

# The future IP-based delivery for television, including OTT and IPTV

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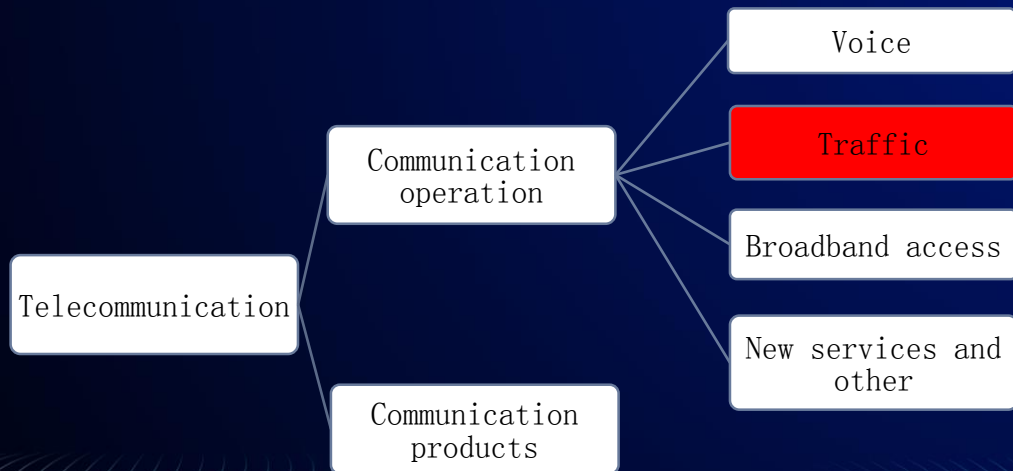


# CT operation' s revenue analysis:

Operator' s revenue in 2020 (≈billion in \$)

CT Operator	Total revenue	Communication	Mobile traffic	Broadband access	Proportion of traffic operation revenue
China Mobile	112.95	102.30	56.61	11.88	60.64%
China Telecom	57.88	54.97	19.04	10.57	51.17%
China Unicom	44.67	40.55	15.57	6.26	48.87%

## Operator' s revenue structure



M-internet access traffic 165.6 billion GB , 35.7% (2019) ↑

Average of mobile access per month 1.035 billion GB , 32% (2019) ↑

- Traffic operation revenues have become the largest proportion of operators' revenues, especially video service.
- Due to the lack of support from market and new services, it is difficult for conventional TV services to attract new users.
- The consumption of mobile traffic is increasing rapidly. "live broadcast +" service covers diverse industries.



## CT Operator

- Abundant network resources, inefficient usage
- Enclosed service capability

Reduce package cost ,  
provide new service ,  
attract more subscribers.

## End-User

- Strong mobile service requirements
- “video+service” will be mainstream

Open the traffic  
operation  
capability of  
operators, and new  
services are  
introduced to  
improve the traffic  
operation  
efficiency

Open service capability , reduce  
traffic resource occupation ,  
Improve the usage of network  
resource.

