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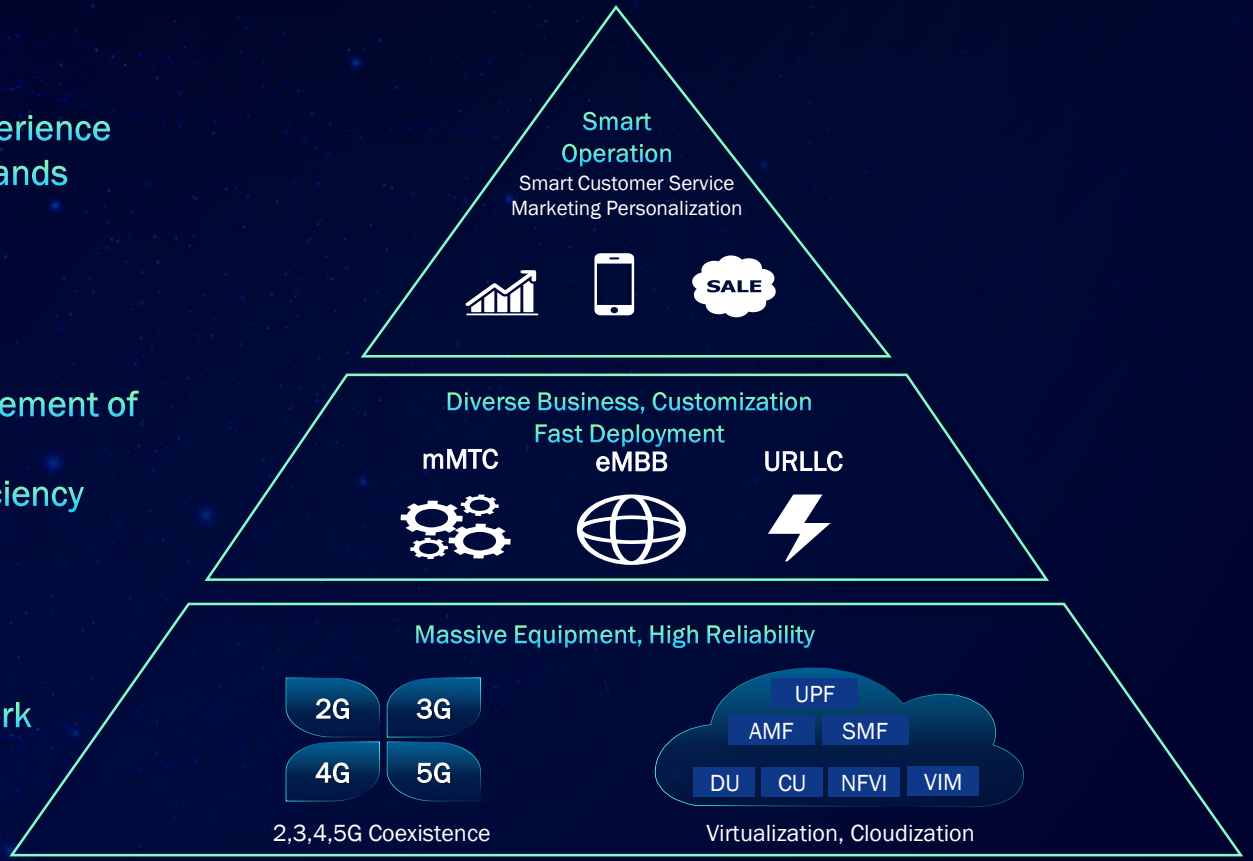
Practice and speculation about value of open source in network intelligence

