Broadband Development Status and Trend in China

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2018.11

Outline

Background

Broandband Development Status & Trend

Summary

Broadband application promotes information consumption in China
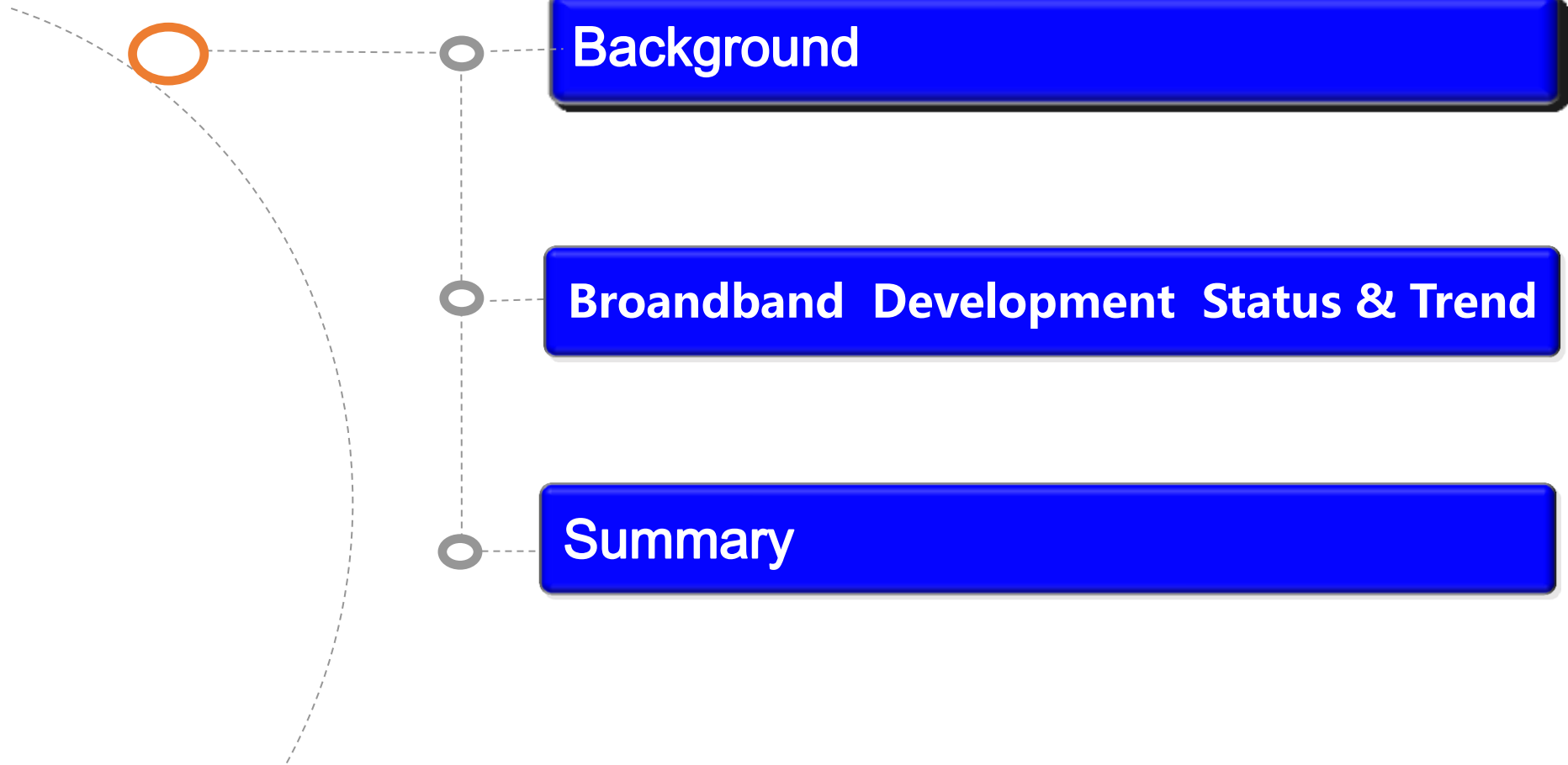
Mobile Internet application innovation is active, traffic consumption explosive growth

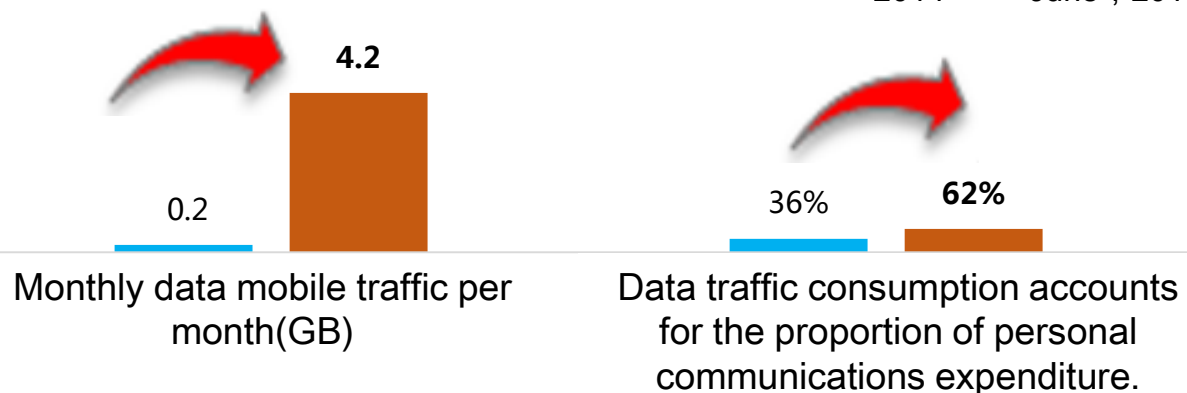✓ New modes of mobile Internet applications are emerging and thriving

Mobile Apps quantity more than **4.21 millions**

App downloads cumulative more than **1.38 trillion**

✓ The proportion of data traffic consumption to household communication expenditure in China has increased from **36% in 2014** to **62%** in June 2018.

