Partner Customer Case Study: ICONICS

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Microsoft
Accelerate IoT for Connected Operations

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VP of Worldwide Sales
About ICONICS
A Mitsubishi Electric Group Company

Headquartered in Foxboro, MA
Since 1986

80+ Countries
400+ Partners

375,000+
Installations Worldwide

Energy Smart Buildings
Smart Cities

Manufacturing Intelligence and Industrial Automation

Power & Water Utilities
Oil & Gas

Public Infrastructure

Gold
Microsoft Partner

Six-time Microsoft Partner of the Year
Manufacturing, Education, Health, Government, Financial Services, Media & Communications & Retail Industry Maps

Enabling Digital Transformation

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Automation Software for Any Industry

Automotive
Building Automation
Food & Beverage
Government & Military
Manufacturing
Oil & Gas
Materials & Pharmaceutical
Sustainability
Transportation
Utilities & Energy
Water
Over 375,000 Applications Worldwide

- US Govt (Pentagon, DISA, etc.)
- Cadillac Fairview 21 High Rises
- Argonne National Labs
- FCA Casting Plant
- Target 1830 Bldgs
- Raytheon 56 Bldgs
- Hess Midstream Processing
- FLSmidth
- ExxonMobil Houston 23 Bldgs
- Singapore (JTC & Ascendas)
- BMW Spartanburg
- Purdue University
- Microsoft 138 Bldgs
- AT&T 900+ Bldgs
- Scholle IPN
- ZF Axle
## Connected Factories
Solution Capabilities for Industry 4.0 and Advanced Digitization

<table>
<thead>
<tr>
<th>Automation</th>
<th>Production Efficiency</th>
<th>Industrial Internet of Things (IIoT)</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCADA / Control</td>
<td>OEE</td>
<td>Edge Analytics, Logging &amp; Data Visualisation</td>
<td>Connected Field Service</td>
</tr>
<tr>
<td>Human Machine Interface (HMI)</td>
<td>Energy Management</td>
<td>Cloud Communications MQTT, AMQP, REST, HTTPS</td>
<td>Augmented / Mixed Reality plus NFC, GPS, QR</td>
</tr>
<tr>
<td>High-speed Data Logging (Data Historian)</td>
<td>Performance Analytics</td>
<td>Azure IoT Edge Containers</td>
<td>Self-service Dashboards</td>
</tr>
<tr>
<td>Advanced Alarming</td>
<td>Condition Monitoring</td>
<td>Gateway Command &amp; Control</td>
<td>Responsive Command and Control Apps</td>
</tr>
<tr>
<td>Data Orchestration</td>
<td>Plant-floor KPI Dashboards</td>
<td>Remote Device Management</td>
<td>Data Collection in Mobile Apps</td>
</tr>
</tbody>
</table>

Learn More Here

Azure
Digital
Twins
Connected Field Service
Energy Management
Condition Monitoring
Performance Analytics
High-speed Data Logging (Data Historian)
SCADA / Control
Human Machine Interface (HMI)
Advanced Alarming
Data Orchestration
Exception Based Surveillance
Centralized Monitoring and Control
with Azure IoT Hub and Azure-based SCADA

Customer Business Goal
Leverage Cloud Platform and IoT Technologies to reduce operating costs, improve resiliency and performance

ICONICS Solution
Full SCADA with command and control, alarm and historian across 900 sites, 1200 wells, 1.6 Million points, 500,000 alarms. Connected geographically disparate data to Azure IoT Hub via IoTWorX. Provided alarm rationalization, high speed data storage and mobile visualization

Results
Asset-based Mobile HMI cloud system improved operator response and reduced operating costs by $5MM over 8 years. Disaster recovery system leverages Azure platform scalability. Preparing to leverage advanced Azure PaaS services including Azure Data Lakes, and Machine Learning.