Future Network Requires More Intelligence

Personalization of Experience
Differentiated Demands

High&Diversified Requirement of Business
Low Scheduling Efficiency

Complexity of Network
Complicated O&M



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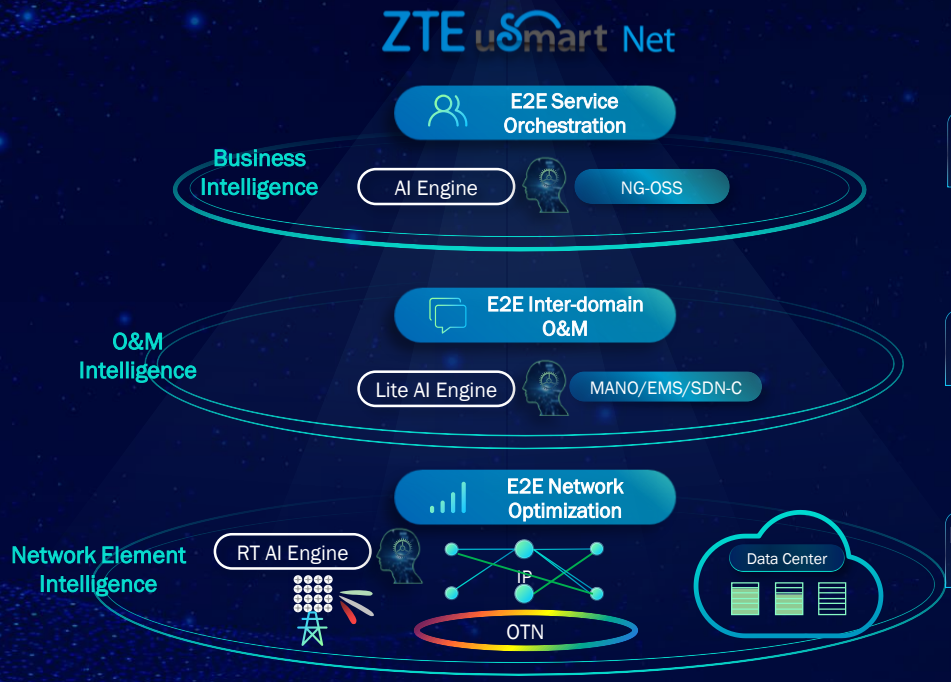
AI Simplifies Network, Empowers 5G Potential



TTM Days

On Demand Service

- Intent-based Service
- Smart Slicing

Manpower 75%

Simplified O&M

- AI-Based RCA
- Proactive O&M

Performance 10%

Smart Scheduling

- AI-Based Massive MIMO
- Intelligent Traffic Optimization
- AI-Based Resource Scale In/Out

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Scenario: Wireless Network Optimization

Challenge

1700 Cells in Meishan City

Large number of Network Optimization Experts

Time-consuming Optimization

Solution

- Weak Coverage
- Cell Overshooting
- .....

PM/CM
MR/CDT
MDT

Problem Detection

AI-based Policy Decision

Logistic Regression
Genetic Algorithm
.....

