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Ingenuity for life

MindSphere Application – SFC Analyzer

Cloud-based analytics solution for converter stations

siemens.com/rail-electrification

Throughout their lifetime Static Frequency Converters (SFC) generate and evaluate vast amounts of external and internal data. The SFC Analyzer helps make this data transparent and hence not only enables analysis in a convenient and user-friendly manner but also reduces redundant and inefficient work.

Benefits

• Monitored conditions of your converter stations on any device 24/7
• Improved business activities due to data analysis with data that would normally be lost
• Improved external and internal communication due to adjustable automatic notifications and availability of data
• Decreased dependencies due to information availability and accuracy
• Reduction of inefficient and redundant work, like reading log files
• Ability to enable condition-based maintenance
• Simplified processes save time and resources

Apps and Services
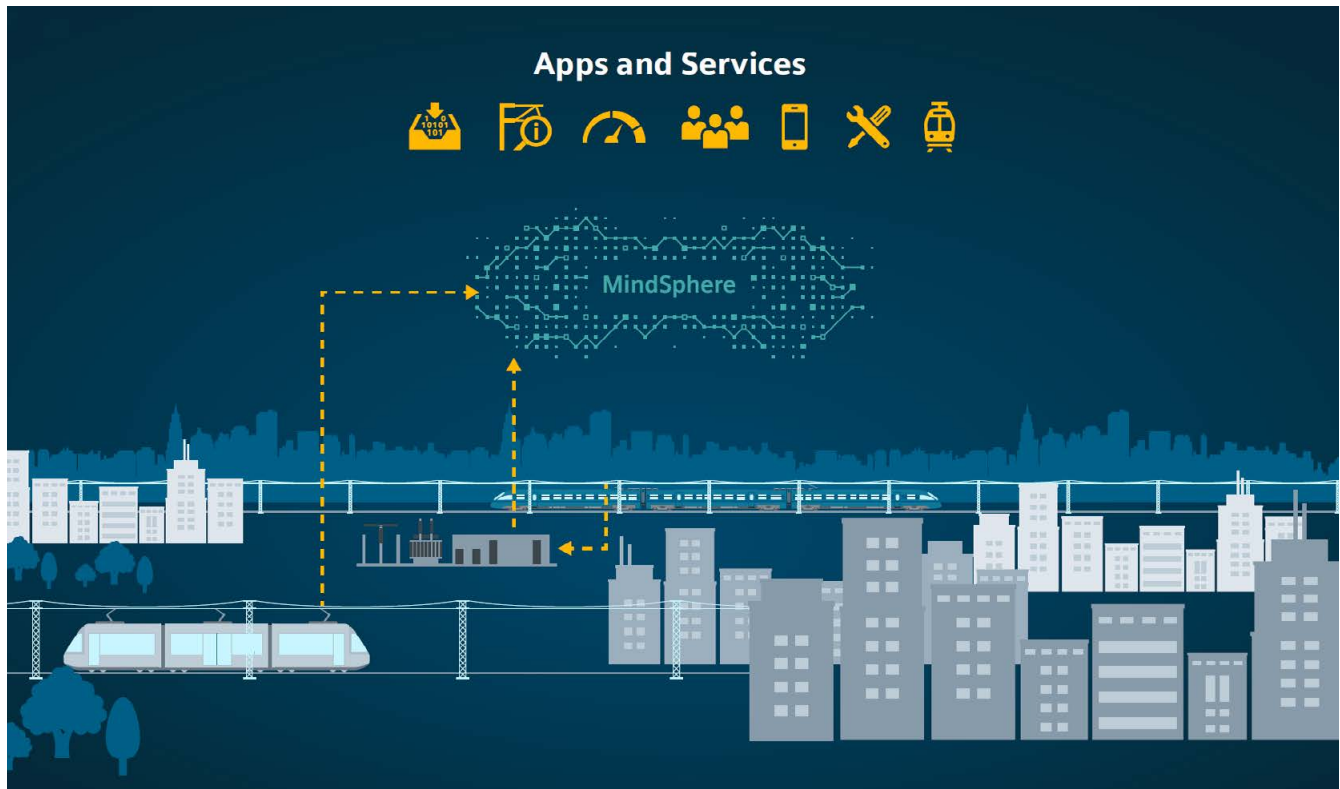
MindSphere

Collected data from your infrastructure gets uploaded to MindSphere, where the data is made available to you within various applications

