

CONNECTING AN ALL-ELECTRIC WORLD

Innovations beyond Smart Metering

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Portfolio and Sales Manager

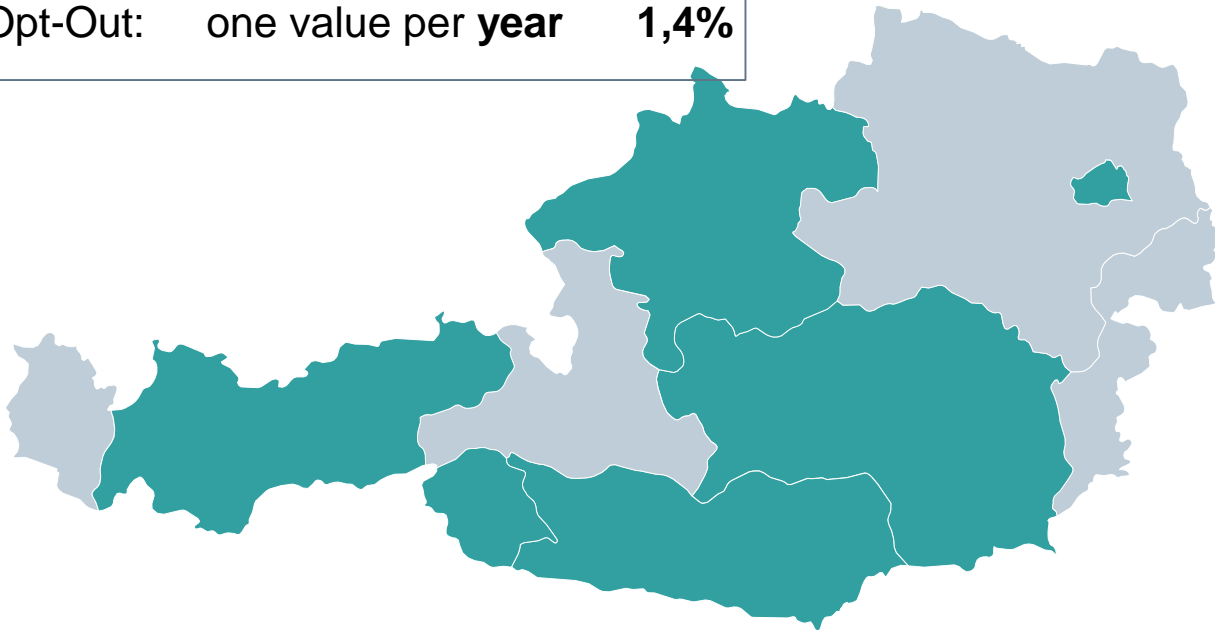
Smart Meter Deployment

Status in Austria

Status of Smart Meter Deployment in Austria

Consumer options *):

Opt-In:	96 values per day	7,6%
Standard:	one value per day	91%
Opt-Out:	one value per year	1,4%



Smart meter projects with Siemens participation

E-Control Report issues every october for last year,
Report from Oct 2018 for End of 2017 *):

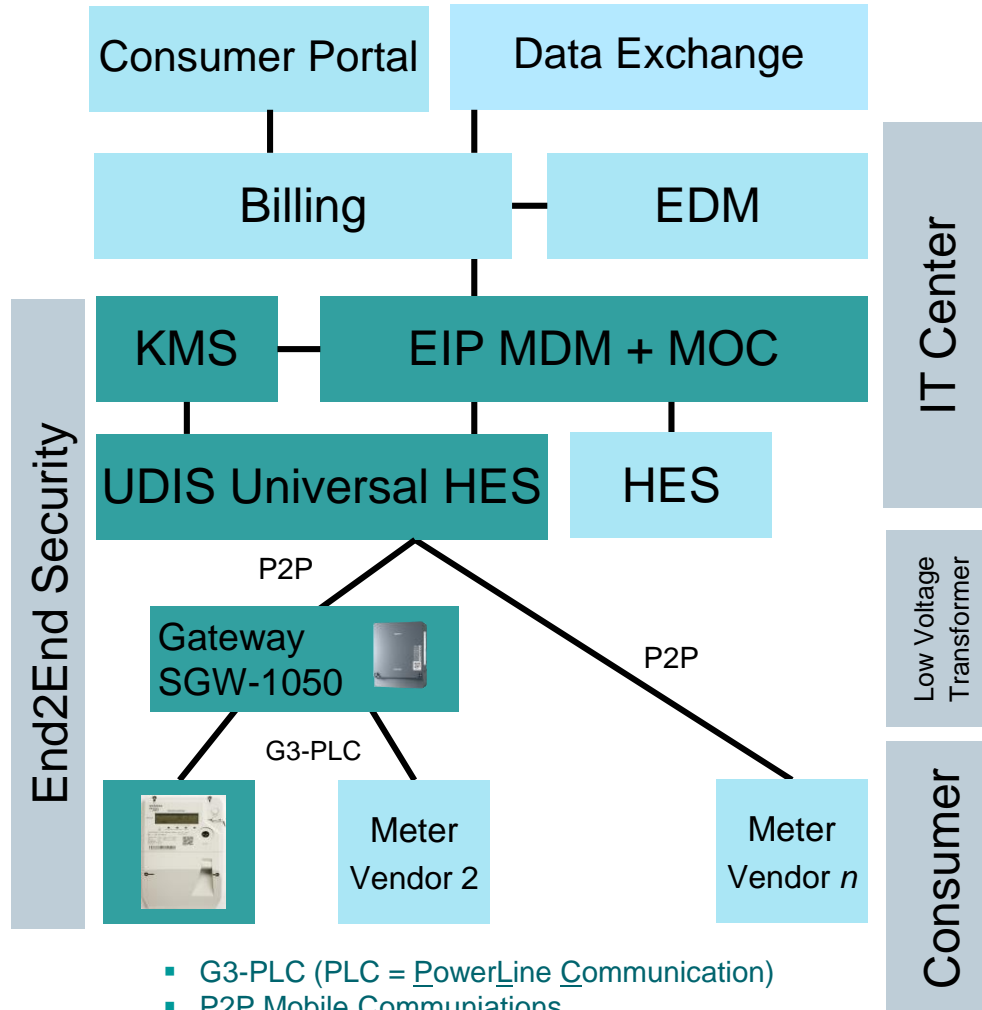
Total Smart Meter:	6,1 Mio
Meters deployed or ordered	20,9%
Target for 80%	end of 2020
with PLC communication	>99%

*) Source: Bericht zu Einführung von intelligenten
Messgeräten 2018, e-control



Actual information in german laguage from
Oesterreichs Energie:
<https://oesterreichsenergie.at/die-welt-des-stroms/stromnetze/smart-meter/roll-out.html>

Unified Rollout System for Austria is based on EnergyIP and integrates with components from other vendors



- G3-PLC (PLC = PowerLine Communication)
- P2P Mobile Communications
- End2End Security acc Austrian requirements

