New Advances in Global SCADA Using Cloud Based Technology

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Monitoring & Control
Xylem/Flygt
What we’re going to talk about

• Where are we today
• Current technology
• Private networks – radio
• Public infrastructure – Cell data
• Cloud based hardware
• How this technology cuts costs
• SCADA Options
Radio – Private Network

- VHF – 150-170 MHz
- UHF – 450 – 470 MHz
- FHSS – 902-928 MHz
- White Space – Abandoned TV
Current Technology - Communications

Public Network – Cellular Data
Current Technology - Communications

Why Cellular and Why Now?

• More and more robust
• More pervasively used
• More cost effective – price is dropping
• More coverage
• Access to the Cloud
Current Technology - Communications

What the heck is Cloud Based SCADA?
What is Cloud Based SCADA?

Cellular Data/secure Internet based. Also known as Web Based.

While traditional SCADA systems are closed, private systems, normally radio based, with data and server being accessed at a local site,

Newer technology, Cloud based SCADA offers access points from any security enabled, browser capable MMI. All data is safely stored within a remote, triple redundant, multi-location environment.
Current Technology - Communications

Why Cloud based SCADA and Why Now?

- More pervasively used
- More cost effective
- More coverage
- More and more robust
- Agility when it comes to new applications and upgrades.
- Enhance reliability through its multiple redundant Internet connections.

Low cost of ownership and low front-end costs.
No servers
Minimal IT engineering
Ease of System integration
Cloud Based SCADA

The Cloud

Pumpview 3

SmartRun

MultiSmart

My Connect
Current Technology - Hardware

- PLC’s
- RTU’s
- Other process equipment.
- Alarming Systems – radio, phone
- Application Specific Pump Station Managers
Current Technology – Hardware

Cost Comparison

• PLC/traditional Radio System - ~$10-15K
• Alarming Systems – ~ $2K - $200/yr.
• Application Specific Pump Station Managers with Fully Functional SCADA
  ~ $ 4K - $600/yr.
Current Technology - Hardware

- PLC’s
- RTU’s
- Other process equipment.
- Alarming Systems – radio, phone
- Application Specific Pump Station Managers
Typical Cloud based Remote Hardware

Flygt MultiSmart

Base Unit

User Interface
Flygt MultiSmart Controller Design

- SCADA Ready
- Up to 64GB of memory
- Data Collection
- Data Archiving for later retrieval
- Local MMI
- User defined control
- No programming
- Intuitively configured
Flygt MultiSmart Controller Design

- Developed a product that is easy to use, almost eliminating the need for a user manual
- Over 700,000 lines of application code
- Manufactured specifically for the water/wastewater industry
- Provides the flexibility to connect to existing or new HMI software package
- Supports Cloud Based and self served SCADA
Flygt MultiSmart

How can this technology reduce Operational Costs?

- Reduce energy costs
- Reduce costly callouts
- Allow for “Predictive Maintenance”
- Ease of setup
- Monitors voltage, current and phase
- Monitors pump run, starts and flow
- Monitors pump efficiency (gal/kW/hr.)
- Calculates Power Factor
Power Factor – for you and me!

Beer Drinkers’ Power Factor Analogy
(Reactive Power = Electrical Froth)

Low Power Factor

High Power Factor
Flygt MultiSmart

How can this technology reduce Operational Costs?

By recording calculated or real flow and electrical characteristics the technology can easily calculate:

Pump efficiency = gallon/kW/hr.

One calculation = $/gallon
Flygt MultiSmart – Main Screen
My Connect Controller
MyConnect
Cloud Based

- With or without GSM/GPRS modem
- 6 digital inputs (10-30V DC)
- 2 digital outputs (30V AC/DC – 120mA)
- 3 analog inputs (16bit resolution)
- Cell Modem, 1xRS-232, 2xRS-485, 1xUSB
- Wi-Fi
- DIN-rail mounting
- Power supply 11-30VDC, 10-24VAC, 8-40 VA
- Charger for backup battery
- Up to 16AI/16AO/32DI/32DO
Flygt Smartphone Pump Application

Control the pumps from a Smartphone/IPad.
Cloud Based Remote Hardware

*Flygt Experior*

*Inspired by you. Engineered by us.*
What is Experior?

Hydraulics

A three pronged, SCADA ready, approach to pump efficiency and energy savings
In broad terms...

