



Creating the Internet of Your Things

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Executive Summary

Where is your business going? How will you make it thrive? How will you make the most of what you have, and incorporate today's and tomorrow's technology breakthroughs to ensure your business is set up for the long term? How are you going to help your employees become more efficient? How are you going to reduce costs yet improve customer service? The answers to these questions—and many more that keep you up at night—likely already exist in your business with the data and systems you have today. You may need ideas, inspiration, and technology partners to help you stop running your business and start making it thrive.

While technology trends and buzz can be exciting to read about, they can also be challenging to assess from a business perspective and challenging to drive business value from. The Internet of Things, also known as IoT, is one such trend. The Internet of Things provides vast opportunities, but it can also pose a challenge to enterprises, since it can seem overwhelming, complicated, and expensive.

At Microsoft, we know there are many conflicting messages in the marketplace about the massive scale and potential of the Internet of Things, so it's no wonder many companies are uncertain about implementing an IoT strategy. In this paper, Microsoft shows how to look beyond the hype and create a strategy that will unlock the potential of the Internet of Your Things to realize real, transformative results in your organization. It's easier than you think.

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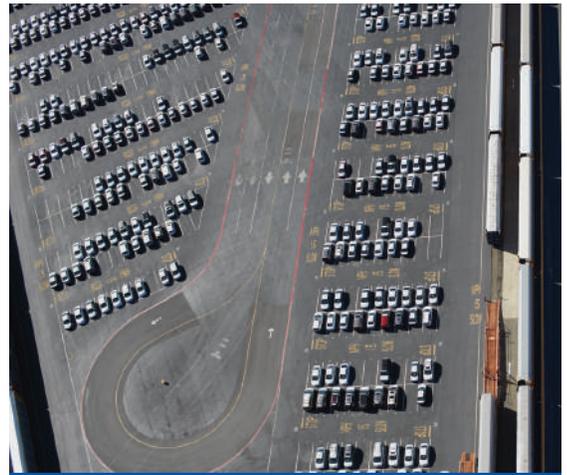
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Understanding the Internet of Things

The term “the Internet of Things” isn’t new. It was actually coined nearly 20 years ago by professors at MIT to describe a world where “things,” which can be devices or sensors, are both smart and connected, with the ability to collect and share data. Data coming from those devices and/or sensors is endless, and when combined and analyzed with other types of data, it can uncover insights that were out of reach in the past. The relationships between all these things, and the invaluable data created by them, is what the Internet of Things is all about. Imagine if your business could understand and make use of the data collected by the things most important to your business and its processes, and if that understanding could help make your business thrive.

Although technology experts have anticipated the evolution of devices with embedded microchips, the proliferation of industry devices, and the rise of machine-to-machine communications scenarios for decades, today the Internet of Things is at an inflection point. Multiple factors are coming together to create the climate for major, worldwide adoption. Consider the following:

- **Costs are falling.** The costs of the Internet of Things components such as microchips, cloud services, GPS devices, accelerometers, connectivity, and other technologies have fallen and are now within reach for most organizations. In addition, processing power is becoming more affordable, and cloud computing services are increasingly available, vastly expanding the capability to crunch very large data sets.
- **Connected device demand is accelerating.** As more companies and consumers realize the value of connected things, the market is swelling into the billions and beyond.
- **Device options are expanding.** Everything from light bulbs and washing machines to point-of-sale terminals is becoming connected, and that connectivity is also greatly improved, whether it's wired, wireless, Wi-Fi, Bluetooth, cellular, or something else. And components are becoming more powerful—tiny microchips are now capable not only of connectivity but also of running much more advanced software than ever before.
- **More machines are talking to each other.** Machine-to-machine (M2M) solutions are going mainstream. Vodafone forecasts that 50 percent of companies will have adopted M2M communications technologies by 2020.¹
- **Software is more advanced than ever.** Today’s rich, dynamic business software is putting high-level data analysis capabilities into the hands of companies around the globe.
- **The economic benefits are enormous.** The Internet of Things has the potential to create economic impact of \$2.7 trillion to \$6.2 trillion annually by 2025, according to McKinsey Global Institute.²



With such huge potential, the marketing hype around the Internet of Things is spiraling out of control and creating a steady stream of noise. It seems like every technology company has an Internet of Things pitch or angle, but in reality, most businesses are still touting the same set of products they’ve been selling.