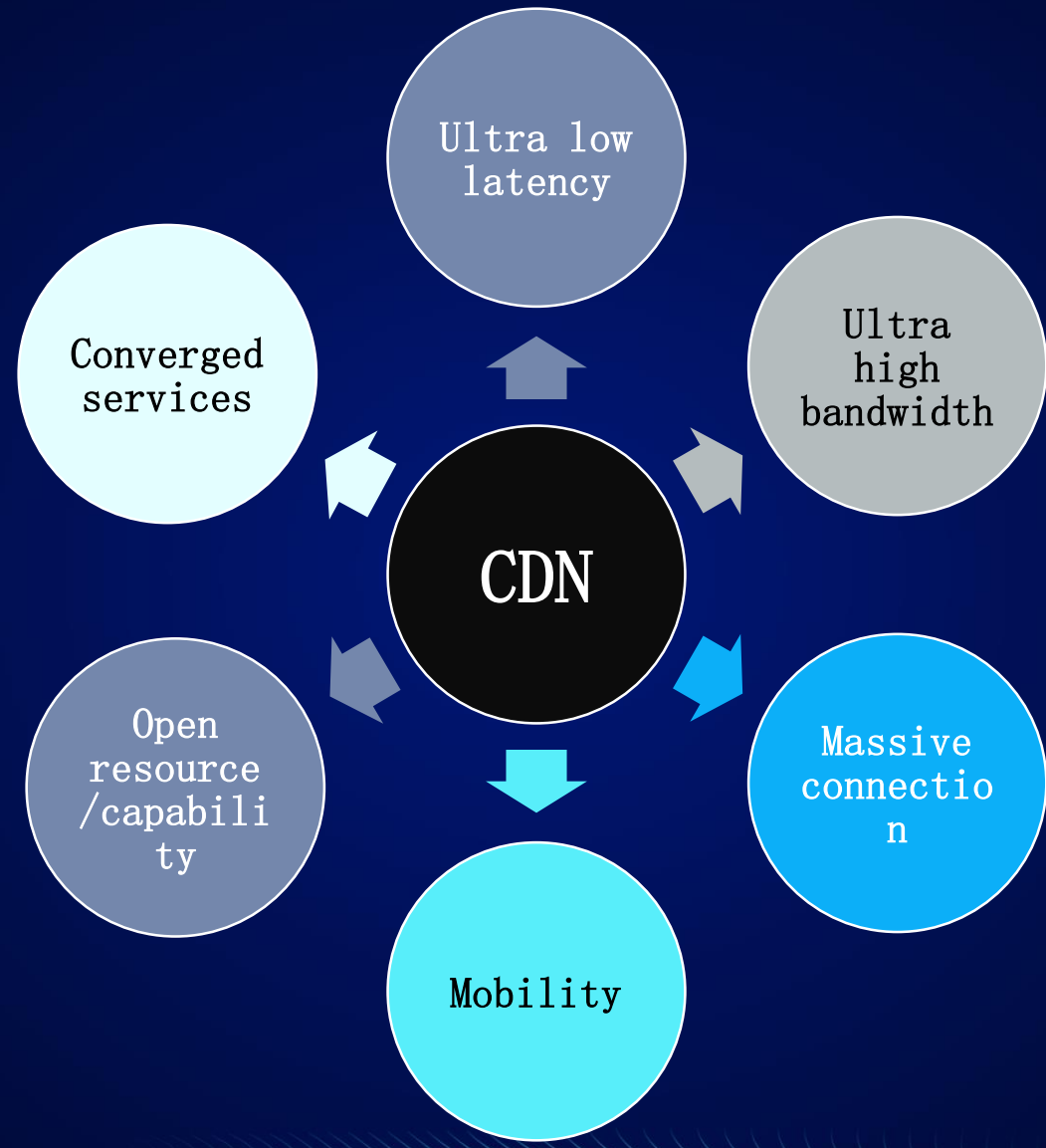
## OTT SP

- Abundant services and capability
- Lack of network resource, high cost

Low cost , better QoE



# Content delivery innovation: where to go?





# 5G: Opportunities and Challenges for CDN innovation

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Ubiquitous “video+” application

