

Huawei IoT

Market trends and Offerings

Beyond Connectivity Introduction to IoT as a Service

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Sep 2018

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- 1 IoT Trends**
- 2 Huawei IoT Overview**
- 3 Some Case Studies**

IoT Gets People, Beings and Things Intelligently Connected



7.4B population

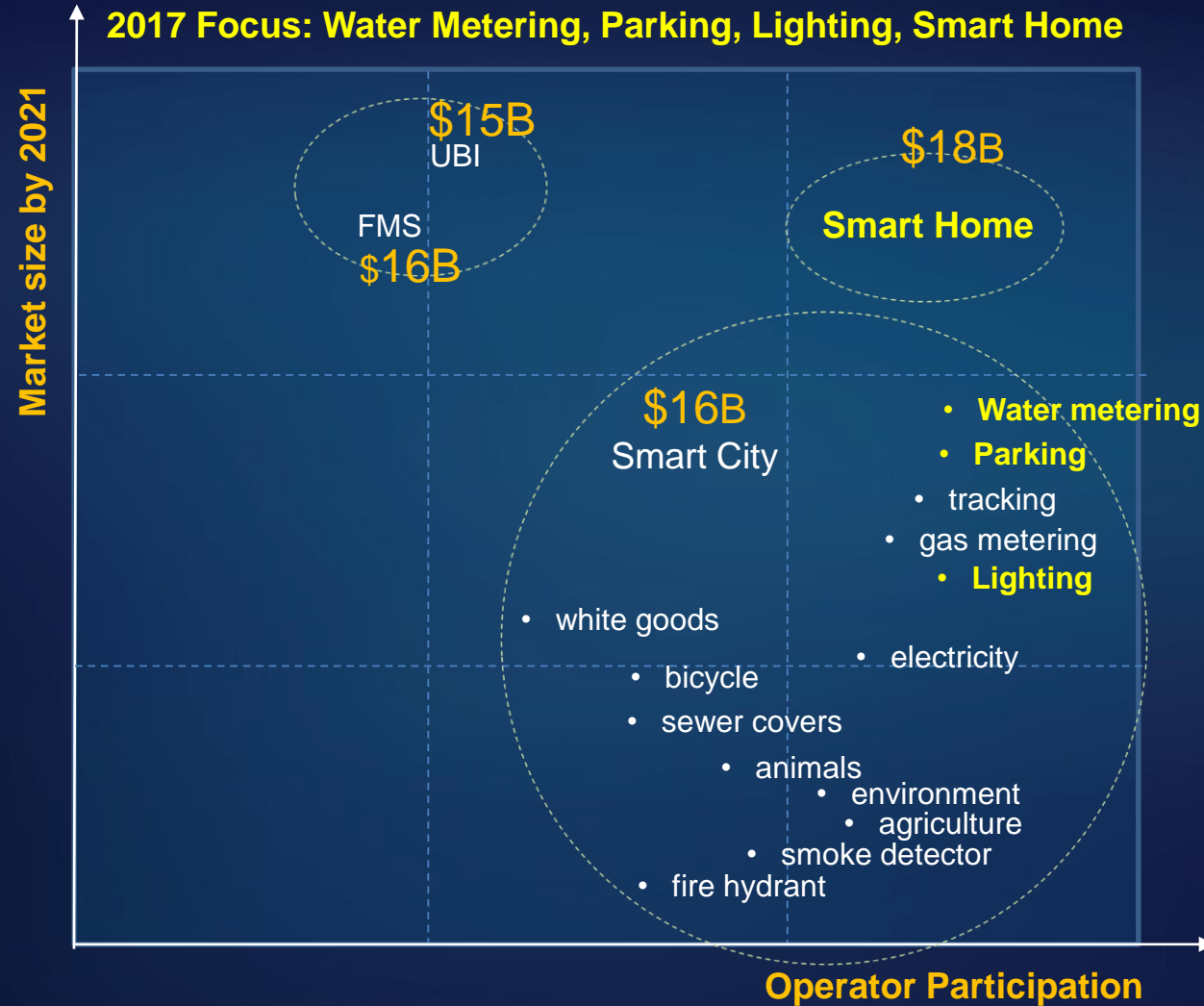


5.1B mobile subscribers

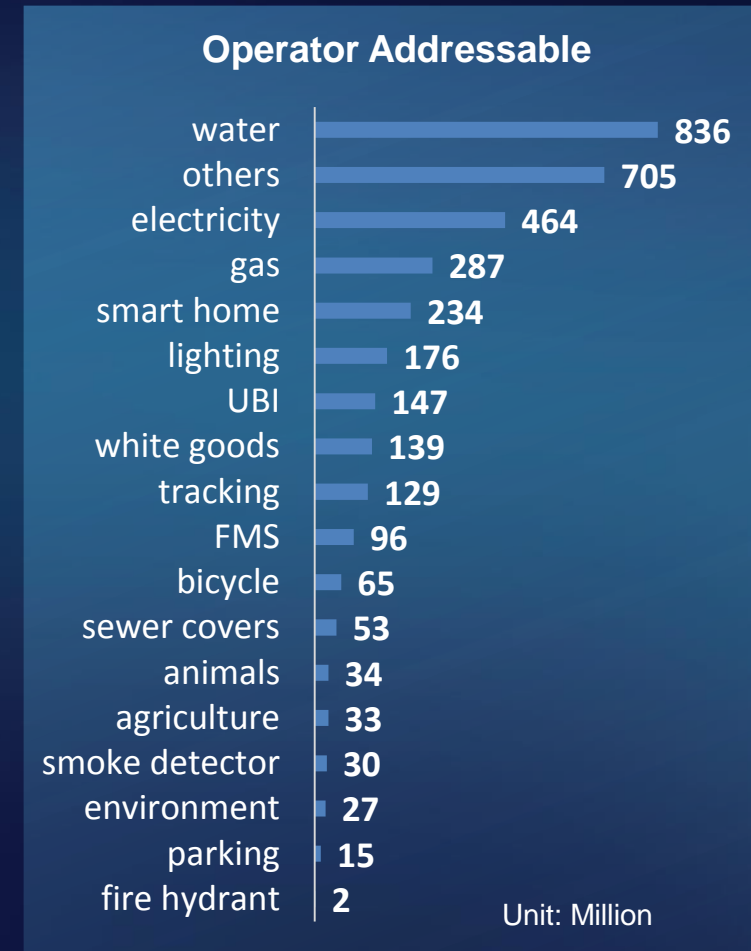


Source: The World Bank, ITU, 2016, GSMA, Huawei MI

\$89B Market with 3.5B Connections for Telco by 2021



3.5B Connections by 2021



Source: Huawei IoT MET

Utility, Home, Vehicle, City are The Top IoT Biz Sectors for Telco



Telco Top Practices

Connections
2015 – 2016



From “SIM Selling” to
“Business Selling”

