



China Mobile 5G network Slicing Exploration

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China Mobile

September, 2018



Agenda

- **Motivation, Concepts and of 5G Network Slicing**
- **5G Network Slice: a Basic Service of Serving for Vertical Industry**
- **5G End-to-End Network Slicing Technology View**
- **China Mobile' s Slicing Case/Template Exploration**
- **Summary**

Motivation



- Traditional network design mode cannot meet the requirements of diverse and isolated 5G scenarios
- 5G network slicing technology is an innovative technology in the 5G era. Based on a common infrastructure, it flexibly provides low-cost, differentiated, customized, and isolated end-to-end networking capabilities to meet the vertical industry's differentiation and customization requirements.

mMTC

No mobility, small data : 100kbps
 Low throughput, terminal life:10years
 High density:
 100 million connections/km2

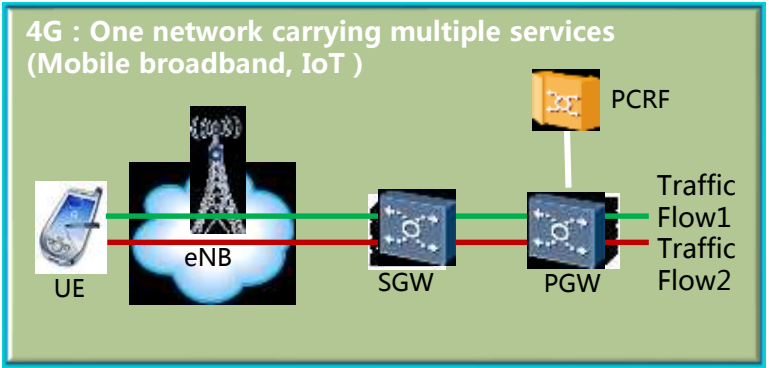
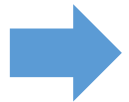
eMBB

High throughput : 100Mbps~1Gbps
 Supporting high mobility

uRLLC

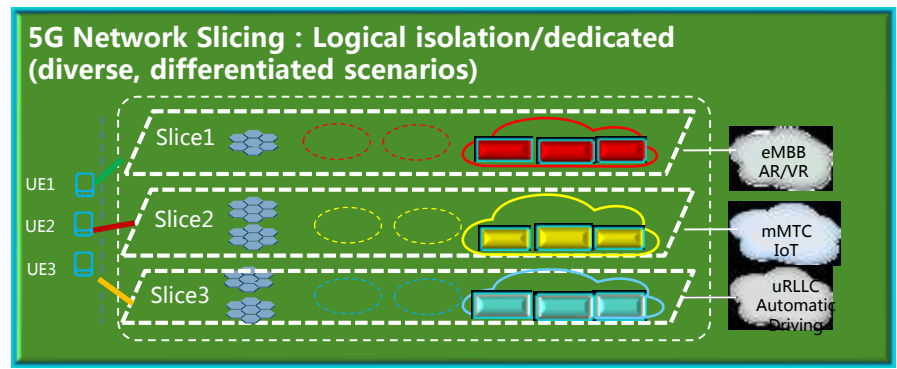
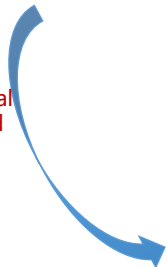
Latency : 5ms~20ms
 High reliability
 Supporting Edge computing

- Diverse requirements
- Differentiated performance and functional requirements



- 4G one-fit-all :
- Using APN/QoS parameters for different traffic flows, and the weak isolation between traffic flows
 - One-fit-all network, Complex functional design
 - Inflexible feature extensions

