Next Generation SCADA realized by IT technology for renewable energy integration and energy saving

6/5/2017
NTT DATA corp
Table of contents

1. NTT DATA: Who we are?
2. Why we are?: Needs for IT in Electric Power industry
3. Success story: TEPCO MDMS Project
4. Next Generation SCADA
NTT DATA
Who we are?
NTT DATA: Who we are?

- Total Assets: ¥20,702.4 billion ($184 billion)
- Net Sales: ¥11,095.3 billion ($99 billion)
- Number of Employees: 241,600 (consolidated)
- Consolidated Subsidiaries: 917

- Planning management strategies for the NTT Group
- Promoting fundamental R&D efforts

Telecommunications Carriers
- NTT East
- NTT West
- NTT Docomo

BtoB IT Services
- Managed ICT / Data Center Network
  - NTT Communications Corporation
- Software (Application Layers)
  - Dimension Data Holdings plc.

NTT Data Corporation
NTT DATA: Who we are?

- **Net sales of over ¥1.5 trillion ≒ $14 billion**
  - Fiscal year ended March 31, 2012: ¥1,251.1 billion
  - Fiscal year ended March 31, 2016: ¥1,614.8 billion
  - Achieved

- **Fiscal year ended March 31, 2016**
  - ¥1,251.1 billion
  - ¥1,614.8 billion
  - ¥253.6 billion

- **¥1,860.3 billion ≒ $16.6 billion**

- **110,000+ Employees**

- **258 + Consolidated Subsidiaries**

**Business Portfolio**

- **Net Sales**
  - ¥519.6 billion
  - ¥523.6 billion

- **Operating Income**
  - (before amortization of goodwill) ¥12.7 billion
  - ¥32.6 billion

**Brand (Product Quality)**

- Global IT service ranking: 10th
  - (Net sales)
  - CMMI certification: Level 5
    - (the highest level)
Global Presence

- Location: 185+ cities in 45 countries and regions
- Number of employees: approx. 110,000

(As of March 31, 2016)

- EMEA
  - Bases: 86 cities
  - Employees: Approx. 18,000

- APAC
  - Bases: 26 cities
  - Employees: Approx. 12,000

- China
  - Bases: 13 cities
  - Employees: Approx. 3,000

- Japan
  - Employees: Approx. 33,000

- Americas
  - Bases: 60 cities
  - Employees: Approx. 14,000

- NTT DATA Philippines
  - Employees: Approx. 180

2017/3 Dell Systems (M&A)
Employees + 28,000
Why we are here?:
Growing IT needs in Electric Power industry
Growing IT needs in electric power industry

- Deregulation
- Decentralization
- De-Carbonization
- Digitalization

"IT" is a key for challenges
Success Stories in Electric Power Industry
TEPCO-MDMS Project

- Tokyo Electric Power Company (TEPCO): 5th largest utility in the world
- NTT DATA integrated MDMS (Meter Data Management System): Management system for Data, Asset, Network on top of the flexible enterprise service bus

Largest MDMS (27M) in the history

Communication Network

- Collect Meter Data
- HES
- MDMS
- NTT DATA
- CIS
- FAN
- WAN
- Electric Power Network
- Smart Meter
- Landis+Gyr

27M household

- Large data Process Platform
- SOA Platform
- OSS
- MAP + GUI
- OSS
- MDMS
- Balancing
- Data Analysis (consulting)

Enterprise Service

- MDM
  - Meter data management
  - Remote configurat
  - Package
  - Add on

- MAM
  - Meter Asset Management
  - Bespoke
  - Package

- NM
  - Network Management Monitoring
  - Package

Tokyo Electric Power Company (TEPCO): 5th largest utility in the world

NTT DATA integrated MDMS (Meter Data Management System): Management system for Data, Asset, Network on top of the flexible enterprise service bus.
Next Generation SCADA
## Back Ground

