Deep collaboration between the application and network

draft-zhang-rtgwg-collaboration-application-network-01

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Diversified service scenarios in the digital age

- Different applications in various scenarios, such as IoV, Massive Data Transmission, Industrial Internet and Circulation etc., have differentiated requirements for both network and computing services.

Remote driving
ultra-low delay

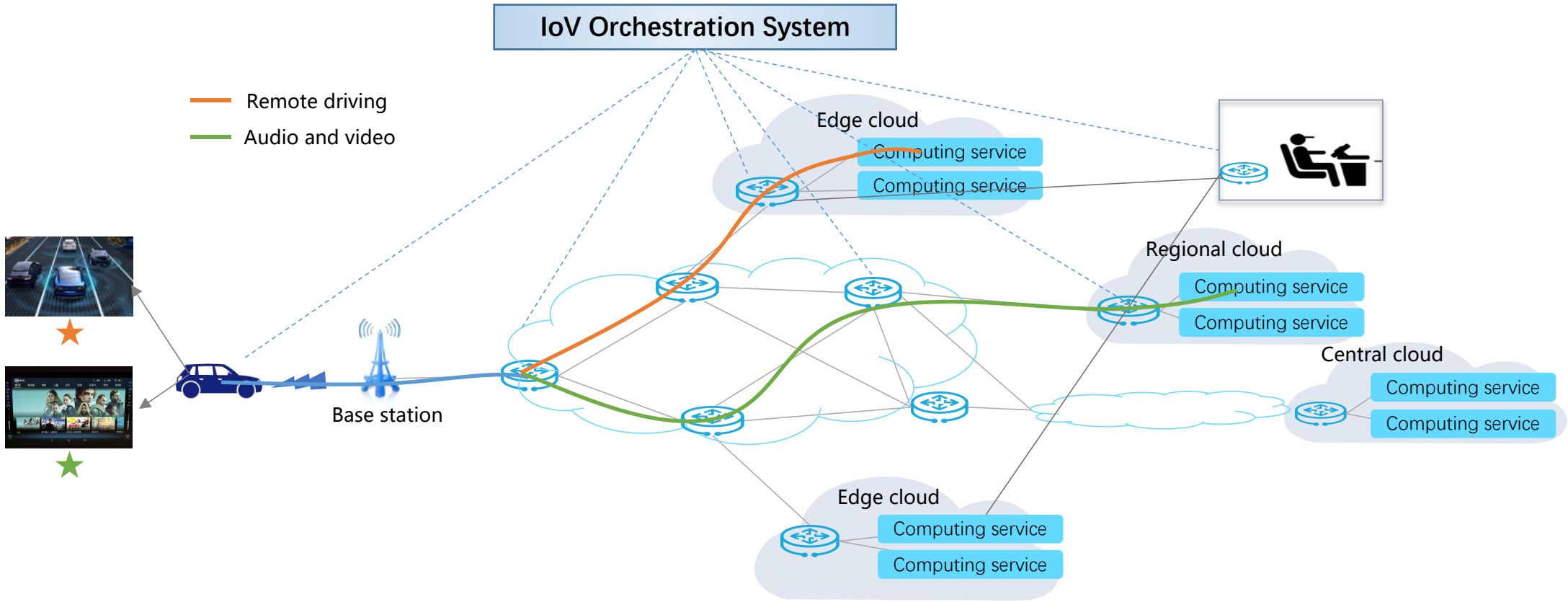
Automatic control
deterministic delay

Data sharing between enterprises
Secure and reliable transmission

- Currently, applications and networks operate independently and are unable to interact to ensure flexible and efficient resource scheduling.

