



The **Internet of Things (IoT)** is the network of physical objects that contain embedded technology to communicate and sense or interact with their internal states or the external environment.

- Gartner

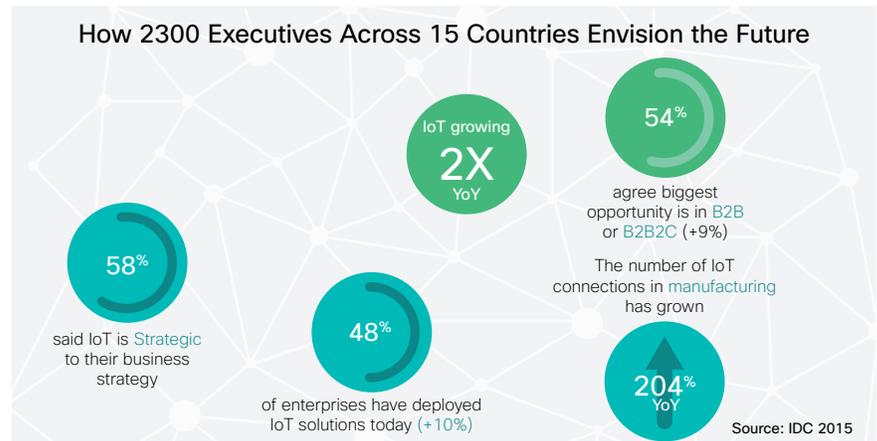
# Internet of Things

## Connected Means Informed

According to Cisco, 500 billion devices are expected to be connected to the Internet by 2030. Each device includes sensors that collect data, interact with the environment, and communicate over a network. The Internet of Things (IoT) is the network of these connected devices. These smart, connected devices generate data that IoT applications use to aggregate, analyze, and deliver insight, which helps drive more informed decisions and actions.

The IoT is a critical part of business strategies going forward. Based on an IDC study of 2300 executives in 15 countries, 48 percent of those surveyed have already deployed IoT solutions, and 58 percent said that the IoT is strategic to their business strategy (Figure 1).

Figure 1. Keys to Creating IoT Strategy



## IoT Drives Digital Transformation and Better Business Outcomes

The IoT is a primary enabler of a larger industry transformation under way: digital business transformation. Companies are increasingly looking to digital technologies to create or improve their competitive edge. The IoT and other technologies are helping companies to transform processes and business models; empower workforce efficiency and innovation; and personalize the citizen, customer, and employee experience. The IoT helps connect physical and digital environments. Data collected from connected devices provides the raw material for businesses to gain insights and respond rapidly to change.

The IoT enables an exchange of data never available before and brings users information securely. Through Cisco® IoT solutions, organizations can create and monetize new business models and services; innovate easily and get more things done, boosting productivity; and deliver insight for better user experiences and engagement.

## Put IoT to Work for You

### Connected Machines: Sample Case Study

#### Mazak: Increasing Process Availability and Machine Utilization at the Factory Floor Through Fog Applications

Manufacturing customers working with the machine tool provider Mazak needed to increase manufacturing line availability and improve machine utilization.

Mazak partnered with Cisco to help increase availability and machine utilization by bringing intelligence in the form of fog applications running on the network infrastructure to achieve real-time detection of anomalies and operator alerts. By processing the data locally rather than in a data center or cloud, Mazak provides manufacturers with secure, real-time processing right next to their critical data sources. Through adaptive learning of expected thresholds, the combined fog application and real-time analytics monitor sensor data for any aberration or deviation from expected norms.

Mazak customers can now prevent downtime, predict necessary maintenance, and improve overall equipment effectiveness (OEE) from continuous monitoring and detection of sudden temperature spikes, erratic vibration patterns, and changes in pressure or coolant levels.

### Connected Transportation: Sample Case Study

#### Linz AG Telekom: Transforming Public Transit Experiences in Austria

In Linz, Austria, the leaders had an innovative vision for city transit. They wanted to further digitize transit operations and rethink core processes as the city upgraded its tram system.

