

Cisco Kinetic for Manufacturing

Harnessing IoT data to boost productivity

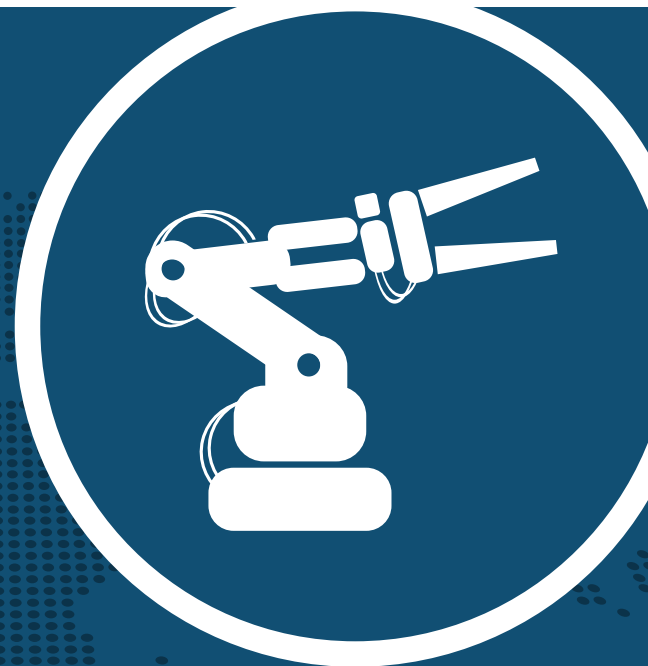


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Introduction

For decades, manufacturing businesses have relied on connected machines and the correlating data to help streamline operations. Now, innovative Internet of Things (IoT) technologies are taking machine data to unprecedented new levels – but also introducing a whole new landscape of challenges in data management, analysis and governance.

Whether you're a machine builder, system integrator, or manufacturer – machine data is your lifeline to higher productivity and profitability. Yet with IoT, you'll now face a tsunami of data generated from connected devices. Massive volumes of intermittent data streams, coming from a variety of legacy and new machines, with new requirements for internal and external data sharing.

It's a new big data paradigm that brings new complexities. Typically, IoT data is locked in its sources, and it's difficult to move data securely and control how it's used. And extracting new types of data in new ways relies on costly and time-consuming support from your PLC or equipment suppliers, making improvements reactive and slower with no real-time insight. Without effective IoT data management, you're unable to access the right information at the right time to solve problems quickly and make smarter decisions.

The net effect is amassing volumes of data you cannot put to work to increase operational margins, reduce equipment downtime, and lower energy costs. That's where **Cisco® Kinetic for Manufacturing** comes in.

The Cisco Kinetic for Manufacturing platform gives you complete real-time visibility and control over your machine data. Having a systematic approach to collect, transmit, process, store and analyze your IoT data helps ensure you have relevant, actionable insights to achieve meaningful business outcomes. Consider a few examples:

- **Optimize equipment usage to reduce costs and increase profits.** Suppose you could increase machine productivity and improve predictive maintenance by identifying performance slow-downs in real time, instead of waiting on historical analysis. Or create more competitive bids by more precisely estimating the green lifetime of machines for a specific job.
- **Improve operations with the right data at the right time.** Imagine you could increase the usefulness of data by moving large data sets to multiple sources at specific times, in specific formats. Or you could accelerate decision making with real-time analysis and data visualization by computing data locally, at the edge. And do all this on your own in a few hours – no custom coding, no long waits for IT or outside vendors.

Key challenges of IoT data management:

- Data is locked in its sources
- No real-time action on data insights
- Difficult to move data securely
- No ability to apply and enforce data policies

Cisco Kinetic for Manufacturing makes it easier and faster to develop IoT data management processes and policies that help ensure you can cost-efficiently evolve and scale your IoT deployments.