Traffic burst, tidal effect

Ultra high broadband demand with the development of ultra HD industry



video+edu



video+health



video+tour



Pop drama



Live sport



holiday



8K live broadcast



VR



Free view-point

Service

webpage

download

social

video

education

Live broadcast

XR

holographic

Technology

distribution

Smart frame extraction

Live transcoding

Image recognition

GPU rendering

FOV

Image enhancement

Live distribution

Deployment of Physical, virtual and container

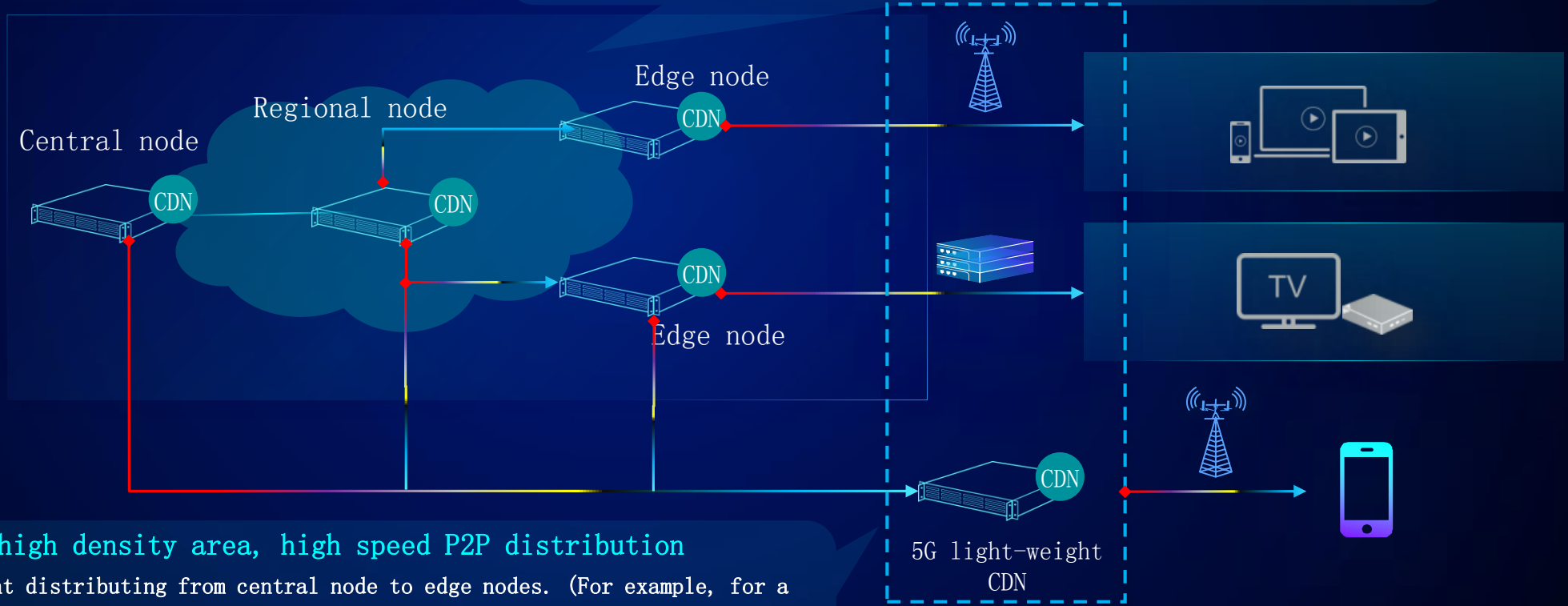
CDN innovation



# 5G CDN: Multilayer distribution, quick activating

## Traditional "waterfall" CDN:

- Content pushed layer by layer, high traffic of backing origin, heavy load on Backbone.
- Couples of time for activating CDN equipment, difficult to cope with traffic burst.
- A few CDN nodes are overloaded due to the unbalance content distribution



## 5G CDN: UHD content, high density area, high speed P2P distribution

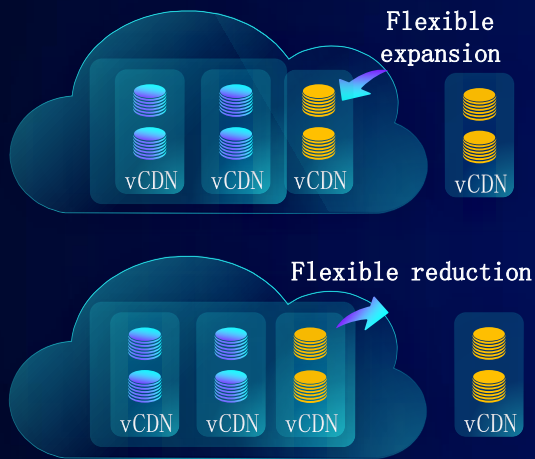
- Ultra high speed content distributing from central node to edge nodes. (For example, for a two-hours 4K film, it only takes 1/10 of the original time, even faster.)
- More new transport/codec protocols are supported by the edge node, which makes it compatible with various of content formats and definitions.



