Service ID for addressing and networking

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draft link:
https://datatracker.ietf.org/doc/draft-huang-rtgwg-sid-for-networking/

What is service identification and how is it in routing network?

Service ID : entity which refers to user-oriented services or capabilities explicitly or implicitly.

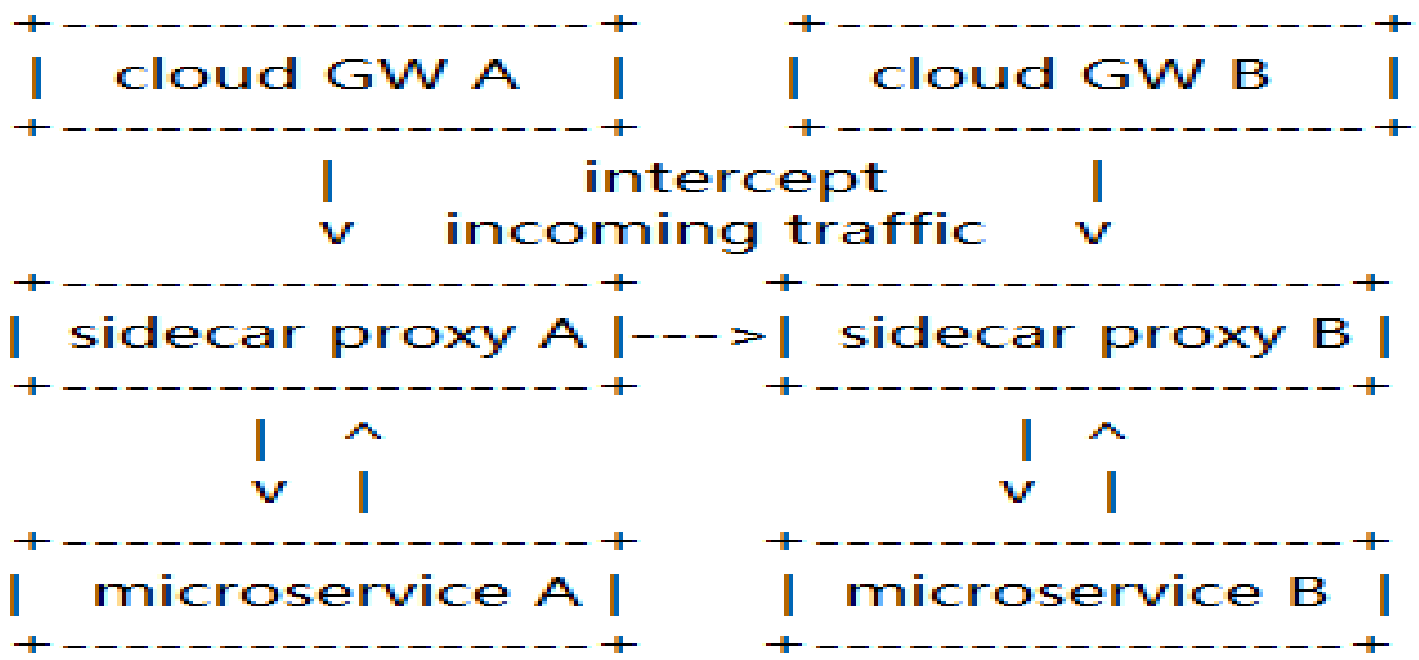
WHY:

- identify service with disparate reqirements and treat the traffic accordingly
- light-weight interface to the users rather than only to the operators
- relevant across terminal, network and cloud

HOW in routing network:

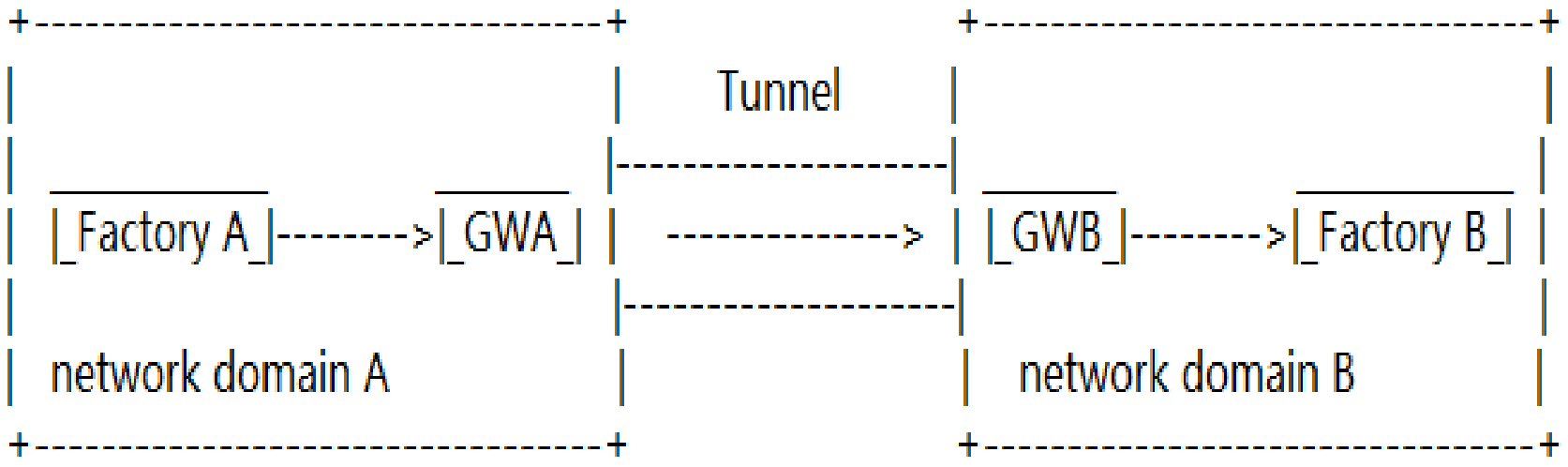
- implicit way: Mapping with 5-tuples
- explicit way: **service address** of ROSA, **App ID** of APN, **Computing service ID** of CATS

Why it matters
- use case 1: service mesh across mutilple clouds



1, Multiple L7 proxy traffic interception in networking among micro-services involves overwhelmed performance price in terms of delay and complexity
2, API gateways at the DCs could be under operation of different parties, additional complexity incurres for the micro-service accessing

Why it matters
- use case 2: multi-cloud/domain interconnection



1, Multi-cloud interconnection could bring up different underlying technologies while the end-to-end service requirements needs to be consistently guaranteed.

- No unified mechanism is in place to ensure the end-to-end requirements satisfication

2, Additional delay cost occurres when the gateways of different domain handles the tunnel operation as well as service mobility.

The gaps of the existing mechanisms

1,State burden : mapping state would increase exponentially while the services migrate from centralized cloud to edge sites

2,Granularity and TE:

- 5-tuples could not identify the sub-flow of service which could be far more networking sensitive than the rest
- Bind SID/Color/DSCP based TE could not reflect the service in a fine-grained and explicit way.

3,Service operation: existing identification is operator-oriented rather than user-oriented.

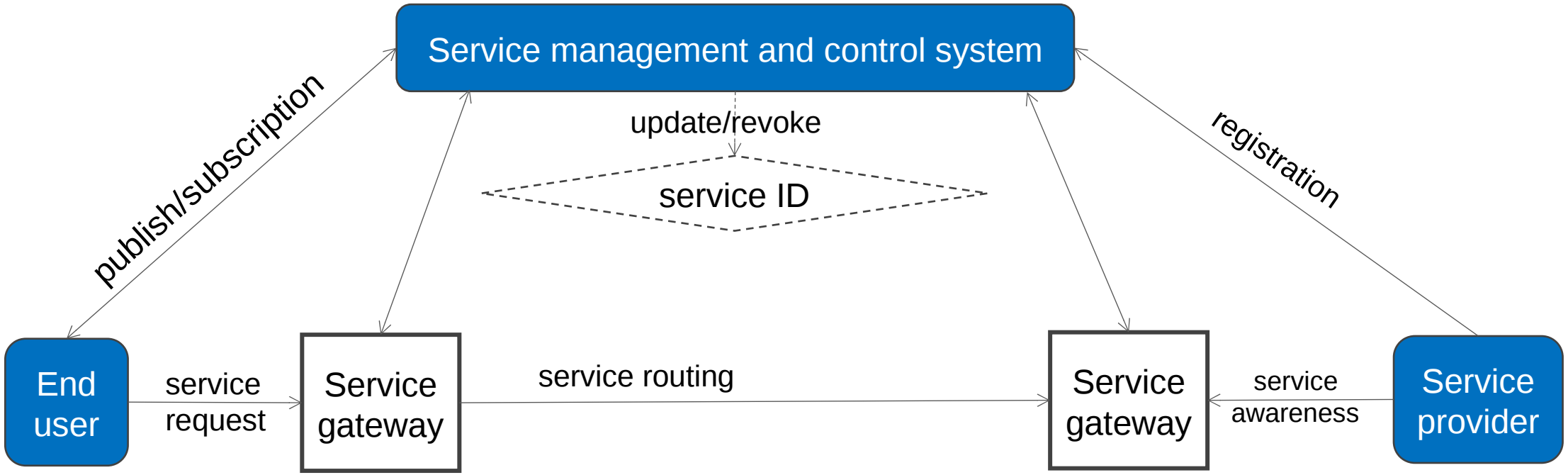
4,Network and cloud convergence: 5-tuples would be terminated by cloud gateway (NAT etc.)

