Connected Machine
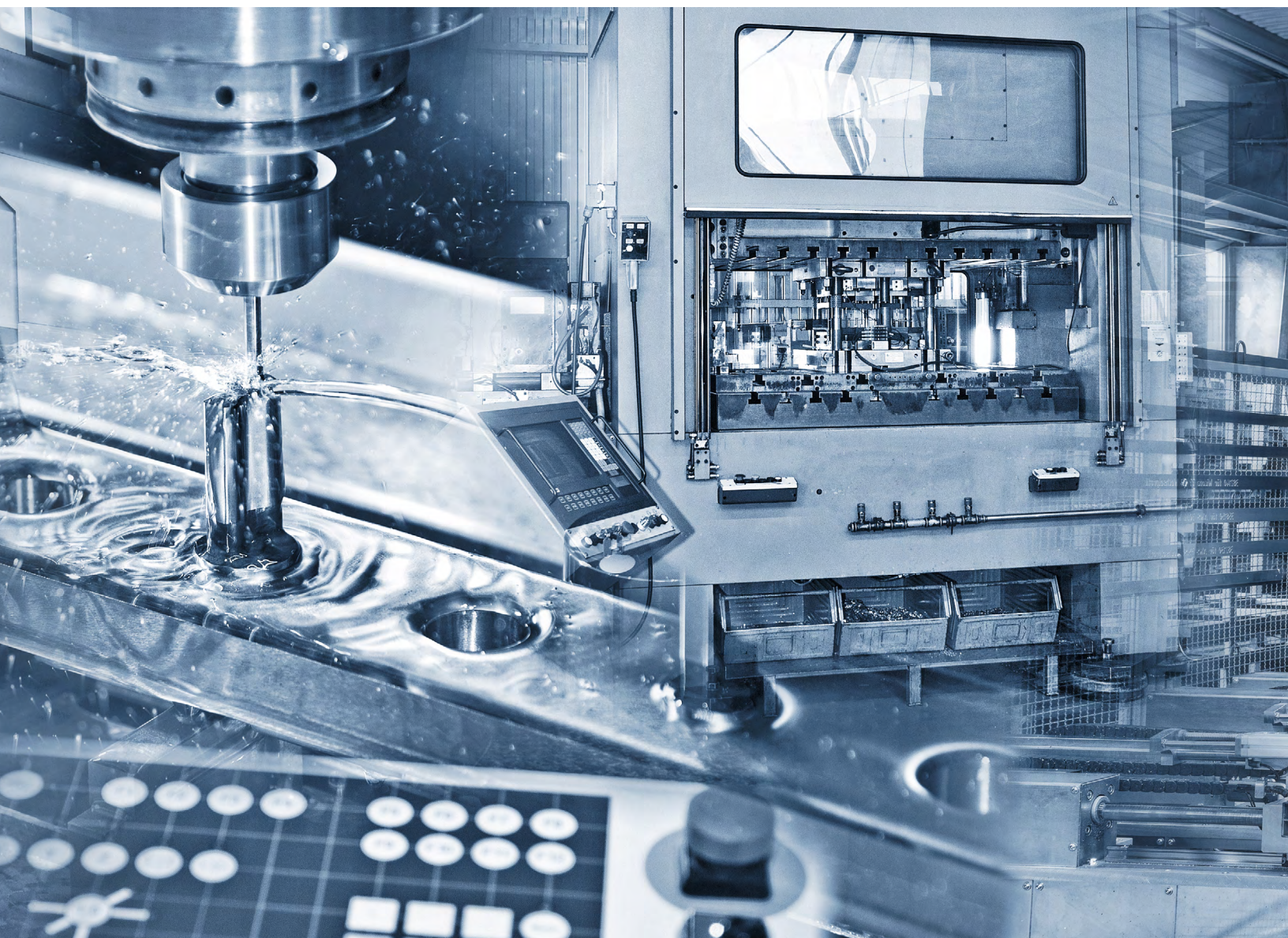
A Full End-to-End IoT Solution for Machine Builders

Executive Summary

Industrial machine equipment builders are adopting the Internet of Things (IoT) to create business value.

This trend supports:

- More interactive machines
- Easier integration with customer IT systems
- Disruptive business models accelerating "machine as a service" adoption

Remote monitoring services are growing in the industry. They bring new revenue sources for machine builders and efficiency gains to manufacturers.

IoT and Industry 4.0 deliver better results with lower costs at almost every operation level. Process optimization through integrated IT systems can:

- Boost productivity
- Speed response to customer needs
- Drive revenue growth

Machine builders are rushing to adopt IoT connectivity in their machines. This adoption comes with a massive market opportunity, opening possibilities for different services.

