SIEMENS


Multi-User Systems 1

File Server 2

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# SIMATIC HMI

# WinCC V7.4 SP1
# WinCC: Configurations

System Manual

Print of the Online Help


02/2017
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# Multi-User Systems 1

## 1.1 Multi-user systems in WinCC

### Content

WinCC can be used to configure client/server systems, thus allowing for system operation and monitoring features to be distributed to several clients and servers. In the case of large-scale systems, therefore, the loads applied to individual computers can be reduced and the performance increased.

This chapter shows you:

- Client/server scenarios that can be realized using WinCC.
- How to configure the server and clients in the client/server system.
- How to configure clients which provide views on several servers.
- How the client/server system behaves in runtime.
- How to configure a server project from a remote client.

# 1.2 Client/Server Systems in WinCC

## Introduction

WinCC can be used to configure client/server systems having several clients and servers, allowing for large systems to be operated and monitored more efficiently. By distributing the tasks for operating and monitoring processes amongst several servers, the utilization rate of each individual server is reduced, thus increasing the performance. In addition, it is also possible to map systems which have a technologically or topologically complex structure using WinCC.

Examples of Client/Server System Implementation:

- Large-scale systems where several operator and monitoring stations (clients) are required for the same tasks.
- Systems where operator and monitor tasks are distributed to several operator stations, such as a central client, for displaying all messages of one system.

Clients can be used for:

- Multi-user systems with one server for configuration: several clients access the project located on a server with process driver connection. In multi-user systems, it is not necessary to configure the clients as all data is provided by the server.
- Distributed systems with several servers to be configured: clients can access data on different servers with process driver connection. Within a distributed system, each client is individually configured, the necessary server data is imported on the clients and, if modified, can be automatically updated. The process data is provided by the servers.
- Remote configuration: a server project is configured from a client.
- Remote monitoring: a server project is monitored from a client.

## Requirements for Configuring Client/Server Systems

In order to configure client/server systems with WinCC, the "WinCC Server" option must be available on every WinCC server.

All computers in a client/server system must be connected to each other via a network (LAN). It is also possible to log on computers in neighboring subnets, which are connected via a router, as clients or servers in the system.

## Redundant Systems

To maintain system operation even in the case of faults, e.g. following failure of a server, it is recommended to configure a redundant server. For detailed instructions for the configuration of redundant systems, see the WinCC documentation "Redundant Systems".

The documentation contains information on the configuration of clients in redundant systems.

**Note**

Remote configuration is not permitted, if the project is open on both redundant systems. In order to configure a redundant system, the standby computer must not have a WinCC project open. In order to configure a redundant system in Runtime, you must proceed as follows:

- Deactivate the standby computer and close the project.

- Configure the master computer either in Runtime, remotely or locally.

- After completion of the online configuration, duplicate the project on the standby computer using the Project Duplicator in Runtime.

- Open and activate the project again on the standby computer.

### Client on a redundant server pair

A WinCC project containing a client without local project may only be edited on a server (master or standby). No WinCC project may be opened on the partner server; the WinCC Explorer and Runtime must be closed while you are editing the project.

You can still configure the master server or standby server as the preferred server to distribute load in Runtime.

WinCC Explorer should remain closed on the clients while Runtime is activated. It is best to start Runtime using "Autostart". To do this, use the "AutoStart Configuration" tool of WinCC.

Operator input is locked (user interface is "grayed-out") if WinCC Explorer remains open and you switch to another server computer. The WinCC editors cannot be started as long as the server from which the project was opened is not the current server of the client.

## See also

Use of the OPC Interface in Client/Server Systems (Page 75)

Remote Configuration (Page 61)

System Behavior in Runtime (Page 53)

Client Configuration (Page 28)

Server Configuration (Page 15)

Client/server scenarios (Page 12)

Quantity structures and performance (Page 10)

Typical configurations (Page 8)

## 1.3 Typical configurations

You can configure different client/server solutions as needed. In so doing, you have the option of using clients, web clients and thin clients.

Observe also the notes on quantity structures and performance in "Quantity structures and performance (Page 10)".

### Using encrypted communication in distributed systems

Set up encrypted communication between computers in a multi-user system.

Specify PSK keys for the computers with "Simatic Shell". This means that only those computers in which the shared specified key is known prior to communication can communicate with each other. You can specify different environments with their own PSK keys for the same network.

### Configuration of Client/Server Systems for Different Requirements

#### Clients

Depending on the configuration, clients in a client/server system can:

- Represent a view from a server on several clients (multi-user system)
- Display views of several servers on clients (distributed system)
- Configure a server project (remote) from a client
- Activate and deactivate a server project (remote) from a client

To configure several clients the "WinCC Server" option is required on each server.

#### WebClients

WebClients are installed in a client/server system, for example, when:

- Access to the system is required via narrowband connections
- Only temporary access to data is required
- Data access is necessary over large distances, e.g. via Internet

WebClients have the following advantages:

- Client computers with different operating systems can be implemented
- Simultaneous access to a server by several WebClients is possible
- Large quantity structures can be realized

In order to configure WebClients, a minimal installation of WinCC is required and the "WinCC WebNavigator" option.

#### ThinClients

ThinClients basically have the same main features as WebClients and the additional features:

- They can also be used on rugged client platforms

In order to configure ThinClients, the minimal installation of WinCC is required and the "WinCC WebNavigator" option.

## See also

Client/server scenarios (Page 12)
Using Data from Different Servers (Page 48)
Displaying Pictures from Different Servers (Page 44)
How to Configure a Preferred Server (Page 39)
How to configure a standard server (Page 36)
Configuring the Import Package (Page 32)
Displaying Messages from Different Servers (Page 50)
Creating a New Project on the Client (Page 30)
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How to Register Clients in the Computer List (Page 19)
How to Configure the Package Export (Page 22)
Configuring Clients in the Server Project (Page 26)
Client/Server Systems in WinCC (Page 6)
Quantity structures and performance (Page 10)

## 1.4 Quantity structures and performance

### Performance of WinCC projects in runtime.

The performance of a WinCC project is dependent on the system configuration, the quantity structures and the configuration. Each of these factors can influence things like the time it takes to change pictures and the archiving speed.

You can find information on the configuration of your system in "Typical configurations (Page 8)". Observe also the hardware requirements in the Installation Notes.

### Notes on configuration

The following notes apply not just to multi-user systems but to every type of WinCC project.

However, you should take these notes into account, in particular, in multi-user systems because the quantity structures grow quickly there and configuration changes can have a stronger effect.

Note when configuring that the following factors affect the performance of a WinCC project:

- Number of web clients
  The number of tags to be processed in the project grows with each additional web client used:
  For each web client, the internal tags of the WinCC project are managed on the web server as tags that are local to the computer. Depending on the configuration, additional web clients multiply the number of managed tags.
- Number of picture windows in a process window
  It is recommended that a maximum of 100 simultaneously displayed picture windows be used.
- Number of nestings in the picture windows (levels)
  Twenty (20) levels are approved as the maximum nesting depth of picture objects.
- Scripts in process screens
  Ensure that the processing time of all scripts with the same cycle is not longer than the configured cycle time.
- Number of tags
  The server load in WinCC Runtime arises from the sum of all tags that are simultaneously registered on all clients or web clients.

### Simultaneous start of several clients on a server

The simultaneous start of several clients connected to a server may lead to an overload situation. In this case, the clients go into timeout.

We recommend starting the clients in succession.

### Possible numbers of clients and servers

Different quantity structures can be realized according to the type and number of client types used. Mixed systems are possible, meaning the parallel use of clients and web clients within a client/server system.

If you use only WinCC clients with a custom project, up to 50 parallel clients can access a server in a WinCC network. A client can access up to 18 servers in Runtime.

You can use a maximum of 36 servers in the form of 18 redundant server pairs.

If you use only web clients, you achieve quantity structures of up to 151 clients (1 client and 150 web clients).

### Configuration of mixed systems

When configuring a mixed system, observe the following rule of thumb to achieve the maximum quantity structures.

The following values are defined for the client types:

- Web client/thin client = 1
- Client = 2
- Client with "Configure remote" function = 4

The total of values of all clients should not exceed following values:

- WinCC server without operator function: 160 per server
- WinCC server with operator function: 16 per server

Example:

| Configuration | Significance |
|---|---|
| 3 Clients with the "Configure remote" function | 3 x 4 = 12 |
| 5 Clients | 5 x 2 = 10 |
| 138 web clients | 138 x 1 = 138 |
| **Sum** | **160** |

**Note**

**Mixed configuration with WinCC servers**

The mixed configuration of WinCC servers that access other WinCC servers as clients is not approved.

## See also

Client/Server Systems in WinCC (Page 6)

Use of the OPC Interface in Client/Server Systems (Page 75)

Remote Configuration (Page 61)

System Behavior in Runtime (Page 53)

Client Configuration (Page 28)

Server Configuration (Page 15)

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# 1.5 Client/server scenarios

## Introduction

Using WinCC you can implement different client/server scenarios depending on the application:

## Multi-user systems

A multi-user system is typically configured for smaller systems in which a distribution of data to several servers is required.

A server with process driver connection is configured which is then responsible for all central functions and several operating stations (clients). The individual operator stations can execute the same or different tasks.

The clients can be used for the following, depending on their operator authorization:

- Monitor the system.
- Monitor and operate the system.
- Remote configuration of the server project, e.g. as service computer.

The clients can be used for the following, depending on their configuration:

- To display the same view of the project when the process, for example, should be capable of being operated from various points in the system.
- To display different views of the project, e.g. only messages.

User authorization is issued to define the functions that are available to an operator on a certain operating console.

## Distributed systems

Distributed systems implementing several servers are generally used in the case of large systems when particularly large quantities of data must be processed. As a result of distributing tasks over several servers, the load applied to individual servers is relieved. This achieves a better system performance realize larger typical applications.

If distributed systems are configured in a WinCC system, the process tasks are distributed amongst the servers by means of the corresponding configuration according either to the process steps or functionally:

- In the case of a technological distribution, each server takes over a technically limited area of a system, e.g. a certain press or dry unit.
- In the case of a functional distribution, each server takes over a certain task, e.g. visualization, archiving, issuing alarms.

In Runtime, the clients in a distributed system can each display the data from up to 18 different servers or from redundant pairs of servers. Each client in a distributed system is configured individually with basic pictures and a little local data. The server data required for displaying the process data is transferred from the servers to the clients and can be updated automatically, if necessary.

## File server

You can use a file server for Client-Server Systems in order to save all projects and administer them in a centralized system. For example, this facilitates the creation of periodic backup copies of all projects. The servers with process driver connection have access to the file server and can configure the projects on the file server. The file server can be used for configuration only.

The file server can be adapted to specific demands, as necessary, by adding further hardware components. This enables, for example, the production of mirrored disks for backup security.

## Central Archive Server

You can save process values and messages of all connected WinCC servers on a centralized archive server (for example, Process Historian). You can display the saved process values and messages, as usual, on the process screen in Runtime in WinCC Online Trend Control or WinCC Alarm Control. Furthermore, you have direct access to archived process values and messages using defined interfaces, such as OLE-DB. In this way, you can make available important production data, for instance, throughout the company for analyzing purposes.

## Server-server communication

During communication between two servers, one server accesses data on another server. One server can access the data from up to 18 other servers or redundant pairs of servers. The server accessing the data behaves as a client in respect of the configuration and operation, except that a standard server cannot be configured.

Each server making access requires a WinCC server license. When the system is being configured, the accessing server must be included in the quantity structure.

## Standard server

In distributed systems, your data is allocated server prefixes from specific servers so that WinCC controls can display messages and process data.

In a distributed system, a standard server is configured for clients so that data, to which no unique prefix has been specified, can be requested from the standard server. If no standard server is defined, an attempt is made to access the corresponding data locally. If there s no local data management (e.g. messages and archives), access is rejected and an error message issued.

## Preferred server

If you use redundant servers in your multi-user system or distributed system, configure a preferred server among the clients.

A preferred server is the server in a redundant server pair which has priority for a client in a multi-user system. The preferred server can be selected separately for each client in order to ensure the operability of the system.

## See also

How to Configure a Preferred Server (Page 39)
How to configure a standard server (Page 36)
System Behavior in Runtime (Page 53)
Client Configuration (Page 28)
Server Configuration (Page 15)
Quantity structures and performance (Page 10)
Client/Server Systems in WinCC (Page 6)
Typical configurations (Page 8)

# 1.6 Server Configuration

## 1.6.1 Server Configuration

### Introduction

A server within a WinCC network can fulfill the following tasks:

- Connection to the process
- Acquisition of the process values
- Archiving messages and process values
- Providing clients with data from the process
- Providing clients with the configuration data

The tasks assumed by the individual servers can be distributed according to technological or functional aspects:

- Technological aspect: Each server manages a specific section of the process/system.
- Functional aspect: Each server fulfills a specific task in runtime in respect of the entire process, e.g. alarm logging or archiving.

### Configuration Steps

#### Configuring a multi-user system

In the case of a multi-user system, several clients are configured which display the view from one server in runtime. The clients receive data exclusively from one server and have no individual configuration.

Proceed as follows to configure a server in a multi-user system:

1. Creating a new project, of the "Multi-User Project" type, on the server.
2. Configuring the necessary project data (pictures, archives, tags...) on the server.
3. Including clients which are supposed to configure or be monitored remotely into the computer list at the server.
4. Assigning operating rights for clients to enable remote configuration.
5. Activating the automatic package import at the server.
6. Configuring client properties in server project (Start picture, Lock key combinations...).

#### Configuring a Distributed System

In a distributed system, clients are configured with views on several servers. The clients have their own projects with local data. Data updated by the server is transferred to the clients via the package export feature.

Proceed as follows to configure a server in a distributed system:

1. Creating a new project, of the "Multi-User Project" type, on each server.
2. Configuring the necessary project data (pictures, archives, tags...) on each server. Depending on the distribution (technological/functional), it can also be related to specific project data, e.g. only archives.
3. Clients which should be capable of remote configuration must be registered in the computer list on the server.
4. Assigning operating rights for clients to enable remote configuration.
5. Configuring the package export (manually or automatically).
6. Configuring the client projects on the clients.
7. Making the server data (packages) available to the clients.

**Note**

Always configure the sever of a client/server system ahead of the associated clients.

## See also

How to Configure a Preferred Server (Page 39)

Configuring Clients in the Server Project (Page 26)

How to Configure the Package Export (Page 22)

How to Configure Operator Authorization (Page 20)

How to Register Clients in the Computer List (Page 19)

Creating a new project on the server (Page 17)

Client Configuration (Page 28)

Client/server scenarios (Page 12)

Client/Server Systems in WinCC (Page 6)

## 1.6.2 Creating a new project on the server

### Introduction

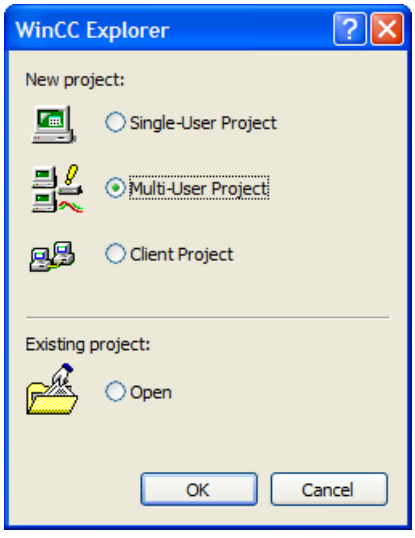
When creating a new project in WinCC, select from the project types below:

- Single-user project A project for a standalone operating station which carries out all tasks in runtime (process driver connection, operating, monitoring, archiving, etc.). Not relevant for client/server systems.
- Multi-user project: A server project for a multi-user system or distributed system in which several clients and/or servers are configured.
- Client project: A project for one client within a distributed system which can display views on several servers.

### Procedure

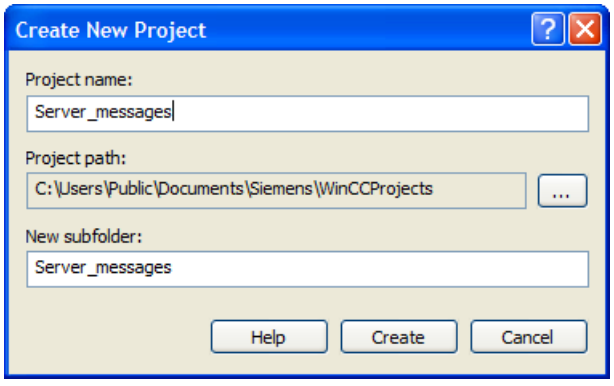
The following procedure describes how to create a server project for a multi-user system or distributed system:

1. Open a server in WinCC Explorer and select the menu items "File" > "New". The "WinCC Explorer" dialog opens:




2. Select "Multi-User Project" and click "OK". The "Create New Project" dialog appears.

3. Enter a project name and the name of a subdirectory if the directory name should be different from that of the project. Normally the "WinCC Projects" folder in the WinCC installation directory is used as the project path.




4. Click the "Create" button. The project is created and opened in WinCC Explorer. The current project is automatically a server project.

**Note**

An existing project can also be converted to a server project by modifying the project type ("Computer Properties" dialog, > "General" tab).

## See also

Configuring Clients in the Server Project (Page 26)

How to Configure the Package Export (Page 22)

How to Configure Operator Authorization (Page 20)

How to Register Clients in the Computer List (Page 19)

Server Configuration (Page 15)

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## 1.6.3 How to Register Clients in the Computer List

### Introduction

If you wish a client to access a server remotely or in Runtime, this client must be registered in the computer list of the server.

### Requirement

You have created a multi-user project (multi-workstation system or distributed system). The configuration computer is then automatically a server in the client/server system.

### Procedure

1. In WinCC Explorer select "Computer" and then select the pop-up menu item "New Computer...".
   The "Computer Properties" dialog appears.
2. Enter the name of the client computer to be granted access to the current server.
3. Click "OK" in order to register the computer in the project's computer list.
4. Repeat the process for all computers to be granted access to the current server in the client/server system.

**Note**

To rename a client computer, delete the selected client computer from the list of computers. Inlcude the new client computer with the modified name as new computer in the computer list.

### See also

Server Configuration (Page 15)

Configuring Clients in the Server Project (Page 26)

How to Configure the Package Export (Page 22)

How to Configure Operator Authorization (Page 20)

Creating a new project on the server (Page 17)

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## 1.6.4 How to Configure Operator Authorization

### Operator Authorization in WinCC

In order for a client to open and process a server project remotely or in Runtime, you must configure the appropriate client operator authorizations in the server project. The following operator authorizations are available on the server for this purpose:

- "Remote configuration": The can open a server project from a remote station and has full access to the project.
- "Remote activation": The client can place a server project in runtime.
- "Web Access - monitoring only": The Web client is authorized to monitor the plant. Such an operator authorization is not relevant for the configuration of other clients.

If a client has the authorization to configure a server project, the operator authorization can also be changed in the server project from the client. The computers in the network are not notified when an operator authorization is changed; the change takes effect when a new client logs on to a server.

The operator authorization is requested on the client as soon as the client opens, activates or deactivates a project on the corresponding sever. If the corresponding operator authorization is not available on the server, the project cannot be processed. When the server project has been closed on the client, logging in is requested again when opened again.

**Note**

The operator authorizations configured are user-related, not computer-related. An operator authorization assigned is therefore valid for all operating stations with the same login.

### Operator authorizations in the operating system

In order for clients to access the server project, the corresponding project folder must be enabled for network access on the server. Set up authorizations in the operating system with all rights required for the users who should have access to the projects.

**Note**

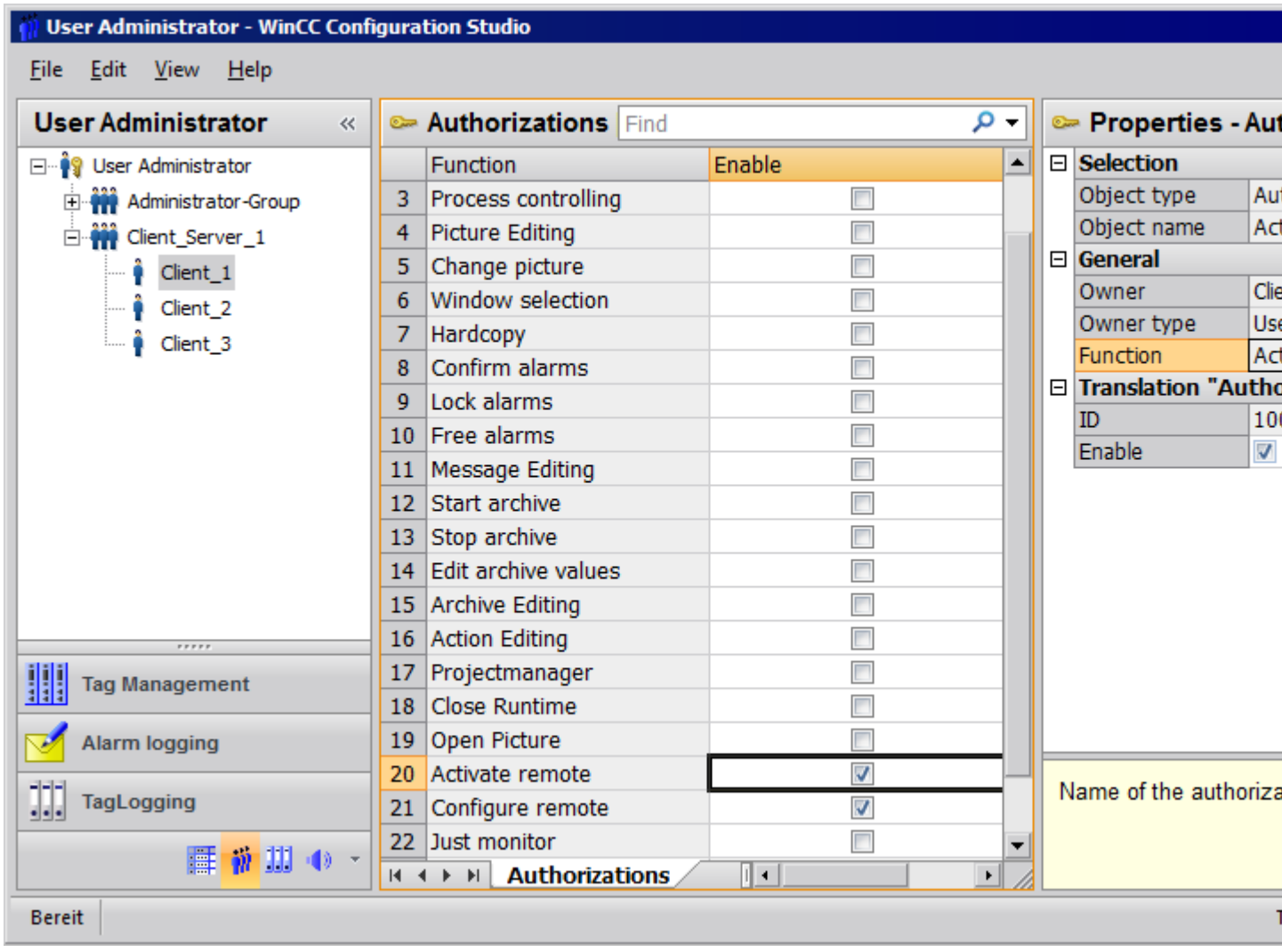
With regard to network security, different Windows operator authorization can be assigned for the project directories enabled.

Detailed information on the assignment of operator authorizations is provided in the Windows documentation.

### Procedure

1. Open User Administrator in WinCC Explorer.
2. Select the user in the navigation area.

3. Activate the "Remote configuration" and "Remote activation" authorizations for a user with full access to the server project.




