PO)

4.3 Step-by-Step configuration

Note

The following instructions have been created based on Windows 7 and PCS 7 V8.1.

CP1623 are used as an example for the system bus transition. Time synchronization is activated.

The PC stations used in the test setup are called:

- ES/OS client: ESV81
- OS server: SV

4.3.1 Preparatory activities

Create a project folder on the OS server and enable it. This allows the OS data configured on the engineering station to be transferred to the OS server.

4.3.2 ES configuration

Creating the multiproject

As a basis for the following instructions, all PC stations must be physically connected according to Figure 4-1(page 22). A multiproject must be also created on the ES, where the hardware and software of the AS are already configured.

Then you begin from the following CPU and CP settings.

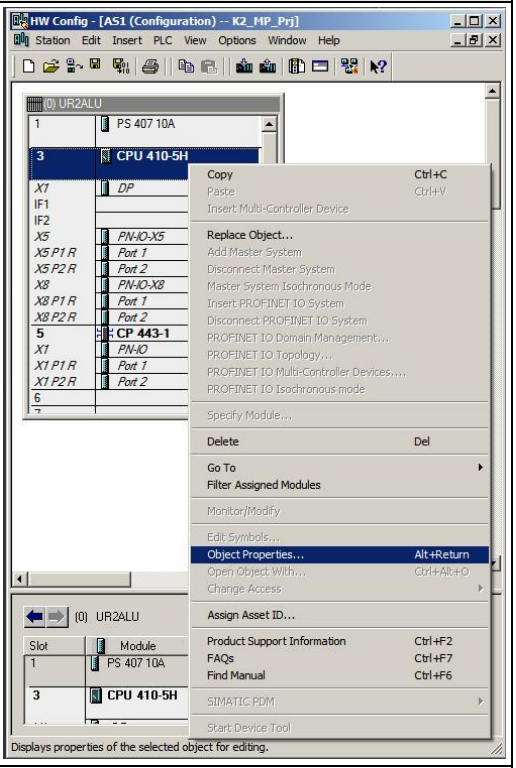
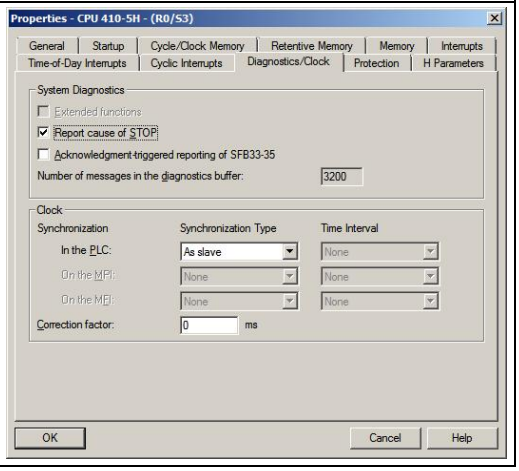
AS settings

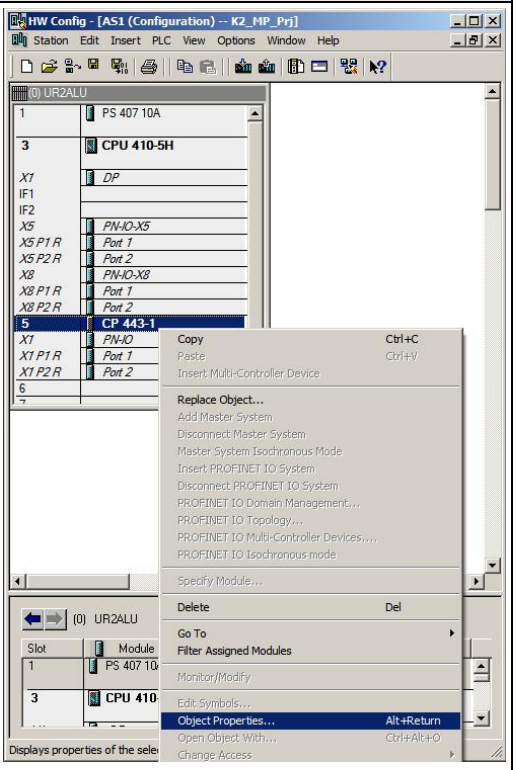
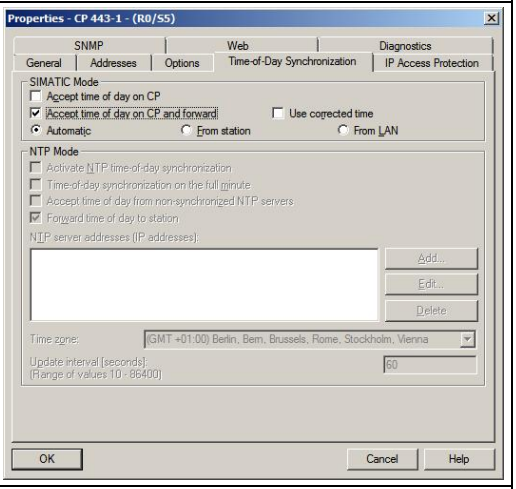
This example describes a way in which the OS server predetermines the master time.

Note More time synchronization possibilities are described in detail in the following manuals:

- SIMATIC Process Control System PCS 7 Operator Station (V8.1)
- SIMATIC Process Control System PCS 7 Time synchronization (V8.1)

Table 4-3

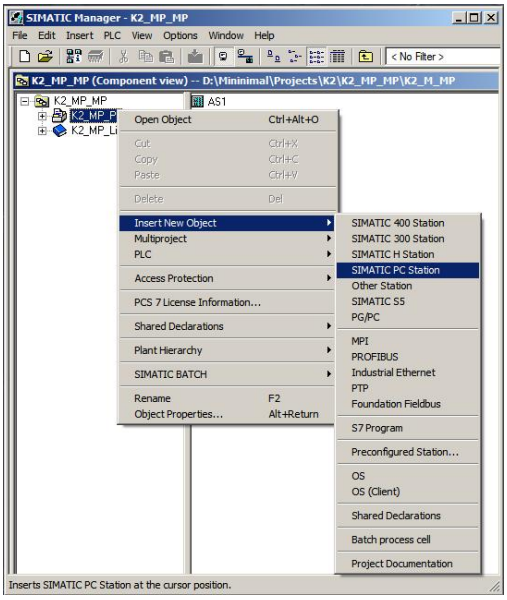
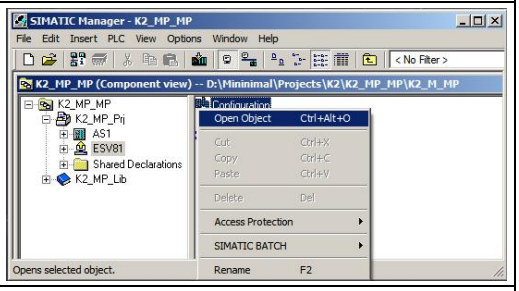
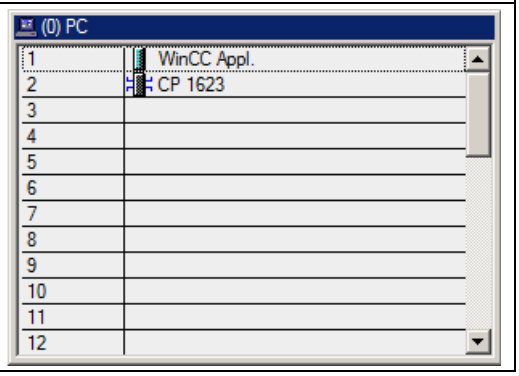
Step	Activity	Screenshot
1.	Open the HW Config for the AS. Select the CPU and choose "Object properties..." in the shortcut menu.	
2.	Switch to the "Diagnostics/Clock" tab. In the "Clock" section, set "Synchronization Type - As slave". Click the "OK" button to confirm the selection.	

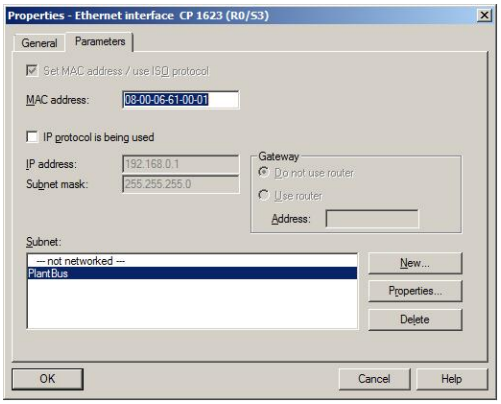
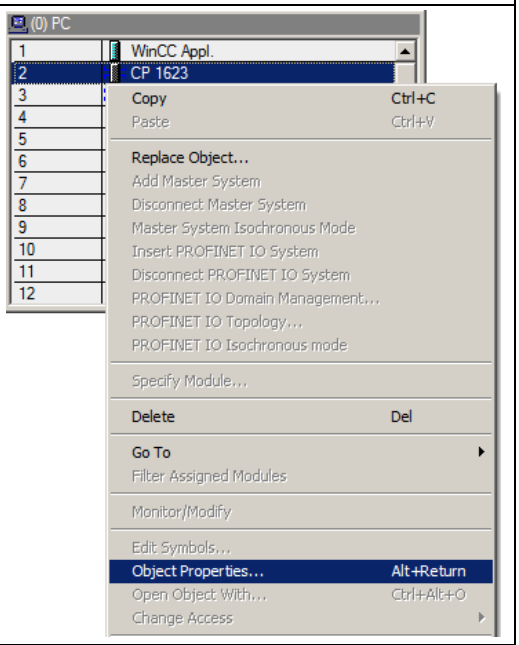
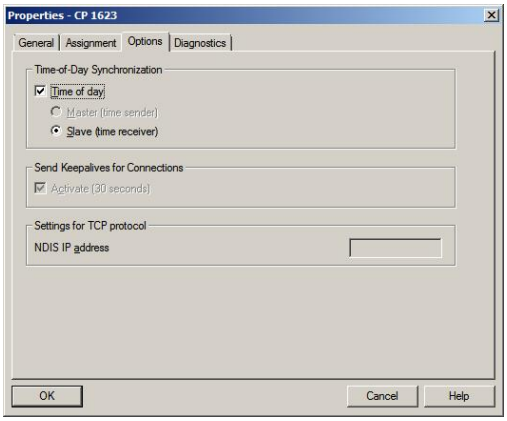
Step	Activity	Screenshot
3.	Open the shortcut menu of the CP and select "Object properties…".	
4.	Switch to the "Time synchronization" tab. Activate the check box "Accept time of day on CP and forward". Click the "OK" button to confirm the setting.	
5.	Save and compile the configuration via: "Station > Save and compile...". Close the HW Config	

Setting up the ES PC station

In order to test the OS project on the ES, create a PC station for the ES with the WinCC application.

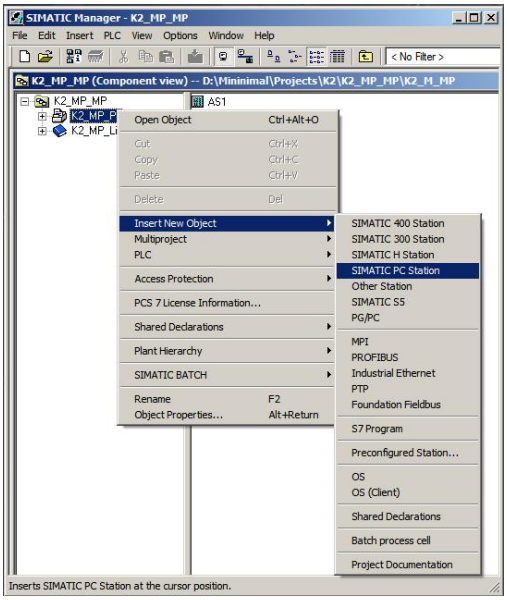
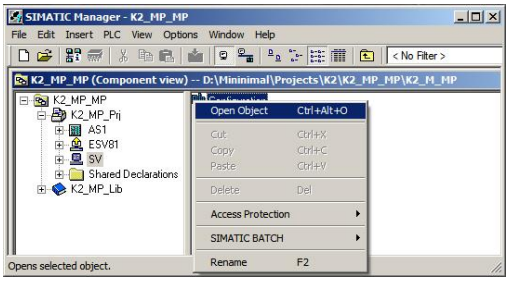
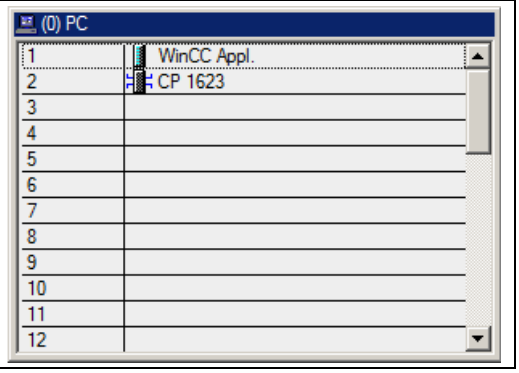
Table 4-4

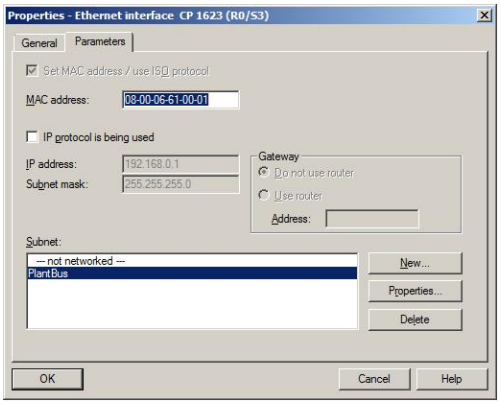
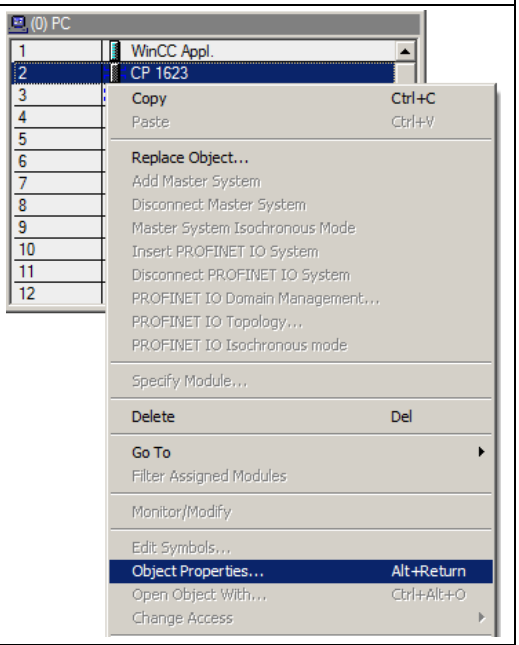
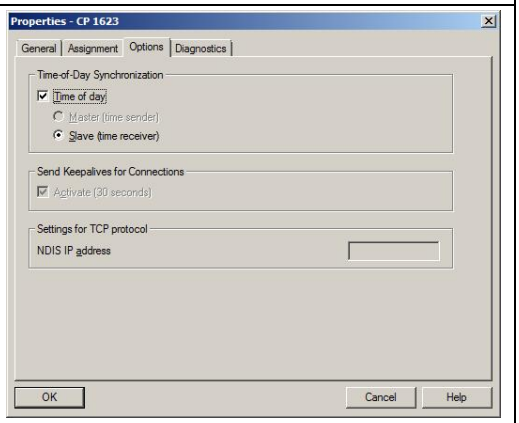
Step	Activity	Screenshot
1.	Open the shortcut menu of the project in the component view and add a new PC station via "Insert New Object > SIMATIC PC station". Change the name of the PC station so that it matches the name of the local computer on the network.	
2.	Open the HW Config of the PC station via the shortcut menu.	
3.	From the object catalog ("View > Catalog") insert a "WinCC application" and a network card of the type "CP1623".	

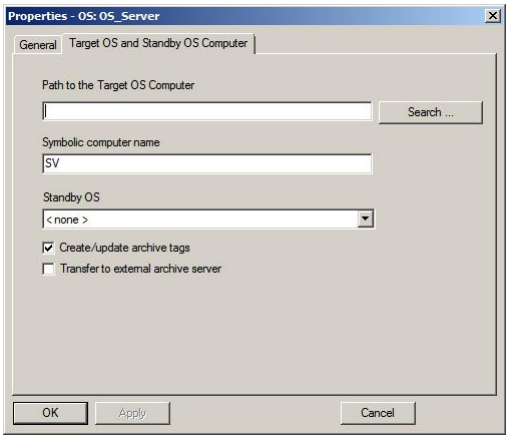
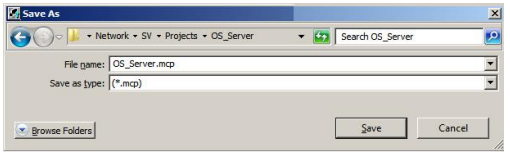
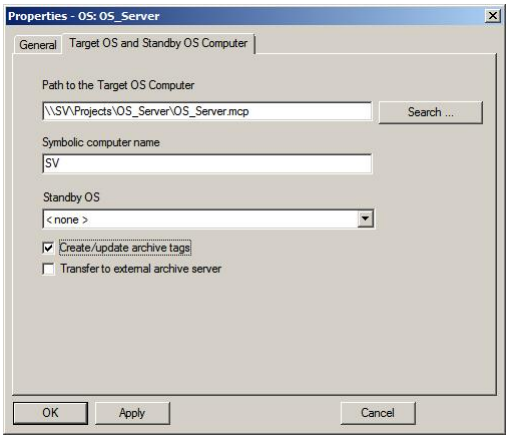
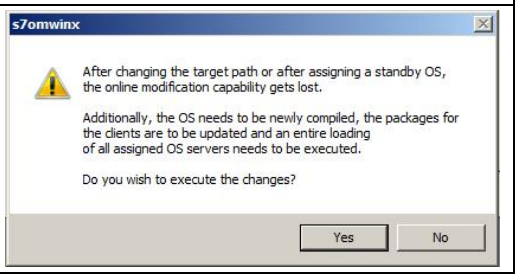
Step	Activity	Screenshot
4.	Select the system bus from "Subnet" or set this by pressing the "New..." button. Assign the corresponding MAC address to the CP1623. Deactivate the check box "IP protocol is being used". Click the "OK" button to confirm the settings.	
5.	Open the shortcut menu of the CP1623 and select "Object properties…".	
6.	Go to the "Options" tab and select the check box "Time of day". Click the "OK" button to confirm the selection.	
7.	Save and compile via the menu command: "Station > Save and compile...". Close the HW Config	
8. optional	In SIMATIC Manager, delete the OS application of the ES PC station, as this is not needed in our example.	

Setting up the OS server PC station

Table 4-5

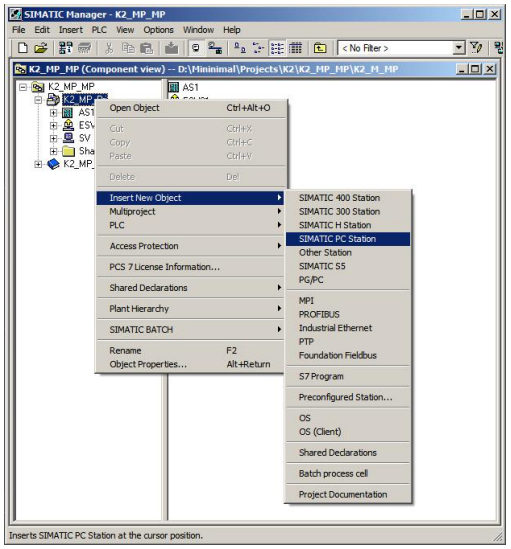
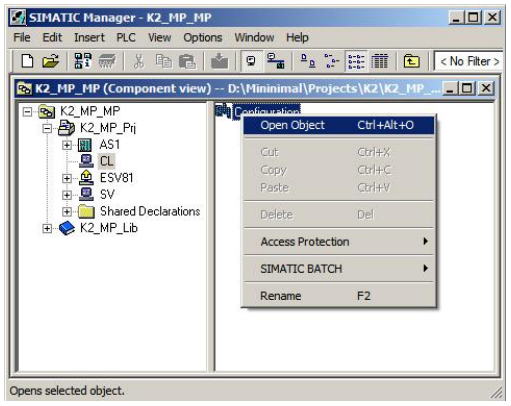
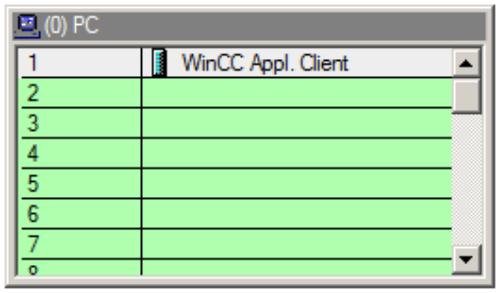
Step	Activity	Screenshot
1.	Open the shortcut menu of the project in the component view and add a new PC station via "Insert New Object > SIMATIC PC station".	
2.	Open the HW Config of the PC station via the shortcut menu.	
3.	From the object catalog ("View > Catalog") insert a "WinCC application" and a network card of the type "CP1623".	

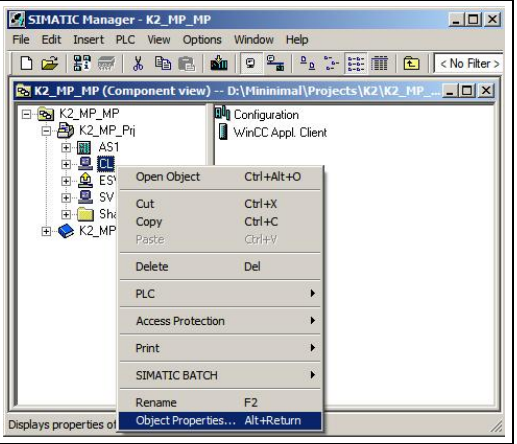
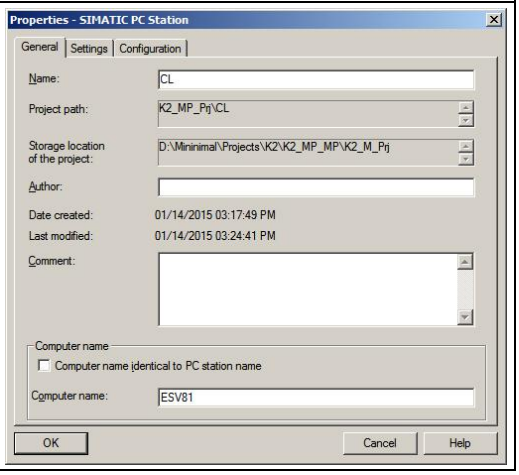
Step	Activity	Screenshot
4.	Select the system bus from "Subnet" or set this by pressing the "New..." button. Assign the corresponding MAC address to the CP1623. Deactivate the check box "IP protocol is being used" **.** Click the "OK" button to confirm the settings.	
5.	Open the shortcut menu of the CP1623 and select "Object properties…".	
6.	Go to the "Options" tab and select the check box "Time of day". Click the "OK" button to confirm the setting.	
7.	Save and compile via the menu command: "Station > Save and compile...". Close the HW Config	

Step	Activity	Screenshot
8.	In SIMATIC Manager, open the properties dialog of the OS server's OS project. Switch to the "Target OS and Standby OS Computer" tab. Select < none > under "Standby OS". Then click the "Search..." button.	
9.	Navigate via the drop-down list to the shared project folder of the OS server (see 4.3.1 Preparatory activities). Click the "Save" button.	
10.	In the text box, select the path "Path to Target OS Computer". Click the "OK" button to confirm this.	
11.	Confirm the information dialog by clicking the "Yes" button.	

Setting up the Client PC station

Table 4-6

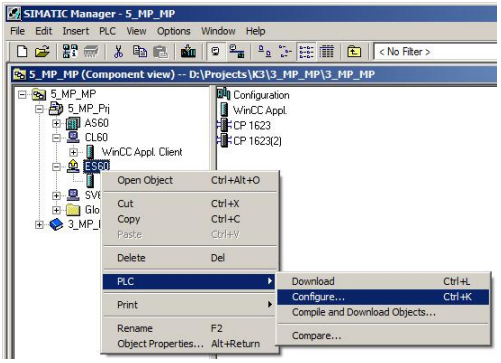
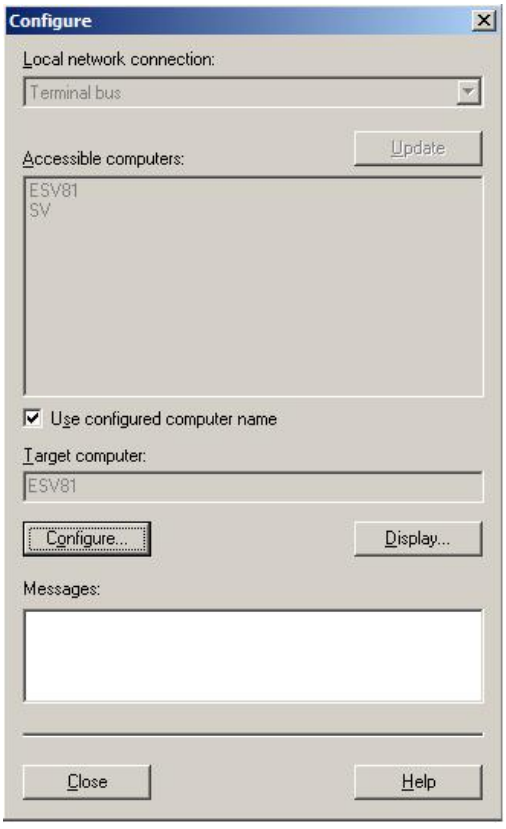
Step	Activity	Screenshot
1.	Open the shortcut menu of the project in the component view and add a new PC station via "Insert New Object > SIMATIC PC station".	
2.	Open the HW Config of the OS client's PC station.	
3.	From the object catalog (View > Catalog) insert a WinCC application client.	
4.	Save and compile via the menu command: "Station > Save and compile...". Close the HW Config	

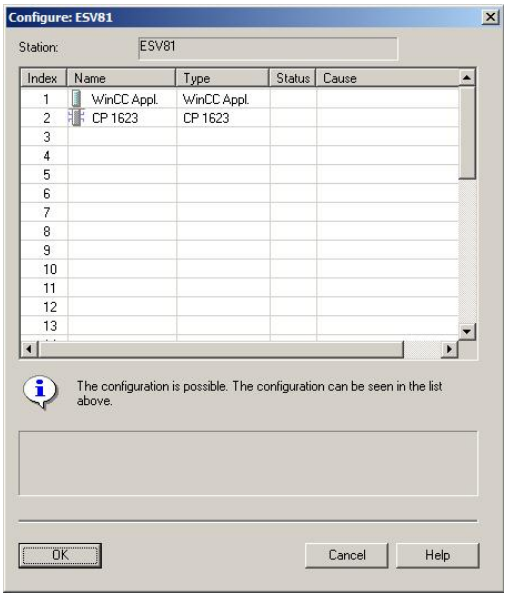
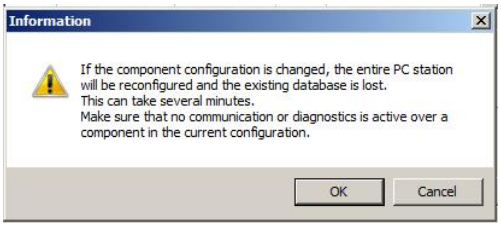
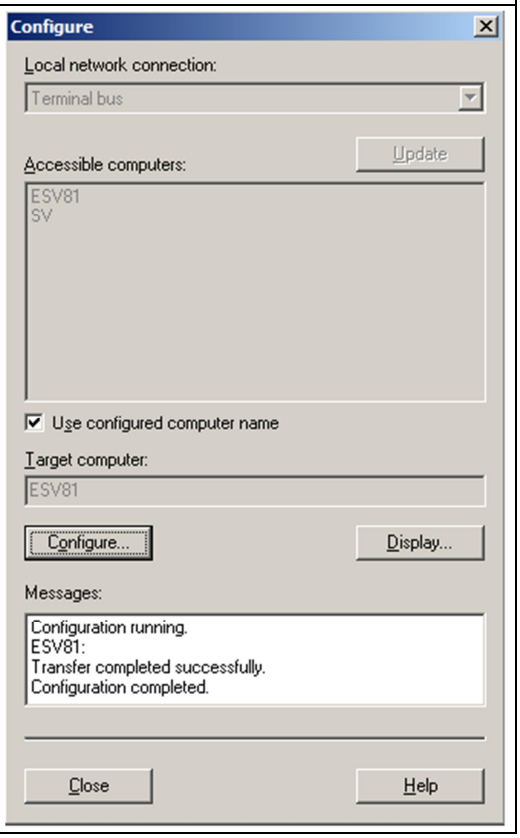
Step	Activity	Screenshot
5.	In SIMATIC Manager, open the shortcut menu of the client's PC station and select "Object properties".	
6.	Under "PC name:" enter the name of the PC on which the operation of the client is intended. In the present configuration, this is the ES PC. Click the "OK" button to confirm the entry.	

