



Where to **start?**



How Windows 10 IoT helps manufacturers
drive digital transformation



Introduction

Smart, connected cities. Smart factories. Connected health systems. Smart appliances. It seems everywhere you look today, you're bombarded with a story about the latest smart product or connected ecosystem. Everything seems to be smart. From the "find your dog" biochip to the "driverless car," bits and pieces of Internet of Things (IoT) scenarios have started moving from storyline to mainstream in our everyday lives.

While IoT has long been heralded for its potential to capture insights, drive productivity, and simplify complex processes, its success has been hindered by fragmented and disconnected technologies and a lack of standards. In short, technological roadblocks have prevented IoT from coming fully into its own.

But change is in the air. A perfect storm is propelling the long-awaited promise of IoT into reality: hardware is cheap, connectivity is ubiquitous, and businesses are hungry for the next technology wave.

In this e-book, we'll explore the ways IoT is transforming business, take a closer look at Windows 10 IoT—the great "digital enabler"—and outline some basic steps to start forming your IoT plan. Most importantly, we help you consider the question:

Is my business ready for the digital revolution?

What's the ROI of IoT?

When the automated teller machine (ATM) entered the marketplace in 1967, it revolutionized retail banking by solving the age-old consumer problem of accessing cash after hours. We've seen similar game-changing technology like radio-frequency identification (RFID) improve inventory control and streamline healthcare visits through process analytics that identify and manage the optimal flow of rooms, equipment, and caregivers. Throughout the 20th century, industrial robotics have been a vital part of the connected assembly line, and as they become "smarter" they become capable of working without human intervention. Wearable health devices track steps and calories, but they have the potential to do so much more, like monitor heart rate, blood sugar, and blood oxygen levels.

What makes an ATM, an RFID tag, an industrial robot, or a fitness tracker relevant to IoT? All these things improved employee productivity and revolutionized the way the bank or store or factory or clinic worked. That's the real promise behind the Internet of Things.

And while things like fitness bands and smart appliances seem to garner the most media buzz, IoT's potential in business is much greater. Research from the McKinsey Global Institute suggests that the operational efficiencies and greater market reach IoT affords will create substantial value:

- Seventy percent of value enabled by IoT will come from B2B scenarios.
- IoT could create as much as \$11.1 trillion a year globally in economic value.
- Nearly \$5 trillion would be generated almost exclusively in B2B settings.

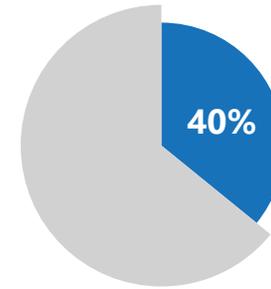
The same experts predict that IoT will improve your business's bottom line by:

- Lowering operating costs.
- Increasing productivity.
- Helping you expand to new markets or develop new offerings.

You just need to figure out what makes sense for your organization.

What's different now?

For the first time, imagination has no physical constraints: hardware is cheap, connectivity is pervasive, development is easy, and new, innovative scenarios are poised to drive new business value.



Interoperability required to capture
40% *of total value*

2X *more value from B2B applications than consumer*



<1% *of data currently used, mostly for alarms or real-time control; more can be used for optimization and prediction*

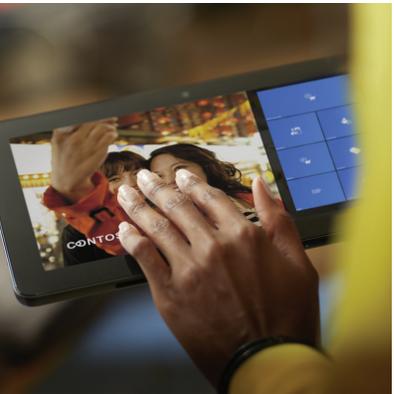
Developing: **40%**
Developed: **60%**





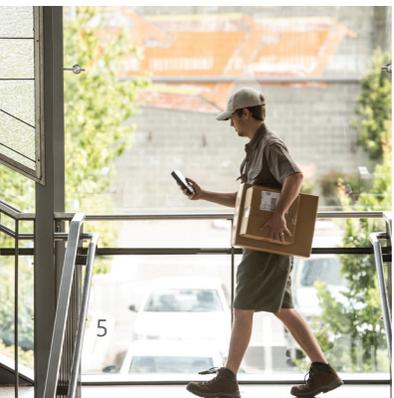
Windows 10 IoT: the “digital enabler”

