

Creating a Future-Ready Factory Network

6 technology refresh considerations for manufacturers





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Introduction

The distinctions between information technology (IT) and operational technology (OT) in manufacturing are fading as smart devices and software-controlled systems drive more production lines. This trend means that a manufacturer's IT team will become more involved in OT projects because of their growing requirements for network capabilities, big data analytics, cybersecurity, monitoring and management, and application integration. Yet many networks in manufacturing today are unable to deliver the needed levels of performance, security, and services.

As an IT leader, you likely know when your network is due for an update to meet your organization's initiatives. Before launching a refresh program, you'll want a sensible strategy for choosing new solutions. Your strategy should aim to reduce costs and risks, as well as simplify the network infrastructure and management. There are six key challenges manufacturers face as they plan a technology refresh.



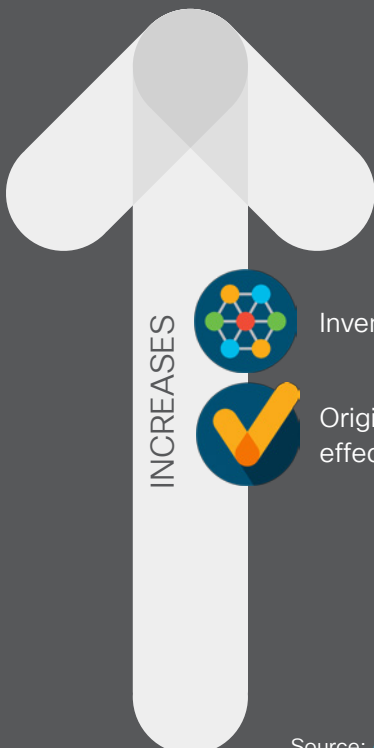


Designing a Fully Connected Factory

In factories today, it seems everything and everyone needs a network connection—for real-time communications, status monitoring, application execution, and remote access. More devices are coming online, especially Internet of Things (IoT) sensors and elements, and wireless infrastructure in particular may be lacking in terms of speed and coverage. Video is becoming ingrained in production activity, encompassing HD-quality live streams from surveillance and production monitoring cameras, as well as more video collaboration for team, customer, and supplier meetings. These trends are creating new pressure on network bandwidth and availability.

A network refresh meets these trends and lays a foundation for fully realizing the benefits of digital manufacturing, including:

- Improved readiness for the flood of data in your Industry 4.0 or smart manufacturing initiative
- Improved factory operations with more visibility, automation, and control
- Accelerated product development
- Increased overall equipment effectiveness (OEE) and faster equipment repair
- Better protection of intellectual property and production integrity
- Simpler network management



INCREASES



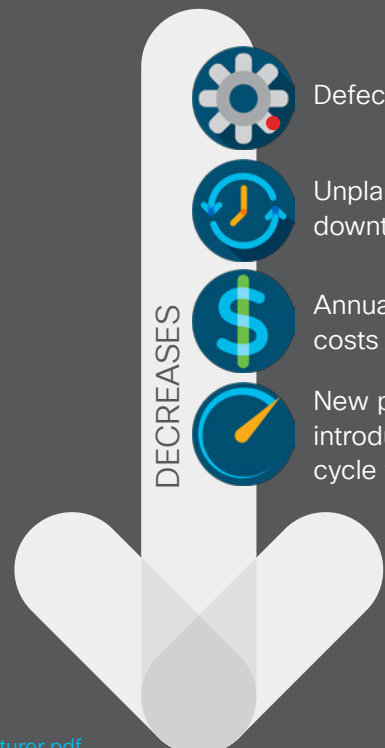
Inventory turns



Original equipment effectiveness (OEE)

Benefits of Digital Manufacturing

Respondents to a survey conducted by SCM World and Cisco indicated they expect these benefits from digital manufacturing.



DECREASES



Defect rate



Unplanned downtime



Annual energy costs



New product introduction cycle time

Source: [cisco.com/c/dam/assets/docs/becoming-smarter-manufacturer.pdf](https://www.cisco.com/c/dam/assets/docs/becoming-smarter-manufacturer.pdf)

Cisco Solutions

[Cisco DNA for Manufacturing](#)

[Cisco Routers](#)

[Cisco Catalyst Multigigabit Switches](#)

[Cisco Industrial Ethernet Switches](#)

[Cisco Wireless Solutions for Manufacturing](#)

[Cisco Connected Mobile Experiences](#)

[Cisco Wireless LAN Services](#)

[Cisco DNA Advisory Service](#)

Case Study

A New, Connected Factory for Campofrio

After a fire destroyed their entire production facility, [Campofrio](#) rebuilt a food-processing plant with a network based on Cisco Industrial Ethernet switches that connect hundreds of Wi-Fi access points and nearly 2000 endpoints to better track production lines.

