Industry 4.0: How to Connect with Confidence

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Now Connecting to the Future.

We are in a new era of industrialization fueled by digital transformation in manufacturing. **The Fourth Industrial Revolution, otherwise known as Industry 4.0,** is characterized by the convergence of smart machines, autonomous robots, cloud and edge computing and big data.

The Industrial Internet of Things (IIoT) component of Industry 4.0 involves manufacturing and industrial automation using smart sensors and machines that can self-monitor, diagnose, act autonomously and communicate with each other, independent of human intervention.

Connectivity. Automation. Productivity.

The goal of Industry 4.0 is to eliminate unpredictability and improve accuracy in manufacturing operations.

Industry 4.0 technology is enabling manufacturers to build the smart factories of the future. The technology is also being deployed by other industries such as energy and utilities. Investing in upgraded IIoT, along with edge computing and advanced networks, will enable you to get more value out of your system and resources while improving environmental stewardship.

Whether you are piloting an Industry 4.0 transition, or you are a large industrial supplier at the leading edge of IIoT, you need tough, reliable connectivity. Digi is unsurpassed with always-on, end-to-end connectivity solutions and expert services to help you take advantage of the Fourth Industrial Revolution.

Top sources of industrial emissions include energy to power facilities, heavy equipment, HVAC and lighting as well as fossil fuels used as raw material inputs to manufactured products.*

Smarter. Faster. More Sustainable.

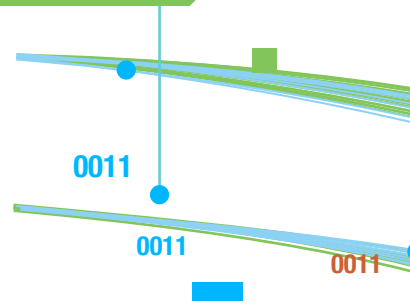
The industrial sector currently accounts for 30% of all domestic greenhouse gas emissions*.

Most likely, your organization or local government has set urgent — or even daunting — sustainability or decarbonization goals. The good news is that as you transition to Industry 4.0, you gain a powerful tool for meeting sustainability targets via monitoring, measuring, processing and sending data to create actionable insights.

Virtually any process that can be automated is a candidate for **clean (or green) technology**. Green technology has emerged as a critical adjunct to industrial innovation, enabling operations in this sector to make smarter decisions that reduce their carbon footprint, save energy and water and reduce the use of fossil fuels. These optimizations also drive value directly to the bottom line.

In the near future, Industry 4.0 will drive greater climate accountability and measurable action via deployment of sensors, IIoT devices, remote connectivity and edge computing to support rapid detection, reporting, data insights and remediation.

*https://www.energy.gov/eere/industrial-decarbonization



Driving Factors for Industry 4.0.

Let's look at some of the challenges you may be facing as you consider an upgrade.

Challenge #1

Connectivity. With 5G connectivity, industrial cellular routers enable ultra-low latency and high-bandwidth communication, facilitating real-time monitoring, control, and optimization of manufacturing processes. These advanced capabilities enable real-time data exchange between machines, robots, and control systems, empowering seamless integration and enabling rapid decision-making for improved operational efficiency and productivity.

Challenge #2

Productivity. Edge computing is a crucial addition to Industry 4.0 deployments, enhancing the performance and efficiency of modern industrial processes, via reduced latency, bandwidth optimization, improved security, compliance and privacy, as well as scalability, flexibility and cost-efficiency. Edge computing allows critical applications to continue functioning even if the cloud connection is lost temporarily, ensuring uninterrupted operations.

Challenge #3

Flexibility. Change is inevitable — from ebb and flow of demand to labor shortages — amplifying the need for automation and remote monitoring capabilities to alleviate the strain on corporate staffing and production pipelines. Supply chain disruptions and market shifts require real-time resource and production data. Additionally, security threats grow as more machines are connected. You need complete, secure solutions that help you adapt to change.

Challenge #4

Competition. Competition is fierce in the manufacturing world, and the pace of industry doesn't slow down for late adopters to catch up. Whether you are piloting an upgrade or transforming your entire operation, a leading **5G edge computing industrial IoT cellular router solution** that is purpose-built with next-generation connectivity and remote management capabilities can help your industrial operations stay at the forefront today and tomorrow.

