

5G Communications Technologies & Solutions

Lecture 3

IoT Security

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Foreword

- During the World Radiocommunication Conference 2015 held in Geneva, Switzerland from October 26 to 30, ITU Radiocommunication Sector (ITU-R) officially approved the resolution on promoting future 5G research and formally decided on "IMT-2020" as the official name of 5G.
- 5G is a new-generation communications technology. Its standards evolution and industry development have attracted much attention and will be promoted by multiple parties. In addition, for mobile Internet and IoT scenarios, 5G brings new technologies and transformations.

Objectives

Upon completion of this course, you will be able to:

- Understand 5G standards evolution and industry development.
- Master key technologies and points for 5G communications.
- Distinguish between three 5G scenarios and their supported applications.
- Be familiar with 5G business solutions and know the key to the success of operators'

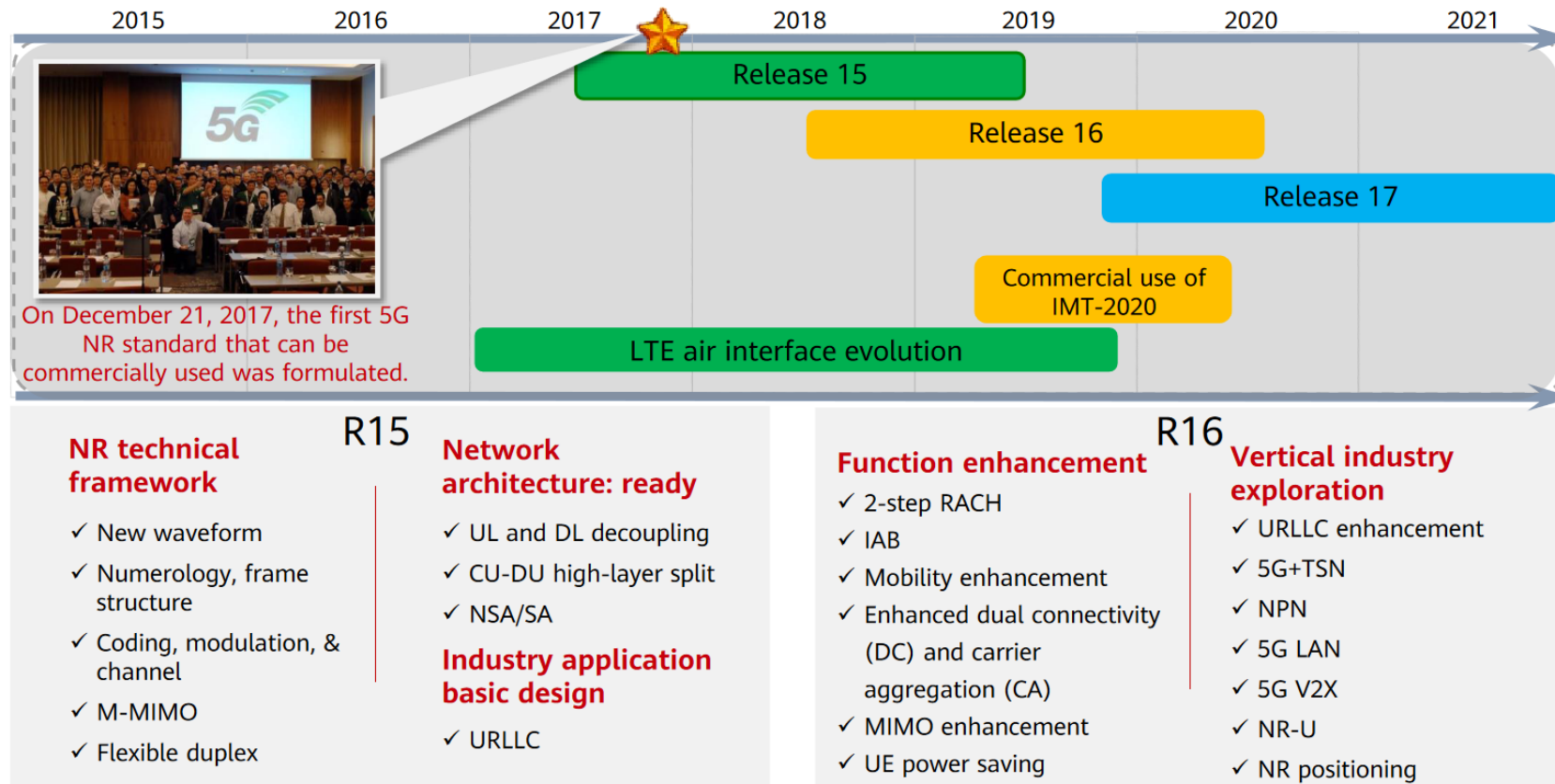
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Vision 2025: Towards an Intelligent World



