

Computing Force Network (CFN) Introduction

CMCC
2022.Jun



- CFN background
- CFN definition
- CFN architecture
- Technologies for CFN
- CFN Progress

With the developing of consumer internet and industrial digitalization, new features and requirements grows out of it, while maintaining traditional network, telco operators need to adapt new scenarios, explore new market and provide new abilities, to satisfy different requirements from individuals, families, and industries.



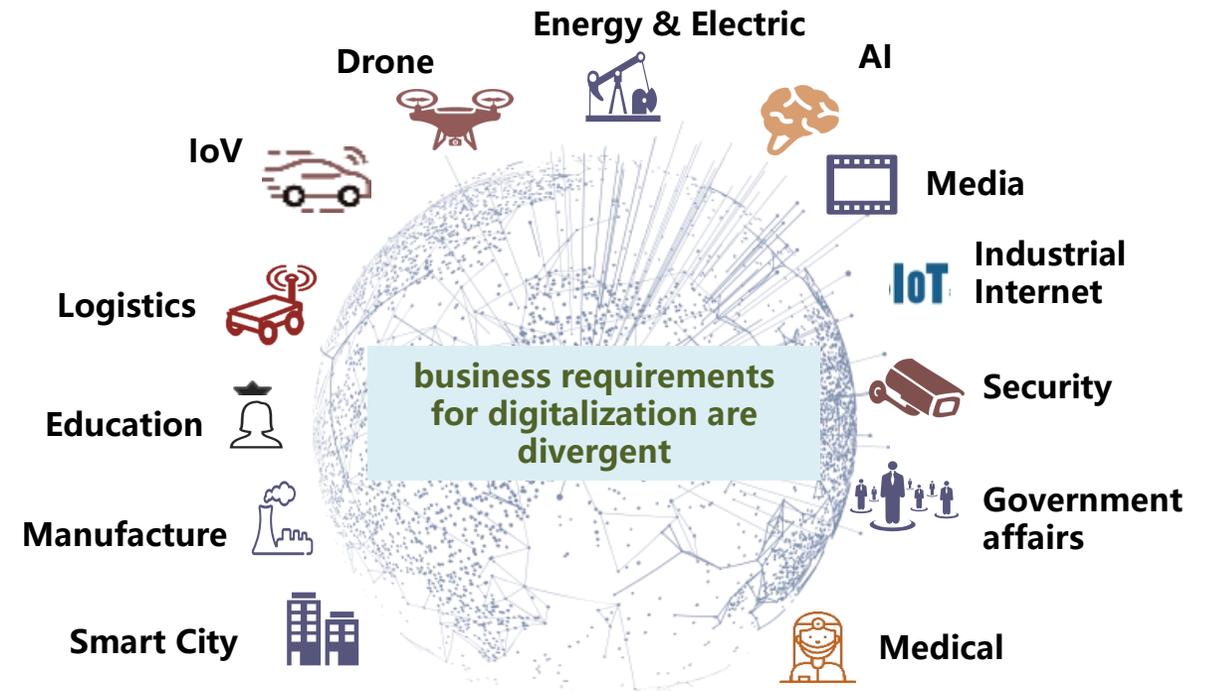
Short Videos

Live Streaming

Remote Education



Individuals and families are the traditional customer of telco operators, business becoming internetized, videos dependent, highly interactive, operators need to provide ubiquitous network with high quality. With the popularity of huge videos related business, operators needs to improve add-on service of "CDN"



Diverse industries are the new market for Telco operators, internetized, localized, and digitalized manufacture is the new characteristic of business.

The divergence between industries is huge and customization is highly required, besides reliable network, operators are need to provide more open, agile, secure, cloud and network converged infrastructure.



Computing Force Network(CFN) is a new information infrastructure that based on network, focused on computing, deeply converging Artificial intelligence, Block chain, Cloud, Data, Network, Edge computing, Terminal computing, Security(ABCDNETS), providing all-in-one services. The Goal is to achieve ubiquitous computing force, computing & network convergence, intelligence orchestration, all-in-one services.

Vision

Ubiquitous
Network

Ubiquitous
Computing

Ubiquitous
Intelligence

Provide computing force as common utilities.

Computing force will be ready for access upon use and easy connect by single entry point.

