SIEMENS

SIMATIC

WinCC Option
Client-Server

Description	08.97

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1 General Information

The implementation of WinCC in heavy machine construction and in plant construction requires a combination of multiple coordinated operator stations in a common connection with networked PLCs. The individual operator stations (PCs) are connected to each other by means of a Windows network. This means that all of the PCs linked in a Client/Server relationships must have a network connection.

The following aspects are of interest for coordinated, networked control and monitoring:

– System configuration

– Coordination in the creation phase (Configuration System)

– Coordination of the process control and monitoring during the run-time phase (Runtime)

– Coordination of on-line configuration

WinCC offers (starting with version 3) a system which accomplishes the tasks listed above through its client/server architecture.

▶ **Practical and Theoretical Limits in the Implementation of Client/Server:**

– Theoretically, due to software-technical limitations, WinCC can accommodate a maximum of 64 nodes (63 WinCC clients, 1 WinCC server) in one project.

– Actually, however, the type and implementation of the process communication selected for the WinCC server is of great significance for a realistic number of WinCC clients. The system can be implemented with up to 8 WinCC clients.

▶ **General Prerequisites:**

– The WinCC server works exclusively based on Windows NT 4.0™ with hardware equipment of at least a PENTIUM 133MHz with 64MB RAM.

– All WinCC clients area available under Windows® 95 as well as Windows NT 4.0™ and have a hardware requirement of at least a PENTIUM 133 MHz with 32 Mbytes RAM.

– Process communication of the WinCC server (process data server) in the client/server system is no diffeerent from that of a WinCC single user system under Windows NT 4.0™.

– The required communication drivers must be installed on the WinCC server and the clients. An authorization of the clients is not required.

▶ **Time Synchronization:**
There is no time synchronization between server and clients. Archiving takes place centrally on one computer and this means that all of the time stamps in a project originate from the same clock. The option packages can provide synchronization with the PLC layer. A DCF77 signal clock can be incorporated into all of the WinCC stations.

1.1 Clarification of Terms

The introduction of the client/server concept means that new terms are now used in WinCC. The following description is a list of these terms with a brief definition for each.

Term	Definition
Server	Windows NT 4.0™ server, work station, or Windows® 95 as a server
Network Server	The PC on which the administration of the Windows network is executed
WinCC Server	A PC with Windows NT 4.0™ workstation as operating system In a WinCC project, **this PC has the only** connection to the process (process data server). The Sybase SQL Server (<u>D</u>ata <u>B</u>ase <u>M</u>anagement <u>S</u>ystem) runs on this PC.
WinCC Client	A PC with Windows® 95 or Windows NT 4.0™ workstation as operating system This PC does **not** have a process driver connection.
File Server	The PC with all of the project-specific data (pictures, database files, scripts, report layouts, etc.). The data are stored in the project folder *[project_dir]* . Normally, the project folder is located on the WinCC server. This can also be a PC on which no WinCC applications are installed.
Message Server	The message server is always on the WinCC server. This is the PC in a WinCC project on which the acquisition and archival of messages is coordinated.
Message Client	These are all of the PCs in a WinCC project on which messages are displayed and acknowledged. Alarm Logging run time must be running. The message server coordinates the acquisition and storage of the messages.
Archive Server	The archive server is always on the WinCC server. This is the PC in a WinCC project on which the acquisition and archival of process data is coordinated.

Archive Client	These are all of the PCs in a WinCC project on which the process data can be output.
	The data is output from archives and is displayed in trends and tables.
	Alarm Logging run time must be running.
Script Server	The script server is always on the WinCC server.
	Script run time must be running.
Script Client	These are all of the PCs in a WinCC project on which scripts and functions can be executed.
	Script run time must be running.
Text Server	The text server is always on the WinCC server.
	Text Library run time must be running.
Text Client	These are all of the PCs in a WinCC project on which text is output.
	Text Library run time must be running.
Operator Station	A WinCC server or client with the appropriate applications

1.2 Remote Client

A WinCC client is not assigned exclusively to one project. Depending on the need, it can **switch** among different WinCC servers to log on as a *Remote Client*.

The prerequisite for this is that the WinCC client be entered in the computer list of each WinCC server.

Each WinCC server connects this WinCC client with the project in the operating configuration preset for that client. A local network or a remote connection by means of ISDN can be used as a connection medium between client and server.
For WinCC clients that are not activated, standard settings for the client stations can be applied in the WinCC server project in order to guarantee security from unauthorized data access or operator operations.
The drive settings for localizing project data should be stored locally on the *remote client* so that it can construct the appropriate connections by means of the Remote Access utilities of the operating system. For this purpose, WinCC may not execute any configuration for a *Remote Client* except for setting the operating configuration.
For security reasons, this prevents a *Remote Client* that is unknown to the project from gaining access to the system that is running.

▶ **Note:**

In the Configuration System, each computer can open each project and change the data contained therein. Only activation of the project is prohibited.