Configuring all relevant PC stations

The function "Configure PC station" transfers project configurations to one or more target stations. First configure the local Station Configuration Editor of the ES and then the OS connected to the system bus.

Table 4-7

Step	Activity	Screenshot
1.	Configure the Station Configuration Editor of the ES. To do this, open the shortcut menu of the ES and choose "PLC> Configure ...".	
2.	Select the PC to be configured from "Accessible computers:". **NOTE** If you have chosen the option "Identical PC name to PC station name" via "Object properties", the target PC to be configured appears directly in the component configurator. Use the "Show" button to display the current configuration of the PC station. Click on the "Configure…" button.	

Step	Activity	Screenshot
3.	In the window that appears you will see how the PC station is configured. Click the "OK" button to confirm this setting.	
4.	Confirm the information dialog by clicking the "OK" button.	
5.	In the bottom window you will then see the message: "Transfer completed successfully." Close the configuration dialog.	

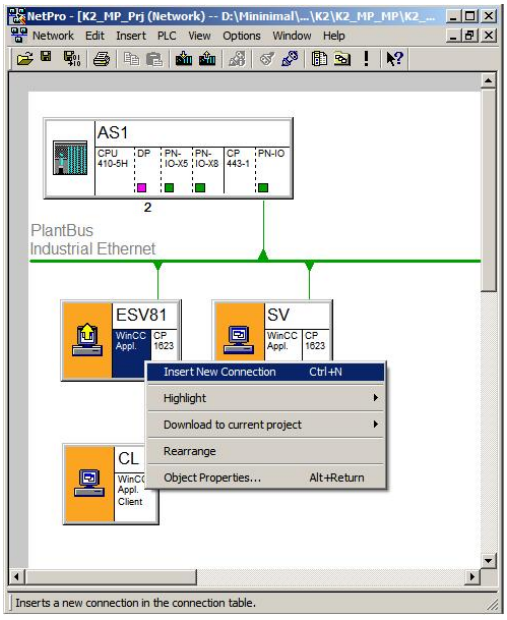
Step	Activity	Screenshot
6.	Configure the Station Configuration Editor of the OS server as shown in steps 1 to 5.	

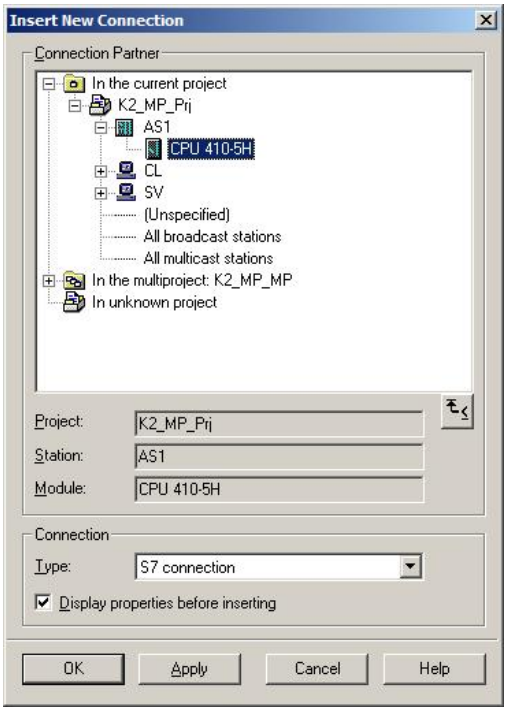
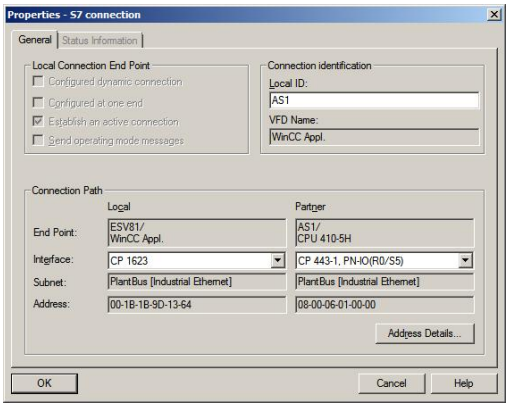
Configuring and loading AS-OS communication

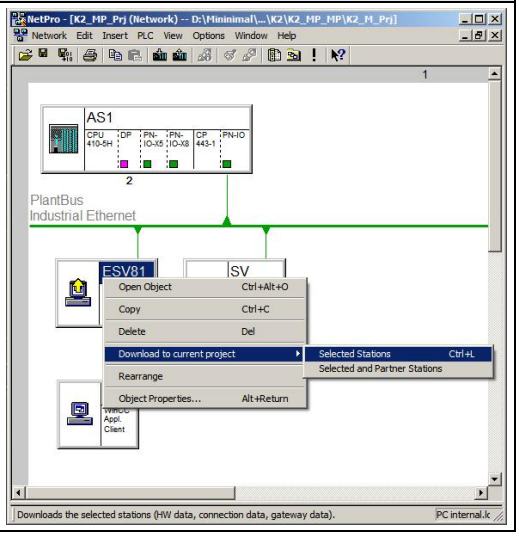
In the following section, the connections between the PC stations and the AS are configured in NetPro and loaded in the individual stations.

Note In case of a granular station configuration, the subnets of the individual sub-projects must be first merged.

Table 4-8

Step	Activity	Screenshot
1.	Open NetPro. Select the WinCC application of the ES and open the shortcut menu. Select "Insert New Connection".	

Step	Activity	Screenshot
2.	Select the CPU of the AS in the "Connection Partner" window. Make sure that an "S7 connection" is selected under "Connection". Click the "OK" button to confirm the selection.	
3.	Under "Connection identification" in the "General" tab, change the "Local ID:" to a descriptive name, such as AS1. Click the "OK" button to confirm the entries.	
4.	Repeat steps 1 to 3 for the connection of the OS server to the AS. When doing this, it is important that the connections of the ES and the OS server to the AS have the **same name**. When ready, save and compile the configuration via the menu command: "Network > Save and Compile…". Select the option button "Compile and check everything" and confirm your selection with the "OK" button.	

Step	Activity	Screenshot
5.	Select the ES and download the connections via the shortcut menu: "Download to current project > Selected Stations". Download the OS server and the AS in the same way. Then close NetPro.	

Compiling and loading the user program

Compile the S7 program and download it to the AS.

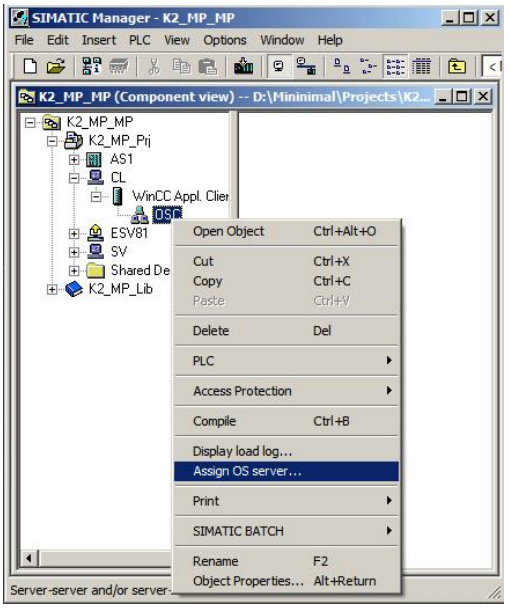
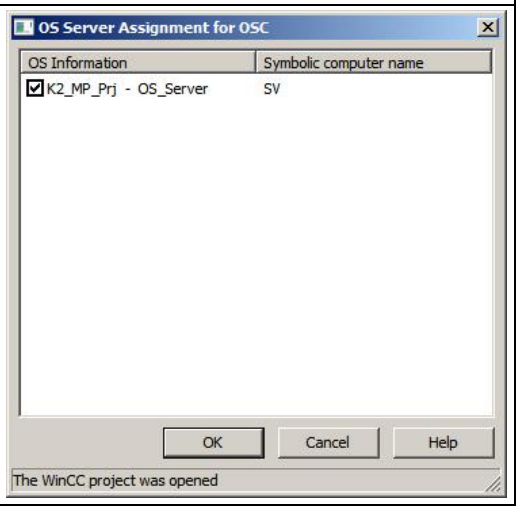
Compiling the OS server project

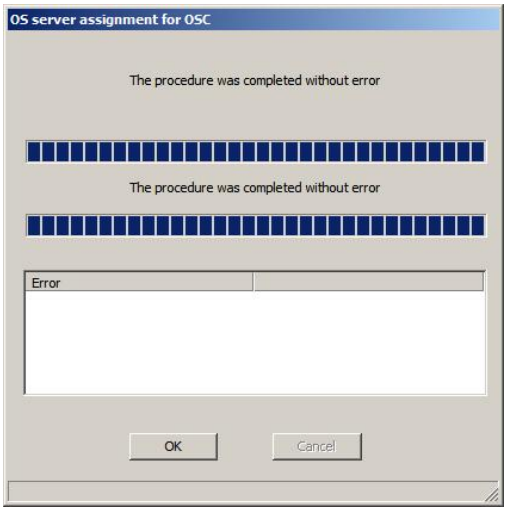
Compile the OS server project in SIMATIC Manager.

Make sure to make the correct OS assignment to the server in the plant view.

Assignment of server packages

Table 4-9

Step	Activity	Screenshot
1.	Select the OS application of the OS client and choose "Assign OS server..." in the shortcut menu.	
2.	Select the corresponding OS project and confirm your selection with the "OK" button.	

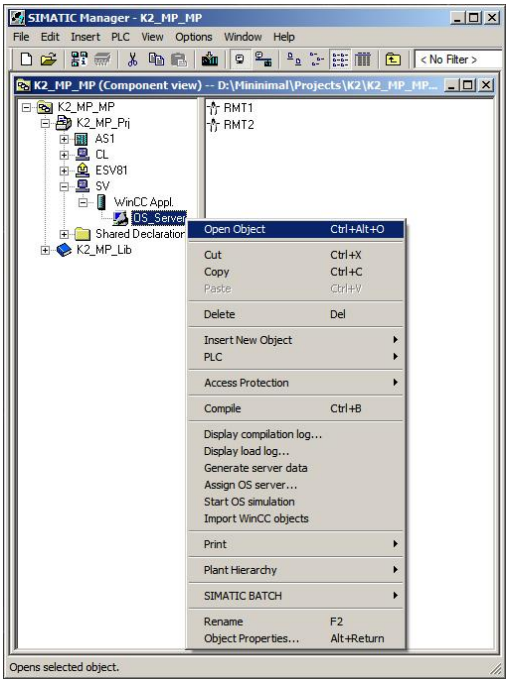
Step	Activity	Screenshot
3.	Confirm successful downloading of the package with the "OK" button.	

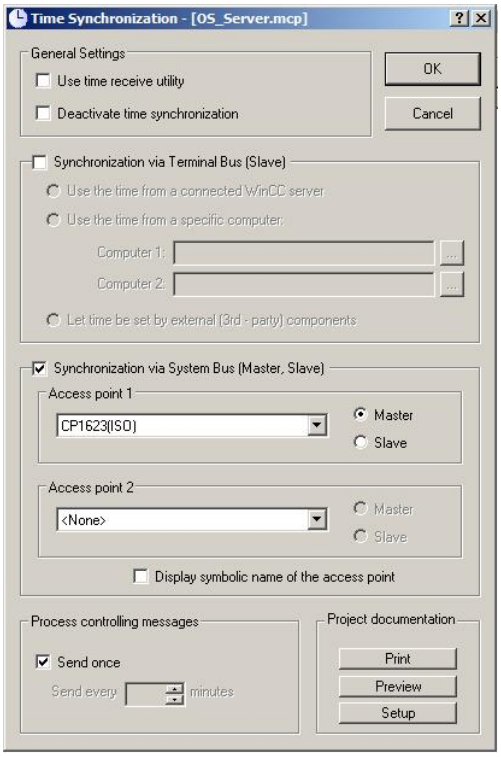
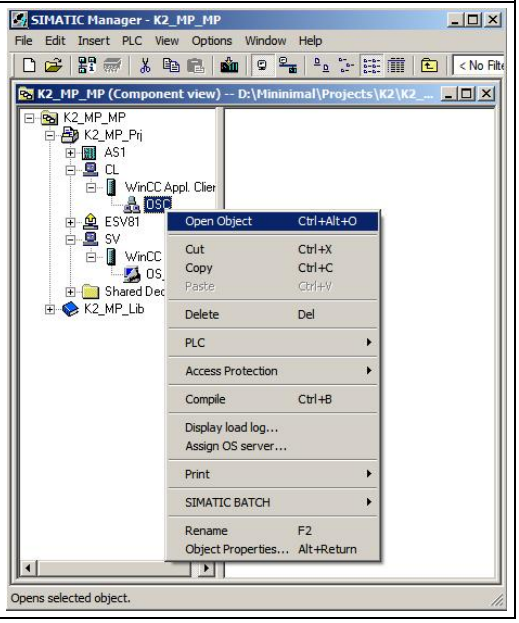
4.3.3 OS configuration

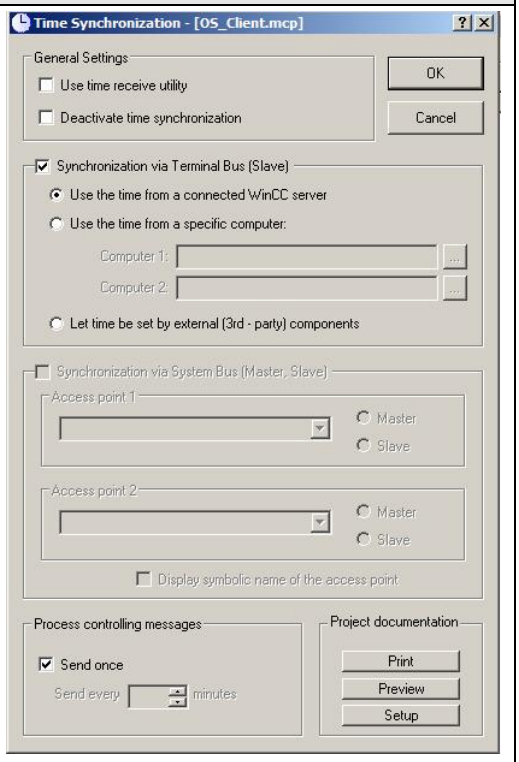
Activating the time synchronization

On the ES, the necessary settings must still be activated in the OS projects of the OS server and OS client.

Table 4-10

Step	Activity	Screenshot
1.	Open the OS server project.	

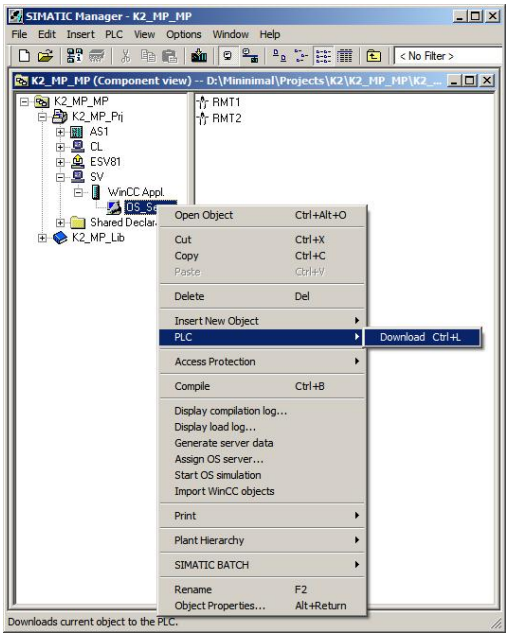
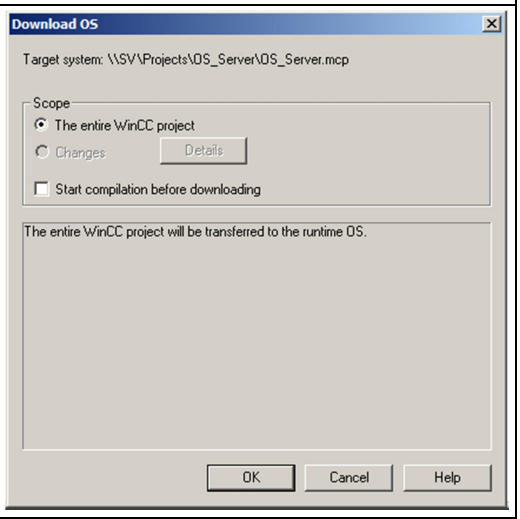
Step	Activity	Screenshot
2.	Open the editor "Time Synchronization" from the shortcut menu. Activate the check box "Synchronization via System Bus (Master, Slave)". Select "CP1623(ISO)" under "Access point 1" and activate the option button "Master". Click the "OK" button to confirm the selection. **NOTE** If, in contrast to the OS server, the ES does not have a CP1623, then activate the option "Display symbolic name of the access point" and select the appropriate access point.	
3.	Close the OS server project.	
4.	Open the OS client project.	

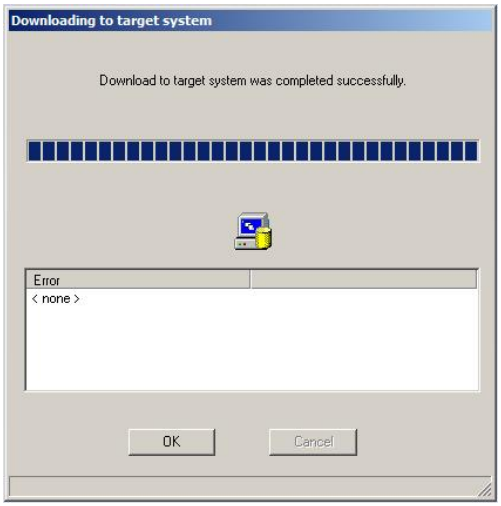
Step	Activity	Screenshot
5.	Open the editor "Time Synchronization" from the shortcut menu. Activate the check box "Synchronization via Terminal Bus (Slave)" and select "Use the time from a connected WinCC server". Click the "OK" button to confirm the selection.	
6.	Close the OS client project.	

Downloading the OS project to the OS server

After the time synchronization is configured on the ES side, download the OS project to the OS server.

Table 4-11

Step	Activity	Screenshot
1.	In SIMATIC Manager, select the OS project of the OS server and select the context menu "PLC > Download".	
2.	For the first OS project download, an entire download is required. Start the download by clicking the "OK" button.	

Step	Activity	Screenshot
3.	After a successful download, the OS project is located in the specified folder on the OS server. Click the "OK" button to confirm the corresponding message.	

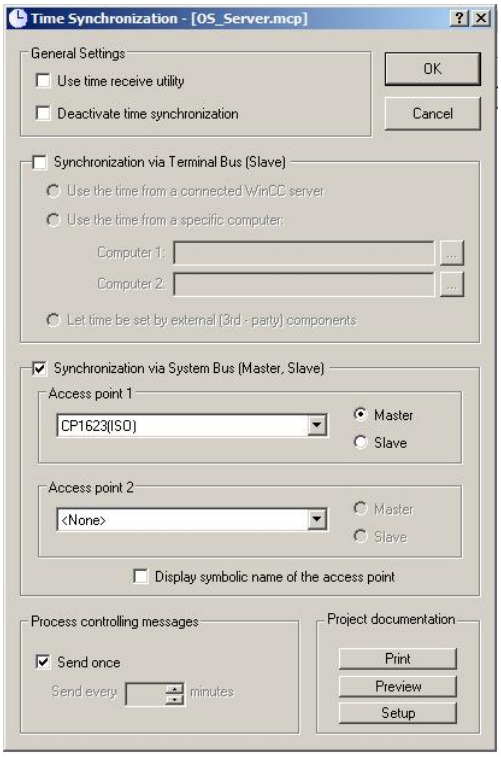
OS configuration on the OS server

The following step instructions for time synchronization must be checked and corrected it if necessary after the first download.

Note

Normally, all the engineering work will be carried out on the ES for the purpose of consistent data management, so that no WinCC engineering licenses are required on the OSs. Nevertheless, each time the WinCC Explorer is opened, a licence-free time window of two hours is enabled for WinCC configuration works.

Table 4-12

Step	Activity	Screenshot
1.	Open the OS project on the OS server.	
2.	Open the editor "Time Synchronization" from the shortcut menu. Check or activate the check box "Synchronization via System Bus (Master, Slave)". Check or select "CP1623(ISO)" and the option button "Master" under "Access point 1". Click the "OK" button to confirm the settings.	

4.3.4 Activating the runtime

Open the OS project on the OS server and activate the runtime.

Then switch to the ES computer and open the OS client project. Activate the runtime here too.

4.3.5 Particularities when loading the OS project changes

Loading changes

Before being able to carry out OS compiling and downloading to the ES, the OS client runtime must be first deactivated and the OS project closed.

Complete download

Before being able to carry out OS compiling and downloading from the ES, the OS client runtime and the OS server must be first deactivated and the corresponding OS projects must be closed.

5 ES, Master OS and Standby OS

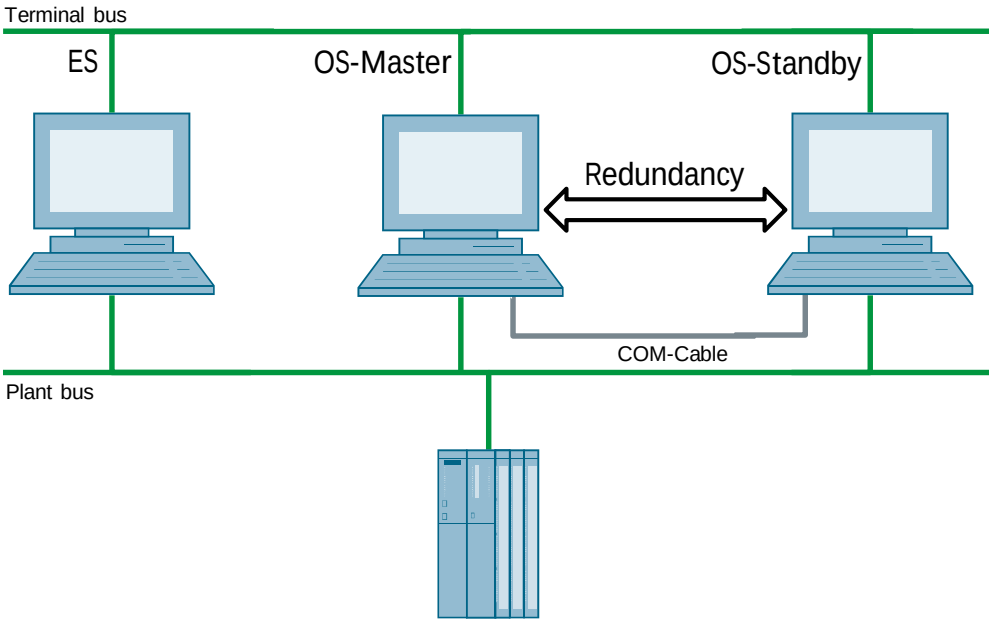
5.1 Configuration description

During the process mode, the pair of single stations runs completely parallel and independent from each other. If one of the single stations fails, there is always an equivalent, redundant OS single station available. The single stations monitor each other during the running period and synchronize the project archives as needed.

Configuring is done via the ES.

