MWC

VR sports entertainment live
一5G slice application scene

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Application case of VR live broadcast

VR live broadcast

Ball games, sports events, and concerts are broadcast through real time.

In the current phase, users can feel immersed, as celebrities in person. Together with VR spatial audio, they can hear in the venue.

In the future phase, users can both enjoy the experience and also interact with others. They can connect with share games, communicate about strategies or even "high five" virtually.

Sports live broadcast

On April 13, 2016, the Lakers were playing against the Jazz. The average ticket price of Kobe Bryant's final game wasUS$26,500.

Next VR provided 360° panoramic live broadcast for that game. A fan who watched from home through live VR said, "It was just like sitting right at the substitute bench, and I could clearly see every one of Kobe's moves. But, if I had gone to the game, it would have cost me US$100 to 200 thousand." With VR, a fan only has to spend US$6.99 to watch the game.

It is the end of Kobe's basketball career, but only the beginning of Cloud VR live broadcast.

Paid VR live TV for star concerts

Faye's Moment Live 2016 concert VR live broadcast

- **Revenue of 30 million tickets**
- **300,000 persons pay for VR services.**
- **30RMB/VR live TV fee**
- **10 million VR benefits**

The concert provided a 3DoF experience, enabling viewers to feel like Faye was right in front of their eyes. Despite the excellent lighting and choreography.

The shortcomings of this experience were also noticeable.: The face of the singer was blurry due to low resolution. Faye's concert was broadcast in 4K VR with a bandwidth of about 12 Mbit/s, This made the images unclear.

With high bandwidths, concerts will be able to provide the expected standard of Cloud VR live experience.
In that case, even if prices rise to CNY100, fans will still find the experience worth the money.

CCTV Spring Festival Gala

2017 / 2018 CCTV Spring Festival Gala VR live broadcast was highly recognized by top leaders of broadcasting and TV system. CCTV began to popularize VR technology in various media fields.
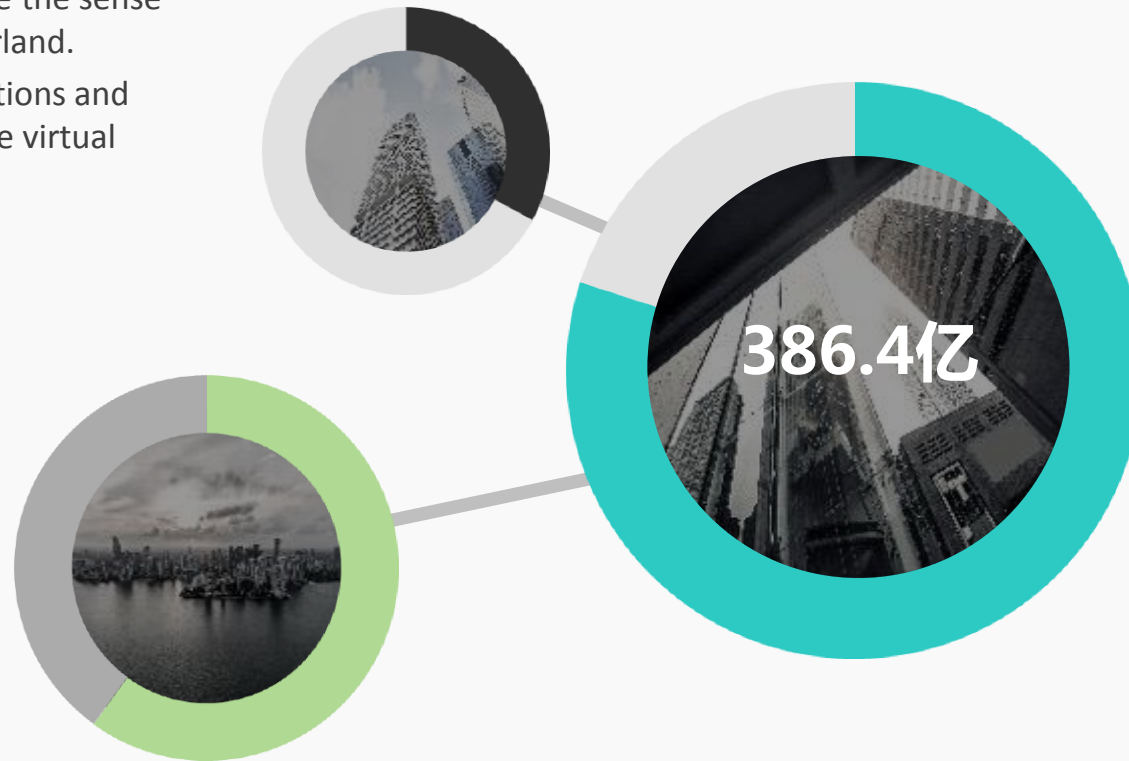
VR end-to-end transport requireme

