ZTE

AI boosts operators building high-effect 5G intelligent network

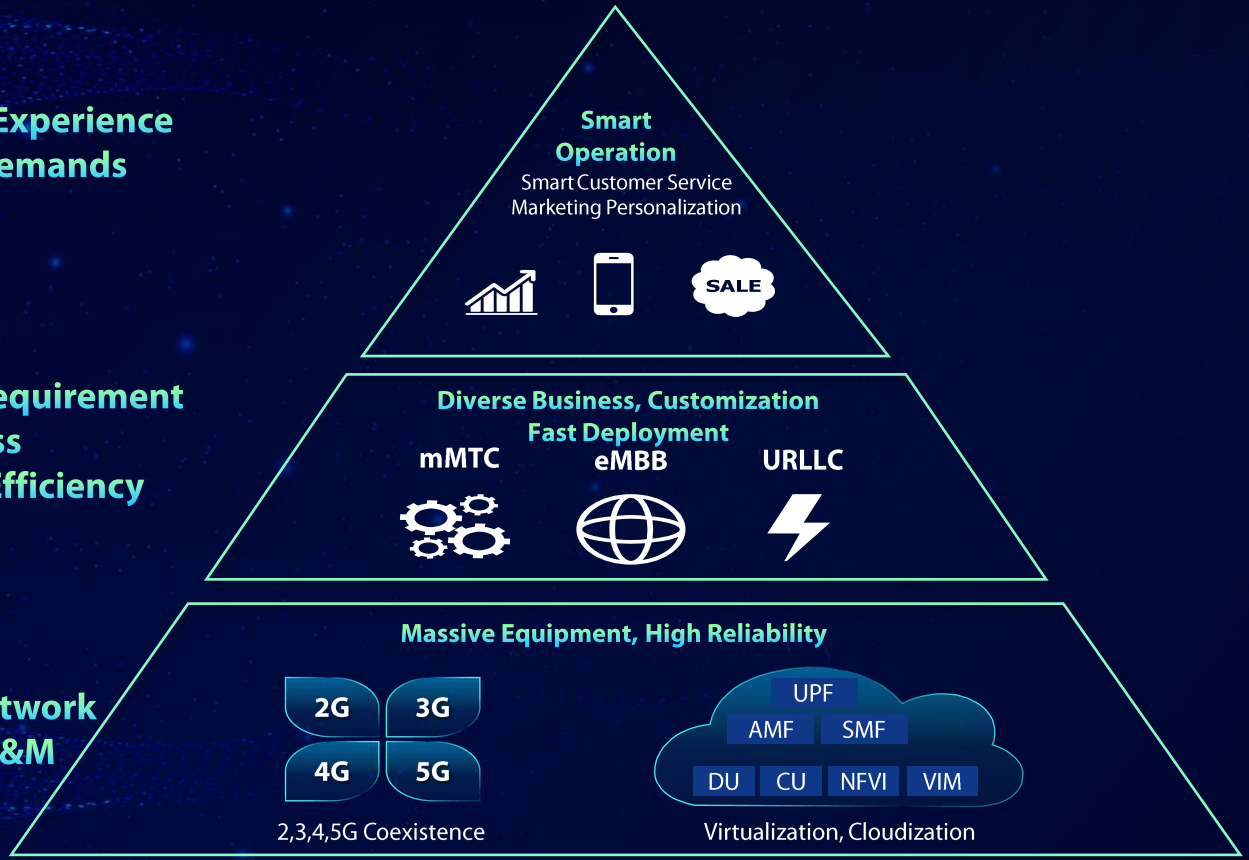
Leading 5G Innovations

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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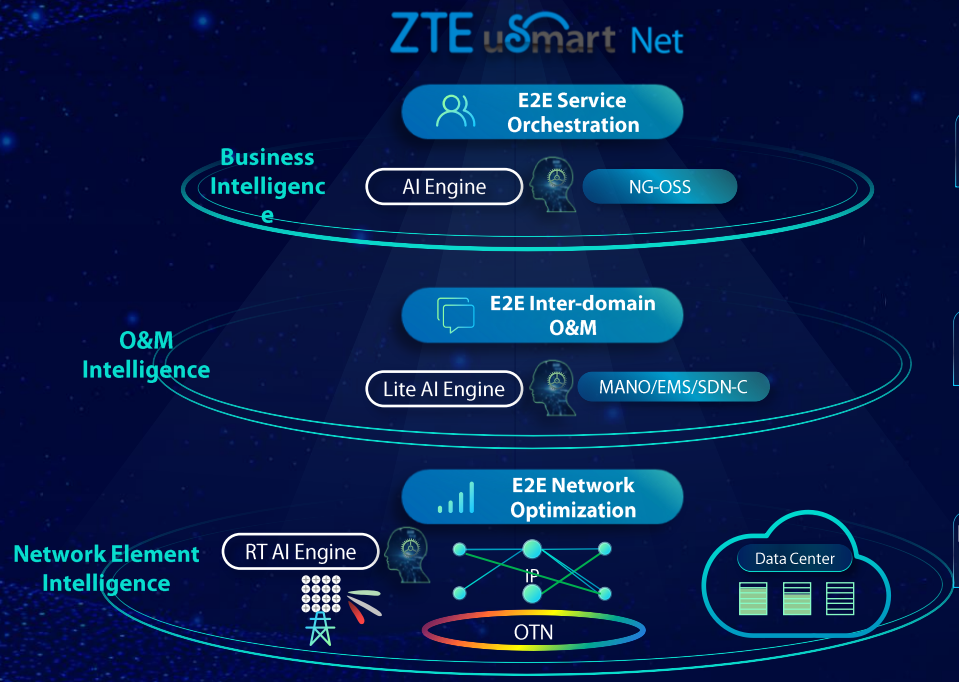
AI Simplifies Network, Empowers 5G Potential



