

Grid Diagnostic Suite

Powered by MindSphere

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Grid Diagnostic Suite

Powered by MindSphere



Grid Diagnostic Suite

Suite of Applications for Protection, Distribution Automation and Power Quality

Transparency of Grid Assets

- Providing data at your fingertips using analytics and dashboard views

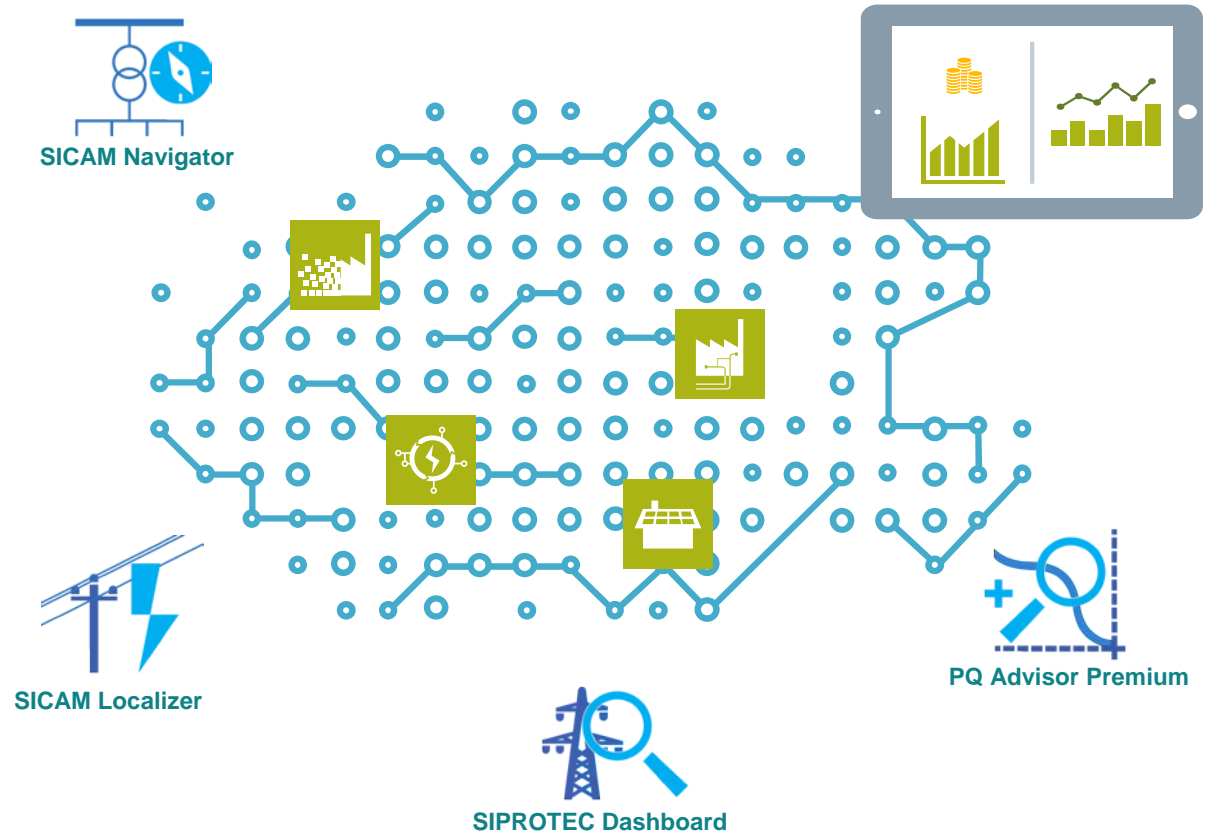
Understand the power system

- Identify asset status and utilization and improve knowledge of assets and grid behavior

Enhance efficiency and quality

- Implementing measures based on advanced data analytics

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Ingenuity for Life



Grid Diagnostic Suite - Powered by MindSphere

Customers benefit from data monitoring and analytics



Achieve transparency

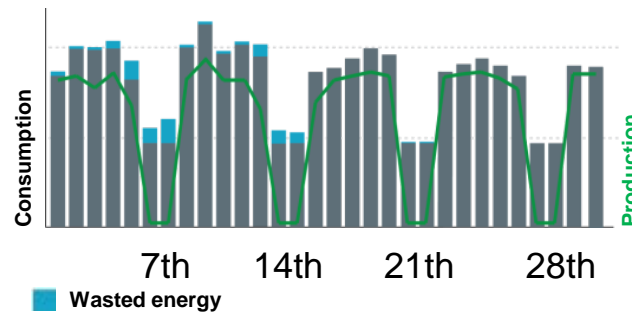


Provide data at your fingertips

Improve transparency of grid assets using analytics and dashboard views

Monitoring

Understand the power system

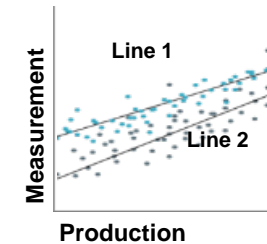


Identify asset status and utilization of power grid

Improve knowledge of assets and grid behavior

Analyze

Enhance efficiency



Enhance business results by reducing operation CAPEX and OPEX

Improve efficiency, quality and output by implementing measures based on advanced data analytics

Optimization

Your Benefits

IoT 4 Energy

100% of data available in 3 Steps



STEP 1

Enable Connectivity

Update SIPROTEC / SICAM devices with IoT connectivity



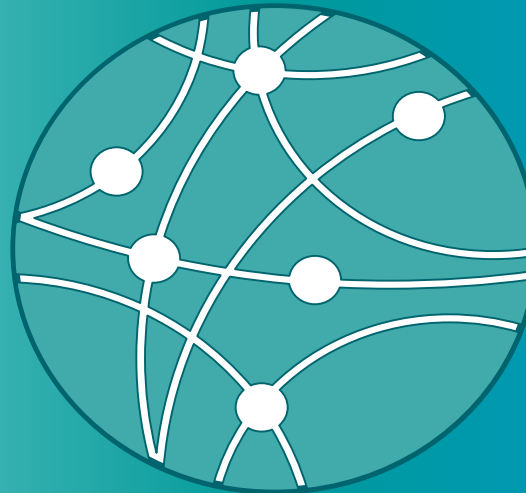
(open IoT-Standard OPC UA Publish/Subscribe*)



STEP 2

Connect to MindSphere

Onboard devices to MindSphere



Step 3

Run data-driven Services

Monitor e.g. health status of your Substation assets with Grid Diagnostics Suite or develop your own Apps



