

# SICAM Power Quality and Measurement

Great benefits for minimal investment

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# SICAM Power Quality and Measurement

Great benefits for minimal investment



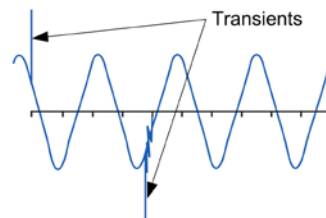
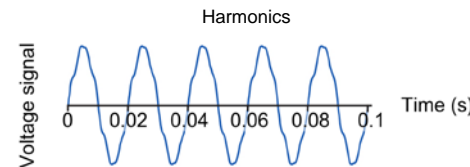
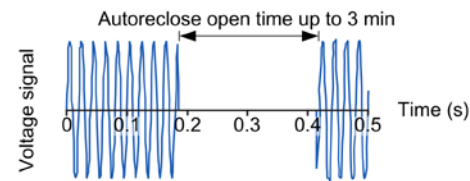
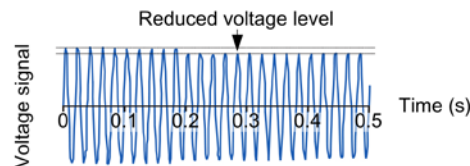
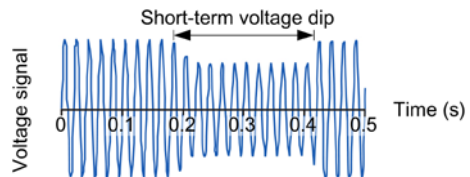


# Stability creates reliability

## Why power quality matters

### Disturbances in the power grid

- Voltage fluctuations
- Voltage dips
- Transients
- etc.



### Possible consequences

- Plant shutdowns and production losses
- Reduced efficiency or service life of electrical systems
- Influencing sensitive IT infrastructures, automation and communication systems
- Data loss in large data storage systems
- Failures of circuit-breakers, relays and fuses

### Measures

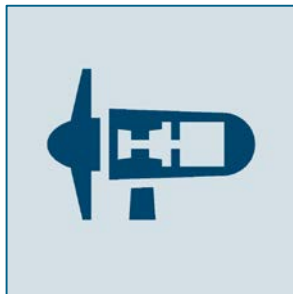
- Continuous measurement of power quality
- Evaluation of the power quality
- Elimination of the cause of the failure

# Stability creates reliability

## Risks in the distribution system

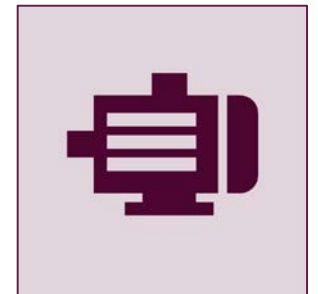
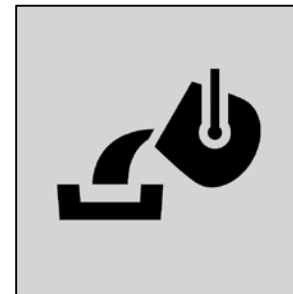
### Renewable energies

- Increase in power electronics and inverters in electricity-supply System
  - Photovoltaic converter
  - Charging stations for electric vehicles
- Interference caused by electromagnetic disturbances
- Switching procedures at the energy supplier



### Power consumers

- Start-up of large loads such as electric motors, arc furnaces, welding equipment, elevators
- Switching semiconductor generated frequency emissions in the range of 2 kHz to 150 kHz



# Stability creates reliability

## Power quality in a new dimension

With the SICAM Power Quality Portfolio you can detect any disturbance of power quality

- SICAM power quality recorder **measure**, **record** and **analyze** the current voltage history
- **Analyzes** make the disturbances in your process visible and thus explainable
- Targeted countermeasures reduce the disturbances and the **improving** process
- This continuous loop of action increases the voltage quality and avoids unnecessary costs



# Stability creates reliability

## The economic entry device – SICAM P855

- Seamless recording, display, and transmission of electrical variables
- Voltage events and harmonics
- Recording and processing according to IEC 61000-4-30
- Visualization and analysis
- Evaluation in the device according to EN 50160
- Reporting
- Accuracy **0.5S**
- 2 GB Storage

Ideal for survey measurements of power quality in industrial plants and buildings or in electrical distribution systems.



Class S

# Stability creates reliability

The precise, versatile solution – SICAM Q100

Covers all functions of SICAM P855, plus:

- Power quality recorder and power meter device
- High accuracy, **0.2S**
- Detects interharmonics
- Transient logging
- Identifies from which direction the fault comes - from the energy supplier or from the energy consumer
- All-in-one solution for energy management applications

Pre-destined for court-usable compliance measurements. First choice for monitoring the power quality at each connection/transfer point.



**Class A**

# Stability creates reliability

The highly sensitive, all-around solution – SICAM Q200

**SIEMENS**  
*Ingenuity for life*

Covers all functions of SICAM P855 and SICAM Q100, plus:

- Detects high-frequency disturbances
- Supra-Harmonics in the range of 2 – 150 kHz
- Extremely fast transients of up to 1  $\mu$ s / 6 kV
- Measurement accuracy class **0.1S** according to the next edition of the IEC 62053-22 standard

Measurements in sensitive production environments, such as chip manufacturing or data centers.



