Industry

Technologies

Cases

ZTE Executive

ZTE

Big Broadband

Bright Future

Michael Song
Vice President
Fixed & Multimedia Product Line
ZTE

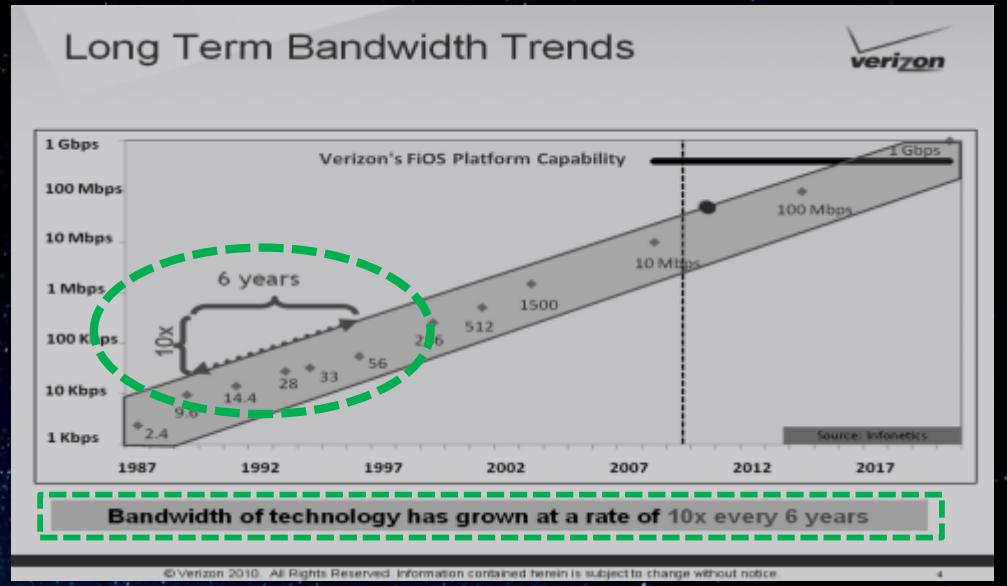
Permanent Theme: the "Seven-Year-Itch" of FBB

Technology

Policy

Service

Competition



Immersive media, online gaming,5G and AI, etc will have strong growth

Bandwidth rate has been increasing tenfold every five to seven years since 1987.

Development milestone of China Telecom

1994	2001	2008	2012-2015	2018-2020
56K	512K-1M	2M-8M	8M-100M	200M-1G

Fixed Broadband is the Key Infrastructure for Future

ZTE

- Strategy 2020, Triple Play, 100% coverage
- FCC:100M for 100% Coverage before 2020
- Connect rural areas with BB connectivity
- 50M, 75% 2014;2018 100%
- 7.2 Billion USD Credit to 100% coverage
- Digital UK, 100% BB coverage till 2012

- NBN, 12M above, 90% with 100M, FTTH
- Cover 25 cities up to 75% population
- i-Japan Strategy 2015,in excess of 100Mbps
- KII-P/G/T, U-Korea, FTTH 2010
- HSBB, 10M above
- iN 2015, 100M-1G

Incumbent	Mobile operators	Emerging operators	MSO/ISP
TIM, BT, China Telecom, orange, Singtel, NTT	vodafone, América Móvil, MTN, China Mobile, Viettel, AIS	MÁSMÓVIL, rds rcs, So·net, true, NetCologne	Liberty Global, Cablevisión, euskaltel, Videotron, comcast

Digital Agenda for Europe (DAE) targets:

- **100%** of population be covered by broadband above **30 Mbps** by 2020
- **50%** of population to subscribe to broadband above **100 Mbps** by 2020
- The full implementation thereof is expected to contribute to the increase of the EU GDP by **5%** and to the creation of **3.8 million** new jobs

Gigabit Broadband Era is Coming with aid from 10 GPON Technology

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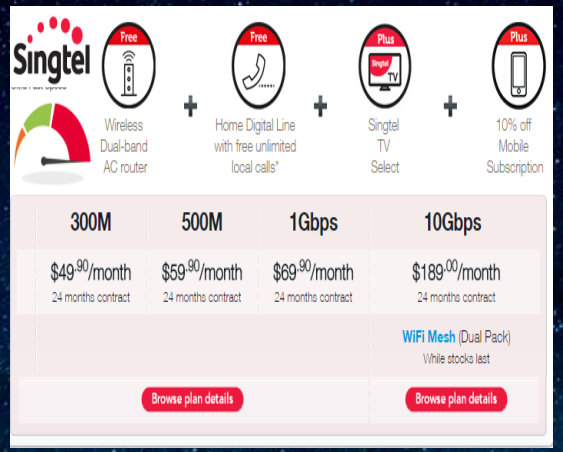
1000M+ in 100 China Cities

1000M+ in Orange Spain

1000M+ in Japan & Korea

1000M+ in Italia



1000M+ in Singapore

1000M+ in France

10GPON technology is matured, and ZTE has achieved shipment more than **1M 10GPON ports**.

