



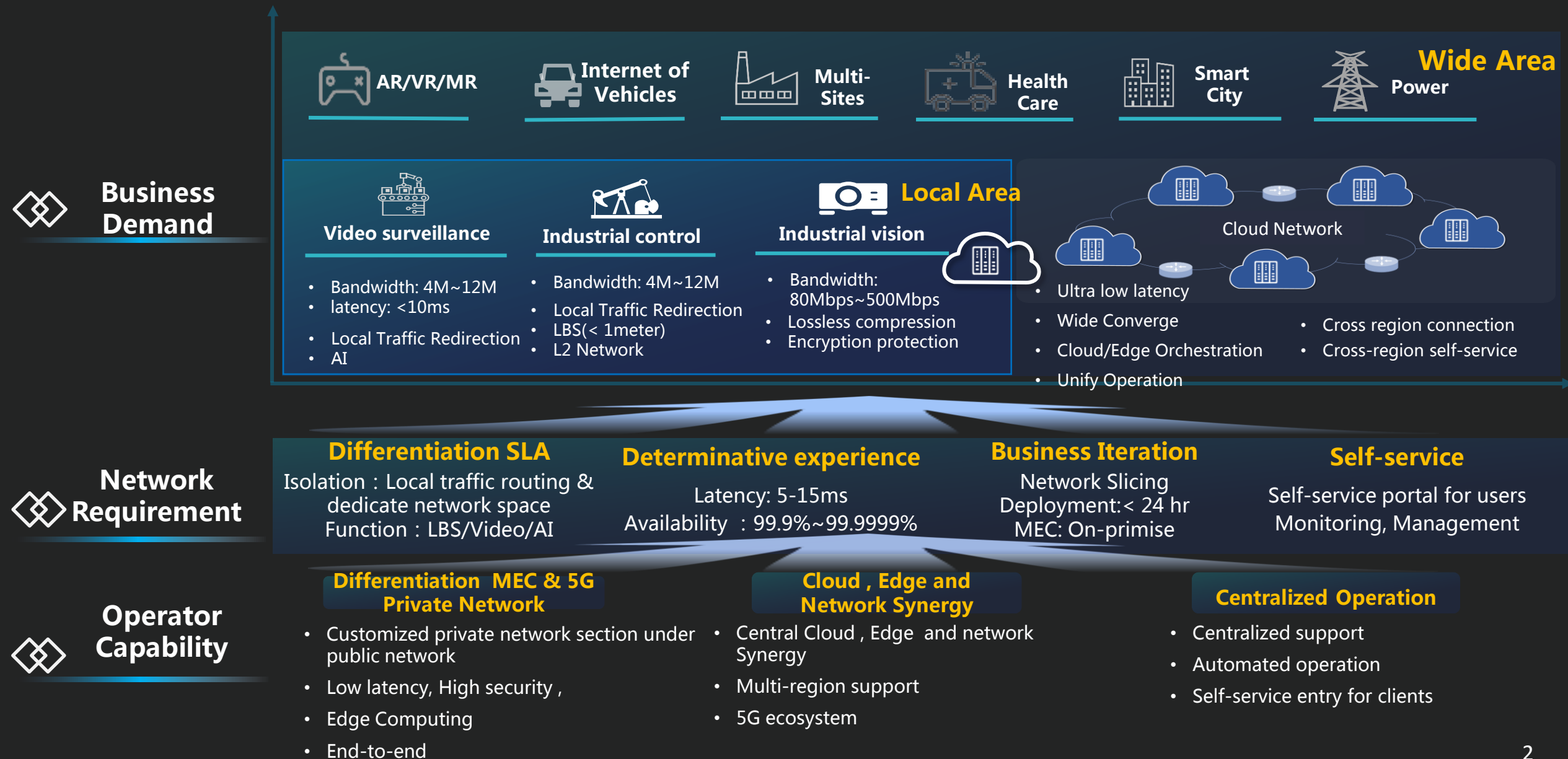
China Unicom 5G MEC Commercial Practice in Industry for Digital Transformation

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New network demands for 5G industry application

