Internet of Things

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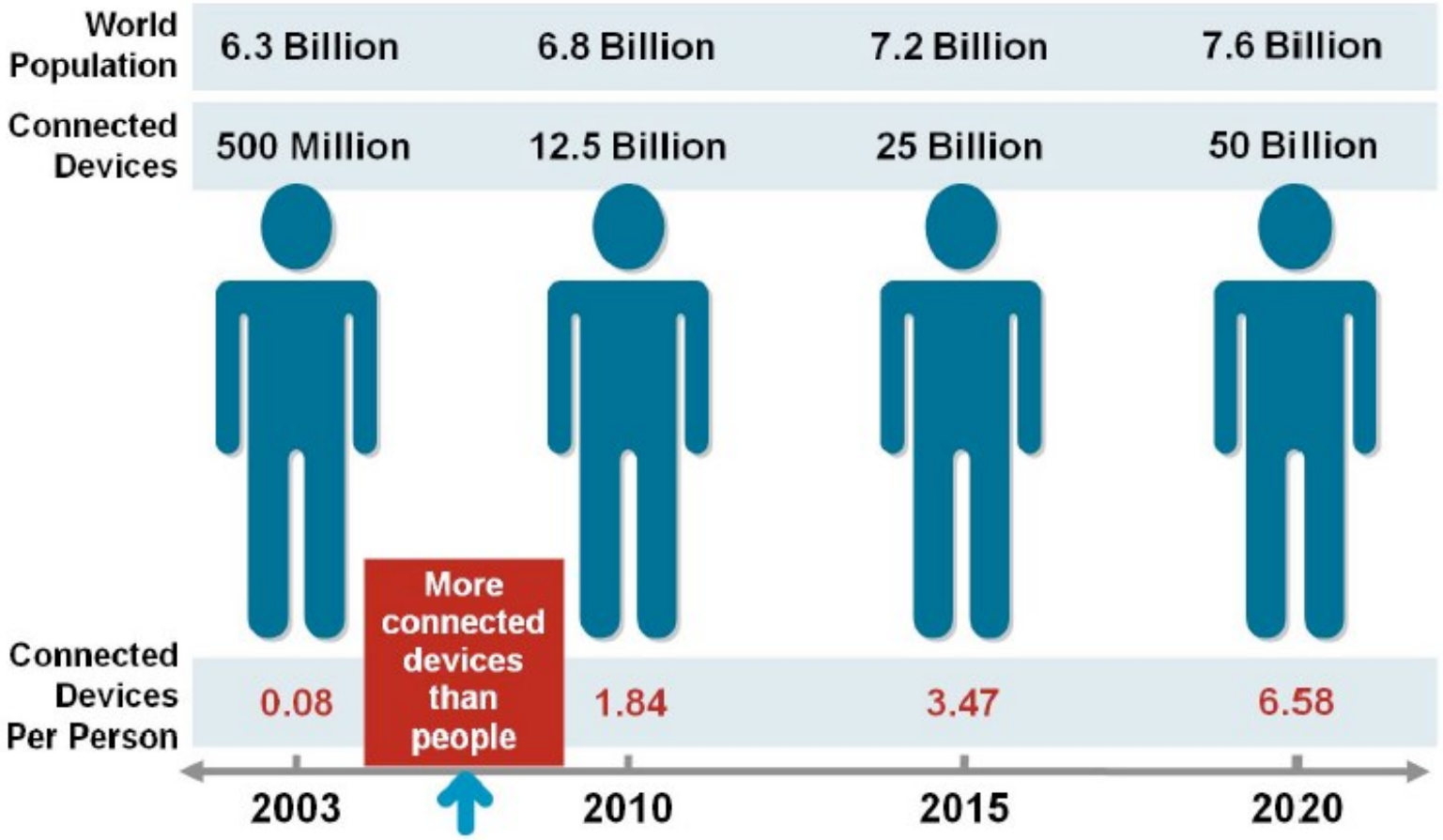
November 5, 2018

Internet of Things

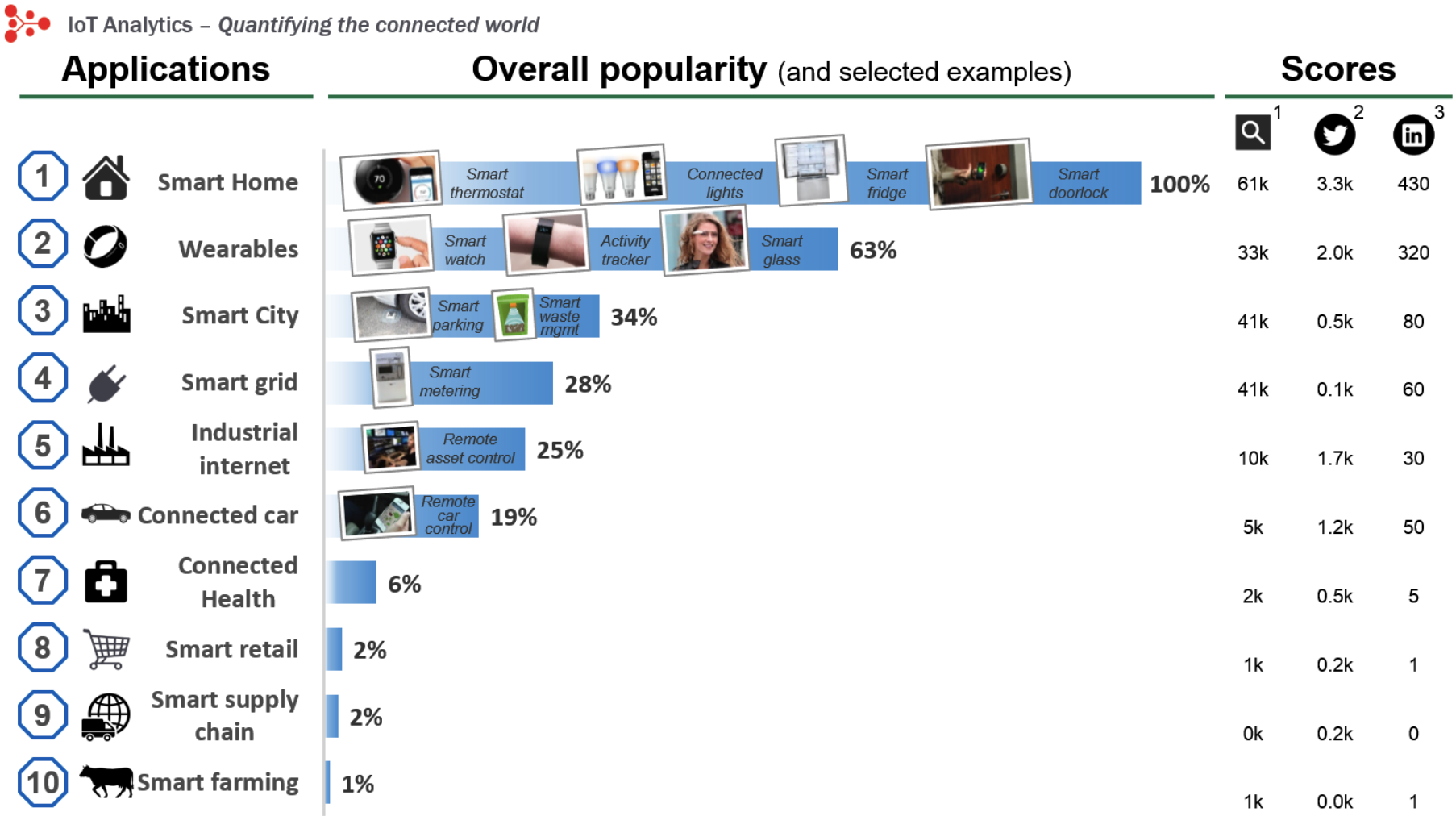
A new era where things can talk via the Internet