Billing

SAP: SAP MDUS Adapter + FlexSync

SDK: EnergyIP FlexSync

E2000: EnergyIP FlexSync and FileSync

Head End System

UDIS: Integration with EIP UAA for IDIS compatible meters

Sagem: Adapter based on EIP SDK for SagemCom and comp. meters

Honeywell: Gateway management

G3-PLC Gateway

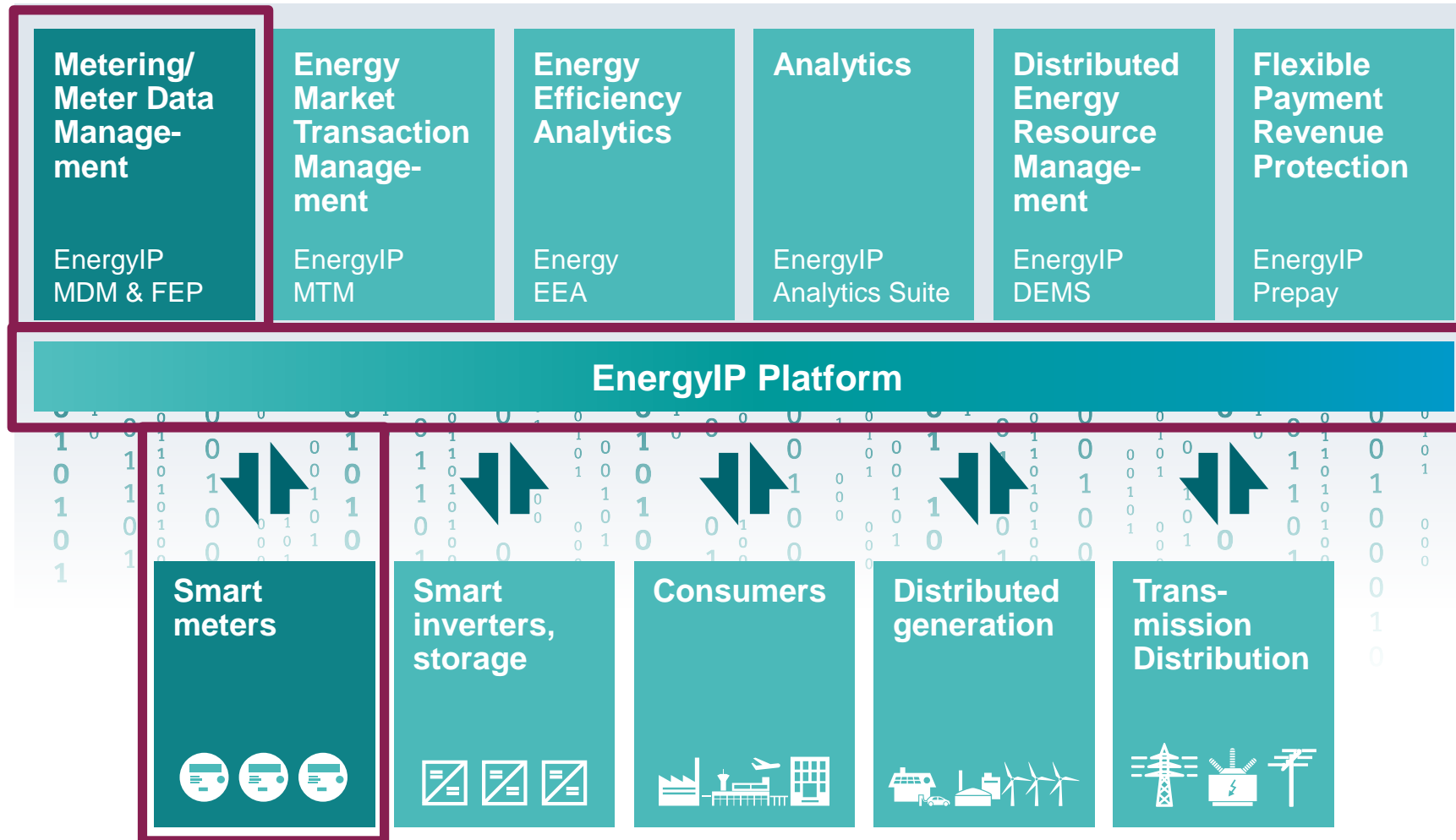
Siemens SGW1050 and Honeywell Beacon

Smart Meter

Siemens IM-x50

Landis+Gyr, Iskraemeco, SagemCom, Kaifa

EnergyIP – Flexible scalable platform for smart grid applications



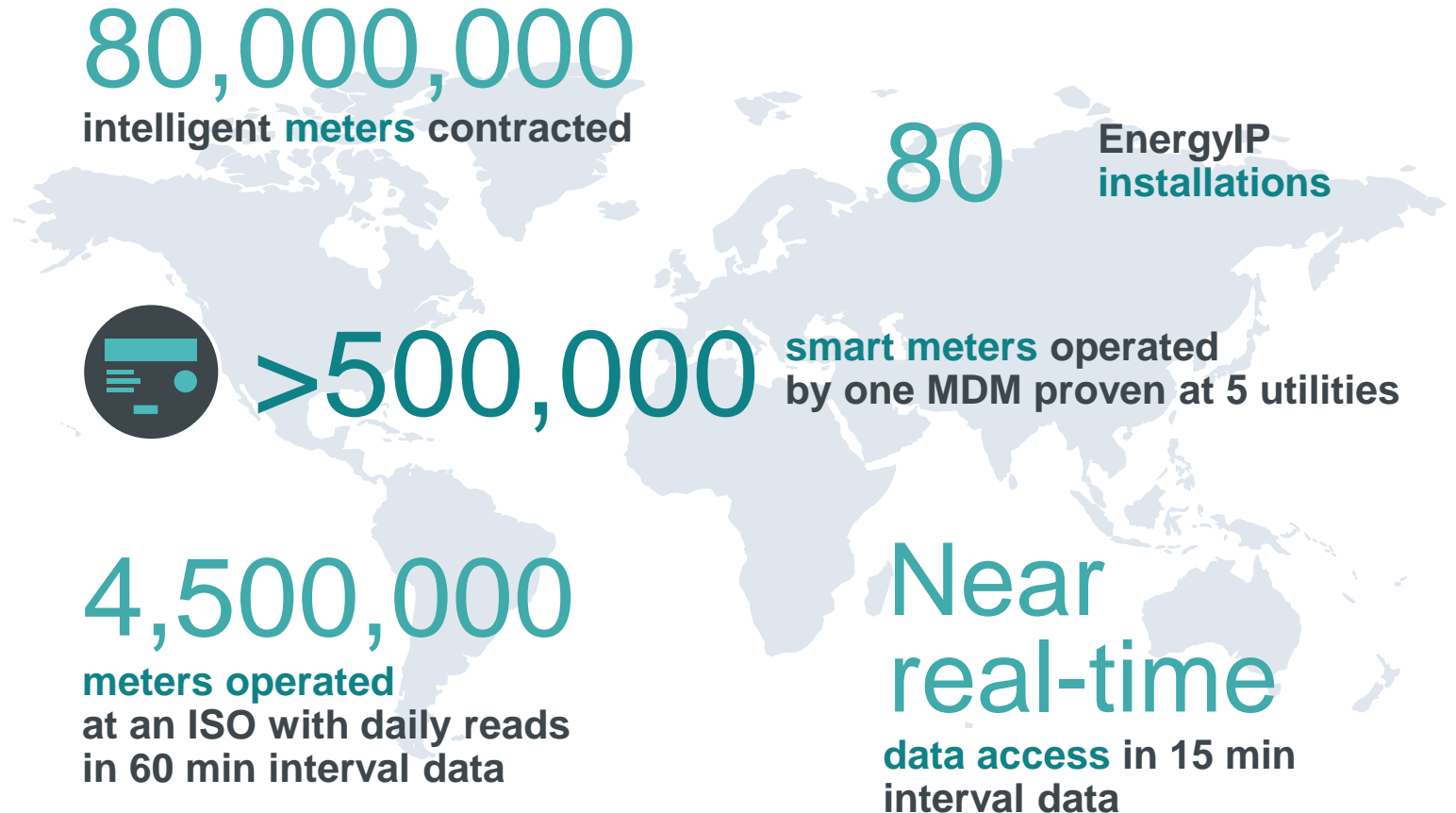
- Powerful Smart Meter and IoT-platform for management of data from millions of distributed assets in near real time
- Efficient IT-OT integration between IT-applications and field devices
- Utility data model to interpret data from energy assets
- Bi-directional, closed-loop communication

EnergyIP – Proven leadership in energy data management



Siemens EnergyIP MDM

continues to be
the world leader
in the Gartner's
Magic Quadrant
for Meter Data
Management



SGW 1050

Substation Gateway for the smart distribution grid



- **Compact Plastic Housing** (IP52, 184*144*69 mm, -20° to +60° C)
- **Integrated power supply** (220-240V AC, 3-phases + N)
- **Future Proof Hardware:** Linux OS with up to 1GB RAM

- **Built-In LTE Cat1/4 modem, 3 Ethernet Prots (LAN,WAN,MTC)**

- **New Functions with Applications (Apps) Download**

- **Cyber Security by design**

- Integrated Hardware Security Module (HSM)
- Interface-bound role-based access (RBAC)

- **Protocol Support**

- DLMS/COSEM (IEC 62056) for smart meter communication
- ModBus TCP with OPC UA PubSub for IoT communication
- HTTPS, TLS, SNMP, NTP
- G3-PLC Dual Band (Cenelec A and FCC)



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Ingenuity for life

**Zero Touch
provisioning**



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- ## Four Quadrant Active and Reactive Energy