Antenna Configuration Optimization

Power Self-optimization
Antenna Self-optimization

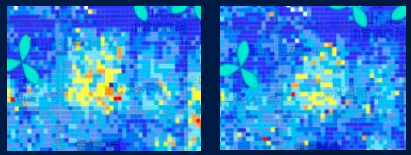
Benefit

Without AI AI-Based

88%

6 months 3 weeks

Performance



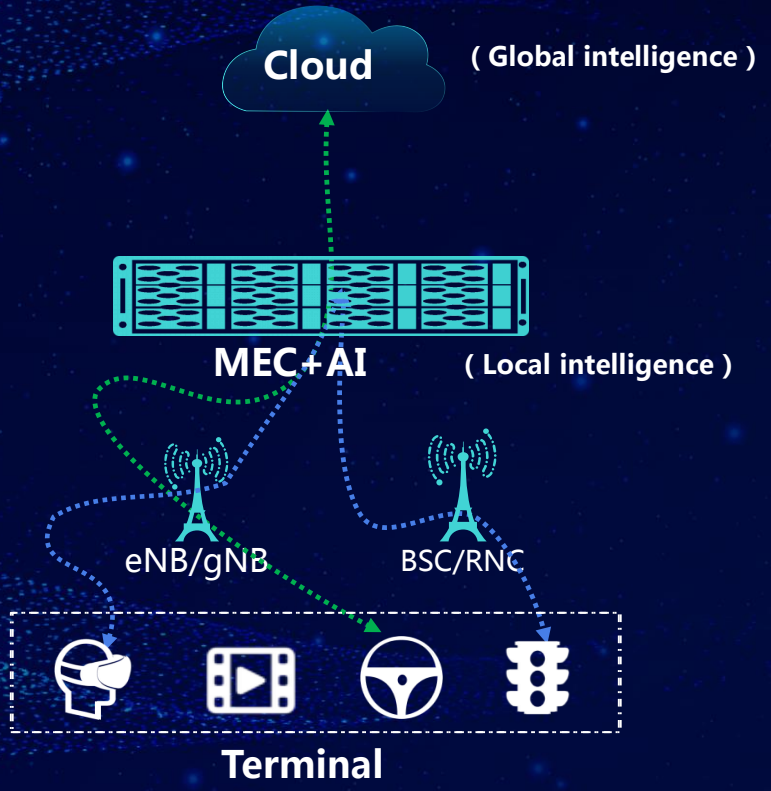
SINR +1.33dB

RSRQ +0.77dB

Throughput +6.16%

5G Smart Edge Cloud Boosts Cloud VR

Cloud+Edge+Terminal Smart collaboration



Cloud VR Based on MEC+AI

- Cost saving **50%**
- Latency reduce **75%**
- Data Rate improvement **10X**
- Computing Capability **2X**

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Scenario: Intelligent Network O&M

Challenge

- Post-mortem processing, unable to guarantee user experience
- Lots of invalid alarms, difficult to locate real faults
- Low efficiency, hard to ensure O&M quality

Solution

- LSTM
- Random Forest
- DBSCAN
- .....

- Network Topology
- KPI
- Alarm
- .....

Benefit

RCA Processing Time

4PH/100sites → 1PH/100sites

Alarm Compression Rate

Compressed/Total: 1056/1909

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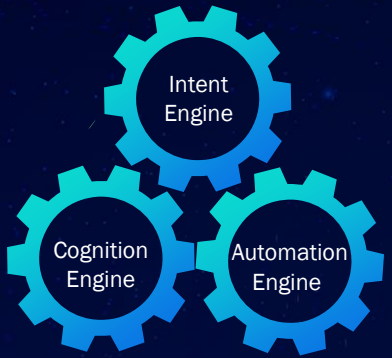
Scenario: Intent-based Service Provisioning

Athena

Network Automation Solution



Agile Network Deployment

- Cloud native deployment
- Configurating time decreased by **65%**

Immediate Service Provision

- Success rate reaches up to **99.9%**
- Provisioning time reduced to **seconds**