50 Billion Connected Devices in 2020



Source: Cisco IBSG, April 2011

Consumer Demand



1. Monthly worldwide Google searches for the application 2. Monthly Tweets containing the application name and #IOT 3. Monthly LinkedIn Posts that include the application name. All metrics valid for Q4/2014.
Sources: Google, Twitter, LinkedIn, IoT Analytics

IoT will change the way we

Graphene Wristband for
Blood sugar monitor

Yale Lock
$152

Amazon
Echo Dot, Echo
$49, $179

Samsung
Family Hub Fridge
$5799

Dash Buttons
$4.99

Nest
$249

Tesla Model 3
$35,000

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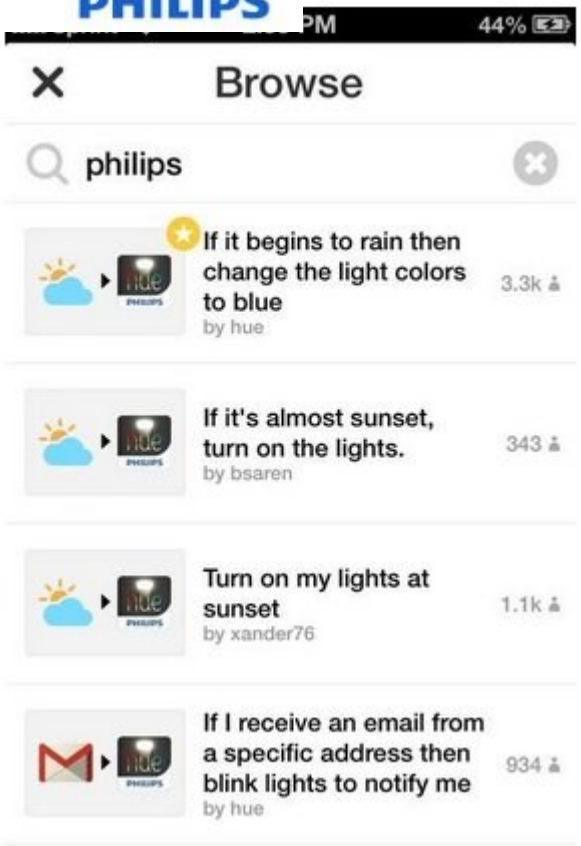
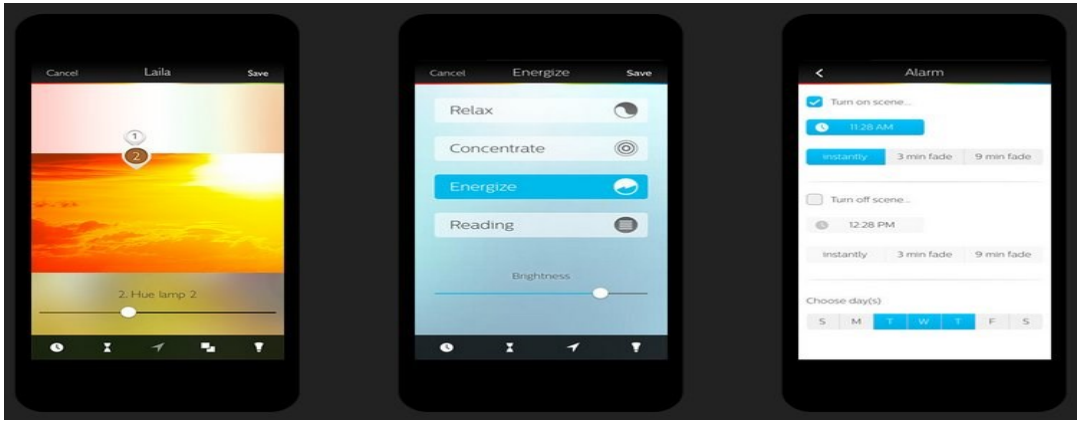
PHILIPS





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+Temperature Control - Google Nest