Every CEO aspires to transform traditional sales into recurring revenue. This change can be challenging in a traditional machinery market. IoT-ready machines with native secure remote connectivity are rapidly changing the industry.

The machines can be sold as a service, and new value propositions can be added, including:

- Remote monitoring
- Set up
- Performance optimization
- Consulting
- Predictive maintenance
- Spare parts

In addition to service benefits, field product feedback is critical to better understanding the customer experience and fomenting product innovation.

Telit is a global IoT solution leader. This brief details how we can help you quickly deploy an innovative IoT machine solution.

Architecture Review

Many markets benefit from remotely connected machines. Use cases are endless and can be deployed in:

- Traditional industrial manufacturing machinery
- Plastic injection
- Packaging
- Food processing
- Warehouse automation
- Power generation
- Water and wastewater treatment

Regardless of the machine type, the market demand and solution architecture have similarities, including the need for:

- Edge data collection
- Local data visualization
- Cellular data transmission
- Cloud system management
- IT integration
- Secure remote access

As shown in Figure 1, Telit deviceWISE® is the core component for:

- Machine data collection
- Edge logic for machine monitoring, alerting and KPI calculation
- HMI replacement with Telit deviceWISE VIEW
- IT connectivity
- Cloud data collection and visualization
- Device and connectivity management
- Secure remote access (tunneling)
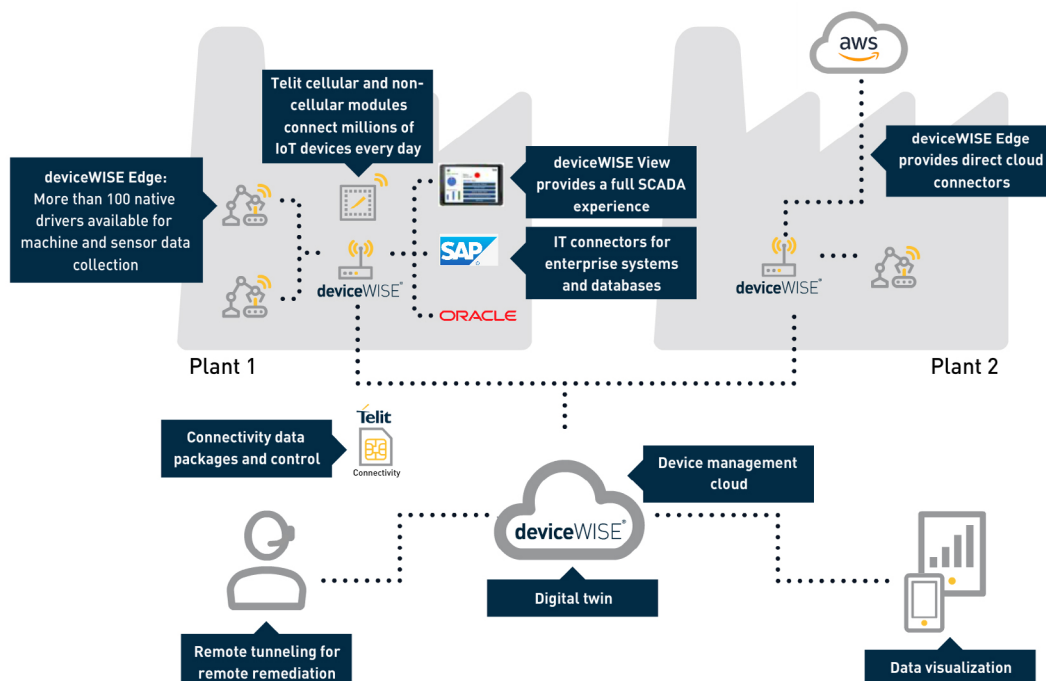- Third-party cloud connectivity and enterprise integration

Figure 1: The Telit deviceWISE connected machine solution.

Telit deviceWISE EDGE is software that can be installed in any gateway. Most machine builders use cellular gateways to gain external network independence for secure data collection, transmission and remote access.

The software is agnostic in terms of hardware gateway vendors. Telit recommends certified gateways you can find here or acquire directly from Telit.

When installed, deviceWISE comes with hundreds of industrial drivers for machine data collection. You can collect data from machine controllers (e.g., PLCs, CNCs, robots) or external instrumentation (e.g., sensors, I/O, actuators).

