Insights Hub
Device Connectivity

Overview

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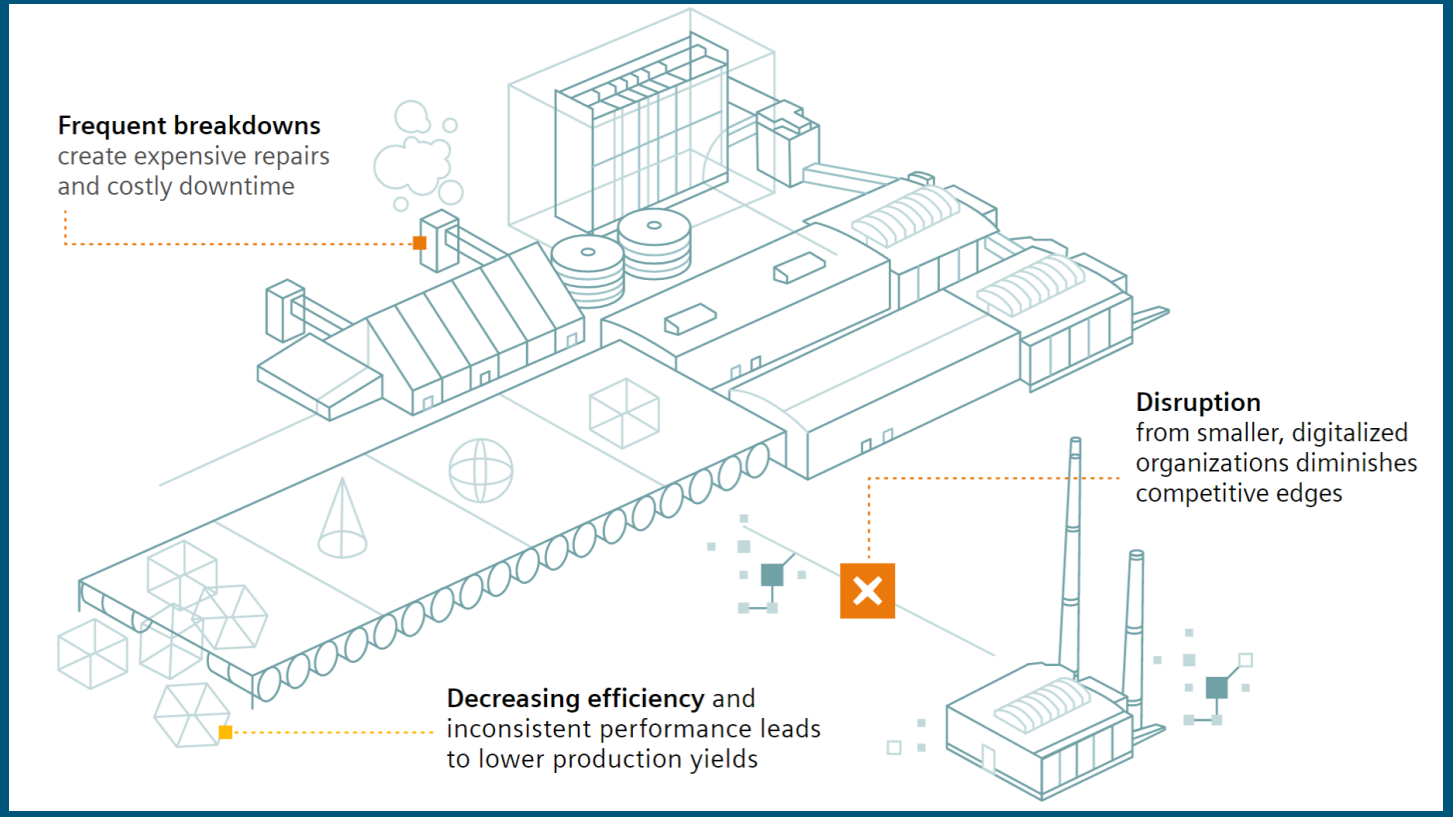
Not investing in digitalized solutions will continually burden you with *avoidable* issues



Use the industrial IoT to get connected and digitalized:

$1.3 billion

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]

[1] Automotive Smart Factories, Capgemini

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Industrial IoT is about things and their data.

It all starts with **connectivity**.

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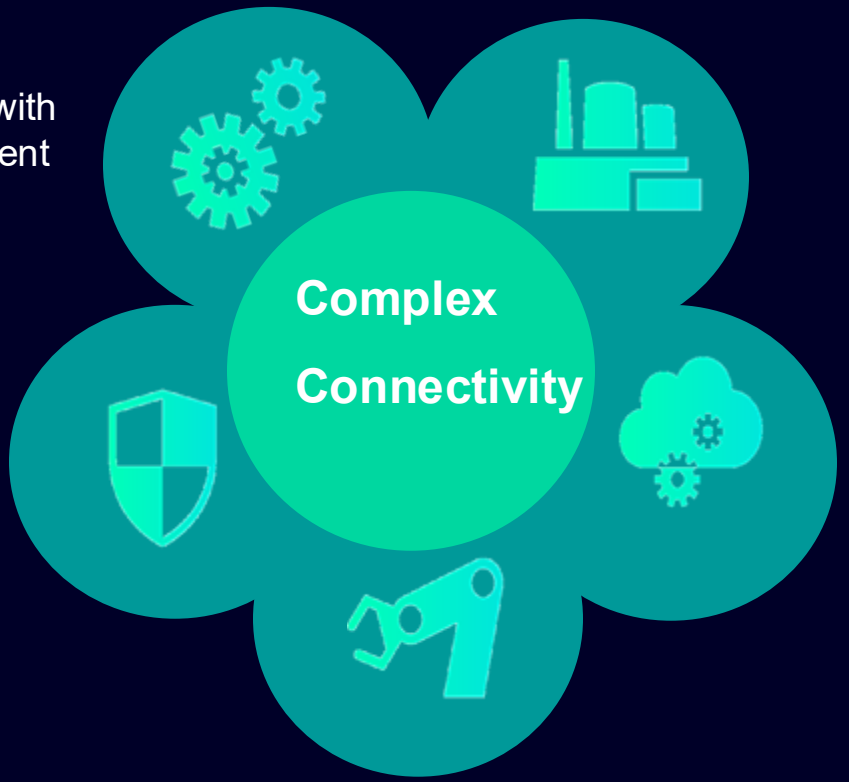
Why is connectivity so complex?

