

# Computing Aware Traffic Steering Use Cases of Mobile User Plane using Segment Routing

**draft-duongph-dmm-computing-aware-ts-mup-sr-01**

Ha-Duong Phung, Minh-Ngoc Tran,

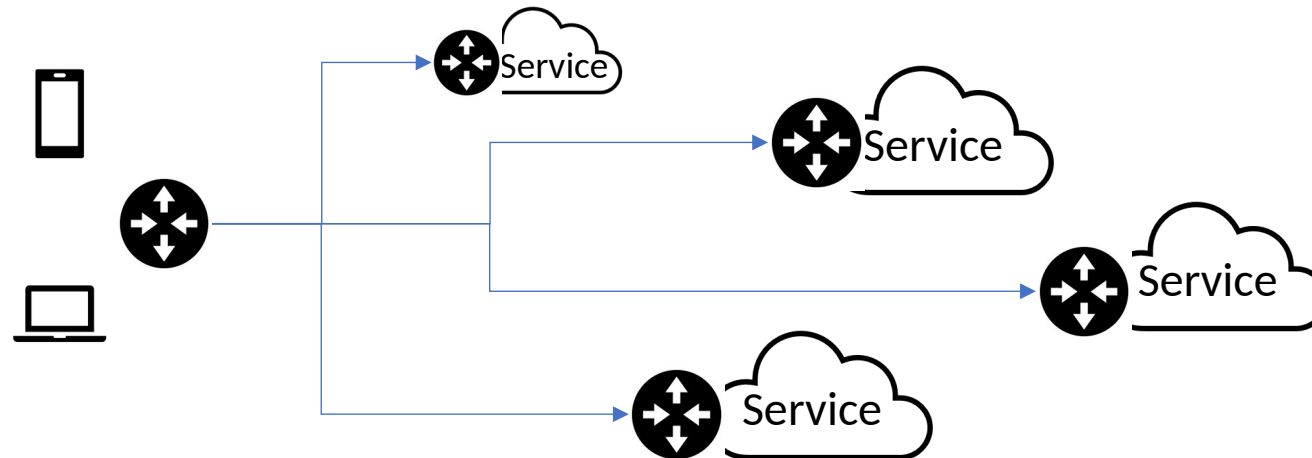
Younghan Kim

# Motivation

Multiple service instances are deployed on geographically distributed edge sites for better availability

- ⌞ The user traffic should be delivered to **optimal edge sites** based on both **computing and networking resource information** to meet **user experience** as well as **optimize** networking and computing **resources**.
- ⌞ In IETF, CATS(computing aware traffic steering) WG created to handle this issue for general Internet Infrastructure.(2023)

How to computing-aware steer traffic dynamically to the “**best**” service instance for current 5G mobile network?



# Computing-Aware Traffic Steering in IETF (CATS)

- IETF CATS WG already proposed CATS framework as general architecture for Computing-Aware Traffic Steering.
  - C-SMA, NMA: Service/Network Metrics Agent
  - C-PS: Path Selector
  - C-TC: Traffic Classifier