■ 2014 **■** June，2018

4.2

0.2

Monthly data mobile traffic per month(GB)

36% **62%**

Data traffic consumption accounts for the proportion of personal communications expenditure.

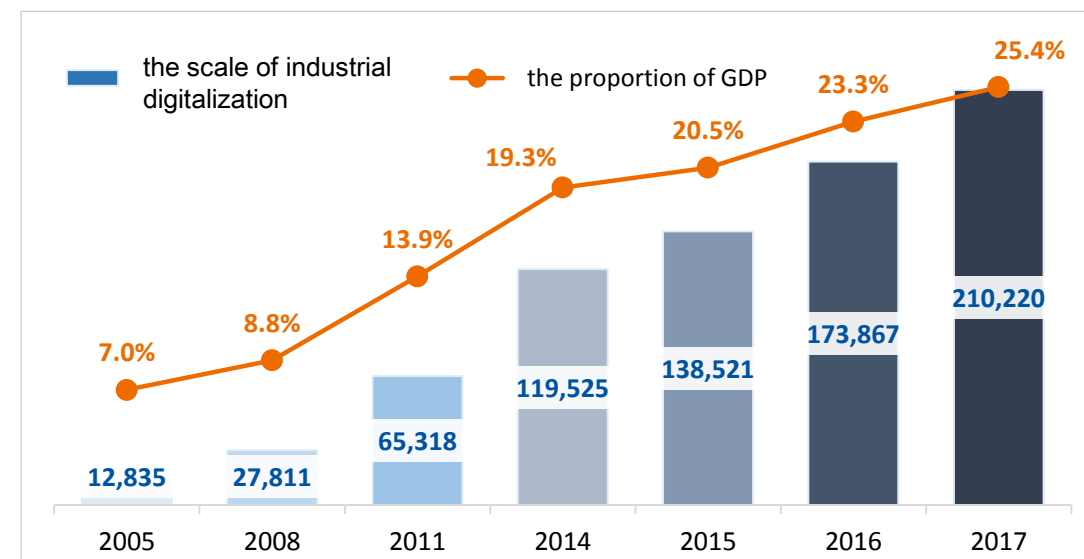## Broadband application promotes information consumption expansion

✓ In the first half of 2018, mobile payment scale was **133.7 trillion yuan**, an increase of **33%** over the same period. Information consumption scale was **2.3 trillion yuan**, an increase of **15%** over the same period, which was 2.2 times the growth rate of GDP in the same period.

✓ In 2017, the scale of industrial digitalization was **21 trillion yuan**, a year-on-year increase of **20.9%,** and the proportion of GDP increased **from 7% in 2005 to 25.4% in 2017**.

■ the scale of industrial digitalization **—●—** the proportion of GDP

7.0%	8.8%	13.9%

19.3% 20.5% 23.3% **25.4%**

12,835 27,811 65,318 119,525 138,521 173,867 210,220

2005 2008 2011 2014 2015 2016 2017

Source: CAICT

China fixed broadband enter into optical fiber Era

- ✓ Fixed broadband users reach **0.378 billions in 2017**， the popularity rate increased to **27.2%**， and the gap with OECD is decreased obviously。
- ✓ Fiber broadband users reach **0.328 billions in 2017,** account for **86.8%,**.and higher than that of other major countries
- ✓ **Entering into optical fiber age .** Covering more than **96%** of the administrative villages in the country, the optical fiber port has increased to **86.3%**
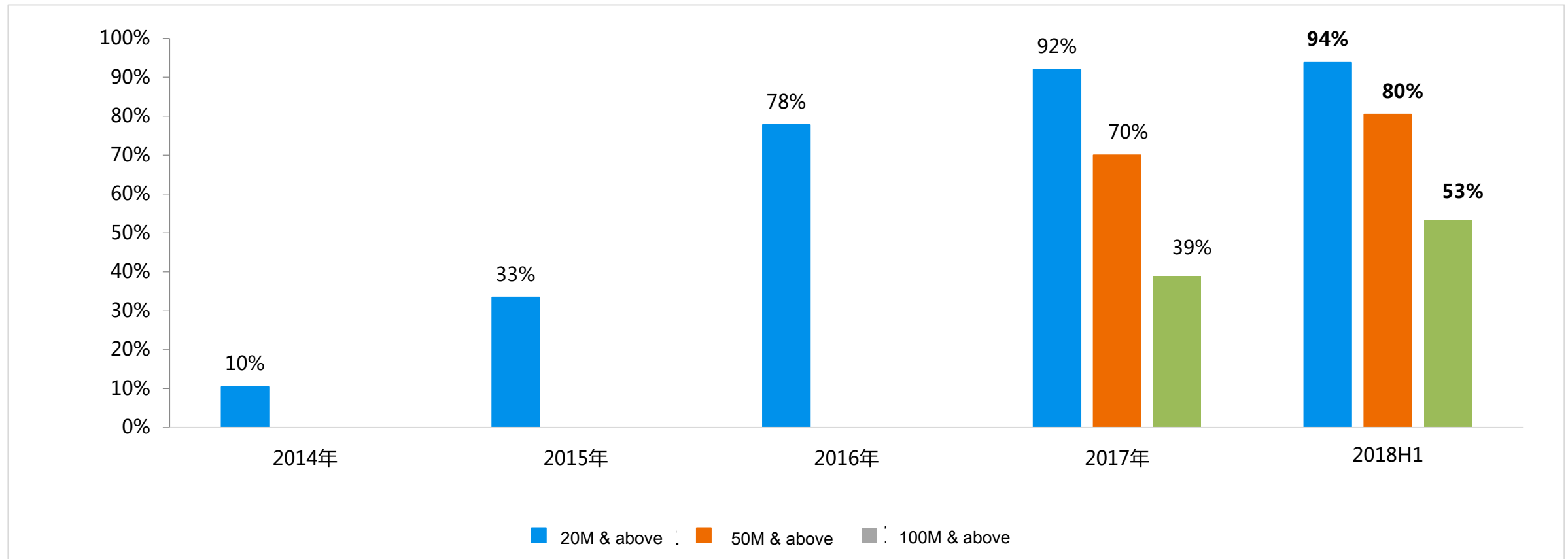

