SIMATIC WinCC

Process visualization with Plant Intelligence

Brochure · April 2012

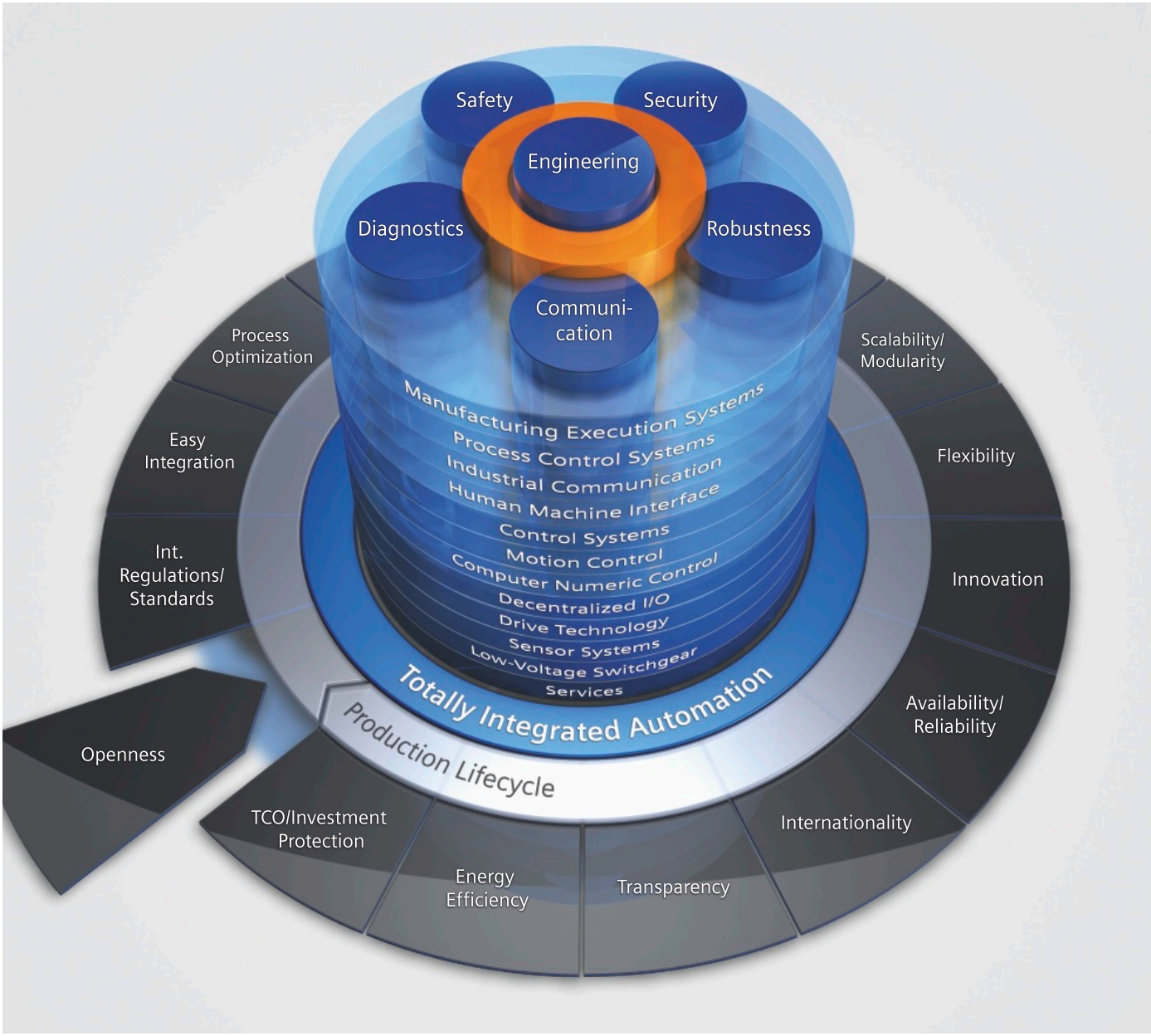
SIMATIC HMI

Answers for industry.

SIEMENS

Totally Integrated Automation

Rely on new productivity standards for sustained competitive advantages



To be able to respond to the increasing international competitive pressure, it is more important than ever to consistently make full use of the potential for optimization – over the complete lifecycle of a machine or plant.

Optimized processes reduce the total cost of ownership, shorten the time to market, and improve quality. This perfect balance between quality, time, and costs is now, more than ever, the decisive success factor in industry.

Totally Integrated Automation is optimized for all requirements and is open for international standards and third-party systems. With its six characteristic system characteristics (engineering, communications, diagnostics, safety, security, and ruggedness), Totally Integrated Automation supports the complete lifecycle of a machine or plant. The complete system architecture offers holistic solutions for every automation segment on the basis of a comprehensive range of products.

SIMATIC: more efficient and systematic automation

SIMATIC, a core part of Totally Integrated Automation, comprises a variety of standardized, flexible, and scalable products – such as the products for process visualization with SIMATIC WinCC presented in this brochure.

SIMATIC is currently considered to be the global number one in automation. One of the decisive reasons for this is that SIMATIC exhibits the six system characteristics of Totally Integrated Automation:

- Engineering
- Communication
- Diagnostics
- Safety
- Security
- Ruggedness

In addition, SIMATIC offers two additional system characteristics:

- Technology
- Fault tolerance

For more information on the system characteristics and the resulting advantages, see the following chapter "System characteristics".

Contents

System features

Engineering

Maximum engineering efficiency –
in all phases of the lifecycle of the machine and plant
With SIMATIC you rely on an integrated engineering environment. Efficient software supports you over the complete lifecycle of your machine or plant – from the planning and design stages through configuring and programming as far as commissioning, operation and upgrading. With its integration capability and harmonized interfaces, SIMATIC software supports a high degree of data consistency – throughout the entire engineering process.
Siemens has redefined engineering with its Totally Integrated Automation Portal (TIA Portal). The new TIA Portal engineering framework combines the SIMATIC STEP 7, SIMATIC WinCC and SINAMICS StartDrive automation software tools in a unique development environment.

Communications

Maximum data transparency on all automation levels –
based on proven standards
SIMATIC creates the foundations for unlimited integration in communication – and thus for maximum transparency on all levels, from the field and control level to the operations management level all they way up to the corporate management level. SIMATIC relies on international, cross-vendor standards which can be combined flexibly: PROFINET, the leading Industrial Ethernet standard and PROFIBUS, the global No. 1 fieldbus.

Diagnostics

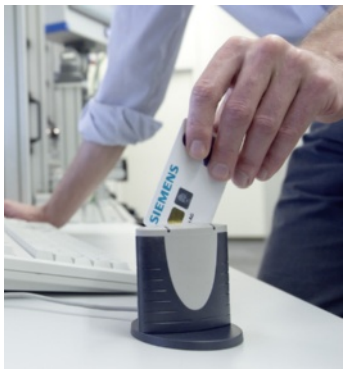
Minimization of downtimes –
through efficient diagnostic concepts
All SIMATIC products feature integrated diagnostic functions with which a fault can be identified and eliminated to provide increased system availability.
Even with larger plants, the Maintenance Station provides you with a uniform view of the maintenance-relevant information of all automation components.

Safety

Protection of personnel and machines –
within the framework of an integrated complete system
SIMATIC Safety Integrated offers TÜV-certified products, which facilitate compliance with relevant standards: IEC 62061 up to SIL 3, EN ISO 13849-1 up to PL e, as well as EN 954-1. Due to the integration of safety technology in standard technology, only one controller, one I/O, one engineering, and one bus system are required. Thus the system advantages and comprehensive functionality of SIMATIC are also available for fail-safe applications.

Data security in the networked world – through harmonized, scalable security systems
Due to the increased use of Ethernet connections penetrating the field level, security issues are gaining in importance in industry. For comprehensive protection of a plant, a variety of suitable measures must be implemented. These range from the company organization and its guidelines regarding protective measures for PC and control systems through to protection of automation cells by segmenting the network. Siemens follows the cell protection concept and, with the modules of the SCALANCE series and the Security modules, offers components for building up protected cells.

www.siemens.com/industrialsecurity



Security

Maximum industrial suitability – through increased robustness
Each standard product from the SIMATIC range is characterized by the highest quality and robustness and is perfect for use in industrial environments. Specific system tests ensure the planned and required quality. SIMATIC components meet all relevant international standards and are certified accordingly. Temperature and shock resistance are defined in the SIMATIC quality guidelines, as are vibration resistance or electromagnetic compatibility.
For demanding to extreme rated conditions, special versions such as SIPLUS extreme or special versions of SIMATIC ET200 are available. These include an increased degree of protection, extended temperature ranges, and exceptional environmental stress.

Robustness

More possibilities, less complexity – through integrated technology functionality
Counting and measuring, cam control, closed-loop control, or motion control: You can integrate technological tasks in many different combinations and with various degrees of complexity without a system changeover into the world of SIMATIC – easily, conveniently, consistently. Parameter assignment and programming are implemented in the familiar STEP 7 environment.

Technology

Maximum availability – with integrated high availability concepts
Siemens offers a comprehensive high availability concept to ensure high availability for the entire plant: from the field level to the control level all the way up to the management level. For example, field-tested controllers ensure high availability through bumpless switching with automatic event synchronization.

High availability

www.siemens.com/simatic-system-features

SIMATIC WinCC – Basic system

More transparency for production

SIMATIC WinCC is a scalable process visualization system with powerful functions for monitoring automated processes. WinCC provides complete SCADA functionality under Windows for all sectors – from single-user to distributed multi-user systems with redundant servers and cross-location solutions with web clients.

WinCC system software

The WinCC system software is available in two basic variants:

- WinCC complete package (RC: license for runtime and configuring)
- WinCC runtime package (RT: runtime license)
  Both packages are available with 128, 512, 2k, 8k, 64k, 100k, 150k or 256k PowerTags.

Only process tags that are connected to the controller or other data sources via a WinCC communication channel are designated as PowerTags. Up to 32 messages and up to 256 user-definable analog alarms can be derived from one process tag. Moreover, internal tags without process connection are available for free to provide additional system performance.

PowerPacks allow an increase in the number of usable PowerTags. Thus, WinCC also grows when your application grows. You can start with the smallest variant and then upgrade as needed with attractive PowerPacks.

With PowerPacks, the number of available archive tags can also be increased, from 512 (contained in the basic scope) by 1,500, 5,000, 10,000, 30,000 or 80,000 to up to 120,000.

WinCC Comprehensive Support

WinCC provides a Software Update Service (SUS) via Comprehensive Support in the form of an extensive support package which contains current updates as well as a lot of useful information and software for WinCC.

Automatic distribution of current upgrades and service packs for WinCC ensures that the latest WinCC version is always available to you.

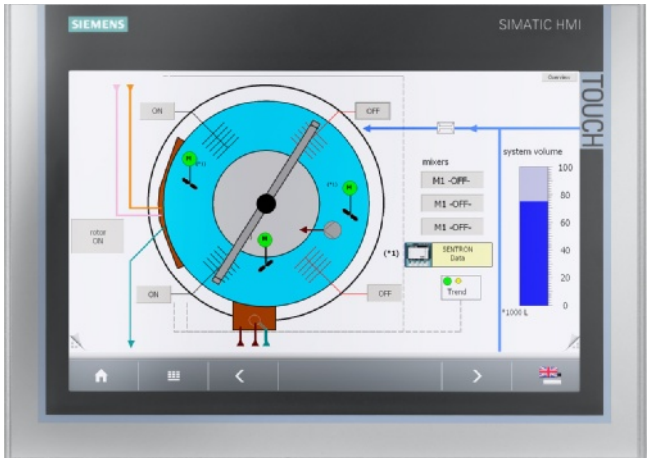
Packages with WinCC runtime software

The SIMATIC Panel PC packages with WinCC are optimally harmonized combinations of HMI hardware and software.

Packages provide you with the following advantages:

- Easy to order
- Cost savings compared to ordering components individually
- Optimally harmonized hardware
- System-tested solution

The Nanopanel PC SIMATIC IPC277D as WinCC single-user station is new – and ready to use with embedded technology. It is available with touch screens from 7" to 19".



Nanopanel PC SIMATIC IPC277D

SIMATIC WinCC – Options
Software expansions for individual requirements
Individual functional or sector-specific software expansions are available in the form of WinCC options and WinCC Add-ons.

WinCC options are products from the development of SIMATIC. You can receive help from our specialist support and by contacting our central hotline. They are available for a number of useful expansions of the WinCC basic system and can be freely combined according to your requirements. Here is an overview of the options available for SIMATIC WinCC V.7:

Scalable plant configurations

WinCC/Server – for expanding a single-user solution into a powerful (distributed) client/server system with up to 12 redundant WinCC servers and 32 clients.

WinCC/Central Archive Server (CAS) – for setting up scalable, central, optionally redundant process data archiving with up to 120,000 archive tags based on the Microsoft SQL Server.

WinCC/WebNavigator – provides the capability of operating and monitoring the plant via the Internet/intranet with the aid of Microsoft Internet Explorer or the supplied WinCC Web Viewer without having to make changes to the WinCC project. Thin client solutions allow the use of PCs and even rugged on-site devices and mobile PDAs under Windows CE.

WinCC/TeleControl – flexibly integrates remote terminal units equipped with SIMATIC automation components into the central process visualization system of the overall plant via a WAN (Wide Area Network).

Plant Intelligence and IT & Business Integration

Standard interfaces and powerful tools for displaying, analyzing and evaluating are decisive factors for universal IT and business integration and the optimization of production through Plant Intelligence.

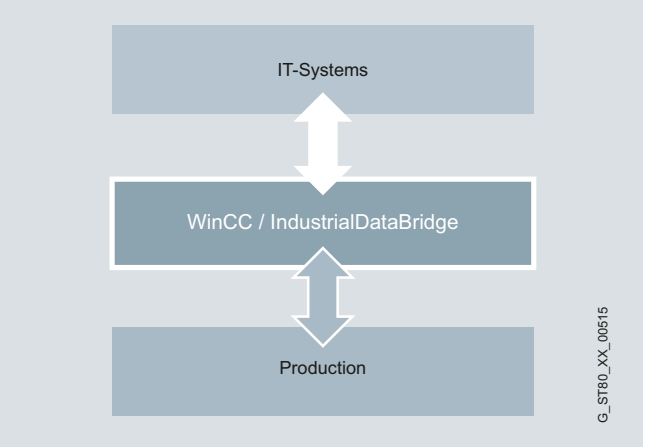
WinCC/DataMonitor – for displaying, analyzing, evaluating and distributing current process states and historical data (measured values, messages, user data) from the process database. The DataMonitor client needed for this can be installed on any office PC. The DataMonitor provides several tools for displaying and analyzing.

Information portal in WinCC / Data Monitor

WinCC/DowntimeMonitor – can detect and analyze downtimes in machine-oriented or line-oriented production facilities and derive from this data plant-specific parameters known as Key Performance Indicators (KPIs). Fault analyses provide information about the frequency and duration of machine or plant downtimes. Corresponding WinCC Controls can be effortlessly integrated in WinCC process screens.

WinCC/ConnectivityPack – allows other applications to access the WinCC archives via OPC HDA or WinCC OLE-DB, or to current values via OPC XML and forwards pending or historical messages via OPC (historical) A&E to higher-level systems. With WinCC/ConnectivityStation, any Windows computer without WinCC installed can be configured as an analysis station.

WinCC/IndustrialDataBridge – supports the connection to external databases, office applications and IT systems via WinCC OLE-DB and OPC DA by means of a parameterizable standard software.



WinCC/IndustrialDataBridge connects the production level with IT systems such as databases, for example.

Increased availability

WinCC/Redundancy – increases the system availability by means of redundant WinCC stations or servers that monitor each other, ensure the operability of the system and allow seamless data acquisition.

WinCC/ProAgent – allows targeted and fast process error diagnostics for machines and plants. By means of full integration into SIMATIC process error diagnostics, ProAgent provides an integrated solution based on STEP 7, the engineering tools, and the SIMATIC S7 Controllers.

SIMATIC Maintenance Station – displays maintenance information about the complete automation technology. The maintenance view is derived from the STEP 7 project. Additional engineering is unnecessary.

Validation and tracing

With the options **WinCC/Audit** (logging of operations, monitoring of project changes and tracing the production process via audit trails), **WinCC/ChangeControl** (project versioning and tracing of project changes) and the SIMATIC Logon integrated in the WinCC user administration (central, plant-wide user administration) and corresponding engineering measures, SIMATIC WinCC facilitates satisfying the requirements as per 21 CFR Part 11 in the pharmaceutical industry, the manufacturing of active ingredients and medicines and as per EU 178/2002 in the food, beverages and tobacco industries.

SCADA expansions

WinCC/User Archives – supports the use of user archives in which data can be saved in the form of data sets and exchanged between WinCC and the controller in the form of recipes or batch data.

WinCC/Calendar Scheduler and WinCC/Event Notifier – The calendar options supplement WinCC with calendar-based functions. A common calendar control supports the planning of schedules and of validity periods. You can use the Calendar Scheduler to trigger time-based actions; the Event Notifier sends messages depending on specific events in the WinCC message system.

System expansions

WinCC/IndustrialX – allows the configuration of user-specific objects in ActiveX technology. The objects can be standardized, used multiple times and centrally changed.

WinCC/ODK – describes open programming interfaces (C-API), which allow you to access data and functions of the WinCC configuration and runtime system and to even create own applications.

Options for energy management

SIMATIC powerrate – provides transparency for energy consumption – from the infeed to the consumer. Energy data is continuously collected, archived and further processed.

WinCC/B.Data – offers users optimized and cost-effective energy management in the areas of controlling, planning and energy purchasing.

Powerful graphics functions for maximum transparency

WinCC Add-ons

WinCC Add-ons are developed and sold by other Siemens departments and external suppliers. The support of WinCC Add-ons is provided by the respective product supplier, who is also the contact for integrating the product into the automation solution.

Premium Add-ons

WinCC Premium Add-ons are high-quality products that are checked in the test center for SIMATIC products for their compatibility with the basic WinCC system and are supported in the first instance by the central SIMATIC hotline. WinCC Premium Add-ons are currently available in the following categories:

- Connectivity
- Process management
- Diagnostics and maintenance
- Industry-specific and technology solutions
- Configuration tools

www.siemens.com/simatic-wincc-addons

Highlights

Universally applicable

Designed for international use from the beginning, the configuration interface of WinCC allows you to switch between different languages, including four Asian configuration languages. You can also design your project simultaneously in several target languages and switch between these languages during operation.

The basic system is designed technology- and sector-independent. References across all applications and sectors in plant construction and mechanical engineering prove this – even in the pharmaceutical industry – where WinCC with appropriate options fulfills requirements according to 21 CFR Part 11.

All important communication channels for connecting to SIMATIC Controllers and Allen-Bradley Ethernet IP, Modbus TCP/IP and cross-manufacturer channels such as PROFIBUS/PROFINET and OPC are supplied with WinCC.

Open interfaces, numerous options and the Microsoft SQL Server already included in the basic system for data archiving as an information hub support the IT & Business integration in the company.

All HMI functions on board

Industry-standard HMI functions are part of the basic equipment of the system:

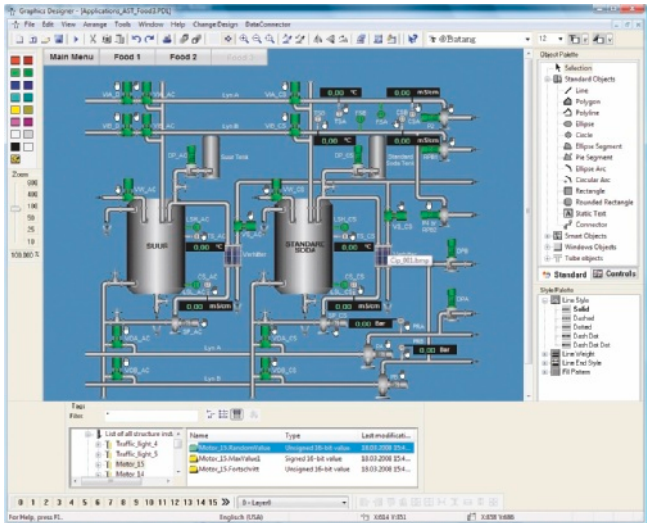
- Pixel-graphics visualization of the process sequences and statuses
- Operating the machine or plant via an individually configurable operator interface with its own menus and toolbars
- Reporting and acknowledging of events
- Archiving of measured values and messages in a process database
- Logging of current process data and acquired archive data
- User administration including their access rights

Quality-relevant processes and events are continuously recorded and can be proven in this way without any gaps.

Can be configured easily and efficiently

Sophisticated configuration functions drastically reduce engineering and training costs:

- User-friendly, object-oriented graphic editor
- Comprehensive libraries
- Efficient modular systems
- Fast changes due to online configuration
- Configuration tool for handling mass data
- Transparency due to cross-reference list



Continuously scalable – also via the Web

To be able to meet growing requirements, the visualization must be expandable at any time without causing technology incompatibilities or requiring completely new configurations. Investment protection is a top priority. WinCC provides the required universal scalability, from the small single-user solution to the redundant client/server solution with a central Microsoft SQL Server for data archiving and web operator stations.