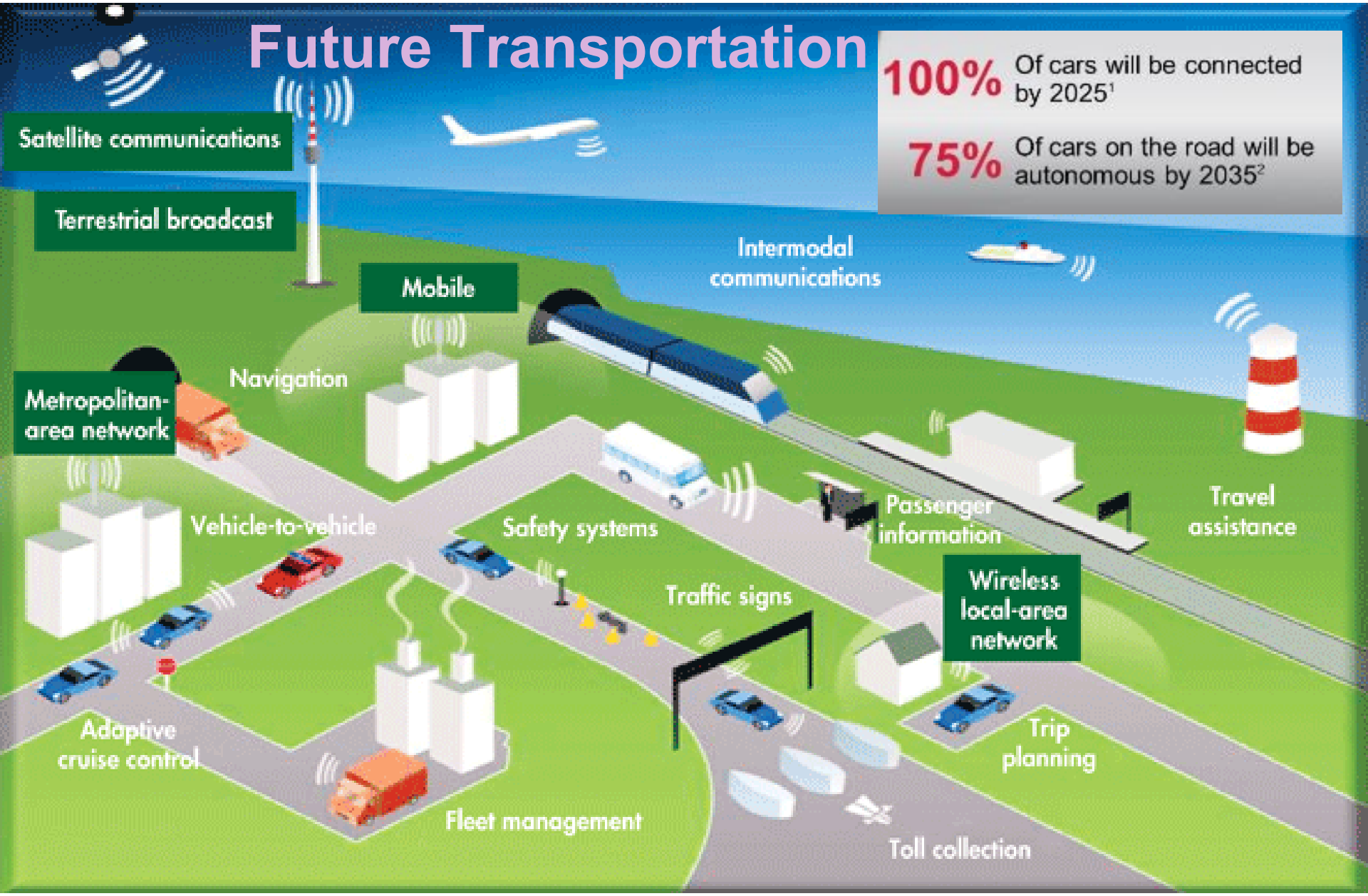
Nest Learning Thermostat $199

The Nest Learning Thermostat is the first thermostat to get ENERGY STAR certified. It learns what temperature you like and builds a schedule around yours. Since 2011, the Nest Thermostat has saved billions of kWh of energy in millions of homes worldwide.* And independent studies showed that it saved people an average of 10% to 12% on heating bills and 15% on cooling bills. So in under two years, it can pay for itself.

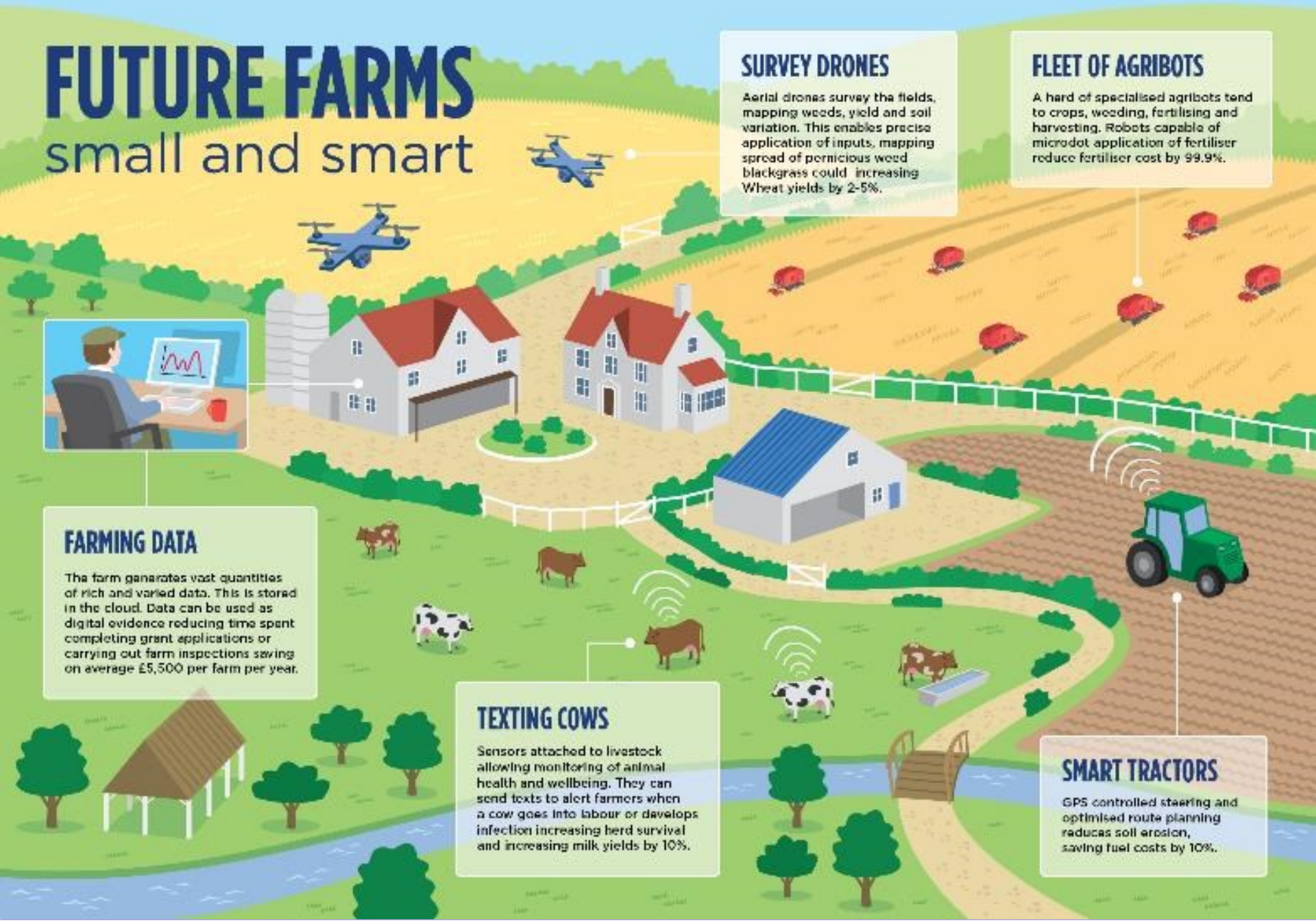
“The Internet of Things (IoT) is the network of physical objects that contain embedded technology to communicate and sense or interact with their internal states or the external environment.”
(Gartner:http://www.gartner.com/it-glossary/internet-of-things/)

