Efficiency needs flexibility

HMI software with numerous powerful functions for monitoring automated processes

Limited space, numerous machines, linked processes: many production facilities are getting more complicated. This can result in faults not being detected in time and thus the failure of a machine or even an entire line. To ensure that plant operators and maintenance personnel, as well as production managers and management, always have the right overview, a visualization solution is needed that offers flexible options for operator control and monitoring.

In production, flexible access to resources is of paramount importance to the productivity and economic efficiency of a manufacturing company. What sounds like a simple feature has taken on new relevance as a result of the experiences of the last year and a half: Automation processes have had to be designed for greater flexibility, remote access has become critical. It has become clear that many advantages and opportunities arise in normal everyday life – which is why many of the innovations will have a lasting impact on working methods and will become established in industry.

Brigitte Händler, Marketing Manager HMI / SCADA of Siemens AG Nuermberg

Flexibility through remote control

The use of remote access has now become standard for PC-based visualizations. In addition to a full scope of operator control, variants are also used which are functionally designed to exclude all types of access to the process – e.g. switching operations – regardless of the rights of the users. By using "view only" clients, dashboards showing production figures are created with minimum effort, directly from the data of the plant visualization. This can be used to directly provide information to management, for example, or also to provide information for production personnel. At the machine level, however, such remote control is still not very common. Independent, parallel access by several operators to one panel on the machine was either not supported by the operator panels or was not desired due to safety concerns. As a consequence, processes were often less efficient, especially in plants with poor access or widely distributed systems. This meant that either long distances had to be covered, or several operator panels had to be installed at the plant – with the associated increase in hardware and configuration costs.

In V17, the new version of Simatic WinCC Unified, Siemens supports flexible remote access to visualizations with HMI Unified Comfort Panels. Using modern HTML5-compatible web browsers, several authorized users can directly access the visualization at the same time without having to install additional applications. They can also operate the machine independently of the local display. This also makes operator control possible via the company's intranet, enabling processes in widely distributed plants to be designed more efficiently. Plant security is always the top priority and is ensured by consistent authentication and configurable authorization levels by structuring the network as a private intranet or global Internet solution in accordance with corresponding IT security guidelines.

Productivity by means of networked visualizations

In many areas of manufacturing, however, there is not only the challenge of several employees working on a single machine or system but also the challenge of one employee having to keep an eye on several systems and processes simultaneously - for example, in order to react promptly to a shortage of material in the supply system or a jam in the packaging machine at the end of a line.

To ensure that the information relevant to the plant operator was available at each operator station, a large amount of information was previously displayed in parallel on several machines. This can result in additional configuration work and higher costs.

Thanks to the Collaboration option in Simatic WinCC Unified V17, this situation is a thing of the past. Concepts for cross-machine visualization or even line monitoring are implemented much more efficiently with Collaboration. Instead of configuring information twice, an existing image of another WinCC Unified Station – whether a Unified Comfort Panel or PC-based system – is referenced directly during engineering. Depending on the operating concept and implementation of the navigation, either the visualization of another station is displayed directly, or detailed images are integrated into the station's own visualizations using what is called "picture window technology". This means, for instance, that important information from upstream or downstream machines can be integrated into local operator control, or that the visualizations of individual machines can be integrated into a complete overview of the line.

The next step: Visualization with Industrial Edge

"During the development of the Simatic WinCC Unified System, we attached great importance to the use of web technologies such as HTML, SVG and JavaScript throughout, so that our users have maximum flexibility: during configuration, in the presentation, in the type of access, but also in the choice of the target system. This versatility and also the high degree of openness are two of the great strengths of Simatic WinCC Unified, which we will continue to build on in the course of our product development. Support of Industrial Edge is also an integral part of our strategy. This new technology not only makes the management of software in machines or plants easier and more flexible – it also offers completely new possibilities for the visualization of machines or plants. Within the next few months, we will introduce WinCC Unified Apps for Industrial Edge, which will allow users to create and operate complete visualization solutions on Edge devices. Functional extensions are possible at any time by installing additional apps via the central Edge Management."

Roland Melzer, Head of Human Machine Interface & Operations Business Segment, Siemens AG

This reduces the amount of configuration work as existing elements can be used for additional machines. However, due to the standardized user interface, which does not differ from local operator control of a machine, the Collaboration functionality also offers significant added value in the operator control. No new login is required as the user rights are predefined by means of standard roles. This makes it easier for machine operators to work on different panels, allows them to stay in one place, reduces the number of operator errors and therefore helps to improve the productivity of the entire line or plant.