22M -> 49M



Maximize connectivity, excel
service, enhance application

50M -> 90M



Connectivity provider, service
provider, data operator

18M -> 25M



Leverage on connection,
emphasize on ecosystem

22M -> 35M

Utility	Smart Home	IoVehicle	Health	Industry	Smart City

LPWA (NB-IoT)

Low-Power Wide-Area Network is a type of wireless telecommunication network designed to allow long range communications at a low bit rate among things (connected objects, such as sensors)



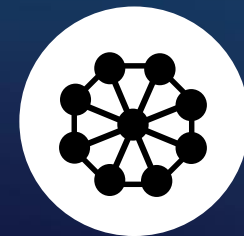
Long Battery Life



Deep Penetration



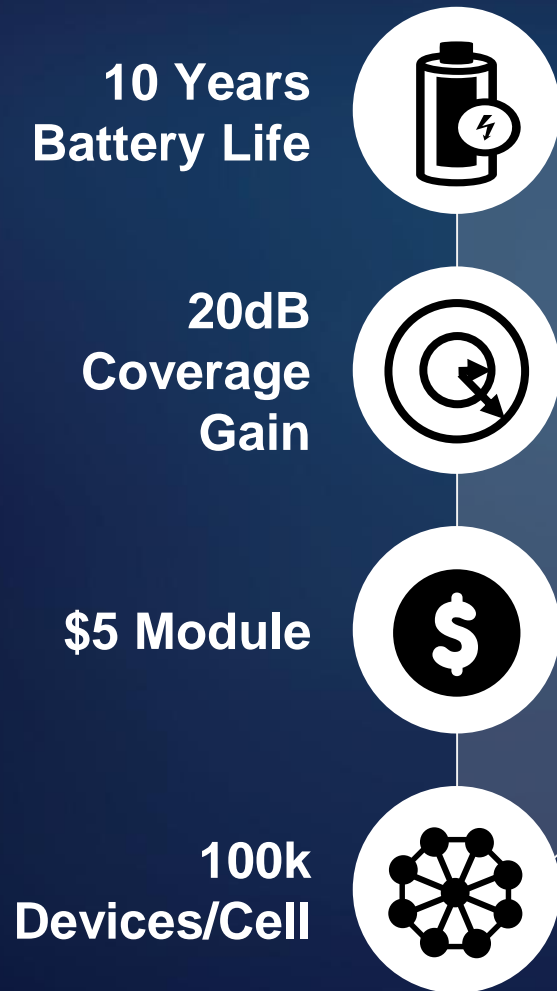
Low Device Cost



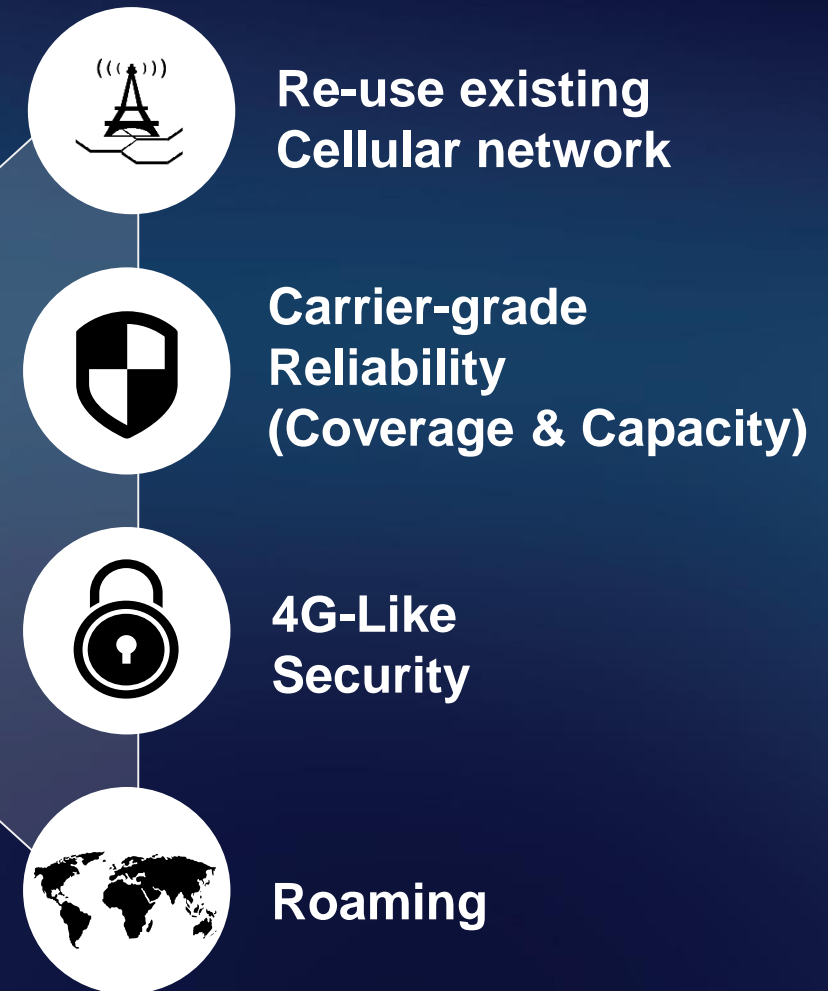
Mass Deployment

NB-IoT is the Best Choice of LPWA Service

Compare to GPRS



Compare to unlicensed technology



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Huawei IoT - Beyond Connectivity, IoT as a Service



