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SIEMENS DIGITAL INDUSTRIES SOFTWARE

IoT connectivity for **brownfield facilities**

Achieving intelligent production excellence – learn how to get it done

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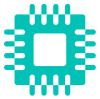
Connecting brownfield environments

Existing manufacturing plants are often filled with old, but still-functional equipment that have several years of service left. Getting these assets connected to a modern, cloud-centric Internet of Things (IoT) system is a necessary step to transform operations by adopting cutting-edge manufacturing solutions and deliver high-quality products on time.

However, getting older assets connected to the Siemens Industrial IoT is a large undertaking that can often seem too complicated. Luckily, three factors are making brownfield – the retrofitting of equipment with sensors to be IoT-ready – digitalization increasingly attractive and accessible to manufacturers:

Advancements in Siemens Industrial IoT

- Availability of proven, hardened, secure solutions based on mature cloud hyperscale technology
- Prevalence of Insights Hub applications and solutions



Availability of add-on sensors

- IoT sensors can be installed on existing assets that don't have them, or that need more
- Sensor cost has declined

Accelerated proof-of-concept (PoC)

- Availability of "pay for what you use" cloud pricing and the low cost of sensors
- Minimal investment needed for companies to create IoT pilots
- Ability to digitalize incrementally rather than all at once

$1.3billion

Capgemini estimates that building an automotive smart factory from the ground up costs between **$1 billion to $1.3 billion** – around 200 times as much as updating an existing facility[1]

How complicated is brownfield connectivity?

While it's gotten easier to implement Industrial IoT, there are still several challenges that companies face when trying to modernize an existing manufacturing facility. Getting a disparate set of machines connected to a central location is challenging due to...

Legacy equipment with outdated or insufficient sensors – or no sensors at all

Lack of a use case or clear alignment with business objectives, resulting in stalled PoCs

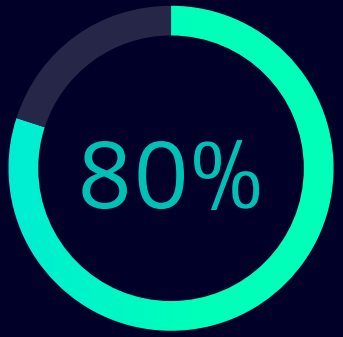
Heterogeneity: different machine types and brands – all with different protocols

Processing systems that connect locally, but not to the cloud

Disconnected, siloed production lines and factories

Security concerns

Lack of IT or ops skillsets



of all IoT projects fail at the implementation stage due to **improper methods of data collection**[2]

While there are plenty of challenges, some IoT solutions have been developed to specifically address these obstacles. Insights Hub, the Industrial IoT application suite from Siemens, tackles the connectivity of disparate, old machines in a very flexible and secure manner.

Insights Hub is the Industrial IoT application suite at the core of the Industrial Operations X technology portfolio for improved decision making. It empowers smart manufacturing to generate actionable insights from assets and operational data while driving manufacturing excellence and improving operational efficiency and quality. Industrial Operations X technology consists of Industrial IoT, Industrial Edge, and Industrial Low Code, enabling Siemens, customers and partners across the Siemens Xcelerator ecosystem to build industry-specific applications.

How Insights Hub connects your brownfield environments

With access to decades of industrial expertise, the Insights Hub solution leverages a broad spectrum of Siemens' technology and business partnerships, offering innovative connection options for the most diverse environments. Uniquely, Insights Hub offers:

Secure asset on-boarding

Bi-directional encrypted data communication

Data transformation and analytics at the edge and in the cloud

Available and ready-to-deploy applications and solutions to realize quick ROI, lower costs and increase quality

Let's take a look at how Insights Hub does this.

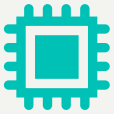
"We've seen up to 80 % of a shop floor connected out-of-the-box with Insights Hub connectivity solutions – and the rest was able to be configured[3]

The layers of connectivity

To get your machines, products and parts connected to the Insights Hub, you need to enable several layers of connectivity, including the asset, local network and cloud.

The Insights Hub suite of solutions provides realistic options to get you connected quickly, flexibly and securely with every layer.

Here's a closer look at what the layers entail:



Assets: Every asset you monitor must have sensors connected for each parameter you want to measure.

Local network: Sensors send data to an aggregator or gateway, which is often a programmable logic controller (PLC) or specific gateway device.