1.3 Network Requirements for Client/Server with WinCC
1.3.1 TCPIP

A TCP/IP address is formed by the TCP/IP network address and the host address; a TCP/IP address consists of 4 tetrads. The number of tetrads, making up the TCP/IP network address, depends on the network class (A, B, or C) used.

For example: 142.016.000.012 (Network Class = B, TCP/IP Network Address = 142.016, Host Address = 000.012)

The TCP/IP network addresses of client and server can be identical, **but** they must differ by a unique host address.

If the TCPIP network addresses of the client and server are identical, you do not need any additional settings for the network operation.

Network addresses with TCPIP:

There are three different classes of network addresses:

Class	Available Networks	Available Hosts	Range	Subnet Mask
A	126	16777214	1 to 126	255.0.0.0
B	16384	65534	128 to 191	255.255.0.0
C	2097151	254	192 to 223	255.255.255.0

The range of 127.X.Y.Z is reserved for loop tests and interprocess communication and does not represent a valid network address.

Example of a network address: 142.16.x.y
                              | Network | Host|
The example shows a class B address. You can see this because the range for class B addresses goes from 128 to 191. In this case, the first two tetrads correspond to the TCPIP network address.

If the TCPIP network address is different, for example, 142.16.x.y and 142.11.x.y, you must make one of the three preparations listed below for the Client-Server operation because a router (Gateway) is necessary for different network addresses.

- Entry in the LMHOSTS file with the following:

  Windows 95: The Windows folder contains a file named LMHOSTS.SAM which must be copied to the same folder under the name LMHOSTS. The necessary entry occurs in that file (see example). You do not need to activate the LMHosts Lookup function because this is an available registry entry with default installations. In addition, you must enter a default gateway.

Windows NT: The WindowsNT\system32\drivers\etc folder contains a file named LMHOSTS.SAM which must be copied to the same folder under the name LMHOSTS. The necessary entry occurs in that file (see example). You must also activate the LMHOSTS Lookup function in the controlpanel/network/protocols/TCPIP/Properties/WINS address. In addition, you must enter a default gateway.

Example of an LMHOSTS entry:
142.16.0.98 | | TestComputer
| TCPIP-Adr.| | WindowsComputerName|

- WINS

  With WINS(**W**indows **I**nternet **N**ame **S**ervice), the WINS server must be entered in the network setup. All of the clients then log on to the WINS server automatically. The server assigns the names. With WINS, there is no communication with UNIX computers or other TCPIP nodes. If the WINS server has a different TCPIP address from the WinCC client or WinCC server, you must specify a default gateway (router) in order to find the WINS server.

- DNS

  The implementation of a DNS (**D**omain **N**ame **S**ervice) must be configured in the network setup. If you implement DNS, you can communicate with the UNIX-WS as well as the rest of the TCPIP world. You must specify a default gateway (router) in the case of different network addresses between the DNS server and WinCC client-server.

1.3.2 NetBEUI

Communication under NetBEUI (NetBIOS extended user interface) runs on layer 2 of the OSI model (seven-layer model). You do not need to make any additional administrative settings. However, NetBEUI can run only on a physical network. A physical unit can also include multiple yellow cables that are connected to each other by means of repeaters or bridges.

1.3.3 IPX

IPX is a Novell protocol that you cannot operate without a Novell server (except for the peer-to-peer solution of Novell). There was no WinCC client-server test with a pure Novell protocol.

1.3.4 Assignment of Authorizations with Windows NT

To operate WinCC under Windows NT 4.0™, you must have write access authorization to the HKEY_LOCAL-MACHINE.

You can implement this by setting up a WinCC group, for example. Write authorization is then assigned to this group for the registry. Because the aplib folder must be enabled for the client-server operation, it is absolutely necessary for the user to have the authorization to enable folders. This means that the user must belong to the PowerUser group at least.

2 System Configuration

The operating system platforms for WinCC are the 32-bit operating systems by Microsoft. A Windows NT 4.0™ server or workstation is the platform for the WinCC server and Windows® 95 or the Windows NT 4.0™ workstation is the platform for the WinCC clients.

A WinCC client/server configuration consists of the following:

- A **WinCC server** with a connection to the process (PLCs) **and** to a Windows network

- One or more **WinCC clients** with a connection to a Windows network

- **Optionally**, the project data can be loaded on a separate file server.
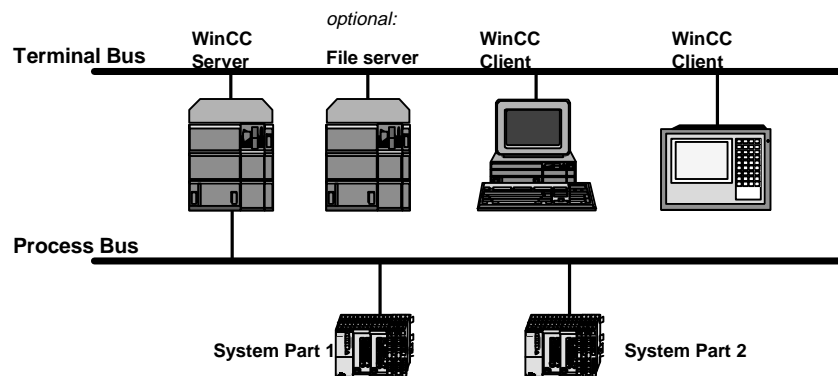
A **WinCC server** always has one physical connection to the PLCs (point-to-point or process network). In addition, the server has a network connection to the assigned WinCC clients.