The real differentiators will deliver innovation, end-to-end simplicity, and road maps that justify investments. A strategy for the Internet of Things needs to be simple to implement.

The results can’t be outweighed by the effort and complexity. The data needs to be insightful, extensible, and connected to your business.

The Microsoft point of view on the Internet of Things

Despite persistent messages to the contrary, the Internet of Things does not need to be complicated. It's not about future predictions of billions or trillions of connected devices. The Internet of Things is here today, and it's a practical and applicable technology trend that is generating ROI and driving efficiencies and insights for organizations that know how to use it.

Across the globe every day, businesses are connecting their things and harnessing their data to create powerful new business value. Connecting devices to IT systems is only the first step. The real value lies in the data that is created by and transmitted from those devices as they interact with other devices and human beings, and the compelling business insights this data can enable.

Simply put, these connected "things" are producing large amounts of information. By tapping into those data streams and connecting them to the cloud and back-end systems, organizations can optimize business processes, make more informed decisions, identify new revenue opportunities, and understand and predict customer and partner behaviors in ways they couldn't imagine before.

At Microsoft, we believe the Internet of Things can make a difference to your business right now—beginning with the things in your business that matter the most. It's really the [Internet of Your Things](#), and it starts by building on the infrastructure you already have in place, using familiar devices and services in new ways, and incorporating the right technology to ultimately help you use data to create insights and make more informed business decisions.

Rather than thinking about the Internet of Things as trillions of devices and sensors connecting to systems and the cloud, think about your things—your devices, sensors, IT infrastructure, cloud services, and software.

Instead of trying to think about the massive amount of data being produced by billions of devices, think about how one piece of data—on your customers, your processes, sales, or inventory—can provide value to your organization. These are your things; they're critical to you and help you power your business.

The impact of data and the cloud

The advancements in connectivity, processing power, form factors, operating systems, and applications, among other technology breakthroughs, are key elements to unlocking value from the Internet of Things. And with these advancements, the impact of data and the cloud are paramount to using the power and potential of the Internet of Things.

Data is mission-critical to your business. Data can have different formats, values, retention requirements, and traffic patterns. It comes from different sources (*intelligent industry devices, services, and more*) and across different protocols.

This data may arrive at your doorstep predictably and structured, but it may also knock on the door in the middle of the night unexpectedly. By providing a framework for the data to ingress and be processed, Microsoft can automate through filters, rules, triggers, or other means—the reception of that data. Most important, data in the typical Internet of Things conversation is large—too large for a traditional organization's compute models to cost-effectively consume and manage.

Big data is the term for a collection of data sets so large and complex that they become difficult to process using typical on-premises database management and processing applications. Big data needs to be processed by a flexible, scalable compute model that evolves as your business evolves. Big data needs to be contextual and, through its very nature, combined with many other assets, sources, and datasets. By possessing data with a set of tools, engines, and scalable architecture, Microsoft is uniquely positioned in the industry to help you take advantage of your data, and then process and apply optimization to your assets. This can be done both on the operational side and when driving new and richer business insight strategy.

Cloud computing offers scalable data collection, processing, and analysis capabilities that change with the needs of your business and processes. Cloud solutions give enterprises the ability to consume significant amounts of data, whether it's latent or in real time; store that data; and apply rules and structure to it for consumption. Cloud computing technology and a flexible consumption-based price structure associated with off-premises hybrid, private, or public cloud compute models have created the ability to deliver new offerings to market, which were simply not achievable in the past.

Unleashing the Internet of Things with intelligent systems

Microsoft has the capabilities and experience to transform your business—right now—by building on your existing investments to easily create one truly flexible [intelligent system](#).



An intelligent system is transformative. Point-of-sale scanners on a retail floor are connected to warehouse systems and analytics software at headquarters, for industry-leading efficiency in inventory.