Telco IoT Business



Huawei Offering



Security: 3Technologies + 1Management

Huawei NB-IoT Has Gained A Global Momentum



23

23 module vendors
8 chip vendors

15M

NB-IoT chipset
shipment in 2017

500K

500K sites
39 networks
28 countries

10M

10M connections
2017

50

50 applications
40 industries

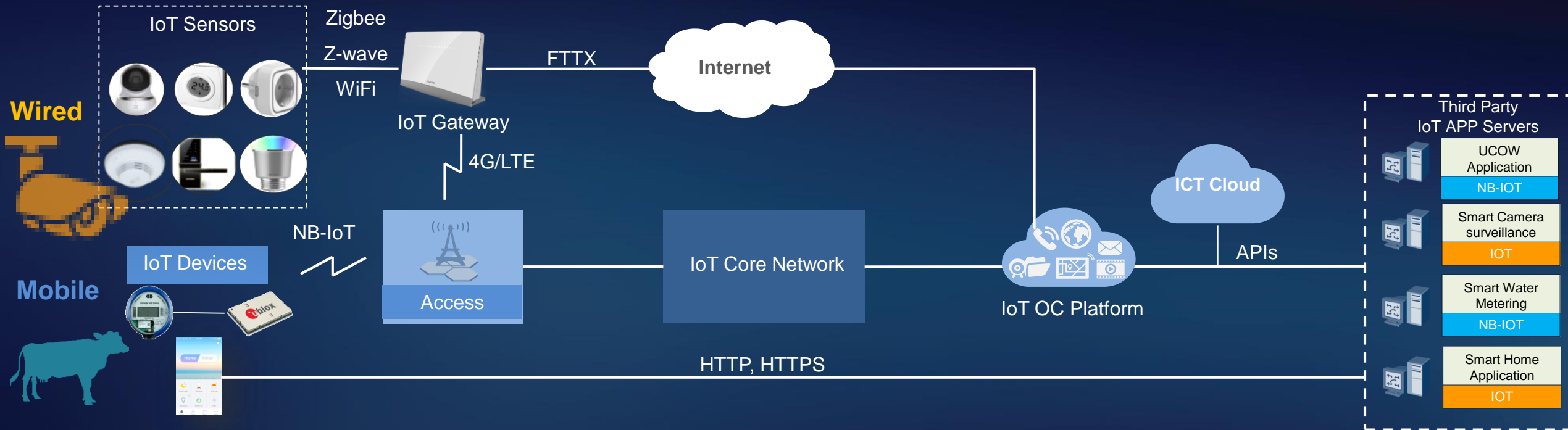
800

GSMA M-IoT
Innovators
Community

IoT is already a Part of Our Cities, Industries And Lives



IoT Connected World



IoT Device

- Devices with IoT capabilities
- NB-IoT devices to support NB-IoT features
- App client to access IoT services

IoT Access

- Wireless
- Fixed

IoT Core

- Packet Core supporting IoT capabilities, such as, NB-IoT, eMTC

IoT Platform

- Connection Management(SIM card、Service signing、Device Management、Data collection、Transmission, etc)
- Service Enabler(Data analysis、Capability openness、app lifecycle management)
- Portal/BSS/OSS

IoT Apps

- Application servers providing IoT services, such as, metering, parking, smart home, etc.