Fast New Service Rollout

- Micro service architecture
- TTM reduced to **days**

High Network Quality

- Improve O&M efficiency by **25%**
- Reduce network faults by **70%**

Athena Demo

PTN/IPRAN

5G Slicing

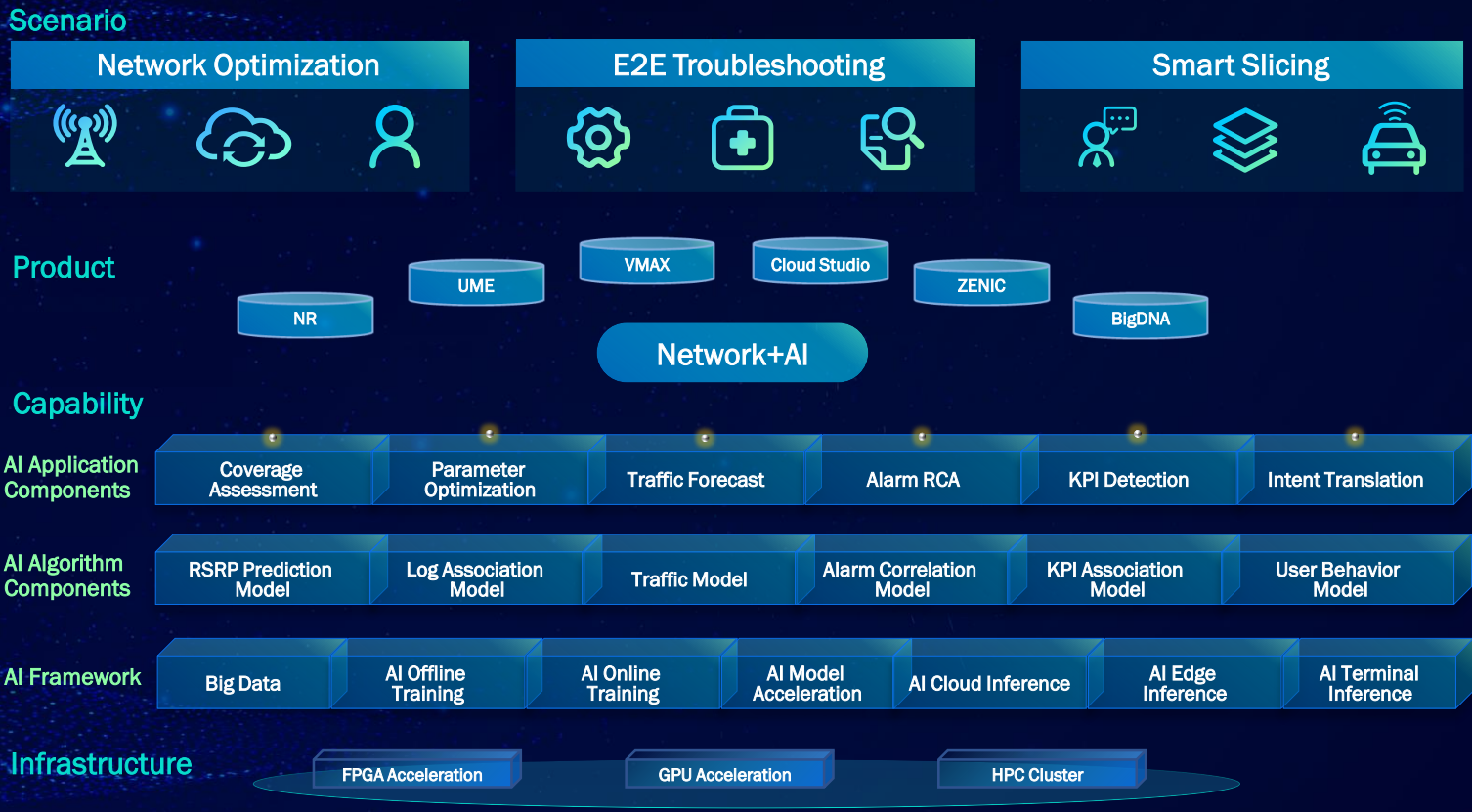
IP+Optical

DCI

SD-WAN

E-OTN

ZTE Network AI Portfolio Helps Operators Achieve Autonomous Network



Open Source Expedites Network AI

ONAP (Open Network Automation Platform): a platform to design, manage, and automate services and network functions

Acumos AI: a platform and open source framework that makes it easy to build, share, and deploy AI apps

PNDA(Platform for Network Data Analytics): a platform for scalable network analytics, aggregating data like logs, metrics and network telemetry

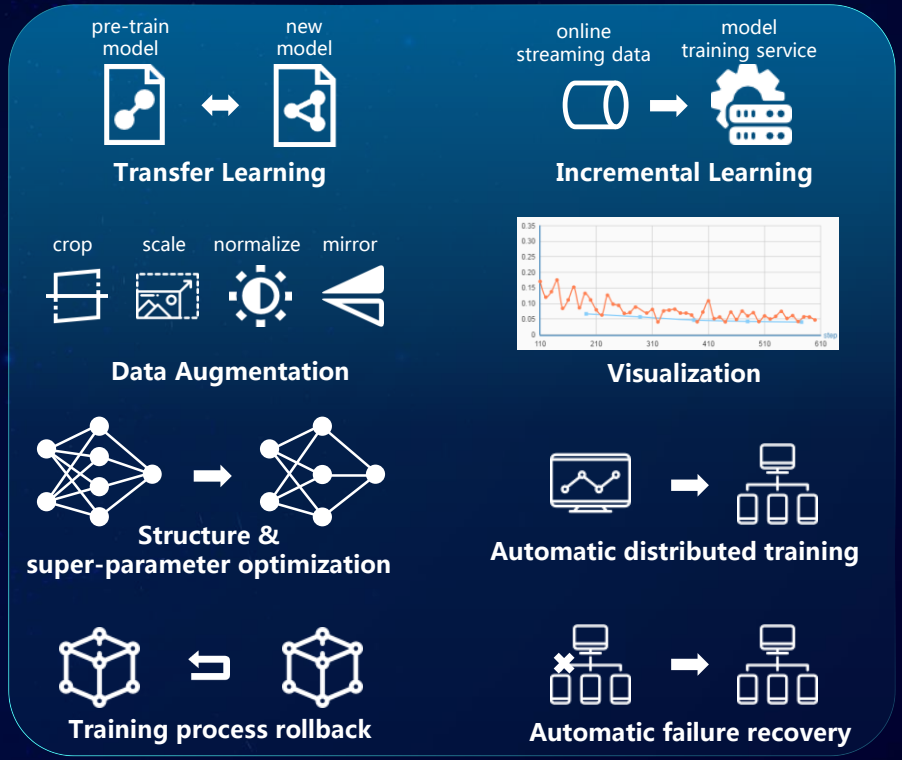
O-RAN: strives to leverage emerging deep learning techniques to embed intelligence in every layer of the RAN architecture.

