Totally integrated IT/OT framework for next generation DMS

Kurt Reisacher - Director Smart Grid Solutions Austria
Siemens Energy Management – Smart Grid Solutions
EM SG SOL experienced control center staff in CEE

EM SG SOL World
more than 350 R&D engineers
more than 600 project engineers

EM SG SOL Central Eastern Europe

Yearly OI & TO
CEE 50 mio €
SAGÖ 25 mio

20 countries
2,5 mio sqm
230 mio inhabitants

Vienna 115
Bratislava 35
Brasov 9
Belgrade 1
Belgrad 1
Istanbul 15
Ankara 15
Prague 2
Linz 6
Salzburg 10

200 employees
mainly in 3 CEE countries

25 Project manager
certified 1 PD, 6 SPM, 10 PM
80 Project engineers SCADA
35 SW development R&D, PE
40 Application experts NA, PA,..
20 Sales, commercial, mgmt, ass.

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Significant changes in energy systems…

From centralized, unidirectional grid …
Growing share of renewables and distributed generation calls for end-to-end energy management including saving potentials through efficient LV grid management

- Avoidance of non-technical losses
- Balancing of generation & consumption
- Load management & peak avoidance
- Resiliency through automatic outage prevention & restoration
- Cost optimization and improved security of supply
- CO₂ avoidance & Support of Renewables
- Avoidance of non-technical losses
Increasing amounts of data enables system and process optimization

How to manage explosion of data?
How to create value from data?
Increasing amounts of data enables system and process optimization

How to manage explosion of data?

How to create value from data?

- The utility of the future is the data empowered utility
- The integration of new software applications and systems is one of the key challenges
- A next generation control center technology and a totally integrated IT/OT framework is the key to move towards a more digital grid
Siemens Energy Management: A strong portfolio

**Digitalization**
- Software/IT
  - Grid control – Grid applications - Big data analytics

**Automation**
- Communication, automation, protection, and field devices

**Electrification**
- Electrification solutions
  - HVDC – grid access – FACTS – AIS/GIS substations – power systems solutions – microgrids/nanogrids
- Products and systems

**Services and security**
- Power generation
- TSOs
- DSOs/munis
- Distributed generation
- Oil and gas
- Industries
- Infrastructure construction

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siemens.com/energy-management
Spectrum Power™ – Seamless integration of operational IT with enterprise IT

- Geographical Information System
  - Equipment data
  - Geographical maps

- Asset Management
  - Customer / transformer assignment
  - Expected outage duration

- Workforce Management
  - Reports
  - Work orders
  - Switching procedures

- Spectrum Power
  - Maintenance schedules
  - Loading indices
  - Switching activities
  - Alarms on current instability conditions

- Phasor Data Concentrator
  - Current power system state
  - Indications on current and future power system stability in real-time

- SAP
  - Supply reliability indices
  - Loading reports

- Meter Data Management
  - Current power system state
  - Indications on current and future power system stability in real-time

- Network Stability Calculation Applications
  - Load Profiles
  - Loss of Supply indications
  - Load Profiles
  - Loss of Supply indications

- Customer Information System
  - Equipment data
  - Geographical maps

- Maintenance schedules
  - Loading indices
  - Switching activities

- Reports
  - Work orders
  - Switching procedures
Totally integrated OT/IT framework

Enterprise IT

Spectrum Power Platform
Grid control applications

EnergyIP Platform
Market driven applications
Totally integrated OT/IT framework

Enterprise IT

Enterprise Service Bus

Spectrum Power Platform
- HIS
- IMM
- GDIM
- OM
- PA
- DNA
- TNA
- TS

Spectrum Power High Speed Bus
- UI
- SCADA
- ICCP
- IFS

EnergyIP Platform
- Outage Event Services
- Market Trans Mgmt
- Register Billing
- Energy Engage

- AMI & Device Integrations
- Meter Ops

- Software Development Kit
- EnergyIP Basic Application Platform

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Totally integrated OT/IT framework

Industrial Data Analytics
- Load Forecast
- Power Quality
- Asset Performance
- Enterprise Service Bus
- Web Service

Cloud-enabled Applications
- Web Services
- Energy/IP Cloud Application Platform
- Social Media
- Revenue Protect
- Forecasting
- Benchmarking

Public cloud
- Home Energy Management Applications
- Web Service

Spectrum Power Platform
- HIS
- IMM
- GDIM
- OM
- PA
- DNA
- TNA
- TS
- Spectrum Power High Speed Bus
- UI
- SCADA
- ICCP
- IFS

EnergyIP Platform
- Outage Event Services
- DRMS
- DEMS/VPP
- Market Trans Mgmt
- Register Billing
- Energy Engage
- AMI & Device Integrations
- Meter Ops
- Revenue Protect
- Software Development Kit
- Energy/IP Basic Application Platform

SMART TRANSMISSION
SMART DISTRIBUTION
SMART CONSUMPTION & MICROGRIDS
Spectrum Power™ ADMS
Next generation distribution management

- Track & Restore
- Monitor & Operate
- Analyze & Optimize
- Track & Restore
Spectrum Power™ ADMS
Next generation distribution management

Monitor, control and optimize the secure operation of the electrical distribution network.