Evolution from traditional one-fit-all to customized and on-demand networking

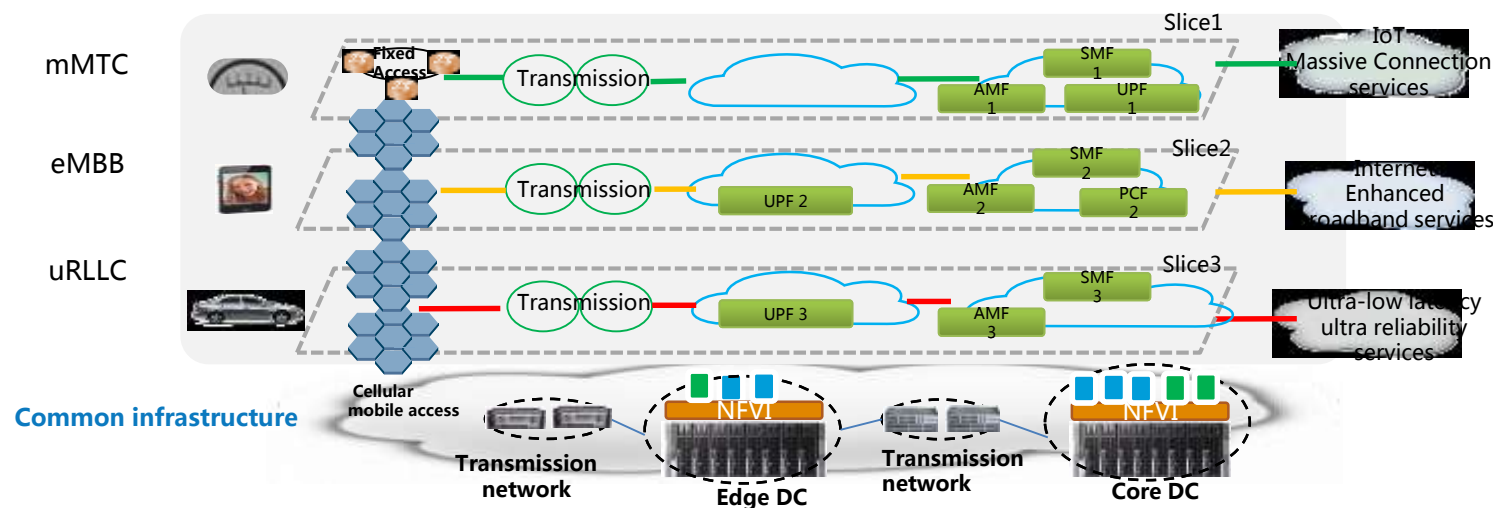


Concepts and Characteristics of 5G Network Slicing



5G network slicing can provide logically isolated, quality assurance and end-to-end networks/network slice instances with a set of customized network capabilities, including access network, transmission network and core network.

Network Slice instance = Access Network + Transmission Network + Mobile Packet Core Network



Characteristics

Customization: Network capabilities, network performance, access types, service coverage/deployment strategies

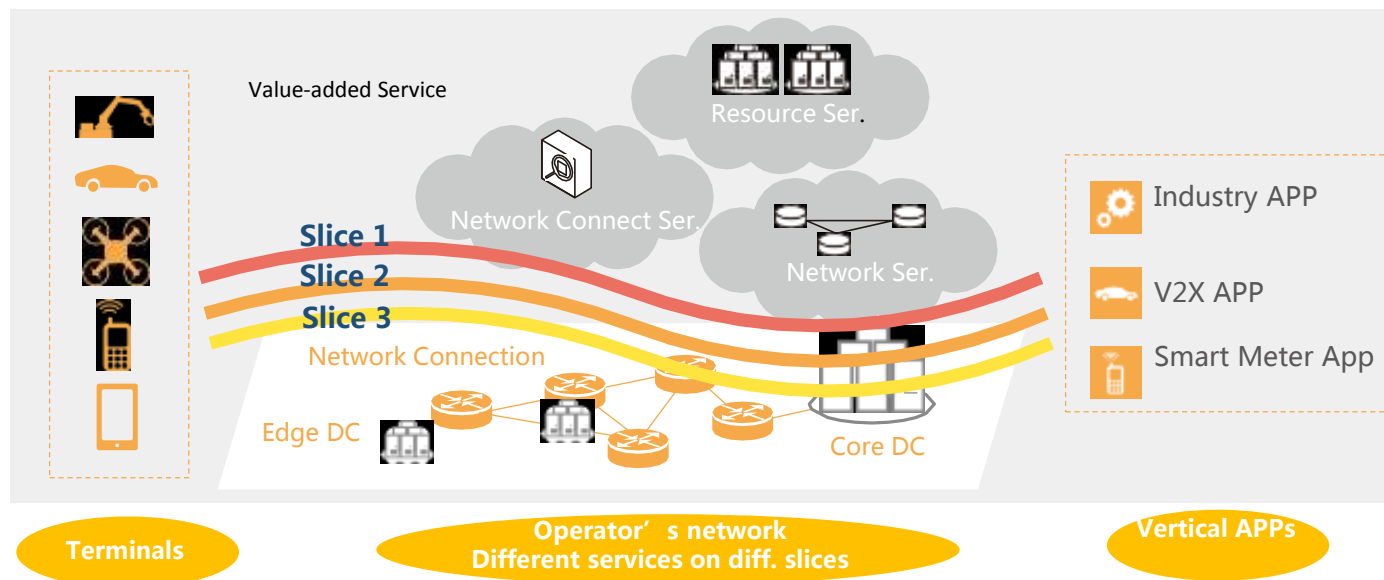
Quality Assurance: based on vertical industry requirements, meet its SLA service quality requirements