The **WinCC clients** have only one network connection to their assigned server.

▶ **Note:**

- The WinCC server should not be implemented for process visualization since the graphic processing requires more than 50% of the computing capacity of a Windows system and this would reduce the on-line data processing capability.

- Direct communication between WinCC clients is not possible.

- Process communication of the WinCC server in the client/server system is not different from that of a WinCC singer-user system.

File Server (optional): Optionally, the WinCC server tasks can be divided flexibly by means of the WinCC architecture. A computer in the network is driven as a separate *file server* and saves the project data in the project folder *[project_dir]* in the database *[project_name].db*. A second computer in the network is the WinCC server which is responsible for the process communication with the PLCs.

Depending on need, the optional file server can be fitted to special requirements by means of its hardware components. For example, it can achieve security from power failure by means of RAID or mirror disks, extra speed by means of multi-processor systems with extremely rapid hard disk controllers, etc.
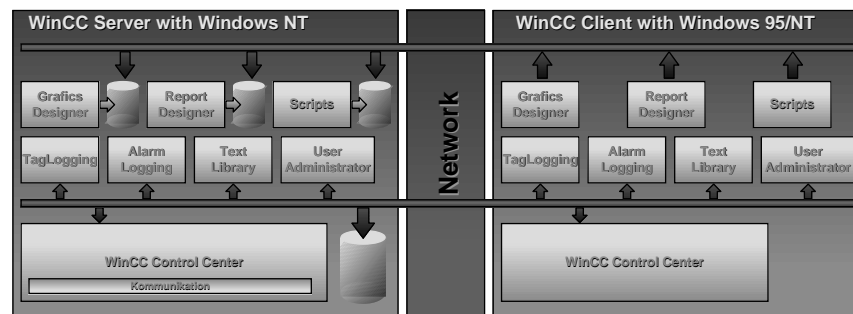
3 Configuration

Each WinCC operator station starts the *[project_name].**mcp*** file in the *[project_dir]* project folder from the Control Center.

The project folder *[project_dir]* can be located on any drive that is connected by means of the Windows network. Typically, it is a local drive of the server station but it can also be a local drive of one of the clients or of another computer that has nothing to do with WinCC except for project data storage (file server).

The computer with the *[project_dir]* holds all of the data. Some are stored as files in subfolders and as data in the *[project_name].**db*** database.

If the local computer name of an operator station is not in the configured computer list of the project, the computer can only configure within the project; it cannot activate the project. This means that it cannot switch to RUNTIME mode. You can change a computer name (in Windows Explorer) to a computer name that is recognized in the project. After you have changed the name and restarted WinCC, you can also switch to RUNTIME mode.

3.1 Configuration – Coordination and Data Organization

The WinCC server is responsible for project management.

An important task of the WinCC server is coordination during configuration in the sense of creating consistent data in the project. Generally speaking, each operator station can execute configurations. These configurations can also occur simultaneously, with certain limitations.

This means that different computers can create new process pictures and add new process tags at the same time and for one and the same project. However, you **cannot** add any message texts **or** configure any archives.

The WinCC server monitors and coordinates the data access and thereby secures the consistency of the configuration data.

▶ **Storage of the WinCC project data is divided into the following two areas:**

- Data in the central database
    - Setting that is global to the project for station data, communication data, tag data, etc.
    - Configuration data for messages
    - Configuration data for process data archives
    - Configuration data for user archives
    - Print job data

- Files on the PC or network drive
    - Process pictures and embedded graphic files (*.bmp, *.wmf, etc.)
    - Print layouts
    - All files that are involved with WinCC scripts (includes, configuration wizard scripts, etc.)

▶ **Note:**

The WinCC Control Center provides transparent access to the configuration data. This means the user has no additional administrative and configuration effort.

However, if files are moved or renamed manually (in Windows Explorer), the user must ensure the consistency of these data. This applies here in the same way as in the single-user system.

3.2 Pictures – Graphics Designer

The pictures of a multi-user project are located centrally on the file server. The file server is the PC on which the *[project_dir]* project folder is located. Normally, this is the WinCC server.

When you use the Graphics Designer to create a picture on a WinCC client, the picture is stored as a file in the project folder. While you are editing it, this file is locked against write access from other operator stations. After you close the file, any other operator station can open the file and continue with a change configuration.

Of course, different pictures can be edited at the same time on different operator stations.

Pictures can be copied to a folder that is local to the operator station *[Computer name]\GraCS\[File name].PDL*.

In RUNTIME mode, these pictures are called first from this local folder (more rapid picture construction). If the selected picture is not located in the local folder, it is loaded from the central memory. The consistency of the pictures between central project memory and local memory must be maintained manually and is not supported automatically by WinCC.