Legacy equipment with outdated or insufficient sensors

Security concerns



Heterogeneity: different machine types and brands with different protocols

Disconnected, siloed production lines and factories

Processing systems that connect locally, but not to the cloud

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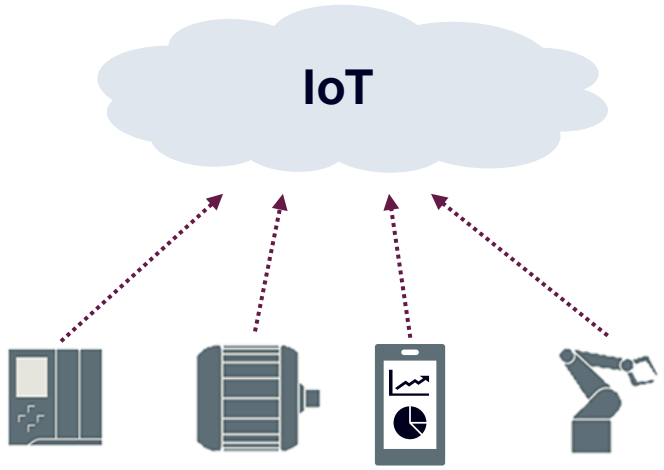
What do you connect?

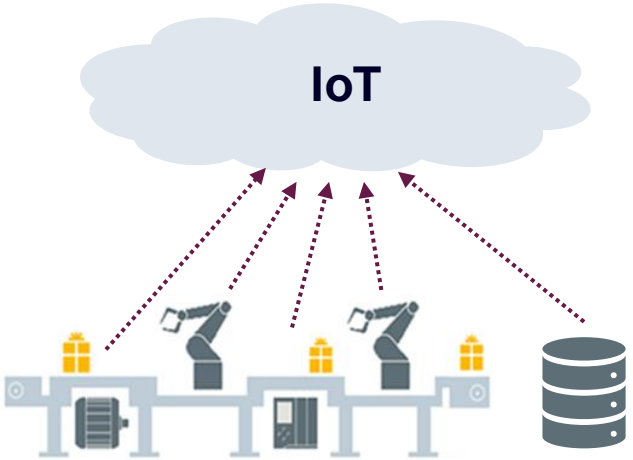
There are two scenarios: connected products and connected shop floor

Products



"I want to enhance my product and digitalize my business model"

Shopfloor production lines



"I want to make my shopfloor more effective and improve operational excellence"

86%

of companies, report increase in profitability with machine monitoring and optimization

