



2024 创新预见 Better Together
6G未来 Better Future
全球6G技术大会
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6G OSS Architecture and Key Tech

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6G OSS Architecture and Key Tech

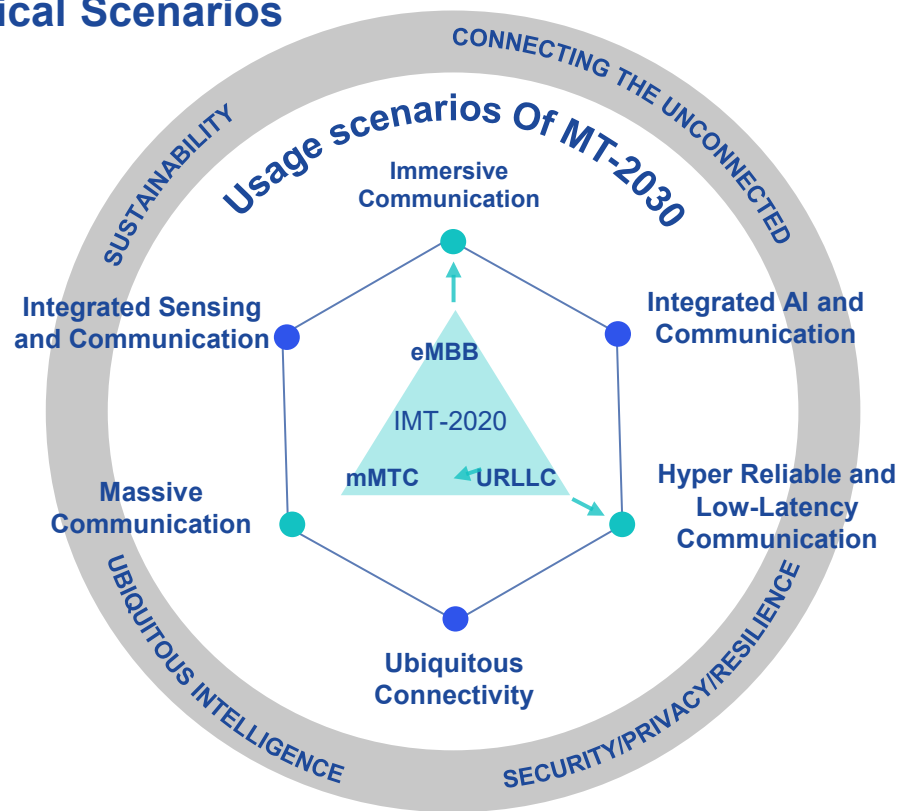
- 6G and 6G OSS
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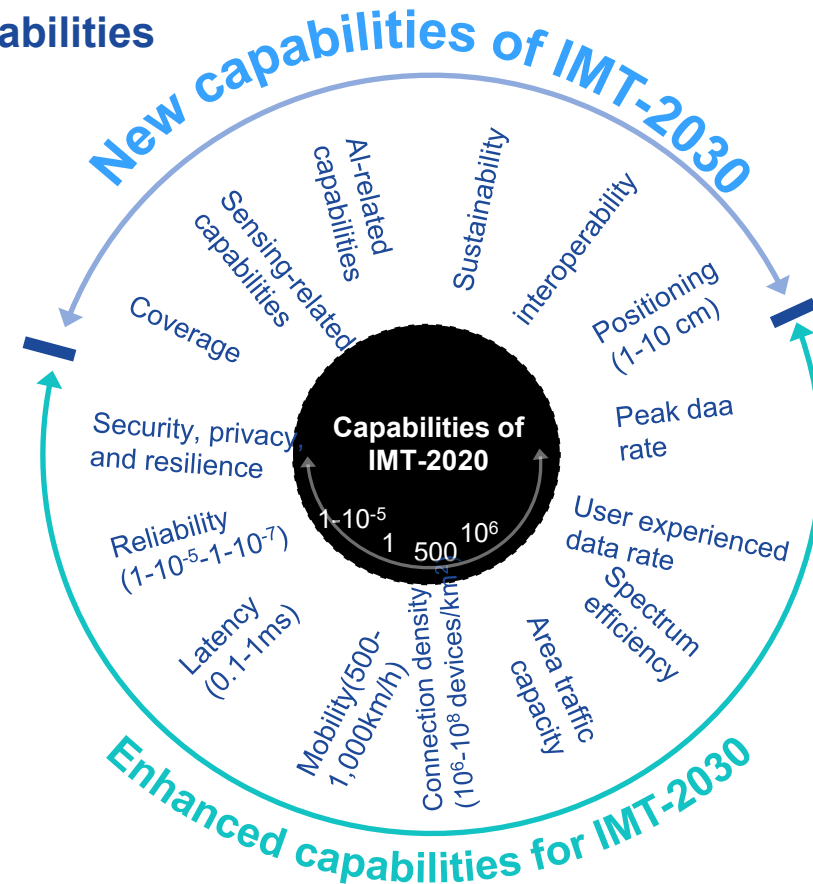
Collaborate to Boost the Development of 6G OSS