Great Development is achieved with "Broadband China" Strategy

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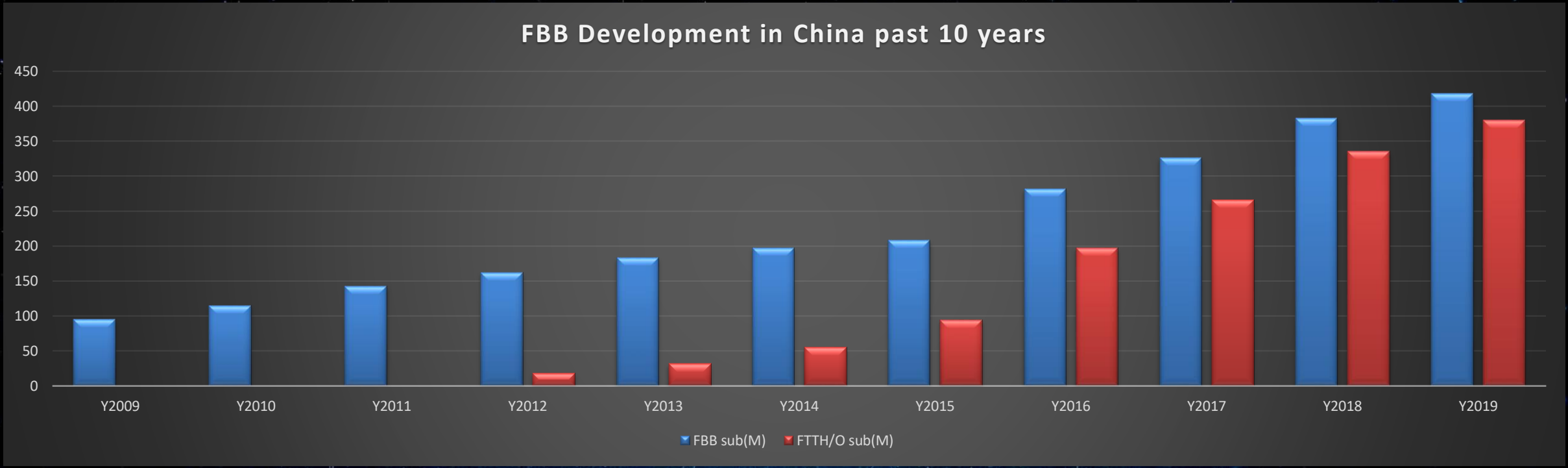
Source: Ministry of Industry and Information, China



Mainstream BW → <8M → 8M → 20M → 50M → 100/200M → 1000M

- In the past 10 years, FBB sub has increased **from 95M to 418M** in China. In the same duration, FTTH/O ratio has reached **90.9%** in Y2019.
- With the main stream FBB developed from 8M to **200M** while the **1000M** FTTH service has started.
- China Mobile 157m (in 4 years), China Telecom 146m, China Unicom 81m.

Key Words of NG Platform: Future-Proof, Convergence, Virtualization

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Traditional OLTs

GPON

XG(S)-PON

TITAN

GPON

Combo PON

XG(S)-PON

50G-PON

WDM-PON

50G-PON

P2P

Universal Computing & Storage

GPON to 50G-PON

- Simplified migration: GPON>XG(S)-PON>50G-PON
- Industry's 1st 16-port Combo PON

