



Using Data to Transform Industrial Organizations

Industrial enterprises are investing in proven technologies that boost efficiency, optimize production, and increase safety.

According to *The Impact of Connectedness on Competitiveness*, the IIoT provides real value to enterprises.¹

90% Say the IIoT is an area of strategic focus for their organization

89% Expect the IIoT to have an economic impact on their industry over the next three years

41% Expect that impact to be significant

The Industrial Internet of Things (IIoT) is transforming businesses around the globe. In manufacturing, logistics, energy, and other sectors, the IIoT can help optimize operations, improve competitiveness, and enhance flexibility—all while bolstering safety and reliability.

To take advantage of these benefits, businesses need a simple, easy way to adopt the IIoT. The Intel® IoT Market Ready Solutions (Intel® IMRS) were created to address this need.

Intel IMRS are end-to-end solutions designed to streamline IIoT deployment. Made possible by the Intel Internet of Things (IIoT) partner ecosystem, these proven solutions provide real benefits today and lay the foundation for a more intelligent tomorrow.

The solutions include:

- **Intelligent Warehouse Management**, which helps factories and warehouses increase efficiency by analyzing data to automate tasks.
- **Industrial Automation**, which helps enterprises improve productivity, worker safety, and competitiveness by optimizing operations.
- **Energy Grid Management**, which increases operating efficiency, reliability, and safety by deploying scalable, flexible solutions.

This business brief provides an overview of these technologies. It will help those responsible for managing operations, logistics, personnel, equipment, finance, technology, and other areas within the organization become more knowledgeable about using IIoT technology to optimize systems and processes.

INTELLIGENT WAREHOUSE MANAGEMENT



Transform factories into *intelligent* factories by connecting systems and evolving to a software-defined autonomous environment

INDUSTRIAL AUTOMATION



Tap into analytics-based insights to strengthen productivity, worker safety, and competitiveness

ENERGY GRID MANAGEMENT



Deploy scalable, flexible solutions to increase operating efficiency, reliability, and grid safety

Companies Can Become More Intelligent with IIoT

Increased competition, shorter lead times, the need for just-in-time supply chains, and other factors are challenging industrial organizations in new ways. To address these challenges, businesses need more access to data—from physical assets, workers, information systems, and other sources—that can be shared across their global operations.

With the right IIoT technologies in place, enterprises can gather this data and transform it into actionable insights, so executives and managers can demonstrate the rationale behind their decisions and justify spending related to operations, equipment, supply chain, and other areas.

To capture these benefits, industrial enterprises should look for proven, holistic solutions that bring together sensors, wireless connectivity, and end-to-end analytics. These solutions enable enterprises to combine data from multiple sources, rather than confine them to separate silos, to create a continuous, near real-time, holistic view of systems. Two other attributes—rapid deployment and scalability—are also necessary as they help produce ROI, enabling businesses to gain the benefits of the IIoT today, while laying a path for future innovation that can lead to increased efficiencies and revenue.

Deployment-Ready IIoT Solutions Benefit Enterprises

Connecting the industrial enterprise requires a solid understanding of the processes, systems, and technology needed to develop IIoT solutions. Intel collaborates with industrial enterprises as well as OEMs and software vendors that serve these industries.

By bringing together Intel's leadership in scalable technology with its partners' expertise in industrial applications, enterprises gain solutions that offer exceptional performance. The results: Businesses across the globe are empowered with end-to-end actionable intelligence, helping them become smarter, more efficient, and safer.

Real-World Results

Industrial enterprises have optimized and added flexibility to their operations—increasing competitiveness, reliability, and safety—by deploying Intel IMRS. Here are a few examples of how the IIoT technology is transforming businesses.

Intelligent Warehouse Management

Smart warehouse management technology systems can boost efficiency by streamlining operations, optimizing storage, and enabling managers to rapidly respond to changes. A common challenge in warehouses is congestion, which can cause delays and hazards as workers and forklifts maneuver between aisles and tight spaces.

To overcome these obstacles, Intel partnered with Hikvision, which created the Intelligent Warehouse Management System (iWMS).

Powered by Intel artificial intelligence (AI), the iWMS platform recommends and adjusts shelf positions in real time by analyzing warehouse storage. It also visualizes warehouse space and monitors automated guided vehicle (AGV) robot movement to avoid obstacles and traffic jams while evenly distributing tasks.

Hikvision has deployed iWMS and 800 AGV robots at one of its own facilities, a 120,000 m² warehouse, handling \$14.6 million in shipments per day. The solution achieved:²

- A 58% decrease in labor cost
- An 84% increase in efficiency

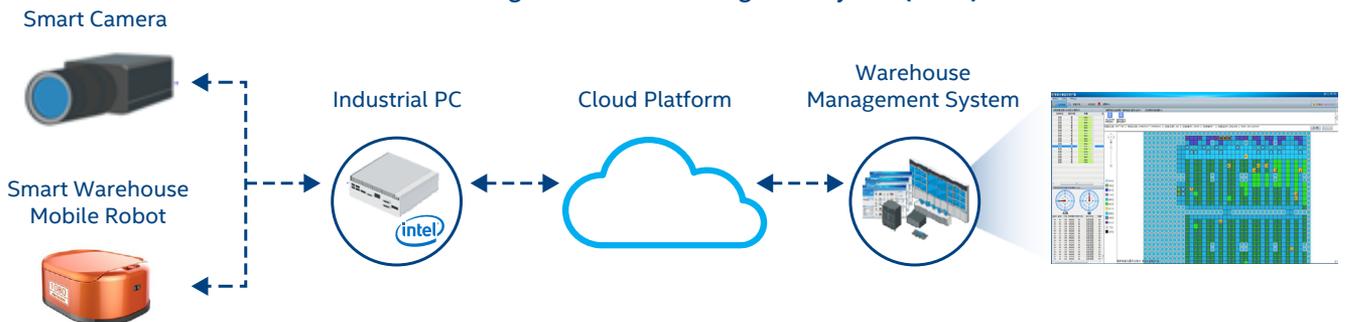
Industrial Automation

Limited visibility into industrial facilities hinders operations, making it difficult for managers to monitor in real time asset performance, inventory levels, and productivity.

