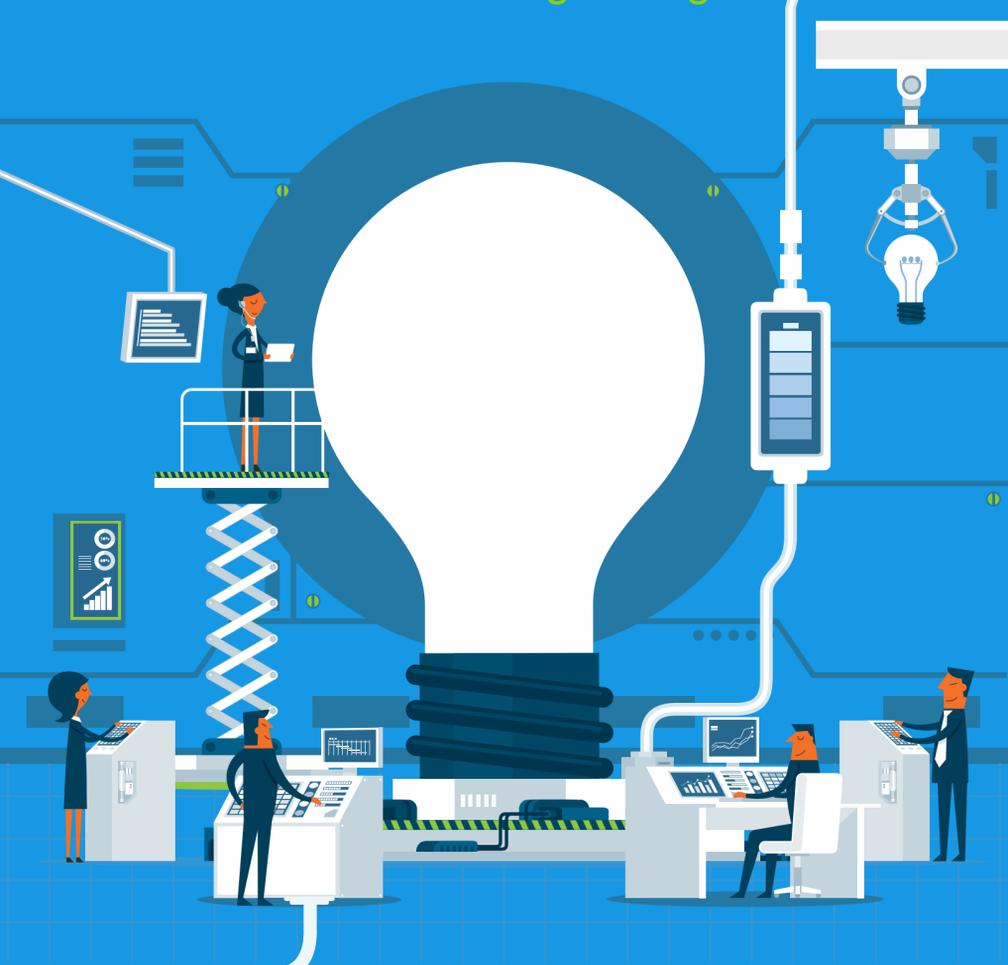


From complex to cognitive...

IoT and the reinvention of engineering



More and more, connected products can make our lives and our work simpler, safer, and more convenient.

Driven by falling costs, continual advances in connectivity, processing, sensor and other technologies—and the expectations of millennials whose reality is a connected world—the Internet of Things is rapidly developing.



By **2018**, **16%** of the population will be Millennials and be accelerating IoT adoption because of their reality of a connected world.¹



The IoT market is estimated to grow from USD **157.05 billion** in **2016** to USD **661.74 billion** by **2021**, at a compound annual growth rate (CAGR) of **33.3%**.²

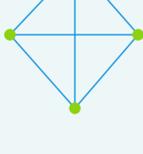
As the IoT plays a bigger role in the world, reliability and security are more critical... and harder to achieve.

Harder, because the connectivity that delivers the value also adds more complexity.

Robert Metcalfe, co-inventor of Ethernet, observed that the number of possible interconnections rises with the square of the number of things we are interconnecting...



2 USERS = 1 CONNECTION



4 USERS = 6 CONNECTIONS



8 USERS = 28 CONNECTIONS

A system engineer will tell you it's simple math:
More interconnections = more chance for failure

And beyond connectivity, product value will be driven by a revolution in product intelligence—delivered through advanced analytics and cognitive capabilities³...



By 2018, over **50%** of developer teams will embed cognitive services in their apps (vs. **1%** today), providing U.S. enterprises **\$60+ Billion** annual savings by **2020**.⁴

Engineering for the “new normal”



These changes require a reinvention of engineering—connecting teams and engineering data and employing advanced analytics and automation to deliver connected systems that work together—because dependencies on which the big picture depends.

IBM continuous engineering connects key engineering and development disciplines to work effectively with engineering data across the entire product lifecycle to create intelligent and dependable products and systems for the IoT:



Systems engineering

Coordinating and managing the complexities and interdependencies of IoT systems to ensure that the end result meets the requirements.



IoT application software development

Creating the software that coordinates the components of an IoT system to deliver the overall system functionality.



Embedded software development

Creating software for the physical devices that form components of an IoT system.

By using continuous engineering, you can:

Adopt robust engineering practices that boost confidence in outcomes and lead to a more dependable IoT.

Build an IoT feedback loop into your business and make it integral to the work of engineering, development, and operations.

Use IoT connectivity and visibility to enable a new level of collaboration within your organization and surrounding ecosystem.

Applying continuous engineering delivers real results:



An industrial manufacturer improves reliability and product design using sensors to collect information from products in the field.



An electronics manufacturer finds **95%** of software bugs while products are still in development.



A rail transportation manufacturing company reduces time to develop system specifications by **66%**.

IBM continuous engineering—because connected products need connected development.

Read the blog: ibm.co/eng1

Find out more at: ibm.com/continuousengineering

¹ IDC FutureScape: Worldwide Internet of Things 2016 Predictions, Nov 2015, Doc #259856.
² MarketsandMarkets Internet of Things (IoT) Market - Global Forecast to 2021, April 2016. <http://www.marketsandmarkets.com/PressReleases/iot-m2m.asp>
³ <https://www.ibm.com/cognitive/>
⁴ IDC FutureScape: Worldwide IT Industry 2016 Predictions — Leading Digital Transformation to Scale, Nov 2015, Doc #259850.