Highlights

- Universally applicable
  - Solutions for all sectors
  - Meets requirements according to 21 CFR Part 11
  - Multilingual for worldwide use
  - Can be integrated in all automation and IT solutions
- All operating and monitoring functions onboard
- Can be configured easily and efficiently
- Continuously scalable – also via the Web
- Open standards for easy integration
- Integrated Microsoft SQL Server for data archiving as information hub
- Increased production transparency through Plant Intelligence
- Expandable using options and add-ons
- Part of Totally Integrated Automation

Open standards for easy integration

WinCC consistently builds on the highest possible openness and ability to integrate: ActiveX and .NET controls for technology- and sector-specific expansions, cross-vendor process communication via OPC, standard interfaces for external access to the database (WinCC OLE-DB and OPC HDA), integrated standard script languages (VBScript and ANSI-C), access to data and system functions via the Application Programming Interface (API) using the Open Development Kit (WinCC/ODK), user-specific expansions of the WinCC graphics editor via Visual Basic for Applications (VBA).

Integrated Microsoft SQL Server for data archiving as information hub

SIMATIC WinCC has a powerful and scalable data archiving function based on the Microsoft SQL Server already integrated into the basic system. The possibilities thereby afforded to users are endless: From high-performance archiving of current process data and events through long-term archiving with high data compression and backup function and beyond to a central information hub in the form of a central enterprise-wide Microsoft SQL Server for data archiving.

Increased production transparency through Plant Intelligence

Plant Intelligence stands for the efforts within production companies to reduce costs, prevent rejects, utilize processing equipment to its full capacity and therefore achieve greater efficiency and profitability through the intelligent use of information within a plant. High degree of system functionality (e.g. statistics functions for measured values and messages in the basic system), unlimited openness, integrated data archiving and a host of options ensure new transparency in the production process and well-founded decisions.

Expandable using options and add-ons

The WinCC basic system forms the core for a wide variety of applications. Based on the open programming interfaces, a wide range of sector-specific WinCC options (from Siemens Industrial Automation) and WinCC Premium Add-ons (by Siemens-internal and external partners) have been developed. WinCC options can be used for scalable plant configurations, for plant intelligence and IT & Business Integration, increasing the availability, expanding the basic system and for simplifying validation or tracing.

Universally applicable

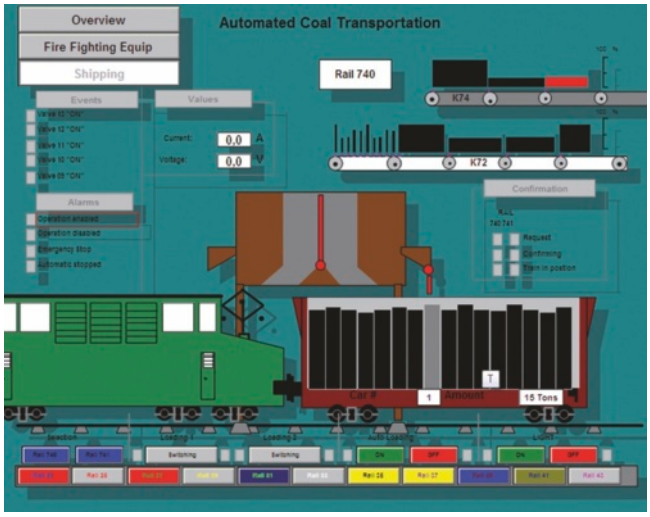
Solutions for all sectors and technologies

The WinCC basic system is designed to be technology and sector-neutral, modular and flexibly expandable. It allows both single-user applications in mechanical engineering and complex multi-user solutions or even distributed systems with several redundant servers and clients in plant engineering. Countless references covering all applications and sectors prove the diversity and performance capability:

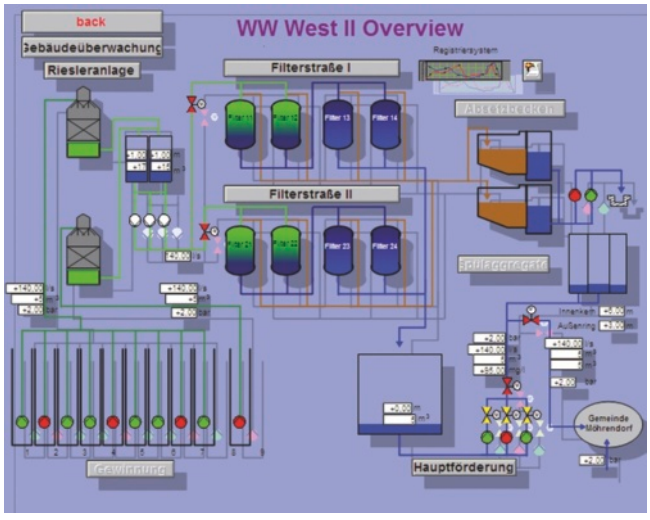
- Automobile production and suppliers
- Chemical and pharmaceutical industries
- Food, beverages and tobacco industries
- Mechanical and plant engineering
- Power supply and distribution
- Trade and services sector
- Plastics and rubber industry
- Metal processing and steel industry
- Paper manufacturing and processing, printing industry
- Transport, traffic and logistics
- Water and waste water treatment
- Building control technology and property management

You can find a large selection of current application articles at

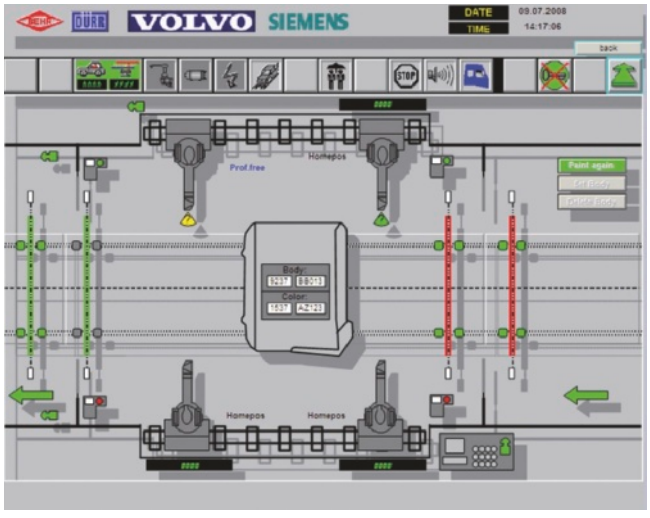
www.siemens.de/hmi-referenzen



Process screen for the transport of charcoal



Process screen for water supply



Process screen from the automotive industry (Volvo)

With the functionality integrated in the WinCC User Administrator and corresponding engineering measures, WinCC meets the requirements according to EU 178/2002 and 21 CFR Part 11 of the Food and Drug Administration in the pharmaceutical industry, the manufacturing of active ingredients and medicines and the food, beverages and tobacco industries.

The functionalities in the WinCC basic system considerably simplify the validation of plants and the tracing of the production process and thereby provide a convincing and comprehensive answer to the requirements in these sectors. For requirements that go beyond this standard, there are a number of WinCC options and add-ons. Thus, for example, operations and project changes can be tracked and documented via audit trails using WinCC/Audit or WinCC/ChangeControl.

More on the guidelines mentioned:

www.fda.gov
www.eur-lex.europa.eu

Ready for worldwide use thanks to multi-language capability

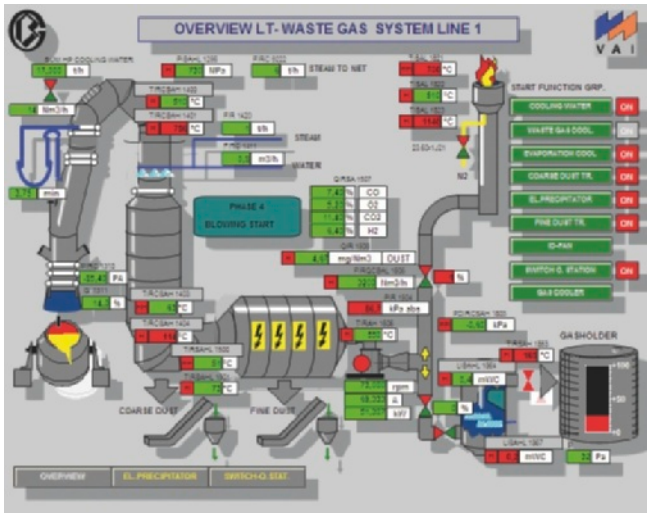
The configuration interface of WinCC can switch between German, English, French, Spanish and Italian at the push of a button. The Asian version supports English and the configuration languages for China, Taiwan, Korea or Japan. Of course, you can design your project for several runtime target languages – for example, German/French/Portuguese or English/Chinese at the same time. In this way, you can use the same visualization solution in several target markets – the desired target language can be switched to during operation at the push of a button. For the translation of the texts, WinCC offers the WinCC Text Distributor, a convenient import/export tool based on a standard ASCII text editor.

Process screen from the packaging industry

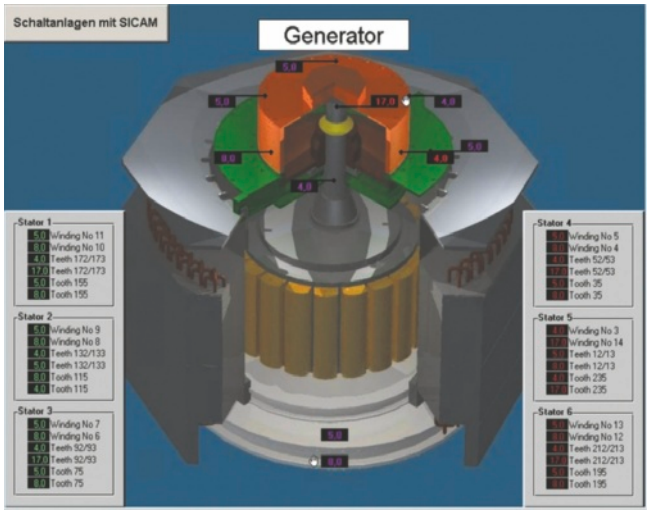
Can be integrated in all automation solutions and any company

All of the essential communication channels for connecting to the SIMATIC S5/ S7/ 505 Controllers (e.g. via the S7 Protocol Suite), and for Allen-Bradley Ethernet IP and Modbus TCP/IP and cross-manufacturer channels such as PROFIBUS/PROFINET and OPC are included in the delivery kit of WinCC. Because every controller manufacturer also provides related OPC servers, almost no limits are placed on the coupling capabilities of WinCC.

SIMATIC WinCC integrates powerful, scalable data archiving on the basis of the Microsoft SQL Server in the basic system, which you can use as a central information hub. Open interfaces and options form the basis for effective IT & Business Integration. This also provides a connection to Manufacturing Execution Systems (MES) and Enterprise Resource Planning Systems (ERP).



Overview screen from the waste water sector



Process screen from the power distribution (switchgear with SICAM)

All HMI functions on board

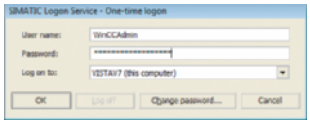
Integrated user administration

With the WinCC User Administrator, you assign and control the access rights of the users for configuration and runtime software. As the administrator, you can create up to 128 user groups with up to 128 individual users each and you can assign them corresponding access rights to WinCC functions at any time, even during operation. In all, up to 999 different authorizations are possible.

All of the operator stations are included in the user administration, i.e. including WebNavigator and DataMonitor clients. You get central, plant-wide user administration that is integrated in the Windows user administration via the integrated functionality of SIMATIC Logon.

SIMATIC Logon – Central, plant-wide user administration

SIMATIC Logon provides numerous security mechanisms both on the administrator side and on the user side. As usual, users receive a unique user ID, user name and password. Functions such as aging of the password, automatic logoff after a predefined time and lockout after several incorrect entries of a password ensure maximum security of operation. In addition, the administrator has the capability of setting up new users online, plant-wide and across applications, or blocking existing users.



Log-on of a user

In the SIMATIC WinCC environment, SIMATIC Logon can be used on the most diverse structures such as single-user stations or client/ server configurations. With SIMATIC Logon, high availability is ensured by primary/secondary domain controllers and the local Windows user management.

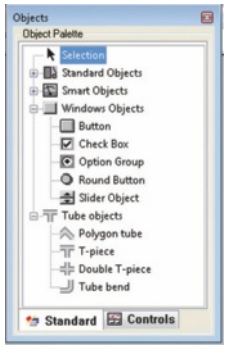
Graphics system

The graphics system of WinCC processes all inputs and outputs on the screen during runtime. The screens that you use for the visualization and operation of your plant are created with the aid of the WinCC Graphics Designer.

Whether you are dealing with small, simple operating and monitoring applications or complex control tasks: With the WinCC standards, individually configured operator interfaces can be created for each application – for reliable operation and for optimizing the entire production. A project-specific look and feel can be created using central design settings and color palettes as well as individual menus and toolbars. Shade, transparency, theming and skinning are available in Vista Design as special effects.

Benefits

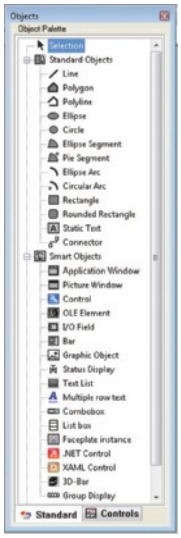
- Central, plant-wide user administration of SIMATIC Logon integrated in the Windows user management
- High security thanks to precautions on administrator and user side
- Various logon procedures can be used: keyboard, chip card reader
- Can be used in different configurations (single-user, client/server systems up to fault-tolerant solutions)



Object palettes of the WinCC Graphics Designer

Operator control ...

Every operation of the plant, of the archives and of WinCC can be locked to prevent unauthorized access. WinCC can record tag operations – with date, time, user name and a comparison of the old and new value. During this process, hover effects provide additional support by highlighting operable objects. For applications in the pharmaceuticals industry, which must be validated according to 21 CFR Part 11, you can also use the WinCC/Audit option.



... and monitoring

For an appealing, process-oriented interface, the system provides various elements, from graphical objects to user-defined menus, toolbars, buttons and controls to user-defined centrally modifiable faceplates.

The project engineer dynamically controls the appearance of the graphics portion and can activate tag values for this or adopt them directly from programs. WinCC supports the display of screens up to 10,000 x 10,000 pixels in size. The resolution can be scaled to the necessary screen resolution at any time. This ensures investment protection for future expansion of your plant.

Panning, zooming and decluttering, i.e. the display of screen contents depending on the zoom factor, round out the graphics functionality of the visualization system and give the user a completely new feeling when operating and monitoring.

Message system

Minimize downtimes – by means of alarms and messages

SIMATIC WinCC records process signals and local events, saves them in archives and makes them available filtered or sorted, as needed. Messages can occur via the derivation of the individual bits of a PowerTag (max. 32), as a result of a chronological message frame directly from the automation system, as a result of analog alarms due to any number of limit value violations, or due to an operation (->operation message). Each message can be configured in such a way that the operator has to acknowledge it.

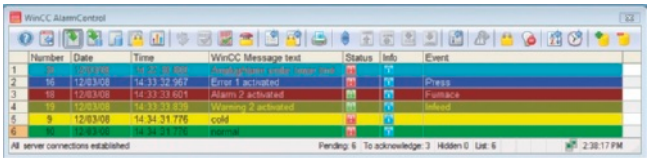
Now it is also possible to compare tags with a defined value. In doing so, hysteresis values can be set and ranges can be monitored easily.

User-definable message structure

Because the message structure is freely definable, it can be tailored to the special requirements of your plant. Dividing the structure into as many as 10 different text blocks (plant ID, fault location, text, etc.) leads to greater clarity of the information and allows targeted analyses to be initiated in connection with the filtering or sorting function. Differentiation of as many as 16 message classes makes easy fault and status messages just as possible as the separate preparation of alarms, warnings, faults and errors for several areas of the plant. Within a message class (e.g. alarm), up to 16 priorities can also be differentiated.

User-friendly message view

Messages are displayed on the screen via the user-configurable WinCC Alarm Control. Here, the display of the message information, for example, can be adapted exactly to the needs of the operator. The settings made can be saved in user-specific or global templates.



WinCC Alarm Control for displaying current/historical messages

Based on the contents of the individual message blocks, filtering, selecting and sorting is possible in the screen, e.g. chronologically, according to priorities or fault location. The contents can then be exported directly as a CSV file or printed as a report. A freely definable toolbar function also provides a high degree of flexibility. In this way, for example, your own project-specific functions can be integrated.

Highlights

- Microsoft SQL Server-based message system with
  - 10 text blocks
  - 10 process value blocks and
  - diverse system blocks (e.g. date and time)
- Selection criteria freely selectable and combinable
- Various user-specific filters can be saved as a filter matrix
- Hit list of the most frequent messages can be generated
- One double word can trigger up to 32 messages
- 256 threshold limits for analog values

To maintain a clear overview of a large number of incoming messages, the operator can suppress unimportant operational messages on the screen display by means of Alarm Hiding. The messages continue to be archived in the background.

Archiving and logging messages

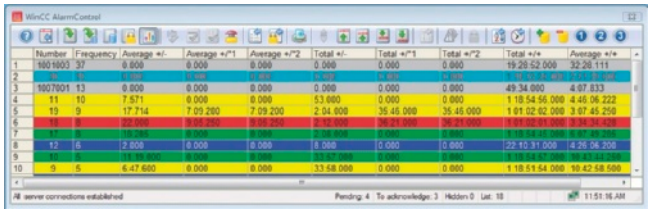
The Microsoft SQL Server is used for archiving message. This ensures complete recording of all events. Messages are archived in the case of so-called message events, for example, when a message occurs and when the status of the message changes.

In the message sequence report, the messages can be (selectively) documented chronologically. All of the status changes (came in, went out, acknowledged) of all currently pending messages are output to a printer. In the message archive report, specific views of the archived messages can be generated.

All HMI functions on board

Statistical evaluations

A number of integrated statistics functions allow a comprehensive analysis of process states. The message hit list shows how long certain messages have been pending on average (message duration) and, in similar fashion, the average and total acknowledgement time. Of course, you can filter them according to the relevant events, message locations and time intervals. This quickly makes it clear where the critical points and bottlenecks in the production are located. To sort the messages in the message view for an analysis, you can simply select the column header and select the desired sorting criterion (e.g. "descending by frequency").



Message hit list for messages that have come in

Archive system

High-performance archiving for messages and measured values

Historical values or value sequences are saved in process value archives. In addition to process values, WinCC also archives messages and user data. The archiving is done in archives in the Microsoft SQL Server database with high performance: up to 10,000 measured values and 100 messages per second as a continuous load (for a message burst even 15,000 messages within 10 seconds) are not a problem for a central archive server. The memory requirement is very low thanks to powerful, loss-free compression functions. Process values can be cyclically (continuously) compressed (e.g. mean value generation), either event-controlled or process-controlled (e.g. limit value exceeded), and archived by means of an integral function.

Archive size and segmentation made to order

The measured values or messages are stored in an archive; the size of which can be configured. One month, one year or a maximum volume of data can be specified in a practice-oriented way as the maximum archiving period. The respective archive itself can be segmented. Closed individual logs can be regularly swapped out to the long-term archive server and read any time from WinCC and analyzed with the available resources. The swap out ensures that no data is lost even during long-term archiving.

Highlights

- Microsoft SQL Server records trends in a memory-optimized way: up to 120,000 trends can be archived on one server
- Mathematical functions, such as integral calculation, are available for statistical analysis
- Long-term back-up with user-definable back-up cycles

In the WinCC basic system, it is possible to archive 512 archive tags. PowerPacks allow an increase up to 120,000 tags. The Tag Logging Editor permits user-defined recording of the process values as required.

Displaying measured values

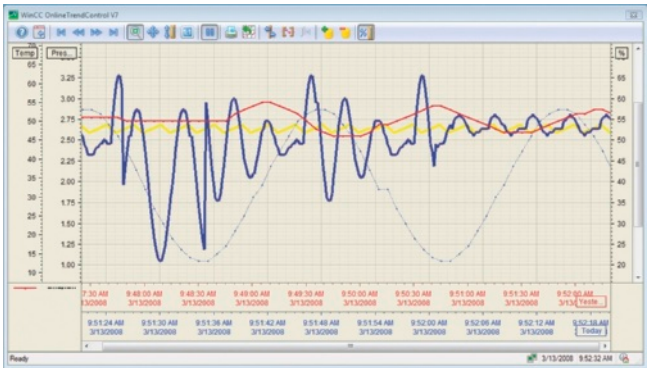
Process values are displayed via the WinCC Online Table Controls and Online Trend Controls, which display the data in the form of a table or trend. In addition, the WinCC Trend Ruler Control gives you the capability to display the integrated statistics functions independently of the trends display. The representation can be freely selected, e.g.

- Online trend, archive trends, F(x) trends
- Setpoint trends
- Different writing directions, display of areas and limit values, interpolation, step curves, graduated trends, tables
- Read line, zooming, scale switching, start/stop, scroll

For improved display and analysis capabilities, the line thickness of trends can be configured. If you click the right mouse button over the trend line, a tooltip with detailed information on the measuring point appears: Archive, archive tag, date/time, value and connection status.

The operator can not only change the display online, but he can save the changes in the configuration data and parameterize a trend view online for any PowerTag.

Current values (online trends), historical process values and setpoint trends can be displayed in the same trend view. For this, it is possible to individually scale the time axis and the value range (e.g. percentile scaling). The time and value axes of the individual trends can be moved online by moving the mouse. This function can be used for batch comparisons, for example.