IoT brings with it unprecedented connectivity between people and technology, and revolutionary ways of doing business and interacting with customers. Devices such as computers, vehicles, machines, or even entire buildings might seem disparate, but when linked together, these assets are the first key to advancing your digital business strategy. When you connect the intelligent devices your people use with your service infrastructure, you can change the trajectory of your organization in real time.



For your organization’s transformation to be successful, you need a dynamic, unified platform—one that can harness the power of the cloud and your devices. This platform must enable you to build on the infrastructure you already have in place, using familiar devices and services in new ways, and incorporating new technology. This platform must enable application development while providing uniform, centralized management and top-level performance.

Windows 10 is that platform.



Windows 10 IoT is the family name for the Windows 10 operating systems that run on a wide range of devices—from small intelligent devices to industry machinery. Whether you purchase Windows 10 IoT devices or you build them in-house, there is an edition available for the type of solution you envision.



Windows 10 IoT Enterprise is a full version of Windows 10 with advanced lockdown capabilities that power a range of industry devices. This edition is optimized to

run unattended inside a non-PC device, like a POS terminal, kiosk, or outdoor display. It can run all varieties of Windows applications and is backward compatible with older applications. Windows 10 IoT Enterprise provides a clear upgrade path for your devices running earlier versions of Windows Embedded.



Windows 10 IoT Mobile Enterprise provides a security-enhanced device experience, instantaneous application access, and excellent battery

life to enable a variety of mobile scenarios. All Windows 10 apps are compatible with Windows 10 IoT Mobile Enterprise and offer advanced lockdown features and multiuser support.



Windows 10 IoT Core is optimized for smaller, lower-cost industry devices. It is designed to power devices such as IoT gateways or micro-kiosks that run a single application. Windows 10

IoT Core extends the flexibility of Windows 10 to a wider range of specialized devices.

The digital business: where to begin?

While IoT enables incredible opportunity, you can start small and still realize a big impact. Begin by making your current devices smarter and progress by adding one device at a time. This digital transformation doesn't have to be complicated. Examine your processes, line-of-business assets, and existing systems to find areas where you can make updates and better use data.

Get ready...get set...get going!

The kinds of things that can be (and are) embedded with intelligence are virtually endless. But what matters are your things—your line-of-business assets and the data they produce, your cloud services, and your business intelligence tools—and implementing a strategy that makes your business thrive in this digital economy.

Here are four things to think about in your IoT planning:

1 Connect and scale with efficiency.

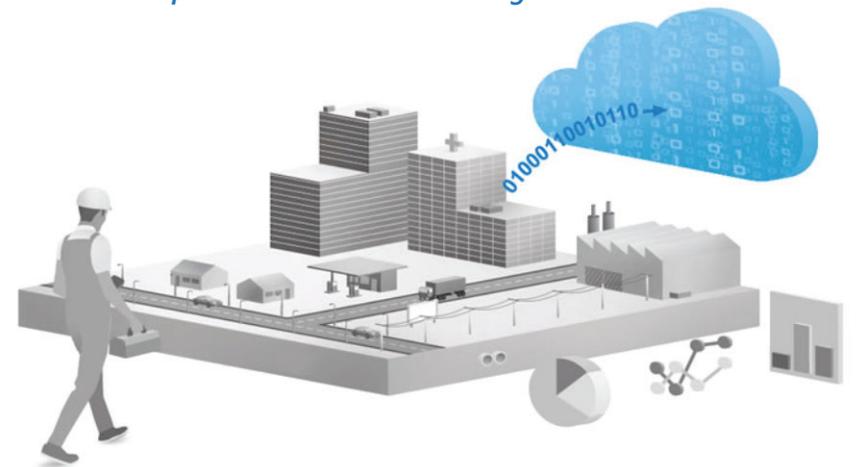
First, focus on the areas of your organization that could provide the quickest return. For example, you might start with operations—connecting systems and line-of-business assets to help deliver better performance visibility—driving toward predictive maintenance and helping reduce downtime. You might move from charts, paperwork, and filing records to an electronic health record system—one that provides true medical intelligence and captures outcomes, not just static data. Connect any asset that's important to you, from robotics to low-power devices and sensors, across any platform or operating system. Easily scale from a few devices to a few million.