10-12%

are the average gains seen with smart factory initiatives

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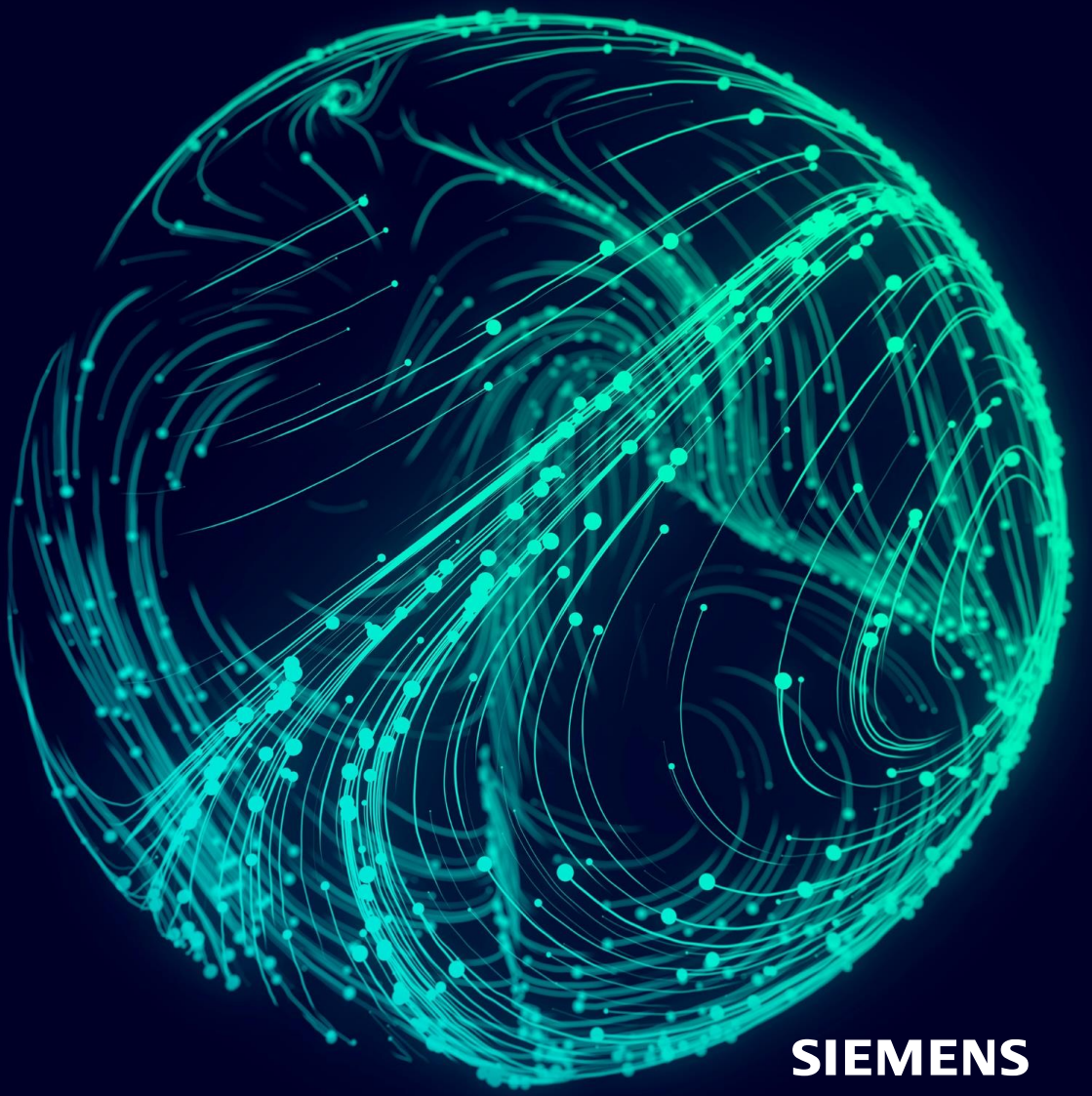
Use Siemens solutions to address all areas of this complexity and…

turn it into your competitive advantage



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Start with Insights Hub, Siemens' industrial IoT as a service solution

Implement connectivity and basic analytics, then scale as quickly as needed

Connectivity

Explore Data

Start your Insights Hub journey, extend the experience by connecting your assets to the cloud, explore your data and develop your IoT strategy.

Base for all future IoT stories

Discover Insights

Discover a world of new insights: Use modern analytic tools to better understand and improve your processes.

Transform Business

Transform your business, processes and products at scale. Create competitive advantage, reduce costs, and improve quality across the entire product lifecycle and supply chain.

Foundation

A solid foundation enables you to set up and customize your IoT environment and configure your tenant as well as your IoT Model. Based on your security strategy we assure the required protection of applications and data stored in your tenants.

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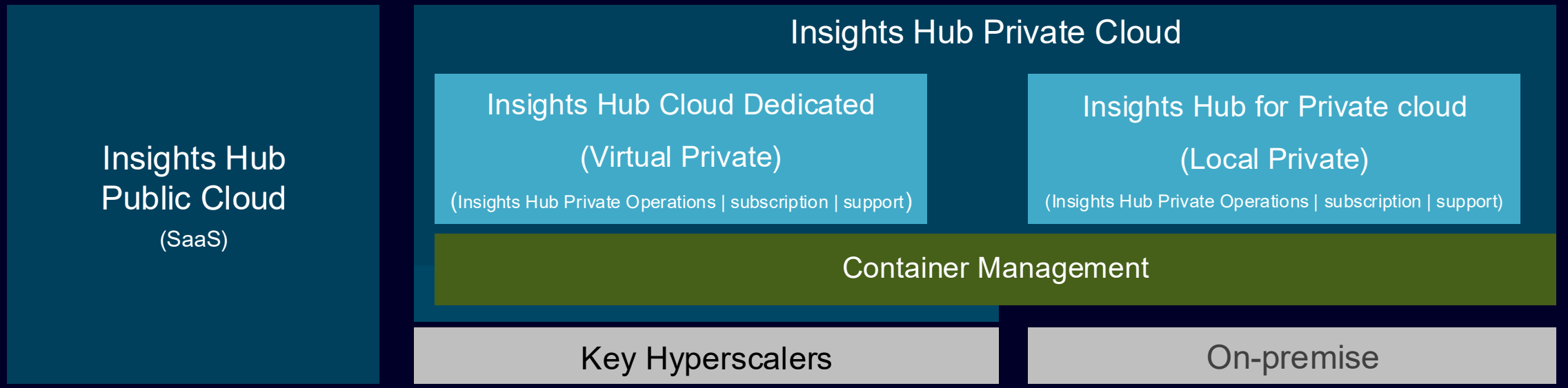
Insights Hub Deployment Options



- Customer receives dedicated Insights Hub SaaS tenant
- Siemens manages Insights Hub and operational infrastructure

- Deployed in customer's cloud tenant
- Siemens manages Insights Hub
- Customer manages virtual private cloud environment
- Connected mode of deployment and operations

- OpenShift container runtime
- Deployed in customer's data center
- Partner provides operational and infrastructure services
- Connected mode of deployment and operations

How do you achieve connectivity with Siemens?