Organization for Economic Co-operation and Development（OECD）
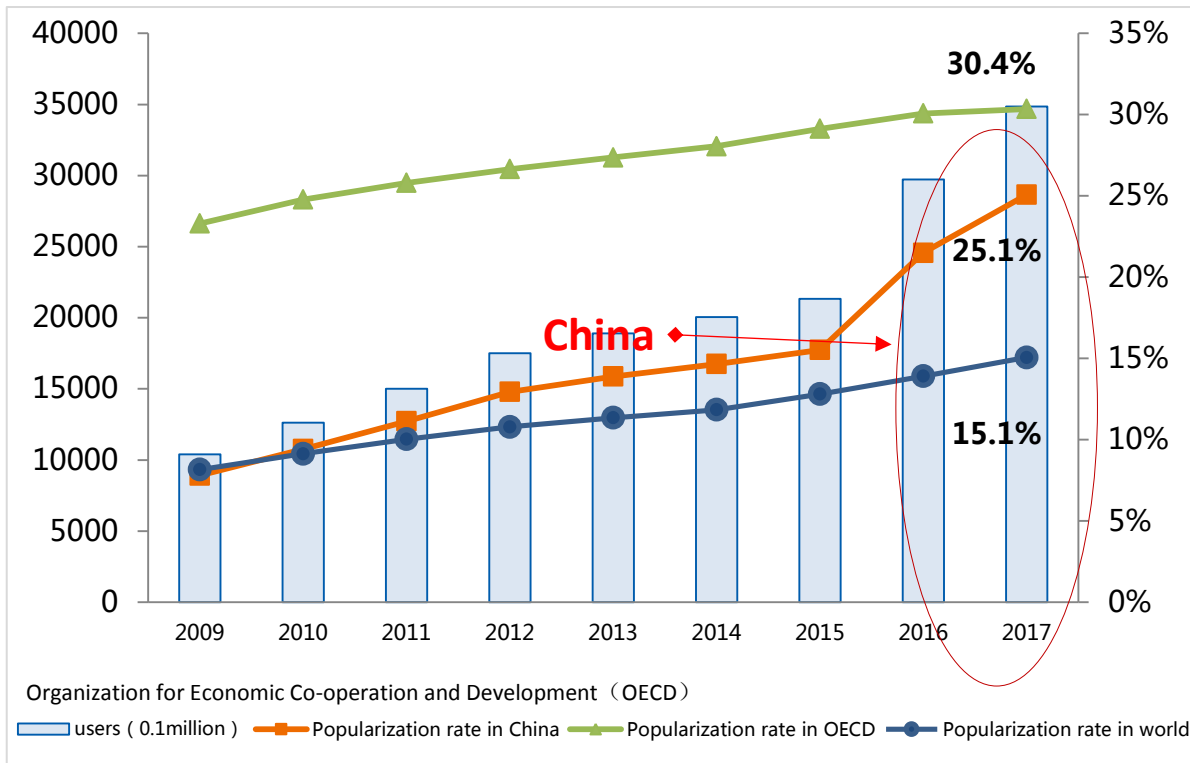
Source：MIIT, China；、OECD、Point Topic