There is real opportunity to be found by optimizing a few key areas of your organization. When you harness your data, and connect your people and infrastructure together, you can change the trajectory of your business in real time to become more efficient and to enhance operational decision-making.

2 Analyze and act on untapped data.

Monitor and analyze data from multiple sources, enabling your business to respond more quickly to competition, supply chain changes, customer demand, and changing market conditions. Maybe you're already capturing alarms and alerts from your connected assets spread around the world. Can you tap into that data to spot issues before they become operational problems? If not, what do you need to do to make that happen? Take advantage of advanced analytics and machine learning to increase reliability and uptime across your organization. Decrease costly outages and expensive repairs with prescriptive maintenance. And, take preemptive actions instead of understanding just the "what" and "why" behind a prediction.

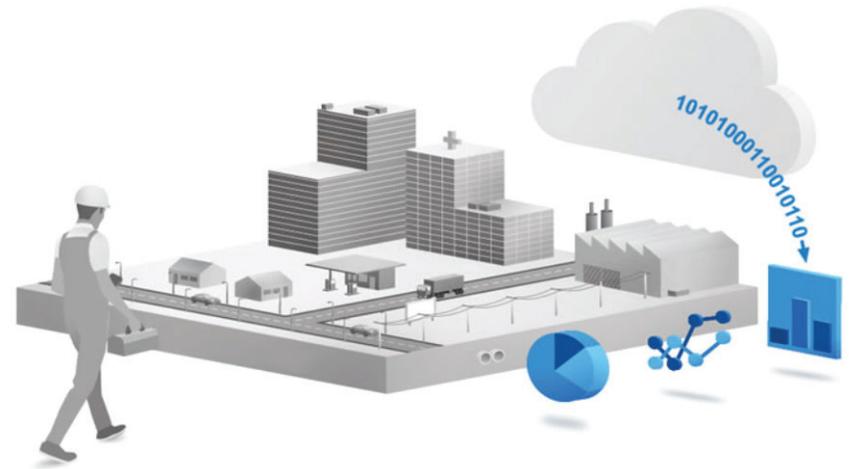


Collecting and analyzing data gives you quick insight into developing trends, so you can change your production activity, fine-tune your maintenance schedule, or find less expensive materials.

3

Visualize what's important.

Data is only ones and zeros until you turn it into insights. Data is no longer just for the corner office. Instead, customize visualization so the right people have access to the metrics that matter to them, updated in real time. Create rich dashboards and reports to show anything from high-level performance KPIs to the details of an individual asset so individuals on the floor can take immediate action based on real-time data. Access data and reports from any device, anywhere, and publish reports to your organization.

