



# How Greater Industrial Network Connectivity and Visibility Transforms Manufacturing Operations

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On the plant floor and in many industrial settings, the network has often been underutilized, silo'd and opaque in business processes. Operations and business teams become isolated, with limited access to production applications and an incomplete view of critical metrics, such as overall equipment effectiveness (OEE). With greater network connectivity and visibility, operations teams on the factory floor can tap IoT technology to transform existing processes and generate optimal business outcomes.

## Here's How

Operations personnel are often consumed by the need to drive efficiency and improve quality. Increasingly, they're relying on IoT connectivity and insight from applications to streamline processes. But without a reliable, integrated and secure network, they're frequently at a disadvantage, often scrambling to identify the source of a problem, restart production quickly, and reclaim lost output.

For asset-intensive companies such as manufacturers, the Internet of Things (IoT) offers levels of interconnectivity that enable more reliable and cost-effective production. Whether it's simply monitoring machine sensors to help schedule asset maintenance or tracking complex processes for optimizing output, IoT provides teams with the operational insight to "see"

across the supply chain and plant floor production. With IoT capabilities in place, operations can then take greater advantage of new innovations such as predictive maintenance based on sensor data analytics. In this white paper, we look at the manufacturing complexities that operations teams face today and how improved network connectivity and visibility can help them gain important insights to increase efficiency and quality across the shop floor. We also explore specific IoT network management tools that can help to overcome these challenges as well as to take full advantage of industrial Ethernet switching infrastructure.

## Overcoming Limitations to Achieve Digital Transformation

While still at an early stage in terms of widespread adoption, a number of new digital technologies are enabling highly responsive IoT-enabled manufacturing and production processes. These include advances in networking and wireless communications; cloud technology that scales on demand; fog technology that enables edge compute close to machines, software systems that turn data into knowledge, and the interconnection of machine sensors and applications through IoT connectivity. In fact, research from IDC projects that by 2020, there will be 28.1 billion connected devices in use worldwide.

Across a diverse range of manufacturing industry verticals, from automakers and pharmaceuticals to technology OEMs and energy companies, IoT sensors have become essential elements in smart manufacturing. Cisco's Industrial Ethernet (IE) switching portfolio enables manufacturing companies to derive increased value from the rich capabilities of greater IoT connectivity and digital transformation.



## **Cisco Industrial Ethernet (IE) switching portfolio**

The IE switching portfolio is the result of Cisco's long history of providing organizations in industrial manufacturing with the right capabilities and products. Further, Cisco has used its expertise in enterprise networking and connected factories, and its own understanding of industrial manufacturing, to help build a rich, interconnected IoT ecosystem.

Cisco's network-as-a-sensor and enforcer approach enables companies to ensure secure connectivity. To drive resilience, high availability technology guarantees that all of Cisco's ruggedized IE switches meet the stringent demands of production environments. Designed to be deployed in the harshest applications, including mining and steel industries, these switches include compact form factors, DIN rail mounting capabilities, alarm channels, DC power operation, and ruggedization, including extreme temperature, shock and vibration.

Moreover, Cisco's IE switch models encompass diverse configurations. These include the compact, fixed, and lightly managed switching series (IE1000, IE2000, IE3000). In addition, the IE switching portfolio has been newly enhanced with the Cisco Catalyst Series (IE3200, IE3300, IE3400, IE3400H) and the Rugged Series (IE4000, IE4010, IE5000).

The portfolio offers options for power over Ethernet, POE for easy integration of devices such as IP cameras, IP phones, badge readers, and wireless access points without an overhaul of the electrical layout. Rapid, consistent deployment across the portfolio lowers operational expenses with Plug and Play operation, express setup, and fast boot. All members of the product portfolio fit in with industrial environments with design and certification for industrial applications. To integrate seamlessly with applications present on site, the product portfolio supports common industrial protocols, including IEEE 1588, Common Industrial Protocol (CIP), PROFINET, MODBUS, CCLink, among others.

The IE 4000 family offers unique capability for fog application execution within the network infrastructure using Cisco IOx. For manufacturers and machine makers the IOx application environment provides the ability to transform IoT data into actionable insight at the edge of the network to deliver real-time control and insight in the form of operator actions and predictive maintenance.

But there are still other, compelling reasons why you should consider adding the Cisco Catalyst Rugged Series. In addition to accelerating digital transformation through easier manageability, lower costs and increased security, the Rugged Series ensures timely ROI.

