14TH ITU ACADEMIC CONFERENCE

ITU KALEIDOSCOPE
ACCRA 2022

Towards computing and network convergence: QoE-oriented service anycast based on SRv6

7-9 December 2022
Accra, Ghana

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Session 1 – Some perspectives on future networks

Paper S1.2

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Background

- XR apps bring great challenges to terminal performance and energy consumption.
- Cloud XR and Edge Cloud XR have been proposed.
- The cloud native system makes it possible to distribute XR applications based on micro-services.
- In the foreseeable future, XR apps will be deployed on a highly distributed computing infrastructure.
- The network infrastructure is not ready for it.

Motivation

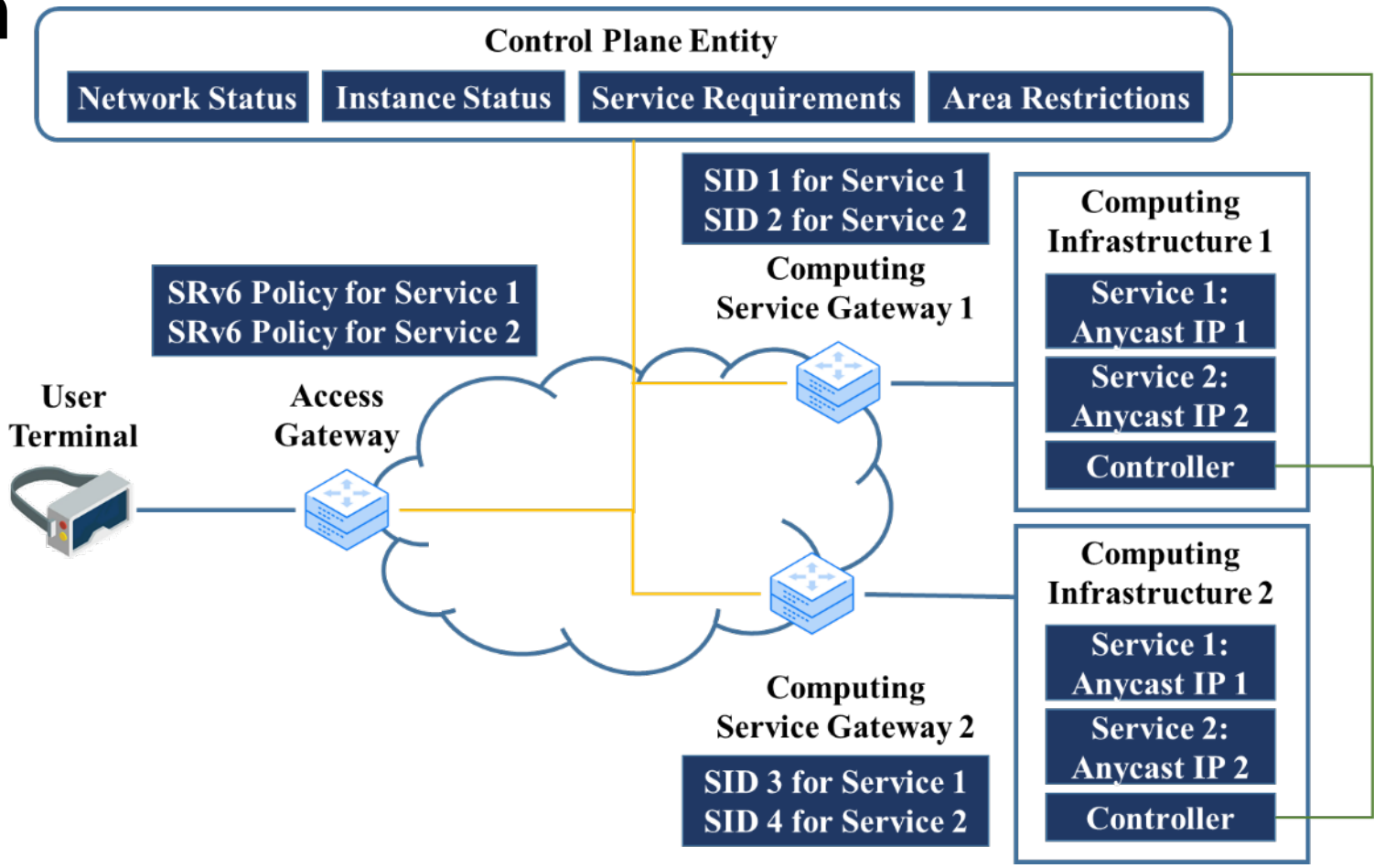
- DNS lacks support for highly distributed services.
- Service resource selection is unaware of user's QoE.
- New requirements for the network
  - Service Resource Discovery
  - QoE Oriented Service Instance Selection
  - Seamless Mobility and Service Continuity