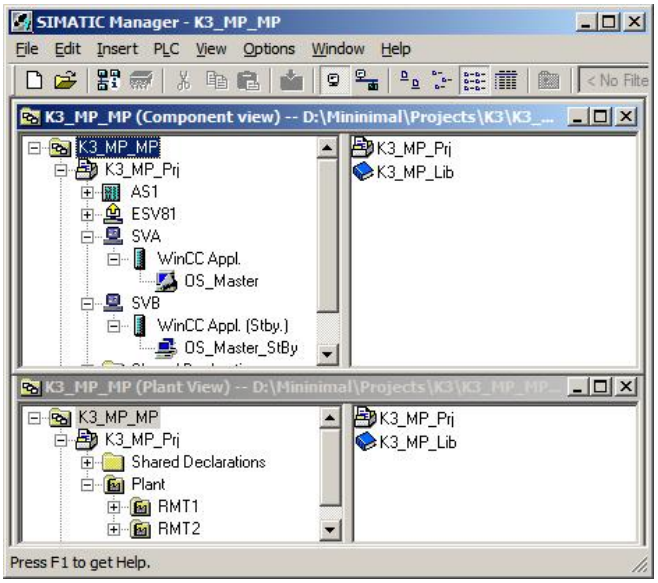
Hardware assembly

Figure 5-1



PCS 7 configuration

Figure 5-2



5.2 Required hardware and software licensing

Hardware

The following hardware is recommended for this configuration and can be ordered via the Siemens mall. This ensures that the appropriate amount of operating systems of your choice and SIMATIC PCS 7 system software are pre-installed on the PC stations.

Table 5-1

Station	Product label	Operating system	System bus transition
ES	SIMATIC PCS 7 ES/OS IPC847D BCE	Windows 7	RJ45 network card
	SIMATIC PCS 7 ES/OS IPC847D IE	Windows 7	CP 1623
2 x OS Single Station	SIMATIC PCS 7 ES/OS IPC847D BCE	Windows 7	RJ45 network card
	SIMATIC PCS 7 ES/OS IPC847D IE	Windows 7	CP 1623

Software licensing

The following section lists the software/license packages required for this configuration selection.

Table 5-2

Component	Software/license package
ES	• SIMATIC PCS 7 AS/OS Engineering Software V8.1 (PO unlimited) • SIMATIC PCS 7 AS Runtime License
OS Single Station Redundant	• SIMATIC PCS 7 OS Software Single Station Redundancy V8.1 (Single License for 2 installations) • 2x SIMATIC PCS 7 OS Runtime License (max. 5000 PO)

5.3 Step-by-Step configuration

Note

The following instructions have been created based on Windows 7 and PCS 7 V8.1.

CP1623 are used as an example for the system bus transition. Time synchronization is activated.

The PC stations used in the test setup are called:

- ES: ESV81
- OS server: SVA
- OS-Server Standby: SVB

5.3.1 ES configuration

Creating the multiproject

As a basis for the following instructions, all PC stations must be physically connected according to Figure 5-1. A multiproject must be also created on the ES, where the hardware and software of the AS are already configured.

Then you begin from the following CPU and CP settings.

AS settings

The analyzability of the process data requires that all the components of the process control system work with an identical clock time in order to be able to assign messages in the correct temporal order.

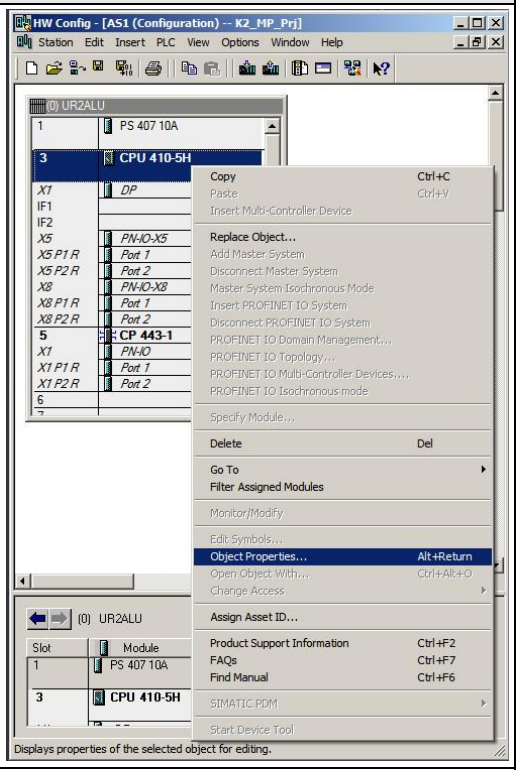
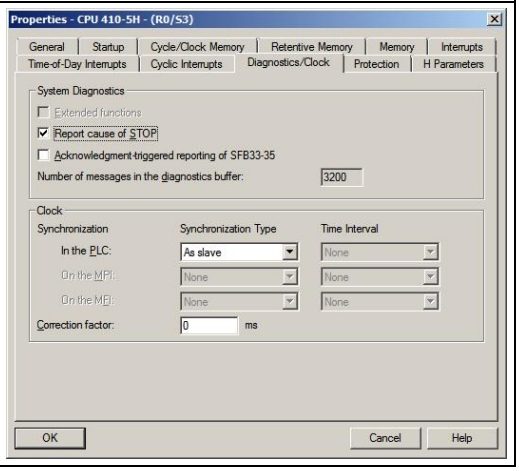
The following section describes a way in which the redundant OS single stations predetermine the master time.

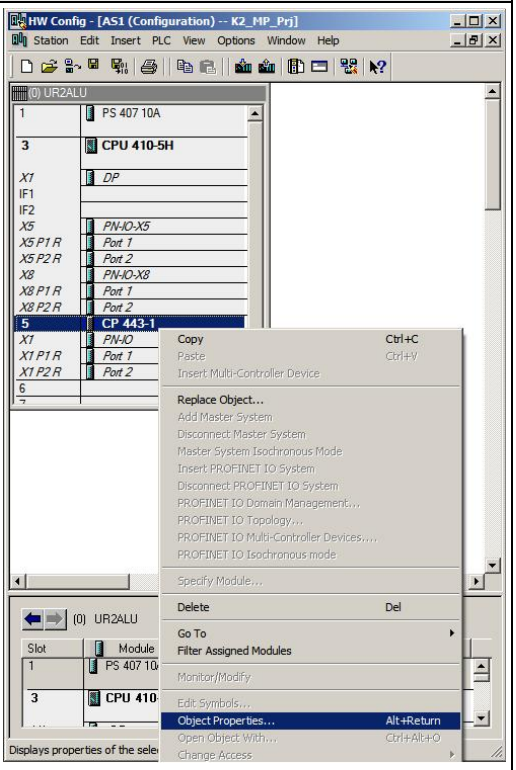
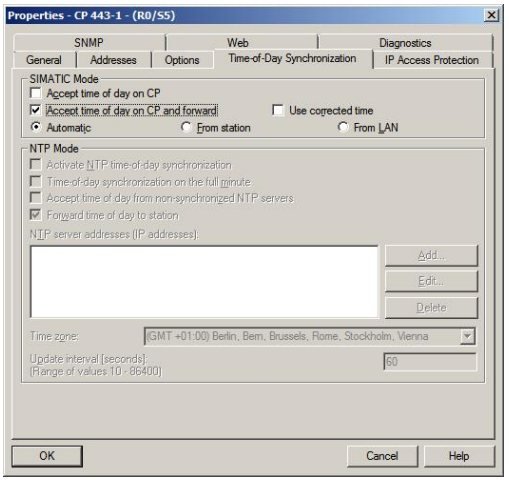
Note

More time synchronization possibilities are described in detail in the following manuals:

- SIMATIC Process Control System PCS 7 Operator Station (V8.1)
- SIMATIC Process Control System PCS 7 Time synchronization (V8.1)

Table 5-3

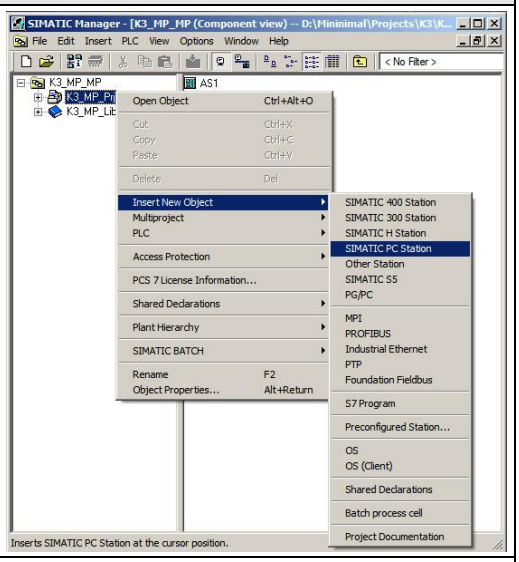
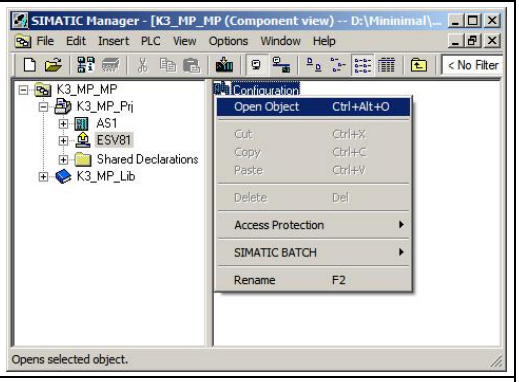
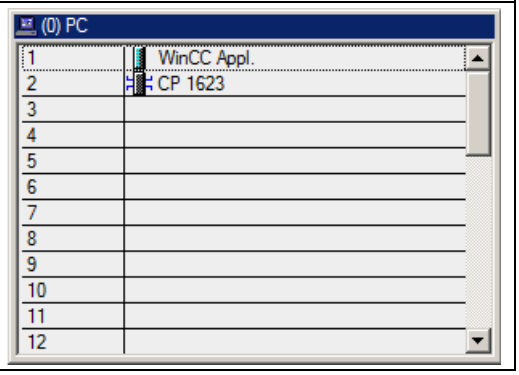
Step	Activity	Screenshot
1.	Open the HW Config for the AS. Select the CPU and choose "Object properties..." in the shortcut menu.	
2.	Switch to the "Diagnostics/Clock" tab. In the "Clock" section, set "Synchronization Type - As slave". Click the "OK" button to confirm the selection.	

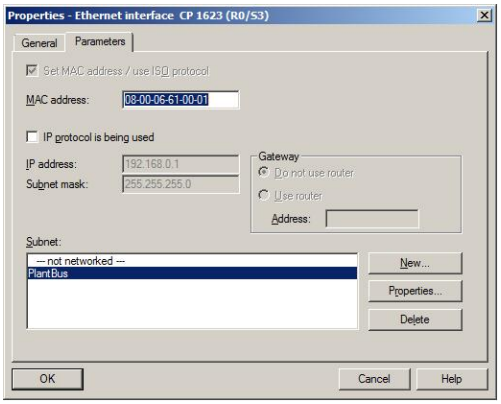
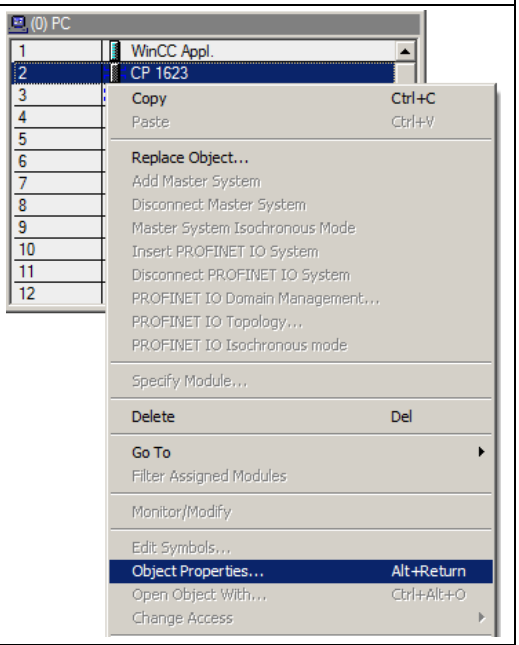
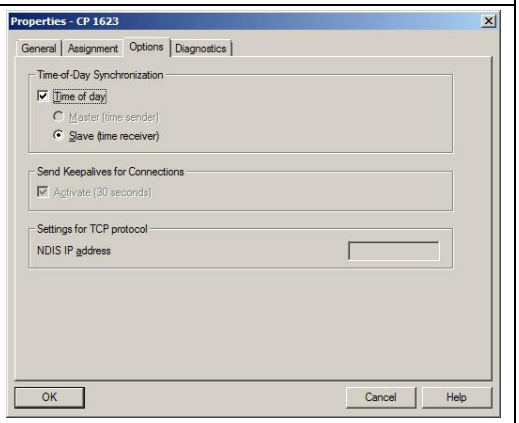
Step	Activity	Screenshot
3.	Open the shortcut menu of the CP and select "Object properties…".	
4.	Switch to the "Time synchronization" tab. Activate the check box "Accept time of day on CP and forward". Click the "OK" button to confirm the selection.	
5.	Save and compile the configuration via: "Station > Save and compile...". Close the HW Config	

Setting up the ES PC station

A PC station is created for the ES with the WinCC application to allow testing the OS project on the ES.

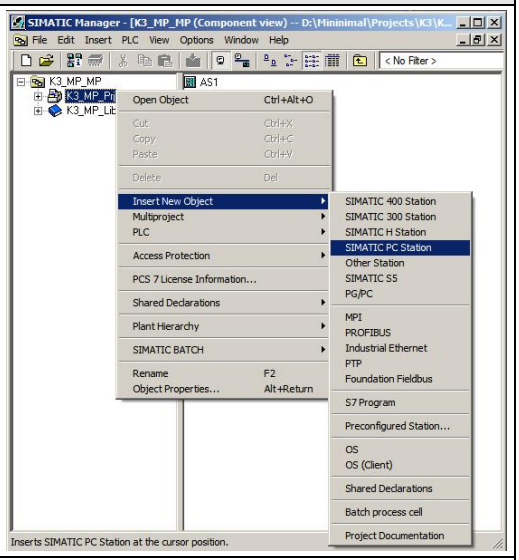
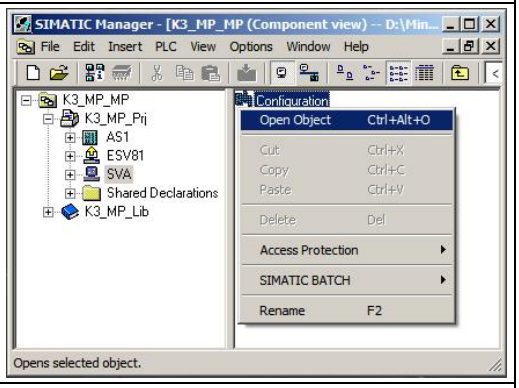
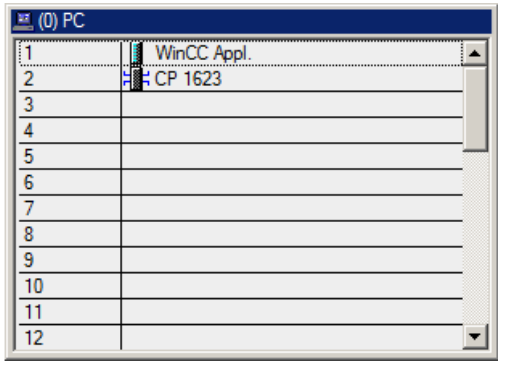
Table 5-4

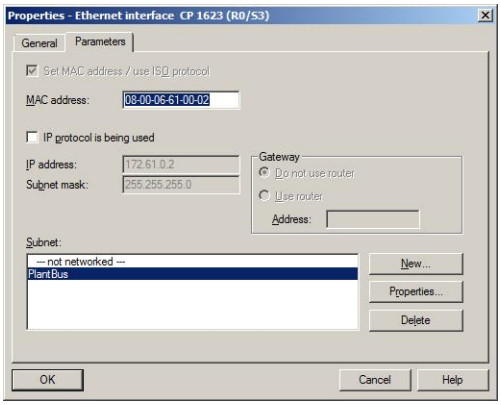
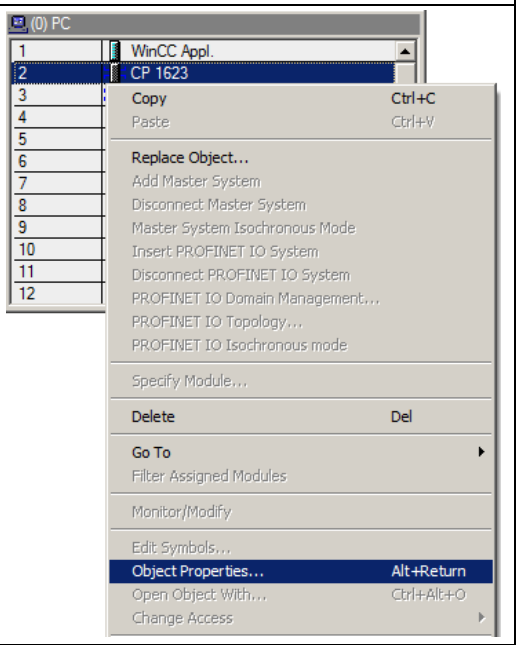
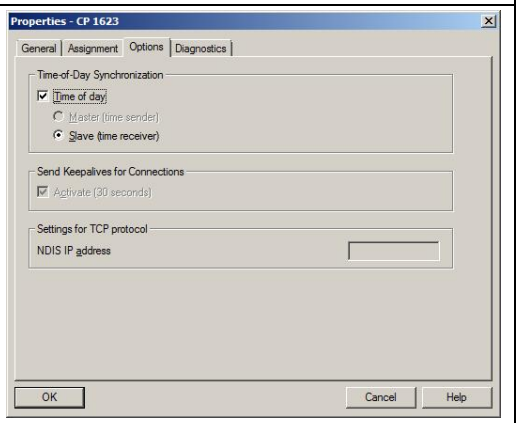
Step	Activity	Screenshot
1.	Open the shortcut menu of the project in the component view and add a new PC station via "Insert New Object > SIMATIC PC station". Change the name of the PC station so that it matches the name of the local computer on the network.	
2.	Open the HW Config of the ES PC station via the shortcut menu.	
3.	From the object catalog (View > Catalog) insert a "WinCC application" and a network card of the type "CP1623".	

Step	Activity	Screenshot
4.	Select the system bus from "Subnet" or set this by pressing the "New..." button. Assign the corresponding MAC address to the CP1623. Deactivate the check box "IP protocol is being used". Click the "OK" button to confirm the settings.	
5.	Open the shortcut menu of the CP1623 and select "Object properties…".	
6.	Go to the "Options" tab and select the check box "Time of day". Click the "OK" button to confirm the selection.	
7.	Save and compile via the menu command: "Station > Save and compile...". Close the HW Config	
8. optional	Delete the OS of the Engineering Station in SIMATIC Manager, as it is not needed in our example.	

Setting up the Master OS PC station

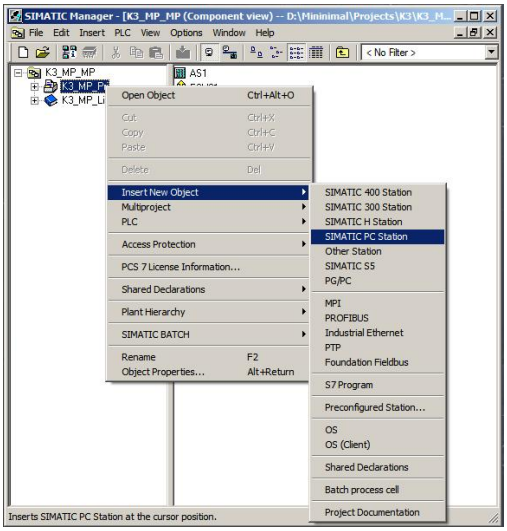
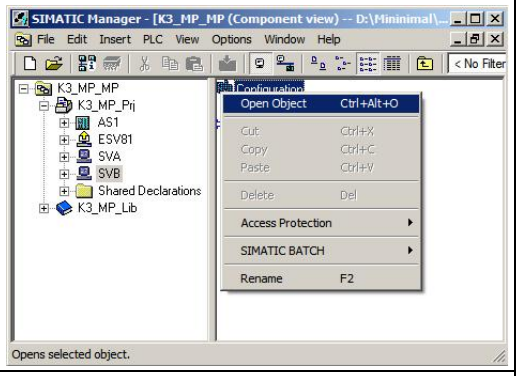
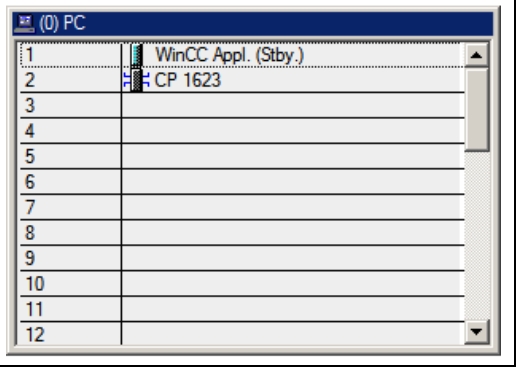
Table 5-5

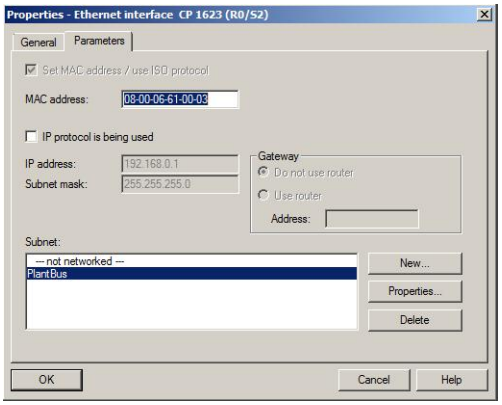
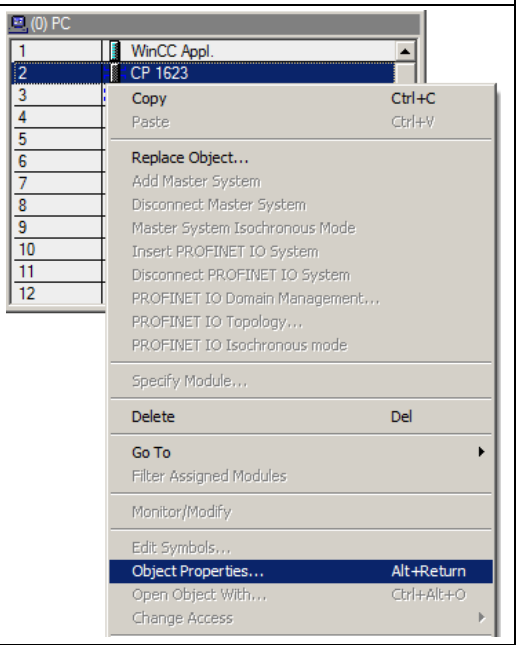
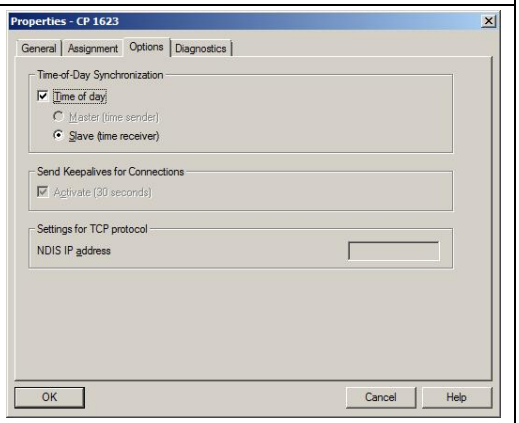
Step	Activity	Screenshot
1.	Open the shortcut menu of the project in the component view and add a new PC station via "Insert New Object > SIMATIC PC station".	
2.	Open the HW Config of the Master OS PC station via the shortcut menu.	
3.	From the object catalog (View > Catalog) insert a "WinCC application" and a network card of the type "CP1623".	

Step	Activity	Screenshot
4.	Select the system bus from "Subnet" or set this by pressing the "New..." button. Assign the corresponding MAC address to the CP1623. Deactivate the check box "IP protocol is being used". Click the "OK" button to confirm the settings.	
5.	Open the shortcut menu of the CP1623 and select "Object properties…".	
6.	Go to the "Options" tab and select the check box "Time of day". Click the "OK" button to confirm the selection.	
7.	Save and compile via the menu command: "Station > Save and compile...". Close the HW Config	

Setting up the Standby OS PC station

Table 5-6

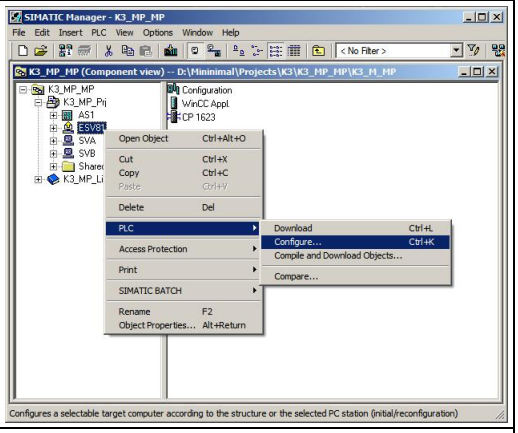
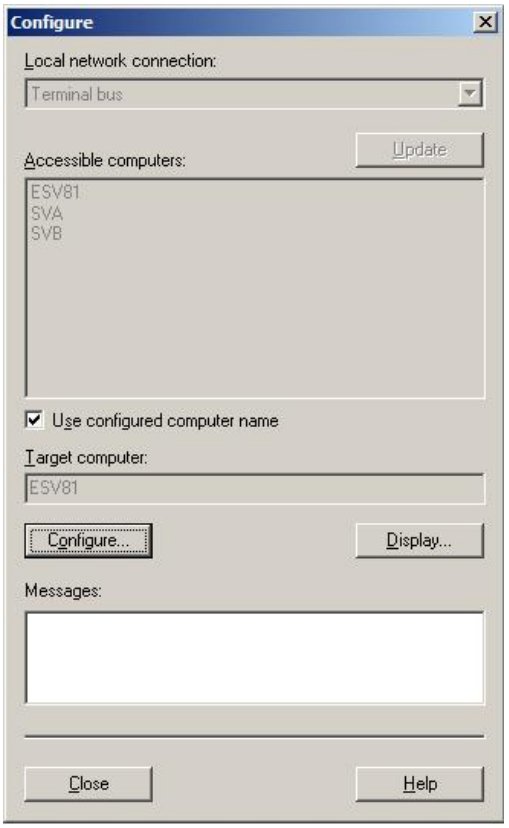
Step	Activity	Screenshot
1.	Open the shortcut menu of the project in the component view and add a new PC station via "Insert New Object > SIMATIC PC station".	
2.	Open the HW Config of the Standby OS PC station via the shortcut menu.	
3.	From the object catalog (View > Catalog) insert a "WinCC application (Stby)" and a network card of the type "CP1623".	