VR end-to-end transport requirement

User Experience

- The user can experience the sense of reality in the wonderland.
- There are more interactions and social interactions in the virtual world.
- Experience a variety of entertainment content.

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Market Space
(consumer, enterprise, marketing)

- The rapid growth in the next five years is expected to reach 38 billion 640 million in 2021.
- The annual rate of growth was 163.4%.
- The VR content market will account for nearly 50% of the overall market size.

Problems Confronting

- The technology of hardware and transmission affects the content display effect.
- The user needs rich and diverse content.
- The user's requirements for comfort and viewing.

VR end-to-end transport req

The continuous upgrading of user experience requires a gradual upgrading of network bandwidth requirements.
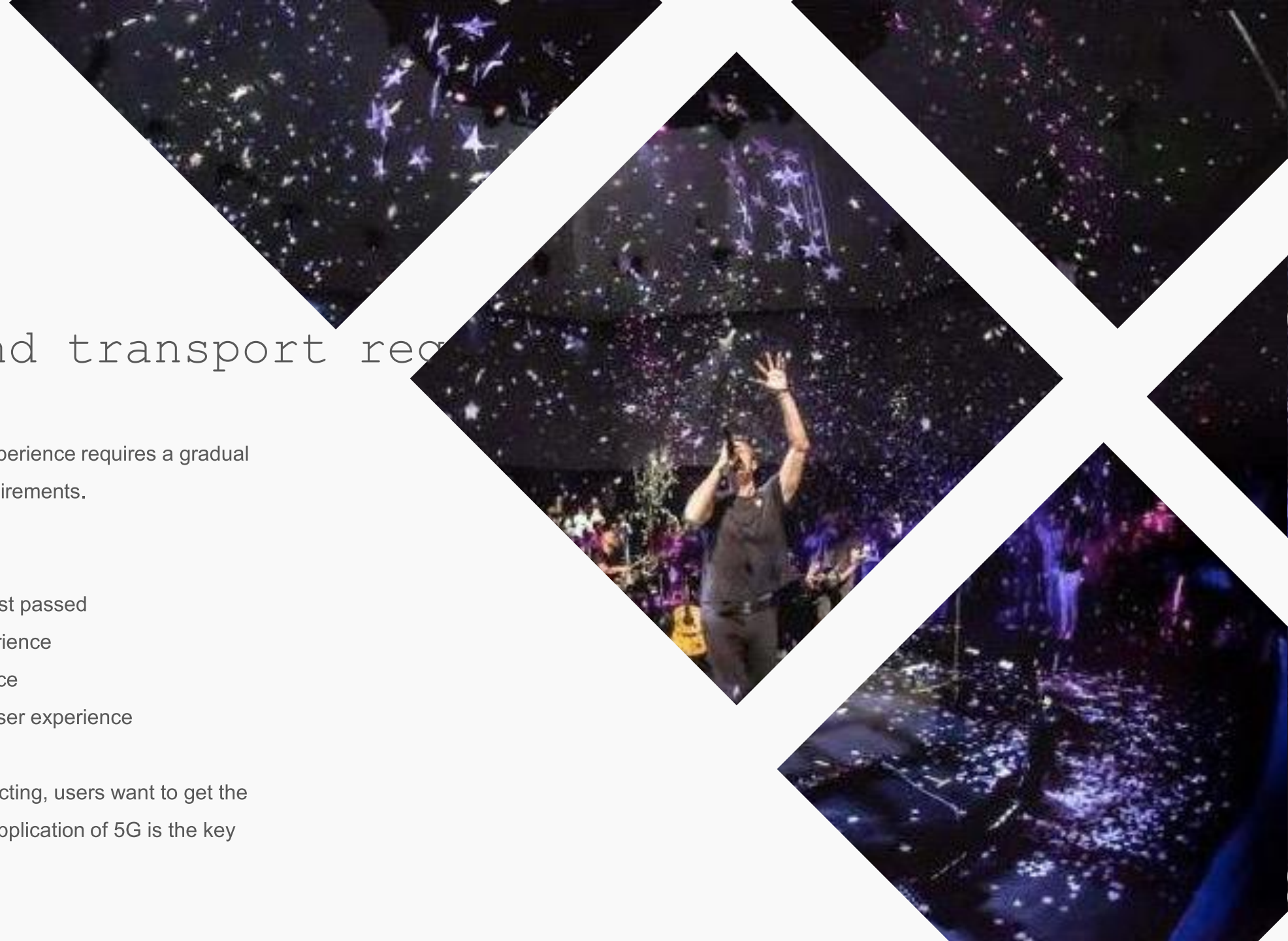
From the clarity of the picture
4K level VR video user experience just passed
The 6K level to achieve a good experience
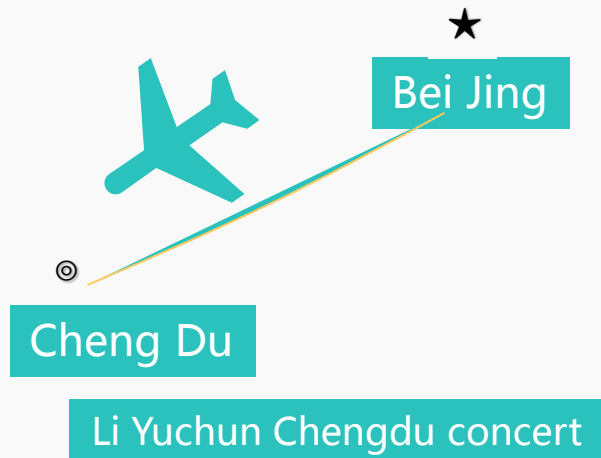The 8K level is a good user experience
The 12K level reaches the ultimate user experience