* IEC 62541

Grid Diagnostic Suite

Easy engineering and secure data handling



Automated secure onboarding for SIPROTEC and SICAM onto MindSphere



Save time with automated onboarding



Save money with minimum engineering
of data base in the cloud



Avoid typing faults for data entry
to reduce test efforts



Protect your data and assets
due to certificates

4 strong partners working hand in hand to protect your data and assets

MindSphere

OPC UA Pub/Sub

SIPROTEC

SICAM



We communicate encrypted



We talk only to authenticated devices



Grid Diagnostic Suite - Powered by Mindsphere

Increased grid availability and service quality for power grids



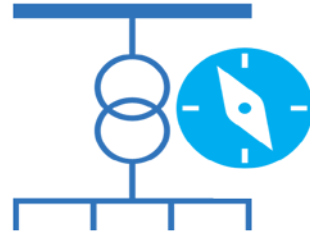
Grid Diagnostic Suite - Applications

SIPROTEC Dashboard



Enables power grid operators to monitor the operational status of their SIPROTEC device and optimize maintenance activities

SICAM Navigator



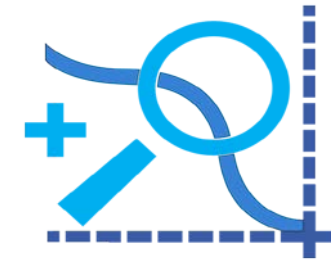
Enables power grid operators to monitor and get a quick view of the operational status in transformer stations (cable network)

SICAM Localizer



Enables power grid operators to monitor and get a quick view of the operational status in distribution overhead lines

PQ Advisor Premium



Enables power grid operators to monitor the power quality of stations to avoid e.g. NCCs

- Enhanced transparency of systems and device status
- Predictive maintenance, optimization of services and resources
- Increased availability of energy supply

Customer benefits



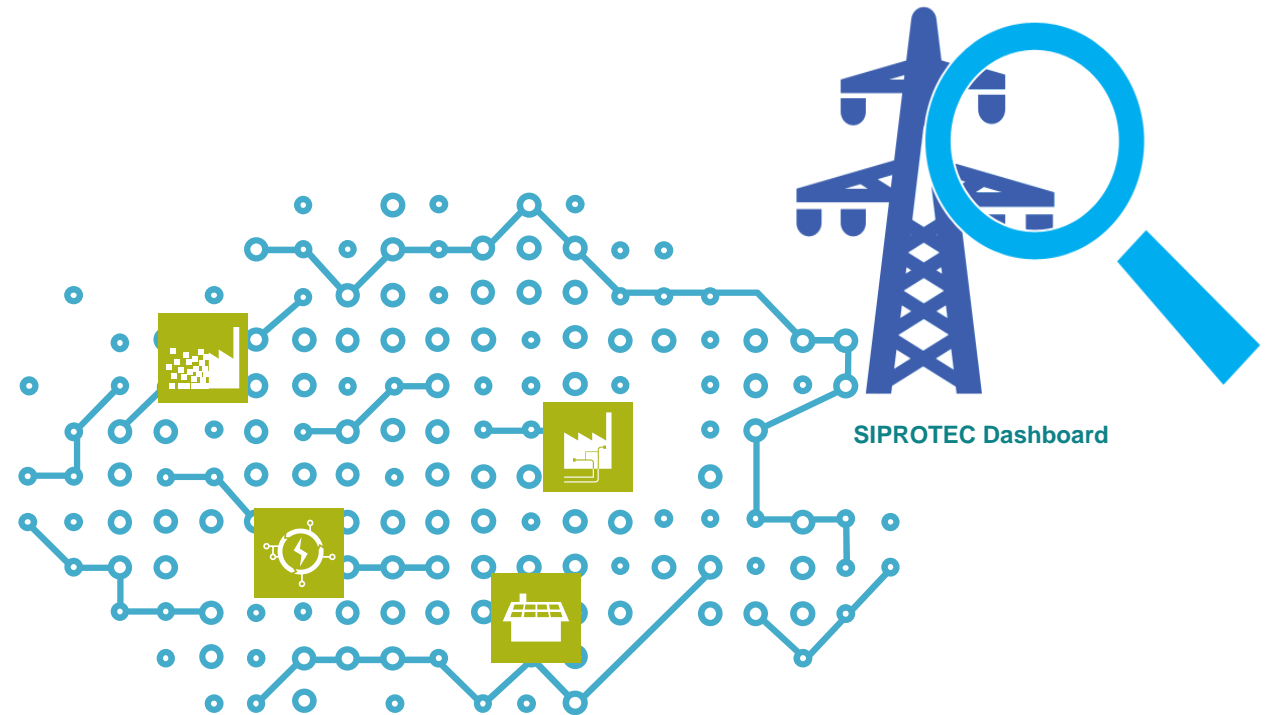
*is installed and runs on systems of the customers infrastructure

SIPROTEC Dashboard

Enables power grid operators to monitor the operational status of their SIPROTEC devices and optimize maintenance activities:

- Quick overview about the operational status of SIPROTEC devices
- Facilitates condition monitoring for transformers and switchgear
- **From anywhere, at any time**

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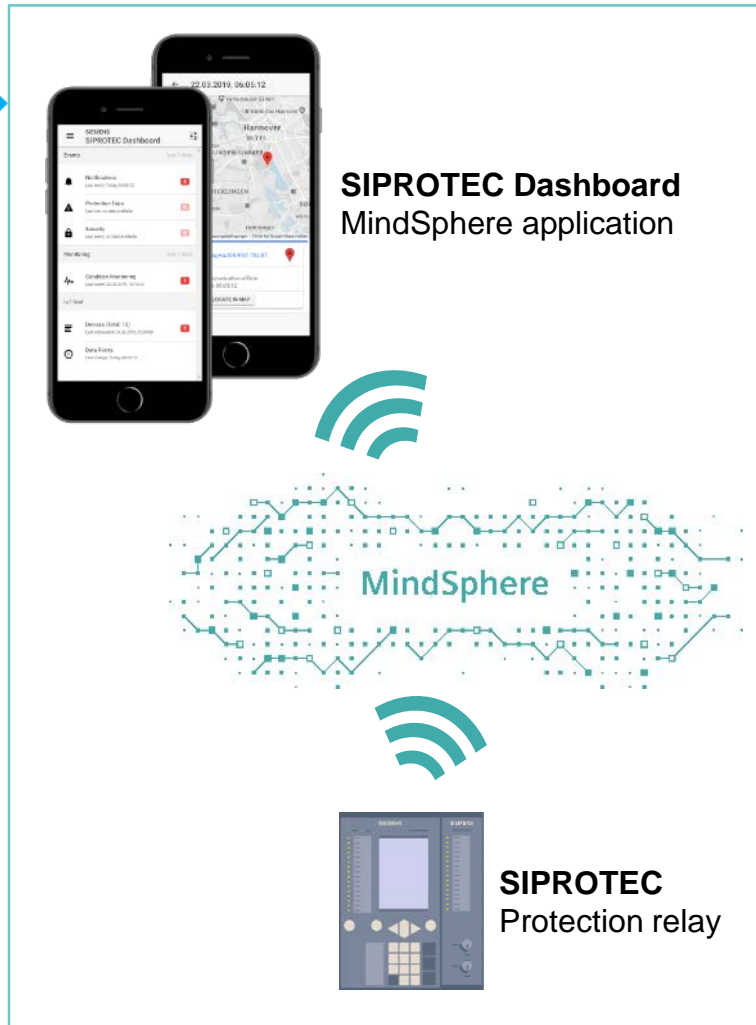
Data Transparency