TTM **Days**

On Demand Service

- Intent-based Service
- Smart Slicing

Manpower **75%**

Simplified O&M

- AI-Based RCA
- Proactive O&M

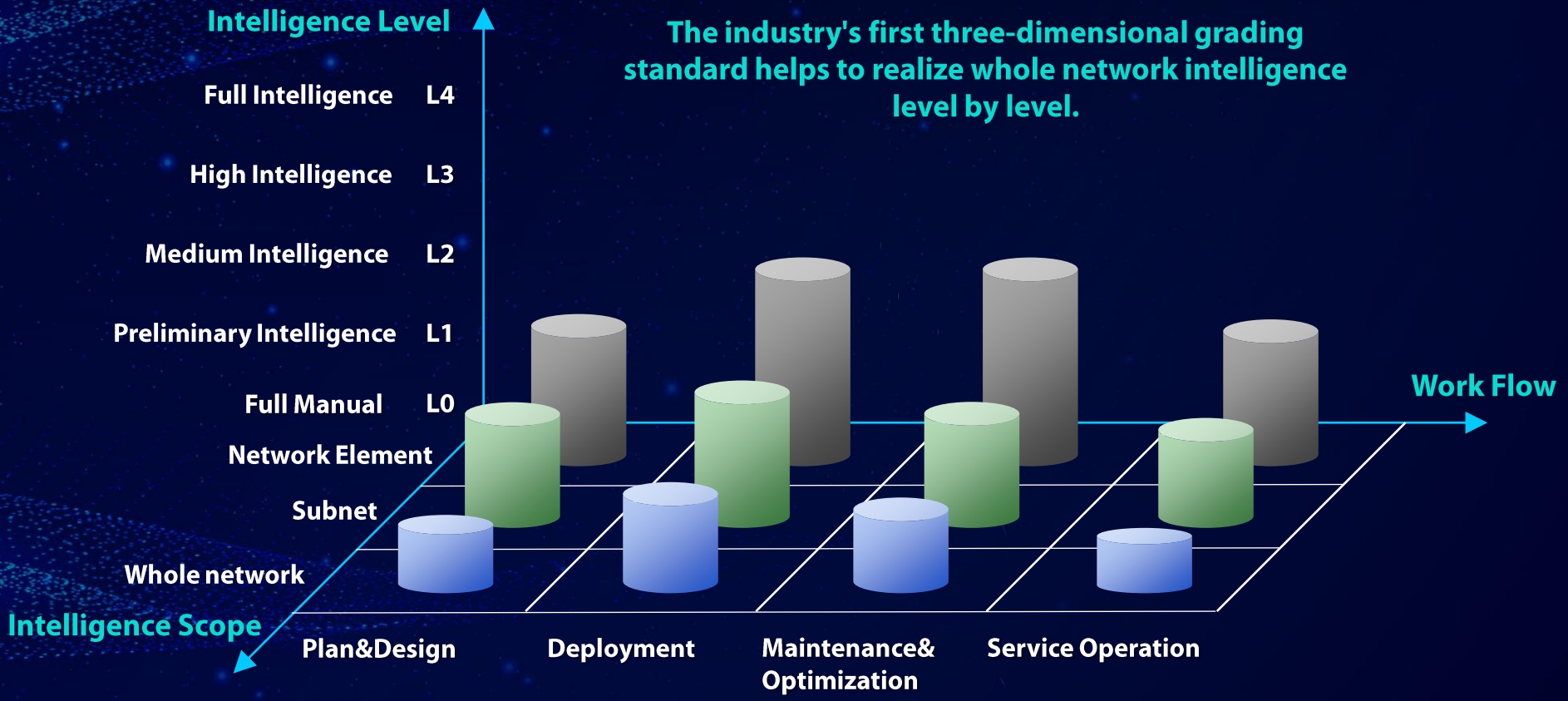
Performance **10%**

Smart Scheduling

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

Intelligent Network Evolution Needs Systematic Grading Method

The industry's first three-dimensional grading standard helps to realize whole network intelligence level by level.



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Road to Autonomous Network

Intelligence Level

L1 Preliminary Intelligence
- **Decision:** Human
- **Policy:** Static
- **Closed-Loop:** None

L2 Medium Intelligence
- **Decision:** Human+AI
- **Policy:** Static + Dynamic
- **Closed-Loop:** Intra-domain

L3 High Intelligence
- **Decision:** AI+Human
- **Policy:** Dynamic
- **Closed-Loop:** Inter-domain

L4 Full Intelligence
- **Decision:** AI
- **Policy:** Self-evolution
- **Closed-Loop:** Global

Evolution Scenarios

~2018
- Base Station RCA ↘ 55%
- TCP Optimization ↘ 18%
- Intelligent Traffic Optimization ↗ 10%
- AI-Based Resource Scale In/Out ↗ 35%

2019~2020
- AI Massive MIMO ↗ 10%
- Wireless Network Optimization ↗ 6%
- Intra-domain RCA
- Intelligent Power Saving

2020~2025
- E2E Smart Slicing
- E2E Fault Detection
- E2E Fault Self-healing
- E2E Network Self-Optimization

2025~
- Intent-driven Full Intelligent Network

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Scenario: AI-based Massive MIMO