“We deployed an enormous system with ICONICS GENESIS64, and are moving it to the Azure Cloud with Azure IoT Hub and ICONICS IoTWorX with disaster recovery and greatly improved mobile operator interface”
- Clifton Summers, Senior Technical Manager, Hess Corporation
Oil and Gas Case Study: Hess
Process Control system that is accessible to mobile users

- **Requirements**
  - Low Latency, Edge Intelligence
  - Interoperability/connectivity
  - Enterprise Visualization
  - Enhanced Security, DR

**Why ICONICS?**
- IoTWorX – Edge Intelligence
- Rich visualization on any glass
- Flexibility & scalability
Customer ShowCase

Manufacturing Intelligence
Real-Time Dashboards on MS Azure with Power BI

Customer Business Goal
Provide Real-Time dashboard to improve OEE, SPC & Machine performance

ICONICS Solution
Provided common metrics for driving improvements, resulting in a system that could be deployed across Scholle globally.

Results
ICONICS OEE solution deployed to all 12 Scholle sites around the world.

"The mantra we follow “Reactive moves to Proactive and eventually to Predictive”, is underpinned and supported by ICONICS."
- Martin Molloy, Global Continuous Improvement Manager at Scholle

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Production Monitoring and Control across **12 plants** and 502 machines **worldwide** with **MS Azure**

- **MS Azure** access from anywhere
- **OEE and KPI’s**
- **ERP Order Integration for Operators**
- **Power BI integration** with business systems
- Unified data model for decisions
- Real-time Machine Status
- Alarm Management
- **Worldwide Data Access**
- **Enterprise Historian**
- **Statistical Process Control with 3.5 Million Samples Per Machine**
- High-Speed Operation: 85 charts for every product at **2 seconds per product**
**ICONICS Suite of Solutions V10**

### HMI / SCADA

**GENESIS64™ MobileHMI™ KPIWorX™**

**HMI, SCADA, Dashboarding**
- HTML5, WPF
- Self-service dashboard
- Advanced Graphics in 2D and 3D
- Smart pins
- GEO Mapping (GIS)
- Asset Management
- Trend Charting
- Standard interfaces

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### Historian

**Hyper Historian™**

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

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### Analytics

**AnalytiX®**

**Analytics**
- Energy Management
- Asset Fault Detection and Diagnostics
- Predictive Maintenance
- Manufacturing Productivity (OEE)
- Alarm Analysis
- Reporting and AnalytiX-BI

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### IoT

**IoTWorX™**

**IoT and Cloud**
- IaaS, PaaS, SaaS
- Pub/Sub Architecture
- Message Oriented Middleware
- Built-in Security
- Edge Analytics
- Over-air-configuration
- Standard interfaces

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**Modular • Interoperable • Secure • Reliable • Scalable • Unified**
From Edge to Cloud – One Platform

Scalable Software Solutions

Edge
- IoTWorX
  - Embedded SCADA
  - Linux, Raspberry, Windows 10 IoT

IoTWorX
- Edge
  - Embedded SCADA
  - Linux, Raspberry, Windows 10 IoT

Mobile
- Windows Phone, iPhone, Android
- Tablets
- Watches
- Augmented Reality
- Smart TV

GENESIS64
- Desktop
- Single Computer
- Server-Client
- Fat Client
- Thin Client, Web Client, Terminal Server

Enterprise Integration Platform
- Distributed Architecture
- GENESIS64, AnalytiX, Hyper Historian

Cloud SCADA
- Platform Cloud Services
  - ICONICS Suite in the Cloud
  - Public, Private, Hybrid
  - Secure Connectivity
  - Azure Services

Cloud Services
- Azure Services

Edge to Cloud
One common platform and code base from Edge to Cloud for Visualization, Command, Control, Historization, Event Handling and Analytics.