Isolation/Dedicated: each slice for each service scenario. Different slices are isolated from each other and do not affect each other.

Common platform: Network slice be deployed flexibly and on demand basing on NFV/SDN unified infrastructure



Network Slice as a Service/Product: Basic service for verticals

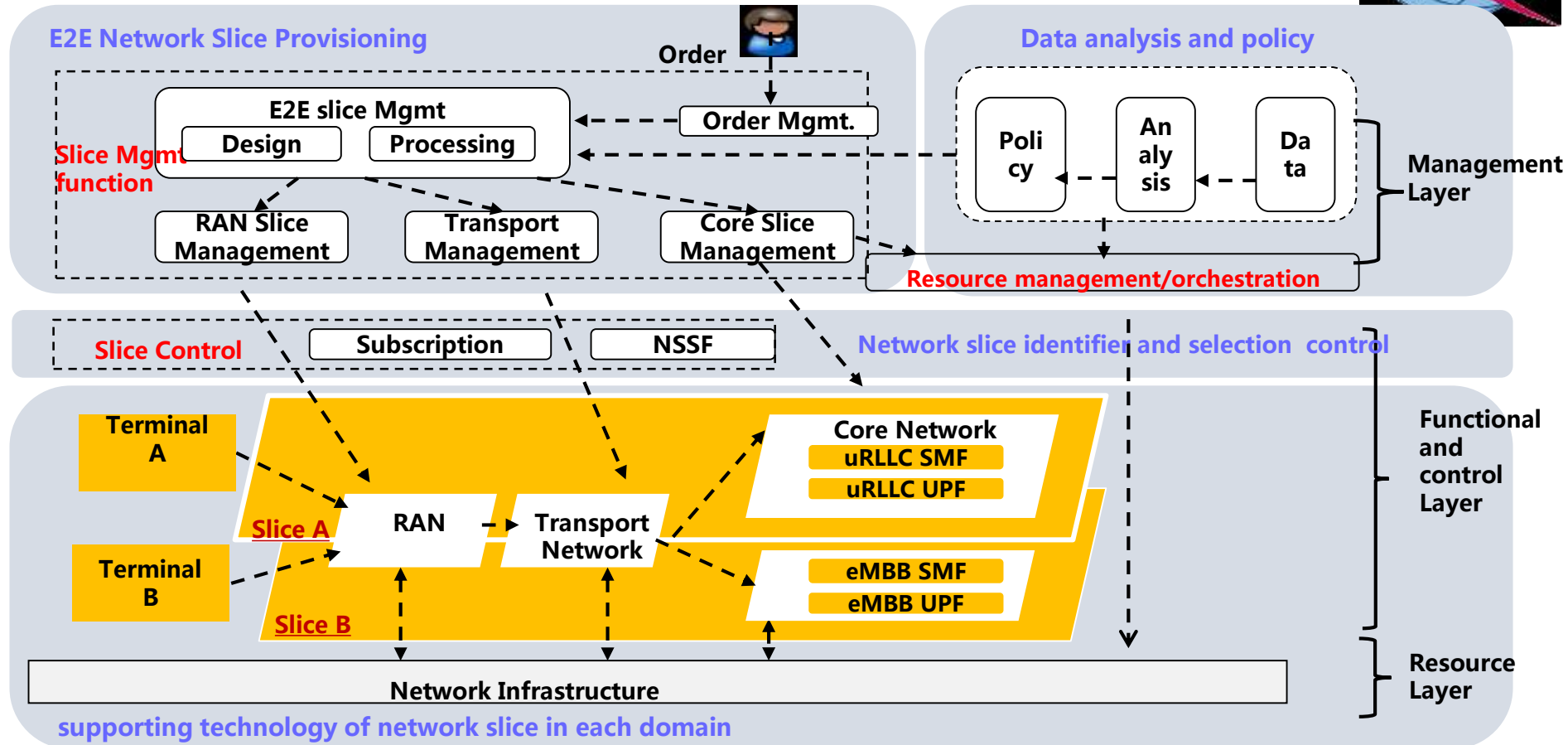


Network slicing as a service: Industry customers can order 5G network slicing from operators according to service type, service coverage, performance index requirements, and special function feature requirements.

- Basic communication connection service: Provides dedicated **network connection services** to meet the most fundamental communication requirements of the vertical industry