“A global infrastructure for the information society, enabling advanced services by interconnecting {physical and virtual} things based on existing and evolving interoperable information and communication technologies.” (International Telecommunication Union – ITU)

"A dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual “things” have identities, physical attributes, and virtual personalities and use intelligent interfaces, and are seamlessly integrated into the information network.". (IoT European Research Cluster – IERC)



Source: electronicdesign.com



ภาพจาก https://imgtec.com

Market Opportunity

Smart Home

Smart Health

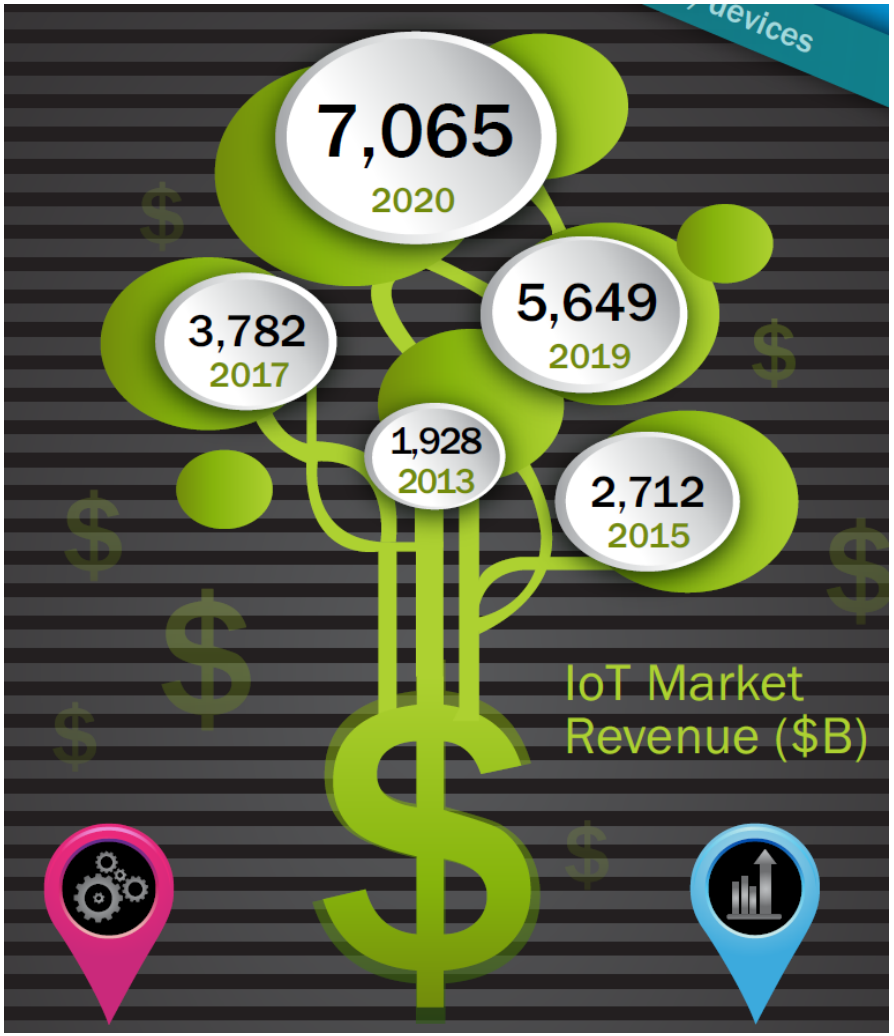
Smart Farm

Smart Energy

Smart Logistics

Smart Factory

IoT Market



Source: IDC

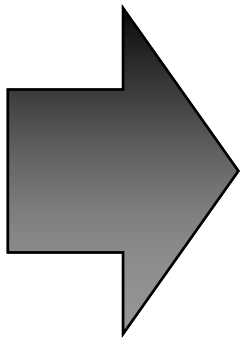
IoT Benefits

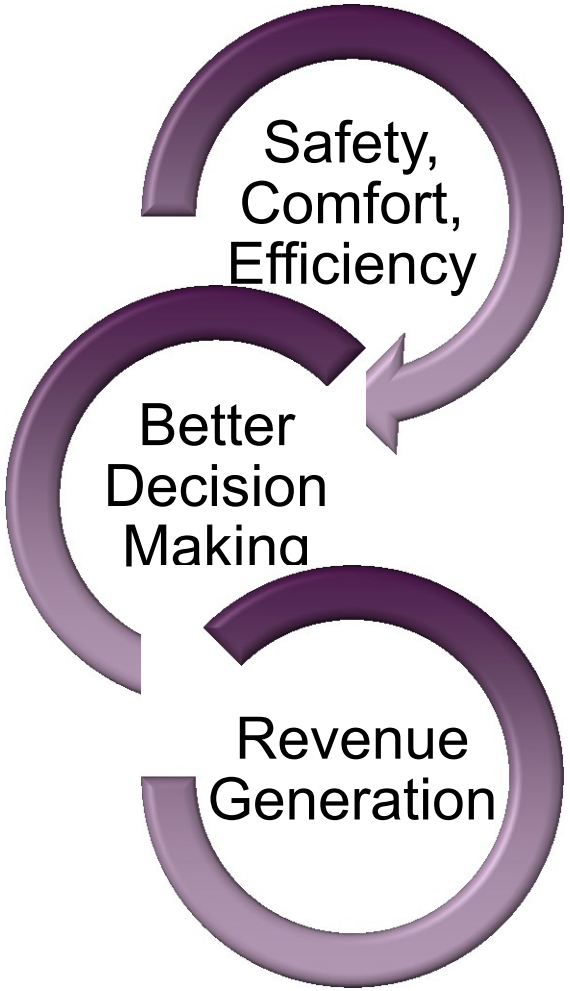