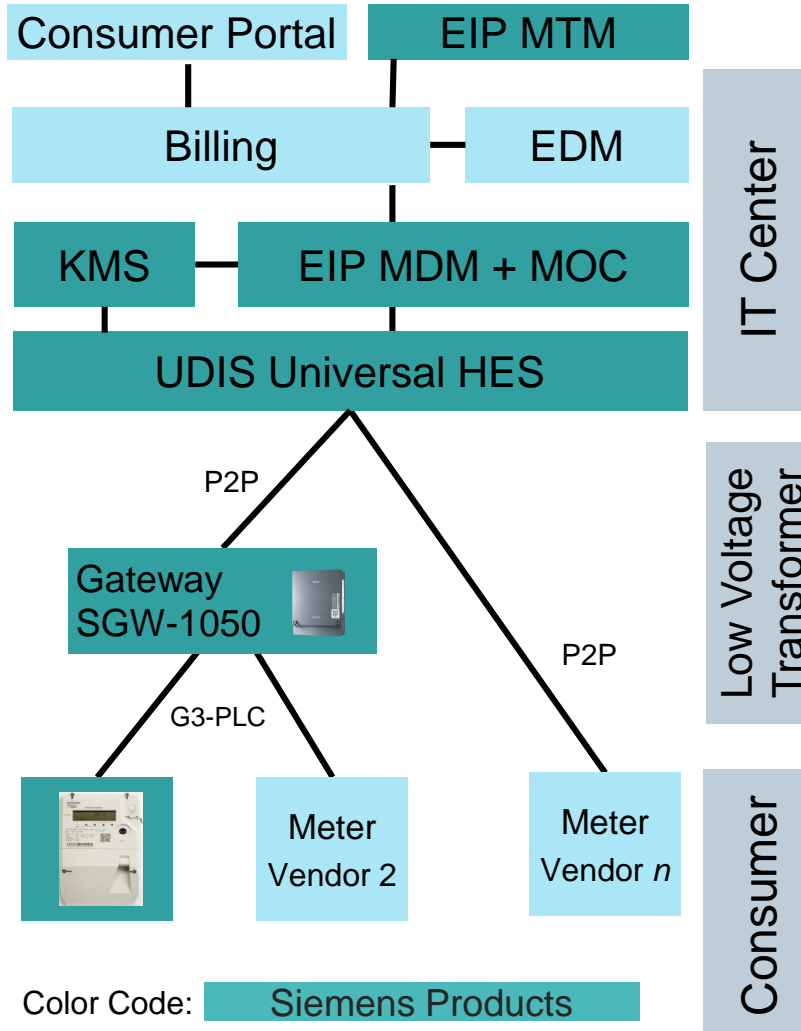
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Synergies and extensions of the smart meter infrastructure

How an existing Smart Meter infrastructure can be used for future topics

Create New Value with existing Smart Meter System



High Secure IT Center
with KMS and PKI
Database of validated
consumer and grid data



Data and Events from Smart Meter can
be aggregated to meet GDPR and
creates analytics use cases to support
grid operations and SCADA

App enabled device
with high speed uplink
in every LV transformer
station with free ports



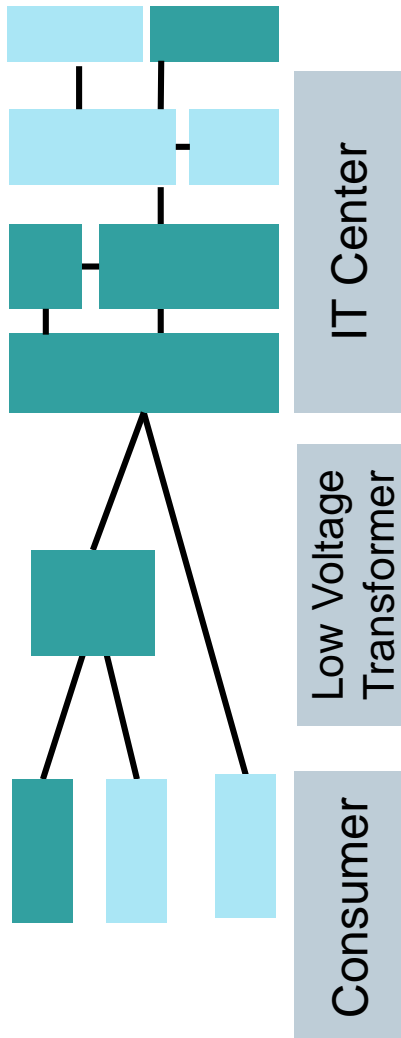
Add new applications and protocol
support to read available devices
Read low range radio services

Multi functional smart
Meter with submeter
and load management
interface



Add new consumer centric services for
available meters and devices (i.e. electric
heating, car charging and photovoltaics)

Create New Value with existing Smart Meter System In the IT Center



provide consumption data for energy retailers and Energy savings consultants

Improve clearing quality with daily or 15 min values

Analyze grid events, forward to SCADA, provide reports

Aggregate grid data for advanced analytics:



Equipment Load Management



Load Forecasting



Power and Grid Quality

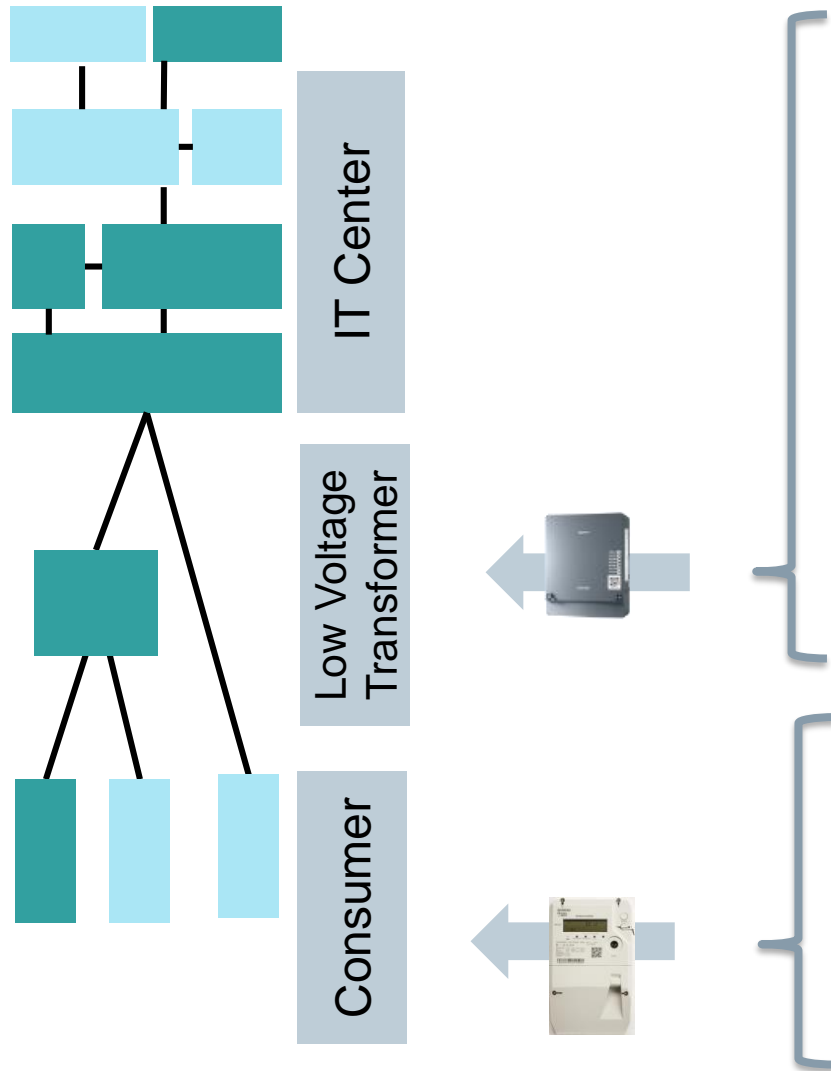


Asset Topology Mapping



Revenue Protection, Grid Loss Detection together with
Security Incident Monitoring

Create New Value with existing Smart Meter System In the Low Voltage Grid



Analyze PLC performance data to better understand low voltage grids and cabling issues

Reuse P2P communication link into low voltage transformer station for the following applications:

- Automate and telecontrol Transformer station with SCADA
- read available and new sensor data into MDM/IoT Platform
- Radio: extend for other communication media – i.e. LoRA, M-Bus