4. Close the User Administrator.

## See also

Configuring Clients in the Server Project (Page 26)

How to Configure the Package Export (Page 22)

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## 1.6.5 How to Configure the Package Export

### Principle

Packages are data packets with all current configuration data (tags, messages, archive, etc.) which are provided to all connected clients in a distributed system or multi-user system. The packages are exported from the server and imported to the clients.

The first ever export at the server and import at a client is done manually. All further update of the packages in server and client can be executed automatically. You can adjust the parameters when package update should occur, and the causes for initiating this update. For instance, you transfer the packages during commissioning manually to the clients to distribute the configuration data for the first time to the clients. To keep data on the clients updated you can then configure automatic package update on each modification of server data.

**Note**

If a project containing packages already created is copied onto another server, adapt the computer name to the copied project in the WinCC computer properties according to the new computer. If you regenerate packages in the copied project, you might have to update the name of the computer in the "Package Properties" dialog box.

When server-server-communication is selected, one server accesses the data of another server. The accessing server behaves at that moment like a client regarding the imported packages. So, in the description below, the details referring to the client are applicable to it.

The configuration data can be updated during normal operation either manually or automatically:

#### Manual Creation of Packages

In case of demand, new packages are manually created at the server. These are available to the clients for importing.

#### Automatic Package Update

With the function "Implicit Update", you can automate package export at the server as well as package import at the client.

The options displayed in the dialog "Configuration Implicit Package Update" on the server affects both the export of the packages from this server and the import of packages from other servers. You can see this in the columns "Import" and "Export" in the tables below.

In the dialog, you have the following possibilities for WinCC

| Setting for WinCC CS | Import | Export | Meaning |
|---|---|---|---|
| Update server data when project is opened | X | | Client imports whenever the project is **opened** |
| Automatic update when notified | X | | The client always imports on receipt of a notification when the following conditions are fulfilled:<br>• The server setting "Notify after export" has been activated.<br>• The project is not activated. |
| Monitor changes to the configuration data.<br>• Generate server data when project is opened.<br>• Generate server data when project is closed.<br>• Generate Server data immediately when changes are made | | X | Server exports the package<br>• when the project is opened<br>• when the project is closed<br>• on every project data change |
| Notify after export | | X | Server sends notification after package export<br>This setting should be activated if the client setting "Automatic update when notified" should become effective. |
| Automatic import | | X | Server reimports its own exported package<br>• to make configurations independent of a special server with the symbolic computer name, e.g. "Tags".<br>• with views of a special server for clients without their own projects. |

| Setting for WinCC RT | Import | Export | Meaning |
|---|---|---|---|
| Update server data when project is opened | X | | Client imports whenever the project is **activated** |
| Automatic update when notified | X | | The client always imports on receipt of a notification when the following conditions are fulfilled:<br>• The client setting "Automatic update when notified" is activated.<br>• The project is activated. |

**Note**

Do not use automatic package export if project data must be changed frequently, e.g., during commissioning or during the use of configuration tools.

To configure the export package, use the server data editor in the WinCC Explorer.

## Requirement

The server project must be open.

## Procedure

### Manual package export

1. Go to "Server data" in WinCC Explorer and select "Create" in the shortcut menu.
2. In the "Package Properties" dialog box specify the symbolic and the physical server names. This information identifies the origin of the package on the client.
   Define the physical and symbolic computer names of the server as soon as possible during configuration. If the symbolic computer name is changed, it must be adapted in all configuration data.
   The symbolic computer name is generally comprised of a combination of the project name and physical computer name.
3. Click "OK". The server data is created. This may take some time, depending on the size of the configuration.

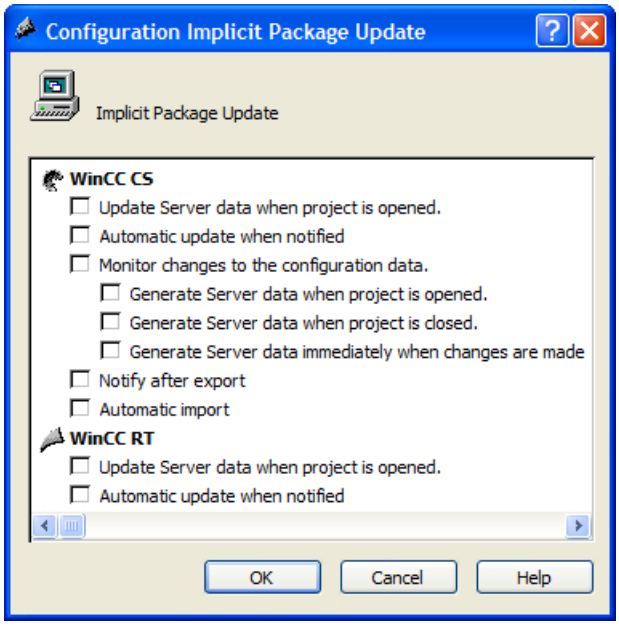
### Results

The package with the server data is located in the WinCC Explorer in the list under "Server data". The packages are saved in the project directory under <project_name>\<computer \packages>*.pck in your file system.

The clients can then import the packages.

### Automatic package export

1. Go to "Server data" in the WinCC Explorer and select "Implicit update" in the shortcut menu.




2. Select the required options. Multiple selection is possible.
3. Click "OK" to confirm your choice.

### Results

The packages with server data from the own server are generated at the moment you have selected, or packages already imported from other servers are updated, on closing the project, for instance.

### Note

In WinCC projects that were created with the SIMATIC Manager, the "Server data" shortcut menu does not contain the options "Create..." and "Implicit Update...": This also applies to WinCC projects created in WinCC and subsequently imported into SIMATIC Manager by using the function "Import WinCC Object". This type of projects are also referred to as TIA projects. If you copy a TIA project with WinCC Explorer and then edit the copy with WinCC Explorer, the shortcut menu of "Server data" includes the menu items "Create..." and "Implicit Update...".

## Display of Generated Packages

When the packages have been generated, they are displayed in the WinCC Explorer data window as follows:

Keyboard, right: Loaded package

Keyboard, left: Package exported from the server

: Loaded package without standard server

: Loaded package with standard server

: Server export package (not reimported)

: Locally created package that was reimported in own project.

## See also

Client Configuration (Page 28)

Configuring Clients in the Server Project (Page 26)

How to Configure Operator Authorization (Page 20)

How to Register Clients in the Computer List (Page 19)

Creating a new project on the server (Page 17)

Server Configuration (Page 15)

Client/server scenarios (Page 12)

Quantity structures and performance (Page 10)

Client/Server Systems in WinCC (Page 6)

Typical configurations (Page 8)

## 1.6.6 Configuring Clients in the Server Project

### Principle

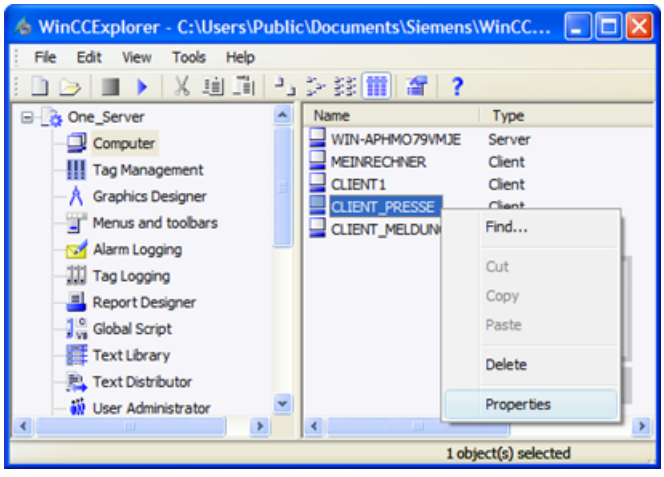
If a multi-user system is configured in which several clients display a view of precisely one server, do not create local projects for the clients, but configure the client behavior in the server project.

### Requirement

The clients which should display the server data have been registered in the server's computer list. The clients only attempt to access one specific server. That server must not import packages form other servers. The server project is open on the server.

### Procedure

1. Open the computer list in WinCC Explorer on the server.
2. Select the client to be configured and then select the "Properties" item from the pop-up menu:




The "Computer Properties" dialog for the client opens.

3. On the Startup tab, check those editors which should be active in Runtime on the client, e.g. Global Script Runtime, if you work with scripts.
4. Use the "Parameters" tab to select the language in which runtime should be started on the client. It s possible, for example, to configure two clients which display the same data in different languages.
5. Specify a start picture for the client on the "Graphics Runtime" tab. The start picture can be individually selected for each client. Define the window attributes here, if necessary.
6. Confirm your settings with "OK".
7. Configure the properties of the other clients in the project in the same way.

8. Open the "Implicit Update" entry in the pop-up menu of the Server Data editor in the server project. Activate the "Automatic import" setting.
9. Generate the package in the server project.

**Note**

A client without its own project can only view the server on which the client is configured. It is not permitted to link this server with another server via server-server communication or to a central archive server.

## Project changes will not be applied if the WinCC Explorer is grayed out.

### Initial situation

- A WinCC editor is opened in Runtime on a client without local project.
- WinCC Runtime is deactivated on the server.

### Behavior

Changes in the editor, e.g., to the script in a project function, are not applied.

### Solution

You may not configure any data as long as the WinCC Explorer is grayed out on the client without local project.

## See also

How to Configure the Package Export (Page 22)

How to Configure Operator Authorization (Page 20)

How to Register Clients in the Computer List (Page 19)

Creating a new project on the server (Page 17)

Server Configuration (Page 15)

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# 1.7 Client Configuration

## 1.7.1 Client Configuration

### Introduction

A client configuration is only necessary when a distributed system is configured in which the clients can display the views on several servers. If a multi-user system is configured in which the clients only display data from one server, no client configuration is necessary. The clients receive all data and their runtime environment from the server project.

If a client/server system is configured which includes several servers, and clients display different views on several servers (distributed system), configure an individual client project for each client. In Runtime, each client can display views on up to 18 different servers or redundant pairs of servers, e.g. display messages from Server 1 and Server 2, display and write process values from Server 3, display pictures from Server 4, etc.

Clients in a distributed system can perform the following according to the respective operating authorizations on the server:

- Monitor the process.
- Monitor and operate the process.
- Remote configuration of projects on a server.
- Remote activation and deactivation of projects on a server.

---

**Note**

In order to display data from different servers, the server prefixes (i.e. the server names) must be unique within the distributed system.

---

Each client has its own configuration and stores a little administrative client-specific data locally in the client database, e.g.:

- Local tags
- User administrator data
- Data from the Text Library
- Project Properties
- User cycles

---

**Note**

All external data of the server configuration must also be available on the clients so that it can be displayed correctly in the client project. External data relates to ActiveX Controls which do not come from WinCC and external graphics which are integrated as OLE objects, for example.

---

## Configuration Steps

1. Configuring server projects.
2. Creating and exporting server packages.
3. Configuring the package import on the client.
4. Configuring the client projects on the clients.

**Note**

If you deactivate Runtime on the server, you must also finish Runtime on the client in order to continue configuration.

## See also

Configuring a Message Sequence Report for Messages from Several Servers (Page 51)
Displaying Messages from Different Servers (Page 50)
Using Data from Different Servers (Page 48)
Configuring a Picture Change on the Client (Page 46)
Displaying Pictures from Different Servers (Page 44)
Configuring the Start Picture of the Client (Page 42)
How to Configure a Preferred Server (Page 39)
How to configure a standard server (Page 36)
Configuring the Import Package (Page 32)
Creating a New Project on the Client (Page 30)
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Client/server scenarios (Page 12)
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Client/Server Systems in WinCC (Page 6)
Typical configurations (Page 8)

## 1.7.2 Creating a New Project on the Client

### Introduction

When creating a new client project in WinCC, select from the project types below:

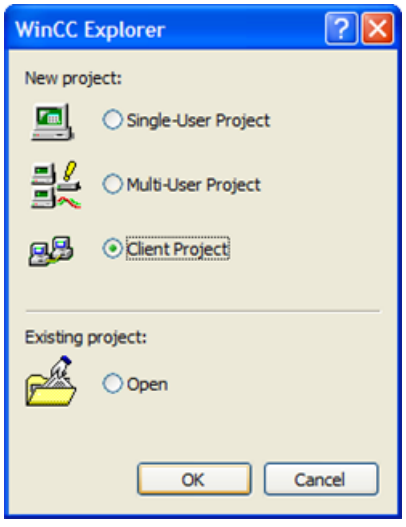
- Single-user project A project for a standalone operating station which carries out all tasks in runtime (process driver connection, operating, monitoring, archiving, etc.). Not relevant for client/server systems.
- Multi-user project: A server project for a multi-user system or distributed system in which several clients and/or servers are configured.
- Client project: A project for one client within a distributed system which can display views on several servers.

**Note**

If a multi-user system is configured in which several clients display a view of precisely one server, do not create local projects for the clients, but configure the client behavior in the server project.

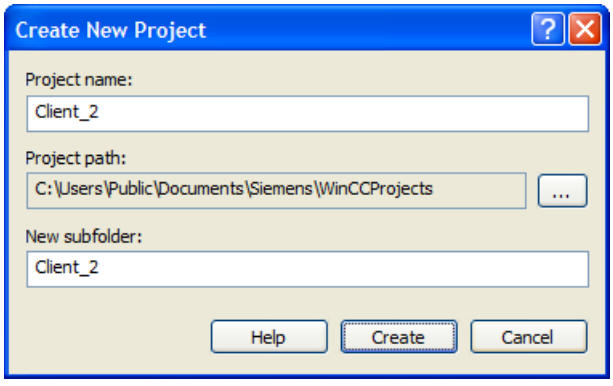
### Procedure

1. Open a client in WinCC Explorer and select the menu items "File" > "New". The "WinCC Explorer" dialog opens:




2. Select "Client Project" and click "OK". The "Create New Project" dialog appears.

3. Enter a project name and the name of a subdirectory if the directory name should be different from that of the project. Normally the "WinCC Projects" folder in the WinCC installation directory is used as the project path.




4. Click the "Create" button. The project is created and opened in WinCC Explorer.

**Note**

It is also possible to convert an existing project to a client project by modifying the project type in the "Computer Properties" dialog.

## See also

Client/server scenarios (Page 12)

Configuring Clients in the Server Project (Page 26)

Configuring a Message Sequence Report for Messages from Several Servers (Page 51)

Displaying Messages from Different Servers (Page 50)

Using Data from Different Servers (Page 48)

Configuring a Picture Change on the Client (Page 46)

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How to configure a standard server (Page 36)

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Client/Server Systems in WinCC (Page 6)

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## 1.7.3 Configuring the Import Package

### Introduction

For a client to display the process data of different servers in a distributed system, it needs the information of the corresponding data. Packages with the configuration data are created on the server in a distributed system for this purpose and the packages are made available to the clients. The client requires the packages from those servers whose data it wants to use.

### Overview

The first ever package export at the server and import at a client is done manually. All further update of the packages in server and client can be executed automatically. You can set when the update is to take place and what triggers it.

**Note**

When server-server-communication is selected, one server accesses the data of another server. The accessing server behaves at that moment like a client regarding the imported packages. So, in the description below, the details referring to the client are applicable to it.

The server can reimport its own packages in order to configure tags, for example, independent of a special server with the symbolic computer.

To complete the package import, use the Server Data editor in WinCC Explorer. There are three ways to import packages:

**Manual loading**

Packages generated on the server are loaded on the client. The import process is triggered manually with the "Load" command. The first import of the packages must be done manually.

**Manual Update**

Packages already loaded on the client by the server are updated using the "Update" command.

### Automatic Update

An implicit package update can be configured on the client, so that the new packages are automatically updated on the clients when a specific condition is met. However, the first import of the packages must be done manually.

| Settings | Meaning |
|---|---|
| for WinCC CS<br>• Update server data on opening project<br>• Automatic update when notified | • Client imports whenever the project is **opened**<br>• Server sends notification after package export, client imports whenever it is notified.<br>This setting is effective only if the setting "Notify after export" is activated at the server for package export. |
| for WinCC RT<br>• Update server data on opening project<br>• Automatic update when notified | • Client imports whenever the project is **activated**<br>• Server sends notification after package export, client imports whenever it is notified.<br>This setting is effective only if the setting "Notify after export" is activated at the server for package export. |

## Requirement

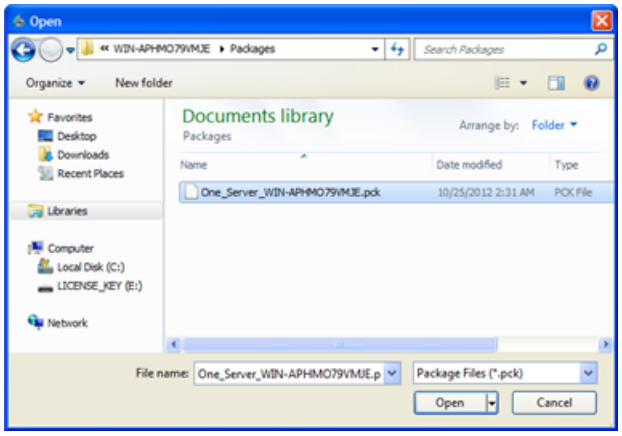
- The packages have been created on the server.
- The client project is open.

## Procedure

### Manual loading

1. Open the client project on the client.
2. In WinCC Explorer select "Server data" and in the shortcut menu select "Load". The "Open File" dialog appears.

3. Select the package you want to load and click "OK".
   The packages are by default stored in the directory "...\\<Server-Project name>\<Computer name>\Packages\" under the name "<Project name_Computer name>*.pck". However, it is also possible to access packages stored on any data medium.



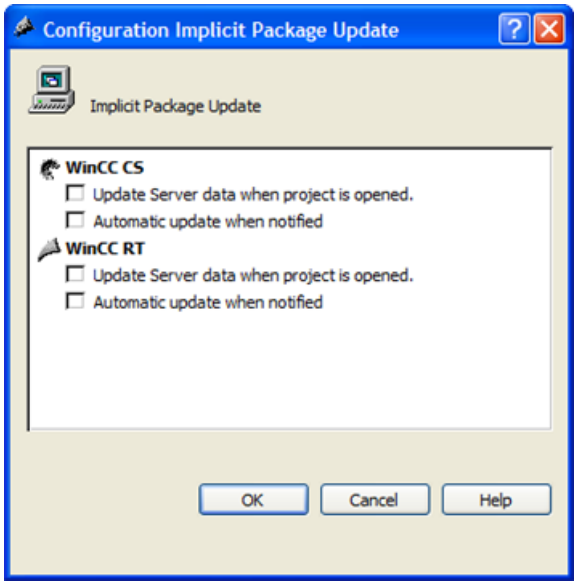

4. Click "Open". The data is loaded. If the corresponding server is not available, the appropriate fault entry appears on requesting the new package.

### Manual Update

1. Open the client project on the client.
2. In WinCC Explorer select "Server data" and in the shortcut menu select the "Update" command.
3. The data is updated. If, in the case of a server-server communication, no packages form other servers are loaded, a fault message appears on the server.

### Automatic Update

1. Open the client project on the client.
2. In WinCC Explorer select "Server data" and in the shortcut menu select "Implicit Update": The "Configuration Implicit Package Update" dialog appears.




3. Select the required options. Multiple selection is possible.
4. Confirm your selection with "OK". The server data is automatically updated on the client, e.g. on opening a project or following notification via the network. If the corresponding server is not available, no fault message appears on the client.

**Note**

If new packages are added or packages are deleted, while the project has been activated on the client, difficulties in representation can occur. You can remedy this situation by deactivating the client and then activating it again.

## Display of the packages loaded

When the packages have been loaded, they are displayed in the WinCC Explorer data window as follows:

Keyboard, right: Loaded package

Keyboard, left: Exported, but not yet loaded package

: Loaded package without standard server

: Loaded package with standard server

## See also

Configuring a Message Sequence Report for Messages from Several Servers (Page 51)

Displaying Messages from Different Servers (Page 50)

Using Data from Different Servers (Page 48)
Configuring a Picture Change on the Client (Page 46)
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## 1.7.4 How to configure a standard server

### Introduction

Configure a standard server for a client in a distributed system from which data should be requested if no unique server prefix (e.g. for tags) is specified.

If no standard server has been configured for a component, an attempt is made to access local client data (e.g. internal tags). If there s no local data management on the client (e.g. messages and archives), access is rejected and an error message issued.

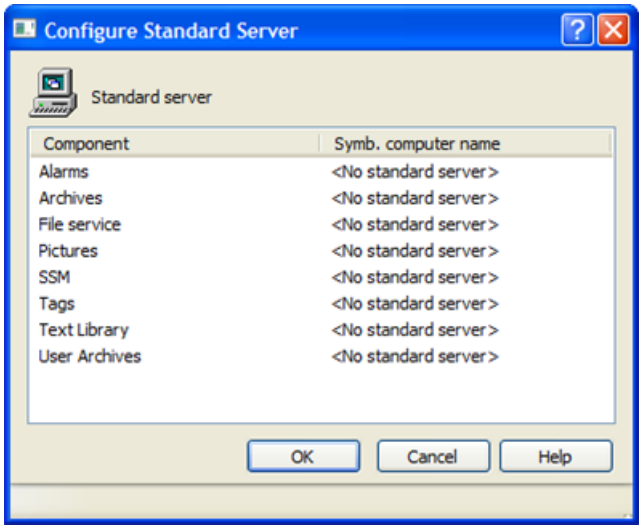
### Requirements

A standard server can only be selected on the client after importing the corresponding packages.

### Procedure

1. Select the "Server Data" entry on the client in WinCC Explorer.
2. Select the "Standard server..." item from the pop-up menu.
   The "Configure standard server" dialog appears.

3. Click the entry for the component required at the symbolic computer name. Select a server from the drop-down list box. The list contains symbolic computer names of all packages loaded on the client.




4. The components listed in the dialog are dependent on the WinCC installation. If options have been installed, the component options (e.g. SSM - Split Screen Manager) can be listed in addition to the components displayed.
5. Click "OK" to confirm your choice.

## When must a standard server be selected for a component?

### Alarms

If operating messages should be generated on the client, a standard server for alarms must be specified beforehand. No Alarm Logging can be configured on the client itself and the messages must be issued on a server.

A client can retrieve user-defined selections of messages centrally from the default server.

### Archives, Pictures, Text Library, User Archive, Tags

When a standard server has been configured on the client, data from these components for which no valid server prefix has been generated, is searched for on the defined standard server. If no standard server has been configured on the client, no server can be located for this data since there is no server prefix.

Setting a default server for archives, pictures, text library, user archives, and tags is only makes sense for for special applications. If you are not explicitly prompted to set a specific server by SIMATIC documentation or Customer Support, leave the setting on "No Standard Server" in the "Server Data" editor in the "Configure Standard Server".

---

**Note**

If a standard server is entered for variables on a WinCC client, no status information is shown in the tooltip in Runtime for tag management.

---

## Select standard server when using Basic Process Control

### Alarms

For alarms, you always have to indicate a standard server.

### Tags

Never indicate a standard server for variables.

### SSM (Split Screen Manager)

Always indicate a standard server for the SSM component.

When trend groups are combined on a WinCC client, the trend groups are saved on the standard server and its redundant partner server. Other WinCC clients can indicate this server also as standard server for the SSM component. Thus the configured trend groups are be made available to these WinCC clients as well. If no standard server is configured on the WinCC client for the SSM component, the compiled trends are locally saved on this computer. Other WinCC clients are not allowed to display such trend groups in WinCC Online Trend Control. It is principally be impossible to display these trend groups in the server project.