Class A



# Detection of the fault direction

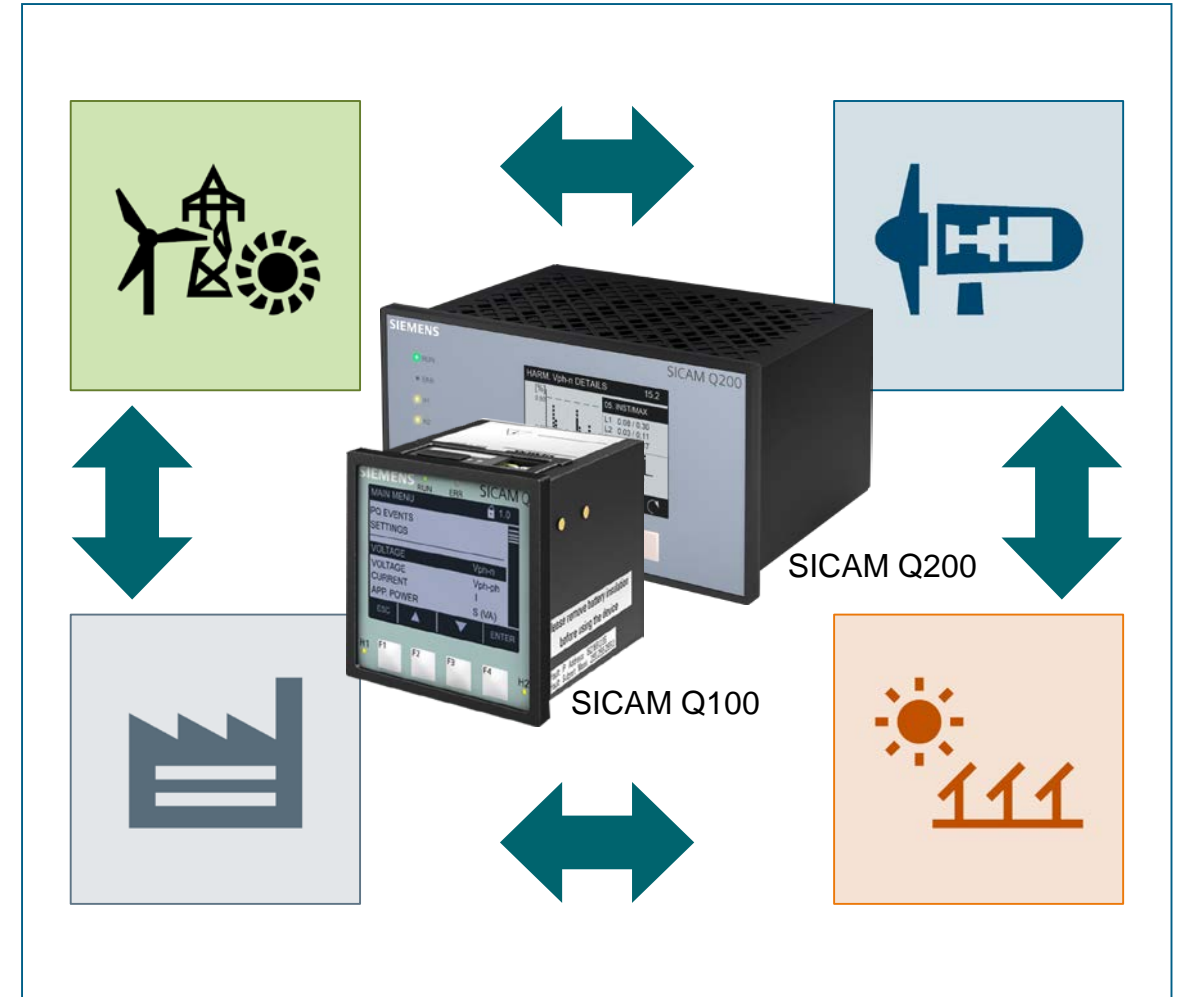
Harmonic phase angles according to IEC 61000-4-7

## Power utilities

- Provides high voltage quality
- Ensure that consumers do not feed poor voltage quality into the grid (e.g. emissions of non-linear loads and renewable energies)

## Power consumers

- Obtaining high voltage quality
- Avoidance of poor power quality being fed into the grid (e.g. caused by non-linear loads)



# Stability creates reliability

## Current standards in Power Quality

### Measurement method:

- Defined accuracy: Class A, Class S
  - IEC 61000-4-30 (Measurement method)
  - IEC 61000-4-7 (Harmonic, Intra-harmonic)
  - IEC 61000-4-15 (Flicker measurement)



Current standards in power quality

### Product standard PQI:

- Defined functional test and uncertainty requirements
  - IEC 62586-1 (Product standard)
  - IEC 62586-2 (Functional test)



### PQ evaluation:

- Defined measurements, processing and evaluation of characteristic curves
  - EN 50160 (Voltage regulation characteristic of the energy, supplied by power utilities)
  - IEC 62749 (Assessment of power quality)

