

Fasten your seatbelt. The next ten years  
are going to be a bumpy ride.

# Back to the Basics of IoT

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IoT is changing the face of data collection, analytics and transmission. The field continues to evolve as new applications for smart devices develop.

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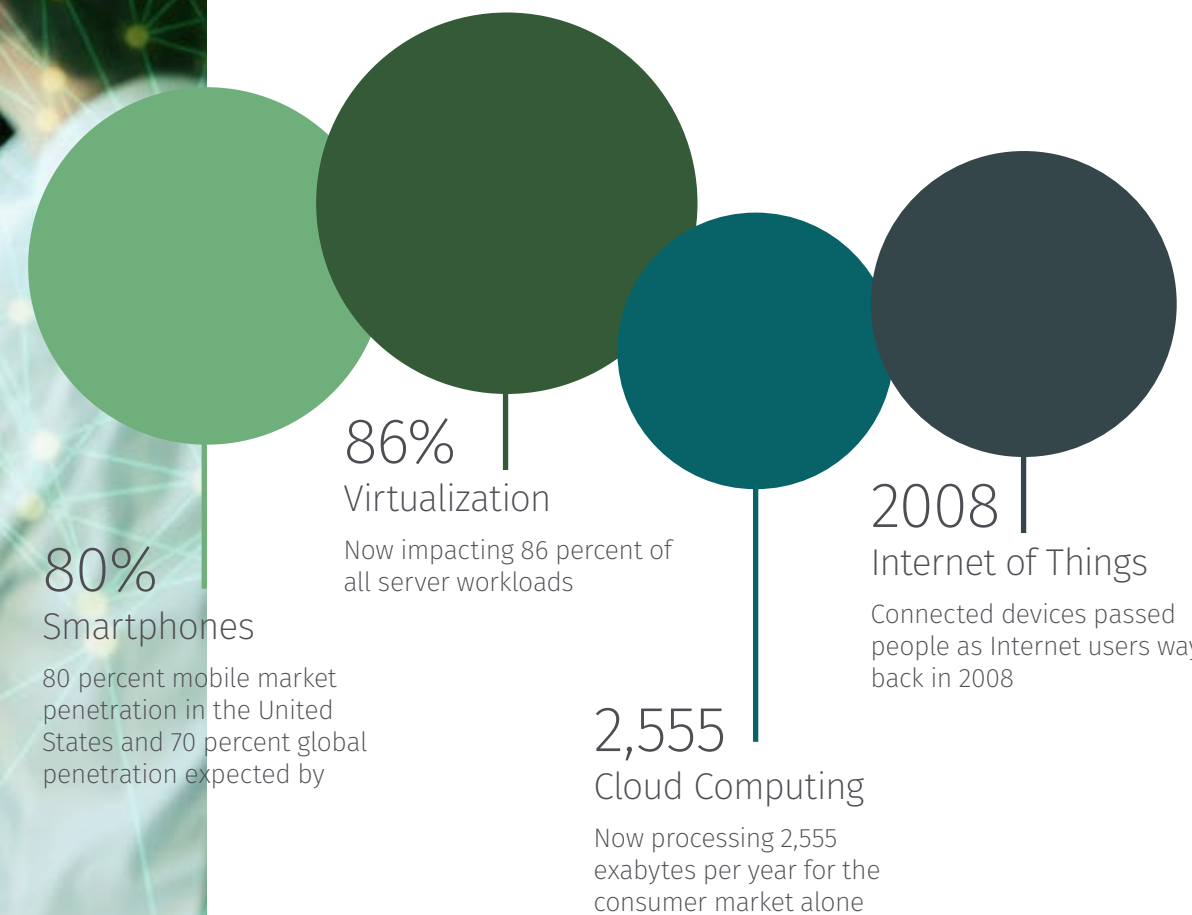


# Introduction

Fasten your seatbelt. The next ten years are going to be a bumpy ride.