Fixed broadband user status
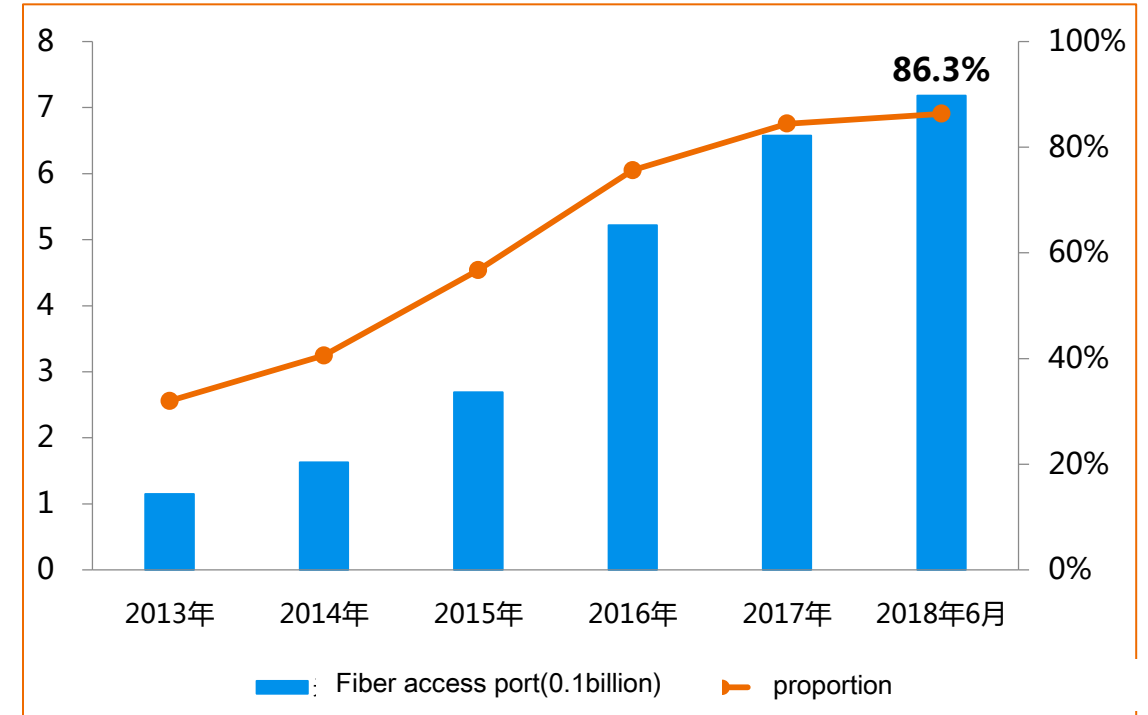
Fiber ports and penetration rate status in China

Fixed broadband access speed enters into 100M Era

✓ The access rate of 100Mbps and above reached 200 million households, accounting for **53.3%.**

Proportion of China's 20Mbps, 50Mbps, 100Mbps and above broadband users

Legend:
- 20M & above
- 50M & above
- 100M & above

Data points:
- 2014年: 10%
- 2015年: 33%
- 2016年: 78%
- 2017年: 92%, 70%, 39%
- 2018H1: 94%, 80%, 53%

Source:MIIT,China

# Mobile broadband subscribers and networks status

- ✓ China has **1.1 billion** 4G users **and 73.5%** penetration, ranking the **top five** in the world, far higher than the average level of OECD countries and the world.

- ✓ The 4G network has largest scale in the world., **3 million 464 thousand 4G base stations** were built, accounting for 55.6% of the total number of mobile base stations in China.