6G Scenarios & Capabilities

6 Typical Scenarios



15 Capabilities



*Reference: ITU-R M.[IMT.FRAMEWORK FOR 2030 and Beyond], Framework and overall objectives of the future development of IMT for 2030 and beyond.

6G Potential Key Technologies

6G Wireless Tech

-  Terahertz
-  Visible Light Communications
-  Ultra-massive MIMO
-  Reconfigurable Intelligent Surface
-  Delay Doppler Domain
-  Intelligent Holographic Radio

6G Convergence Tech

-  Joint Communications and Sensing
-  AI Native
-  Digital Twin Network
-  Coordination of Computing and Network

6G Network Tech

-  Joint Space-Air-Ground NW
-  Service-oriented RAN
-  Distributed Autonomous NW

6G Security Tech

-  Security Native
-  Blockchain-RAN

1. ITU-R M.[IMT.FRAMEWORK FOR 2030 and Beyond], Framework and overall objectives of the future development of IMT for 2030 and beyond.
2. Y.DTN-DataFrame, Digital Twin Network: Framework and functional requirements of data domain in network digital twin layer.

3. Y.IMT2020-CNC-FW, Framework for coordination of computing and networking in IMT-2020 and beyond.
4. White Paper on 6G OSS Technologies, AsiaInfo etc., 2023

Requirements and Challenges for 6G OSS

Improving Network Operation Capabilities

- Orchestration and Scheduling for Joint-SAG
- Planning and Optimization for Ultra-Massive MIMO and RIS
- O&M for 6G Holistic Service-Oriented and Distributed Network

Native Capabilities in OSS for Ubiquitous Intelligent

- E2E Management for 6G Network Intelligence
- OSS for 6G Native AI and Digital Twin
- OSS for 6G Native Security

Orchestration and Scheduling for Joint-CSC Service

- O&S Capabilities for Integrated Sensing and Communication, and Converged Computing and Networking Services

ESG Proactive and Normalization

- Open and Unified Management for Service-Oriented Network Capabilities
- Better Fulfill Social Responsibility in Areas Such as Sustainable Development and Public Safety

Convergence With New IT

- Data Governance to Enhance Data Management Efficiency and Value
- Super Automation Tech Such as RPA, Process Mining
- Holistic Service-Oriented Tech

Progress in Standardization of OSS

Overall Architecture And Principles Of Network Operation, Maintenance And Management

- TMN: Telecommunications Management Network
- FCAPS: Fault, Configuration, Accounting, Performance and Security
- ITU-T SG2: Serials of Standards on AI enhanced Telco OSS
- ITU-T SG13: Serials of Standards on Autonomous Networks



ITU-T TMN Management Functions. ITU-T Recommendation M.3400 (2000)
3GPP TS 28.104 Management and orchestration;Management Data Analytics (MDA)
TM Forum, "A WHITEPAPER ON autonomous networks", 2022.9

Specification For Network-side Element Management Function Design And Interface

- NWDAF: network data analysis function at the network function layer
- MDAS: Management Data Analytics Service at the management layer
- 3GPP SA5 Rel-18: OSS study focus on NW Intelligence, NW Management Arch and Mechanism, New Service Support



Specification In Relation To Business Support And Network Operation Management

- NGOSS: Including Etom, TAM, SID And TNA
- ODA: Open Digital Architecture
- AI Based Aiops
- Intent-driven NW Management



Specification For Network Management Based On Network Virtualization

- ETSI ZSM: Zero-touch Network And Service Management
- ETSI NFV: ETSI Network Function Virtualization
- ETSI ENI: Experiential Networked Intelligence



ETSI, "Zero-touch network and Service Management (ZSM);Reference Architecture", 2019.08
O-RAN, "Use Cases and Deployment Scenarios Towards Open and Smart RAN White Paper", 2020.2
White Paper on 6G OSS Technologies, AsialInfo etc., 2023