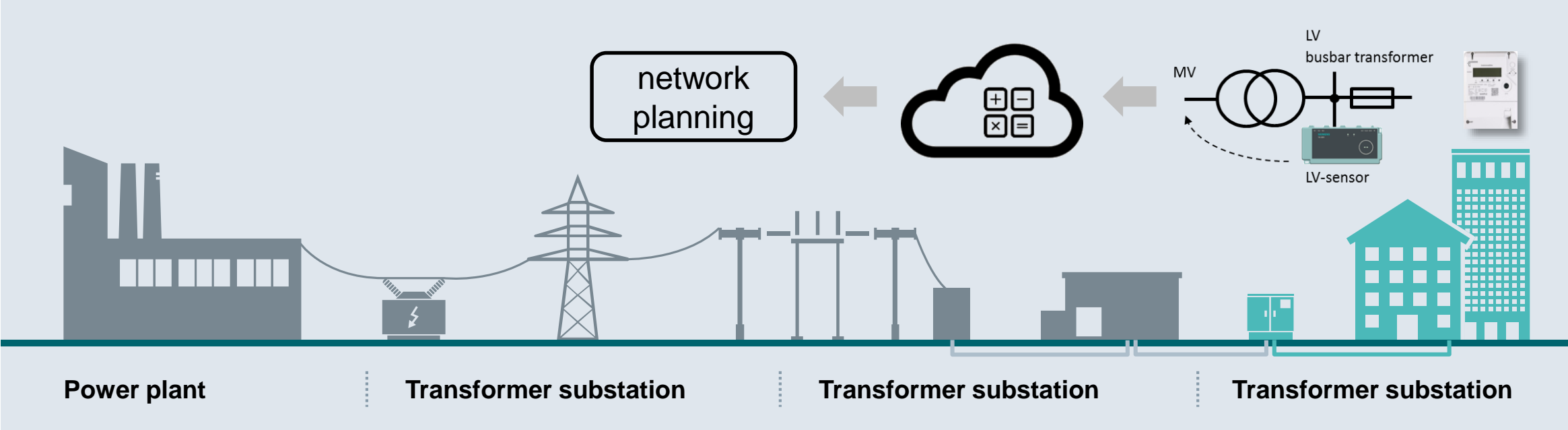
Congestion management with ripple control applications in the smart meter to control heating, fotovoltaics and car charging stations

Read out water, gas meters and other information available at consumer premise

Innovation Topics

Selected Use Cases

With AMI Data and additional sensors New Applications on the Meter and Grid Level Evolve



Asset Connectivity Model, Asset Parameter, SCADA Data, Asset Location Data

Meter Data

Equipment Load Management



Power Quality



Load Forecasting



Grid Loss Detection



Asset Topology Mapping

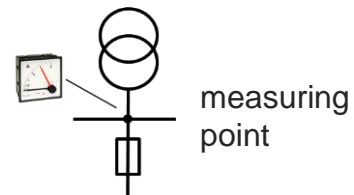


Revenue Protection

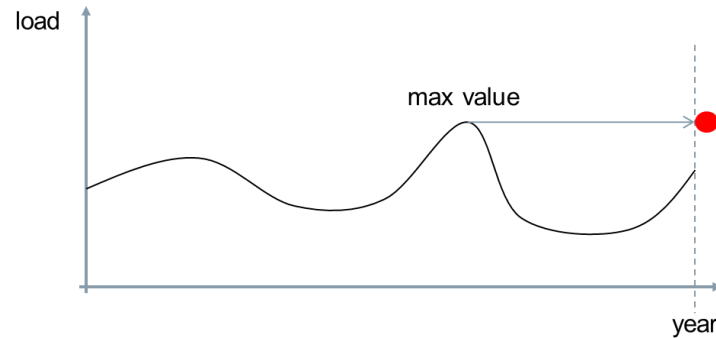


„Trailing Pointer“ - Evolution

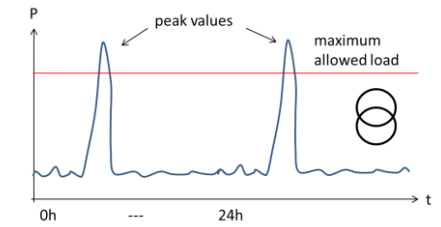
Analogue „Trailing pointer“



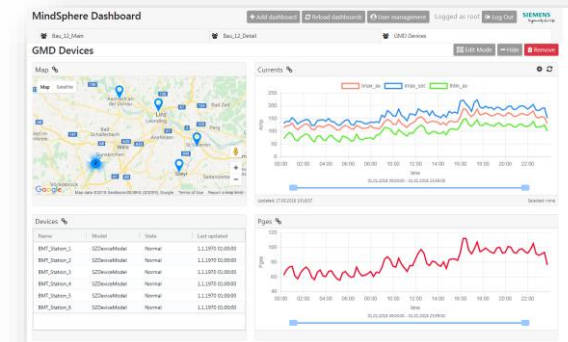
Only one maximum value per year



Digital „Trailing pointer“



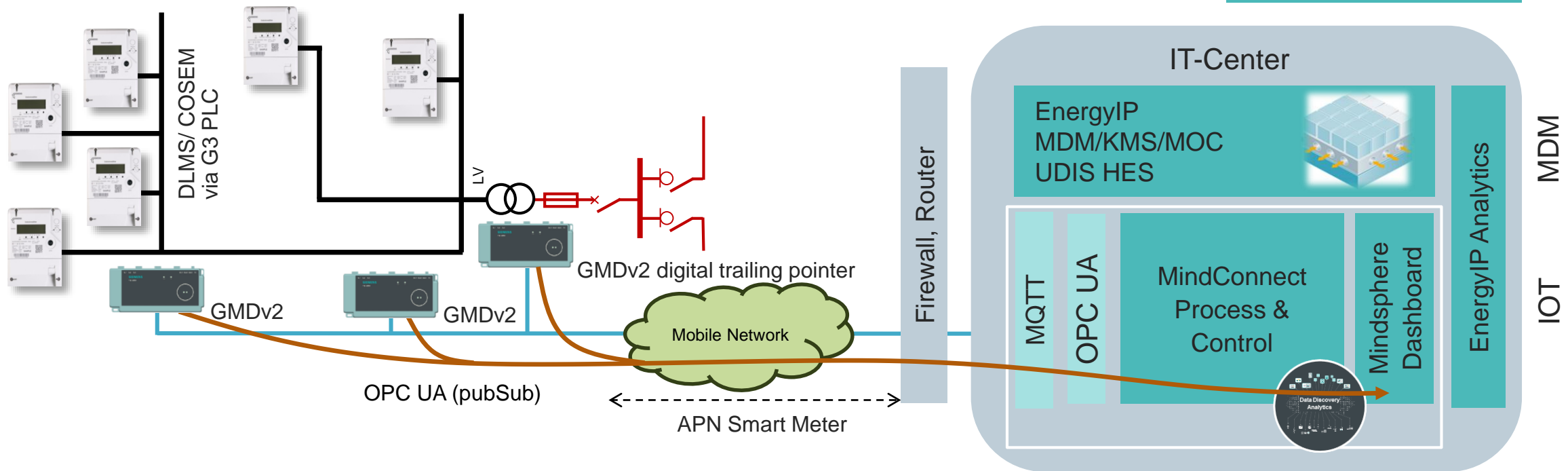
Average values every 2,5 min



Sensors in the grid provide extensive status information

Color Code:

EnergyIP Applications

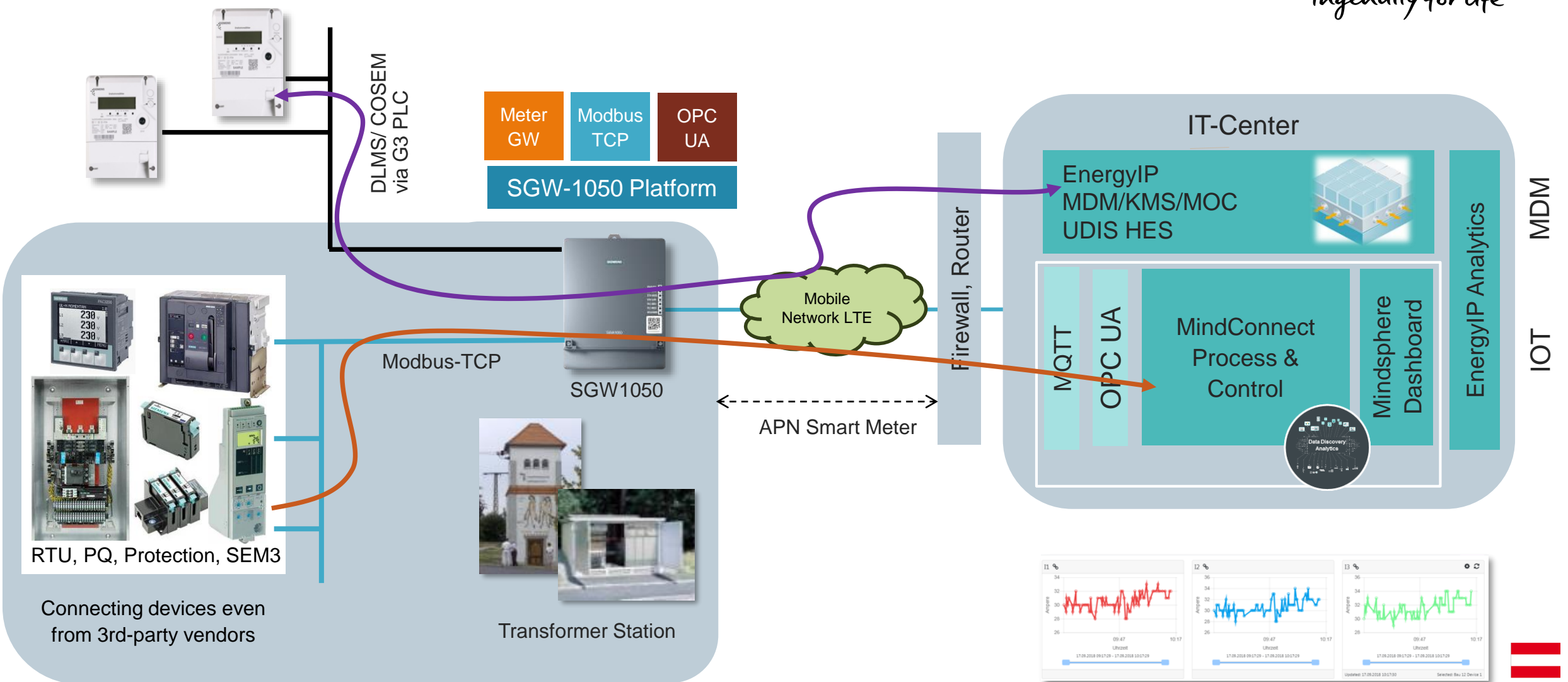


Determine system health precisely through **analysis of voltage, reactive power, and outage data** from available sensors and smart meters. Benefit from getting detailed and granular insights into momentary outages and **reports**.

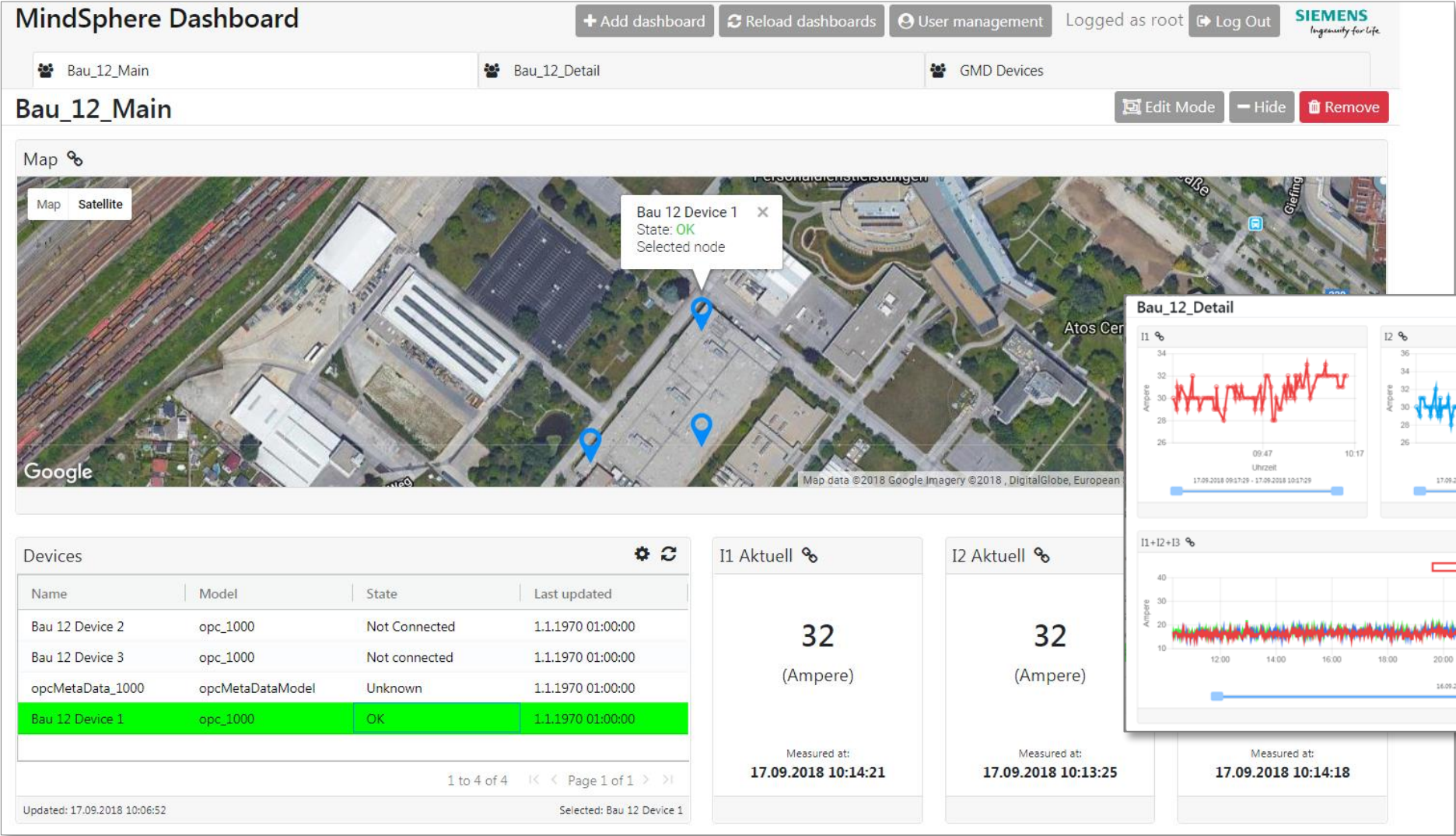
Extending „Smart Meter Gateway - SGW1050“ with IoT-Applications