Challenge

64T64R

Sport

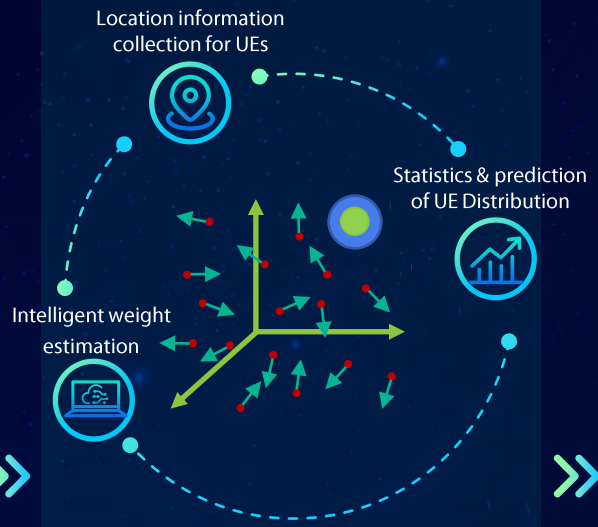
Concert

- H-beam width
- V-beam width
- Azimuth angle
- Down tilt angle

10000+ parameter combinations

Difficult to configure & optimize antenna parameters for multi-scenarios

Solution

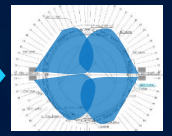


AI-based Weight Adaptation of Antenna Parameters

Benefit

Sport

Concert



Average Number of Users

15.5%

Without AI AI-Based

Average Throughput

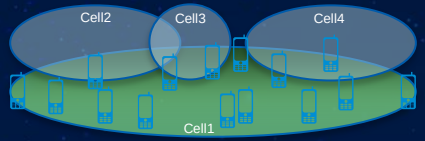
11.8%

Without AI AI-Based

Improvement of Resource Utilization and User Experience

AI Empowered Load Balancing Based on O-RAN Arch.

Challenge



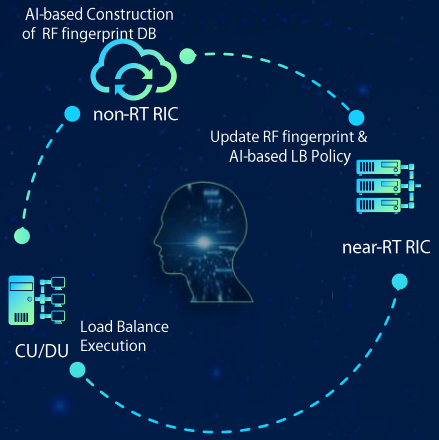
Passive

Blind Selection
Blind handover

Slow handover

Current LB Has the Lack of Accuracy and Timeliness

Solution



Core AI Model

Prediction	⇨	Proactive user association
Radio Fingerprint	⇨	Make precise strategies
Scenario Recognition	⇨	Customized optimization

Benefit

Increase LB Accuracy

Reduce LB Time

Scenario: Wireless Network Optimization

Challenge

1700 Cells in Meishan City

Lots of Network Optimization Experts

Time-consuming Optimization

Solution

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

PM/CM
MR/CDT
MDT

Problem Detection

AI-based Policy Decision

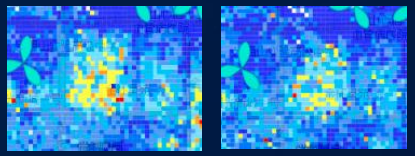
Logistic Regression
Genetic Algorithm
.....