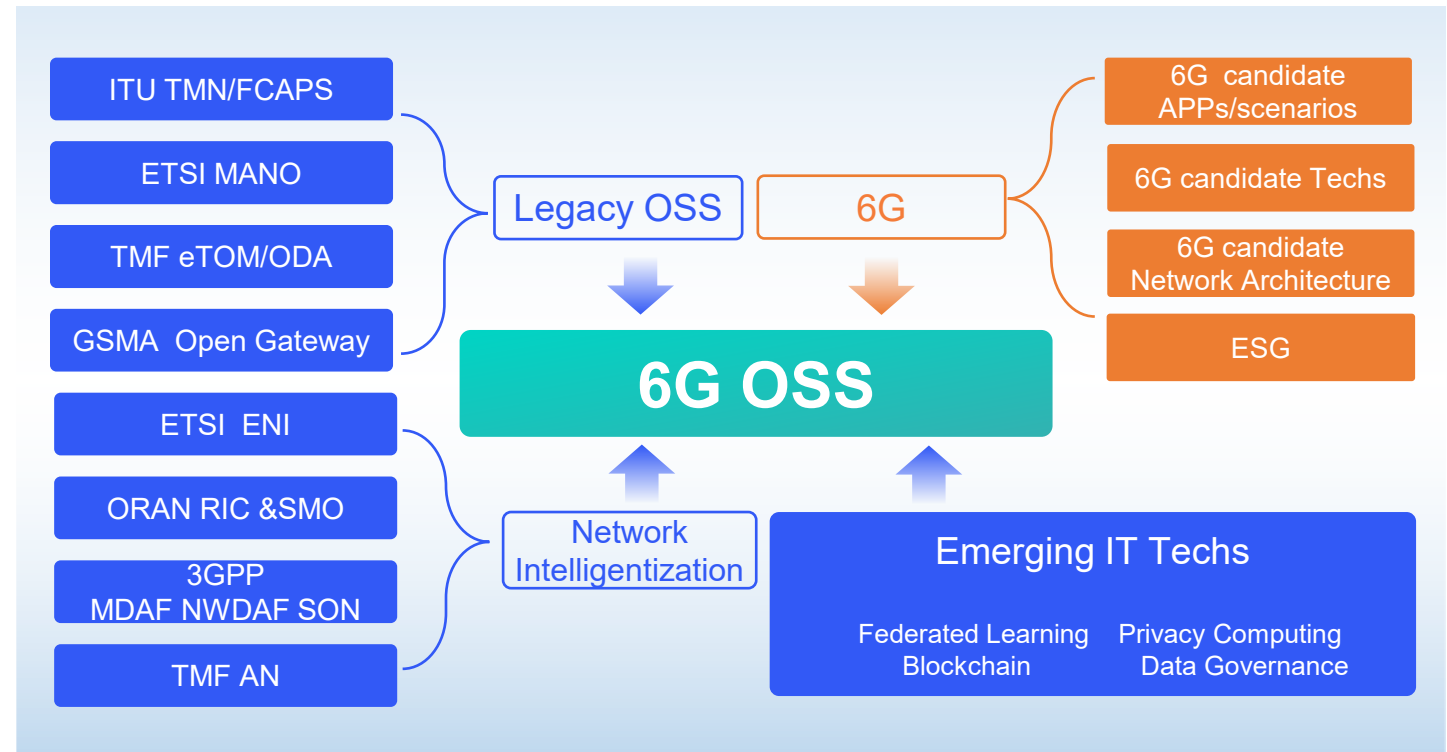
Network Management Mode Based On Open RAN And Implementation Path

- Open, Virtualized And Intelligent RAN Architecture
- Wireless Network Intelligent Control Platform
- Wireless Intelligent Manager
- Open And Standardized Interfaces



6G OSS Technical Route

- Key network O & M technologies to support new technologies, architectures and services for 6G networks
- Key technologies to upgrade and extend functionality based on existing standardized network O & M
- Key technologies for intelligent network O&M to support network intelligence and autonomous network evolution
- Key ICT convergence technologies to apply new IT to OSS



Overall Vision of 6G OSS

From Monolithic/Single-Domain Network Management to Joint Space-Air-Ground and Communication-Sensing-Computing Management

- Integrated management for multi-dimensional networks
- Integrated management for multi-dimensional resources
- Improve the resource and energy utilization of 6G

From Intelligent Network Management to Automated, Intelligent and Digital-twin Network Management

- Combining automation, intelligence and digital twin
- Meet the O&M requirements for the full life cycle
- Provide unprecedented experience of digital 6G services

From L5 5G Autonomous Networks to 6G OSS Ready

- Realize the native intelligence
- In-depth integration of total automation, high-level native intelligence and the network digital twin
- Autonomous space-air-ground integrated network

