Overview of China Mobile's Participation in CNCF

China Mobile Research Institute

2024-3

China Mobile is the world's leading telco service provider

Network scale ranks 1st in the world

5G base stations
2023
1.9+ million

Households with gigabit coverage
2023
370 million

Customer scale ranks 1st in the world

Total connections
2023
3.19 billion

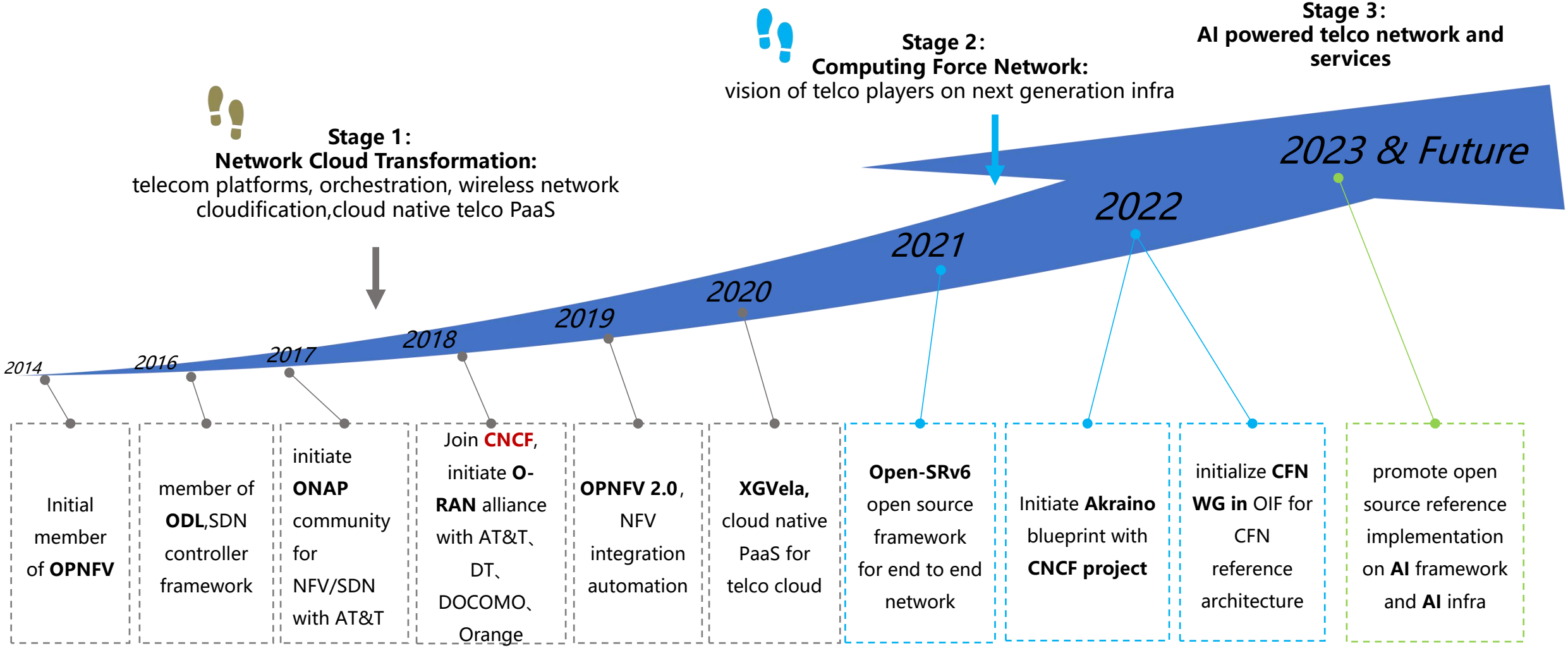
Connections (things)
2023
1.69 billion

Income scale ranks 1st in the world

Operating revenue
2023.10
139,597 million

Profit
2023
14.718 billion

China Mobile's Open Source Milestones



China Mobile's work in CNCF

CLOUD NATIVE COMPUTING FOUNDATION

中国移动 China Mobile

2018 — Join CNCF as a member

CLOUD NATIVE COMPUTING FOUNDATION

2019 — 5G edge computing, telco network functions evolution powered by cloud native techniques

kubernetes

KubeEdge

Prometheus

HELM

2021 — telco's CFN concept, cloud native as foudamental techniques for multi-cloud and multi-cluster management