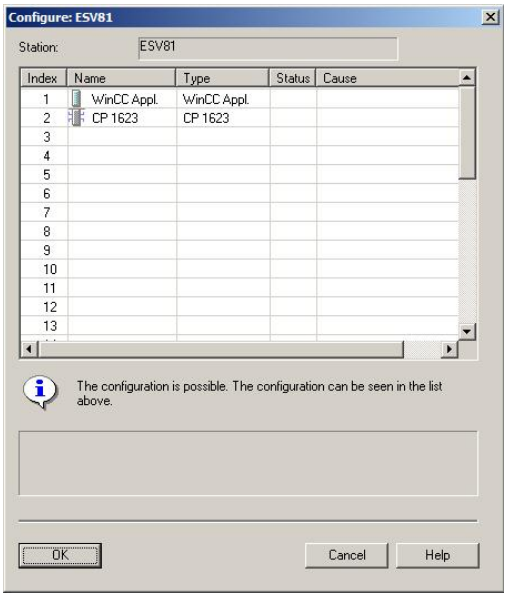
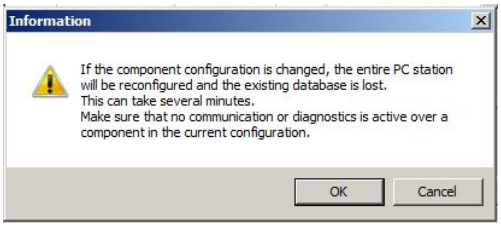
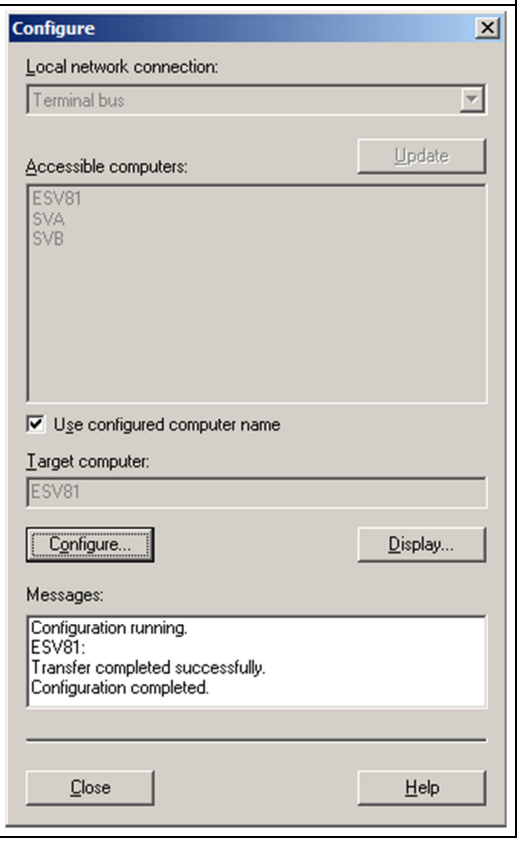
Step	Activity	Screenshot
4.	Select the system bus from "Subnet" or set this by pressing the "New..." button. Assign the corresponding MAC address to the CP1623. Deactivate the check box "IP protocol is being used". Click the "OK" button to confirm the settings.	
5.	Open the shortcut menu of the CP1623 and select "Object properties…".	
6.	Go to the "Options" tab and select the check box "Time of day". Click the "OK" button to confirm the setting.	
7.	Save and compile via the menu command: "Station > Save and compile...". Close the HW Config	

Configuring all PC stations

The function **"Configure PC station"** transfers project configurations to one or more target stations. First, configure the local ES and then all Operator Stations connected to the system bus.

Table 5-7

Step	Activity	Screenshot
1.	Configure the Station Configuration Editor of the ES. To do this, select the PC station of the ES and then choose "PLC > Configure..." in the shortcut menu.	
2.	Select the PC to be configured from "Accessible computers:". **NOTE** If you have chosen the option "Identical PC name to PC station name" via "Object properties", the target PC to be configured appears directly in the component configurator. Use the "Show..." button to display the current configuration of the PC station. Click on the "Configure…" button.	

Step	Activity	Screenshot
3.	In the window that appears you will see how the PC station is configured. Click the "OK" button to confirm this setting.	
4.	Confirm the information dialog by clicking the "OK" button.	
5.	In the bottom window you will then see the message: "Transfer completed successfully." Close the configuration dialog.	

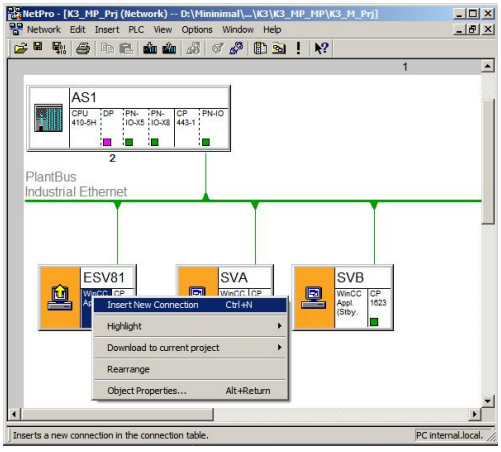
Step	Activity	Screenshot
6.	Configure the Station Configuration Editors of the Master/Standby OS as shown in steps 1 to 5.	

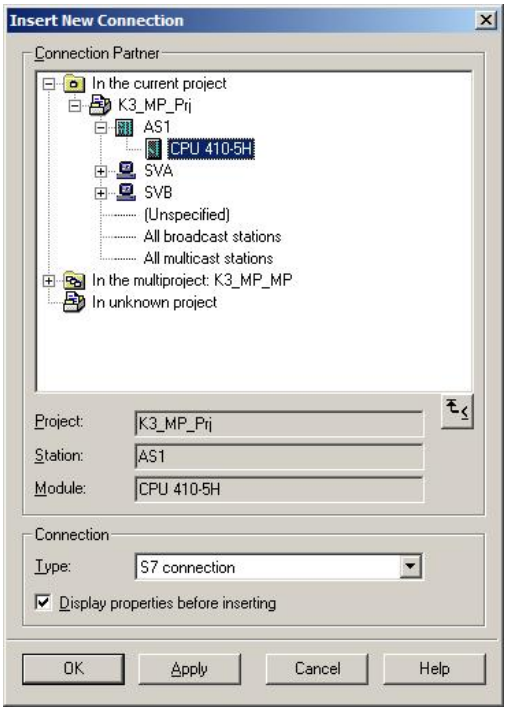
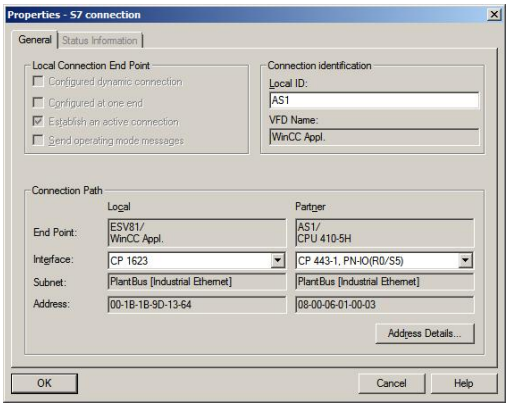
Configuring and loading AS-OS communication

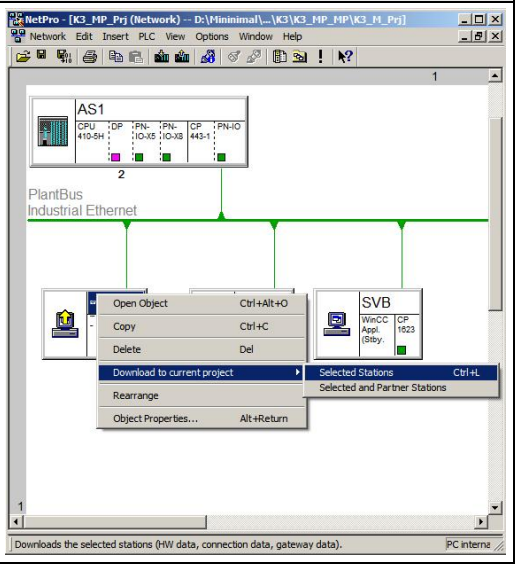
In the following section, the connections between the PC stations and the AS are configured in NetPro and loaded in the individual stations.

Note In case of a granular station configuration, the subnets of the individual sub-projects must be first merged.

Table 5-8

Step	Activity	Screenshot
1.	Open NetPro. Select the WinCC application of the ES and open the shortcut menu. Select "Insert New Connection".	

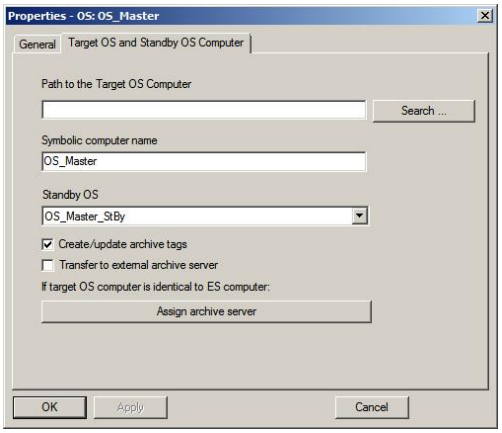
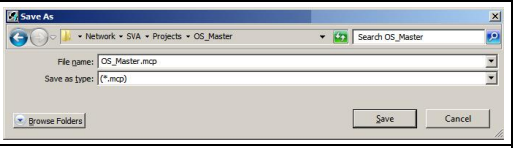
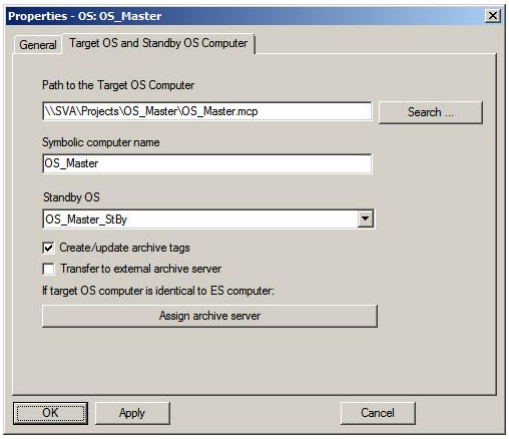
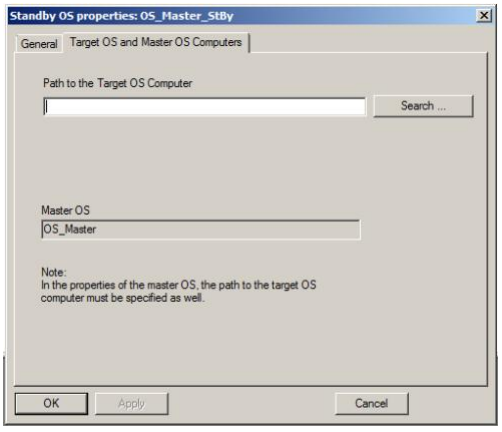
Step	Activity	Screenshot
2.	Select the CPU of the AS in the "Connection Partner" window. Make sure that an "S7 connection" is selected under "Connection". In this example, a high-availability S7 connection is configured due to the AS configuration. Click the "OK" button to confirm the selection.	
3.	Under "Connection identification" in the "General" tab, change the "Local ID:" to a descriptive name, such as AS1. Click the "OK" button to confirm the settings.	
4.	Also set the connections of the Master OS and Standby OS to the AS by repeating steps 1 to 3. When doing this, it is important that the connections of the Master OS, Standby OS and ES to the AS have the same name. Then save and compile the configurations via the menu command: "Network > Save and compile...". Select the option button "Compile and check everything" and confirm your selection by clicking the "OK" button.	

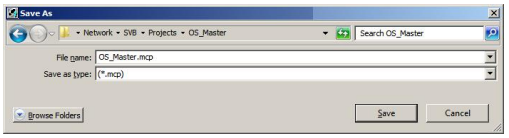
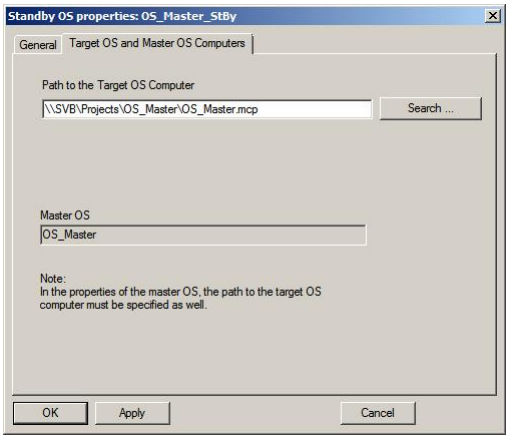
Step	Activity	Screenshot
5.	Select the ES and download the connection via the menu command: "Target system > Download to current project > Selected Stations". Download the AS, the Master OS and Standby OS in the same manner. Then close NetPro.	

Master/Standby settings on the ES

Here you define the Master/Standby assignment and create the loading paths.

Table 5-9

Step	Activity	Screenshot
1.	In SIMATIC Manager, open the properties dialog of the Master OS. Switch to the "Target OS and Standby OS Computer" tab. Select the Standby OS from the drop-down list. Activate the check box "Create/update archive tags". Deactivate the check box "Transfer to external archive server". Click on the "Search..." button.	
2.	Navigate via the drop-down list to the shared project folder of the Master OS (see 4.3.1 Preparatory activities). Click the "Save" button.	
3.	In the text box, reselect the whole project path "Path to Target OS Computer". Click the "OK" button to confirm the entry.	
4.	Open the properties dialog of the Standby OS. Switch to the "Target OS and Mater OS Computers" tab. Check whether OS_Master is entered in the "Master OS" field. Click the "Search..." button to select the file path of the OS data.	

Step	Activity	Screenshot
5.	Navigate via the drop-down list to the shared project folder of the Standby OS (see 4.3.1 Preparatory activities). Click the "Save" button.	
6.	In the text box, select the path "Path to Target OS Computer". Click the "OK" button to confirm this. Confirm the next appearing dialog by clicking "Yes".	

Compiling and loading the user program

Compile the S7 program and download it to the AS.

Compiling the OS project

Compile the OS project of the Master OS in SIMATIC Manager.

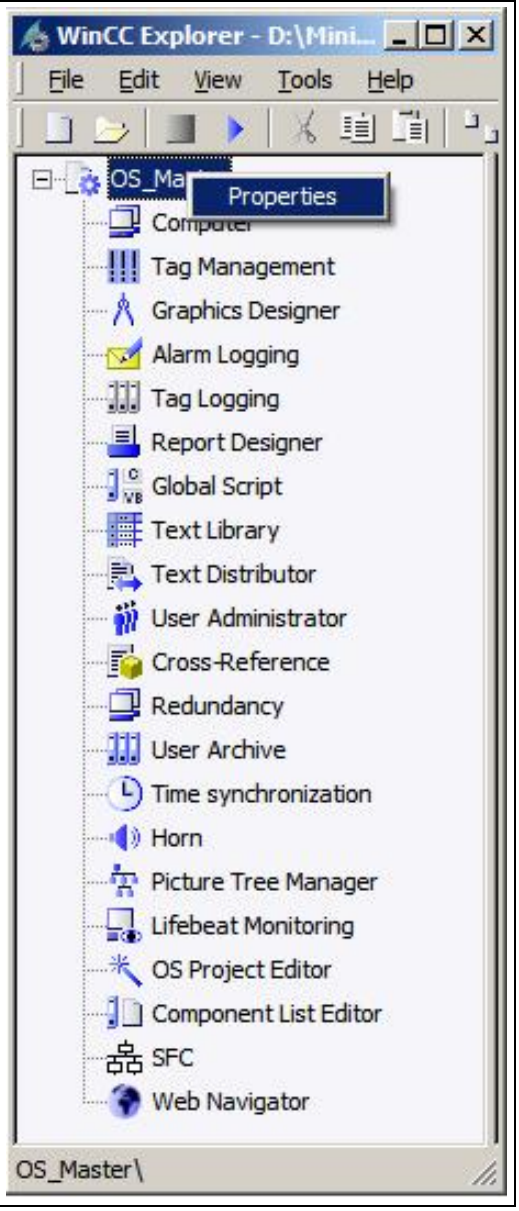
Make sure to make the correct OS assignment to the server in the plant view.

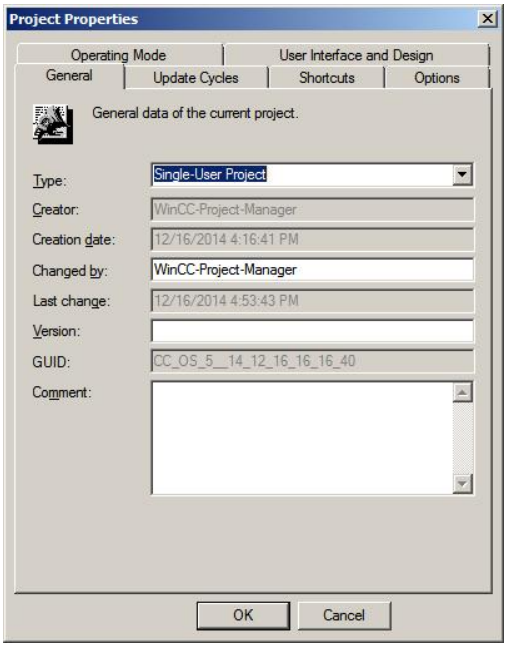
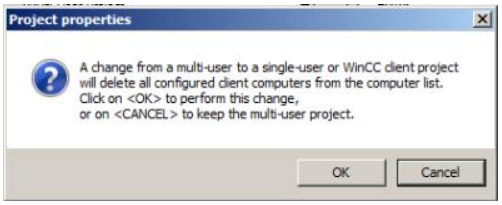
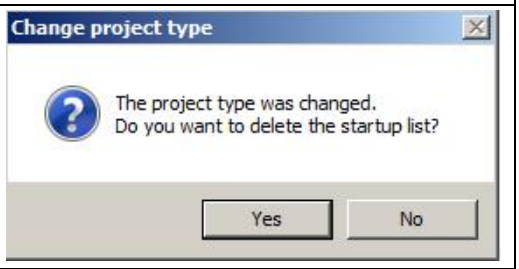
5.3.2 OS configuration

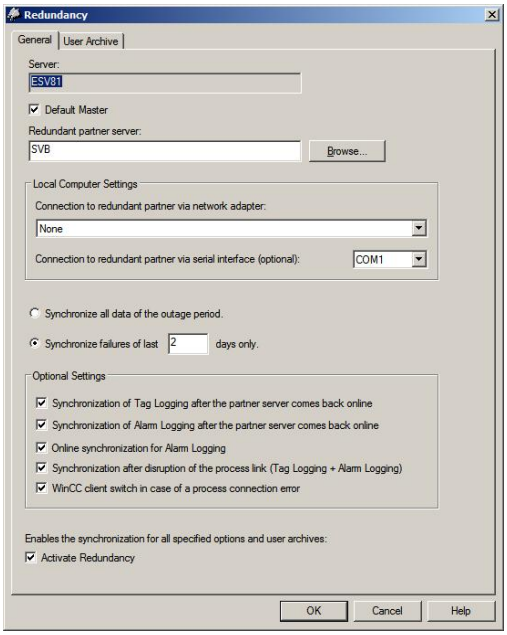
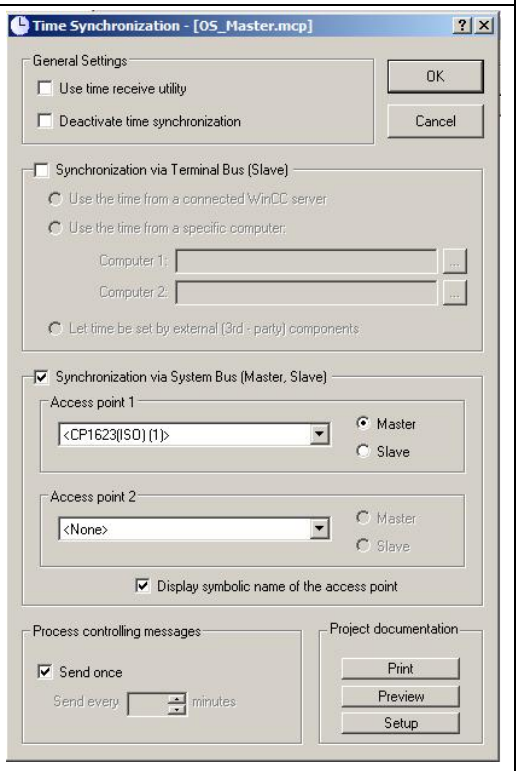
OS configuration on the engineering station

On the ES, a conversion must be still done from a multi-user to a single-user system, and the settings for the redundancy and time synchronization must be still adjusted.

Table 5-10

Step	Activity	Screenshot
1.	Open the OS project of the Master OS in the ES. Select the OS project in the open WinCC Explorer and select "Properties" in the shortcut menu.	

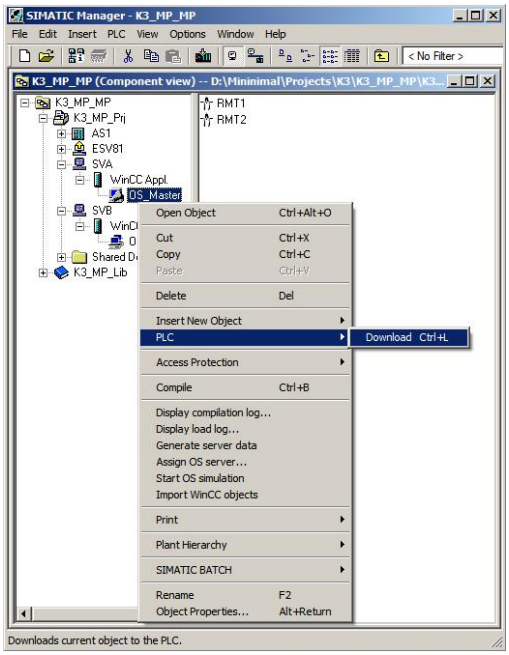
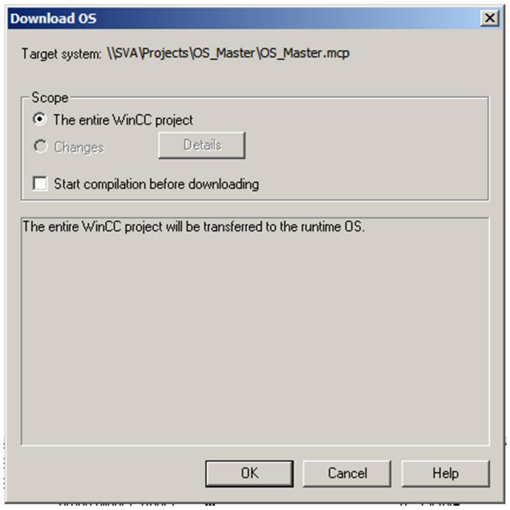
Step	Activity	Screenshot
2.	Under "Type" in the "General" tab, select: "Single-User Project". Confirm your entry and the displayed message by clicking the "OK" button.	 
3.	Prevent deleting the startup list by clicking the "No" button.	

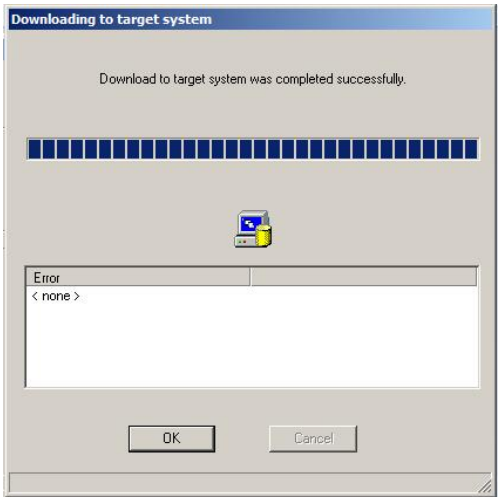
Step	Activity	Screenshot
4.	Open the "Redundancy" editor. Activate the "Default Master" option. Enter the Standby OS in the "Redundant partner server" field. Check whether your desired check boxes are activated under "Optional Settings". If you do not want to operate the RS 232 redundancy cable on the COM1 interface, you must adjust this setting later yourself on the operator stations (see section "OS configuration on the Operator Station"). Click the "OK" button to confirm the settings.	
5.	Open the "Time Synchronization" editor. Activate the check box "Synchronization via System Bus (Master, Slave)". Select "CP1623(ISO)" under "Access point 1" and activate the "Master" option. Activate the check box "Display symbolic name of the access point". Click the "OK" button to confirm the settings. **NOTE** If the ES does not have a CP1623, then activate the option "Display symbolic name of the access point" and select the appropriate access point.	
6.	Close the OS project.	

Downloading the OS project to the OS computer

Once the redundancy and time synchronization are configured on the ES, download the OS project to the Master OS and the Standby OS.

Table 5-11

Step	Activity	Screenshot
1.	In SIMATIC Manager, select the Master OS and choose the following in the context menu: "PLC > Download".	
2.	For the first OS project download, an entire download is required. Start the download by clicking the "OK" button.	

Step	Activity	Screenshot
3.	After a successful download, the OS project is located in the specified folder on the Master OS. Click the "OK" button to confirm the corresponding message.	
4.	Repeat steps 1 to 3 to download the OS project to the Standby OS.	