ZTE's Practice in Network AI related Open Source

Actively participates in various organizations and plays active roles

The Linux Foundation	One of the premier and founding members of Deep Learning Foundation. Acquired position in board, TAC and TSC
Tensorflow	Committed over 100 times in Tensorflow community in 2018
O-RAN	Participates in O-RAN and endeavouring for leadership positions
ONAP	One of the platinum members and leading contributors.

High-performance & Distributed DL Platform Based on Tensorflow



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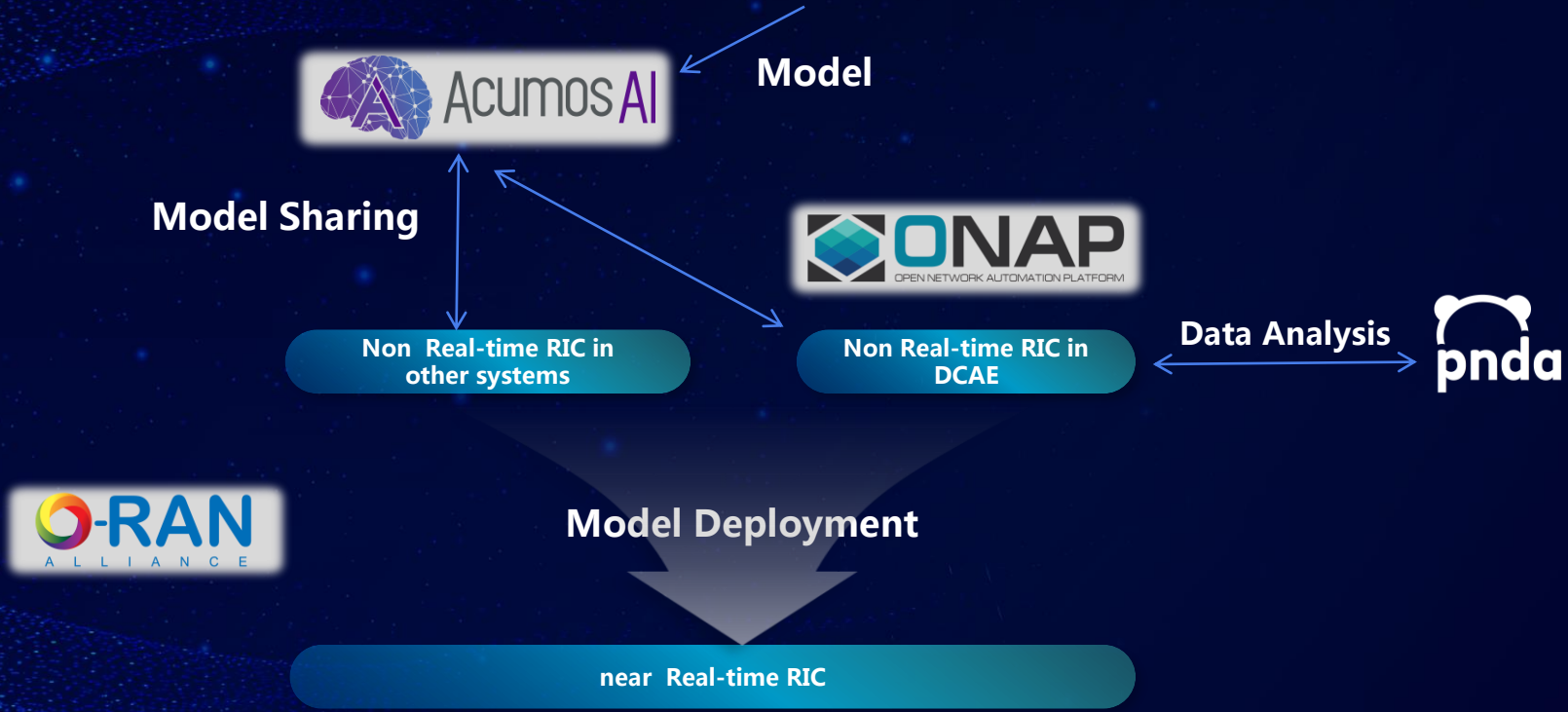
Collaboration Creates More value