Incorporating Environmental, Social, and Corporate Governance (ESG) into 6G OSS Capability System

- Incorporate ESG into 6G OSS capability system at the design phase
- Ensure that the 6G communication system will fulfill more ESG and public safety responsibilities
- Support the achievement of the carbon peaking and carbon neutrality goals

Constructing a Secure and Trustworthy 6G OSS

- Construct a natively safe and secure OSS
- Provide services and assurances for 6G networks and applications

6G OSS Potential Key Technologies

6G OSS Orchestration for Space-Air-Ground Integrated Network

- Enhanced Intent-Based Network Technology
- Network Telemetry-based Real-time Data Collection
- Intelligent Orchestration

6G OSS Management for New Wireless Technologies

- Management for NEs in New Forms
- Communication and Sensing Data Management
- Intelligent Data Direction and Routing Management
- New Type of Network Optimization in Cell-free Mode

6G OSS Capability Opening

- Opening Based on GSMA Open Gateway & TMF Open API
- Digital Capability Opening
- Data Opening Based on Privacy Computing and Blockchain
- Capability Opening Based on Programmable Network

6G OSS Support for 6G Holistic SBA

- Supporting the Expansion of Service-based Architecture in Network Fields
- Supporting the Evolution of Service-based Interface Protocol
- Supporting the Evolution of IP Transport Protocol

6G OSS Data Governance

- Developing Data Governance Standards
- Intelligent Data Governance

6G OSS Hyperautomation

- Robotic Process Automation (RPA)
- Process Mining/Business Process Management (BPM)
- LowCode/NoCode

6G OSS Application in ESG

- Sustainable Public Safety based on Joint Space-Air-Ground Security
- Natural Disaster Prevention and Control Based on Space-Air-Ground Integration and Joint Sensing and Communication
- Green Computing Technology

6G OSS Distributed Autonomous Cooperation

- Distributed OSS Technology Incorporating Native AI
- Distributed OSS Management Technology by Domain for New Technologies such as Space-Air-Ground Integration and Communication Awareness
- Multi-domain OSS Collaboration Technology for Cross-domain Fusion

6G OSS DTN

- By interacting with the network twins, realize automatic network operation
- Improving the network adaptability to new services, new scenarios, and new differentiated demands

6G OSS Native Network Security

- Trust Fusion Technology for Heterogeneous Resources
- AI-based Native Network Security Capability Orchestration Technology
- Ubiquitous Cooperative Security Situational Awareness Technology

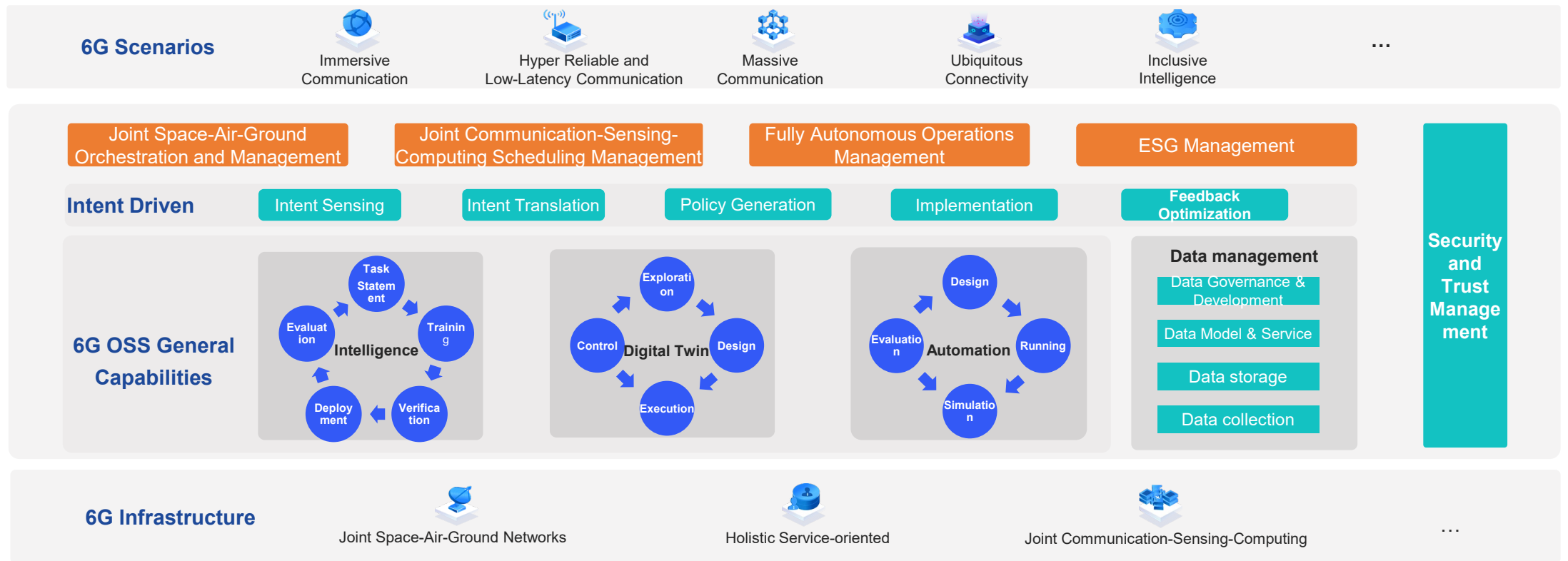
6G OSS Management for Computing Native Network

