

# Extension of Transport Network Aware Mobility in the Data Network

draft-mcd-rtgwg-extension-tn-aware-mobility-00

Kausik Majumdar (CommScope)

Uma Chunduri (Futurewei)

Linda Dunbar (Futurewei)

# Background

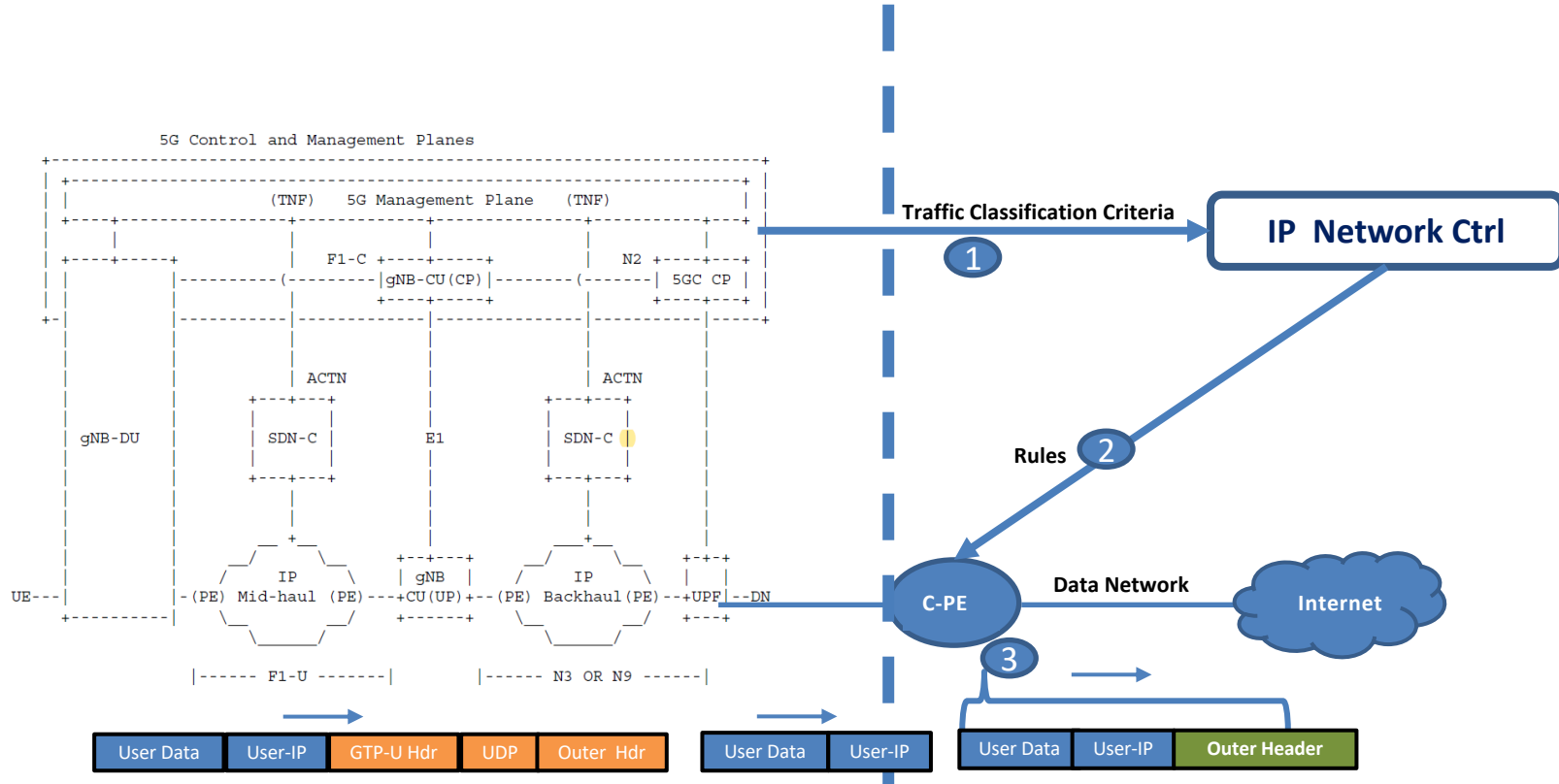
- The existing Transport Network Aware Mobility for 5G [*draft-clt-dmm-tn-aware-mobility*] draft defines a framework for mapping the 5G mobile systems Slice and Service Types (SSTs) to corresponding underlying network paths. The focus of that work is limited to the mobility domain.
- To maintain E2E transport network characteristics the framework needs to be extended beyond UPF.
- This proposed draft describes a framework for extending the mobility aware transport network characteristics from the UPF through the Data Network.