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Evolution of 5G Communications Technical Standards



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3GPP Release 15: New 5G Technology Standards



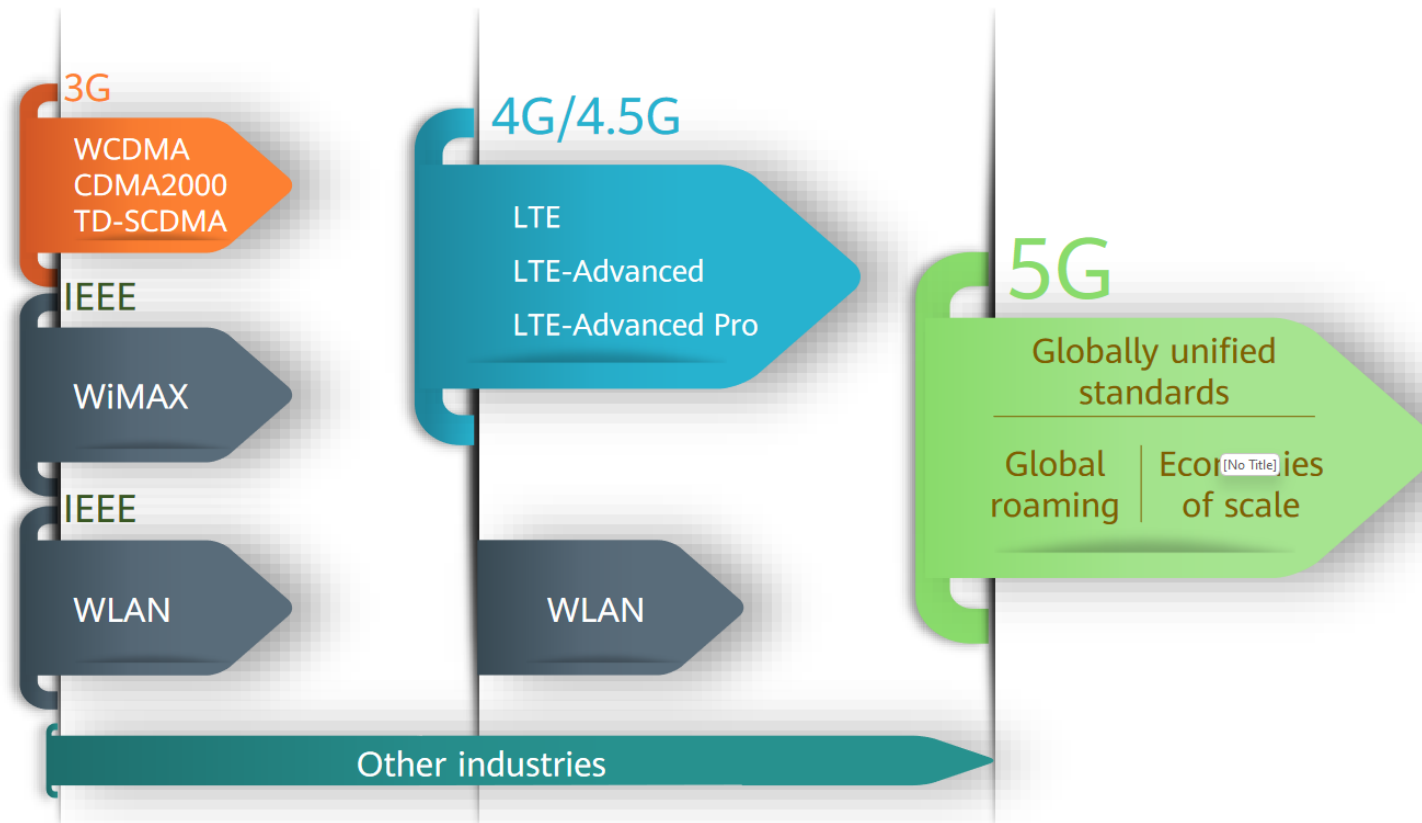
These include:

- New radio
- LTE Advanced Pro evolution
- Next generation core (NGC)
- EPC evolution

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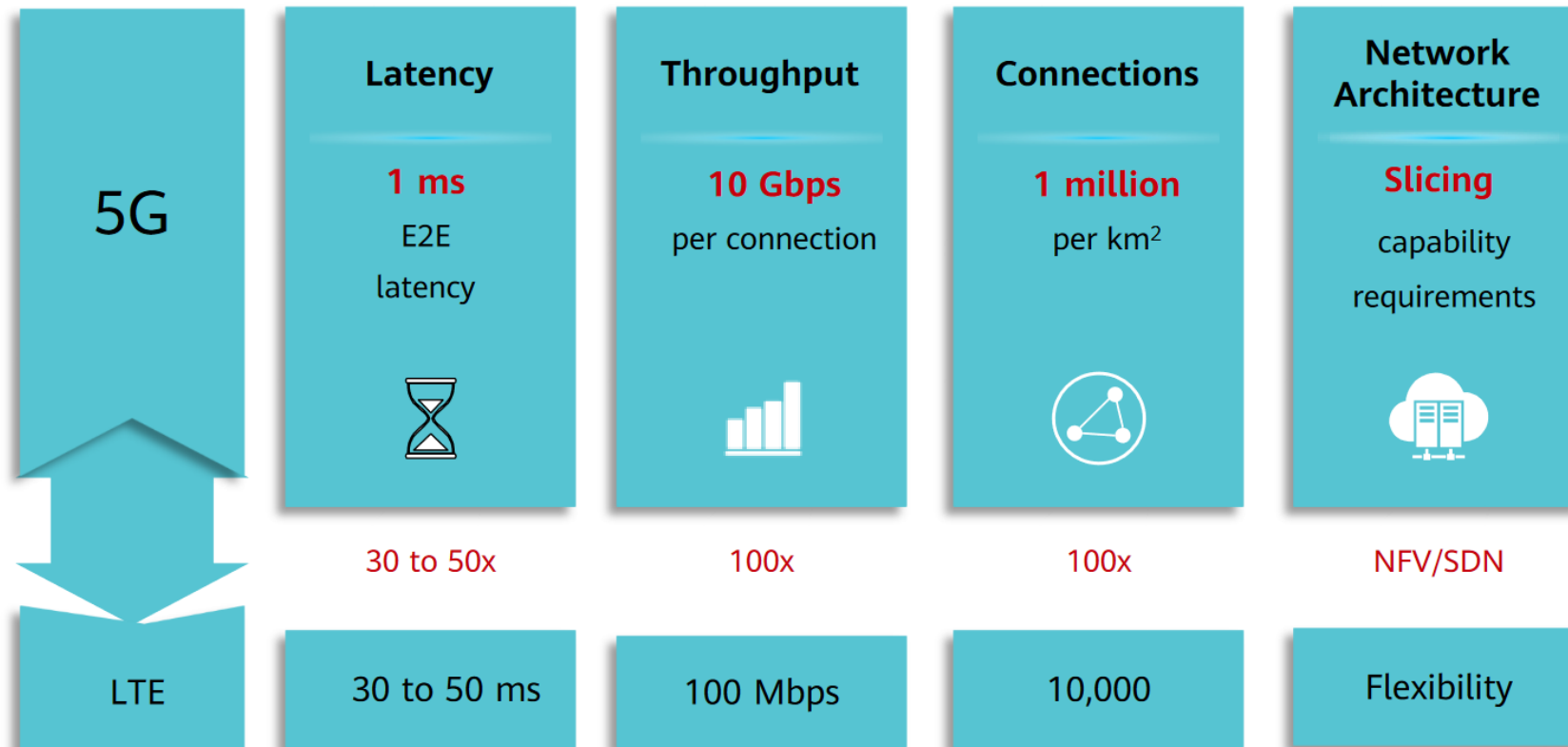
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5G Unified Standards