FMC

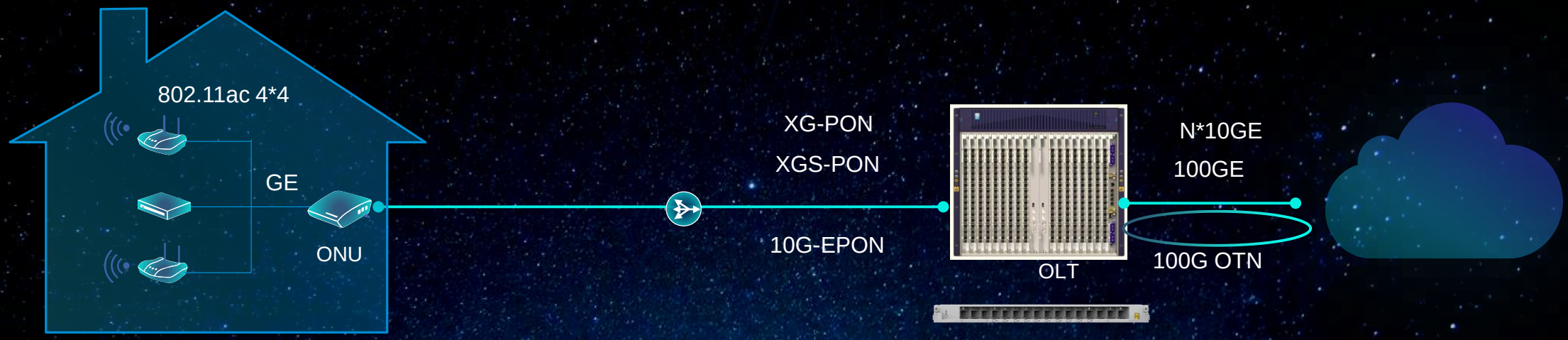
- Saving trunk fibers in high-density residential areas

MEC

- Light Cloud: Access CDN & vSTB

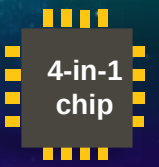
A Big Step Forward for Speed: XG(S)-PON is Ready for Rollout

1 Giga @Home | 10 Giga @Access | 100 Giga @Aggregation



GE Connection @Home | 10Giga for Access Network | 100G uplink for Aggregation

- **Innovative 4-in-1 ASIC chip** provides programmable capability and its power consumption is 50% lower than CoC V5.0
- ZTE 10G PON with TITAN has been **largely commercial used** in China Telecom
- The accumulative shipment of ZTE 10G PON is now more than **1.3 Millions PON ports**



Combo PON Helps a Smooth Migration to 10G PON

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Compatible with the 16-port GPON for smoothly upgrading to 10G PON.

16 ports XG(S)-PON & GPON Combo

3-rate Combo PON

ZTE Combo PON solution won the "**Total Telecom Innovation Award**" at the World Communication Awards (WCA) in London, UK.

Benefits

45K Ports

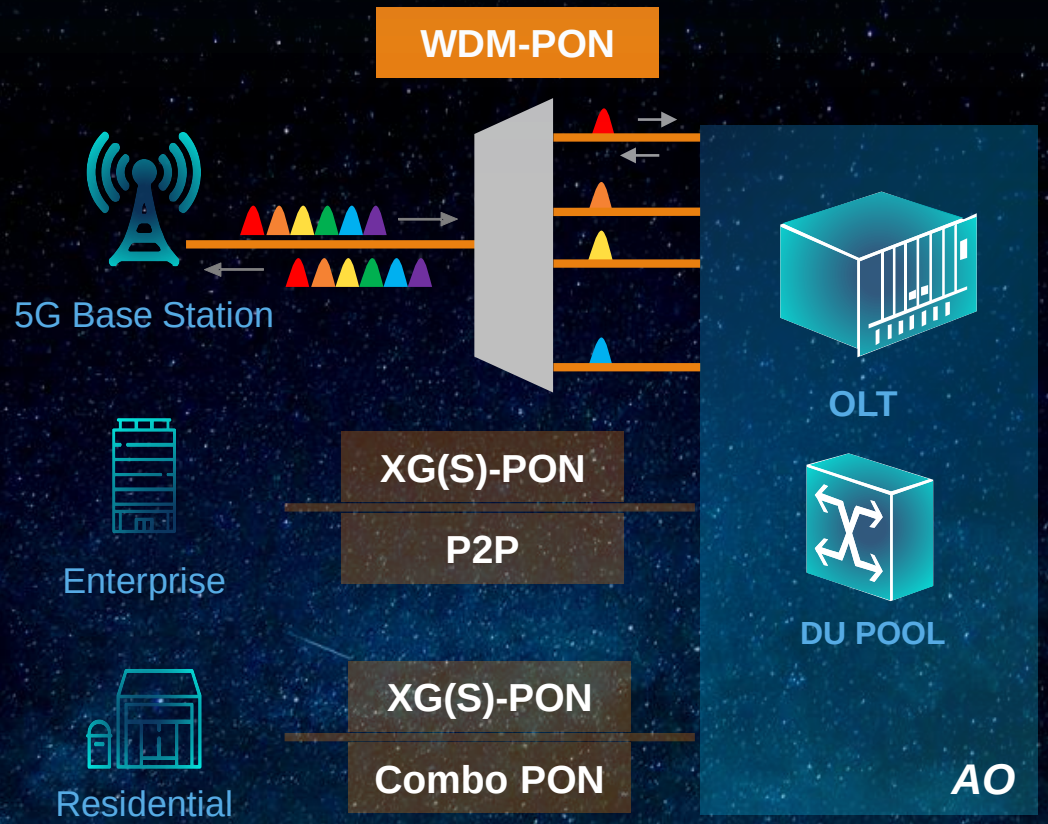
- **Less room spaces:**
  No Need for external WDM1r with 10G PON OLT
- **Reduce 1.5 dB insertion loss:**
  Increase enough optical power margin
- **Simplify fiber routing:**
  Reorganizes the ODF fiber routing
- **Easy management:**
  Unify two sets of Management of GPON and 10G PON