# Architecture

The proposed Extension of Transport Aware Mobility in the Data Network solution focuses on the following areas:

- The Mobility packet transition in and out from the UPF to the C-PE Node maintaining the Transport Path Characteristics.
- On a PE node, based on the transport characteristics, use different methods of fetching SR-TE path segments from the SR-TE Controller and map the SR-TE segments with the mobility aware transport packets.
- On a SD-WAN CE Node, based on the transport characteristics, mapping of mobility aware transport packets to the secure and un-secure tunnel paths.

# Packet Transition from the UPF to the Data Network



# TN Characteristics Mapping to the SR-TE Paths

- The UPF would be terminating the 5G mobility connectivity from the UE. It can be co-located with the PE on the same device or it can be connected to the PE node over IP Network.
- On a PE node, based on the mobility transport characteristics, the current draft proposes of different methods of applying SR-TE path segments:
  - **Scenario 1:** The Ingress PE node is connected to the BGP SR-TE Controller through the BGP SR-TE Policy SAFI Session.
  - **Scenario 2:** The Ingress PE node is connected to the SR-PCE (Path Compute Element) Controller through the PCEP Session.
  - **Scenario 3:** The Ingress PE node is connected to the SR-TE Controller over Restconf/ Netconf or gRPC Session.

# BGP SR Policy 5G Metadata Sub-TLV

- To support the Transport Network Mobility Traffic Mapping to BGP SR-TE Policy Path in the Ingress PE, a new 5G Metadata Sub-TLV needs to be supported.
- There is no change in the existing encoding that is defined in the *draft-ietf-idr-segment-routing-te-policy* draft

SR Policy SAFI NLRI: <Distinguisher, Policy-Color, Endpoint>

Attributes:

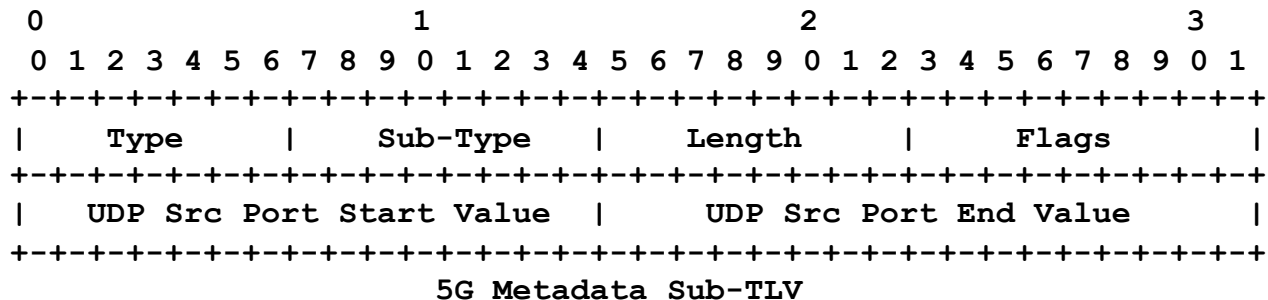
Tunnel Encaps Attribute (23)