Online Trend Control with key for data export

To increase the clarity of the information, only the Y axis of the currently selected trend is displayed upon request, to the left and/or right of the trend view. The trend selection can be defined by means of configuration or online via the Trend Control buttons. The settings made can be saved in user-specific or global templates.

Using the freely definable toolbar function, your own project-specific functions can be integrated. This ensures maximum flexibility.

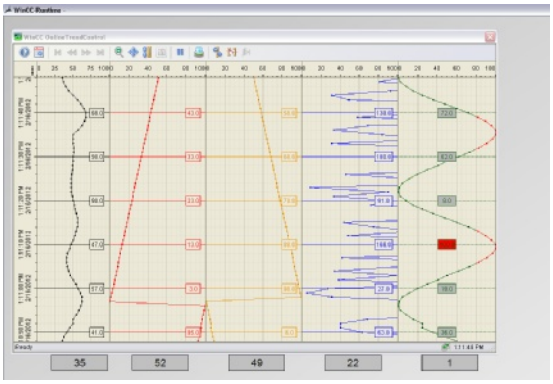
The process values and statistical data displayed in the trend view can be exported to a CSV file at the push of a button and analyzed using standard tools.

Statistical evaluations for measured values

A large number of integrated statistics functions allows a comprehensive analysis of process states, which can be positioned at any point in the WinCC Trend Ruler Control.

For acquired process values, the minimum, maximum, average, standard deviation and integral can be determined and displayed for a defined period of time.

For a simplified data analysis, a second read line can also be used. It is also possible to have a logarithmic display of trend sequences and to export the displayed values in Excel format.



Trend control with highlighted intermediate values

Reporting and logging system

WinCC has an integrated logging system which you can use to put data from WinCC or from other applications on paper. It prints data acquired during the runtime in configurable layouts by means of various types of logs, from a message sequence log, a system message log and an operator log to user reports. The reports can be saved as a file and displayed as preview on the screen. Of course, these logs can also be configured in multiple languages.

Individually configurable layouts

The report output can also be started time-controlled or event-driven or by operator input. The printer can be selected online via a printer selection dialog. The contents of a log can be determined dynamically during runtime.

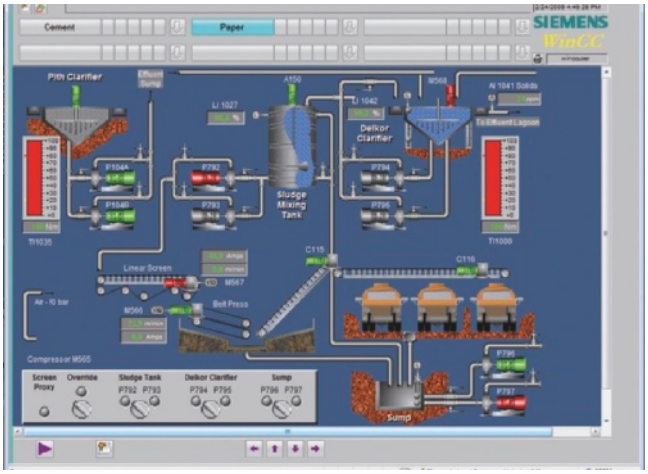
Open and capable of integration

WinCC logs can contain data from the database and external data in CSV format as a table or trend. To display data from other applications as a table or graph, you can also develop your own report provider.

Process control functions (Basic Process Control)

The WinCC basic system also contains functions which make a WinCC station suitable for control engineering applications - with a minimum of engineering effort. Additional objects and configuration tools (e.g Picture Tree Manager) in Basic Process Control permit the easy implementation of typical process control requirements:

- Group displays
- Fixed screen layout
- Screen hierarchy, screen navigation
- Sign-of-life monitoring
- Activation of external signal transmitters (e.g. horn)
- Time synchronization with PROFIBUS or Ethernet



Display of instrumentation and control (Basic Process Control)

Can be configured easily and efficiently

In the life cycle of an automation solution, engineering costs make up as much as 50% of the total costs. If you want to significantly lower costs, you will need simple and efficient tools for configuring – and intuitive operator prompting. SIMATIC WinCC provides both.

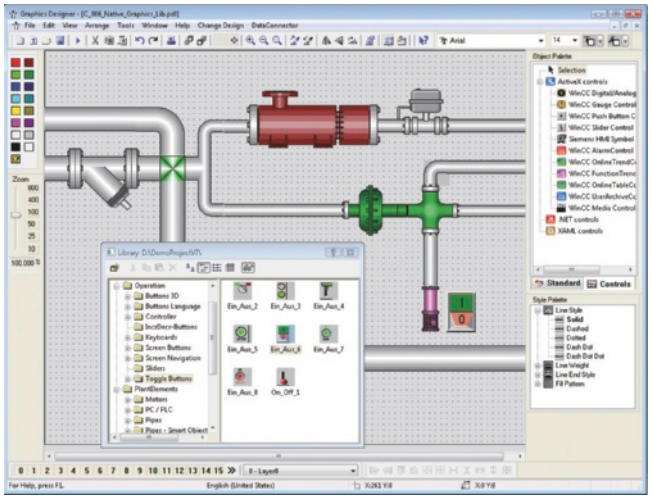
Simply use the expertise from PC applications for the industrial process – this idea determined the development. What resulted was an object-oriented, multilingual engineering environment with a configurable configuration interface, tooltips, comprehensive online help and configuration examples.

Refined in detail

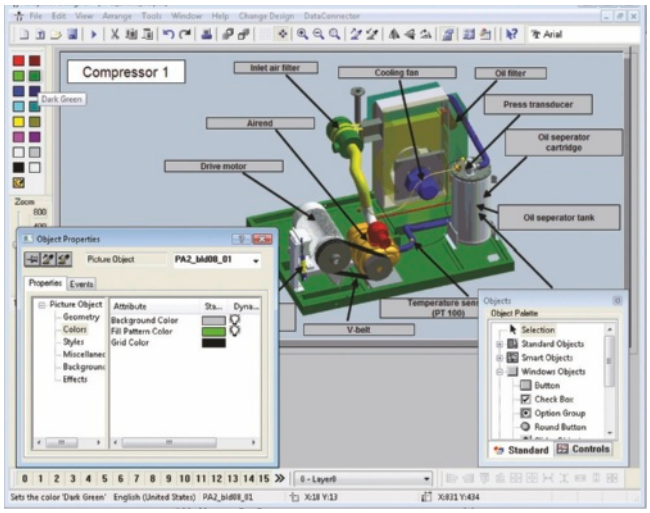
The linking of an object to an internal or PowerTag is easily conceivable: Once the affected object is positioned on the screen, concise configuration dialogs appear. In addition to this, the WinCC Graphics Designer provides the capability to manipulate and dynamize all of the properties of an object – even activation via a script is possible in order to gain the greatest possible flexibility.

The WinCC Graphics Designer supports configuration in 32 image levels. For complex images involving several overlaid objects, individual levels can be hidden to provide a clearer overview. There is also the convenient capability of being able to change the properties of individual objects in a grouping of objects – without affecting the grouping.

Objects that appear more than once on the screen are generally just copied. When copying the objects, their tag links are also copied 1:1. To optimize rewiring, i.e. the connection to other tags, WinCC provides the rewiring dialog in which all of the tags linked to the selected objects are listed and can be directly "rewired".



SIMATIC WinCC global object library



Screen configuration using the WinCC Graphics Designer

Configuration wizards save time for more important work

Time-saving configuration also means: delegating tasks. SIMATIC WinCC supports the project engineer with wizards for routine tasks. For example, the message wizard: This provides preset parameters that can be accepted or modified. Preview windows show the effect of the currently used parameters. If the project engineer follows the recommendations, he can implement cost-effective and practice-oriented solutions in no time at all and change them at a later date, if required.

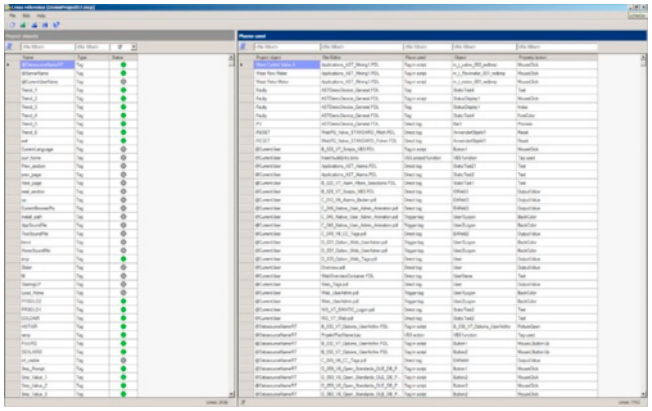
Easily get "passive knowledge" from the library

Why constantly reinvent the wheel? With the aid of the library, previously created objects can always be called up again. In this way, the project engineer can create company-specific, technology-specific or sector-specific standards for quickly creating projects. A large selection of objects are already prepared and sorted by topic in the library ready to be dragged and dropped onto the process screen.

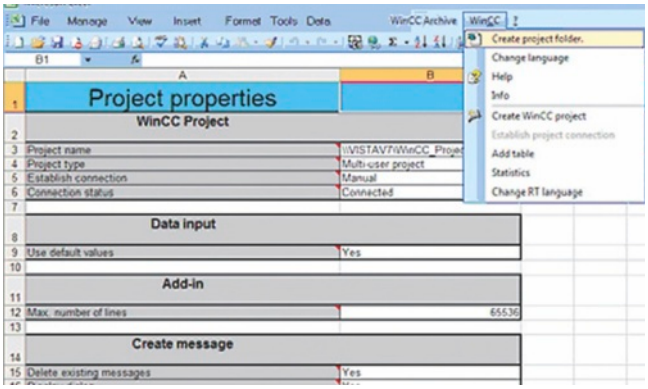
New objects can be inserted into the library just as easily. If the online language switching function is to be fully utilized later during runtime, it is worthwhile to take the time to configure such objects for multiple languages at the same time.

Centrally modifiable graphic objects

It is also possible to configure in block technology: Any number of graphical objects can be grouped into a new, user-specific faceplate, in which only those interface parameters that are relevant to the process link "make it to the surface". These faceplates are created and managed centrally. Changes are automatically made at all usage points.



Cross-reference list for the listing of all the tags, functions, etc. used



Configuration tool for handling large projects

WinCC as integration platform

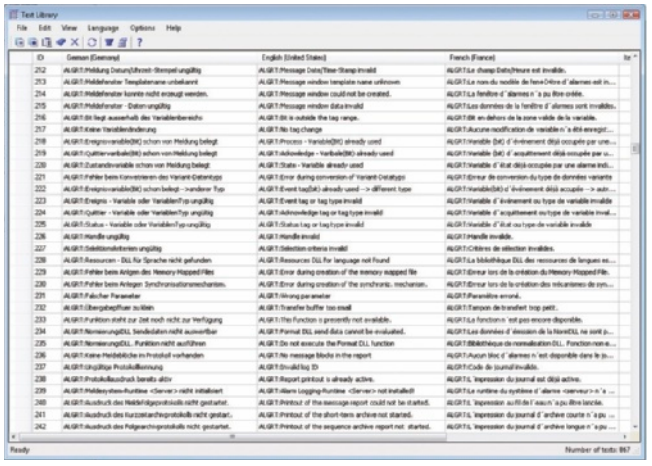
WinCC supports the integration of its own technology-specific XAML and .NET controls via a .NET container. In addition, ActiveX Controls can also be created by means of the WinCC/IndustrialX option and displayed in WinCC.

Cross-reference list and display of the screen properties

For service or plant personnel, it is often difficult to get acquainted with a project and to analyze the individual project specifics. The ideal tools in this case are a cross-reference list with the (filtered) tabular listing of all of the tags, screens and functions defined in the project and the central display of the screen properties directly in WinCC Explorer. In this way, WinCC creates transparency in the project and facilitates the change configuration even after a long period of time.

Configuration of multilingual applications

The texts for the runtime application can be edited in all of the primary languages of Windows. In addition to the statistical texts, this also includes the tooltips. With the Text Distributor editor, all of the texts are exported in CSV format and



WinCC Text Library with message texts in five languages

imported again so that the translation can be done easily using a standard tool. To facilitate the translation of message texts, there is a text library which provides the terms used in the individual languages in the form of a table. In the text library, you can enter the texts in the Windows languages that are to be used later during runtime, depending on which runtime language is currently set. User-friendly filter mechanisms facilitate make your work easier in case of large quantity structures.

Configuration tool for configuration of mass data

For a user-friendly and quick configuration of bulk data, you can fall back on a Microsoft Excel-based configuration tool. Existing projects can be read and new ones can be created. In addition to process connections and tags, measured values, messages and the textlibrary can also be processed. For the configuration of archive tags, there is also an Archive Configuration Tool. The tabular format allows user-friendly editing and even auto-filling. Other capabilities are provided for advanced users via macros based on VBA (Visual Basic for Applications).

Fast certainty – runtime simulation

Even before the connection to the controllers is made, a SIMATIC WinCC project can be tested. By means of tag simulation, each (internal) tag used can be assigned a value sequence. If the screens then appear on the monitor to be tested, it quickly becomes clear whether or not the configured color changes are right.

A boost for commissioning: online configuration

Changing configuration data in the middle of a "hot" test phase? No problem – do it online. With the next screen selection the modified screen is updated (and commissioning time is considerably reduced!). Simultaneously, quality-relevant processes and events are continuously recorded and can be proven without any gaps.

Continuously scalable – also via the Web

Automation and IT solutions are generally subjected to constant change. This includes, for example, modernizations of individual sections of the plant, later plant expansions, the implementation of central monitoring of various locations in a company, and the optimization of the process sequences at a location or in a company.

To be able to meet growing requirements, the visualization must be expandable at any time without causing technology incompatibilities or requiring completely new configurations. Investment protection is a top priority. SIMATIC WinCC provides the required integrated scalability, from the small single-user solution to the client/server solution with a central Microsoft SQL server for data archiving and operator stations on the web.

Virtualization increases flexibility and offers a significant potential for savings in system administration and maintenance. The possibility of using simple, robust thin clients provides additional cost benefits and increases IT security.

From a single-user system to distributed client/server solution

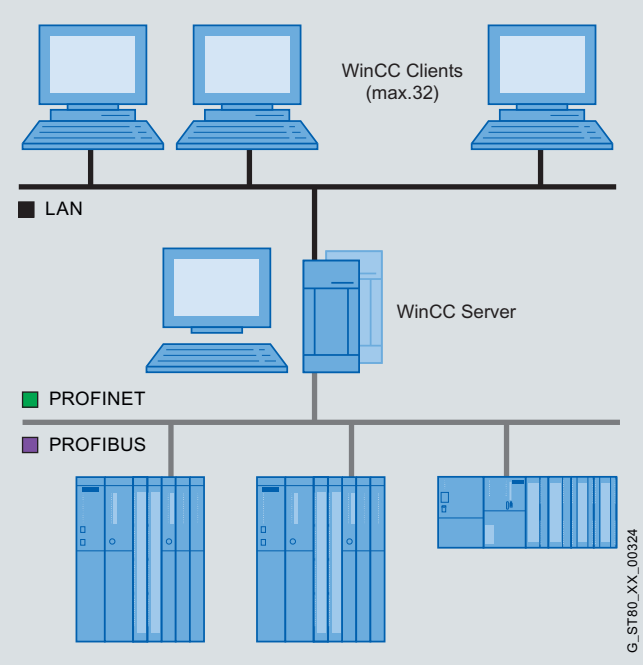
Scalable means that the number of tags in your project can be upgraded as needed with PowerPacks – without paying more, as if you had chosen the larger solution in the first place. From single-user systems, you can create coordinated operator stations at any time by means of the server option – i.e. a multi-user system. In all, up to 12 redundant WinCC servers with 32 WinCC clients can be used in a linked system configuration. The servers themselves can be configured as a distributed system. The distribution of the overall application or of the tasks to several servers allows a considerably higher quantity structure, relieves the individual servers and ensures good performance.

Upon request, an optional central archive server, for example, can be set up for central process data archiving. The distribution also allows for the topology of a plant.

The overall view of the plant is provided by WinCC Clients, which have simultaneous access to or viewing of screens and data of different server projects and which can also be used for online configuration. For these clients, a shared message view and trend view of archives from different servers can be configured.

Limitless operator control and monitoring

WinCC can also be expanded beyond the local network (LAN) of a site, whether in order to be able to sporadically and remotely monitor a section of a plant (e.g. in wastewater treatment plants or in station control systems) or on order to be able to access current or historical process information (e.g. for statistical analysis) from any location.



WinCC multi-user system

The WinCC/WebNavigator supports full-fledged operator control and monitoring via the web – generally without requiring changes to the project. A WinCC web server can be installed on a WinCC single-user system, a WinCC server or client. Thus a web client connected to the web server has access to the projects of all (up to 12) WinCC servers in a plant from anywhere in the world.

The user administration of the operator stations on the web is included in the database of the plant on-site. Different authorization levels regulate the access rights. In addition to this, support of standard security mechanisms for operating on the Internet is provided. Central, plant-wide user administration, into which web clients are also integrated, can be set up using SIMATIC Logon.

In addition, the use of terminal services and thin clients is also possible by means of the WinCC WebNavigator option. Via thin client solutions, rugged on-site devices (e.g. SIMATIC Thin Client) and mobile clients (PDA – Personal Digital Assistant) can be connected under Windows CE with few hardware requirements. The application itself runs on the Terminal Server.

Note

In this case, suitable protective measures (including IT security such as network segmentation) should be taken in order to ensure safe operation of the system. For more information on the topic of industrial security, go to **www.siemens.com/industrialsecurity**.

Cost cutting through virtualization

Virtualization stands for the decoupling of software applications from the associated hardware. With SIMATIC WinCC, SCADA solutions can also benefit from the advantages of this technique, proven in the IT world. Both WinCC clients and WinCC servers can be virtualized on various hardware platforms. The basis of the virtualization is VMware ESX(i), a worldwide established hypervisor application. Access to the clients takes place via Ethernet and the standardized Remote Desktop Protocol (RDP). To this end, cost-effective and robust thin clients can be used.

Savings potential

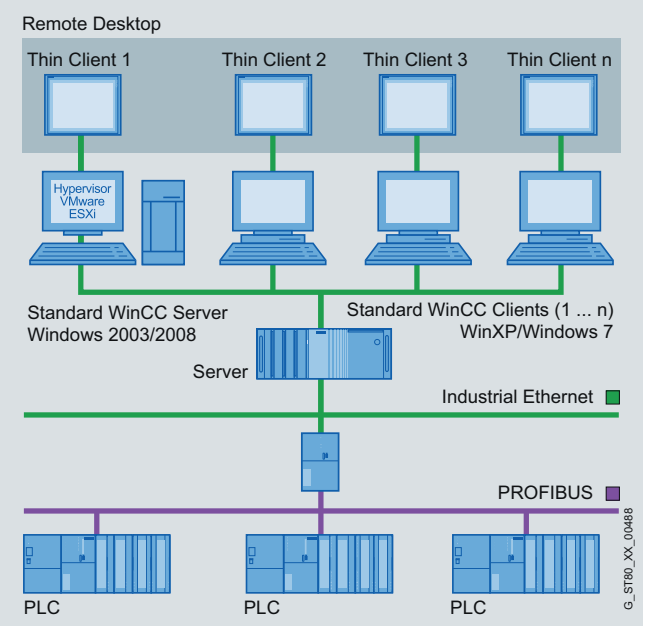
- Multiple WinCC server and/or client sessions can be operated on a central HW platform
- Simple thin clients, such as mobile PDAs, can be used
- Reduced overhead for central administration and maintenance

Increased safety

- Centralized rights management
- Reduced susceptibility to attack for thin clients

Higher availability and flexibility

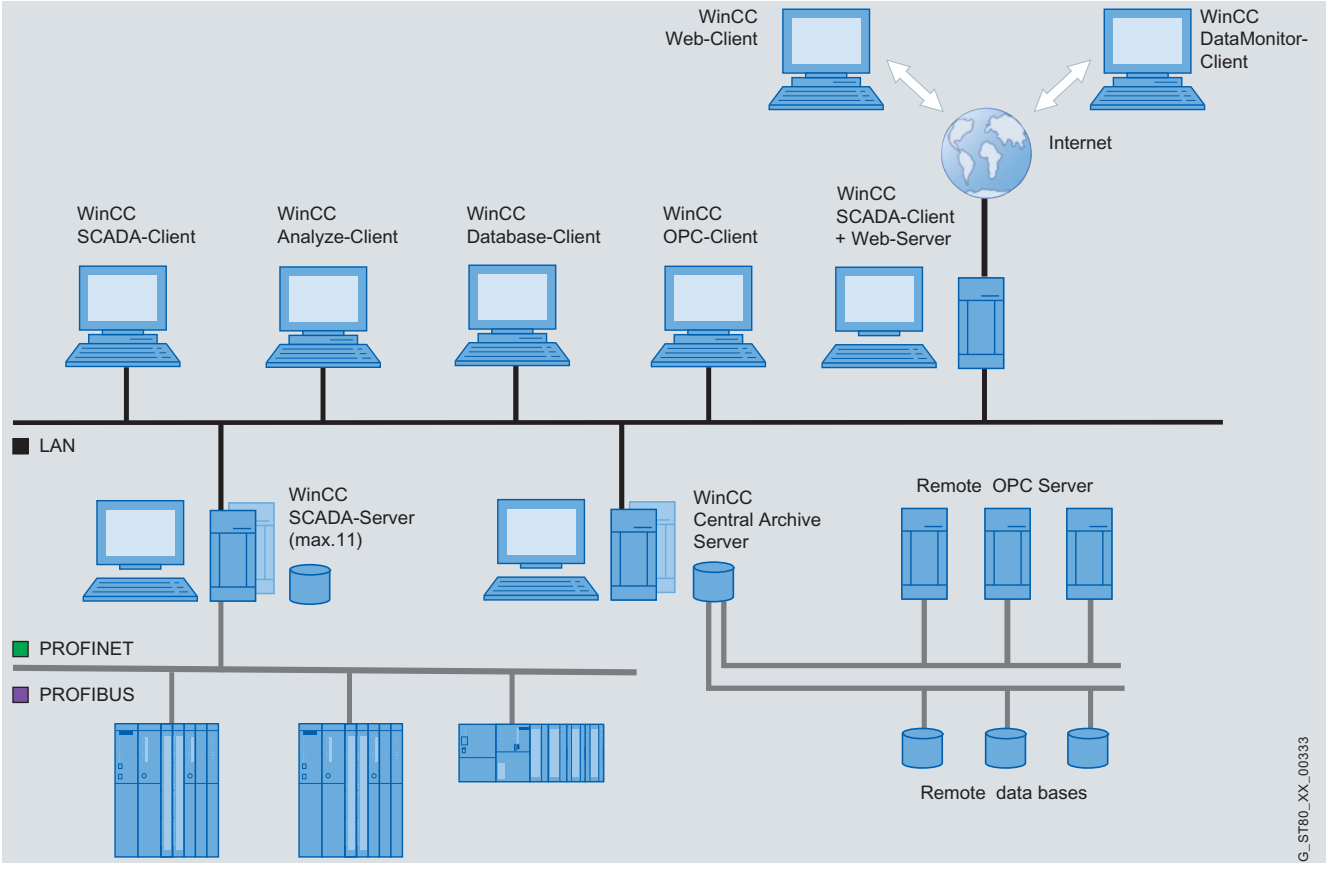
- Hardware can be replaced on the virtual server during operation
- Clients can be activated simply by starting an additional VMware session.



