Intelligent Building Software for Smart Real Estate

Stewart Paterson – Director Business Development Canada
About ICONICS

Global Presence

Established 1986

Headquarters:
Foxborough, MA USA

Largest Independent provider of HMI/SCADA worldwide

Offices
USA, Canada, UK, France, Italy, Netherlands, Germany, Czech Republic, China, India, Australia

Microsoft Alliance

Windows Azure
Windows 8
SQL Server
Office
Windows Server 2012
Windows 7

Award Winning Partner

Microsoft Partner

Partner Ecosystem

80+ Countries
400+ Partners

- Distributor
- OEM
- Systems Integrator

Diverse Industries

300,000 Licenses Installed

- Manufacturing
- Building Automation
- Energy
- Water Treatment
- Electric Utilities
- Renewable Energy
- Oil, Gas and Chemical
- Metals and Mining
- Public Infrastructure
50,000 Buildings Worldwide Run ICONICS

- **5 Million Data Points**
  - Building Automation
  - Security
  - Lighting
  - Jetways
  - Baggage Handling
  - Moving Walkways
  - Billing Systems
  - Elevators / Escalators
  - Electrical

**SMART BUILDINGS**
- 6.5 Million sq. ft. Building
- 5 Million Data Points
- 3D Graphical Representations
- Effective Building Management
- Real-time Alarming
- Remote Monitoring and Control
- Integrates Disparate Systems
50,000 Buildings Worldwide Run ICONICS

New Headquarters Campus
- 20 Buildings – 389 Acres
- Fully Integrated prior to Occupancy
- Building Management Integration
- Integration All Building Systems: HVAC, Elevators, Irrigation, Boilers, Chillers, Traffic Lights, Parking Control, Pumping, Fire, PMCS,…
- Single Visual Front End

ENERGY SMART BUILDINGS
- 109 Buildings/35,000 Assets/7 BAS
- Real-time Situation Awareness
- Automated Energy Management & Reporting
- Energy Consumption
- Fault Detection & Diagnostics
- Integrate with Work Order System

Universal Connectivity
- BACnet
- Siemens
- Alerton
- Modbus
- SquareD PowerLogic
- SNMP
- Generators, PDU, UPS
Energy and Fault Detection Applications

PROJECT SPECIFICS
- 21 Premier Malls
- Operated at Mall Level
- Integrates HVAC, Energy, Lights
- Long Term History
- Fault Detection & Diagnostics
- Energy Analysis
- Peak Demand Monitoring

REAL ESTATE DASHBOARDS
- 35-story multi-tenant HQ Building
- Fault Detection & Diagnostics
- Energy Monitoring System
- Energy Usage Analysis for Equipment like Escalators, Elevators, Chillers, etc.

Tenant Billing Analysis
Real-Time Software Solutions

**Building Automation**
- GENESIS 64
- Human Machine Interface
  - Supervisory Control & Data Acquisition
    - WebHMI™ Portal Dashboards
    - Advanced Graphics in 2D and 3D
    - Alarm Management
    - Trend Charting
    - GEO SCADA Mapping
    - Asset Management

**Historian**
- Hyper Historian
- Enterprise Historian
  - High-Capacity 100,000 Samples/Sec
  - Mission Critical Redundancy
  - Virtualization
  - SQL Query Interface
  - Advanced Archival
  - Distributable Architecture
  - Real-Time Statistical Calculation

**Analytics**
- AnalytiX
- Analytics and Manufacturing Intelligence
  - Energy Management
  - Asset Fault Detection & Diagnostics
  - Manufacturing Productivity (OEE)
  - Alarm Analysis
  - Reporting
  - Enterprise Data Integration

**Mobility**
- Mobility
- Remote Visualization and Control
  - Role-Based Security
  - Any Place
  - Any Time
  - Any Device