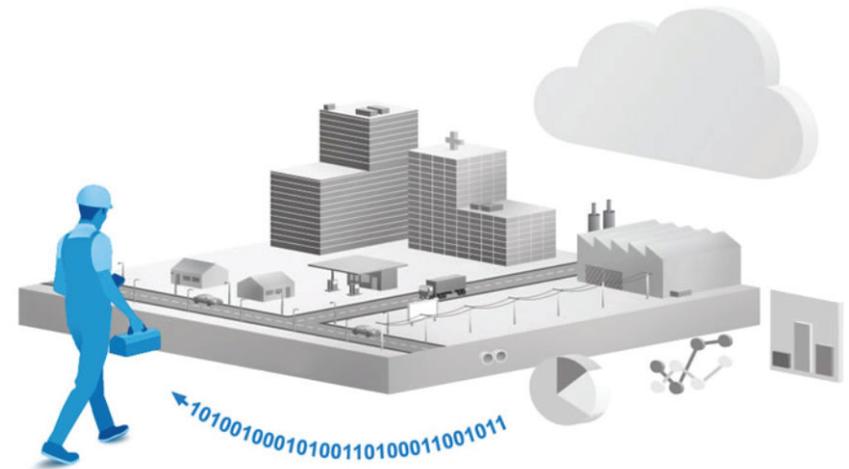


When you use the data from your asset monitoring and use advanced data analytics to enhance decision-making and innovation, you start to see the potential to transform your business—whether it be in new business models or revenue streams. These are insights that simply weren't visible before IoT.

4

Integrate with your business processes.

IoT starts with identifying the one process that matters the most to you, then making small changes for a big impact. You might start by automating previously manual processes and integrating IoT data with your existing business systems such as CRM, ERP, and supply chain. For example, if a product goes down at a customer site, a service ticket can auto-generate in CRM, from which various courses of action can be assigned, such as notifying technicians to fix the issue, diverting the product, or shipping a replacement to your customer.



IoT provides the opportunity to fundamentally reconfigure an existing process. By starting with the desired end state and working back, success may more quickly be realized. This could mean shortening a process from days to minutes.

The biggest competitive gains come when IoT data informs decisions

In this digital age, data is the currency. You need to be able to take the data assets that you have and convert them into intelligent action. That's where Azure IoT Suite comes into play.

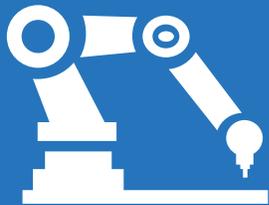
Azure IoT Suite makes it simple to get started with IoT by providing you with the services you need based on where your business is today. Azure IoT Suite includes preconfigured solutions that enable you to quickly get started with and explore common IoT scenarios, such as remote monitoring and predictive maintenance.

You might have existing services and systems that are collecting data from your devices. Or, you may be creating or implementing new devices or new business models. With the Azure IoT suite, you can bring all these services together, scaling from a few devices to many to deliver new insights to workers when and where they need them, streamlining processes and transforming business results.



Test your IoT hypothesis in minutes.

Connect any kind of device across any platform, and then scale your IoT solution to the assets that matter to your business, anywhere in the world.



There's no debate that today's digitally connected world is shaping consumer expectations. And that pervasive connectivity, combined with the declining prices of hardware, is poised to reshape the manufacturing industry and bring about the next industrial revolution many call Industry 4.0. One thing is for certain: IoT is helping manufacturers build leaner, faster, more agile businesses than ever before.

But you can't transform your manufacturing operations with drive and desire alone; you need technology and, specifically, a new generation of smart, connected devices that will bring this promised transformation to fruition. By embedding smart devices into your products, you can collect data on how the product is being used, helping you increase customer engagement, provide better service, create new innovations, and offer new services to the marketplace.

Are you ready to start the transformation?

From **billions** to **trillions**:

The smart device revolution in manufacturing picks up speed.

76% of manufacturers will increase their use of smart devices or embedded intelligence in manufacturing processes in the next two years.¹

The potential value of IoT in factories could be as much as **\$3.7 trillion** in 2025.²

IoT can increase productivity by 10–25 percent via production efficiency—savings of **\$633 billion** to **\$18 trillion** in 2025.²

Predictive maintenance could reduce maintenance costs by as much as **40%** and reduce downtime by up to **50%**.²

Inventory optimization could save as much as **50%**² of factory inventory carrying costs.

Organizational redesign (using data to redesign jobs and tasks) could provide **\$50 billion** in value annually.²

Manufacturing is ready for a revolution.

According to the World Economic Forum,³ manufacturing organizations will benefit from IoT in four key areas:

- Vastly improved operational efficiency (such as improved uptime, asset utilization) through predictive maintenance and remote management.
- The emergence of an outcome economy, fuelled by software-driven services; innovations in hardware; and the increased visibility into products, processes, customers, and partners.
- New, connected ecosystems, coalescing around software platforms that blur traditional industry boundaries.
- Collaboration between humans and machines, which will result in unprecedented levels of productivity and more engaging work experiences.



