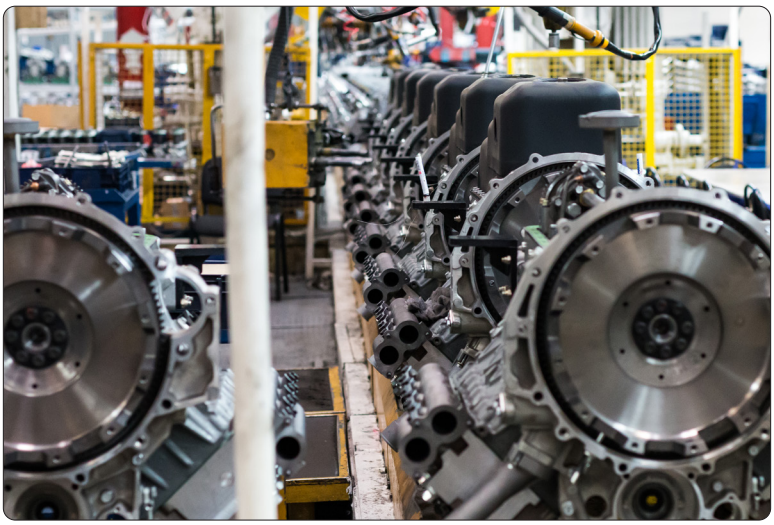
How an Automotive Manufacturer Successfully Deployed New IIoT Technologies for Product Process Data and Traceability

Leveraging Modern IT Technology to Improve Product Manufacturing on the Shop Floor

A large-scale manufacturer of automotive components recently needed to implement new Industrial Internet of Things initiatives into its process due to customer requirements. Many large automobile companies are starting to require deeper levels of traceability, genealogy, and process data delivered with the products they integrate into today's vehicles.



Because customers were requiring these IoT features for more visibility, it helped create a strong sense of commitment in the organization to implement changes. The strong customer requirement helped open the door and greenlight the ability to bring in new Industry 4.0 technology approaches to the plant floor instead of keeping with the automation world status quo.

To achieve the goals of an IIoT upgrade, the manufacturer required status information from all production equipment throughout each manufacturing site. Some equipment was modern or PLC controlled, and some equipment dated back to the 1970s with no integrated data connectivity.

The Solution

To start the process of implementing and deploying IoT technologies into its processes, the manufacturer brought in some help. They created a proof of concept in one plant, utilizing Inductive Automation as a solution partner. Inductive Automation provides Ignition, a software platform that allows users to seamlessly collect data and help to design industrial applications with ease. Advantech's intelligent hardware is compatible with numerous software solutions, including Ignition. Working with eco-partners, systems integrators and additional software providers, Advantech devices are ideal to work with Ignition Edge and Ignition Enterprise.

For the first proof of concept, the automotive manufacturer team deployed Ignition to complete basic OEE reporting from its assembly process in an effort to visualize data. From there, it only took a few days to have a full proof of concept to launch a pilot program on the assembly line—a process that can usually take up to six months or more.

The goal was to leverage modern IT technology to improve the way the company was building product on the shop floor. The pilot program was then rolled out to assembly lines across the company's many manufacturing sites. To avoid the common issues of "proof-of-concept purgatory," and get its IIoT initiative off the ground floor, the team kept with the following charges:

- Made sure to get buy-in from all levels of the organization, especially the operations system group.

- Formed an implementation and deployment team that included members from several different business groups—engineering, IT, operations, etc. Everyone's skills and expertise helped to leverage the right technology in the right way.
- Aligned Key Performance Indicators (KPIs) with the whole team to make it easy for everyone to leverage the new collected data.
- Closely involved the engineering team so that as they're designing new products and specking new equipment, they are ready to plug into the ecosystem.
- Connected and worked closely with the right partners for both software and hardware solutions.

Several Advantech hardware solutions were included in the IIoT application for data visualization on the automotive shop floor, including the following:

Wzzard Wireless Mesh Sensing

Advantech's Wzzard Wireless Mesh Sensing platform was used to gather data from legacy assets to create a basic OEE profile, which was not previously available. The relay logic that controlled the machine's operation was connected to the digital inputs of the Wzzard sensing nodes, enabling data to be gathered on machine status, utilization, and output.