4G user penetration rate

Status of 3G/4G base stations in China

IEEE 802.3 NEA AD HOC - BWA2 - IEEE 802.3 NOV. 2018 Plenary Bangkok, Thailand
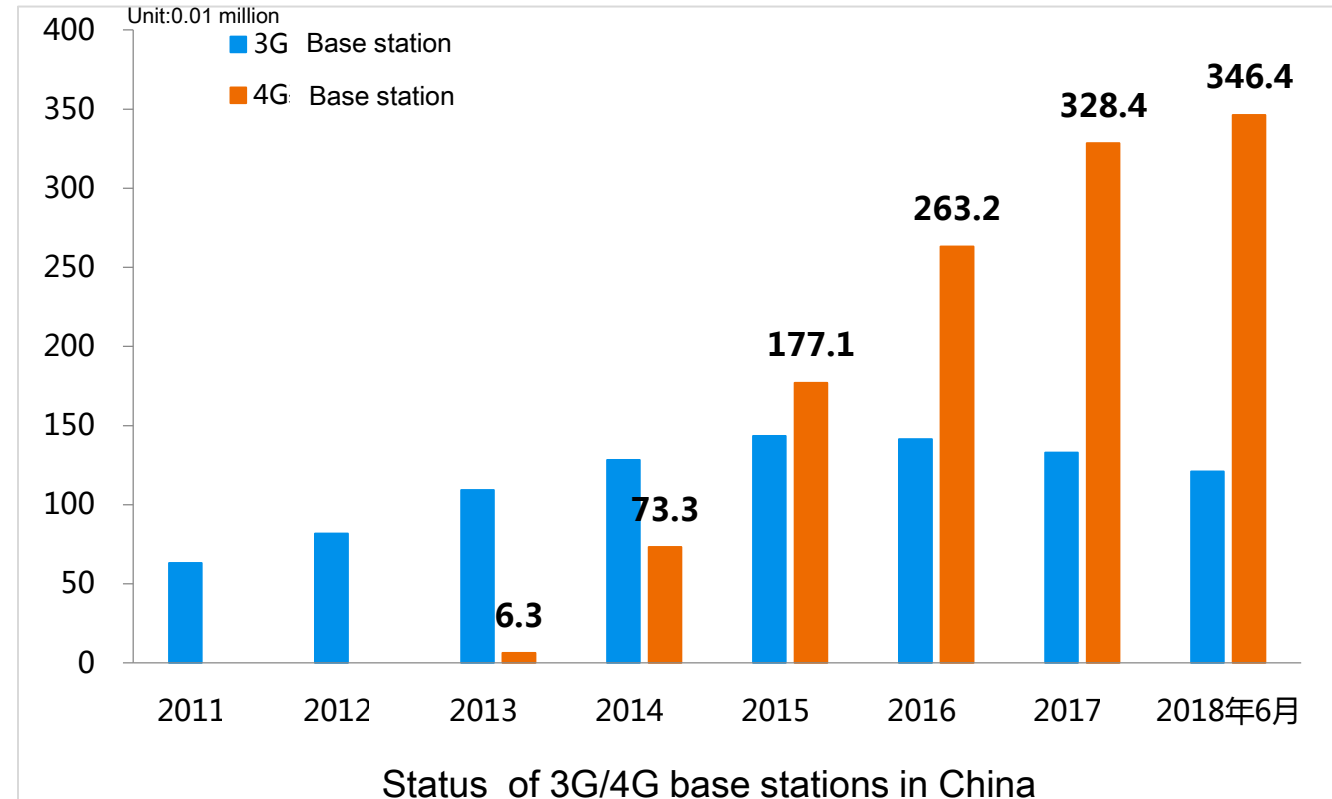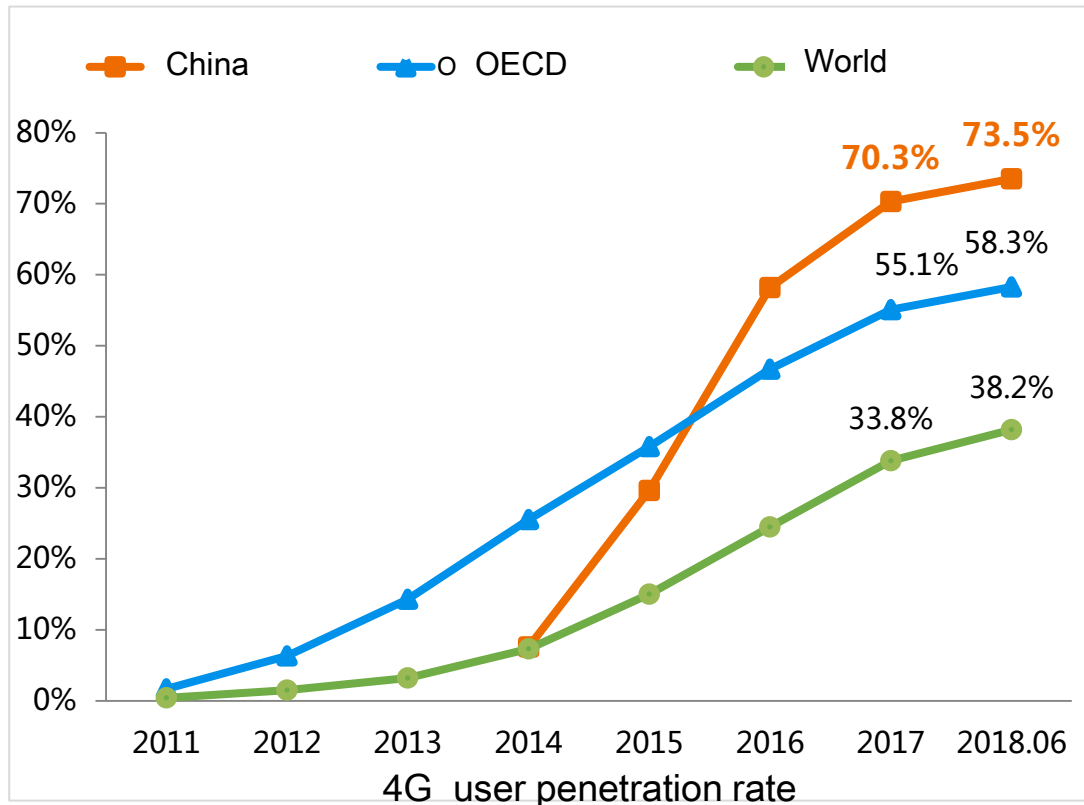
Users download rate significantly improved