**Modular • Interoperable • Secure • Reliable • Scalable • Unified**
Facility AnalytiX® Maximize Savings through FDD

- Monitor and Predict Equipment Performance
- Detect Problems Before Failure Occurs
- Continuous Commissioning

Equipment running outside set standards
Equipment not running as designed
Focus on the areas that matter the most
The Fundamental Components of FDD

Flexible Rules

Cost Calculations

Probable Causes

Paving the Way to Continuous Commissioning
ICONICS FDD Maximizes Efficiency

- Proven scalability for large portfolios
- Add, modify and adjust rules
- On-going visibility empowers technicians
- Libraries of proven fault rules

Top 20 Faults = 355,000 Opportunity

<table>
<thead>
<tr>
<th>VAV (all types)</th>
<th>AHU/RTU (ID)</th>
<th>Chiller Plant/Loop</th>
<th>Heating Plant/Loop</th>
<th>Misc. Exhaust Fans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damper Stuck Closed</td>
<td>Dirty Filter</td>
<td>High/low condenser/evaporator water flow</td>
<td>Boiler cycling</td>
<td>Off Hours Operation</td>
</tr>
<tr>
<td>Damper Stuck Open</td>
<td>Economizer Optimization</td>
<td>High/low refrigerant charge</td>
<td>Boiler inefficiency</td>
<td>Unoccupied Fan Operation</td>
</tr>
<tr>
<td>Fan Operation</td>
<td>Minimum Fan Speed</td>
<td>Condenser/Evaporator fouling</td>
<td>High/low hot water loop differential pressures</td>
<td></td>
</tr>
<tr>
<td>Fan Speed Optimization</td>
<td>Damper Stuck Closed</td>
<td>Refrigerant stacking in condenser</td>
<td>High/low boiler temperature/pressure</td>
<td>Low condensate return</td>
</tr>
<tr>
<td>High Fan Speed</td>
<td>Damper Stuck Open</td>
<td>Non-condensable gas in system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Duct Pressure/Flow Sensor</td>
<td>Damper Adjustment</td>
<td>Compressor inefficiency</td>
<td>Sensor failure</td>
<td></td>
</tr>
<tr>
<td>Occupied Setpoint</td>
<td>Off Hours Operation</td>
<td>Compressor hunting</td>
<td>Setpoint not met</td>
<td></td>
</tr>
</tbody>
</table>
## Prioritizing Faults, Manage Workload

### Top 500 Fault Savings for Selected Day

<table>
<thead>
<tr>
<th>Campus</th>
<th>Date</th>
<th>UniqueFaultID</th>
<th>AssetType</th>
<th>FaultType</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>EastCampus.33.LR.AHU.3</td>
<td>02/21/2014 8:00AM</td>
<td>Minimum Fan Speed Fault</td>
<td>AHU</td>
<td>Off Hours Operation Fault</td>
<td>$30,467</td>
</tr>
<tr>
<td>NorthCampus.BLDG2.L03.AHU.301</td>
<td>02/21/2014 7:46PM</td>
<td>Off Hours Operation Fault</td>
<td>AHU</td>
<td>Off Hours Operation Fault</td>
<td>$28,242</td>
</tr>
<tr>
<td>NorthCampus.BLDG2.L07.AHU.701</td>
<td>02/21/2014 7:46PM</td>
<td>Off Hours Operation Fault</td>
<td>AHU</td>
<td>Off Hours Operation Fault</td>
<td>$24,934</td>
</tr>
<tr>
<td>NorthCampus.BLDG2.L05.AHU.501</td>
<td>02/21/2014 7:46PM</td>
<td>Off Hours Operation Fault</td>
<td>AHU</td>
<td>Off Hours Operation Fault</td>
<td>$22,220</td>
</tr>
</tbody>
</table>

**Top 20 Faults = 355,000 Opportunity**
Real-Time Optimization - Probable Causes

'Overcooling' Fault Incident
Corporate Holdings, Shopping Centers, Swan Lake, HVAC, Zone 5, VAV-5-5