In the process of watching and interacting, users want to get the ultimate network transmission. The application of 5G is the key to VR live broadcast.
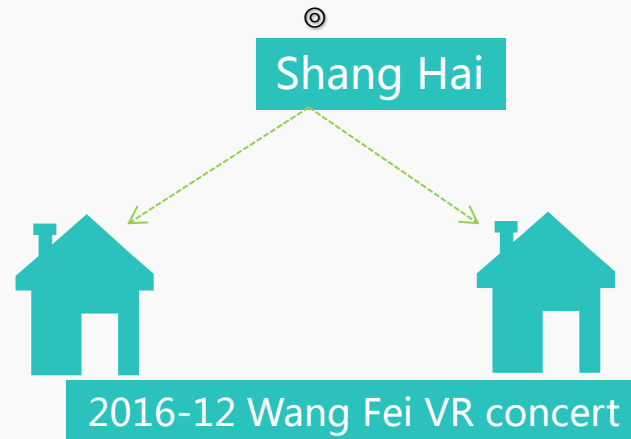
Application Scenario Introduction

Live Viewing

★ Bei Jing

◎ Cheng Du

Li Yuchun Chengdu concert

Home based VR live broadcast

◎ Shang Hai

2016-12 Wang Fei VR concert

5G interactive VR live broadcast based on meeting field

★ Bei Jing

Main venue

Parallel Sessions 1 Guang Zhou

Parallel Sessions 2 Shang Hai

Future VR interactive concert

Tickets were like gold dus

Spectators are willing to pay tickets and tickets for live concerts. Without tickets, I would like to go to the scene to feel the atmosphere of the concert..
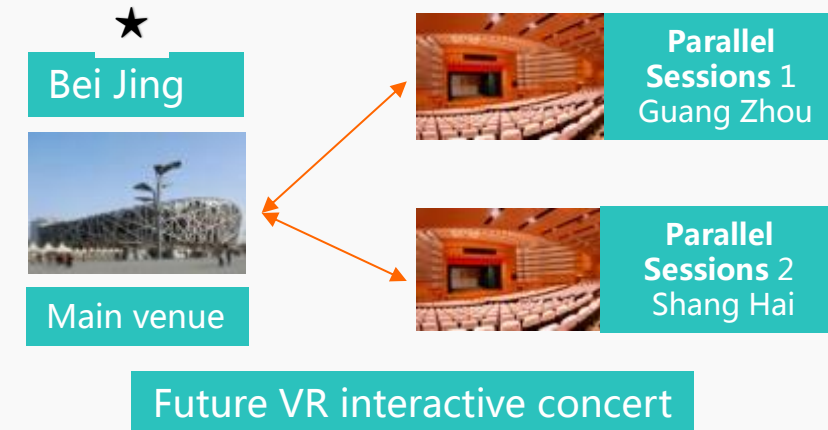
Pay to watch the

Enthusiasm The current scheme can not satisfy users' immersive experience needs, network bandwidth and other QoS can not be guaranteed.

Apart from the main venue, a branch venue mode is set up to solve the two major pain points of the network and terminal.

VR end-to-end transport requirements

Innovation achievements of Mobile Research Institute and HUAWEI and Letin
Digital -- end to end optimization solutions

It solves the need of VR production end to lease rendering capability and network capability in time.

The demand for timely distribution and network security of distribution network is solved.

It solves the network security of user experience and improves user experience through slicing technology. Reduce the requirements for terminal equipment and reduce the threshold. Effective use of network transmission and computing power to enhance user experience.

Letin digital joint mobile won the two prize in the 5G application competition of the Ministry of industry and commerce.
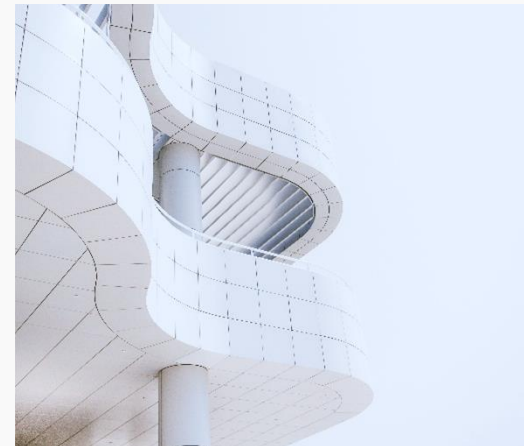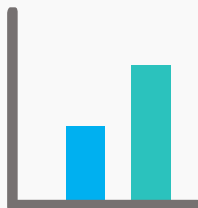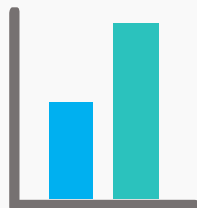
Scene Network Requirements
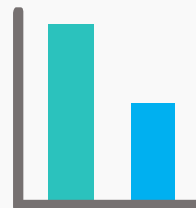
VR broadcast wireless

Uplink bandwidth

Downstream bandwidth

Time delay

5G network primary indicators:

- Uplink bandwidth: 1Gbps
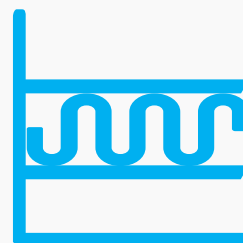- Downlink high bandwidth: 10Gbps
- Ultra low delay: 5G NR 1ms

E2E SLA/QoS Guarantee

Best Effort

Guaranteed QoS

5G quality guaranteed network slicing:

- E2E SLA/QoS security mechanism
- Ensure user experience

Fast line of business

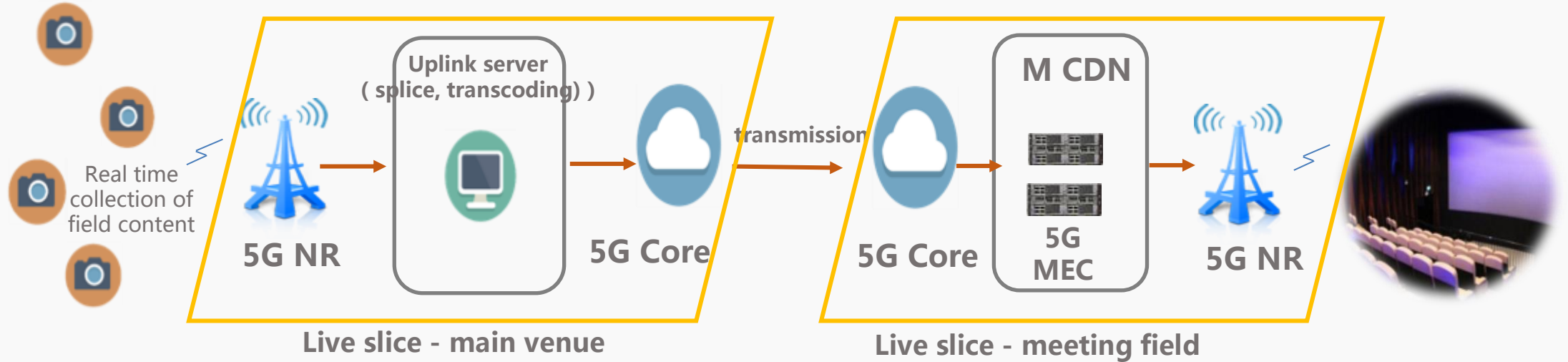Month

Week   the opening time of the business

5G temporary network slice:

- "Zhou" level network service opened
- Mobile and flexible, multi live scene

VR Live broadcast solution

4 Way *50Mbps=200Mbps

Single way 20Mbps*500 people

Real time collection of field content

Uplink server (splice, transcoding))

transmission

M CDN

5G MEC

5G NR **5G Core** **5G Core** **5G NR**

Live slice - main venue **Live slice - meeting field**

Main venue

Parallel sessions

Main venue :
- **Key point: wireless VR camera**
- **Camera: 4*50M=200Mbps, HDI output, external device to IP**
- **5G TUE: implementation of IP to empty conversions**
- **5G NR: support 200Mbps or higher uplink bandwidth, priority scheduling**
- **5G Core: supports sectioning isolation, SLA/QoS protection, fast business generation and pull up.**

Parallel sessions :
- **Key point: MEC+mCDN delay time delay**
- **5G NR: support 1Gbps downlink bandwidth, priority scheduling**
- **5G Core: supports sectioning isolation, SLA/QoS protection, fast business generation and pull up.**
- **5G MEC: verifying the fast generation and pull of the slicing business**
- **Edge CDN: the main venue is directly transcoded to the mCDN after distribution.**

Cloud VR Family
Entertainment

Cloud VR Family Entertainment

In 2018, VR will quickly enter the stage of comprehensive cloud computing. Cloud VR family entertainment will enter thousands of households. Cloud VR will become an important application scenario for operators.

VR Live broadcast

Event VR live broadcast, for star concert or large time, 180 degree 3D effect, as the feeling of personal experience atmosphere.

VR Cloud games

Render the cloud, liberate the terminal processing power, and experience the immersive game with great freedom.

VR Interest sowing

PGC+UGC quality resource aggregation, content rich 360 degree VR video content, novel and interesting

VR Education

Multi role first person experience teaching, a strong sense of substitution.

IMAX

Benefit the old IPTV HD video resources and experience private IMAX without leaving home.

Terminal form:

1、Mature integrated machine solutions, covering high and low three gear models, suitable for 5 categories of cloud VR business, immersive experience;

2、Optional spectacle rack + smart phone client solution (easy and low cost)

3、The trial operation is strictly controlled. The one machine does not support external APK installation. The system does not support other third party terminal access.

Cloud VR

Good feedback from user experien

In 2018, the sixteenth China Strait exhibition, Cloud VR was first released at the Fuzhou exhibition.

Cloud VR

Future application

Social K songs competition shopping will become a strong interactive application platform of the operator, high value-added business operators.