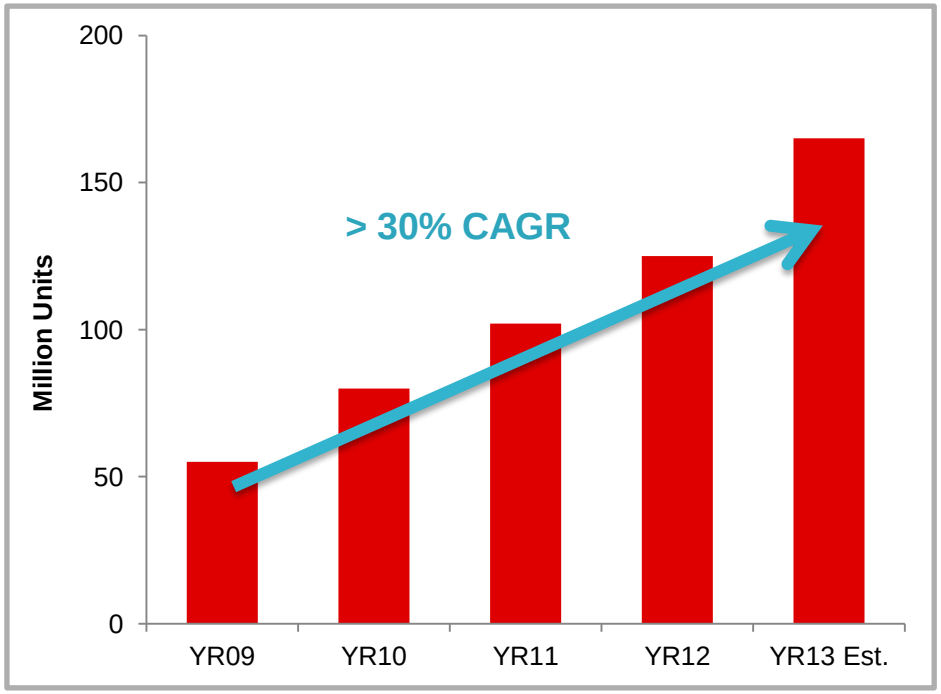
TI: The Internet of Things Technology Leader