With the power of a Cisco network portfolio and robust software capabilities, the Cisco Kinetic platform enables manufacturers to maximize business value at every stage of the IoT data lifecycle, from the edge to the dashboard:

- **Streamline data extraction** from controllers, machines, sensors, and connected devices to make data usable
- **Optimize data computing** to filter and transform it, apply business rules, and perform distributed micro-processing from edge to endpoint
- **Control data movement** programmatically to the right applications at the right time, and enforce governance policies for secure, reliable delivery



Unlock the value of IoT data from the edge to the dashboard

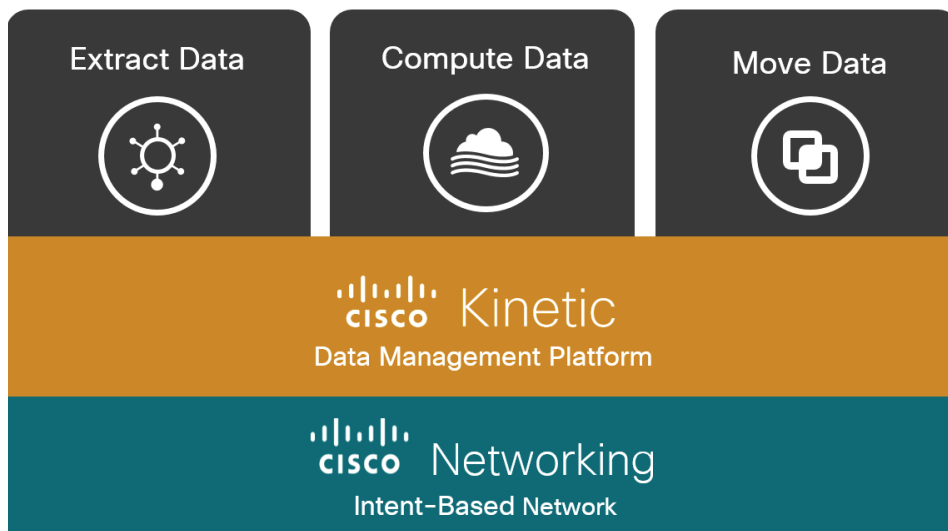
Cisco Kinetic provides simple, automated, secure data interactions to ensure you get the most out of your IoT data, and use it to optimize your business:

- **Reduce test time and calibration** – Establish and record machine calibration data points to predict test results and calibration parameters.
- **Improve quality** – Reduce the cost of producing scrap (bad parts) by identifying the root cause for scrap and self-optimizing the assembly line.
- **Lower energy costs** – Proactively monitor energy consumption to identify areas for cost reduction and view resource consumption by process.
- **Increase yield** – Develop benchmark analysis across lines and plants to improve first-pass yield and pinpoint causes of performance bottlenecks such as OEE or cycle time.
- **Perform predictive maintenance** – Analyze machine health to identify top causes of failure, and predict component failures to avoid unscheduled machine downtimes.

Accessing Real-Time Machine Data

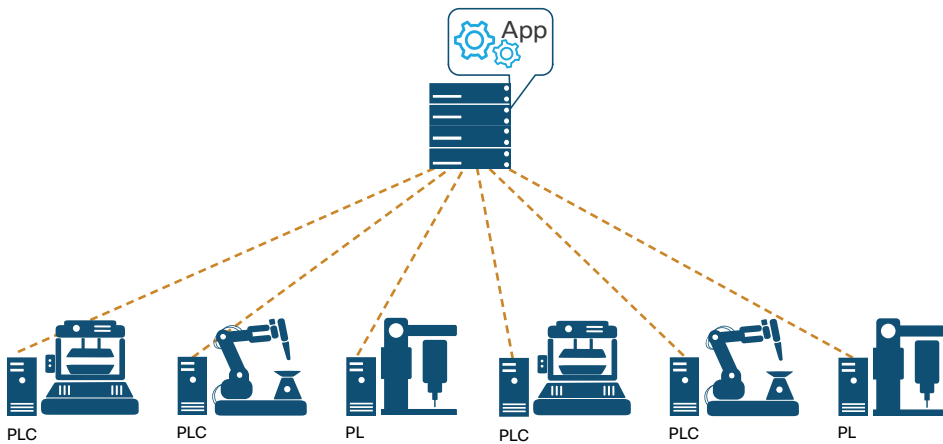
A production machine can generate over 1 terabyte of data every 24 hours, which means both the machine and its IoT data are business-critical assets. To ensure optimal use of machine data, the Cisco Kinetic for Manufacturing platform utilizes three independent software modules:

- **Gateway Management Module** to centrally manage and orchestrate edge applications and micro-services
- **Edge & Fog Processing Module** to compute, filter and process data
- **Data Control Module** to move processed data to business visualization, intelligence and analytics applications



Cisco Kinetic standardizes data across an entire manufacturing network, whether the plant floor has one type of machine or hundreds of different machines. The platform acquires IoT data via two different methods, reading SCADA variables known as process control equipment “tags”, or through the use of physical sensor devices applied to machines.

