SIEMENS

White Paper

WinCC Unified: Defining the future of HMIs for greater usability, flexibility and scalability

As more data, systems and interactions take place between humans and machines, a more sophisticated and responsive HMI is required for communications. Siemens SIMATIC WinCC Unified is the next generation of HMI systems designed in response to digitalization and the increasing demands in functionality and operability by both machine builders and plant operators.

The Internet of Things (IoT) is quickly transforming the relationship between humans and machines to open new opportunities for innovation in discrete manufacturing and process industries. As Industrie 4.0 unfolds, more and more devices and systems are becoming interconnected, so their operators can leverage the benefits of new technological advancements such as artificial intelligence (AI), virtual reality, and augmented reality. And that's not to mention enabling operators to extract new operational insights from the wealth of data produced by such technologies.

But these trends are driving new demands on the functionality and usability of human machine interfaces (HMIs). They must deliver the right data at the right time to the right person or system. That can exceed what a lot of legacy HMI systems can deliver. In fact, with production data estimated to increase to 175 zettabytes by 2025[1], it is clear that data management and visualization are quickly becoming critical to production optimization and overall performance. Digitalization is no longer a competitive advantage in the workplace but rather a competitive imperative for profitability and longevity in a market dependent on fast-changing consumer trends.

Next-generation HMI technology takes human-machine interactions to new levels of sophistication

To do this, operators need a system designed with the future in mind. The Siemens SIMATIC WinCC Unified System enriches the current Siemens SIMATIC portfolio by providing operators with much more flexibility in its applications and capabilities on the shop floor. Programmable through the SIMATIC Totally Integrated Portal (TIA Portal), a fully integrated engineering and programming automation framework that provides unrestricted access to all of Siemens digitalized automation services, WinCC Unified enables the continuous deployment of software updates while offering manufacturers a single integration platform. It provides four core benefits to plant operators and OEMs:

- Greater operating visibility
- More hardware connectivity options
- Faster time-to-market
- Easy scalability of operating systems to foster innovation and incorporate emerging technologies

Designed with openness in mind

WinCC Unified uses an open-source runtime engine that supports full native web technologies, such as HTML 5, Scalable Vector Graphics (SVG), and Javascript to be used within TIA Portal. This provides engineers with the ability to customize and animate HMIs, such as the **Siemens SIMATIC HMI Unified Comfort Panels**, for greater data visualization via Dynamic SVG or custom web controls.

With JavaScript as the primary scripting language for all Unified Comfort Panels and Siemens SIMATIC industrial PC (IPC) systems, application developers now have full use of the entire object-oriented JavaScript scope for handling data, objects, classes, and inheritance to maximize portability in both commissioning and execution environments.

What's more, the Openness API in the TIA Portal saves valuable engineering time by allowing code blocks and components to be used across all WinCC Unified Platforms. This reduces commissioning time through easy-to-run comparison reports and debugging traces that can catch errors early – before they manifest later, potentially costing more engineering time to fix.

The dramatic increase in production data generated by technologies supporting IoT connectivity and cloud-based services require enhancements in analytics and visualization to realize its benefits. Application openness delivers the necessary visibility and accessibility without compromising operations on the shop floor.

SIMATIC WinCC Unified Comfort Panels come preinstalled with web and system applications that offer users the ability to work in documents, view instruction videos through built-in media players, and get instant access to web-based systems. Synchronous remote access mirrors panel to app, keeping teams connected with access to the WinCC Unified System from any modern web browser, including mobile devices, without the need to install extra plugins.

Future-Ready SIMATIC WinCC Unified, the newest addition to the WinCC portfolio …

The new Siemens SIMATIC WinCC Unified System is programmable in the TIA Portal V16, as are WinCC Advanced and WinCC Professional. It provides major future-ready enhancements over its legacy WinCC counterparts. WinCC V7 remains available as does WinCC OA, the latter for extremely large-scale requirements.

Case Study Snapshot

Heizomat, a German manufacturer of fully automatic wood chip heaters, required an efficient solution that could keep up with its customers' growing demands for greater functionality and usability. Their latest generation of heaters deliver powerful performance, greater flexibility, and an improved visualization system to their heating systems with 7-inch SIMATIC HMI Unified Comfort Panels powered by SIMATIC WinCC Unified. The openness of the system also allows Heizomat to import their own software and applications into the devices for maintenance operations.

Support for extending industrial edge applications and capabilities

WinCC Unified's functionality is extended further via **Edge Apps,** available through the Open Pipe Interface. Device-managed Edge Apps are installed locally with diagnostic information available remotely via webserver or Control Panel.

Centrally-managed Edge Apps provide additional flexibility in user management and version control. These Edge Apps can be managed on-premise or remotely through the **Industrial Edge Management System** or other third-party cloud platforms for easier deployment of device-related updates and implementation of security patches. The WinCC Unified System leverages this connectivity to enable a new level of communication between machines. Screens, tags, archives, alarms and other machine data are all fluidly exchanged between machines during runtime, allowing production data from several machines to be combined for advanced analytics and greater insight into performance.

Remote engagement is possible through data visualization and connectivity apps. For example, the **MQTT App** connects automation equipment to cloud-based systems like **Siemens MindSphere,** the IoT open operating system for applications and data, while the **SIMATIC Flow Creator** defines data workflows and rules that will trigger action if threshold values are exceeded or a special event occurs.

SIMATIC HMI Unified Comfort Panels can even be connected to smart devices via the **SIMATIC Notifier App,** issuing system alarms and messages directly to the smartphones or smartwatches of plant operators and technicians. Additionally, these intelligent displays are compatible with external hardware, such as printers or bar code scanners, for additional field-level connectivity or can be connected.