Challenges of O&M: More Difficult to Build during Cloudification

Operator

Demand: Independent R&D

Pros: Understanding the overall network

Cons: R&D capability, high cost

Vendor

Demand: Competitiveness of network products

Pros: Deep understanding of network element

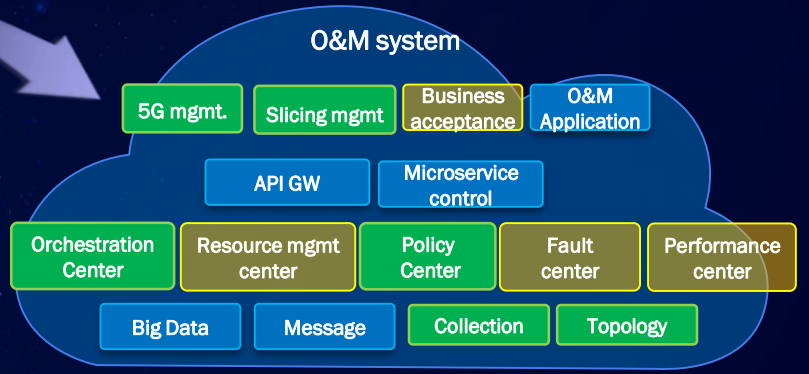
Cons: Lack of experience of business operation

OSS Provider

Demand: Maintain Competitiveness of OSS products

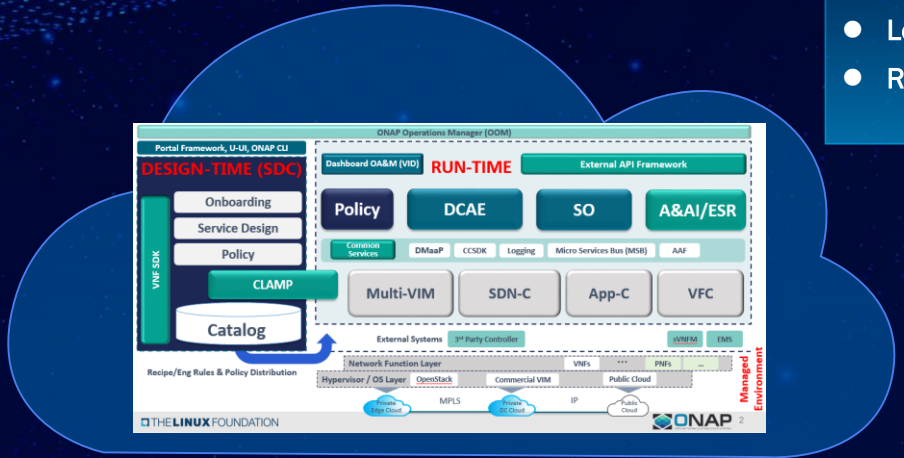
Pros: Understanding of traditional O&M process and cross-vendor management

Cons: Limited understanding of network virtualization



It's difficult to build O&M system efficiently

Referring to the Open Source Framework, Participators Find A Way to Jointly Develop the Intelligent O&M



Operators

- Identify architecture with open source framework
- Lead the coordination of interface and model
- Responsible for overall system integration & testing

Vendors

- Refer to the open source code to complete the development of modules such as slicing, orchestration, and strategy,
- Submit as microservices.

OSS Providers

- Refer to the open source code to complete the development of functional modules such as performance, faults, and asset management,
- Submit them microservices.

Contribution and Co-creation is not only a cooperation model innovation, but also a business model innovation.

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Leading 5G Innovations