- Customized **value-added services**: provide customizable value-added services, provide enhanced service or resource capabilities, and promote business development of the vertical industry
 - Network business services: including high-definition audio and video communications, cache distribution and other services
 - Network resource services: provide resources for deploying industry applications, such as for MEC applications
 - Management services: provide the status of the network, such as capacity, etc.



End to end network slicing architecture



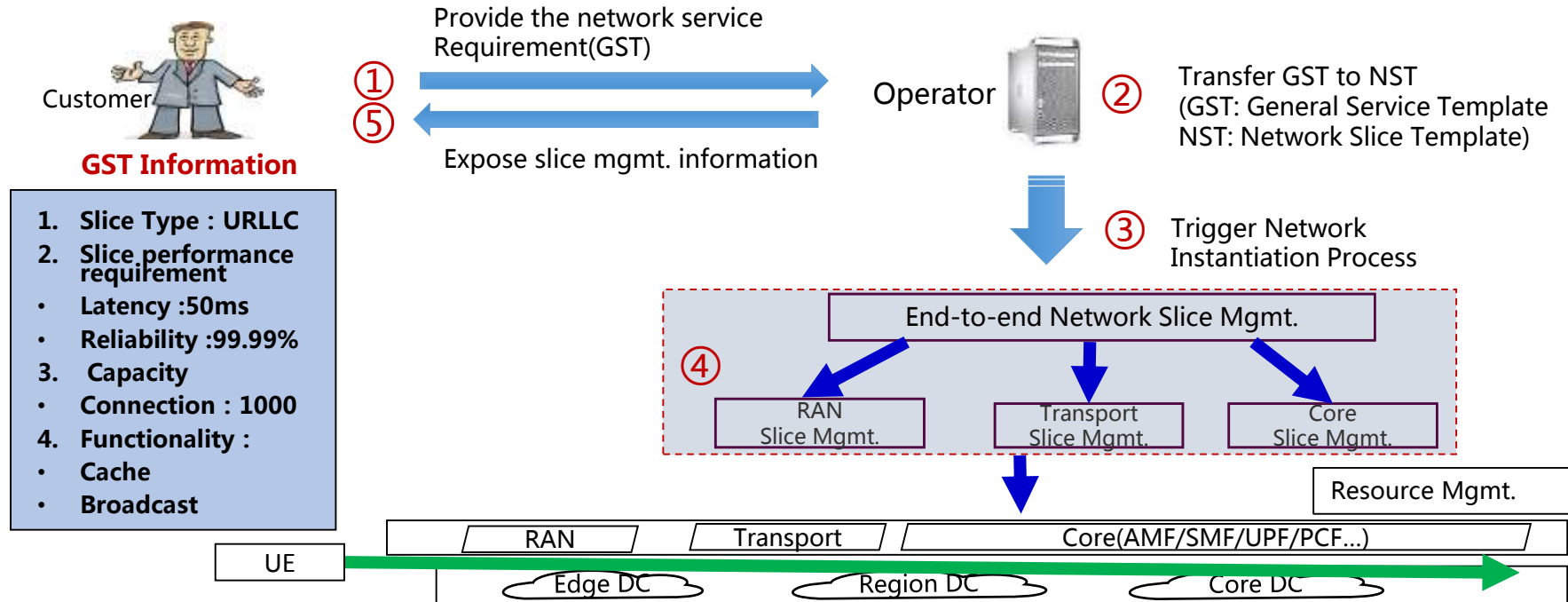
China mobile actively promotes the technical standards in 3GPP, ITU-T, NGMN, etc.