- Differentiate, Synergy and Centralized Operation



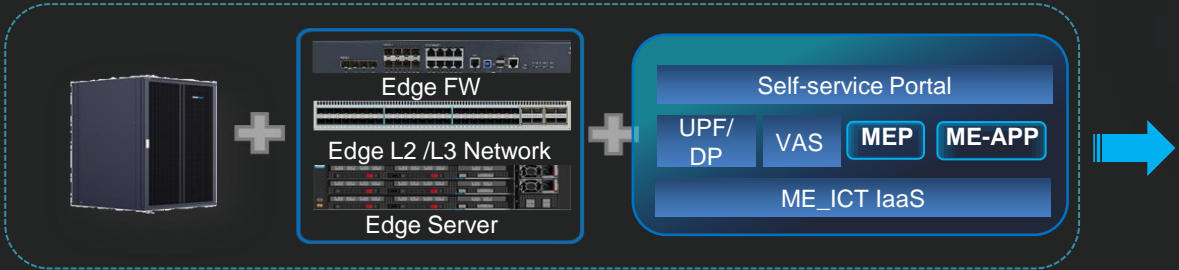
China Unicom 5G MEC

- Low-latency network and high-quality edge computing

Product Definition

5G MEC = (Edge Network + Edge Computing) x Edge Ecosystem x Integrated Service

A 5G-based platform over mobile edge network with edge computing capability , **providing end-to-end ICT services which are integrated, open, synergy and elastic**. It help users to deploy service close to business with better performance and better cost-effective .

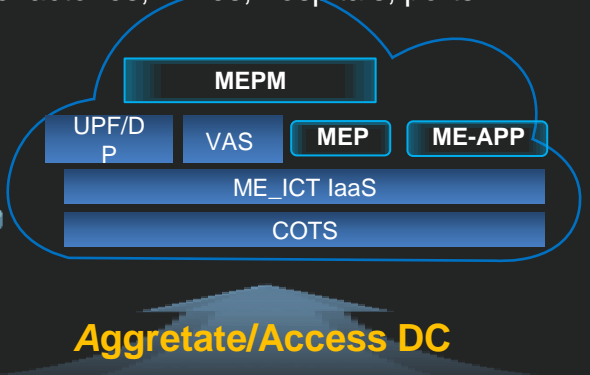


- 5G
- Home
- Enterprise



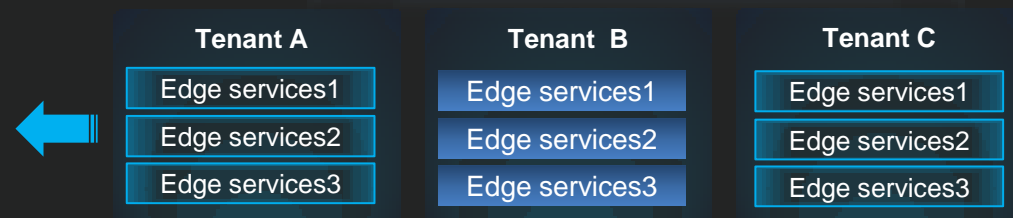
01. On-Site:Dedicated Model

- For 2B customers, to provide "plug and play integrated" dedicated services to meet intact user data for high security requirements. Self-service services is also provided to clients (self-monitoring, self-deployment, self-operation and etc.)
- Typical scenario : Large factories, mines, hospitals, ports