Reduce cost

Increase Efficiency

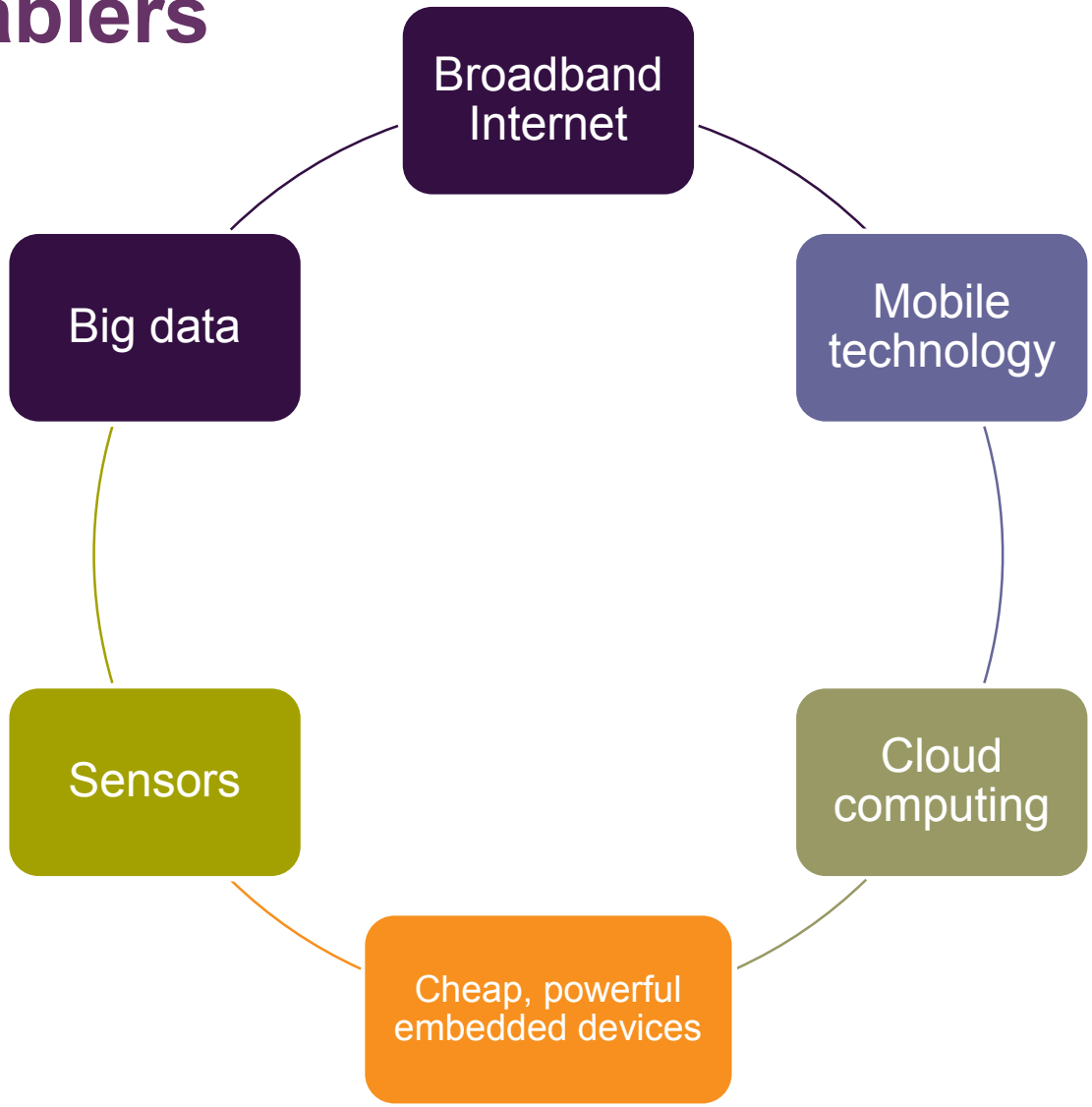
Value-added products

Innovative services

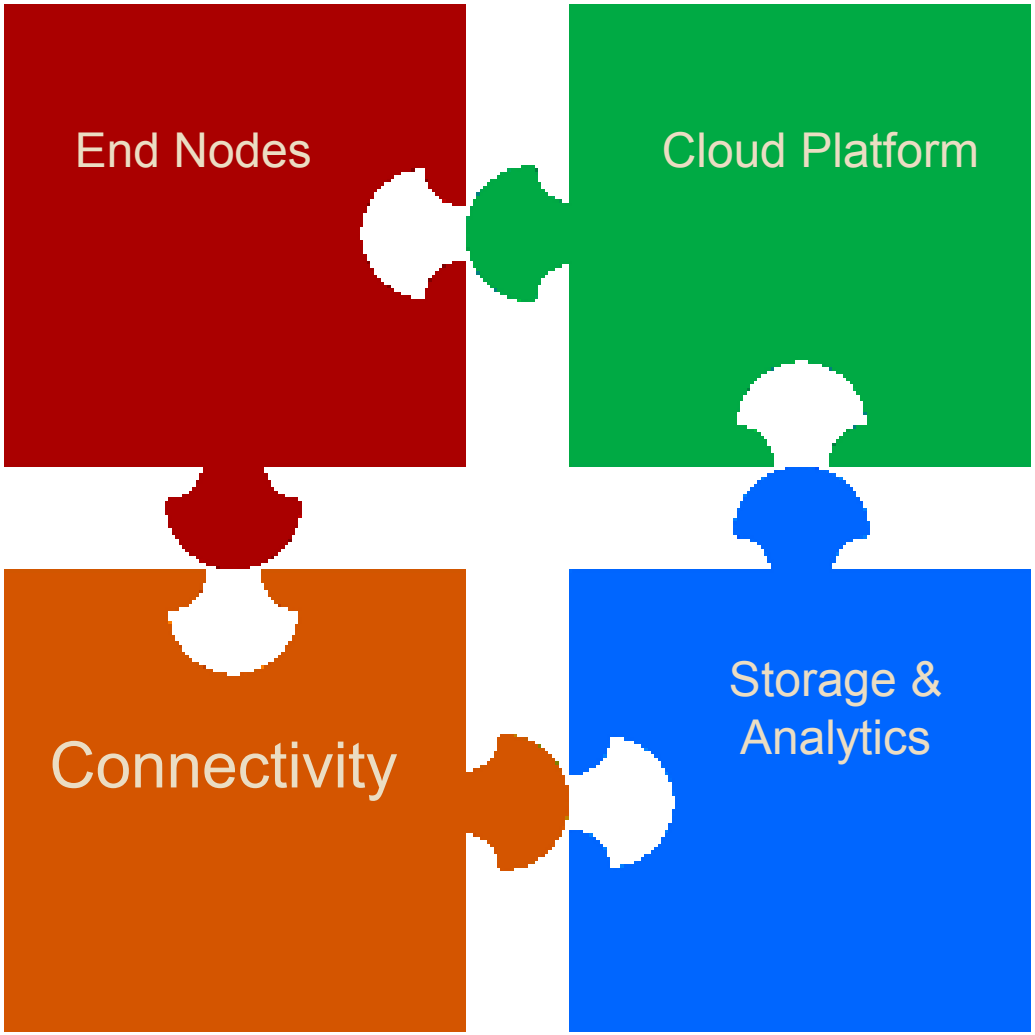




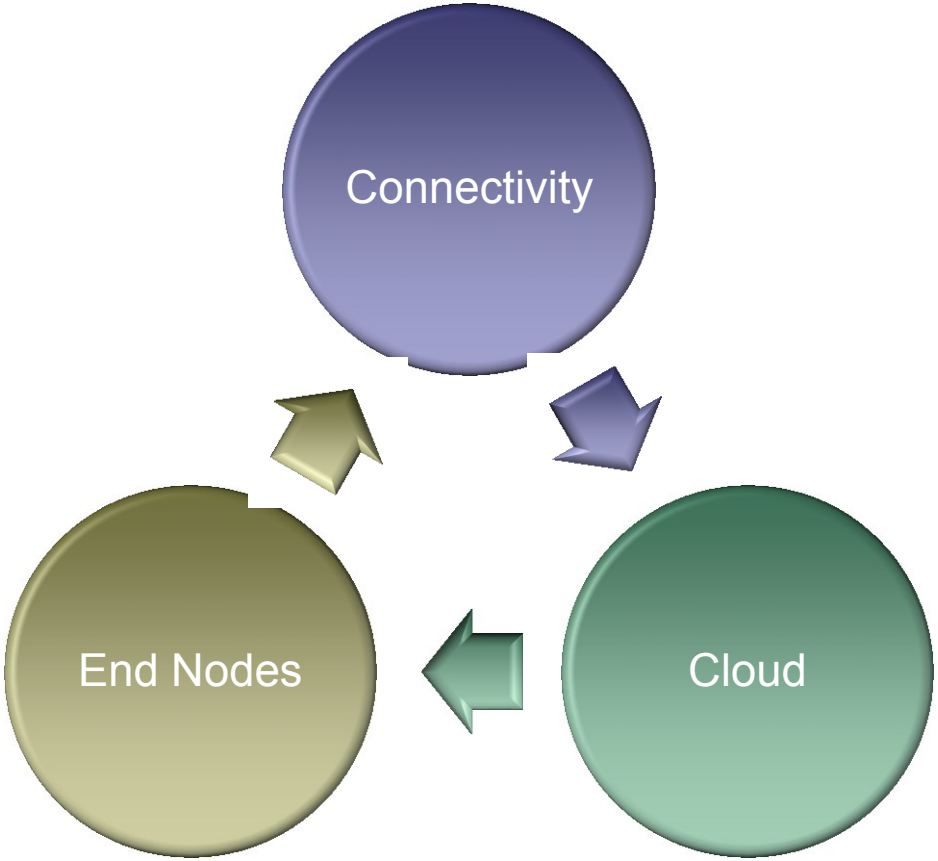
IoT Enablers



Internet of Things Ecosystem



IoT Components



IoT End Nodes

- **Sensors**
  - Light, temperature, humidity, location, presence,...
- **Actuators**
  - Controllers, things that can take action