SFC Analyzer – A solution for your digital future

Sitras SFC plus already creates and collects a lot of data today. But converter stations are often unmanned and located in remote areas. In addition, the technology used is complex. In case of a problem it is not only hard to access the data, but also it must be accessed by a person with specialized knowledge. This can be time consuming and might be an issue in a time-critical situation.

In the future this data will be made available not only on-site but at a central location or wherever needed using an industrial cloud application. This leads to a better understanding of operations and immediate attention if necessary. For our converter stations we provide and continuously improve cloud-based data analytics visualizations that enable live time transparency over your assets.

Do you know your data?

The first step to benefit from new opportunities which digital solutions offer is connectivity. We use a MindConnect Rail EL, a connectivity solution, which can be installed at any converter station with minimal effort. This plug&play solution connects directly to the converter station where all data is collected locally. This data is sent via a secure connection to MindSphere, the open IoT operating system from Siemens, where it can be used in different applications.

Today, a major challenge is accessing data remotely and giving efficient remote support. This is why we developed a solution for automatic collection and transfer of operational data. It can get data from converter modules, cooling system, transformers, ventilation system, fire detection system, and other components. The signals and data transmitted consist of messages, alarms, traces, frequencies, voltages, currents, switch positions, conductivity as well as the overall operational status of the system and its sub-systems.

Remotely connecting to SFCs solves the access challenge. Thanks to the remote and predefined collection of data, specialists from anywhere can support the data analysis and offer remote support. All data is transferred completely, correctly and quickly without any additional actions needed. This simple data collection enables you to setup automatic notifications according to definable rules; for instance including options for text messages to mobile phones or E-Mail notifications in the case of failure. As a result troubleshooting time and mean downtime are reduced while system availability is increased.

Operation key figures – live

Stay up-to-date with what is happening in your converter station. In addition to key figures that are usually seen in the HMI (like active and reactive power, winding temperature, feeder voltage, etc.) further alternative variables (from up to 32.000 variables) can be added to understand technical correlations and improve business activities. For instance the data can be used to build a condition-based maintenance framework which accordingly decreases downtimes.

Events

Once a threshold is exceeded an event gets triggered, listed and automated notifications will be sent to the respective employees via email or text message. Depending on the event, action or contact recommendations might be given. Properly defined notifications will avoid complex communication channels and hence simplify communication and speed up progress.

