GUIDE

How to extend your IT network for smart manufacturing

A straightforward approach to adopting technology that powers production.

Leading manufacturers are doing amazing things by integrating IT with operational technology.

Terabytes of data from the industrial Internet of Things (IIoT) are shaping manufacturing processes, supply chain management and preventative maintenance. Real-time asset tracking and analytics powered by AI have become powerful tools to reach new levels of efficiency. As the potential of smart manufacturing becomes reality, networks will extend to nearly every component of the production floor.

In one survey, 39% manufacturing leaders anticipated an increase in IIoT investment in the coming year, while 54% already use their repositories of data to inform supply chain decisions.[1] Staying ahead of the competition will require manufacturers of all sizes to deploy data-intensive applications, which necessitate upscaling the underlying network.

This guide explains how your organization can approach — and accomplish — digital transformation for the smart factory.

Technology leaders in the manufacturing sector are realizing these benefits across the value chain, according to McKinsey & Company:[2]

- Increased production capacity
- Reduced material losses
- Better customer service
- Improved delivery lead times
- Higher employee satisfaction
- Lower environmental impact

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8 steps to help extend your network to the production floor

Smart manufacturing requires new investments in connectivity, network infrastructure, cybersecurity, cameras, sensors and other technology. But first, it requires a plan.

Many industrial organizations struggle with where to begin when preparing their networks for the future. Among the manufacturers in one study, 42% said they hadn't started their digital transformation journey and two-thirds believe their competitors are ahead of them.[3] Business leaders are often challenged to align IT with operational technology, budget priorities and their growth. Nonetheless, with the right planning, most organizations can find a way to realize the potential of smarter, more connected manufacturing.

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of manufacturers believe their competitors are ahead of them in digital transformation.[4]

The most successful digital transformation initiatives take a value-based approach, viewing technology adoption in terms of specific, well-defined business problems. Manufacturing leaders recognize this is not a one-time project and treat digital and physical interconnectivity as an ongoing journey toward smart manufacturing. Here are eight steps you can take to get there:

Step 1: Find the right path and partner for your success

Extending your IT network to your physical operations can be a challenging journey, but it's one that will help ensure your organization can unlock the potential of rapidly advancing manufacturing technology. Set goals first and the digital capabilities you need will become clear. Then execute based on your objectives, stakeholder insights, existing capabilities and benchmarks that will inform the next stage of your digital evolution.

An expert partner in networking and connectivity can make digital transformation significantly easier to achieve.

Define what success looks like first and the digital capabilities you need will become clear.

Step 2: Define success

Network and operations integration should begin with high-level business priorities, rather than the technical details that can complicate goal setting if addressed too early. A simple place to start is identifying objectives for improving production, logistics or other areas. Prioritize those with the highest impact and the lowest risk first.

Once business goals are in place, define what success looks like: What are your technology capabilities now and what do you envision them to be in the future? Any initiative should include measurable key performance indicators (KPIs) tied to your goals. Likewise, each goal and KPI should have a well-defined connection to your broader company strategy.

Step 3: Develop a smart manufacturing strategy

With your goals identified and successful journey defined, you can begin to create a strategy for new capabilities. Early steps in this process can include research into best practices for adopting technology relevant to your goals. You should also conduct cost-benefit analyses with input across departments to compare potential investments against anticipated business impacts.

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Apply these findings to your final recommendations for expanding your network infrastructure. Pair each recommendation with benchmarks for success, such as estimated return on investment and total cost of ownership. Then establish reporting parameters for those benchmarks. With the groundwork for your strategy in place, as well as clear expectations for the results you hope to achieve, you can begin laying out a timeline and allocating resources.

Step 4: Hand pick a cross-functional, dedicated team
Extending your digital network to see, understand and influence your physical world impacts your entire organization from assembly lines to warehouses to corporate offices. It's important to establish buy-in from relevant leaders across the organization from the beginning. Pick a dedicated team of experts to represent each department set to benefit from converging your IT infrastructure with operations. Empower these team members to develop the project strategy, goals, scope, cost-to-benefit analyses, collaboration and communications. Examples include:

- A representative from executive leadership.
- A dedicated project leader from IT or business operations.
- Employees in IT and operational technology.
- Leaders that choose and implement operational technology.
- End users, such as production floor operators.

Break down any organizational silos at the beginning to ensure effective communication as different business units outline their priorities and challenges. Once you have established clear roles and responsibilities, use the team's early work to inform your priorities.

Step 5: Assess your digital maturity
Before planning for the future, it's valuable to assess where your technology stands today. It can be useful for your team to address the following questions to help identify the most appropriate scale and pace of the first phases of your digital transformation:

1. How well is your current network technology serving your needs?
2. How well-positioned is your organization to leverage new technology for growth and changing business conditions?
3. What is your organization's ability to integrate new digital infrastructure into its operations?
4. What is the technical skill level of your personnel and what tasks will you offload to a technology partner?
5. What improvements to your network and physical security will you need to put in place?
6. Will your organization be able to adopt emerging technologies in AI, automation and analytics in the future?