You can transform the collected data at the edge. Telit deviceWISE comes with advanced edge workflow programming software to create:

- Alarms
- Alerts
- Arithmetic
- Algorithms
- Parsing
- Local storage

The data can also be integrated into local IT systems or original equipment manufacturer (OEM) IT systems, including:

- ERP
- MES
- Asset management systems (AMS)
- Local databases and cloud systems (e.g., AWS, Azure, Google Cloud)

For human-machine interface (HMI) replacement, Telit deviceWISE VIEW offers complete local data visualization and machine interface. Charts, tables and multiple widgets like buttons and text boxes are available to provide full process and machine data visualization. You can design and edit HMIs using a drag-and-drop development tool that doesn't require custom code.

The Connected Machine Package

Telit created a connected machine package to simplify IoT adoption for machine builders.

 The package includes:

- Hardware
- Edge software
- Cloud application
- Visualization package
- Connectivity

LTE Gateway

- Intel® Wireless-AC 9560 2 x 2 AC and Bluetooth® 5.1 with vPro®
- 8 GB DDR4-2666 MHz (soldered)
- 128 GB SSD M.2 2242 PCIe TLC

deviceWISE® EDGE

Telit deviceWISE EDGE (Asset Gateway)

- Up to five connected machines
- Unlimited drivers
- Unlimited tags
- Edge logic

deviceWISE® VIEW

Telit deviceWISE VIEW (Asset Gateway Version)

- No-code HMI builder
- Up to five concurrent users
- Unlimited screens

deviceWISE® CLOUD

Telit deviceWISE CLOUD

- Cloud data management
- Device management
- Connectivity management
- Secure remote access

Collecting Machine Data

Data collection is the primary challenge for effective industrial IoT (IIoT) implementation. Good data analytics begin with good data.

Telit deviceWISE enables real-time machine data collection. As seen in Figure 2, this IIoT platform is an efficient protocol converter. It allows machine data collection using industrial-standard protocols and device-specific private protocols, such as:

- OPC DA and UA
- Modbus
- MTConnect
- BACnet
- Siemens
- Rockwell
- Mitsubishi
- Omron
- FANUC
- Torque Tools

deviceWISE has over 200 drivers available for download at no additional cost.

Data mapping is a simple process with Telit deviceWISE. It consists of choosing the driver and pointing to the IP address. The device is then created with controller tags exposed with read or read/write access.

If machines require analog or digital I/O data collection or external instrumentation, Telit deviceWISE can collect data from sensors. It can also use Telit deviceWISE SmartIO, a hardware adaptor for legacy machines.

Data is transformed in a no-code environment that enables edge logic creation using drag-and-drop actions to create triggers (see Figure 3).
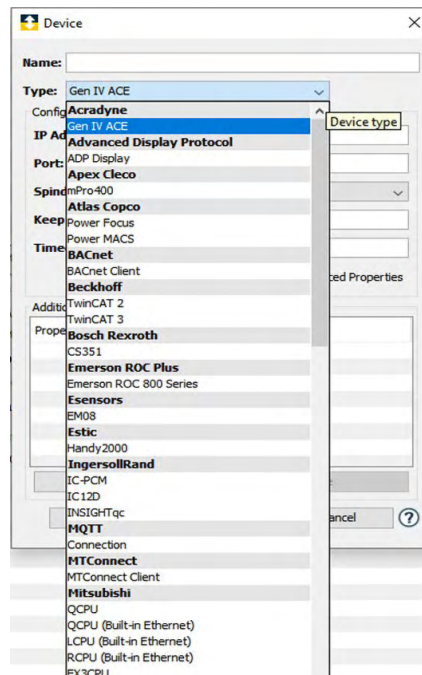

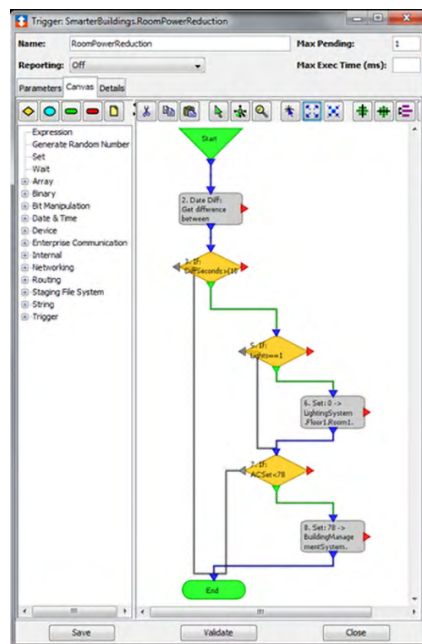**Figure 2**: Hundreds of protocols are available to enable real-time data collection.

