



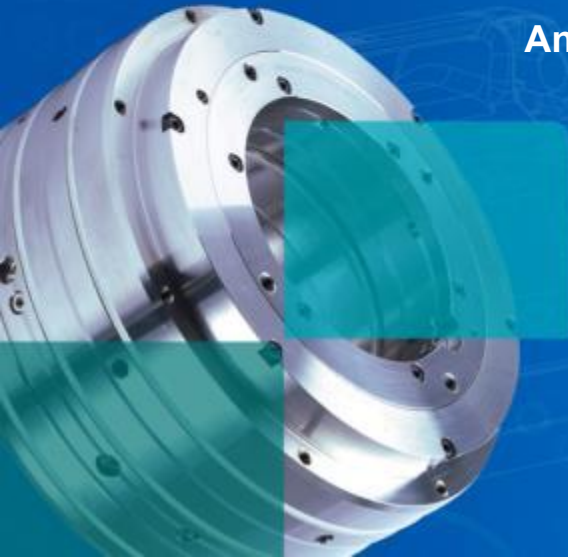
# Internet of Things for optimum materials efficiency

## *Introduction*

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Workshop 1.2, Nancy 9/10 June 2016



# McKinsey believe that the Internet of Things has the potential to create economic impact of up to \$6.2 trillion annually by 2025



## Big Data



- Personalized lifetime relationships with retail & services
- Real-time data-driven decision making

Develop deep insights into customer behavior and preferences

## Shift to the cloud



- Low-powered devices utilizing scalable processing, Storage & Software as a Service

Minimize channel infrastructure where every square foot counts

## Social, Local, Mobile



- Proximity and social connections create highly targeted social and commercial opportunities

Create a truly continuous relationship with customers

## Ubiquitous connectivity



- Always-on high-speed broadband on mobile connections enable other trends

Increased interaction speed and productivity in very channel

## Improved device performance



- Miniaturization and low power consumption combined with faster devices

Faster and longer lasting devices with more power/ better battery life

## New device form factors



- "Smarter" objects allow for ecosystem development with apps and cloud services

Digital devices that are wearable, flexible, embedded, implanted

## New device interaction models



- Ability to interface with technology through gesture and voice commands

Interact more naturally with digital devices and services

## Augmented reality



- New device and display technologies enable visual layer of information overlaid on everyday sight

Get info you need, when you need it – turn financial needs into experience

## Cognitive computing



- Intelligent "AI-like" personalities are able to perform complex tasks and offer nuanced recommendations

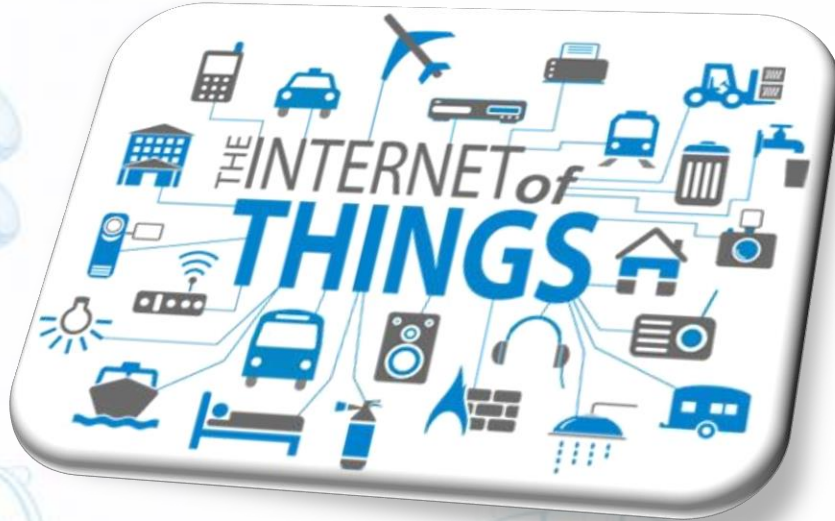
Predictive VA – from "know before you know" to product suggestions

# Significant opportunity to impact on materials and waste!

Internet of Things (IoT) connects the Physical, Digital and Human worlds providing new capabilities and information flows resulting in increased efficiency, *EVERYWHERE!*



*“Smart Cities”* provide shelter and security for the World’s expanding population



Advancing healthcare through digitisation and *“wearable sensor”* technology



*“Autonomous vehicles”* increase safety and reliability in transportation and logistics