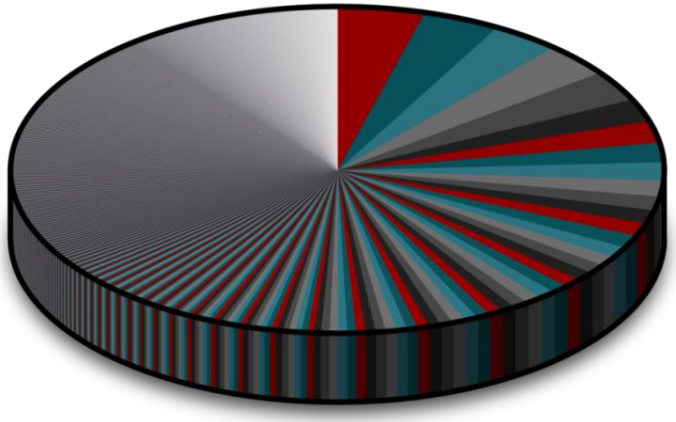
HS Yoon, Connecitivity Lead, TI Korea

Strong momentum in embedded market



Embedded TI Connectivity shipments

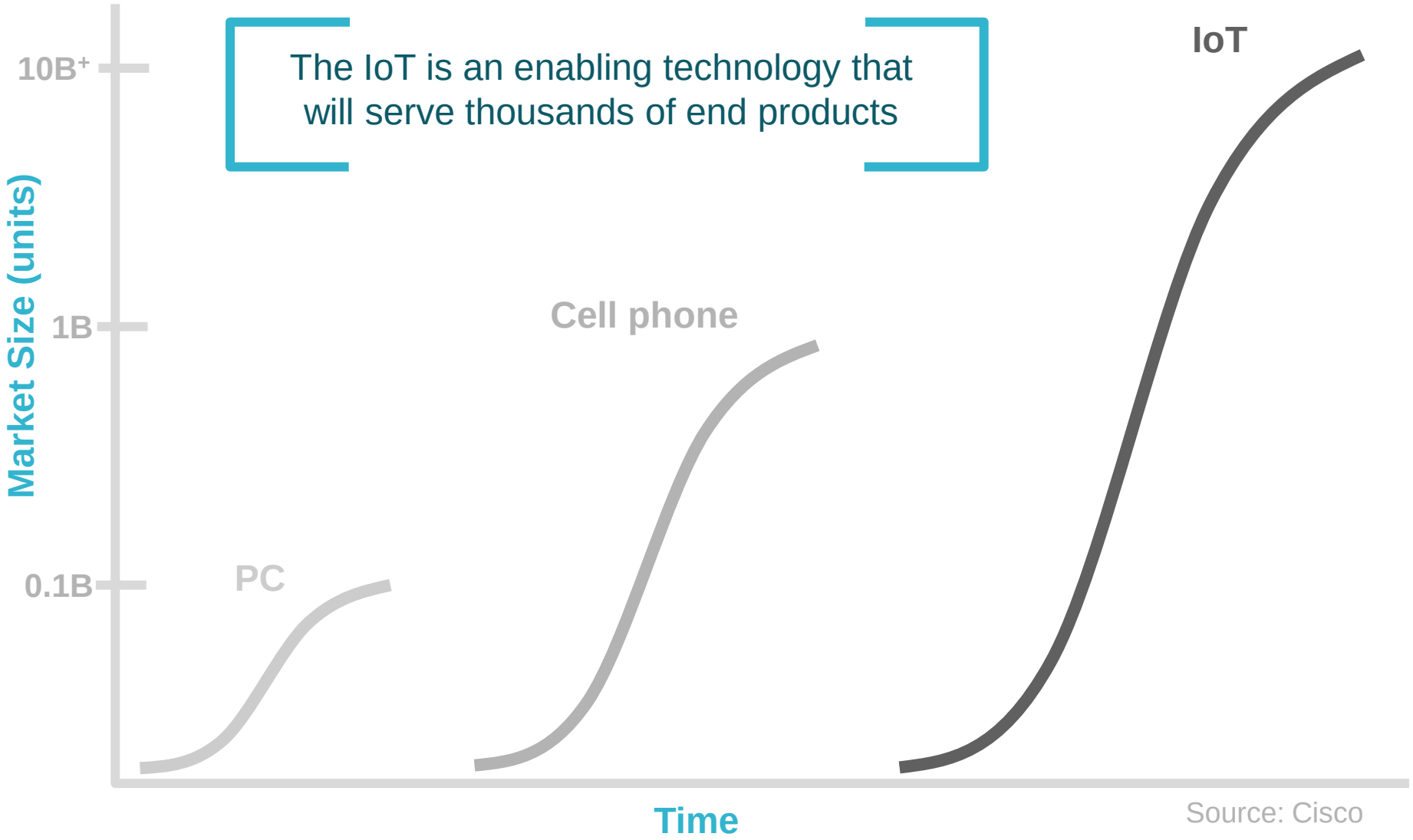
TI #1 supplier of low-power RF to the industrial market