Related Works

- Edge computing enabling architecture in 3GPP
  - Network capabilities exposure, edge computing service discovery
- Named Data Networking
  - Addressing data instead of host
- Anycast
  - Effective for single-round-trip service
- CFN Dyncast
  - Modified BGP advertisement and session affinity

Architecture Design

- **Fundamental:** Use traffic engineering to direct service traffic to anycast hosts through the control plane.
- **Access Gateway:** Execute SRH encapsulation and forwarding according to the policy issued by the control plane.
- **Computing Service Gateway:** Remove the SRH in the packet and forward it to the corresponding service instance, according to the SID.
- **Control Plane:** QoE-related status information collection and SRv6 policies configuration.



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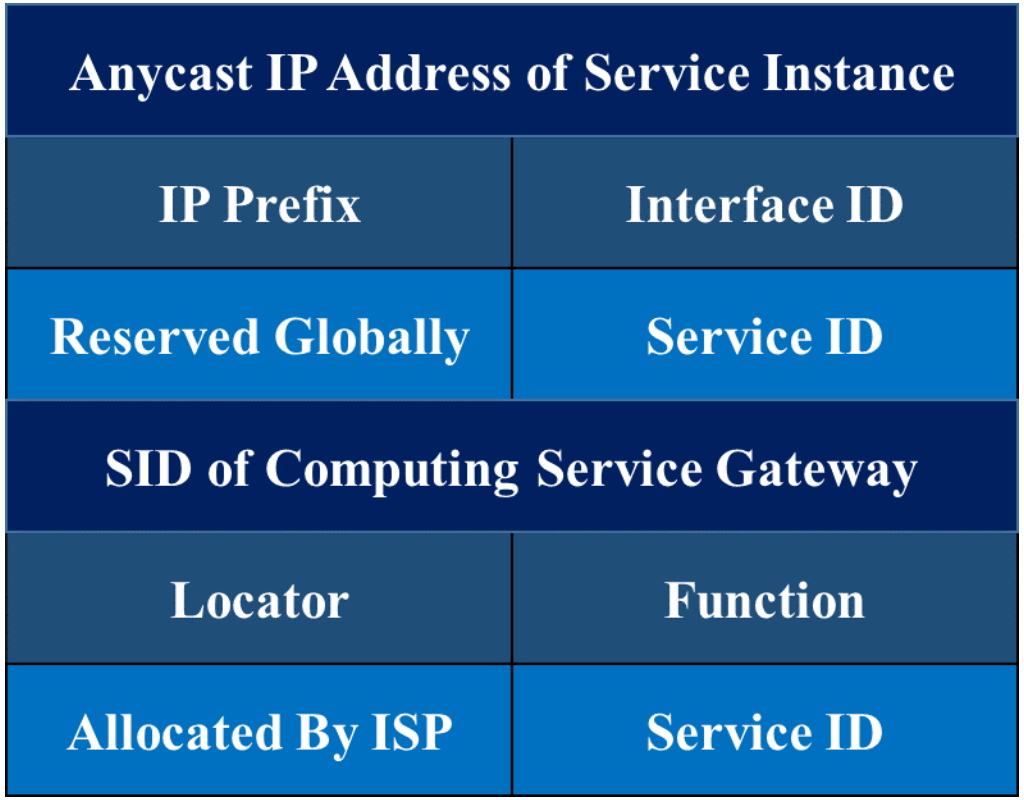
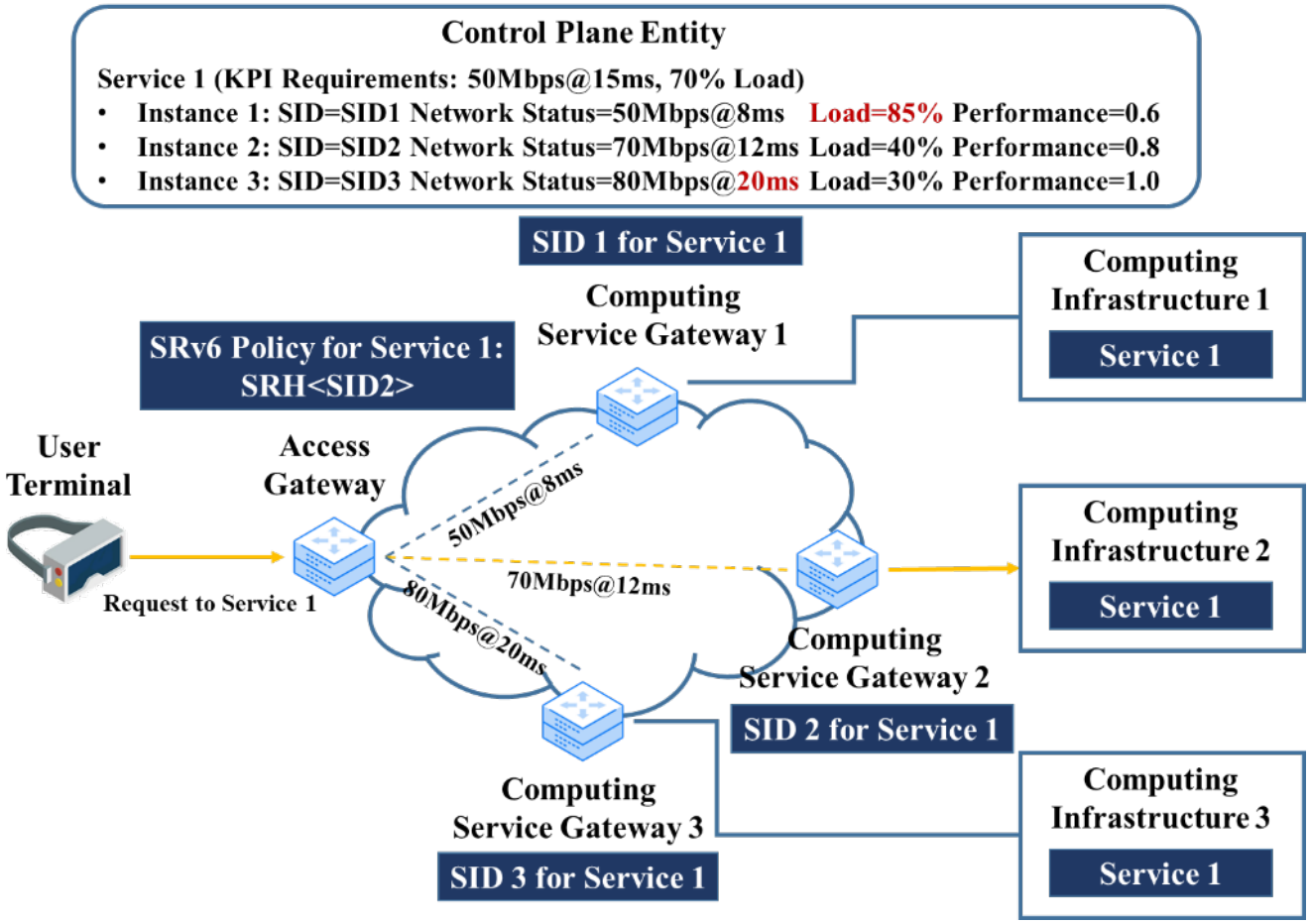
Service Resource Discovery

- **Predefined Computing Service Gateway SIDs for Service**
- **The control plane discovers service resources based on SID advertisement.**



QoE-oriented Load Balance

- **Predefined SLA**
- **Network status maintained by control plane**
- **Computing nodes status obtained from computing infrastructure**
- **Real-time SRv6 policy decision**
  - Priority for stateful service
  - ECMP for stateless service