## Productivity: Innovate Easily and Get More Things Done



Cisco IoT solutions make it easier to innovate and get things done to boost productivity because of continuous insight into changing conditions. Productivity enhancements delivered through IoT allow you to:

- Speed time to market
- Improve supply chain efficiency and availability
- Boost organizational flexibility
- Optimize asset utilization
- Implement predictive maintenance
- Improve product development by replacing outdated equipment, integrating controls, and regulating elements

## Monetization: Build New Business Models and Services



New insights from IoT connected device data enable organizations to create new business models and new business services. Sensors can detect location, environment, presence, and more and provide raw data and analytics to applications, which transform that insight into action that can provide competitive advantage. Cisco IoT securely connects devices and fuels applications that can be delivered as services. This opens the door to users paying for the end result, not the physical product. This creates new recurring revenue streams and opens the door to new market opportunities:

- Create business models
- Offer new services
- Create or enhance competitive advantage

## Engagement: Insight Enables Personalization for Better User Experiences



Cisco IoT enables organizations to harness new levels of data and insight to better engage constituents. When organizations are allowed visibility into their systems, they can optimize flow and environment for better experience. Cisco IoT also enables organizations to customize the experience for citizens, customers, and employees. For instance, sensors can alert citizens to open parking spaces and governments to recurring traffic flow issues. By providing a better user experience, Cisco IoT solutions improve citizen, customer, and employee satisfaction and engagement:

- Deliver services that personalize and delight customers
- Enable employees to customize environment to their preferences
- Optimize citizen experience

By using Cisco IoT as a part of its infrastructure, Linz AG Telekom was able to engage and personalize the experience of its riders:

- **Self-diagnosing ticketing machines:** New ticketing machines can support cash or credit card transactions while being monitored and managed from a central location. The machines are securely connected with Cisco Industrial Ethernet switches. Now the ticketing machines notify LINZ AG staff about any tampering or malfunctions. LINZ AG dispatches technicians to the right location, already aware of the issues, which saves hours of time and lots of money and eliminates return trips to get the right parts.
- **Dynamic displays to improve transparency:** Using real-time video displays at tram stations, Linz AG now displays tram schedules and announces events or incidents that might cause transportation delays. Passengers complete their trips more quickly, improving customer satisfaction, and the city has greater transparency with the public.
- **Analytics to drive improvement:** Data from connected trams and existing data sources can be analyzed in real time, which enables Linz AG to optimize traffic flow and improve schedule accuracy. The company has increased tram efficiency and performance while reducing energy consumption by 10 percent, and carbon dioxide output dropped by 85 tons in just 9 months.
- **Smart connected trams:** Linz AG's 56 trams now provide free public Internet services, supporting up to 500 simultaneous Wi-Fi users. The same wireless controllers also transmit shift and drivers' schedule details to the main driver information system for optimizing scheduling.

## Why Cisco for IoT?

Cisco is the proven partner for success in IoT and digitization journeys. Connecting things securely, analyzing data dynamically, and delivering business value demand an intelligent IoT platform. These things also require application execution within a proven IoT network infrastructure and security from fog to cloud. Cisco provides the most comprehensive solution to securely deploy and simply manage your IoT initiatives:

- Cisco's IoT portfolio is the most comprehensive suite of products, solutions, and services providing connectivity, security, automation, and insights from the fog to the cloud that organizations can deploy right now.
- Cisco's IoT portfolio enables the ecosystem of technology partners to build innovative IoT businesses across all verticals.
- Cisco offers a wide range of solutions to automate the service lifecycle of IoT businesses by providing real-time visibility, control, and actionable insights.
- Cisco enables customers to automate the process of connecting devices over a global network of the top service providers.
- Only Cisco's IoT security delivers scalable, end-to-end threat protection and simplified compliance from fog to cloud.
- Cisco IoT offers a simple, secure, and scalable end-to-end IoT solution based on architectures and open standards that integrate with third-party and legacy equipment.

For more information about Cisco IoT solutions, customers, partners, and offerings, visit [www.cisco.com/go/iot](http://www.cisco.com/go/iot).