Diverse customer base: >4K customers

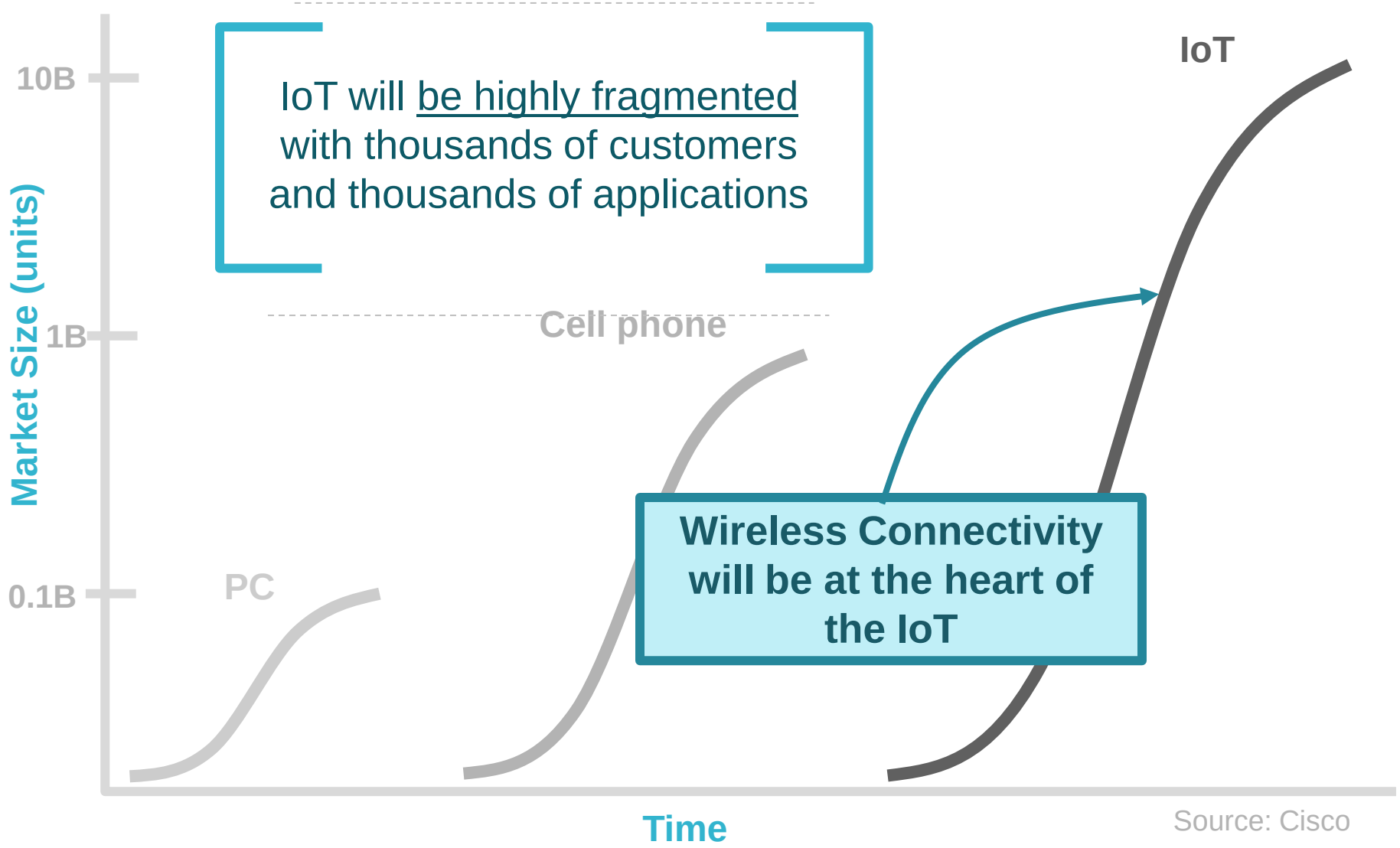
Why the IoT is attractive

The IoT is an enabling technology that will serve thousands of end products

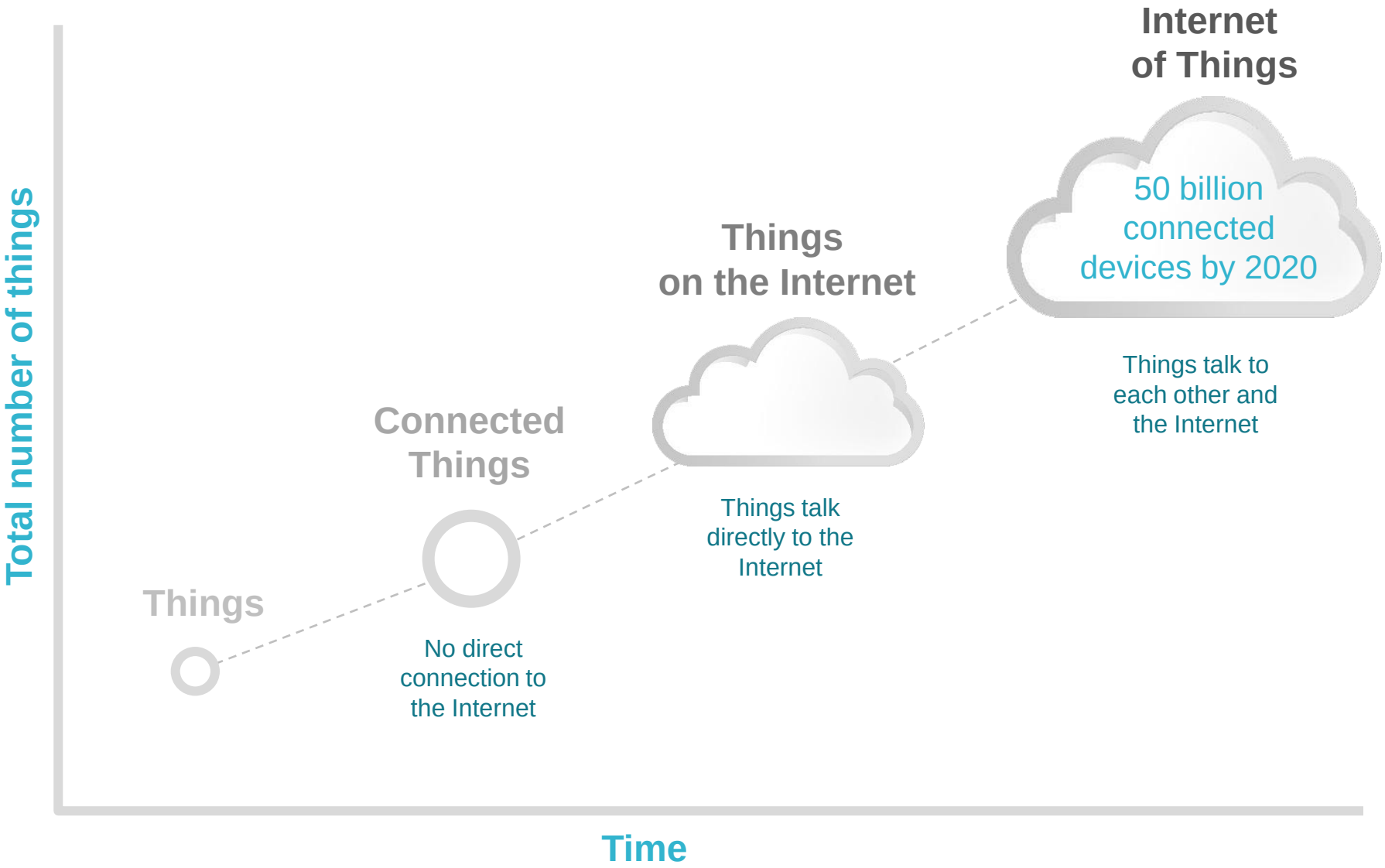


Source: Cisco

