GSMA
Foundry

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CASE STUDY

# End-to-End **Automation of Networks Operations**

## ZTE is using AI to enable cross-domain agents to work together to optimise the end user experience of mobile connectivity

### Highlights

- Traditionally, network operations and maintenance has been hampered by silos and a lack of integration with business operations
- ZTE is using AI to enable multiple agents to coordinate the allocation of network resources to deliver a better service for end-users
- China Mobile has employed the solution at major events across China
- The solution has enabled China Mobile to handle more traffic, increase efficiency and identify and resolve faults faster
- ZTE is now looking to deploying its multi-agent solution beyond China

Traditionally, telecoms operators have relied on inefficient manual processes for network operations and maintenance (O&M). As a result, O&M teams often responded slowly to outages or performance degradations. At busy major events, in particular, the end user experience can suffer.

To address these challenges, the telecoms sector is developing and deploying autonomous networks. But significant obstacles remain. One of these is to fully integrate business operations into network O&M, as a separation between service provisioning and network resource optimisation can limit productivity. Interruptions to business processes lead to disjointed workflows and inefficient operations, hampering execution and service delivery, while curbing customer satisfaction.

Achieving full integration across various operational domains and different vendor systems is also a significant hurdle: network interfaces tend not to integrate

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seamlessly with other technologies, constraining adaptability, and slowing down the deployment of new services and technologies across different platforms. This disjointed integration impedes seamless network management, leading to fragmented operations and delayed responses to evolving network conditions. Networks often present normal operational indicators, even when users are experiencing significant issues, leading to poor service without immediate detection.

“The main thing for autonomous networks is to have an easy and fast reaction and an easy and fast adaption of inputs,” explains Hans Neff, Senior Director in the CTO Group at ZTE. “You have a radio network, you have a core network, you have transport, supplied by various vendors. To know the ongoing user experience, you have to combine all this information together.” Therefore, the operator needs a cross-domain layer collecting and analysing the data, he explains. “You have to have business analytics, coverage analytics, quality analytics and they need to be correlated for anomaly detection.”

## Advances in AI open up new opportunities

To optimise end-to-end network assurance both at major events and for day-to-day O&M, ZTE has leveraged generative artificial intelligence (AI) to create cross-domain agents that use standardised APIs to exchange information between different systems. These agents are underpinned by large language models that are continuously trained and refined using data collected by the cross-domain agents (see chart). “The architecture’s open nature uses advanced natural language models to facilitate inter-agent collaboration, improving cross-domain and cross-vendor integration,” explains Shen Yuan, RAN Product Planning Director at ZTE. “This approach surpasses traditional customised protocols, enabling smoother interactions and fostering a more agile and scalable network ecosystem.” The resulting solution then automatically identifies and resolves issues that are impacting the user experience.

## Extending the frontier of autonomous networks

China Mobile employed the multi-agent solution at the World Internet Conference Wuzhen Summit. During the event, the assurance agent and monitoring agent implemented end-to-end intelligent orchestration of the entire process, including network hidden risk investigation, guarantee policy deployment, second-level network indicator monitoring, automatic emergency policy processing, and automatic summary report output, explains Shen Yuan. The result was a fivefold improvement in efficiency and a 100% connection ratio, according to ZTE.

Usage of the multi-agent solution at events in Beijing and Shaanxi Province resulted in an increase in short video traffic of 10% and an increase in network traffic of 20% respectively. A deployment at the Olympic Centre concert in Zhejiang Province saw the monitoring workload fall by 30%. Similarly, at an international tennis event in Anhui Province, the maintenance workload fell 83%.