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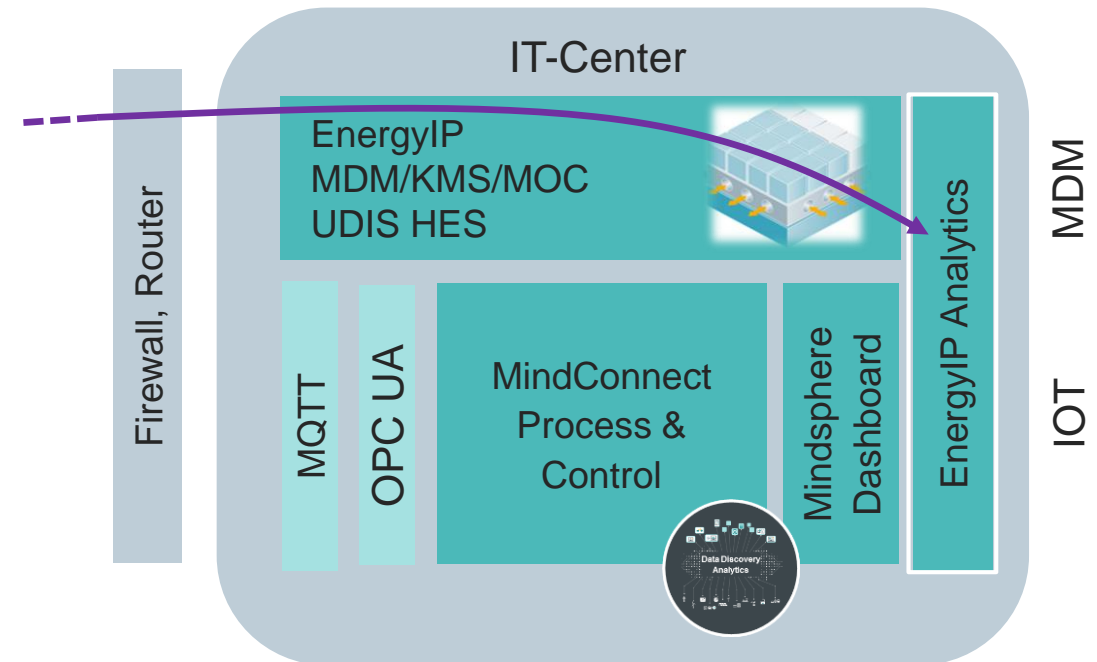
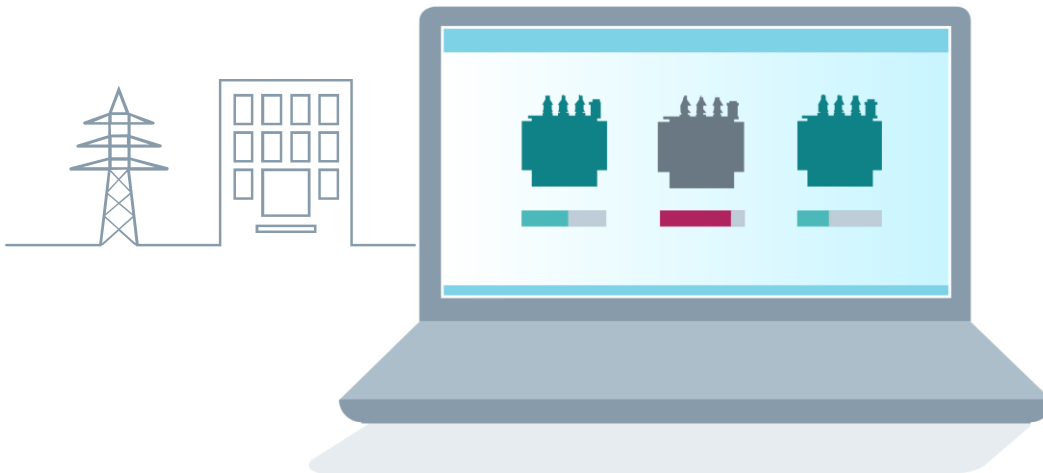
MindSphere Dashboard using MindConnect



EnergyIP Analytics – Equipment Load Management



Combines AMI consumption data with distribution grid topology and equipment ratings to identify **load on distribution transformers** to intervene before an overload occurs.