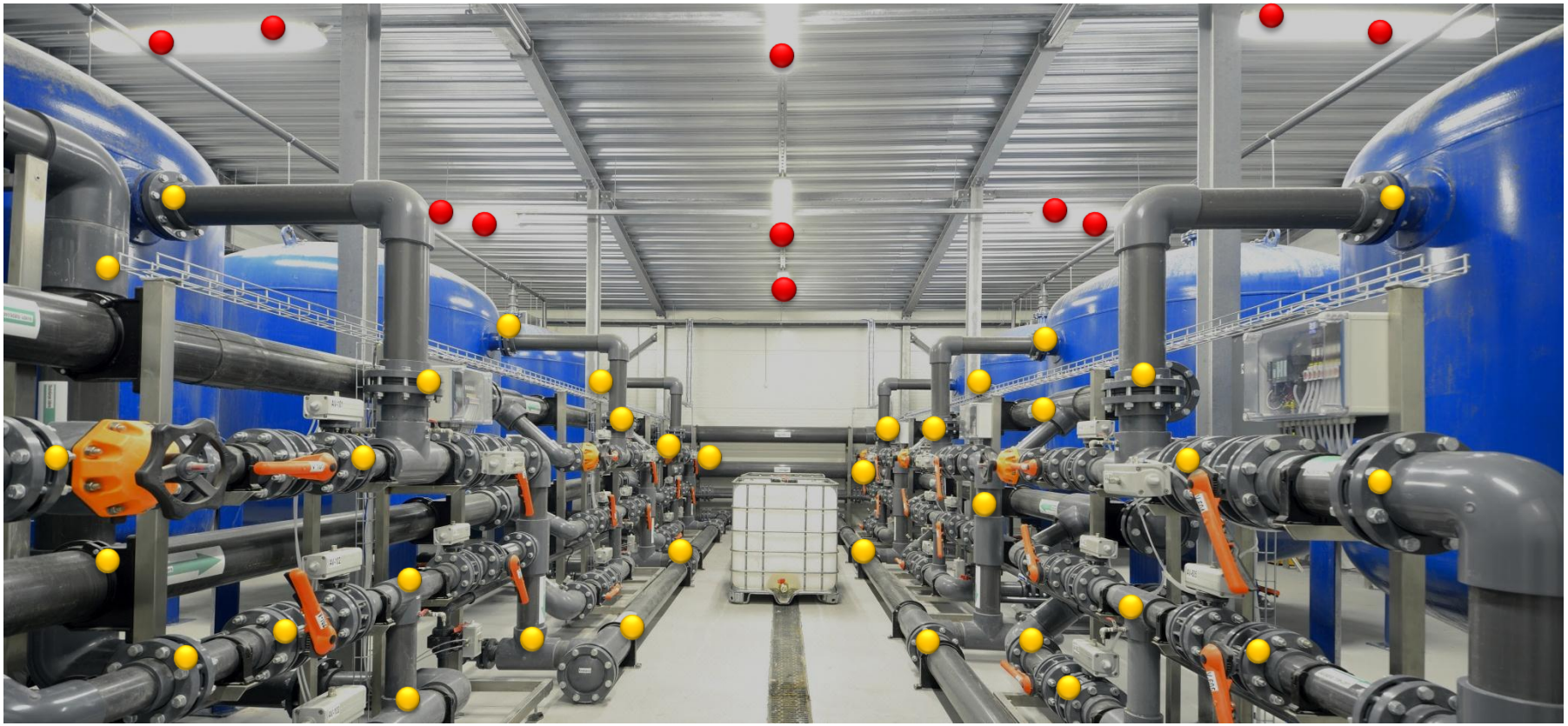
IoT – the first 10B Unit market



The Evolution of the IoT



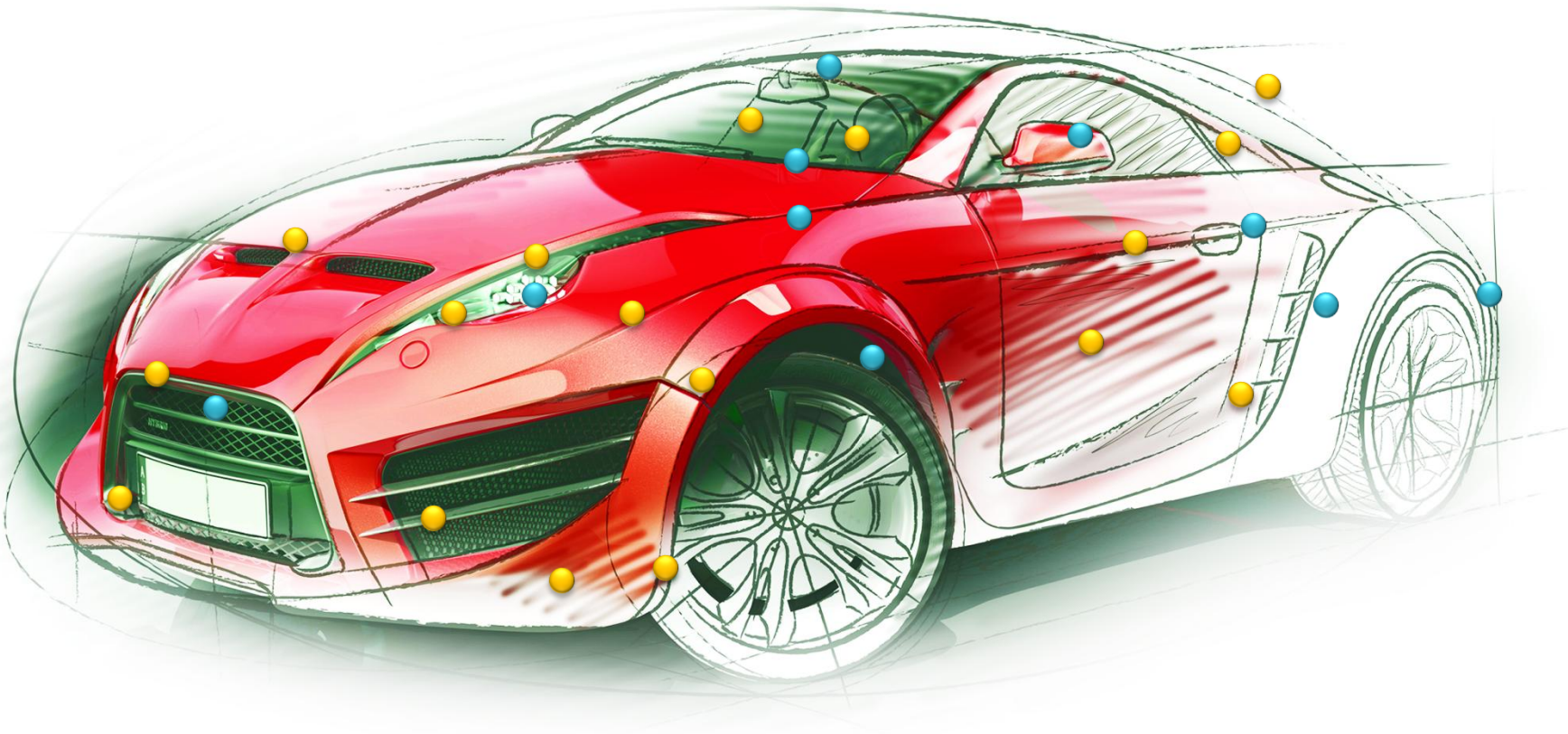
Industrial in the IoT



Wirelessly connected LED lighting & energy management