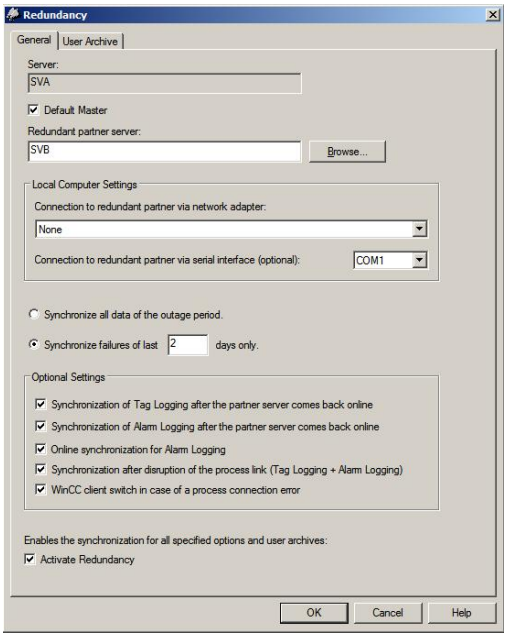
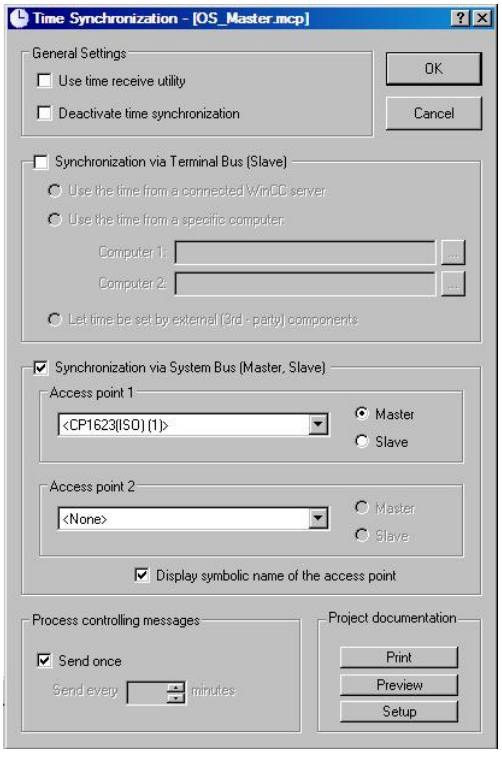
Configuring on the Operator Station

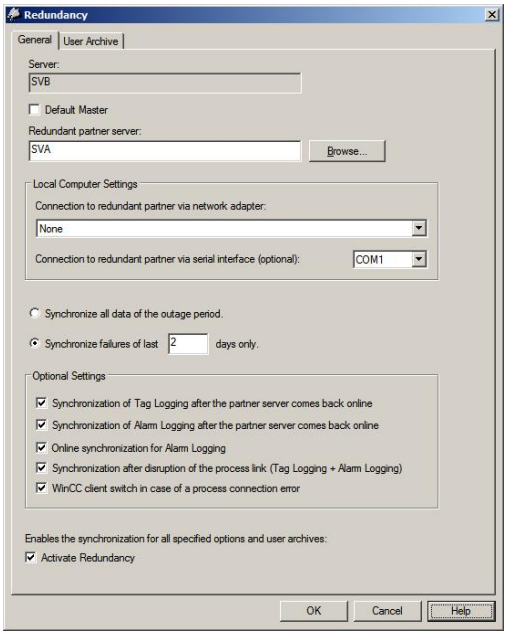
If, as opposed to the operator station, the engineering station has no CP1623 or if the RS 232 redundancy cable is not connected to the COM1 port, the following step instructions must be carried out. Generally we advise you to check the project settings after the project has been downloaded to the target systems.

Note

Normally, all the engineering work will be carried out on the ES for the purpose of consistent data management, so that no WinCC engineering licenses are required on the OSs. Nevertheless, each time the WinCC Explorer is opened, a licence-free time window of two hours is enabled for WinCC configuration works.

Table 5-12

Step	Activity	Screenshot
1.	Open the OS project on the Master OS.	
2.	Open the "Redundancy" editor. Check the name of the Master OS in the "Server" field. Activate the "Default Master" option. Also check whether the name of the Standby OS is entered correctly under "Redundant partner server:". Check whether your desired check boxes are activated under "Optional Settings". If you operate the RS 232 redundancy cable on a port which is not the COM1 port, you must set the corresponding port under "Connection to redundant partner via serial interface:". Click the "OK" button to confirm the settings.	
3.	Open the "Time Synchronization" editor. Check or activate the check box "Synchronization via System Bus (Master, Slave)". Check or select "CP1623(ISO)" and the option button "Master" under "Access point 1". Click the "OK" button to confirm the settings.	
4.	If you have carried out project changes in WinCC Explorer, close the OS project and reopen it for the settings to take effect.	

Step	Activity	Screenshot
5.	Repeat steps 1 to 4 on the Standby OS with the following modifications for step 2 (redundancy): • The check box "Default Master" must be deactivated. • Check whether the name of the Master OS is entered correctly under "Redundant partner server:" and change it if required.	

5.3.3 Activating the runtime

Activate the OS project, first on the Master OS and then on the Standby OS. It is recommended to wait before activating the second runtime until the boot process of the first one has completed.

With regard to redundancy, the online synchronization is immediately active.
As opposed to this, the mutual synchronization of archives starts 10 minutes later.

6 Master ES/OS and Standby OS

6.1 Configuration description

In this configuration with two redundant OS single stations, one of the two stations also serves as a simultaneous ES, which saves the need for a separate third station.

The following two criteria must be observed, which is why we generally recommend creating a configuration with a separate ES (see chapter 5 "ES, Master OS and Standby OS"):

Comparatively low saving potential

The saving potential has been reduced since PCS 7 V8.0 because the OS runtime license is not included with the ES license any longer. Therefore, the savings are limited to one computer (hardware and Windows license).

Particularities when configuring

The configuration differs from that of the PCS 7 Engineering Standard and represents a kind of workaround.

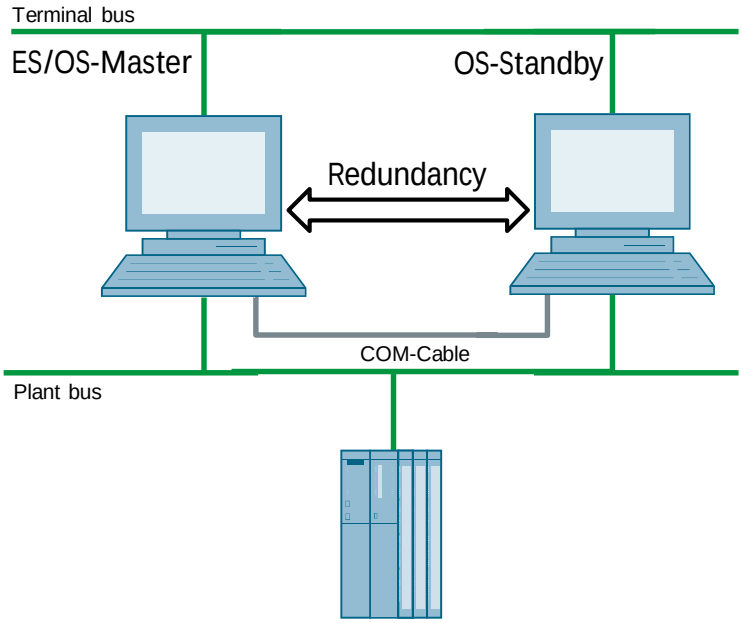
The "WinCC Application" and "WinCC Standby Application", which are the standard means of PCS 7, cannot be used, as it is not possible to download changes during operation. The mechanisms, that both systems must be in runtime, and that the runtime on the ES must be stopped for the download to proceed, block each other off.

For this reason, we only configure an OS application, open it on both stations and configure their mutual redundancy locally in WinCC. To be able to download to the OS Single Station, the runtime on the ES and the OS must be first closed.

NOTICE This configuration has been tested with a PCS 7 basic installation including the Web Option. No statement can be made regarding the functionality with additional optional packages.

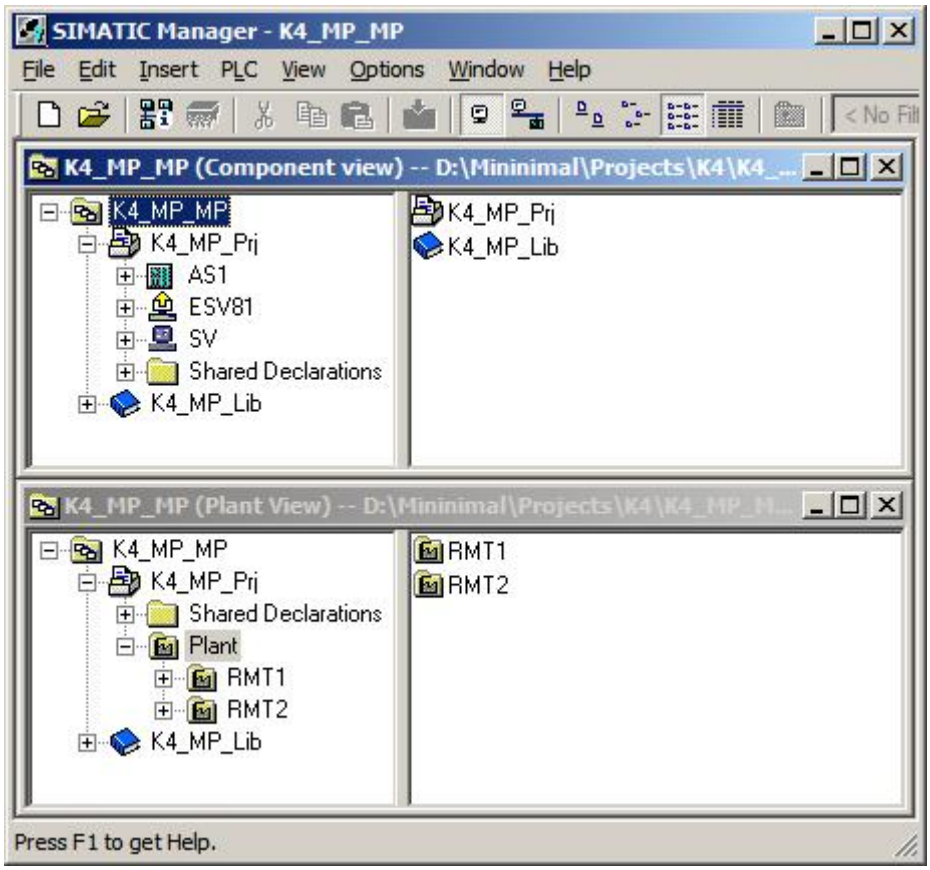
Hardware assembly

Figure 6-1



PCS 7 configuration

Figure 6-2



Limitations/particularities

Due to the untypical configuration of PCS 7 with only one OS, there are differences in system behavior that must be observed:

- The first activated OS takes over the master role.
- For an entire download to be performed, the runtime must be deactivated and the OS project closed in both computers. During this time, operator actions and archiving are both not possible.
- To download changes, the runtime on the ES must be stopped when compiling the OS. These can be then re-activated to test the modified OS functions. For the downloading process, the runtime must be terminated and the OS Project closed.
  During this time, the operator is restricted from taking any actions on the ES computer.

NOTICE Depending on the changes performed, if the runtime remains active during OS compilation, it can happen that a subsequent downloading of changes is not performed completely, which will cause errors. If this happens, only an entire download is possible.

- When the runtime is active on the ES computer, the runtime archives are stored in the multiproject path. They are incorporated in the ZIP file when archiving and therefore cause an increased demand on memory resources as well as longer archiving times.
  Workaround:
  - Deactivate the runtime on the ES computer
  - Reset the archives in the OS project on the ES computer and close the entire PCS 7 project

  After archiving and after re-activating the runtime, the archives are synchronized again. However, it must be noted that more time is needed for synchronization.

6.2 Required hardware and software licensing

Hardware

The following hardware is recommended for this configuration and can be ordered via the Siemens mall. This ensures that the appropriate amount of operating systems of your choice and SIMATIC PCS 7 system software are pre-installed on the PC stations.

Table 6-1

Station	Product label	Operating system	System bus transition
ES/OS	SIMATIC PCS 7 ES/OS IPC847D BCE	Windows 7	RJ45 network card
	SIMATIC PCS 7 ES/OS IPC847D IE	Windows 7	CP 1623
OS Single Station	SIMATIC PCS 7 ES/OS IPC847D BCE	Windows 7	RJ45 network card
	SIMATIC PCS 7 ES/OS IPC847D IE	Windows 7	CP 1623

Software Licensing

The following section lists the software/license packages required for this configuration selection.

Table 6-2

Component	Software/license package
ES	• SIMATIC PCS 7 AS/OS Engineering Software V8.1 (PO unlimited) • SIMATIC PCS 7 AS Runtime License
OS Single Station Redundant	• SIMATIC PCS 7 OS Software Single Station Redundancy V8.1 (Single License for 2 installations) • 2x SIMATIC PCS 7 OS Runtime License (max. 2000 PO)

6.3 Step-by-Step configuration

Note

The following instructions have been created based on Windows 7 and PCS 8.1.

CP1623 are used as an example for the system bus transition. The time synchronization is additionally activated.

The PC stations used in the test setup are called:

- Master ES/OS: ESV81
- Standby OS: SV

6.3.1 ES configuration

Creating the multiproject

As a basis for the following instructions, all PC stations must be physically connected according to Figure 6-1. A multiproject must be also created on the ES, where the hardware and software of the AS are already configured.

Start from the following CPU and CP settings.

AS settings for time synchronization

The analyzability of the process data requires that all the components of the process control system work with an identical clock time in order to be able to assign messages in the correct temporal order.

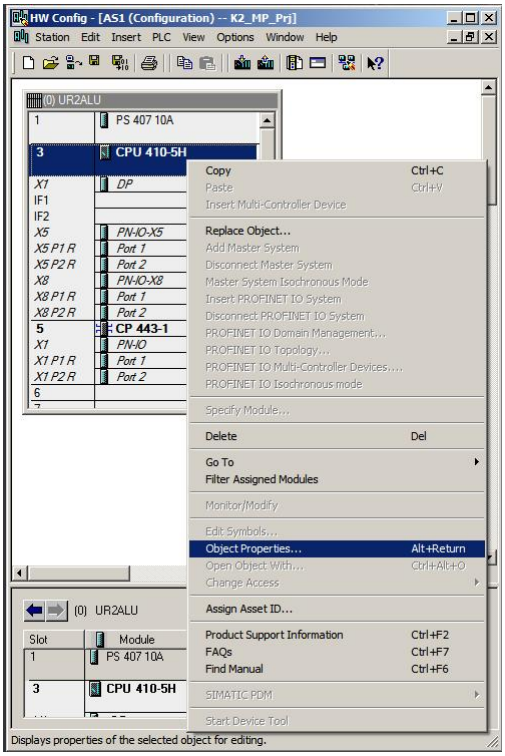
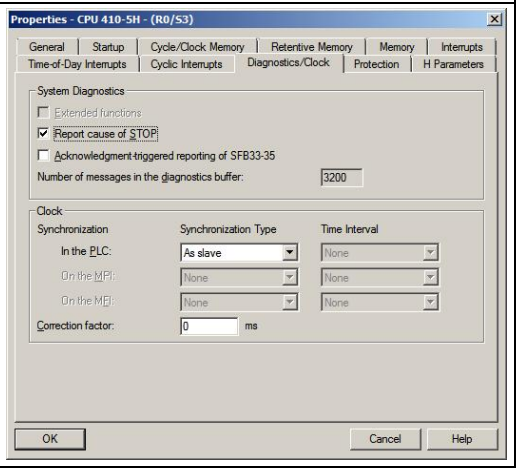
The following section describes a way in which the initially activated OS single station predetermines the master time.

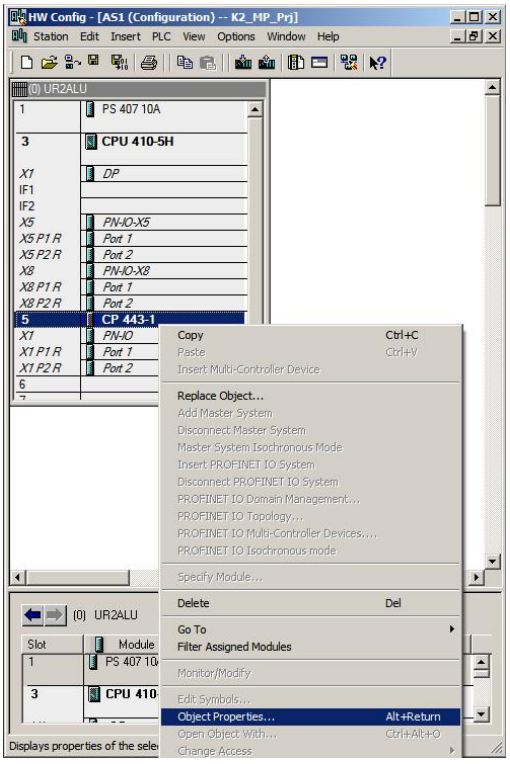
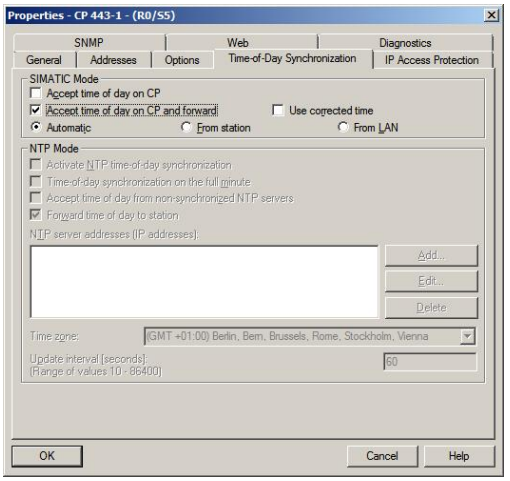
Note

More time synchronization possibilities are described in detail in the following manuals:

- SIMATIC Process Control System PCS 7 Operator Station (V8.1)
- SIMATIC Process Control System PCS 7 Time synchronization (V8.1)

Table 6-3

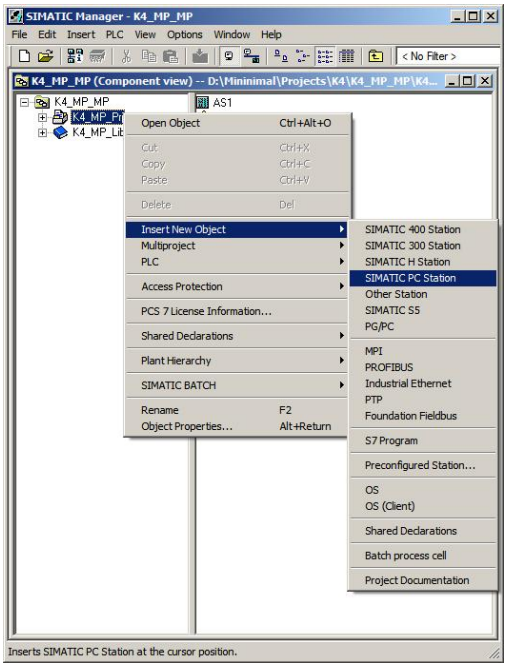
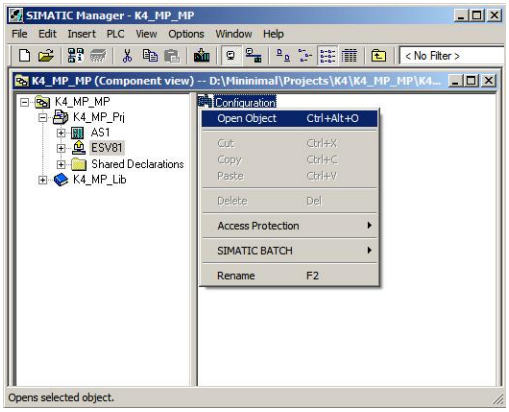
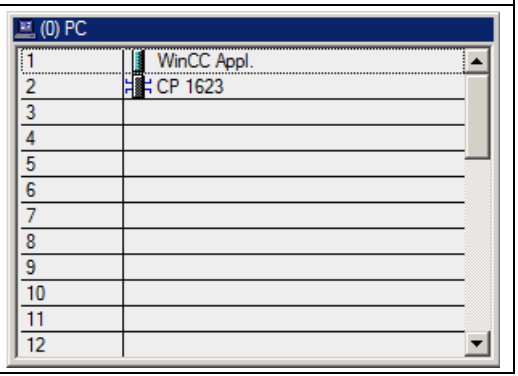
Step	Activity	Screenshot
1.	Open the HW Config for the AS. Select the CPU and choose "Object properties..." in the shortcut menu.	
2.	Switch to the "Diagnostics/Clock" tab. In the "Clock" section, set "Synchronization Type - As slave". Click the "OK" button to confirm this setting.	

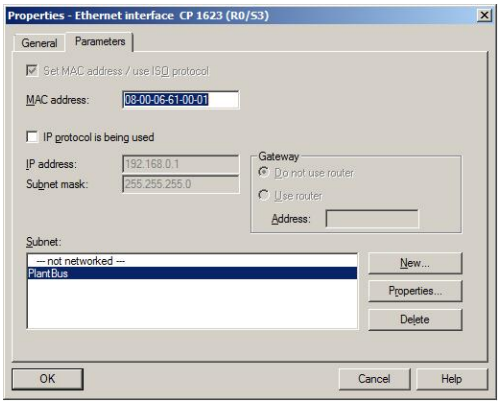
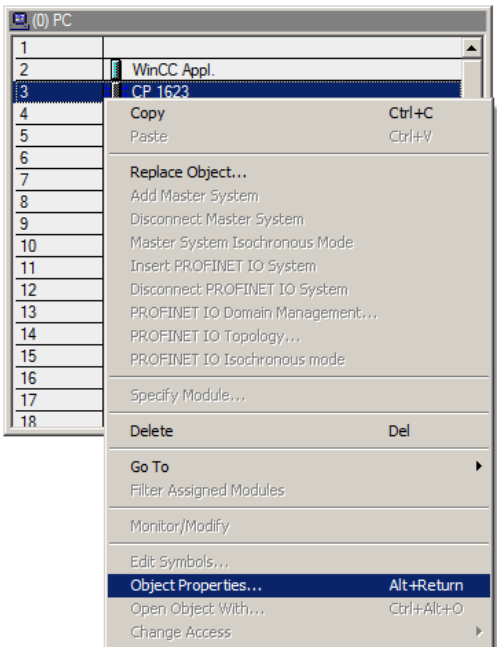
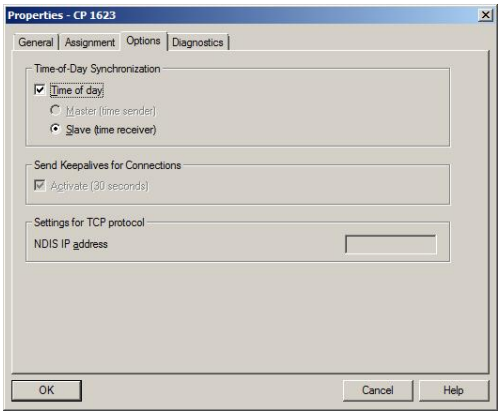
Step	Activity	Screenshot
3.	Open the shortcut menu of the CP and select "Object properties…".	
4.	Switch to the "Time synchronization" tab. Activate the check box "Accept time of day on CP and forward". Click the "OK" button to confirm the selection.	
5.	Save the configuration via the command "Station > Save and compile..." Close the HW Config	

Setting up the ES PC station

In order to run the OS project on the ES, a PC station is created for the ES with the WinCC application.

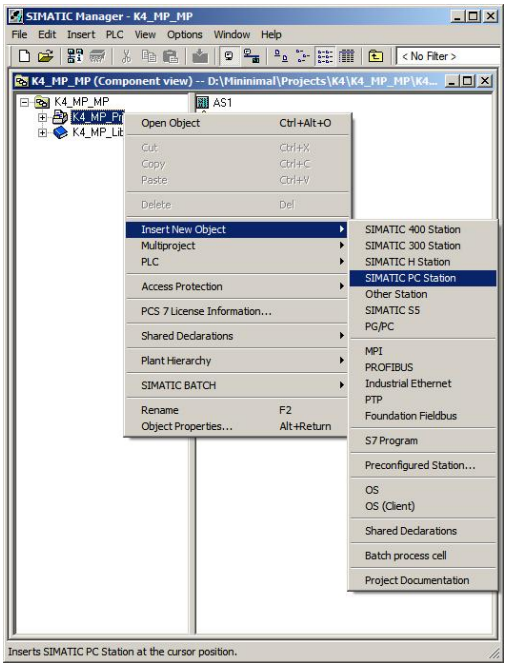
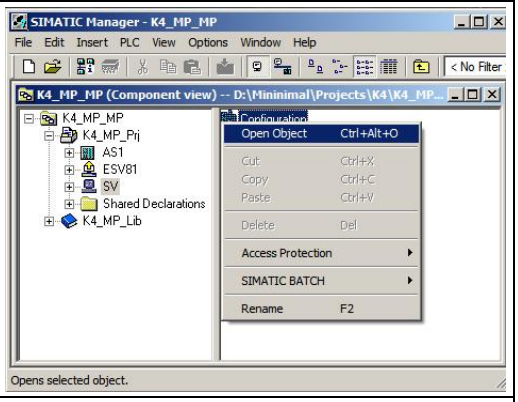
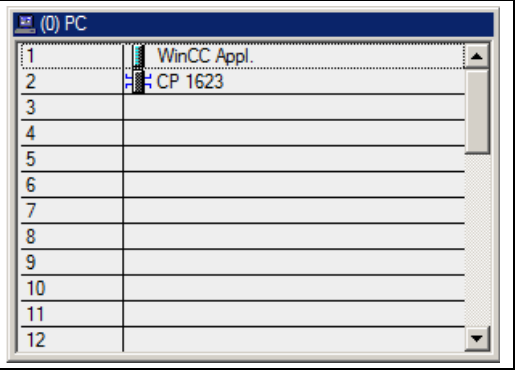
Table 6-4

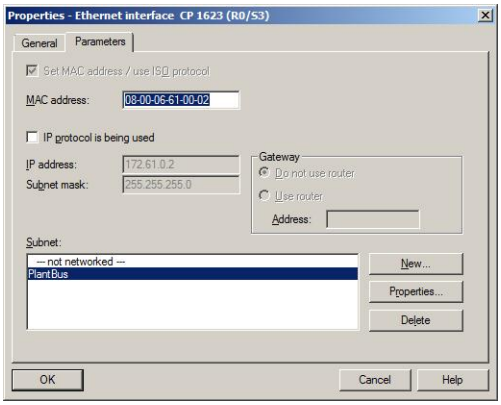
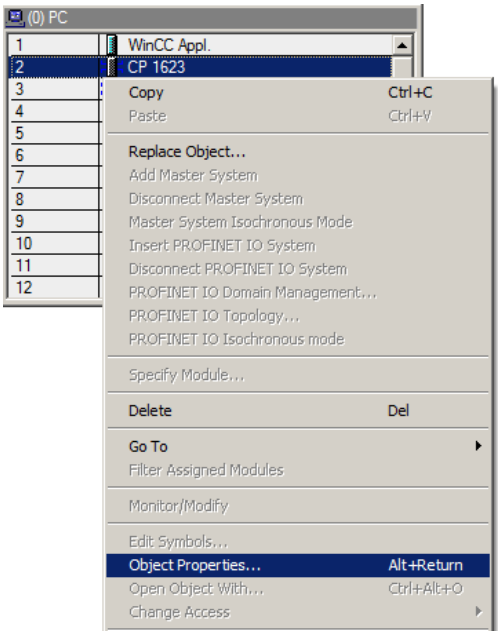
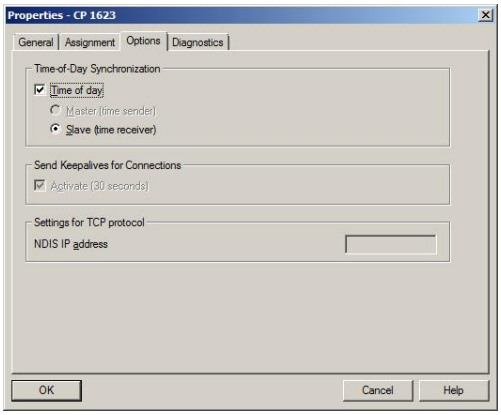
Step	Activity	Screenshot
1.	Open the shortcut menu of the project in the component view and add a new PC station via "Insert New Object > SIMATIC PC station". Change the name of the PC station so that it matches the name of the local computer on the network.	
2.	Open the HW Config of the ES PC station via the shortcut menu.	
3.	From the object catalog ("View > Catalog") insert a "WinCC application" and a network card of the type "CP1623".	