Challenge #5

ROI. Expenditure or investment? You may be ready to move to 4.0, but cost concerns and lack of awareness within your organization may present a barrier. Sharing relevant industry examples or proposing a pilot project is a good strategy. Many companies tell us that their IIoT investment pays for itself. In fact, they typically find additional ROI in process and efficiency improvements. Our teams can help you make the case for your upgrade.

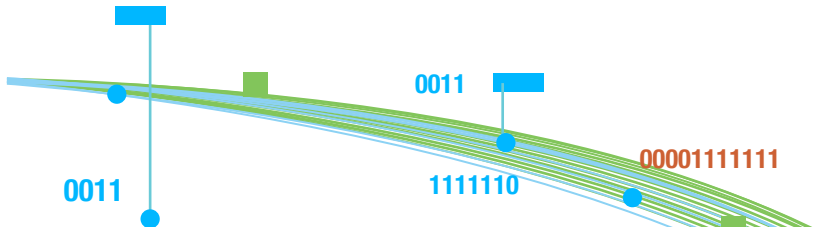
Better Data. Better Operations. Better Business.

As more customers transition to Industry 4.0, we are seeing a trend toward several transformational use cases across a variety of applications.

Digital Twins. In practice, a digital twin is a virtual model of a real industrial application (factory production line, city bus system, oil field, etc.) based on real-time data collected using connected sensors. With advanced sensors delivering accurate data, you can replicate an industrial operation or run a simulation to understand the state of a machine or system, monitor and drive industrial lines, reduce defects or problems, respond to changes and improve operations.

Video-based AI. With HD and 4K video stream analytics, visual inspections can be automated, saving labor costs and eliminating human error or fatigue. End-to-end, machine-based automation is fast and accurate, allowing you to collect actionable insights from production line data, identify quality issues and perform process inspections.

More connected end points. Smarter applications require a network of connected devices such as sensors and routers. But these newer devices must co-exist with legacy equipment that is difficult to replace due to the large capital investment required. For seamless operations, devices need intelligent connectivity with cloud services, edge devices, and security monitoring tools. The more devices on a network, the more important your security strategy becomes. For all Digi solutions, robust built-in security is non-negotiable. And intelligent software enables management of your end points from anywhere.



Expect Leadership. Enable Transformation. Connect with Confidence.

With complete infrastructure and service offerings, Digi can help you realize the transformational promises of Industry 4.0. Since 1985, we have been a pioneer in connectivity, trusted for tough industrial devices that are relentlessly reliable even in the most demanding conditions.

Here's what you can expect when you partner with Digi:

Security. Increased connectivity must be protected with increased security. Digi solutions have built-in, best-in-class security. They undergo stringent end-to-end security verification before launch and are continually updated to protect against new threats.

Reliability. Which part of your network has room for failure? None. Networks driven by Digi software and connected with Digi hardware are relentlessly reliable for always-on connectivity.