02. Aggretate/Access DC: Shared Model

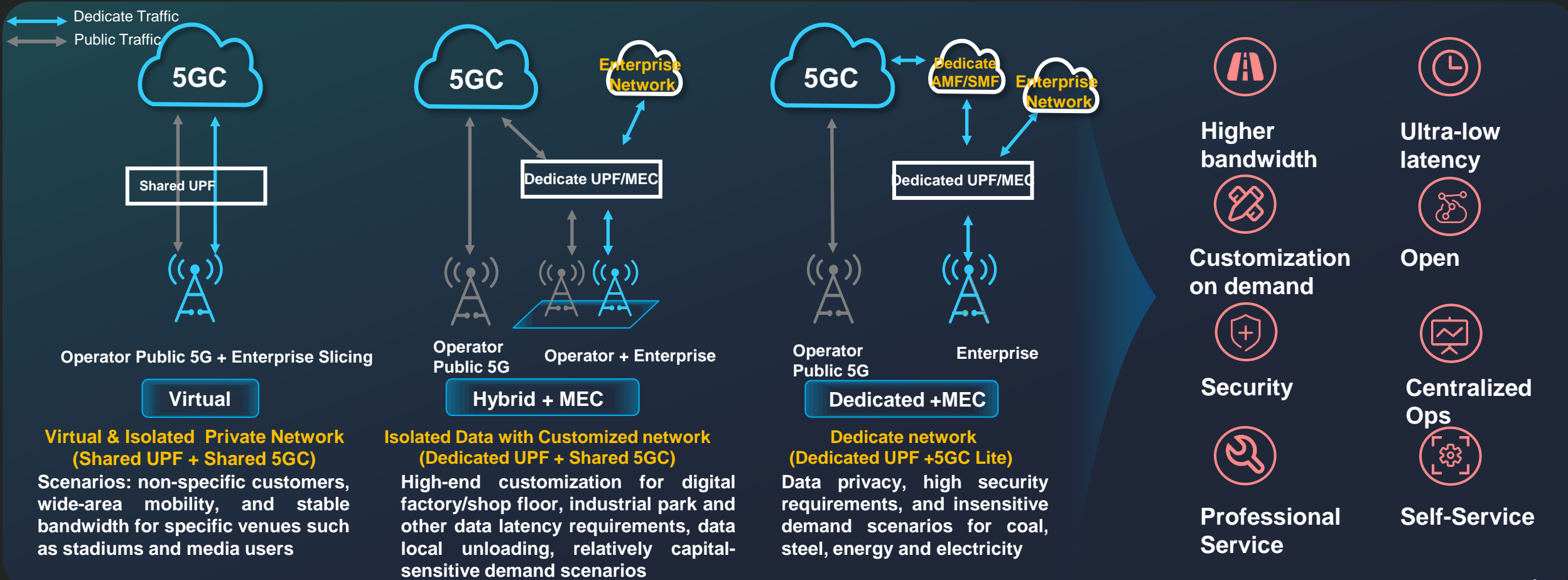
- 2B or 2B2C customers who need to, share edge infrastructure in a "multi-tenant" way, typically deployed in Aggregate/Access DCs
- Typical scenario : campus, cloud gaming/XR and other wide-area services



- Three Models : Virtual ,Hybrid and Dedicated

Product Portfolio

There are three models for China Unicom 5G private network according to the level of customization: **Virtual ,Hybrid and Dedicated**. They are designed to different type of clients to provide 5G network for **specific area coverage, specific network transfer, specific security level and user end device management** to fit different business scenarios



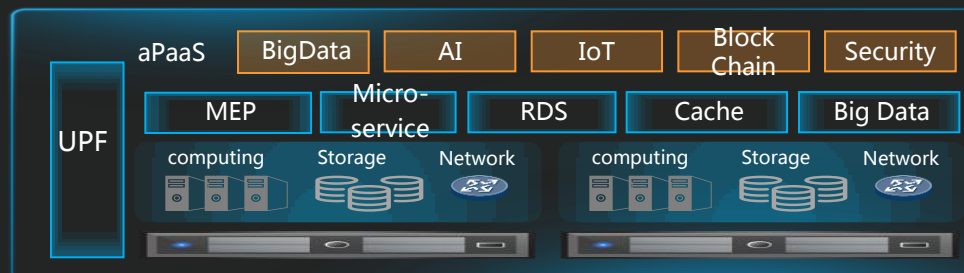
Industry Digital Transformation Acceleration by 5G MEC

- CNEEB "5 in 1" : Cloud, Network, Edge, End-Device & Business

⑤ **Business** ✓ 2B、2C、2H Applications and Ecosystem



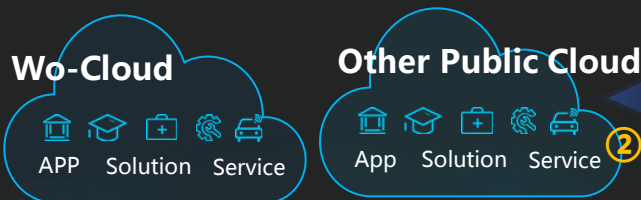
③ **Edge** ✓ Lower-down computing to edge to provide new computing model with ecosystem capability