Virtualization of WinCC servers and clients

High availability thanks to redundant solutions

- Redundant servers via the WinCC/redundancy option,
- server farms with a redundancy concept for WinCC/WebNavigator and
- Redundant process communication via S7-REDCONNECT.



WinCC SCADA Client as web server for different clients in the web with central process data archiving

Open standards for easy integration

SIMATIC WinCC is strictly based on Microsoft technology, which provides for the greatest possible compatibility and integration ability.

Microsoft Windows –
no compromises when it comes to the operating system

WinCC was the first process visualization system on the market with 32-bit software technology under Microsoft Windows 95/NT 4.0. Today, Windows XP Professional, Windows 2003 Server, and Windows 7 represent an open standard platform for WinCC servers and clients or single-user systems. With WinCC, you can follow innovations in the operating system without any problems, which means you have the greatest possible investment protection.

Microsoft SQL Server –
high-performance real-time database

The Microsoft SQL Server is already integrated into the WinCC basic system – real-time behavior, performance and industry standard included. In individual cases you can create up to 120,000 archive tags and up to 10,000 measured values or 100 messages (compressed) per second and then analyze the data using existing WinCC tools. Via open interfaces (WinCC OLE-DB and OPC HDA, OPC A&E), you also have the capability of further editing archive data at any time using any external tools. For WinCC Clients, it is also possible to dispense with the installation of the Microsoft SQL Server. This results in lower demands on the hardware. Using the same hardware, performance can be increased if no database is active. Sometimes manufacturers' specifications forbid the installation of an Microsoft SQL Server.

WinCC as integration platform

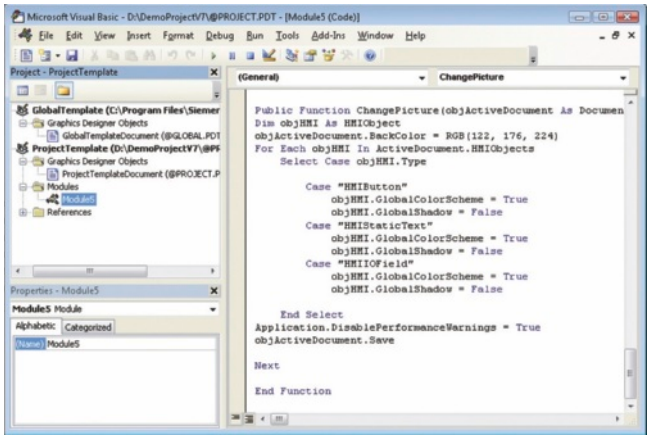
WinCC is a .NET Container, through which user-created .NET Controls can be integrated.

ActiveX Controls – open for application modules

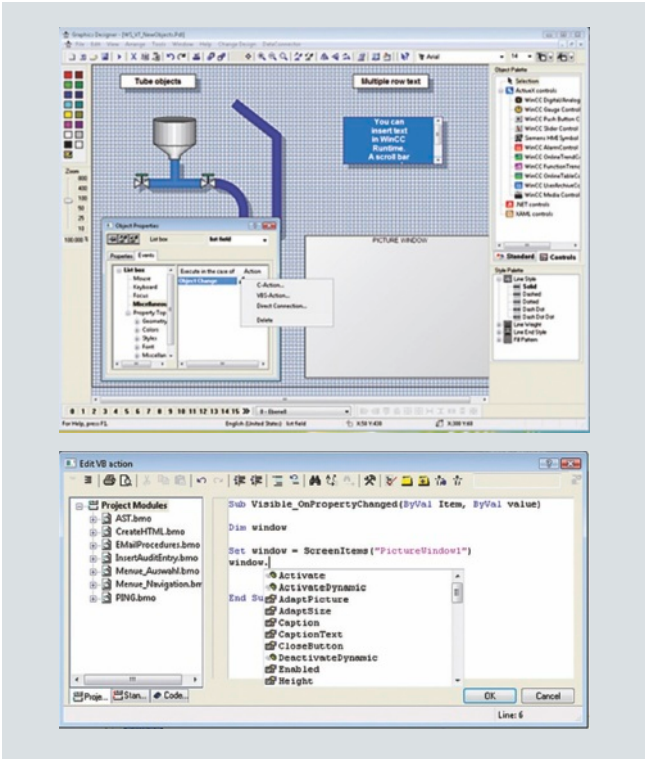
Via OLE (Object Linking and Embedding), additional applications can be integrated into the process screens and the associated data can be exchanged. Technology-specific and sector-specific ActiveX Controls also have access to the system so that you can also use rendered engineering services for your operating and monitoring task. Corresponding components are widely available on the market.

Visual Basic for Applications –
for individual expansions

Whenever standards for sector-specific or project-specific solutions need to be created, the desire for individual adaptations and expansions of the configuration tool crops up. For this reason, VBA
was integrated into the WinCC Graphics Designer for WinCC – the user-friendly standard environment for application-specific expansions (incl. debugging). Via VBA, you have access to all of the configuration data (tags, messages, screens and screenobjects, incl. dynamization). In this way, for example, complete configurations can be automated. Thus, the Visual Basic knowledge possessed by many project engineers and users can be used effectively. And: proprietary standards for recurring engineering tasks save time and money! Define your own menu entries or quick configuration dialogs for your own user-specific objects.



VBA script for a project template



Visual Basic Scripting

**VBScript or ANSI-C –
for scripting there is a choice**

Normally, the configuration of screens, links and dynamic processes is done via simple dialogs. If necessary, scripts can also be programmed in VBScript or ANSI-C – for example, for converting values, for formulating conditions for the start of a report or for creating individual messages.

VBScript has its own, user-friendly editor with debugging support. The scripts themselves have access to the properties and methods of all WinCC graphic objects, to ActiveX Controls and to the object model of applications from other manufacturers. This allows the dynamic behavior of objects to be controlled, and it also allows a connection to be established to applications from other manufacturers relatively easily (e.g. Microsoft Excel and
Microsoft SQL databases).

Open programming interfaces – C-API

You would like to have additional individual applications? The WinCC function modules are open via API interfaces, which allow access to data and functions of the configuration and runtime system. This allows you to use WinCC configuration and runtime functions in your scripts or even to develop independent applications with direct access to WinCC (e.g. connections of third-party drivers or sector-specific functionalities). Access to the programming interfaces is made really easy with the Open Development Kit ODK.

**OPC: Openness, Productivity, Collaboration –
for cross-vendor communication**

Cross-vendor communication in the automation sector has always been of primary importance for WinCC. As an OPC DA client, WinCC can log on for current process data locally or via the network for lower-level controllers and then receives the data cyclically via the assigned OPC DA server. On the other hand, the integrated WinCC OPC DA server can make current process values available to other OPC-compatible applications such as Microsoft Excel for further processing.

With OPC XML DA, this is even possible across platforms for different operating systems via the web between WinCC and Office applications, ERP/PPS systems (e.g. SAP/R3) or business-to-business portals.

You can gain access to WinCC archive data via OPC HDA (Historical Data Access) or via WinCC OLE-DB Provider with the aid of Microsoft DTSX Packages. An OPC HDA client (e.g. a reporting tool) can specify start and end times of an interval and request the data to be transmitted in a targeted way for WinCC and, if necessary, actively compress the data before the data is transferred to higher-level systems for information preparation.

A WinCC message is displayed as an alarm with OPC A&E (Alarm & Events) and it is forwarded together with all of the associated process values to any subscriber in the production or corporate management level. Filter mechanisms and subscriptions ensure that only selected, modified data is transmitted. Of course, acknowledgements can also be made on the MES or ERP level. Similarly, access to messages archived in WinCC is also possible via OPC (historical) A&E. This access can also be simplified by using Microsoft SQL Server tools.

Integrated Microsoft SQL Server for data archiving for IT & Business Integration

SIMATIC WinCC has a powerful, scalable SQL Server for data archiving on the basis of Microsoft SQL Server integrated in the basic system. This provides the user with all of the capabilities for archiving and analysis.

Archiving ...

- High-performance archiving of current process values and process interrupts
- Long-term archiving with data compression and backup archives
- Use as a central archive server (optionally redundant)

The archiving of data and events in the form of process value, message and user archives is implemented with high performance: up to 10,000 measured values per second and up to 15,000 messages within 10 seconds as a message burst. The memory requirement is very low thanks to powerful compression functions. Self-contained individual archives (e.g. weekly archives) can be swapped out to the long-term archive server (backup server).

Up to 11 WinCC servers, remote OPC DA servers or remote databases serve as data sources. For high availability requirements, integrated redundant solutions can be set up with redundant WinCC servers, archive servers and back-up servers.

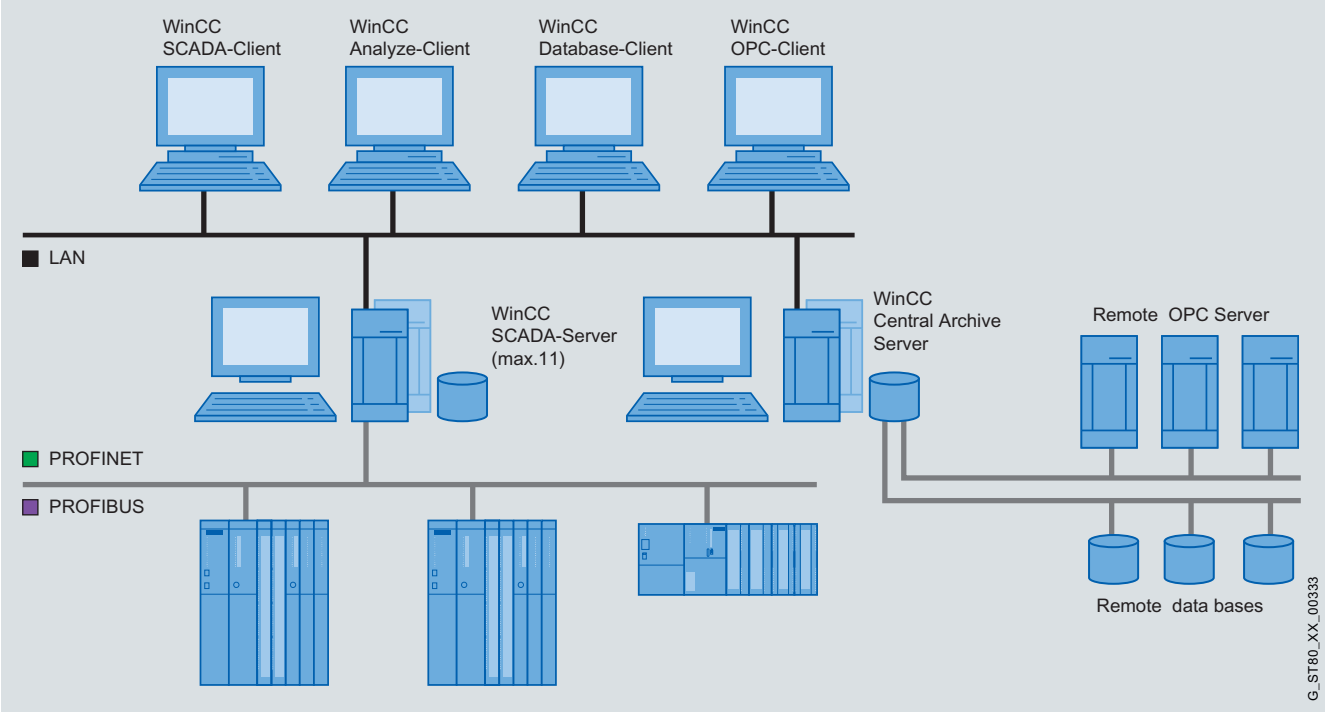
In the WinCC basic system, it is possible to archive 512 archive tags. PowerPacks allow an increase up to 120,000 tags.

... and analysis

The data from the WinCC archive system can be displayed via WinCC process screens with integrated WinCC Online Trend Control, WinCC Online Table Control, WinCC Trend Ruler Control or WinCC Alarm Control, in which statistical functions are integrated. Additional analysis capabilities are included in the WinCC options (e.g. WinCC ConnectivityPack, WinCC/DataMonitor) and the WinCC Add-ons.

Different clients for evaluation:

- WinCC SCADA Clients for operator control and monitoring (and configuring)
- WinCC Web Clients for full-fledged operator control and monitoring via the web, via Microsoft Internet Explorer or WinCC Web Viewer, optionally via Terminal Services
- WinCC DataMonitor clients as an information portal for current process layers via Microsoft Internet Explorer, statistics functions, online analyses via Microsoft Excel and creating, displaying and distributing of reports
- Analysis clients on the basis of the WinCC/ConnectivityStation with free access to current and historical data (e.g. via OPC or WinCC OLE-DB).



Central archive server on the basis of WinCC – process data archiving and information hub

Increased production transparency through Plant Intelligence

Increasing quality requirements with fast product changes and frequent modifications make production processes more and more complex. In order to simultaneously ensure the highest possible productivity, it must be possible to make timely, goal-oriented process optimization decisions on all levels. This requires an integrated flow of information across all plant levels and locations. SIMATIC WinCC is the right solution for this: Scalable client/server systems for process visualization, options for IT & Business Integration and Plant Intelligence – the basis for a high degree of transparency and process optimization with a quick return of investment.

Plant Intelligence is based on the intelligent utilization of information to improve processes within the company. It is designed to lower plant costs, avoid wastage, utilize production facilities better and ultimately ensure greater efficiency and cost effectiveness within the company.

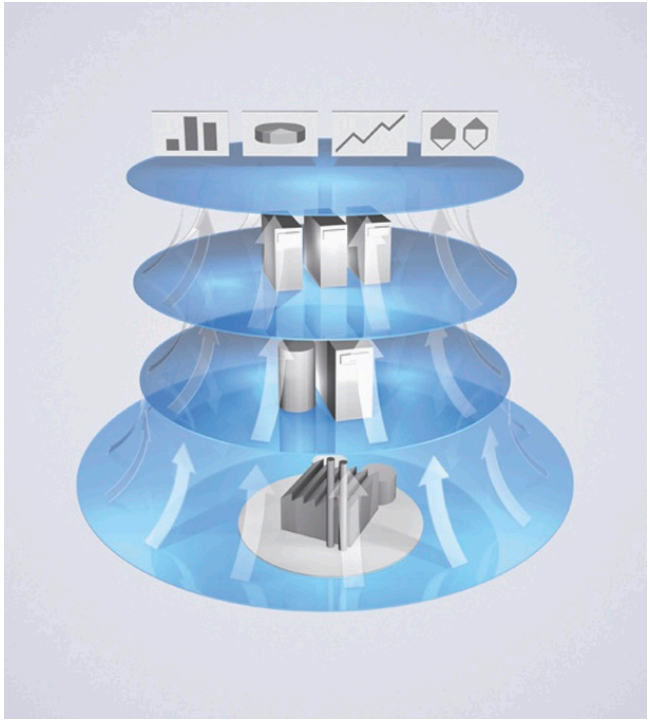
WinCC provides the best conditions for achieving this, since WinCC features an integrated Microsoft SQL Server for data archiving for the acquisition of important production data. Using intelligent functions and tools, these process data can be edited into information necessary for making decisions and can be made available throughout the company whenever and wherever it is required – for operators as well as production managers or anyone else within the company.

Even the WinCC basic system provides a wealth of display and evaluation functions, such as the statistics function for the message and measured value logs. WinCC options for Plant Intelligence and IT & Business Integration make additional "smart" tools available for optimizing production.

- WinCC/DataMonitor –
  display, analysis, evaluation and distribution of current process states and historical data on any office PC with Internet-capable tools
- WinCC/DowntimeMonitor –
  recording of downtimes in machine-oriented or line-oriented production plants and analysis and derivation of plant-specific parameters (KPIs)
- WinCC/ConnectivityPack and WinCC/ConnectivityStation –
  access for other applications to the WinCC archives or to current process values and messages via OPC or OLE-DB
- WinCC/IndustrialDataBridge –
  linking of external databases, office applications and IT systems

With the integration of Plant Intelligence applications from the machine to the company level, Siemens provides a complete and scalable solution from a single source. Upgrading from a cost-effective, powerful entry variant on the basis of the visualization system SIMATIC WinCC to a comprehensive optimization solution on the MES level with SIMATIC IT is seamlessly possible. Plant Intelligence connects the SCADA level to the MES level and thus creates greater transparency in production by means of efficient acquisition, archiving, compression, analysis and distribution of production data.

The connection and integration of SCADA and MES leads to an enormous advantage for the customer. As before, he can expand his existing SCADA solution by Plant Intelligence with SIMATIC WinCC options. He can extend the plant transparency with additional expansions to the MES or company level as needed. Simatic IT can associate and evaluate parameters such as the Key Performance Indicators across several plants and it can thus also analyze production data such as orders, genealogy and batch data in this way.



Process visualization with Plant Intelligence

Part of Totally Integrated Automation

Savings in engineering and lifecycle costs

Totally Integrated Automation facilitates total integration of the individual automation components – from the controller, distributed I/Os and drive system through HMI as far as the production control level. You will always profit from the unique integration. In other words: You can reduce your engineering costs for automation solutions – as well as your lifecycle and overall costs.

As part of Totally Integrated Automation, SIMATIC WinCC uses identical configuration tools under Windows, accesses shared data of the SIMATIC Manager and communicates integrally. In this way, WinCC uses tags and message lists, for example, of the SIMATIC Controllers and uses their communication parameters. This dispenses with time-consuming multiple entries and additional sources of error - from the very beginning.

Integrated diagnostic functions for increasing productivity

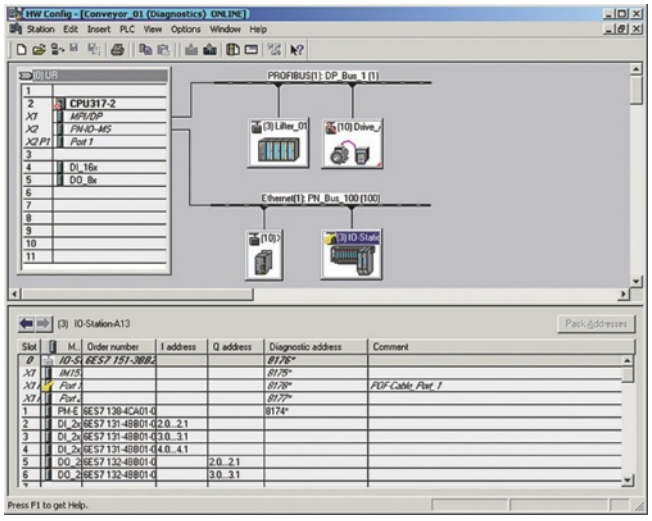
Totally Integrated Automation provides integrated diagnostics as an essential system feature. In conjunction with other SIMATIC components, SIMATIC WinCC also supports system diagnostics and process error diagnostics during normal operation:

- Jump into the STEP 7 hardware diagnostics directly from WinCC
- Call-up of STEP 7 blocks from WinCC screens
- System diagnostics via web technology with WinCC Scope
- Diagnostics of the communication link via expanded WinCC Channel Diagnosis
- Reliable process error diagnostics with WinCC/ProAgent

System diagnostics

You can start STEP 7 hardware diagnostics, for example, directly from the WinCC screen for comprehensive error diagnostics from circuit diagrams through to the PLC program. Just as directly, STEP 7 blocks can be called up from WinCC screens and thus create a direct link to the corresponding STEP 7 logic.