Drive Network Convergence to Create More Opportunity

- 5G fronthaul + FTTH share ODN, saving trunk fiber and meet the latency requirement for 5G fronthual
- TDM-like channel meets uRLLC requirements

WDM-PON Technology is Verified for 5G Fronthaul

Dec 2018,with China Telecom, ZTE completes the industry's **first 5G fronthaul** verification based on **N×25G WDM-PON** in Suzhou.



Trunk fiber-saving

90%+ Less

Bare-fiber connect

Qualified low delay

Trans

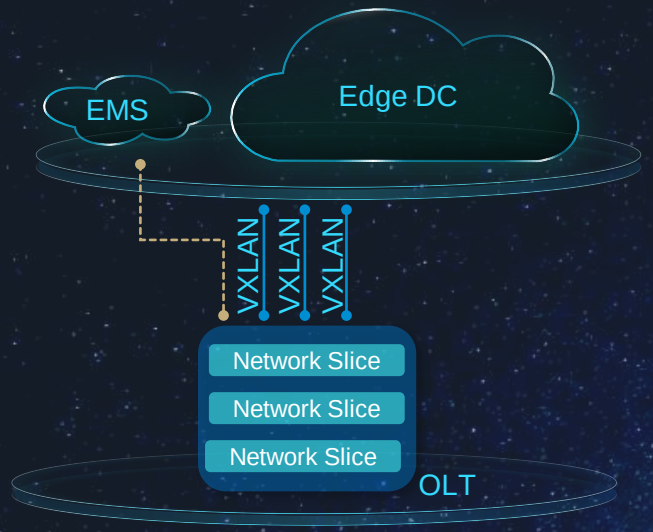
59% Less

Allowed fronthaul delay (100 μs)

Sharing ODN Resources in FTTH high density area

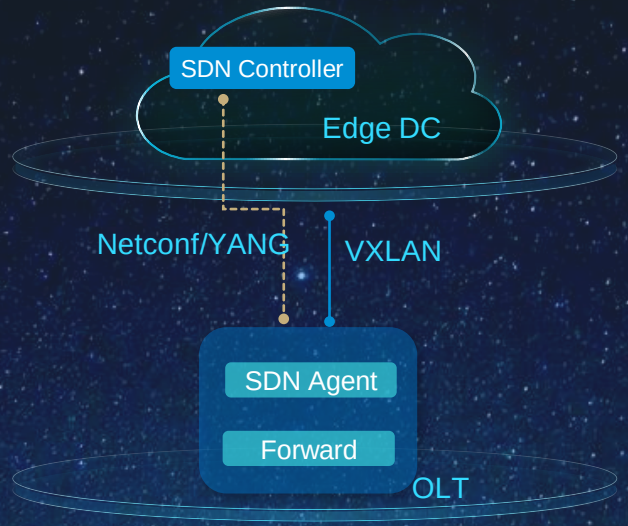
Access Network Evolutions on Demand, Virtualized in Stages