View-of-Things: Web-based visualizations for a specific device

There are situations in which the usual operator control and monitoring via operator panels or even PC systems cannot be used at all – for example, in particularly confined spaces, or for stations (e.g. remote water-pumping stations) that are difficult to access, only need to be monitored temporarily and whose display is not time-critical.
To display and evaluate data of a SIMATIC S7-1500 controller, the web server integrated in the CPU offers the possibility of running visualizations created by the user in the TIA Portal as a web application.
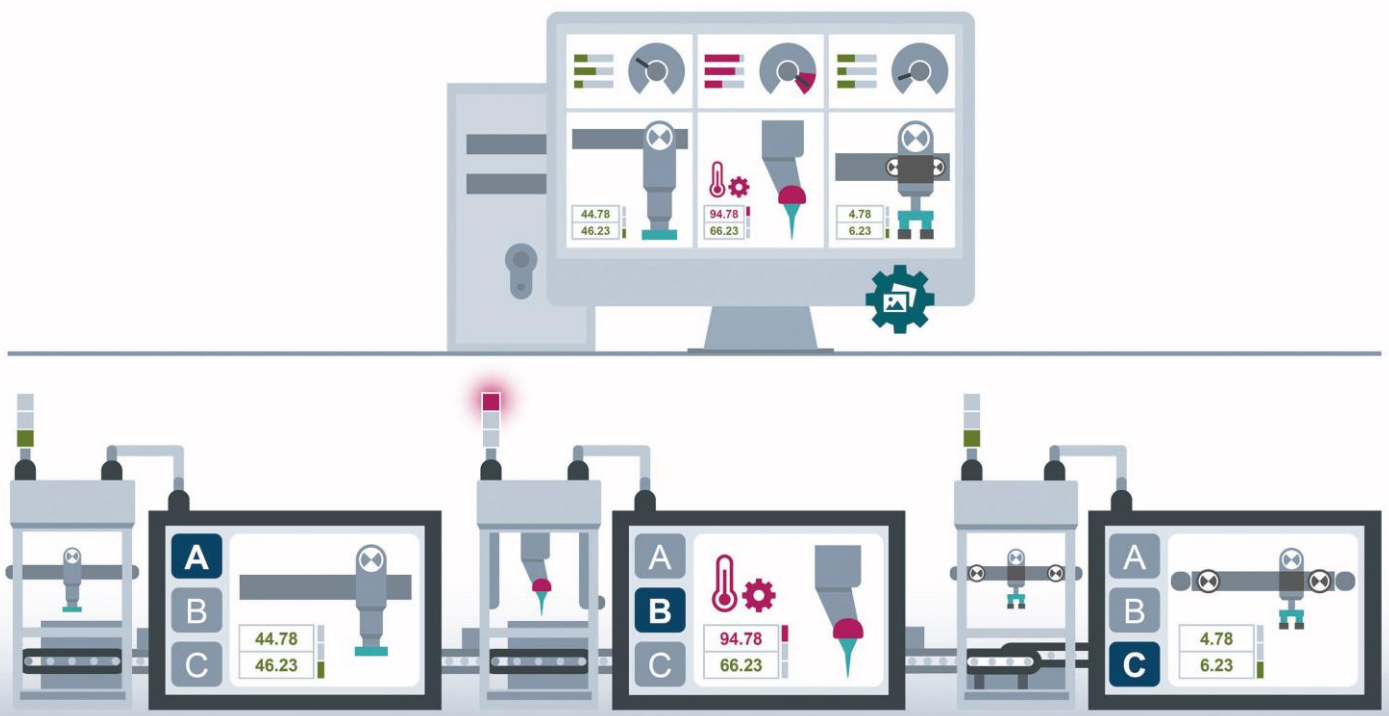
01 **From the individual machine to the complete line: With the Collaboration function, Unified devices can access the visualization of other Unified platforms – including in sub-areas only**

02 With the View-of-Things function, control parameters can be monitored and evaluated easily via the production network using a web server

These individually created web-based visualizations for the respective customer application can now easily be assembled graphically and without any programming knowledge using View-of-Things.

In the TIA Portal, users create their visualizations for the controller with the elements supported for CPU, such as SVG graphics and input/output fields.

temporary basis. They also enable service personnel to adjust the parameters of controls via remote access – for example, in the event of a fault.

Tools for flexibility without complexity

Modern web technologies make it easier than ever before to create platform-neutral

User rights can also be configured individually and on a role and group basis – ranging from purely observational ("read only") and access to individual machines through to full operating rights for the entire plant. In addition, it is possible to import existing Windows users and groups for the integration of user administration into a central IT solution. Simatic WinCC Unified, like all Siemens automation components, is integrated into TIA Portal, allowing users to take advantage of the familiar development environment and tried and tested tools such as automated engineering with Simatic Visualization Architect (SiVArc). In addition, tools such as the HMI Template Suite facilitate the design of machine visualization for standardised operating concepts from the panel to the PC system – so that both developers and operators have the complexity of modern manufacturing under control at all times.

The system combines efficient engineering with powerful archiving and highest data security

To do this, they use the same image editor tool that is used for the panel and PC system. To receive the visualization in the browser of their mobile device, they connect to the controller via secure communication.

On web-based visualizations created with View-of-Things, the most important parameters of a plant unit can be monitored and operated on a

visualization solutions that can be flexibly adapted to the requirements of different users or fields of application. However, it is always important that both internal interfaces and access to the plant visualization are protected. Simatic WinCC Unified makes use of secure encrypted communication using certificates, not only for the connection of controllers and the collaboration of multiple Unified stations, but also for remote access to visualization via browsers.

Picture: Siemens

www.siemens.com/wincc-unified

English translation from the German magazine "INDUSTRIELLE AUTOMATION 4/2021"