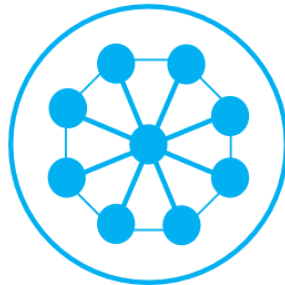
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5G Key Performance Indicators



Three Key 5G Innovations

New Architecture



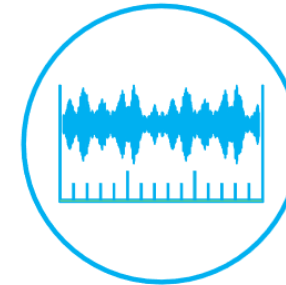
Using both low and
high frequency bands
for new experience

New Radio



One physical network
for hundreds of
industries

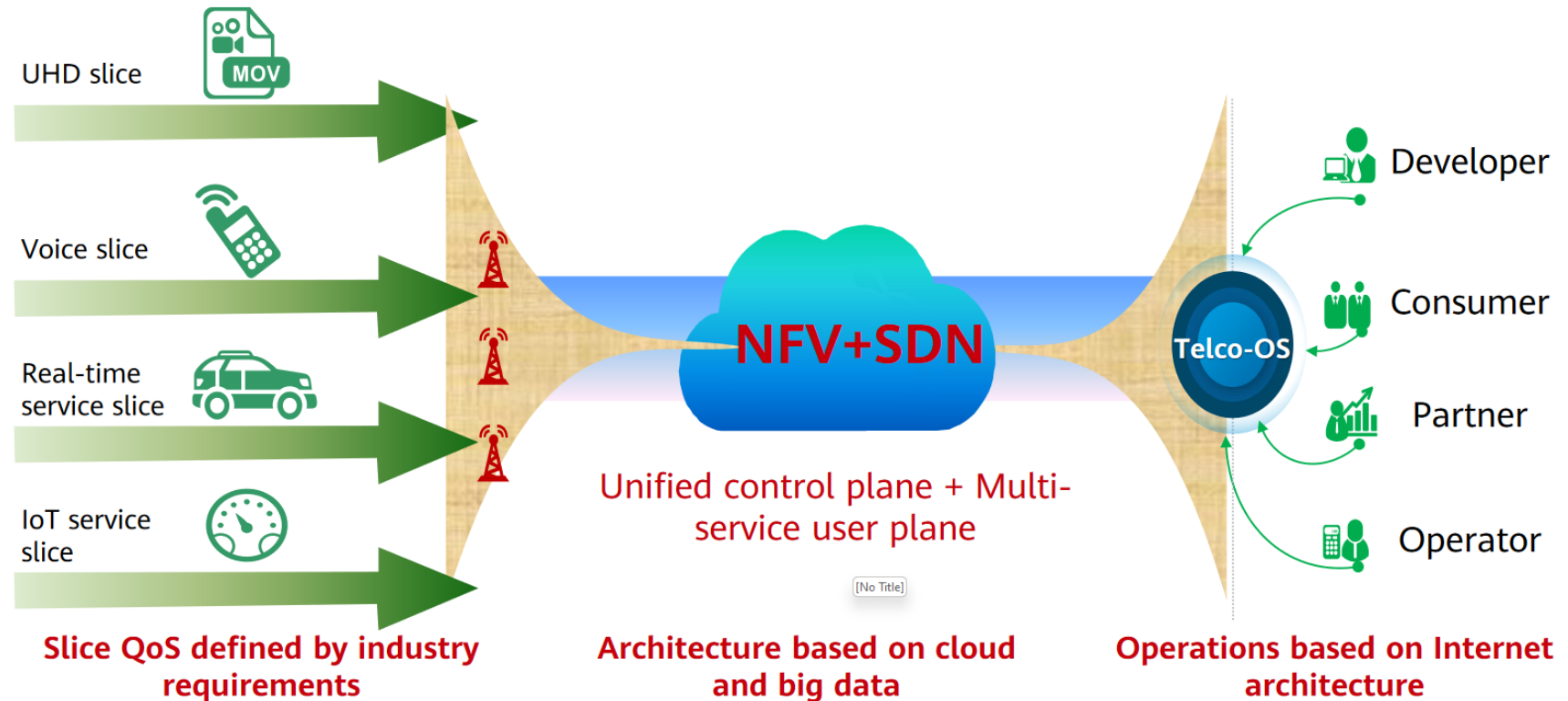
Full Spectrum



Flexible adaptation to various
services
Improved spectral efficiency

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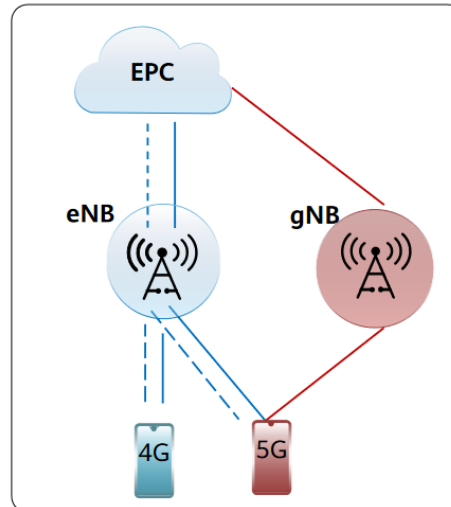
5G New Architecture – One Network for Hundreds of Industries



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5G Networking Mode