An assessment of your organization's adaptability and technical capabilities can help you shape realistic goals and explore how your organization's culture will shape your initiatives.

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For many manufacturers, the upfront costs of new technology can make it difficult to initiate an upgrade. A technology partner that offers flexible managed services can help put smart manufacturing within reach.

Step 6: Identify potential technology investments

Your digital maturity can inform the types of technology best suited to your organization and its goals. Advancements in manufacturing that require parallel investments in network capabilities include: the use of smart cameras and environmental sensors, analytics to better forecast orders for raw materials, modeling that can predict the effect of proposed production changes and cloud computing that can scale to accommodate the prolific data produced by smart manufacturing.

These requirements demand a more advanced network infrastructure than many manufacturers have in place now. Some of the building blocks that form the foundation of digital transformation in manufacturing include:

- Scalable fiber bandwidth for reliable, low-latency connections.
- Secure, high-performance connectivity designed to deliver exceptional user experiences and improve production and flexibility.
- Defense-in-depth security solutions that help guard against malware, data breaches, phishing and threats in the cloud.
- A single, cloud-based portal that provides 360-degree visibility into your digital network, connected machines, equipment and devices.
- Smart cameras and environmental sensors that can enhance employee safety, monitor inventory and notify personnel immediately if unauthorized access or potentially damaging environmental conditions pose a threat to facilities.
- Networking equipment that can scale and accommodate more complex technology demands.

For many manufacturers, the upfront-capital costs of new technology can make it difficult to initiate an upgrade. A technology partner that offers flexible managed services can eliminate initial capital expenditures, helping put smart manufacturing within reach. With no network equipment to buy, maintain or repair, manufacturers can extend their network to the production floor for one predictable, monthly fee.

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Step 7: Start small, scale fast

Technology adoption for the smart factory doesn't need to happen all at once. Uncertainty and risk can be a barrier to digital adoption, and a phased approach to replacing network infrastructure can make the transition easier.

Consider starting with a small pilot project tied to a specific use case from your wider planning. This will help your team gauge your internal capabilities and the level of effort required to uplevel your technology. You can collect data from the pilot implementation to compare against your goals. This will inform whether a given solution is worth implementing and scaling. As you identify technologies that deliver a high return on your investment, you can repeat the process across new solutions and build the business case for a larger smart manufacturing program. Throughout this process, continue to test your assumptions, learn from the outcomes and repeat the process for continuous improvement of your operations.

Step 8: Protect your investment

New threats to networks require a layered approach to security. In the context of smart manufacturing, this also encompasses the security of physical assets. Connected smart cameras, IIoT devices and environmental sensors add more endpoints for IT to protect against data breaches — just as expanding cloud applications and remote work increase the size of the potential attack surface.

Physical and network security are merging as a result. By integrating physical security safeguards more closely with the technology used to manage the overall network, manufacturers can gain a comprehensive view of both cybersecurity and risks to physical spaces. In one study, 60% of IT leaders said greater control of physical security would result from its convergence with network security.[5] Nearly half also said this unification can improve the ability to perform security analytics and gain better visibility into threats.[6] Achieving smart and fully integrated security, though, can be a challenge when dealing with multiple legacy systems that weren't originally designed to work together. The right IT partner can offer the expertise needed to merge elements of physical security and networking for a safer manufacturing facility.

Spectrum Business:

- Takes the time to understand your goals.
- Designs solutions to meet complex challenges.
- Brings IT into a single, efficient platform.
- Provides the support you need for success.

Why partner with Spectrum Business®?

Spectrum Business has served manufacturers across the country. We take time to understand your unique business needs and tailor solutions to meet them. Our nationwide reach and technologies designed to work together can help you scale your network to adapt quickly to business and industry changes.

Managed Workplace Package with Smart Spaces from Spectrum Business simplifies the adoption of the network infrastructure that makes manufacturing smarter. Our all-in-one platform offers flexible solutions that encompass connectivity, network management, unified communications and collaboration, security and connected smart cameras and environmental sensors. It includes equipment, maintenance, updates and 100% U.S.-based support, available 24/7/365. You can control your network from a single, cloud-based dashboard that incorporates a variety of services that can be fully managed or co-managed according to your needs.

Spectrum Business can help extend your network to the production floor, preparing your digital infrastructure for the future so you can make the most of emerging technologies in manufacturing.

Learn more

1. "Alithya's 2023 Manufacturing Trends Survey Reveals that Technology Investment Remains Paramount," Alithya, April 5, 2023.
2. Ewelina Gregolinska, Rehana Khanam, Frédéric Lefort and Prashanth Parthasarathy, "Capturing the True Value of Industry 4.0," McKinsey & Company, April 13, 2022.
3. Evelyn DuJack, "Digital Transformation in Manufacturing: Trends and Challenges," L2L, October 23, 2023.
4. Ibid.
5. "The Opportunity for Convergence: Integrating and Improving Physical and Network Security," CIO, 2023.
6. Ibid.