Grid Analytics

Grid Diagnostic Suite – SIPROTEC Dashboard

Quick overview and data transparency



Data Transparency

Dashboard overview screen with:

- Notifications
- Protection Trips
- Security
- Overall data
 - Devices
 - Data Points
- Map view

Grid Analytics

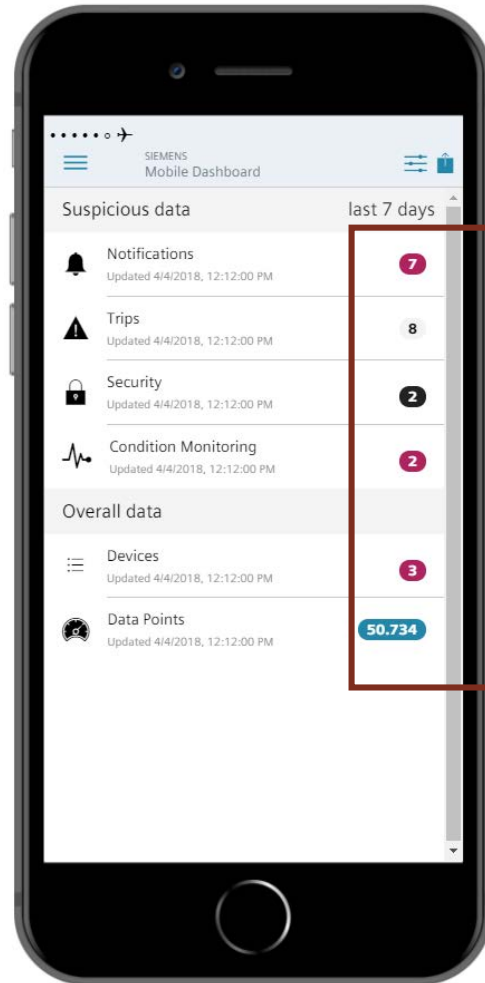
- Condition monitoring, e.g.
 - Circuit breaker monitoring
 - Transformer monitoring
 - Switchgear monitoring
- Trend analysis
- Data analytics

Grid Diagnostic Suite – SIPROTEC Dashboard

Dashboard Overview

Dashboard overview screen with:

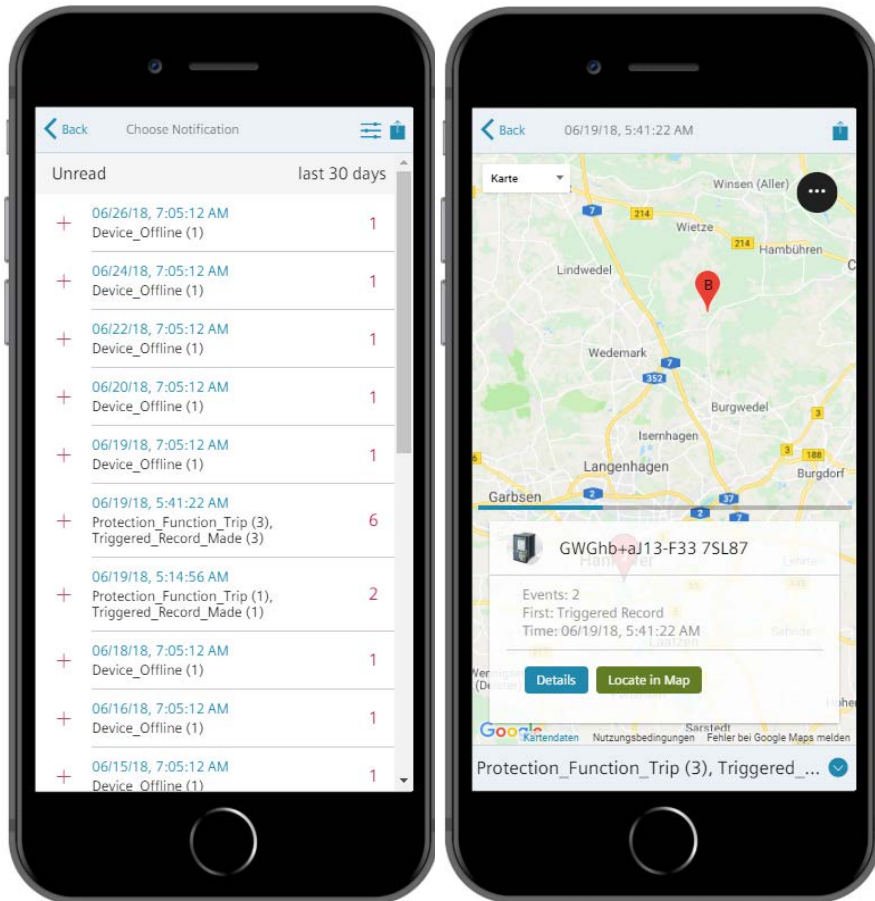
- Notifications
- Trips
- Security
- Condition Monitoring
- Devices and Data points



On the right side:

- Number of events within the selected time frame
- Displaying the total number of devices and datapoints