Asset file lists

Work with the data that has been collected for you in MindSphere. Download your trace and message export data files that get automatically generated whenever you need them. To analyze and understand further business activities you can use your historical data in MindSphere. It might not only help you to understand recent problems but also analyze historical data to improve your future business activities.
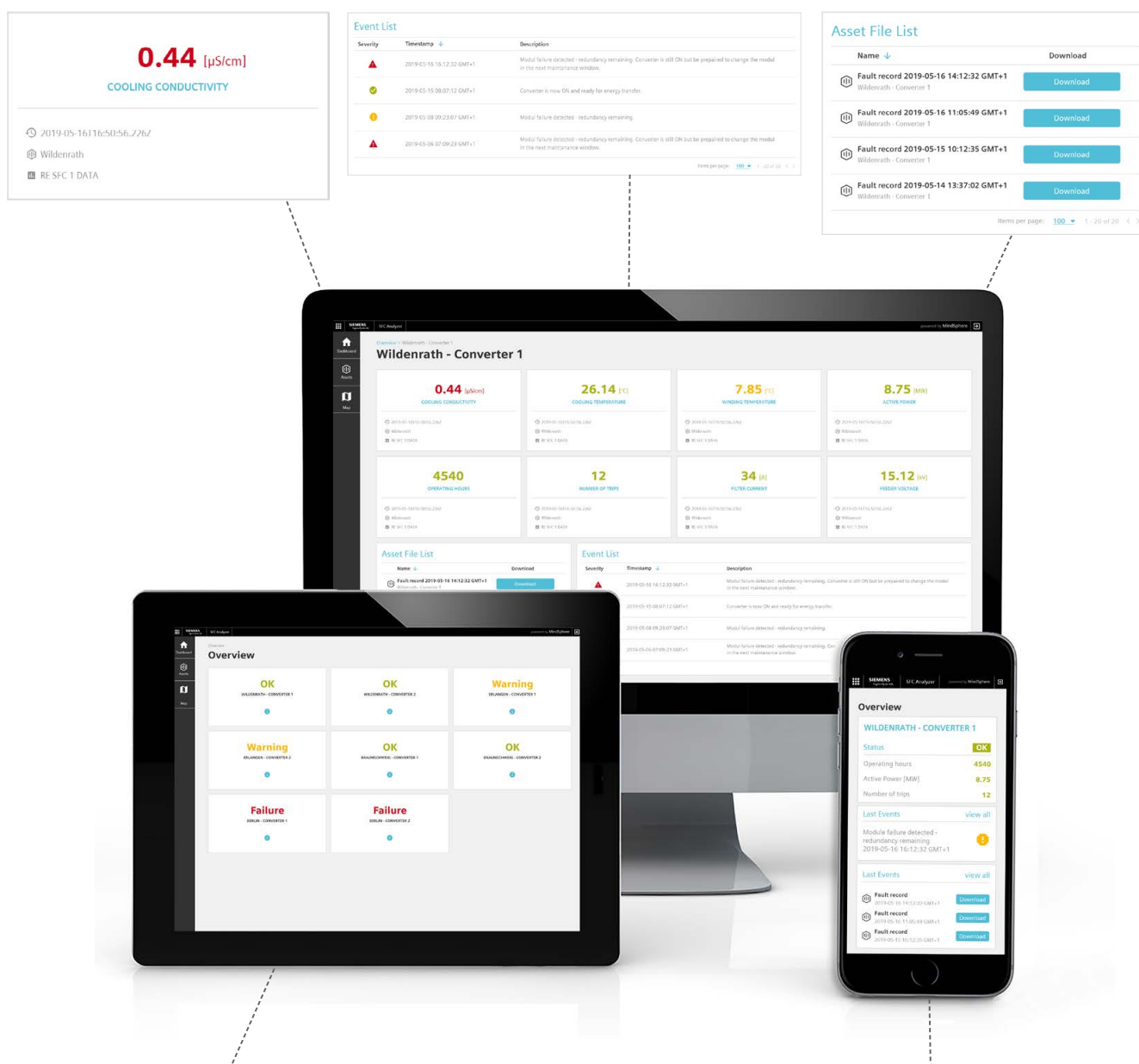
Overview

An overall condition is computed for each converter station and displayed in an overview-window that can be checked 24/7. Depending on your preferences these dashboards can be personalized.

User-friendly and responsive information availability

User-friendly and responsive interfaces allow you to understand and work instantly with the information gathered in your converter stations. There is no explicit training necessary. A responsive implementation lets you access your data 24/7 no matter where you are or whatever device you have available. The information can be made available to all responsible internal employees as well as all involved external partners.

MindSphere:
Your gateway to IoT

MindSphere is the Internet of Things (IoT) operating system from Siemens. It is built as a secure and scalable industrial end-to-end solution for everything from connecting products, trains, rail systems and substations to unlock your IoT data potential. By connecting your rolling stock and railway infrastructure to the digital world, MindSphere provides powerful industrial applications with advanced analytics and digital services to unleash increased productivity and efficiency across your entire business.

MindConnect Rail EL:
Connectivity in one place

Our connectivity solution consists of a compact connectivity box (400 mm x 500 mm x 210 mm), that contains a data collector, a data capture unit (DCU) and a connection setup. Our data collector unit uses OPC UA and file transfer protocols to gather transient fault record documents and accumulate the continuous data into a timeseries format which is space-efficient and can be read and retained in MindSphere. Consolidated to one package this data first gets forwarded to the DCU and then further to MindSphere, where it will be available to you. The DCU obtains your data securely and ensures a separation of your operating business activities and the data collection process. Depending on your existing infrastructure, you can select different setups to forward the data packages from your connectivity box to MindSphere.