What can Windows 10 IoT devices do for your business?

By combining intelligent devices with state-of-the-art applications, IoT is helping manufacturers build leaner, faster, more agile businesses than ever before and driving benefits that help them:

Get closer to customers

Products are communicating back to manufacturers after they are sold, providing a wealth of insight that can help companies develop better products. This insight also gives manufacturers a direct link to consumers. For example, diagnostic or entertainment systems in automobiles can be configured to pass data back to the auto manufacturer, creating a new relationship between car buyer and car maker—a relationship previously based solely on customer-to-dealer interaction.

Improve operational performance

Efficiency is another of the top benefits for manufacturers, as shop floor processes and machinery get networked. Already, technicians can monitor systems, perform diagnostics, and do some repairs remotely, even across continents. They can identify bottlenecks and optimization opportunities, using supplier production data to drive better demand forecasting and inventory management and a leaner supply chain.

Accelerate growth through innovation

The insights provided by connected systems is prompting the exploration of new business models. Rather than simply selling their products, some companies have begun to offer product-as-a-service models. By building data gathering into the original product, companies can monitor usage and trigger preemptive service that may help the customer avoid costly repairs in the future.



Smart, connected devices are reshaping the manufacturing industry.

The potential value of IoT in factories could be as much as \$3.7 trillion in 2025² and inventory optimization could save as much as 50 percent of your factory inventory carrying costs. Imagine how process changes, new devices, and data insights could transform your operation.

Using the power of the cloud, data from the back office, factory floor, and logistics are integrated to streamline the supply chain.

Mobile devices enable factory workers to share 3D designs easily and collaborate efficiently.

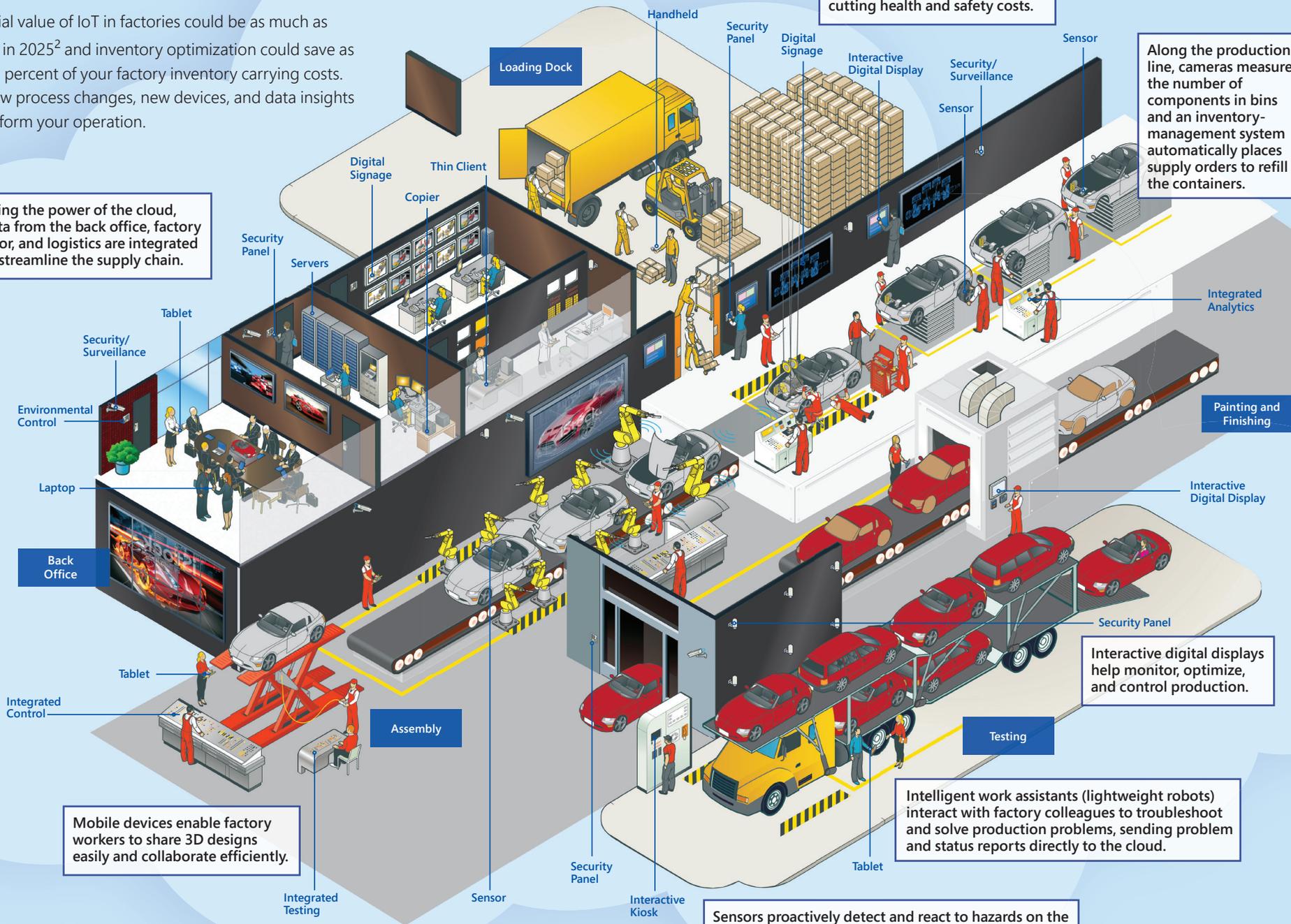
Autonomous vehicles move needed materials within the factory, raising productivity and cutting health and safety costs.