Huawei "3T+1M" Security Frame Safeguards IoT Business



3T_{echnology}



Defend @ Device

- Configurable Defense
- Device & Cloud Collaboration



Assurance @ Pipe

- Massive Reliable Access
- Anti-attack and Dispatch



Analysis @ Cloud

- Malicious Detection & Isolation
- Platform and Data Protection

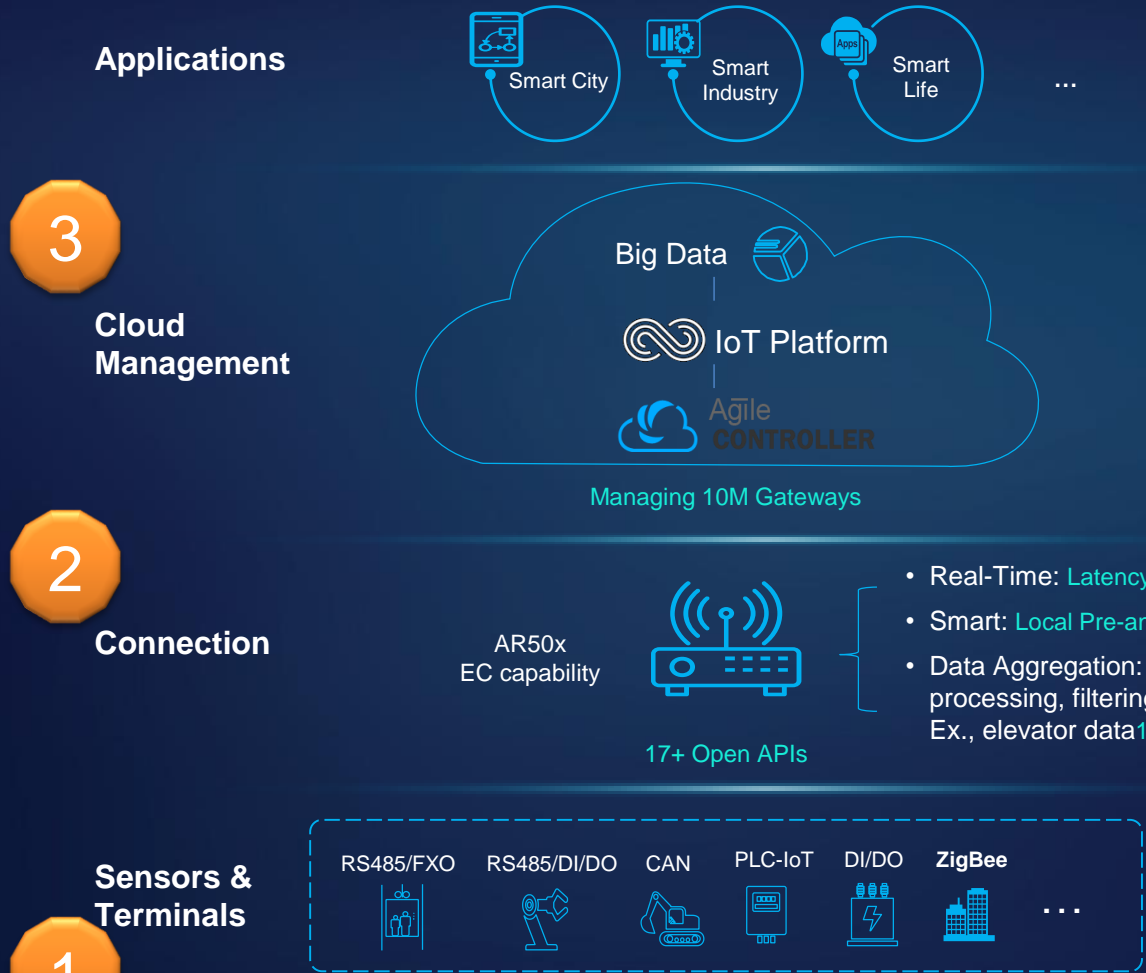
1M_{anagement}



Tools & Procedure

- Security status awareness
- Security inspection tools
- Development guides
- Security test services ...

Huawei IoT: Infrastructure to ensure Demanding Reliability

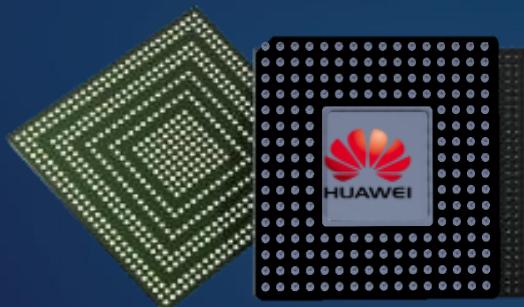


- ### Benefits for Carriers
- More Connections: Enterprise-level -> IoT-Level
 - Service-Oriented Transformation: Connections -> Service
 - Promoted Public Cloud + Big Data Service Revenue: Industry Data & Service Hosting

- ### Benefits for Enterprises
- Predictive Maintenance: Maintenance Costs 50%↓
 - Optimized Quality: Defect Rate 40%↓
 - Operation Reliability: Service Interruption Time 90%↓

Boudica

NB-IoT Chipset



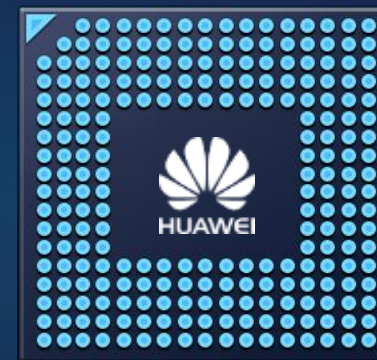
150 MP in April, 2018

- R14 compliant
- US700, APT700, 800, 850, 900, 1800, 2100 MHz
- SOC: BB +RF +PMU + AP + eFlash + SRAM
- Three ARM Cores: AP+CP+SP
- AP Open for 3rd party

MP: Massive Production

Balong

C-V2X Chipset



V2X in 2019Q1

- Single chipset supporting PC5 and Uu
- Up to 1.2Gbps throughput in Uu Interface
- Mode3 and mode4 supported

PC5: Proximity-based Communication 5

Mode 3: Sidelink eNB scheduling mode

Mode 4: Sidelink UE scheduling mode

Huawei LiteOS: Making Devices Smarter



50 million+ shipments

30,000+ community users

13 Top MCU vendors supported

40+ development boards

30+ NB-IoT use cases

• Min 6KB kernel

• uA power consumption

• uS response time

[Smart Connectivity]

- Wi-Fi, BLE, NB-IoT, eMTC, etc.
- CoAP, MQTT, LWM2M
- Optimized auto-networking & self-healing

[Sensor Management]

- Unified management for different types of sensors, plug-and-play

[Security Management]