*“Connected Homes”* increase safety and convenience whilst decreasing energy and resource consumption



*“Smart Factories”* boost efficiency and employee safety, save energy and reduce waste by embedding sensors into manufacturing

*IoT is a world where "things" (devices or sensors) are connected and are able to share data*

MIT

*The Internet of Things is all about the invaluable insights enabled by harnessing and analyzing the data from the connected devices*

Microsoft



*The Internet of Things Brings the Power of Device Ecosystems to your Enterprise*

Gartner

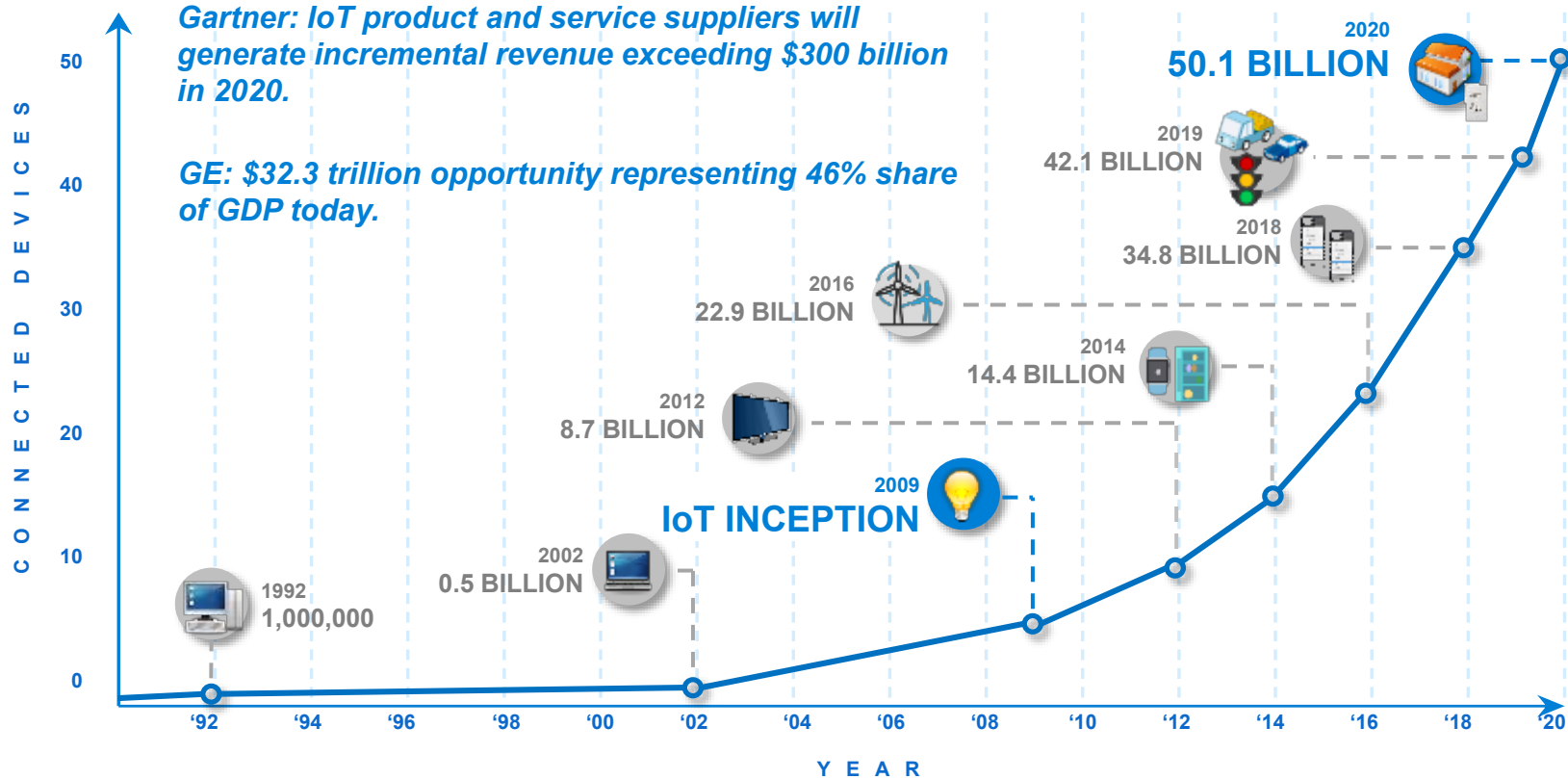
*Internet of Everything is the latest wave of the internet, connecting physical objects to provide better safety, comfort and efficiency*