A WinCC operator station can also be used for maintenance (option: SIMATIC Maintenance Station). Completely in keeping with the concept of Totally Integrated Automation, the maintenance station is automatically generated from the hardware configuration of the automation systems displayed in STEP 7. Based on this, the maintenance station detects which devices belong to the plant and generates an image with universal symbols for maintenance in WinCC.



Call-up of the STEP 7 hardware diagnostics from WinCC

The diagnosis of system faults detects all of the components that are connected to the controller via PROFIBUS or PROFINET – without configuration expense on the side of WinCC. For the configuration, the error texts and all of the relevant diagnostics data are automatically adopted from the diagnostics data saved by STEP 7. During runtime, in the event of a fault, a system message containing all of the relevant information (module, slot, detailed information, etc.) is automatically sent to WinCC. The SIMATIC Maintenance Station is also based on the diagnostics of system faults.

WinCC Scope accepts the diagnostics of the WinCC Station and the station environment via the web. Often, the faults that primarily occur during communication are difficult to analyze. WinCC Channel Diagnosis helps you to quickly detect and clear faults.

Process error diagnostics

With the process error diagnostics messages from the controller via S7-PDIAG and S7-GRAPH, irregularities in the event of a fault with WinCC/ProAgent are also displayed in WinCC – without additional configuration expense and without additional diagnostics tools. In this way, WinCC effectively supports you in fault localization and clearing and considerably reduces the downtimes of your machine or plant.

Coupling options

Number of connectable controllers

For communication via Industrial Ethernet with a CP 1613 communications processor, with a maximum message frame length of 512 bytes up to 60 SIMATIC S5/505 Controllers or up to 64 SIMATIC S7 Controllers and via PROFIBUS with a CP 5613 a max. of 44 controllers (CP 5611 max. 8) can be connected. With approx. 10 or more controllers, the use of Industrial Ethernet is recommended.

Mixed mode with different controls

With their multiprotocol stack, CP 1613 and CP 5614 communications processors support the parallel operation of two protocols, e.g. for mixed operation of a variety of PLCs via a bus cable. WinCC supports the operation of two similar communication processors only in connection with the channels SIMATIC S5 Ethernet Layer 4 (2 x CP 1613), SIMATIC S7 Protocol Suite (2 x CP 1613, 2 x CP 5613) as well as PROFIBUS DP (4 x CP 5613; each CP 5613 max. 122 slaves). In addition to communication via Industrial Ethernet or PROFIBUS, a CP 5511 or CP 5611 can be used for communication with SIMATIC S7 via MPI.

Client/server communication

The communication between the clients and the server is achieved using the TCP/IP protocol, generally via a separate LAN. For small projects with correspondingly low message frame traffic, Industrial Ethernet can be used for both process-server and client-server communication.

Communication redundancy

The software package S7-REDCONNECT is required for the redundant connection of PCs via 2 x Industrial Ethernet to SIMATIC S7. Pure communication redundancy can also be achieved by setting up optical rings.

Connection to controllers and systems from other manufacturers

A communications interface for Allen Bradley controllers and Modbus is included in the scope of supply of WinCC.

For connecting to controllers and systems of other manufacturers, OPC is recommended. Current notes about OPC servers can be found at:

www.opcfoundation.org

WinCC supports the following standards:

- OPC Data Access Client and Server 1.1, 2.05a, 3.0
- OPC XML Data Access V1.0 Client (in basic package) and Server (ConnectivityPack option)
- OPC HDA V1.1 Server (ConnectivityPack option)
- OPC A&E V1.2 Server (ConnectivityPack option)
- OPC Unified Architecture

Protocol	Description
SIMATIC S7	
SIMATIC S7 Protocol Suite	Channel DLL for S7 functions via MPI, PROFIBUS or Ethernet Layer 4 + TCP/IP
SIMATIC S5	
SIMATIC S5 Ethernet Layer 4	Channel DLL for S5 Layer 4 communication + TCP/IP
SIMATIC S5 Programmer Port AS511	Channel DLL and Driver for Serial Communication with S5 via AS511 Protocol at Programmer Port
SIMATIC S5 Serial 3964R	Channel DLL and driver for serial communication with S5 via RK512 protocol
SIMATIC S5 PROFIBUS-FDL	Channel DLL for S5-FDL
SIMATIC 505	
SIMATIC 505 Serial	Channel DLL and driver for serial communication with 505 via NITP/TBP protocol to SIMATIC 535/545/555/565/575
SIMATIC 505 Ethernet Layer 4	Channel DLL for 505 Layer 4 communication
SIMATIC 505 TCP/IP	Channel DLL for 505 TCP/IP communication
PLCs from other Manufacturers	
Allen Bradley - Ethernet IP	Channel DLL and drivers for communication with Allen Bradley controllers via Ethernet TCP/IP with Ethernet IP protocol
Modbus TCPIP	Channel DLL and drivers for communication with Modicon controllers via Ethernet TCP/IP using Modbus TCP/IP protocol
Mitsubishi MC TCPIP	Channel DLL and drivers for communication with Mitsubishi controllers via Ethernet TCP/IP using Mitsubishi MC TCP/IP protocol
Cross-vendor	
OPC DA client, OPC UA client and OPC XML DA client	Channel DLL for OPC communication, WinCC can acquire data from OPC server applications.
OPC server for DA, XML DA, HDA, A&E	Server applications for OPC communication; WinCC provides process data for OPC client
PROFIBUS FMS	Channel DLL for PROFIBUS FMS
PROFIBUS DP	Channel DLL for PROFIBUS DP

Technical specifications

SIMATIC WinCC V 7.0				
Operating system	WinCC single-user station and client: Windows 7 (Professional SP1/Enterprise SP1/Ultimate SP1, 32-bit and 64-bit)/Windows XP Professional SP3 WinCC server: Windows Server 2003 SP2/Windows Server 2003 R2 SP2/Windows Server 2008 SP2, 32-bit/Windows Server 2008 R2 SP1, 64-bit/Windows XP SP3			
PC hardware requirements	**with Windows XP**	**with Windows 7**	**with Windows Server 2003**	**with Windows Server 2008**
Processor type				
Single-user station				
Minimum	1 GHz Pentium III	2.5 GHz P4	1 GHz Pentium III	2 GHz DualCore CPU
Recommended	2.5 GHz P4 or comparable	3.5 GHz P4 or DualCore CPU	3 GHz P4 or comparable	2.4 GHz MultiCore CPU
Multi-user system				
Minimum	–	–	1 GHz Pentium III	2 GHz DualCore CPU
Recommended	3 GHz P4 or comparable [1]	–	3 GHz P4 or comparable	2.4 GHz MultiCore CPU
WinCC client				
Minimum	800 MHz Pentium III	2.5 GHz P4	–	–
Recommended	2 GHz P4 or comparable	3 GHz P4 or DualCore CPU	–	–
Work memory RAM				
Single-user station				
Minimum	1 GB RAM	2 GB RAM	1 GB RAM	2 GB RAM
Recommended	2 GB RAM	2 GB RAM	2 GB RAM	4 GB RAM
Multi-user system				
Minimum	1 GB RAM	2 GB RAM	1 GB RAM	2 GB RAM
Recommended	2 GB RAM	2 GB RAM	2 GB RAM	4 GB RAM
WinCC client				
Minimum	512 MB RAM	1 GB RAM	–	–
Recommended	1 GB RAM	2 GB RAM	–	–
Functionality/quantity structure				
Number of messages	150,000			
Message text (number of characters)	10 x 256			
Message archive	> 500,000 messages [2]			
Continuous load of messages, max.	Central archive server: 100/s · Server/single-user station: 10/s			
Message burst, max.	Central archive server: 15,000/10 s every 5 min Server/single-user station: 2,000/10 s every 5 min			
Archives				
Archive data points	Max. 120,000 per server [3]			
Archive types	Short-term archive with and without long-term archiving			
Data storage format	Microsoft SQL Server 2005, SP2 (included in scope of delivery of WinCC)			
Measured values per second, max.	Central archive server: 10,000/s · Server/single-user station: 5,000/s			
User archive				
Archives (recipes)	system-dependent [2]			
Data records per user archive	65,536 [4]			
Fields per user archive	500 [5]			
Graphics system				
Number of screens, objects and fields	system-dependent [2]			
PowerTags	256 k [5] per server			
Trends				
Trend views per display	25			
Trends per trend view	80			
User administration				
User groups	128			
Number of users	128			
Authorization groups	999			

SIMATIC WinCC V 7.0	
Configuration languages	5 European (Ger, Eng, Fre, Ita, Spa), 4 Asian (simpl. + trad. Chi /Kor/Jap)
Runtime languages	system-dependent [2]
Reports	
Message sequence reports (simultaneously)	1 per server/single-user station
Message archive reports (simultaneously)	3
User reports	system-dependent [2]
Tags per report	system-dependent [2]
Multi-user system	
Server	12
Clients for server with operator station	4
Clients for server without operator station	32 WinCC clients + 3 web clients or 50 web clients + 1 WinCC client

1) Max. 3 clients without redundancy
2) Dependent on the available storage space
3) Dependent on the number of licensed archive tags
4) The sum of the number of fields and the number of data records must not exceed a value of 320,000
5) Depends on the number of licensed Power Tags

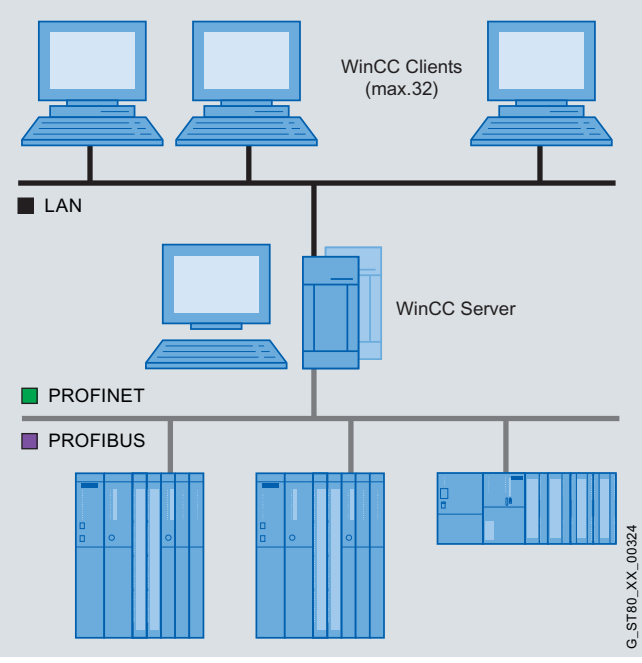
SIMATIC WinCC – Options

WinCC/Server – Setup of client/server systems

Benefits

- Setup of a client/server system for operator control and monitoring of large plants with up to 12 WinCC servers and 32 coordinated operator stations (also possible later)
- Distributed function or applications on several servers with higher quantity structures with high system performance
- Project-wide overview with access to all of the servers in the plant from one operator station
- Clients can also be configured as remote web servers
- Cost-effective configuration of clients
- Reduced installation costs for standard clients without SQL servers (meets requirements of IT departments in large companies)

Through the use of the server option, you can expand a WinCC single-user system to a powerful client/server system. In this way, you can operate several coordinated operator control and monitoring stations in a group with networked automation systems. One server supplies up to 32 connected clients with process and archive data, messages, screens and reports. The prerequisite is a network connection (TCP/IP) between the computer (server) and the connected clients.



Multi-user system with up to 32 clients on one server

Servers and clients as required

Depending on the size of the plant, up to 12 redundant servers can be used in a client/server solution. The plant is operated via SCADA clients, which access a server or provide a central view of several servers (see also "distributed system"). For the clients, only the smallest runtime license RT 128 is needed, or if configuration is to be done on the client, the smallest complete license RC 128. This makes it possible to configure cost-effective operator and configuration stations in a network. The configuration of the screens can of course be carried out online without affecting the functioning of the servers and operator stations. Operator stations can also be implemented in the form of web clients. In mixed configurations with SCADA and web clients, the following mixed quantity structure limits result, for example (variations possible):

- 50 WinCC web clients and
  1 WinCC SCADA/configuration client, or
- 32 WinCC SCADA clients and 3 WinCC web clients.

Distributed system

In a complex plant, you can also configure WinCC as a distributed system - depending on the requirements with functional distribution (e.g. message and archive servers) or distributed corresponding to the physical plant structure (e.g. body-in-white, paint shop, etc.). The distribution of the overall application or of the tasks to several servers allows a considerably higher quantity structure, relieves the individual servers and ensures good performance. The distribution also allows for the topology of a plant.

A central archive server is a special example for a functional distribution (with the WinCC/Central Archive Server (CAS) option).

WinCC/CentralArchiveServer (CAS) – Central archiving

Benefits

- Central, high-performance, optionally redundant archiving of messages, process values and reports (emf)
- Integrated back-up system for the archive data
- Company-wide information hub with transparent access via WinCC clients, the WinCC/DataMonitor and the open interfaces in WinCC/ConnectivityPack or WinCC/ConnectivityStation
- Integrated StoragePlus Webviewer for data analysis in the Microsoft Internet Explorer

Central data management, reliable and high-performance archiving of long-term relevant data and central backup mechanisms are the basis of an archive server solution. Integration in the SCADA world, data interfaces for accessing archived data, and analysis capabilities are the associated components.

The WinCC/CentralArchiveServer (CAS) option was designed for this purpose and is used to export the archived data of all servers in the system to an (optionally redundant) central archive server (CAS) and manage it. Through the integration of the CAS into the WinCC world, the data remains accessible to the WinCC clients as well as via the WinCC standard interfaces. The WinCC/CAS can be configured with redundancy in order to increase availability. In addition, it is possible to use a RAID system on the CAS.

Function

Both process value archives and message archives are created on the individual WinCC servers and transferred to the CAS and backed up, compressed and archived there when individual database segments have been closed. For long-term archiving of reports, the created emf files are swapped out to the CAS. There, they are also saved in the database. With "Store&Forward", when the network is interrupted between the WinCC server and CAS, data will be reliably transferred as soon as the network is operating again.

In addition, data from any **OPC DA servers** or from external databases can be archived on the WinCC/CAS. The WinCC/CAS thus becomes a company-wide information hub, via which the centrally acquired data can be forwarded to the production level and the corporate management level MES/ERP.

The access rights for the central archive server data are set in the WinCC user administration.

Accessing data for displaying and analysis is possible and transparent via the WinCC client or the WinCC/DataMonitor client option. It is of no consequence whether the data is on the WinCC server or already on the CAS. For displaying (e.g. in WinCC Online Trend or WinCC Alarm Control), the data is automatically and correctly delivered for the selected time range. In addition, the data saved on the CAS can also be viewed via the "StoragePlus Webviewer" in the options package with the aid of the Microsoft Internet Explorer. It provides views of alarm tables, hit lists, process values in the form of trends or tables and WinCC reports. The data of the distributed WinCC system can also be accessed through the familiar interfaces (OPC DA, OPC HDA, OPC A&E, OPC (historical) A&E and Ole-DB) of the WinCC/ConnectivityPack option or WinCC/ConnectivityStation. In this manner, the data saved in the CAS can be efficiently transferred to higher-level systems or used for the purposes of analysis.

Licenses

The WinCC/CentralArchiveServer (CAS) option contains all of the licenses for a central archive server with up to 1500 archive tags. If higher quantity structures occur over the course of the project, the number of usable archive tags can be upgraded via Archive PowerPacks by 1,500, 5,000, 10,000, 30,000 or 80,000 archive tags to a maximum of 120,000 archive tags.

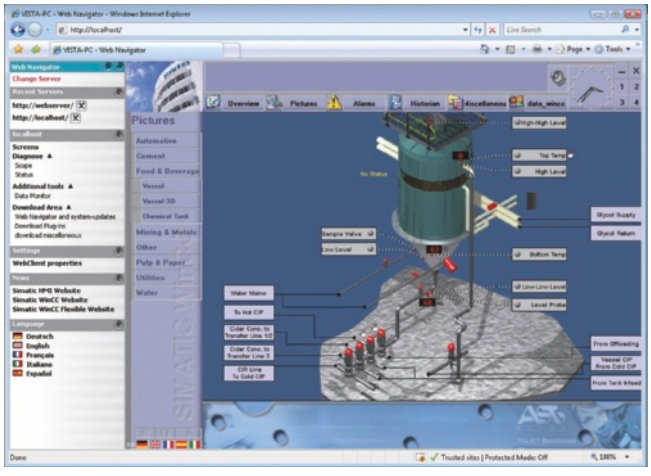
Distributed system with central archive server:
For additional information, see graphic on page 20.

WinCC/WebNavigator – Operator control and monitoring via the web

Benefits

- Operator control and monitoring over long distances with up to 50 operator stations simultaneously
- Fast update rates due to event-driven communication
- Optimally tailored clients for operating and monitoring, analysis, service and diagnostics
- Thin client solutions on different platforms (PC, on-site panel, mobile PDA)
- Web and terminal clients can be added whenever required
- Minimum maintenance costs due to central software administration
- Acceptance of configuration data for the web, generally without changes
- Increased security and availability due to separation of WinCC and web server
- Granting access rights using plant-wide user administration
- High Internet security standards

The WinCC/WebNavigator provides you with the capability of operating and monitoring your plant via the Internet or the company-internal intranet or LAN without the need for changes to the WinCC project. This results in the capability to display, operate and access archives just as for on-site operator stations. This also means



Operator control and monitoring of the plant via a web browser

that the displayed process screens can contain Visual Basic or C scripts for dynamic sequences, that the operator interface can be switched between several languages and that the operator stations on the web are integrated into the user administration of the plant on-site.

New application areas

In addition to the typical use of the WinCC/WebNavigator in WANs (Wide Area Networks), the WinCC/WebNavigator can also be used for applications that must be implemented at minimal cost. These include applications that have a pronounced distributed structure (e.g. water/wastewater) or in which access to process information is only sporadic (building management). In addition to this, web clients can also be used as normal operator stations on the LAN.

Web server and clients

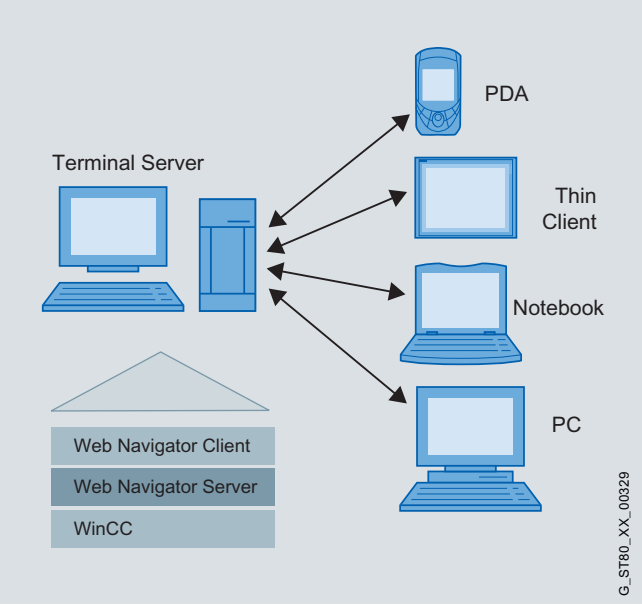
For a web solution, the WebNavigator is installed on a WinCC single-user system or server and a WebNavigator client is set up on any Windows PC. This allows a running WinCC project to be operated and monitored via Microsoft Internet Explorer, or via Terminal Services, without the need for a WinCC basic system on the computer. It is also possible to use the web client without Microsoft Internet Explorer; the visual appearance corresponds to the standard client. Such a web server can also be set up on each WinCC (SCADA) client. This means that a web client that is connected to the web server can access the projects of all (up to 12) redundant WinCC servers in a plant from anywhere in the world. The projects can be displayed simultaneously in different tabs, e.g. via the multi-tabbing functionality of Microsoft Internet Explorer V7.

In this case, the web client also switches transparently between redundant, lower-level WinCC servers. If the browser is started several times on the web client, it is even possible to simultaneously view several plants, i.e. also several web servers.

A security concept made to order

The separation of WinCC servers and web servers already ensures greater security and availability, and this can be even further enhanced by means of independent web servers on two independent SCADA clients. The operator stations on the web are included in the user administration of the plant on-site. Different authorization levels govern who has which access rights.

The operator can either just view the plant (view only) or partially/fully operate it, depending on the configuration of his access rights. Every login and logout can be traced by means of a system message. An optional logout after a configurable period of time is another security feature in addition to the option of disabling certain key combinations, and this allows the use of WinCC/WebNavigator even where FDA requirements must be met. Furthermore, the WebNavigator supports all of the standard security mechanism that can be used for applications on the Internet such as routers, firewalls, proxy servers, SSL encryption and VPN technologies.