Insights Hub solutions are designed to connect diverse equipment quickly and securely

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

- Secure asset on-boarding
- Bi-directional encrypted data communication
- Data transformation and analytics at the edge as well as in the cloud
- Available and ready-to-deploy applications and solutions

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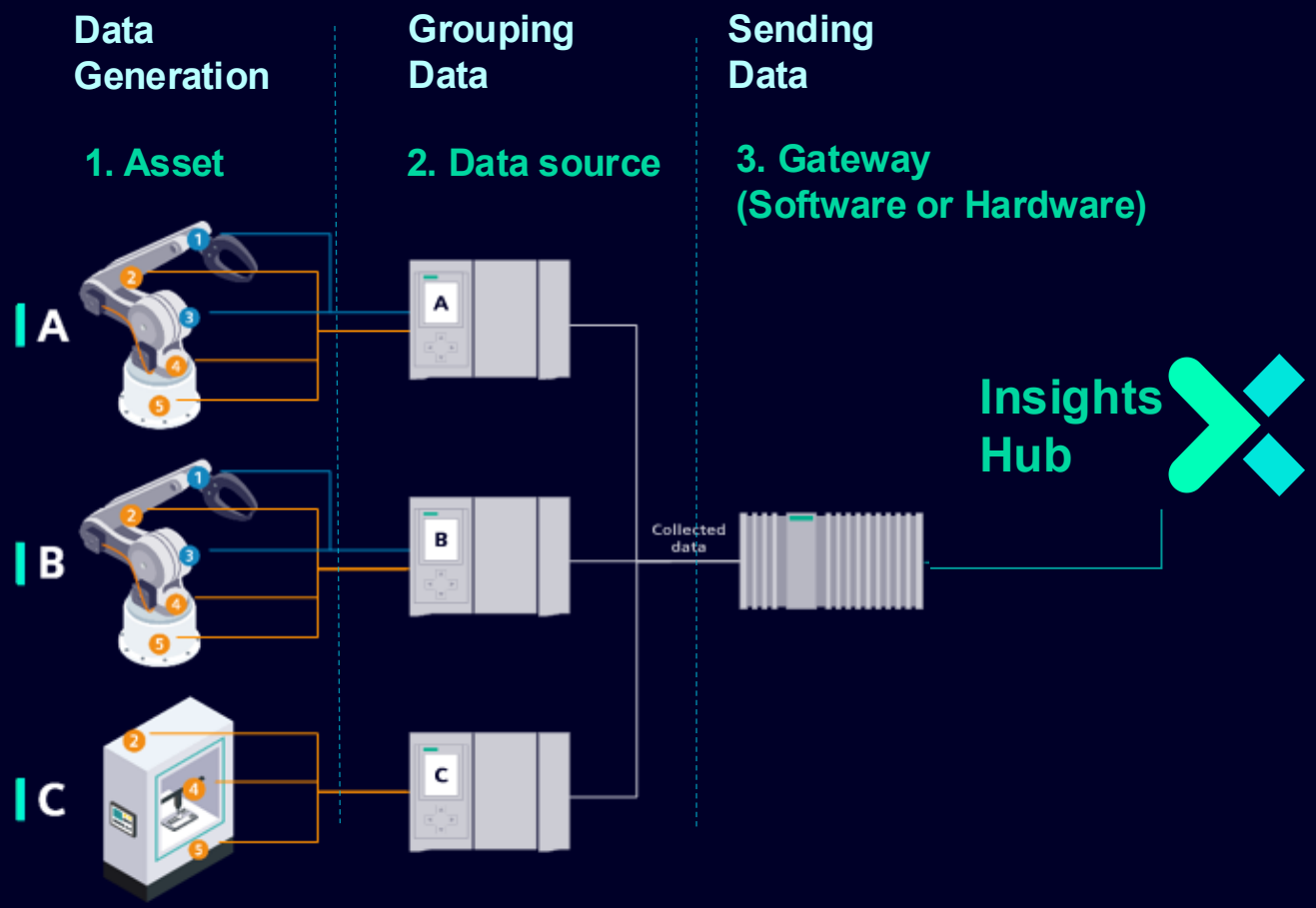
What does connectivity look like from a 10,000 ft view?

1. **Asset with sensors:** Create data using sensors you have or install ones of your choice.
2. **Data source:** Collect and group data from industrial assets
3. **Gateway:** Standardize data into common protocol to send to Insights Hub. This enables connectivity.



Insights Hub will connect to 3rd party machines, regardless of brand, type or age.

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Insights Hub hardware & software solutions

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Connectivity with Insights Hub

Heterogeneous landscapes require different connectivity options

It is crucial to have the right solution for each connectivity need.

Insights Hub offers software and hardware solutions for broad connectivity.

Software solutions

For use with existing hardware that can act as gateways

Ready-to-use software gateways (MindConnect Software Agent)

Build your own customized connectivity agent using MindConnect API / LIB / MQTT

Hardware solutions

For use where existing gateway hardware solutions are not available

Ready-to-use hardware gateways (MindConnect IoT2040, Nano, Industrial Edge)

Insights Hub will connect to 3rd party machines, regardless of brand, type or age.