Wzzard nodes have a five-year battery life, which simplifies installation, and others were powered by 24VDC where that power was readily available. The sensing nodes publish data over a self-forming, self-healing wireless mesh network to a gateway. The gateway aggregates the data and publishes it to the Ignition application over MQTT.

BB-WSD2M06010, Wzzard Industrial Wireless Sensor Node - 6 Digital Inputs, M12

The Wzzard™ intelligent wireless sensor platform creates a complete, quick and easy connectivity stack between your sensors and application—on your network or the Internet.

- Industrial node with 6 digital inputs, internal temperature
- Ultra-low power 802.15.4e SmartMesh IP technology
- Communicates with SmartSwarm 342 gateway via highly scalable and reliable wireless mesh networks
- Connect to industry standard analog or digital sensors
- Rugged, IP67-rated, fiber-reinforced polyester PBT enclosure
- MQTT and JSON IoT protocol to application platform
- Sensor interface cable and antenna included

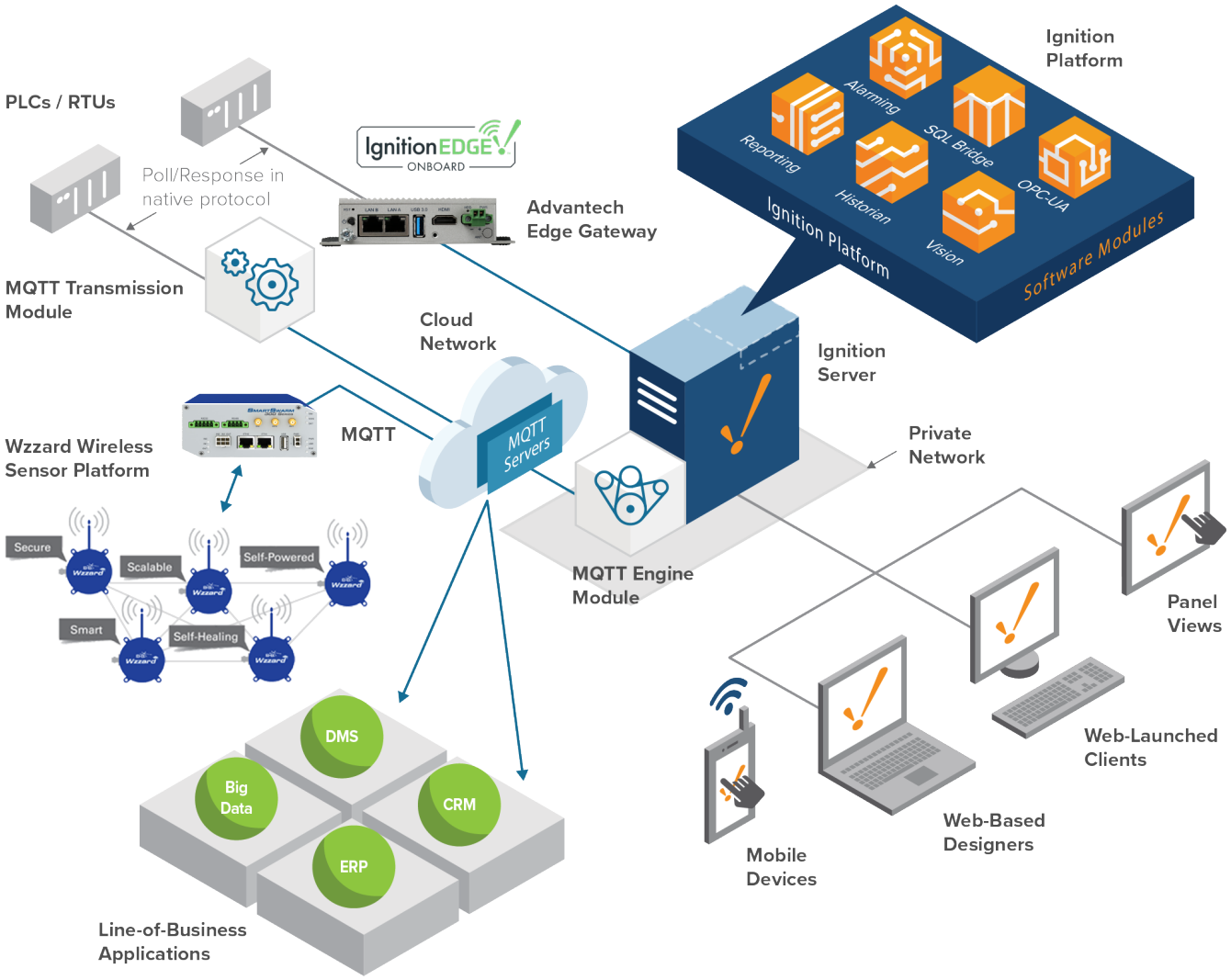
BB-SG30000525-42, SmartSwarm 342 Gateway - 2 Ethernet, Dust, International Power Supply

The SmartSwarm 342 IIoT gateway helps owners and operators of remote assets integrate data from those assets into IIoT applications such as dashboarding, analytics, or predictive maintenance.