Thin clients on various operating system platforms on the WinCC/WebNavigator server

Thin client solutions

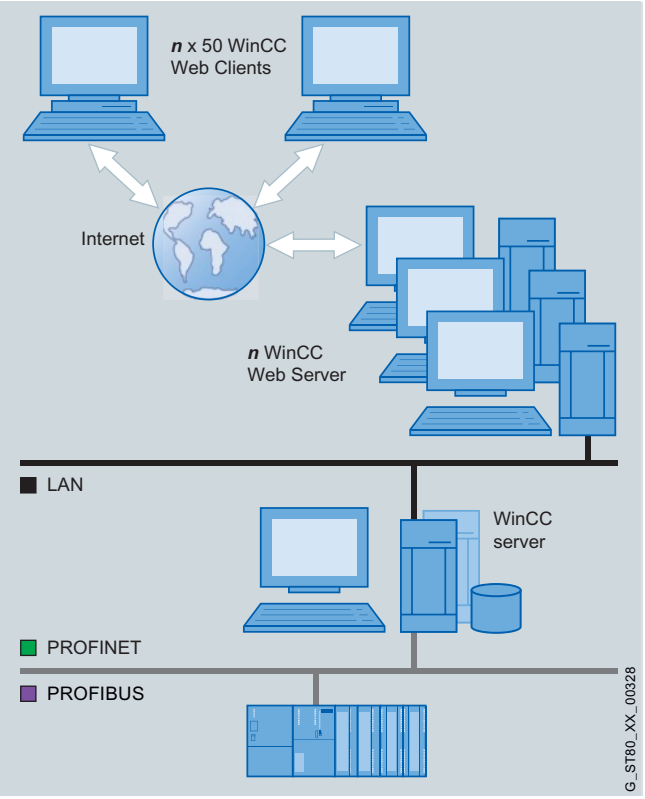
Via thin client solutions with Microsoft Terminal Services, simple PCs under a Windows operating system, rugged on-site devices (e.g. SIMATIC Thin Client), and mobile devices can also be connected. Such solutions have few hardware requirements, because the clients only provide the screen display, while the application itself, i.e. the WebNavigator client, runs on the terminal server under Windows. Up to 25 thin clients can be connected to one terminal server. In contrast to typical WebNavigator installations, the thin clients are generally located on the same LAN as the server. Access via WAN, RAS and even via the intranet/Internet are, however, also permitted. Mobile devices can be connected via various media, such as mobile radio links or wireless LAN.

Server farms with Load Balancing

If a great many web operator stations are needed at the same time, server farms can be configured with several web servers. This requires a Load Balancing license for the participating web servers. With Load Balancing, a compensation of the load is possible by means of which newly connected web clients are automatically assigned to the web server with the currently lowest load. The web servers all have access to one and the same WinCC project and each can have up to 50 web clients assigned. In all, there can be several hundred operator stations on the web. If the assigned web server fails, the clients attempt to connect to another web server in the server farm.

Licenses as required

The WebNavigator client software can be installed as many times as required without the need for a license. A corresponding (server-based) license is required in order to use the WebNavigator server. Licenses are available for simultaneous access to the Web server by 3, 10, 25, or 50 clients. PowerPacks are available for upgrading the number of simultaneously active clients. In addition, the diagnostics clients licensing is ideal for system integrators who are responsible for maintenance and servicing of widely distributed plants. WinCC/WebNavigator diagnostics clients have, regardless of the number of current accesses, guaranteed access to all web servers with the WinCC/WebNavigator license or the cost-effective WinCC/WebNavigator diagnostics server license.



Web server farms (load balancing) with many web clients

Note

In this case, suitable protective measures (including IT security such as network segmentation) should be taken in order to ensure safe operation of the system. For more information on the topic of industrial security, go to **www.siemens.com/industrialsecurity**.

WinCC/Calendar Options – Working with calendar functions

The Calendar Options supplement WinCC with calendar-based functions. A common calendar control supports the planning of schedules and of validity periods. You can use the Calendar Scheduler to trigger time-based actions; the Event Notifier sends messages depending on specific events in the WinCC message system.

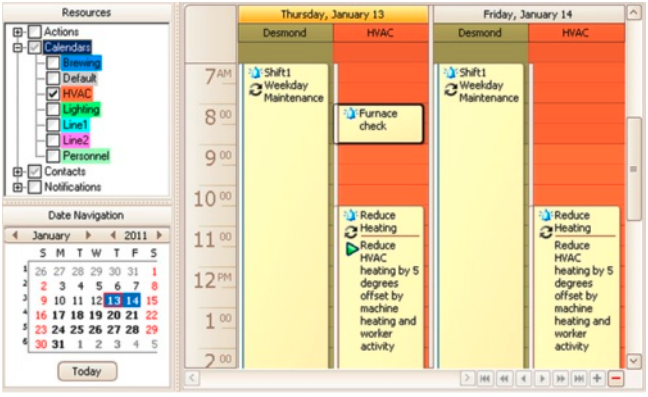
Benefits of the Calendar Options

- Simple and reliable scheduling of events and actions
- User-friendly HMI in the style of Microsoft Office
- Easy to send important messages to a defined group of people at a defined time by email or text message
- Guaranteed comprehensibility: events and actions are logged and displayed in the WinCC message system.

Calendar Scheduler

The Calendar Scheduler supplements WinCC by a calendar-based HMI in the style of Microsoft Office. It includes editors with which events and associated actions can be configured and managed. The planned events and actions can be connected directly to WinCC tags or global scripts.

In order to control the plant process, several calendars, events and associated actions can be created, filtered, edited and managed. For example, the action editor can be used to execute program scripts. The editor supports events and interruptions which occur regularly, e.g. holidays or maintenance work.



Points in time or areas in which actions (Scheduler) or messages (Notifier) are triggered can be configured in a similar way to a Microsoft Outlook calendar.

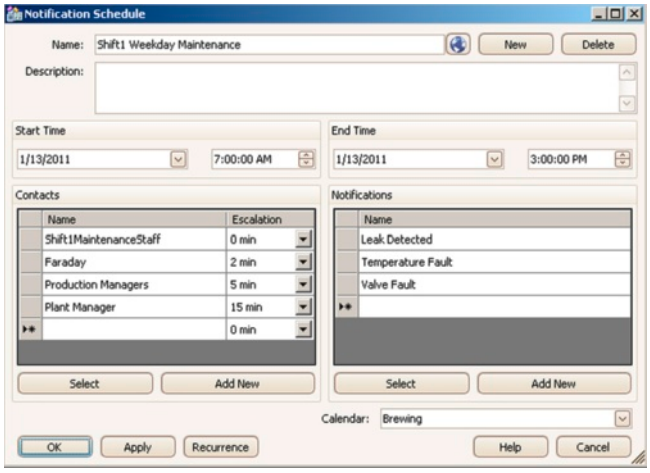
Multi-level user privileges protect the scheduling from unauthorized access. The message system logs and displays every action carried out. This guarantees comprehensibility of the corresponding events.

Event Notifier

You can use the Event Notifier to set which people in a defined time period are notified about specific events. The events are associated with messages in the WinCC message system. Contacts can even be selected as potential messaging targets from the WinCC user administration during runtime. The messages can be sent via
email or via a provider gateway as text message (SMS) to a mobile phone.

If multiple groups of people are defined for messaging in the same time frame, different escalation times (i.e. delay time before messaging) can be realized. This means that group 2 is only messaged if none of the people "on-site" or the previously messaged people have responded within the configured escalation time. When someone reacts to the triggering event, all persons messaged receive an acknowledgment.

Calendar Control is configured in the Graphics Designer and can be dynamized with all WinCC standard mechanisms such as tag connection, VBS, C, direct connections or dynamic dialogs in WinCC.



User-friendly configuration of persons or groups to be messaged according to specific events (messages)

WinCC/DataMonitor – Visualizing processes, analyzing and distributing data

Benefits

- Display and analysis of current process states and historical data on office PCs with standard tools such as the Internet Explorer or Microsoft Excel
- No additional configuration overhead, because screens from the WinCC project can be used directly
- Evaluation via centrally administered templates for detailed analyses of the company processes (e.g. reports, statistics)
- Information from the process can be individually compiled online during runtime (information portal) and distributed to different recipients via e-mail.
- User administration with user groups and individual access rights (read, write, create)

The WinCC/DataMonitor is an important component for Plant Intelligence applications in connection with the SIMATIC WinCC visualization system. The DataMonitor is used for displaying (view only), analyzing, evaluating and distributing current process states, historical data and messages from the process database. With the DataMonitor, WinCC process data can thus be made available to all function levels of a company via the web.

Powerful tools for displaying and evaluating current process states and historical data (measured values, messages, user data) from the process database allow the efficient monitoring and analysis of production and reports to be created and distributed to the people concerned. For displaying, a DataMonitor client can be installed on any office PC. The data provider, a WinCC/WebNavigator or a WinCC/DataMonitor server can be installed on any WinCC single-user system, server or client.

Specific functions of the DataMonitor client can be implemented without installation. Tools for the full scope of functions can then be downloaded from a download area.

The DataMonitor and its tools

For visualization and evaluation, WinCC/DataMonitor provides a range of Internet-capable tools, which support all of the popular security mechanisms such as login/password, firewalls, encryption, etc.:

- Process Screens
  Purely for monitoring (View Only) via WinCC process screens
- Trends & Alarms
  Display and analysis of archived process values and messages in trends or tabular form
- Excel Workbooks
  Transfer of archived process values into an Excel table for evaluation and display via the web or as a print template for reports
- Published Reports
  Automatic generation of time-driven and event-driven reports in Excel format or as PDF file
- WebCenter
  Central information portal for access to WinCC data via user-specific views
- User administration
  Administration of DataMonitor users in user groups with individual rights for reading, writing and creating WebCenter sites

The **Process Screens** function is used exclusively for monitoring and navigating using WinCC process screens with Microsoft Internet Explorer as the "View Only Client". The WinCC/DataMonitor uses the same mechanisms as the WinCC/WebNavigator, e.g. for communication, user administration and displaying the screens. Trends and Alarms is a tool for displaying and analyzing archived WinCC process values and messages via predefined web sites. These contain the displays for the process value table, the trend display as well as the alarm table and the hit list of the alarms (including filter functionality). They also contain the statistics functions available in WinCC for process value sequences (e.g. average, standard deviation, variance). In the tables, only the desired WinCC archive data (measured values or messages) must then be parameterized. Data selected online can be exported to a CSV file if desired and then be further processed (e.g. compressed) later.

WinCC/DataMonitor – Visualizing processes, analyzing and distributing data

Trends and Alarms is a tool for displaying and analyzing archived WinCC process values and messages. Predefined web sites already contain the displays for the process value table, the associated trend displays, the alarm table and the hit list of the alarms with associated operator functions. They also contain the statistics functions available in WinCC for process value sequences and messages (e.g. average, standard deviation, variance). Tables then only have to be linked to the desired WinCC archive data (measured values or messages). Selected data can be exported to a CSV file if desired and then be further processed (e.g. compressed) later.

The **Excel Workbooks** are a logging tool for displaying messages and current or archived process values in an Excel table. The data can then be evaluated, graphically prepared and compiled for a report by means of a user-friendly wizard using Excel resources. Newly created Excel workbooks can be published and thus prepared for displaying via the intranet/Internet or used as a template for reports that are to be automatically created via Published Reports. Reports can also be created offline and saved locally as a user-specific evaluation.

Published Reports automatically generate print jobs from WinCC reports and prepared Excel workbooks. Reports are initiated either time-controlled (e.g. at the end of the shift) or event-driven (e.g. when a WinCC tag is changed) and, if applicable, distributed by e-mail. A report created using Excel is saved as an xls file and one created using WinCC Report Designer is saved as a pdf file. The reports can then be further processed.

The **WebCenter** is the central information portal for access to WinCC data via the intranet or Internet. Here, users with corresponding user rights can compile WinCC process data, messages and process screens for any number of screen views for various groups of persons. Specific process values can be selected by means of filter mechanisms. By means of these views, WinCC data can be compared, analyzed, evaluated and, if necessary, even exported over absolute or relative periods of time.

WebCenter: Compilation of an information portal

On a WebCenter site, the user can configure his own screen views from the WebParts and save them. WebParts are process value tables, trends, statistics displays, alarm table (including hit list), and a graphical, link and favorites display. Process values can be connected to generate graduated or linear trends. WinCC screens can be integrated in the WebCenter without installation overhead.

This allows various information from the plant to be generated in an understandable form for different user groups, corresponding to the function areas of a company, e.g for Quality Assurance (e.g. tables and trend diagrams with operating figures), the plant operator (e.g. pie charts with piece counters) or the service personnel (e.g. trends with temperature characteristics).

Licensing as required

The licensing is server-based, which means that it is done on an existing WebNavigator or on an additional DataMonitor server. Depending on the license selected, the DataMonitor software package for the DataMonitor server contains 1, 3, 10, 25 or 50 client licenses. The number of client licenses describes the maximum number of simultaneously active clients. Any number of clients can be connected. PowerPacks are available for upgrading the number of simultaneously active clients.

WinCC/DowntimeMonitor – Detection and analysis of downtimes

Benefits

- Complete transparency for all machines as basis for optimizing the plant's productivity, this means
  - Avoiding disturbances and bottlenecks
  - Increasing availability
- Deriving specific parameters (KPI - Key Performance Indicators)
- Integration of appropriate display instruments (controls) in WinCC process screens
- Can be used for individual machines or even complete production plants
- Distribution of evaluations to various people over the web

Using the WinCC/DowntimeMonitor, the machine data management software, standstill times can be recorded and analyzed centrally in machine or line-oriented production plants. For individual devices, machines or entire production lines, the specific parameters can be determined this way:

- OEE (Overall Equipment Efficiency)
- MTBF (Mean Time Between Failures)
- MRT (Mean Repair Time),> and other Key Performance Indicators (KPI).

The production equipment can be individually and plant-specifically defined. The maximum production speed or quantity per time unit can be adapted to new conditions during runtime when different products are to be produced.

Fault analyses provide information about the frequency and duration of machine or plant downtimes. Corresponding display instruments can be effortlessly integrated in WinCC process screens.

In the DowntimeMonitor, the time model of the production equipment is determined from production, maintenance and downtimes. The shifts can also be included in the analysis via shift calendars. Three shift calendars can be activated simultaneously. All of the plant statuses relevant to the evaluation are parameterized in a detailed cause directory. The determined data gives information on the effectiveness of individual machines and of entire production plants. The transparency of the data allows for a quick response and countermeasures in the event of faults, which increases the availability of the machine.

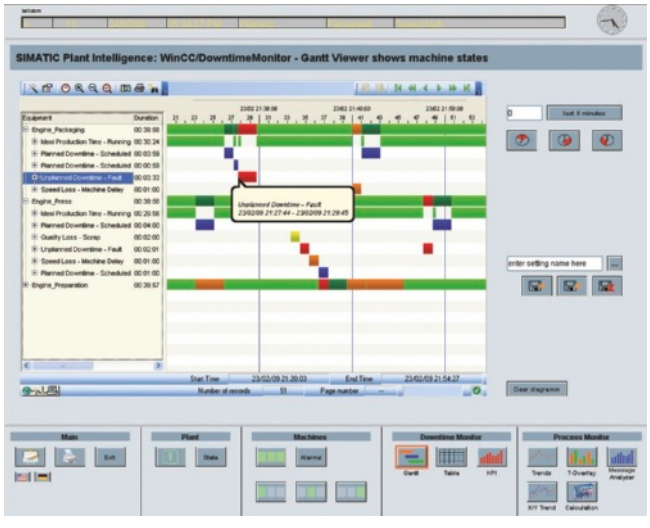
All of the analysis results are integrated in the form of controls in WinCC screens. A distinction is made between several different display instruments:

- Gantt and Pareto charts
- Bar or column charts
- Trends or tables

The displayed data can be processed with WinCC and WinCC options and distributed via the web to different people as needed.

As Windows service, the DowntimeMonitor can be operated in locked server rooms.

DowntimeMonitor: Key Performance Indicators at a glance



DowntimeMonitor: Analysis via Gantt charts

WinCC/IndustrialDataBridge – Connection to databases and IT systems

Benefits

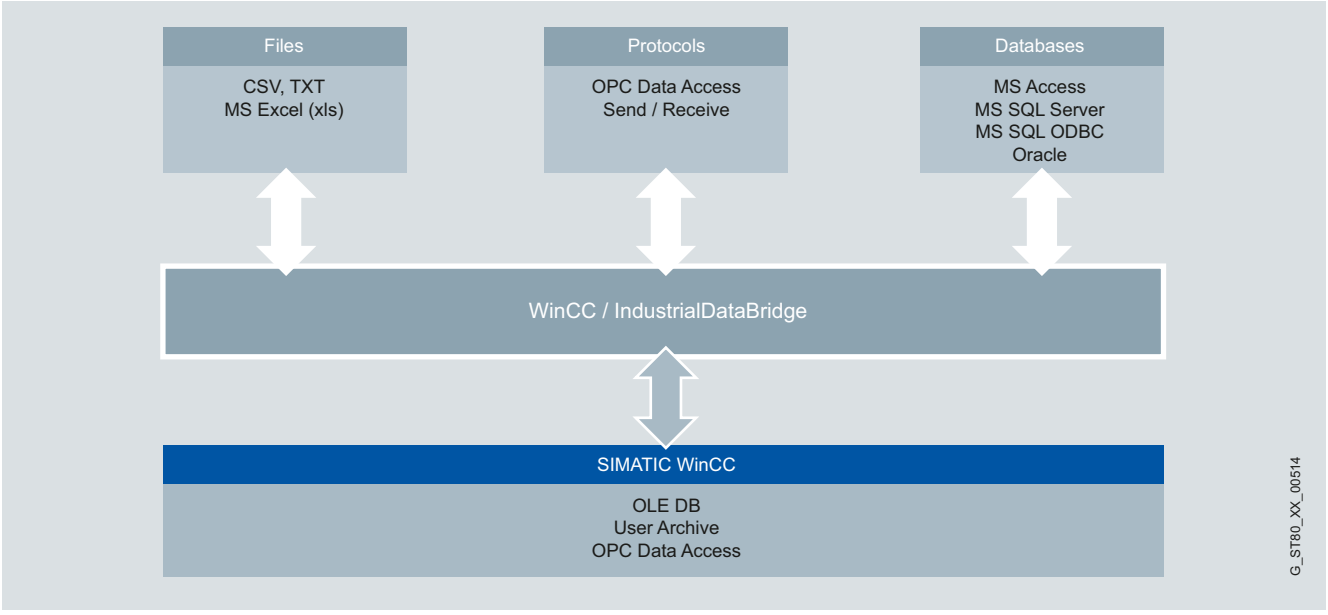
- Connecting the automation level to the IT world
- Integration of systems from different manufacturers via numerous standard interfaces (OPC, SQL, ODBC, OLE-DB, office formats, etc.)
- Simple and therefore low-cost configuration using standard software (without programming)
- High-performance data exchange between several systems at the same time

WinCC/IndustrialDataBridge uses standard interfaces in order to connect the automation level with the IT world and ensure two-way information flow. Examples of such interfaces are OPC in the field of automation and Microsoft SQL database interfaces in the IT world. Systems from different manufacturers can be integrated via a number of standard interfaces. The configuration is done cost-effectively (without programming) via standard software. Typically, WinCC (or other SIMATIC products such as WinCC flexible) with its OPC DA server interface is the data source and an external database is the data destination. In addition, access to the archived messages and process values in the WinCC database is possible via the WinCC OLE-DB provider. Depending on the volume of data, licenses are available with 128, 512, 2k and 10k tags.

Flexible control point between applications

IndustrialDataBridge establishes a connection between the source and destination interface and transfers the data

- depending on a value change,
- after a configurable time period has elapsed or
- when a certain event occurs.



WinCC/IndustrialDataBridge connects the production level with IT systems, such as databases

IndustrialDataBridge exchanges data between automation systems from different vendors, e.g. via OPC. The connection of OPC servers via IndustrialDataBridge enables communication between a variety of devices, data sources and data destinations:

- Coupling of SCADA and control systems from different manufacturers via the OPC interface
- Storage of process data in Office formats such as Microsoft Excel or Microsoft Access.
- SQL databases are available as data destinations for operating data acquisition. The data can be transferred from the data source either in an event-driven way via the OPC or sent directly from the controller.
- With a database as a data source, recipes and default values can be transferred directly into WinCC or a controller.
- Cyclic data archiving can be implemented via the OPC Data Access, WinAC ODK or Send/Receive data sources and the SQL database data target.

The WinCC/ConnectivityPack and WinCC/IndustrialDataBridge allow licensed access to online and archived data of WinCC.

Both options include licenses for access via:

- WinCC OPC-XML-DA server
- WinCC OPC-DA server
- WinCC OPC-HDA server
- WinCC OPC-A&E server
- Win CC OPC UA client

A WinCC Client Access License (WinCC/CAL) is no longer required as of WinCC/ConnectivityPack and WinCC/IndustrialDataBridge V7.0.

Note

In the case of access to WinCC user archives via Microsoft OLE-DB, a ConnectivityPack license is required on the computer with the WinCC user archives.

WinCC/ConnectivityPack, WinCC/ConnectivityStation – Access to WinCC using OPC & WinCC OLE-DB

Benefits

- Simple IT and business integration via standard interfaces
- Access to current and historical data from any computers via standard interfaces (OPC XML DA, OPC HDA, OPC A&E, OPC (historical) A&E, WinCC OLE-DB)
- Further processing or analysis of the data possible using external tools

Cross-vendor communication in the automation sector has always been of primary importance for WinCC. WinCC therefore has a standard integrated OPC DA 3.0 server (data access), which gives access to all online values in the system and which, as a client, can read data from another application – via the web as well.

