

Create a flexible infrastructure

For the data-driven factory



Robust and secure connectivity is essential to become a successful data-driven factory. It connects systems, allowing data to be correlated and analyzed to make factories smarter, more profitable, safer, and more sustainable.

Smart factories comprise an array of machines, sensors, and controllers. They all require a reliable, flexible infrastructure, allowing data to flow dynamically and production lines to be reconfigured without maintenance shutdowns. The infrastructure must give the networking teams full visibility into the network, connected devices, and data traffic to optimize processes and monitor for data security.

Network performance

Without reliable connections and connectivity between the various OT systems, manufacturers cannot receive an accurate and clear picture of the data for analysis, smart decision-making, and enhanced operational efficiencies.

A networking roadmap is essential for manufacturers to scale the data-driven factory concept and get real value from operational data. Many factories, however, are unaware of their assets and which ones are networked. Some legacy machines have never actually been networked.

Digital transformation does not mean ripping out all legacy systems and replacing them with new technologies. It is

a step-by-step process, integrating the old with the new and connecting them through the most reliable networks. These can include Industrial Ethernet, Wireless, Bluetooth Low Energy (BLE), LoRA, 4G, and 5G, together with very secure IPsec access solutions for enterprise-wide communications, offering secure access to the cloud, enabling traffic to flow to the Internet from the closest link.

Another issue is basic logistics and safety. How are cables currently installed, and where are routers and switches housed? The most efficient cable layout must be considered when replacing a network infrastructure. This is also why ruggedized devices for LAN and WLAN networks are recommended, built for durability and strength, instead of consumer-grade options.

In addition, it can be very hot and humid in a factory, which can adversely impact standard wireless access points and devices. And machinery can produce interference that produces noise on the radio frequency (RF) spectrum, disrupting the production process and delaying outputs.

“By 2024, 30% of industrial organizations will have become leaner and more agile than their competitors by making real-time operational insights available anytime, anywhere, to anyone.”

IDC

Infrastructure requirements to support the smart factory

A robust wired and wireless network infrastructure is essential to connect the hundreds of devices, machines, sensors, and controllers across the factory floor. The network must be reliable, scalable, secure, efficient, and easy to manage. These are the important considerations when building a flexible infrastructure:

1 Network asset assessment

Many manufacturers are unaware of the assets they have in a factory or how they are connected – if at all. In addition, some of the OT systems may be decades old. Traditionally a network review has only been activated due to an acquisition, for example. Manufacturers must run a network assessment to examine their current networking capabilities before drawing up a digital, cloud-orientated networking strategy.

2 Network security

IT/OT convergence increases the risk vector. Make sure you prioritize network security and invest in a high-quality flexible network infrastructure to reduce risk. A secured network architecture design, such as network segmentation, reduces the risk of threats emerging from the IT network. Ensure that networking devices adhere to standards before being onboarded to the network. Ensure that unused ports are disabled to reduce entry points for malicious actors.

3 Overarching network strategy

Draw up an overarching networking strategy built on reliability, that keeps data secure, information flowing, and the internet connection fast and dependable. Ensure that it covers network security, device security, and security monitoring and management. Make sure it has visibility at its core. Many manufacturers struggle to have visibility regarding their assets and processes, preventing them from having overall network control. Ensure that the networking strategy is flexible enough to cope with changes in markets and demands and can be scaled accordingly. Network performance and availability are key. More capacity will be required as more devices are added to the network.

4 Perform a cloud migration assessment

It is important to understand that not all applications are suitable for the cloud environment, such as applications that may have been built internally to

manage and store very sensitive data. Evaluate on-premises applications before moving to the cloud to see which ones should migrate and which ones to optimize first. Perform a cloud migration assessment and draw up a robust migration plan.

5 Run a wireless network assessment

The factory can be a hostile environment for wireless communications given the amount of metal, for example, that exists that can interfere with signals. Machines can generate noise that isn't on the radio frequency spectrum. Ensure that wireless networks have the required signal strength and position the Wi-Fi antenna to cover the necessary space. Here, Wi-Fi spectrum analyzers can help with deployment and troubleshooting issues. Run a wireless network assessment to determine your organization's best wireless solution. From a wireless perspective, manufacturers should look to deploy or upgrade to Wi-Fi 6 for lower latency, and quicker response times.

6 Use LoRa where geographical coverage is large and data volumes small

Consider LoRa networks for long-range, low-power projects. The advantage of LoRa is its ability to distribute small bits of data across a wide area. It also offers a low cost of deployment and operation and excellent indoor penetration. As with any networking technology, it is important to develop a deployment strategy to ensure it achieves desired goals.

7 Revisit connectivity strategies regularly

Many manufacturers complain that their global infrastructure is not delivering the expected performance. Yet, they have not looked at or revised their networking strategies for years. A networking strategy should be regularly revisited, and assets re-evaluated to ensure connectivity delivers on business objectives. Before any network upgrade can be made, it is essential to understand why it is required. A regularly updated connectivity plan is an essential document in making this assessment.



Summary

A successful data-driven factory depends on having a secure, mission-critical, high bandwidth, low-latency network that provides centralized visibility and control.

A flexible and secure infrastructure is critical to interconnecting all the solutions and assets within the smart manufacturing environment. Cloud computing and converged systems deliver significant business value and data insight. They add complexity, however.

Planning a data-driven factory and supporting its wider ecosystem needs a multidisciplinary approach that takes into consideration all aspects of operations – including connectivity, collaboration, production, and security. This is where a trusted partner comes in, helping to build a future-proofed network that supports hyper-automation and robotics going forward.



Orange Business – trusted by its partners in building a data-driven business

Orange Business has 2,200 global experts available to help you deliver a data-driven strategy. This allows you to maximize plant energy efficiencies, provide faster resolutions, seamlessly exchange data, enhance safety and quality control, track components across the value chain, and ensure on-time delivery. Our offering includes:



A consultancy-led approach to transforming data and creating value for the business



Auditing data assets and analytics maturity to create an overarching data-driven strategy



Design and build a central Unified Namespace (UNS) as a centralized repository for structured data to make it meaningful to all components in the enterprise



Data governance expertise to ensure the quality of data and manage its use



Help you focus on areas of your business where technology and a data-driven approach will have the greatest impact



Create easy-to-use dashboards so employees can track and optimize product quality and efficiently manage all manufacturing-related costs

1. IDC futurescape top 10 predictions future of operations <https://www.idc.com/getdoc.jsp?containerId=prUS49960122>