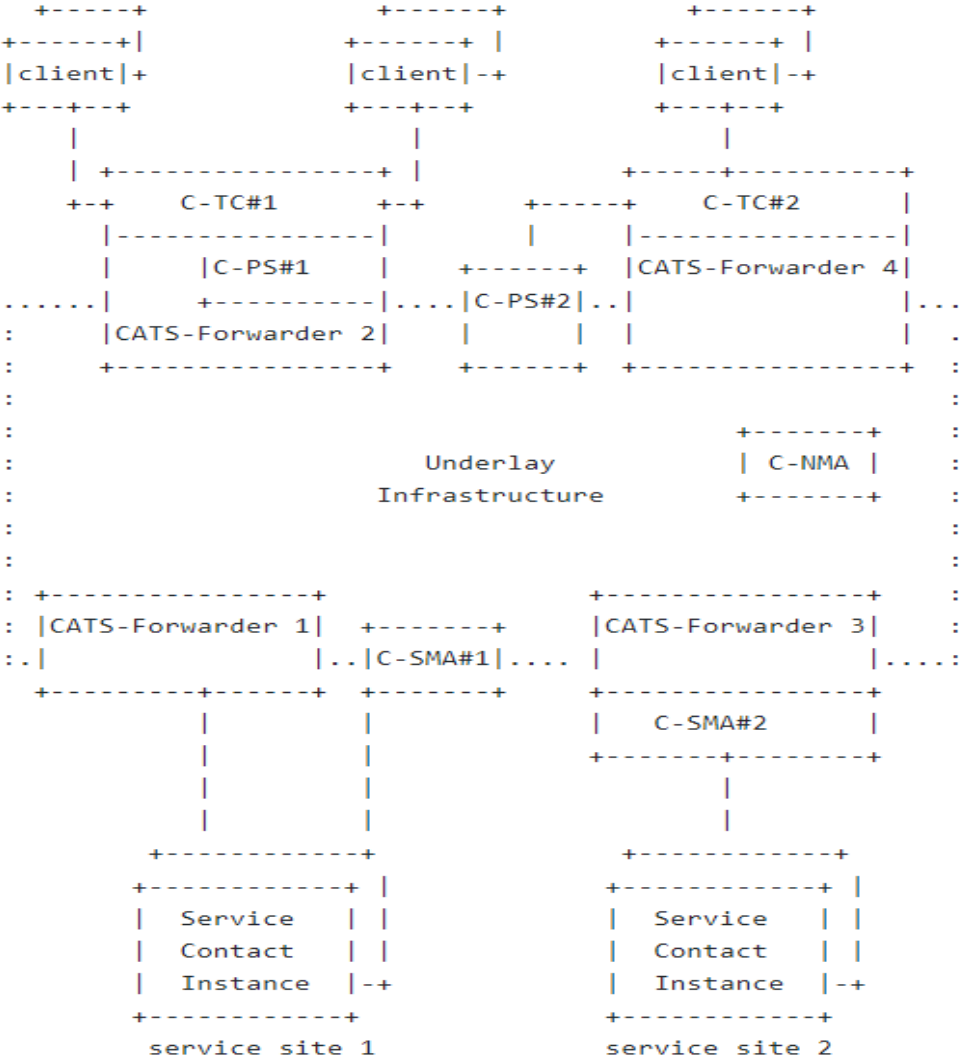


Figure 1: CATS Functional Components

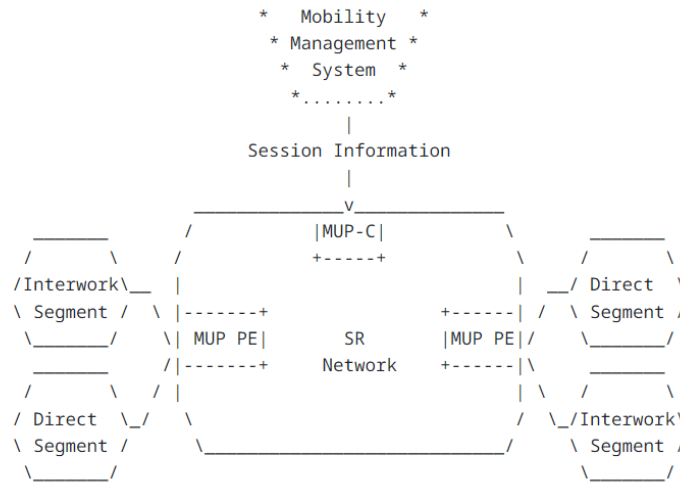
# What are required to implement this CATS architecture in 5G?

- CATS mobile user plane.
  - Mobile user plane can collect networking and computing metrics
    - > **using BGP** for advertising CATS metrics as described in [draft-liu-idr-bgp-epe-compute-applicability-00]
  - Mobile user plane can route traffic from Ingress Router to Egress Router and vice versa
    - > **using SRv6** as described in [draft-lbdd-cats-dp-sr-00]
  - **Extend SRv6 MUP with CATS capability**
- Interfaces between CATS mobile user plane and 5G Control Plane

# SRv6 as Mobile User Plane for CATS

- SRv6 MUP-C, MUP-PE requires CATS capabilities.
  - MUP-C enhances with Path Selection bases on CATS metrics
  - MUP-PE enhances with CATS metrics collection and advertising.
- Interfaces between CATS mobile user plane and 5G Control Plane

**SRv6 MUP Controller:** SR-MUP architecture enables the SR data planes to integrate mobile user plane into it for the IP networks. With its additional routing types, it can **help bypass UPF** and provides optimized path just through SRv6 underlay network.