### Data exchange and communication standards:

- Defined communication protocol
  - IEC 61850-90-17
- Defined data formats:
  - IEEE 1159.3 PQDIF (Measurement data)
  - IEEE C37.111 COMTRADE (fault records)



# Stability creates reliability

## SICAM Power Quality – configuration & operation

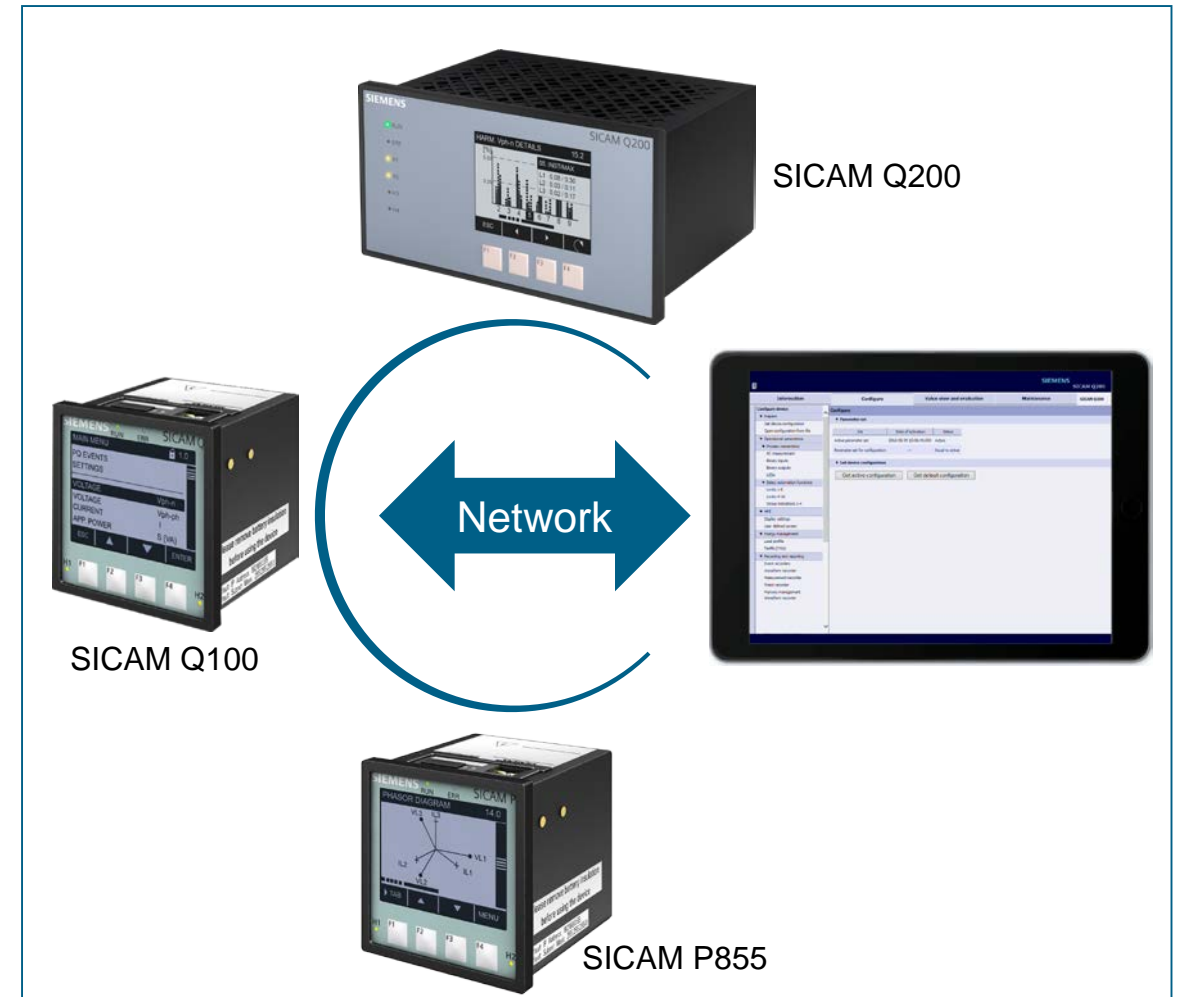
### Communication

Communication with SICAM Power Quality devices without time-consuming installation of software

### Evaluation

In conjunction with the COMTRADE Viewer and the SIGRA Plug-in for Internet Explorer, you can even view and evaluate events directly in the browser

All you need is a standard browser and a network connection.