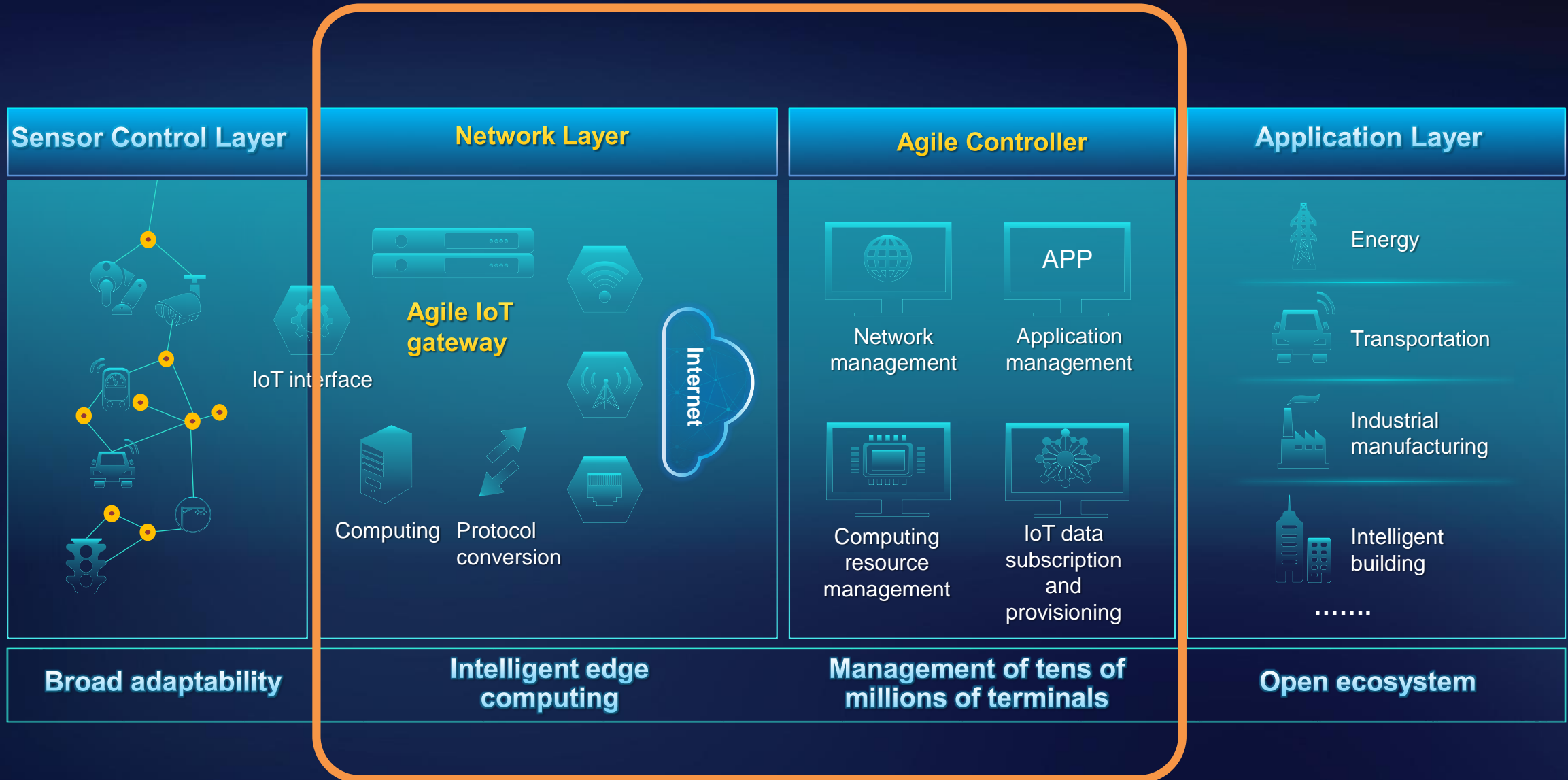
- Device-Cloud collaboration via agent to ensure device security

Example:



- Low-power framework
- BLE, NB-IoT & NFC protocols supported
- High debugging efficiency
- Smart lock development from **months** to **weeks**

Agile IoT Gateway - Solution Architecture



Huawei Edge Computing – IoT Gateways

Adapt to Harsh Industrial Environments



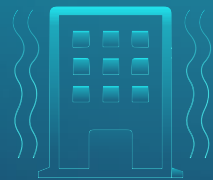
Wide temperature range



Waterproof and dustproof



Anti-electromagnetic interference



Anti-vibration



Compact design



Low power consumption

17 IoT Interfaces



Wired

- FE/GE
- PLC
- RS232/485
- DI/AI/DO/AO
- CANBus
- ...

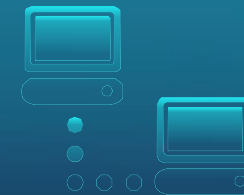


Wireless

- GPRS/3G/LTE
- Wi-Fi
- ZigBee
- RF
- Bluetooth
- GPS
- ...

Adapt to Various Industry Protocols

Complex and various industry protocols



- Meter reading: DLMS
- Power distribution automation: IEC 101/104
- Vehicle control: CANBus
- ...