“Designing our facility with connectivity at its core, we are confident to have a Factory 4.0 blueprint that will help us in continuing to demonstrate excellence through innovation, competitive pricing, and rapid time-to-market.”

Javier Alvarez, CIO, Campofrio Food Group

Cisco Solutions Make the Connection for IT and OT

Digital manufacturing relies on technologies that empower the network to intuitively and securely manage an unprecedented scale of connected systems, devices, and users.

The **Cisco® Digital Network Architecture (Cisco DNA™) for Manufacturing** defines solutions for updating a network with key digital capabilities and simpler, centralized management of all IT and OT networks from your office space to your factory floor.

Cisco supports converged networking with a variety of **routing solutions**, including ruggedized products designed for harsh industrial environments.

To support higher capacity networking, **Cisco Catalyst® switches** with multigigabit Ethernet technology deliver speeds beyond 1 Gigabit on existing Category 5e/6 cables. **Cisco Industrial Ethernet switches** can withstand extreme environments while adhering to industrial network design, compliance, and performance requirements.

Reliable and pervasive wireless connectivity supports communications on the plant floor as well as seamless tracking of people, sensors, and assets. **Cisco Aironet® wireless access points**, together with expert Cisco services, deliver highly secure, industrial Wi-Fi for monitoring all endpoints in a plant, even when they are located in hard-to-reach indoor, outdoor, or hazardous locations.

With the **Cisco Connected Mobile Experiences (CMX)** solution, managers and applications engineers can use real-time analytics to make on-the-spot decisions about the best use of assets. CMX also gives factory workers zone-specific communications and advisories on their handheld devices for faster problem-solving.

Cisco Wireless LAN Services help you evaluate the security, performance, and scalability of your wired and wireless network, then plan, design, and build a secure wireless network based on Cisco DNA solutions, the 802.11ac standard, and Cisco CleanAir® technology.

The **Cisco DNA Advisory Service** helps you create a strategic plan to achieve business objectives through technology while maintaining a stable, secure network during your transition.

Cisco Solutions

[Cisco Wireless Solutions for Manufacturing](#)

[Cisco Kinetic](#)

[Cisco Next-Generation Firewalls](#)

[Cisco IoT Threat Defense](#)

[Cisco Edge Fog Fabric](#)

Case Study

FANUC Uses IoT to Reduce Downtime

By using embedded Cisco technologies and sending IoT data through the Cisco Intercloud Fabric, robotics manufacturer [FANUC](#) remotely monitors industrial robots to proactively detect potential equipment or process problems and reduce unplanned downtime.

"I think what we and Cisco are working on together has the potential to have the biggest impact of anything that I've seen in the last 35 years."

Rick Schneider, CEO, FANUC

The Growth of IoT

As more RFID tags and IoT sensors and devices are installed throughout your facilities, network connectivity can help them deliver business value for tracking products, resources, and processes. IoT data messages typically are not large, but the devices are pinged frequently for data, making reliable connectivity a critical network requirement.

In most cases, installing and maintaining more cables for wired network connections to IoT devices will be too expensive and impractical. Yet unlike a clean office environment, wireless deployments in a factory can face significant challenges in building structure, temperatures, and signal propagation.

Preparing the network for large-scale IoT connections means looking for wireless technologies that are not only up to date, but designed to overcome the challenges of a manufacturing environment.

Cisco Solutions Keep Pace with IoT

Network solutions specifically designed for the data, connectivity, and management requirements of IoT will help deliver greater value for plant information and control.

For example, **Cisco wireless solutions** have been purpose-built for industrial deployments, including connectivity with large numbers of IoT sensors and devices, while still providing the simple, central management capabilities required to manage a large number of access points.

Cisco Kinetic makes it easy to connect IoT gateways and devices to the network, then extract, compute, and securely move data from those devices to analytics applications and enterprise resource planning (ERP) and manufacturing execution systems (MES). The result is unified operational and business insights drawn from IoT devices across IT and OT environments.