# Cyber Security

Meeting tomorrow's requirements - SICAM Q100/Q200



## Role Based Access Control

RBAC ensures that users can only exercise the rights corresponding to the assigned role

SICAM Q100



## Safe and reliable https protocol

Guarantees secure transfer of sensitive data

## Firmware label

Security against firmware manipulation. Only firmware marked by Siemens is loaded



SICAM Q200

## Security log

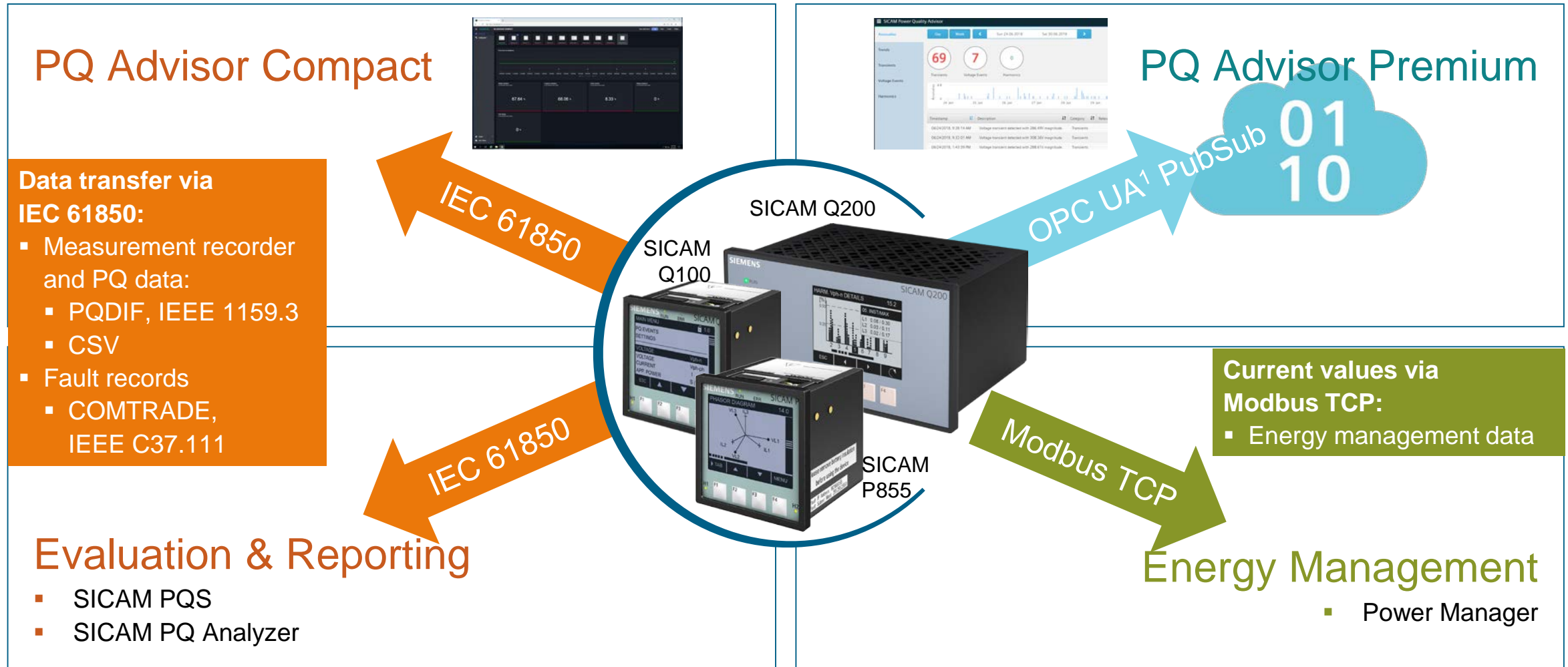
Non-volatile recording of SYSLOG events





# Connectivity, system integration & data transfer

## Open and transparent - SICAM Power Quality



**Data transfer via IEC 61850:**

- Measurement recorder and PQ data:
  - PQDIF, IEEE 1159.3
  - CSV
- Fault records
  - COMTRADE, IEEE C37.111