On-Line Configuration: The picture data can be changed in run time. Different pictures can be edited on different operator stations at the same time. After they are saved, they are immediately available for all operator stations in the project. To make the selection, deselect the current picture and load the new or changed picture.

▶ **Note:**

If multiple copies of a picture are available (on the file server and locally on the operator station), the changes apply only to the changed file. There is **no automatic update**!

3.2.1 Exceptions in Picture Configuration

With respect to displaying graphic pictures, networking multiple computers can cause some tasks to turn up that are not solved automatically. Such tasks are caused by different configuration in the computers involved.

▶ **Error Possibilities with Picture Selection:**

- If a picture is displayed on a computer with an **OCX** that is not installed on that computer, the message "Unknown Object" appears.

- The same applies to the display of **OLL objects**.

▶ **For OLE Links:**

- The OLE server is not installed.

- A referenced file is not on the local computer.

In both cases, the data are displayed in run time but cannot be changed (by double clicking).

3.3 Scripts – Global Scripts

WinCC standard and project functions exist only once in a project and are located centrally in the project folder *[project_dir]*. Project-specific actions can be defined independently on a local computer.

The *.fct project or standard functions created by means of Global Scripts and the *.pas actions are saved in files. Actions in pictures are stored in the corresponding picture files. While you are editing a file (function or action), it is locked for write access and read access from other operator stations. After you close the file, any other operator station can open the file and continue with a change configuration.

If you configure on a client without access to the server, the configuration is executed locally which means that the standard functions are stored locally and used for compilation. The behavior here is the same as a single-user system. In this case, the user is responsible for copying the standard functions to the file server wenn it can be accessed and for introducing the functions to the system by means of the "Generate new header" command.

▶ **The script data of a project contain items such as the following:**

- Project functions
- Properties of the project functions
- Project-specific description files of the function libraries (header files)

▶ **Note:**

With an API call *apcompile* and *apcompileex* a flag can specify if the Include path should be set locally or globally.

On-Line Configuration:

Functions or actions can be changed in run time. Any of the operator stations logged on to the WinCC project can make the change(s).

WinCC ensures that the changes are distributed to all of the connected operator stations. The operator stations that are notified unload the old version of the changed function and load the new (corresponds to the delete or add function command). The prerequisite for this action is that Script RUNTIME mode is running on the operator station.

3.4 Messages – Alarm Logging

The configuration data exist only once in the project and are located centrally in the project folder *[project_dir]* in the *[projekt_name].db*. database.

Only one operator station at a time can configure the Alarm Logging System. Naturally, it is a prerequisite that the WinCC server and the file server are accessible. Local configuration with later transfer of the data is not planned.

▶ **Notes:**

Pay attention to the configuration notes of the appropriate editor for the configuration of reports (Report Designer) or message window links (Graphics Designer).

When you read data from the database, standard texts are loaded from the resource DLL for the report system.

Text Library CS, Alarm Logging CS, and Password CS are not locked from each other on the same computer. The lock is in place when crossing computers. This means that the Text Library, Alarm Logging, or Password configuration systems can only be started in parallel on one computer.

On-Line Configuration:

Alarm Logging data can be changed in run time. Any operator station logged on to the WinCC project can execute the change. In contrast to off-line configuration, the extent of the on-line changeability is limited, however.

Possible Changes:

- Changing attributes of the message blocks
- Creating/changing message window
- Adding message blocks
- Adding single messages

Not Possible:

- Changing message archive structures
- Message reports
- Group messages
- Removing a message class.
- Deleting a single message.

WinCC ensures that the change is distributed to all of the connected operator stations.

3.5 Archives – Tag Logging

The configuration data exist only once in the project and are located centrally in the project folder *[project_dir]* in the *[projekt_name].**db*** database.

Only one operator station at a time can configure the Tag Logging system. Naturally, a prerequisite for the configuration is that the WinCC server and the file server are accessible. Local configuration with a later transfer of the data is not planned.

On-Line Configuration:

Tag Logging data can be changed in run time. Any operator station logged on to the WinCC project can make the change.

WinCC ensures that the change is distributed to all of the connected operator stations.

3.6 User Management – User Administrator

The list of all users and the assigned user authorizations exists only once in the project and is located centrally in the project folder *[project_dir]* in the *[projekt_name].**db*** database.

Only one operator station at a time can configure the user administrator. Naturally, a prerequisite for the configuration is that the WinCC server and the file server are accessible. Local configuration with a later transfer of the data is not planned.

On-Line Configuration:

The user authorizations can be changed in run time. The change can occur on the WinCC server or on a WinCC client.

None of the other operator stations are notified since the current authorization list is loaded from the database everytime someone logs in to run time.

▶ **Note:**

To make a change in authorization immediate, the user must log in again.

All configured authorizations relate to the user, not the computer. This means that an assigned authorization is valid for all of the operator stations with the same login.