Flygt Experior finds the “sweet spot” of energy savings coupled with pump efficiency!
Communication options

- Serial
- Ethernet
- Cell modems
- Radio’s
- Fiber / WIFI
- Phone lines
Protocols

or

or

or

Modbus®

SCADA
SCADA options

- **Outpost 3**
  - Prebuilt local installed SCADA
  - Feature rich

- **PumpView 3**
  - An outsourced SCADA system
  - Simple
  - Low upfront costs
  - No hassles
  - Monthly hosting fees

- **Integrate to current SCADA**
  - Communicate using either Modbus / DNP to open SCADA
  - Integrate any of the 700+ Tags available
  - Custom platform that you will have to maintain and develop
SCADA options

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  - An outsourced Server
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PumpView 3

- No radios, no servers, no IT engineers
- Fully functional SCADA
Alarming options

PUMPVIEW 3

MULTICHLANNEL

WEB

SMS

VOICE

EMAIL
PumpView3
Cloud-Based Telemetry/SCADA Services

Provides customers with high-value remote data access

- Alarms
- Reports (Daily, Monthly and Custom)
- No infrastructure to support
- Low entry cost
- Low maintenance
- Scalable
- Low TCO
- Easier to meet site monitoring mandates
### PumpView creates standard reports

#### Daily Report: Accumulator Totals

<table>
<thead>
<tr>
<th>Site Name</th>
<th>P1 (Hours)</th>
<th>P2 (Gal)</th>
<th>P3 (Gal)</th>
<th>P4 (Gal)</th>
<th>Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrollton Rd</td>
<td>6,910</td>
<td>4,380</td>
<td>0</td>
<td>13,195</td>
<td>2,267</td>
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<td>Edison</td>
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<td>970</td>
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<td>1,905</td>
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<td>2,881</td>
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<td>2,697</td>
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<tr>
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<td>Sherman</td>
<td>1,040</td>
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<td>816</td>
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<td>Stoker</td>
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<td>Tulane</td>
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<td>6,544</td>
<td>24</td>
<td>13,288</td>
<td>2,328</td>
</tr>
</tbody>
</table>

#### Daily Report: Total Run Time

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Total Run Time (Hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrollton Rd</td>
<td>13,019</td>
</tr>
<tr>
<td>Edison</td>
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<td>Hanchett</td>
<td>6,796</td>
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<tr>
<td>Jones</td>
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<td>Stoker</td>
<td>19,604</td>
</tr>
<tr>
<td>Tulane</td>
<td>13,288</td>
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</tbody>
</table>

#### Daily Report: Total Starts

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Total Starts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrollton Rd</td>
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<tr>
<td>Edison</td>
<td>2,758</td>
</tr>
<tr>
<td>Hanchett</td>
<td>2,697</td>
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<tr>
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<td>1,969</td>
</tr>
<tr>
<td>Tulane</td>
<td>2,328</td>
</tr>
</tbody>
</table>

#### Daily Report: Total Volume

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Total Volume (M Gal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrollton Rd</td>
<td>15,428</td>
</tr>
<tr>
<td>Edison</td>
<td>5,517</td>
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<td>Hanchett</td>
<td>4,903</td>
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<td>Sherman</td>
<td>1,172</td>
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<td>Stoker</td>
<td>4,063</td>
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<tr>
<td>Tulane</td>
<td>2,265</td>
</tr>
</tbody>
</table>

#### Daily Report: Accumulator Totals

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Peak Date/Time</th>
<th>Peak Value</th>
<th>Average Value</th>
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<td>Carrollton Rd</td>
<td>8/24/2011 15:26</td>
<td>297</td>
<td>647</td>
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<td>Edison</td>
<td>8/24/2011 4:00</td>
<td>74</td>
<td>572</td>
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<tr>
<td>Hanchett</td>
<td>8/24/2011 9:00</td>
<td>67</td>
<td>280</td>
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<tr>
<td>Jones</td>
<td>8/24/2011 17:11</td>
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<td>198</td>
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<tr>
<td>North Michigan</td>
<td>8/24/2011 4:00</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Sherman</td>
<td>8/24/2011 9:30</td>
<td>70</td>
<td>526</td>
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<tr>
<td>Stoker</td>
<td>8/24/2011 9:16</td>
<td>160</td>
<td>233</td>
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<tr>
<td>Tulane</td>
<td>8/24/2011 9:35</td>
<td>711</td>
<td>631</td>
</tr>
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</table>

#### Daily Report: Power and Efficiency (Multismart Only)

<table>
<thead>
<tr>
<th>Site Name</th>
<th>P1 (kW)</th>
<th>P2 (kW)</th>
<th>P3 (kW)</th>
<th>P4 (kW)</th>
<th>P1 Cost (kW)</th>
<th>P2 Cost (kW)</th>
<th>P3 Cost (kW)</th>
<th>P4 Cost (kW)</th>
<th>P1 Cost (kW)</th>
<th>P2 Cost (kW)</th>
<th>P3 Cost (kW)</th>
<th>P4 Cost (kW)</th>
<th>P1 Cost (kW)</th>
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<tbody>
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<td>$6.00</td>
<td>$0.00</td>
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<td>Edison</td>
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<td>6</td>
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<tr>
<td>Hanchett</td>
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</tr>
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<td>Tulane</td>
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</table>

#### Flexible reporting package - Can customize reports

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**xylem**

*Let's Solve Water*
SCADA options

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Conclusion:

With the Advanced SCADA technology currently available, implementing fully functional systems is far easier, more cost effective and functional that ever.
Questions?

Thank you!