Cisco

**Analytics and Insights derived from data collected from connected devices will ultimately drive IoT value**

# The speed of change is *Exponential*.....

.....with 50 billion devices connected by 2020



# An infinite range of IoT Applications and an opportunity for significant waste reduction

## Range of applications

- Near to far: *Smart Spoon to Mars Rover*
- Small to large: *Medical Nanobot to A380*
- Local to global: *Home Area Network to Global Internet*

## Continually improving

From Refrigerators to Airplanes:

- *Reducing energy and electricity usage*
- *Reducing material usage and scrap*
- *Increasing quality and lowering costs*

*All processes from manufacture, to assembly, through production and supply chain.*



## The world can be a better place!

# Key market drivers will continue to propel IoT growth

Sensor technology capabilities increase whilst cost decrease (est. from 1.3\$ to 0.6\$ in the past decade)



2006-2016

Mesh networks connecting large number of devices at lower power consumption



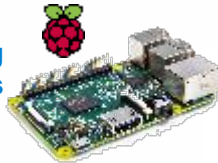
2015

Dramatic increase of "Smart" mobile devices (63% of mobile phones sold globally)

Mobility

Disruptive Technology

Open Source Hardware delivering exceptional compute at minimal costs



Being the best at what we do



2019

Approximately 60% of world's population connected to Internet (up from 40% today)

Global Connectivity



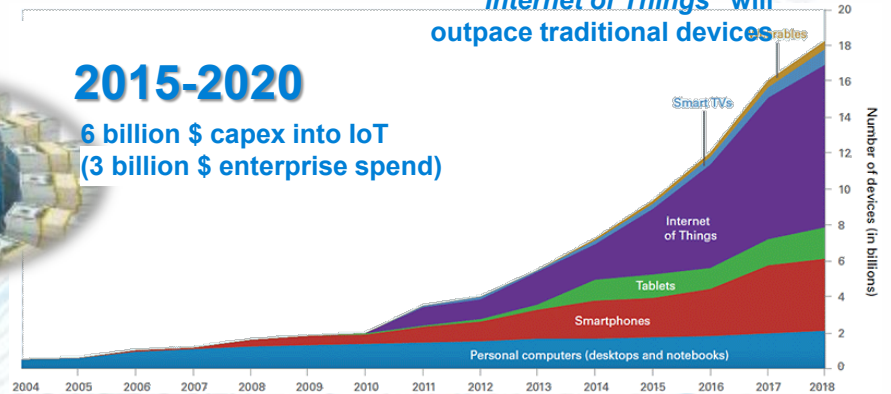
Growing world-wide availability of fast/cheap internet

Investment

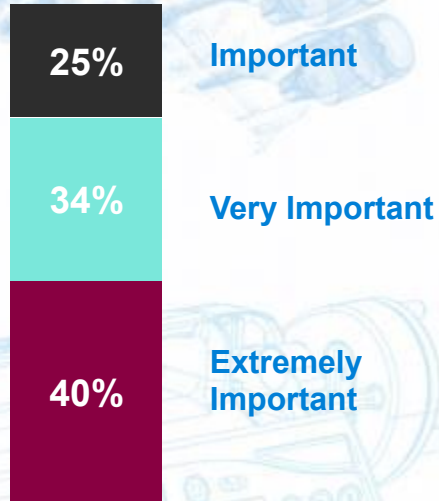
2015-2020

6 billion \$ capex into IoT (3 billion \$ enterprise spend)