Cisco Kinetic reads machine variables in real time to deliver immediate insight into overall equipment effectiveness, and performance issues that could impact product quality. Machine data acquisition is passive, so the process does not interfere with critical operations of machines in production.

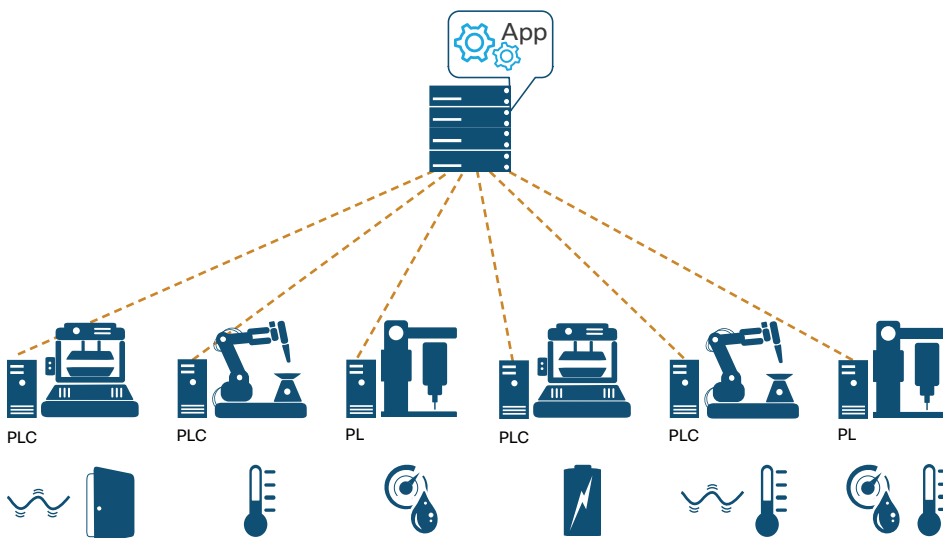


Historically, manufacturers have relied on their machine builders and system integrators to help improve equipment effectiveness. With the flexible, end-to-end architecture of Cisco Kinetic for Manufacturing, businesses can more quickly and cost-effectively discover production optimizations on their own.

Accessing Machine Data from External Sensors

To make legacy machines IoT-enabled, physical external sensors are a cost-effective way to add connectivity and gather data. The sensors are often attached directly to a machine, or in close proximity, with no need to change the machine's historic control programming. You can then extract data from these connected machines that may be stand-alone, connected via serial connection, or use proprietary network protocols.

These sensors are often specialized to capture specific types of data, such as temperature, humidity, electrical current, vibration, pulse inputs and even a machine's physical enclosure status.



Cisco Kinetic automatically exports the machine data to a network-attached sensor gateway or edge/fog application that may reside in a Cisco Industrial Ethernet Series switch. Machine data is then pre-processed to shed less interesting data, then moved securely to the Cisco Kinetic Data Control Module for plant-wide aggregation in offices, corporate headquarters or the cloud.

Processing Machine Data at the Edge

The Cisco Kinetic Edge and Fog Processing Module provides a fully automated method to extract and transform machine data, normalizing the data to make it usable. After local processing at the edge, this module sets machine IoT data into motion, securely and reliably moving it to site operations for plant-wide aggregation.

Controlling IoT Data to Drive Outcomes

Cisco Kinetic for Manufacturing ensures you can translate machine data from high-value physical assets into meaningful business outcomes. The Data Control Module securely aggregates data from edge devices within the plant, including sensor gateways and edge devices. It then applies and enforces your custom-defined policies (for data privacy, security, etc.) to ensure that only relevant data is distributed to business-critical applications.