Stage 1 Support network slice function



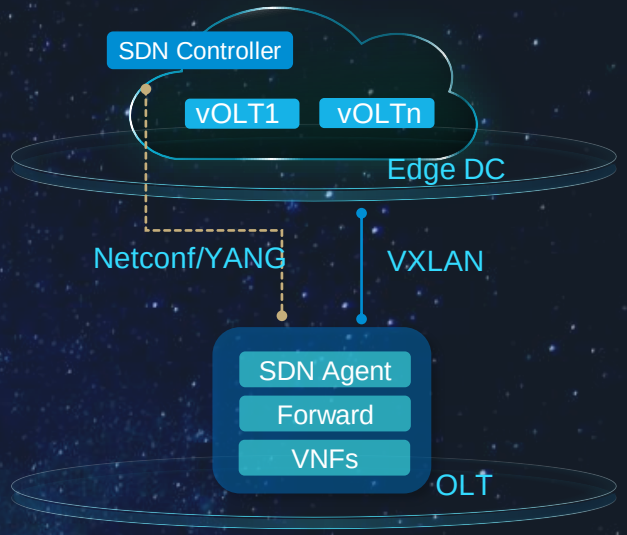
- Different scenarios/users correspond to different network slices, with independent resources, and services are isolated from each other.
- VXLAN seamlessly connects to CO and establishes a large Layer 2 network

Stage 2 SDN，control surface up-shift



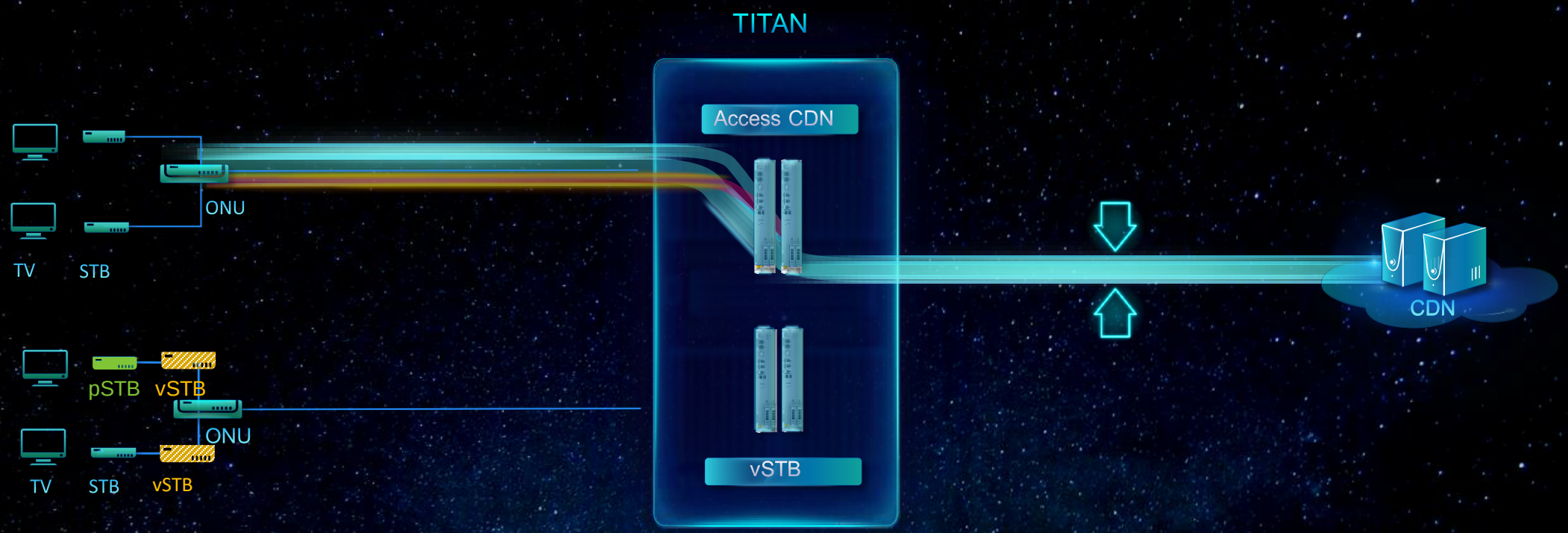
- Support SDN Agent，Netconf/YANG
- SDN controller for business dynamic management, open resource allocation capabilities

Stage 3 Access virtualization



- VNF can be shift up to the data center, deployed on demand
- The OLT implements forwarding as a PNF, and can also load part of the VNF.