Local data collection, transformation and analytics: Analysis of aggregated data can occur at the edge for speed-critical decisions. Meanwhile, data is also sent to the cloud for aggregation across multiple locations and higher-level analytics such as model optimizations.

Cloud: Data that arrives from one or more gateways can be securely partitioned and/or federated with other factory and system data for more complex analytics and optimization. Moving data to the cloud provides greater compute, storage and memory resources that are fast, powerful and cost-effective.

Connecting to Insights Hub

1 Sensors

Sensors come with a large variety of protocols – with Insights Hub, this doesn't matter. Use the sensors you have and/or install the ones of your choice.

2 Gateway

Insights Hub provides software and hardware solutions that support a large range of protocols, several data sources, etc.

3 Deployment

- Cloud: Use Insights Hub how and where you want: on the public cloud through hyperscalers, such as AWS; on a virtual private cloud (VPC); or on a hybrid cloud environment.
- Edge: Perform low-latency analytics at the edge.
- On-premise: Use Insights Hub on a private local cloud (with the Siemens IBM Redhat turnkey solution)

Insights Hub flexible OT connectivity

2200+ connectable devices from sensors up to lines

Hardware and software gateways: a closer look

Siemens offers a number of hardware and software gateways to meet the needs of any manufacturer.

Hardware

Insights Hub Connectivity IoT 2040: An entry-level, pre-configured device for collecting and transferring data to Insights Hub. With a data reading cycle of up to 30 data points per second, it is well adapted to smaller production environments.

Insights Hub Connectivity Nano: A pre-configured device for collecting and transferring data to Insights Hub. It has a data reading cycle of up to 250 data points per second, allowing for constant monitoring of the industrial process and near real-time business insight.

Insights Hub Connectivity IoT 2050: A device that supports transmission of data through a secure Internet connection to Insights Hub to enable cloud-based applications and services through different protocols. It has also a data reading cycle of up to 250 data points per second.

Software

Insights Hub Connectivity LIB: Insights Hub Connectivity LIB is a software development kit (SDK) that enables self-programming of customer or use case specific connectivity agents. It supports encrypted transmission of on-site data to Insights Hub through a secure internet connection, to enable cloud-based applications and services. It enables connectivity for almost every asset creating flexibility that can drive deeper insights into your business.

Insights Hub Connectivity Software Agent: A cost-effective, virtual representation of the Insights Hub Connectivity firmware that can be installed on a Windows 10 system that supports Hyper-V or as Docker for INTEL or ARM based systems. It allows you to connect all existing hardware to Insights Hub.

Insights Hub Connectivity Edge Analytics: Collects a huge amount of data (up to 50Khz) from a wide range of data providers and calculates KPIs on the edge. Send the calculated KPIs and preprocessed data into Insights Hub for further calculations and analysis.

Insights Hub Connectivity Integration: Enables connection of multiple data systems to Insights Hub. Using browser-based tools to graphically configure data value mapping, Insights Hub Connectivity Integration provides flexible tools to bring enterprise systems and data historians into context with Insights Hub.

Insights Hub MindConnect MQTT: Enables connecting agents or systems to Insights Hub using MQTT and OPC UA Pub/Sub protocols. It allows you to seamlessly perform bidirectional communication between applications in Insights Hub and the agents on the field.

Insights Hub Connectivity IoT Extension: A connectivity layer that expands the number of protocols that can communicate directly with Insights Hub. Various field protocols are supported along with an increased range of hardware connectivity agents that create direct connections to assets in the production environment.

The right solution for brownfield connectivity

Siemens Insights Hub offers connectivity options with software, hardware and professional services that are designed to maximize the capital investment in your existing equipment by enabling you to integrate it into the connected factory and keep it up-to-date throughout its entire lifecycle.

Start for Free

See how easy it is to connect a device, get a Insights Hub Start for Free account.

About Siemens Digital Industries Software

Siemens Digital Industries Software helps organizations of all sizes digitally transform using software, hardware and services from the Siemens Xcelerator business platform. Siemens' software and the comprehensive digital twin enable companies to optimize their design, engineering and manufacturing processes to turn today's ideas into the sustainable products of the future.

From chips to entire systems, from product to process, across all industries, Siemens Digital Industries Software – Accelerating transformation.

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For additional numbers, click here.

1 Automotive Smart Factories, Capgemini, 2018.
2 IFC White Paper, IoT 2020: Smart and Secure IoT Platform
3 Internal Siemens expert

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