End Node Types

Microcontrollers

ARDUINO UNO R3
280 BAHT

ARDUINO MEGA
450 BAHT

NODEMCU
250 BAHT

ESP8266
MODULE
100 BAHT

Single-board PCs

RASPBERRY PI
ZERO

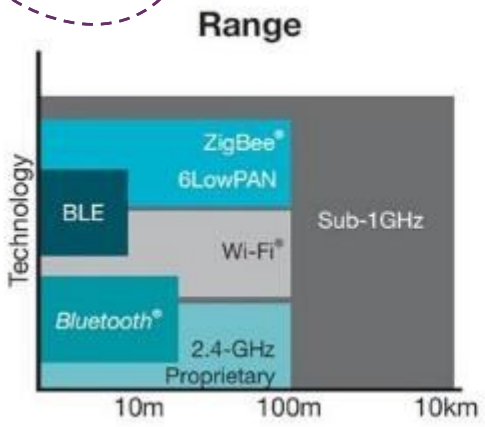
RASPBERRY PI 3
1,190 BAHT

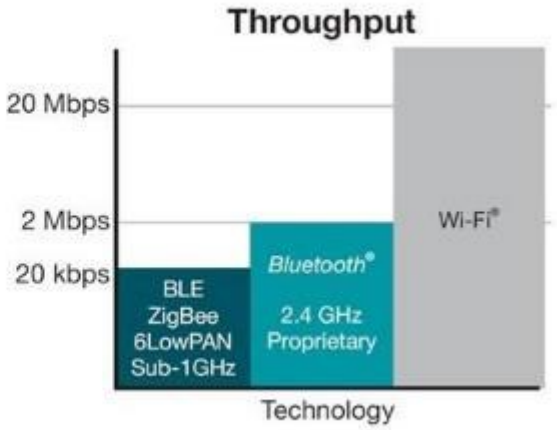
BEAGLEBONE BLACK
1,700 BAHT

Mobile devices

Computers

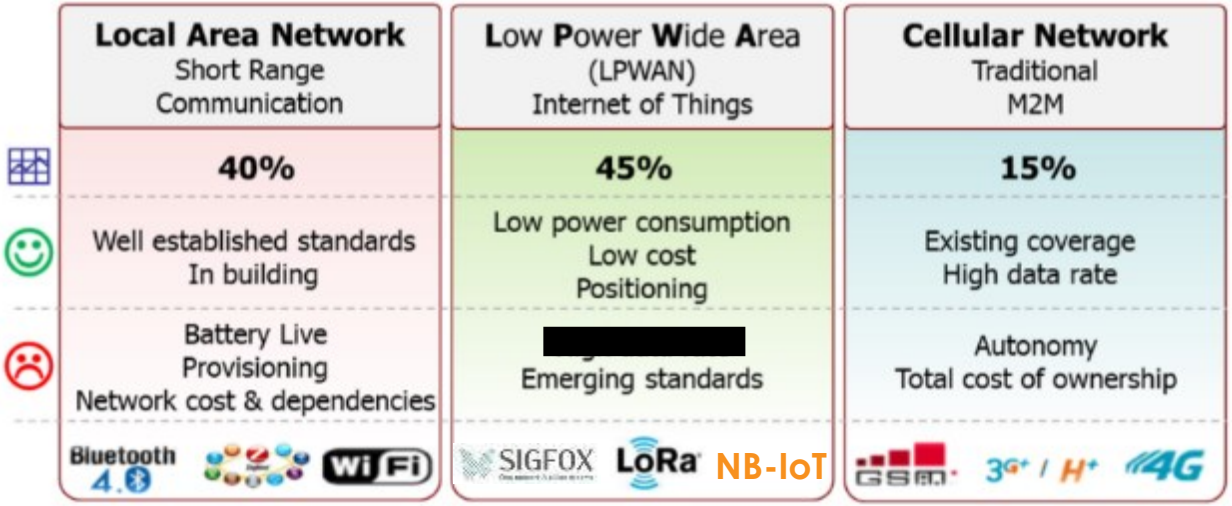
IoT Connectivity



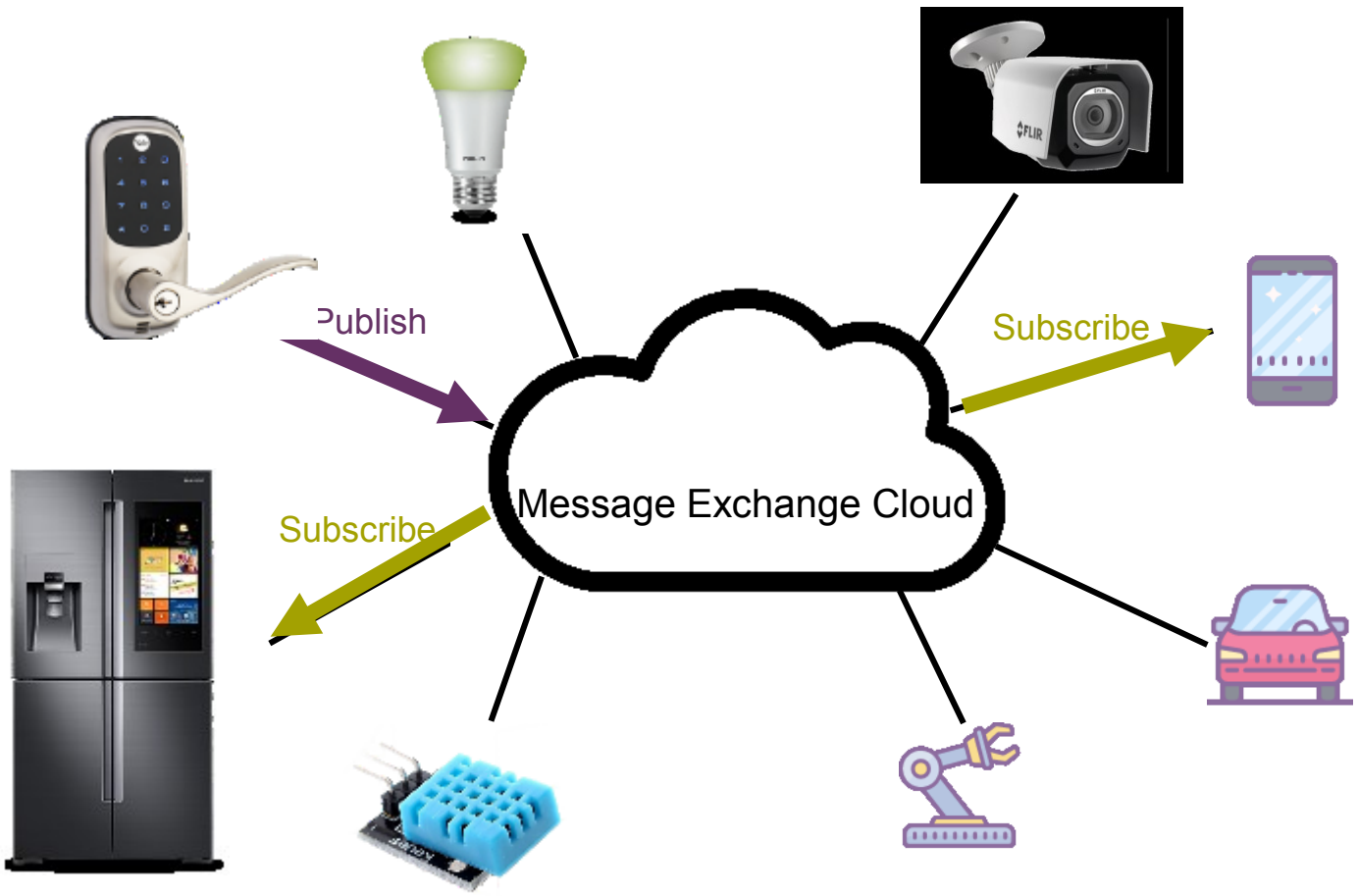


Low-Power Wide Area Network

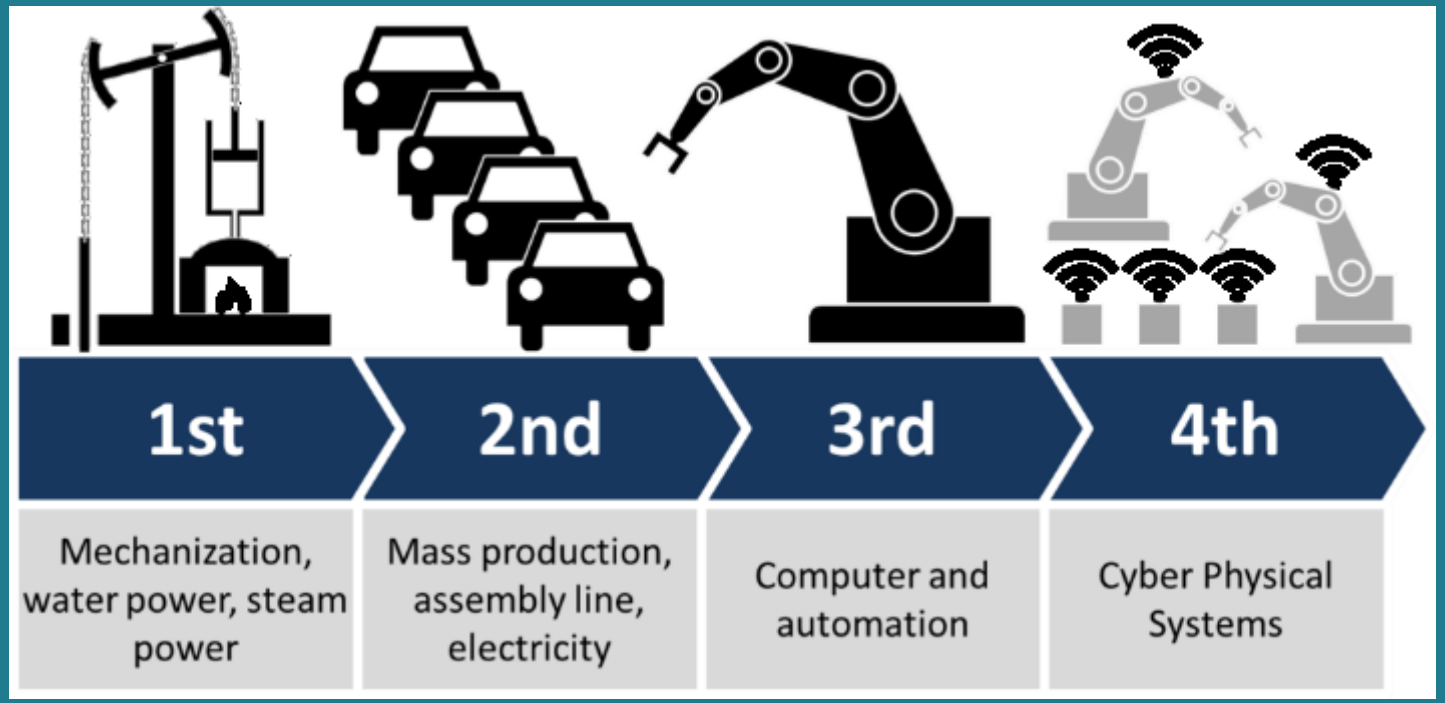
LoRa NB-IoT SIGFOX One network A billion dreams



IoT Cloud



Industry 4.0

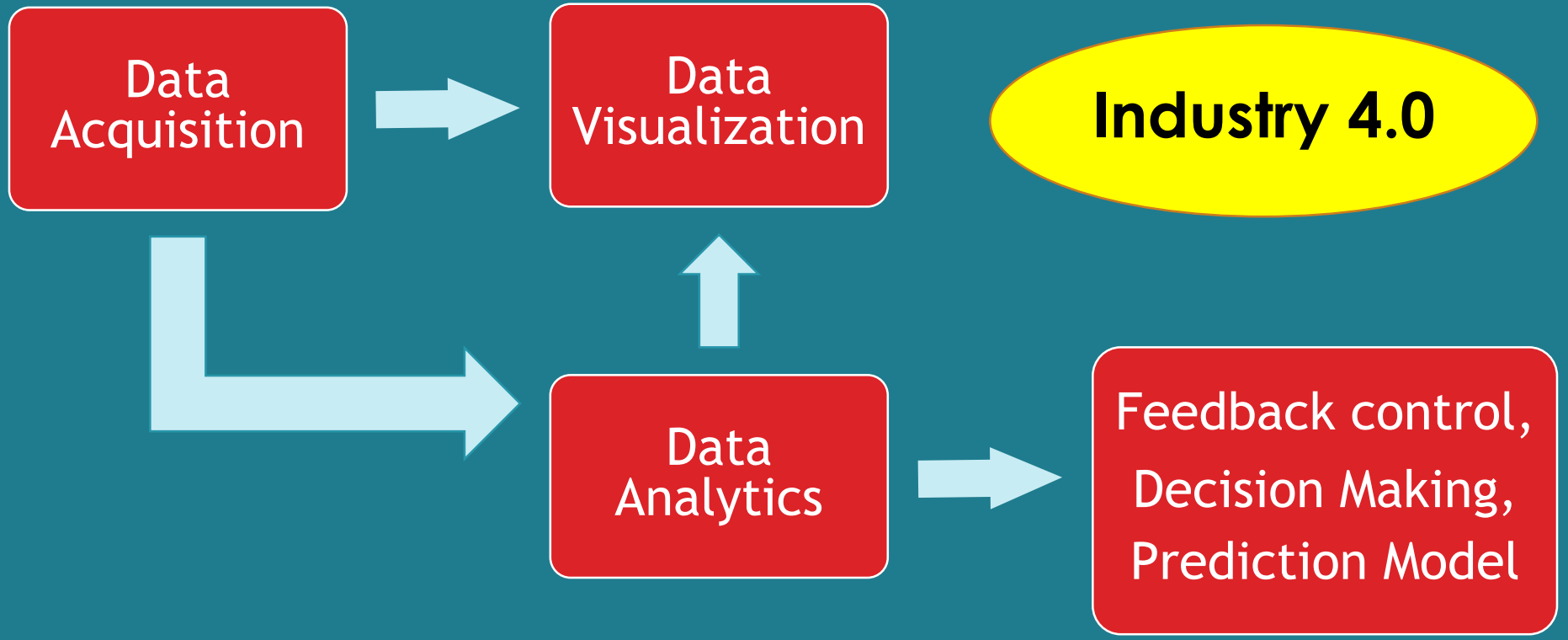


The figure is credited to Christoph Roser, http://www.allaboutlean.com /industry-4-0/"

Thailand

How to prepare for Industry 4.0?

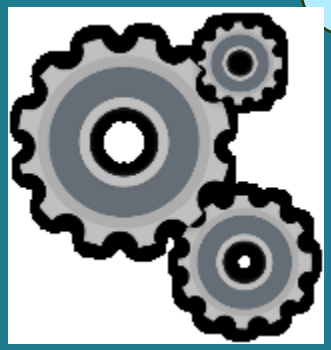
IoT: Sense → Collect → Analyze → React



Cloud Manufacturing

Cisco's Kinetic

Siemens' MindSphere



IBM's Watson

GE's Predix

Microsoft Azure

Conclusions

- Internet of Things → Integration of Everything (human, machine, process, system, information).
- Information is the key to success.
  - Monitor, control, visualize, react
  - High quality data or information can help you make better decisions.
- Benefits : competitive advantage, cost saving, high productivity and quality