Utilizing CIM Integration Platform for Utility Analytics

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- Utility analytics – problems & challenges
- CIM based solution
- Benefits to utility
- Real-life use case
Utility analytics – problems & challenges

Rapid data volumes growth – how to efficiently manage it?

Multitude of IT systems (SCADA, DMS, EMS, MDM, GIS, ERP, asset management,...):
  • lack of cross-system integration
  • not all relevant data is shared
  • common data not in sync and up to date

Proprietary analytical tool with each IT system:
  • vendor and system specific
  • outputs cannot be matched among systems

All of the above makes centralized utility analytics a real challenge.

Big data analysis potential – but often unexploited.
CIM based Integration Platform

- Serves as communication broker for various interconnected IT systems
- Backed by CIM repository as a centralized data warehouse
- **CIM repository** – single source of truth for all business and operational data – basis for smart grid analytics
CIM integration platform

WEB.CIM Modules
- Client Console
- Data Acquisition
- Workflow
-...

CIM Integration Bus (CIB)

SCADA / DMS / EMS
- CIM Interface

OMS
- CIM Interface

Asset Mngmt.
- CIM Interface

MDM
- CIM Interface

GIS
- CIM Interface

...

WEB.CIM Integration Platform

Main CIM DB

MultiSpeak Interface

Analytics
Components of WEB.CIM integration platform:

- **CIM Database (main repository):** Containing all objects and attributes of all the integrated systems

- **CIM Integration Bus:** Windows Communication Foundation (WCF) based messaging bus
  - CIS – Component Interface Specification (IEC 61970-4XX)
    - GDA-Generic Data Access (IEC 61970-403)
    - HSDA-High Speed Data Access (IEC 61970-404)
  - SIDMS – System Interfaces for Distribution Management Systems (IEC 61968)

- **CIM Interfaces (source system side):**
  - IT system API access interface
  - Integration & transformation logic

- **WEB.CIM Modules**
Benefits of CIM for analytics

• All relevant business and operational data is integrated, up to date, in sync and centralized – available for easy access and query.

• 360° view of the data enables utilities to improve their demand management, optimize the grid and secure their revenue.

• Any analytical tool can be used to perform Smart Grid analytics.

• No more dependency on specific proprietary tool, IT system or vendor for analytical reporting.
General CIM integration platform benefits

- Better data quality, derived from data unification across all the existing IT systems
- Optimization of the work process as less administrative work is necessary to manage data across the systems
- The solution serves as a backbone for all further IT system expansions, assuring high overall scalability
- Integrated, smart grid ready IT landscape
Use case: Elektro Maribor (EM)

- Slovenian distribution utility
- Approximately 215,000 customers
- Covering 4,000 km² (1,500 mi²) area in North-East Slovenia
- 750 employees
- 30 substations
- 16,000 km network (170 km HV, 4,000 km MV, 12,000 km LV)

**IT systems provided and implemented by GDB:**

- GE GENe SCADA / DMS and OMS
- WEB.CIM Integration Platform
- WEB.SCADA and WEB.OMS as Backup (Disaster Recovery) Control Center
WEB.CIM integration platform:

- GENe SCADA / DMS (GE)
  including Outage Management System
- Asset Management (3rd party)
- GIS (ESRI)
- Meter Data Management (Landis)
- WEB.SCADA (GDB)*
- WEB.OMS (GDB)*

* As Backup (Disaster Recovery) Control Center
EM: Integration diagram

WEB.CIM Integration Platform

CIM Integration Bus (CIB)

- SCADA / DMS
  - CIM Interface
- OMS
  - CIM Interface
- Asset Mngmt.
  - CIM Interface
- WEB.CIM Modules
  - Client Console
  - Data Acquisition
  - Workflow...
- MDM
  - CIM Interface
- GIS
  - CIM Interface
- WEB.SCADA
  - CIM Interface
- WEB.OMS
  - CIM Interface

Analytics

Backup Control Center
EM: Analytical reporting
EM: CIM based reports

- Outages / assets life cycle correlation, eg. transformer, circuit breaker...
- Weather affected outages*
- Energy loss calculation on LV, MV network. Difference between measured / calculated load flow in MV / LV substation bay and the sum of measured active / reactive power on meter location.
- KPI reporting

* after integration with SCALAR (Slovenian Center for Automatic Localization of Atmospheric Discharges)
EM: CIM based reports – KPI reporting

1. **Performance KPIs**
   (Actual YTD / Planned YTD ratio, Actual YTD / Planned Year-ending ratio)
   - **Maintenance**
     - Work performed (in hours)
     - Pole / feeder section / cable replacements (in units)
     - Route cleaning / felling / downing trees (in units)
   - **Investments** (total amount)
   - **Operation** (total amount)

2. **Efficiency KPIs**
   - **Total costs per kWh** (current value, trend based on past data)
   - **No. of new customers** (YTD, last 1m...12m)

3. **Reliability KPIs**
   - **SAIFI, SAIDI, MAIFI**...
Effective integration of SCADA / DMS, OMS, asset management, GIS and MDM:

- No discrepancy of equivalent objects between the systems as data automatically flows from one system to another
- Much less manual administrative work
- Economical, technological and organizational benefits

Union of data from all the integrated IT system serves as a solid basis for:

- Advanced and flexible reporting
- A disaster recovery system with our own CIM based SCADA and OMS modules
- Painless future additions of new functionalities and integration of new IT systems
Any questions?

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