Abstract

New technology such as IOT, edge computing, etc. propose the requirement of computing in network, so convergence of network and computing has become a trend. This document points out the requirements of computing according to the development of new Industry, and analyzes the new architecture including precision and Intelligence of the network.

Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119].

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1. Overview

Intelligence in the whole industry has a huge demand for computing, which puts forward immense challenges to cloud computing and network. Network Architecture is undergoing a transformation towards cloud and service, providing rapid response and flexible deployment for different industries. Precision and intelligence will be the important direction of next-generation network development.

2. Requirements of Network

Next generation network needs new architecture, to building precision network and new ubiquitous intelligence capability.

2.1. New Architecture

New Architecture needs to integrate computing into a part of the network, so the computing capability could extend as the network. It also needs to use the AI technology to enable network the capabilities of self-generating and self-optimizing. On the one hand, the network driven by users and services could be self-generating, self-constructing, self-configuring and self-management on demand. On the other hand, the capability and service of network could be iterated, optimized and evolved automatically.
2.2. Precision

Precision of the network refers to the deterministic of latency, packet loss rate and computing resource.

In the face of time sensitive services such as industrial Internet and telemedicine, the traditional network’s best-effort forwarding mode can no longer meet the demand of such services for network latency. The deterministic latency brings forward a new measure latitude for network, which changes from in-time to on-time.

Packet loss rate is another factor to evaluate the precision of the network. Utilizing the ubiquitous computing capability of the network, network prediction and segment-by-segment path retransmitting are realized based on AI, network transmission can be optimized and service QoS can be ensured.

Besides those, how to precisely distribute network computing power to meet the requirements of business requests is also a challenge to the network. It considers the network status and the performance status of computing resources to dynamic match the computing power. So the user experience, utilization rate of computing resources and the network efficiency can be optimum.

Some technologies such as time-sensitive network TSN, deterministic network DETNET, etc., have proposed corresponding technical means to provide network bearers with deterministic latency(IEEE802.1Qbv, IEEE802.1Qbu) and packet loss rate and guarantee the user’s business experience. However, it also needs to consider how to guarantee the service’s end-to-end latency, packet loss rate and resource utilization rate.

2.3. Ubiquitous Intelligence

Ubiquitous Intelligence refers to use AI in the whole network, which could realize the programmability of network, flexible scheduling, heterogeneous computing resources and Atomized AI algorithm.

Traditional IP-based addressing and TCP/TLS session-based network model are difficult to play dynamic, micro-service, ubiquitous computing advantages, also can’t guarantee the maximum computing efficiency. Function-based addressing distributes the application solution of Server side into the cloud platform. So the client only needs to care about the computing function itself, but not about the computing resources such as server, virtual machine, container and so on, so as to realize the function as a service.
Traditional IP network and users can not configure each other, the network can not provide customized services according to users’ needs, and the terminal also lacks the ability to perceive the necessary network state. So it is necessary to open network interface to express user’s needs and realize network programmability. The network can configure parameters according to users’ needs, and users can transfer requirements based on network capabilities/states, thus effectively supporting future business requirements.

3. Conclusion

Under the new business requirements, the existing network technology can not meet the needs of transmission, calculation and efficiency. Precision and intelligence are the key directions in the evolution of network computing convergence. The new network needs to make the connecting reach everywhere, calculation distribute everywhere and Intelligence support everywhere.

4. Security Considerations

TBD.

5. IANA Considerations

TBD.

6. References

6.1. Normative References


6.2. Informative References


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