FIELD MOUS:
A technical data repository for enabling JIT decision making

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Maynilad Water Services, Inc.
FIELD MOUS: A technical data repository for enabling JIT decision making

Business Challenge

- To have a single, consistent source of technical data across the organization which may be used for multiple applications

Solution

- Used the OSIsoft software components to create a technical data repository called “FIELD MOUS”

Results and Benefits

- Single version of the truth
- Easy for the users to access, use and analyze the data
- Easy to interface the data to many different systems
Our company
Maynilad Water Services, Inc. (Maynilad)

- Largest water concessionaire in terms of customer base in the Philippines
- Serving a population of 9 million people
- Has exclusive rights to provide water and wastewater services in the West Zone of the greater Metro Manila area until year 2037
- Re-privatized on January 24, 2007
- Owned and operated by Metro Pacific Investments Corp., DMCI Holdings Inc. and Marubeni Corp
Operations Snapshot

Service Area: 540 sq km

Coverage: 17 cities and municipalities in Metro Manila and Cavite

Key facilities:
- 3 water treatment plants (2500 MLD combined capacity)
- 7 sewerage treatment plants
- 1 septage treatment plant
- 21 pumping stations
- 23 reservoirs

Distribution:
- Around 500 km sewer line
- 7,125 km water pipeline
Service Expansion

From 4,575 km in 2006, our water distribution line has increased by 56% to 7,085 km by the end of March 2013.

<table>
<thead>
<tr>
<th>Year</th>
<th>Pipes Laid per Year (in km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>40</td>
</tr>
<tr>
<td>2012</td>
<td>233</td>
</tr>
<tr>
<td>2011</td>
<td>375</td>
</tr>
<tr>
<td>2010</td>
<td>441</td>
</tr>
<tr>
<td>2009</td>
<td>456</td>
</tr>
<tr>
<td>2008</td>
<td>318</td>
</tr>
<tr>
<td>2007</td>
<td>685</td>
</tr>
</tbody>
</table>

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Water source
## Service Improvements

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013 (Q1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coverage (%)</td>
<td>80.5</td>
<td>82</td>
<td>85.6</td>
<td>87.7</td>
<td>92.5</td>
<td>94.6</td>
<td>94.7</td>
</tr>
<tr>
<td>24-hour service (%)</td>
<td>46</td>
<td>58</td>
<td>65</td>
<td>71</td>
<td>84</td>
<td>96</td>
<td>96.7</td>
</tr>
<tr>
<td>Over 7 psi pressure (%)</td>
<td>53</td>
<td>67</td>
<td>79</td>
<td>86</td>
<td>96</td>
<td>99.8</td>
<td>99.8</td>
</tr>
<tr>
<td>Number of Connections in '00</td>
<td>703.5</td>
<td>762</td>
<td>815</td>
<td>904</td>
<td>1,005</td>
<td>1,073</td>
<td>1,088</td>
</tr>
<tr>
<td>Population Served</td>
<td>6.4</td>
<td>6.7</td>
<td>7.1</td>
<td>7.4</td>
<td>7.9</td>
<td>8.1</td>
<td>9</td>
</tr>
</tbody>
</table>
Awards and Recognition

- 47 ISO certifications
- 4 international awards
- 30 local awards
The project
The Challenge

• Management needs information in order to make decisions

• Data is usually “locked” in different systems
  – IT transactional systems (sales, billing, logistics, …)
  – Automation & Control systems

• These systems store “raw” data
  – Not in a format meaningful to management
Our two-pronged approach

1. Extract data from transactional systems and place them into our Data Warehouse
   - Business Intelligence reports
   - Dashboards
Our two-pronged approach

2. Use the PI System as an extractor and repository of field data
FIELD MOUS

• Field Monitoring User System
  – Coined name for the application
• The idea is for this to be a repository of ALL field data
  – Single version of the truth
  – Common repository for the whole company
Challenge: Heterogeneous sources

• Different devices
  – PLCs (all brands)
  – SCADA
  – Data loggers
  – Meters (many brands)
  – IT systems (many)
Challenge: Heterogeneous sources

- Different communications
  - SMS
  - Fibre
  - DSL
  - GPRS
  - Flat files
  - DBs
But the real challenge is….

• People!
  – This is “my” data
  – Exposure of manual intervention
  – A feeling of irrelevance once things are done automatically
  – Exposes the “magic” of things
• “silo” mentality
How to overcome?

• Start with a champion department
• Success generates recognition
• Other departments want “in”
• This has a snowball effect
Ability to view water pressure and flow along our lines

* Provided on-line access to the regulator
See status of reservoirs, pumping stations
Water treatment plant
Alarms based on conditions

- Production alarms
- Reliability Centered Maintenance
- Critical operational conditions
Drive-by metering
Drive-by metering
Meter Data Mgt repository

- Brand A
- Brand B
- Brand C
- Reports
- Customer consumption
- Other sys
- PI System
- SAP
Non-revenue water (losses)
Hydraulic Hierarchy

MAYNILAD - GLOBAL

DISTRICT AREA

BUSINESS AREA

DMA LEVEL

HYDRAULIC SYSTEM
Flow and Pressure Analysis

- Minimum Night Flow
- Net Night Flow (Leakage)
- Minimum Night Consumption
- Varying Customer Use
- Burst Leakage
- Background Leakage

Flow Rate (l/s) vs. Pressure (m)
Flow and Pressure Analysis

Flow and Pressure behavior before leak occurred

Flow Increased and abnormal network occurrence

Flow and Pressure behavior after leak repair
Water Losses

- 27.1 percentage point reduction since re-privatization
- Recovered 640 million liters of treated water
Evolution of the system’s acceptance

• From rejection to skepticism to acceptance to eagerness in being involved and using the system
• Many requests from different departments
• Success has its own challenges
  – governance
Governance challenges

• Different data comes from different sources maintaining it
  – Telemetry, Metering, Water Supply and networks, Sewerage, Automation
  – Someone must be “in charge”

• Different reports needed by different depts
Architecture

Data Sources
- Water networks
- Sewerage
- Water supply
- Telemetry
- Billling

PI System

Reports
- NRW
- Losses
- Networks
- Supply
- Commercial Consumption

Data for a report may be coming from different devices and owners.
Different roles and responsibilities

• **Data owners** – responsible for maintaining the correct data in the PI System

• **Report and application owners** – maintain reports/applications

• **Information Technology** – QA, “officiates” reports/applications, in charge of governance

• **Automation and Instrumentation** – data owner, also in charge of interfacing FIELD MOUS with PLCs, SCADA
Next Steps

• Connect, connect, connect….

• Integrate Business Intelligence Data with FIELD MOUS data
  – NRW can be automatically calculated

• Make it part of our Central Control Room’s displays

• View on the field (mobility)
Conclusions

• The PI System is the perfect system for keeping technical data
  – Robust, easy to use interface, fast, deep history
• Our aim is to make this the single source of all technical data within the company
• Single source of truth
• Success is all about people
Maraming Salamat!
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THANK YOU