

# **IP network 3.0: Solution of fine-granularity deterministic networking capability as a service**

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# Why fine-granularity deterministic networking capability as a service

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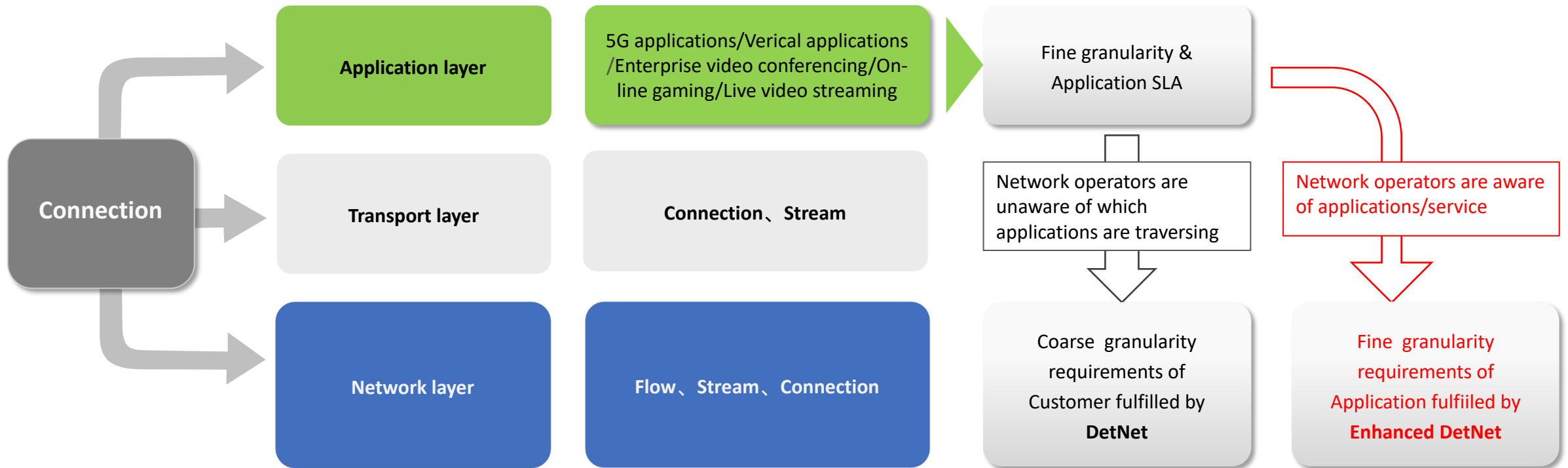
# Requirement 1: fine-granularity

## Problem statement

The network operators need to be able to provide fine-granularity and even applicationlevel SLA guarantee to achieve better Quality of Experience (QoE) for end users

- 5G and verticals generates more and more applications with diverse network requirements
- Revenue-producing apps: online gaming, live video streaming, enterprise video conferencing with much more demanding requirements
- Network operators are typically unaware of which applications are traversing their network, which is because network is decoupled from app
- Not able to provide fine-granularity traffic operations for specific applications
- Without corresponding revenue increases that might be enabled by differentiated service prov.
- Adding application knowledge to the network layer enables finer granularity requirements of applications to be specified to the network operator (even by app)