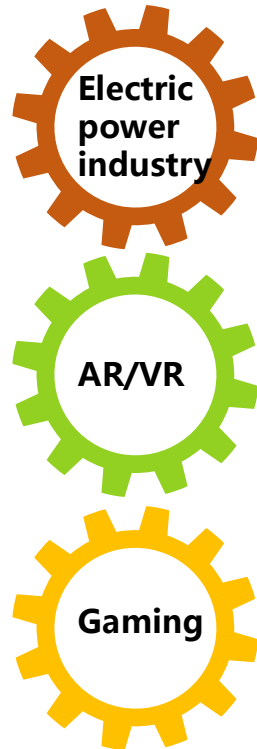
The way to create a network slice



- Industry customers order network slices from operators and provide the network requirements, including network slice type, capacity, performance, and related coverage. Operators generate network slices according to their needs.
- Industry customers obtain management information of ordered slices through open interfaces (such as number of access users, etc.)



China Mobile Explores 5G Network slicing Applications



What requirements for network slicing from Verticals



what kind of slices (slice capabilities) can be provided by operators
(slice template from the aspects of deployment, network capabilities and infrastructure)

DC Resources/Networking Function capability Configuration(performance,etc)

Explore and release three kinds of slice templates to make 5G network to support and enable 5G business in Shanghai MWC 2018

- China mobile actively promotes the industry application of slicing in GSMA, 5GSA.
- As one of founding members, china mobile initiates the 5GSA(5G slicing association) in Barcelona MWC 2018

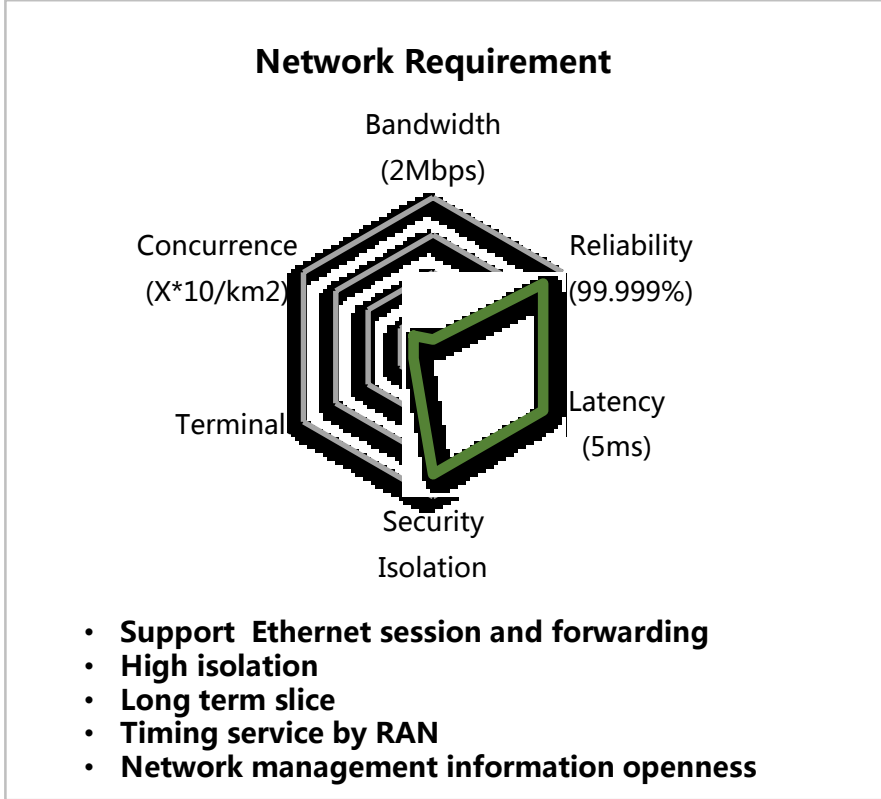
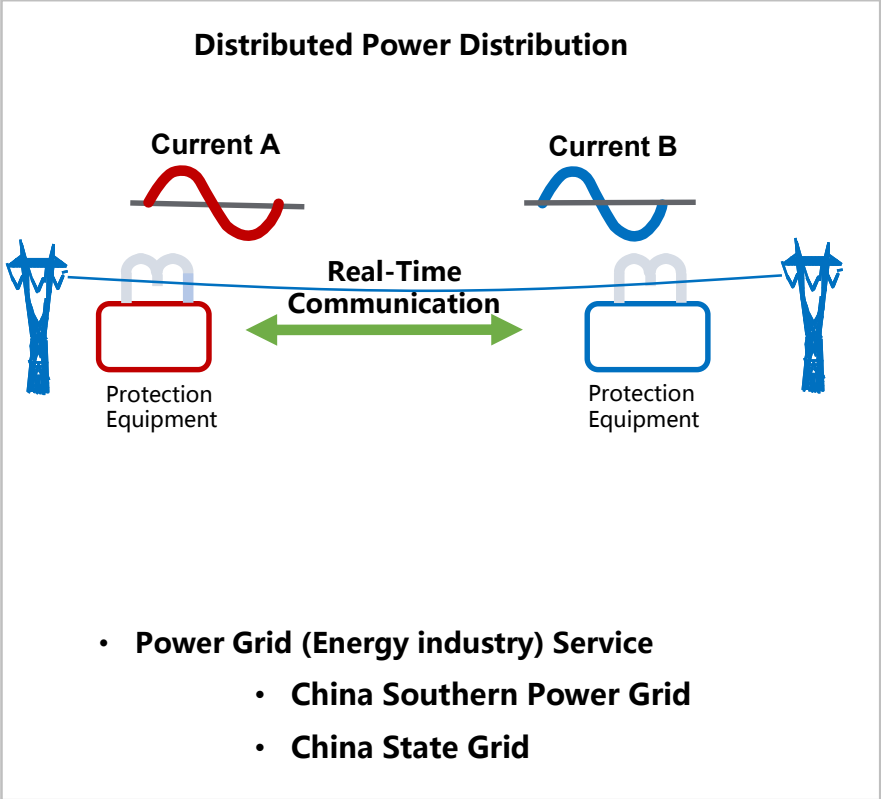