5,L4/L7 gateway in the way: traffic routing and fowarding would be terminated with significant performance prices.

The requirements of standalone service ID in routing network

REQ1 Service identification SHOULD have **standalone semantics versus 5-tuples.** *location and device independant*
REQ2 Service identification SHOULD have **global and unified semantics across terminal, network and cloud.**
REQ3 Service identification SHOULD be able to **index the specified service profile in terms of its SLA requirements.**
REQ4 Service identification might indicate specified networking capabilities and specified applications as well as application components such as micro-services.
REQ5 Service identification might cover only the selected services and applications which have been designated to be networking and computing sensitive.

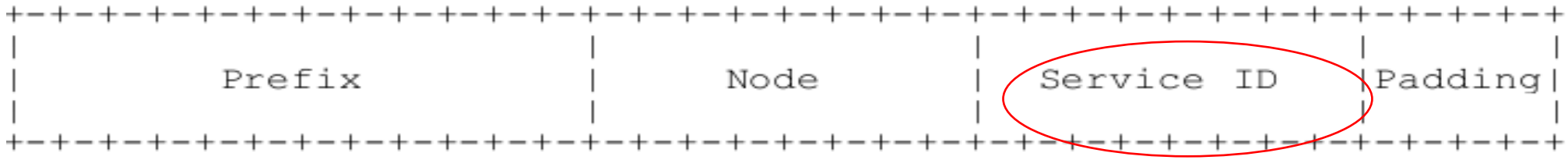
Management and governance of service ID



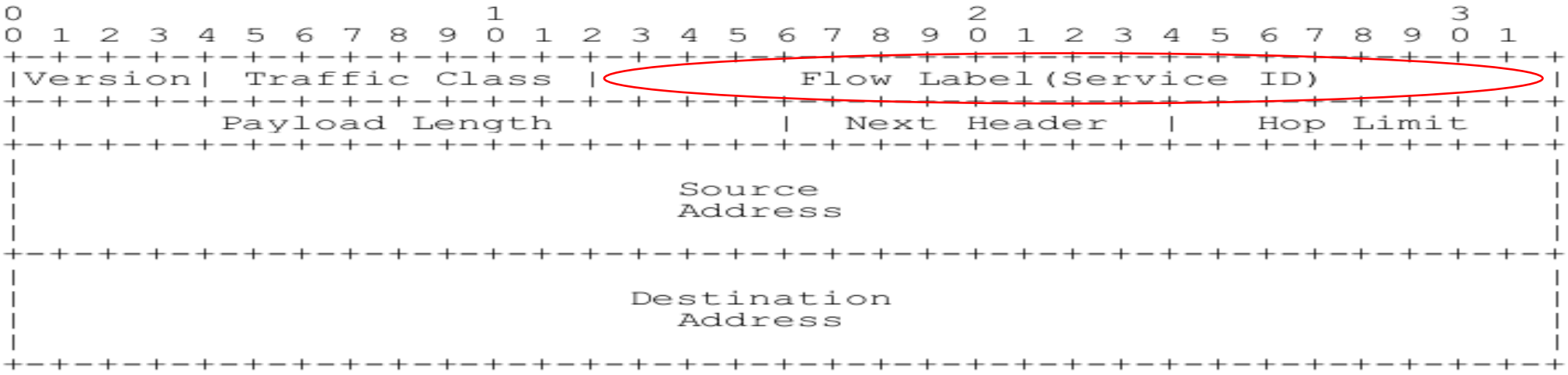
- Service ID is governed and managed by a controlled system
- Service ID is an agreement and explict interface between provider and user