④ **End-Device** ✓ Diversification, customization, pan-device, intelligent device,



① **Cloud** ✓ Public and Private cloud. Multi-cloud orchestration



② **Network** ✓ Network orchestration with Cloud; Agile, Open, Elastic and efficiency network

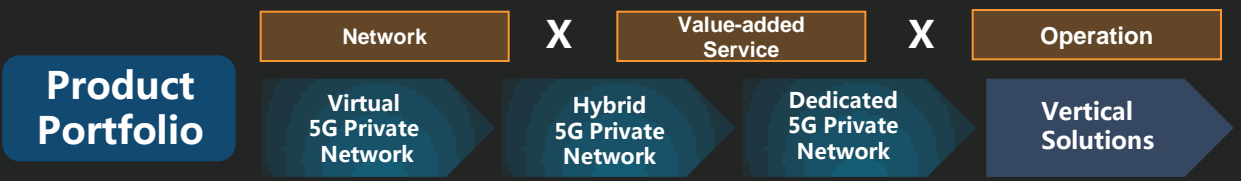


China Unicom Intelligence 5G Operation Platform:

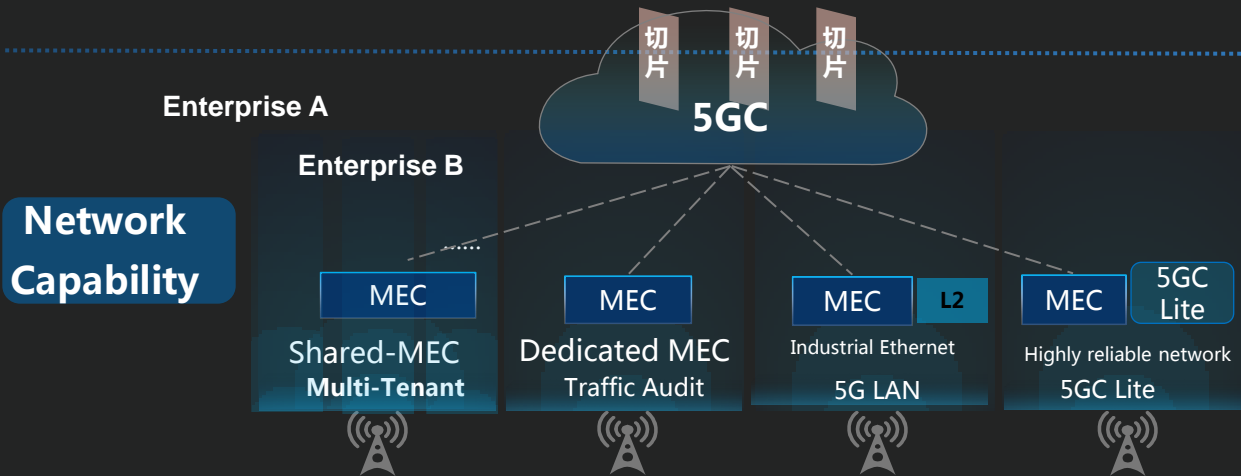
- The centralized ops platform to support 5G MEC business scaling and replication



- Product Gap-Filling**
 - ✓ Integrated with Business Middle Platform for seamlessly produce go-live and provisioning process
 - ✓ Integrated with IOT management Gateway for SIM card configuration
- Network Gap-filling**
 - ✓ Integrated with OMC for network service provisioning automation
 - ✓ NSMF+ integrated with wireless, access, aggregate and core for overall network management