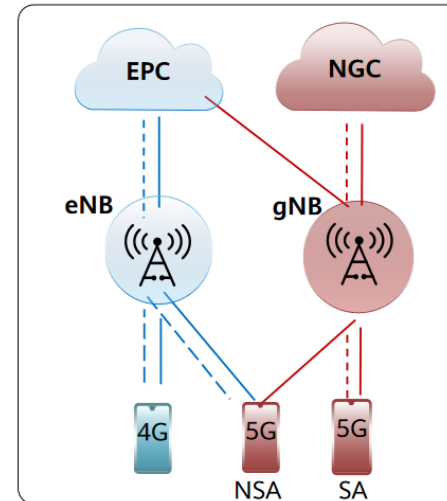
2019
NSA Option 3x



Enabling eMBB services:

- Quick deployment in the early stage
- LTE as the anchor point
- LTE&NR DC

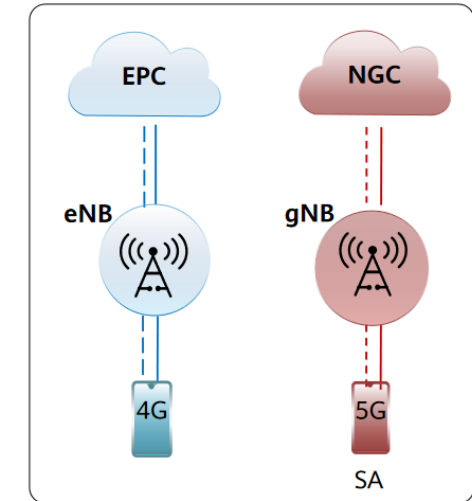
2020 to 2023
Long-term coexistence of NSA and SA



Enabling 5G 2B services:

- One network adapts to both NSA and SA networking.
- Uplink enhancement (such as super uplink and NR uplink CA)

2023+
SA as the target architecture



Fully enabling vertical services:

- NR carrier aggregation

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Three 5G Application Scenarios

eMBB

- In eMBB scenarios, 5G needs to provide enhanced mobile Internet services:
 - Services such as VR/AR/MR require higher rates.