VOLCANO

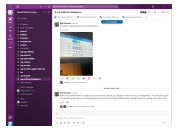
KEDA

KARMADA

KubeVirt

2023 — AI for telco network, CNTI new Initialtive

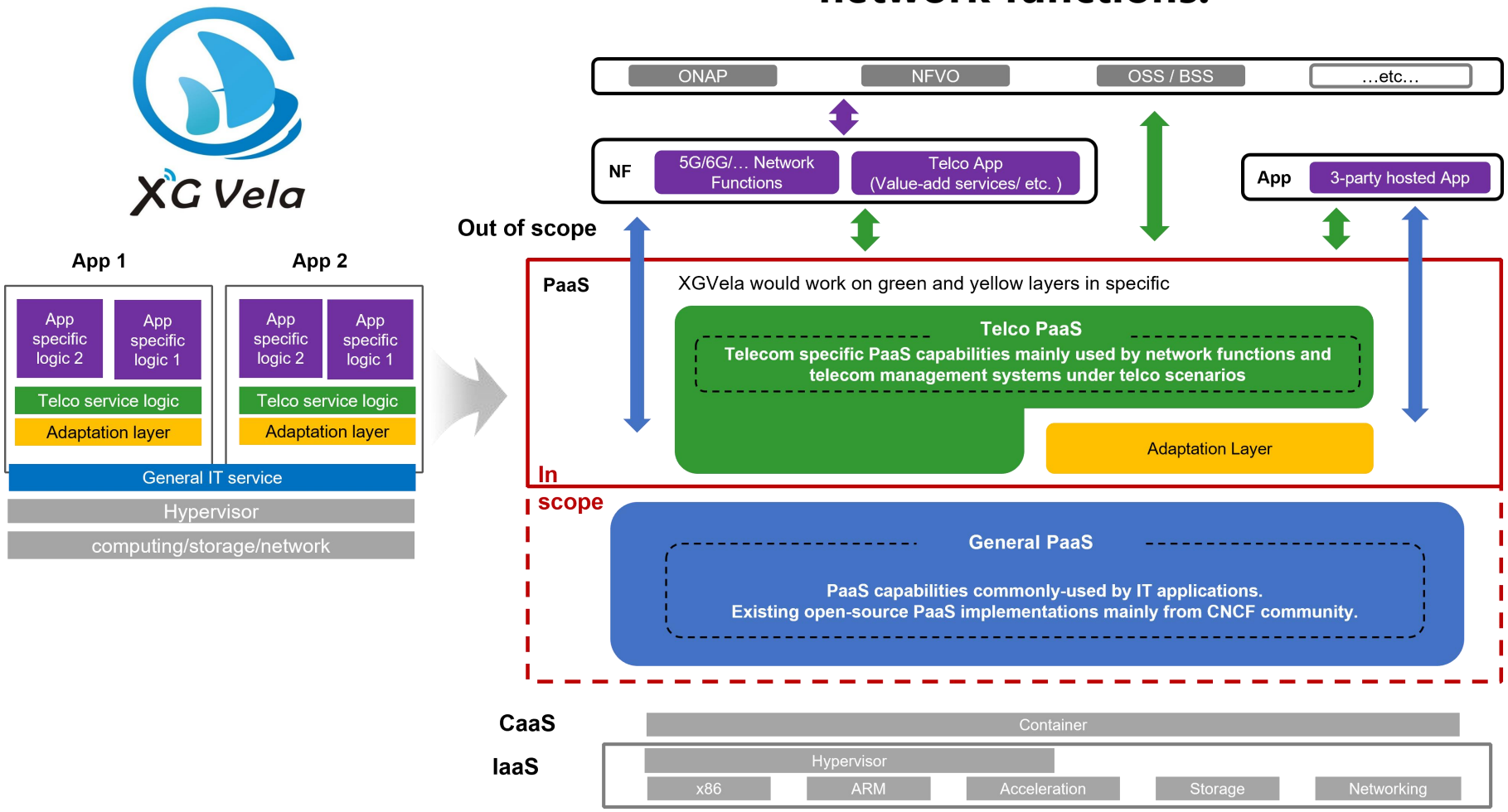
Kubeflow



AI WG

LFN XGVela project

China Mobile initiated XGVela under LFN in 2020 to work on PaaS capabilities for cloud-native network functions.

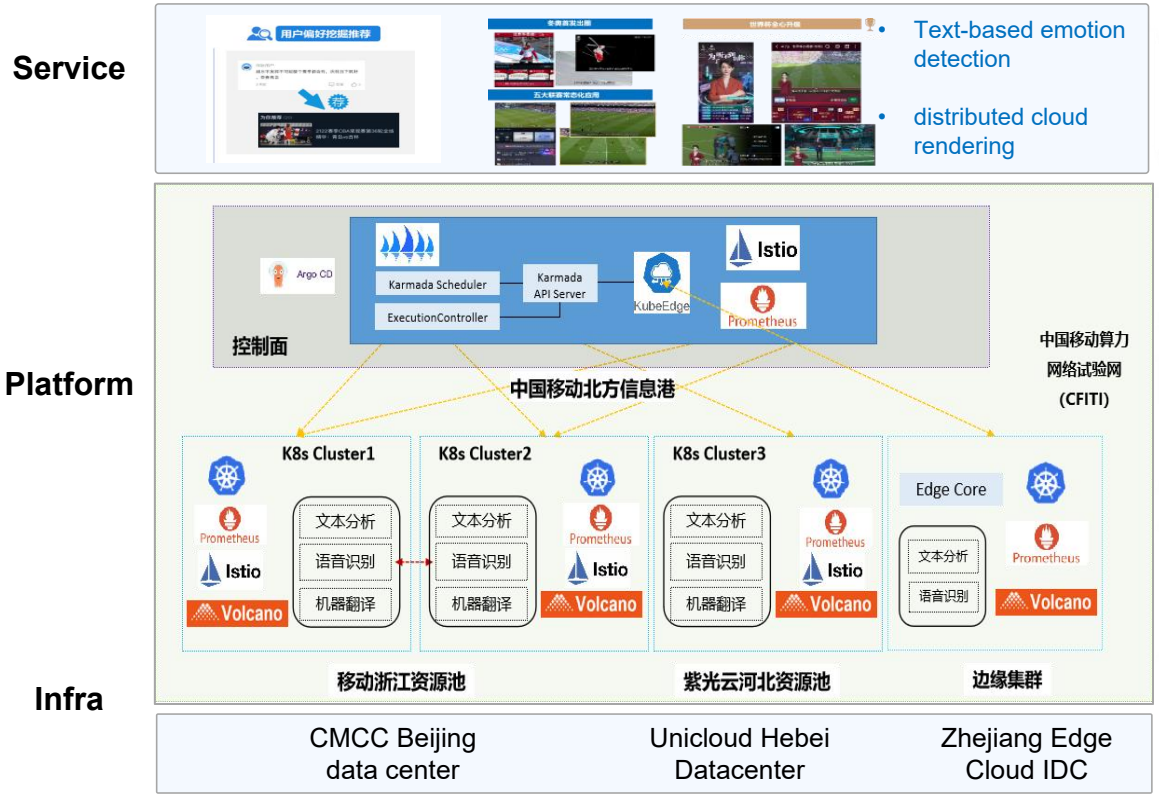


- XGVela Release 2022.11 has **delivered 5 telco PaaS functionalities** which related to management of **NF's configuration, topology, performance, alarm, log**. And a **micro-service designed UPF** has been provided as **CNF example**.
- XGVela is a sandbox project under LFN and seeking collaboration point with CNTI.
- The key for network cloud native evolution is promoting VNF evolving towards CNF with microservice architecture and "real" cloud native infrastructure being used.