Site manufacturing operations and control (Level 3) is often the natural point for aggregating all production IoT data. From there, aggregated and processed machine data is sent to business and production applications within the plant, enterprise, and the manufacturer's private or public cloud for data visualization, analysis and business intelligence.

Translate data from
high-value assets
into actionable
insights on machine
utilization and health
to improve outcomes

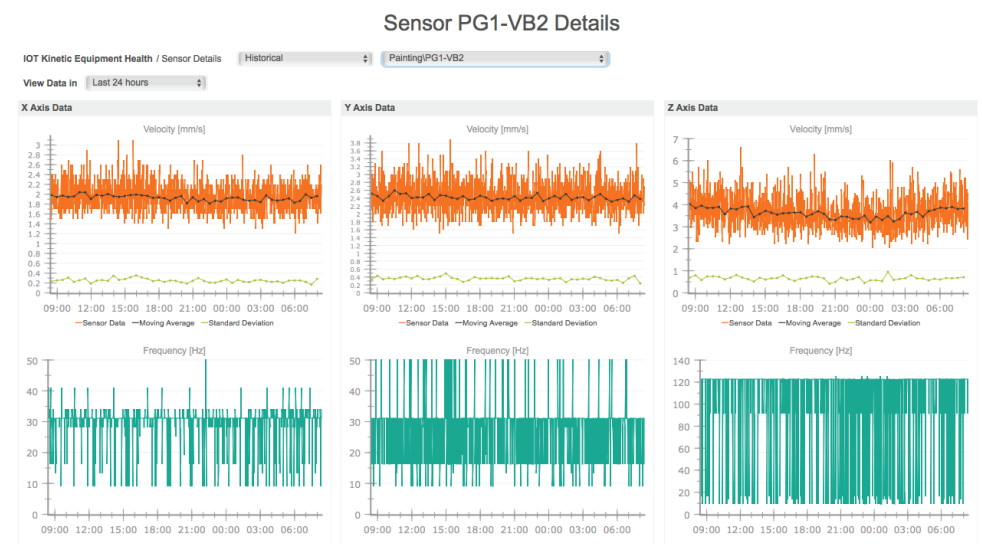
Understanding Machine Data with the Cisco Kinetic Dashboard

Historically, machine data has not been considered useful or effective for measuring production efficiency, because the data is cryptic and often only evaluated by the machine builder or the manufacturer's system integrator. Manufacturers typically need additional special software to interpret the data from their production environment.

Cisco Kinetic for Manufacturing changes all that. The platform's dashboard delivers real-time machine data visualizations in multiple formats such as numerical values, linear graphs and wheel charts. Based on your custom-defined policies, you can ensure the right people in your organization can easily access IoT data to gain actionable insight into machine utilization and health.

IoT sensors enable you to capture granular machine data such as speed, vibration, temperature, power, pressure, or torque. When data is no longer within a pre-defined range of tolerance, the Cisco Kinetic visualization interface changes color. The platform can also automatically send alerts to specified people such as a machine operator, plant manager, vendor, or machine builder to inform them a machine is operating outside of an approved tolerance range.

You can also visualize historical data in the Cisco Kinetic dashboard, and download it for import into other business tools.



Cisco Kinetic Dashboard - Monitoring Equipment Health

Summary

The Cisco Kinetic for Manufacturing platform enables you to overcome the many barriers of accessing valuable IoT data housed in new and legacy equipment across a diverse plant floor. Machine data is a business-critical asset, and Cisco Kinetic provides a programmatic way to extract, normalize and securely move relevant data to operational and business applications.

Cisco Kinetic unlocks and optimizes your machine IoT data in real-time, enforcing policies for ownership, privacy, security and governance as data moves from the edge to the enterprise and cloud. Making machine data usable and actionable puts you on the fast track to increase operational margins, minimize equipment downtime, and lower energy costs – meaningful business outcomes that grow your bottom line.

Learn More

For more information about Cisco Kinetic for Manufacturing, contact your Cisco account representative, and visit www.ciscokinetic.com.

Unlock and optimize
your machine data
in real time to drive
meaningful results



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