- ✓ The actual average available download rate for **fixed broadband is 21.31 Mbps**, 3.5 times the amount of 2015.
- ✓ The average download rate **20.22Mbps** of 4G network access to the Internet is 1.7 times that of the fourth quarter of 2016.
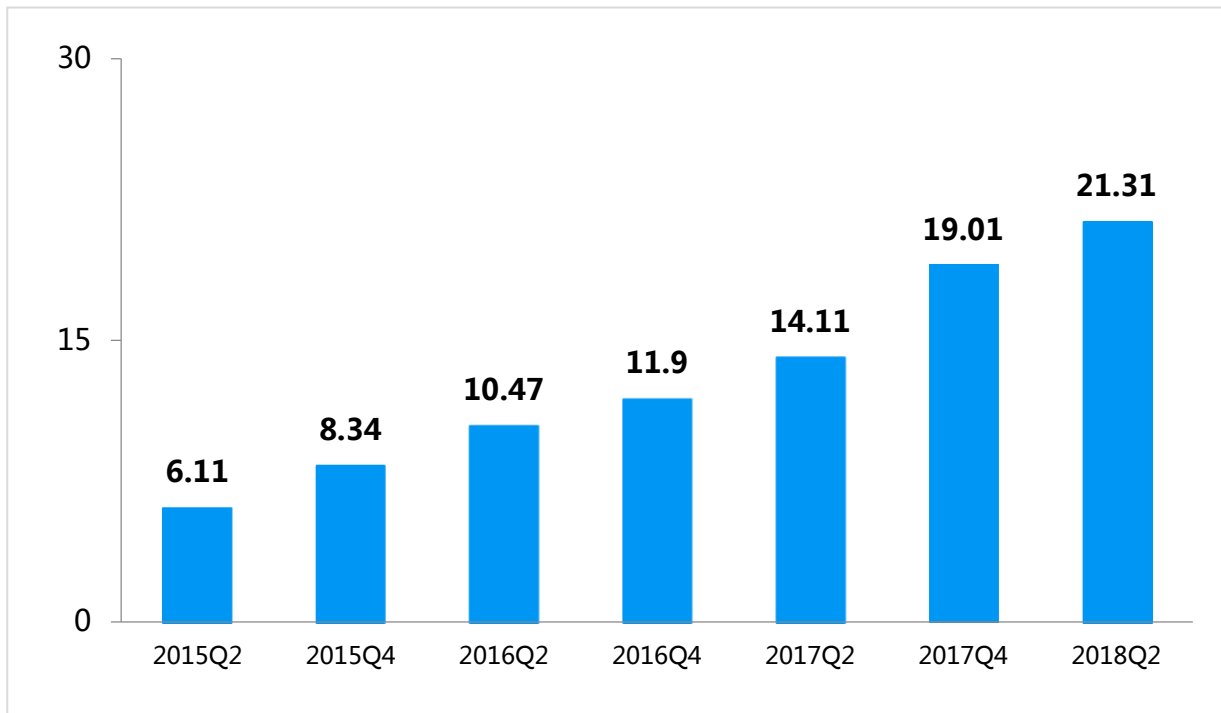
The average available download rate of fixed broadband users in China (Mbps)
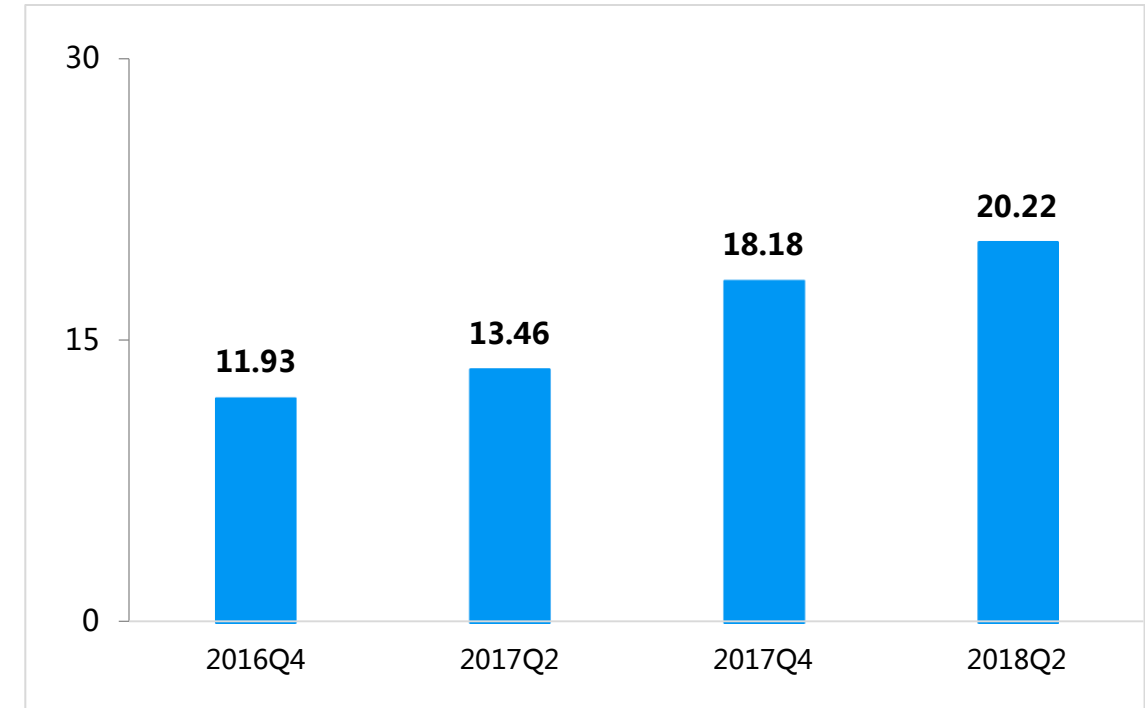
Average download rate of 4G users in China (Mbps)

Source : Broadband Development Alliance（BDA）

6

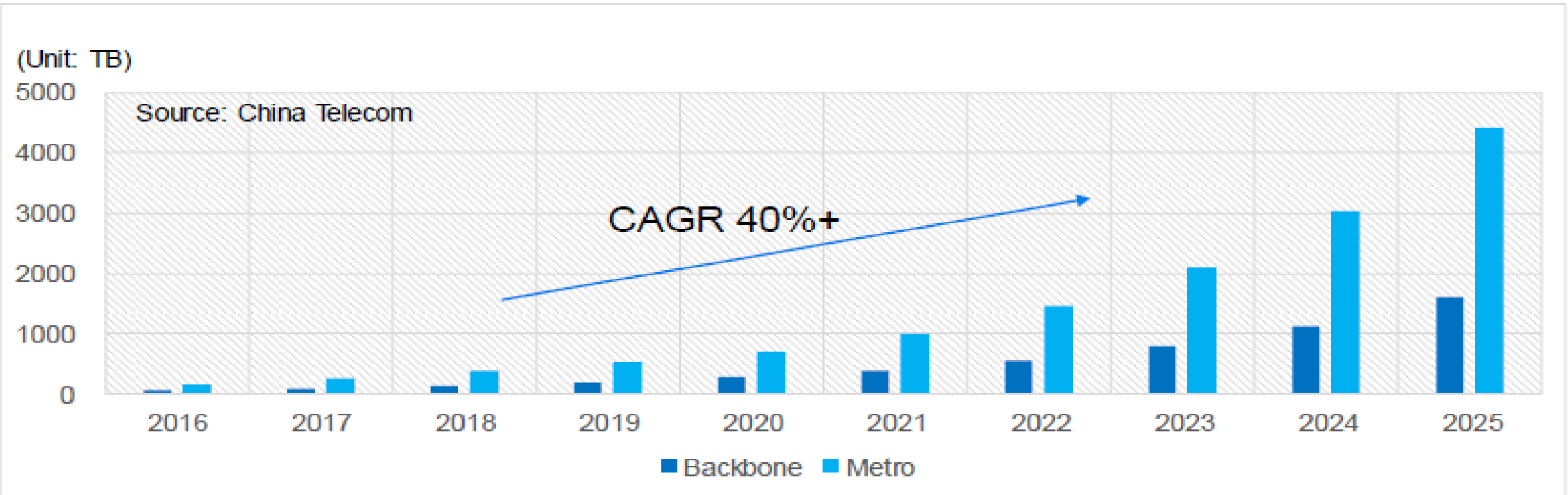# Backbone traffic keeps rapid and steady growth in China

- ✓ Backbone traffic keeps rapid and steady growth in China in recent several years.