Collabration between LF Edge and CNCF projects

China Mobile initiated LF Edge Akraino CFN ubiquitous scheduling blueprint project in 2021, collabrating with CNCF karmada team

End-to-End architecture



CMCC CFITI

LF EDGE AKRAINO

CLOUD NATIVE COMPUTING FOUNDATION

Verify the hierachical computing resources management and service ubiqutous scheduling among cloud-to-cloud and cloud-to-edge, which are cross-region and cross-CSP.

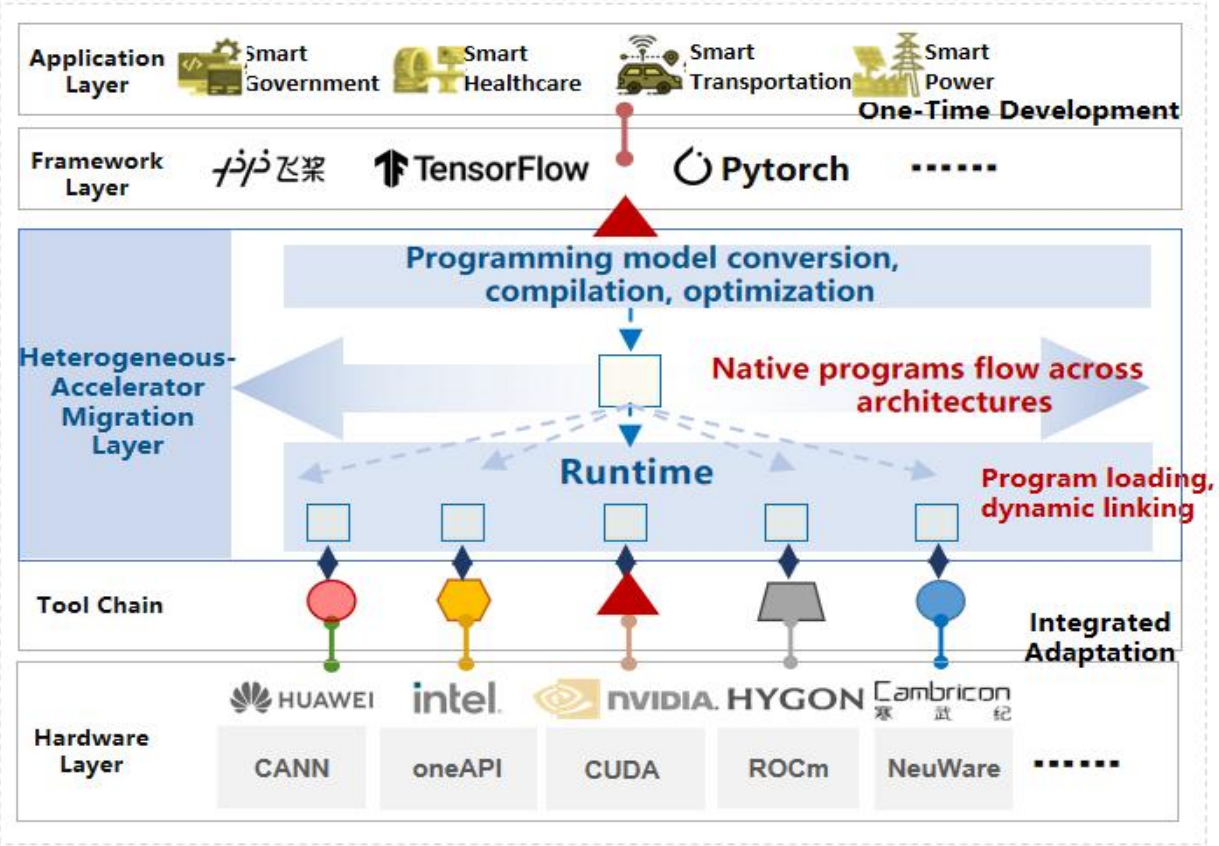
(CMCC datacenter -Beijing +Edge cloud-Zhejiang+Unicloud datacenter-Hebei)