Figure 3: Create your edge logic with drag-and-drop functionality.

In this environment, you can:

- Build, manage and monitor projects and triggers (your application logic)
- Configure and manage connections to devices and sensors
- Configure network settings (LAN and cellular)
- Configure connections to enterprise applications
- Configure node connections to the machine-to-machine (M2M) service
- View logs and reports

The system empowers you to create various applications like protocol translation and calculate KPIs, including:

- Production
- Traceability
- Quality control
- Overall equipment effectiveness (OEE)

Universal Platform
SCADA, alarming, reporting and more on one platform

On-Premises Visualization
Create local dashboards and HMIs for complete visualization and control

Drag-and-Drop Charts and Widgets
Create new dashboards in minutes

OEE and Other KPIs
Calculate machine performance and display live, colorful charts

Real-Time Monitoring
Collect, process and display collected data in real time

Bidirectional Control
Command your machine through touch screen displays and use it to aggregate operator data inputs

Turn Any Screen into an HMI
With HTML5 and Pub/Sub technology, you can web-launch clients to any device with a browser

Creating an Industrial HMI

Telit deviceWISE VIEW enables real-time data visualization in a few clicks. You can transform your data and calculate KPIs with deviceWISE's visual edge logic engine.

Custom dashboards and HMIs can be created and displayed on-premises and in the cloud leveraging drag-and-drop widgets. Visualizing factory data empowers you to identify patterns and trends and analyze and interpret data to make more informed business decisions.

These displays are bidirectional. You can leverage the displays to visualize machine and process data and use buttons and es to control the machines and add operator inputs.

You can display the screens on any device, including traditional HMIs, tablets, cellular phones and computers.

Figure 4: Create engaging dashboards on any device, including mobile.

Remote Access and Cloud Application

Telit deviceWISE CLOUD is a leading ready-to-use cloud platform that connects enterprise IT systems to devices and machines. Solutions built using deviceWISE CLOUD are easy to deploy to any device without complex programming or development.

Telit deviceWISE CLOUD enables every machine to create a digital twin that describes all the machine variables, states and alarms in a graphical way (see Figure 5). You can orchestrate data in the cloud, including triggers for data transformation, parsing and arithmetic.

This IIoT platform comes with robust device management functionalities that include:

- Monitoring
- Remote diagnostics
- Firmware and software over-the-air updates
- Connectivity management

You can create monitoring panels with a no-code dashboard tool for remote monitoring (see Figure 6).

Moreover, secure remote access enables technicians to enter the gateway and PLC levels with all security layers when they need to make a fix.
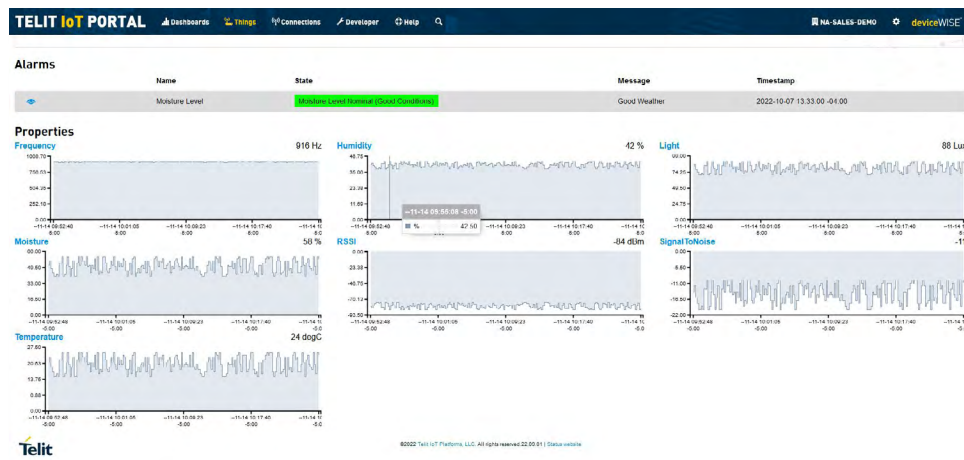