**SRv6 MUP Controller**

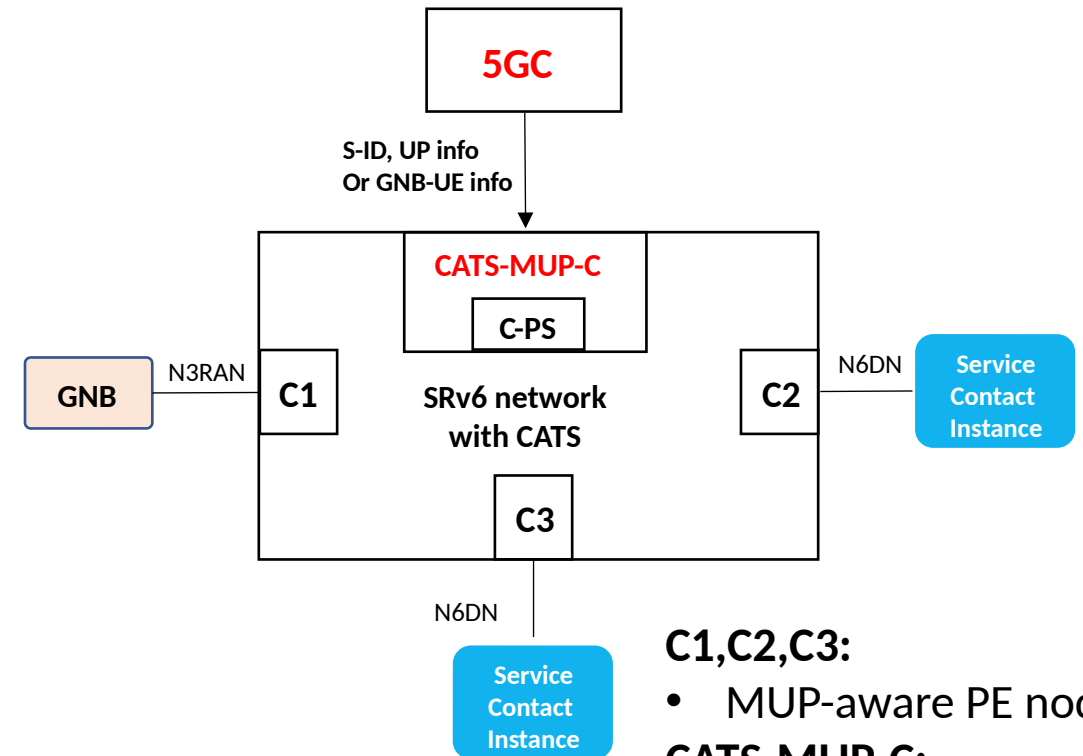
Ref: draft-mhkk-dmm-srv6mup-architecture-06  
Mobile User Plane Architecture using Segment Routing for  
Distributed Mobility Management

# Interface between 5GC and CATS-MUP-C

SRv6 as **N3+N6** underlay network

**Service ID** for multiple contact instances of same service

- UE requests PDU Session Establishment with **Service ID**.
- 5GC establishes UE PDU Session and informs CATS-MUP-C about **session information**.
- CATS-MUP-C selects the **optimized Service Contact instance**, setup user plane path by advertising Session Transformed Route Types to **MUP PEs**.



**C1,C2,C3:**

- MUP-aware PE nodes

**CATS-MUP-C:**

- Path selection
- Path setup
- Session info transform

# Summary and Next Steps

- CATS can interwork with Mobile User Plane using Segment Routing.
- We would like to hear comments and feedbacks from WG.
- We are really appreciated!