**Evaluation & Reporting**

- SICAM PQS
- SICAM PQ Analyzer

**Current values via Modbus TCP:**

- Energy management data

**Energy Management**

- Power Manager

# Stability creates reliability

The knowledgeable advisor - PQ Advisor Compact

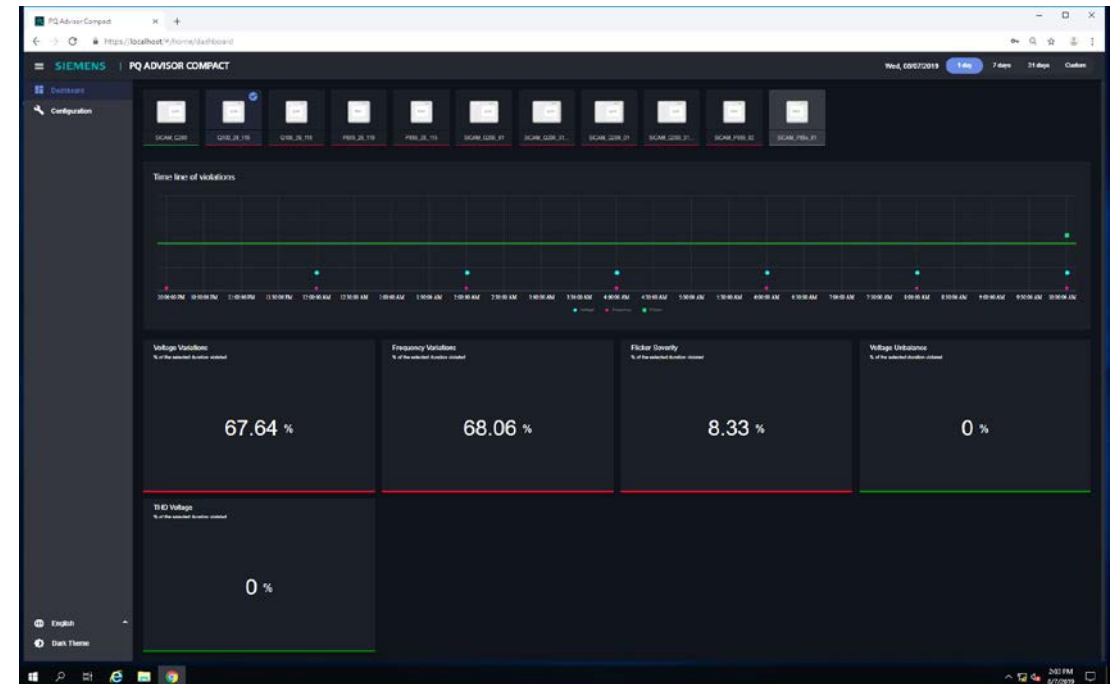


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## PQ Advisor Compact

- Automatically searches for SICAM power quality recorders in your network without any configuration
- Monitors all relevant operational values
- Grid Code evaluation according EN 50160
- Professional evaluation of your grid quality thanks to graphic processing of the data via a traffic light
- You will learn **what** caused the malfunction, **when** it occurred and **where** it occurred: **externally** or **internally**
- Can be integrated into existing IT infrastructure (Windows)

## Use the software even without expert know-how



Designed for use in small industrial plants, infrastructure and in municipal utilities.

# Stability creates reliability

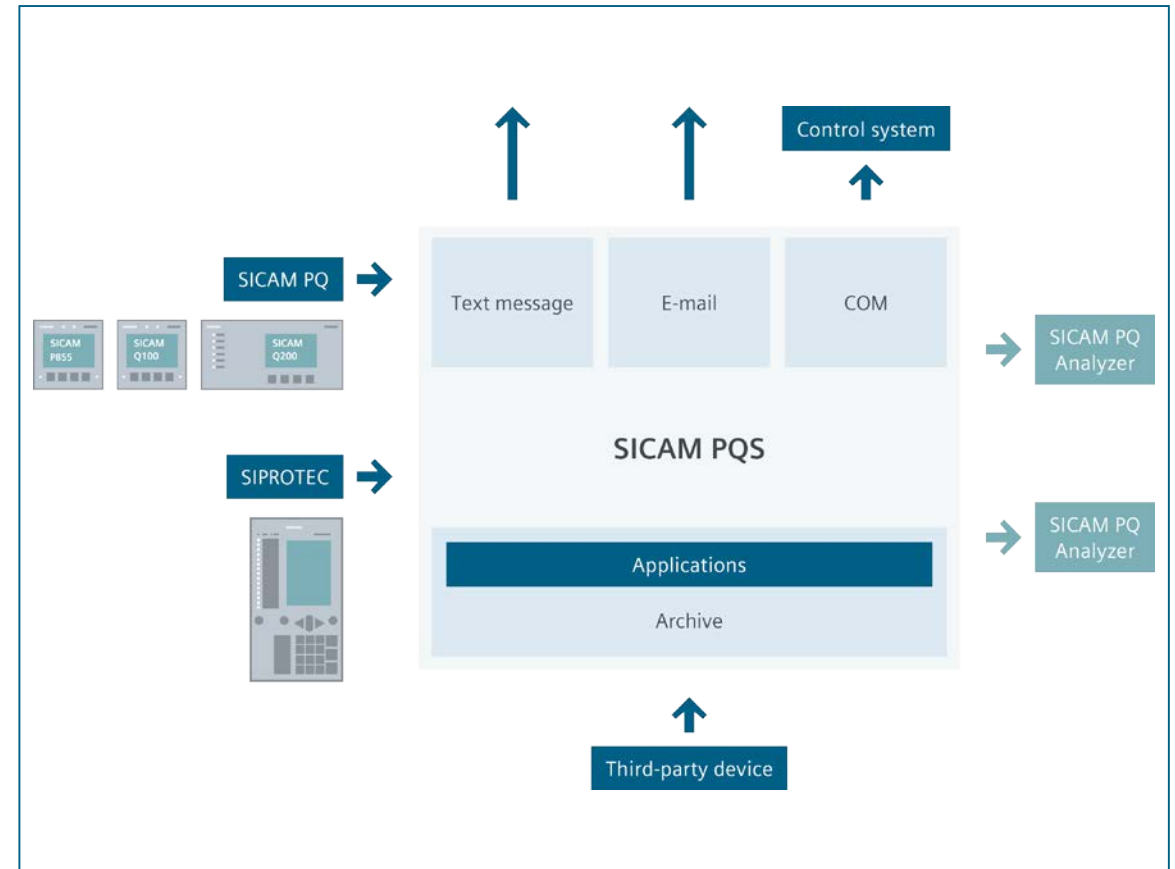
The partners for experts - SICAM PQS and PQ Analyzer

## SICAM PQS

- Central collecting and archiving of all power quality data and fault records from the field level across all manufacturers
- Evaluation of archived PQ measured values and fault records

## SICAM PQ Analyzer

- Visualization and analysis of evaluated results, PQ measured values and fault records



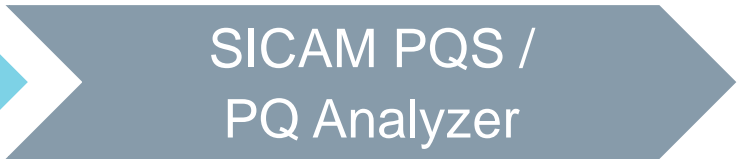
Perfectly suited for use in large plants in industry and power utilities.