Tunnel Type: SR Policy

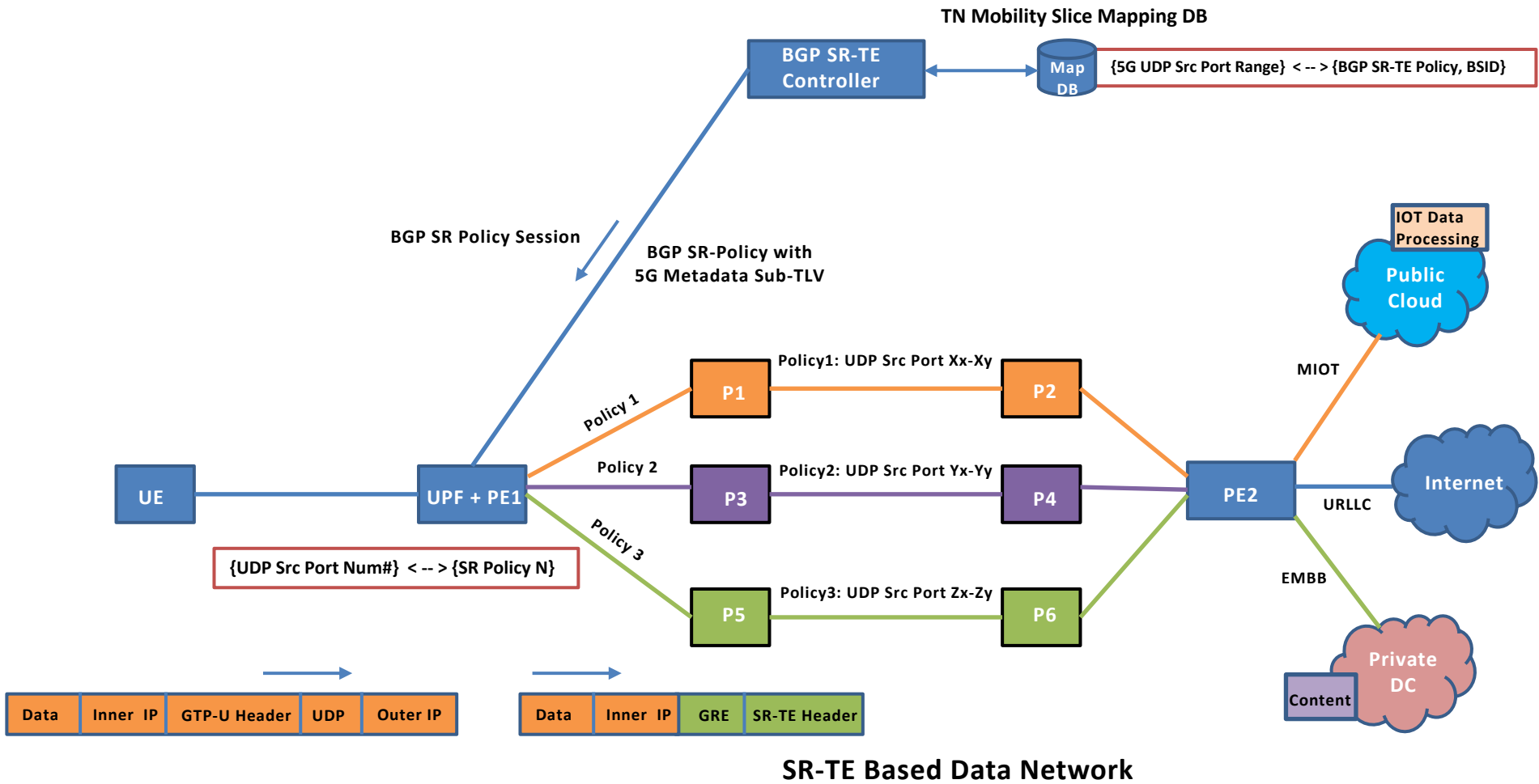
Existing Policy Sub-TLV

5G Metadata Sub-TLV ← New Sub-TLV

The format of the new SR-TE 5G Metadata Sub-TLV is captured below:



# Scenario 1: Extend TN Aware Mobility for BGP SR-TE Policy



# TN Aware Mobility Integration with SR-PCE

## 1. Define Class-map for Mobility SST

```
Class-map type traffic match MIOT  
  match UDP Source Port Range Xx – Xy
```

```
Class-map type traffic match URLLC  
  match UDP Source Port Range Yx – Yy
```

```
Class-map type traffic match EMBB  
  match UDP Source Port Range Zx – Zy
```

## 2. Define Policy-map to Map SST to SR-TE Color

```
Policy-map type Transport-Network-Aware-Mobility  
  class type traffic MIOT  
    set color <MIOT-10>
```

```
  class type traffic URLLC  
    set color <URLLC-20>
```