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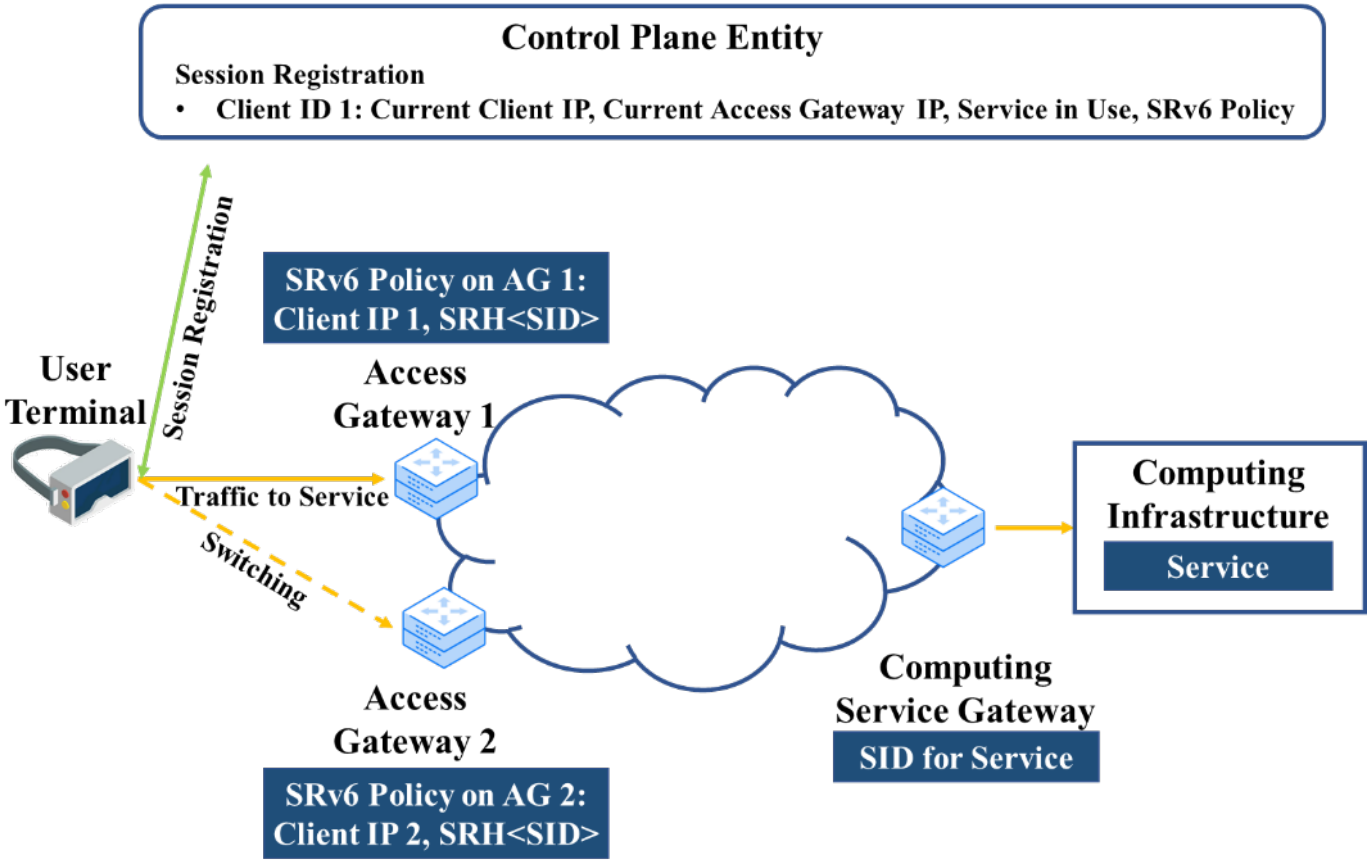
Service Continuity

- **Session Registration**
- **User dedicated SRv6 policy assignment**



Conclusions

- An overlay service anycast system is proposed to enable the distributed XR apps from the perspective of network.
- Related recommendation:
  - ITU-T Y.2501 Computing power network – Framework and architecture
- Related work item:
  - ITU-T SG13 Y.IMT2020-CNC-req
  - ITU-T SG13 Y.IMT2020-QoS-CNC-req
- This paper provides a preliminary technical solution.

Thank you!