Flow & pressure sensors

Automotive in the IoT



Navigation, Bluetooth hands free & audio, Wi-Fi

Keyless entry, interior lighting, mirror control, sensors

Homes in the IoT

Security & safety system, sensors

Smart home energy gateway, thermostats, sensors

Fitness and healthcare in the IoT

Informed workouts with activity & performance measurement

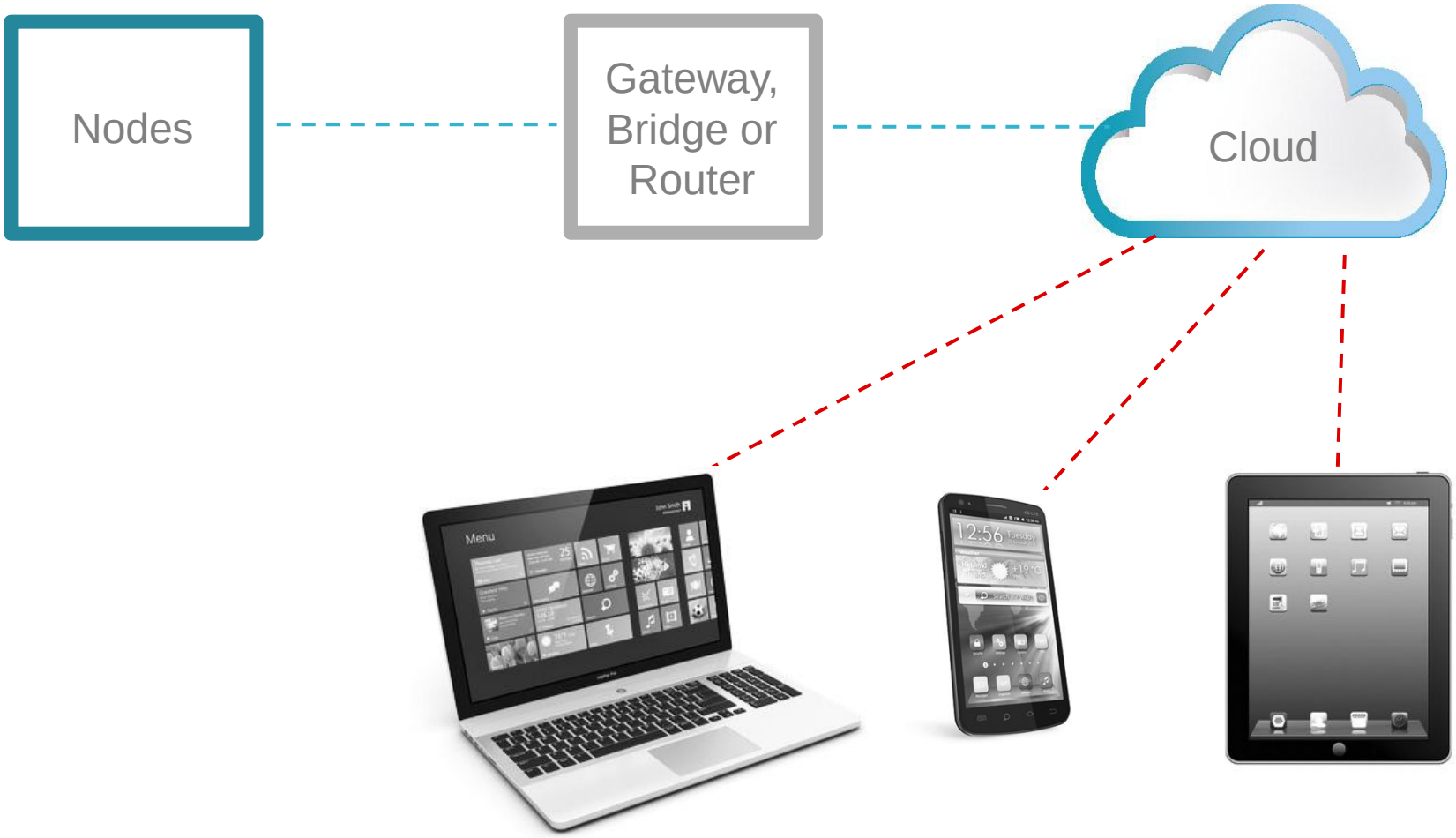
Safe independent living with fall detection, medication monitoring, etc.

IoT: Why now?