If screen compositions are configured on the WinCC client, they are saved on this server only if a standard server is indicated for the SSM component. If no standard server is indicated, the configured WinCC client screen compositions are saved locally and are not accessible for any other client. It is principally impossible to display these screen compositions in the server project.

If redundancy is configured on a server, the data of the trend groups and of the screen compositions is also synchronized on its redundant partner server. On redundancy changeover, all compiled trend groups and all screen compositions can be requested from the WinCC clients.

## See also

Configuring the Import Package (Page 32)

Configuring a Message Sequence Report for Messages from Several Servers (Page 51)

Displaying Messages from Different Servers (Page 50)

Using Data from Different Servers (Page 48)

Configuring a Picture Change on the Client (Page 46)

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## 1.7.5 How to Configure a Preferred Server

### Introduction

You configure the preferred server on a client of a distributed system or multi-user system if redundant servers are used.

A preferred server is the server in a redundant server pair which has priority for a client in a distributed system. The client receives data from the preferred server as long as it remains available.

The preferred server can be defined individually for each client so that the clients can be distributed among the redundant servers to ensure the permanent operability. If there is a network interruption to the configured server, the client switches over to the redundant partner server. When the server is available again, the client switches back to the preferred server.

By distributing the clients among the redundant servers, the load is distributed and the performance of the entire system is improved.

**Note**

The configuration of redundant systems in WinCC is described under the topic "Redundant Systems".

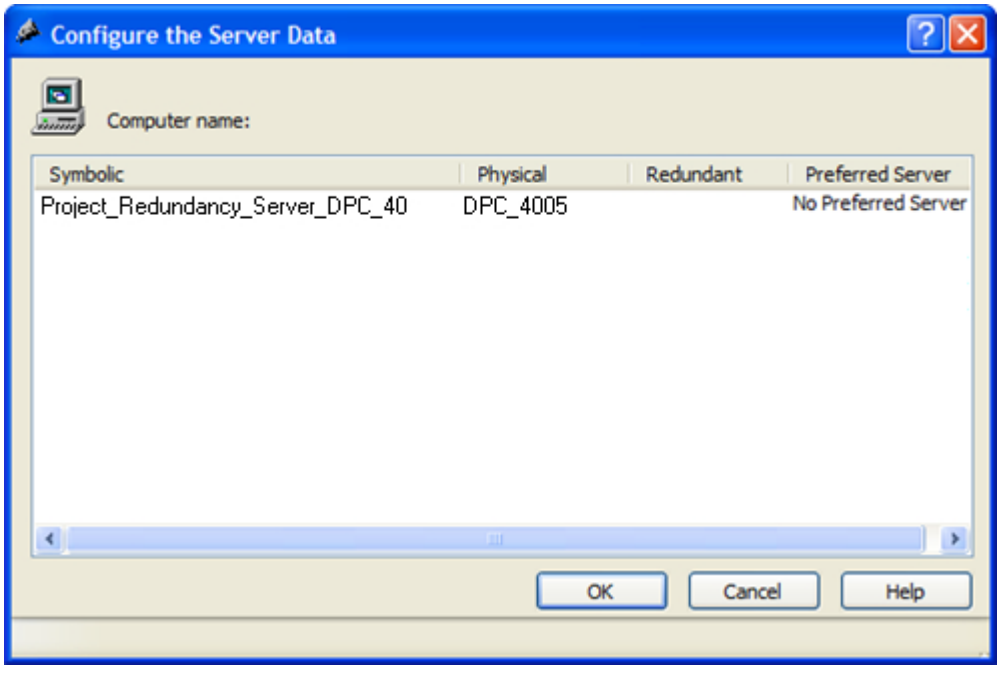
### Procedure

The preferred servers for the clients in distributed systems and multi-user systems are configured differently:

**Configuring a preferred server for clients in a distributed system**

1. Select the "Server Data" entry on the client in WinCC Explorer.
2. Select "Configuring" from the shortcut menu.
   The "Configure server data" dialog appears.

3. The list contains the symbolic and physical computer names of all servers from which packages are provided on the client. If a redundant server is available for a server, the physical computer name is specified. Select a server from the redundant server pairs as the preferred server.
   A redundant server pair in a distributed system has only one, common, symbolic name, by which the server is addressed.



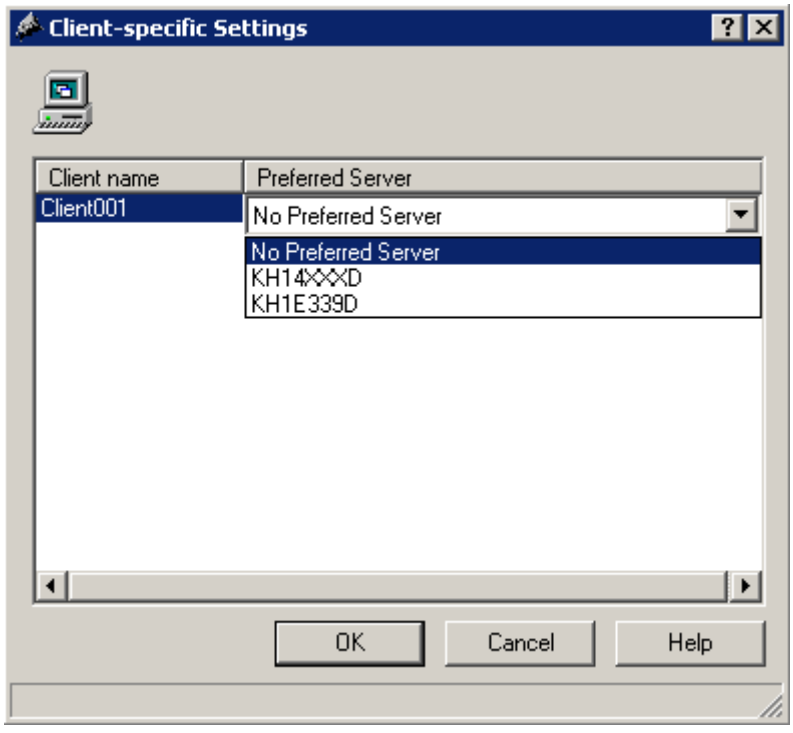

4. Conclude the input by clicking "OK".

### Configuring a preferred server for clients in a multi-user system

The clients must be entered in the server's computer list.

1. Select the "Server Data" entry on the server in WinCC Explorer.
2. Select "Client-specific Settings" from the shortcut menu.
   The "Client-specific Settings" dialog appears.

3. A list of all clients entered in the server's computer list appears. Select the required client and select one of the two redundant servers from the "Preferred Server" column as the preferred server.




4. Conclude the input by clicking "OK".

## Runtime behavior of the client

The client remains connected to the specified redundant server as the preferred server as long as it is available.

If the preferred server fails, the client switches to the redundant partner server. When the failed preferred server becomes available again, the client switches back to it.

## See also

Configuring the Start Picture of the Client (Page 42)

Configuring a Message Sequence Report for Messages from Several Servers (Page 51)

Displaying Messages from Different Servers (Page 50)

Using Data from Different Servers (Page 48)

Configuring a Picture Change on the Client (Page 46)

Displaying Pictures from Different Servers (Page 44)

How to configure a standard server (Page 36)

Configuring the Import Package (Page 32)

Creating a New Project on the Client (Page 30)

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## 1.7.6 Configuring the Start Picture of the Client

### Introduction

Any picture in the distributed system can be used as the start picture of a client. This can be a picture from the server, a local picture on the client or any other picture.

The following description explains how to use a picture on the server as a start picture (start screen).

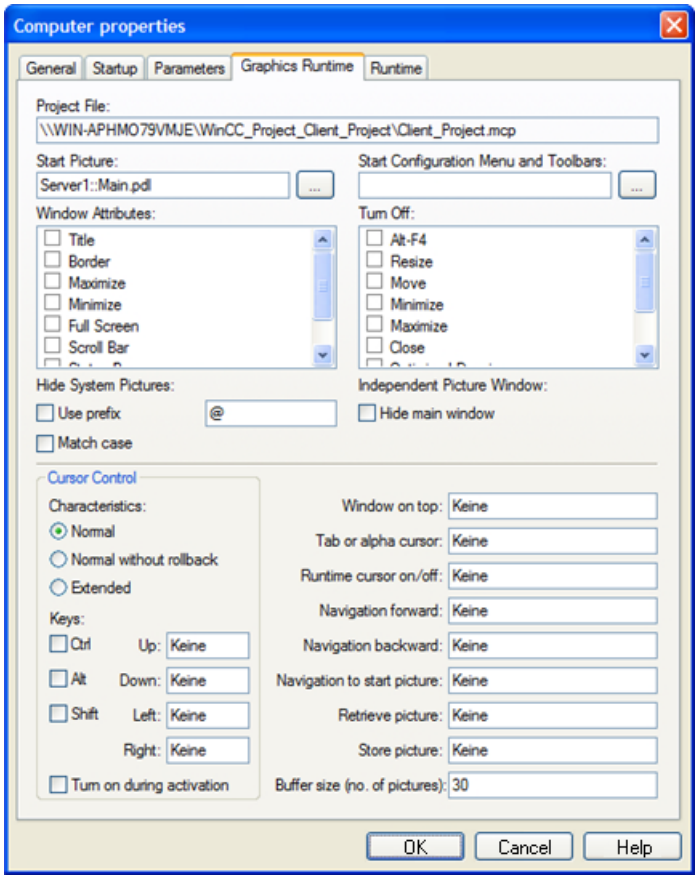
### Requirement

The server packages whose picture is to be used as the start picture are imported on the client.

### Procedure

1. Open the client project on the client.
2. Select the computer in WinCC Explorer and then select the "Properties" option from the pop-up menu.
3. Activate the "Graphics Runtime" tab.

4. Enter the name of the server computer as the start screen name and then the picture to be used, e.g.:




5. It is also possible to search for pictures using the "Search" button. The selection dialog displays pictures of all server packages loaded on the client.
6. Conclude the input by clicking "OK".

## See also

Configuring a Message Sequence Report for Messages from Several Servers (Page 51)

Displaying Messages from Different Servers (Page 50)

Using Data from Different Servers (Page 48)

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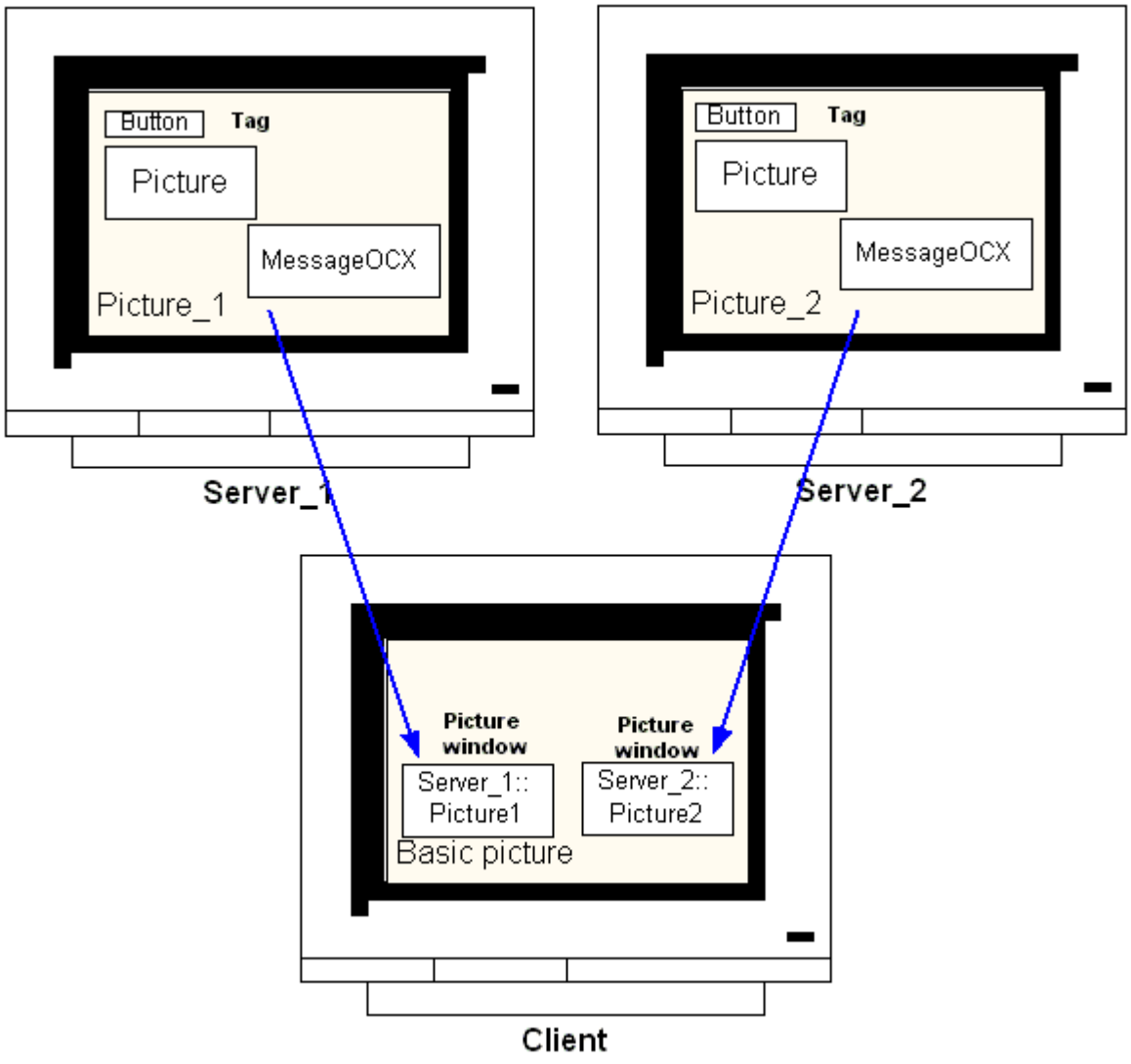
## 1.7.7 Displaying Pictures from Different Servers

### Principle

Pictures from different servers can be displayed in picture windows inside the basic screen configured on the client:



Data from a server can be accessed from each picture window. In order to integrate a server picture as a picture window in a client picture, the server prefix must precede the picture file name.

**Note**

The server prefixes must be unique within the distributed system.

Server pictures can be inserted in picture windows via a script (C or VBS) and via direct linking.

The pictures on the server must be adapted to the picture client's window size.

## Requirement

The packages on the corresponding server must be imported on the client.

## Procedure

1. Open the picture on the client to be inserted in the picture window.
2. From the standard pallet in Graphics Designer, select the "Picture Window" from the group of smart objects and insert it in the picture.
3. Open the Properties dialog by double-clicking the picture window.
4. From in the "Miscellaneous" group, double-click the "Properties" tab and select the "Picture Name" attribute in order to search for a picture.

   or:
   In the "Picture Name" attribute, double-click the "Static" column to enter a picture name directly in the form "<Server_prefix>::<Picture_name>".
5. Close the Properties dialog.

**Note**

If a server prefix is not automatically specified in the "Picture Name" attribute, the server prefix can also be entered via the "Server prefix" attribute. After double-clicking the "Server prefix" attribute, a selection list containing all servers appears whose packages are on the client.

## See also

Configuring a Message Sequence Report for Messages from Several Servers (Page 51)

Displaying Messages from Different Servers (Page 50)

Using Data from Different Servers (Page 48)

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## 1.7.8 Configuring a Picture Change on the Client

### Introduction

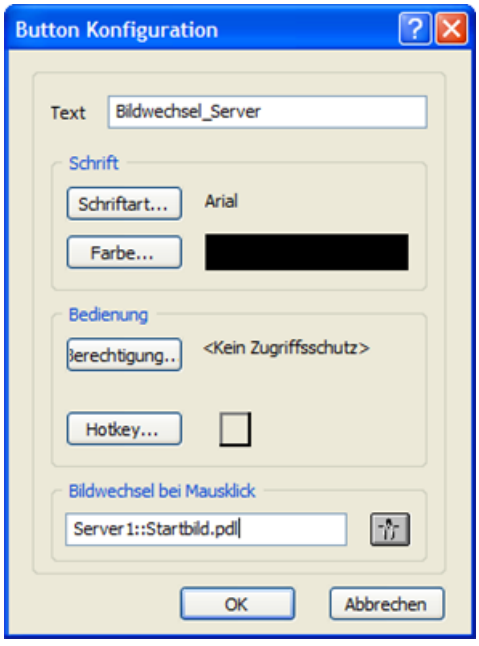
It is possible to use a client in a distributed system to configure a picture change on a server picture by prefixing the server prefix to the target picture. There is no difference in configuration with WinCC whether configuring a normal" picture exchange or changing a basic picture.

### Procedure

The following procedure describes an example of how to configure a button to initiate a change of picture on the server.

1. Open a picture of the client project in Graphics Designer.
2. Insert a button in the picture from the group of Windows objects.
   The Configuration dialog appears.

3. Enter the server prefix as the target under "Change Picture" and the picture name in the form "<server_prefix>::<picture_name>", e.g.:




4. Close the dialog by clicking "OK".

## Alternative Procedure

The picture change can also be configured in the "Properties" dialog of the button:

- Use the "Events "tab to configure a direct connection, for example, with a mouse click.
- Enter the picture name with server prefix as the constant of the direct connection.

## See also

Server Configuration (Page 15)

Configuring a Message Sequence Report for Messages from Several Servers (Page 51)

Displaying Messages from Different Servers (Page 50)

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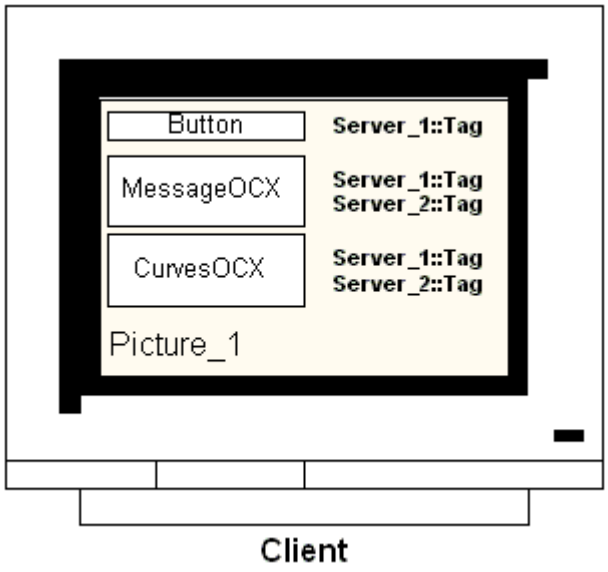
## 1.7.9 Using Data from Different Servers

### Principle

The basic picture of a client in a distributed system and all objects contained in it are configured directly on the client. Access to data from several servers can be made from each basic picture, e.g.:

- An output field for the process value from Server_1 which monitors system part A, an output field for the process value from Server_2 which monitors another part of the system.
- Trend displays which display data from different system pats/servers in comparative form.
- Message windows which display the messages from several servers.




Basic pictures, projected on a client, can be copied to other clients. To do this, the server packages which can be addressed in the basic picture must be available on the target client.

**Note**

All tags configured on the server which were transferred with a package to a client are available on the client in the Tag Selection dialog.

C-actions and functions or VBS actions and procedures from Global Script must be available on the client in order to execute them. Global C and VBS scripts are not component parts of the packages.

## Procedure

The following procedures describe examples of how the process data from two different servers can be displayed in a trend display on the client.

1. Open the client project on the client.
2. Use Graphics Designer to configure the picture to be used as the basic picture.
3. Insert the WinCC Online Trend Control in the basic picture from the "Controls" tab in the Object Pallet. The "Properties of WinCC Online Trend Control" dialog opens.
4. Select "Online Tags" as data source when the current process is to be monitored.
5. Activate the "Trends" tab.
6. Select a tag for the first trend whose process values should be displayed by selecting "Selection of Archives/Tags" and then the "Selection" button.
7. Enter the tag names in the following form: "<server_prefix1>::<variable_name>". Confirm with "OK".
8. Click the "+" button in the "Trend" tab in order to add a second trend.
9. Connect the second trend with a tag from the second server in the form: "<server_prefix2>::<variable_name>".
10. Confirm your settings with "OK".

### Results

In Runtime, two trends appear in the trend display on the client: Trend 1 shows the data from server 1, trend 2 data from servers 2.

## See also

Configuring the Import Package (Page 32)

Configuring a Message Sequence Report for Messages from Several Servers (Page 51)

Displaying Messages from Different Servers (Page 50)

Configuring a Picture Change on the Client (Page 46)

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## 1.7.10 Displaying Messages from Different Servers

### General procedure

Messages from several servers can be displayed on a client in a distributed system as follows:

- Configure a message display for each server whose messages are to be displayed
- Specify several message servers as source in a message display

**Note**

If an Alarm Control is integrated in a basic picture of the client, the associated server picture is displayed as the basic picture on the client on executing the "Loop in Alarm" function. It is not possible to return to the original basic picture.

If an Alarm Control is integrated in a picture window of the client, the associated server picture is displayed in the "Loop in Alarm" picture window on executing the "Loop in Alarm" function. Return to the basic client picture by clicking the relevant button.

### Procedure

1. Open the client project on the client.
2. Use Graphics Designer to configure the picture to be used as the basic picture.
3. Insert the WinCC Online Trend Control in the basic picture from the "Object Pallet", "Alarm Controls" tab. The "Properties of WinCC Alarm Control" dialog opens.
4. When the messages of all connected servers in this Alarm Control are to be displayed, select "Server Selection" and activate the "All Servers" check box.
5. If only the messages from a specific server are to be displayed, deactivate the "All Servers" check box and click the "Selection" button to select a WinCC server from the network .
6. Close the dialog by clicking "OK".

**Note**

In multi-user systems, you must ensure that contents displayed in the selection dialog on a client are named identically on all servers.

### See also

Configuring a Message Sequence Report for Messages from Several Servers (Page 51)

Displaying Messages from Different Servers (Page 50)

Configuring a Picture Change on the Client (Page 46)

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How to Configure a Preferred Server (Page 39)

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## 1.7.11 Configuring a Message Sequence Report for Messages from Several Servers

### Principle

If messages from several different servers are to be displayed in a basic picture on the client, it is also possible to display the corresponding message sequence report. The messages from all servers are collected and output in the correct sequence.

WinCC provides a preconfigured layout and print job for the message sequence report.

### Procedure

1. Open the "@CCAlgRtSequence.RPl" layout in the WinCC Explorer Report Designer. The Line Layout Editor appears.
2. Click the "Selection" button. The "Protocol Tables Selection" dialog appears.
3. Use the "Add Server" button to insert servers whose messages are to be logged in the message sequence report to the list of "Selected Servers". Only these servers are displayed whose packages have been imported on the client.
4. Transfer the message blocks to be logged to the "Column Sequence Of The Report" list using the arrow buttons.
5. Click "OK" to confirm your entry.
6. Open the "@Report Alarm Logging RT Message sequence" print job in the WinCC Explorer.
7. The layout has been stored under an individual name, select the layout from the "Layout" list. Activate the "Line layout for line printer" check box.
8. Activate The "Printer" check box on the "Printer Setup" tab.
9. Select the printer from the list of connected printers on which the report is to be printed out.
10. Confirm your settings with "OK".
11. Select the Client Computer in the WinCC Explorer and then the "Properties" command from the pop-up menu. The "Computer Properties" dialog appears.
12. Activate "Message Sequence Report" on the "Startup" tab.
13. Confirm your settings with "OK".