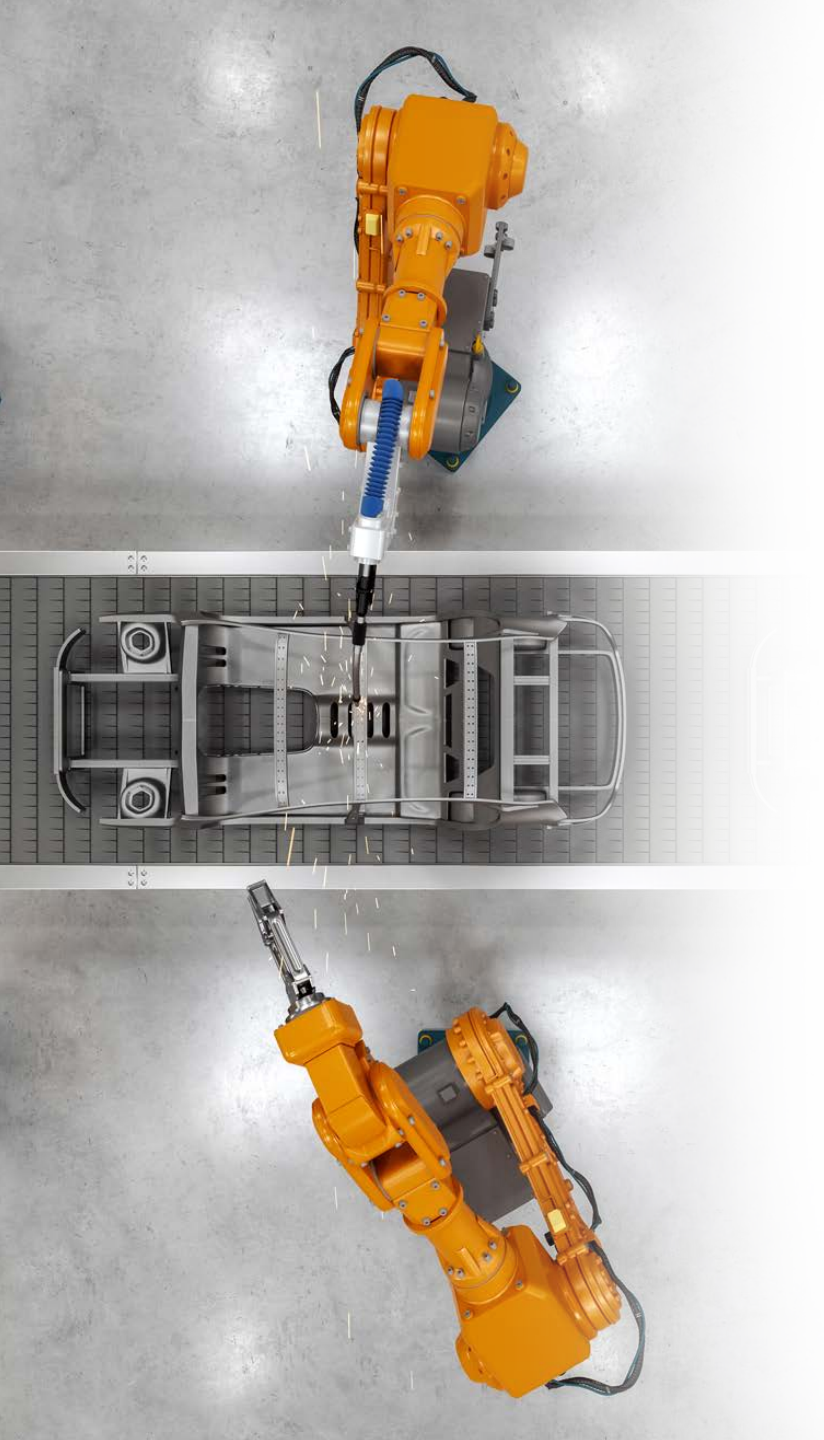
Longevity. Digi solutions are robust, rugged and made to last — for lower total cost of ownership. Our products are known for outstanding durability in tough industrial environments, from vast oil fields to smart cities to factory floors.

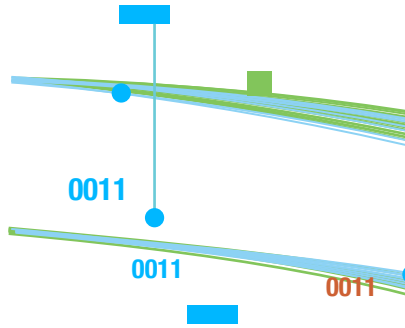
Scalability. Your system must function properly and predictably, and readily adapt to changes in network size or capacity. Digi Remote Manager® enables zero touch configuration for rapid, seamless additions to your network as you grow.

Sustainability. When the environment is at stake, robust connectivity is mission critical — supporting processes, automation and timely decision making that reduce energy usage and optimize resources. We support the many IoT-based initiatives that industrial applications are building and deploying in their quest to reduce their carbon footprint.

Protocol conversion. Legacy products can be integrated into your intelligent networks with protocol conversion. We support an extensive list of routing protocols found in industrial applications.

Tailored solutions. Software. Hardware. Professional services. Digi delivers the network connectivity solution you need to enable your Industry 4.0 digital transformation. Our teams can design, install and deploy the solution that's right for your application, from off-the-shelf products to fully customized networks.