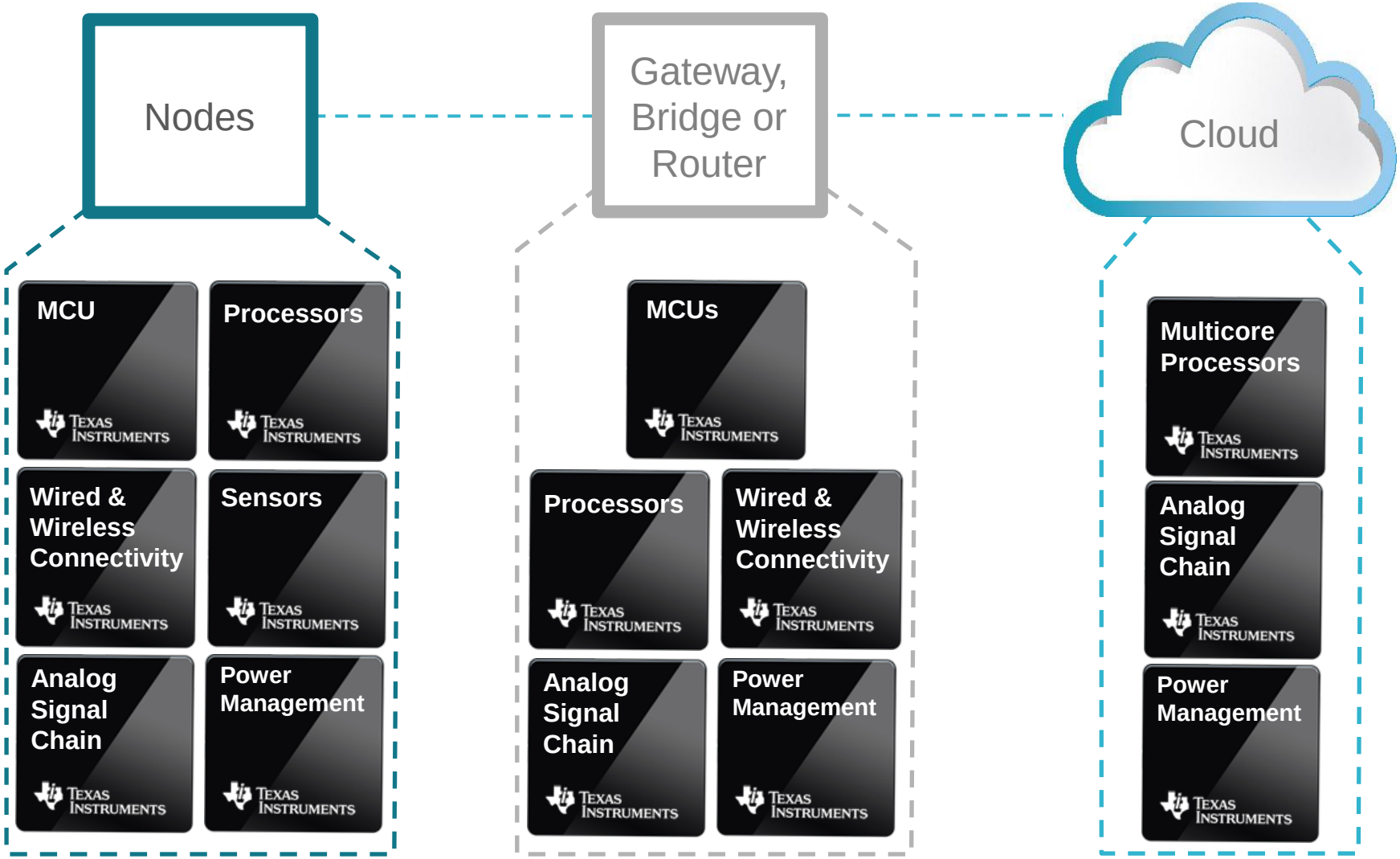
- More products are adding intelligence with MCUs to support more sophisticated control.
- Adding connectivity is getting easier & cheaper.
- New silicon enables battery applications.
- Wi-Fi and internet access broadly available.
- Tablets, PCs and Smartphones broadly available.
- Customer benefits are now clearer.

We are at the IoT inflection point

How the IoT works



Only TI has all the IoT building blocks

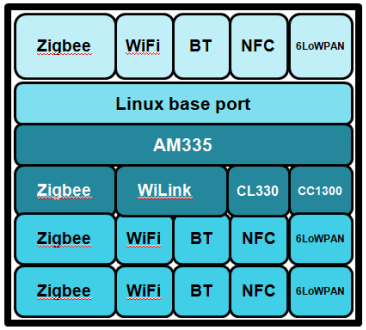


Only TI has all the IoT building blocks

MCU

ZigBee

Power Management



TI gateway reference design

- Hardware
- Software
- Speeds development

HP Moonshot

- DSP-accelerated ARM server
- Leverages TI's 66K2Hx KeyStone II multicore DSP + ARM® Cortex™-A15 platform
- High-performance computing
- Ideal performance/power