Grid Diagnostic Suite – SIPROTEC Dashboard Notifications



Notification tab

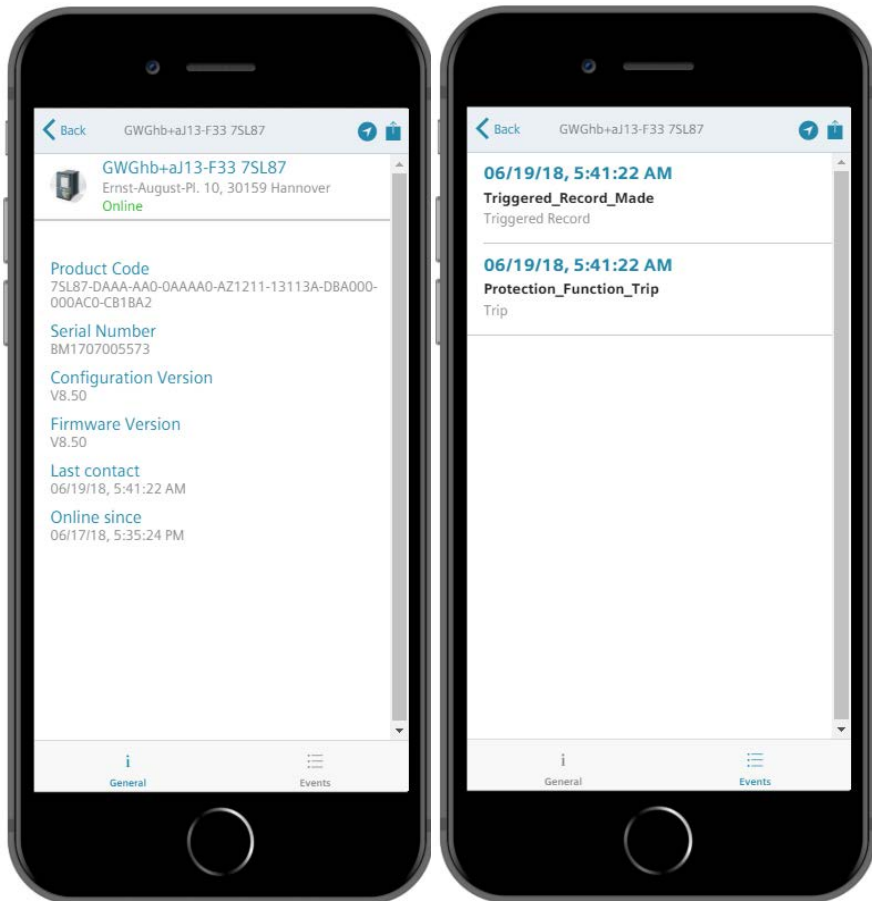
- List notification groups of the last 30 days
- One notification group exists of one or more events
- Each event belongs to a specific category