## See also

Creating a New Project on the Client (Page 30)
Configuring a Message Sequence Report for Messages from Several Servers (Page 51)
Displaying Messages from Different Servers (Page 50)
Configuring a Picture Change on the Client (Page 46)
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# 1.8 System Behavior in Runtime

## 1.8.1 System Behavior in Runtime

### Introduction

A client/server system in WinCC can be used to distribute the system configuration to several servers in order to reduce the load applied to the individual servers. The data configured on the servers can be displayed by clients, whereby a client can display data from up to 18 different servers or redundant server pairs in Runtime.

### Behavior of Editors in Runtime

#### Archives

If the archive system is activated on an operating station, the Tag Logging Runtime operates on the servers as archive server, on the clients as archive client. Only the archive server accesses the database and compiles and archives the process data. The clients receive archive data from the archive server.

The archive data can be displayed as a table or graphic on every client on which the Tag Logging Runtime runs. The data to be displayed always comes from the archive server. All operations on the client are transmitted to the server and the result of the processing is transferred back to the client.

#### Graphics

When a picture is called in by a client in Runtime, Graphics Runtime initially searches for locally stored pictures. If no picture with the corresponding name is found locally, a search is made in the project folder on the server. If no picture is available, the corresponding message appears.

If a picture request requires an exchange with another editor (Alarm Logging, Global Script), the exchange is local. A picture can be opened and processed by several operating stations in Runtime.

---

**Note**

The picture build up on the client is quicker when the respective picture is copied locally onto the client. Enter the relevant directory in the client's "Computer Properties" dialog in the "Runtime" tab. It is also possible to specify whether the directory is to be used always or by preference.
If a picture is modified in the server project, the data must be updated manually by copying the modified picture to the local directory of the client again.

---

#### Messages

If messages are displayed on a client, the client receives the data displayed from the server. The message server receives the configured data from the database.

Archive data and message lists can be displayed on every client. The data to be displayed always comes from the message server. When new messages are received, the messages are archived in the message server.

When an operating acknowledges an alarm, the acknowledgement is transferred to the message server. The server enters the change of status in the archive and distributes the notification to all participating clients. The same process applies to the locking of messages.

If a message server is not available in Runtime, the corresponding message appears in the message window instead of the messages. When the server becomes available again, messages are displayed in the message window again.

#### Reports

The protocol system in WinCC does not detect Runtime in the real sense of the meaning. Protocols and print jobs can be configured and executed at any time. Only print jobs which are to be display the archive or process data are dependent on Runtime.

The protocol system is automatically started on every client during the startup routine. The server operates as a protocol server, the clients as protocol clients. During the startup routine, the client log in on the server and receive the current information on the print jobs available and their status. If a print job is started on a client, it obtains the related data from the server database. The print job is started locally. The protocol server receives the current data concerning the print job status from the client and transfers the information to the other clients.

#### Scripts

If an operating station activates a project locally, the server's project functions and standard functions are loaded locally.

#### User Administrator

The operating rights are checked by the Runtime component of the User Administrator. The user administrator Runtime component is automatically started on every computer when WinCC is activated. If the login is changed, the current operating rights list is loaded from the local database.

#### Text Library

If the server project is activated, Text Library Runtime runs on the server as text server and on the clients as text client. The data is always read from the server database.

### Behavior in the event of system errors

If a server is not available, the clients poll the server cyclically until is has been started up again. Data on the server cannot be displayed in the case of system faults, all operable graphic objects, for example, are switched inactive.

---

#### Note

If problems develop on a client concerning the running WinCC, you can restart the client to reconnect to the server without affecting the server.

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### See also

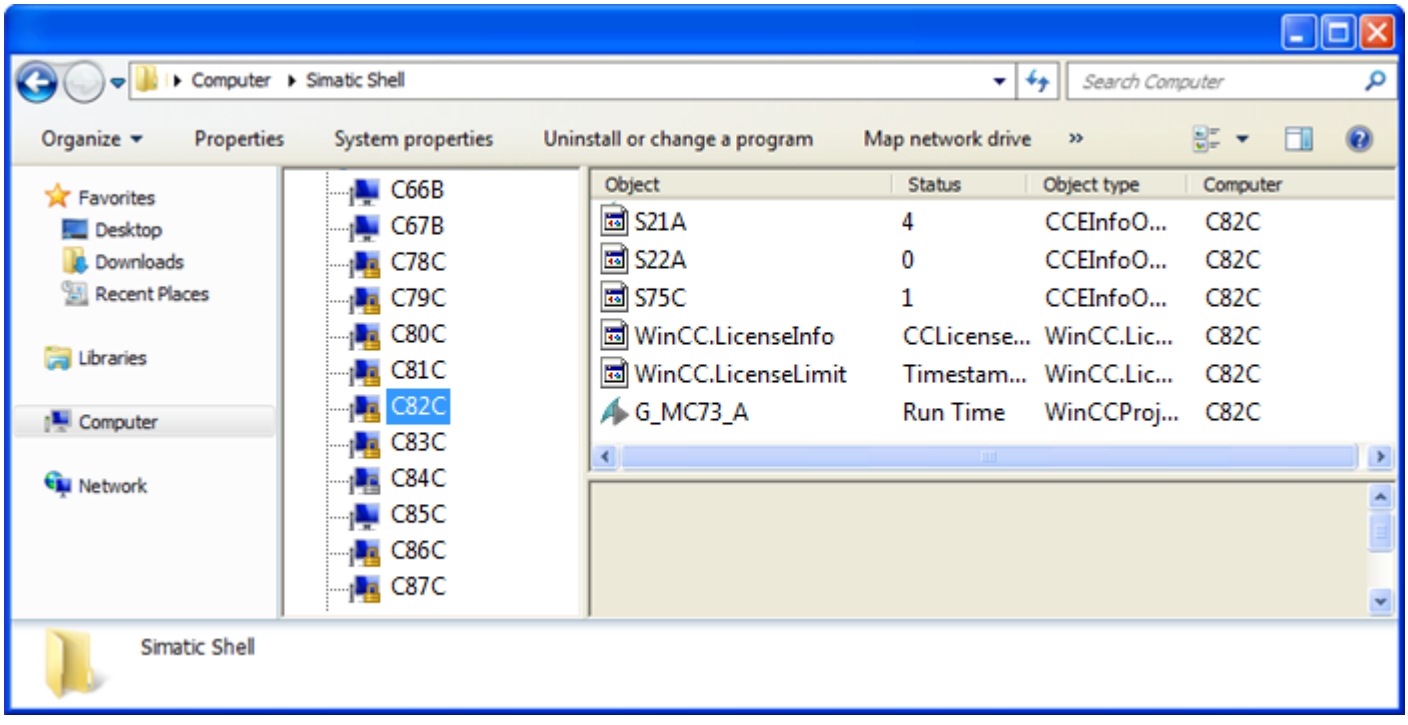
Starting Up the Server (Page 55)
Specifics of Communication for a Server with Several Network Cards (Page 57)
Shutting Down the Client (Page 59)
Shutting Down the Server (Page 59)
Starting Up the Client (Page 56)
Client/server scenarios (Page 12)
Quantity structures and performance (Page 10)
Client/Server Systems in WinCC (Page 6)

## 1.8.2 Starting Up the Server

### Principle

Servers in a client/server system can be started up independently of the clients. As soon as a server has been started up, it makes its services available to the clients and retrieves information on all participants in the network.

You can view the current status of all servers in the data window of the "Simatic Shell" dialog. You open "Simatic Shell" via the Windows Explorer.



If a server fails during normal operation, the data on the clients can no longer be updated and information is provided on the failed server.

**Note**

If a file server is used in the client/server system, the system is only ready for operation again when both the file server and the WinCC server have been started up.

### Remote Activation

A server can also be started from another remote computer (client or server). The procedure for this is described in "Activate project".

### See also

Specifics of Communication for a Server with Several Network Cards (Page 57)

How to Activate a Project (Page 71)

Shutting Down the Client (Page 59)

Shutting Down the Server (Page 59)

Starting Up the Client (Page 56)

System Behavior in Runtime (Page 53)

Client/server scenarios (Page 12)

Quantity structures and performance (Page 10)

Client/Server Systems in WinCC (Page 6)

## 1.8.3 Starting Up the Client

### Principle

The clients in a client/server system boot independently of the servers.

When a client in a client/server system starts up, it receives all current information on the following via the WinCC servers known to it in the network, e.g.:

- Project names
- Server names and IP addresses
- Project status of the servers (configuration or Runtime)

The user can view the corresponding information in the list in the "Simatic Shell" dialog. When the status of a server changes, the "Simatic shell" is also updated.

### Server not available.

If servers are not available, a corresponding error message is issued. In addition, graphic objects, for example, who receive their data from the server , are switched inactive.

Scripts can be used to configure the display of connection faults to the client.

### See also

Specifics of Communication for a Server with Several Network Cards (Page 57)

How to Activate a Project (Page 71)

Shutting Down the Client (Page 59)

Shutting Down the Server (Page 59)

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## 1.8.4 Specifics of Communication for a Server with Several Network Cards

### Introduction

If several network cards or SIMATIC NET SOFTNET drivers are installed on a WinCC server for the process connection and are operated with an active TCP/IP protocol, communication of the server with WinCC clients could be affected.

A possible cause could be that each network card or the SOFTNET driver in the server has its own IP address. Therefore, under certain circumstances, it is possible that when the server is logged on in the network, Windows attempts to establish a connection via the wrong IP address, e.g. via that of the SOFTNET driver. If the attempt to establish a connection fails, Windows marks the communication via this IP address as defective but does not attempt to establish a connection via another IP address available on the computer.

In this case, appropriate modifications must be made by the network administration.

### Checking the sequence of the network cards

If several network cards are installed on the computer, the network card for the terminal connection must be in first place.

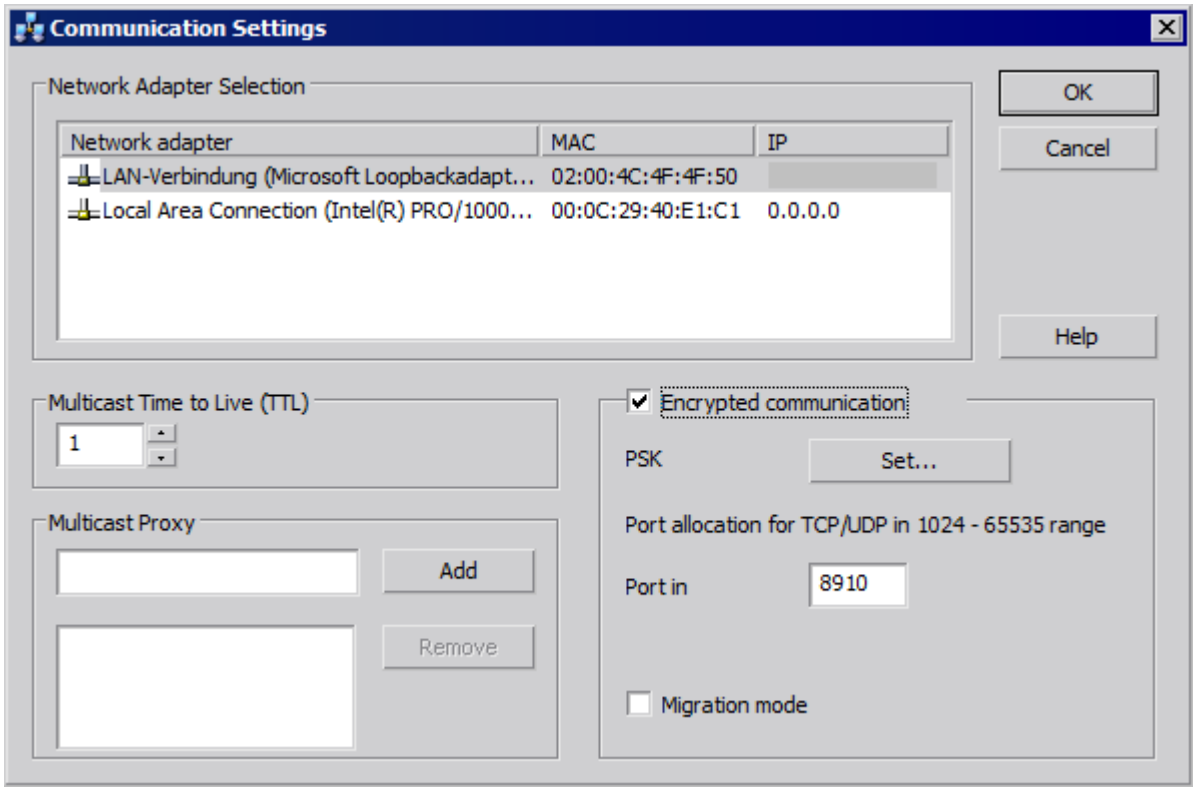
Check the sequence in the Windows Control Panel under "Network connections". In the "Advanced" menu select the menu command "Advanced settings". The sequence is available in the "Advanced" dialog on the "Network cards and connections" tab in the "Connections" section.

## Diagnostics

Using the directory "Simatic Shell", you may check the configuration of the network card. If you determine that a computer indicates an address with an incorrect, i.e. inaccessible network area, select a different network adapter.

## Procedure

1. In the navigation window of Windows Explorer, click the "Simatic Shell" directory.
2. In the shortcut menu of the directory, select the "Settings..." dialog.




3. If you wish to change the network interface, click the desired network card in the "Network Adapter" area.

A check is also to be made in the configuration of the SOFTNET driver on the server whether the Windows utilities not required for the process connection can be deactivated.

If a connection can still not be established after checking these points, please contact Customer Support.

## See also

How to Access Computers Outside a Subnet (Page 62)

Remote Configuration (Page 61)

Starting Up the Client (Page 56)

Starting Up the Server (Page 55)

System Behavior in Runtime (Page 53)
Client/Server Systems in WinCC (Page 6)

## 1.8.5 Shutting Down the Server

### Principle

If a server in the client/server system is shut down, it can no longer provide the connected clients with process data. It is simultaneously logged off from the system and is marked as deactivated in the "Simatic Shell".

### Remote Deactivation

A server can also be shut down from another remote computer (client or server). The procedure for this is described in "Deactivate project".

### See also

Starting Up the Client (Page 56)
How to Deactivate a Project (Page 73)
Shutting Down the Client (Page 59)
Starting Up the Server (Page 55)
System Behavior in Runtime (Page 53)
Client/server scenarios (Page 12)
Quantity structures and performance (Page 10)
Client/Server Systems in WinCC (Page 6)

## 1.8.6 Shutting Down the Client

### Principle

When a client in a client/server system is shut down, it is logged off from the system.

### See also

How to Deactivate a Project (Page 73)
Shutting Down the Server (Page 59)
Starting Up the Client (Page 56)
Starting Up the Server (Page 55)

System Behavior in Runtime (Page 53)
Client/server scenarios (Page 12)
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# 1.9 Remote Configuration

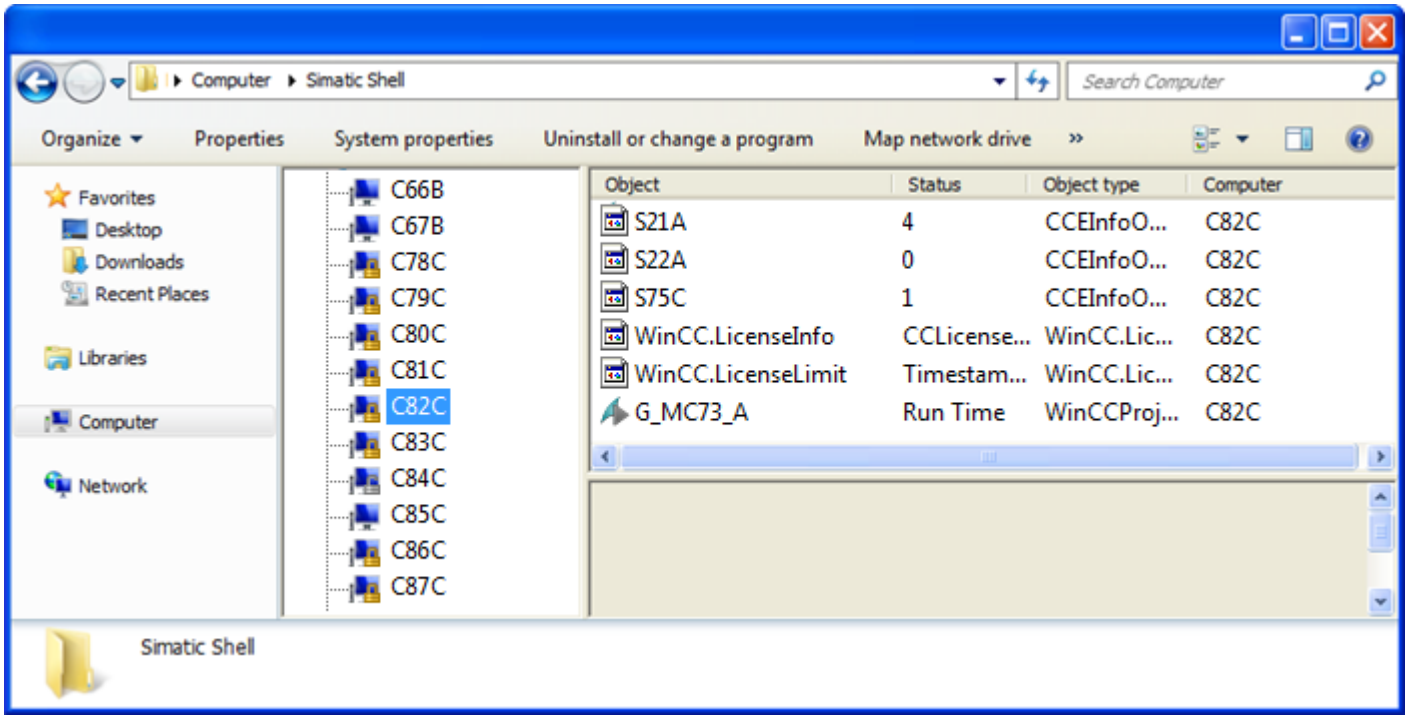
## 1.9.1 Remote Configuration

### Principle

Clients provided with the corresponding operator authorizations can operate a server project from a remote station, e.g.:

- Remote configuration of a server project
- Activate a server project
- Deactivate a server project

For remote configuration, the "Simatic Shell" dialog is available which you access through Windows-Explorer.




#### Remote Desktop Protocol (RDP)

Information on access over RDP is available in the WinCC Information System in the Release Notes under "Notes on WinCC > Remote access and Remote Desktop Protocol (RDP)".

### Function of Simatic Shell

In the "Simatic Shell" dialog, you can view the enabled servers and computers with the WinCC projects available through the network. These include all projects which run under a demo license.

You have the option of establishing encrypted computer communication in addition to the unencrypted communication.

If you use encrypted communication, connections are only established to computers for which the same PSK key was specified. You can only communicate with these computers. Connecting to unencrypted computers is not possible. You can specify different environments with their own PSK keys for the same network. You can find information about configuration under "How to Access Computers Outside a Subnet".

Migration mode is also available for upgrading during operation. This mode allows encrypted and unencrypted connections side by side in the network. Use migration mode only as a temporary solution on the way to encrypted communication throughout the entire plant.

Depending on the configuration of encrypted communication, only the relevant computers are shown in the Simatic Shell. In migration mode, all computers in the network with encrypted and unencrypted connections are shown (see figure above).

| | |
|---|---|
| C83C | The computer only allows encrypted connections |
| C84C | The computer allows encrypted and unencrypted connections (migration mode) |
| C85C | The computer allows unencrypted connections |

The window can be used to access an enabled server project from a client:

- to open a project remotely
- to activate a project remotely
- to deactivate a project remotely

### See also

How to Deactivate a Project (Page 73)

How to Activate a Project (Page 71)

How to Edit Server Project Pictures (Page 70)

How to Open a Project for Editing (Page 68)

Access to Projects from Several Clients (Page 66)

How to Access Computers Outside a Subnet (Page 62)

Client/Server Systems in WinCC (Page 6)

## 1.9.2 How to Access Computers Outside a Subnet

### Principle

Computers in your network which are downstream from a router, for example, can be made known to the system via "Simatic Shell". "Simatic Shell" is part of WinCC and is used for central maintenance and diagnostics of all computers integrated in the client-server system.

Using the settings in "Simatic Shell", you introduce a computer within your subnet as an "Agent" who distributes the information from other computers to the computers within the subnet.

If you are using encrypted communication, only those computers in which the shared specified key is known prior to communication can communicate with each other.

After you have logged on, all participating computers in the system can communicate even beyond network limits. Each computer added to an existing group is informed of the current status of all computers. When the status of a computer changes, a message is issued to all participants, e.g.:

- If a computer has activated a project
- If a computer is shut down.
- If a computer is started up and thus enters the group.

---

**Note**

**Communication beyond network limits**

To allow WinCC computers from different networks to communicate with one another, you need to make the following adjustments to the local Windows firewall.

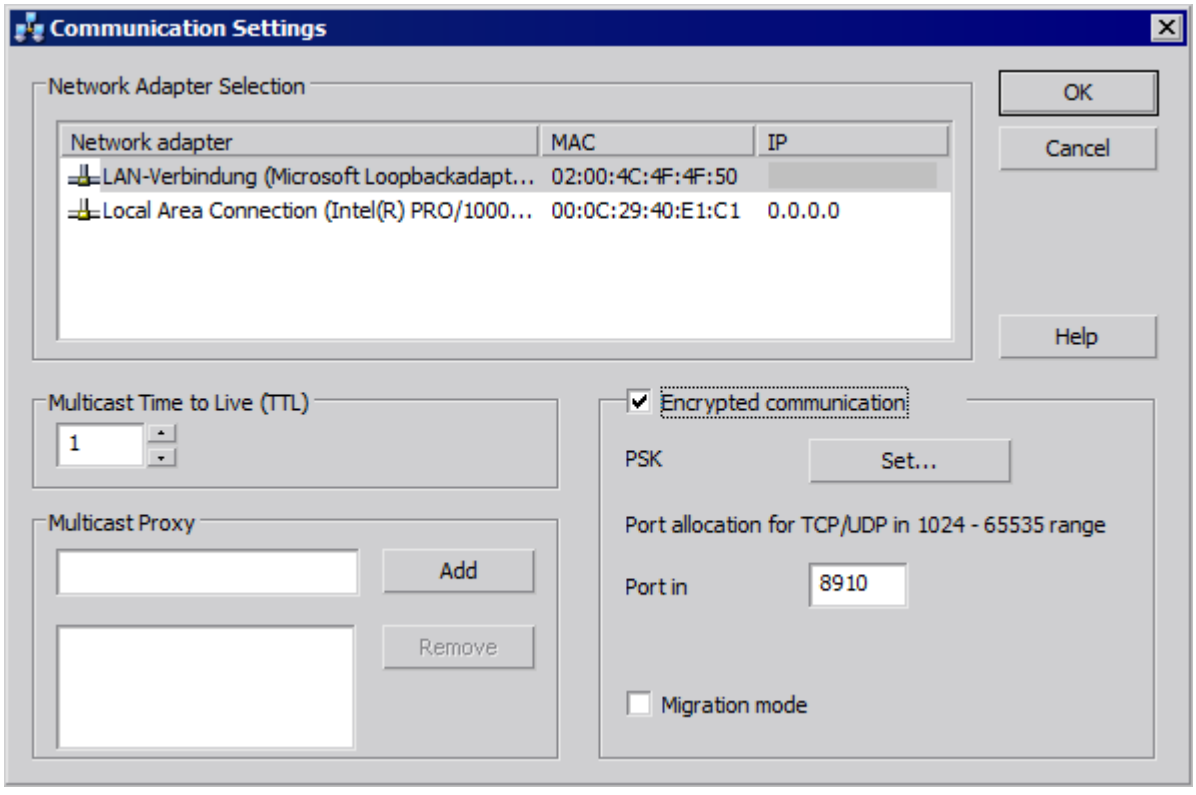
For all WinCC-specific firewall rules, you need to expand the scope by the IP addresses of the computers from other networks or the complete IP scope of the other networks.