To assure security of IoT devices and data, **next-generation firewalls** from Cisco provide advanced protection measures while increasing threat visibility and reducing costs through security automation. **Cisco IoT Threat Defense for Manufacturing** helps obtain extensible, scalable protection against external attacks and compromised IoT devices through a suite of compatibility-tested solutions.

Cisco Edge Fog Fabric immediately analyzes data at network-edge and fog nodes to improve monitoring of IoT and distributed manufacturing processes.

Cisco Solutions

[Cisco UCS](#)

[Data Center Solutions for SAP](#)

[Network Optimization Service](#)

Case Study

Daimler

Based on validated design guides for Converged Plantwide Ethernet (CPwE) from Cisco and Rockwell Automation, [Daimler Trucks North America](#) now has a converged IT infrastructure that supports big data and analytics, process optimization, and new tools and applications.

“I think what we and Cisco are working on together has the potential to have the biggest impact of anything that I’ve seen in the last 35 years.”

Rick Schneider, CEO, FANUC

The Data Tidal Wave

Much of the tremendous volume of data produced by manufacturing activity is already integrated into MES and ERP systems. Yet with greater use of robotics, video, and IoT, even more data is coming. IT needs new capabilities for managing that data, both within the enterprise data center and in the cloud.

Upgrading the network and data center to better handle data delivers notable business benefits. Better and more timely information leads to decreases in inventory costs, energy costs, and product defect rates. Visibility into resource availability and utilization allows for the improved planning that is critical to profitability and competitiveness.

Cisco Solutions for Managing Big Data

Virtualized servers in the data center and an optimized network are two solutions that help manufacturers address data growth.

The **Cisco Unified Computing System™ (Cisco UCS™)** servers process streams of big data and connect them to analytics applications, whether hosted in the cloud or the data center.

SAP and Cisco have partnered to define the first **SAP HANA reference architecture** optimized for the speed and volume of big data and analytics. Based on Cisco UCS servers and an application-centric infrastructure, this highly scalable architecture includes computing, storage, connectivity, and unified management capabilities.

The **Cisco Network Optimization Service** optimizes the network and devices to help your infrastructure operate with stability and peak efficiency as data volumes increase.



Cisco Solutions

[Cisco Connected Mobile Experiences \(CMX\)](#)

[Cisco ONE Software](#)

[Cisco Industrial Network Director](#)

[Cisco DNA Analytics and Assurance](#)

[Cisco DNA Center](#)

[Cisco Enterprise Network Services](#)

Case Study

Weetabix

To gain a better view of the manufacturing floor and make processes more efficient, [Weetabix](#) refreshed its network with Cisco switches and wireless access points, managed with Cisco ONE software.

"With Cisco ONE, we will never again be locked into outdated technology."

Paul Mobbs, Solutions Architect and Development Manager, Weetabix

Orchestrating Converged OT and IT Networks

When there is a lot more data flowing to a lot more places, IT teams need the ability to orchestrate what goes where and to whom. Connecting machines on the factory floor to the network supports the monitoring and data analysis that leads to reduced downtime, improved product quality, streamlined scheduling and inventories, and increased operational efficiency and safety. But the converged network needs to be designed, optimized, and managed in a way that allows data and applications to securely reach everywhere they need to go.

Converging IT and OT onto a single network also offers several benefits for network management, including:

- Reduced network downtime and improved troubleshooting
- Reduced overhead for network administration and easier device provisioning
- Automation to support consistent policies as well as appropriate quality of service (QoS) and security configurations for all network connections

Cisco Solutions Integrate and Simplify Network Management

Several Cisco solutions make management simpler for a converged IT and OT network.

Cisco CMX simplifies management of guest network access in the plant.

The **Cisco ONE™** offering presents a flexible way to buy software for the Cisco products in your data center, WAN, and access domains. The ability to port Cisco ONE licenses to the next generation of applicable devices locks in future value.

Cisco Industrial Network Director is an easily integrated management system for operations teams, providing full visibility and control of the industrial Ethernet infrastructure. It also provides a plug-and-play capability to quickly install and commission new or replacement network hardware.