5G Network Slicing Application-Power Grid

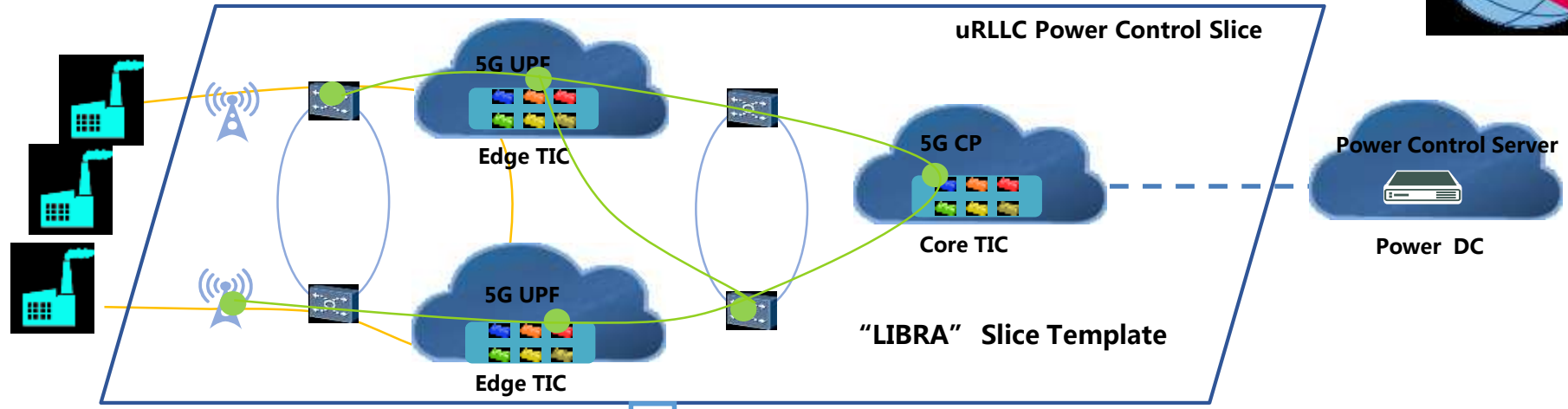


Scenario

Requirement



5G Slicing Template- Power Grid Industry



Template

<p>RAN</p> <ul style="list-style-type: none"> • Timing • Low latency 	<p>Core</p> <ul style="list-style-type: none"> • Edge TIC+Core TIC • Shared physical resources • Dedicated uRLLC CN NFs/VMs • UPF with Ethernet packet support • QoS (e.g., 5ms/2Mbps) 	<p>Transport</p> <ul style="list-style-type: none"> • Flex-E hard isolation among TICs • No connection between TIC and Power DC
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Fit for



