Option 2

Stratus Innovation Group Intelligent Factory Solution

Using IoT to improve manufacturing

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Agenda

1. Internet of Things (IoT) market opportunity and challenges

2. How the Intelligent Factory Solution works

3. Intelligent Factory use cases

4. Intelligent Factory Solution architecture

Internet of Things

A growing market opportunity for manufacturers and device makers

#1

The manufacturing industry is where most Industrial IoT projects are realized and where most Industrial IoT investments are made.[2]

15%

Percentage of all U.S. IoT purchases that manufacturing is expected to account for in 2020.[2]

60%

Percentage of early movers in manufacturing that say they are using IoT solutions to improve the reliability or performance of products and services.[2]

Core challenges for ODMs and manufacturers

Productivity & profitability

The fear among manufacturers that they will have to make huge investments in new equipment to enable IoT solutions that can help them reduce waste, improve efficiency, and lower operational costs, plus device manufacturers' constant struggle to find new services and revenue streams to complement the sale of their hardware devices.
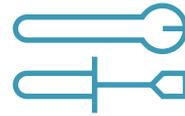
Time to market and time to value

Slow time to market and time to value for IoT solutions due to long and costly development cycles and the difficulty of moving IoT projects from prototype to full deployment.

Cost & complexity

The cost and complexity of developing IoT solutions, especially those with advanced capabilities such as machine learning and artificial intelligence, plus the difficulty of enabling and connecting legacy devices and brownfield equipment in an IoT network.

Stratus Innovations Group Intelligent Factory Solution

Implement IoT and predictive maintenance faster, easier, and with less risk

Predictive maintenance and connected field service

Reduced costs and less risk

Rapid time to market and time to value

Predictive maintenance and connected field service

Additional functionality takes solutions far beyond simply monitoring the current health of devices

Use the extensible machine learning engine to enable predictive analytics and anticipate potential problems before they occur.

Easily transition from device health and process insights to predictive analytics and preventive maintenance to reduce process outages and production downtime.

Pinpoints the problem before it develops and enables manufacturer to proactively dispatch a field technician to the right device with all of the information they need to address the situation.

Supports large-scale requirements for real-time global operation process support and connected field service.

Reduced costs and less risk

Uses pre-built components to significantly reduce the cost of solutions and the risk of implementation

Lowers both up-front provisioning cost and ongoing operational costs to deliver exceptional ROI and reduce TCO.

Near zero risk of implementation project failure eliminates many barriers and disincentives for IoT solution development and deployment.

Supports hyperscale computing for easy scalability and unrestricted growth.

Includes services that help devices efficiently and accurately communicate telemetry data to the database.

Rapid time to market and time to value

Dramatically reduces the time required for IoT solution development and deployment

The IoT Protocol Gateway Adapter offers incredibly fast time-to-market and time-to-value by enabling manufacturers to quickly and easily connect existing legacy devices to the IoT network

Easily ramp up a pilot or proof of concept (usually in 1-4 weeks) to demonstrate overall functionality and move more quickly to production and implementation

Ensure optimal communication and data transmission with software adapters that connect disparate devices, controllers and HMIs to the Azure IoT Hub

Plug into disparate device platforms and leverage the same solution for multiple product lines and product offerings

Powered by Microsoft Azure

Built on Azure services, the Intelligent Factory solution provides the security, remote management, and powerful analytics that manufacturers need

Ease of connectivity

Flexibility and scalability

Predictive analytics

Data and intelligence

Security and management

> **Our field techs are absolutely amazed at the visibility we can now provide on the health and welfare of our laser devices."**
>
> — **COO**, Global Device Manufacturer

Customer logo
if possible

In three weeks, a Southern California EPG manufacturer went from concept to production of a deployed solution, which was provided to global factory technicians. The solution currently supports uploading device-log data files to a central website. Future enhancements will include uploading device telemetry automatically and providing machine learning for predictive analytics. A key benefit is the ability to use the same solution for additional product lines and product offerings.