Data Collection:
Extending your possibilities

Converter stations create various amounts of data in converter modules, cooling systems, transformers, ventilation systems, protection devices, the local HMI and even the fire detection system. It is possible to connect further devices and use different protocol types to access data from other modules. According to your preferences the connectivity box can be implemented at any location that provides access to your network. For further information on MindSphere or data security please follow the links in our copyright notice.

MindSphere

Connectivity box

Data Collector

Data Capture Unit (DCU)

Connection unit

See detailed information for product components at:
Data Security: https://new.siemens.com/global/en/products/mobility/rail-solutions/rail-automation/secure-connectivity.html
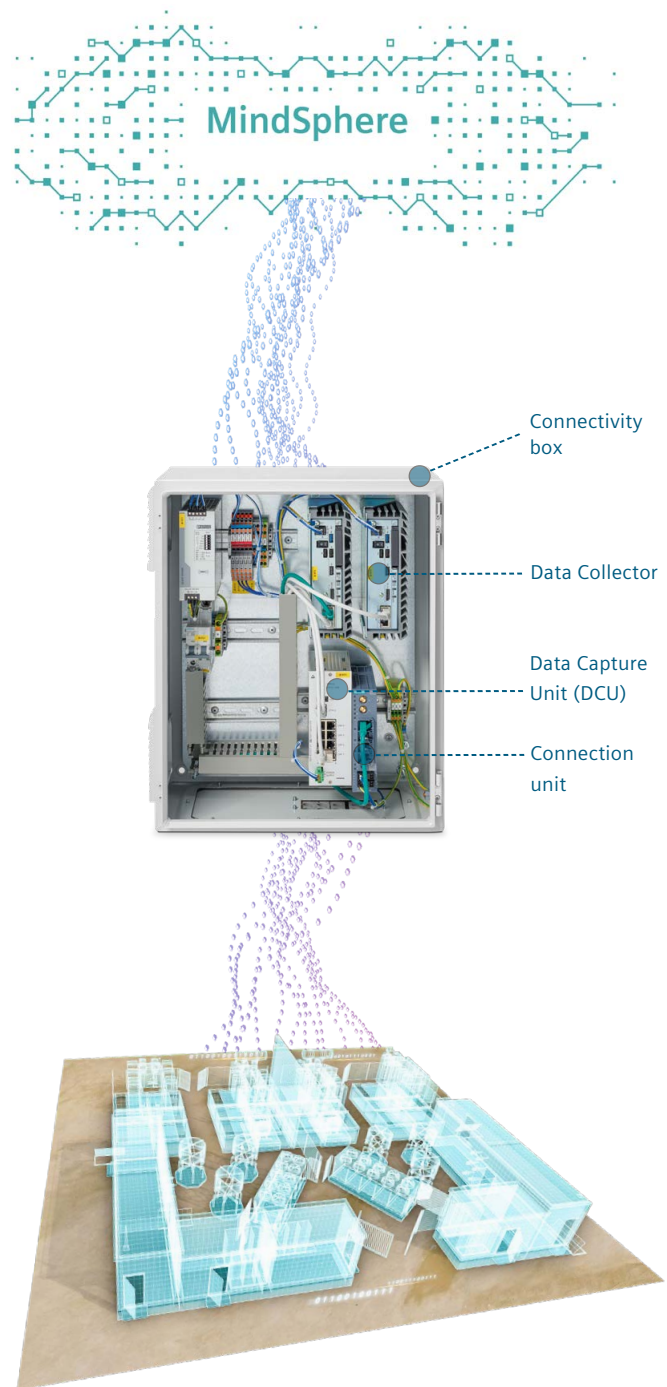**MindSphere:** https://siemens.mindsphere.io/en

Security information
In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

For more information about industrial security, please visit:
http://www.siemens.com/industrialsecurity.