Note: TIC is telecom integrated cloud



5G Network Slicing Application-VR Live Broadcast



Scenario

Requirement

Beijing Main Meeting place

Shenzhen Sub-meeting place

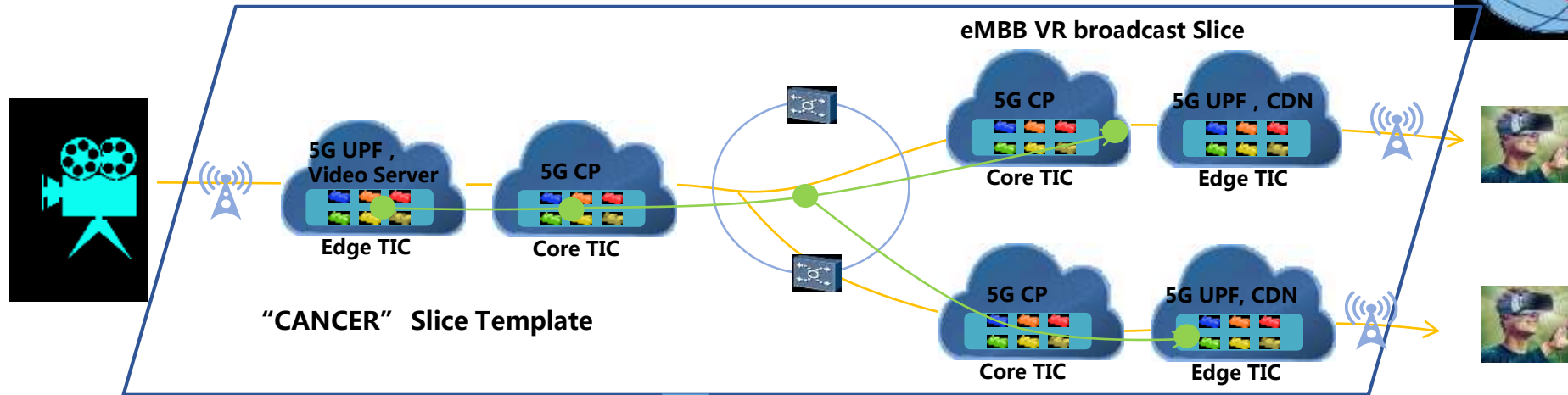
Shanghai Sub-meeting place

- VR live broadcast service
 - LetinVR Digital Technology

- BW guarantee
- High concurrence
- Dynamic on-demand Network Slice
- Edge APP (e.g., Video processing locally)
- Low isolation



5G Slicing Template- VR live broadcast



Template

RAN <ul style="list-style-type: none"> • Uplink BW • High concurrence • Downlink BW 	Core <ul style="list-style-type: none"> • Edge TIC+Core TIC • Edge Video Server/CDN • Shared physical resources • Dedicated eMBB CN NFs/VMs • QoS (e.g., 50Mbps) 	Transport <ul style="list-style-type: none"> • Soft isolation among TICs in one province and cross provinces
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Fit for

Drone patrol for oil line



Emergency video communication for energy or



Note: TIC is telecom integrated cloud



5G Network Slicing Application-AR Game



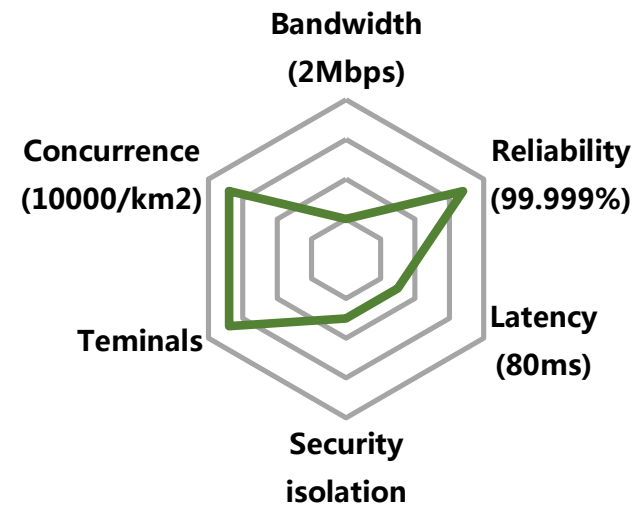
Scenario



“一起来捉妖”