Living humans have seen more change than anyone else in human history. Even in the last decade, smartphones (currently at 80 percent mobile market penetration in the United States and 70 percent global penetration expected by 2020), virtualization (now impacting 86 percent of all server workloads), cloud computing (now processing 2,555 exabytes per year for the

consumer market alone) and the Internet of Things (connected devices passed people as Internet users way back in 2008) have created consumer conveniences difficult to imagine even a decade ago. What's more, all these emerging technologies synergize, creating innovation at an even faster pace.





# Challenges with traditional technology

Traditional technologies limit data collection to manual studies and processes. Computers perform processes only when requested by human users. Cloud computing, machine learning, big data and the Internet of things, however, revolutionize this basic concept of computing. Data collection and analytics no longer happen in the back office at your request. Data is collected, transmitted and analyzed almost constantly, with far less user oversight than was necessary a decade ago. Modern businesses and consumers have already come to expect a certain level of IT-based creature comforts in their daily lives.

Consumers have taken a vanguard role in pushing innovation. The cliché “Uber for X,” used to describe the latest and greatest platform disrupting the market encapsulates a pervasive attitude among contemporary consumers. If one application meets a specific need, why can’t a similar technology meet a similar need? And why doesn’t this service already exist? The Internet of Things is, at its most basic level, this principle (consumers asking “why isn’t there an app or gadget that can solve this problem for me?”) applied to its logical conclusion.

To perform like consumers expect, the Internet of Things requires easy, automated data collection, predictive analytic capabilities and an expanding network of servers and devices. Each of these nodes must communicate with another and everyone is competing for bandwidth. Businesses who do not adopt IoT technologies will be left behind, whether their customers are other businesses or individual consumers.





# Where Did The Internet of Things Come From?

You'll probably be surprised to hear that the first Internet-connected device dates to 1982.

The Internet of Things is meeting customer demands, but its origins lie in the realm of engineering. You'll probably be surprised to hear that the first Internet-connected device dates to 1982. It was a Coca-Cola machine, rigged by Carnegie Mellon computer science grad students to track their supply of cans and how cold they were. Mark Weiser's paper, "The Computer of the 21st Century" began the theoretical outline of what we now think of as the Internet of Things in 1991. Platforms like NEST have been proposed since the mid-1990s, but it wasn't until 1999 that technologies like RFID made the Internet of Things more of a reality.

Of course, the Internet of Things also requires orders of magnitude more processing power and

bandwidth than existed in 1999. With cloud computing, however, server and storage limits went out the window. With these developments, engineers began testing Internet-connected devices in earnest. The cloud further opened the door to more accurate and rapid data collection. Collected data can also be analyzed more quickly, providing actionable information for computers, smartphones and other connected devices.

It didn't take long for the tech sector to realize the nearly endless potential of this increased connectivity. In 2017, the Internet of Things is just scratching the surface of what it can do for businesses and consumers alike with automation and the attendant increased productivity and efficiency.



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MID-1990S

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1999



## Some examples of the promise of the Internet of Things to streamline business include:



- A joint DHL / Cisco study predicts an overall savings of \$1.2 trillion in productivity costs
- IoT provider Enlightened estimates lighting bills reduced by 60 to 70 percent for its clients.
- Enlightened further estimates a reduction of 20 to 30 percent in heating and cooling costs.
- Facebook leveraged the Internet of Things to reduce server energy output by 38 percent.



- 117 million barrels of oil saved through energy use and routing analytics



- Shipboard sensors saved \$50 per hour or approximately \$650,000 per year for a fleet of 50
- An optimized hull cleaning schedule saved \$400,000 per ship

The savings, especially for enterprise-class businesses are significant. That 60 percent savings in lighting costs can be reinvested in your business, allowing you to expand your operations or invest in other efficiency-increasing devices.