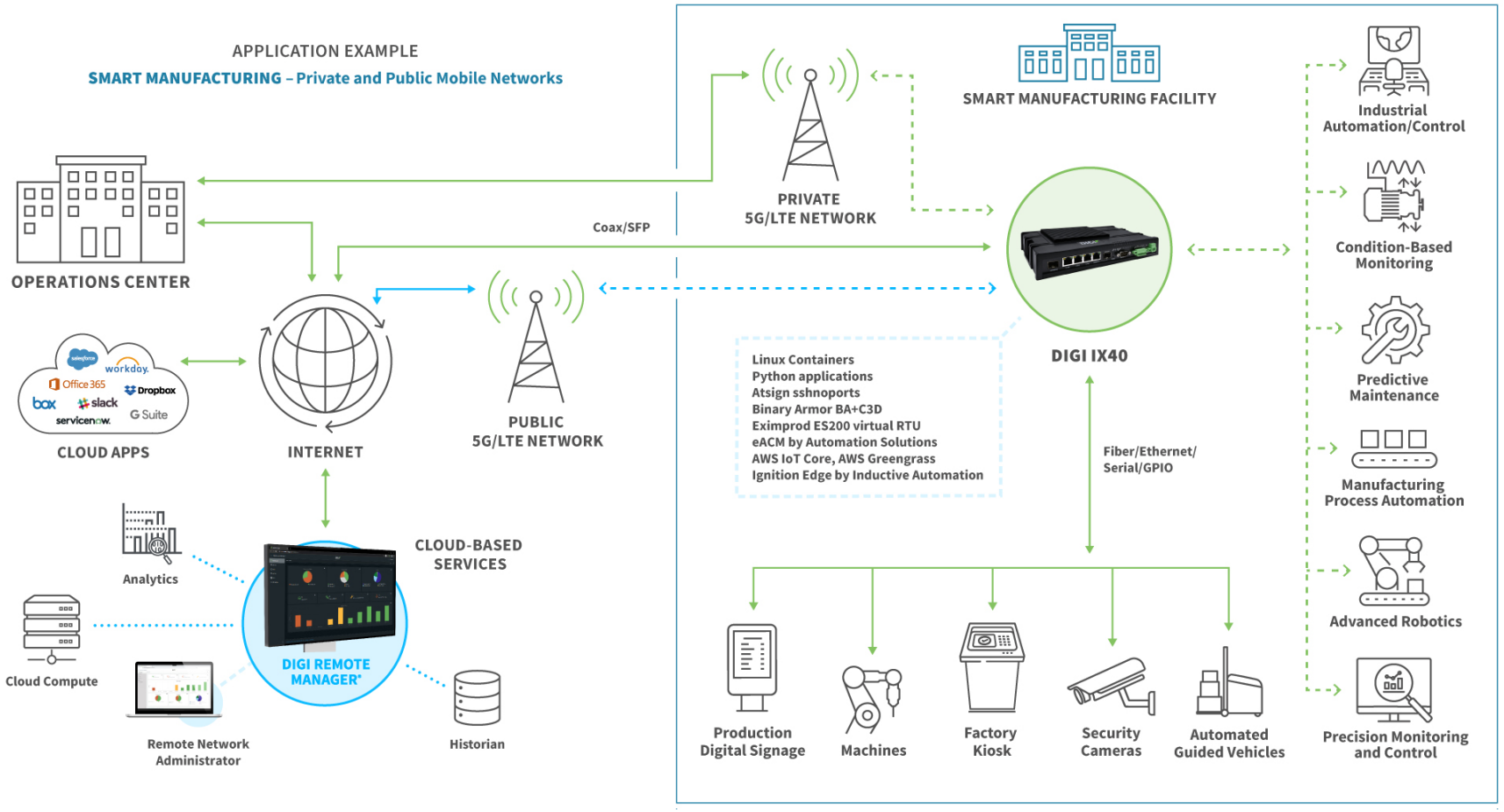
How Edge Intelligence Drives Industry 4.0

Computing at the edge eliminates the latency challenges of the past, enabling the reliability, bandwidth optimization and real-time processing required for Industry 4.0 applications, including:

- **Precision monitoring and control:** Edge computing enables vast amounts of data to be filtered for precision monitoring and control, and the ability to dynamically adjust manufacturing processes.
- **Condition-based monitoring:** Extracting data from multiple machines generates a large volume of data. Edge computing enables manufacturers to filter and reduce the data before sending it to a server.
- **Predictive maintenance:** Data analytics driven by rapid processing at the edge can detect potential machine failures in advance, and thus enable maintenance to occur before a breakdown.
- **Advanced robotics:** Real-time processing, advanced sensors and vision systems enable precision manufacturing and optimized industrial processes with both robots and “cobots.”