- Mobile AR Game service
 - Tencent

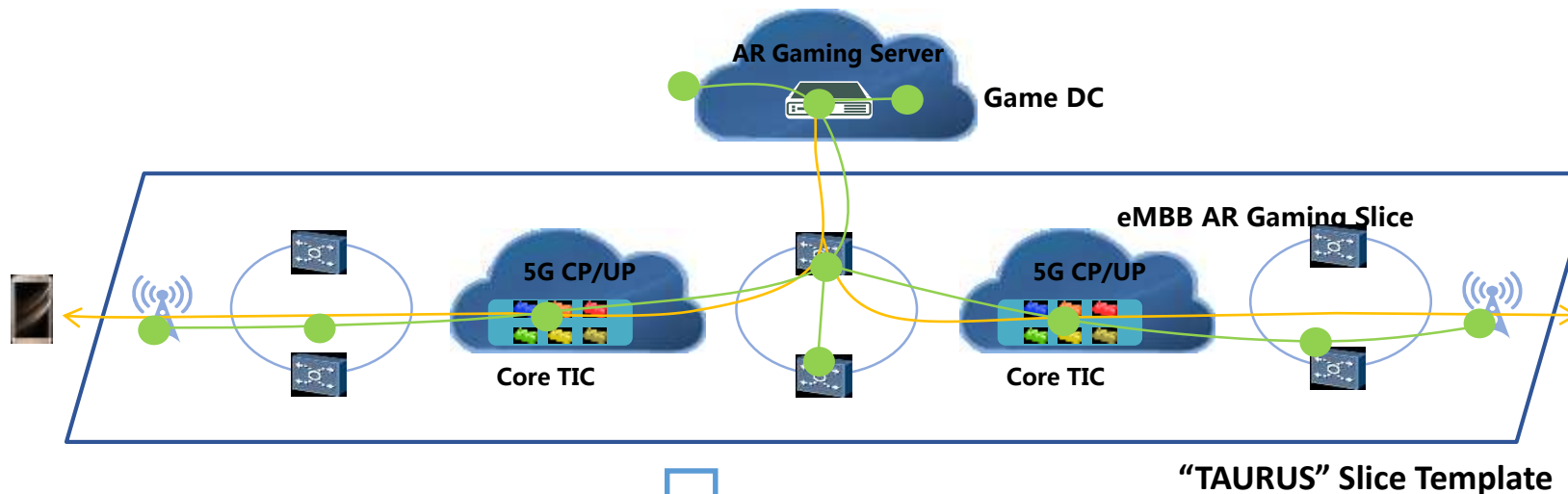
Requirement



- Low jitter on latency
- Slice subscription openness
- High concurrency
- Low Isolation
- Mobility support and high coverage



5G Slicing Template- Mobile AR Gaming



Template		
RAN <ul style="list-style-type: none"> • High concurrence • Low jitter on latency • Wide coverage and mobility 	Transport <ul style="list-style-type: none"> • Soft isolation among TICs • Soft isolation between TICs and Game DC 	Core <ul style="list-style-type: none"> • Core TIC • Shared physical resources • Shared/Dedicated eMBB CN NFs/VMs • Slice subscription openness • QoS (e.g., 80ms/2Mbps) • Mobility

Fit for



Assisted driving



Note: TIC is telecom integrated cloud



Summary



- From technical aspects, 5G network slicing, one of key 5G features, is an end-to-end network technology which needs to be promoted from the aspects of standards, technologies and industries.
- From business aspects, 5G network slice is a basic service or product for industry verticals.
- Different from traditional mobile service for public users, industry verticals have their customized requirement with service guarantee, which need deep cooperation between operators and verticals.
 - **Exploring key use cases and customers is more important and urgent in the present situation(5GSA, GSMA, etc.)**





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