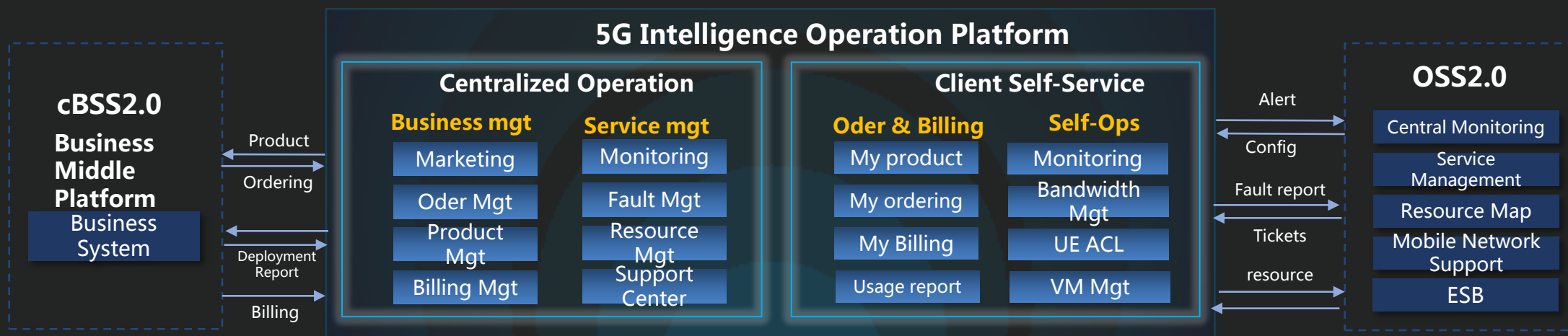
- Product Portfolio Definition**
 - ✓ Define 2B business model and identify the service components (Network, computing or value-added PaaS) and price model
 - ✓ Define unit product and enable ordering and provisioning automation



- Wide solution Coverage**
 - ✓ Beyond standards, innovation-friendly, enhance network capacity, 2B2C synergy, rich industry applications
- Automated Provisioning**
 - ✓ Build-in UPF with Pre-integrated to support plug-and-play
- Reliable Network**
 - ✓ Differentiated SLA , Hight-reliable 5GC ; High-Available UPF

- The platform to support internal operation and external self-service

Country-wide 5G centralized platform for 5G MEC/Private Network in **unified operation, centralized support and client self-service**



Support internal operation : Seamlessly integrated with Business Middle Platform and OSS2.0 with the capability to provide end-to-end support

Support external self-service : Dedicated for client with the capability for on-site support



Pre-sale



Middle-sale



Post-sale



Shanxi China Unicom & PangPangTa Coal mine

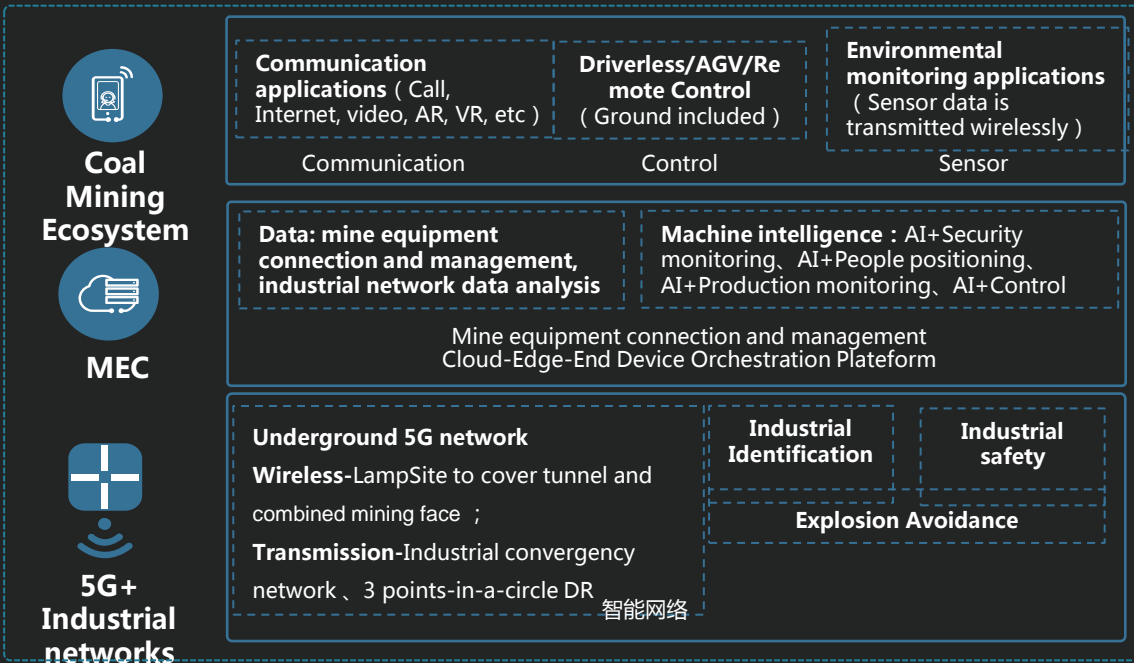
Intelligent Coal Mine Project



PangPangTa Coal mine introduction:

- Capacity > 10,000,000 tons/year
- First China Coal Mining Standard Pilot project
- More than 100 kilometers, combined mining face > 300 Meters. 4 combined mining face

Intelligent Coal Mine Ecosystem Architecture - 5G is one of the core infrastructures



Source : China Unicom Shanxi Province

Reliability Requirement : 5G system for coal mining should be able to network independently and run independently in case of the external network failure or disconnection

煤矿 5G 通信系统安标

China Coal Mining Communication Safety/Security/Reliability Standard

安标国家矿用产品安全标志中心有限公司
二〇二〇年六月

3.1 核心网

系统应能实现独立组网、独立运行，在外部网络故障或断开时，系统应能实现安全、独立、稳定运行，保证无线通信及数据传输的可靠性、稳定性。

June 17th, 2020, China Security Standard Center released Coal mining 5G Communication system safety technical requirements (Pilot). 5G system for coal mining should be able to network independently and run independently , In case of the external network failure or disconnection , The system should be able to operate safely, independently and steadily , to ensure reliable and stable wireless communication and data transmission. It is to meet the relevant provisions of safety isolation on the well;

Typical business scenarios for the coal industry :

scenario	Description	Availability requirements
Underground fixed video surveillance	Underground roadways, transport car park distribution video	In case of the external network failure or disconnection , surveillance should keep running independently over 24 hours
Underground remote control	Remote control and video transmission of coal mining surface shearers and diggers	In case of the external network failure or disconnection , end device should keep running over 24 hours
Underground automatic inspection	Automatic inspection of the robot underground electromechanical chamber	In case of the external network failure or disconnection , robot should keep running over 24 hours

PangPangTa Coal Mining Scenarios : High reliability, Low latency and broad bandwidth



Unmanned surface remote digger



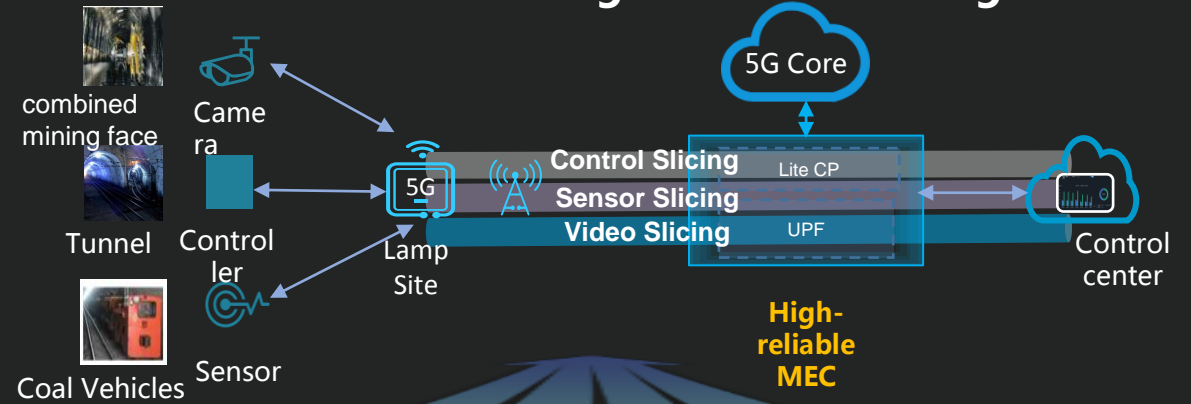
Underground staff monitoring



Underground sensing equipment connection

Application	Scenario	Network Requirement
Control system	The coal mining surface coal machine is controlled remotely and centrally	Latency < 50ms Reliability > 99.999%
coal mining Sensor	Underground environment and machine operation monitoring	> 5000+ Devices
HD video streaming	Work surface, digging surface, transport reprint point, distribution video	Upstream bandwidth > 1.6Gbps