Reduce network loading at peak times and increase asset utilization, network efficiency and reliability.

Proactively and safely guide operators when needed most, i.e. during storms and outage-related restoration activities.
Increased operational efficiency

- Advanced topologic coloring and tracing in single phase and three phase distribution networks
- Dynamic symbols for different events and states
- Extended tracing for outages, trouble calls, crews, etc.
- Easy-to-create switching procedures
- Visualization of switch plan and corresponding topology changes before execution
- Online – editable Temporary Network Elements (TNEs)
- Advanced visualization capabilities (3D, …)
Analyze & Optimize
DNA – Advanced Distribution Network Operation

Reduced network loading at peak times and increased efficiency and reliability

- Real-time assessment of network status for instant identification of equipment overloads, voltage limit violations, losses, loops, parallels, and other abnormal operating conditions
- Ability to evaluate and optimally select network control actions
- Improved fault location process, incl. coordination with field crews, and accelerated restoration of service
- Improved field crew safety and reduced service interruptions

- Fault Location (FLOC)
- Fault Isolation and Service Restoration (FISR)
- Distribution System Power Flow (DSPF)
- Distribution System State Estimator (DSSE)
- Short Term Load Scheduler (STLS)
- Volt-/Var Control (VVC)
- Short Circuit Calculation (SCC)
- Optimal Feeder Reconfiguration (OFR)
Track & Restore
Outage Management with integrated Trouble Call Management

Proactive and safe guidance for operators when needed most

- Fast and efficient handling of unplanned outages and planned work
- Prediction Engine and Rule Engine for all trouble events designed to efficiently handle even a large amount like trouble calls, smart meter messages or SCADA alarms
- Storm Mode to handle extreme weather conditions, with tracking of all outages and damages during the storm
- Seamless workflow – from network diagram to Outage Management OM – and a consistent experience with one Common User Environment
- Improved notification to customers, e.g. through call back registration
## Spectrum Power™ ADMS

**Staying ahead of the curve with Spectrum Power ADMS**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Standard HW on x86 64bit</td>
<td>Free choice supports your purchasing strategy (HW and OS)</td>
</tr>
<tr>
<td>CIM (IEC 61970, 61968,...) compatibility</td>
<td>Protects your investment</td>
</tr>
<tr>
<td>Online activation</td>
<td>Secure data engineering without interruption of the productive system</td>
</tr>
<tr>
<td>Back-Up configurations</td>
<td>Provides n-1 security up to control center level</td>
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<tr>
<td>Multi-Site configurations</td>
<td>Flexible operation sharing and global view on control centers with centralized data engineering</td>
</tr>
<tr>
<td>Renewable Generation Integration</td>
<td>Maximize renewable injection, maintain supply security &amp; power quality and minimize losses</td>
</tr>
<tr>
<td>Fully integrated Outage Management</td>
<td>Optimized, integrated workflows for shorter outage restoration times</td>
</tr>
<tr>
<td>Geospatial visualization</td>
<td>Show dynamic Geospatial data (trouble calls...) on top of your network an map</td>
</tr>
<tr>
<td>Front running in IT security (NERC CIP, BDEW...)</td>
<td>Protects your grid against cyber attacks</td>
</tr>
<tr>
<td>Proven SOA capabilities</td>
<td>Enables seamless IT integration and easy extension in response to regulatory changes</td>
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EM SG SOL References
Spectrum Power™ Control Centers CEE

Marketoperator:
- AT APCS
- BG ESO
- XK KOSTT
- MK MEPSO
- KZ KEGOC
- CEE CAO

GenCo:
- AT APT,VHP,EKW
- EVN, TIWAG, VIW
- KELAG, EAG
- SK SE Rove
- BA ERS Trebinje
- EPHZHB Mostar
- RO HE Lotru
- MK ELEM
- NL Electrabel, EET
- DE ENBW, EET
- IT ENEL; ID PLN

DSO:
- AT EVN, KNG, Tinetz
- SAG, EAG, LinzAG, IKB, ...
- CZ PRE; SK RWE
- HU E.ON; RO E.ON, ENEL
- UA Donetsk; AZ Baku
- BA Brcko, MD UF
- TR BEDAS, MEDAS, KCETAS, AYDEM, SEDAS, AKEDAS
- IL IEC; BG EVN; MK ELEM
- PH MERALCO; ES IBERDROLA
- CH AEW; IT EWN
Questions?

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