Cloud notification service for smartphone user

Simply and flexibly usable

Grid Diagnostic Suite – SIPROTEC Dashboard

Basic Device Information



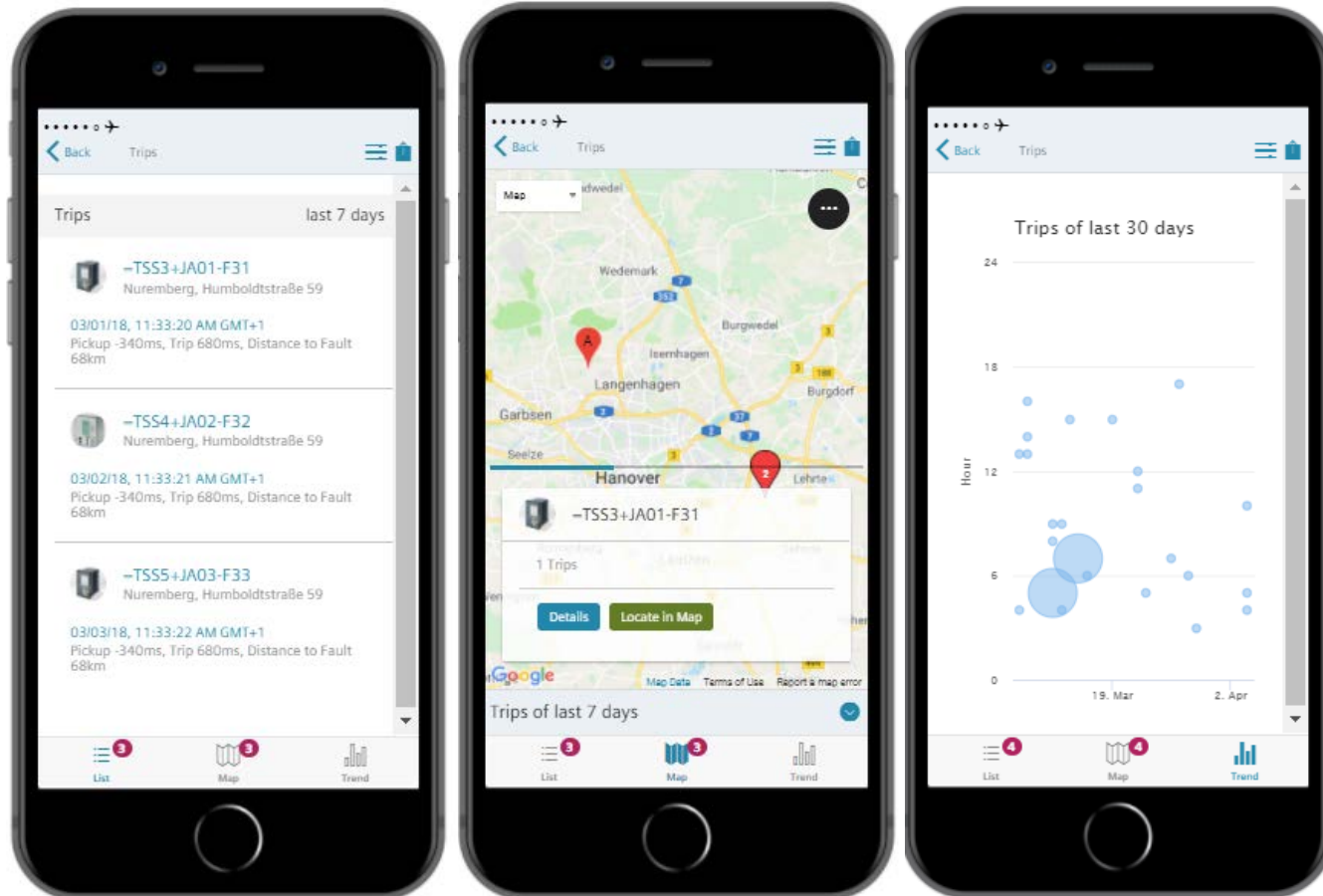
Overview about device details

- Name
- Product code
- Serial number
- Configuration version

Event list with the latest occurred events



Grid Diagnostic Suite – SIPROTEC Dashboard Protection Trips



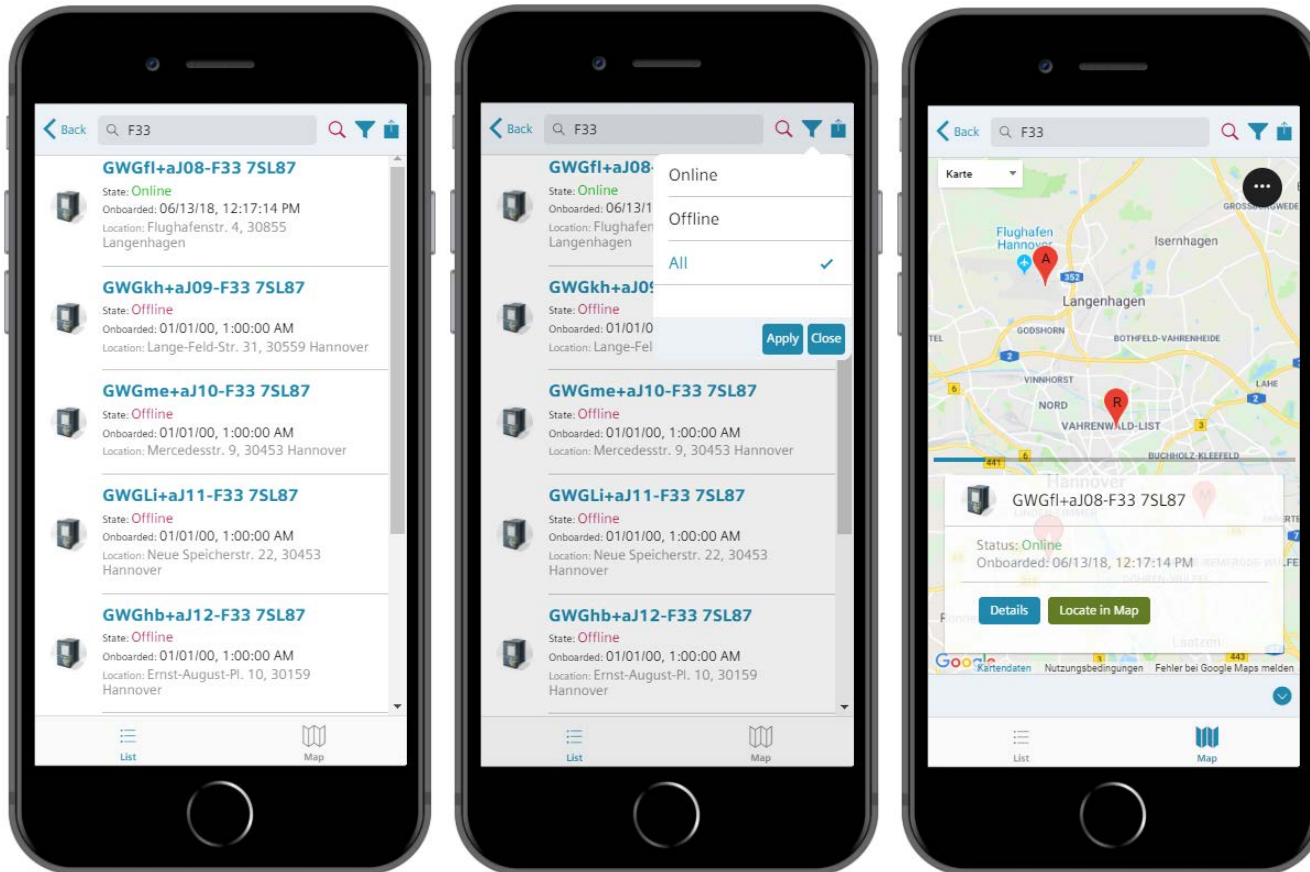
Protection trips section

- List of devices tripped within the last 7 days (up to 1 year)

Map view

Trend analysis

Grid Diagnostic Suite – SIPROTEC Dashboard Overview of all Connected SIPROTEC Devices



Overall data section

- Shows all devices whether an event was created or not

Search for specific devices

Filter status of the devices:
Online/Offline

SICAM Navigator

Enables power grid operators to monitor and get a quick view of the operational status in **transformer stations** (cable network)

- Quick and efficient fault clearance
- Get notified on overload situations
- Improve KPIs of Outages (SAIDI)

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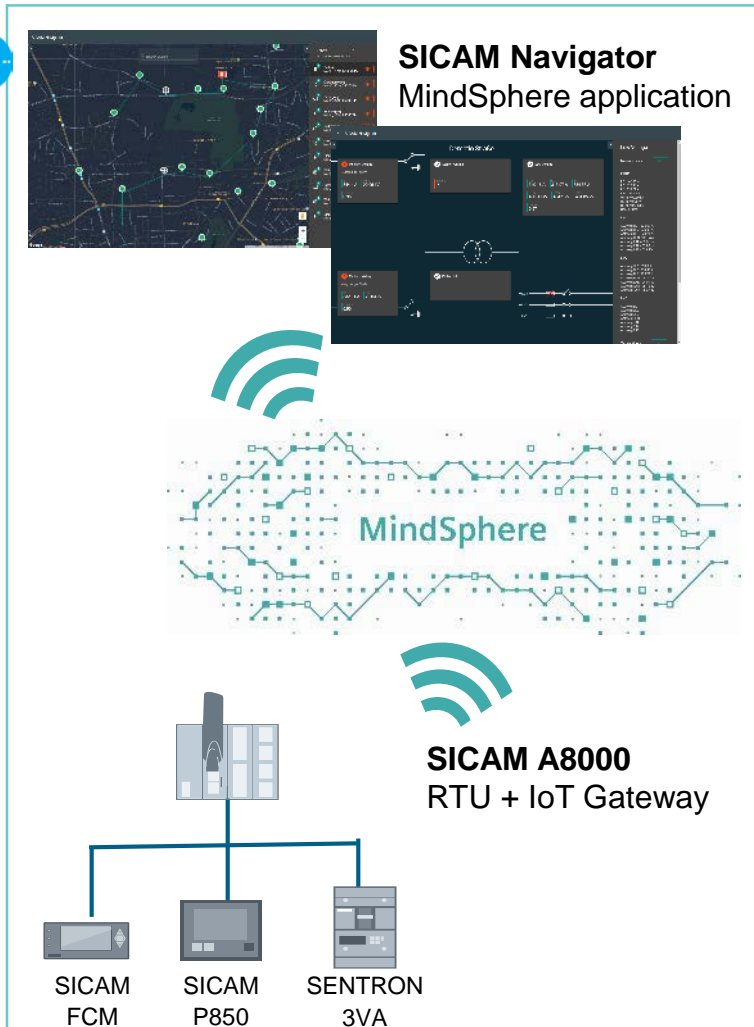
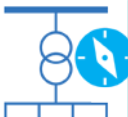
Fault management



Grid analytics

Grid Diagnostic Suite – SICAM Navigator

Reduce outage costs and analyze grid usage to be future ready



Fault Management

- Faults presented on map view
- Fault indicators with GPS-position
- View of analog values for grid sections
- Notification via e-mail