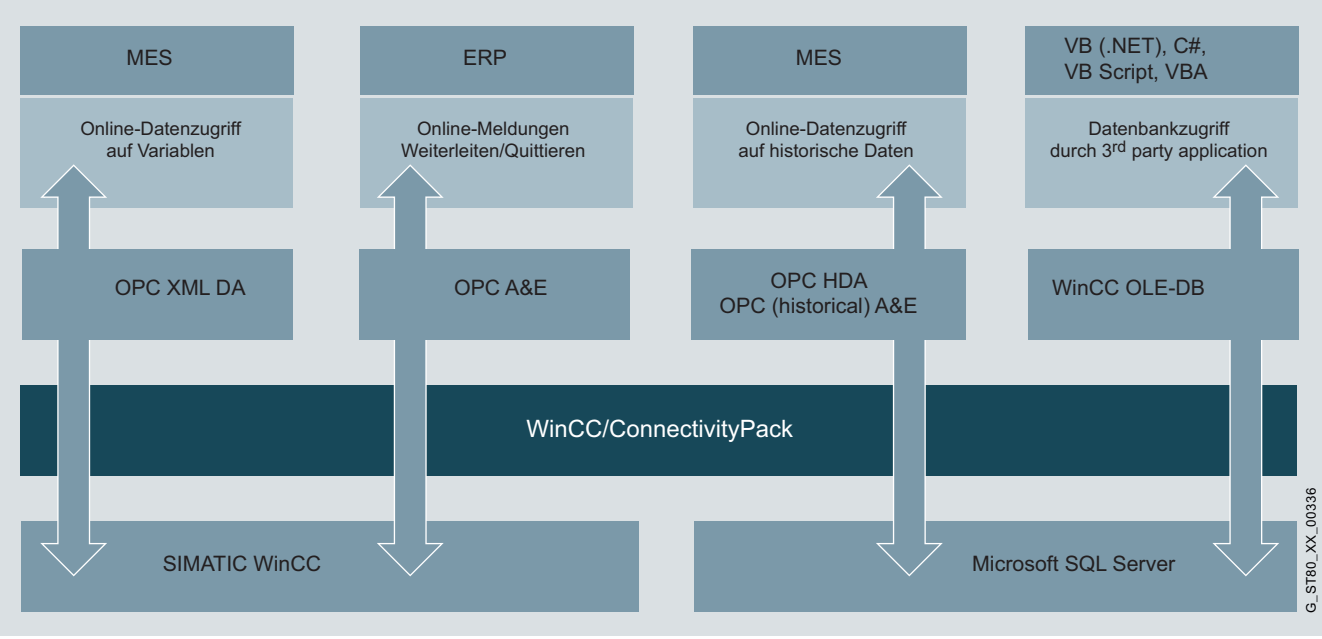
The WinCC/ConnectivityPack provides additional capabilities. This means that preprocessed production and process data can be transferred to higher-level systems for information processing (e.g. MES Manufacturing Execution System, ERP Enterprise Resource Planning or Microsoft Excel, Microsoft Access, etc.) and feedback messages can be received in the form of job data or acknowledgements.

Access to messages and historical data via OPC/ WinCC OLE-DB

The option package encompasses the servers OPC HDA 1.1 (Historical Data Access) and OPC A&E 1.0 (Alarm & Events) for access to historical data of the WinCC archive system or for forwarding/acknowledging messages. As an OPC XML DA 1.0 server, WinCC can provide data across platforms via the web PPS/MES systems and, conversely, as an OPC XML DA client, it can accept job data or recipe data.

As an HDA server, WinCC makes historical data from the WinCC archive system available to other applications. The OPC client (e.g. a reporting tool) can specify the start and end time of a time interval and thus request the data to be transferred in a targeted manner. The client can also call up preprocessed data from the HDA server, which means actively start data compression, before the data is transferred. The OPC HDA server can also be used in redundant configurations.

A WinCC message for a current process interrupt is displayed as an alarm with OPC A&E and it is forwarded together with all of the associated process values to any subscriber in the production or corporate management level. Filter mechanisms



WinCC/ConnectivityPack: Access to WinCC via OPC & WinCC OLE-DB

alarms via OPC (historical) A&E can be implemented very easily by means of access via Microsoft SQL server tools. Via the WinCC OLE-DB provider, it is possible to directly access the archive data (messages, process values, user data) that is saved in the Microsoft SQL server database by WinCC. Statistic functions can also be used. Access to the WinCC OLE-DB provider is also possible from the script languages C# and VB.NET.

From a WinCC multi-client, transparent data access is also possible via OLE DB to redundant WinCC systems and distributed configurations with a central archive server. For addressing, only a symbolic computer name is needed.

WinCC/ConnectivityStation

If no visualization is required at a station, any Windows computer can be configured via this WinCC option package as a WinCC/ConnectivityStation with access to WinCC via OPC and WinCC OLE-DB without a WinCC installation being necessary.

Client Access Licenses (CAL)

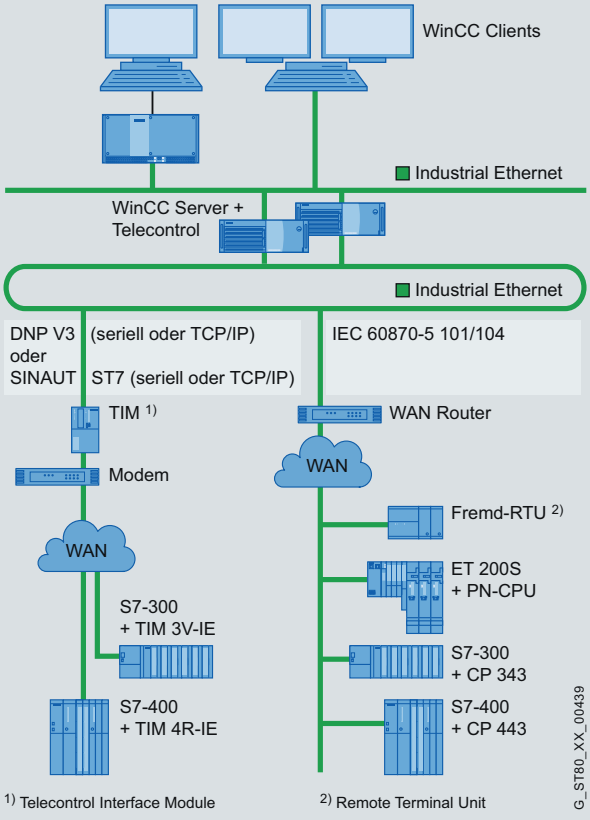
You will find information on the use of WinCC/CAL in connection with the ConnectivityPack on page 37.

WinCC/TeleControl– Remote control technology

SIMATIC WinCC TeleControl flexibly integrates remote terminal units equipped with SIMATIC automation components into the central process visualization system of the overall plant via a WAN (Wide Area Network). The main fields of application can be found in the water/wastewater and oil and gas sectors. SIMATIC WinCC TeleControl supports the three most important telecontrol protocols IEC 60870-5 101/104, DNP V3 (serial or TCP/IP), and SINAUT ST7 (serial or TCP/IP). The software can be individually adapted to the requirements of a plant. The uniform user interface for local and remote processes minimizes the risk of error. Less time is required for training of the employees, since the same SIMATIC WinCC process visualization system is used for telecontrol and for the actual process visualization. Installation, commissioning and maintenance costs can therefore also be reduced considerably.

Benefits

- Integration of remote terminal units in central process visualization
- The most important telecontrol protocols are supported
- The uniform user interface for local and remote processes minimizes overhand and the probability of error



WinCC/Redundancy – Increasing the system availability through redundancy

Benefits

- Increased system availability and data integrity without gaps
- Automatic switch-over when a server fails or the communication to the server fails
- Continuous operation and visualization through automatic switchover of the clients to the intact server
- Automatic synchronization of all archives, message information (message lists and statuses, message acknowledgements, comments) and internal tags in the background after a fault is cleared

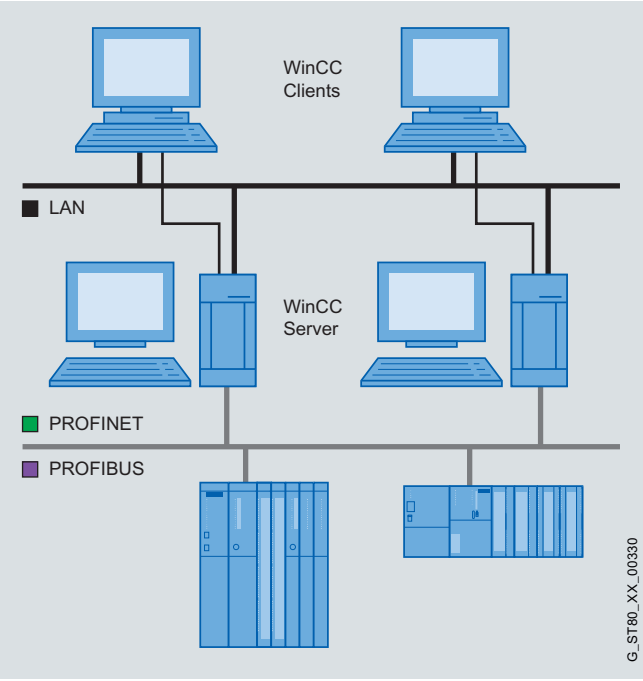
It is possible to increase system availability by means of redundancy for applications with WinCC by using

- redundant servers,
- redundant communication paths and
- high-availability controllers.

WinCC/redundancy provides the capability to operate two interconnected WinCC single-user systems or servers in parallel in order to monitor each other. For each redundant partner server you will need one of the two redundancy licenses from the delivery kit of the options package. If one of the two server computers fails, the second server assumes control of the entire system. After the failed server is operative again, the contents of all the message and process value archives are copied to the other (now operative) server. In all, this leads to significantly higher system availability. You production remains online, even if a server should fail. The status information of the WinCC server is also synchronized when an additional second computer connection is available (serial or via Ethernet).

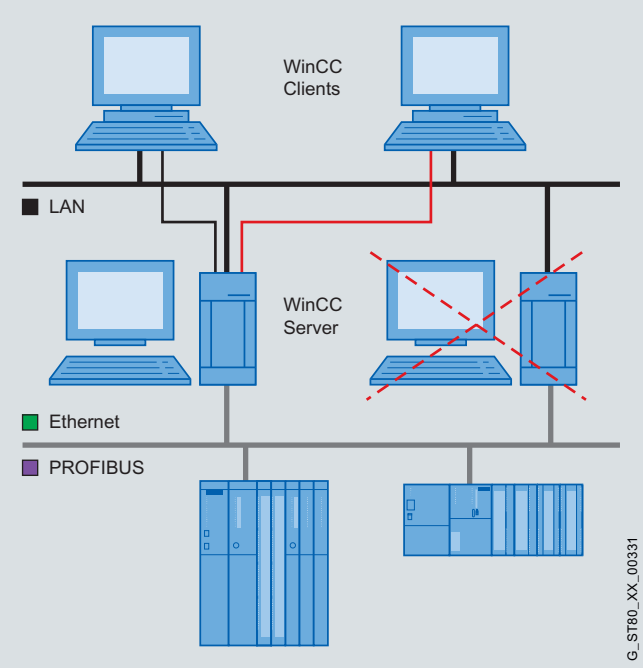
Functional principle

Normally, two WinCC stations or process data servers are running completely in parallel, i.e. each station has its own process connection and own archives. The clients that are connected to the servers can be distributed to any of the servers, which leads to a reduction in load.



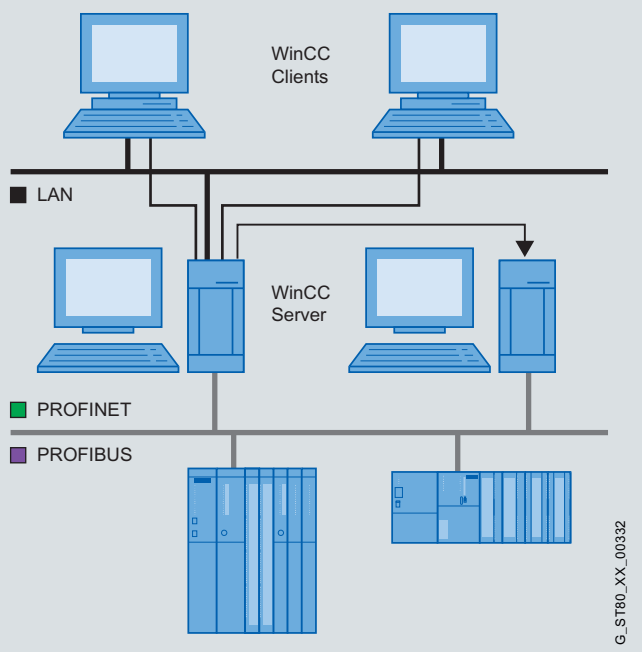
Normal case

When one of the two WinCC stations **fails**, the other takes over the archiving of messages, process data and user data. This ensures data integrity with no gaps. In client/server mode, the clients are automatically switched from the failed server to the redundant partner. This ensures continuous plant visualization and operation on every operator station. A license is only required on the redundant single-user system or redundant server.



Failure of a client

When a failed partner **is restored**, all of the archived process values, messages (including statuses, acknowledgements, lists and comments), data from the user archive of the failure period and internal tags are automatically synchronized with the partner in the background– without affecting the system that is operating. Once this is complete, two equivalent servers/stations will be available again. The clients connected to the servers are distributed among their original server partners again. The automatic switchover to the redundant partner takes place not only when a server fails, but also in case of disturbed process communication or faulty applications.



Return of the client

Additional increase in system availability

In addition to the capability of using two servers connected in parallel via the WinCC/Redundancy option, you can also design the communication channels for the SIMATIC S7 controller to be redundant in a WinCC application. Two communications processors are plugged in and the communication paths are doubled (communication software S7 REDCONNECT). The use of the failsafe H series SIMATIC S7 Controllers can, if required, further increase availability at the control level. Combining the system solutions creates a security concept that meets even high demands.

WinCC/ProAgent – Increased availability through process diagnostics

Benefits

- Component of Totally Integrated Automation: Increases productivity, minimizes engineering outlay, reduces lifecycle costs
- Support for troubleshooting, increased machine and plant availability, shorter downtimes
- No additional configuration costs for the diagnostics functionality due to automatic generation of the diagnostics-related parts for the controller and HMI
- Frees up controller capacity with regard to memory requirements and program execution time
- No special knowledge required to operate

Increased productivity is being achieved more and more by cutting costs. In this context, the focus is increasingly on maintenance. The emphasis here is on rectifying faults as quickly and efficiently as possible. Ideally, the operating personnel should also perform part of the maintenance tasks. The operating personnel are on-site, they are familiar with the procedures and can intervene quickly. This saves time and reduces costs. It is precisely here that ProAgent can assist operating personnel in identifying faults quickly, particularly in the automotive and machine tool industries.

In the event of a process fault, process error diagnosis with SIMATIC ProAgent will provide information about the location and cause of that fault and support personnel with troubleshooting. The ProAgent solution has been optimized specifically for use with SIMATIC S7-300/S7-400 and SIMATIC WinAC. It can be used in combination with the S7-PDIAG, S7-GRAPH STEP 7 engineering tools. The ProAgent option package features standard displays that are updated with process-specific data during runtime.

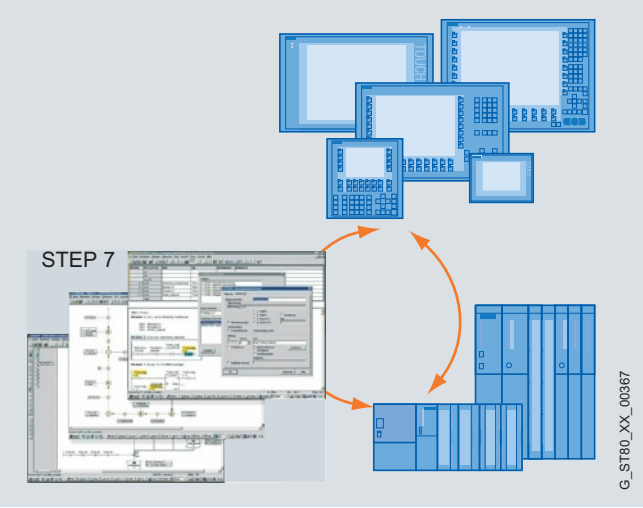
Standard views instead of configuration

ProAgent is available for various devices and software platforms from the SIMATIC HMI range: Panels and Multi Panels, WinCC flexible and WinCC. ProAgent contains standard views, which are attuned to the requirements of the process error diagnosis of a plant or machine. During configuration, the data that is relevant to process error diagnosis such as symbols, comments and message texts are saved in a standardized data management system. During runtime, the standard screens are then filled with process-specific data.

For SIMATIC WinCC, ProAgent directly accesses the engineering data and imports it into the WinCC project. The ProAgent standard screens needed for the diagnostics mode are automatically created in WinCC. ProAgent and STEP 7 engineering tools represent a standardized diagnostics concept for SIMATIC S7. No additional configuration overhead for the WinCC application is thus required for the diagnostics functionality.
The standard views are: message view, unit overview, diagnostics detailed view, motion view and the sequencer operating display.

Functional scope

- Context-sensitive diagnostics initiation due to process error message
- Output of the operands with symbols and comment Switch-over capability between LAD, STL and signal list
- Supporting fault rectification by means of direct process access when using the motion view
- Output of the faulty operands directly in the message including address, symbol and comment
- Consistency test in runtime: Inconsistent diagnostics units are marked with icons. This permits quick locating of faults regarding configured data in the commissioning phase.
- Direct, unit-related entry point in the diagnostics view from user displays (by using ProAgent functions)
- Unit or message-related entry to STEP 7, e.g. LAD/STL/FBD editor, S7-GRAPH, HW CONFIG upon system error messages, is supported fully automatically
- S7-GRAPH OCX for the graphical display of step sequences (overview display)



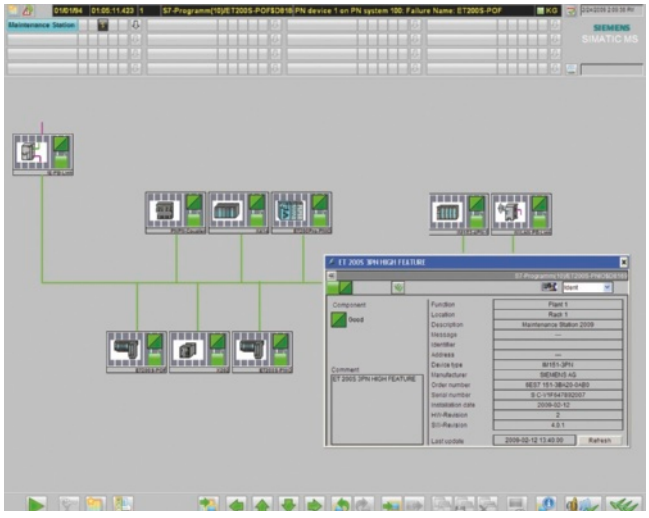
Process error diagnosis with WinCC/ProAgent and the Step 7 engineering tools

SIMATIC Maintenance Station –
User interface for efficient maintenance

Benefits

- Visualization of the maintenance information of the entire automation technology
- Automatic derivation of the data from the hardware configurations
- Cross-vendor display of identification and maintenance data
- Automatic messages ensure that events and operator inputs are fully comprehensible, providing a basis for subsequent evaluation for optimizing the plant
- Data, visualization and operation of the SCADA system and Maintenance Station are uniform and consistent

Constant high productivity is simply the competitive requirement in production. Production outages should be avoided if possible – or if this is not possible – they should be kept to a minimum. Often, downtimes are caused by maintenance that is not optimal. This is where intelligent maintenance strategies are needed. The main goal of which is to make it possible to plan maintenance, which will significantly reduce downtimes. Efficient maintenance is possible with the WinCC SIMATIC Maintenance Station option. The Maintenance Station can either be configured as separate operator station with maintenance functionality, or it can run together with the WinCC process visualization on a WinCC operator station.



Monitoring the plant status via automatically generated screens

Since the same operator control and monitoring tools are used, the display can be switched between visualization and maintenance. The advantage is clear: The plant operator gets an overview at any time of the current Identification and Maintenance (I&M) information without having to interrupt the process.

Generating instead of configuring

The Maintenance Station is configured when the user selects (in STEP 7) the automation systems to be mapped for a hardware configuration. Based on this, the Maintenance Station detects which devices belong to the plant and generates an image for maintenance in WinCC. The integration of components is based on established standards for PROFIBUS and PROFINET, and is possible for a large number of devices from many different vendors.

The project is automatically generated in the form of hierarchically structured, already interconnected WinCC screens – without additional programming overhead for the user – and is then automatically transferred to the Maintenance Station. New hardware components are incorporated into the hardware configuration of STEP 7 and are then automatically available for use by the Maintenance Station. Manual updating is unnecessary, consequential costs are avoided.

Corrective/preventive maintenance

During operation the Maintenance Station displays all of the connected controller components (PLC, operator panels), switchgear, drives, networks (PROFIBUS, PROFINET), etc. and monitors the current plant status with uniform symbols. The program does not only respond when faults occur (i.e. corrective maintenance), but it also responds to the warnings generated by the components that are supposed to prevent faults in advance (preventive maintenance). The timing of such condition-based measures can be planned such that the existing resources can be used optimally.