VR



Everything you see is unreal.

AR



You can tell the difference between the 'real' and the 'virtual'.

MR



You cannot tell the difference between the 'real' and the 'virtual'.

Immersion



Interaction



Imagination



Panoramas

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Three 5G Application Scenarios

mMTC

- In mMTC scenarios, 5G needs to provide IoT services with massive connections.
 - Internet of everything – large-scale IoT

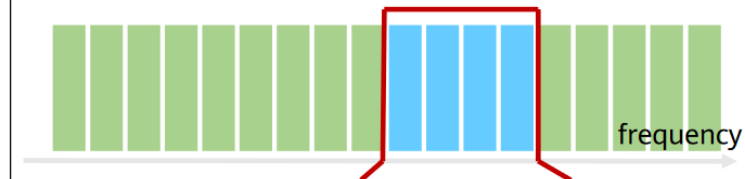


All things connected

NB-IoT Already Evolved to NR

The ITU-R WP 5D#35e remote conference held by the International Telecommunication Union (ITU) announced that 3GPP 5G technologies (including NB-IoT) meet the requirements of IMT-2020 5G technical standards and are officially accepted as ITU IMT-2020 5G technical standards.

NB-IoT systems embedded into 5G



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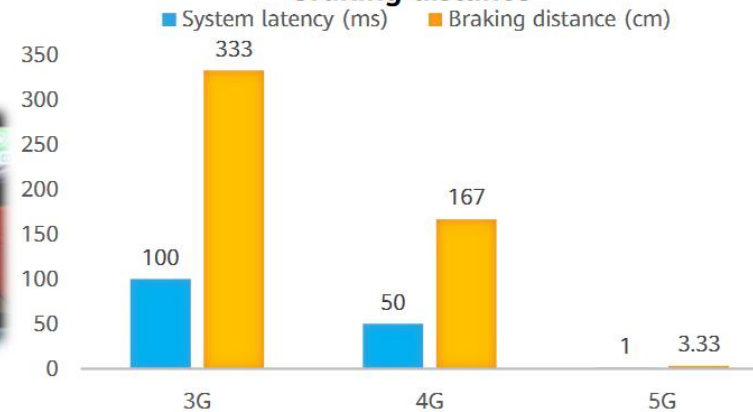
Three 5G Application Scenarios

URLLC

- In URLLC scenarios, 5G needs to provide ultra-high reliability and ultra-low latency services.
 - In V2X scenarios, services such as assisted driving and automated driving require low latency.
 - Scenarios demanding high real-time performance, such as smart healthcare and remote surgery, require low latency.



Relationship between system delay and braking distance



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Three 5G Business Solutions Driving Business Success

5G Business Solutions



B2C: 5G enriches life



Experience 5G anytime, anywhere

- **Business insight:** 3 key success factors
- **Solution:** Leading VR service solution; Digital indoor solution
- **Best practice:** LG U+ China Mobile, Elisa, ...



B2B: 5G boosts industry



Industry-level quality, ensuring SLA

- **Business insight:** Blue ocean market, starting from connectivity
- **Solution:** Rapid and economical business connections; Guaranteed SLA solution
- **Best practice:** STC, China Unicom, Sunrise, ...