1. In Windows, go to "Control Panel/System and Security/Windows Firewall".
2. Click "Advanced settings". The "Windows Firewall with Advanced Security" dialog opens.
3. Under "Inbound Rules", select one by one all affected firewall rules, e.g. CCAgent, WinCC ProjectManager.
4. In the "Scope" tab in the properties, add the IP addresses or IP scopes of the communication partners to "Remote IP address".

---

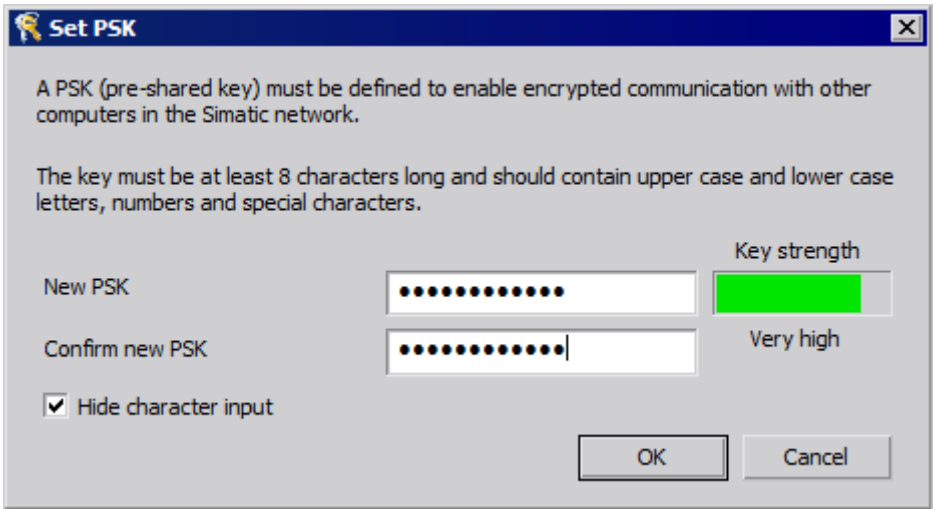
## Procedure

1. On the computer that is to access the WinCC computer as a client, select the "Simatic Shell" entry in the Windows Explorer.
   The "Simatic Shell" window appears.
2. Select the first entry in the "Simatic Shell" dialog in the navigation window. In the shortcut menu of this entry, select the menu item "Settings...".
   The "Communication Settings" dialog opens.
   If the navigation window of the "Simatic Shell" dialog does not contain an entry, you can also call up the shortcut menu in the blank window.




3. Check the setting in the field "Multicast Life Time (TTL)". The value gives the maximum number of transitions between various subnets (IP parameters TTL).
4. Under "Multicast Proxy", enter the address for the computer intended as "Agent" for the subnet. Alternatively, you can enter the computer name.
   This may be any computer in the subnet (client or server).
   Use the "Add" button to add the computer to the list of agents.

5. If you want to set up encrypted communication for the computers, select the "Encrypted communication" option.
   Click the "Specify" button to enter the PSK key.




6. Enter characters with a high key strength for the key.
   The key must be at least 8 characters long and include numbers and symbols in addition to uppercase/lowercase letters.
   Confirm your settings with "OK".
7. Specify the assignment of the inbound port if you do not want to use the available port assigned with the standard setting.
8. If you want to allow encrypted and unencrypted connections side by side, select the "Migration mode" option. This makes sense for upgrading during operation, for example.
9. Confirm your settings with "OK".

## See also

Access to Projects from Several Clients (Page 66)

How to Deactivate a Project (Page 73)

How to Activate a Project (Page 71)

How to Edit Server Project Pictures (Page 70)

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## 1.9.3 Access to Projects from Several Clients

### Configuration Options

Depending on the type of data, one or several clients may access the server project during remote operation. A differentiation is made between data stored in a server database (alarm logging, tag logging, tags, user admin, text library) and data based on files (pictures and graphics, reports, scripts).

---

**Note**

Data from the server database can be processed by several clients at the same time. Observe, in this case, that modifications from the last client that stored the data are stored when several clients access the same data. In the case of data from the server database, all data in the respective editor is stored, even if only a few values were modified.

In the case of data stored in the files, the data is blocked for further access when the file is open.

---

#### Archives (tag logging)

Archives are stored in the server database. The data in Tag Logging can be modified in Runtime. The modifications are distributed by the server to all participating clients.

#### Pictures

Pictures are stored as files on the server or file server. When a client accesses a picture on the server, the picture blocked for other clients. Different project pictures can be opened by different clients.

Pictures can be changed in Runtime and, after being stored, are available the next time the picture is selected. Pictures can also be stored locally for editing but matching them with the respective ones on the server must be carried out manually.

#### Messages

Messages are stored in the server database. The data in the alarm logging system can be modified in Runtime. The modifications are distributed by the server to all participating clients.

#### Reports

Protocols are stored centrally in the server's project folder. The protocol data is divided into layouts (files) and print jobs (entries in the project data base). Only one client can configure the protocol system to the respective server.

Protocols can be stored locally to be edited, but matching them with the respective ones on the server must be carried out manually. It is not intended to enable modifications to the protocol system in Runtime because protocols can be executed independent of Runtime.

#### Scripts

Scripts are stored centrally in the server's project folder. Project-specific scripts can be defined individually on local computers. Scripts are stored in files. Graphics Designer actions are stored in the picture. During editing, the files (scripts or pictures) are blocked for other clients. If there is no connection to the server, scripts can be modified locally, but matching them with those

on the server must be performed manually. Scripts can be modified in Runtime. The server distributes the modifications to all participating computers.

**Note**

If a client without access to the server configures a script, that script is stored locally. If the script is to be available on the server, the script must be copied in the appropriate server folder manually.

### Texts in the text library

Texts in the text library are stored in the server database. The text objects are stored individually. Texts can be modified in Runtime. The server distributes the modifications to all participating computers. Updating occurs in the configuration language defined on the local computer.

**Note**

Certain WinCC editors, such as Alarm Logging and User Administrator, access the same database table in the text library during configuration. Therefore, these editors can only be operated simultaneously on one operating station.

### Tags

Tags are stored in the server database.

**Note**

If a client project is deactivated in order to modify a tag, the modifications only take effect after restarting all computers on which the project was active at the moment it was changed.

### User Administrator

The user administrator operating rights are stored in the server database. User administrator data can be modified in Runtime. The participating computers are not notified. The new data takes effect when the client is logged in again.

## See also

How to Activate a Project (Page 71)

How to Deactivate a Project (Page 73)

How to Edit Server Project Pictures (Page 70)

How to Open a Project for Editing (Page 68)

How to Access Computers Outside a Subnet (Page 62)

Remote Configuration (Page 61)

Client/Server Systems in WinCC (Page 6)

## 1.9.4 How to Open a Project for Editing

### Principle

A server project can be edited by a client in configuration or Runtime operation of the project. Updating the data in Runtime is dependent on which data is configured.

The "Simatic Shell" dialog in Windows Explorer provides you with a list of all server projects within the network enabled for configuration. You obtain additional information on the selected server, e.g., which mode is currently active (configuration/Runtime).

Several clients can open and edit the same project simultaneously.

### Requirement

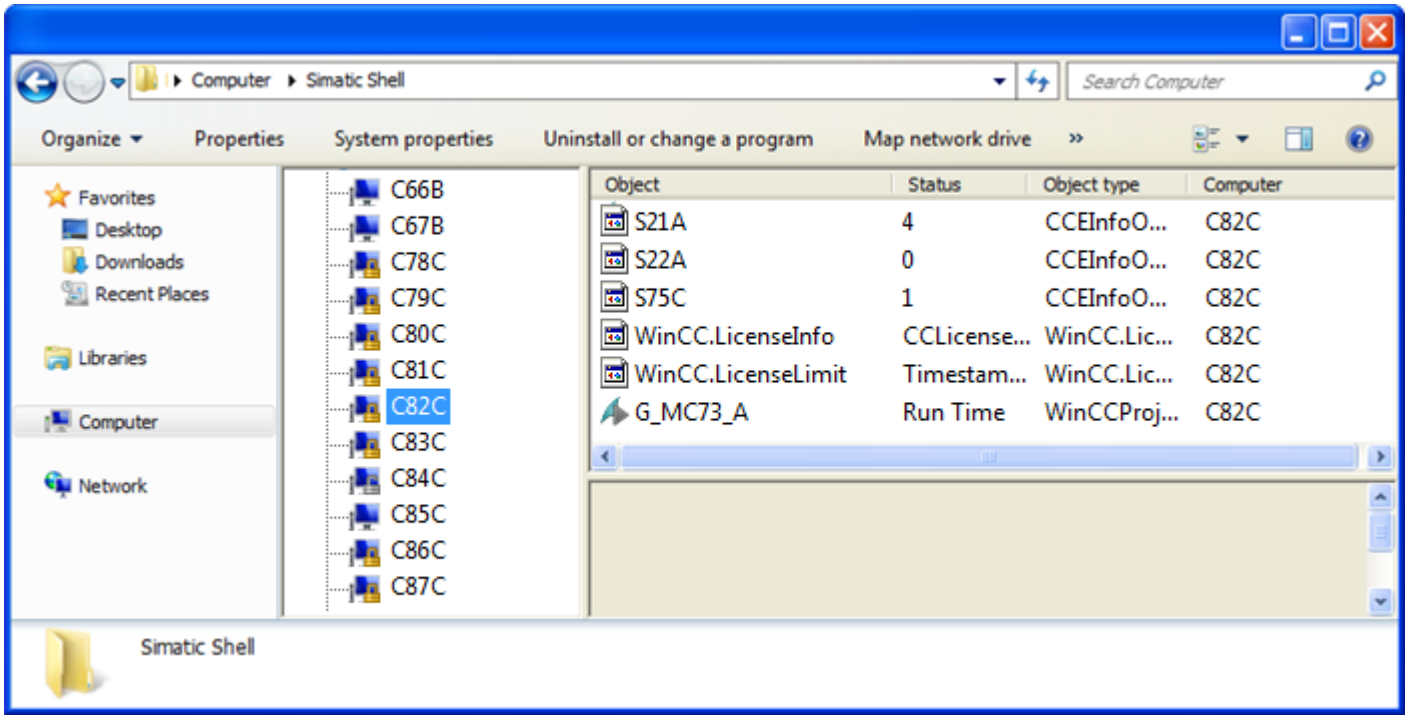
In order to open a server project on a client for remote editing, the following conditions must be fulfilled:

- The user registered on the client has the operator authorization for "Configure remote" in the server WinCC project.
- The client has been entered in the server's computer list.
- The project has been enabled for network access

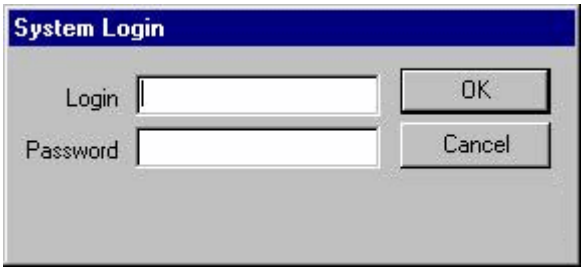
## Procedure

1. In Windows-Explorer of the client, select the "Simatic Shell" entry. The "Simatic Shell" window appears.
   In the window list all currently available serves and projects in the network.

   Alternatively, open the "Simatic Shell" dialog in a separate window. In Windows Explorer, select the "Open" command in the pop-up menu of "Simatic Shell".




2. Select a computer in order to display the projects specific to this computer.
3. From the project list, select the project to be opened and select the "Open" command from the pop-up menu.
   A Login dialog appears.




4. Enter the user name and password for the current computer.
   Passwords are case-sensitive.
   Click "Start server locally" in the "WinCC Explorer - Server not available" dialog.
   The project is opened on the client for configuration.

**Note**

If you have opened a server project for processing through the client and execute the "Activate Runtime" command in WinCC, you must observe the following:

If you activate Runtime from a client in a multi-user system, only the client project is activated even if the server project is open.

If you wish to activate the server project, use the command "Activate Remote" in the "Simatic Shell" dialog. The same applies to the "Deactivate Runtime" command.

### See also

How to Deactivate a Project (Page 73)

How to Activate a Project (Page 71)

How to Edit Server Project Pictures (Page 70)

Access to Projects from Several Clients (Page 66)

How to Access Computers Outside a Subnet (Page 62)

Remote Configuration (Page 61)

Client/Server Systems in WinCC (Page 6)

## 1.9.5 How to Edit Server Project Pictures

### Principle

Pictures on a server can be opened, edited and saved on a remote client. If Runtime is active while editing, the modifications take effect the next time the picture is activated.

Since each picture is stored in an individual file, only one client can access a picture at a time. Access is blocked to the picture for other computers.

### Requirement

- The project folder on the server must be enabled for network access.
- The user registered on the client has the operator authorization for "Configure remote" in the server WinCC project.

### Procedure

1. In Windows-Explorer of the client, select the "Simatic Shell" entry. The "Simatic Shell" window appears.
   In the window list all currently available serves and projects in the network.
2. From the project list, select the project to be opened and select the "Open" command from the pop-up menu.
   A Login dialog appears. Enter the user name and password for the current computer. Passwords are case-sensitive.
   In the dialog "WinCC Explorer - Server not available", click the "Start server locally" button.
   The project is opened on the client for configuration.
3. Open the desired picture in Graphics Designer on the client.
4. Edit the picture and save it again in the project folder on the server.

### See also

How to Deactivate a Project (Page 73)

How to Activate a Project (Page 71)

How to Open a Project for Editing (Page 68)

Access to Projects from Several Clients (Page 66)

How to Access Computers Outside a Subnet (Page 62)

Remote Configuration (Page 61)

Client/Server Systems in WinCC (Page 6)

## 1.9.6 How to Activate a Project

### Principle

A client/server system not only provides the option of remote project configuration but also to activate and deactivate them remotely.

If you activate a server project from a client by using the "Simatic Shell" dialog, only the server project is activated. However, if you have opened a server project for processing and activate it in WinCC by using the "Start Runtime" button in the toolbar, only the client project is activated even if the server project is open.

**Note**

You can only activate Runtime if the project is on the local computer.

## Requirements

In order to open a server project on a client for remote activation, the following conditions must be fulfilled:

- The user registered on the client has the operator authorization for "Activate remote" in the server WinCC project.
- The client has been entered in the server's computer list.
- The project has been enabled for network access.

## Procedure

1. In Windows-Explorer of the client, select the "Simatic Shell" entry. The "Simatic Shell" window is displayed.
   All servers and projects available on the network as well as their current status are displayed.
2. Select the project to be activated.
3. Select the "Activate remote" command from the shortcut menu.
   A Login dialog appears.
4. Enter the user name and password for the current computer. The project is activated on the server.

   **Note**

   Passwords are case-sensitive.

## How to activate an OS computer remotely from an Engineering Station

The following requirements generally apply to an OS project and remote activation:

- Enter the ES computer name as OS server in the WinCC project for the OS project.
- If you want to use another computer to remotely activate the OS project, this computer must be entered as client computer.

Because the computer name for server and client cannot be identical in a WinCC project, you must note the following procedure:

1. Change the ES computer name entered under "Server" in the computer list to a fictitious name in WinCC Explorer.
2. Close the project.
3. Open the project.
4. Add a new client in the computer list in the WinCC Explorer.
5. Enter the ES computer name under "Client" in the computer list.
6. Load the target system using SIMATIC Manager.
7. You can now remotely activate Runtime on the OS computer from the Engineering Station.

### See also

How to Deactivate a Project (Page 73)
How to Edit Server Project Pictures (Page 70)
How to Open a Project for Editing (Page 68)
Access to Projects from Several Clients (Page 66)
How to Access Computers Outside a Subnet (Page 62)
Remote Configuration (Page 61)
Client/Server Systems in WinCC (Page 6)

## 1.9.7 How to Deactivate a Project

### Principle

A client/server system not only provides the option of remote project configuration but also to activate and deactivate them remotely.

If you deactivate a server project from a client by using the "Simatic Shell" dialog, only the server project is deactivated. However, if you have opened a server project for processing and deactivate it in WinCC by using the "Stop Runtime" button in the toolbar, only the client project is deactivated even if the server project is open.

### Requirements

In order to open a server project on a client for remote deactivation, the following conditions must be fulfilled:

- The user registered on the client has the operator authorization for "Activate remote" in the server WinCC project.
- The client has been entered in the server's computer list.
- The project has been enabled for network access

### Procedure

1. In Windows-Explorer of the client, select the "Simatic Shell" entry. The "Simatic Shell" window is displayed.
   In the "Simatic Shell" dialog you can view the enabled servers and projects of your client/server system available through the network.
2. Select the project to be activated.

3. Select the "Deactivate remote" command from the pop-up menu. A Login dialog appears.
4. Enter the user name and password for the current computer. The project is deactivated on the server.

**Note**

Passwords are case-sensitive.

## See also

How to Activate a Project (Page 71)
How to Edit Server Project Pictures (Page 70)
How to Open a Project for Editing (Page 68)
Access to Projects from Several Clients (Page 66)
How to Access Computers Outside a Subnet (Page 62)
Remote Configuration (Page 61)
Client/Server Systems in WinCC (Page 6)

# 1.10 Use of the OPC Interface in Client/Server Systems

## Principle

OPC (OLE for Process Control) is a worldwide communication standard for components in the automation industrial sector. Developed from Windows-based technology, the OPC provides an open interface which enables problem-free, standardized data exchange between PLCs, operating and monitoring systems and office applications from different manufacturers.

**Note**

Leading companies involved in the automation industry cooperate within the "OPC Foundation".

Further information on the OPC Foundation is available in Internet under the following address: "http://www.opcfoundation.org"

## Using OPC in WinCC

Used within a distributed system, each WinCC server can monitor the entire system. A WinCC server, however, only assumes a specific range of tasks, for example, such as message editing or archiving.

The WinCC OPC servers enable OPC access to the WinCC Runtime data via the software interface. The WinCC OPC servers support the full functional scope complying with the corresponding OPC specifications.

As OPC client, any software can be implemented which is based on the respective OPC specification. In this way, the OPC client can be used, for example, to analyze various sources. Proprietary OPC clients may be created to best meet specific requirements.

In order to operate the WinCC OPC server mode, the Connectivity Pack license must be installed on the computer which is to be used as the WinCC OPC server. No Connectivity Pack License is required for the OPC DA sever.

The OPC interface is installed on the client and server with the WinCC installation.

The OPC servers from WinCC support the following specifications:

- OPC Data Access 2.05a und 3.00
- OPC XML Data Access 1.00
- OPC Historical Data Access 1.20
- OPC Alarm & Events 1.10
- OPC UA 1.02

Detailed information to the use of the OPC interface in WinCC is available in the WinCC Information System under the topic "Communication" > "OPC"

## See also

Client/Server Systems in WinCC (Page 6)

# File Server

# 2

## 2.1 Setting Up the File Server

### Introduction

The WinCC file server is a server with minimum configuration of WinCC components.

You can save projects on the file server and manage them centrally. For example, this facilitates the creation of periodic backup copies of all projects.

**Note**

You use the file server exclusively for configuring.

### Requirement

Before installing a WinCC Fileserver V7, please observe the conditions described in the Installation Notes.

The following conditions also apply:

- The computer must be available in the network (LAN).
- If you want to use the file server, you need administrator rights.

**Note**

WinCC V7 and WinCC Fileserver V7 cannot be installed at the same time on one computer.

### Installation

In order to set up a computer as a file server, you run the Fileserver Setup on the computer.

1. Start the WinCC installation DVD.
2. Select the installation type "Custom Installation".
3. Select the "WinCC V7.4 SP1 Fileserver" entry in the "WinCC" group in the "Programs" dialog.

The minimum installation for WinCC is installed on the computer.

### Configuration

The projects are stored on the file server.

To enable all project members to access the projects, you must share the corresponding drives or folders on the file server.

Assign the shared folders or drives with unique drive letters on the configuration computers. Project members can then open the projects on the file server like a local project.

**Note**

You must have administrator rights to share folders or drives.

# WinCC ServiceMode 3

## 3.1 WinCC ServiceMode

### Contents

WinCC ServiceMode provides the option of operating WinCC Runtime as a service. WinCC Runtime can also be active as a service when no interactive user is logged into the computer.

This chapter shows you:

- In which configurations the WinCC ServiceMode can be used.
- How to configure a project as a service project.
- How a service project is activated.

## 3.2 Standard Project and Service Project

### Overview

Your can configure a WinCC project as a standard project or as a service project. To operate a WinCC project in WinCC ServiceMode, you must configure it as a service project.

#### Standard project

In order to run WinCC Runtime, a user must be logged into the computer. Interactive user inputs are possible.

#### Service Project

WinCC Runtime can also be run on the computer when no interactive user is logged into the computer.

WinCC Runtime can also be operated with a logged-in user; interactive user inputs are then possible.

---

**Note**

**WinCC is not executable when the system is being accessed**

Changes to the processes and services of WinCC in the Control Panel and in the Windows Task Manager are not allowed. The following changes are affected:

- Changes to the properties
- Manual accesses:
  - Start
  - Exit
  - Stop
  - Resume
  - Restart
- Priority change

There are dependencies between the individual processes and services.

Do not make any changes.

---

## 3.3 Configurations for a service project

### Overview

WinCC Runtime can run as a service project on the server in the following configurations:

- WinCC Server with Windows Server operating system
  WinCC clients with or without their own project
- WinCC WebNavigator server or dedicated Web server
  WinCC Web clients
- DataMonitor server or dedicated DataMonitor server
  DataMonitor clients

## 3.4 Using a service project and restrictions

### Use

On the server, the project in WinCC service mode is operated as a service project. WinCC Runtime starts as a service. A service project is started automatically or manually.

#### Operation without logged on user

A service project can run without an interactive user being logged on to the computer. If no interactive user is logged on, no interactive operation is possible.

#### Operation with logged on user

Interactive operation is not generally desired in service projects.

An interactive user can log on e.g. for service purposes. In this case, the user can activate the interactive operation of the service project.

#### Automatic start

With automatic start, WinCC Runtime is automatically start when the server is turned on and the set project is activated. The automatic start can be performed without an interactive user being logged on.

#### Manual start

With a manual start, the user must log on to the server and then activate the project. When the user logs off the server, WinCC Runtime continues to be active.

#### User logon and logoff

While the service project is active, interactive users can log on and off the server at any time.

### Limitations

A service project is subject to the following restrictions:

#### Scripts

Since an interactive user is not normally logged on to service projects, C scripts and VB scripts e.g. lead to problems in the following cases:

- If you require interactions, e.g. inputs.
- If you display message boxes.

There is no common data area for C scripting in the service mode. Thus, for example, no global C variables can be exchanged between "Global Script" and the "Graphics Designer".

#### Additional programs or tasks

With a service project, you cannot add additional programs and tasks to the startup list.

#### Non-released components

OPC access via Connectivity Station is not released for a service project.

### Diagnostics information for a service project

As a general rule, a user is not logged on to a server with an activated service project. WinCC cannot show diagnostics information on the server. WinCC thus forwards diagnostics information to the clients. You can find additional information on this in the WinCC Information System under the topic "Working with WinCC" > Working with projects > Appendix > WinCC diagnostics window and license information".