**Next Generation SCADA:**

**SCADA of the utilities, by the utilities, for the utilities**

**Consortium members:**

<table>
<thead>
<tr>
<th>Company</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tokyo Electric Power Company (TEPCO)</td>
<td>• Consulting</td>
</tr>
<tr>
<td></td>
<td>• Assessment</td>
</tr>
<tr>
<td></td>
<td>• Requirement definition</td>
</tr>
<tr>
<td></td>
<td>- Reliability, Interoperability, Redundancy, Security</td>
</tr>
<tr>
<td></td>
<td>• Verification</td>
</tr>
<tr>
<td>Toshiba</td>
<td>• Development</td>
</tr>
<tr>
<td></td>
<td>• SCADA platform</td>
</tr>
<tr>
<td></td>
<td>• SCADA Application</td>
</tr>
<tr>
<td>McAfee</td>
<td>• Development</td>
</tr>
<tr>
<td></td>
<td>• Security component</td>
</tr>
<tr>
<td>NTT DATA</td>
<td>• Project Management</td>
</tr>
<tr>
<td></td>
<td>• Network Design</td>
</tr>
<tr>
<td></td>
<td>• System/NW Integration</td>
</tr>
</tbody>
</table>
Needs for renewable energy integration

- SCADA enables power grid to integrate, monitor and control RE generation

**SCADA is “a must” for RE integration**

NIST Framework and Roadmap for Smart Grid Interoperability Standards, Release 3.0
Specification: Utility-oriented and interoperability

- Fully compliant to IEC standard (No vendor lock-in)

Cost-competitiveness, interoperability for every utility

<table>
<thead>
<tr>
<th>Platform</th>
<th>CIM Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Platform</strong></td>
<td><strong>Core DBMS</strong></td>
</tr>
<tr>
<td><strong>EMS/DMS/NMS</strong></td>
<td></td>
</tr>
<tr>
<td>Network Manager ABB</td>
<td>No</td>
</tr>
<tr>
<td>eTerra Alstom Grid</td>
<td>No</td>
</tr>
<tr>
<td>PowerOn Advantage/Reliance GE</td>
<td>No</td>
</tr>
<tr>
<td>Spectrum Power Siemens</td>
<td>Yes</td>
</tr>
<tr>
<td>ADMS/Oasis Schneider Electric</td>
<td>No</td>
</tr>
</tbody>
</table>

Next Generation SCADA

Yes

Yes
Specification: Reliability

- Japan has a record electricity reliability in the world
- TEPCO’s reliability requirement is most severe in Japan
- Next-Gen SCADA has been upholding its reliability updating over the decade
Specification: Cost-Effectiveness

- Centralized server structure with thin-client (No server in each location)
- Minimum cost for installing, updating, operation and maintenance

Simple structure & Minimum cost

Existing SCADA system

Central CC (Control Center)

Server

Single System

Server

Single System

Server

Single System

Server

Single System

Transmission CC x10

56 Distribution CC x56

Wide Area Distributed triple system

Server 1

Server 2

Server 3

Client 1

……

Client n

Thin Client

Next Generation SCADA

Supervisory control over 1580 substations
Specification: Redundancy

- Triple server structure: proved to be most cost-effective with high redundancy
- Control centers keep running at least one Master is alive and connected
Specification: Flexibility and Scalability

- Able to pick up appropriate solutions on top of the “SCADA platform”
- EMS, DMS, PMU … Standard components are “ready to go”

Expandable: Appropriate solutions for utilities

Structure of Next Gen SCADA

- PMU (Phasor Measurement Unit)
- DMS (Distribution management System)
- EMS (Energy Management System)

SCADA

MW

OS
Specification: Security

- IDS (Intrusion Detection System) / IPS (Intrusion Prevention System): Compliant to NIST SP 800-82rev2 and ISO/IEC15408
- Palm vein authentication is required for every control with authority

**Absolute security for utility operation**
Thank you for your attention and we hope to be of service to you in the future.