# PQ Advisor Compact

Closing the gap in the industrial market segment



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## Windows-based solution

- ONE software tool
- Easy to use, intuitive
- No configuration
- No training required
- Status at a glance
- Small investment



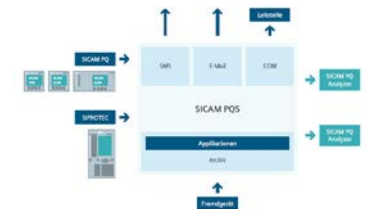
## Cloud based solution

- SaaS licensing
- Cloud based (MindSphere)
- Cloud based analytics



## Protecting your Cash Cow

- Profit w/o high investment
- Use existing sales channels & customers
- Listing in IndustryMall





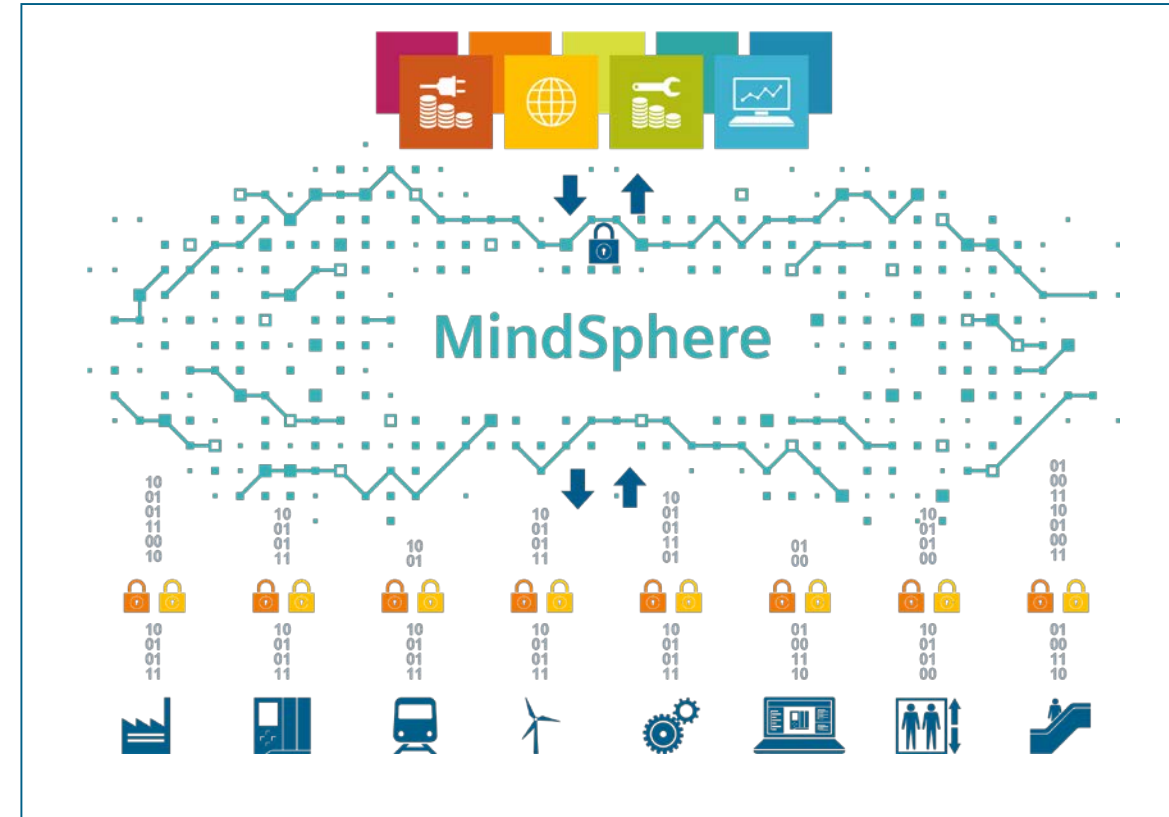
# Stability creates reliability

The future is built in - PQ Advisor Premium



## The path to the cloud leads via PQ Advisor Premium

- Application of the Siemens Grid Diagnostic Suite
- Connection of SICAM power quality recorders with the Internet of Things (IoT)
- Providing the data in the cloud
- Apps analyze and visualize this information
- Track anomalies and trends in the grid from anywhere, anytime