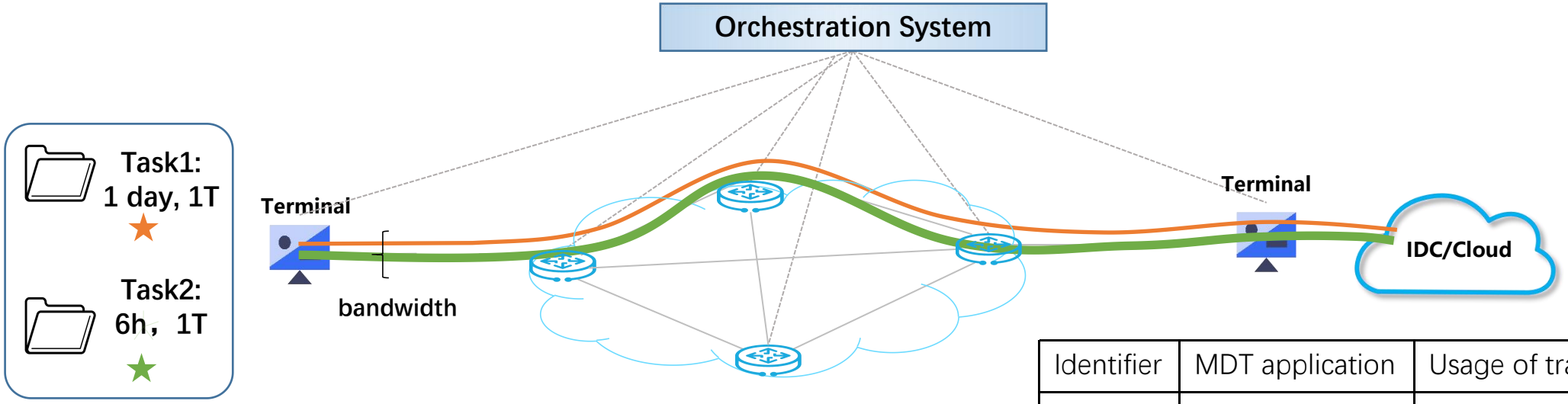
High-speed IoV

- Applications **affecting driving**, such as autonomous driving, remote control, and intelligent driving services, require extremely low network delay for quick judgments and responses.
- Applications **unrelated to driving**, such as voice communications, streaming media, and other entertainment services, are insensitive to delay but may require higher computing performance.



Massive Data Transmission

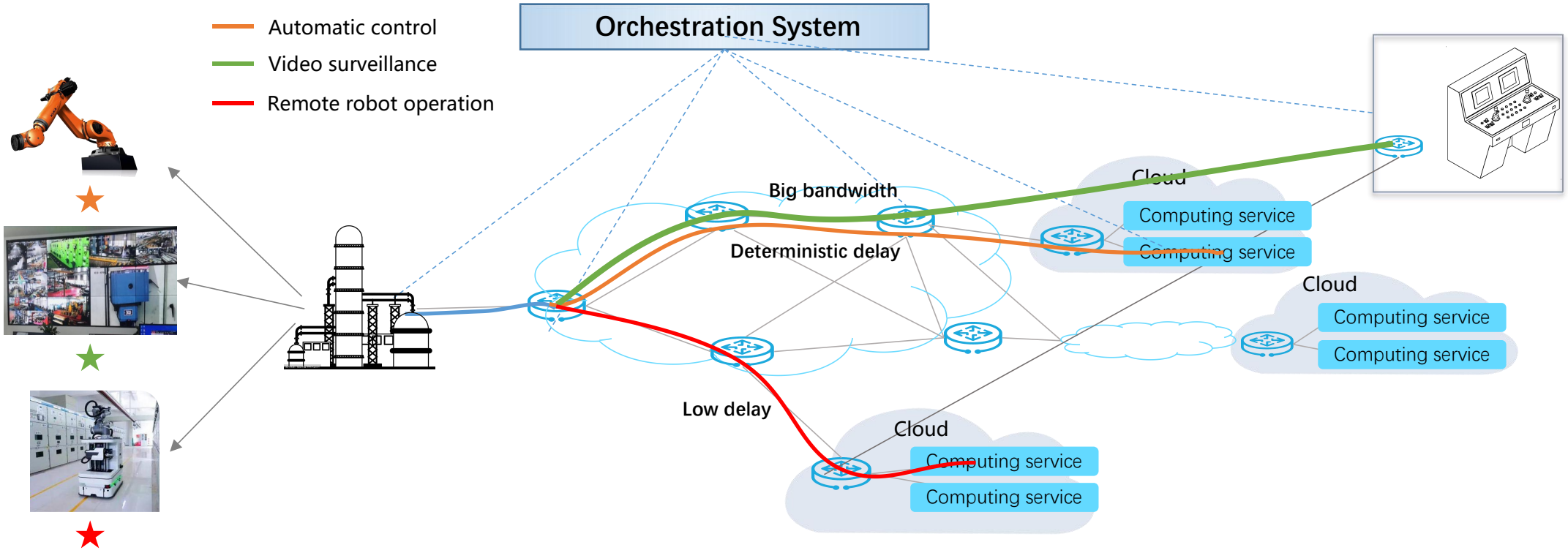
- **Before starting transmission**, different tasks have different demands of data size and expected completion time. This leads to differentiated requirements of real-time available bandwidth for different tasks. Network needs to aware MDT applications to provide suitable service without affecting other services on the existing network.
- **After the transmission task is initiated**, network devices need to identify MDT applications and corresponding account information based on certain identifiers to perform traffic record.