- Configurable user business logic data processing and display engine
- Comprehensive data outputs via MQTT, email, SMS and a variety of other services and database connections
- Cellular or Ethernet connection to IIoT system
- Acts as LAN to WAN bridge for third party device connection

Ignition IIoT Architecture

Cloud-Based Redundant MQTT Server Solution



Edge Data Collection

Advantech's UNO-2000 Series IoT Gateway, equipped with Ignition Edge IIoT, is an ideal solution for polling PLCs at the edge of the network and transmitting that data through MQTT to an on-premise or cloud application. This allows you to make device data the one source of truth, improving data throughput, data reliability, reducing latency, and getting access to more data. Easily combine with Ignition Edge Panel to visualize critical data at the edge of the network.

When running Ignition Edge MQTT, the UNO is equipped with OPC-UA, Modbus, Siemens and Allen Bradley suite of drivers, supporting up to 500 tags. Data is seamlessly integrated with Ignition by the MQTT Engine by Cirrus Link Solutions, using the Spark Plug MQTT standard. The UNO can be used in combination with Advantech sensor nodes to easily add sensor data. Advantech has a broad offering of wired and wireless sensor nodes also featuring MQTT, many with added flexibility for Modbus TCP and REST interfaces.

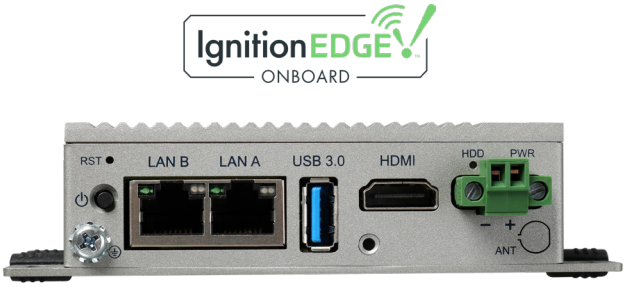
UNO-2271 with Ignition Edge bundle

Smart Factory Edge Gateway

Advantech's UNO-2000 series of embedded automation computers are highly ruggedized, fanless, and have a modular design. The UNO-2000 series includes pocket-, small-, and regular-sized form-factors for different types of smart factory

applications. The modular design of UNO- 2271G features optimized I/O and offers three different configurations. It also supports Advantech's iDoor technology via a second expansion stack. The UNO-2000 series provides flexible and time-to-market support for a variety of applications

- Intel® Atom™ E3815/E3825 processor with 4GB DDR3L onboard memory
- 2 x GbE, 1 x USB 3.0, 1 x HDMI, Option 2 x RS-232/422/485 or 3 x USB2.0
- Compact fanless Design
- Rubber Stopper Design with internal reserved screws for 2nd layer assembly
- Diverse system I/O and Isolated Digital I/O by iDoor Technology
- Supports Fieldbus Protocol by iDoor Technology
- 3G/GPS/GPRS/Wi-Fi communication by iDoor technology
- Supports 30+ iDoor combination with four main categories of smart factory applications
- 32GB eMMC storage onboard



About Inductive Automation

Inductive Automation creates industrial software that empowers organizations to swiftly turn great ideas into reality by removing all technological and economic obstacles. By cross-pollinating IT with SCADA technologies, Inductive Automation created Ignition software, the first universal industrial application platform with unlimited potential. Ignition empowers industrial organizations around the world and in virtually every industry, with an outstanding software platform and top-notch support. For more information, visit inductiveautomation.com.

Learn More about the IIoT

To learn more about successful IIoT technology deployment projects and IIoT trends, check out our "IoT at the Edge" podcast with Mike Fahrion, CTO of IIoT Solutions at Advantech. Listen to the podcast here: https://soundcloud.com/iotattheedge.

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