Open and Secure for interoperability with IoT, Controllers and Computing Systems of All Types

Open and Secure for interoperability with IoT, Controllers and Computing Systems of All Types
Universal Connectivity

Equipment

Control Systems

Open Protocols

Centralized, Uniform Platform delivered on a Single Pane of Glass

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Convergence of Disparate Devices to One IoT Platform

Connectivity (Edge)

Software Gateway

Cloud Applications

Equipment

Control Systems

Open Protocols

Connectivity (Edge)

Cloud Applications

MQTT

AMQP

Closed Loop IoT/Service Platform

Enterprise Historian

Customer

Provisioning and System Configuration

Customer Support

CFS ICONICS

Connected Field Services

ICONICS Asset Manager

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Establish bidirectional communication with thousands of IoT devices
  • Secure transport of telemetry data from device to cloud
  • Communication via a publisher/subscribe methodology (Pub/Sub)
  • Secure transport protocols: AMQP, MQTT, REST, Web Services

Authenticate per device for security-enhanced IoT solutions
  • Independent credentials and identities for each connected device
  • MS Azure IoT Hub TLS Security Supports TPM + X.509

Automate IoT device provisioning and registration to accelerate deployment
  • Zero touch provisioning secure and scalable
  • Load balance across multiple IoT Hubs
  • Device Provisioning Services (DPS) with MS Azure IoT Hub

Cost effective platform and networking with cloud technology at the edge device
  • Store and Forward for resiliency and network efficiency; Low cost hardware and operating system
  • Easy Orchestration of micro-services (containers) for device twins and edge analytics
  • Azure IoT Edge Operating System (residing on the IoT gateway)
IoTWorX™ Integrated IoT Solution

Cloud Connectivity
- Built in secure Cloud Connectivity
- Quick time to cloud deployment
- Enterprise wide Visualization
- Remote Monitoring
- No touch provisioning from the cloud

IoTWorX:
- Real time data logging and visualization at the edge
- FDD analysis at the edge
- Data Storage at the edge
- Store and forward Data to cloud
- Local Playback on IoT Visualizer
- Supports up to 5000 tags
Azure IoT Edge is a fully managed service that allows you to deploy Azure and third-party services, and edge modules to run directly on IoT edge devices, whether they are cloud-connected or offline.

The **IoT Edge security daemon** starts each time an Edge device boots and bootstraps the device by starting the IoT Edge agent.

The **IoT Edge agent (is the manager)** facilitates deployment and monitoring of modules on the IoT Edge device, including the IoT Edge hub. Ensures that IoT Edge modules are always running.

The **IoT Edge hub (is the communicator)** manages communications between modules on the IoT Edge device, and between the device and IoT Hub.
IoT WorX™ Software Stack

- Azure IoT Edge Runtime Platform
- Linux Ubuntu
- Docker Containers
- IoT Cloud Connector
- IoT Communicator
- IoT Hyper Collector
- IoT Analyzer
- IoT Visualizer
- Integrated MQTT Broker
- System Health
• Secure, Automatic (no touch) Provisioning
  • Azure DPS (Device Provisioning Service)
  • TPM (Trusted Platform Module)
  • Zero touch provisioning over cloud
  • Device Vendor installs Device Software
  • User provides (to device vendor)
    • ID Scope
    • Registration ID (not needed if TPM based)

• Optional Manual Provisioning
  • User installs device software and manually enters connection string
Getting Started with IoTWorX

<table>
<thead>
<tr>
<th>Model</th>
<th>IoT Cloud Connector</th>
<th>IoT Communicator</th>
<th>IoT Collector</th>
<th>IoT Analyzer</th>
<th>IoT Visualizer</th>
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<tr>
<td>IoTWorX Communicator 5000 Tags*</td>
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* Requires subscription for one or more ICONICS products in the cloud. All ICONICS IoTWorX models are available through affordable subscription pricing.

Minimum Hardware requirement (Windows10)

- Processor: Intel Atom 38xx 03 39xx Dual Core
- Memory: 4GB RAM
- Storage: 32GB SSD

Minimum Hardware requirement (Linux Debian)

- Processor: ARM CorteX A53
- Memory: 1GB RAM
- Storage: 32GB Micro SD

Minimum Azure Services

- Virtual Machine - Minimum DS2_V2: 2 cores, 7GB RAM, 14 GB Disk Space
- Azure IoT Hub – S1 recommended
- Azure SQL Database - Basic
Connect with ICONICS

Rev up your digital transformation journey today

Email iot@iconics.com

www.iconics.com

https://iconics.com/WWCS
Q&A
Thank you!