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Hardware options
Connect your device to the network and get your journey started

Ready-to-use devices

MindConnect Nano

MindConnect IoT2040

MindConnect IoT2050

Industrial Edge

MindConnect IoT2040
- Entry-level connector ideal for smaller production environments
- Data reading cycle: up to 30 data points per second
- Up to 5 connections

MindConnect Nano
- Provides constant monitoring of the industrial process and allows near real-time business insight
- Data reading cycle: up to 250 data points per second
- Up to 30 connections

MindConnect IoT2050
- TI ARM SoC, 64 Bit, 4 cores (approx. 10k DMIPs)
- Storage internal eMMc 16GB
- 2 GB DDR4 RAM
- 2x GB Ethernet Interfaces with TSN

Industrial Edge
- Create your own applications, manage and transfer it to the edge device
- Do edge computing and send preprocessed data into Insights Hub

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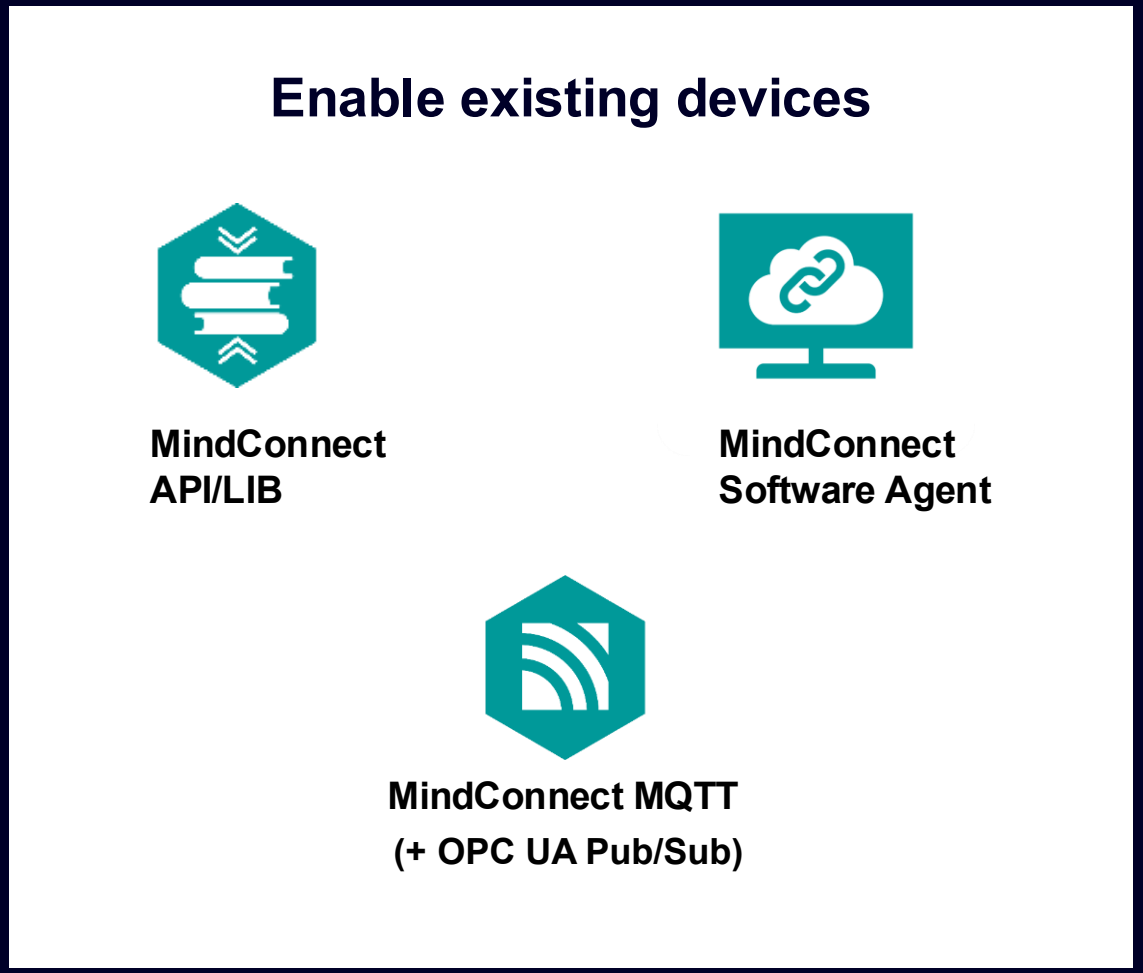
Software options
Make existing devices or hardware Insights Hub ready



MindConnect API/LIB
- Software development kit (SDK) for self-programming specific connectivity agents
- Supports encrypted transmission of on-site data to Insights Hub

MindConnect Software Agent
- Virtual representation of MindConnect firmware that can be installed on Window 10 system that supports Hyper-V

MindConnect MQTT
- Facilitates bidirectional communication between agents on the field and Insights Hub using MQTTS
- Onboard several agents with zero touch

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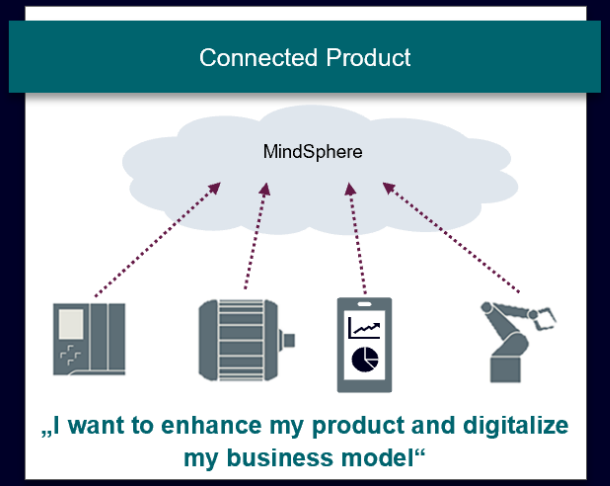
Solutions used to connect will depend on what's being connected



Lots of single assets of same type installed at different (end customer) sites.