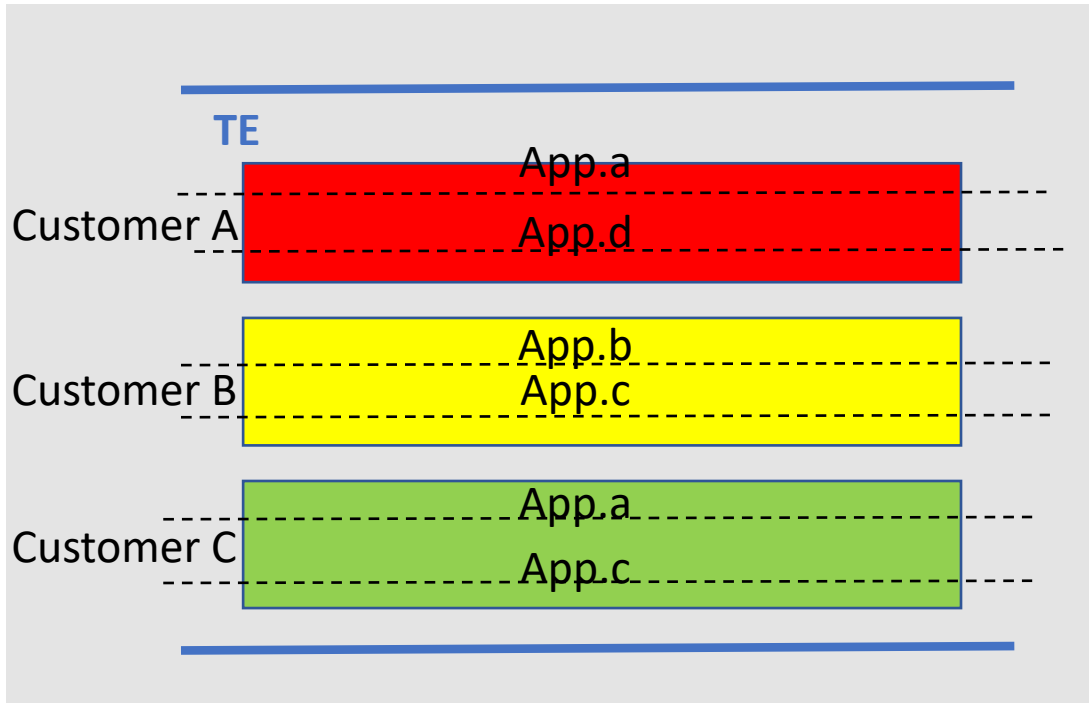
# Requirement 1: fine-granularity



- **Req01:** It is required that Network layer is capable to aware application/service requirements
- **Req02:** It is required that the application's fine granularity requirements are exactly mapped into network requirements without lost of information through global service ID.
- **Req03:** It is required that the network requirements could be fine granularity classified and meet by EDN.

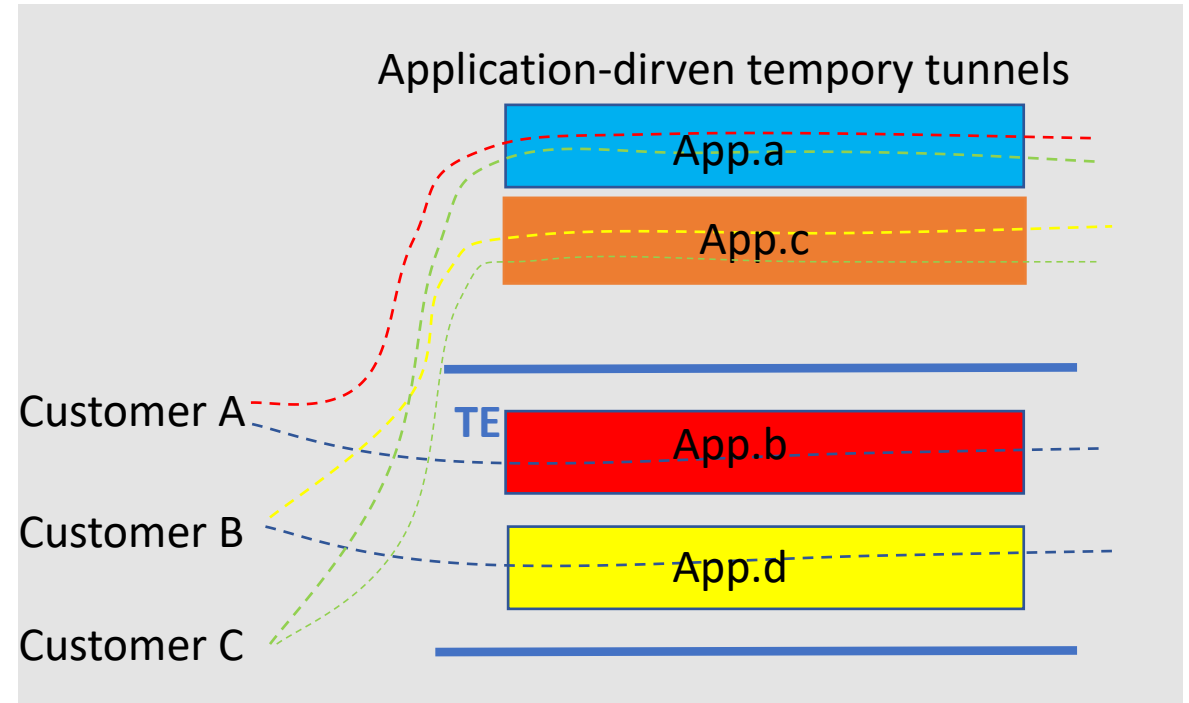
# Requirement 2: as a service

Problem statment



- if the customers rent only 1 tunnel for their applications, when congestion happens, the packets of the most important application(for example, App.a,the signalling packets) will be discard randomly just as the less important applications.
- If the customer rent multiple tunnel for different applications, it is very costly for the small and medium-sized enterprises.