OceanConnect: Integrated IoT PLATFORM



Smart City | Smart Industry | Smart Life

3rd Party
Cloud Platform

200+ APIs

OceanConnect

Flexible Application Enablement

Converged Device Management

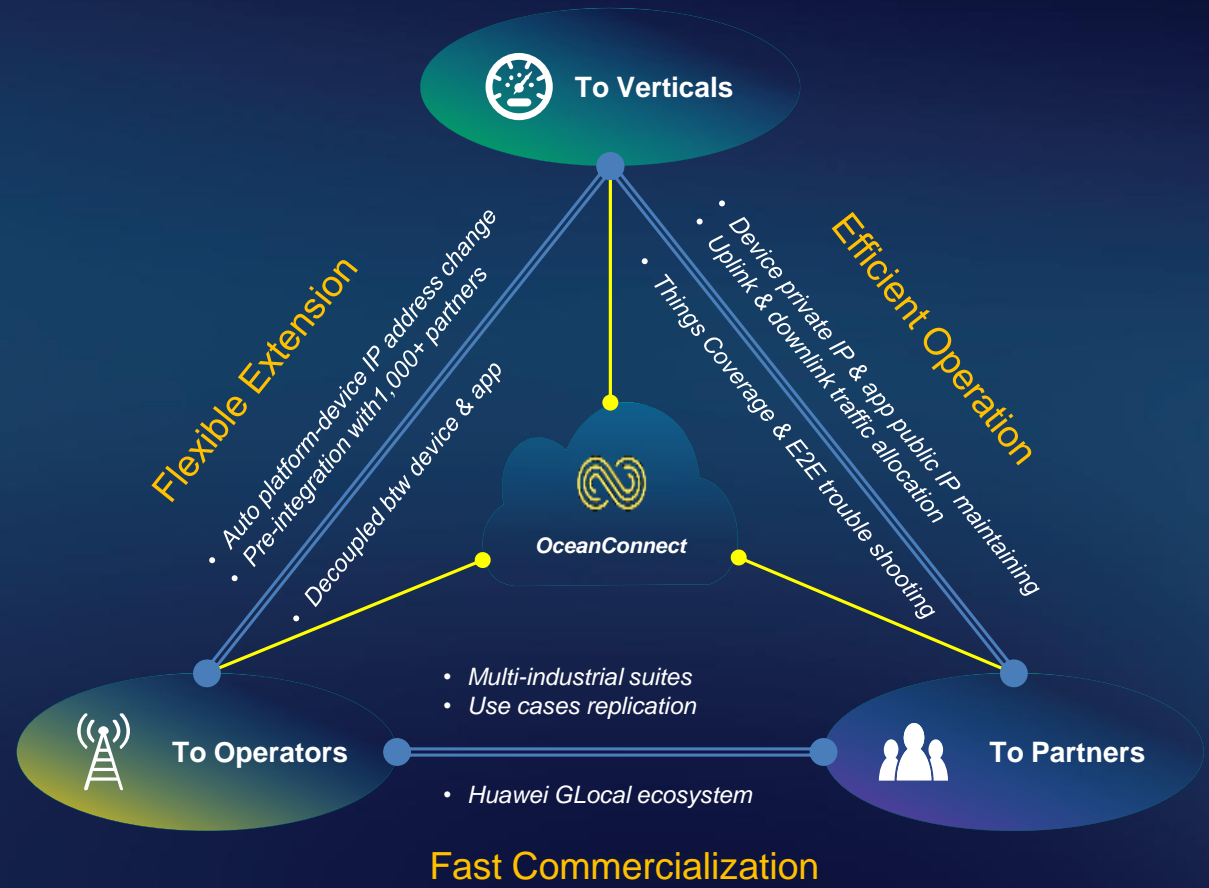
Open Connectivity Management

2/3/4G, FBB

NB-IoT, eMTC, C-V2X



Huawei LiteOS + Chipset + IoT Agent



GLOBAL-LOCAL Ecosystem Empowered 'IoT as a Service'



NB-IoT Forum 1,000+ Members				

22 OpenLabs

Developer Enablement Plan

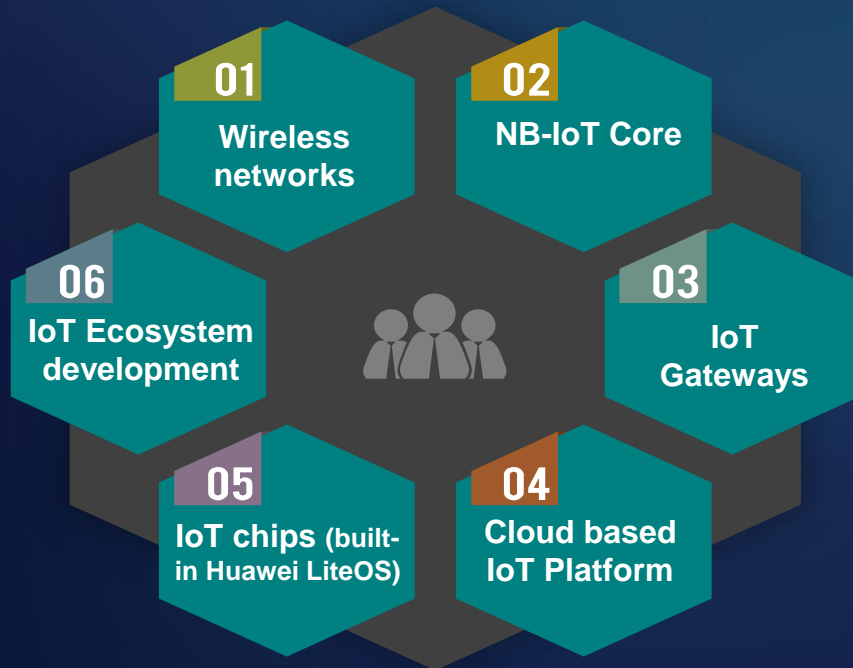
Billion in 5 years

- Innovation Fund Marketing Fund
- Huawei Certification
- Talent Training Development Support