Maintenance jobs can be printed out directly, forwarded by the WinCC Premium Add-on AlarmControlCenter ACC directly to the service personnel or to the WinCC Premium Add-on PM-MAINT (maintenance management system).

The SIMATIC Maintenance Station provides the perfect support for the maintenance sequence. It creates a comprehensive database for subsequent optimization of the plant.

WinCC/Audit –
Tracing operator inputs and project changes using Audit Trails

Benefits

- Reliable recording of operator actions and project changes in an Audit Trail
- Project versioning and document control
- Compliant with the requirements of the Food and Drug Administration (FDA)
- Reduced engineering overhead to comply with 21 CFR Part 11 & EU 178/2002

WinCC/Audit is used for monitoring operator activities in runtime mode and for recording project changes during the engineering phase. All change data is recorded in a protected database, the "Audit Trail", and displayed via the Audit Viewer. The use of WinCC/Audit leads to gap-free traceability of both the operator activities and the project changes and simultaneously helps mechanical engineers and plant operators to reduce the engineering costs for meeting requirements according to 21 CFR Part 11 and EU 178/2002. The engineering measures that are necessary for simplifying the validation are documented in a White Paper.

More on the guidelines mentioned:

www.fda.gov
www.eur-lex.europa.eu

Monitoring the runtime mode

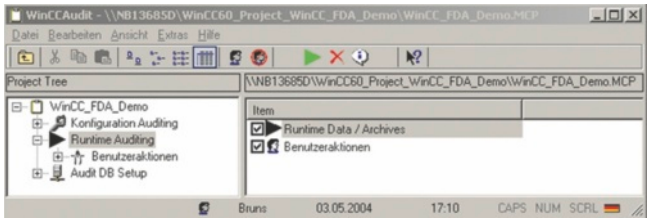
In runtime mode

- completed operator actions,
- activities within the scope of the central user administration with SIMATIC Logon
- and the starting and changing of recipes are stored in the Audit Trail.

In addition, the plant operator can individually record certain events by means of an Audit Entry function, e.g.:

- the operation of buttons and sliders
- or the pressing of a key

in the Audit Trail.



Monitoring the runtime mode with WinCC/Audit (Runtime Auditing)

Audit Trail database and Audit Viewer

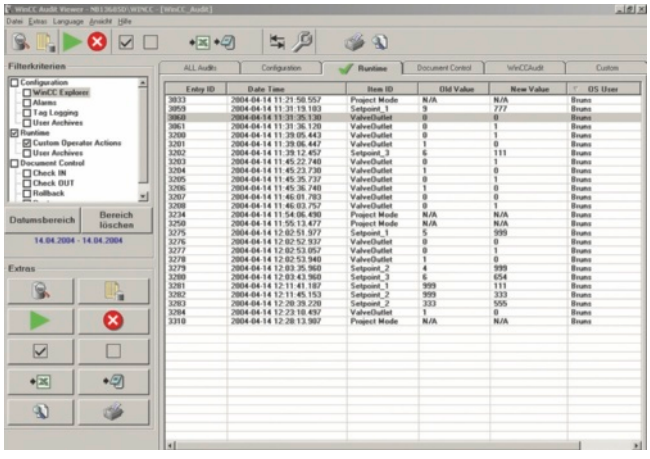
All modification data such as operator actions, configuration changes and changes that are subject to document control are stored in the Audit Trail database. The Audit Trails are made up of:

- Date and time of the modification
- Project ID, PC and database name, old value and new value
- User name
- Event/function
- Comment/reason for change

Audit Trail data are visualized using the Audit Viewer. Users select the desired view of the Audit Trail data via filters and they can export the data to an Excel file. Audit Trail data are protected and can thus not be modified or deleted. WinCC Audit therefore also satisfies the FDA requirements according to 21CFR Part 11 in this respect.

Tracing project changes

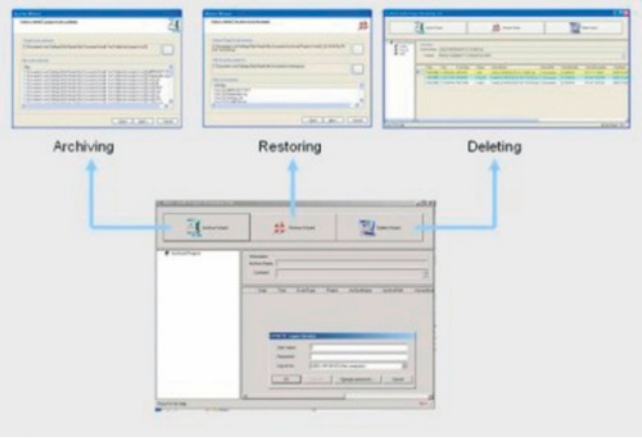
The tracing of project changes with WinCC/Audit is done as described for WinCC/ChangeControl (see page 45).



Access to the Audit Trail database using the Audit Viewer

WinCC/ChangeControl – tracing of changes

It is possible to monitor project changes both with WinCC/Audit and with the more cost-effective WinCC/ChangeControl option. There are project changes that change the WinCC database, such as changes to tag management or the creation of a user group, and those that are limited to the modification of files, referred to as document check. The document check covers process screens, scripts, log layouts, and customer-specific documents. This means that all these documents or files can be monitored for changes, intermediate versions can be created or restored using a Rollback function. In all, monitoring can be activated very easily and comprehensively. Plant designers and operators can use monitoring to quickly and easily retrace which modifications have been implemented in the plant (for example, during plant downtimes). This supports the fault analysis and shortens plant downtimes.



Archiving and restoring projects or project data

With the aid of project versioning,

- WinCC projects can be archived, restored and deleted,
- all WinCC data, including the project database, project files (e.g. screens, reports, scripts) and user documents can be archived and
- all activities of the project versioning tool can be recorded.

For engineering, the WinCC/Audit RC or WinCC/ChangeControl license is needed. On the runtime system, only the low-cost WinCC/Audit RT license is required.

WinCC/User Archives – management of data sets

Benefits

- Storing and managing of any user data in data sets
- Flexible display via WinCC User Archive Control, with optional table and form view
- Easy connecting of data set fields to the process via direct tag connection
- Import/export functions for further processing with other tools (e.g. Microsoft Excel)

The WinCC/User Archives option allows the use of user archives in which associated data can be stored in the form of data sets. WinCC and its automation partners (e.g. a SIMATIC S7 controller) can write these data records and, if required, exchange them with each other.

For example, an operator can enter parameter sets (the operating parameters of a machine) in WinCC, store them in the user archive and forward them to the automation level as needed. On the other hand, an automation system can continuously acquire production parameters during a shift and send them to WinCC at the end of the shift. Further application examples are the acquisition of batch data, the specification of production parameters or the administration of storage management data.

Simple to configure ...

WinCC user archives are conveniently created in a separate editor and preallocated with data. Special ActiveX Controls, which are integrated in the object palette of WinCC Graphics Designer, are used to display data from the user archives during runtime. These controls can also run on the WebNavigator in an Internet environment.

The coupling of data sets and fields from user archives to the process is easily done via direct tag connection.

WinCC/User Archives – management of data sets

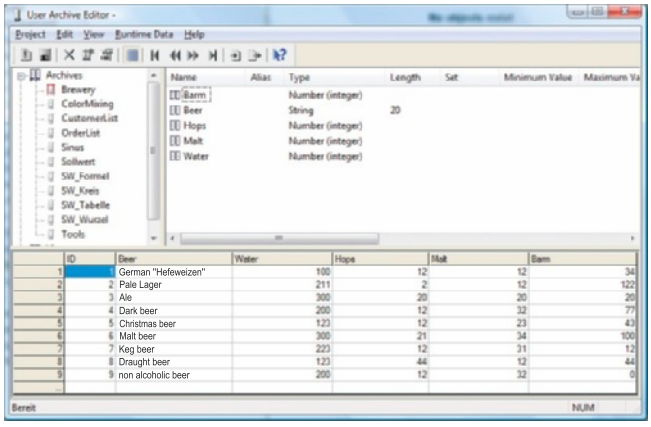
... useable in multifaceted ways

Import and export functions support the import and export of data via external applications (e.g. Excel). Freely selectable filter criteria allow a clear display of data sets. The view can be switched between a table view and a form view.

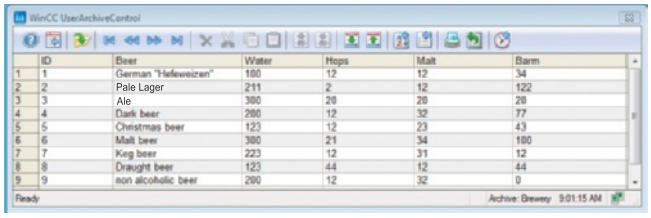
Some project-specific functions can be integrated via freely definable toolbar buttons.

WinCC provides C functions for freely organizing the data storage in the user archives that affect archives, data sets and fields. Thus, you can create, open, close or reset archives and read, write or overwrite data sets or field contents.
Sequence archives can accommodate batch data, shift production data or even product quality data and satisfy legal certification obligations by means of gap-free recording.

A license is only required on the server (or single-user system)



WinCC/User Archives editor: Free definition of the archives and views and the archive data



Display of the archive data using the WinCC User Archive Control in table form

WinCC/ODK – Open Development Kit

Benefits

- Individual system expansions via an open standard programming language (C-API/.NET)
- Access to data and functions of the WinCC configuration and runtime system
- Development of your own applications and add-ons for the WinCC basic system

Would you like to considerably expand the functionality of WinCC for a sector-specific application? Do you want to integrate your own data in WinCC tools, e.g. the reporting and logging system? The WinCC options package Open Development Kit WinCC/ODK specifies open programming interfaces, which you can use to gain access to data and functions of the WinCC configuration and runtime system. The interfaces are designed as C-Application Programming Interface (C-API) and for access via .NET.

The API functions can be used at the following points:

- In WinCC, e.g. in global scripts or within the scope of C actions in the Graphics Designer,
- in Windows applications in the C programming language (as a developer's environment for WinCC, the current version of Microsoft Visual C++ is needed)
- in Windows applications in the programming language .NET

API functions are configuration and runtime functions, such as:

- MSRTCreateMsg: Creates a message
- DMGetValue: Determines the value of a tag
- PDLRTSetProp: Sets the object properties in a screen

In the delivery kit for WinCC/ODK there is a CD-ROM with several examples and a voucher for a one-day training session and expanded support via a telephone hotline.

WinCC/IndustrialX – Creating customer-specific ActiveX objects

Benefits

- Easy creation using configuration wizards
- Quick entry through the use of standards: ActiveX technology, creating with the aid of Visual Basic
- Centrally creating and changing of object displays of the same type (typing) saves time and money
- Configuring intelligent, web-conformant, industry and technology-specific objects (graphic illustration and logical processing) with know-how protection
- Can be used in versatile ways: in WinCC screens and other Windows applications (e.g. Internet Explorer, Excel)

SIMATIC WinCC can already be conveniently configured with the basic functions. The WinCC/IndustrialX option also simplifies the solution of visualization tasks, because you can standardize user-specific objects using IndustrialX.

For individual motors, pumps, valves, etc., you do not need your own display object – you simply standardize objects of the same type. The engineering costs are significant reduced by the fact that the functions and displays can be used multiple times.

IndustrialX uses ActiveX technology for process visualization. Configuration wizards support the easy creation of own standard displays. IndustrialX Controls can be flexibly tailored to the requirements in different applications, e.g. industry-specific for applications in the manufacture of chemicals, glass and paper.

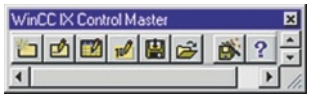
IndustrialX provides code templates for easy linking of customer-specific ActiveX Controls to WinCC data sources, which themselves are suited for use on WebNavigator clients.

Easy and quick to configure

With the IndustrialX Control Designer, you create an IndustrialX Control for similar process objects, for example for several motors, which means a special ActiveX Control for the visualization of these process objects.

The individual fields are linked to the individual data of a data set, for example, setpoint, actual value, temperature, and operating mode. Once the IndustrialX Control is created, you can integrate it in screens as often as you like.

For each integration, only the name of the data set is specified. At runtime, each integration of the IndustrialX Control then functions automatically with the data of the assigned data set. With each use of an IndustrialX Control, you save on the configuration overhead for linking the individual data.



Change centrally

IndustrialX Controls that frequently are already integrated into the process screens can easily be changed later. Such a change is made centrally and can affect both the graphic display and the processing logic. It affects all of the IndustrialX Controls of this type in all of the already configured process screens. If, for example, a plant has 47 motors of the same type and these are visualized in 13 different process screens with IndustrialX Controls, then the changes are made only once centrally and they affect all points. This does away with costly and fault-prone corrections at 47 points.

Fast processing, know-how protected

IndustrialX Controls consist of compiled Visual Basic Code, which ensures high processing speed. You can protect your technological expertise that you have invested in the creation against copying by not giving out the source codes with the application.

SIMATIC powerrate and B.Data – Intelligent energy management

In the face of continuously dwindling energy resources and rising energy costs, cost reduction by reducing energy requirements is a must for successful corporate behavior in the future. The situation is further intensified by increasingly strict legal requirements. SIMATIC WinCC offers options for a scalable energy management system that includes all forms of energy, such as electricity, gas, water and steam.

SIMATIC powerrate – Exploiting saving potentials on the visualization level

SIMATIC powerrate provides transparency for energy consumption – from the infeed to the consumer. Energy data is continuously collected, visualized and archived. Exact knowledge of the consumption profile helps you to detect even more potential for saving. Monitoring of the actual power compared to the contractually agreed power limit makes it possible to turn off or reduce the power of consumers and thus prevent directly increased power costs when a limit violation is pending (15 min value).

Acquisition and preparation of energy data

Energy data (counter pulses, counter values, power values or mean power values) of any PROFIBUS or PROFINET-capable devices can be recorded with the aid of prepared blocks. Counter values read manually can be entered directly and thus be used for further evaluations. From this data, SIMATIC powerrate calculates the mean power values and the work values for a specified period. In addition, a limit forecast is extrapolated for each period.

Displaying energy data

The currently acquired energy data is presented as mean power values/work values per time interval. A load trend display enable analysis of archived energy data as well as its representation in tables.

Further processing of data

The archived data can be exported directly from WinCC to Excel or different reports can be generated:

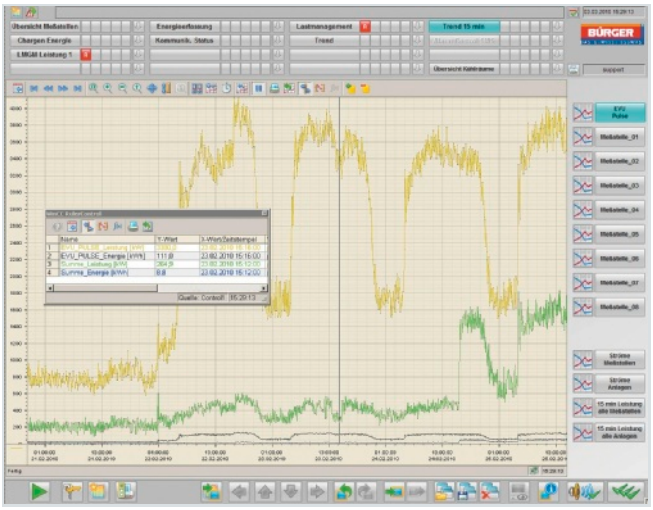
Energy trends: Simple representation of the energy demand of one or several consumers over time.

Batch reports: Representation of the energy demand and the energy costs with reference to a batch (with start and end time of batch).

Cost accounts report: Consumption is allocated to different cost accounts and the costs can be calculated on the basis of predefined tariffs.

Duration curve (load trend): Evaluation of the frequency with which a specific mean power value occurred in a specified period of time. Based on this characteristic curve, it is easy to recognize whether there are brief power peaks.

Load management: Power limits agreed in a contract (usually the 15-minute mean power value for current) must be observed; otherwise, significantly higher power prices or even penalty payments may become necessary. The load management feature of SIMATIC powerrate carries out cyclic trend calculations in order to issue warnings/alarms if violation of the limit is likely and to switch off or turn down consumers in accordance with the given configuration should this be required.



Energy characteristic curves provide transparency

Benefits

- Visualized load trends make for easy identification of energy-intense consumers and processes
- Load management helps to prevent load peaks in order to observe the mean power values agreed upon
- Comparison of consumer profiles as foundation for the optimization of process sequences
- Use of existing energy data from field-level devices (sensors, frequency converters, motor starters or easy to retrofit measuring devices, such as PAC, switchgear and protective devices) lowers investment costs

B.Data – Company-wide energy management

An improved energy consumption behavior and optimized procurement options result in additional saving potentials. To benefit from them, you need consistent system solutions, starting with automatic energy data acquisition, through data preparation, plausibility checks and calculation of key performance indicators (KPI), all the way to analysis, accounting and prediction of the energy demand.

B.Data brings together technical and commercial data processing systems to create the basis for economical, optimized energy management.

Recording and pre-processing of energy and operating data from upstream systems

B.Data supports current interface standards, such as OPC, ODBC, ASCII or XML and offers direct interfaces to SICAM230 with automatic configuration adjustment. In the case of manual data input, B.Data supports route planning for the counter reading operation, including a plausibility check during input.

Management and analysis of energy data

The calculation functions, e.g. heat calculation of boiler plants or the quality of CHP plants, can be freely modeled. B.Data offers an automatic plausibility check and substitute value creation as well as a long-term archive with versioning and compression functions. A trend display (Trender) displays current (online) and historical load trends for a direct comparison of forecast and actual energy demand.

Energy and material balance

Freely configurable user interfaces are available for a transparent and usage-based balance of energy flows for different media, such as current, heat, gas, steam, emissions (e.g. CO_2). B.Data supports the calculation of characteristic values (KPIs, efficiency coefficients, etc.) with direct reference to production (batches, quantities, etc.).

Energy accounting (costs and revenue accounting)

The allocation of energy costs to plants, plant areas or cost accounts supports finely-tuned allocation according to the costs-by-cause principle. The bottom-up (measurement) and top-down (allocation) procedures are supported here.

Accounting structures can be flexibly modeled. Price evaluation is flexible and takes into consideration historical tariff models regardless of their complexity. This means that you can calculate new contract models with different tariff structures and energy prices with existing actual energy demands to determine the best possible contract model. Energy amounts and costs can be directly transferred to an ERP system (e.g. SAPR/3).

Energy planning, reporting

Requirement forecasts can be created based on production-dependent factors (production planning) and basic load profiles (typical days). Energy road maps can be created for registration with energy suppliers.

Transparency of all media by means of powerful graphics functions and a hierarchical structuring of your plant all the way down to the level of individual consumers

Benefits

B.Data

- creates company-wide transparency thanks to gap-free energy and material balancing of power generation and consumption plants.
- allows the development of key performance indicators that enable reliable conclusions to be drawn on raising the efficiency of energy generation, distribution and consumption systems.
- enables energy costs to be allocated according to the costs-by-cause principle and permits transfer to the ERP accounting system (e.g. SAP R/3).
- provides planning reliability thanks to production-related load and demand forecasts.
- supports the purchasing department in energy procurement.
- fulfills the legal obligations concerning the monitoring and reporting of greenhouse gas emissions (CO_2 emissions).

Step into the world of SIMATIC

This brochure has given you an initial overview of the extensive SIMATIC portfolio for factory and process automation – and of the advantages for you as a machine builder and plant operator. Further information on the individual families of systems can be found in the Internet sites listed below.

S I M A T I C

SIMATIC is a principal component of Totally Integrated Automation, the comprehensive and integrated range of products and systems for automation:
www.siemens.com/tia

SIMATIC – the leading automation system for industry:
www.siemens.com/simatic

Get to know the SIMATIC consistency through its system features:
www.siemens.com/simatic-system-features

SIMATIC PCS 7	SIMATIC Controller	SIMATIC ET 200
The powerful, scalable process control system for all sectors	Powerful controller based on various hardware platforms	The distributed, modular I/O system for all requirements
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SIMATIC Software	SIMATIC Technology	SIMATIC HMI
Industrial software for maximum efficiency in every phase of an automation project	The comprehensive range of products for performing technological tasks	The complete range for operator control and monitoring
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SIMATIC PC-based Automation	SIMATIC IT	SIMATIC NET
Comprehensive range of hardware and software products for PC-based Automation	The basis for customer-specific, integrated MES solutions	The extensive range of products and systems for industrial communication
www.siemens.com/pc-based-automation	**www.siemens.com/simatic-it**	**www.siemens.com/simatic-net**

SIMATIC Safety Integrated	SIMATIC Sensors	SIPLUS extreme
The seamless system for safety technology that integrates smoothly and completely into standard automation	Sensors for an enormous variety of requirements in the production industry	Products for industrial applications in harsh ambient conditions and extreme environments
www.siemens.com/simatic-safety-integrated	**www.siemens.com/simatic-sensors**	**www.siemens.com/siplus-extreme**

Get more information

SIMATIC WinCC homepage:
www.siemens.com/wincc

Information on Plant Intelligence:
www.siemens.com/plant-intelligence

Information on maintenance:
www.siemens.com/maintenance

SIMATIC system properties:
www.siemens.com/simatic-system-features

SIMATIC Manuals Guide:
www.siemens.com/simatic-docu

Info material for downloading:
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