Identifier	MDT application	Usage of traffic
★	Task1	...
★	Task2	...

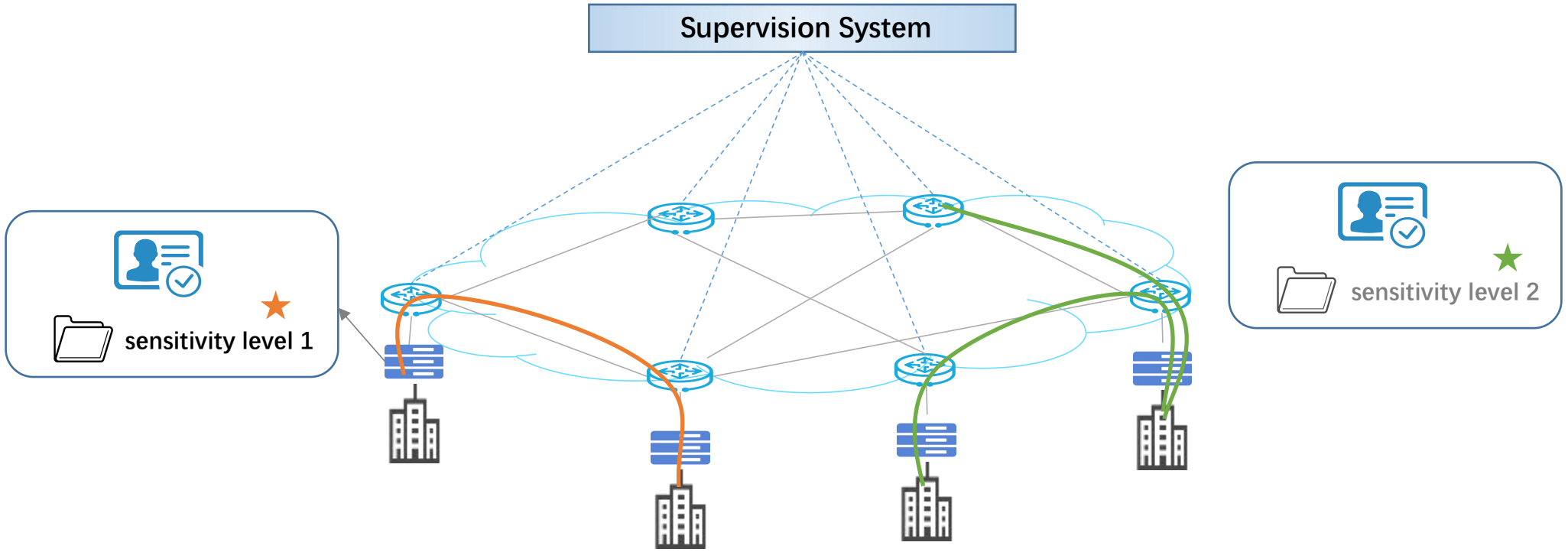
Industrial Internet

- **Industrial control** tasks require systems to respond within strict time constraints, automatic control applications have high requirements for deterministic network delay.
- **Video surveillance** requires the transmission of a large amount of video data and real-time reflection of factory conditions. The network must have enough real-time available bandwidth.
- **Remote robot operation** requires real-time transmission of control instructions and feedback data, requiring ultra-low network transmission delay to ensure accuracy and real-time operation



Data Sharing and Circulation

- Institutions such as enterprises or hospitals may have demand for data sharing and circulation, these data often involve **sensitive information**. It is necessary to classify and identify the sensitivity level of data and bring this information to network, so that the circulation scope of sensitive data can be controlled.



Consideration

What If applications and networks can achieve deep collaboration?

- Network resources and application requirements can be dynamically and accurately matched.
- The stability and user experience of the application be improved.
- The utilization efficiency of network and computing resources can also be enhanced.