Backup Slide

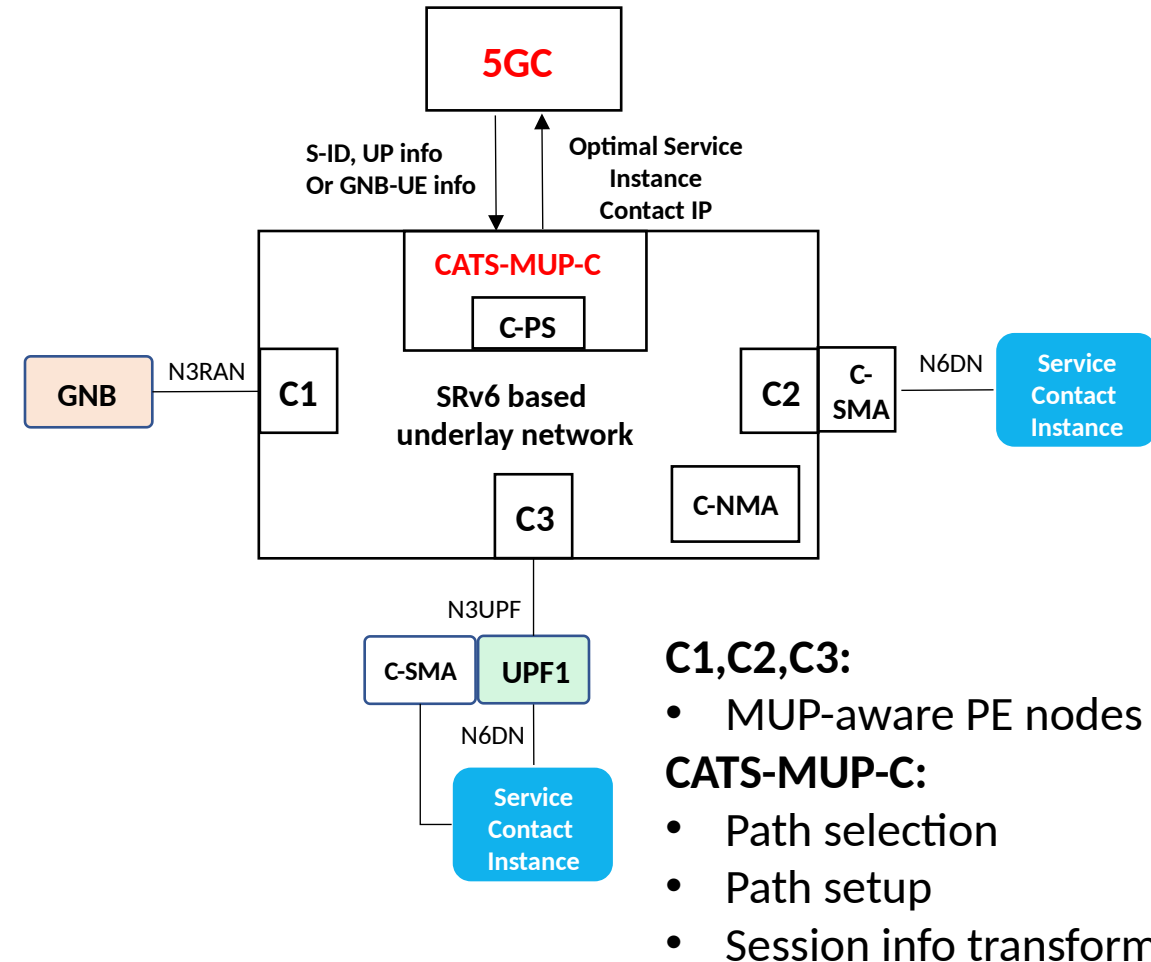


# Case 1.1: Interface between 5GC and CATS-MUP-C Using Specific Service IP address for UE PDU session

SRv6 as N3+N6 underlay network

1 Service ID - multiple IP addresses for multiple contact instances of same service

- UE requests PDU Session Establishment with **Service-ID**.
- 5GC asks CATS-C for **service resolution** for **S-ID**.
- CATS selects and responds to 5GC with an **optimized Service Contact Instance IP**.
- 5GC establishes UE PDU Session and informs CATS-MUP-C about **session information**.
- **CATS-MUP-C** setup user plane path by advertising Session Transformed Route Types to **MUP PEs**.



# Case 1.2: Interface between 5GC and CATS-MUP-C Using Anycast Service IP address for UE PDU session

SRv6 as N3+N6 underlay network

1 Service ID - 1 anycast IP address for multiple contact instances of same service

- UE requests PDU Session Establishment with **Service ID**.
- 5GC may ask CATS-MUP-C for resolving **S-ID** to **Anycast Service IP Address**.
- 5GC establishes UE PDU Session and informs CATS-MUP-C about **session information**.
- CATS-MUP-C selects the **optimized Service Contact instance**, setup user plane path by advertising Session Transformed Route Types to **MUP PEs**.