Robots on a factory floor send production and maintenance information directly to those who need it, for unparalleled reliability and uptime. Diagnostic images from a CAT-scan machine are shared instantly with radiologists at another medical facility and the family practitioner at the bedside, for state-of-the-art patient care. In each case, new insights are generated that drive the organization's objectives forward on many levels. Surprising new value is created from connecting assets that were already in place, and often by simply adding a few new devices that can tap into data in new ways.

Microsoft continues to invest in delivering the integrated platforms and services that help enterprises capitalize on the Internet of Things by gathering, storing, and processing data—this includes the [Microsoft Azure Intelligent Systems Service](#). Built on [Microsoft Azure](#), the Intelligent Systems Service makes it easier for enterprises to securely connect, manage, capture, and transform machine-generated data from line-of-business assets such as industry devices and sensors, regardless of their operating system.

When enterprises use Intelligent Systems Service to harness machine-generated data, they can drive improvements in operations and unlock new business opportunities by using Microsoft assets like [Power BI](#) for Office 365 and [HDInsight](#) for analytics to produce meaningful insights. Underlying all these capabilities is enterprise-grade security developed and supported by Microsoft.

Intelligent Systems Service provides agents and open-source agent software to support heterogeneous operating systems and protocols across these line-of-business assets. By supporting diverse environments, a barrier often associated with other customer solutions, enterprises can deploy and yield value from the Intelligent Systems Service at a faster rate. Also, having a unified approach to security distinguishes the solution with enterprise-grade security developed and supported by Microsoft. The Intelligent Systems Service is also distinguished as a horizontal solution applicable across industries, increasing the importance of partners in the sales cycle and often putting partners in the lead for solution implementation.

Using the Microsoft Azure Intelligent Systems Service opens up a variety of new business possibilities.

For example, Microsoft is working with telent and CGI to help London Underground modernize the systems that securely monitor, manage, and automate its things—everything from escalators, lifts, and HVAC controls to closed-circuit video and communication systems. Data from sensors and intelligent edge devices, such as temperature, vibration, humidity, fault warnings, and system alerts, are all available in one central location to provide access to needed information on mobile apps, a web browser, or through text alerts.

According to Steve Pears, managing director of rail for telent, telent is transforming its business with new services for London Underground not previously possible. Some transformations include automating manual processes, spotting equipment issues in real time before they cause service disruptions, and tracking equipment performance to support infrastructure planning.

Why bet on Microsoft to help you build the Internet of Your Things?

Microsoft is likely already a strategic partner for your business with the platforms, infrastructure, and productivity tools you use today. Through its comprehensive technology offerings, Microsoft has the analytics, business intelligence, and compute tools required to unlock the potential of the Internet of Things—today.

Proven Microsoft experience and leadership can help you generate better results, faster and with less risk. Microsoft delivers a comprehensive portfolio of traditional and cloud-based technologies, devices, and services to accelerate how you can create and use the Internet of Your Things.

Businesses deploying customized intelligent systems with Microsoft can harness a trusted platform to gather data from the edge of the network, analyze it, and reap real business value. All the components are here today—the familiar Windows platform already powers everything from specialized industry devices to PCs, phones, and servers. The Microsoft Azure Intelligent Systems Service offers massive processing capabilities that can be tied into engaging analytics tools in Azure SQL Database, Power BI, and Office.

With Microsoft, you can do the following:

- **Build on what already works.** Microsoft can help you create an intelligent system to capture opportunities simply by building on your existing investments—and get you started today.
- **Lean on trusted support and expertise.** Microsoft is an industry leader with a clear vision for what the Internet of Things means to business. Microsoft has the right devices, the right tools, the right solutions and the right partners to take your business to the next level with the Internet of Your Things.
- **Unlock innovation with a cohesive platform and skilled partners.** Microsoft has a global ecosystem of partners who are experts in putting technology to work on your company's challenges—device manufacturers to build the next generation of devices and leading software vendors and systems integrators who can help you develop a compelling solution to make your vision a reality. Microsoft can connect you with all the pieces you need to create the Internet of Your Things. Together with our partners, we have the technology and the experience to transform your business, right now.