3.7 Text Library – Text Library

The configuration data exist only once in the project and are located centrally in the project folder *[project_dir]* in the *[projekt_name]*.**db** database.

Only one operator station at a time can configure the Text Library.

The Alarm Logging and User Administrator configuration systems use the same database table as the Text Library configuration system and consistently have read and write access to the same database table on an operator station at the same time.

This concurrent configuration opportunity, however, is **not** possible from different operator stations.

On-Line Configuration:

The Text Library can be changed in run time. Any operator station logged on to the WinCC project can execute the change.

WinCC ensures that the change is distributed to all of the connected operator stations. The update is executed in the data language that is installed locally on each station.

3.8 Reports – Report Designer

The configuration data consists of the layouts (files) and the print jobs (entries in the database). Both types of data exist only once in the project and are located centrally in the project folder *[project_dir]*.

Only one operator station at a time can configure a layout file. The same applies to the print jobs. Naturally, a prerequisite for the configuration is that the WinCC server and the file server are accessible. Local configuration of the layout is possible. However, the user is responsible for transferring the data later (in Windows Explorer).

On-Line Configuration:

Configuration of the report system in run time is not planned.

Reports – print jobs with corresponding layouts – are configured and then executed.

4 Coordination in Run Time

With a multi-user system, special measures are considered for the startup, failure and restart after a failure. This applies to server and client.

Startup

Generally, all of the operator stations in a multi-user system can start up independently of each other.

The WinCC server starts up and makes its utilities available. The WinCC clients start up and log on to the WinCC server. If they cannot access the server yet, they switch to a standby status and begin cyclic login attempts until the WinCC server is accessible.

Server Failure

If the WinCC server fails while the system is running, the WinCC clients are no longer updated and they report the failure of the WinCC server by means of a box. The WinCC clients attempt to access the WinCC server again automatically.

4.1 WinCC Server

In run time, the WinCC server plays the central role in process communication with the PLCs. Data exchange with the process data is executed by the WinCC server with the help of the communication driver.

The server distributes the process data for storage in the archives and the message system or sends it to the WinCC clients for visualization. The clients then display the process data in the process pictures or edit them further in action scripts.

The WinCC clients turn to the WinCC server for updating the necessary process data.

The WinCC server sends the requested data cyclically in configured time frames to the operator stations. However, the data exchange only occurs if the value has changed from the previous value. The decision about whether a value has changed depends on each data type. For example, with an integer value, the smallest deviation is 1; with a floating-point value, it is 1e-[n], with n the number of the last digit after the decimal point.

With the same request data, all of the operator stations work principally synchronously. However, this is not guaranteed with graphic objects if the same picture is open at the same time on two different clients.
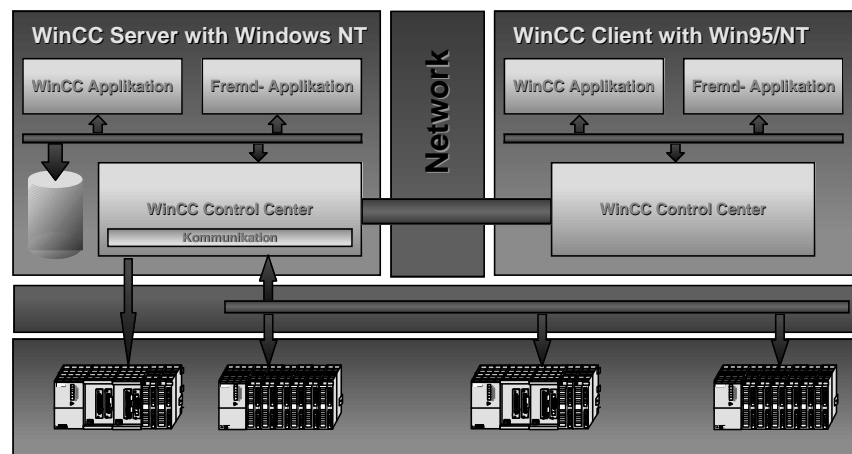
▶ **Note:**

The data can be stored on a separate file server optionally. This is of no significance when requesting the data by means of an operator station.

4.2 Editing Graphics

If a picture is called on an operator station in run time, the operator station first checks to see if the picture is located in a permanently set local path *\bin\PdlCache\[Picturename].PDL*, or, if not, in the project folder *[project_dir]\GraCS\[Picturename].PDL*. If the picture is not available, a message appears.

If the call for a picture requires an exchange with other WinCC applications (Alarm Logging, Tag Logging, or Global Scripts), the exchange is always executed locally (on the affected operator station).

▶ **Note:**

In contrast to configuration, a picture can be opened and edited by multiple operator stations at the same time in run time.

Graphic actions that have a cyclic trigger are transferred and edited when a picture is called.

Graphic actions that have an event trigger, typically a button operation, are also loaded and the corresponding trigger is not transferred until the event occurs.

4.3 Editing Scripts

Script control is available on each operator station and is started by WinCC automatically in run time. The task of the script control is to execute *.fct functions, *.pas actions, or graphic actions.