Along the production line, cameras measure the number of components in bins and an inventory-management system automatically places supply orders to refill the containers.

Interactive digital displays help monitor, optimize, and control production.

Intelligent work assistants (lightweight robots) interact with factory colleagues to troubleshoot and solve production problems, sending problem and status reports directly to the cloud.

Sensors proactively detect and react to hazards on the shop floor or drive predictive maintenance systems.





Be part of the new industrial revolution

Smart, connected devices and IoT promise a future for manufacturing that is leaner than ever. The devices you imagine and build can transform the manufacturing industry as you know it today, reducing scrap, optimizing energy consumption, reducing schedules, enabling new business models, and helping manufacturers do more with less.

With Windows 10 IoT, one common platform, and Microsoft Azure, a platform to capture and analyze previously untapped data, your ability to transform your business is bound only by your imagination. Consider implementing Windows 10 IoT devices that:

- Predict issues and limit downtime.
- Collect data from suppliers to efficiently schedule production timelines.
- Optimize delivery routes and protect high-value goods from shrinkage or theft with sensor-tags, connected vehicles, and route data.
- Send alerts for production problems and avoid breakdowns or malfunctions that could end up ruining the entire production run.
- Monitor load balancing and peak energy consumption to improve energy efficiency and usage.
- Track inventory and monitor inventory levels and automatically report material consumption.
- Monitor assets remotely for better utilization, safety and security monitoring, and energy management.
- Collect data on how customers use products, highlighting opportunities for product improvement, innovations, and additional services.

Join Microsoft on this amazing, exciting journey and put the Internet of Things to work in your manufacturing practice today.

Visit www.InnovateOnWindows10IoT.com today.

Some see devices and data. We see game-changing opportunities.

Whether you mark the birth of IoT with the ATM or the day tech pioneer Kevin Ashton first uttered the phrase, the Internet of Things is here. It's real. And it can be a pivotal time for your organization. With Windows 10 IoT, you have the platform and tools you need to become a digital business.



Get started.

Visit us at www.InnovateOnWindows10IoT.com to capitalize on IoT today.

¹ <http://mpi-group.com/wp-content/uploads/2016/01/IoT-Summary2016.pdf>

² McKinsey Global Institute "The Internet of Things: Mapping the Value behind the Hype."

³ http://www3.weforum.org/docs/WEFUSA_IndustrialInternet_Report2015.pdf