Internet of Everything, the future is coming

E-surfing Internet of Things Technology Co., Ltd.
June 2019
Digital China, IoE, 5G era, empowering the future

IoT undertakes the historical mission of building digital China

Dec. 2018, the Central Economic Working Conference

“...playing a key role in investment, improving technology transformation and equipment renewal of manufacturing industry, accelerating 5G commercialization, enhancing the construction of new infrastructure such as AI, Industrial Internet, IoT, etc.”

June 2019, 5G license officially released

“...focus on areas such as Industrial Internet, IoT, Connected Car, empowering more vertical industries, and promoting digitization, networking, and intelligent development of all industries.”

2018-2022 China’s IoT Industry Scale (billion RMB)

<table>
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<th>Year</th>
<th>2018</th>
<th>2019E</th>
<th>2020E</th>
<th>2021E</th>
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Source: Foresight Industry Research Institute <China Internet of Things Industry Segment Demand and Investment Opportunity Analysis Report>, 2018.4
Empowering Beijing International Horticultural Expo —— integration of IoT technology and green nature

One-stop professional service

Unified portal  Unified identification  Integrated operation management  Unified decision management

8 intelligent scenarios
7000+ intelligent terminals
Daily average wireless connection success rate >99.5%
Terminal concurrency success rate 100%
Warning success rate 100%

Intelligent street light  Environmental monitoring  Water quality monitoring  Manhole cover monitoring
Intelligent sanitation  Intelligent smoke detecting  Intelligent irrigation

5G Smart Park Integrated Service Solution

Industry Aggregation  Intelligent Service  Ecological Livability

Visualization Intelligent management platform
Smart Metering  Environmental monitoring  Security monitoring  Smart Parking
Smart Network Management  Power Consumption Monitoring  Smart Home  Smart Firefighting

Platform Capability Exposure

International Horticultural Expo ➔ 100,000 communities ➔ Digital China
Empowering Shenzhen Police —— Space-ground integrated three-dimensional police

**Motorcycle patrol**
Face recognition, Billionaire face, second-level recognition

**AR glasses**
Real-time situation control, efficient joint command

**Drone**
Automatic patrol: reducing costs by 80%

**Upstream bandwidth > 100Mbps, Delay: 10ms**

**5G+Cloud**
Safer and more reliable

**Police Station Monitoring Center**
- Video application platform
- Command screen
- Emergency command and control platform
- Has covered 20+ police station

Shenzhen Police ➔ 45,000 Police Station ➔ Digital China
Empowering National New District —— Human-vehicle-road-cloud Cooperative Intelligent Driving

RTK Base station signal, 5G Network communication signal

Bus priority - signal control, green wave pass

Bus-hailing: door-to-door community service

Bus priority - signal control, green wave pass

Remote driving

Digital China

Bus priority - signal control, green wave pass

Cashless bus – face-recognition payment

Smart parking - precise positioning, reverse car search

Smart logistics – multiplex branch line and network-hailing bus, precise path planning

Intelligent scheduling improve travel experience

Getting road signals in the car

Getting road signals in the car

National New District

Intelligent transportation signs

Lidar – No-dead-angle perception
- Dynamic vehicle and pedestrian recognition
- Crash detection and warning
- High-speed processing under complex scenario

HD camera – Omnidirectional positioning
- Auto-driving vehicles, V2X vehicles
- Ordinary vehicles, pedestrian tracking
- Video surveillance and high precision positioning

Connected device – high-speed communication
- LTE-V roadside device
- 5G based roadside and cloud connection
- Channel management and protocol optimization

Remote driving

HD camera – Omnidirectional positioning

Branch bus automatic driving

Lidar – No-dead-angle perception

Cashless bus – face-recognition payment

Intelligent scheduling improve travel experience

Getting road signals in the car

National New District

Remote driving

Digital China
Empowering industries —— joint innovation of 5G IoT applications

20+ provinces

10+ vertical industries

200+ joint trial customers

Xi'an
- Law enforcement
- 5G HD live broadcast

Chengdu
- Smart bus
- Drone traffic control law enforcement

Kunming
- Lake Cui; Haitang Dam, Cloud Village
- 360VR, water quality monitoring

Shenzhen
- Spring Festival Evening
- 4K/VR live broadcast
- Bus automatic driving
- Smart Police