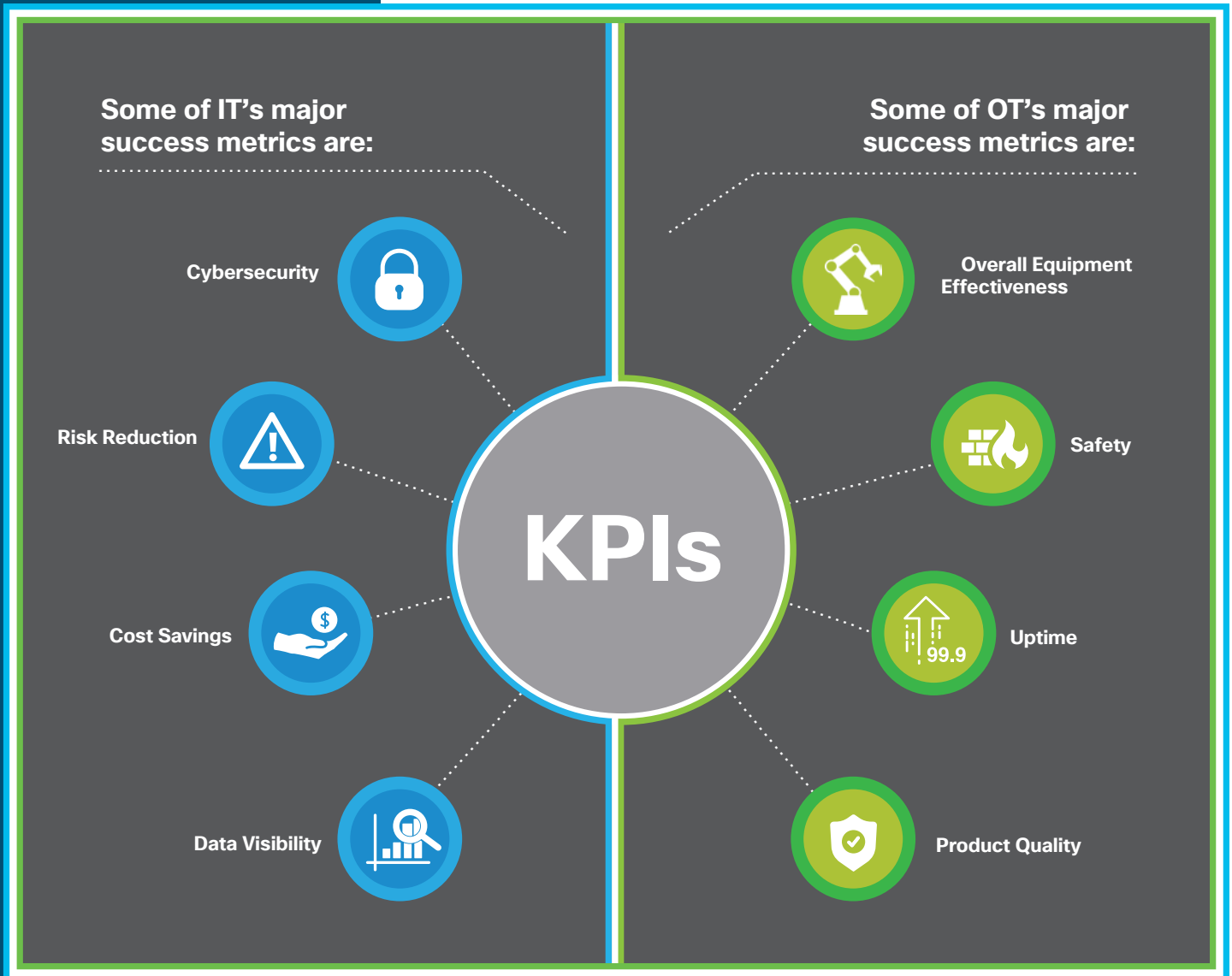
Cisco DNA Analytics and Assurance proactively monitors your network, gathering and processing information from devices, applications, and users. This information is presented in Cisco DNA Center, an easy-to-use single dashboard for managing all analytics tasks.

Cisco DNA Center assurance features predict network performance and problems, then recommend solutions to reduce downtime.

Cisco provides a lifecycle of **network services**, including professional, managed, and technical services.

Orchestrating Converged OT and IT Networks

IT and OT Success Metrics



Cisco Solutions

[Cisco UCS](#)

[Data Center Solutions for SAP](#)

[Cisco Enterprise Network Services](#)

Case Study

AWNC

[AW North Carolina](#) (AWNC) implemented an optimized Cisco network infrastructure for seamless and secure application delivery across more than one million square feet of factory floor. In the data center, a new Cisco Flexpod system provides integrated computing, networking, and storage.

"We'll save over \$1 million in technology costs this year and we have a reliable, secure platform to build on."