Instantiation of service ID in IPv6 headers

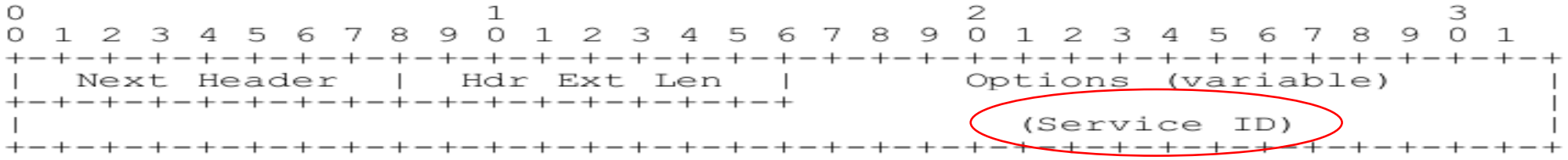
Servcie ID in IPv6 address field:



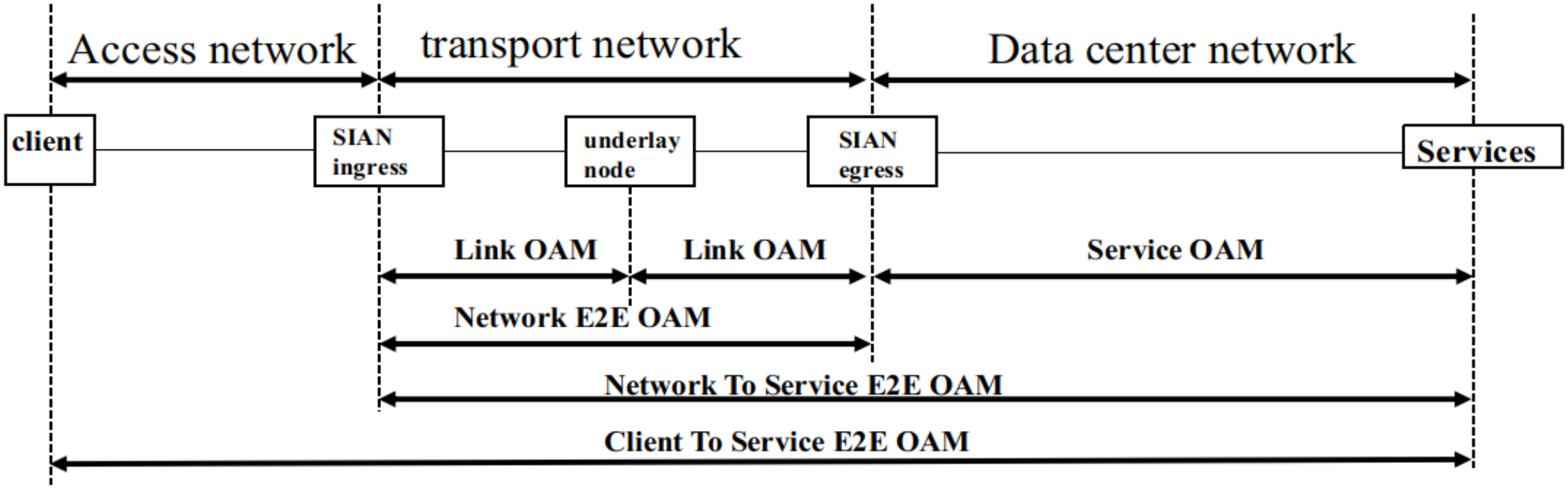
Servcie ID in IPv6 flow label field:



Servcie ID in IPv6 extension header:



OAM upon service ID



What's new:

- Service ID-based OAM extends from transport network to the cloud of which OAM would be associated with that of network.
- Network to servcie OAM leveraging service ID as the unified interface.
- Availability of multiple OAM in terms of service ID.

- The draft focuses on rationale of standalone servcie ID in routing network rather than the specific framework solution, so the use cases and gap analysis would be refined and decoupled from this draft.
- Any comments, suggestions and contributions would be welcome and appreciated.