Each operator station knows whether it is a script client or a script server based on the entries in the computer list.

When an operator station activates a project (starts run time locally), the following data are loaded locally:

- The *.fct project functions from the project folder *[project_dir]\Library\[Functins_name].ftc* on the file server

- The *.fct standard functions from the installation folder *[WinCC_dir]\aplib\[Functins_name].ftc* on the WinCC server

▶ **Note:**

At the point of activation, the WinCC server must be running for access to the standard functions located there to be possible. If the server fails later, the functions are still available locally on the operator station. This only applies as long as the operator station is running.
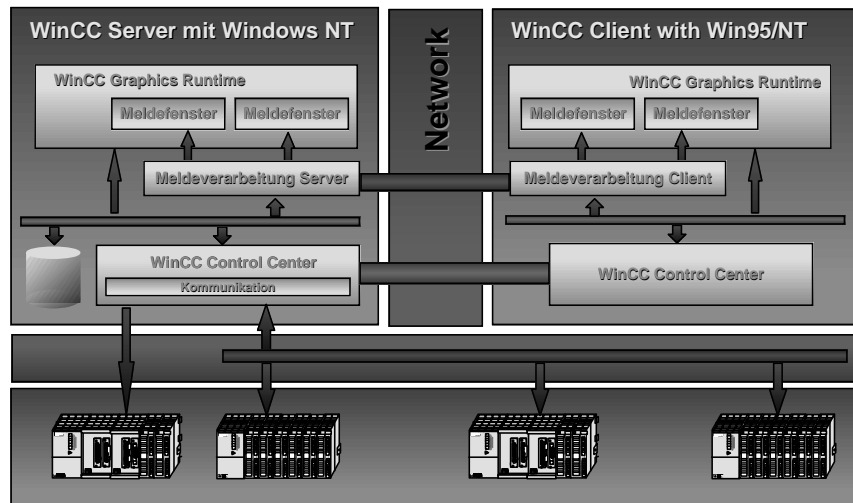
4.4 Editing Messages

If the message system is activated on an operator station, Alarm Logging run time functions as the message server on the WinCC server and as a message client on the other operator stations. It gets the information for this from the computer list of the Control Center.

When activated, the message server gets the configured data from the database. The message clients log on to the message server.

The display and operation of the message list or message archives is executed on all of the operator stations like a single-user system.

▶ **New Messages:**
When new messages occur, the message server is responsible for archiving the messages. If message clients need data for the display, they turn to the message server which provides the data.

▶ **Acknowledgement:**
If a message is acknowledged on an operator station, the acknowledgement goes to the message server which enters it in the archive and distributes it to all of the message clients that are logged on. If an acknowledgement bit was configured for a tag, the message server ensures that the corresponding information is written to the data manager tag.

▶ **Lock:**
The message server coordinates locking messages. If a message is locked on an operator station, the lock also applies to all of the other operator stations.

4.5 Editing Archives

If the archive system is activated on an operator station, Tag Logging run time functions as the archive server on the WinCC server and as an archive client on the other operator stations. It gets the information for this from the computer list of the Control Center.

Only the archive server accesses the database. The archive clients turn to the archive server for access to archive data.

Only the archive server acquires and archives (saves) the process data. The archive clients always request the data from the archive server.

▶ **On-Line Trends/Tables:**
The display of on-line trends/tables can occur on every operator station on which Tag Logging run time is running. The data for the display always come from the archive server.

All of the operations during run time from the interface or by means of the Tag Logging API are transmitted to the archive client which then notifies the archive server. The task is processed in the archive server and the result is sent back to the archive client. The client assigns the result to the appropriate user.

▶ **User Archives:**
User archive access from the PLC or write/read access from the PC to the PLC are always edited by means of the archive server which is always running on the WinCC server.
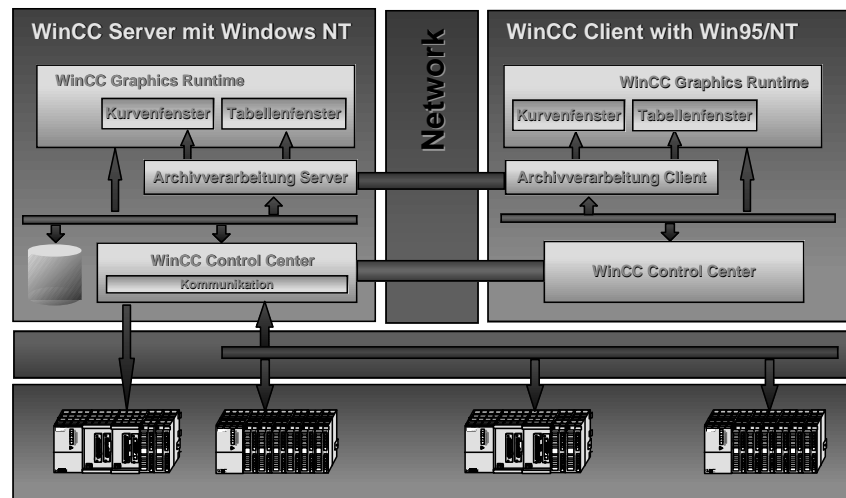
4.6 User Administration

The User Administrator run time checks the user authorizations. When WinCC starts, it is started automatically on every operator station.