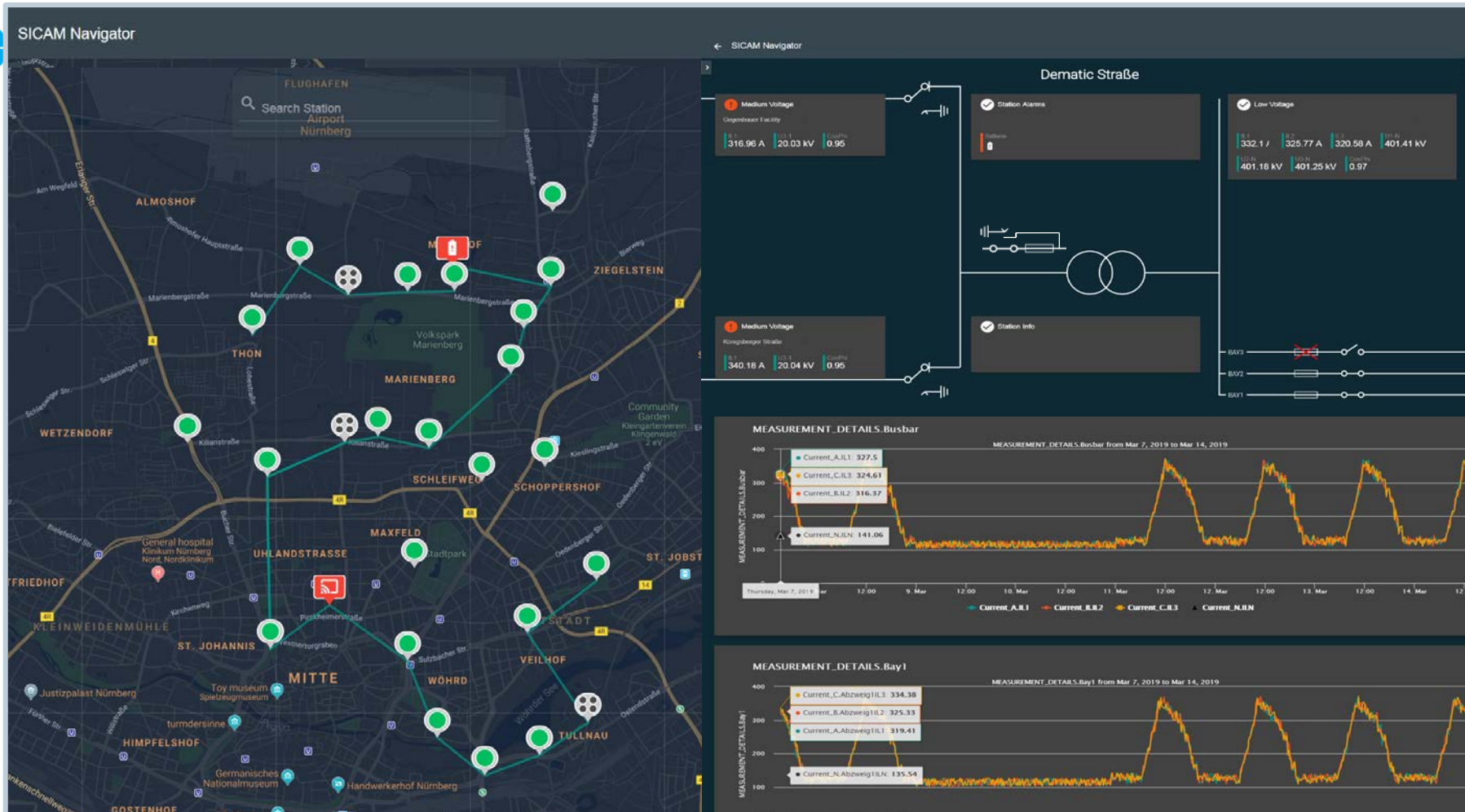
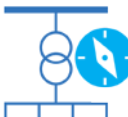


Grid Analytics

- Min, max, and mean shows grid utilization
- Build load-profiles using live values
- Detect peak times, imbalances, unusual grid behavior
- Access to archived faults and events

Grid Diagnostic Suite – SICAM Navigator

Grid Analysis helps identifying components at risk



Get fault information immediately, where ever you are.

Analyze the grid data, what ever you need.

SICAM Localizer

Enables power grid operators to monitor and get a quick view of the operational status in **distribution overhead lines**

- Quick and efficient fault clearance
- Get notified on overload situations
- Improve KPIs of Outages (SAIDI)



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Fault management

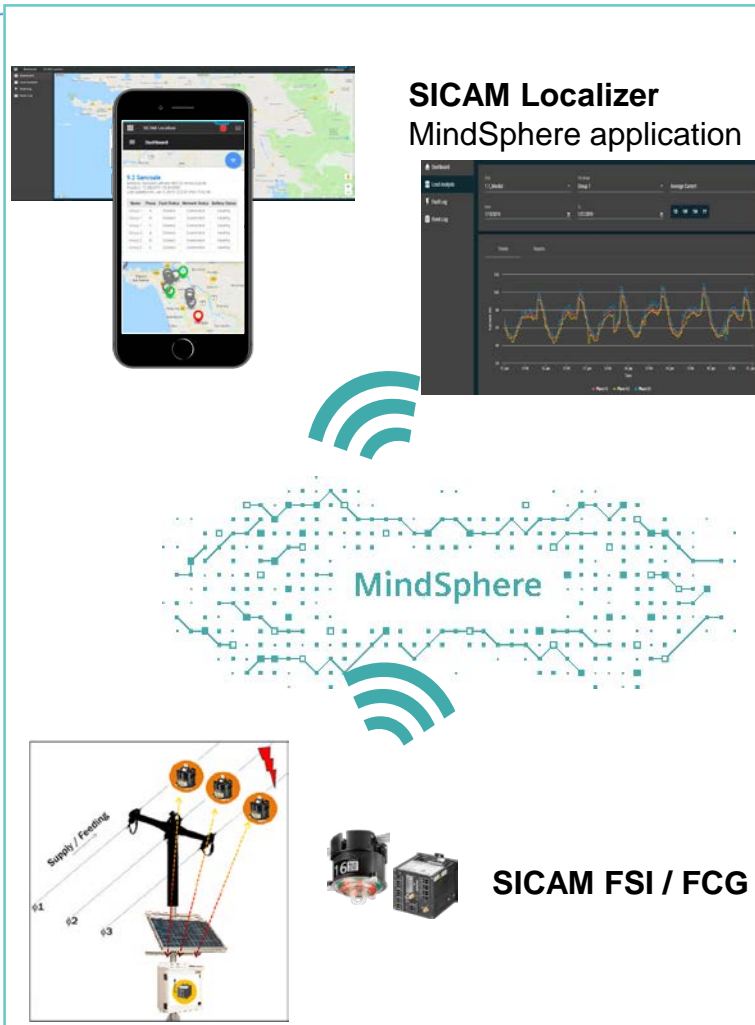


Grid Analytics

Grid Diagnostic Suite – SICAM Localizer

Reduce outage costs and analyze grid usage to be future ready

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Fault Management

- Faults presented on map view
- Fault indicators status remotely
- Load profile view
- View of analog values for grid sections
- Notification via e-mail