You need:

- Easy and fast mass onboarding
- Low usage of bandwidth (as they are often in remote areas)
- Fleet / over-the-air firmware updates
- Easy to integrate in already existing products
- Price sensitive solution

A high amount of different, interconnected assets within a site.

You need:

- Easy configuration of different structured agents
- High amount of collected data per agent
- High speed data collection
- Several different data adapters are needed

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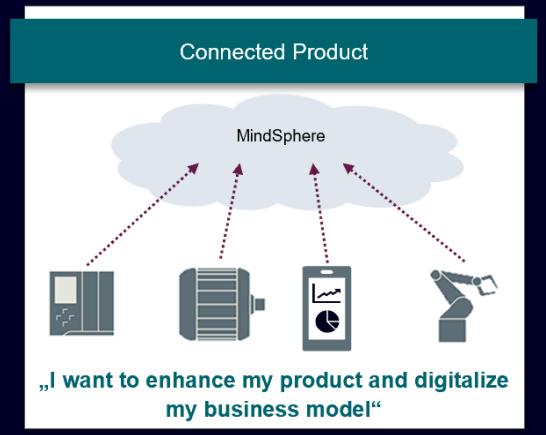
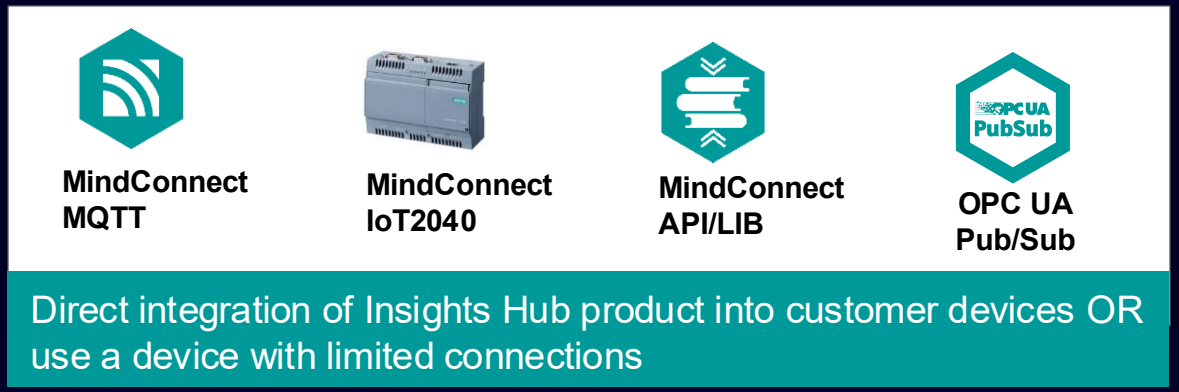
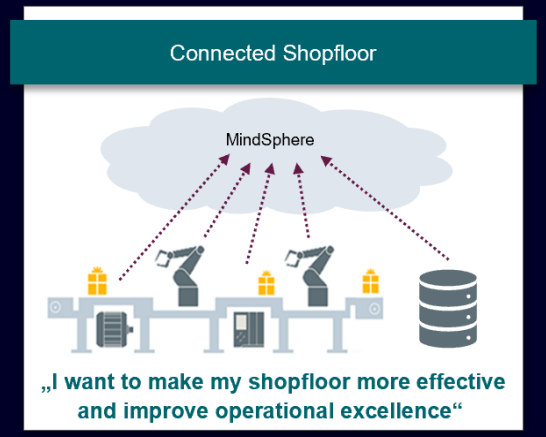
Solutions used to connect will depend on what's being connected







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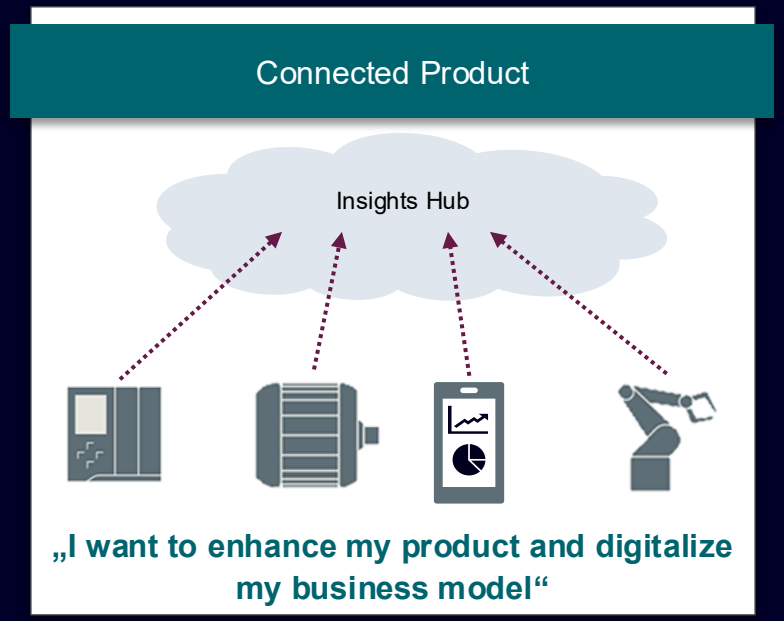
Connected product with Insights Hub