---

**Note**

**Editing or migrating service projects**

in order to edit or migrate a service project, you need to administer the ServiceMode user accordingly on the computer. If the ServiceMode user is not available, the logged on Windows user must have been administered accordingly for editing or migrating the project.

---

# 3.5 WinCC status and control in the system tray

## Introduction

WinCC shows the "SIMATIC WinCC" symbol in the Taskbar Notification Area, the so-called tray area. This symbol provides information on the project status. The WinCC project can be activated and deactivated via the symbol's shortcut menu.

## Project status

The following table shows which project status goes with which symbol:

| SIMATIC WinCC® symbol | Status |
|---|---|
| | • WinCC is not active.<br>• No project is open. |
| | WinCC changes the status:<br>• WinCC opens a project.<br>• WinCC activates a project.<br>• WinCC deactivates a project.<br>• WinCC closes a project. |
| | Project is open. |
| | The project is activated. |
| | Project is activated and the server has the "Fault" status. |

## Control Options via the Pop-up Menu

You can control an open project depending on its status. The shortcut menu of the "SIMATIC WinCC" symbol provides the following control options:

- Start Graphics Runtime.
- End Graphics Runtime.
- Activate project.
- Deactivate project.
- Open diagnostics window.

## SIMATIC WinCC® Window

To open the "SIMATIC WinCC" window, click on the "SIMATIC WinCC" symbol.

Example: Window with Runtime activated

The window shows the following information:

- Project name
- Project type
- Project status
- Computer List
  The local computer is represented in blue.

## Computer List

The computer list contains all computers on the network. If the project is activated, the connection status of all existing computers is shown.

The following table shows the icons of the connection status and their meaning:

| Icon | Status |
|---|---|
| | • No connection<br>• Connection disconnected |
| | • Local computer<br>• Redundant partner server |
| | Connected<br>• With standby server<br>• With master server, but standby server is the preferred server |
| | Connected<br>• With master server<br>• With standby server as preferred server |

# 3.6 Functionality and Prerequisites

## 3.6.1 Mode of operation of a service project

### Introduction

This chapter describes the mode of operation of a WinCC service project.

### Standard project

A standard project is started as follows:

- The user logs on to the system.
- The user starts WinCC Runtime or WinCC Runtime starts automatically.

WinCC Runtime remains active until one of the following cases occurs:

- The user exits WinCC Runtime.
- The user logs off from the system.
  In this case the system terminates WinCC Runtime.

### Service project

With a service project, WinCC Runtime is started as a service. Depending on the setting, these services are started at the following times:

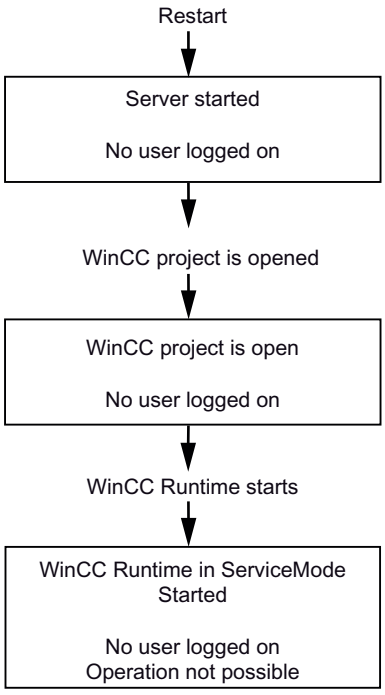
- Automatically after the operating system has started.
- After a user has logged on and started WinCC Runtime.

WinCC remains even if the user logs off again.

The WinCC Runtime data is still accessible.

A logged on user can activate runtime operation as required.

The following diagram shows the states between starting the server and automatic Runtime start with a service project.




## 3.6.2 Requirements for running a service project

### Requirements

Interactive operation is not generally desired in service projects.

#### Scripts

Since an interactive user is not normally logged into service projects, C scripts and VB scripts e.g. lead to problems in the following cases:

- If you require interactions, e.g. inputs.
- If you display message boxes.

#### Service project in a distributed WinCC scenario

You must set up a dedicated Windows user for a service project. The Windows user configured for the service project must belong to the "SIMATIC HMI" user group.

You can use a local Windows user or a Windows domain user. Observe the following points relating to a WinCC multi-user system and to distributed systems with server-server communication:

- Local Windows user
  The user must be a member of the local "SIMATIC HMI" user group on all the computers in the network. The password for this user must be identical on all computers.
- Windows domain user
  The user must meet one of the following conditions:
  - The user is a member of the local "SIMATIC HMI" user group on all computers.
  - The user is a member of a group which is in turn a member of the local "SIMATIC HMI" user group.

  **Note**

  The precondition for uninterrupted runtime of a WinCC service project is that the password of the configured user is not changeable and cannot expire.

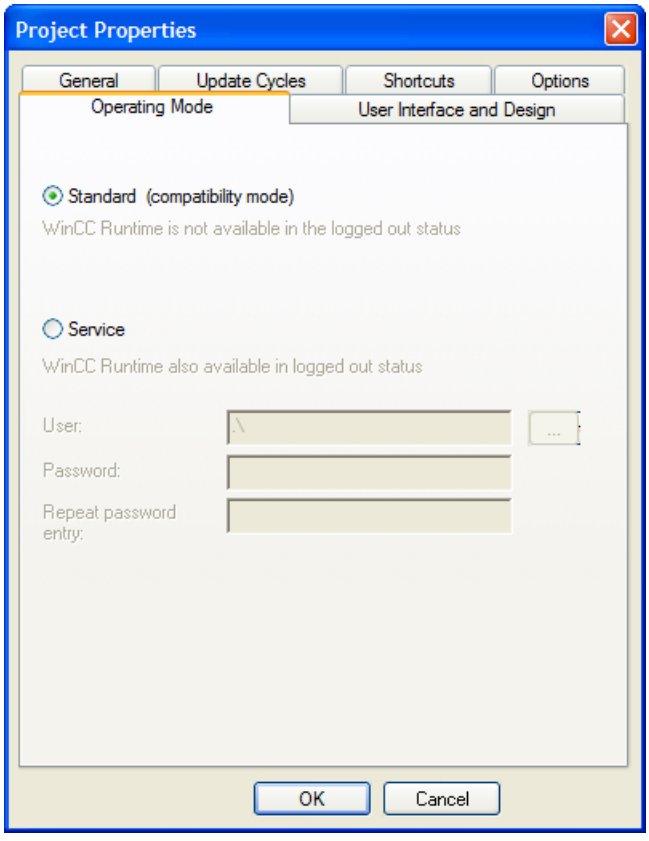
  To ensure this, activate the following options when setting up the user:
  - "User cannot change password"
  - "Password never expires"

# 3.7 Configuring WinCC ServiceMode

## 3.7.1 How to define a project as a service project

### Introduction

Specify in the project properties whether the project is run as a standard project or a service project.




### Procedure - defining a service project

1. Click the project name in the navigation window of the WinCC Explorer and select the Properties command in the shortcut menu.
   The "Project Properties" dialog opens.
2. Switch to the "Operating mode" tab.
3. Enable the "Service" option.
   WinCC shows a message that the project needs to be reloaded in order to convert the project.

4. Enter the user in the "User" field, under which the WinCC service project will run.
   For more information on the required properties of this user, refer to the section headed "Requirements for running a service project (Page 87) ".
5. Enter the associated password in the "Password" field.
6. Confirm the password in the "Password" field.
7. Confirm your entries by clicking "OK".
8. Reload the project.

## Setting up Autostart

WinCC can activate the desired project when the computer starts.

Enter the project in the "AutoStart Configuration" tool.

---

**Note**

**Project start during service restart**

If you have configured Autostart for a project, the project is also restarted when the "SIMATIC WinCC CCProjectMgr" service is restarted.

**Reconfigure Autostart after changing the operating mode**

After converting the service project to a standard project and vice versa, you must reconfigure Autostart.

---

## Procedure - setting up autostart

1. Open the Windows start menu and select "SIMATIC > WinCC" and then the "Autostart" command.
   The "AutoStart Configuration" dialog opens. The settings of the local computer are displayed.
2. Enter the computer name, select the local computer or select a computer in the network path with ...
   To display the current configuration of the selected computer, click "Read configuration".
3. Select the required project by clicking the ... button beside the "Project" box.
   The project file and its full path are entered in the box.
   The project type is displayed under the path.
4. Configure the settings for the autostart behavior.
5. Activate the option "Autostart active".
   If the option is deactivated, autostart is not executed for the configured computer.
6. Confirm your settings with "Apply" and close with "OK".
   The next time you boot the computer, WinCC starts automatically and the selected project is opened.

## Converting a service project to a standard project

If you want to convert a service project to a standard project, check the "Standard" option on the "Operating mode" tab.

## Converting a standard project to a service project

If you want to convert a standard project to a service project, check the "Service" option on the "Operating mode" tab.

**Note**

**Converting a standard project to a service project not generally possible**

A service project is subject to the restrictions. Note these before you perform a conversion. You can find additional information under "Using a service project and restrictions (Page 82)".

# 3.8 Service Project in Runtime

## 3.8.1 Service project in Runtime

### Introduction

WinCC creates the "SIMATIC WinCC" icon in the Taskbar Notification Area, the so-called System Tray. Execute the following functions via the shortcut menu of this icon:

- Start Graphics Runtime
- Exit Graphics Runtime
- Activate a project
- Deactivate a project
- Open diagnostics window

Additional information on this is available in the WinCC Information System in the chapter "Working with WinCC" > "Working with projects" > Annex > WinCC status and control in the system tray".

## 3.8.2 How to activate a service project

### Requirements

The project must be saved as a service project. You can find additional requirements in the section "Requirements for running a service project (Page 87) ".

### Procedure - automatic start of a service project in service mode

If automatic start was correctly configured for the project with the "Autostart Configuration" tool, the following is carried out:

- The project is automatically activated as soon as the server is started up.

User input is not required.

### Result - automatic start of a project in WinCC service mode

The project is activated. No user is logged on to the server.

### Procedure - manual start of a project in WinCC service mode

The following procedure assumes that automatic start is not configured for the project.

1. Start the server.
2. Log on to the server.

3. Open the project.
4. Select the command "Activate project" in the shortcut menu of the icon in the system tray. Alternatively, activate the project with the WinCC Explorer.

### Result - manual start of a project in WinCC service mode

The project is activated. WinCC displays the icon .

To ensure that WinCC Runtime remains active when you log off from the server, only exit the WinCC Explorer. To do this, select the "Exit WinCC Explorer" entry in the dialog "Exit WinCC Explorer". WinCC Runtime then remains active.

## 3.8.3 Show to log into and off of an activated service project

### Introduction

You can log into the service and log off again, while a WinCC project is in Runtime, in order to perform necessary work on the server.

**Note**

If updates are installed that require a restart, WinCC Runtime is ended.

### Requirements

A service project is activated. No user is logged into the server.

### Procedure

1. Log into the server.
2. Perform the desired actions.
3. Log back off of the server.

### Results

You logged into and off of the server. WinCC Runtime is not affected.

## 3.8.4 How to activate the interactive operation for service purposes

### Introduction

You can activate the interactive operation while a WinCC service project is in Runtime.

## Requirements

A service project is active. The interactive operation is not activated.

You log in as a user who is a member of the "SIMATIC HMI" group.

## Procedure - Activating the interactive operation

1. Log into the server.
2. Select the "Start Graphics Runtime" command from the pop-up menu of the icon in the tray area.
   WinCC releases the interactive operation. You can operate the WinCC project.

## Procedure - Ending the interactive operation

1. Select the "End Graphics Runtime" command from the pop-up menu of the icon in the tray area.
   WinCC ends Graphics Runtime.
2. Log off if necessary.

# Redundant Systems 4

## 4.1 Redundancy

### Content

The WinCC option "WinCC/Redundancy" is used to configure a redundant system. The availability of WinCC and the system are enhanced by parallel operation of two interconnected servers and automatic switching of the servers in the event of a malfunction.

### Overview

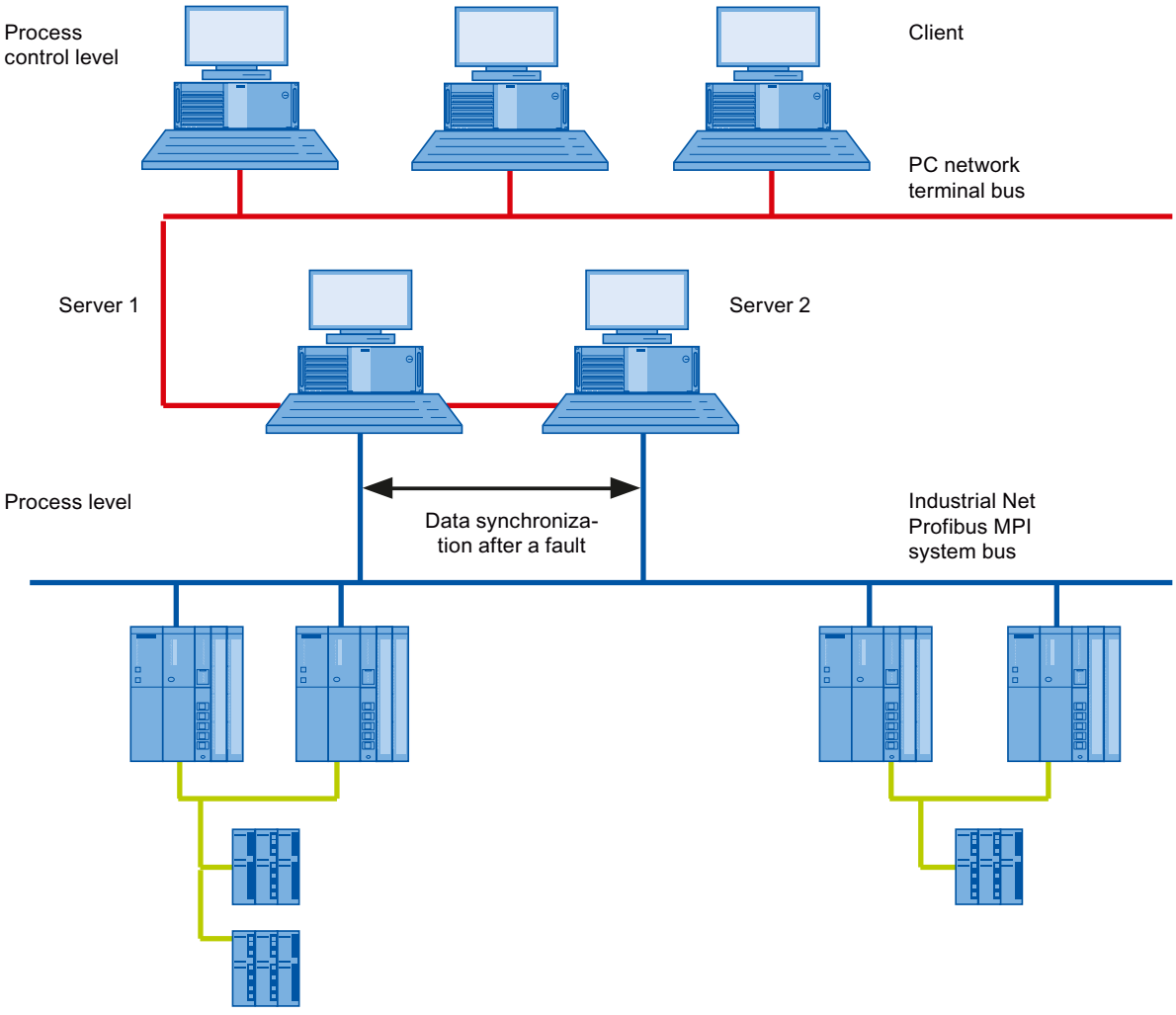
This documentation shows you the following:

- The requirements for a redundant system.
- How to create a redundant system in WinCC.
- How to configure the server for redundancy.
- How to configure the synchronization of the redundant archive.

# 4.2 WinCC Redundancy

## Introduction

A redundant WinCC project consists of two WinCC servers configured to perform the same functions and operating in parallel: one master server and one standby server. The two servers are connected to the automation system, the clients and each other.




## Overview of the functions of WinCC Redundancy

WinCC Redundancy provides the following functions:

- Automatic switching of clients if a server fails or the process connection fails.
- Automatic synchronizing of message archives, process value archives and user archives after a failed server has been restored or the process connection fault has been eliminated.
- Online synchronization of internal messages.

- Online synchronization of internal tags that support tag synchronization.
- Online synchronization of user archives.
- The "Project Duplicator" for copying a project to the redundant server.
- The "Application Health Check" function to monitor the WinCC applications.
- The "SelfDiagnosis" function for monitoring the hardware and software of the local system.

## The "Application Health Check" function

The "Application Health Check" function automatically monitors all important WinCC applications.

The lifebeat monitoring performs the following after detecting a software error:

- Set the server status in the "@RedundantServerState" system tag to "Fault".
- Authorize the connected clients to switch to the redundant server.
- Informing the user about the software error by means of a process control message. A process control message cannot be triggered if the alarm server caused the failure.

---

**Note**

If a software error was detected by the "Application Health Check" function and client switching was initiated, the relevant server must be restarted. Only then can the clients be reconnected to the server. The archives are synchronized retroactively up to the point where the software error was detected.

---

## The "SelfDiagnosis" function

The "SelfDiagnosis" function comprises the following tasks to ensure availability and stability of the redundant system:

- Monitoring and reporting local HW and SW problems
- Monitoring local system performance
- Monitoring the state of the data volume
- Server fail-over, if necessary

The following tasks are performed in case of malfunction:

- Restart of applications
- If necessary, the server state is set to "Fault" and the servers change over.
- A log entry is generated.
- A system alarm is triggered.

## 4.3 Requirements for redundant systems

### Overview

The following prerequisites must be fulfilled for WinCC Redundancy:

- For redundant WinCC servers with multi-user operation, you can only use computers with server operating systems.
- The WinCC Redundancy option must be installed on both servers. The WinCC Redundancy license must be installed on the redundant servers.
- The two redundancy servers must be configured functionally identical.
- You may not configure any further PCs as redundant servers in addition to the two redundant servers.
- The servers have to be time-synchronized servers. Time synchronization of the entire system is recommended. The time synchronization can be configured with the "Time synchronization" option in WinCC.
- Messages and acknowledgments from the automation systems and clients must always have a time stamp in the frame (chronological messaging). This prevents duplicate entries. For example, use alarm blocks in the automation systems.
- Process values, messages and active message blocks from the lower-level automation systems have to be sent to both servers at the same time.
- One of the following additional connections must exist between the redundant servers:
  - Network adapter
  - Serial connection

  This additional connection ensures exact definition of the "Master" or "Standby" status. You configure the additional connection via the network card in the WinCC Explorer using the "Redundancy" editor. Use the TCP/IP protocol with the corresponding IP address. The IP address must not be in the same subnet as the terminal bus.

---

**Note**

**Runtime behavior during commissioning of WinCC and activated WinCC Redundancy**

During commissioning, WinCC Runtime is often activated and deactivated on the server computers. This repeated starting with an activated WinCC Redundancy causes the archives to be synchronized every time. This may result in a notable deterioration of the WinCC runtime behavior. We therefore recommend that you deactivate WinCC Redundancy during commissioning.

---

**Note**

To safely exit WinCC in the event of a power failure, the use of an uninterruptible power supply (UPS) is recommended.

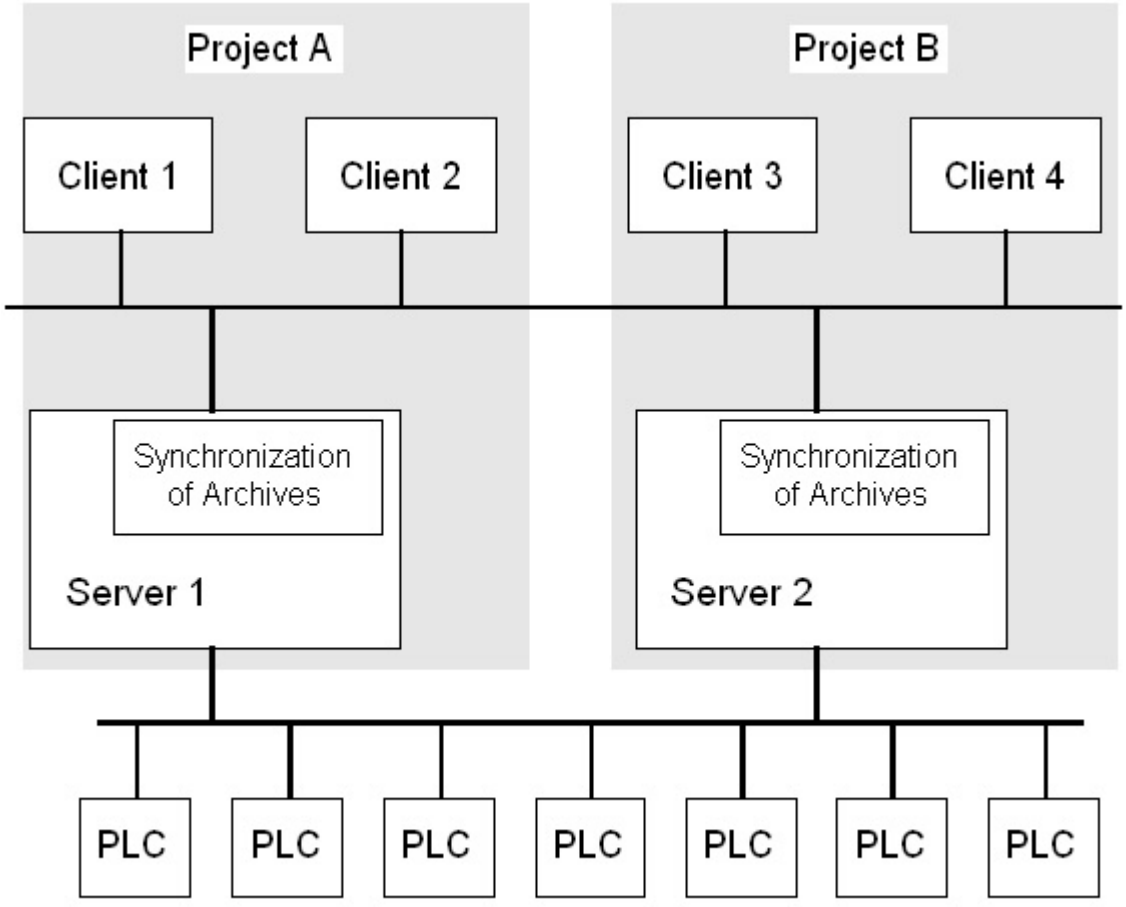
---

## 4.4 How Redundancy Works

### Introduction

Both servers have equal rights and work independently of each other. Both are available to the user. If one of the servers fails, an equal redundant server will always be available.

The following picture shows the archiving and the archive synchronization of parallel-redundant servers.




### Identification of the redundant servers

One of the two servers is configured as the default master. The system variable "@RM_MASTER" is set to "1" in Runtime for this server. If the status of the tag changes, for example, due to a computer failure, the clients switch over to the "standby" computer. The previous "Standby" computer is now the master.

The servers monitor each other in Runtime to allow for an early detection of a failing partner server. An additional connection via network adapter or serial connection between the servers is used to monitor the status. The connection leads to an improvement in the communication

between the redundant partner servers. This increases the availability of the redundancy. The additional connection is not used to synchronize the archives.

## WinCC archiving in normal operation

The servers usually run completely parallel in Runtime. Each server computer has its own process driver connection and has its own data archives. The process data and messages are sent by the automation systems to both redundant servers and are processed by both redundant servers accordingly.