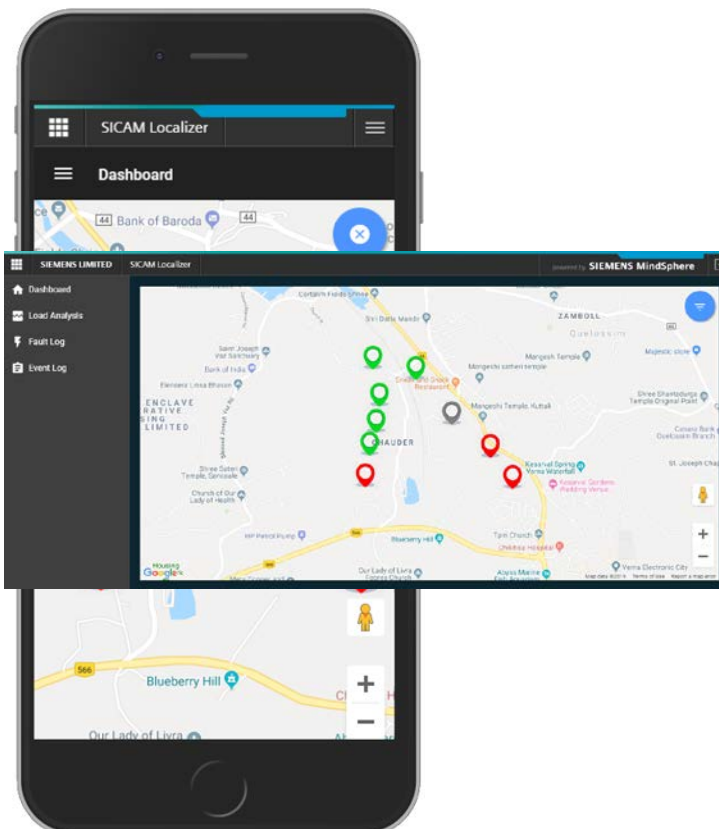
Grid Analytics

- Min, max, and mean shows grid utilization
- Build load-profiles using live values
- Detect peak times, unbalances, unusual grid behavior
- Access and report generation of archived faults and events

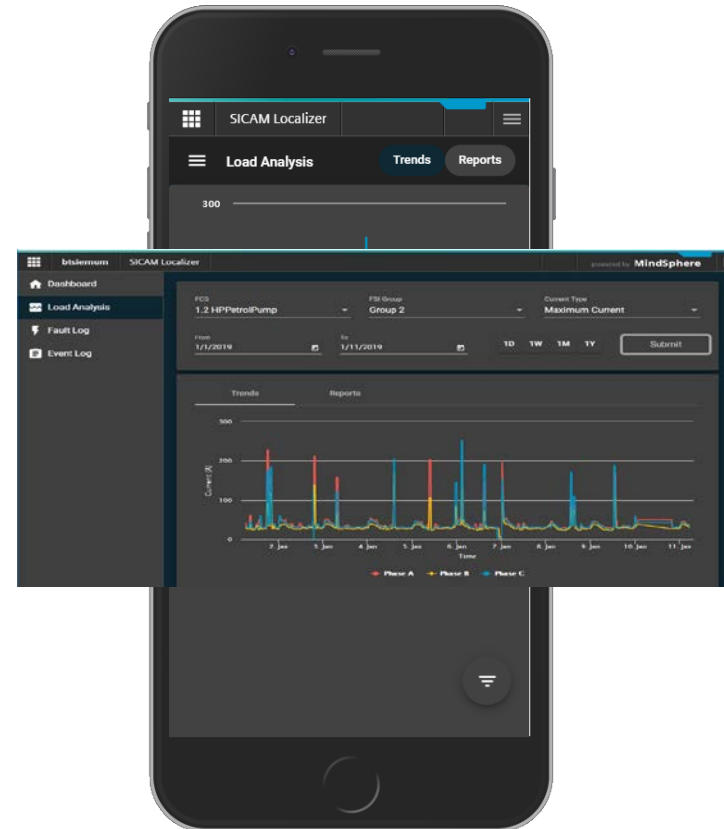
Grid Diagnostic Suite – SICAM Localizer Fault Management – Quick, flexible, direct



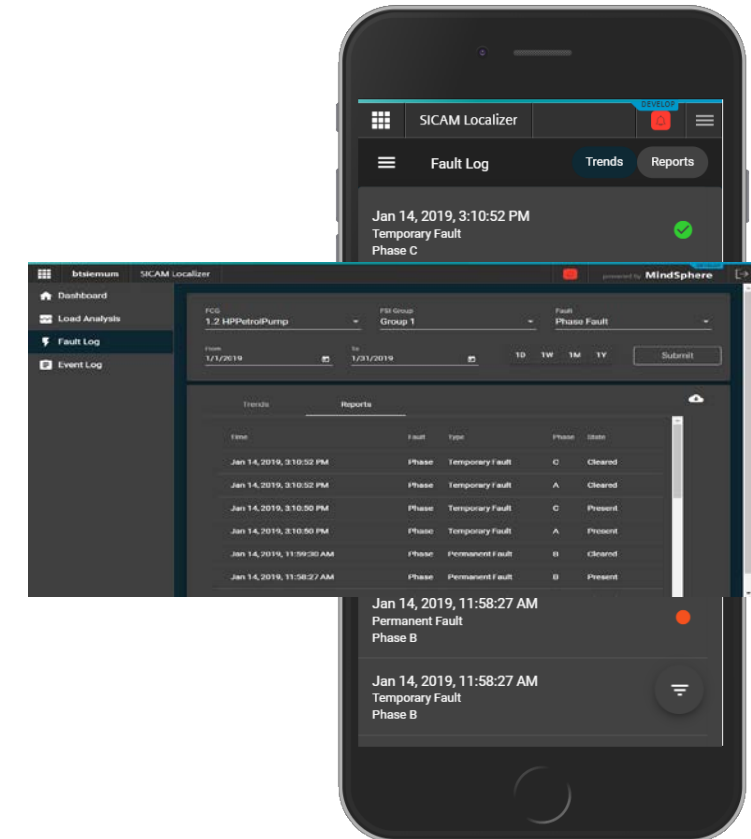
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Dashboard View



Load Analysis View

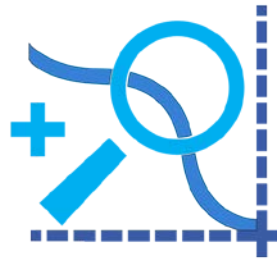


Fault Log view

Grid Diagnostic Suite PQ Advisor Premium

Enables power grid operators to monitor the **power quality of power stations** and **industrial applications** using Power Quality devices to avoid process interruptions (e.g. Non-Conformance Costs)