IIoT solutions, such as the Cisco* Connected Factory, provide near real-time visibility into operations by connecting multiple networks. The solution monitors equipment performance, inventory status, employee productivity, and more, enabling managers to better understand and optimize operations.

SMART FACTORY

Hikvision Intelligent Warehouse Management System (iWMS)



Data Intake and AGV Control

Local Processing and Analysis

Data Transmission, Storage, and Visualization

SMART MANUFACTURING

Cisco Connected Factory



The Cisco solution uses standards-based Intel technology to combine multiple factory networks into a unified Industrial Ethernet system that smoothly integrates with IT. Data is no longer trapped within factory sub-systems and can be shared among different departments. The benefits are increased productivity, reduced downtime, and lower operating costs.

In one example, appliance maker Subzero deployed the Cisco Connected Factory and achieved:³

- A \$2,500 per production line per hour increase
- A \$140,000 reduction in travel and field testing costs

Energy Grid Management

The Indra InGRID Active Grid Management (AGM) suite combines open architecture built on scalable Intel technology with state-of-the-art analytics to effectively monitor and manage a wide range of grid assets. The solution supports

multiple use cases such as medium and low-voltage grid monitoring, asset condition monitoring, and integrating Distributed Energy Resources and Demand Response initiatives.

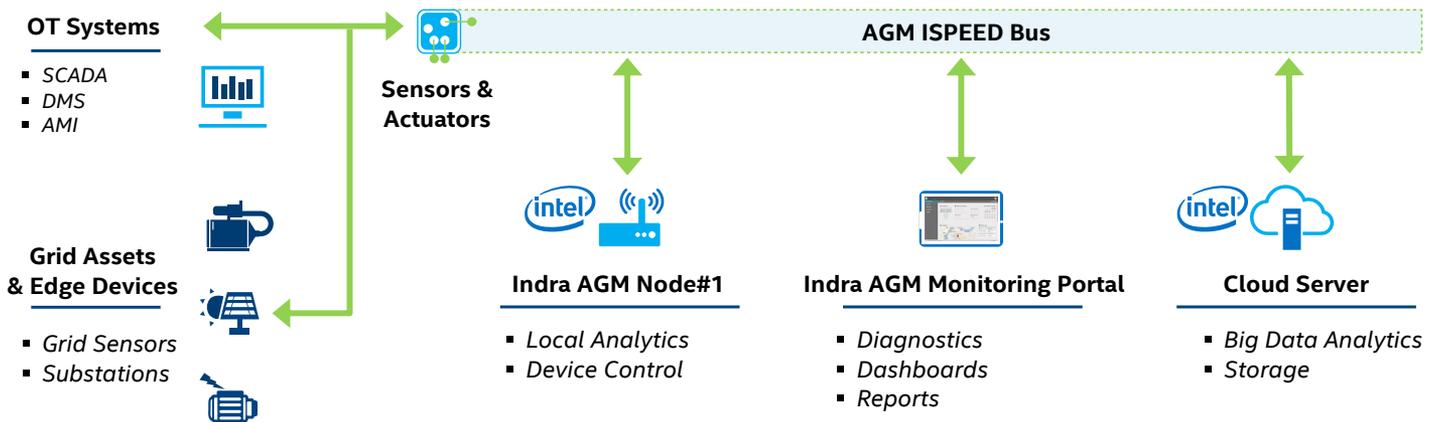
Deployed by utilities and a wide range of energy-intensive facilities—such as factories, universities, and production sites—the Indra InGRID AMG suite is designed to reduce costs, optimize asset management, and improve grid reliability.

Monash University in Australia deployed the Indra InGRID AGM Suite to intelligently manage and operate a scalable, sustainable microgrid connected to a range of energy sources. This end-to-end solution enables the university to:⁴

- Generate 7GWh of electricity by 2020 – enough to power 1,000 homes for a year
- Save an estimated 15 million \$AUD per year by 2028
- Eliminate its carbon emissions by 2030

SMART GRID

Indra InGRID Active Grid Management



Making Industrial Enterprises More Intelligent

Enterprises throughout the world are using IIoT technologies to meet multiple challenges. Solutions such as Intel IMRS advance the intelligent factory, empowering executives and managers with information to make data-driven decisions,

increasing efficiency, productivity, and competitiveness, reducing complexity, accommodating shorter lead times, meeting government regulations, and improving workplace safety.

For more information, visit the [Solutions Directory](#).



¹ <https://cmocouncil.org/thought-leadership/reports/the-impact-of-connectedness-on-competitiveness>

² Hikvision internal data

³ <https://blogs.cisco.com/digital/sub-zero-innovates-with-the-internet-of-everything>

⁴ <http://www.esdnews.com.au/monash-builds-campus-wide-microgrid/>

Intel® technologies' features and benefits depend on system configuration and may require enabled hardware, software or service activation. Performance varies depending on system configuration. No computer system can be absolutely secure. Check with your system manufacturer or retailer or learn more at intel.com.

Cost reduction scenarios described are intended as examples of how a given Intel-based product, in the specified circumstances and configurations, may affect future costs and provide cost savings. Circumstances will vary. Intel does not guarantee any costs or cost reduction.

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