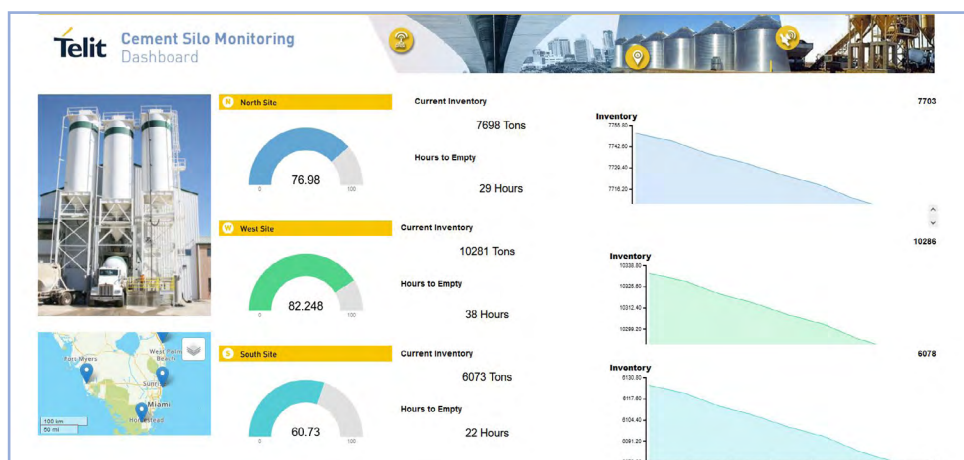**Figure 5**: Alarms and alerts to monitor industrial machines.

Figure 6: Example of a dashboard to monitor a cement silo.

A Customer Use Case in the Packaging Industry

Real-world customers have implemented Telit deviceWISE EDGE and CLOUD to enable industrial connected machine systems. These implementations create real business value for IoT-enabled machine system vendors, dealers and users (see Figure 7).

The packaging sector benefits from IoT connectivity. After years of selling machines conventionally and suffering industry ups and downs, a leading packaging company chose to release its first remotely connected machine.

At first, customers were hesitant to accept an externally connected machine. However, Telit's security layers helped the company check boxes with customer IT departments.

Machine remote monitoring provided additional value with increased machine uptime, making the machines more productive.

The packaging company implemented Telit deviceWISE on local wireless routers to connect to their industrial machinery in the field. deviceWISE EDGE provides a local edge connection to machinery. The remote connection enables data orchestration (i.e., collection, rationalization, transformation, analysis and delivery).

Connecting Telit deviceWISE EDGE to Telit deviceWISE CLOUD is the first half of the data journey from the equipment to the business systems. The data follows multiple paths to various systems to support business needs.

For product life cycle management, dealer network support and end user application data are sent to:

- Salesforce
- An ERP
- Multiple AWS services
- Custom-built web applications

These applications leverage several deviceWISE CLOUD services, including digital twin and data orchestration and delivery.

Telit deviceWISE CLOUD's bidirectional capabilities support device management through secure remote access to equipment for software updates and remediation. Telit deviceWISE's geolocation services support equipment location and operation monitoring.

Telit's connected machine solution enables IoT system management for modern industrial systems.

Digital Twin
Out-of-the-box digital twin of your device

Alarms and Alerts
Monitor critical conditions

Cloud Triggers
Automate triggers for real-time actions

Secure Remote Access
Complete tunneling capability to access gateway logic or Layer2 VPN access

Full Security Capability
Data encryption, role-based security, multifactor authentication, audit actions traceability, etc.

Device Management
Monitor, diagnose and act with a fully implemented device management platform

Connectivity Management
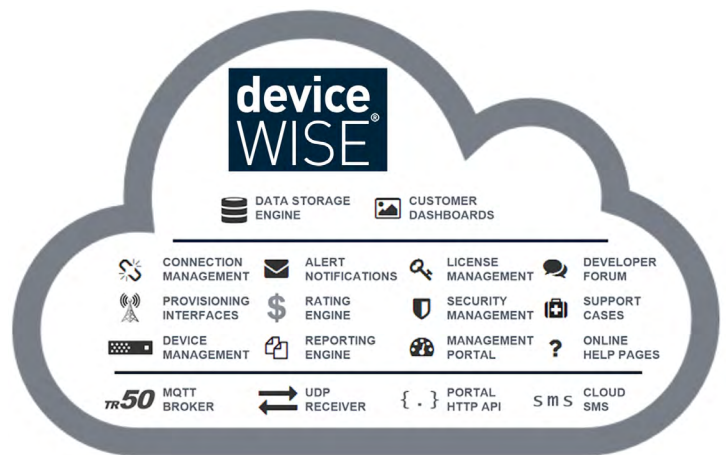Complete CDP integration for cellular connectivity management

Figure 7: Telit deviceWISE's robust IIoT enablement.

Connect Your Machines to Apps

Request a Telit deviceWISE CLOUD Trial

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