Huawei IoT Offering & Collaboration



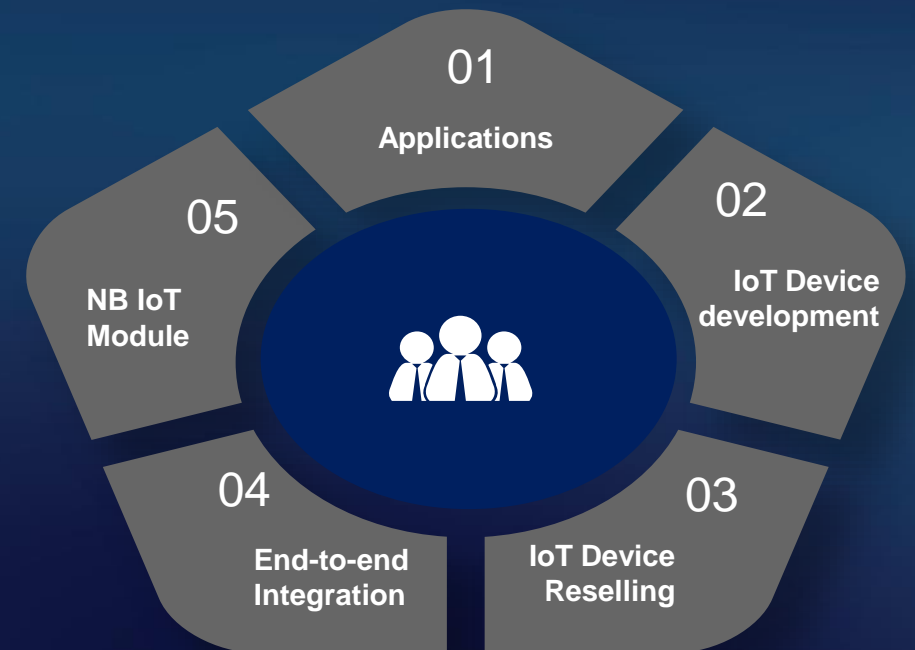
HUAWEI Business scope



Telecom Network Operators



Huawei Partners' Business scope



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CONNECTED FARM



CONNECTED COWs





FROM THE WELLHEAD TO YOUR DOORSTEP



Upstream and Production

Transmission

Power generation

Industrial users

Distribution

Residential and Commercial



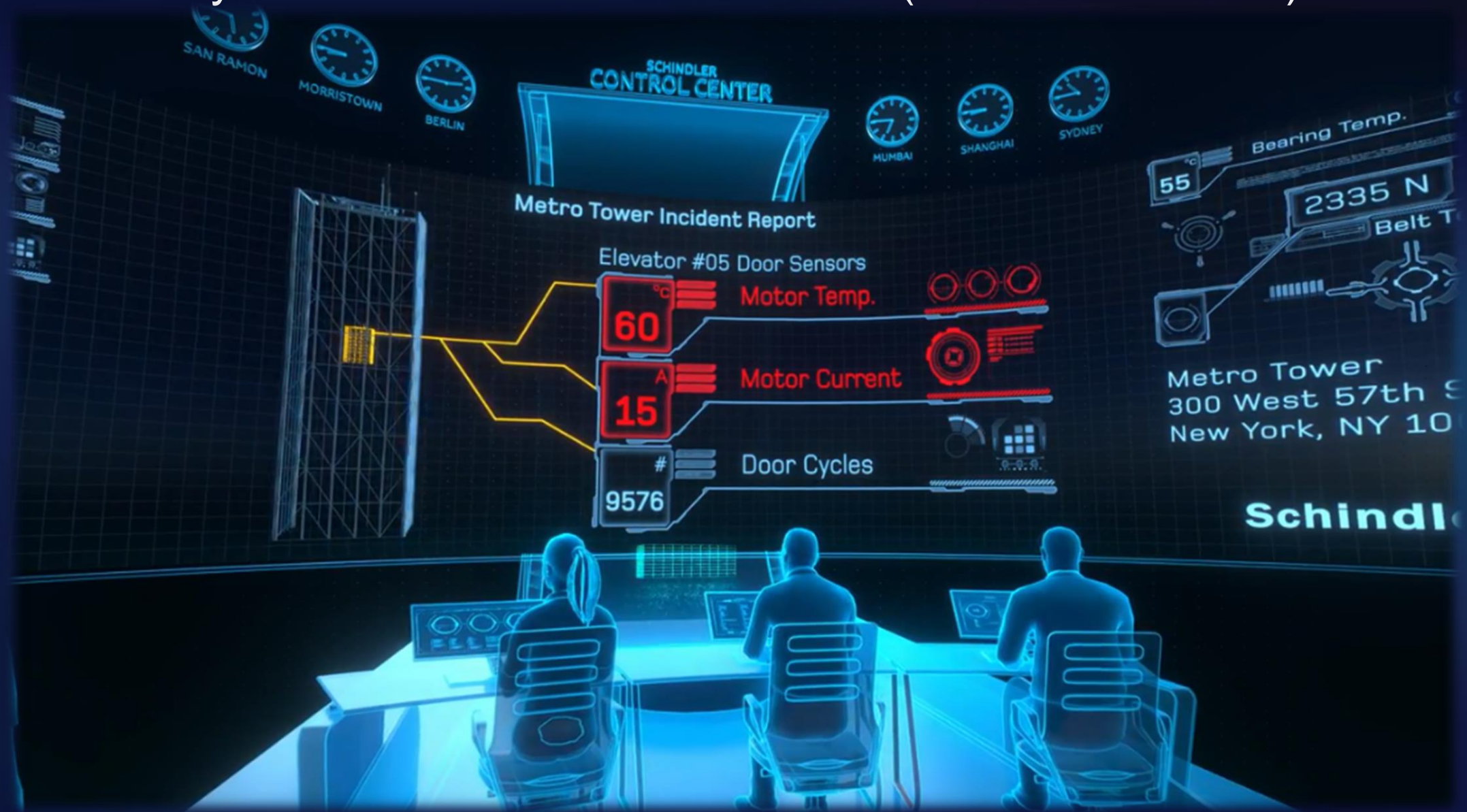
Huawei and Partners Release World's First Operational NB-IoT Electrical Energy Smart Meters in Portugal

