China Unicom 6G VISION

Source: Qun Wei <weiqun5@chinaunicom.cn>, China Unicom
Agenda item: 8
Document for: Discussion

S1-241125 - 3GPP SA1#106, 27 May – 31 May 2024, Jeju Island, KR

© 3GPP 2024

General 6G Vision

- **Overview and Drivers**
  - 5G-A/6G integrated development and operations
  - New life, manufacture and world
  - Socially, technologically and Innovation driven
- **To start with umbrella SA1 SID is possible!**

1 6G Categories and High Priorities

中国联通 China unicom

5G/5G-A

- RedCap, 5GSAT, AmbientIoT, AI/ML, NetShare……

6G Future Network

- Immersive Communication
- Hyper Reliable and Low-Latency Communication
- Massive Communication
- Qbiquitous Connectivity
- AI and Communication
- Integrated Sensing and Communication

6G Essential use case

1. Immersive Communication
2. Distributed Network
3. Integrated sensing and communication
4. Ubiquitous Connectivity
5. Data Services

6G typical use case

1. Integrated AI and Communication
2. Massive Communication
3. Quantum-safe Security and Trustworthiness-Digital Identity System

6G design and operation

1. Customizable network and Resilience
2. Sustainability: Energy Efficiency
3. Simplified and Unified Network
4. Wireless and Wireline Convergence
5. Natural Operation and Orchestration

2 Prioritized UCs: Immersive Communication

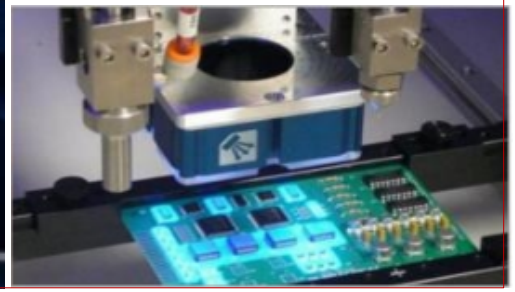
中国联通 China unicom

Use cases

- ✓ **Immersive communication**
  - XR Wearables
  - Virtual live show
  - Virtual meetings
  - Remote interactive sell
- ✓ **Holographic Communication**
  - Surgical Practice
  - Physical Activity
  - Artistic Education
  - Mechanical Operation
- ✓ **Multi-Modal communication**
  - Barrier-free society
  - Elderly life
  - Safe driving
  - Leisure and recreation
- ✓ **Ubiquitous interaction**
  - Polymorphic devices
  - Smart home
  - Smart city
  - Smart transport

Capabilities

- ✓ **Ultra KPIs**
  - Bandwidth
  - Latency
  - Reliability
- ✓ **Real and virtual**
  - High-precision positioning
  - Spatial calculation
  - Identify Network info
- ✓ **challenging KPI**
  - Holographic telepresence, Interaction between Human-digital entities-objects-environments
- ✓ **Accesses**
  - Diversified terminals
  - Multiple connections
- ✓ **Others**
  - Edge Computing
  - Naked-eye 3D
  - Generating .....



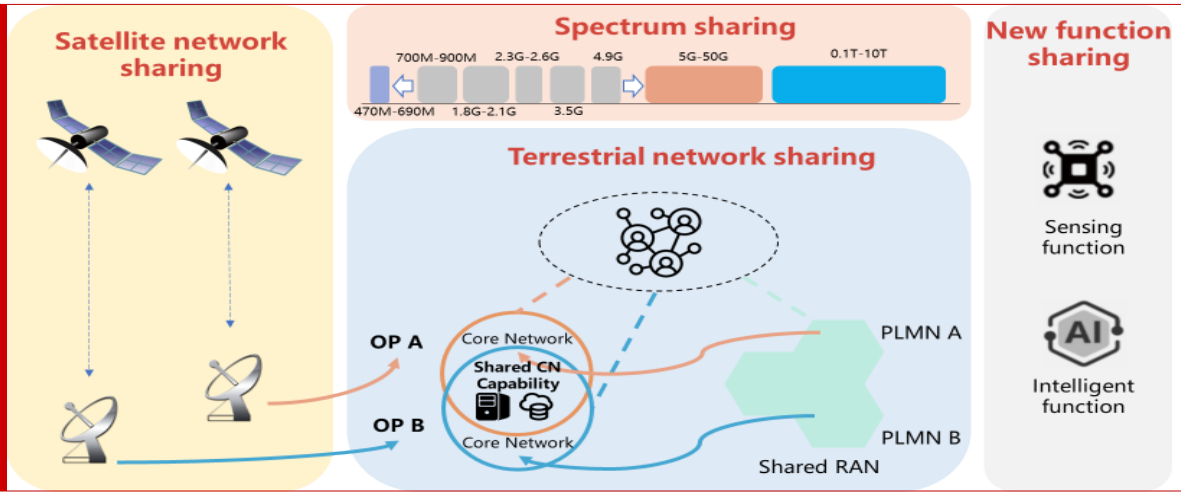
Prioritized UCs: Ubiquitous Connectivity