John Peterson, general manager of information technology, AWNC

More Applications to Integrate, Access, and Manage

Systems on the factory floor need to communicate more than ever before. The network needs to support more automation by integrating plantwide communications as well as connecting OT devices with applications such as ERP and MES systems. The network also needs to support industrial PCs that are being virtualized for easier scalability and management, as well as more mobile and video communications across facilities. And when applications move to the cloud their availability becomes critical, making it important to sustain high network uptime and application priorities.

Data center virtualization supports higher uptime for applications now and the ability to deliver higher levels of performance as application and data growth continues. Newer network technology also makes it possible to implement scalable systems, processes, and communications across the internal network and the cloud.

Cisco Solutions Offer a Platform for OT and IT Application Delivery

High-performance application delivery relies on robust technologies in the data center and the network.

Cisco UCS data center servers support virtualization, ERP, big data, and analytics solutions from SAP and Oracle. Together these solutions accommodate growing volumes of manufacturing data such as IoT sensor data, third-party logistics information, and inventory and production statistics for extended visibility into the supply chain.

When you're ready to implement new network solutions, **Cisco network planning services** help align your OT objectives with IT policies and capabilities. Cisco also offers **deployment services** for site preparation and product installation, validation, and testing.



Cisco Solutions

[Cisco ASA with FirePOWER Services](#)

[Cisco Stealthwatch](#)

[Cisco IoT Threat Defense](#)

[Cisco Identity Services Engine](#)

[Cisco Enterprise Network Security](#)

[Cisco Security Services](#)

Case Study

Ansell

As aging network devices approached end-of-life, [Ansell](#) saw an opportunity to refresh its infrastructure and ensure effective security. Today, Cisco solutions provide threat-focused, next-generation security through Cisco Integrated Services Routers and Cisco ASA with FirePOWER Services under a Cisco Security Enterprise Licensing Agreement (ELA).

“The Cisco ELA gives us access to all of the security solutions we needed for one-third the cost of purchasing everything separately, which allowed us to bring on security solutions we never had before.”

George Michalitsianos, IT Infrastructure Director, Ansell

Strong Security for IT and OT

Legacy manufacturing systems typically weren't designed with cybersecurity in mind, so they rely on strong network security capabilities for protection. Additionally, OT networks that previously were internal only now need a secure Internet connection via the network.

The network itself needs to minimize the risks that come with more connected machines and user devices. For connected machines, a key concern is how OT might disrupt production or create an opening for theft of intellectual property and sensitive business data. For users, it's important to know who is coming into a plant and what they have access to—and prevent malware on their devices from entering and spreading through the corporate network.

The key challenge is strengthening network security without impacting plant operations, worker safety, or production line performance, yet still allow secure network access for users and devices.

A network refresh allows for better management of security when all applications are administered by the IT team. They can leverage network technology and production techniques to reduce threats and the associated downtime and data loss.

Cisco Solutions Focus on Strengthening Security End-to-End

Cisco security solutions offer the powerful combination of our experience in protecting large and complex networks and our knowledge of the unique security demands of manufacturing environments.

Cisco ASA with FirePOWER Services is a single platform that consolidates multiple security layers, with full contextual awareness, for greater visibility into all network activity.

Cisco Stealthwatch software uses telemetry data to detect suspicious or noncompliant device behavior and improve visibility, security, and response times for incidents across the network. The Stealthwatch Deployment Service helps install, configure, tune, and integrate Stealthwatch into your network.

Cisco IoT Threat Defense for Manufacturing offer solutions for protecting against compromised IoT devices.

Simplify network use for factory employees and visitors with **Cisco Identity Services Engine (ISE)**, which manages highly secure user access over wired and wireless connections.

Cisco Enterprise Network Security lets you use real-time data to secure access, provide intelligence, and sense suspicious activity—even in encrypted traffic.

Cisco Security Services help IT teams develop and implement a strong strategy around network security, compliance, and threat management.

For More Information

Read more about [Cisco DNA for Manufacturing](#) and additional [Cisco solutions for manufacturing](#).

A Future-Ready Network

IT and operations leaders in manufacturing understand that success in the digital era means working together to converge and upgrade networks. They see the need for a unified enterprise and manufacturing network that handles growth and change intuitively, by constantly adapting to the enterprise while also constantly protecting against cyber threats. The result of this network refresh: New opportunities to improve operational efficiency, maintain compliance, maximize profitability, and increase competitive advantage.