User archives, internal messages and internal tags can be continuously synchronized online. The two servers communicate via LAN with the TCP/IP protocol to synchronize the archives.

## Failure of a server

If one server fails, the clients are automatically switched from the failed server to the redundant partner server. This ensures that all clients are always available for monitoring and operating the processes.

During the failure, the active server will continue to archive all messages and process data of the WinCC project. After the failed server comes back online, the contents of all message archives, process value archives and user archives are automatically copied to the returned server. This will fill the archive data gaps of the failed server.

---

**Note**

**Redundancy failure must be at least 69 seconds**

For technical reasons, in a redundant server system, the failure time until automatic synchronization of both systems must be at least 69 seconds.

---

## Factors triggering the client switch

The switch of the clients from the default (master) server to the partner server during a server failure is performed automatically by the system.

The following factors cause a switch of servers:

- Network connection to server failed
- Server failure
- Malfunction of process connection
- The "Application Health Check" function has detected a defective WinCC application and triggers a switchover.
- The project is deactivated.

If the redundancy option for client switchover in case of a fault in the process connection is activated, the number of defective logical connections to the "Master" server and the redundant partner server is cyclically determined. If the "Master" server has more defective logical connections than the redundant partner server, a client logged on to the "Master" server will be switched over to the redundant partner server.

Once the error in the process link has been eliminated, a client is switched back to the preferred server to which it was originally connected.

Monitoring of the process link will not be started until both redundant servers are in runtime.

**Note**

In the event of a software error on the server it is possible for connected clients not to be switched over to the redundant partner but for the system to be blocked.

## Factors triggering archive synchronization after the server returns

The synchronization of the archives between the servers will be initiated after the following errors have been corrected:

- Process connection error. You can, however, deactivate the process connection monitoring.
- Network connection failure to the partner server.
- Server failure.
- Project is not activated.

## Synchronization after the server returns

After the failed server has returned, WinCC Redundancy transfers the missing data to the failed server. This applies to the message archives, process value archives, user archives and internal tags. For message archives and process value archives, all segments that were active during the downtime are transferred. Two equivalent servers are available once again after the transfer.

The archive synchronization is implemented as a background function and runs parallel to the process management and archiving of WinCC. Therefore the operation and observation of the system is guaranteed at all times.

### Comparing internal tags

The internal tags must have the property "Tag synchronization".

Internal tags are compared on partner computers as soon as one of the tags is modified on one of the redundant servers.

The internal tags also include the system tags whose name starts with the "@" character, such as "@RM_Master". You may not configure an online synchronization for system tags.

## Synchronization after process connection error

If you have activated the process connection monitoring, synchronization of all archives is started automatically after the fault between a server and the automation systems has been eliminated.

If process connection monitoring has been activated, the respective server carries out lifebeat monitoring on all configured connections. A server detects that the process connection to an automation system is faulty when the addressed automation system fails to send an acknowledgment back to the server.

If a network fault to one or more of the automation systems was found, synchronization of all archives of the automation systems belonging the project is carried out. The archives of the automation systems that have not failed are also synchronized. If this option is deactivated, the runtime loads on the servers are prevented.

Because an error in the network of automation systems is not recognized when the monitoring of network connections is deactivated, no archive synchronization will take place.

## Online synchronization

Direct server-to-server synchronization is supported:

- With alarm logging for:
  - Internal message tags
  - Messages without tag connection
  - System operation messages
  - "Batch" messages
- For user archives
- For internal tags with tag synchronization

## Comparing blocked messages

When a failed server is restored, currently blocked messages are searched and synchronized through a general query of the automation systems.

If a message is blocked passively on only one server, the blocking information is synchronized.

# 4.5 Configuring the redundant system

## 4.5.1 Guide to Setting Up a Redundant System

### Introduction

Here you get an overview of how a redundant WinCC system is set up. You can find general information on the structure of a client-server system in the WinCC Information System section entitled "Distributed Systems".

### Entering the servers in Windows

The two redundant servers must recognize each other on the network. In addition, users/ passwords must be identical on the redundant servers. You have to set up the users with Administrator or User rights. Users have to be members of the "SIMATIC HMI" user group.

### Configuring the project on the server

The following is determined during the configuration of the WinCC redundancy:

- The standard master.
- The partner server.
- The switchover behavior of the clients.
- The type of archive synchronization.

Before duplicating the project, create the server package by using the "Server data" editor in WinCC Explorer. Create a server package preferably on the standard server.

**Note**

Only configure the user archives for the synchronization that you really need. The greater the number of user archives to be synchronized, the longer the synchronization process will take and the greater the system loads will be.

### Duplicating the WinCC project

To have a functionally equivalent WinCC project on the redundant partner server, duplicate the project from the default server using the "Project Duplicator". The master server and the standby server then have the same project settings.

**Note**

Before duplicating, make sure there is sufficient memory on the computer on which the project is duplicated. If you are duplicating an existing project, this project may not be open.

## Configuring the standby server

To monitor the status of the redundancy, you still have to set the additional connection to the master server on the standby server in the "Redundancy" editor.

## Configuring the clients

To use WinCC Redundancy on the clients, follow these steps in the "Serverdata" editor:

- Create the package of the default server
- Set the preferred server and activate the automatic updating of packages.

## Activating the redundancy servers

1. Activate initially the configured Master server.
2. Next start up the connected clients.
3. When the clients are active, activate the second server and its connected clients.

The first synchronization is now carried out. The downtime for this synchronization encompasses the interval between activating the first and second server.

---

**Note**

Please note during startup of redundant servers that the first server must be started completely prior to activating the redundant partner. During initial startup of servers, no clients must be active.

Once you have completely deactivated a redundant server pair, you must adhere to a specific sequence during reactivation. Activate the server first which was the last server to be deactivated. Once this server has been completed started, you can activate the redundant partner.

---

## Deactivating a redundant server

Please note that prior to deactivating a redundant server, the second server must be functional and operating without errors.

Archive synchronization must be completed prior to deactivation as indicated by the corresponding process control message.

---

**Note**

Data losses may occur if you deactivate the second server before the archive synchronization of the first server was completed. This is particularly important in case of frequent switching between activation / deactivation of the servers during commissioning.

---

## 4.5.2 Configuring an Identical Function

### Process data archives and message archives

Tag Logging and Alarm Logging must be configured in a functionally identical way for the redundant servers. You need identical archives, whereby additions can be made in the form of additional measurement points or archives. The extensions are not included in synchronization. You have to coordinate the extensions on the partner server yourself.

WinCC synchronizes the following archives that are based on hard disks:

- Process value archives
- Compressed archives
- Message archives

The synchronization of main memory archives is not performed.

### User archives

The user archives require the same structure on both servers:

The configuration of user archives that are going to be synchronized must be identical in terms of their properties as well as field and record structure.

---

Note

Synchronization of Changed Configuration Data Not Possible via Load Online Changes

Changes to user archive configuration data, such as deleted fields in the archive, cannot be transferred with an online download of changes to a redundant server pair.

---

### User administration (User Administrator)

Changes in the user management are not synchronized automatically. This also applies to the configuration in Runtime via the WinCC UserAdminControl.

If you want to configure changes to the user management, you have the following options:

- Configure the changes on the engineering station. Transfer the changes to the redundant servers.
- Configure the changes identically on both redundant servers.

### See also

WinCC Redundancy (Page 96)

## 4.5.3 How to configure the redundant servers

### Introduction

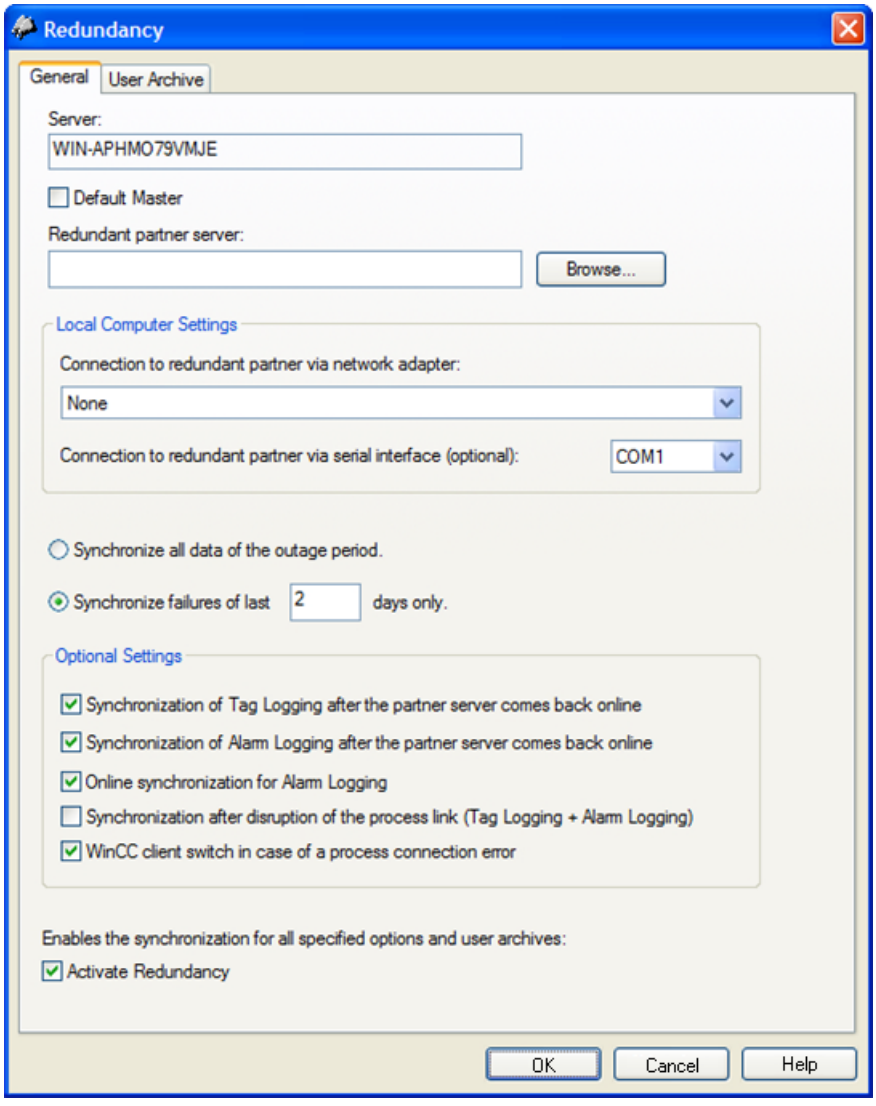
You use the "Redundancy" editor in WinCC Explorer to configure the redundant servers and synchronization of the archives.

### Requirement

The two redundancy servers must be configured functionally identical.

## Procedure

1. Open the "Redundancy" editor in WinCC Explorer. Go to the "General" tab. The "Server" field contains the name of the computer on which WinCC Redundancy is configured.




2. If you want to configure and use WinCC Redundancy, activate the "Activate Redundancy" check box.
3. Activate the "Default Master" option to specify that the server entered above is activated routinely as the master when both servers are being booted at the same time. If the option is not activated, the server becomes the standby server.

| NOTICE |
| --- |
| **Only one redundant server can be "default master"**<br>Ensure that the "Default Master" option is only activated at one of the two redundancy servers. Otherwise problems may arise during the redundancy switchover of clients. |

4. Enter the computer name of the partner server or click "Search".

5. Specify for the status monitoring whether there is a connection to the redundant partner via a network adapter. Connection via a network adapter is to be preferred to serial connection. If you want to use a serial connection, select an interface.
6. Specify the period for the synchronization after a failure. Activate either the option for all data or the option with a specifiable number of days.
7. At the optional settings activate those synchronizations that are to be carried out after the system comes back online or a fault is eliminated.
8. Click "OK" to save your settings.

---

Note

Restarting Runtime when Options are Changed

If you do not restart Runtime, only the changes in the following options become effective immediately:

- "Synchronization ... after the partner server comes back online".
- "Online synchronization for Alarm Logging".
- "Synchronization after process connection error...".

Changes to the other options take effect after restarting Runtime.

---

## 4.5.4 How to configure the synchronization of user archives

### Introduction

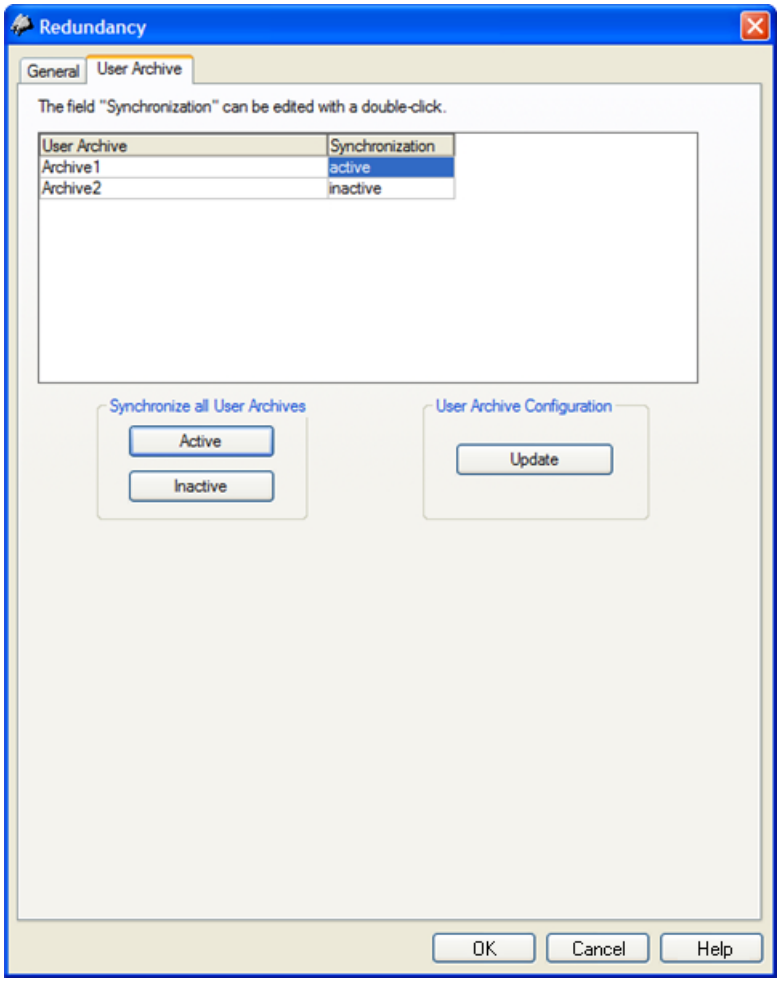
User archives can be processed by operations, independent programs or automation systems. For redundant systems configure the automatic synchronization of the user archives.

### Requirement

The configuration of the user archives must be identical on the two redundant servers. Use the Project Duplicator to this purpose.

## Procedure

1. Open the "Redundancy" editor in WinCC Explorer. Open the "User Archive" tab.




2. In the "User Archive" column, all configured user archives are displayed by row. Activate or deactivate the synchronization of the individual user archives by double-clicking the "Synchronization" column. The settings have to be identical on both partner servers.
3. The two buttons at the "Synchronization of all User Archives" field are used to activate or deactivate the synchronization of all displayed user archives.
4. Has the configuration of the user archives in the "User Archive" editor changed after the "Redundancy" editor was called up? If so, click the "Update" button to apply the current configuration of the user archives.
5. Click "OK" to save your settings.

---

**Note**

**Synchronization of Changed Configuration Data Not Possible via Load Online Changes**

Changes to user archive configuration data, such as deleted fields in the archive, cannot be transferred with an online download of changes to a redundant server pair.

---

**Note**

**Restarting Runtime after changes in the archive synchronization with the User Archive**

Changes to the archive synchronization with the User Archive only take effect after Runtime has been restarted..

### Editing user archives in parallel

Note the following when adding records to redundant user archives in parallel:

- Records can only be added to a previously failed server if the synchronization is made after the return. Otherwise, you will get an error message in the script or in the user archive control.
- Even during the online synchronization, some time will pass before the record has been synchronized in the redundant archive.

**Note**

If both server computers fail or both computers are shut down, you must first start the server computer that was used last. Otherwise, changes that have not been saved could be lost.

### See also

Failure scenarios (Page 118)

WinCC Redundancy system messages (Page 125)

How to configure the redundant servers (Page 106)

Guide to Setting Up a Redundant System (Page 103)

WinCC Redundancy (Page 96)

## 4.5.5 How to Duplicate a Project for Redundant Servers

### Introduction

The two redundant servers must be set up to be functionally identical with regard to their hardware and software. After completing the WinCC configuration and after every change in the WinCC project, use the WinCC Project Duplicator to generate the redundant partner project.

The Project Duplicator performs the following:

- Copying of all associated project data, such as pictures, scripts and archives to the redundant partner.
- Configuring all the required settings on the target computer, if the computer is already configured for the use of WinCC Redundancy.

You must change computer-specific settings manually afterward.

**Note**

To transfer a project to a redundant server, you cannot use the Windows Explorer.

You can save minor changes using the function for downloading changes online in SIMATIC Manager and then transfer them to the servers in runtime.

## Principle

Select the project you want to duplicate in the Project Duplicator.

Specify the target computer and folder in which the project is duplicated. The project folder is created in this target folder.

You cannot duplicate a project on the local computer. You always duplicate a project on another computer in the network to which you have access rights.

Depending on the status of the project, you can copy the configuration data and the runtime data into the selected folder:

| Project Status | Configuration Data | Runtime Data |
|---|---|---|
| Project closed | + | + |
| Project open and deactivated | + | - |
| Project in Runtime | + | - |

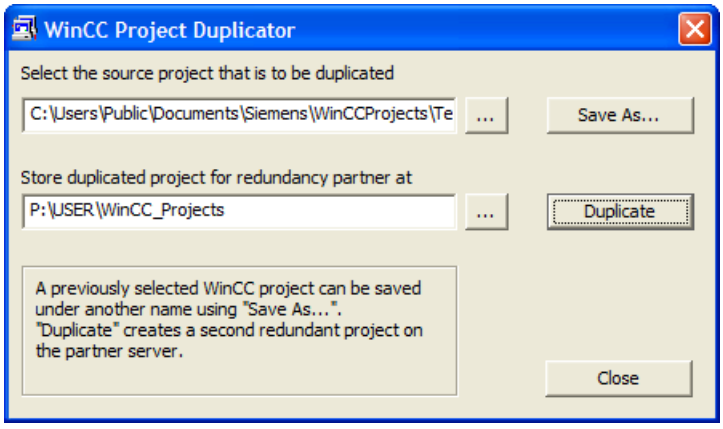
You can only duplicate the entire project and the entire folder structure. You cannot exclude any data or folders from the duplicate operation.

## Requirements

- The WinCC Redundancy option is installed on both computers.
- The target folder for the duplication is created on the target computer and is made available for access.
- You have access rights for the target folder.
- The target computer has enough free space on the hard disk.
- The correct WinCC version must be installed on the target computer. The computer must be started.
- Runtime is deactivated on the target computer.
- The project is closed on the target computer.

## Procedure

1. In the Windows start menu, select the "Project Duplicator" entry in the "SIMATIC > WinCC > Tools" folder. The WinCC Project Duplicator is opened.




2. Enter the project you want to duplicate in the "Select the source project that is to be duplicated" box. Enter the path and the <PROJECT>.MCP project file directly or search by clicking the ... button.
3. Enter the path where the duplicated project will be stored in the "Store duplicated project for redundancy partner at" box. Enter the folder path and the <PROJECT>.MCP project file directly or search by clicking the ... button.
4. Click the Duplicate button.
   The "Copy" window is opened. During duplication, the Project Duplicator displays the files and folders with a progress bar. Use the "Cancel" button to stop duplication.
   After duplicating the "Notes on the Project Duplicator" window is opened. WinCC indicates the settings that you still need to check.

   **Note**

   If you duplicate an open WinCC project on the source computer, no progress bar will be displayed.

5. Close the Project Duplicator with the Close button.
6. Check the settings in the duplicated project and change them if necessary.
7. Check the following:
   - The computer name.
   - The settings in the Redundancy Editor.
   - If necessary, the settings in the editors.

## Duplicating a project with project-based access protection

SIMATIC STEP 7 must be installed in order to transfer a WinCC project with project-based access protection to a redundant server.

When you click the "Duplicate" button in the "WinCC Project Duplicator" dialog, you have to enter the password for the STEP 7 project.

If SIMATIC STEP 7 is not installed or you enter the wrong password, the Project Duplicator aborts with an error message.

## 4.5.6 How to duplicate a redundant project at runtime

### Introduction

If you edit a redundant project, you can also update the project on the redundant server during operation.

You can save minor changes with the Save Online Changes function and then transfer them to the servers. You should also refer to the documentation on the topic of "Load Online Changes".

### Duplication using the Project Duplicator

Some configuration cannot be saved by the download online changes function. In this case, you must generate a duplicate of the project to the redundant server using the Project Duplicator.

---

**Note**

**No Redundancy**

For changes during normal operation, you must deactivate one of the partner servers. During this time, no redundancy is available.

---

### Requirements

- The target folder has been created.
- You have access rights for the target folder.
- The redundant server on which the copied project will be stored has enough free hard disk space.

### Procedure

This chapter describes how to use this function in a redundant system with the two servers Server1 and Server2.

1. Exit Runtime on the redundant Server1 and close the project.
2. Make the configuration changes on Server2 in Runtime and save the changes.
3. Start the Project Duplicator on Server2.
4. Use the "Duplicate" button to duplicate the project on Server1 to the target folder of the project deactivated under "1." and overwrite the project.
5. Open the project on Server1.

6. Check the settings.
7. Start Runtime and wait for the redundancy synchronization.

# 4.6 Scenarios for WinCC Redundancy

## 4.6.1 Client switchover in the event of a process connection error

### Overview

A redundant system consists of two functionally identical servers. One server is the "Master" server and the other is the redundant partner server.

The servers have the following status in the undisturbed operating state:

- The master server has the status "master".
- The redundant partner server has the status "standby".

Clients are connected to the respective preferred server or to the master server if no preferred server has been specified.

As soon as both servers are in Runtime, the processes coupling monitoring is activated. WinCC Redundancy determines cyclically the number of defective logical connections of the "Master" server and the redundant partner server.

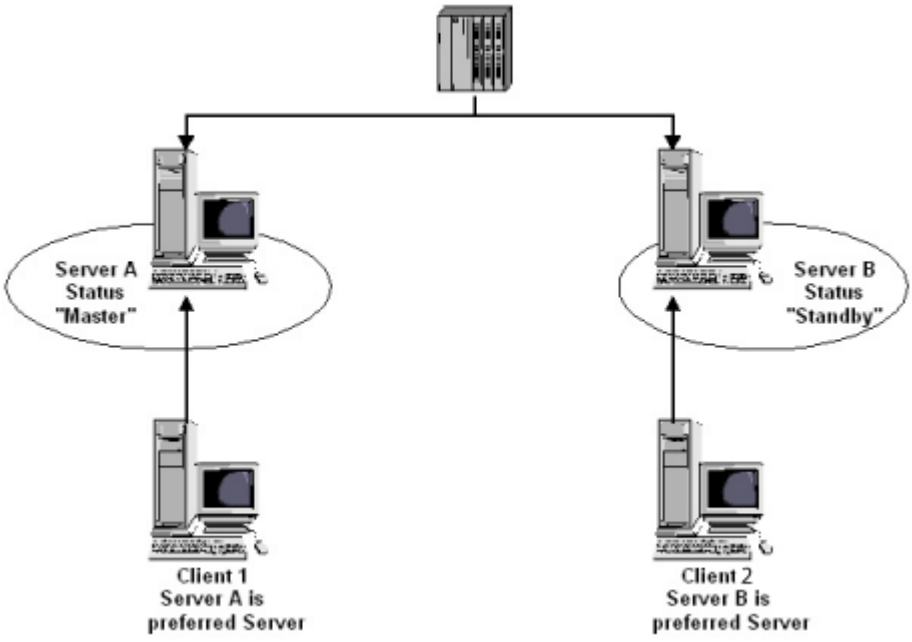
If the "Master" server has more defective logical connections than the redundant partner server, the status of the server is set to "Fault" in the "@RedundantServerState" system tag. The clients are switched over to the redundant partner server, which now has the "Master" status.