# Applications of IoT

IoT is changing the face of data collection, analytics and transmission. The field continues to evolve as new applications for smart devices develop. The broad applications of IoT fall into three categories:

## Engagement Technologies

Engagement technologies disrupt how users engage with existing technology. The common smartphone is perhaps the most well-known example of an IoT engagement technology. Also included under this rubric are wearables like your FitBit or smart goggles, and health devices like smart heart pumps and home monitors like Piper.

## Insight Technologies

Insight technologies provide the user with information. For example, the FitBit mentioned above is an engagement technology and an insight technology, providing the user with information about their daily activities. For business, insight technologies are revolutionary, sometimes saving millions of dollars per year. Consumers can collect significant data about their health, consumption patterns or just about any other aspect of their daily lives.

## Supporting Technologies

Supporting technologies act as scaffolding, keeping the Internet of Things connected and functioning properly. IoT devices even keep data centers operating at peak performance. That kind of support helps the Internet of Things to keep functioning in the fashion consumers have grown accustomed to.



## IoT Stats:

2008



By 2008 there were more things connected to the Internet than people.

- The smart home industry generated over \$79 billion in revenue in 2014.
- Over 78 million wearables shipped in 2015.
- That's a 171 percent increase from the previous year.

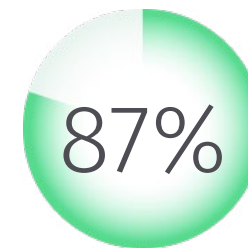
2014



2020



- By 2020 it is estimated that 50 billion devices will be connected.
- That's an average of 5.1 connected devices per person.
- By 2020 over half of new business processes and systems will integrate IoT.
- That represents \$19 trillion in profits and cost savings.
- By 2020 90 percent of cars will be connected to the Internet.
- 7 percent of consumers currently own a wearable IoT device.
- 13 percent expect to buy one in the next year.
- 33 percent expect to buy one in the next five years.
- 87 percent of consumers have not heard the term "Internet of Things"
- The industrial Internet applications promise to add \$117 billion in value by 2020.



87 percent of consumers have not heard the term "Internet of Things"

- Healthcare IoT devices are expected to be valued at \$2.5 trillion by 2025
- Manufacturing will be valued at \$2.3 trillion

2025



# Key Considerations

*The IoT offers exciting new potentials, but it also comes with emerging risks. Put simply, every new IoT device is a potential point of entry for hackers. Any enterprise, especially those in bloTech, must mitigate risks and protect organizational data.*

## Looking for a fit

Many organizations aren't sure how to properly integrate smart devices into their business. We talk to our customers, listen to their needs and find smart devices capable of filling in gaps and soothing pain points. We go far beyond simple wearables and common smart home products, finding applications and devices specifically to meet the needs of our customers. Whether you need better data collection, facilities monitoring for healthcare applications or something else, we're here to help you see the opportunities implicit in task automation, data analytics and beyond to streamline your overhead and find new revenue opportunities.

## Building the Business Case

Quantifying the value of IoT can be difficult. This is particularly true for companies unsure of how to integrate IoT into their business. While many organizations are excited by novel technology, the practical cost -- both in terms of man hours and dollars and cents -- often creates hesitation due to a lack of understanding of specific applications and their value. We're here to help our customers understand what IoT can do for them and what it means for their bottom line.

## Locking down your environment

IoT devices come with opportunities, but they also open your business up to new risks. Each new device is a potential new backdoor for hackers. Common issues that pose the highest risk to data privacy include weak access credentials, unencrypted data transmissions and managing devices as assets. For these reasons, we work with your company to create a comprehensive plan to keep your devices and your customers' information safe and secure.

Many of our customers are IoT early adopters. SPK engineers work closely with our clients, evaluating the potential applications of IoT. We also advise clients as they develop new IoT devices to ensure these devices meet customer needs and the latest security and privacy regulations. [Reach out to us today](#) to see how we can help you optimize your product design process or fully take advantage of IoT.

## HARNESSING TECHNOLOGY FOR PRODUCT DEVELOPMENT



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