- **Ubiquitous connectivity** achieves **unified and efficient resource planning and network control** of the communication network, construction of **ground, airspace and sea areas** to provide global space continuous communications.

Ubiquitous Connectivity

Key points and Consideration

1. Efficient OPEX for network deployment
2. Wireless resources scheduling
3. High density of access nodes plan
4. Energy efficiency and saving



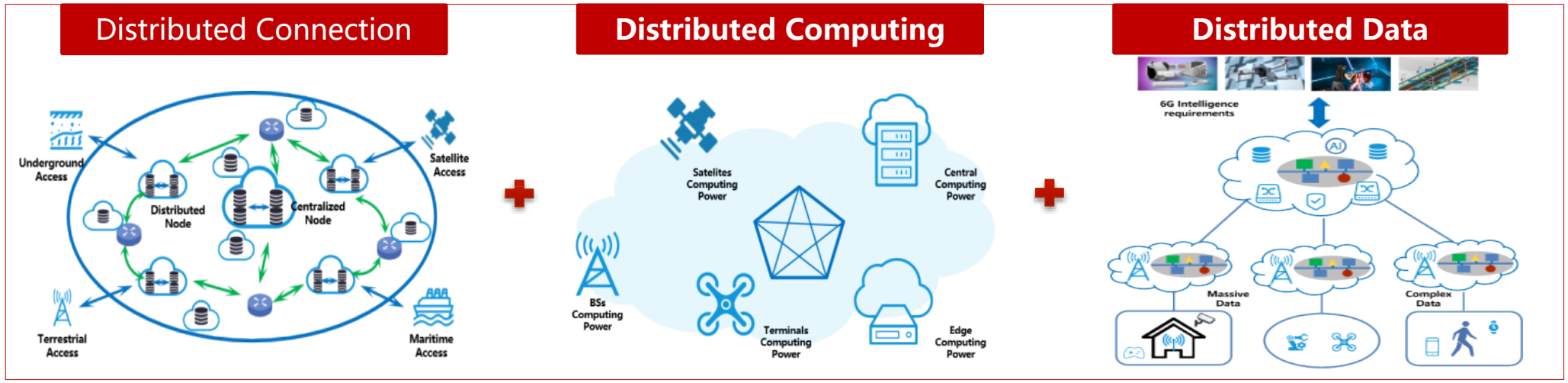
Network Sharing

Use cases extension

1. Wireless resources sharing
2. Terrestrial network sharing
3. Satellite network sharing
4. New functionality sharing

4 Prioritized UCs: Distributed Network

- **Scenarios:** New scenarios like providing **user-friendly customization(User-Centric)** and corresponding flexographic network, to UEs, 3rd parties, industries, IoTs, etc..



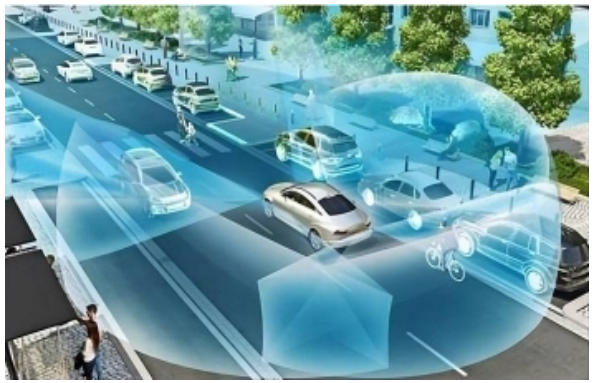
- **Information Identify :** Understand user requirements and **identify service network** (e.g., application server topology) to enable on-demand dynamic generation of distributed networks.
- **Flexible orchestration :** Achieve **collaboration and intelligent autonomy** within and **between distributed networks**.
- **Trustworthiness :** Distributed network authentication and security, etc..