Antenna Configuration Optimization

Power Self-optimization
Antenna Self-optimization

Benefit

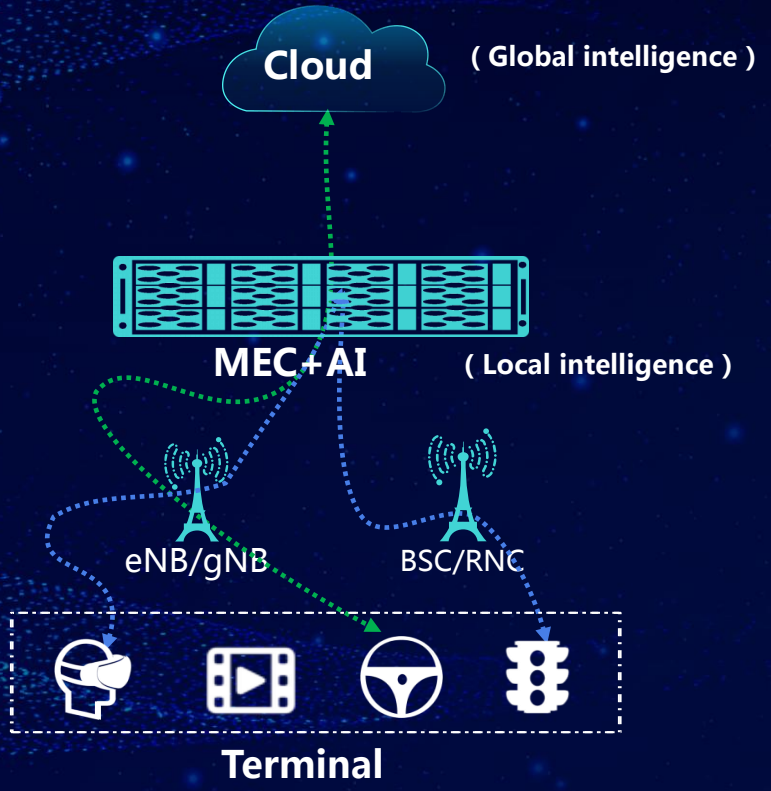
Performance



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 save 50%
- Latency reduce 75%
- Data Rate improve 10 X
- Computing Capability 2 X