# vCDN: A flexible and efficient network architecture based on virtualized infrastructure

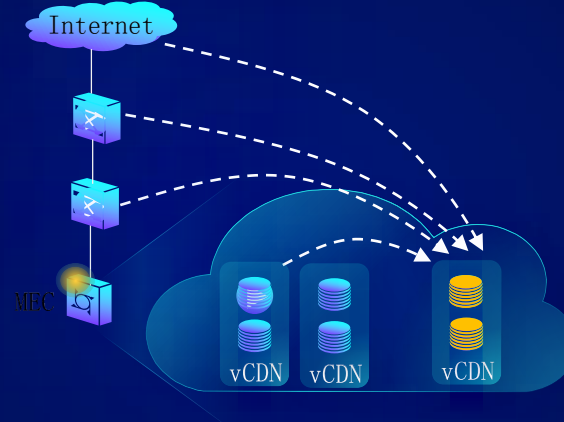
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## Flexible nodes scaling



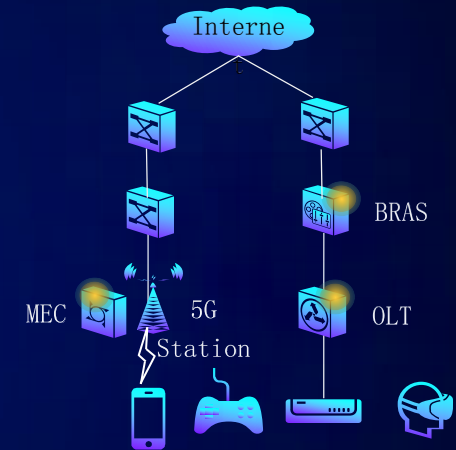
Fast new application deployment, against tidal effect