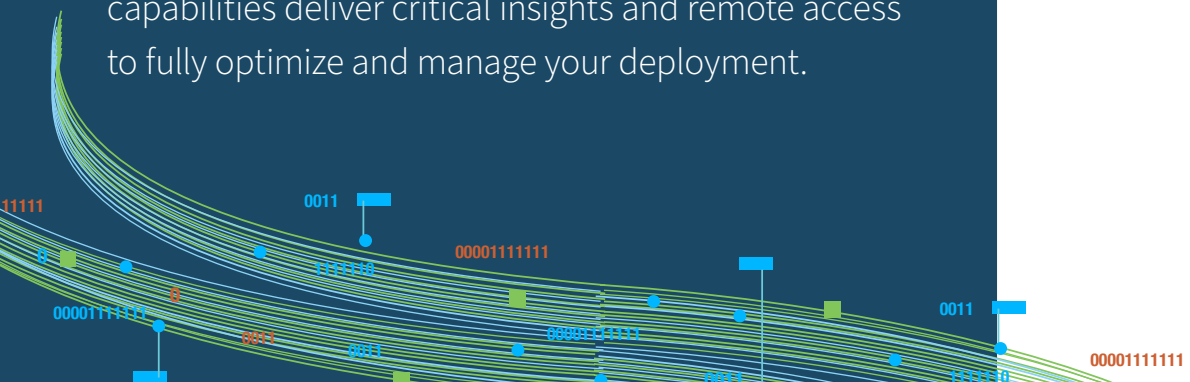
How 5G Speed Is Driving Industry 4.0 Adoption

5G technology plays a crucial role in supporting the full realization of Industry 4.0 by providing high-speed, low-latency, and reliable wireless connectivity. The deployment of 5G industrial cellular routers like Digi IX40 facilitates seamless data transfer, enables real-time communication, and supports automation and intelligent decision-making.



The "Why" Behind Why Your Network Is so Reliable.

Virtually indestructible on the outside. Leading edge technology on the inside. Digi IX routers are software-defined solutions with industry-leading configuration, security and management features that make them easy to deploy, monitor, manage and update — regardless of where you deploy and how many devices you manage. Sophisticated software paired with cloud-based systems and edge management capabilities deliver critical insights and remote access to fully optimize and manage your deployment.



Resilience

- In the event of an interruption to your primary network connection, Digi devices automatically switch (failover) to a secondary connection
- **Digi Remote Manager** offers secure terminal access for out-of-band management of offline devices
- **Digi SureLink®** provides always-on persistent connections and creates redundant connectivity with dual SIMs
- **Carrier Smart Select** automatically detects cellular carriers in the event of interruption and is compatible with 3G/4G/LTE/5G

Security

- The **Digi Accelerated Linux operating system (DAL OS)** has enhanced data security and integrity and is available across our product lines
- **Digi Remote Manager** gives you a single, secure, cloud-based platform for configuration, notifications, firmware updates and device management
- The **Digi TrustFence®** security framework is built in, providing multi-layer support and best-in-class security

Configure. Deploy. Monitor and Manage.

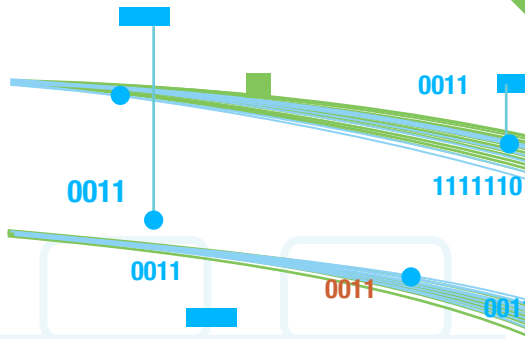
Digi Remote Manager® transforms a multitude of dispersed IIoT devices into a dynamic, intelligent network.