" We were impressed with how quickly we could take our existing customer devices and connect them to the Azure IoT Hub to gain real-time device telemetry data."

— **Lead Architect**, Global Device Manufacturer

Customer logo
if possible

In just four weeks, a global manufacturer based in New England went from concept to a fully functioning prototype, providing its global management team with an industrial IoT solution that supports a proprietary customer front-end UI/UX tool for developing web and mobile device applications. A key feature of the new solution is its ability to leverage device communication code for the entire disparate device product line, which has been expanding primarily due to corporate merger-and-acquisition activities.

Next steps

→ Contact your Microsoft representative

→ To learn more about Stratus Innovations Group solutions, or to contact Stratus Innovations Group directly: https://stratusinnovations.com/solutions/intelligent-factory/

Enabling Remote Mgmt of Discrete Mfg HW

Stratus Innovations Reference Architecture (Components in white are to be added to complete the solution)

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Edge Intelligence	Cloud Upload	Cloud Services	Cloud Intelligence	Mgmt Experience
Our unique adapter module is easily compiled to add cloud capabilities to your existing devices, controllers and HMIs.	Our software uploads key ops data to the cloud so your team and customers can keep equipment operating at peak efficiency.	Microsoft's Azure cloud offers a secure, scalable and resilient platform for our solution and for your customer's data.	Cloud modules provide a full view of your equipment and how it's working for customers so you can optimize results and reduce costs.	Our solution includes a web-based management application and a full API that allows for custom features and integration with your systems.

Left icons:
- TEMPERATURE REGULATOR HW
- ITEM SHAPE MONITOR HW
- COORDS MEASURING HW
- LASER POSITION SYSTEM
- OTHER DISCRETE MFG HW

Edge Intelligence:
- ON BOARD CONTROLLER
- EXTERNAL CONTROLLER
- MULTI-PLATFORM / MULTI-PROTOCOL DEVICE TWIN AND CLOUD CONNECT MODULE
- ENHANCED HMI / UPLOAD LOGIC
- CONFIGURE THRESHHOLDS FOR TESTING
- CONFIGURE EXPECTED USE FOR OEE CALC

Cloud Upload:
- UPLOAD DEVICE STATUS, CONDITION, OPERATION, TELEMETRY, TEMP, ETC.
- SYNC LOCAL CONFIG WITH THE DEVICE TWIN IN THE CLOUD (BOTH DIRECTIONS)

Cloud Services:
- BI-DIRECTION DEVICE TWIN
- AZURE IOT HUB
- STREAM ANALYTICS
- SERVICE BUS + EVENT MGR
- AZURE COSMOS DB

Cloud Intelligence:
- AZURE WEB JOBS
- CALCULATE OEE, MOVING AVGS, ETC.
- AZURE ML (DAILY SCHED)
- DETECT OUTLIERS
- AZURE APP SERVICES
- R/W REST API FOR WEB AND INTEGRATIONS
- AZURE FUNCTIONS
- CHECK FOR ERRORS AND EMAIL ALERTS

Mgmt Experience:
- DASHBOARD: HW STATUS, EVENTS, OEE
- POWER BI HISTORICAL REPORTS
- WHITELABEL MGMT WEB APPLICATION
- DEVICE TWIN CONFIG (TWO WAY)
- ACCT MGR: CUSTOMER EQUIP REVIEW
- MFG OPS MGR: REVIEW EQUIP OVERALL PERF
- EX: ADD TICKET IN CRM,
- CUSTOMER EMAIL ALERTS

Right icons:
- CUSTOMER OPS/PLANT MGR
- CUSTOMER LINE MANAGER
- CUSTOMER HW OPERATOR
- MANUFACTURER OPS/PROD MGR
- MANUFACTURER TECH ACCT MGR

Legend:
- Partner component
- Solution Builder component
- Azure service
- Microsoft product
- Customer component
- Components to be added