Conclusion:

A game-changing opportunity

Leveraging the Internet of Your Things with an intelligent system represents an immense opportunity for your business. For that reason, industry leaders aren't waiting.

Microsoft is delivering the technologies and services for the Internet of Things today, helping customers connect their things to reduce costs, drive operational efficiency, deliver better customer experiences, and more quickly respond to changing business conditions.

Working together, we can transform your business with better insight, enhanced customer service, improved processes, new business opportunities, and a real competitive edge.

Microsoft looks forward to seeing what we can help you create with the Internet of Your Things. The potential is as limitless as your imagination and as unique as your business.

Get started today

Put the Internet of Your Things to work for you with four simple steps:

- Stay informed with the Internet of Your Things newsletter at www.InternetofYourThings.com.
- Learn about intelligent systems, the Microsoft solution for the Internet of Things, at www.microsoft.com/intelligentsystems.
- Request access to the Microsoft Azure Intelligent Systems Service limited public preview at www.microsoft.com/iss.
- Move your existing devices to a modern Windows platform by upgrading through volume licensing or buying new devices from our OEM partners at www.microsoft.com/windowseembedded/en-us/products-solutions-overview.aspx.

Why your business needs a strategy for the Internet of Things

- When you connect business systems and tap into new and existing data streams, you get real-time visibility into your processes, enabling you to make smarter decisions now—and better plans for the future.
- By putting the Internet of Your Things to work against the competition, you can gain an edge that allows you to become a leader in your industry. When you harness your data and connect your people and infrastructure, you can unlock new opportunities, increase efficiency, delight customers, and gain a real advantage over the competition.
- Open new business opportunities. By harnessing and analyzing data, your organization can more quickly spot trends, identify and prepare for new opportunities, open new revenue streams, predict customer and partner behavior, and innovate faster.
- Redefine customer service. When you build the Internet of Your Things, you gain greater insight into your customers, allowing you to provide what they want—sometimes before they even know they want it.

When you create truly personalized experiences that surpass your customers' needs, provide instant access to inventory information via connected devices, or offer speedy and streamlined service, you raise the bar on customer service—and that leads to loyal, repeat customers.

¹ Vodafone, The M2M Adoption Barometer, June 2013.

² McKinsey Global Institute, [Disruptive technologies: Advances that will transform life, business, and the global economy, May 2013](#).

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Ten reasons your business needs a strategy to capitalize on the Internet of Things today

The Internet of Things is not a futuristic technology trend: it's here today, and it starts with your things—your line-of-business assets, such as industry devices and sensors, the data they produce, your cloud services, and your business intelligence tools. That's the Internet of Your Things. By implementing a strategy to capitalize on the Internet of Things, you can stop just running your business and start making it thrive.

1. Get a jump start on your competition.

Cut a food-service inspection process in half. Give doctors and nurses access to patient records in a fraction of the time. Enable online grocery shopping with one-hour delivery. Microsoft customers are already taking advantage of the Internet of Things by connecting their devices to create new insights from data that help them transform their businesses. It's time to create an Internet of Things strategy so your business can lead, instead of fighting to catch up.



2. Get more out of your existing IT assets.

Start with your existing IT assets and build upon them. Add a few new devices; connect them to the cloud; and enable them to talk to each other, to your employees, and to your customers. Transform your business by utilizing the data those devices generate with business intelligence tools to have deeper insight into what your customers and employees want and need.

3. Enable small changes to make a big impact.

The Internet of Your Things starts with identifying the one process, product line, or location that matters the most to you, then making small changes for big impact. Connect robots on the factory floor with back-end systems and create a production line with more continuous uptime. Add expiration dates to the data set for pharmacy inventory and save thousands of dollars in wasted medications. Connect one handheld device to your inventory system, suddenly, you've got real-time customer service on the sales floor. The Internet of Things doesn't have to be overwhelming—a few key improvements can make a big difference.

4. Become more efficient.

Connecting devices and systems can help you shave minutes from a user's login process, hours from restocking inventory, or days from routine system upgrades and enhancements. When secured data flows seamlessly between devices and through the cloud, you can access and use it more efficiently than ever before. That means spending less time pulling reports and more time creating new services and products based on your new insights.



