Grid Diagnostic Suite
Powered by MindSphere

Simone Kachelriess, Sales Consulting, Energy Automation
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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
Grid Diagnostic Suite - Powered by MindSphere
Customers benefit from data monitoring and analytics

Achieve transparency

Understand the power system

Enhance efficiency

Provide data at your fingertips

Improve transparency of grid assets using analytics and dashboard views

Identify asset status and utilization of power grid

Improve knowledge of assets and grid behavior

Enhance business results by reducing operation CAPEX and OPEX

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

Your Benefits

Monitoring

Analyze

Optimization
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

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<td>Enables power grid operators to monitor the operational status of their SIPROTEC device and optimize maintenance activities</td>
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<td>SICAM Navigator</td>
<td>Enables power grid operators to monitor and get a quick view of the operational status in transformer stations (cable network)</td>
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<td>SICAM Localizer</td>
<td>Enables power grid operators to monitor and get a quick view of the operational status in distribution overhead lines</td>
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<td>PQ Advisor Premium</td>
<td>Enables power grid operators to monitor the power quality of stations to avoid e.g. NCCs</td>
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Customer benefits
- Enhanced transparency of systems and device status
- Predictive maintenance, optimization of services and resources
- Increased availability of energy supply

*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
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
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)
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)

Fault management

Grid Analytics
Grid Diagnostic Suite – SICAM Localizer
Reduce outage costs and analyze grid usage to be future ready

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

SICAM Localizer MindSphere application
MindSphere
SICAM FSI / FCG
Grid Diagnostic Suite – SICAM Localizer
Fault Management – Quick, flexible, direct

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

Power Quality
Energy Management
Grid Diagnostic Suite – PQ Advisor Premium Reduces Non Conformance Costs

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

PQ Advisor Compact

Ethernet: OPC UA PubSub
Ethernet: IEC 61850

Record

Internet

Analyze

PQ Advisor Premium

Ethernet: Https

Measure

Switch

Simone Kachelriess / Energy Automation Products
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 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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Simone Kachelriess
Smart Infrastructure / Digital Grid
Sales Consulting, Energy Automation
Humboldtstraße 59
D-90459 Nuremberg
Germany

Phone: +49 (911) 433-8416
Mobile: +49 (172) 323-3199

E-mail: simone.kachelriess@siemens.com