Deep collaboration between applications and networks needs:

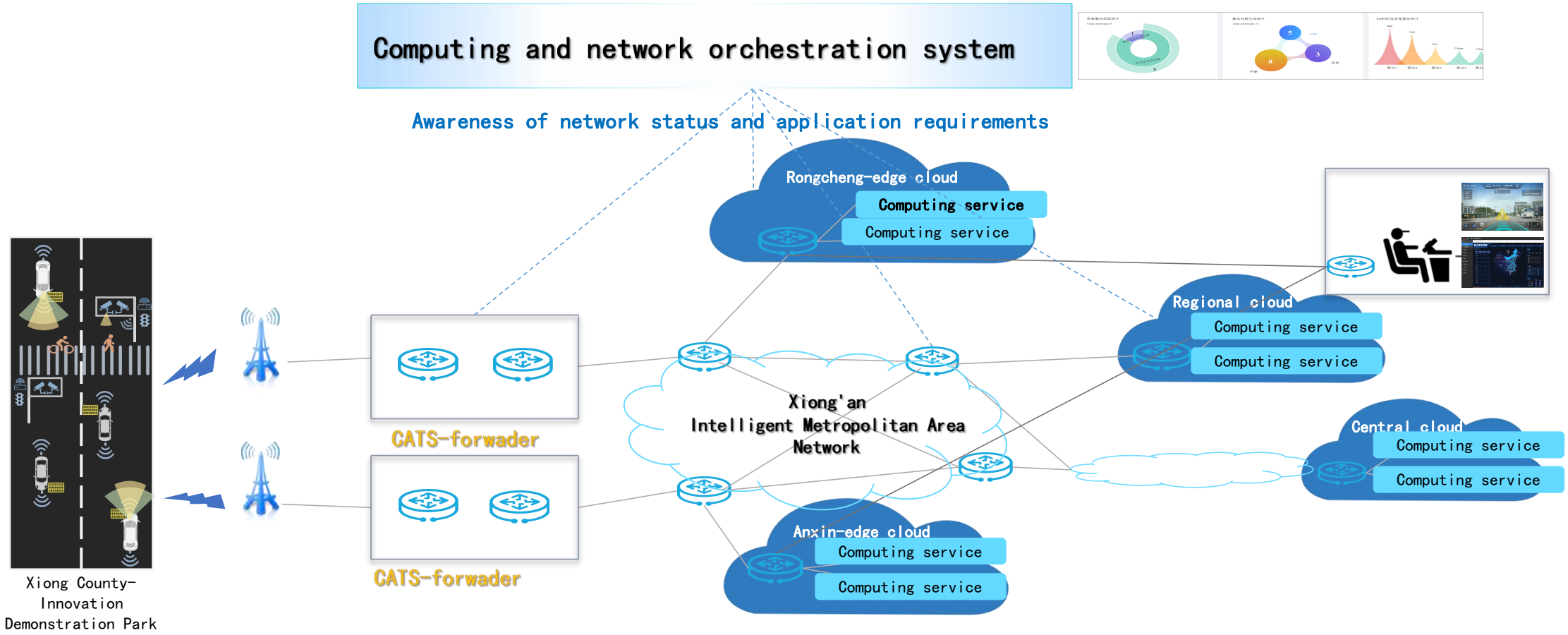
- The precise awareness of network status by applications.
- The awareness of application requirements and status by networks.

Requirement

- The ability of network awareness by application
  - Accurate measurement of network indicators
  - Cross cloud measurement
  - Obtaining of measured network indicators by application
- The ability of application awareness by network
  - Fine grained awareness of application requirements
  - Computing status awareness of server applications

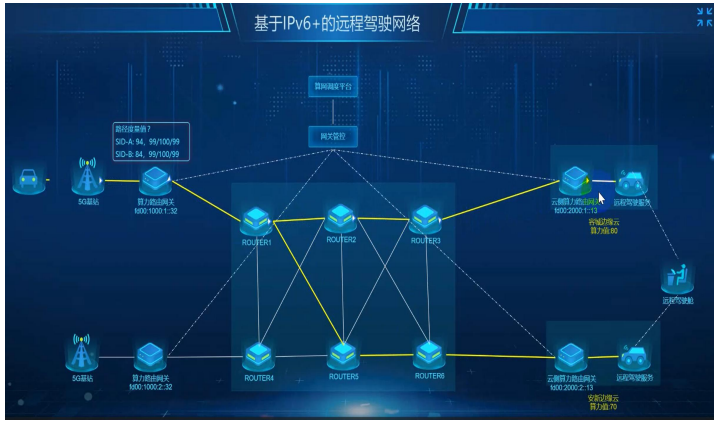
Deployment case

- Current network verification for IoV solution based on application and network collaboration in Xiong'an, Hebei, China



Deployment case

- IoV solution based on application and network collaboration



- Provided high quality and more flexible solution for high-speed IoV.

- Please refer to the [draft-zhang-rtgwg-collaboration-application-network-01] for detailed information.
- Any comments and suggestions are welcome.