You can also quickly and securely deploy the Catalyst IE 3x00 Rugged Series in almost any setting, whether space-constrained, industrial, or in harsh external environments. As companies expand their IoT capabilities, the modular, versatile design of the Rugged Series can be easily adapted to optimize those investments.

As a result, digital factories that utilize Cisco's Industrial Ethernet portfolio in the automotive sector are able to reduce production costs, resulting in shorter cycle times for new model launches.

In the consumer goods sector, an IoT-enabled supply chain ensures improved inventory management through constant, real-time visibility as well as higher numbers of delivery fulfillments. On the factory floor, operations can acquire insights from IoT-derived data to dramatically improve their systems and processes.

These innovations illustrate the potential of increased digital business. However, within many manufacturing organizations, industrial assets and the people and processes involved with them still operate in silos, isolated from each other. This divide exists, especially between enterprise IT and operational teams. Bringing IT and Operations together can benefit both parties with operations gaining security enhancements and standards to help lower cost, while IT gains a better understanding of the specific needs on the factory floor.

In addition, as these companies transition toward increased reliance on digital business, they can benefit from basic diagnostic information indicating whether a machine cable has become disconnected, a network alarm has occurred, or a configuration has changed. These examples demonstrate why an operations-centric management system that won't disrupt the manufacturing platform network is so crucial. It's also important for that system to be customizable and familiar to operators, not merely a subset of wider enterprise IT network management.

Finally, many manufacturers have identified the potential gains of moving from a production-oriented business towards a customer-focused

business. Companies that embrace the concept of digital transformation are subsequently relying more heavily on IoT connectivity and will benefit enormously from increased connectivity and visibility offered by the IoT network.

## The Value of Manufacturing Insights: Cisco's Industrial Network Director



***Cisco Industrial Network Director Software Platform***

In most manufacturing environments, operations can access individual machines at will. However, not knowing full network topology and associated connected devices can adversely affect production and maintenance of a plant network. To meet these networking needs, Cisco has introduced the Industrial Network Director (IND), a key component integrated within the company's IE portfolio. The software provides comprehensive management of the IoT switching network and related assets, enabling operators to focus on information relevant to their needs.

As manufacturing networks reach ever-increasing levels of complexity, IND demonstrates how crucial it is for operational teams to have shop floor visibility. Operators can simplify and accelerate troubleshooting by accessing an intuitive Web-based interface displaying all plant floor automation, including network devices and connected systems.

Team members can focus on automation endpoints as needed to view more granular details, such as vendor, Industrial Protocol, and product name. Accessing a unified dashboard, operators can easily drill down to view individual networking switches for specific data on health, bandwidth utilization, and recent troubleshooting activity.

Alarm icons alert operators to potential problems, enabling them to zoom in on a specific asset to evaluate issue severity and also view any other effected automation endpoints. They can then take immediate steps to reduce or avoid downtime. IND provides a rich set of APIs for easy integration of network information into existing industrial asset management tools.

Delivering increased operator productivity through simplified monitoring and rapid troubleshooting, IND provides operations teams the following:

- Easy-to-use, purpose-built tools for non-IT operations personnel
- Dashboards customized to meet specific requirements, built using REST-ful APIs
- Instant alerts and alarms for all network events to accelerate troubleshooting
- Real-time device metrics, traffic statistics, and network status to monitor network health
- Accessible audit trails for managing all network changes
- Plug and Play installation capability for new network hardware

In the manufacturing sector, the adoption of digital services (i.e., mobility, IoT, cloud, etc.) ensures greater interconnectivity, but it also introduces security concerns. [Cisco's Active Advisor](#) incorporates the data gathered by IND to provide network lifecycle information and to help ensure security. A free, cloud-based service for subscribers, Active Advisor runs analysis on all Cisco network infrastructure, alerting the customer to quality, performance, or security issues and ensures that product updates are current.

## Conclusion

As manufacturing companies continue toward digital transformation, they're achieving new levels of efficiency up and down the value chain. On the factory floor, the projected gains can be considerable. For example, by analyzing IoT-derived data, manufacturers can acquire information that dramatically improves their systems and processes. Such intelligence is leading to new approaches and innovations, such as smart manufacturing, informed products, and design thinking. IND offers manufacturers a critical competitive edge by increasing the quality of plant automation processes.

To achieve full visibility and troubleshooting of your industrial automation network using Cisco's Industrial Network Director, visit

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