5 Prioritized UCs: Data Service

- **Key point:** Build an **independent data plane**, provide unified data control&&management, **lifecycle management** of data service, and meet the requirements of new scenarios and technologies in 6G.

6G data service scenarios

Sensing and Communication



Immersive Communication

Digital Twin

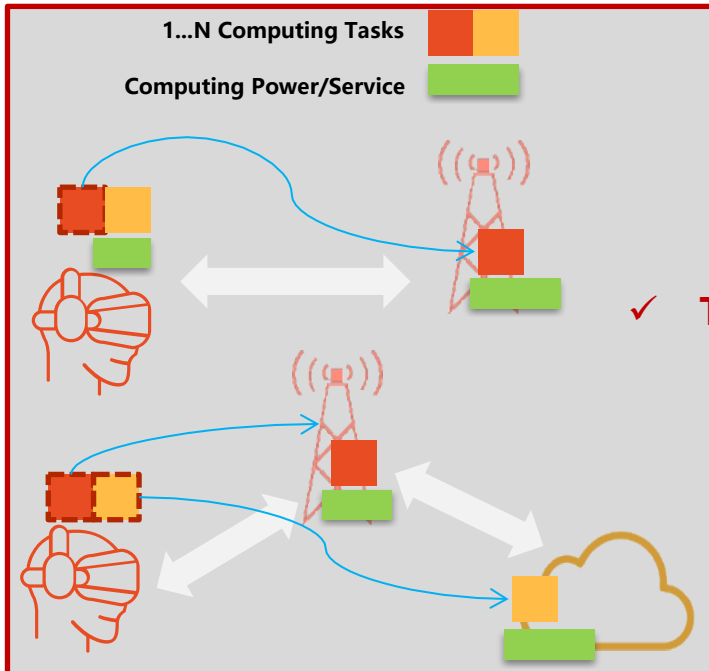
AI Native

- 6G data service abilities:
  1. **Unified data plane** functions need to be considered at the beginning of 6G architecture design, to support the data service.
  2. Involves unified data collection, transmission, processing, storage, analysis and sharing.
  3. Different KPIs, that require highly reliable data storage, high-speed data processing, and extremely reliable data transmission.
  4. Supports efficient management and operations with scalable 6G data plane protocol stacks.

Prioritized UCs: Computing and Network Convergence

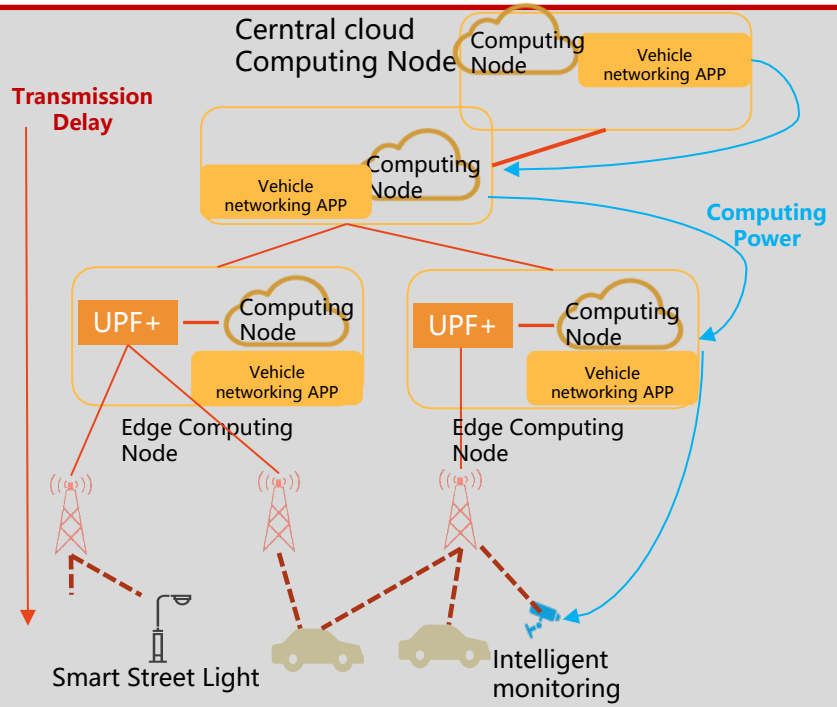
■ **Key point: Computing as a service**, beyond the communication connection