5. Discover new ways to delight your customers.

From the least-used fitting room in the store to the keywords that drive the strongest coupon sales, every piece of data is a clue to the products and experiences your customers are seeking. Visualize emerging patterns and predict behavior to anticipate trends and give your customers what they want, before they even know they want it.

6. Open up new business opportunities.

Connecting line-of-business assets, such as industry devices and sensors, data, and people gives you faster processes and fresh insight, resulting in new business opportunities. Combining GPS with automated kiosks and RFID-enabled check-in lets motorists join a car sharing service and drive away in minutes. Automating the stonecutting process frees up craftsmen to meet increased demand without sacrificing quality. The insights you get from your data help you see new possibilities.



7. Increase agility.

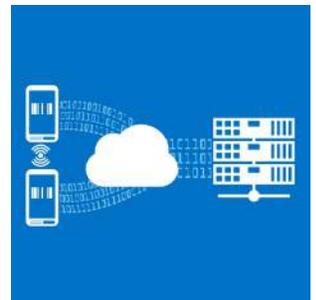
Data insights can help you respond more quickly to competition, supply chain changes, customer demand, and changing market conditions. Collecting and analyzing data gives you quick insight into trends, so you can change your production activity, fine-tune your maintenance schedule or find less expensive materials. With the Internet of Things, you can spend less time wondering and more time taking action.

8. Build the ability to scale.

New ideas are born when you work with new partners, new technologies, new devices, and new data streams. You suddenly put your employees and technology to work together in ways never before imagined. New data opportunities let you shift your focus from repairing machines to fine-tuning their performance over the long term. Comparing results from different store locations lets you identify the most successful services and roll them out nationwide. The Internet of Things lets you scale from the smallest data point to global deployments.

9. Get your devices to start talking.

Devices have the potential to say a lot, but only if there's someone or something on the other end to engage, react, and listen. By utilizing the Microsoft Azure Intelligent Systems Service, sensors can tell your distribution center systems which merchandise routes are plagued with delays. Machine-generated data can tell your operations teams which remote service kiosks will need repairs the soonest. From sensors to handheld scanners to surgical instruments, the devices in your business can create efficiency and insight, if you enable them to talk to each other, your employees, and your customers.



10. Transform your business.

When you have a strategy in place to take advantage of the Internet of Things—and you team up with the one company that can provide the right platforms, services, tools, and partner ecosystem—you can transform your business in real time. Microsoft and its partners have the technology and the experience to help you put the Internet of Your Things to work in your business today, so you can stop just running your business, and start making it thrive.

Put Microsoft and its partners to work creating the Internet of Your Things today.

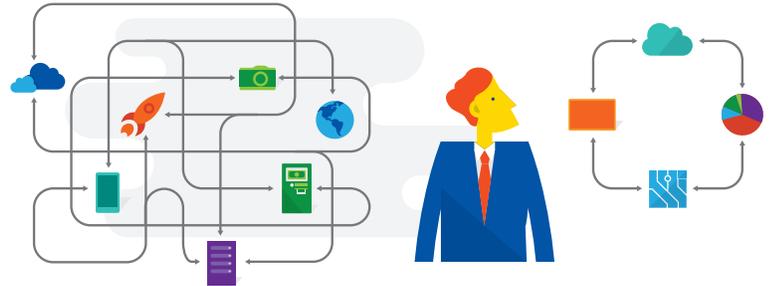
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Create the Internet of Your Things.



Forget connecting everything.
Focus on what matters to you.

When trillions of things can be connected, which things should you connect? The Internet of Things has the potential to give businesses a competitive edge. That's why 75% of companies are already exploring or using it. The best part? The Internet of Things is not complicated when you forget the big picture and start small.



The Internet of Things begins with **your things**.



Transform your business with Microsoft.

We have everything you need to make the Internet of Your Things a reality, right now.



Simple changes. Big impact.

No matter your industry, we can help you incorporate the right technology to drive business value in areas that matter the most to you.



Stop running your business. Start making it thrive.

See how at InternetofYourThings.com.