R7 release is already pubslished.

https://wiki.akraino.org/display/AK/CFN+%28Computing+Force+Network%29+Ubiquitous+Computing+Force+Scheduling

CFN WG - Computing Native Subgroup

The Computing Native sub-group has been dealing with challenges of Cross Architecture Migration over Heterogeneous Accelerator, and continuously tackling key problems in 4 key technical directions, including heterogeneous-accelerator migration abstraction and cross-architecture compilation optimization.



Key Technology 1: cross-architecture compilation optimization technology

Hybrid heterogeneous parallel optimization to generate standard native programs that can be transferred and migrated

Key Technology 2: heterogeneous-accelerator migration abstraction

Heterogeneous resources form a unified computility abstract model, relevant programming model and interface

Key Technology 3: adaptive runtime technology

Realize program loading and mutual mapping execution mechanism with computility platform hardware

Key Technology 4: computility pooling technology

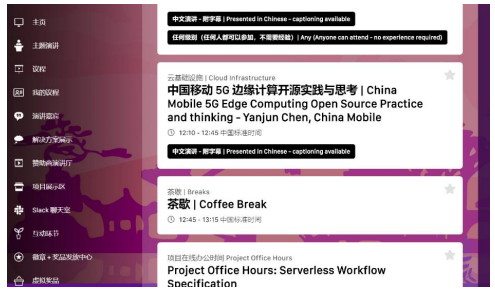
Realize virtualization of computility equipment, split and share remote calls, improve computility utilization, and reduce fragmentation

A toolchain prototype for computing native has been launched in 2023. Our next step is to integrate the toolchain with container and kubernetes system.

Participations in CNCF Events

KubeCon China 2019

"IoT Application Running on KubeEdge + ARM Platform" , *Jia Xuan, Bin Lu*



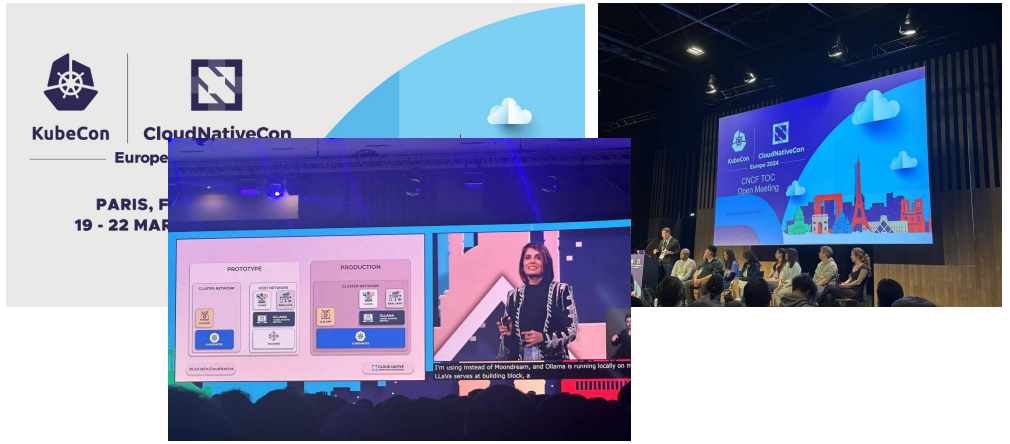
KubeCon China 2021

"China Mobile 5G Edge Computing Open Source Practice and and Thinking", *Yanjun Chen*

KubeCon 2023

"Cloud Native is Good, but How to Apply it in Telecom Networks?", *Qihui Zhao, Pengxiang Chen*

"Deep Dive into Telco's Open Source Practices on Next Generation Infrastructure", *Yanjun Chen*



KubeCon Europe 2023, KubeCon Europe 2024