Built-in Blade to Support MEC

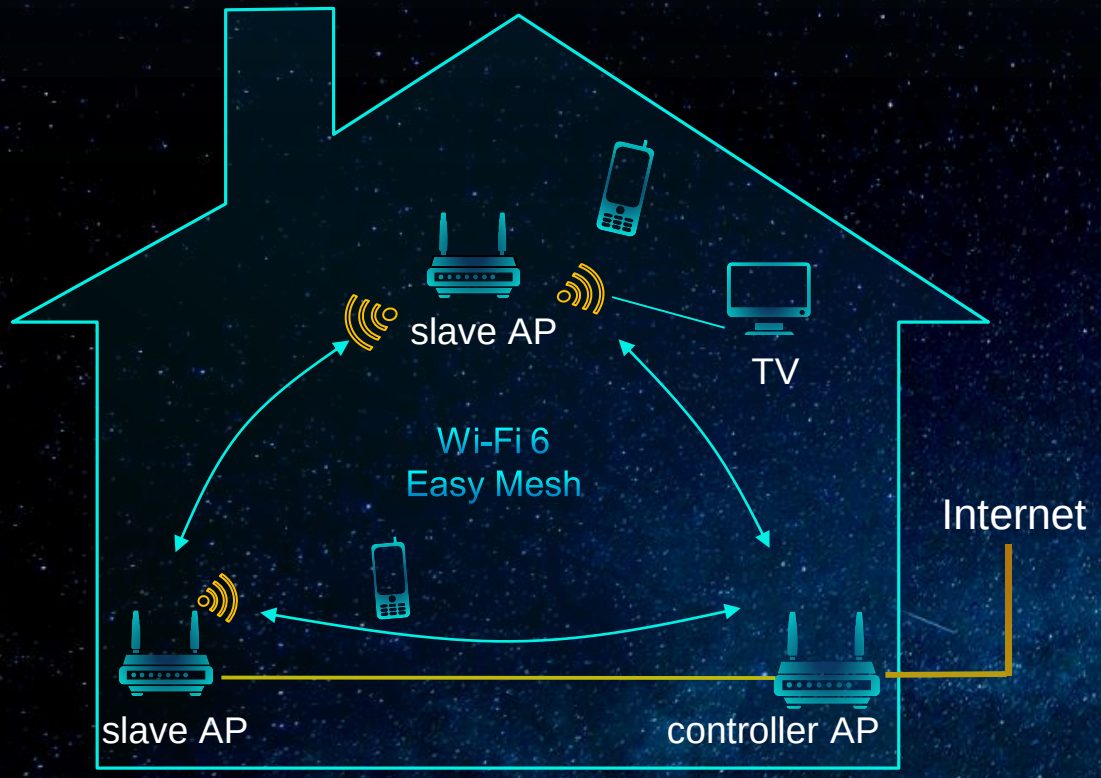


- 15T local storage, 30Gbps processing capability
- 0 extra room space required, 50% reduction in power consumption

- Released Built-in Blade White Paper (Feb.2019)
- Field trial of vSTB (China Telecom, Jan. 2019)

ZTE NetSphere Wi-Fi Ensure Seamless Coverage at Home

Ready for higher Wi-Fi throughput for home connection, whole home covered network for Smart Home



Net Sphere

- Whole home Wi-Fi
- Plug & Play
- Smart diagnosis
- Smart roaming
- Easy management

- WiFi6 for 10G service
- Band steering/AP steered roaming
- 802.11k/r/v improves performance and user experience
- WiFi Mesh