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

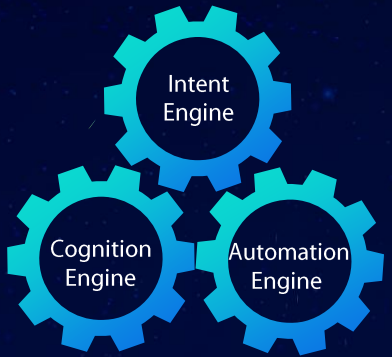
Alarm Compression Rate

Compressed/Total: 1056/1909

ZTE 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

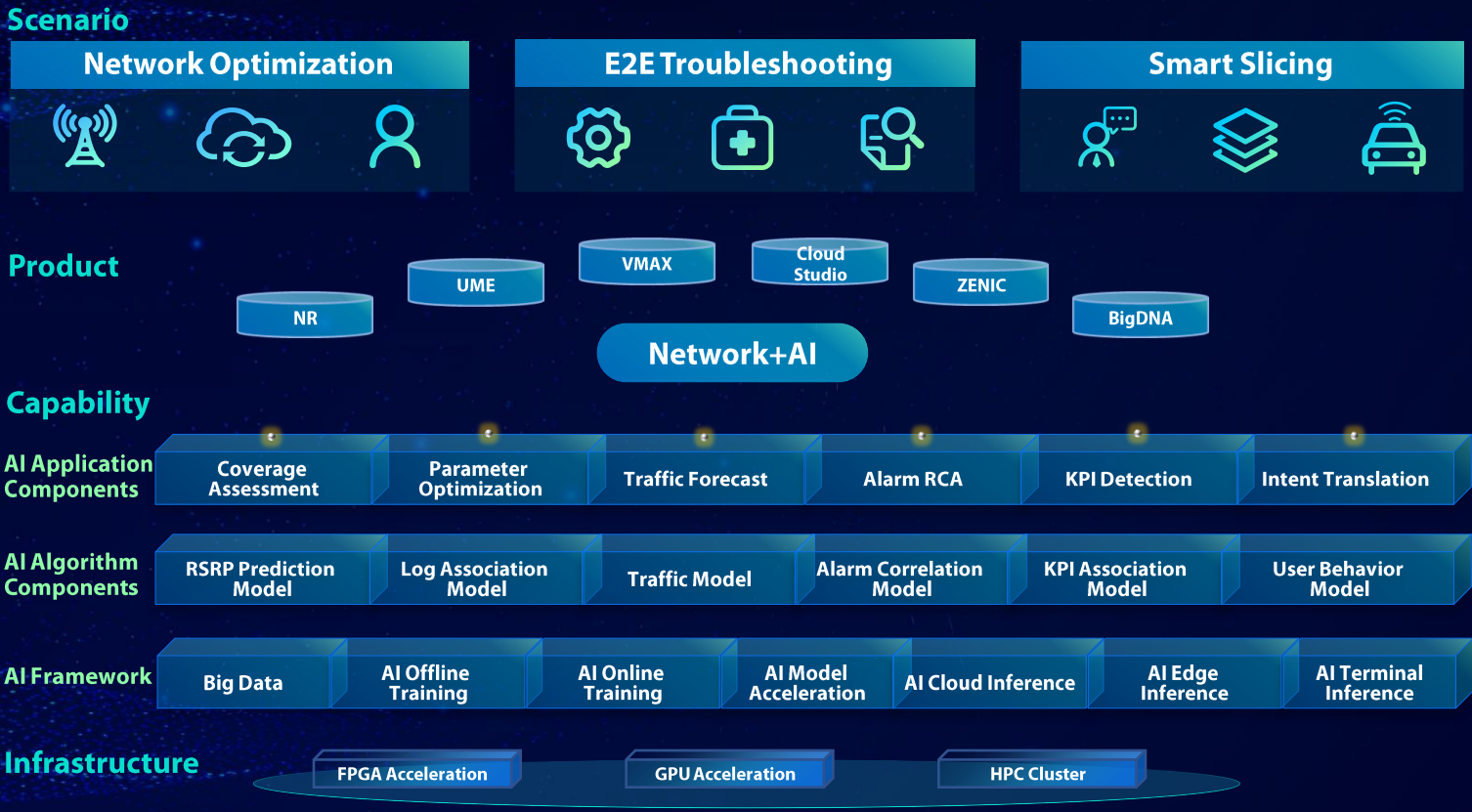
IP+Optical

DCI

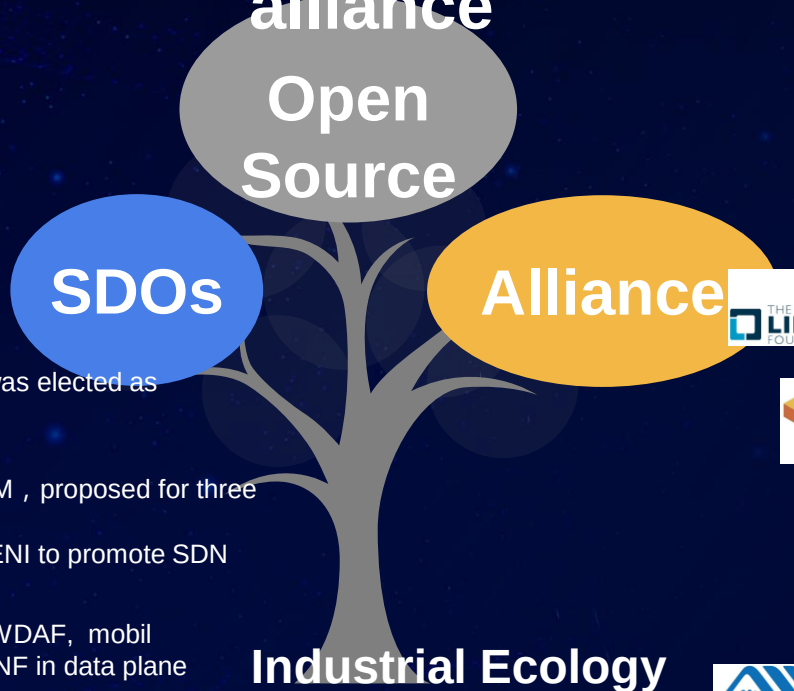
SD-WAN

E-OTN

ZTE Network AI Portfolio Helps Operators Achieve Autonomous Network



ZTE's progress in Standard and Open alliance



SDOs

Participate in ITU-T FG-ML5G，was elected as WG3 Chairman

1. Founding member of ISG ZSM，proposed for three projects in 2018Q1.
2. Taking an active part in ISG ENI to promote SDN intelligence

putting forward 2 proposals on NWDAF, mobil ity management and selection of NF in data plane

contributing to projects in TC1WG1; leading the network intelligence projects in TC5

Participate in ORAN and endeavouring for leadership positions

Open Source

one of the premier and founding members of Deep Learning Foundation. Acquired position in board, TAC and TSC

Committed over 100 times in Tensorflow community in 2017

Alliance

Participating in daily affairs of AIIA general group, standard group and technical group, collecting use case, and setting up open source projects

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Leading 5G Innovations