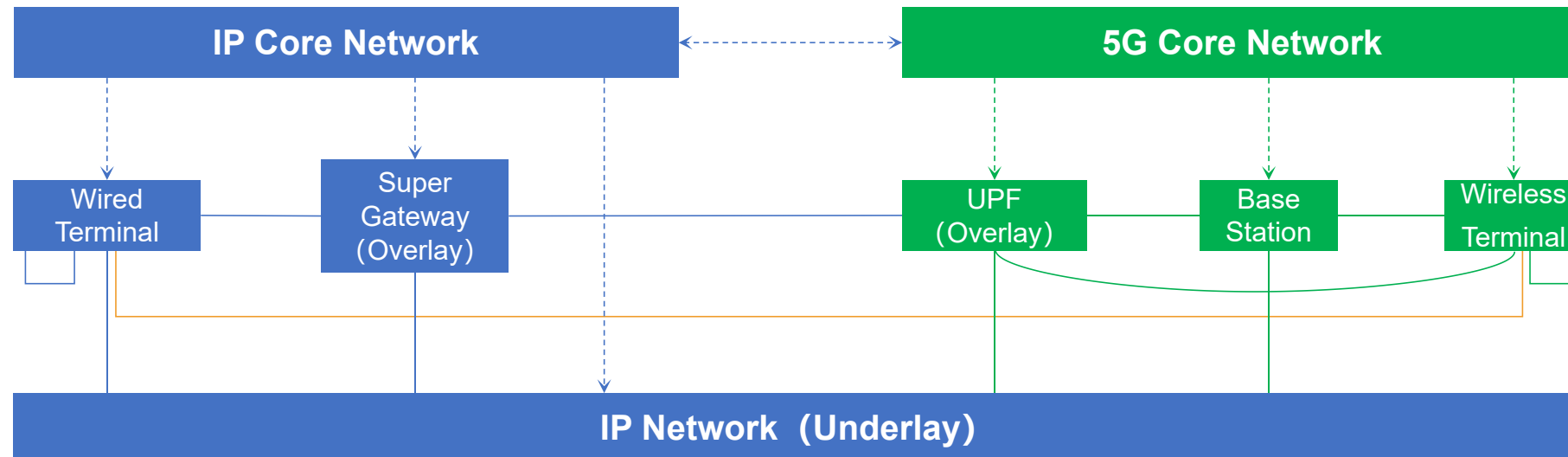
Requirements



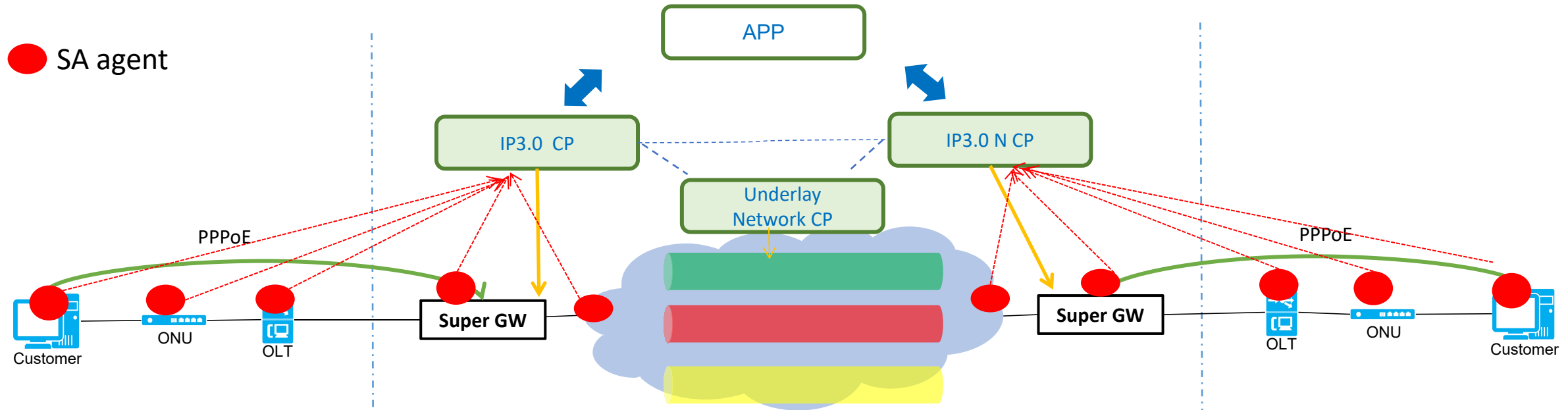
- **Req04:** It is required that the DetNet capability be provided as a service. This service should be initiated and suspended at any time, any duration, any network resouce requirements.
- **Req05:** It is required that the DetNet capability is automatically driven by applications when the their Quality deterioration is detected
- **Req06:** It is required the application classification and application quality could be automatically detected.

# Solution: China Telecom IP network 3.0 (IP3.0 for short)

- IP 3.0: the name of IP core Network
- IP core network is similar to the 5G core network.
- It is responsible for service status tracking and service control (including but not limited to terminal attachment, user authentication and authorization, allocation of resources based on service requests and maintenance of service status, etc.)
- IP 3.0 provides the capability to manage the IP connection in session level. It avoids the statistical multiplexing problem, which introduces the non-deterministic network service, of the traditional IP network.
- IP 3.0 provided the foundation to meet the requirement 1 ( fine-granularity deterministic networking) and requirement 2(capability as a service)



# IP3.0 solution for fine-granularity deterministic networking capability as a service



1. IP3.0 CP acquires the application information from SA agent and figure out the application types and application quality;
2. If the VIP application ( defined by customer) quality is degraded under a threshold value for a specific time duration, the IP3.0 CP interacts with super GW and underlay network CP to initiate a new tunnel which meet the applications requirement and steer the application flow to this tunnel;
3. When the underlay network performance return to normal, the IP3.0 CP will remove this tunnel and steer the application flow back to the underlay network.

The architecture of the IP3.0 gives the benifits to meet the “fine granularity” and “as a service” requirements of the deterministic networking.