▶ **Login:**
When the login is changed (different user), the current user authorization list is loaded directly from the database of the file server and stored locally in the operator station.

▶ **Testing the Operation:**
The test is executed by means of the local user authorization list.

If the operation is locked (the current user does not have authorization), the user can log on again. After a successful login, the user authorization list is requested from the file server and loaded on the local operator station. The test is then executed again.

The authorization list that is then available locally is retained until a new login requests a new copy from the database.

4.7 Text Service

After the project is activated, the Text Library run time functions as the text server on the WinCC server and as a text client on the other operator stations. It gets the information for this from the computer list of the Control Center.

WinCC ensures that the data are always read from the database of the file server. The prerequisite for this is that the file server is running and is logged on to the network.

4.8 Report Output

▶ **General Information About the Report System:**
The report system does not recognize a run time in the sense of other WinCC applications (such as Tag Logging and Alarm Logging).

In the context of configuration, page layouts or line layouts and print jobs are set. The report output occurs in the execution section which represents the "Report Run Time." However, this is **not** linked directly with the activation of a WinCC project (run time) but can also be started independently.

This means that print jobs in the report system can also be started during off-line configuration of WinCC. These print jobs document configured data (for example, tags and connections in the Control Center or from configuration system applications).

If a print job that should contain process or archive data starts during off-line configuration, the WinCC project must be active (in RUNTIME mode).

▶ **Client/Server:**
The report system starts automatically on each operator station when WinCC
starts up. The report server starts on the WinCC server and the report clients
start on the other operator stations. The report clients log onto the report server
or attempt to do so cyclically if it cannot be accessed. If the report server is
accessible, all of the report clients receive the current information about the
available print jobs, their status, and the available printers.

▶ **Output of the Print Jobs:**
If a print job is started on an operator station, the operator station gets the
corresponding current print job data from the database from the file server. It
uses these job data to start a print process locally. This print process requests
the application-specific data from the local applications and links these data
with the layout defined in the print job and prints the report on the configured
printer.

The report server receives the status information about the current status of the
print job and distributes it to all of the other connected report clients.

5 Startup/Failure Behavior in Run Time

In a multi-user system, you must consider special measures for the startup, failure, and restart following failure. This applies to all of the PCs in a WinCC project.

Startup

Generally, all of the stations in a multi-user system can start up independent of each other. The WinCC server starts up and readies its utilities. WinCC clients start up and log onto the WinCC server. If the server cannot be accessed, the clients move into a standby mode and start cyclic logon attempts until they can access the server.

With a scaled system (WinCC server, file server), the system is not ready for implementation until both servers are available on the network.

Server Failure

If the WinCC server fails while the system is running, nothing is updated on the clients and they report the failure of the WinCC server by means of a box.

▶ **Important!!**
If the WinCC server fails, the project must be restarted. This means that the project must be reloaded on all of the connected clients after the server restarts.

5.1 Control Center

Client and Server Startup

Client and server stations possess the WinCC system software which starts up by itself after every start until it reaches the "empty" Control Center (without project).

From the Control Center, the project that was edited last and is located centrally on the file server is opened. This means that a WinCC client must access the project memory remotely by means of the previously installed Windows network. The WinCC client cannot activate a WinCC project until its own Windows computer name is configured in the project it wants to open; otherwise, it can only configure the project off line.

If the WinCC server (or file server) is not accessible, a message appears in a system box. You then have the following choices:

- Enter a cancel command at which the WinCC client returns to the Control Center (without project).

- The system box remains unused. This causes the WinCC client to continue to attempt to open the project cyclically until the WinCC server is accessible.

- Enter a command for a local start of WinCC. This makes sense if the WinCC server is not accessible but the network connection to the file server still exists. In other words, you can still reach the project folder. In this case, the WinCC client assumes the function of the WinCC server (but **without process driver connection**) in the project. The Data Base Management System runs on this WinCC client. This operator station answers all of the requests from other WinCC clients.

- If the file server defined in the project is physically lost (network failure, hardware defect, etc) you cannot edit the project and must open a new project.

When a project is activated, the WinCC server builds the communication links. The WinCC clients turn to those links and report if the WinCC server is not accessible.

Server Down

If the server (WinCC server, file server) fails while a project is running, the next request of a WinCC client that goes unanswered triggers an appropriate message on its screen.

If accessible, the WinCC clients can display and operate the configuration data in run time (for example, picture exchange). Missing process data are identified by means of a special character.

Server Returns

If the WinCC server returns, the project must be reloaded on all of the connected WinCC clients.

5.2 Graphics Designer

Server Down

If the WinCC server fails during run time, no process data can be entered. In place of the process values, the pictures receive special characters like setpoint: " ***** ".

Server Returns

If the server becomes available again, the existing pictures receive the current data automatically.