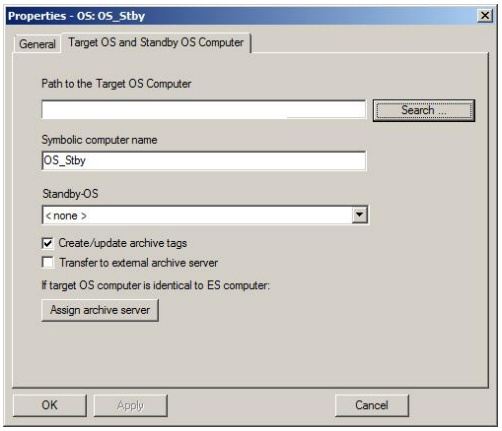
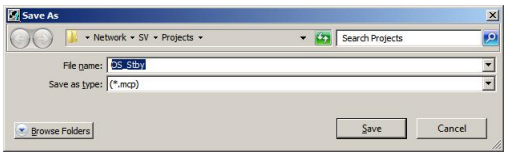
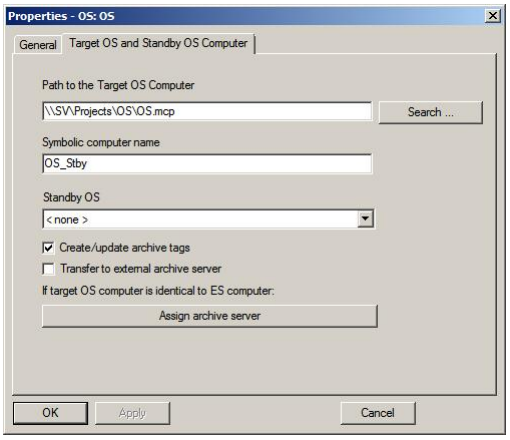
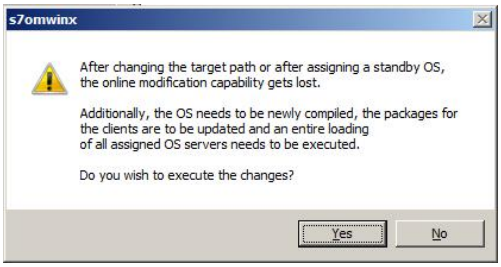
Step	Activity	Screenshot
4.	Select the system bus from "Subnet" or set this by pressing the "New..." button. Assign the corresponding MAC address to the CP1623. Deactivate the check box "IP protocol is being used". Click the "OK" button to confirm the settings.	
5.	Open the shortcut menu of the CP1623 and select "Object properties…".	
6.	Go to the "Options" tab and select the check box "Time of day". Click the "OK" button to confirm the selection.	
7.	Save and compile the configuration via the menu command: "Station > Save and Compile…". Close the HW Config	
8.	Delete the OS of the PC station of the ES in SIMATIC Manager, as it is not needed in our example.	

Setting up the Standby OS PC station

Table 6-5

Step	Activity	Screenshot
1.	Open the shortcut menu of the project in the component view and add a new PC station via "Insert New Object > SIMATIC PC station".	
2.	Open the HW Config of the Standby OS PC station via the shortcut menu.	
3.	From the object catalog (View > Catalog) insert a "WinCC application (no WinCC Application Stby!)" and a network card of the type "CP1623".	

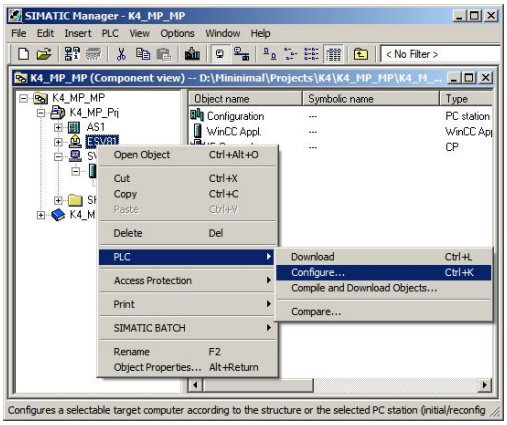
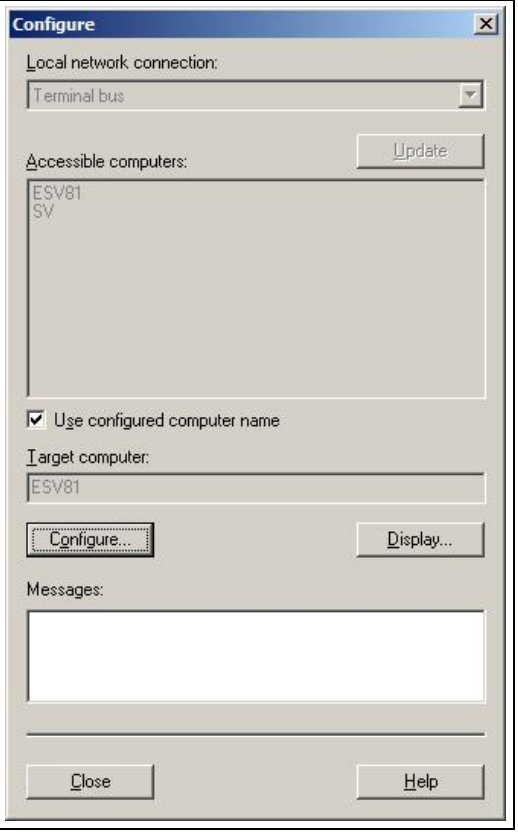
Step	Activity	Screenshot
4.	Select the system bus from "Subnet" or set this by pressing the "New..." button. Assign the corresponding MAC address to the CP1623. Deactivate the check box "IP protocol is being used". Click the "OK" button to confirm the settings.	
5.	Open the shortcut menu of the CP1623 and select "Object properties…".	
6.	Go to the "Options" tab and select the check box "Time of day". Click the "OK" button to confirm the setting.	
7.	Save and compile via the command: "Station > Save and Compile…". Close the HW Config	

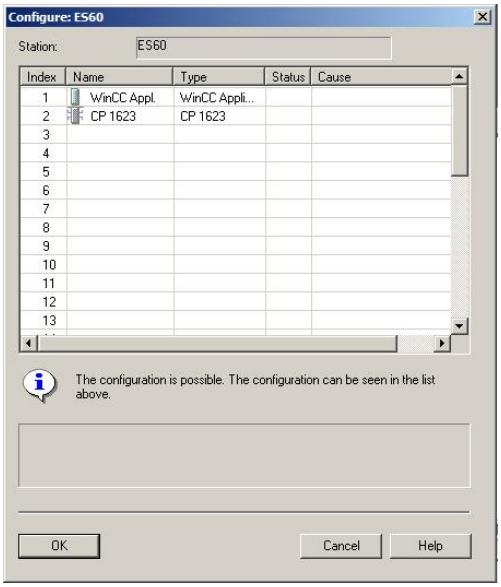
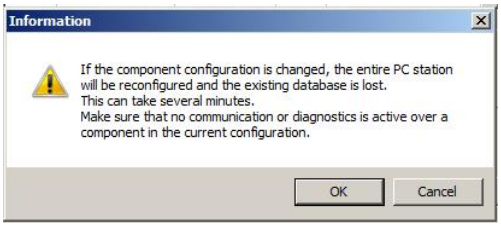
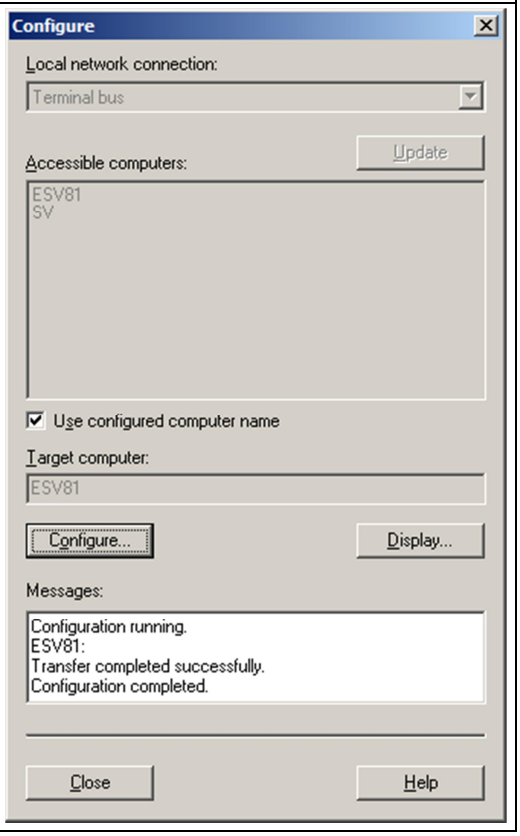
Step	Activity	Screenshot
8.	In SIMATIC Manager, open the properties dialog of the Standby OS. Switch to the "Target OS and Standby OS Computer" tab. Activate the check box "Create/update archive tags" and deactivate the check box "Transfer to external archive server". Click on the "Search..." button.	
9.	Navigate via the drop-down list to the shared project folder of the Standby OS (see 5.3.1 Preparatory activities). Click the "Save" button.	
10.	In the text box, reselect the whole project path "Path to Target OS Computer". Click the "OK" button to confirm this.	
11.	Confirm the information dialog by clicking the "Yes" button.	

Configuring the PC stations

The function "Configure PC station" transfers project configurations to one or more target stations. First configure the local Station Configuration Editor of the ES and then all the other PC stations connected to the system bus.

Table 6-6

Step	Activity	Screenshot
1.	Execute the Station Configuration Editor of the ES. To do this, select the PC station of the ES and in the shortcut menu choose: "PLC > Configure...".	
2.	Select the PC to be configured from "Accessible computers:". **Note** If you have chosen the option "Identical PC name to PC station name" via "Object properties", the target PC to be configured appears directly in the component configurator. Use the "Show" button to display the current configuration of the PC station. Click on the "Configure…" button.	

Step	Activity	Screenshot
3.	In the window that appears you will see how the PC station is configured. Click the "OK" button to confirm this setting.	
4.	Confirm the information dialog by clicking on "OK".	
5.	In the bottom window you will then see the message: "Transfer completed successfully". Close the configuration dialog.	

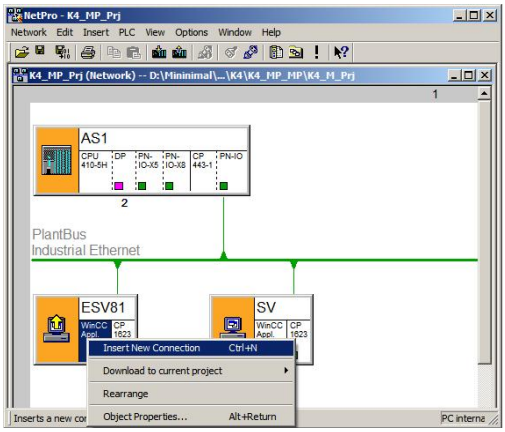
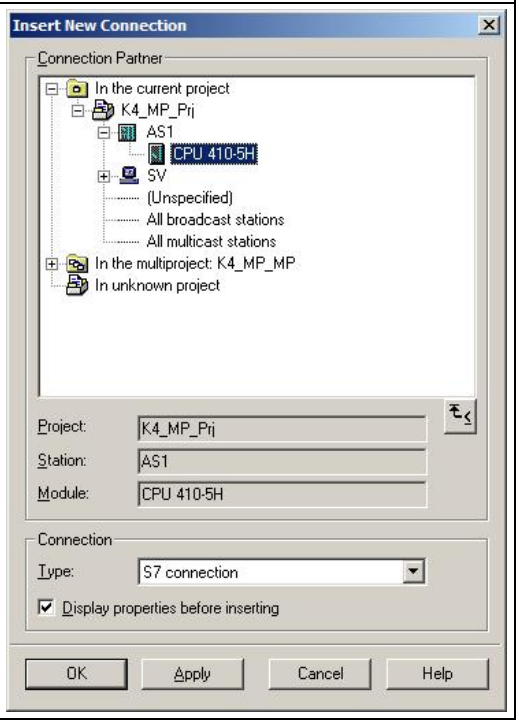
Step	Activity	Screenshot
6.	Configure the Station Configuration Editor of the Standby OS as shown in steps 1 to 5.	

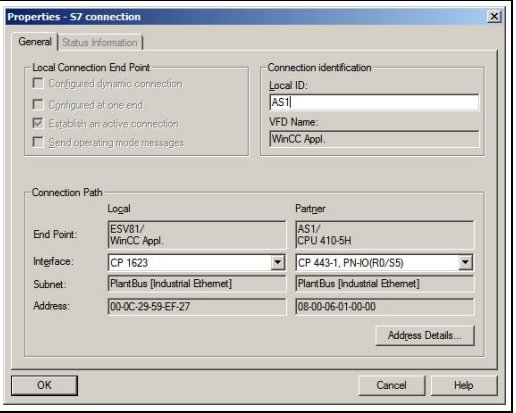
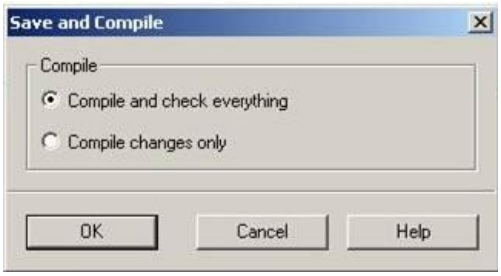
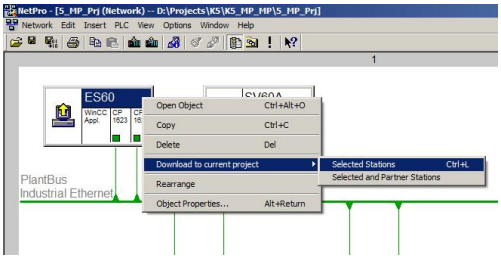
Configuring and loading AS-OS communication

In the following section, the connections between the PC stations and the AS are configured in NetPro and loaded in the individual stations.

Note In case of a granular station configuration, the subnets of the individual sub-projects must be first merged.

Table 6-7

Step	Activity	Screenshot
1.	Open NetPro. Select the WinCC application of the ES and open the shortcut menu. Select "Insert New Connection".	
2.	Select the CPU of the AS in the "Connection Partner" window. Make sure that an "S7 connection" is selected under "Connection".	

Step	Activity	Screenshot
3.	Under "Connection identification" in the "General" tab, change the "Local ID:" to a descriptive name, such as AS60. Click the "OK" button to confirm the settings.	
4.	Also create a connection between the Standby OS and the AS by repeating steps 1 to 3. When doing this it is important that the connection has the same name as the connection of the ES to the AS. When ready, save and compile the configuration via the menu command: "Network > Save and Compile…". Select the option button "Compile and check everything" and confirm your selection with the "OK" button.	
5.	Select the ES and download the connections via the shortcut menu: "Download to current project > Selected Stations". Download the Standby OS and the AS in the same way. Then close NetPro.	

Compiling and loading the user program

Compile the S7 program and download it to the AS.

Compiling the OS project

Compile the OS project of the Standby OS in SIMATIC Manager.

Make sure to make the correct OS assignment to the server in the plant view.

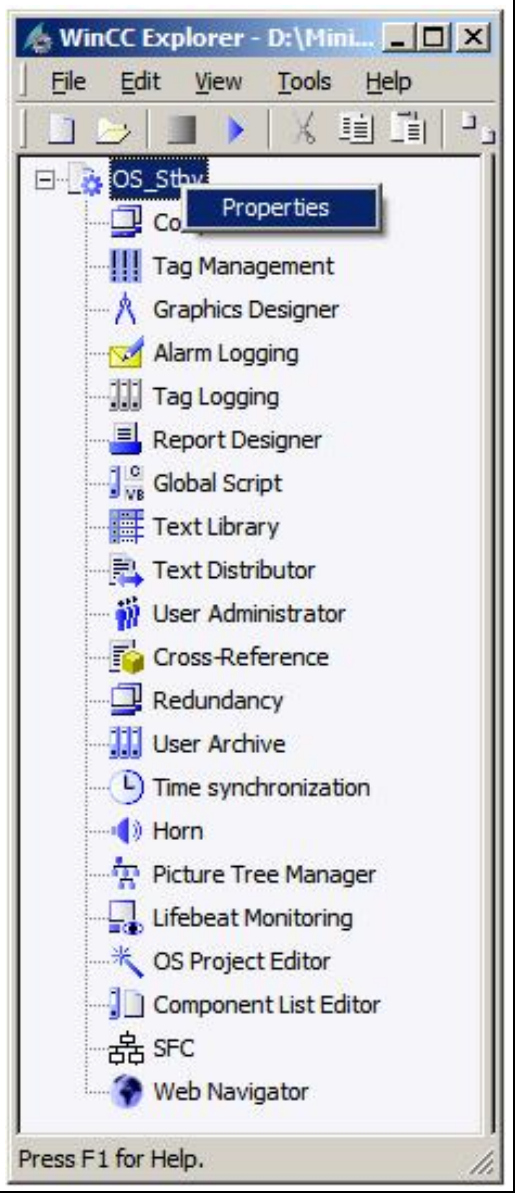
6.3.2 OS configuration

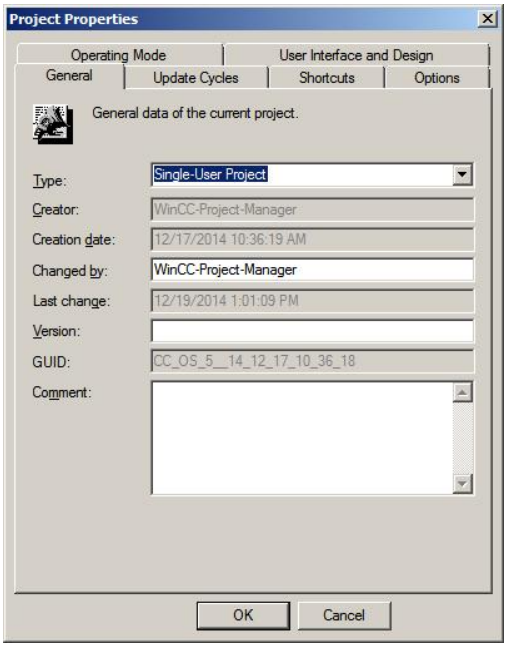
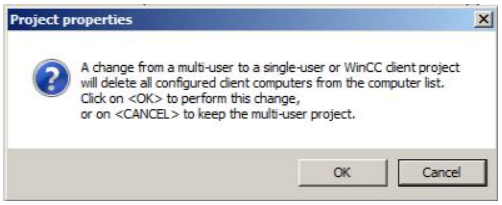
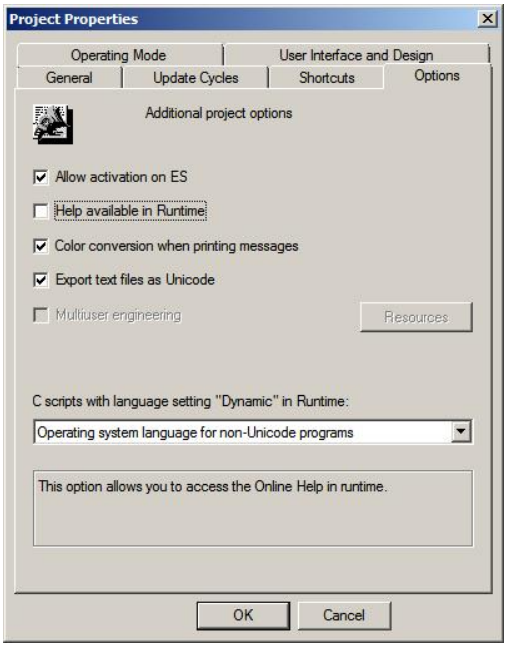
OS configuration on the engineering station

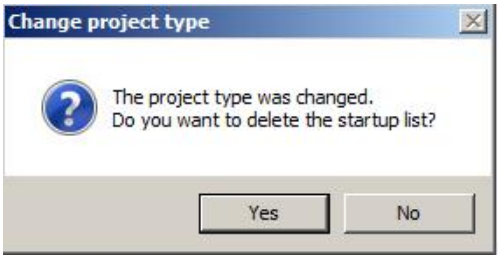
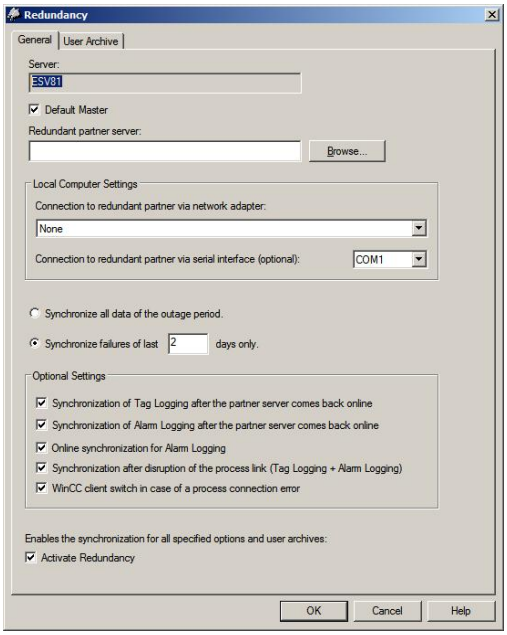
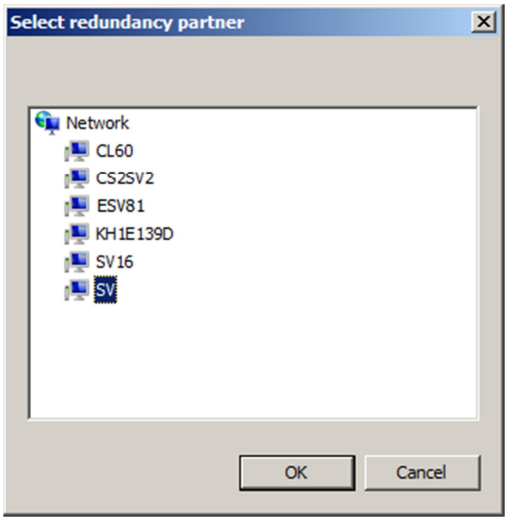
On the ES, a conversion must be still done from a multi-user to a single-user system, and the settings for the redundancy and time synchronization must be still adjusted.

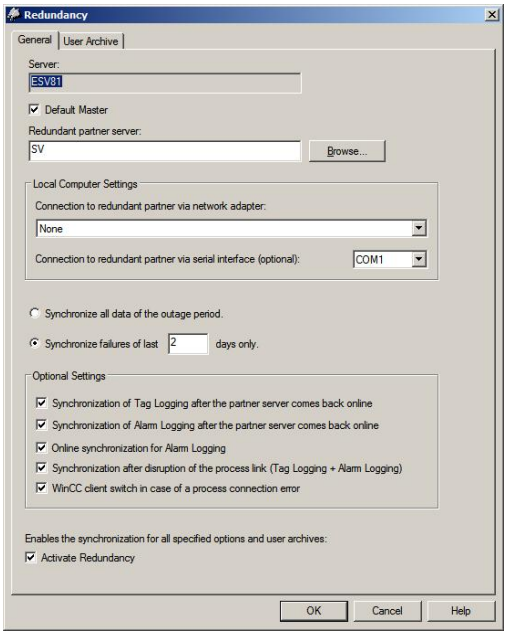
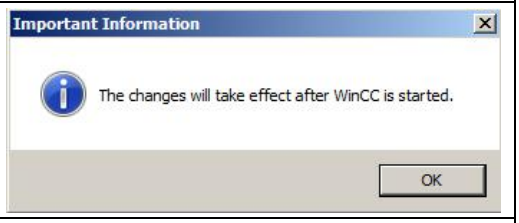
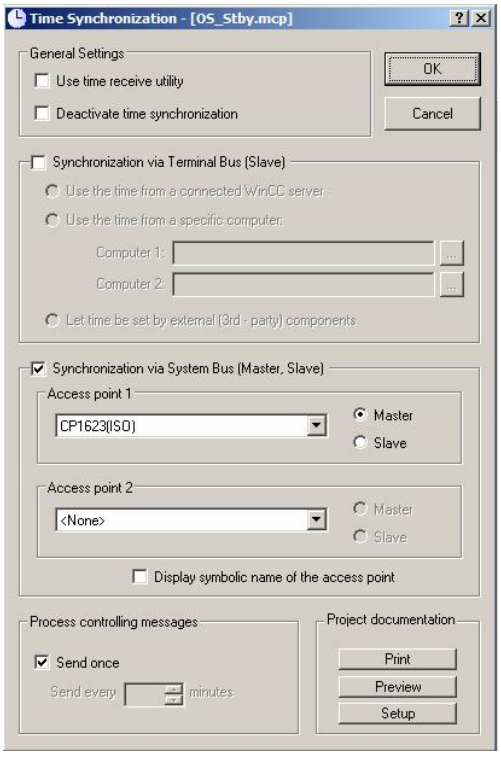
Note In this particular configuration, it is necessary to complete the redundancy settings in WinCC Explorer of the Standby OS after the entire download completes.

Table 6-8

Step	Activity	Screenshot
1.	Open the OS project of the Standby OS in the ES. Select the OS project in the open WinCC Explorer and select "Properties" in the shortcut menu.	

Step	Activity	Screenshot
2.	Under "Type:" in the "General" tab, select the project "Single-User Project" from the drop-drop-down list.	
	Confirm your settings and the displayed message by clicking the "OK" button.	
3.	Activate the OS project option "Allow activation on ES" from the "Options" tab. This setting allows the runtime to be activated in the ES. Then click on the "OK" button.	