High-reliable MEC/Private 5G Network for Critical coal mining business running



- Dedicated wireless + Dedicated MEC
- MEC local traffic redirection
- Edge MEP + Vertical applications
- Network Slicing for isolation

- Reliable Network**
- Intact Data**
- Low latency**
- Board bandwidth for video**
- Business isolation**

China Unicom: Leading 5G MEC/Private Network Commercial Practice

In 2020, Over 100 MEC/Private 5G network project had been deployed to support client in digital transformation

Virtual 5G Private Network+MEC for Smart Grid **【State Grid】**

5G SA with network slicing and end-to-end orchestration for grid scheduling



- ◇ 5G Slicing for reliable private network
- ◇ Support data analysis for business

Hybrid 5G Private Cloud for Smart Manufacturing **【Gree】**

Machine vision for quality control

Dedicated 5G Private Network+MEC for smart coal mining **【HuoZhou Coal】**

China first 5G+ Smart Coal mining



- ◇ Dedicated 5G private network +MEC
- ◇ MEP + Coal mining apps



- ◇ enhanced 5G coverage with dedicated UPF
- ◇ MEP+ manufacturing apps

#	Province	Client Name	Industry	运作模式
1	GuangDong	Gree electrical 格力电器	Manufacturing	MEC+5G Slicing+Value-Added Service
2	ShanXi	Jinnan Steel 晋南钢铁	Manufacturing	MEC+Ecosystem App
3	GuangDong	WeRi de 文远知行	Internet of Viehcle	MEC+Ecosystem App
4	GuangDong	Mino 明珞装备	Manufacturing	MEC+Ecosystem App
5	Gansu	Baofang carbon 宝方碳材	Manufacturing	MEC+Value-Added Service
6	Jiling	FAW Red Flag 一汽红旗	Manufacturing	MEC+5G Slicing+Value-Added Service
7	Zhejiang	State Grid 国网秒控	Power	MEC+Value-Added Service
8	HeiLongJiang	Yichun West Steel 伊春西钢	Manufacturing	MEC+Value-Added Service
9	GuangDong	Toyota(Guangzhou) 广州丰田	Manufacturing	MEC+Ecosystem App
10	GuangDong	Honda(Guangzhou) 广州本田	Manufacturing	MEC+Ecosystem App
11	Xinjiang	State Grid 国家电网	Power	MEC+Ecosystem App
12	AnHui	Changhong Meiling 长虹美菱	Manufacturing	MEC+Value-Added Service
13	Jiangsu	China University of Mining and Technology 中国矿大	Education	MEC
14	Jiangsu	Bosch (Suzhou) 苏州博世	Manufacturing	MEC
15	QingHai	Scenic spot	Tourism	MEC+Value-Added Service+Ecosystem App
16	JiLing	SiPing City Public Security Bureau 四平市公安局	Smart city	MEC+Value-Added Service+Ecosystem App
17	Anhui	JEE 巨一	Manufacturing	MEC
18	GuangDong	BaoWu Steel 宝武钢	Manufacturing	5G Dedicated Network+MEC+Value-Added Service
19	Zhejiang	Ferrotec 大和热瓷	Manufacturing	MEC+Value-Added Service
20	ChongQing	Chuanyi Automation Co., Ltd 川仪自动化	Manufacturing	MEC
21	GuangDong	Sunwoda 欣旺达	Manufacturing	MEC
22	GuangDong	EVOG 研祥集团	Manufacturing	MEC
23	GuangDong	Zhuhai City Emergency Management Agency	Government	MEC
24	GuangDong	TianHong Digital Mall 天宏数码城	Building	MEC
25	GuangDong	HuCais 虎彩	Manufacturing	MEC+Ecosystem App
26	ShangHai	ZhangJiang 张江人工智能岛	Building/Campus	5G+MEC+Ecosystem App
27	ShangHai	COMAC(商飞)	Manufacturing	5G+MEC+Ecosystem App
28	HeBei	State Grid(Heibe)	Power	5G+MEC+Ecosystem App
29	ShanXi	Zhang Jiaxuan Coal Mine	Manufacturing	5G+MEC+Ecosystem App
30	ShangHai	SWS 外高桥造船	Manufacturing	5G+MEC+Smart shipbuilding applications

Thank you.



5Gⁿ
让未来生长