- ✓ The predicted traffic data growth CAGR rate of China Telecom reached **40%**, China mobile and China Unicom have the similar rate.

- ✓ By the end of 2025, the traffic bandwidth will increase with **11** times!

(Unit: TB)

Source: China Telecom

CAGR 40%+

■ Backbone ■ Metro

The predicted traffic data on China Tlecom's network

Source : CTC,,,CM,CUC

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5G transport requires new features

- ✓ It is estimated that in 2020, telecom operators will invest more than 220 billion yuan in 5G network equipment,China's 5G market continued to grow in the next 10 years
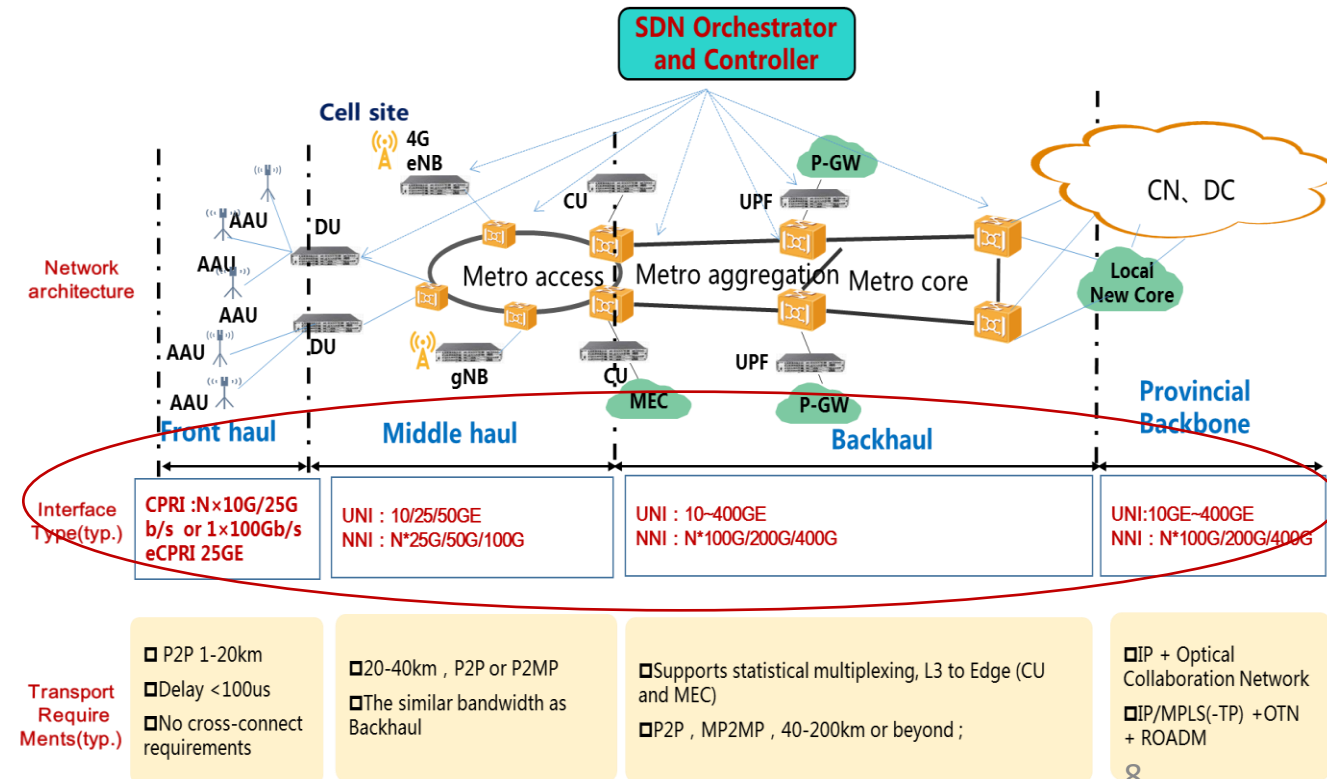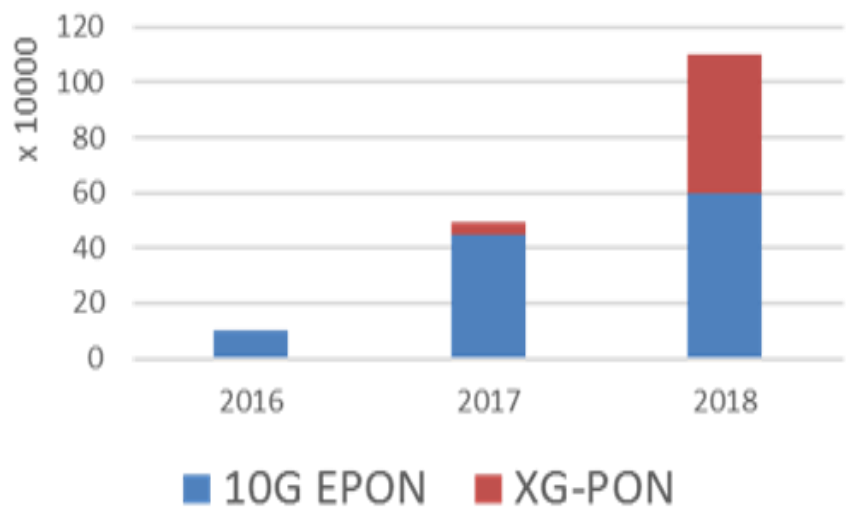- ✓ In 2030, it is estimated that the expenditure on 5G equipment in various industries will exceed 520 billion yuan, accounting for nearly 69% of the total revenue of equipment manufacturing enterprises
- ✓ 5G transport requires many new features, and a variety of new high-capacity port applications appear