Jul 12, 2017

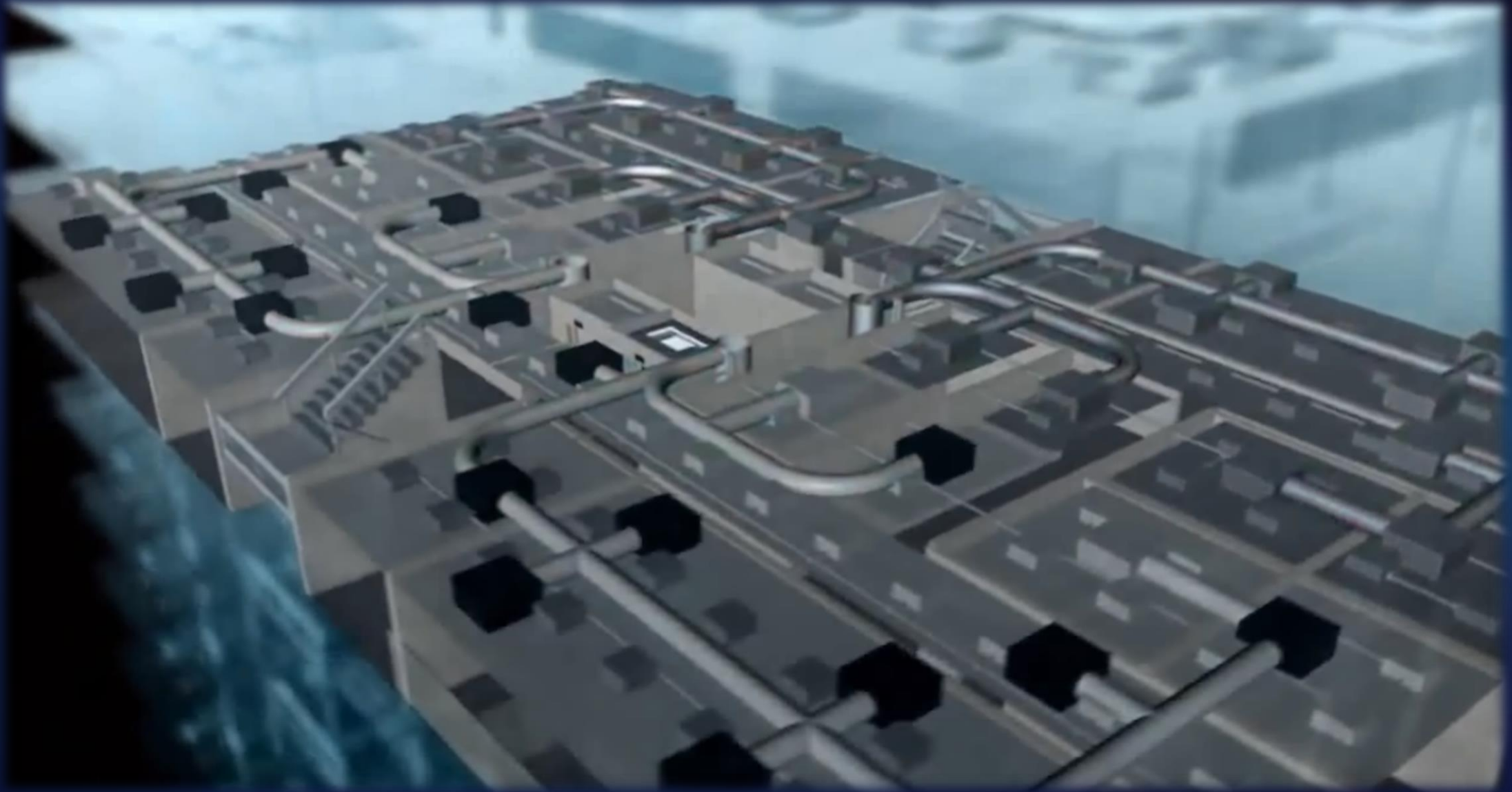


[Lisbon, Portugal, July 12, 2017] Huawei, which has been one of the main contributors towards standardizing NB-IoT technology (4.5G technology), has developed the first NB-IoT Smart Meter in partnership with JANZ CE and u-blox. EDP Distribuição is using this technology for a pilot project as part of the UPGRID project of the Horizon 2020 Program of the European Commission. The infrastructure network using NB-IoT technology has been installed by NOS, based on Huawei's technology. NOS thus becomes the first operator in Portugal to test the 4.5G – IoT technology on its network infrastructure.

Case Study:— internet of smart-elevators (Schindler Ahead)



Case Study: internet of Smart-Buildings (Tiridium)



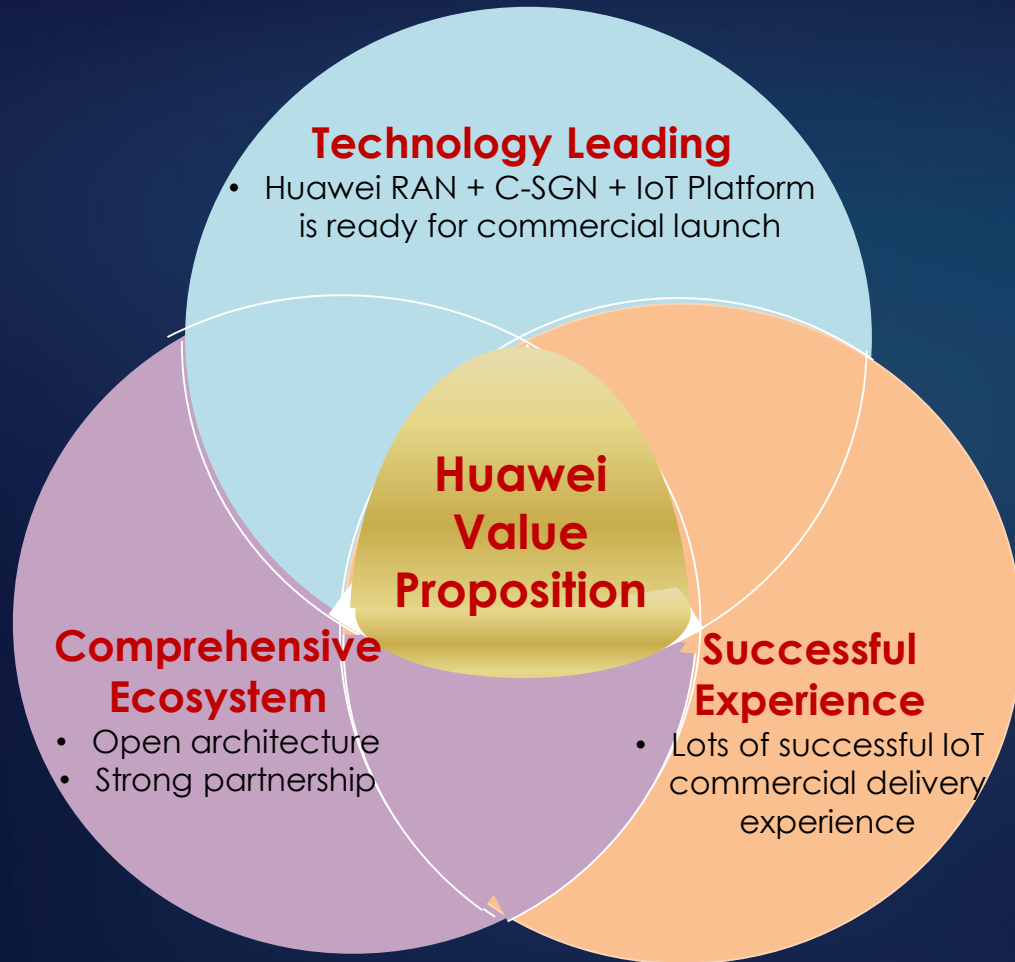
Case Study: internet of Smart-Vehicles (PSA Group)

Huawei Connected Vehicle Solution



In Summary...

Summary - How can Huawei Help



How Huawei Can Help?

Worldwide applications and partners

- Huawei worldwide application and partners are available

Open lab

- Huawei will utilize global OpenLabs to support integration with existing and new partners' application and devices

Marketing support

- Huawei expands local partners network together with Telco operators

Developer community

- Huawei provides comprehensive technical know-how, integration and support

THANKS

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