Worry Free Service Assurance for eXcellence User eXperience

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Challenges

Complaints Per 10K Users

109

160

Truck Roll Rate

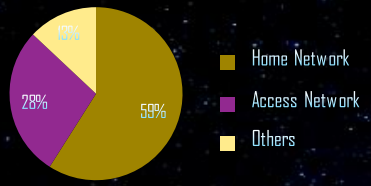
23.6%

53.8%

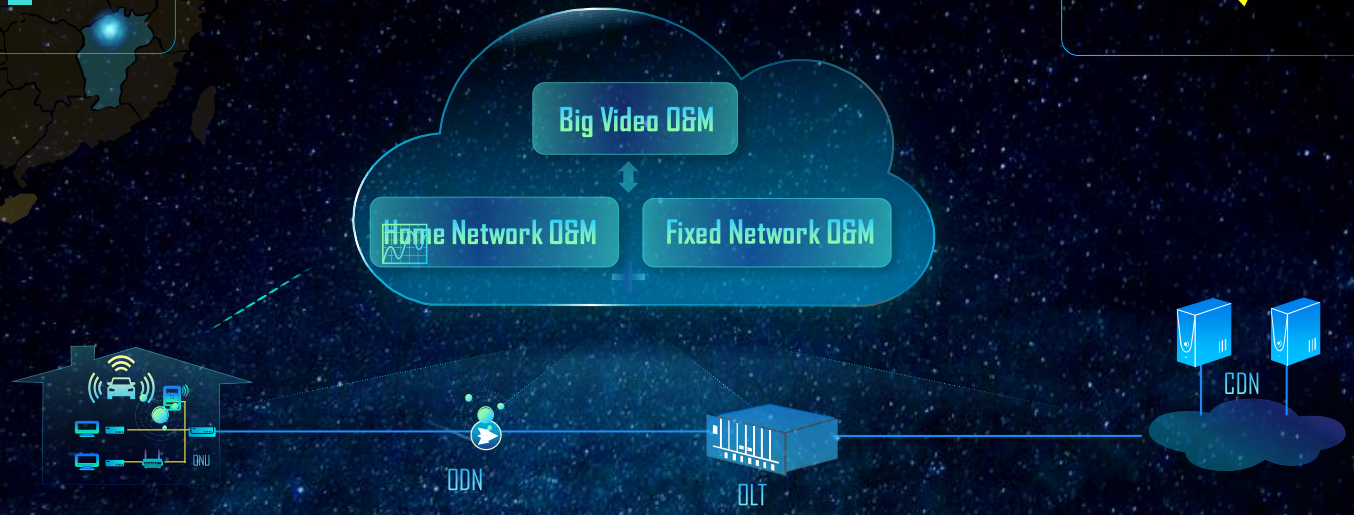
Operator A

Operator B

Fault Distribution



Big Video@FBB Connetion Assurance Solution



Benefits

Complaints Per 10K Users

Operator B

30%

Before 160

After 112

Truck Roll Rate

55%

Before 53.8%

After 24.6%

- **90% less** provisioning time with QR-scanning: From 24 to 2.5 mins.
- **Cloud-based** Wi-Fi optimization: Wi-Fi Complaints reduced.
- **Low-QoE user** indentified and optimized: UX improved.
- **Low-quality link** located and fixed: ODN ensured.

Investment for Growth and Leading the Industry to Future

ZTE

R&D innovation	Standards leadership	Patent contribution	Industrial cooperation
2,000+ Experts	200+ Proposals	1,000+ Patents	Top-tier Operators

- ZTE's 10G PON products were the first commercially deployed in the world and rank No.1 for sales in the industry.
- ZTE is continuing deep cooperation with China Telecom in carrying 5G over WDM-PON.
- In 2018, ZTE released the industry's first single-wavelength symmetric 50G-PON solution.

Cooperation and In-House Design to Increase Customer Value

ZTE

Industry-chain collaborations

BROADCOM. Quantenna HGTECH FINISAR Accelink MEDIATEK QUALCOMM TSUHAN Hisense

Strengthen industry-chain cooperation

Proprietary OLT chips

2009	2011	2016	2018
Low-power GPON chip	Industry's first 10G PON ASIC chip	Multi-mode PON chip	High-density multi-mode 10G PON chip

Total shipments 6 million ports

Proprietary CPE chips

2013-2014	2015-2016	2017-2018
1st -gen E/G PON and XG-PON low-power	2nd -gen E/G PON &10G PON gateway	3rd universal low-power smart CPE chips & five-mode 10G PON

Total shipments 70 million units

Market Performance Update

ZTE

Cooperate with 10 of the top 20 operators globally

19 M G/E PON ports

1.1M 10GPON ports

330M units
CPE shipments

No.1
10G PON market share:
46.6%

No.2
FN market share:
26%

No.2
PON market share:
29.5%

No.2
CPE market share:
20.6%

Source: IHS 2018Q3

- In 2018, ZTE has achieved shipment: PON OLT **2.6M ports**, CPE/ONT **39.8M units**, DSL(MSAN) **6.2M ports**.
- Fixed network products are deployed in **100+** countries by **150+** operators , achieving a **top 2** ranking worldwide.

Summary

Highly Converged Network Enable

Full Services and Convergence
in 5G Era

Your Reliable Partner

Better Delivery
Strong R&D and Production ability

THANK YOU

Leading 5G Innovation