(Unit: 100 million)

Operators' network device expenditure

Industry's 5G device expenditure

Source : CAICT

Network architecture

Cell site — 4G eNB, AAU, DU, gNB, CU, DU, CU, MEC, P-GW, UPF, P-GW, UPF, Metro access, Metro aggregation, Metro core, CN、DC, Local New Core, SDN Orchestrator and Controller

Front haul | Middle haul | Backhaul | Provincial Backbone

Interface Type(typ.)

Front haul	Middle haul	Backhaul	Provincial Backbone
CPRI :N×10G/25G b/s or 1×100Gb/s eCPRI 25GE	UNI : 10/25/50GE NNI : N*25G/50G/100G	UNI : 10~400GE NNI : N*100G/200G/400G	UNI:10GE~400GE NNI : N*100G/200G/400G

Transport Require Ments(typ.)

❑ P2P 1-20km ❑Delay <100us ❑No cross-connect requirements	❑20-40km , P2P or P2MP ❑The similar bandwidth as Backhaul	❑Supports statistical multiplexing, L3 to Edge (CU and MEC) ❑P2P , MP2MP , 40-200km or beyond ;	❑IP + Optical Collaboration Network ❑IP/MPLS(-TP) +OTN + ROADM

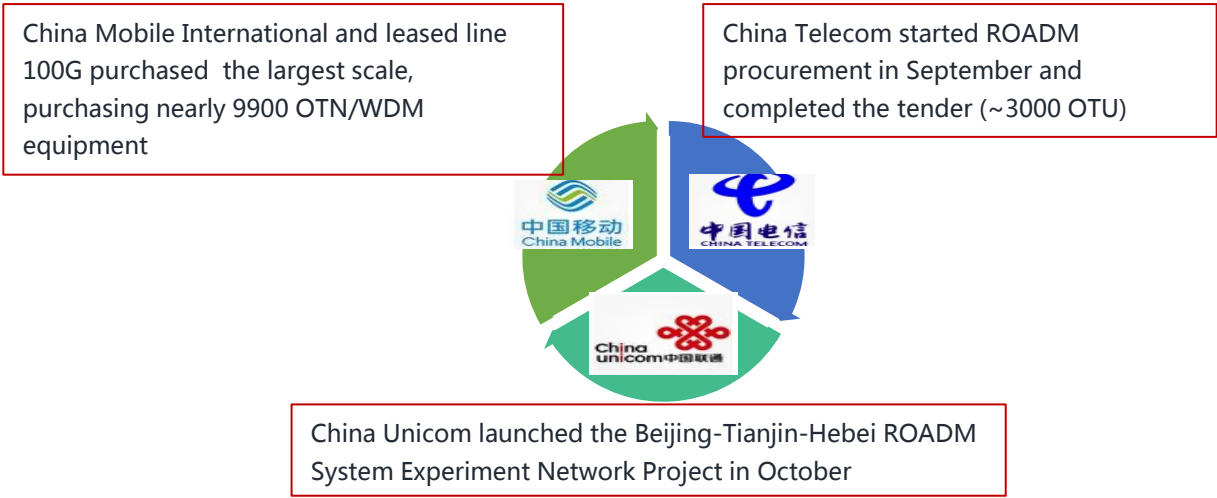# Follow-up China will continue to deploy higher speed network technology

✓ For the access network, the number of **10G PON** OLT ports collected has increased steadily in the past three years, and **Gigabit access trial application** was gradually developed, and the scale of subsequent applications will gradually expand.

✓ For the metro core & backbone, In the past five years, the **100G rate** has become the dominant rate for high-speed transmission, and the cumulative purchase volume per year has accumulated tens of thousands of pieces.

✓ In recent years, **200G and 400G** WDM/OTN technologies have been gradually evaluated in the field , and it is expected to gradually step into scale application from 2019~2022.

Number of 10G PON OLT ports collected in the past three years(Operator X)

Source : CAICT

China Mobile International and leased line 100G purchased the largest scale, purchasing nearly 9900 OTN/WDM equipment

China Telecom started ROADM procurement in September and completed the tender (~3000 OTU)

China Unicom launched the Beijing-Tianjin-Hebei ROADM System Experiment Network Project in October

China operators 100G OTN and ROADM deployment in 2018

9

Summary

1. Broadband application promotes information consumption in China, the data traffic consumption become the major household communication expenditure.

2. China fixed broadband enter into optical fiber era, and access bitrate increases to 100M

3. For both fixed and mobile broadband application, users download rate significantly improved in recent years.

4. Backbone traffic keeps rapid and steady growth with about CAGR 40% in China.5G transport requires many new features, and a variety of new high-capacity port applications appear.

5. Follow-up China will continue to deploy higher speed network technology.