You can easily configure, deploy, monitor and manage hundreds or thousands of mission-critical Digi devices from a single, secure platform on your desktop, tablet or smartphone.

Even relatively small deployments — if they are distributed across a wide area such as a factory or warehouse — need to have an interface for critical insights, notifications of security issues and remote access for remediation. With **Digi Remote Manager** — our secure, cloud-based software system — you can manage your entire network: edit configurations, update firmware, schedule and automate tasks, and manage your deployment over its complete lifecycle.

Advanced Features with Technology Integration

Today's technology stack is complex — integrating hardware, software and cloud services from multiple vendors to provide the optimal functionality and performance for targeted use cases. At Digi, we seek to integrate disparate but complementary technologies in order to drive faster, more successful IoT deployments and support the most sophisticated requirements of our customers — all from one vendor.



Meet some of our technology integrations supporting Industry 4.0 use cases:

Digi WAN Bonding

Digi WAN Bonding aggregates multiple connections into a seamless and resilient connectivity solution that ensures optimal performance and maximum uptime anywhere around the world. WAN bonding supports the most robust connections for demanding applications with hot failover, WAN aggregation, WAN smoothing, WAN prioritization, and increased throughput.

Digi Containers

Digi Containers simplify and centralize the process of building, deploying and running custom applications on edge devices managed with Digi Remote Manager® as the central portal. Containers are a powerful capability implemented via Lightweight Linux Containers (LXC), supporting portability, scalability, security, speed and efficiency.

Network Options for Mission-Critical Industry 4.0 Applications

When security is paramount, and downtime can't be tolerated, you have options. Digi continually enhances the value, performance, and security of our network devices with advanced capabilities. Here are some featured options:

- **Private Networks:** Private networks offer extensive benefits in environments requiring high levels of security, privacy and reliability. Expanded use of robotics and automation in manufacturing is driving the need for low-latency connectivity between machines on the factory floor. Private networks enable robots and IoT devices to connect seamlessly and facilitate better process monitoring and predictive maintenance.

- **Emergency Networks:** Digi cellular router solutions offer integration with first responder networks, designed to meet the demands of applications where reliability is essential — even in the event of full-scale public emergencies. For example, Digi IX40, which is purpose-built for Industry 4.0 applications, includes FirstNet Capable™ models supporting extended primary users, including critical manufacturing facilities.

Reliable Connectivity. Regardless of Conditions.

Digi industrial routers provide rugged, reliable network connectivity and remote management tools for heavy-duty applications such as precision agriculture, oil fields, industrial tanks, water treatment and construction. The Digi IX family features a ruggedized enclosure and internal components built to handle extreme temperatures, moisture and dust to provide secure connectivity and communications over a cellular network.

Industrial routers are the communications backbone for all applications that run in outdoor environments, including industrial applications like mining, oil and gas and agriculture, as well as digital signage, street lighting, metering, wastewater management and transportation use cases.

Digi IX40 Cellular Router
5G edge computing industrial IoT router solution, purpose-built for Industry 4.0. Offers real-time processing at the edge for manufacturing and precision automation use cases, including advanced robotics, asset monitoring and predictive maintenance.

Digi IX10 Cellular Router
Rugged, reliable, cost-effective connectivity for critical industrial applications.

Digi IX20 Cellular Router
Programmable IoT gateway connects Digi XBee-enabled devices to remote applications over cellular and Ethernet.

Digi IX30 Cellular Router
Intelligent C1D2-certified 4G router designed for critical infrastructure and harsh environments.

Choosing the Right Partner for Your Industry 4.0 Operation.

DIGI®

Connect with Confidence.

Industry 4.0 is not only the future: it's here right now. Digi's broad range of solutions and expertise for industrial applications continues to grow. We offer industry-leading hardware, software and professional services. Our expert teams can help you create a scalable, cost-effective system to meet your needs for today and tomorrow.

Contact your Digi team today to learn more about what you can do with Industry 4.0 and how Digi can help you accomplish your goals.
Choose Tough. Choose Digi.