Requires connecting multiple gateways with few assets per gateway



Key connectivity solution criteria:

- Easy and fast onboarding
- Over-the-air updates
- Just data collection necessary
- Low usage of bandwidth (as they are often in remote areas)
- Fleet updates necessary
- Remote access / bi-directional communication to do remote service

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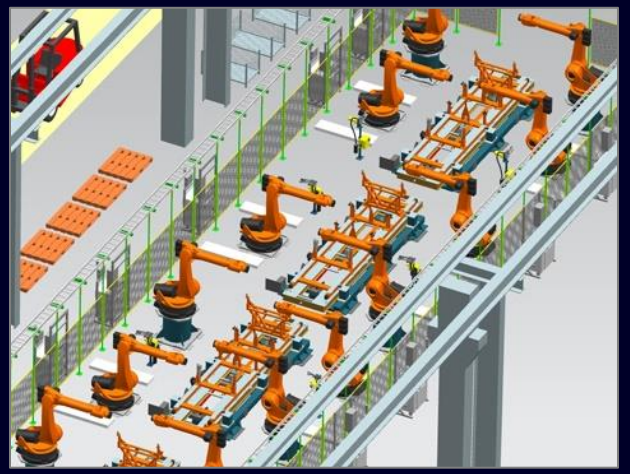
Connected shopfloor with Insights Hub
Connect large amount of assets with least number of gateways

Key connectivity solution criteria:

- Good scaling of gateway performance (e.g. usage of virtualization)
- Possibility to do advanced functionality on gateway (e.g. condition monitoring)
- Over-the-air / mass updates
- Easy configuration of different structured agents
- High amount of collected data per gateway
- High speed data collection
- Several different data adapters are needed



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Examples

MAHLE

Accomplish **full connectivity** in **less than 1 months**

Mahle

Connect devices quickly and securely

Customer challenge

- Quickly and efficiently connect disparate assets across 5 different sites

Solution

- Hardware: MindConnect IoT2050, MindConnect Nano, MindConnect IoT2040
- Software: MindConnect Lib, MindConnect MQTT, MindConnect Software Agent, NodeRED

Customer benefit

- First assets configured within 3 hours, once connectivity solutions were deployed
- Full connectivity in less than 1 month from project kick off
- 189 asset attributes connected
- 70-80% of assets connected with out-of-the-box solutions:

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DyeMansion

Create transparency by connecting assets

Customer challenge

- Customer transparency into machine performance without asset connectivity

Results

- Create example dashboard at Formnext booth
  - 3 machines connected in Munich On-Demand Finishing Services
  - 3 machines connected from Formnext booth
- Connect machines using: MindConnect Nano and raspberry pi with open source connectivity elements
- Machine connectors accesses data from OPC UA servers of the machine PLC and securely directs it to the cloud

DYE MANSION

Create **transparency** to improve **machine performance**

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Appendix

Device Connectivity and Enterprise Integration with Insights Hub
Continuing to extend on connectivity capabilities

easy-to-implement connectivity solutions

onboard a wide range of assets

MindConnect Nano

MindConnect IoT2040

MindConnect API/LIB

new release

MindConnect MQTT

new release

MindConnect Software Agent

new release

Industrial Edge

new release

OPC UA Pub/Sub

MindConnect IoT Extension

MindConnect Integration

MindConnect IoT2050

… + many more options

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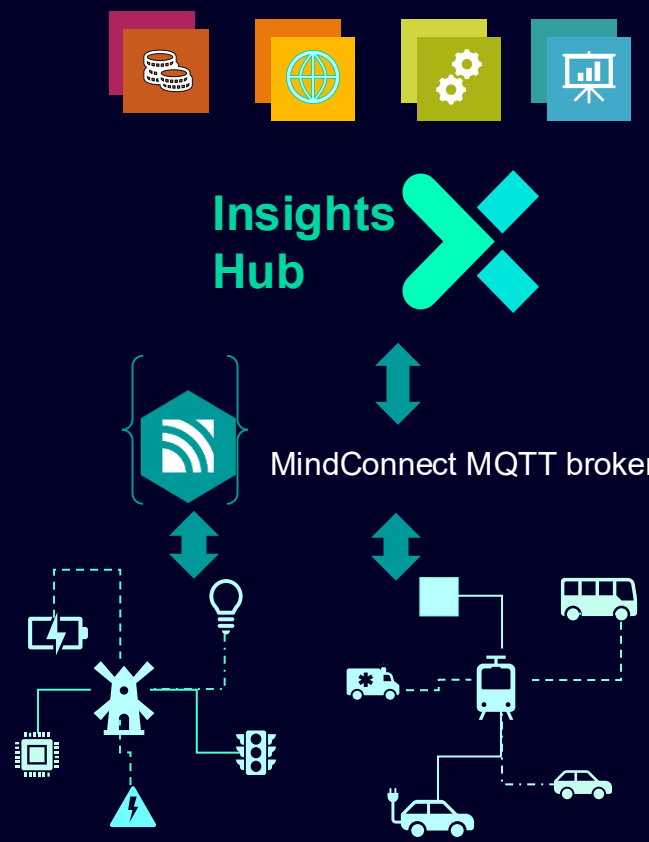
With MindConnect MQTT broker, exchange data with reduced infrastructure cost & maintenance, and without compromising on security