Guangzhou
- CCTV4 HD live broadcast, 5G bus

Hangzhou
- Marathon 4K live broadcast
- 8K live broadcast of West Lake area
- 8K returning of World Swimming Competition

Fuzhou
- CCTV 4K HD live broadcast

Beijing
- Cloud VR of International Horticultural Expo
- 4K VR panoramic live broadcast

Jinan
- Connected car

Nanjing
- Power slicing

Xuzhou
- Automatic driving

Hefei
- Connected car
- VR travelling of Mount Huangshan

Nanchang
- Drone VR live broadcast in Dragon and Tiger Mountain
Consideration of Telecom Operators in 5G IoT era

Customer Requirements

Connection
Ubiquitous→Intensive

Service
Fragmentation→Scale

Data
Wasteland→Goldmine

Ecosystem
Supply chain→Ecosystem

5G era
Thing-cloud
Intelligent connection solution
Smart Park
Smart Police
Smart Transportation
...
Ubiquitous connection, Intensive management

for everything through 2/3/4/5G and non-cellular network

Coordinated development of 4G and 5G.

NB-IoT long-term evolution, overall upgrading to R14

- SA primary, SA/NSA hybrid networking, cross-provincial cross-domain scale trial network
- World’s largest FDD high quality network
  - 1.2+ million base station
  - 80+ million 4G connection
- Connections exceed 27 million
  - 400,000+ base station
  - 98% population
  - Overall upgrading to R14

2G, 3G, 4G, 5G

R13, R14, R15, R16

NB-IoT core part standard completion
NB-IoT enhancement enhancement
NB-IoT enhancement enhancement
Standard completion
Supporting commercial use
LTE-eV2X
5G V2X

CoAP, J808, MQTT, HTTPS

IoT GW

Agent SDK

Water meter
Vehicle terminal
Home GW
Industry access GW

CoAP plug-in
J808 plug-in
MQTT plug-in
HTTPS

Enterprise GW

Agent SDK

HTTPS

Industry protocol, such as Modbus, OPC-UA

Connected Car
Smart Park
Smart Agriculture
Smart Street Light
Sharing Bike
Smart Metering
Platform converges things on a large scale

Fragmented stovepipe development and deployment

App A

Point-to-point closed communication

Low value channel

App B

Point-to-point closed communication

Large-scale development and deployment based on platform

App A

Reduce development difficulty

Reduce operation and maintenance costs

Massive terminal access

Reduce development time

Increase scale efficiency

App B

Cap. M

Convergence

Cap. N

Deposit

Data

Sharing

Application developer: integrating various standardized capabilities based on easy-to-use development and deployment environment, to quickly complete the process of application from concept to commercial use

Terminal provider: the differences between access technology and protocol is eliminated through the packaged terminal development components to quickly realize the connection between terminal and application

IoT open platform offers unified developing/testing/running environment for various industries, solving the problems such as massive terminal access, application development, high cost of operation and maintenance, service fragmentation, etc.
Data operation, showing value

**Massive data transmission**

- Data collection
- Massive data transmission
- Traditional monitoring center
  - Monitoring room
  - Basic video application system
  - Client area network
  - Collection
  - Storage and distribution server
  - Upper level networking

**Data processing**

- Feature extraction
- Model training test

**Massive data transmission**
+ data storage
+ Intelligent analytics

**Application**

- Face detection and recognition
- Pedestrian detection and monitoring
- Vehicle recognition

**Huge volume of data**

- Video Cloud
  - City video gathering cloud
  - Cost-effective cloud storage

- Video cloud
  - Face recognition
  - Integrated management system
  - Urban video smart application cloud
  - Video dedicated network
  - Video scheduling

**Huge value of data**
From chain to circle, building a win-win ecosystem

**Smart gas 1.0**
Channel level
CT era

- 2017
- First large-scale NB-IoT national gas project

**Smart gas 2.0**
Platform level
IT era

- 2018
- Cloud infrastructure, line and application

**Smart gas 3.0**
Data level
DT era

- 2019
- Cloud, security + gas
- Big data + gas

Use case: Wuhan smart gas
Together with E-surfing IoT, making a better future!