

THE INTERNET OF THINGS CONNECTS THE WORLD

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It may be hard to believe, but the term the “Internet of Things” (IoT) was first coined back in 1998.¹ The concept of the Internet connecting any device with an on/off switch to people and other devices may have seemed futuristic at the end of the last century. Yet the IoT is here: The technology research firm Gartner has estimated that 4.9 billion IoT-connected devices will be in use in 2015, and that number could reach 25 billion by 2020.²

Analysts agree that we are still in the early stages of transforming into an interconnected world of people and machines. Yet, the growth has been rapid, fed by the increasing availability of broadband technology and the decreasing cost of connecting devices through the Internet. More equipment and devices are being designed and built with sensors and Wi-Fi capabilities, and smartphone use continues to surge worldwide.

The IoT connects people to devices, as well as devices to devices. A milestone in the IoT was reached in 2014, when the number of devices talking to each other surpassed the number of people talking to other people.³

REAL VALUE IN CONNECTIVITY

How will the IoT affect global business? As a commentary in *Forbes* recently noted, “Anything that can be connected, will be connected.”⁴ Business-to-business applications of the IoT are expected to create the greatest value. A study by

the McKinsey Global Institute predicts that business-to-business applications will generate nearly 70% of the overall potential value of the IoT.⁵

The IoT can improve efficiency and optimize operations through sensors and data that predict equipment failures and correct them proactively. It also will help predict customer trends, enabling manufacturers to make changes seamlessly to existing products, and quickly adjust product design and production.

The McKinsey study reveals that advanced economies will reap the greatest benefit from the IoT due to rapid transformation, but it also notes that developing countries could generate nearly 40% of the value of the IoT.⁶ Many emerging economies have been fast adopters of smartphone technology, and it is anticipated the same will hold true for IoT technology.

GETTING FROM HERE TO THERE

Several significant challenges need to be addressed as the IoT transforms our world:⁷

- **Security** — With billions of devices connected, how can companies and their customers be assured that their information will remain secure? This is a complex issue facing cybersecurity specialists and companies and will require combining approaches that address mobile and cloud technology security with industrial controls, physical security and automation. Gartner predicts that by 2017 more than 20% of organizations will have digital security services to protect business operations conducted through devices and services connected by the IoT.⁸



- **Interoperability** — IoT systems must be able to instantaneously communicate with devices, exchange data and then use the information, often through many diverse IT systems. Technology manufacturers are devising new ways to help customers incorporate interoperability into the design and development of their products and ease communications across systems.
- **Big Data management** — Linking devices to IoT systems will generate massive amounts of data, much more than most companies could readily track, analyze, store and use. Organizations need to figure out how to harness the power of this information tidal wave and factor in the ramifications of gathering, analyzing, storing and protecting Big Data.

The IoT represents a paradigm shift in technology, and the opportunities it provides are boundless — from improving efficiency and production, to seamlessly monitoring operations, to improving product design and responding instantly to changing customer demand.

To discuss these topics in more detail, please contact your PNC Relationship Manager.

¹ "Sketching out the Internet of Things trendline," by Philip N. Howard, Brookings Tech Tank blog, available at: <http://www.brookings.edu/blogs/techtank/posts/2015/06/9-future-of-iot-part-2>

² Press release: "Gartner Says 4.9 Billion Connected 'Things' Will Be in Use in 2015," Nov. 11, 2014. Available at: <http://www.gartner.com/newsroom/id/2905717>

³ "Sketching out the Internet of Things trendline," cited above.

⁴ "A Simple Explanation of the Internet of Things," by Jacob Morgan, *Forbes*, May 13, 2014. Available at: <http://www.forbes.com/sites/jacobmorgan/2014/05/13/simple-explanation-internet-things>

⁵ "The Internet of Things: Mapping the Value Beyond the Hype," a report by McKinsey Global Institute, June 2015. Available at: http://www.mckinsey.com/insights/business_technology/The_Internet_of_Things_The_value_of_digitizing_the_physical_world

⁶ "The Internet of Things: Mapping the Value Beyond the Hype," McKinsey Global Institute, cited above.

⁷ Challenges summarized from the following references:

▪ "The Internet of Things: Mapping the Value Beyond the Hype," McKinsey Global Institute, cited above.

▪ "A Simple Explanation of the Internet of Things," by Jacob Morgan, cited above.

▪ Press release: "Gartner Says that the Internet of Things Will Change Cybersecurity Forever," Gartner, Sept. 2, 2015. Available at: <http://www.gartner.com/newsroom/id/3123018>

⁸ Press release: "Gartner Says that the Internet of Things Will Change Cybersecurity Forever," Gartner, Sept. 2, 2015, cited above.

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