- Energy Management
- Power Quality Evaluation
- Trend Analytics
- Anomaly Detection



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Power Quality

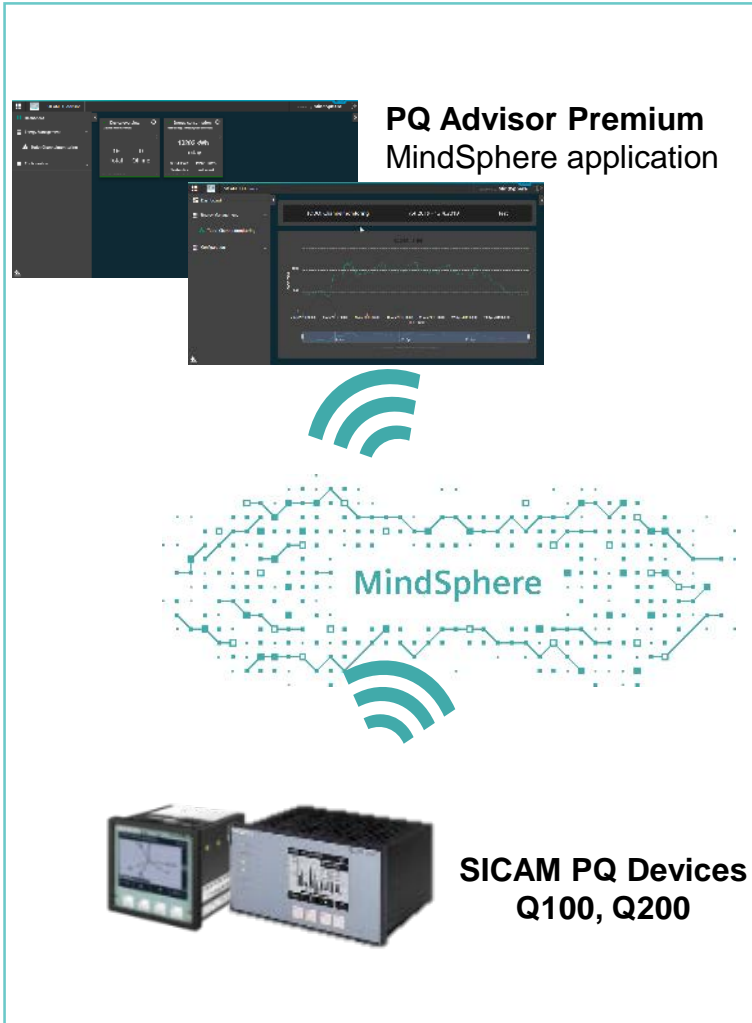


Energy Management



Grid Diagnostic Suite – PQ Advisor Premium Reduces Non Conformance Costs

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Power Quality

- Monitor: Harmonics, Power factor, Voltage dips, swells & interruptions, Transients, Imbalance
- Evaluate EN 50160 grid code
- Understand and reduce impact of Power Quality
- Identify the status of your Power Quality in a single dashboard
- Color code indicators to help focus on the most urgent Power Quality topics
- Identify the origin and number of Power Quality events

Energy Management

- Monitor: Energy, Power, Over-/Undervoltage, Voltage imbalance
- Manage power loading and balancing
- Monitor energy use and aggregate data from all assets
- Access near real-time and historical data
- Save money and meet sustainability goals

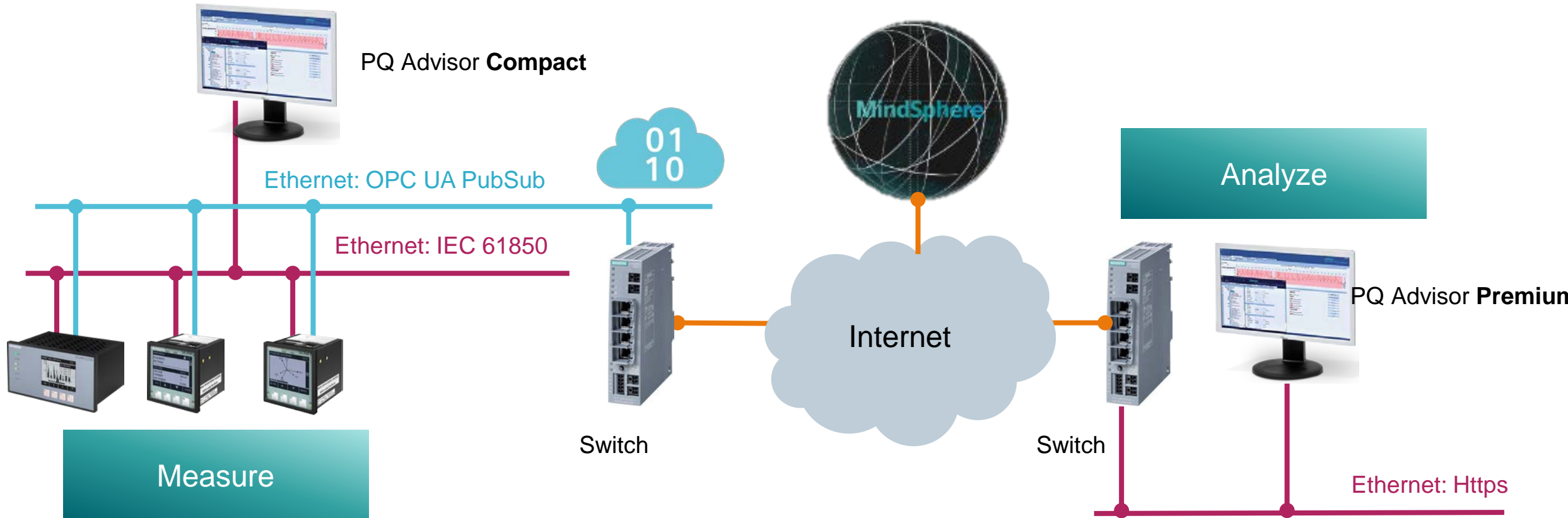


PQ Advisor Premium Connectivity & system integration



Record & Analyze

Record



Measure

Analyze

PQ Advisor Premium



PQ Advisor Premium Dashboard view



“Online” display of

- Power quality events
- Voltage
- Frequency
- Voltage THD
- Voltage unbalance
- Total Energy consumption
- Power factor
- Total active power

Values are updated every minute

Configuration per widget.

- Displayed device(s)
- Upper and lower warning / alarm limit

Clicking on the widget leads to a detailed view of the selected characteristic. In the detail view it is possible to compare the data from several devices (e.g. to compare different plants)

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