MindConnect MQTT enables bidirectional asynchronous communication between apps and agents



Zero Touch Configuration

Create asset type, assets from the device
Perform mapping for storing data
Define Meta data
Zero touch onboarding

Certificate Based Authentication

X.509 certificate for each device
Authenticate Entire Device Fleet
Secured Connectivity

MindConnect MQTT Broker

Use Asynchronous APIs
Monitor data from every device

Command Agents from Apps

REST interface to send data to selected agent
Receive responses from the agents asynchronously

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Industrial Edge with Insights Hub
Core benefits

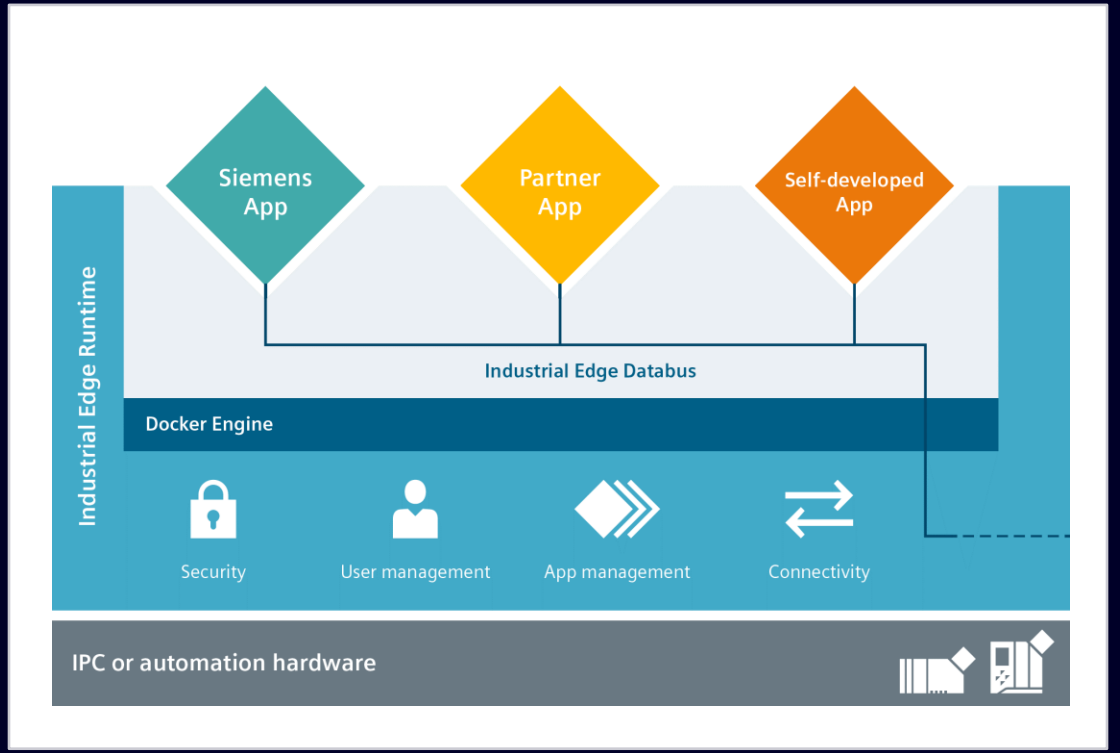
Flexibility
Integrates perfectly into existing infrastructure

Open Ecosystem
Manages Siemens and 3rd party devices/apps

Quality
With easy workflows and up-to-date security, IT scales easily across many machines

Focus on IT & OT
Provides OT-grade robustness together with open APIs for IT-Systems

Completeness
Serves industrial use cases out-of-the-box



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Edge Computing introduces IT-mechanisms to the shopfloor to provide local data processing and analytics capabilities in the easiest way

Provides decentralized and **local** data

- acquisition
- storage
- analytics and
- transfer capabilities

Increases **flexibility** by allowing to deploy **any** software fast and **reliably** on to the shopfloor

Reduces complexity and IT-costs by providing Edge device and application lifecycle management functionalities

Allows **secure data** handling **within production** and reduces costs for cloud data transfers

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Portfolio of devices
Industrial Edge Devices

Industrial Edge Devices by Device Builders – Flexible and scalable for customer scenarios

Ultra compact Embedded IPC for small applications

SIMATIC IPC127E

Embedded IPC for mid-sized applications

SIMATIC IPC227E

IPC for demanding applications

SIMATIC IPC427E

Remote Terminal Unit for Distributed Network

SIMATIC RTU 3041C

Human Machine Interface

SIMATIC HMI Unified Comfort Panel

Limited Industrial Edge functionality as option available

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Portfolio of devices
Industrial Edge Devices – upcoming devices

Industrial Edge Devices by Device Builders – Flexible and scalable for customer scenarios

Network Infrastructure

SCALANCE LPE9403 Planned

Rugged Network Infrastructure*

RUGGEDCOM APE1808 Planned

Rack IPC for high-end applications Coming soon

SIMATIC IPC847E

Virtual Edge Device for IT infrastructure

Industrial Edge Virtual Device (IE VD)

Planned for Q2/22

*Limited Industrial Edge functionality as option available

Thank You!

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