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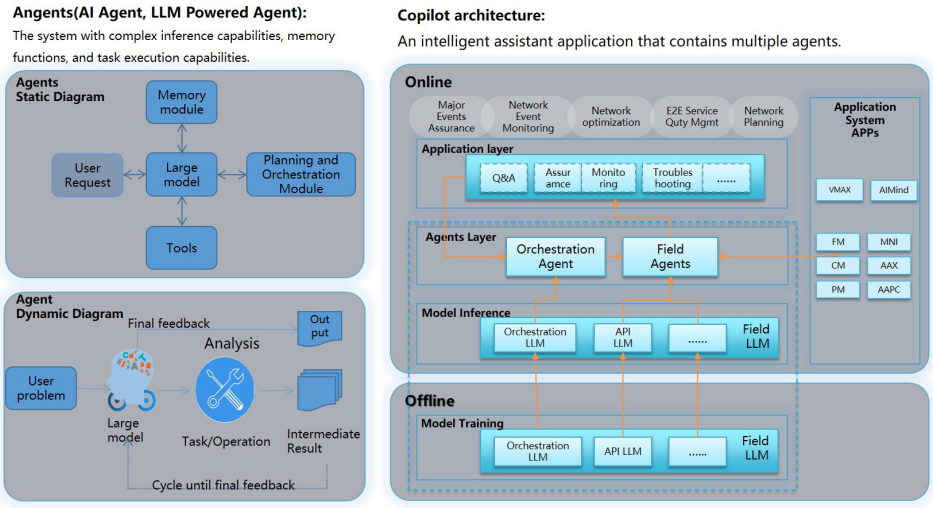
**Hans Neff** - Senior Director in the CTO Group at ZTE



Hans Neff says the new system can deliver level 3.8 autonomy, where level 4 autonomy indicates that a system can generally manage itself, in most circumstances. “This is the first end-to-end real-life implementation,” he adds. “So originally these optimisations were run in silos, they were radio-focused, they were transport-focused, they were core-focused. This is the generation where all of them come together.”

## Coordinating complex cross-domain tasks

As well as employing a multi-agent system for autonomous decision-making, ZTE says its solution leverages sophisticated task scheduling algorithms. “This synergy enables seamless coordination and execution of complex, cross-domain tasks,” explains Shen Yuan. “The result is a fully integrated, closed-loop system that aligns business, network, and service processes. By automating these critical operations, the architecture ensures greater efficiency, adaptability, and responsiveness, paving the way for a truly autonomous network ecosystem that meets the evolving demands of the digital age.” The goal is to achieve seamless end-to-end integration of processes, breaking down traditional silos between business operations and network operations, and ensuring cohesive performance across all network layers.

The solution employs a natural language user interface to interact with the O&M team. ZTE says it can translate user requirements and intent directly into actionable network responses, delivering services swiftly and accurately. “This intuitive model ensures that service needs are addressed in real-time, responding to user expectations within seconds, using the distributed computing power available at the network resources,” says Shen Yuan. To that end, the system aims to fully leverage the computing resources in the radio access network to better perceive the service quality for the end-user and react accordingly. Modern base stations contain significant computing power, which is largely under-utilised today, according to ZTE.

ZTE is in discussions with operators and other vendors about deploying its multi-agent solution outside of China, with strong interest, so far, from stakeholders in two European markets. To take full advantage of its capabilities, the different systems used by the mobile network operator need to employ standardised APIs.

By seamlessly integrating service and network resource management, ZTE believes operators will see major business benefits. “By optimising automation and real-time resource allocation, we empower operators to enhance productivity, streamline operations, and adapt dynamically to the demands of digital evolution,” concludes Shen Yuan.

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**Shen Yuan** - RAN Product Planning Director at ZTE

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The GSMA is a global organisation unifying the mobile ecosystem to discover, develop and deliver innovation foundational to positive business environments and societal change. Our vision is to unlock the full power of connectivity so that people, industry, and society thrive. Representing mobile operators and organisations across the mobile ecosystem and adjacent industries, the GSMA delivers for its members across three broad pillars: Connectivity for Good, Industry Services and Solutions, and Outreach. This activity includes advancing policy, tackling today's biggest societal challenges, underpinning the technology and interoperability that make mobile work, and providing the world's largest platform to convene the mobile ecosystem at the MWC and M360 series of events.

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Our vision is to unlock the full power of connectivity so that people, industry, and society thrive. This enables the mobile industry's mission: to connect everyone and everything to a better future.

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For more information, visit: www.zte.com.cn

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