C/E/T

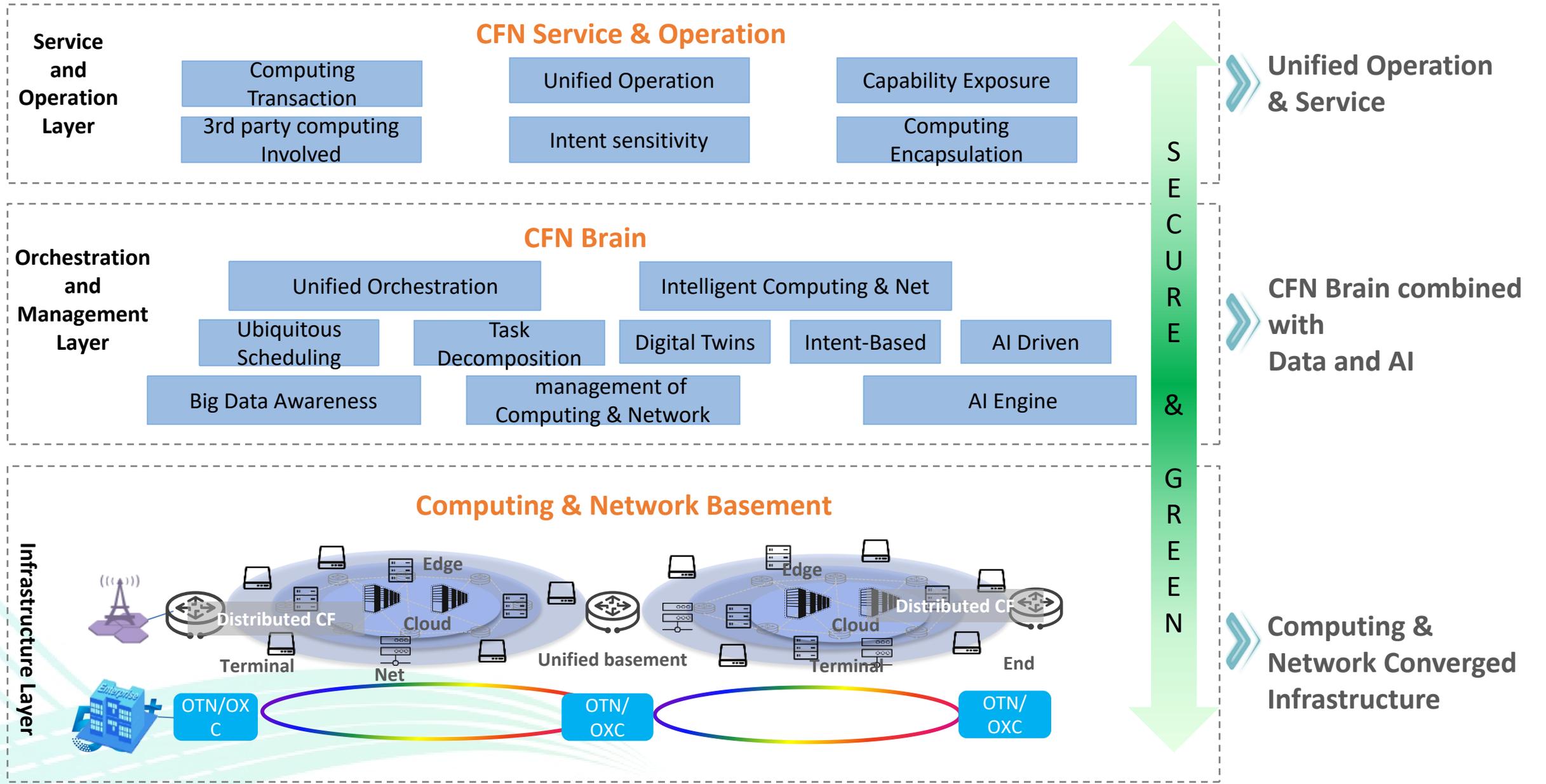
Net

Data

AI

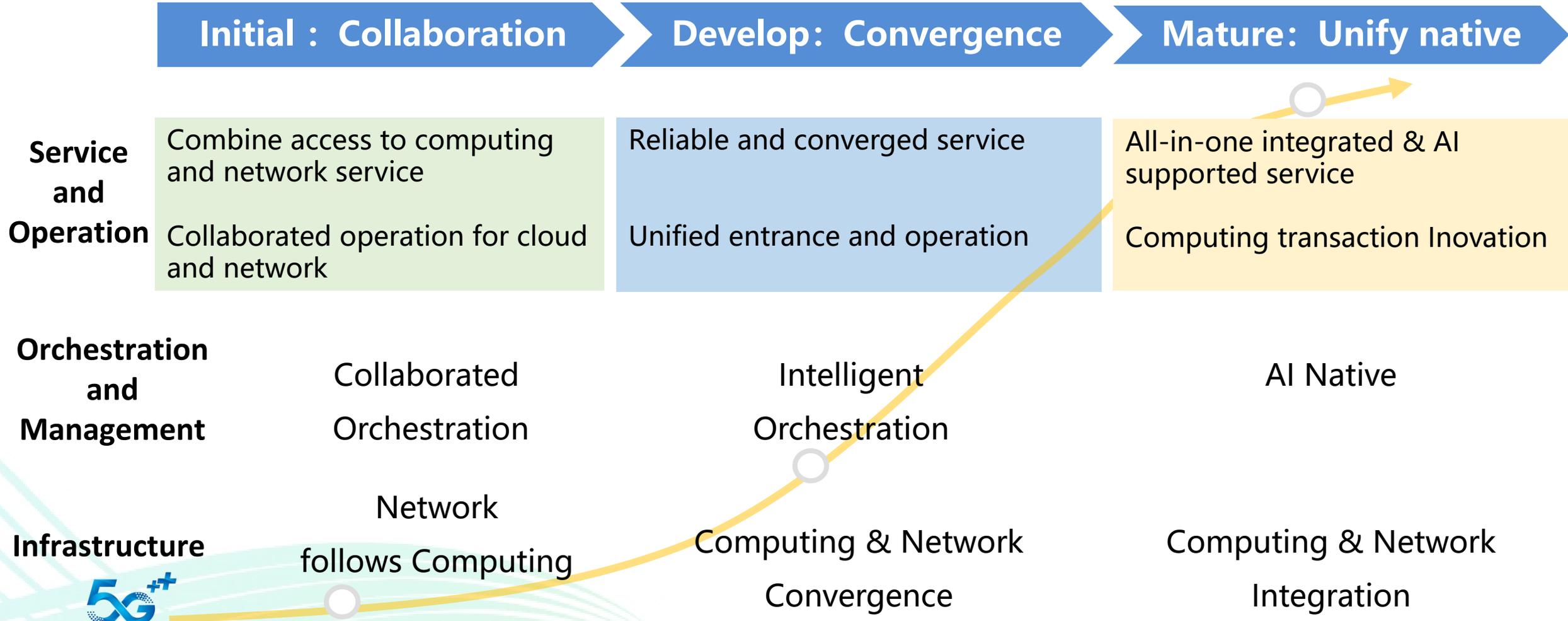
BC

Sec



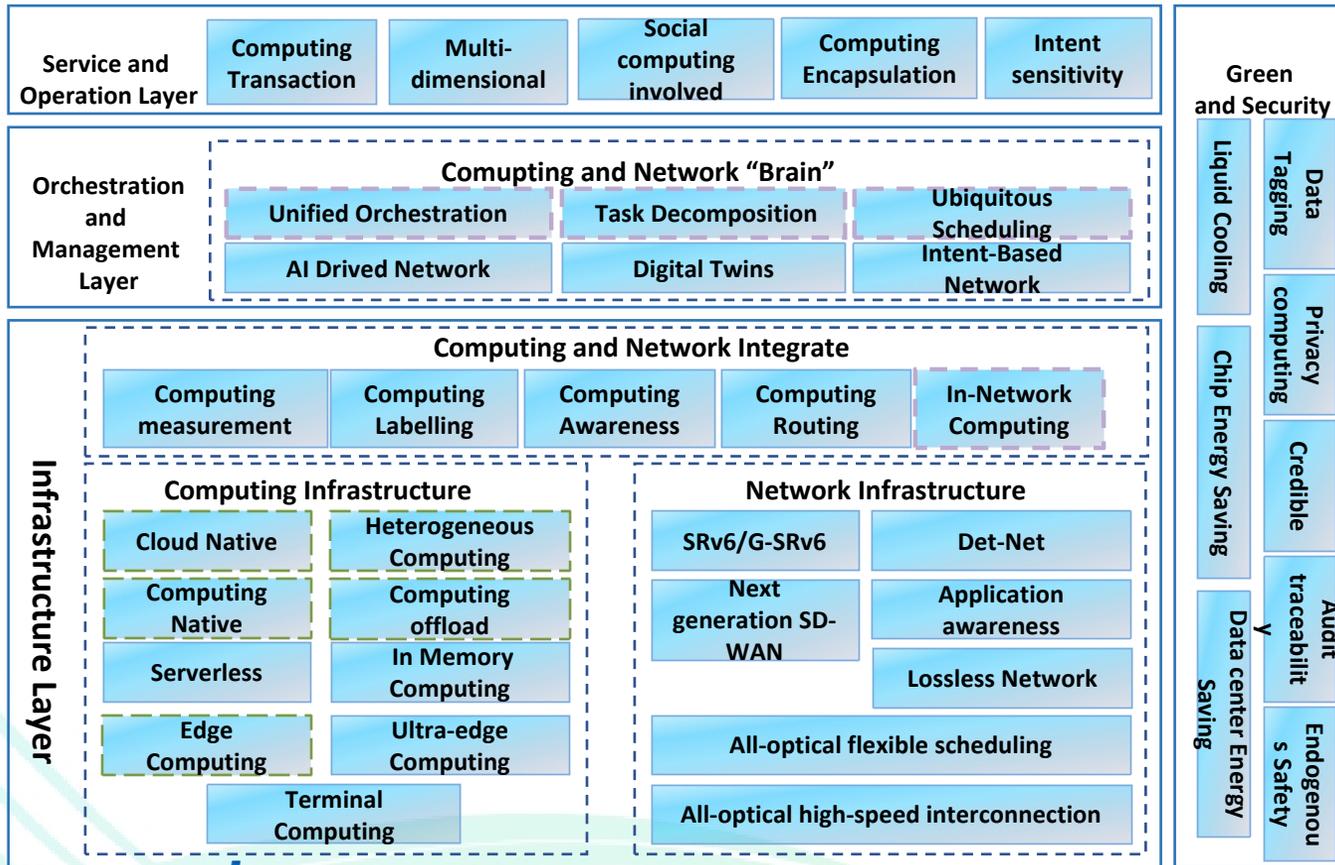
3 Stages for CFN

Achieve CFN goal step by step.



Core technical capabilities of CFN

Technology MAP



Key Technologies Associated To OpenSource Community and Projects

- Edge Computing:** CNCF、OpenInfra、LFE、EdgeGallery、ONAP
- Cloud Native:** CNCF、OpenInfra、LFN、LFE、ONAP
- Heterogeneous Computing:** ODCC、LFE、CNCF、OpenInfra
- Computing Offload:** ODCC、LFN、LFE、OpenNIC、Corundum
- Computing Native:** OneAPI