## Rapid "hot" content copy



Rapid content "push" & hot content duplication

## Edge node "sink"



Containerized, "sink" to BRAS/OLT/MEC as requirement



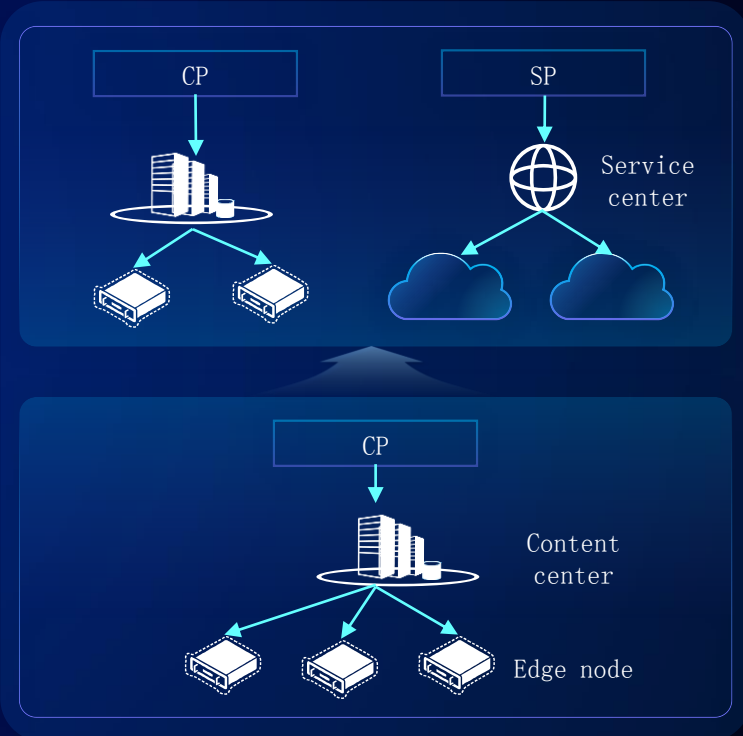
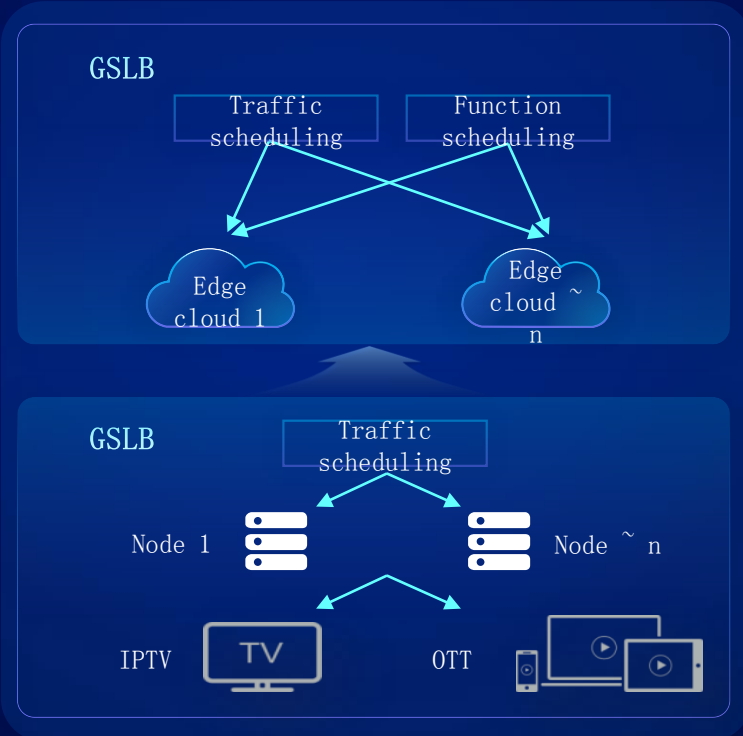
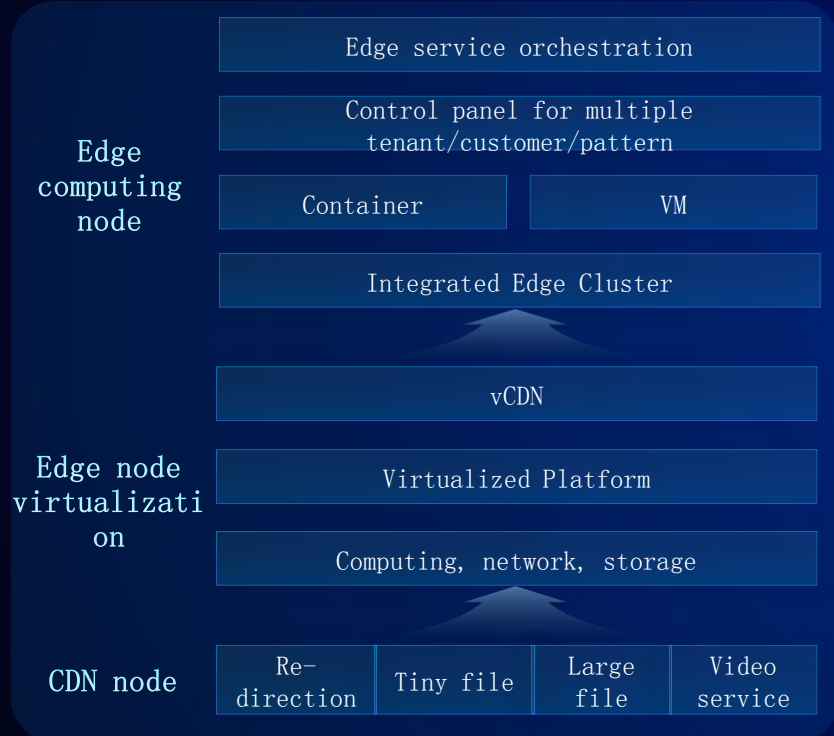
# MEC-CDN: Network + Computing + Application

