SCADA's role in
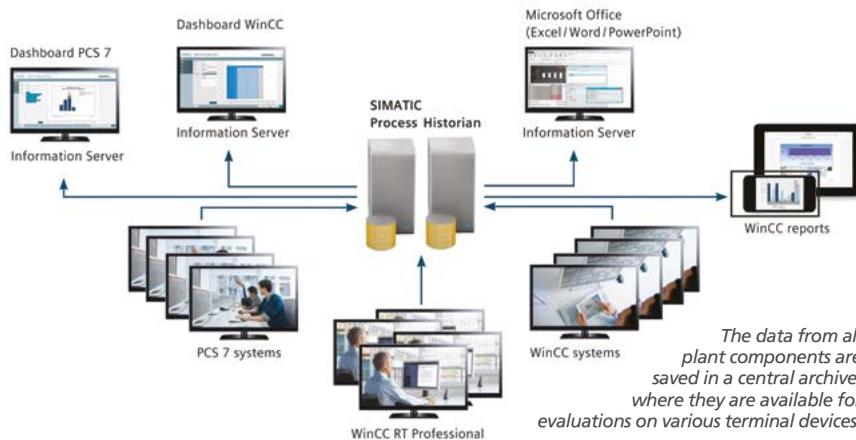## optimising production

Brigitte Händler discusses the requirements for a SCADA system in an age of digitisation.

The data from all plant components are saved in a central archive, where they are available for evaluations on various terminal devices.

For years, Scada systems have been employed wherever large amounts of information, from various sources and locations, need to be jointly processed – for example in supply network monitoring, water treatment or infrastructure projects. Central evaluation of information is becoming more important and production lines are no longer viewed in isolation, but as part of a network with other systems and plants.

Stock is matched to the required production quantities, orders are processed faster and with optimised resources and energy consumption is minimised. Data are provided, acquired and processed for each of these tasks – with a corresponding strong increase in the data volume. At the same time, the targeted processing of this information serves to control workflows, as well as forming the basis for operational decisions which have an influence on efficiency and profitability.

All these requirements demonstrate why SCADA systems represent one of the core components of digitisation. Acting as interface between production and corporate management, manifold roles and tasks have to be accomplished.

In daily operation, SCADA systems combine engineering, diagnostics and runtime functions with data security. Many systems are parameterised step-by-step, with identical information input required for various points. This can lead to inputting errors which may necessitate correction during commissioning. At worst, such incorrect parameters result in downtimes and costly troubleshooting.

Existing configuration data of the control program are directly imported in the Siemens Simatic WinCC SCADA, does away with multiple entries avoiding errors. Simatic WinCC in the TIA Portal goes even further. Using rule-based tools, such as the Simatic Visualization Architect, HMI configuration is largely automated on the basis of an existing PLC program code and prepared picture elements.

In addition to process data, further information, such as energy measuring points, process and fault messages or process diagnostics need to be configured. In contrast to heterogeneous systems, solutions with Simatic components provide corresponding blocks in the control and in the visualisation system. The integrated program code for energy measuring points can be generated at the push of a button via the Simatic Energy Suite.

Intelligent archiving

WinCC SCADA ensures reliable process information archiving in the integrated Microsoft SQL server database. Data are viewed online in the SCADA system via curve and message displays which facilitate numerous analysis options and integrated statistical evaluations. Long-term-relevant data from one or multiple SCADA systems can be saved in a central archive, the Process Historian. The data volumes accumulating in an archive are much greater than in an individual SCADA system so the Process Historian relies on intelligent functions such as the swinging door algorithm and compression for data archiving. Expansions or conversions can be realised without technology gaps or complete reconfigurations. Thanks to standardised OPC interface, the Historian acts as the hub for vertical consistency with superior IT/MES systems.

Reliable access

Reports and analyses of production data are implemented with the Simatic Information Server on the basis of archived data. Historical plant data can be compiled in web-based dashboards or automated reports for various target groups, without the need for any programming knowledge.

Optional packages such as WebUX can help make monitoring expansive or spatially distributed plants. For example, production key performance indicators are consistently available to the management staff via mobile devices with internet browser and the quality assurance staff can view messages and process data pertaining to a remote plant. The applications not only display the plant data relevant to the user, but also facilitate the plant's remote operation. Maintenance staff with

respective access rights can access fault messages at all times, doing away with many unnecessary trips.

Plant optimisation

The consistent calculation and analysis of standardised key performance indicators (KPIs) allows for qualitative conclusions in terms of production, which in turn discloses optimisation potentials. The overall equipment efficiency (OEE) represents a well-known example of such KPIs which document the efficiency of machine and plant operation. The consistent analysis of KPIs reveals the potential for improvements by means of optimisation measures. KPIs can be calculated in a shift- and product-related manner, allowing for the detection of weak spots in the production process.

Energy costs can be optimised, with the help of the Simatic Energy Manager Pro energy management software. This addition the SCADA system expands the analysis options by the plant's energy flows, allowing energy unit costs to be calculated. This facilitates the derivation of energy saving potentials and the avoidance of load peaks, supporting sustainable energy management in accordance with the ISO 50001 standard.

Failure of plant visualisation can result in serious consequences so selection of the PC hardware is crucial in order to help prevent downtimes. Depending on the application site computers need to guarantee impeccable functioning in harsh industrial environments and in continuous operation applications. Industrial PCs were designed to meet these requirements.

A SCADA system needs to support the operator with plant-wide control and monitoring. Simatic allows production data to be centrally archived and evaluated over long periods of time, standstill alarms are saved and detailed evaluations are output. This results in the provision of all essential data for strategic planning support and further efficiency increases. New technologies are taken into account for new developments. Mobile solutions, multi-touch gestures, apps as well as visualisation and operation via tablets and smartphones represent current subjects.

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