"Internet of Things" will outpace traditional devices

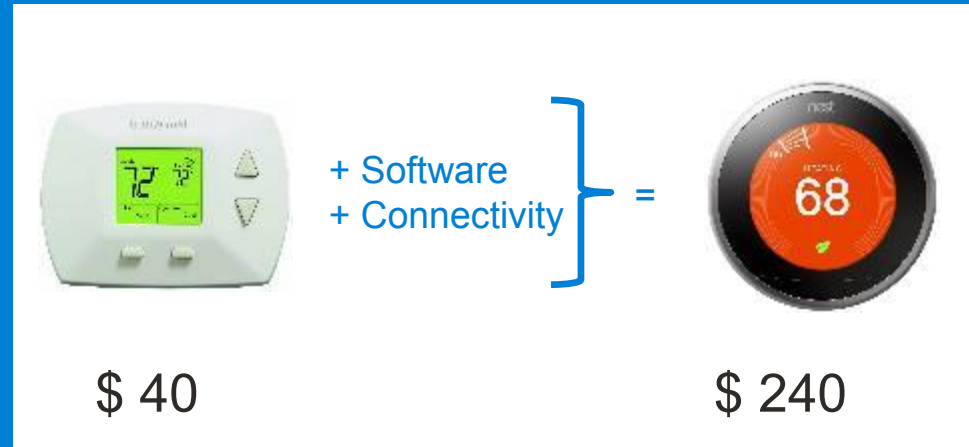


Q: How important is creating new revenue streams through new products and services from the Industrial Internet?\*



\*Source: World Economic Forum Industrial Internet Survey, 2014

## Monetise value by making devices more intelligent ...



Source: 2016 Flexera Software

## “X as a Service”



# Examples exist everywhere – the key is how to derive value

**2000** **2013**

THE PRODUCTION PACE NECESSARY TO MEET CUSTOMER DEMAND DROPPED

**120**  
MINUTES

**12**  
MINUTES

THE INTERNAL FAILURE RATE FELL

**35**  
PER  
SEMITRAILER

**3**  
PER  
SEMITRAILER

ACCIDENTS DECLINES

**85**

**5**



Schmitz Cargobull's use of information technology and telematics as a differentiator has results in market leadership

- 2013 – 82% of semitrailer sales in Germany, 50% market share in Europe
- Embedded sensors continually inform drivers, freight agents and customers of cargo, temperature and location
- Customers can better manage trailers and minimize risk of break down

# Examples exist everywhere – the key is how to derive value



Itron, a water meter manufacturer, uses information flows, sensors and a smart grid solution to be invaluable to its customers.

- Developed intelligent water metering systems which enables remote monitoring
- Helps municipalities identify leakages and changes in water usage patterns
- Increases maintenance efficiency and reduces water waste
- Single project in Kalgoorlie, Australia reduced water loss by 10%
- Smart water metering systems in British Columbia, Canada anticipated to save \$1.6 billion over 20 years

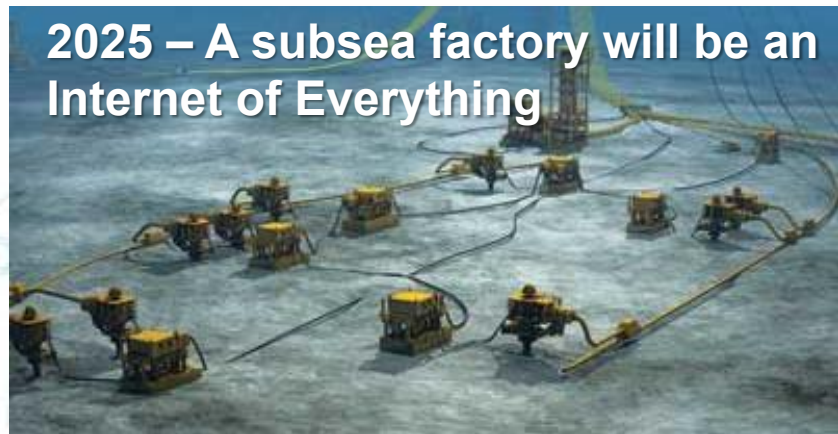
# Software is the critical enabler in IoT



- Medical data is expected to double every 73 days by 2020.
- 81% of healthcare executives familiar with Watson Health believe it will positively impact their business.
- Watson can read 40 million documents in 15 seconds.
- 80% of health data is invisible to current systems because it's unstructured. Watson Health can see it.

Source: 2016 IBM

**Software is transforming the earth enabling a new era for Data, Analytics, Machine Learning & Cognitive Computing**



The IoT journey has many challenges, unknowns and will continue to radically evolve over next 5 years.

## Barriers

- Security, at the right cost is paramount
- Technology fragmentation and evolving industry standards
- Interoperability
- Network connectivity
- Skilled human resources and development capabilities
- Data privacy
- Power consumption “e.g. of sensors, WiFi, LiFi, SigFox, LoRa WAN”

**McKinsey** – “40% of IoT’s potential economic value can be unlocked only by solving interoperability issues”

**Gartner** – “Through 2018, there will be no dominant IoT ecosystem platform...”

**AT&T** – “A shortage of skilled IoT developers is a primary obstacle...”

**Thank You!**