One integration platform to scale SCADA efficiently across multiple machines

As manufacturers navigate their digital transformations, they must weigh if emerging technologies warrant the significant resource and cost investments with what their current system can support. For many, the path to digitalization – and the potential gains in efficiency and productivity – are inhibited by a lack of flexibility in their current processes. Furthermore, older control systems do not have the extensibility or scalability necessary to integrate the innovative technologies of Industrie 4.0. such as AI, augmented reality or edge technologies.

One integration platform not only makes it easier to understand what to scale but how to scale. While the WinCC Unified system supports current controls, IPCs, and other technologies used in HMIs and supervisory control and data acquisition (SCADA) systems today, its openness provides the flexibility to connect all kinds of new devices in the future.

By supporting multiple components and third-party tools like cameras, 3D viewers, sensors or GPS trackers, WinCC Unified provides the foundation for OEMs and their customers in the manufacturing and process industries to move nimbly from automated to autonomous processes with fewer friction points along the way.

Applications pre-installed on the Siemens SIMATIC WinCC Unified System

- Google Chrome Browser
- VLC Media Player
- Okular PDF Viewer
- Libre Office

One modern software platform for all runtime environments and one engineering environment within TIA Portal provides greater reliability and usability, whether its scaling to a complex SCADA solution or adding new requirements to runtime. Machine configuration is streamlined to be built with the .NET programming language that allows for individual project configurations to be created within seconds.

Easy device changes, reusable components and consistent user interfaces deliver an intuitive user experience whether that person is a programmer or operator. programmer or operator.

With emerging technologies on the horizon, WinCC Unified offers many ways to integrate third-party tools for improved changes, reusable components and consistent user interfaces deliver an intuitive user experience whether that person is a programmer or operator.

With emerging technologies on the horizon, WinCC Unified offers many ways to integrate third-party tools for improved collaboration and communication between devices. One way of connecting, for example, is through custom web controls that are used during runtime by the operator. These controls are connected through a cloud-based platform and externally created in the WinCC engineering environment before being imported into the user interface.

Another way to integrate devices and support their collaboration is via the **WinCC Unified Open Pipe** interface. It connects a third-party application to runtime through a connection code that can be written in any programming language supporting pipe technology.

Lastly, Open Data Kit (ODK) software enables offline data collection that submits data to an on-premise server during runtime. This runtime openness allows for large data exchanges with database systems as well as the sharing of screens, tags, archives and alarms for greater visibility and flexibility in use cases involving multiple machine supervision.

A modern user interface for enhanced communications and performance

Siemens SIMATIC HMI Unified Comfort Panels brilliantly display the next level of communications from PC-based systems, edge, and cloud environments. With capacitive multitouch technology on all frame sizes, from 7- to 22-inch diagonals, the panels offer great readability with bright colors and vector-based graphics, even in full daylight. With a significant increase of performance and system limits compared to previous SIMATIC Comfort Panels as seen in Figure 1, the new Unified Comfort Panels come fully configured for larger applications and system limits, regardless of panel size.

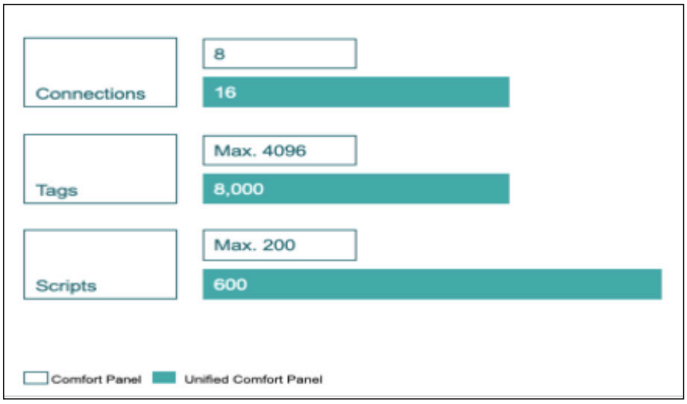

Figure 1.

An intuitive interface brings the smartphone user experience to industrial applications with improved multitouch gestures such as zooming and panning in web controls and document viewers, screen change swipes, and scrolling in list. What's more, the hardened, anti-reflective glass front has been tested with a variety of commercial work gloves to ensure usability, plus the interface's high electromagnetic compatibility safeguards operability in any environment. Moving from pixel-based to vector-based graphics also greatly improves the design and usability of the panels.

WinCC Unified: Making today's plant operators and their OEMs future-ready

In the future, the HMI and SCADA portfolio in the TIA Portal will be based on the Siemens SIMATIC WinCC Unified System to take advantage of the virtually limitless possibilities that its openness and integration provide. As consumer demands drive innovation even beyond today's most advanced technologies, the convergence of OT and IT will become increasingly more prevalent in industrial automation while connectivity, security and data optimization become critical to operations.

As such, industrial automation will depend more on operating systems that can scale to optimize production performance and availability and still support the continuous digital transformation necessary to remain competitive. While the path to digitalization looks different for every manufacturer and industry, one thing is clear: it requires flexibility in technology application and greater interoperability to stay competitive and embrace the next generation of automation as well as autonomous manufacturing.

To learn more about the Siemens SIMATIC WinCC Unified System and SIMATIC HMI Unified Comfort Panels, readers are invited to visit siemens.com/wincc-unified-system. They can also register there to join the SIMATIC WinCC Unified community and gain access to on-demand video clips, user forums and additional information on how to get started with this innovative technology and putting it to work laying the foundation for their own next-generation machines and industrial facilities.

1 Gartner Identifies Top 10 Strategic IoT Technologies and Trends. Gartner, Inc. November 2018.

Siemens Industry, Inc.

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