### Normal operating state

The system is made up of the following computers:

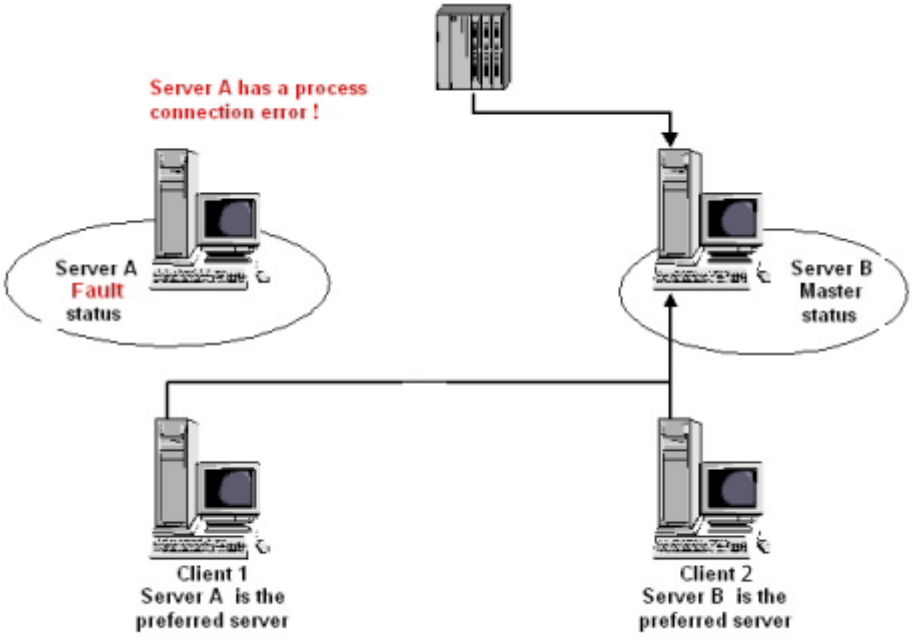
- Redundant Server A
- Redundant Server B

- Client 1 with preferred server A
- Client 2 with preferred server B



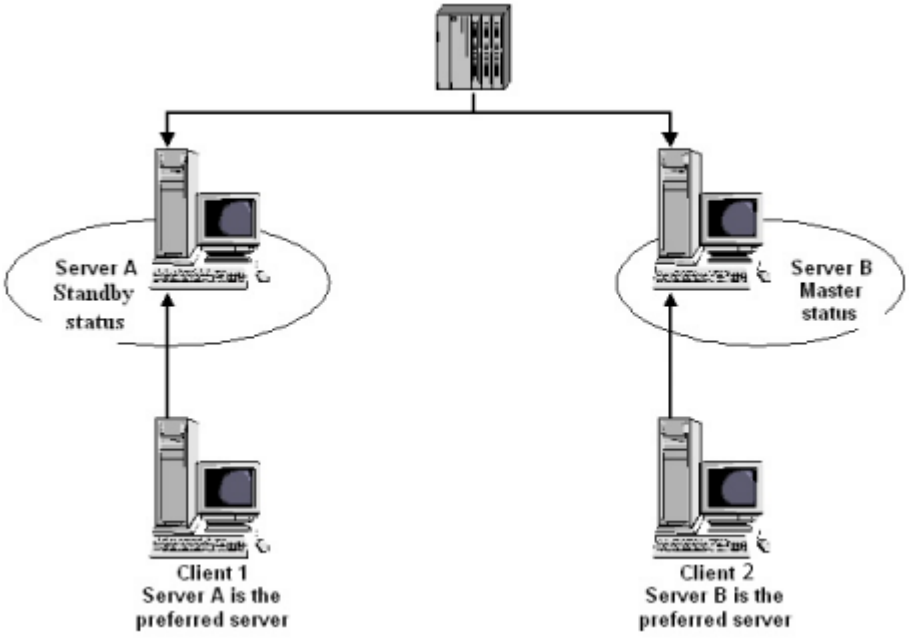

## Process connection error on server A

There is a process link error on server A. The error is not present on server B. The number of defective logical connections on server A is greater than on server B. Server A therefore receives the "Fault" status. As a result, Client 1 switches over to the redundant server B.



## End of the process link error

When the process link error on server A has been cleared, server A then has the status "Standby". Client 1 then switches over to Server A because the server is entered as its preferred server. Client 2 remains connected to Server B as its preferred server.




**Note**

The OPC couplers are not monitored. Therefore, no client switching in case of an error of the OPC couplers takes place.

## See also

Failure scenarios (Page 118)

How to configure the synchronization of user archives (Page 108)

How to configure the redundant servers (Page 106)

Guide to Setting Up a Redundant System (Page 103)

WinCC Redundancy (Page 96)

## 4.6.2 Failure scenarios

### 4.6.2.1 Failure scenarios

#### Introduction

We use some failures that occur in reality to illustrate how WinCC Redundancy works.

1. Scenario 1: Project on server computer not in Runtime (Page 119)
2. Scenario 2: Connection Fault to Partner Server (Page 121)
3. Scenario 3: Faulty Network Connection to Client (Page 122)
4. Scenario 4: Faulty Process Connection (Page 123)
5. Scenario 5: Software Error (Page 124)

WinCC Redundancy will recognize the current error itself or react to error messages with the following actions:

- Saving times of events.
- Archive synchronization.
- Changing the "Master" and "Standby" identifiers.
- Switching clients.
- Triggering messages.

#### Startup of the server PCs

When the server PCs are starting up, the redundancy component establishes whether the partner server is already active.

- If the partner server is already active, the "Standby" status is set in the server computer.
- If the partner server is not active during startup, the "Master" status is set in the server computer.

#### WinCC redundancy system tags

The status of the server computer is saved in the "@RM_MASTER" system tag.

| Status of server computer | "@RM_MASTER" status |
|---|---|
| Master | 1 |
| Standby | 0 |

The "@RM_MASTER_NAME" tag contains the name of the server system that has the "Master" status, e.g., "Server1".

The "@RedundantServerState" tag displays the redundancy status for each redundant server, e.g., "Standby".

Redundancy only sets the above tags. Both servers are always completely equal.

Scripts or other applications can evaluate these tags. Only the "@RM_MASTER" tag can be changed.

An overview of the system tags in available under WinCC Redundancy System Tags (Page 125) .

### Exchanging status information

The status of the redundancy is controlled via a separate connection. The connection can be established as follows:

- Using a network adapter
- Using the serial interface

Connection via a network adapter is to be preferred to serial connection.

**Note**

Note that the archive synchronization is performed via the terminal bus. The archive synchronization is not executed via the status connection.

## 4.6.2.2 Scenario 1: Project on server computer not in Runtime

### Introduction

This scenario shows the behavior of WinCC Redundancy when the project on Server2 was deactivated.

The following actions will be triggered:

- Server1 stores the downtime with date and time of Server2.
- Server1 will report the failure of Server2 through a system message.
- If Server1 is the standby server, Server1 takes over the role of the master server. The "@RM_MASTER" tag is set and the "@RM_MASTER_NAME" and "@RedundantServerState" tags are changed.
- The clients connected to Server2 switch over to Server1.

### Server2 comes back online

The downtime means that there is a gap in the archives of Server2. This gap will be filled by the following measures:

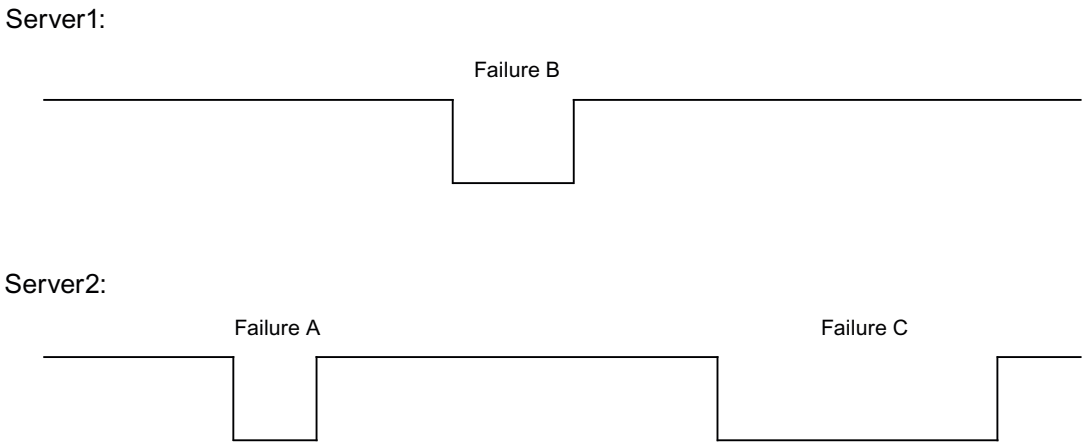
- Server1 stores the return time with date and time of Server2.
- Server1 reports the return of Server2 through a system message.

- A redundancy synchronization for the following archive from Server1 is executed on Server2.
  - Message archives
  - Process data archives
  - User archives
- With Server1 "@RM_MASTER" remains set, with Server2 "@RM_MASTER" is reset. "@RM_MASTER_NAME" and "@RedundantServerState " remain unchanged at both servers.
- Clients, which are configured with Server2 as their preferred server, switch back to Server2.

Compared to online synchronization, archive synchronization after a server failure can take longer. The duration of the synchronization depends on the number of records to be synchronized and the computer and network load.

## Alternating Failure of the Server

If failures alternate between the two servers, they are synchronized one after the other. After the synchronization, all data is available in both archives.




If the synchronization was configured, a synchronization is always performed.

### Failure A

Server1 transfers all values to Server2.

### Failure B

Server2 transfers all values to Server1.

### Failure C

Server1 transfers all values to Server2.

All these processes run automatically in the background, independently of the process value archiving and message archiving from the lower-level automation systems taking place at the same time.

### 4.6.2.3 Scenario 2: Connection Fault to Partner Server

#### Introduction

This scenario shows the behavior of redundancy in the case of a connection failure to the partner server. Prior to the occurrence of this event, both servers run in Runtime without failures.

The described connection failure occurs if, for example, the network connection at Server1 is pulled.

#### Initial Situation 1

When the connection fails, Server 1 is the master server and Server 2 the standby server.

**Connection failure occurs**

The following reactions are triggered when the connection fails:

- Server2 becomes the master server and saves the time of the failure with date and time.
- Server2 displays a system message stating that the partner server has failed and Server2 is now the master server.
- Tags "@RM_MASTER", "@RM_MASTER_NAME" and "@RedundantServerState" are adapted accordingly on both servers.

**Connection is restored**

During the connection failure, the messages of Alarm Logging and the user archives were not synchronized.

The following measures are carried out:

- Master Server2 stores the time of the return.
- Server2 displays by way of a system message the return of the partner server.
- Redundancy synchronization from master server to standby server.
- Through online synchronization of the Alarm Logging, the following is reported from Server1 to Server2 and display on Server1 as a system message:
  - An error has occurred in the redundant operation.
  - Server1 has switched to "Standby" status.
  - Return of Server1.
- The "@RM_MASTER", "@RM_MASTER_NAME" and "@RedundantServerState" tags remain unchanged on the two servers.

#### Initial Situation 2

When the connection fails, Server 1 is the standby server and Server 2 the master server.

#### Connection failure occurs

The following reactions are triggered when the connection fails:

- Server2 remains the master server and saves the time of the failure with date and time.
- Server2 displays the failure of the partner server by means of a system message.
- Server1 changes to the "Fault" status. The clients with Server1 as the preferred server switch over to Server2.
- The "@RM_MASTER", "@RM_MASTER_NAME" and "@RedundantServerState" tags remain unchanged on the two servers.

#### Connection is restored

During the connection failure, the messages of Alarm Logging and the user archives were not synchronized.

The following measures are carried out:

- Server2 stores the time of the return.
- Server2 displays by way of a system message the return of the partner server.
- Redundancy synchronization from master server to standby server.
- Through online synchronization of the Alarm Logging, the following is reported from Server1 to Server2 and display on Server1 as a system message:
  - An error has occurred in the redundant operation.
  - Return of Server1.
- The "@RM_MASTER", "@RM_MASTER_NAME" and "@RedundantServerState" tags remain unchanged on the two servers.

### 4.6.2.4 Scenario 3: Faulty Network Connection to Client

#### Introduction

In this scenario, there is a disturbance in the network connection between Server2 and the "CL5" client belonging to Server2. Server1 is the master server.

The following reaction is triggered:

- Client "CL5" automatically switches over from disturbed Server2 to running Server1.

#### End of the network disturbance to the client

The following reactions are triggered at the end of the network disturbance:

- The "@RM_MASTER", "@RM_MASTER_NAME" and "@RedundantServerState" tags remain unchanged on the two servers if Server1 was already the master server before the failure.
- The client "CL5" switches back to the preferred server, Server2.

### See also

WinCC Redundancy System Tags (Page 125)

Scenario 2: Connection Fault to Partner Server (Page 121)

Scenario 1: Project on server computer not in Runtime (Page 119)

Failure scenarios (Page 118)

Scenario 4: Faulty Process Connection (Page 123)

## 4.6.2.5 Scenario 4: Faulty Process Connection

### Introduction

In this scenario, there is a fault on the process connection on Server2 due to an interrupted network connection to the automation systems.

### Failure of a connection to an automation system

The connection failure to an automation system is only recognized in WinCC Redundancy if the connection to a server is faulty.

An interruption in the connection of an automation system to both servers is not a failure in terms of redundancy, for example, the failure of an automation system..

### Reaction to an Error

If WinCC recognizes a failure, the following actions will be triggered:

- The disturbance of the process link is reported on Server2.
- Server1 receives a message that partner Server2 has failed.
- Server1 saves the time of the error on Server2 with date and time.
- If you have configured the "Client change with disturbance in the process connection" option in the "Redundancy" editor, the clients connected to this server are switched over to the partner server.
- With Server1, the "@RM_MASTER" tag is set to "Master", with Server2 to "Standby". The "@RM_MASTER_NAME" and "RedundantServerState" tags are adapted accordingly. The "@RedundantServerState" tag is set to "Fault" at Server2.

### End of the process link error on Server2

Provided process connection monitoring has been activated, the gap in the archive of Server2 will be filled by the following measures:

- Server1 stores the return time of Server2.
- A redundancy synchronization is carried out from Server1 to Server2, since no faults were found for process connection on Server1. The data of all automation systems are synchronized, including the data of the automation systems without faults.

- With Server2, the "@RedundantServerState" tag is changed from "Fault" to "Standby".
- The correction of the process link error on Server2 is announced by a system message.

### 4.6.2.6 Scenario 5: Software Error

#### Introduction

In this scenario, an error occurs on Server2 in software that is being monitored. At this time of the failure, Server2 has the "Master" status and Server1 the "Standby" status. Several clients are connected to both servers.

If the "Application Health Check" function detects an error in the WinCC software, the following actions are initiated:

- "Application Health Check" reports the fault to WinCC Redundancy. The status of Server2 is set to "Fault" in the "@RedundantServerState" tag. The "@RM_Master" tag is set to "Standby".
- With Server1 "@RM_Master" is set to "Master". "@RM_MASTER_NAME" and "RedundantServerState" are adapted accordingly.
- The clients connected to Server2 switch over to Server1.
- A process control message informs users of the software error if the the alarm server itself has not caused the error.

#### Measures at the end of the software error on Server2

Deactivate the affected Server2 project. Restart Server2. When the project is activated on Server2, the archives are automatically synchronized.

- With Server2 "@RedundantServerState" is set to "Standby". Server1 remains the "Master".
- Server1 stores the return time of Server2 with date and time.
- Reconnecting to this server is now possible. Archive synchronization is only performed retroactively to the moment when the software error of Server2 was detected.

#### See also

WinCC Redundancy System Tags (Page 125)

Scenario 3: Faulty Network Connection to Client (Page 122)

Scenario 2: Connection Fault to Partner Server (Page 121)

Scenario 1: Project on server computer not in Runtime (Page 119)

Failure scenarios (Page 118)

Scenario 4: Faulty Process Connection (Page 123)

## 4.6.3 WinCC Redundancy System Tags

### Overview

The "@RM_MASTER" and "@RM_MASTER_NAME" system tags are used by WinCC Redundancy for Master/Standby control of the two redundant servers and for client switchover. You can read the tags with other applications or scripts, but only "@RM_MASTER" can be changed. The tags are located in Tag Management under "Internal tags" in the "Redundancy" tag group.

You have to open the "Redundancy" editor in WinCC Explorer and close it again using "OK" so that the system tags are set up by WinCC Redundancy.

| System tags | Description |
|---|---|
| @LocalMachineName | Contains the local computer name. |
| @RedundantServerState | Displays the redundancy status of the server:<br>0: Undefined status or start value<br>1: Server is "Master"<br>2: Server is "Standby"<br>3: Server is "Fault"<br>4: Server is standalone or no redundant operation |
| @RM_MASTER | Identifies the master server. If the server becomes the standby server, "@RM_MASTER" is reset. |
| @RM_MASTER_NAME | Name of the master server. |
| @RM_SERVER_NAME | Name of the server to which a client is connected. |
| @RM_UA_ONL_"Archiv name" | Is used for diagnostics. A separate tag with the corresponding tag name is inserted for each user archive.<br>The tag has the value "1" when a user archive has changed. After online synchronization the tag has the value "0" again. |
| @RM_Offline_UA_Name | Is used for diagnostics. The tag contains the name of the user archive that has just been synchronized. |

### See also

WinCC Redundancy system messages (Page 125)

## 4.6.4 WinCC Redundancy system messages

### Overview

WinCC Redundancy provides a series of system messages. You have to select the command "WinCC System Messages..." in the "Options" menu of the Alarm Logging editor to use the system messages.

The following system messages can be output by WinCC Redundancy:

| Message No. | WinCC Message Text |
|---|---|
| 1012200 | REDRT:Partner station fails<br>WinCC was terminated on the partner server. |
| 1012201 | REDRT:Partner station restarts<br>WinCC was restarted on the partner server |
| 1012202 | REDRT:Projects are not functionally identical |
| 1012203 | REDRT:Archive synchronization failed |
| 1012204 | REDRT:Internal error in Redundancy |
| 1012205 | REDRT:Communication error to partner<br>The connection to the partner server failed |
| 1012206 | REDRT:Communication to partner reestablished<br>The connection to the partner server is restored |
| 1012207 | REDRT:Partner server - WinCC not activated<br>Upon startup, system detected that WinCC was not started. |
| 1012208 | REDRT:Archive synchronization started<br>This message is issued at the start of an archive synchronization |
| 1012209 | REDRT:Archive synchronization complete<br>This message is issued at the end of an archive synchronization |
| 1012216 | REDRT:Synchronization interrupted<br>Synchronization was interrupted by another failure |
| 1012217 | REDRT:Partner server project not activated<br>During start-up the system detects that WinCC is not running on the partner server or that it is not in Runtime |
| 1012218 | SWITCH:Client was automatically switched<br>Client was automatically switched to the partner server |
| 1012219 | SWITCH:Client was manually switched<br>Client was manually switched to the partner server |
| 1012220 | REDRT: Synchronization not ready for all user archives<br>The synchronization is not ready for all locally configured user archives, because the archive structure on the partner server differs for at least one archive or synchronization has not been activated on the partner server. |
| 1012221 | REDRT: Synchronization ready for all user archives.<br>The synchronization is ready for the locally configured user archives and the archive structure corresponds to that of the partner server. |
| 1012226 | REDRT:Partner server project activated<br>During start-up the system detected that WinCC is activated on the partner server. |
| 1012227 | REDRT:Error - partner computer not a server<br>During start-up the system detected that the configured partner computer is not a server. |
| 1012240 | REDRT: Error<Error Description> in <Name of Application> triggers switch.<br>Switch was triggered by Application Health Check due to an error in the named application. |
| 1012241 | REDRT: Switch to status <Status Description><br>Message indicating status change. |
| 1012244 | REDRT: Overload during online synchronization of alarm logging<br>Number of messages to be synchronized is too large. |
| 1012245 | REDRT: Loss of serial connection |
| 1012246 | REDRT: Serial connection reestablished |

| Message No. | WinCC Message Text |
|---|---|
| 1012247 | REDRT:<Computer name where the message was generated> OS Server (Master) <Computer name> OS Server (Standby) <Computer name> Redundancy error<br>Depending on the failure scenario, the master server and the standby server or one of the two servers sends the redundancy error. Redundancy is endangered. |
| 1012248 | REDRT: OS server (standby) redundancy reestablished |
| 1012349 | REDRT: Connection via network card (MAC) address lost<br>The connection to the partner server via redundant LAN is interrupted or lost. |
| 1012350 | REDRT: Connection via network card (MAC) address reestablished<br>The connection to the partner server via redundant LAN is reestablished. |
| 1012351 | REDRT:RedundancyControl: System blockage detected. Switch to Fault status. |
| 1012352 | REDRT:RedundancyControl: System blockage detected. Restart your computer as soon as possible. |
| 1012354 | RedundancyControl: Status in FAULT changed, but server isolation is not activated |
| 1012355 | RedundancyControl: Status in FAULT changed, but server isolation is locked by @1%s@ Reason: @2%s@ |
| 1012356 | RedundancyControl: Status in FAULT changed => server is isolated |
| 1012357 | RedundancyControl: Status in FAULT changed, but automatic restart is not activated |
| 1012358 | RedundancyControl: Status in FAULT changed, but automatic restart is locked because the network adapter is disconnected and DHCP is enabled |
| 1012359 | RedundancyControl: Computer restart is locked by @1%s@ Reason: @2%s@ |
| 1012360 | RedundancyControl: Computer restart was canceled because the last restart was executed while less than @1%s@ s have expired |
| 1012361 | RedundancyControl: Computer restart was canceled because no further restart is permitted for the duration of @2%s@ s after @1%s@ restarts |
| 1012362 | RedundancyControl: Restarting computer in @1%s@ s |
| 1012700 | Self-diagnostics: Value @7%s@ of node @10%s@ is invalid. |
| 1012701 | Self-diagnostics: Value @7%s@ of node @10%s@ has exceeded the HIGH error limit. |
| 1012702 | Self-diagnostics: Value @7%s@ of node @10%s@ has undershot the LOW error limit. |
| 1012703 | Self-diagnostics: @100%s@: Value @7%s@ of station @10%s@ has violated the warning limit HIGH. |
| 1012704 | Self-diagnostics: @100%s@: Value @7%s@ of station @10%s@ has undershot the LOW error limit. |
| 1012705 | Self-diagnostics: @100%s@: Value @7%s@ of node @10%s@ no longer exceeds the error limit. |
| 1012706 | Self-diagnostics: @100%s@: Value @7%s@ of node @10%s@ is OK. |
| 1012707 | Self-diagnostics: @100%s@: Node @10%s@ causes @2%s@. |

## See also

WinCC Redundancy System Tags (Page 125)

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