1. Computing power enhancement involves terminal computing, edge computing, cloud computing and other computing resources.
2. Endogenous computing functions are introduced, to **coordinate the communication resources and computing resources**, so as to achieve the optimal experience of on-demand computing.



✓ **ToC Use case:**

- XR Render computation
- AI distributed learning
- .....



✓ **ToB Use case:**

- Intelligent Connected Vehicle
- Remote driving
- OTA software upgrade
- Vehicle-road collaborative perception

– Computing ability expansion/offloading (e.g., UE)
– Distributed computing orchestration (task trigger)

– Computing source management from UE to Cloud nodes

– Wide area mobility
– KPI updates

MNO Vision and Consideration

- **6G technology are on the way, consensus direction, regional requirements and partner interests.**

✓ The vast majority of **scattered functionality** will make it **difficult to bring to market**.

✓ Identifying the **difference between 5G and 6G use cases** is challenging and important.

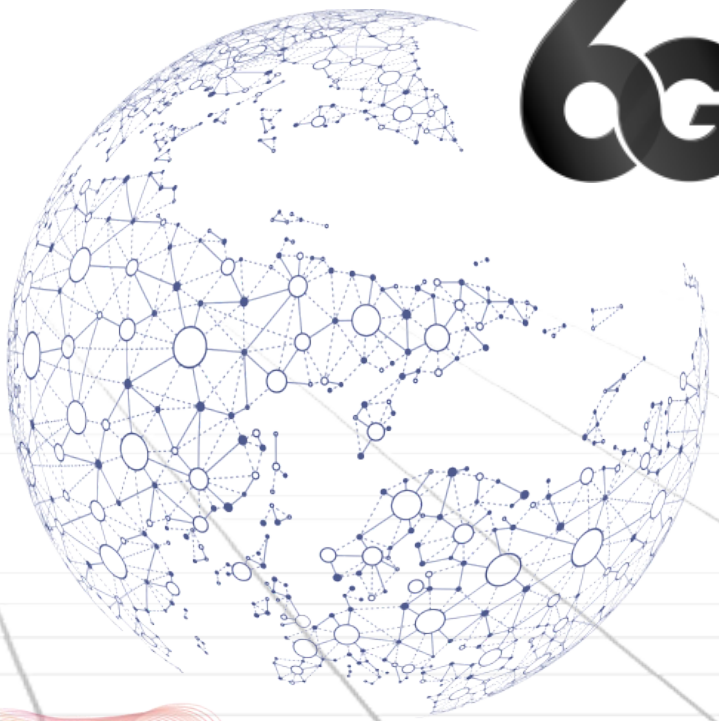
✓ **6G is not a new baby, so compatibility of key 6G features with 5G and 6G** needs to be considered in advance.

✓ **General guidance from SA1** to sub-group work, e.g. 6G design principle (avoid multiple options).

✓ Where individual requirements cannot be avoided, functionality should be **designed in a simple, modular and composable way,** with baseline requirements and independent branches, taking into account the unified 6G network.

✓ **6G baseline**: network greening, automation and sustainability.

6G SID Way Forward

- **Three approaches provided:**
  - ✓ Option 1: One big SID, the scope of which can be generalised and not include building block divisions. There is a chance that we could reach an agreement in August.
  - ✓ Option 2: A large SID with a scope that touches on building block divisions. there is a risk of one meeting delay.
  - ✓ Option 3: A large SID with a scope that does not touch on building block divisions. Let the use cases flow in freely, then consolidate them once we have the full picture. Or building block is discussed at the skeleton stage after the SID is approved.
- **Question:**
  - ✓ **SA2 SID** is expected to be approved in **June' 2025**. **What does SA1 need to achieve before that**, categories, principles?

THANK YOU