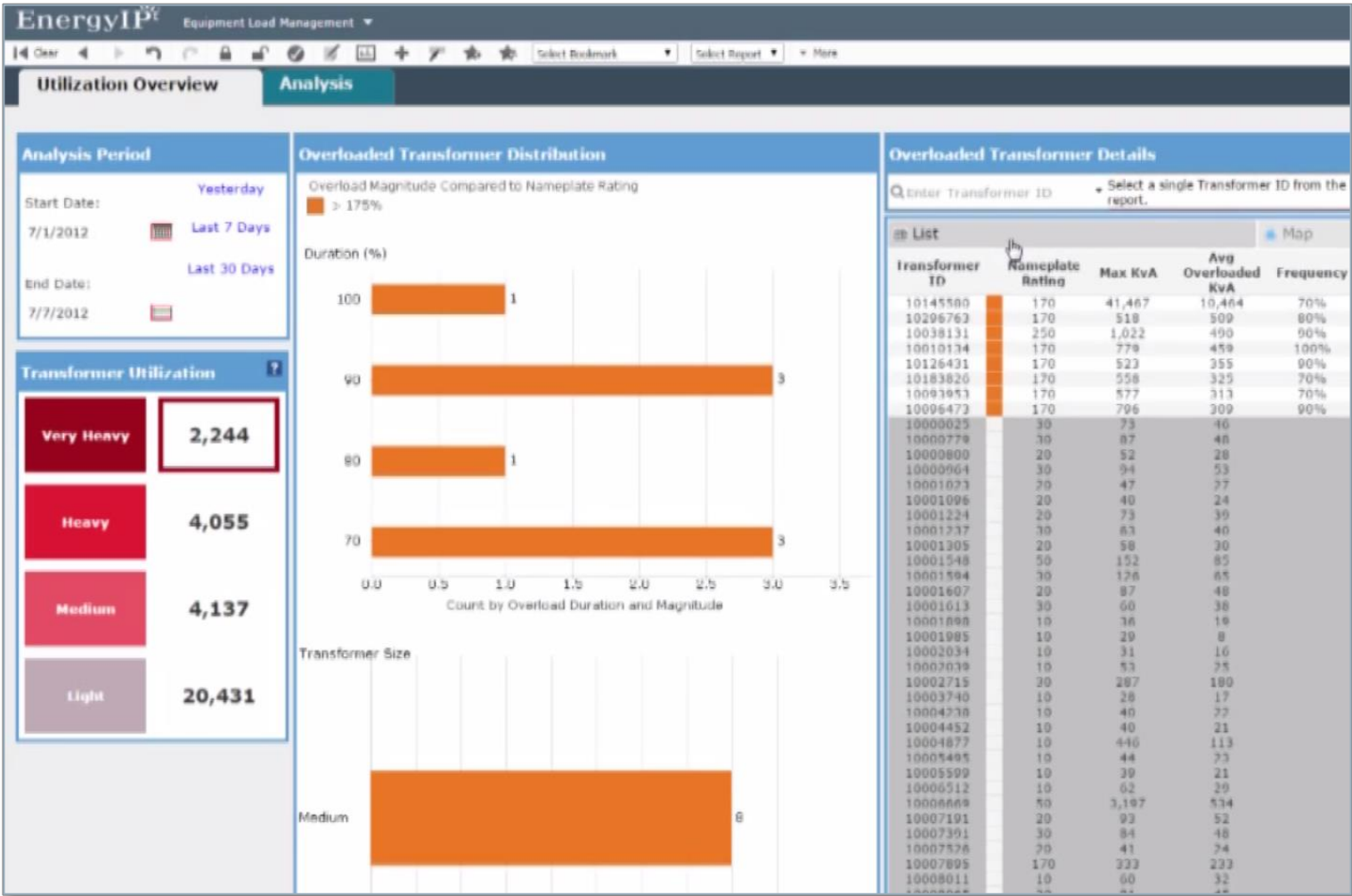


EnergyIP Analytics – Equipment Load Management



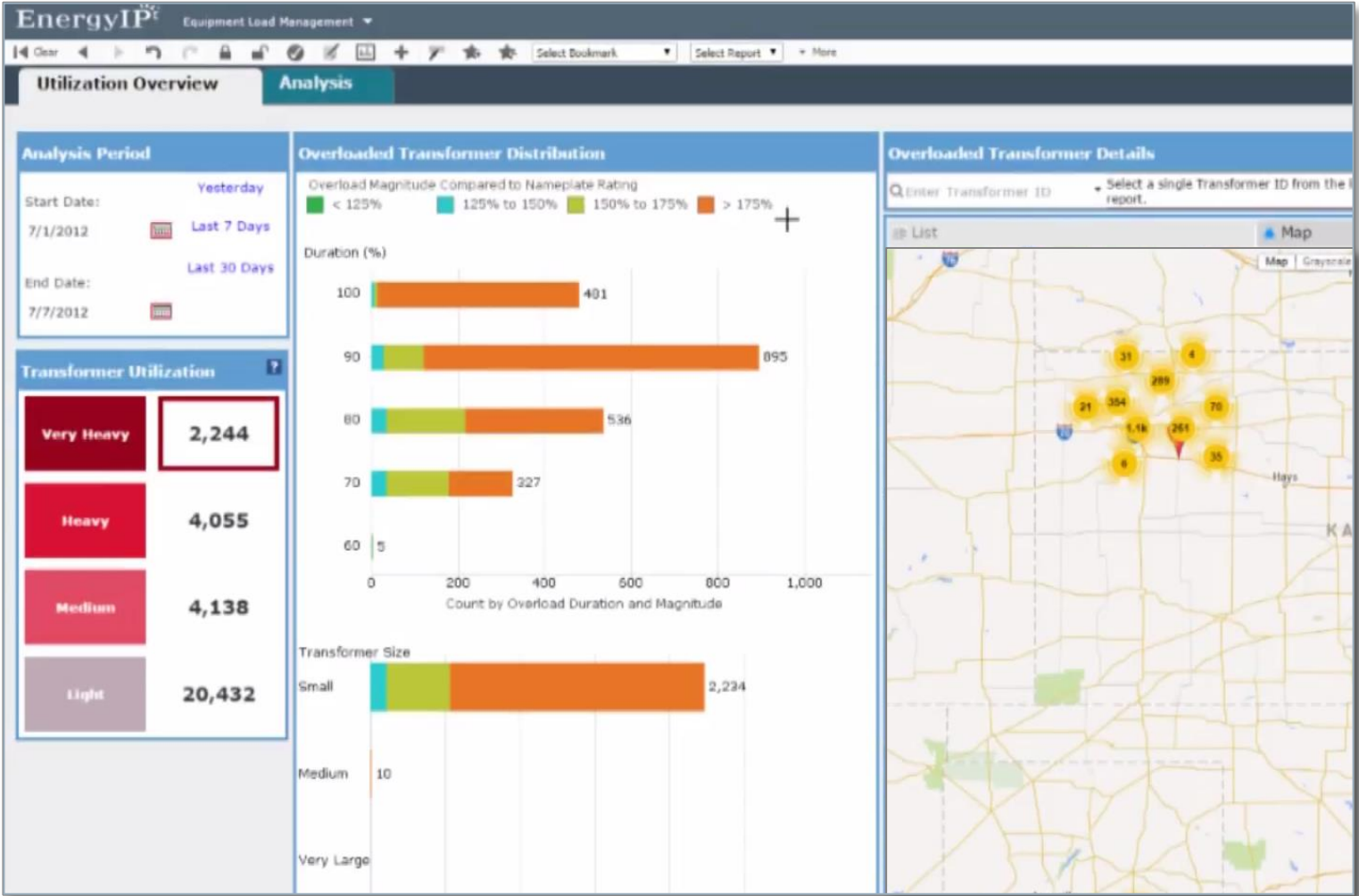
Build Your
“At-Risk” Asset List

Creates a prioritized list based on name plate rating as well as actual load conditions such as extent and duration of overload



Where is the
main area
of my problem?

Understanding
Geographical
Dispersion

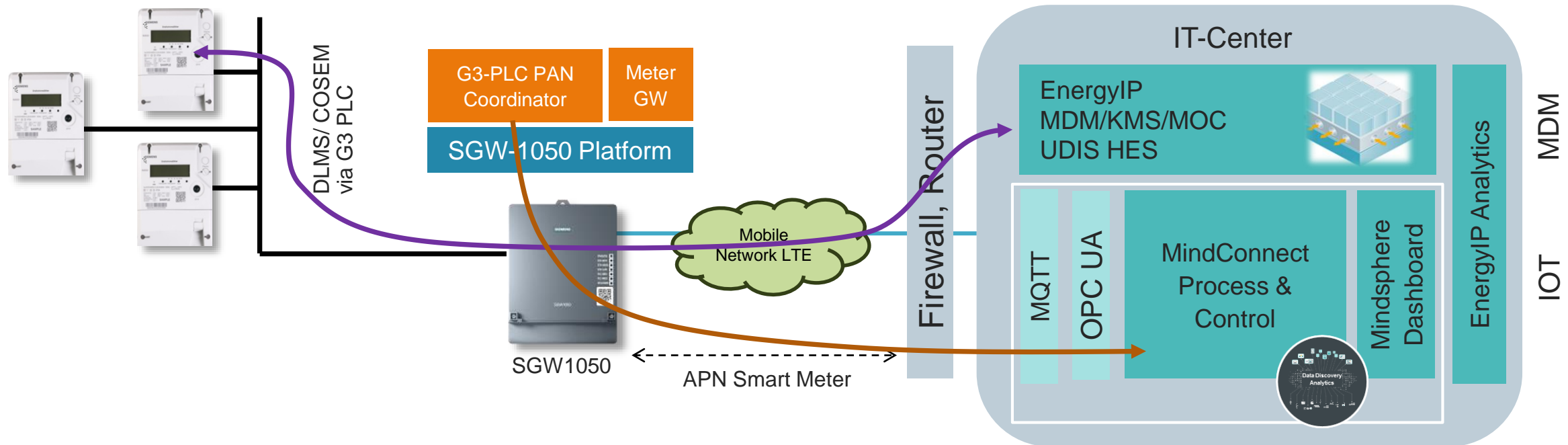


Drill down into
individual transformer

Offers a very
interactive and intuitive
user interface that
makes it easy to go
from big picture to
details and vice versa
thus saving time.

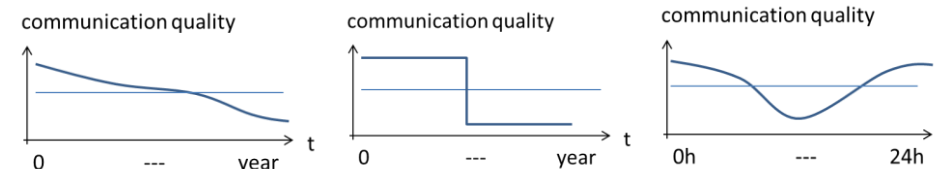


G3-PLC performance provides additional grid status information



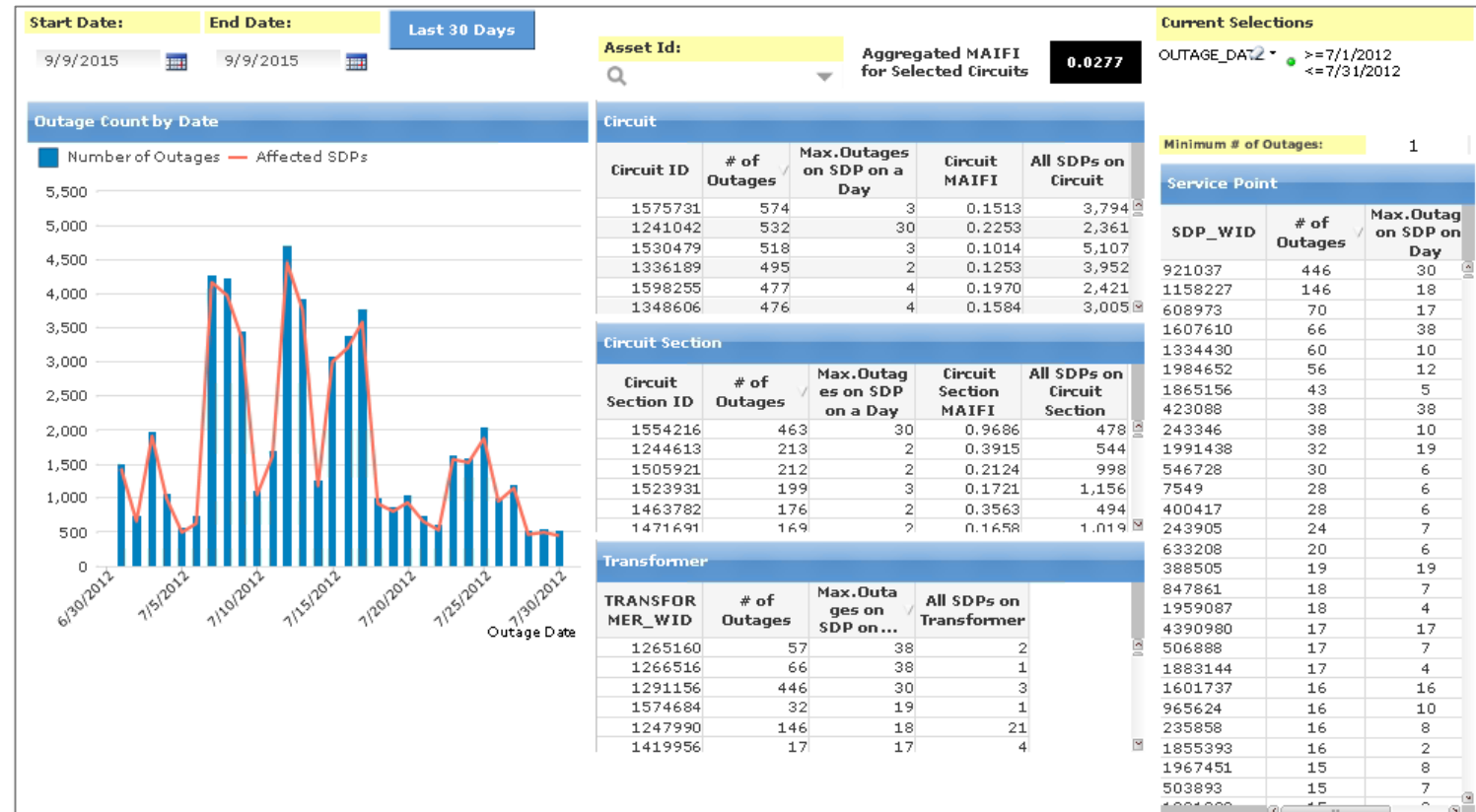
G3-PLC PAN Coordinator has lot of detailed information:

- Amount of connected Smart Meter
- Communication topology
- Number of hops and quality for communication link
- Percentage of successful / missed communication attempts



Where is the likely source of a majority of momentary outages?