5.3 Script

Client and Server Startup

WinCC server and WinCC clients can start up in any sequence. During startup, WinCC installs the script server and enables the standard function catalog. When a WinCC client starts up, the script client starts and the connection to the script server is built.

If the WinCC server does not start until later or if it is completely unavailable, the script client does not receive a connection to the script server. The system attempts to make the connection to the server cyclically. If the connection can be set up later, see the "Server returns" description.

Server Down

If the script server fails, all of the script clients note this and can react to it. A notification is sent to all of the connected client applications (for example, script). The script control now attempts to reconstruct the connection cyclically itself.

If the data manager (Data Base Management System) fails, the script server continues normally. Read and write tasks for the data manager are denied by the data manager with errors.

Server Returns

If the WinCC server becomes available again, all of the connected operator stations are notified. Script can now access the central standard functions again, for example.

5.4 Alarm Logging

The prerequisite for operating the Alarm Logging run time is that the WinCC server and the file server are running and accessible.

Client and Server Startup

Alarm Logging run time is running on the WinCC server (exactly there and only there due to process driver connection) as the message server; it is the message client on all of the other computers in the project.

The message server logs onto the WinCC server for assignment with the message events set in the configured data and opens the message archives. The message clients log onto the message server.

Both are then available for requests from clients in Alarm Logging runtime, typically from the graphic system. Requests first go to the local Alarm Logging run time. If the request is sent to a message client, it passes the request to the message server which then sends the requested data back.

Server Down

If the message server is no longer accessible, the message clients are notified and all of the clients of the Alarm Logging run time on all operator stations display "Message System Run Time Server Not Initialized" instead of the message window, which is hidden.

The message clients continue to attempt to access the message server cyclically.

Server Returns

If the message server is accessible again, the message clients reopen automatically and the message windows in Alarm Logging run time client applications are displayed and updated.

5.5 Tag Logging

The prerequisite for operating the Tag Logging run time is that the WinCC server and the file server are running and accessible.

Client and Server Startup

Tag Logging run time is running on the WinCC server (exactly there and only there due to process driver connection) as the archive server; it is the archive client on all of the other computers in the project.

When Tag Logging run time is started on an operator station, the station knows from the computer list whether it is functioning as an archive server or archive client. In either case, the operator station gets Tag Logging configuration data from the file server.

The archive server logs onto the WinCC server for assignment with the process data assignments set in the configured data and opens the measurement value archive or the user archive. The tag archive clients log onto the archive server.

Both are then available for requests from clients in Tag Logging run time, typically from the graphic system. Requests first go to the local Tag Logging run time. If the request is sent to an archive client, it passes the request to the archive server which then sends the requested data back.

Server Down	If the WinCC server fails, the archive server also fails and requests from the archive clients remain unanswered.
	If the file server fails, newly started Tag Logging run times do not receive current configuration data and cannot request the archived data in the archives.
	The archive clients continue to attempt to access the archive server cyclically.
Server Returns	It the archive server is accessible again, it answers the logon attempts of the archive clients and the system runs again.

5.6 User Administrator

Client and Server Startup	When WinCC starts up, the User Administrator is started automatically on every operator station. In run time, it waits for a login event to happen. Then it loads the current authorization lists from the file server.
	The User Administrator configuration system works on the project database exclusively from any operator station. There is no logon of the client stations to the server, neither for configuration nor for run-time utilities.
Server Down	If the file server fails, the User Administrator configuration system cannot access the database to configure authorization lists.
	After the file server fails, run time clients cannot access the project database at login to get the current user authorization list stored there. If clients can even continue to work without a file server, they cannot enable any of the protected operations.
Server Returns	If the file server is accessible again, configuration as well as the run-time applications can access the project database again. However, there is no automatic way to inform the User Administrator configuration system or run time on the operator stations of the availability of the file server. Implicit user actions initiate the access to the server.

5.7 Text Library

Client and Server Startup	When WinCC starts up, the text library is started on the operator stations on which the Text Library run time is entered in the startup list. This is configured as a text server or text client corresponding to the computer setting. The text server carries the connection to the project database and text clients wait for requests from their client application.
Server Down	If the WinCC server fails, the text service is also not available. As long as the connection to the file server is still available, the Text Library can be configured off line.
Server Returns	Since the text service is request-driven and not oriented towards logins, the text clients can answer all of the requests of text clients that occur after the text server is available again.

5.8 Report Designer

**Client and Server
Startup**

When WinCC starts up, the report system is started automatically on every operator station. The report server starts on the WinCC server and the report clients start on the other operator stations. The report clients log onto the report server or attempt to do so cyclically if the server is not accessible. If the report server is accessible, all of the report clients receive the current information about the available print jobs, their status, and the available printers.

Server Down

If the report server fails, all of the report clients recognize this and can react to it. The report clients attempt to reconstruct the link to the report server cyclically.

Server Returns

If the connection to the report server can be rebuilt, coordinated change configuration is possible again and the report server provides the current status information about the print jobs again.

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