Probable Causes

91
Cooling setpoint is overridden and should be released back to normal operations.

5
Damper is fully open longer than it should.

5
Heating Valve is not opening properly and should be inspected.

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Fault Comment Tracking

**Leaking Cooling Coil**
- **Location**: Corporate Holdings; Shopping Centers; Swan Lake; HVAC; Zone2; RTU-2-1

**Incident Details**
- **Event Date**: 6/27/2015 7:14:06 PM
- **Status**: INACTIVE
- **Last Update**: 6/28/2015 7:13:33 PM
- **Duration**: 00d 23h 59m 27s
- **Conditions**: Dirty Filter; Low Pressure

**Comments**
- **Katie R.**, 6/1/2015 8:18:08 PM: [RTU-5-1; Leaking Cooling Coil 6/27/2015 8:20:57 PM]
  Inspected unit and saw possible leak. Applied patch, but may need replacement coil if the patch does not hold.
- **Andy L.**, 6/10/2015 8:17:34 PM: [RTU-5-1; Leaking Cooling Coil 6/27/2015 8:20:57 PM]
  Lowered Cooling Coil Temperature Setpoint to mitigate poor cooling.

**Comment Display Options**
- Only the Current Incident
- Fault Name: Leaking Cooling Coil
- Asset Name: Corporate Holdings; Shopping Centers; Swan Lake; HVAC; Zone2; RTU-2-1
- Active Time: 6/23/2015 7:40:06 PM
- Multiple Conditions
  - Multiple Incidents Having
    - Same Fault Name as the Current Incident
    - Same Asset Name as the Current Incident
    - Active Time in the Range:
      - From: 6/22/2015 7:19 PM
      - To: 6/28/2015 7:19 PM

**Refresh Comments**
Energy AnalytiX

Advanced Energy Management

- Consumption of Energy
- Cost of Energy Used
- Carbon Emission

Energy Star Reports
Create Energy Star compliant reports
Features of Energy AnalytiX

- Asset Based
- Metadata
- Calculations
- Market Agnostic
- Charts
- Quick Connect
Retro vs. Continuous Commissioning

- **Building constructed**
- **Efficiency Loss with Retro Commissioning**
- **Periodic retro-commissioning**

*Time*

5 years 10 years 15 years 20 years

Building Efficiency (%)
Retro vs. Continuous Commissioning

- FDD solution
  - Automates visibility to ALL equipment!
- FDD Solution Enabled Optimization
- Efficiency Loss with Retro Commissioning
- Retro-Commission < 5% of equipment per year
- Periodic retro-commissioning

Time:
- 5 years
- 10 years
- 15 years
- 20 years

Building Efficiency (%)
- 100
- 95
- 90
- 85
- 80
- 75
- 70
- 65
- 60
Big Data Platform

The Foundation of Analytics Solutions
ICONICS Healthcare Customers
ICONICS Federal Customers

- DISA
- Oak Ridge National Laboratory
- AWE
- CDC
- NASA
- HRVATSKI POVIJESNI MUZEJ
- MONOPOLIO DI STATO
# Why ICONICS?

<table>
<thead>
<tr>
<th>Data Capture</th>
<th>Integration</th>
<th>Visualization</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICONICS has always had open, industry standard protocol support</td>
<td>Calculation engines for data manipulation</td>
<td>Industry leading user experience and dashboards</td>
<td>Reporting and visualization from any device</td>
</tr>
<tr>
<td>OPC, OPC UA, OLEDB, ODBC, BACnet, SNMP, WS</td>
<td>Expression Engine, Unified Data Manager, Hyper-Historian aggregates</td>
<td>GraphWorX64, PortalWorX</td>
<td>WPF, Silverlight, Portal, HTML5 - Android, iOS, WP</td>
</tr>
</tbody>
</table>

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Thank you!