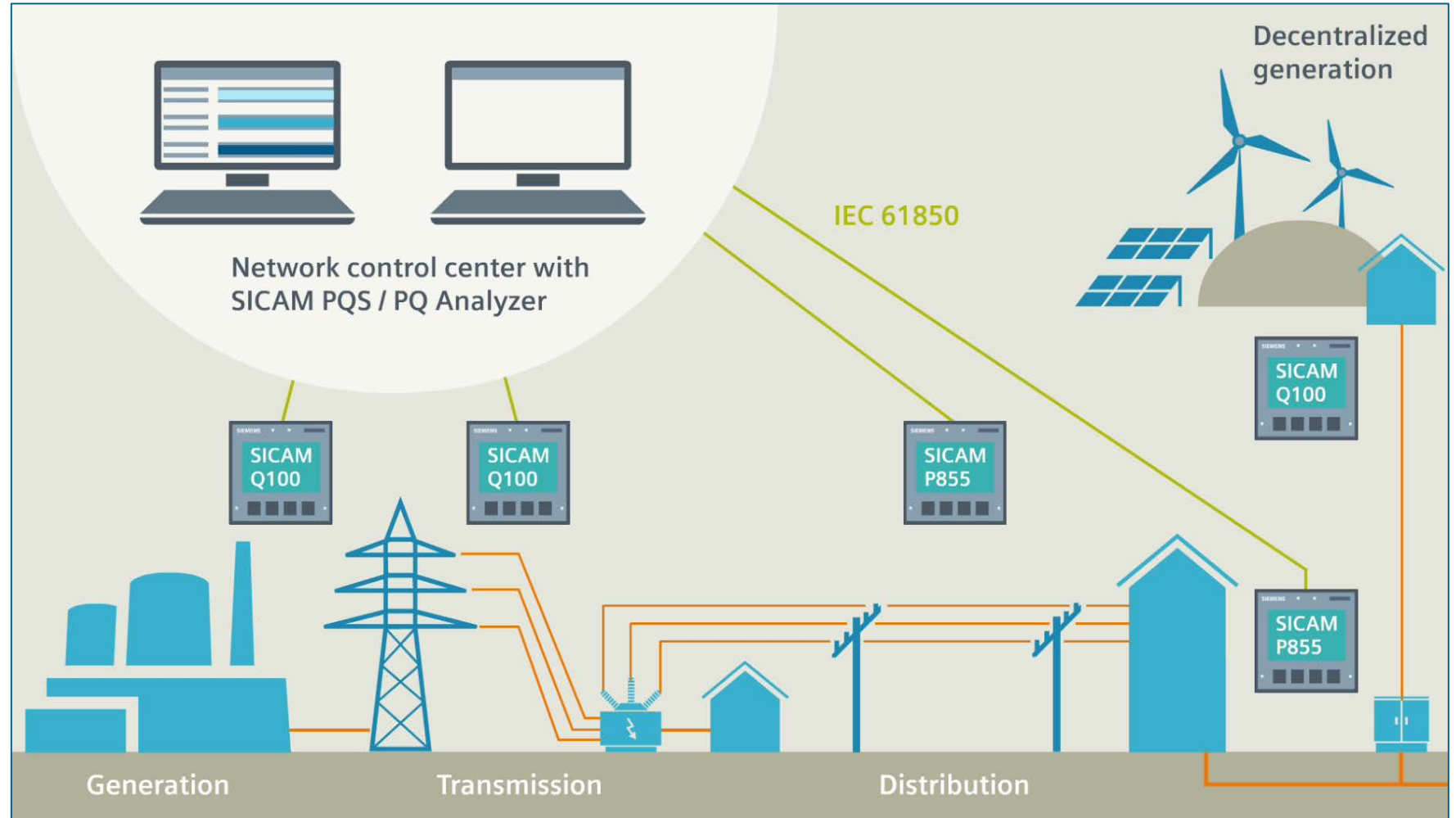
Use the standardized OPC UA PubSub protocol. It directly connects SICAM power quality recorders and easily with MindSphere and other platforms.

# Great benefits for minimal investment

## Along the entire energy chain - SICAM Power Quality

Optimum power quality can only be achieved if the entire energy chain is monitored:

- Generation
- Transmission
- Distribution



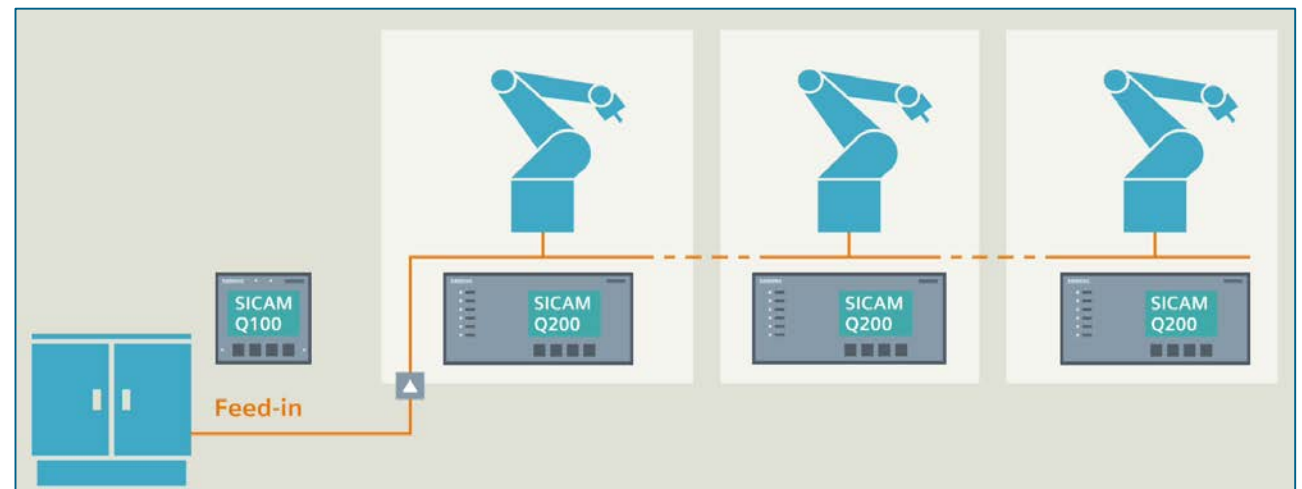
# Great benefits for minimal investment

## Power quality as a competitive advantage

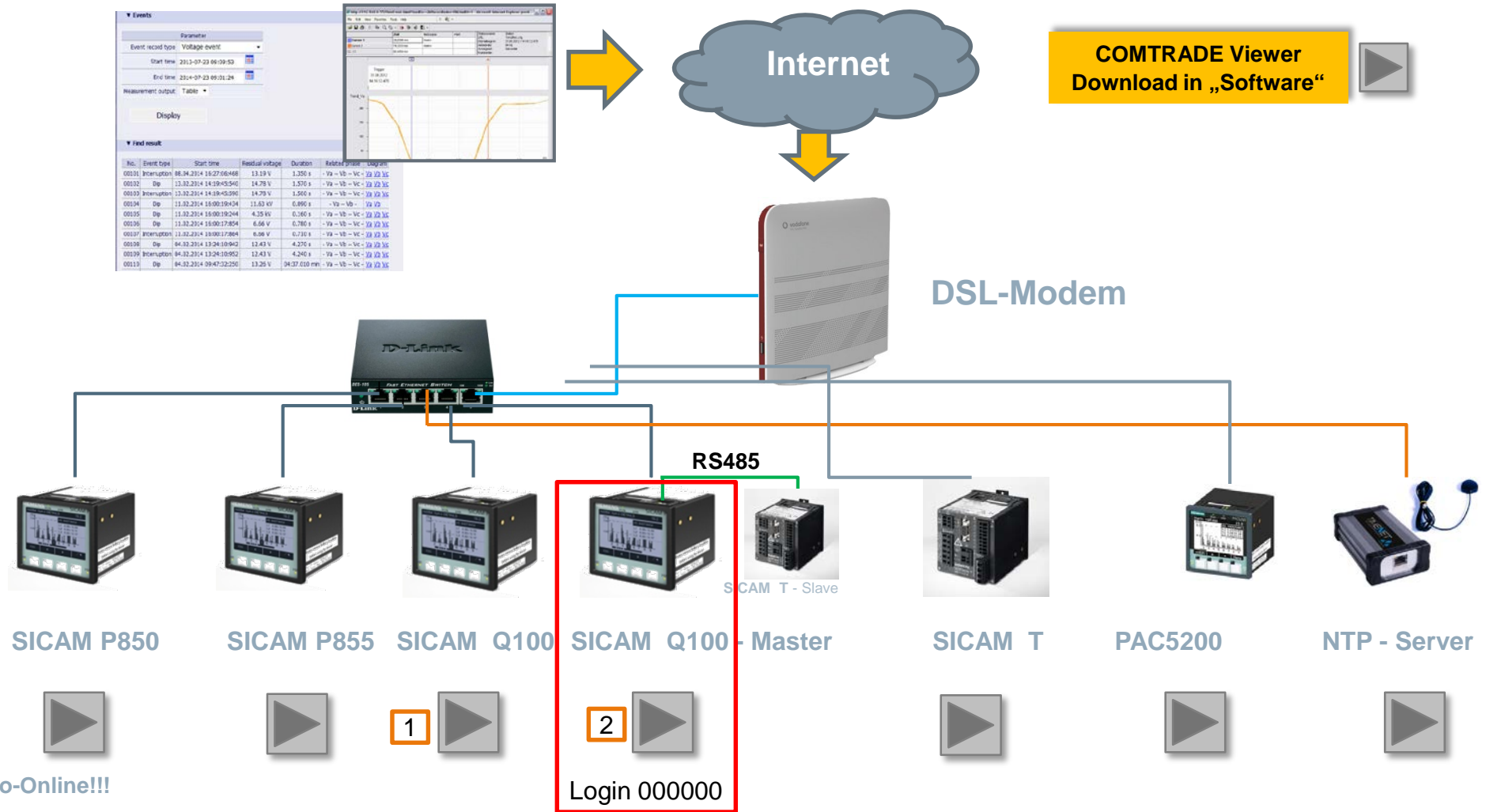
In industrial processes, it's useful to separately monitor the shared point of connection (transfer point) between the customer and the electricity-supply system.



For very sensitive processes, such as chip manufacturing, a SICAM Q200 is a much better choice.  
Captures extremely fast transients up to **1  $\mu$ s** / 6 kV



# PQM Labor - Online Access





# Great benefits for minimal investment

## SICAM Power Quality - measurably better

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