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CDN → cloud CDN → edge cloud CDN

CDN traffic scheduling → “traffic + function” scheduling

CDN for content delivery → CDN for edge computing service

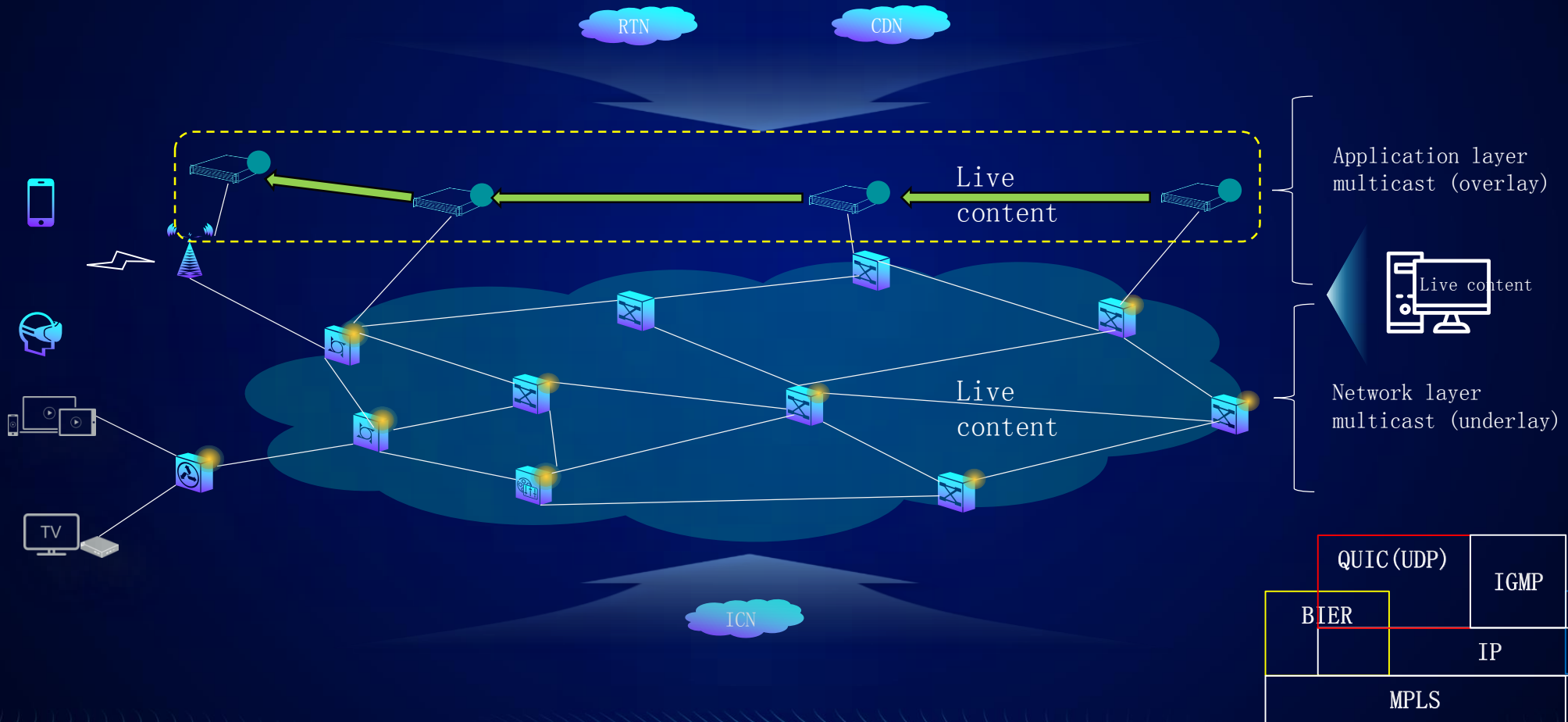






# Interactive living broadcast: ultra low latency real-time multicast /broadcast

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THANKS!