B2H: 5G enables wireless optical fibers



Quick launch and experience of wireless optical fibers

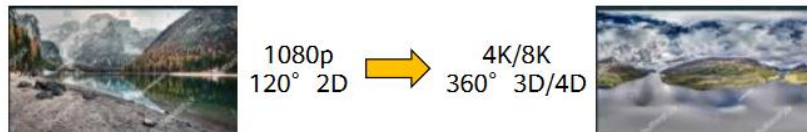
- **Business insight:** Three scenarios drive business development.
- **Solution:** All-scenario CPEs + WTTx suite
- **Best practice:** Globe, Telcom, 3, ...

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B2C Industry Insight: Three Key Success Factors

5G Brings More New Services

New video: more details, immersive experience



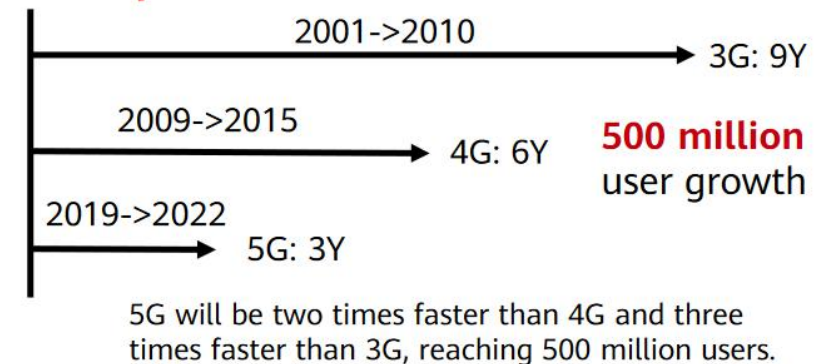
New live broadcast: onsite-like experience



New games: any game, any device



Rapid Increase of 5G B2C Users



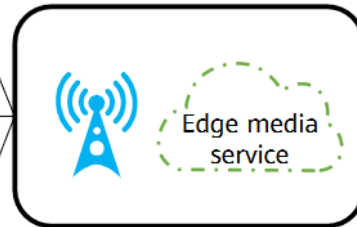
Three Key Factors for 5G B2C Success

- ✓ High-quality network
- ✓ Rich content
- ✓ Flexible multi-dimension tariffs

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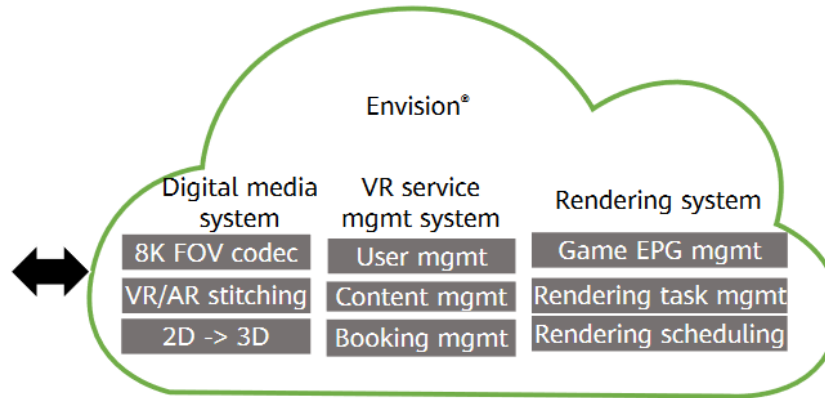
Solution: Driving VR/AR Business Success

Huawei VR Glasses



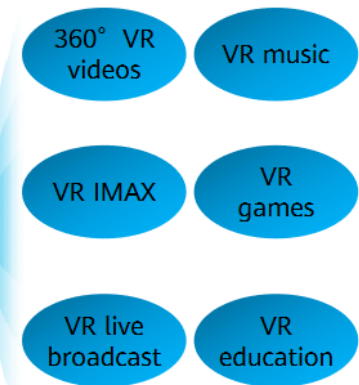
Mobile operators
5G & ICT
infrastructure

VR Cloud Platform



Huawei cloud/Huawei cloud stack
(including Co-Operation Cloud)

VR/AR Content



Commercial cases:

- China Telecom: e-Cloud VR
- China Unicom: Wo Video



Thank You