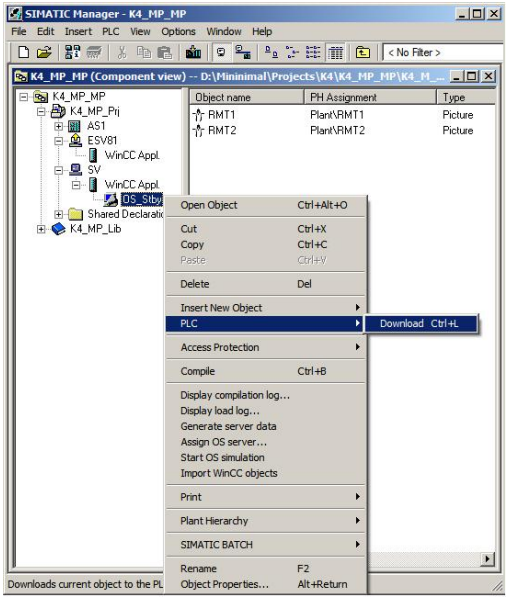
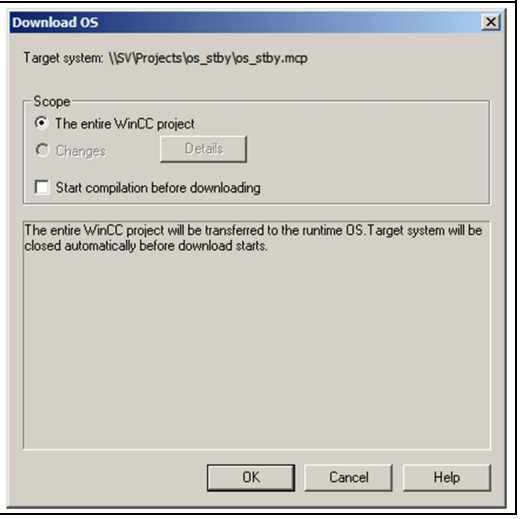
Step	Activity	Screenshot
4.	Prevent deleting the startup list by clicking the "No" button. Confirm the displayed message by clicking on "OK".	
5.	Open the "Redundancy" editor. Activate the "Activate Redundancy" option. Select the option "Default Master". Adjust the redundancy properties in "Optional Settings" according to your requirements. If you do not want to operate the RS 232 redundancy cable on the COM1 interface, you must adjust this setting later yourself on the Standby OS (see section "OS configuration on the Operator Station").	
6.	To complete the redundancy settings for the ES, the partner server must be still selected. Click the "Search ..." button and select the Standby OS as a redundant partner from the network. Click the "OK" button to confirm the settings.	

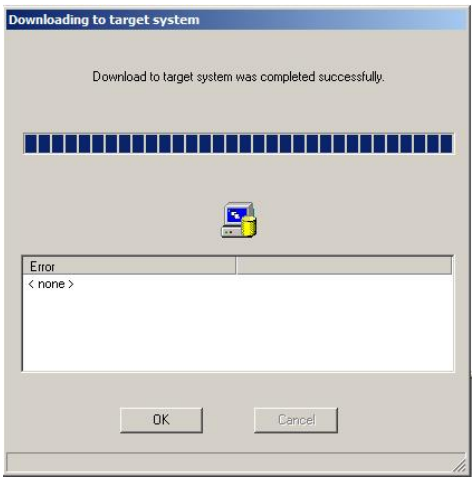
Step	Activity	Screenshot
	Double check all your options before you confirm the redundancy settings with the "OK" button.	
	Confirm the displayed note by clicking the "OK" button.	
7.	Open the "Time Synchronization" editor. Activate the check box "Synchronization via System Bus (Master, Slave)". Select "CP1623(ISO)" under "Access point 1" and activate the check box "Master". Click the "OK" button to confirm the settings. **Note** If the ES does not have a CP1623, then activate the option "Display symbolic name of the access point" and select the appropriate access point.	
8.	Close the OS project.	

Downloading the OS project to the Standby OS

Once the redundancy and time synchronization are configured on the ES and the OS project is closed again, download the OS project on the Standby OS.

Table 6-9

Step	Activity	Screenshot
1.	In SIMATIC Manager, select the Standby OS and choose the following in the context menu: "PLC > Download".	
2.	For the first OS project download, an entire download is required. Start the download by clicking the "OK" button.	

Step	Activity	Screenshot
3.	After a successful download, the OS project is located in the specified folder on the Standby OS. Click the "OK" button to confirm the corresponding message.	

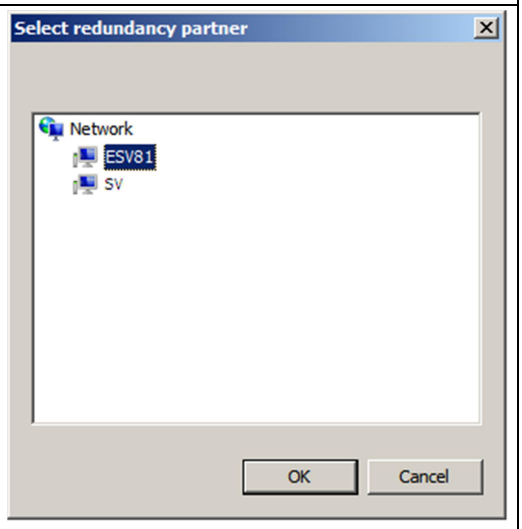
OS configuration on the Standby OS

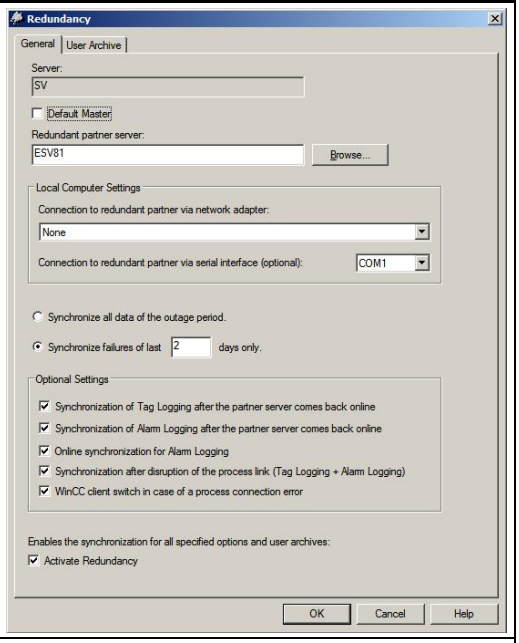
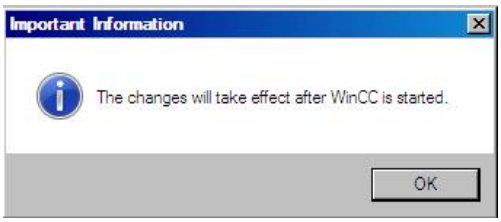
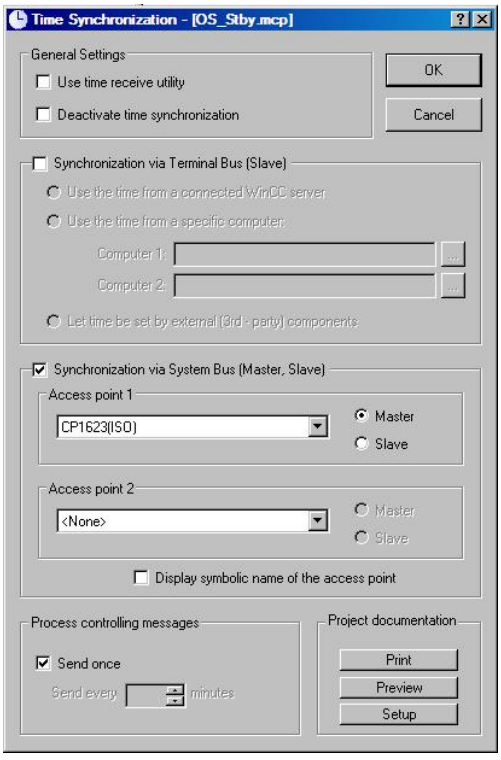
In this particular configuration, it is necessary to complete the redundancy settings after the download completes.

If, as opposed to the operator station, the engineering station has no CP1623 or if the RS 232 redundancy cable is not connected to the COM1 port, the following step instructions must be carried out. Generally we advise you to check the project settings after the project has been downloaded to the target system.

Note Normally, all the engineering work will be carried out on the ES for the purpose of consistent data management, so that no WinCC engineering licenses are required on the OS. Nevertheless, each time the WinCC Explorer is opened, a licence-free time window of two hours is enabled for WinCC configuration works.

Table 6-10

Step	Activity	Screenshot
1.	Open the OS project on the OS standby under the shared project folder.	
2.	Open the "Redundancy" editor from the shortcut menu. Click the "Search ..." button and select the ES computer as a redundant partner.	

Step	Activity	Screenshot
	Deactivate the check box "Default Master". Check whether your desired check boxes are activated under "Optional Settings". Click the "OK" button to confirm the settings.	
	Confirm the displayed note by clicking the "OK" button.	
3.	Open the editor "Time Synchronization" from the shortcut menu. Check or activate the check box "Synchronization via System Bus (Master, Slave)". Check or select "CP1623(ISO)" and the option button "Master" under "Access point 1". Always click the "OK" button to confirm the settings.	

Step	Activity	Screenshot
4.	If you have carried out project changes in WinCC Explorer, close the OS project and reopen it for the settings to take effect.	

6.3.3 Activating the runtime

Activate the OS project, first on the ES and also on the Standby OS. It is recommended to wait before activating the second runtime until the boot process of the first one has completed.

With regard to redundancy, the online synchronization is immediately active.
As opposed to this, the mutual synchronization of archives only starts 10 minutes later.

6.3.4 Particularities when loading the OS project changes

Loading changes

To download changes, the runtime on the ES must be stopped when compiling the OS. These can be then re-activated to test the modified OS functions.

NOTICE Depending on the changes performed, if the runtime remains active during OS compilation, it can happen that a subsequent downloading of changes is not performed completely, which will cause errors. If this happens, only an entire download is possible.

For the downloading process, the runtime must be terminated and the OS Project closed.
This results in the operator being restricted from taking any actions on the ES computer.

Complete download

For a complete download the following must be always observed:

1. The runtime must be deactivated on both PC stations and the OS project must be closed.
2. Before enabling the runtime on the Standby OS again, the redundancy settings must be set again.
   Do this by repeating the steps Table 6-10.

7 Expansion with the PCS 7 OS Web Option

Positioning

In order to control automated processes via the Internet/Intranet, SIMATIC PCS 7 provides operating and monitoring options: the so-called "Web Options".

This chapter describes the configuration of the Web Option on one ES/OS single-user system. The instructions can also be used as an expansion for the following minimal configurations:

- ES/OS single-user system (Chapter 3)
- Master ES/OS and Standby OS (Chapter 5)

Note To expand the redundant single-user system configuration with the Web Option, the ES/OS station in the following example has been configured as a Web Server. The partner OS could also be used the same way as a Web Server. Nothing changes in the functionality for the Web clients.

The redundancy of the operator stations is not available for Web clients. If the OS with the Web Server option is in STOP, even the Web clients have no connection to the process.

Function

All relevant pictures and scripts are stored on the Web Server to enable them to be displayed or run through a Web client.

The Web client accesses the system data provided by the Web Server via a TCP/IP connection. The user interface corresponds to the appearance of a standard OS client with overview, work and key area.

The following functions are some of the ones available via Web:

- Operator control and monitoring functions, which are also used on an OS client
- Message lists that are called up in a user-dependent manner, just like on an OS client. Messages can be acknowledged in a user-dependent manner.
- Displaying the picture hierarchy according to the plant hierarchy
- Group display function including the "loop-in-alarm" function
- Extended status display

Note For further information about the PCS 7 Web Options, see the following manual: "SIMATIC Process Control System PCS 7 Web Option for OS (V8.1)"

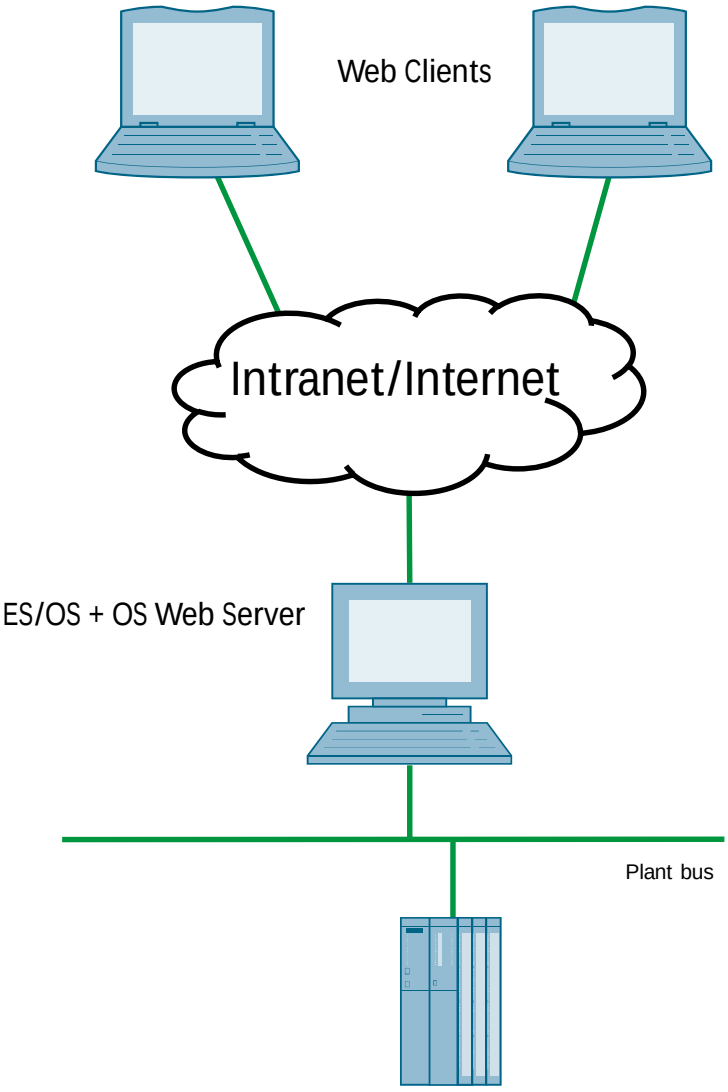
7.1 Web configurations

In our example, the configuration of the Web Option represents an expansion of the hardware and software configurations mentioned in chapter 3, "ES/OS single-user system" and chapter 5 "Master ES/OS and Standby OS".

ES/OS single-user system with OS Web Server option

To operate and monitor the system process, the OS Web clients draw their project data from the single-user system with the OS Web Server option via Internet/ Intranet by means of Internet Explorer.

Figure 7-1



Master ES/OS with OS Web Server option

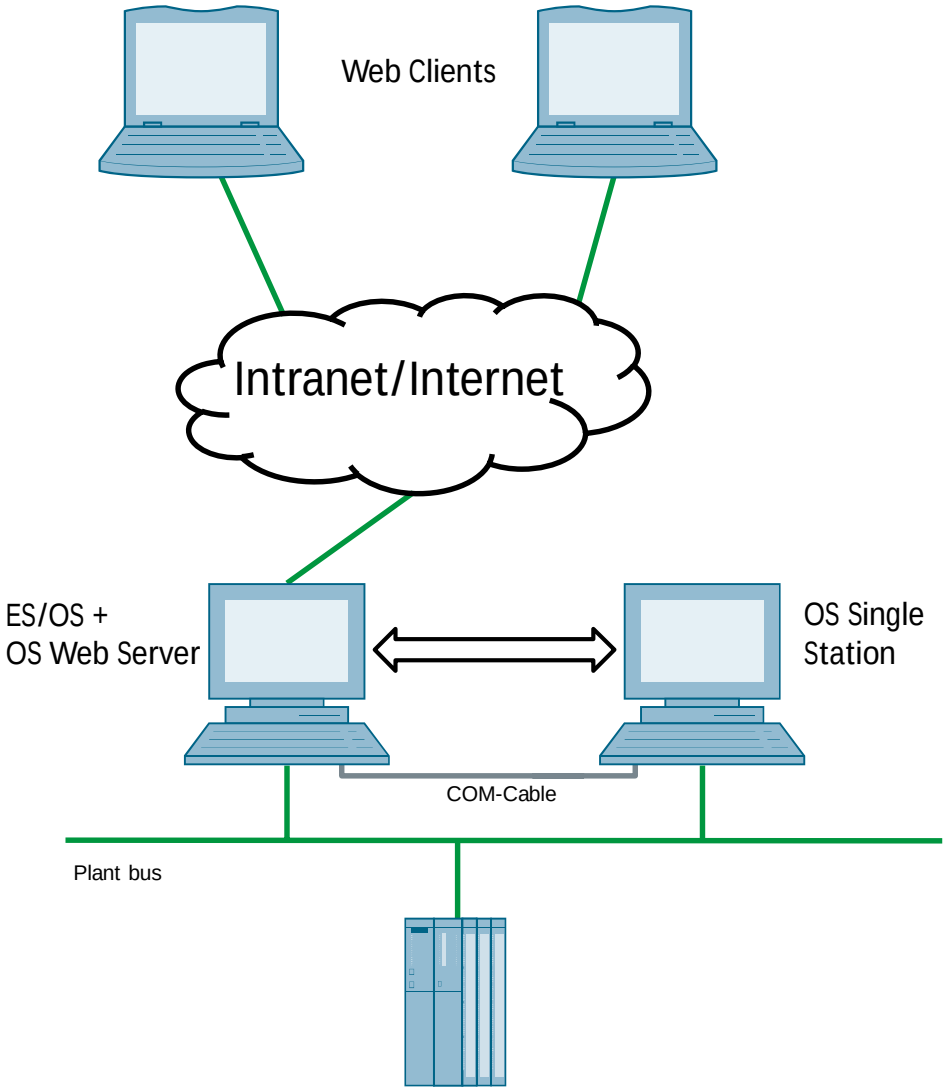
To operate and monitor the system process, the OS Web clients draw their data from the single-user system with the OS Web Server option via Internet/Intranet by means of Internet Explorer.

In addition, the system process is set as redundant to offer a widest possible protection against failure of system operation.

NOTICE

The redundancy of the operator stations is not available for Web clients.
If the OS with the Web Server option is in STOP, the Web clients have no process connection.

Figure 7–2 Web Option in a redundant single-user system



7.2 Web-specific hardware and software requirements

Single-user system with Web Server option

Table 7-1

Characteristic	Requirement
Operating system	• Windows 7 Ultimate/Enterprise SP1 (32 bit) • Windows Server 2008 R2 SP1 Standard Edition (64 bit) For further information, see the document "SIMATIC Process Control System PCS 7 PCS 7 Readme V8.1".
Hardware	• SIMATIC PCS 7 ES/OS IPC847D BCE • SIMATIC PCS 7 ES/OS IPC847D IE For further information, see the document "SIMATIC Process Control System PCS 7 PCS 7 Readme V8.1".
Software	• Internet Explorer • Internet Information Server (IIS)
Other	Faster access (>= 64 kbit/s) to the Web client via internet/intranet or TCP/IP connection

Web client

Table 7-2

Characteristic	Requirement
Operating systems	• Windows 7 Ultimate/Enterprise SP1 (32 bit) • Windows 7 Ultimate/Enterprise SP1 (64 bit) • Windows Server 2008 R2 SP1 Standard Edition (64 bit) For further information, see the document "SIMATIC Process Control System PCS 7 PCS 7 Readme V8. 1".
Minimum hardware requirements	No PDAs, tablet PCs etc.
Software	Internet Explorer
Other	Faster access (>= 64 kbit/s) to the Web client via internet/intranet or TCP/IP connection

Note The Internet Explorer version must be selected according to the PCS 7 version. For further information, see the following FAQ: https://support.industry.siemens.com/cs/ww/en/view/2334224

7.3 Maximum amount of Web client connections

The following number of concurrent Web client connections have been tested and thus released:

Table 7–3

Operating system on the stand-alone system with Web Server option	Maximum number of concurrent Web connections
Windows 7	3
Windows Server 2008	3

7.4 Configuring the OS Web Server

Configuration steps on the ES

- Publishing pictures via Web View Publisher
- Configuring user rights, start screen and language of the website in the User Administrator
- Downloading and compiling the Web Server

Publishing OS data

The Web Publisher enables pictures and scripts, which should later run on the Web clients, to be published on the OS Web Server. The following actions are performed:

- Project data is compressed and saved
- Picture windows are converted into Internet-enabled ActiveX components
- Scripts are converted so that they run on the Web

Requirements

Before publishing the Web Server data, the following requirements must be met:

- The hardware and software requirements mentioned in chapter 7.2 have been met.
- The software package "PCS 7 Web Server" is installed on the ES/OS single-user system.
- The PCS 7 Project is available and fully configured.
- "OS compiling" has been completed.
- The scripts that are accessed by the Web clients are present.
- Process pictures contain no double underscore (e.g. yy__xx.pdl).
- Tag names in plain text (quotation marks) within C scripts contain no spaces.

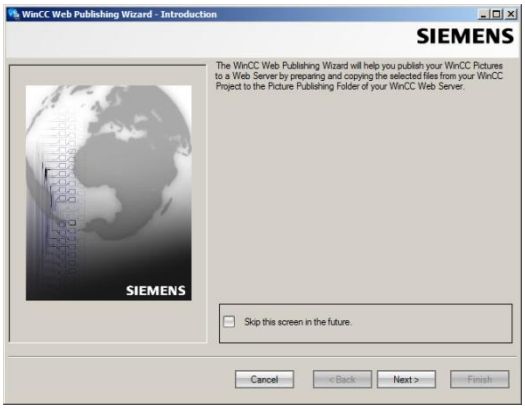
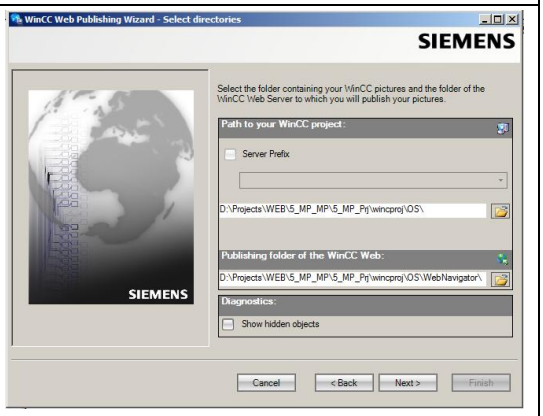
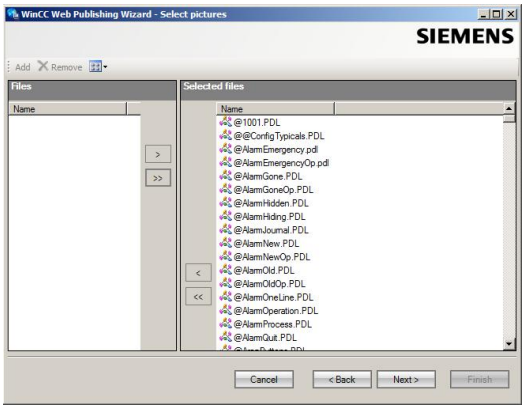
Note

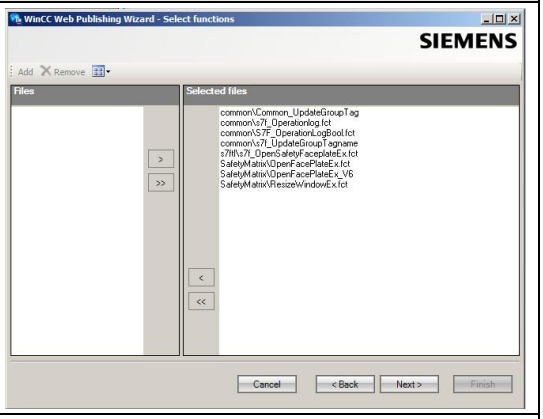
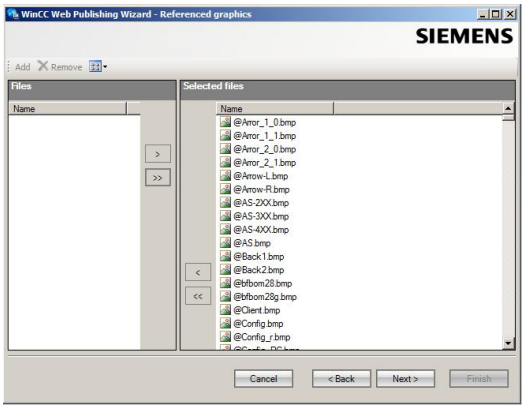
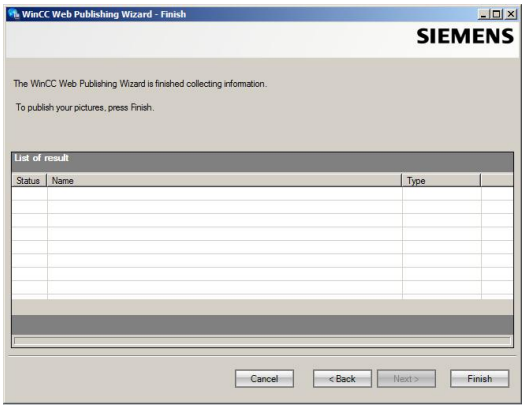
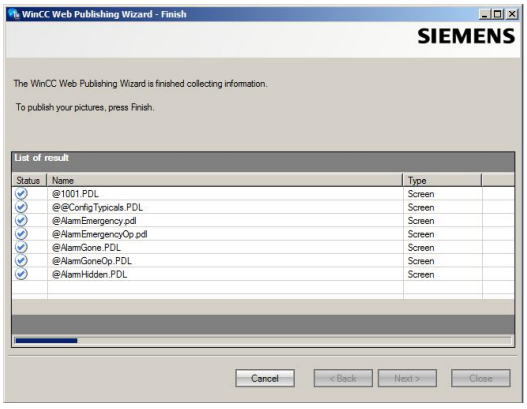
In a single-user system, only one publishing process is needed for the publishing of local data on the Web Server.