- Dynamic Decision-making of Communication and Computing Resources
- Lossless Migration of Network Applications
- Cloud-Network Computing Resources Collaboration

6G OSS Native Intelligence

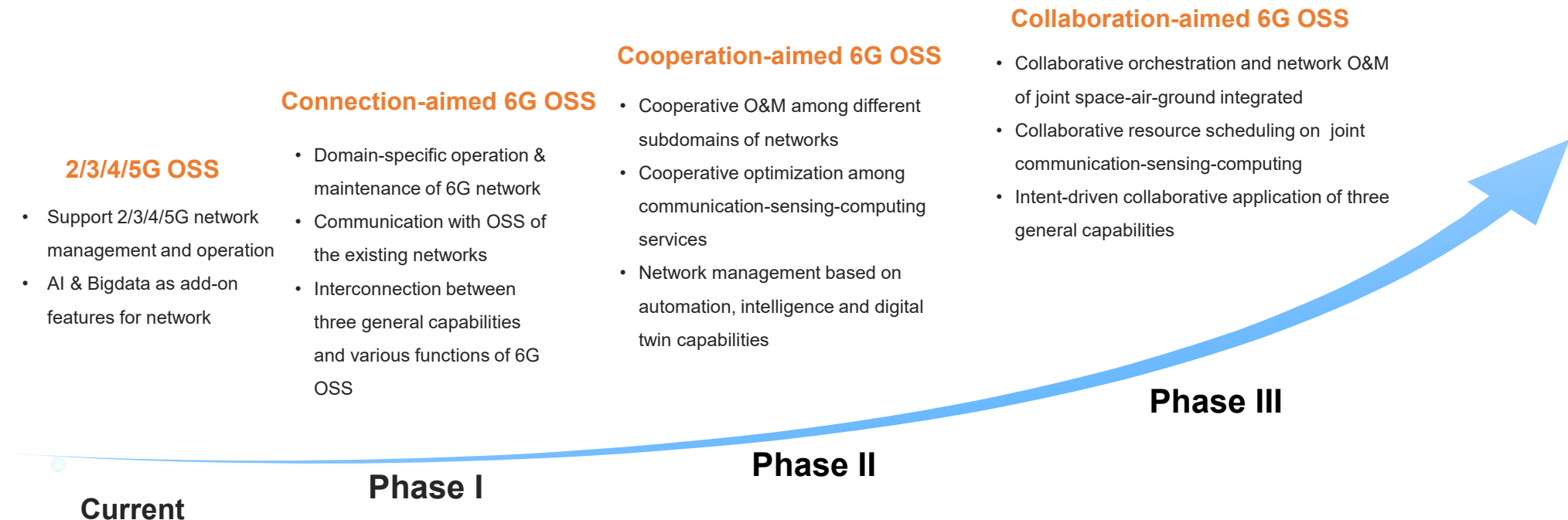
- Component-based Dynamic AI Capability Orchestration
- Distributed Native AI Cooperative Management and Scheduling
- AI Model Simulation Verification Based on Digital Twin
- AI Signaling Interaction System
- Multi-dimensional Native AI Assessment and Evaluation System

6G OSS Functional Architecture



Evolution from 5G OSS to 6G OSS

For 6G commercial goals by 2030, 6G OSS has already laid the foundational conditions and driving force for pioneering research and development. Its roadmap can be divided into three phases:



Asiainfo Collaborates with Industry University Research Partners to Boost the Development of 6G OSS



- White Paper on 6G OSS Technologies

- White Paper on 6G BSS Technologies

- A White Paper of AIGC (GPT) Empowering Telecom Sector V2.0

- Mobile Communications Big Data Analysis: Practical Data Mining and Machine Learning

- Mining over Air: Wireless Communication Networks Analytics



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