Only TI has all the IoT building blocks

MCU

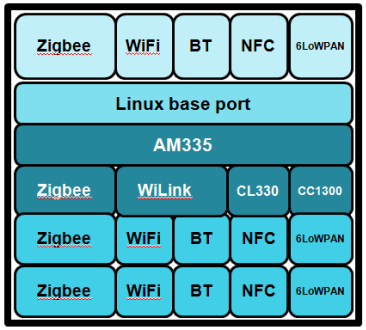
Ethernet

Sub-1GHz

Sensors

Analog Signal Chain

Power Management



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Only TI has all the IoT building blocks

Processor

MCU

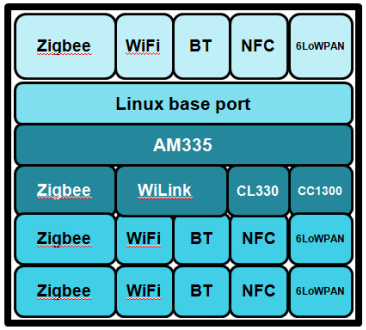
Wi-Fi

ZigBee

Sensors

Analog Signal Chain

Power Management



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No one standard will win in the IoT

CHALLENGE

Connectivity:
One size doesn't fit all

WHAT IS NEEDED

Broad variety of wired or wireless standards

TI DELIVERS

ZigBee™
- Low power mesh network
- Smart metering & lighting
- Moving into home automation

Sub-1GHz (Low Power, Robustness, Long Range)
- Low power & long range
- Proprietary & open protocols
- Metering, security systems

Wi Fi®
- Fast – 10Mbps++
- Direct Internet connection
- Home & enterprise apps

Bluetooth® SMART
- Lowest power
- Connect to tablet/phone
- Moving to industrial, automotive

PRIME ALLIANCE / **G3-PLC Alliance**
- Data over power lines (OFDM)
- Developed for smart grid
- Lighting, solar, appliances

EtherCAT® / **ETHERNET**
- Fast, low latency Ethernet
- Real-time industrial control
- Information technology

NFC · GPS · RFid · 2.4GHz · Bluetooth® · LoWPAN · IEEE P1901.2 · EtherNet/IP · ANT+ · PurePath™ Wireless Audio · RF4CE · IEEE 802.15.4

System-level approach to power is required

CHALLENGE

Power is critical

WHAT IS NEEDED

The lowest power solutions for any application

TI DELIVERS

Technology for billions of battery- or harvested-powered devices

Power management & precision analog ICs

Low-power microcontrollers

MSP430™ MCU

Tiva™-C MCU

Low-power wireless connectivity

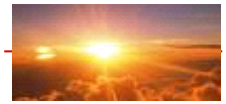
Wi-Fi

Bluetooth

ZigBee

Sub-1 GHz

Harvesting power and stretching battery life

Light  Vibration Thermal RF

Security vital at all layers

CHALLENGE

Security is a must

WHAT IS NEEDED

Built-in hardware security technology

TI DELIVERS

Security solutions to prevent, detect and respond to unintended or malicious behavior

Hardware	Software	Connectivity	
Symmetric cryptography	Authentication & anti-cloning	IP protection	Tamper protection

Protecting manufacturers' and consumers' devices, solutions and services

The IoT must be easy

CHALLENGE

Complexity

WHAT IS NEEDED

IoT solutions for everyone, not just experts

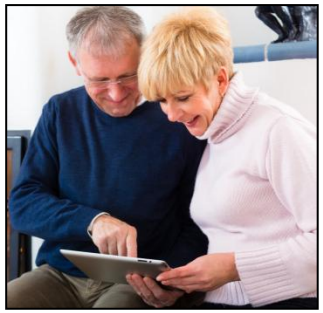
TI DELIVERS

Solutions that are making the IoT easy for manufacturers and consumers

Manufacturers:
Easy to develop and add to designs

- Simplified RF
- Easier Internet connectivity
- Tools, software & support

Consumers:
Easy to set up and use



Making the IoT of 2020 happen

CONNECT MORE WITH TI

Challenges	What is needed
Connectivity: One size doesn't fit all	Broad variety of wired or wireless standards
Power is critical	The lowest power solutions for any application
Security is a must	Built-in hardware security technology
Complexity	IoT solutions for everyone, not just experts
Rapidly evolving	Flexible hardware and software portfolio to mix & match

TI has the broadest "IoT-ready" portfolio

ti.com/connectmore

ti.com/iot

TI is connecting the IoT now

- Automotive
- Portable medical
- Metering
- Home & building automation
- Mobile lifestyle accessories