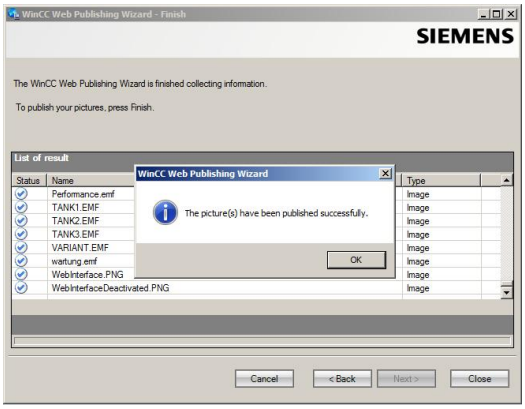
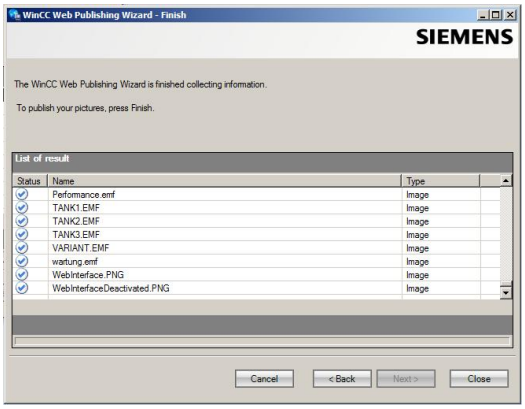
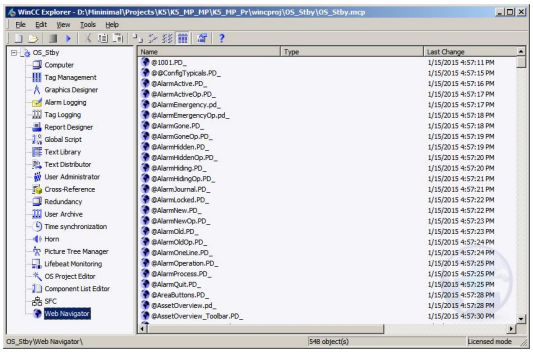
For information regarding the subject "supported script standard functions" see the chapter "Web-enabled Functions for PCS 7 OS Web Option" in the manual: "SIMATIC Process Control System PCS 7 Web Option for OS (V8.1)".

7.4.1 Publishing project data

Table 7–4

Step	Action	Remark
1.	Open the OS project of the OS Web Server in WinCC Explorer. Using the shortcut menu of the "Web Navigator" editor, select the command "Web View Publisher". The dialog box "WinCC Web Publishing Wizard - Introduction" opens. Click on the "Next" button.	
2.	This opens the dialog box "WinCC Web Publishing Wizard – Select files and folders". Deactivate the check box "Server Prefix" because you want to publish local data. Accept the default destination and source path. If you really want to change the respective path, click on the button behind the grayed entry fields. Navigate to the desired target or source folder. Click on the "Next" button.	
3.	The dialog box "WinCC Web Publishing Wizard - Select pictures" opens. Select all pictures you wish to publish. We recommend to publish all standard pictures. Use the ">>", "<<", ">" and "<" buttons to select the pictures. Click on the "Next" button.	

Step	Action	Remark
4.	The dialog box "WinCC Web Publishing Wizard - Select functions" opens. Select all functions you wish to publish. In the pictures, only the scripts that you selected during the publication process are available. Therefore, select all the needed functions at every publication process. Use the ">>", "<<", ">" and "<" buttons to select the functions. Click on the "Next" button.	
5.	The dialog box "WinCC Web Publishing Wizard - Referenced graphics" opens. Select all the graphics you wish to publish. We recommend to publish all standard graphics. Use the ">>", "<<", ">" and "<" buttons to select the graphics. Click on the "Next" button.	
6.	The dialog box "WinCC Web Publishing Wizard - Finish" opens. Click "Finish".	 

Step	Action	Remark
7.	Pictures and functions that contain faulty scripts are identified from a red cross. Double-click on each faulty picture to open the picture in the editor "PdlPad" and to correct it. Once the publishing process is complete, click the "OK" button to confirm the message.	
8.	The transferred images are listed in the dialog box "WinCC Web Publishing Wizard – Finish". Click "Finish".	
9.	The published pictures are displayed in the data window of the Web Navigator.	

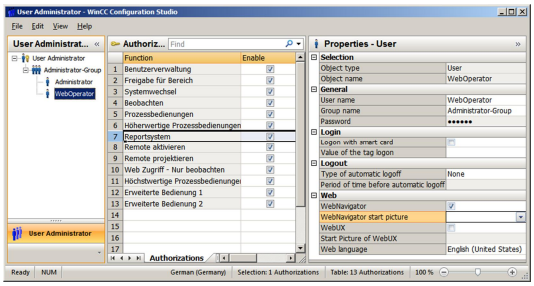
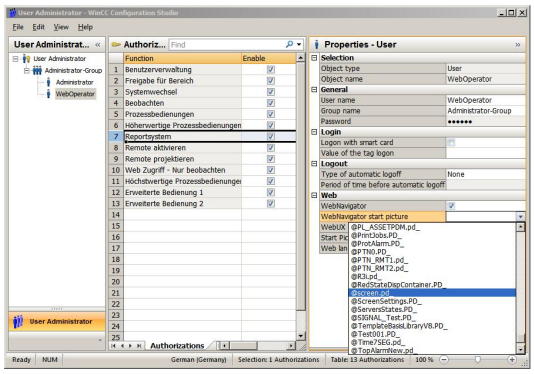
7.4.2 Setting up user rights, website start screen and language

Restriction of access

You can control the connections of the Web client to the OS Web Server by defining user rights. User rights are assigned in the editor "User Administrator". User rights are the same as those of the standard clients.

Settings in the editor "User Administrator"

Table 7–5

Step	Action	Remark
1.	Open the editor "User Administrator" in the WinCC Explorer of the currently open OS project. Add the new users and/or new user groups to which you want to assign appropriate permissions. Also activate the option button "Web Navigator" for the user/s or user group/s and enter the website in the corresponding input fields "Start Screen" and "Language".	
2.	Use the "..." button to select the start screen from the published graphics. "…\OS Web Server\<wincc-projectrelease-Name>\Web Navigator\pictures" Select the graphic "@screen.pd_" as start screen. Click the "OK" button to confirm your selection. You can also specify a language for the control and monitoring interface of the Web clients. To do this, you must also click the corresponding button "...". Click the "OK" button to confirm your selection.	
3.	Close the User Administration Editor.	

7.4.3 Configuring with the Web Configurator

Web Configurator tasks

The Web Configurator enables you to configure and manage the Internet Information Service (IIS) and therefore the website of the OS Web Server. The setting up is performed on the Web Server after you have downloaded the project to the Web Server. Setup and configuration are necessary to set up an operating station (OS) as an OS Web Server and to make it accessible for the Web clients via the intranet/internet.

The Web Configurator enables you to adjust the necessary firewall settings, if a firewall is enabled.

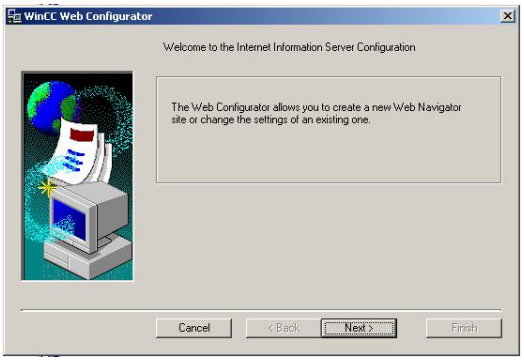
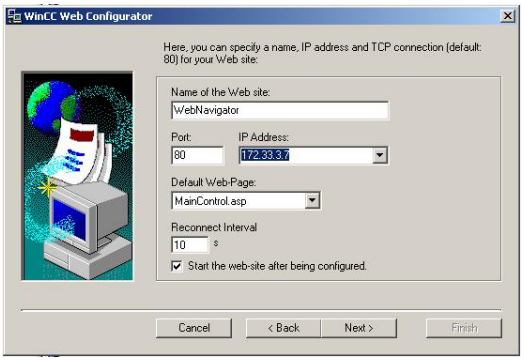
Requirements of the single-user system

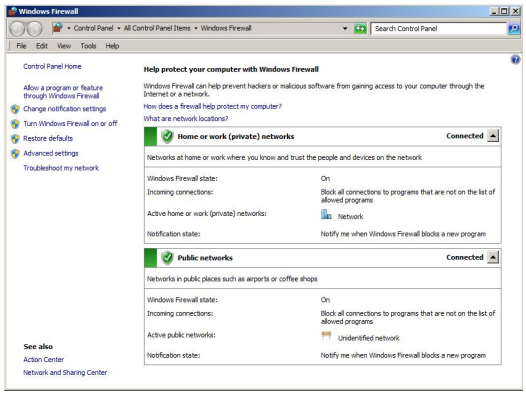
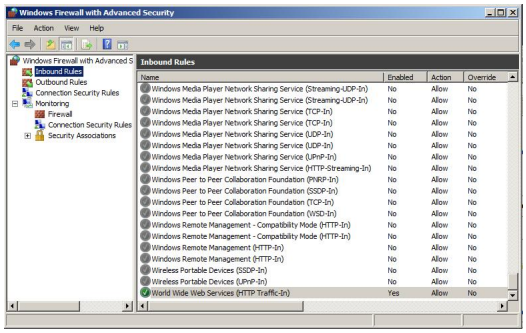
- The PCS 7 Web Server software is installed on the single-user system
- The OS project has been downloaded to the single-user system
- All settings have been entered in the OS
- Pictures, functions and graphics are published
- User rights have been granted/applied

Note For further information about the default Web page, see the chapter "Configuration on the OS Web Server" in the manual: "SIMATIC Process Control System PCS 7 Web Option for OS (V8.1)".

Settings in the editor "Web Navigator"

Table 7–6

Step	Action	Remark
1.	Open the OS project in WinCC Explorer on the OS Web Server. Using the shortcut menu of the "Web Navigator" editor, select the command "Web Configurator". The dialog box "WinCC Web Configurator" opens. Click on the "Next" button.	
2.	In the next window, select "Create a new standard Web site (stand-alone)". Click on the "Next" button.	
3.	Assign a name to your website in the "Name of the Web site" text box. Also assign the IP address and connection port of the computer using the text boxes "Port" and "IP address". In the "Default Web-Page" text box, select "MainControl" from the drop-down list. Also enter a time interval in the text box "Reconnect Interval". Activate the check box "Start the web-site after being configured". Click on the "Next" button. If your Windows firewall is not activated, skip to step "7".	
4.	Click on the "Windows Firewall" button (the button is only visible if the firewall is activated).	

Step	Action	Remark
5.	Click the button "Advanced Settings" in the "Windows Firewall" dialog box.	
6.	Check whether the inbound rule "World Wide Web Services (HTTP Traffic-In) is activated. If this feature is deactivated, select it and choose the command "Enable" in the shortcut menu.	
7.	Click "Finish".	
8.	Click the "OK" button. Then close WinCC Explorer and restart your computer to apply the settings.	

7.4.4 Downloading and compiling the Web Server

Downloading the Web Server

Since the OS Web Server function is on a single-user system (ES/OS/Web Server), it is not necessary to perform a download or changes download of project data. Thanks to the "Compile OS", the necessary data are already available locally.

Compiling

The "Compile Changes" function can be performed in single-user systems without having to interrupt the process mode of the Web Server.

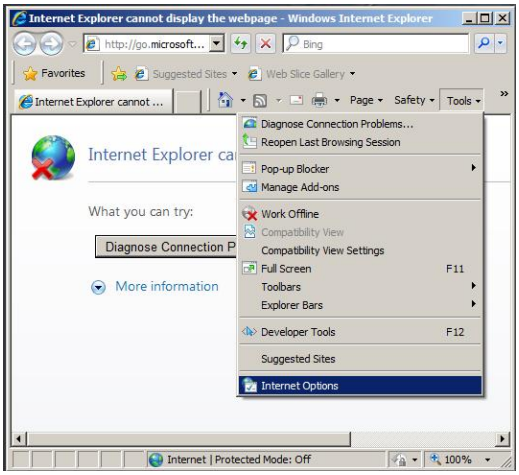
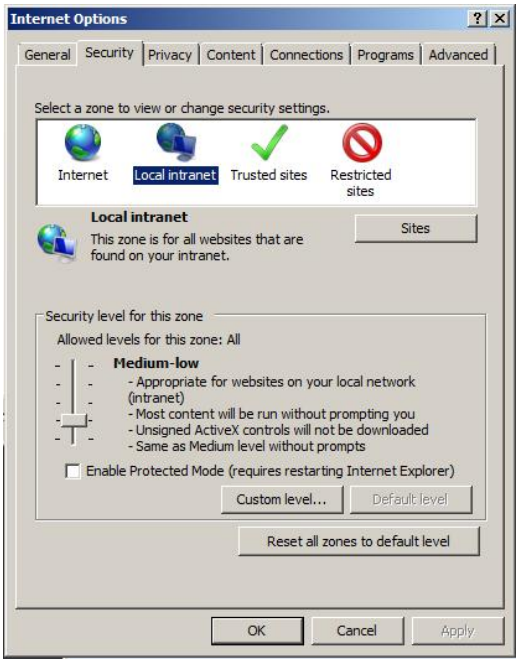
Note For further information about the default Web page, see the chapter "Configuring the OS Web Server on an ES" in the manual:
"SIMATIC Process Control System PCS 7 Web Option for OS (V8.1)" .

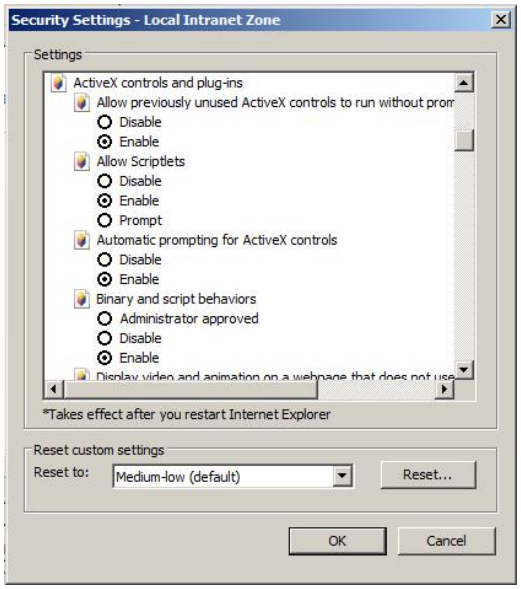
7.5 Settings for the Web client

Settings for the Web content zone "Internet" or "Local Intranet"

In Internet Explorer, you must adjust/check the settings for the Web content zone, so that later you'll be able to install the plug-ins for the Web client from the OS Web server.

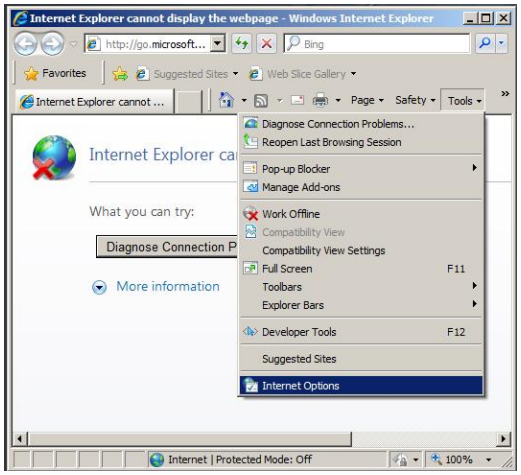
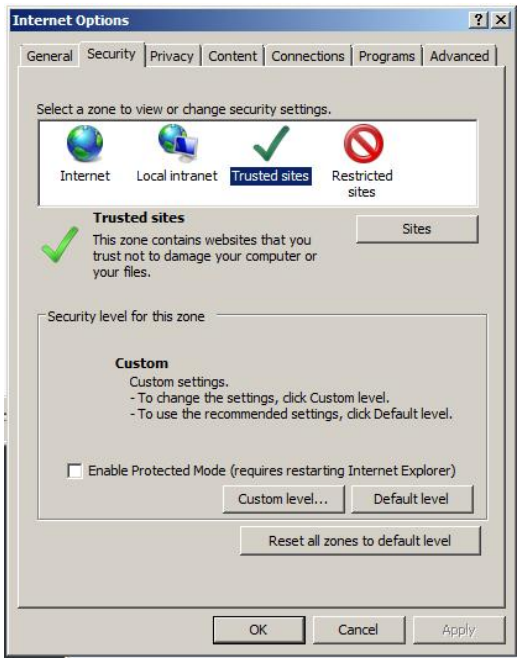
Table 7–7

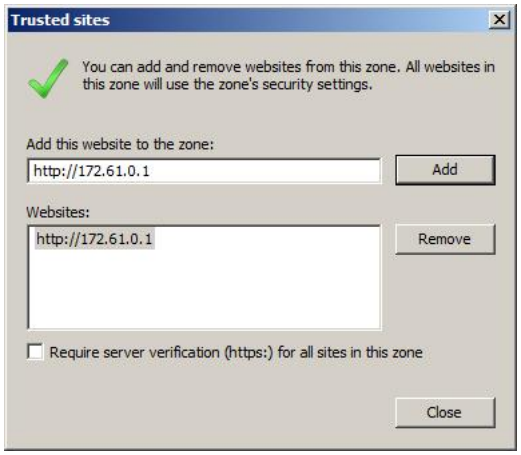
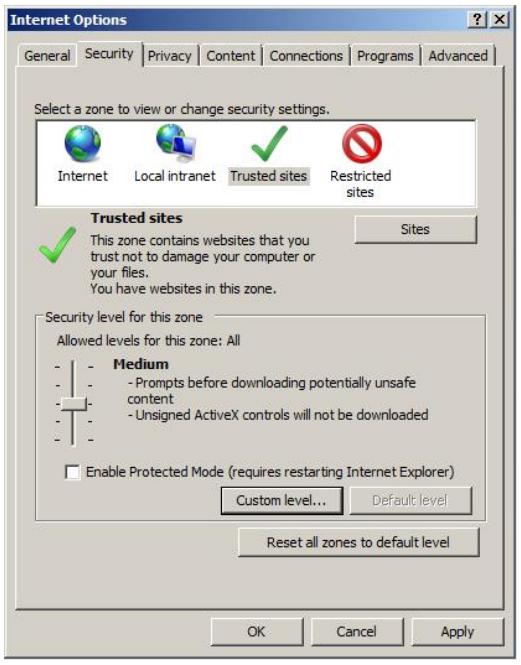
Step	Action	Remark
1.	Open Internet Explorer. Select the menu command: "Tools > Internet Options".	
2.	Click on the "Security" tab. Select the Web content zone in which the Web server resides ("Internet" or "Local intranet"). Click on the "Custom Level" button.	

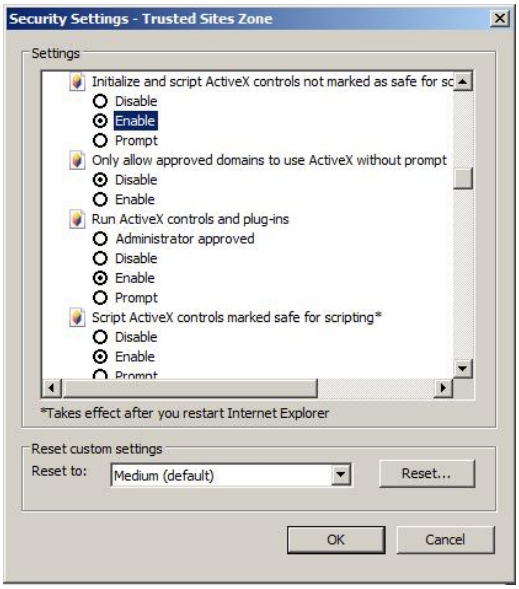
Step	Action	Remark
3.	Activate the option buttons under "Run ActiveX controls that are safe for scripting" and "Download signed ActiveX controls".	
4.	Click on each of the "OK" button for the dialog boxes "Security Settings" and "Internet Options" to close them.	

Settings for the Web content zone "Trusted sites"

Table 7–8

Step	Action	Remark
1.	Open Internet Explorer. Select the menu command: "Tools > Internet Options"	
2.	Click on the "Security" tab. Select the Web content zone "Trusted sites". Click the "Sites" button to open the dialog box.	

Step	Action	Remark
3.	In the text box "Add this website to the zone", insert the address of the OS Web server (7.4.3 Configuring with the Web Configurator > Settings in the editor "Web Navigator") e.g. *://172.61.0.1 or http://*.microsoft.com Also deactivate the check box "Require server verification (https:) for all sites in this zone". Click on the "Add" and "Close" buttons.	
4.	Select the Web content zone "Trusted sites". Click on the "Default level" button and then on the "Custom level" button.	

Step	Action	Remark
5.	In the "Security Settings" dialog box, enable the option button under "Initialize and script ActiveX controls not marked as safe for scripting".	
6.	Click on each of the "OK" button for the dialog boxes "Security Settings" and "Internet Options" to close them.	

You have now managed to create the conditions required for a connection from of a Web client to a Web server.

7.6 Installing the Web client plug-ins

Installation ways

During the installation of plug-ins for Internet Explorer, you can choose between two installation ways:

- Remote Installation - Installation via the Intranet/Internet from the Web server
- Local Installation - Installation via the Windows installer package of the Web client

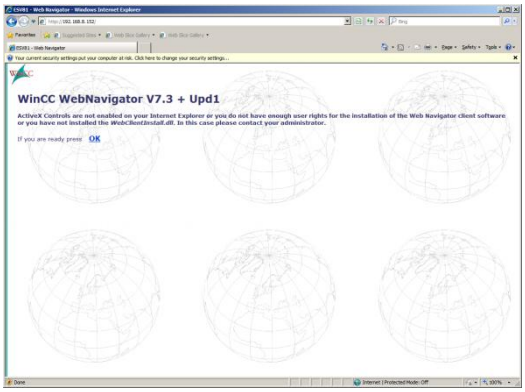
In this application example, we consider the "remote installation".

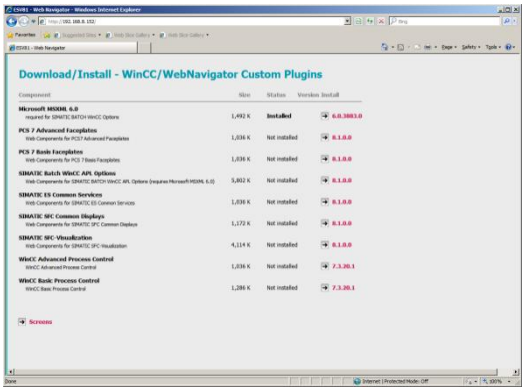
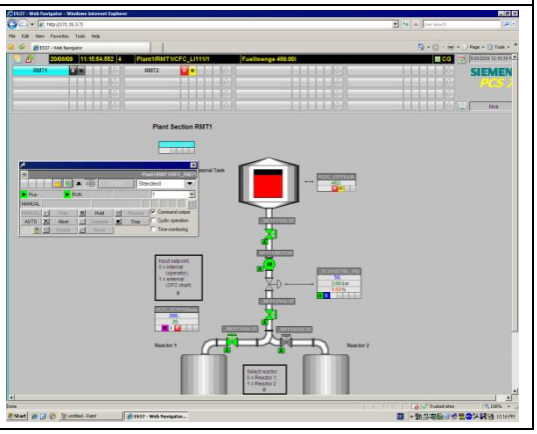
Requirements

- The OS Web server is in runtime.
- The software package "PCS 7 Web Client" is installed on the PC.
- The Web client has access to the Web server.
- You know the Web server's address.
- You know the domain name, username and password.
- The user permissions apply for the PCS 7 Web Options.
- The logon session on the PC has the rights of a primary user.

Installation

Table 7–9

Step	Action	Remark
1.	Open Internet Explorer. Enter the web server address (http://<server name or IP>) in the "Address" text box.	

Step	Action	Remark
2.	In the "Enter Network Password" dialog box, enter the credentials that were set in the "User Administrator" editor on the Web server.	
3.	When you first connect, the "Security Warning" dialog box will open. Proceed by clicking on the "Install" button.	
4.	All the available plug-ins for the Web client will now be displayed in the Internet Explorer window. To install the plug-in, click on the arrow in front of the version number in the "Install" column. The following plug-ins are installed to ensure a minimum of process control: • WinCC Basic Process Control • WinCC Advanced Process Control • PCS 7 Basic Faceplates • PCS 7 Advanced Faceplates During installation, always follow the shown sequence.	
5.	The installation of the Web client is complete. Close Internet Explorer and reopen it in order to register for the process control. The process pictures can be called up once the Web client has established a connection to the Web server.	

Note Further information about the topics "Installing a Web client", "Process control on the Web client" and "Settings" in the manual: "SIMATIC Process Control System PCS 7 Web Option for OS (V8.1)" by reading the chapter: "Installations and Settings for the Web Client"

8 History

Table 8-1

Version	Date	Modifications
V1.0	10/2006	First edition V6.1 SP1
V1.1	11/2006	Revised V6.1 SP1
V1.2	05/2009	Revised V6.1 SP1
V2.1	09/2008	First edition V7.0 SP1
V2.2	12/2008	Correction of table 6–2
V2.3	05/2009	Revision V7.0 SP1
V3.0	05/2009	First edition V7.1
V3.1	05/2009	Revision V7.1
V3.2	11/2009	Extension of the document for V7.1 to include the PCS 7 Web Option (tested for PCS 7 V7.1 and V7.0 SP2)
V2.4	12/2010	Note added: The configuration described in chapter 6, "Master ES/OS and Standby OS" only works in PCS 7 V7.0 SP3 if it has WinCC V6.2 SP3 HF8 or higher.
V3.3	09/2011	Note added: The configuration described in chapter 6, "Master ES/OS and Standby OS" only works in PCS 7 V7.1 SP2 and SP3 if it has WinCC V7.0 SP2 HF5 or higher.
V4.0	10/2012	First edition PCS 7 V8.0 Upd1
V4.1	11/2012	Adaptations in the following chapters: • Chapter 7 "Expansion with the PCS 7 OS Web Option" • Chapter 7.1 "Web configurations" • Chapter 7.2 "Web-specific hardware and software requirements" New chapter: • Chapter 7.3 "Maximum amount of Web client connections"
V4.2	01/2013	Introduction in chapter 6 "Master ES/OS and Standby OS" has been editorially revised.
V4.3	05/2013	Test and declaration for PCS 7 V8.0 SP1
V4.4	09/2013	License adjustments in chapter 7.1. "Web configurations" in Figure 7–1 "Web Option in single-user system"
V5.0	02/2015	First edition PCS 7 V8.1
V5.1	04/2015	License adjustments in chapter 3.1 “ES/OS single-user system” table 3-2.