Already covered in OS community



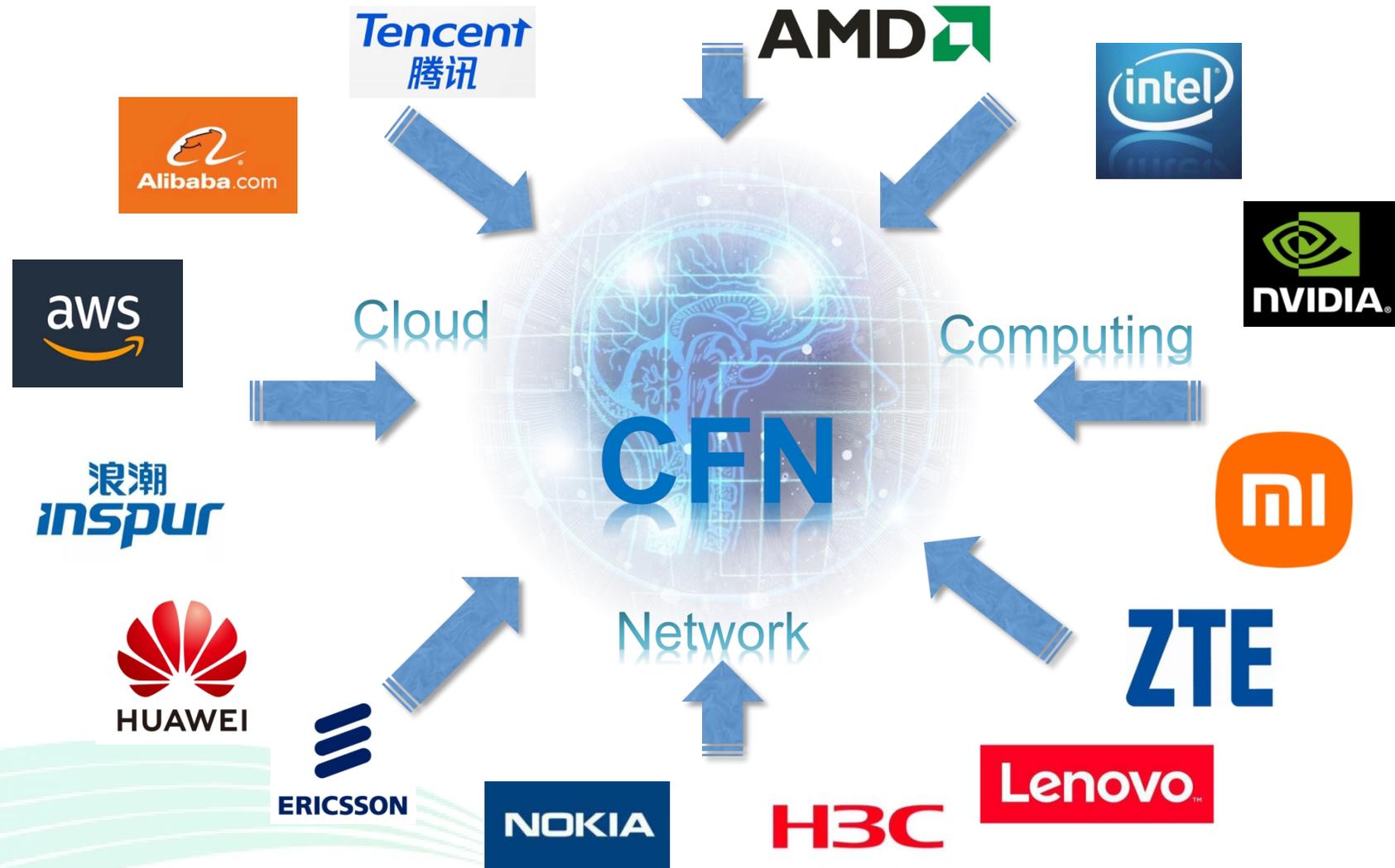
Planned

CMCC has carried out a number of projects to form CFN-related technical solutions, and simultaneously tried to further promote it in the industry through open source communities and standardization organizations.

Major research directions	CMCC internal study areas/contents	OpenSource/Standardization
Computing Native	Facing heterogeneousness and ubiquity of computing resources, research key technologies such as computing abstraction and computing measurement, and realize cross-architecture development of services.	Open Source: CNCF Standardization Org: ITU, CCSA
Ubiquitous Scheduling	Facing scheduling management of cloud, edge and end (terminal) diverse computing force infra: ① research key technologies of ubiquitous scheduling and task decomposition, E2E processes, and key algorithms. ② build prototype of ubiquitous scheduling system, and test & verify it on the live network.	Open Source: LF Edge Akraino BP, CNCF Standardization Org: CCSA
Edge Computing	Based on E2E use cases of edge computing, provides reference implementation for open source technology stack. Research scheduling, management and other solutions of CFN for edge scenarios, and conduct lab verification of E2E scenarios through blueprint project.	Open Source: EdgeGallery, Akraino
Cloud Native	Agility improvement and capability optimization of network & cloud platform, involving micro-service design for NFs/apps, container infrastructure, PaaS platform capabilities, automation improvement, etc.	Open Source: XGVela, CNCF Standardization Org: ITU, CCSA
NFV & SDN	① OpenStack based cloud platform to support unified management of heterogeneous CPU architectures (x86_64, Arm, etc.) and heterogeneous acceleration resources such as GPU/FPGA/DPU/NPU within single resource pool, providing foundation for the realization of unified abstraction & measurement of computing force. ② CMCC Network Cloud SDN solution based on "software SDN + vSwitch offloading by Smart NIC" ③ Hierarchical scheduling scheme	Open Source: OpenInfra, CNCF Standardization Org: CCSA
Computing Offload	SW and HW integrated virtualization technology based on Smart NIC, including vSwitch offloading by Smart NIC & elastic bare metal service by DPU, and their related technical requirements, decoupling scheme & standardization.	Open Source: OpenInfra Standardization Org: CCSA, ODCC
Req & Arch	Research on industry standards for CFN Architecture and CFN Requirements Analysis.	Standardization Org: CCSA
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Current Collaboration for CFN

CMCC is currently working on build datacenter and basement, and also collaborate with other companies in cloud, networking and computing aspect to promote CFN development.



Thanks for your time!

We are expecting to work with global wisdoms on how to build this new information infrastructure, these efforts, in turn, will benefit the infra evolution towards CFN.