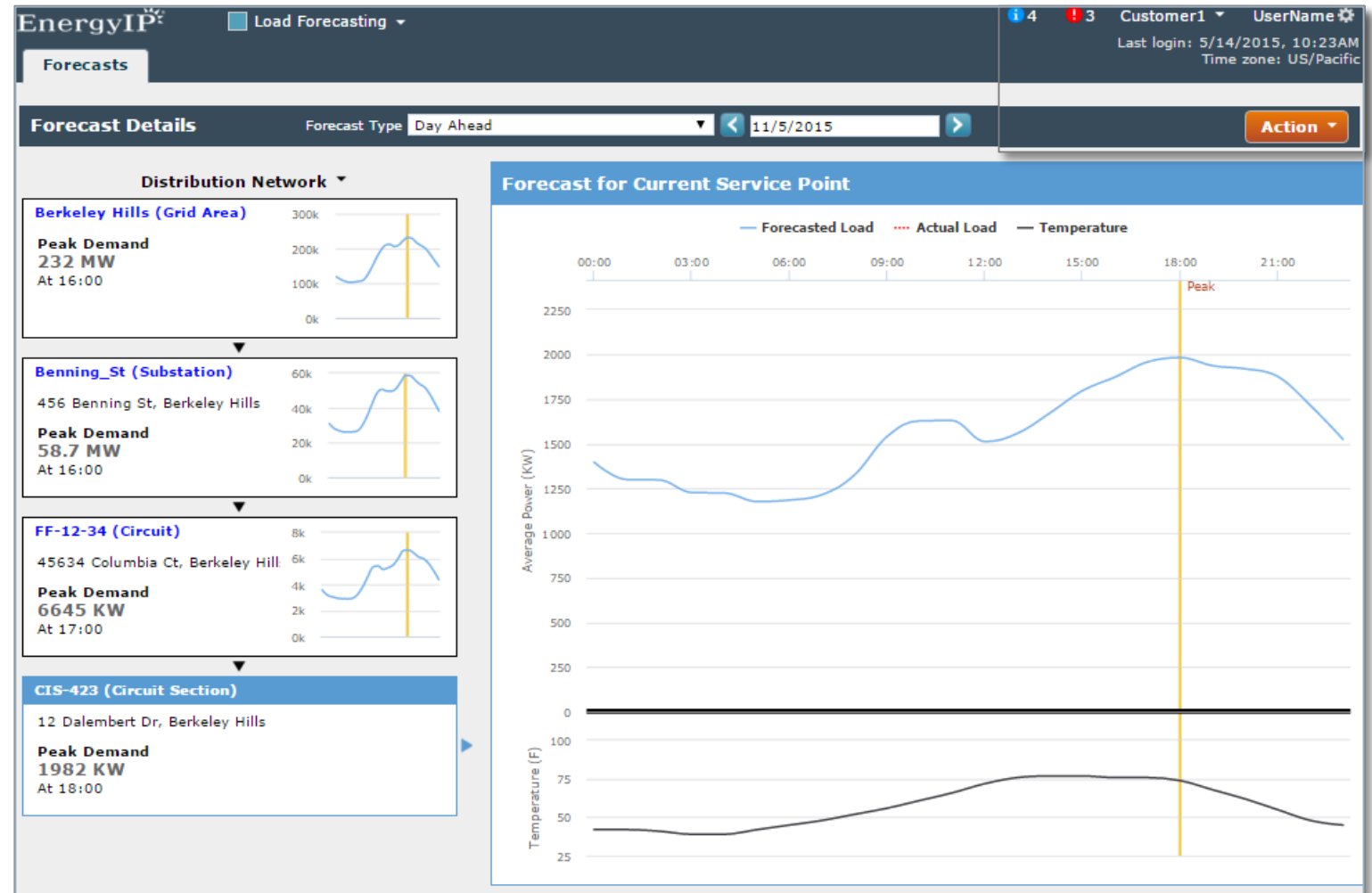
Creates a prioritized list based on the specific power quality metric as well as combining it with other key derived metrics



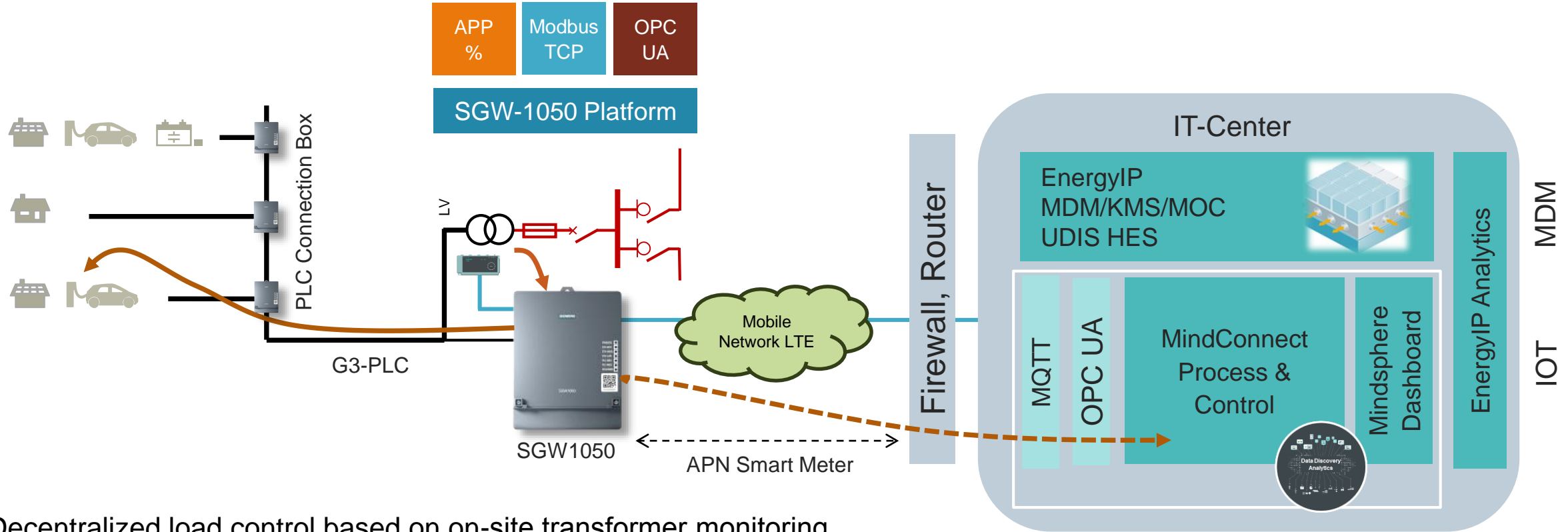
EnergyIP Analytics – Load Forecasting

Not just what the peak will be but also who the key contributors will be

Provides load forecasts at every level of the low-voltage grid that enables identifying the source of variance reliably.



Local Grids – Key Element for “Energy Revolution”



Decentralized load control based on on-site transformer monitoring...

- **E-Mobility (first use-case)**
- Decentralized generation
- Heat pumps

DSO specifies the connection requirements
DSO is able to ramp down loads as a percentage
 (on selective loads)



**Siemens offers EnergyIP powered
by MindSphere a future proof
solution platform for the all
electric digitalized energy world**

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