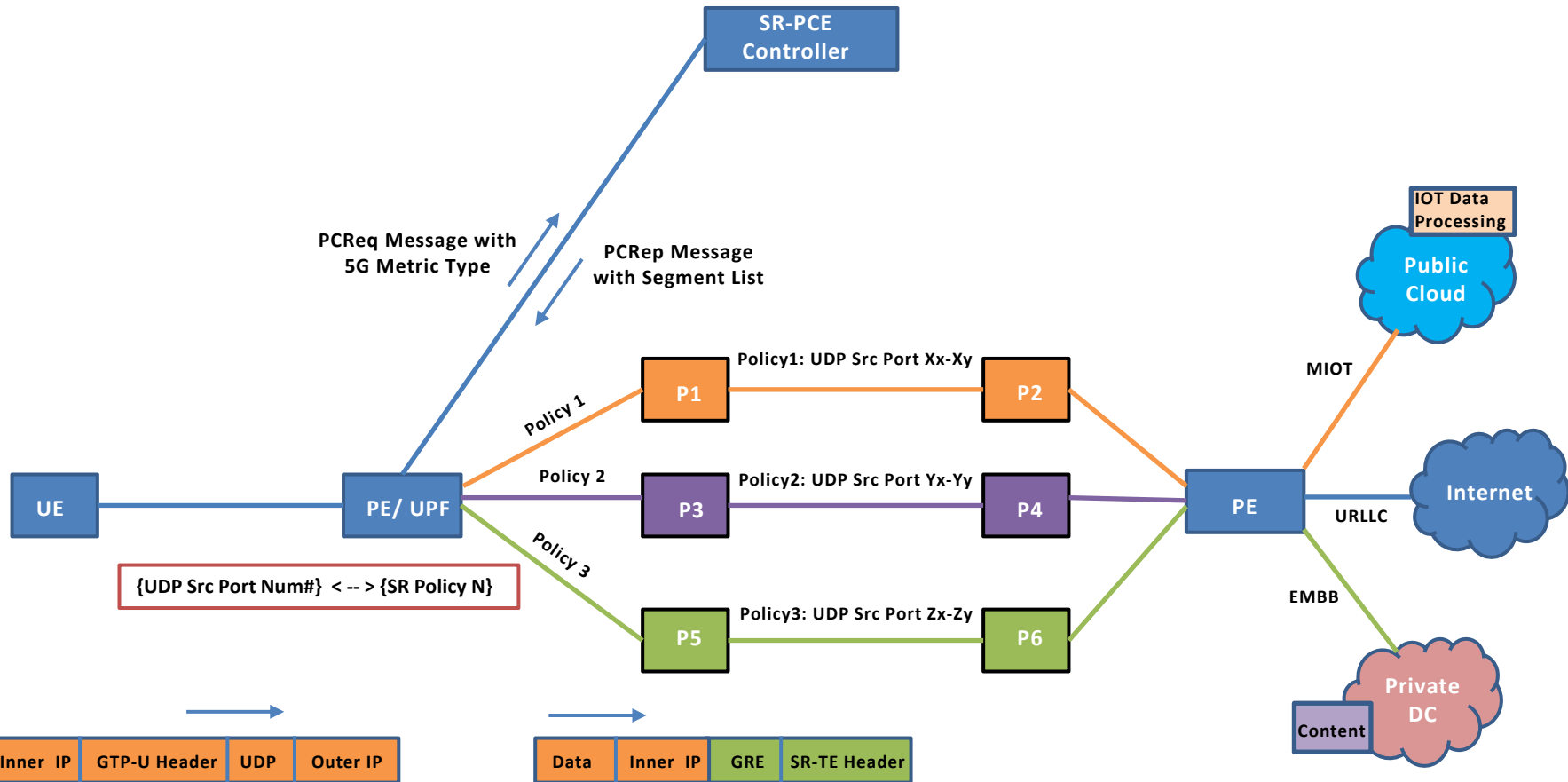
```
  class type traffic EMBB  
    set color <EMBB-30>
```

## 3. Define SR-TE Color Dynamic for 5G Metric Type

```
Segment-routing traffic-eng  
  on-demand color <MIOT-10> dynamic  
  metric  
  type <MIOT>  
  on-demand color <URLLC-20> dynamic  
  metric  
  type <URLLC>  
  on-demand <EMBB-30> dynamic  
  metric  
  type <EMBB>
```

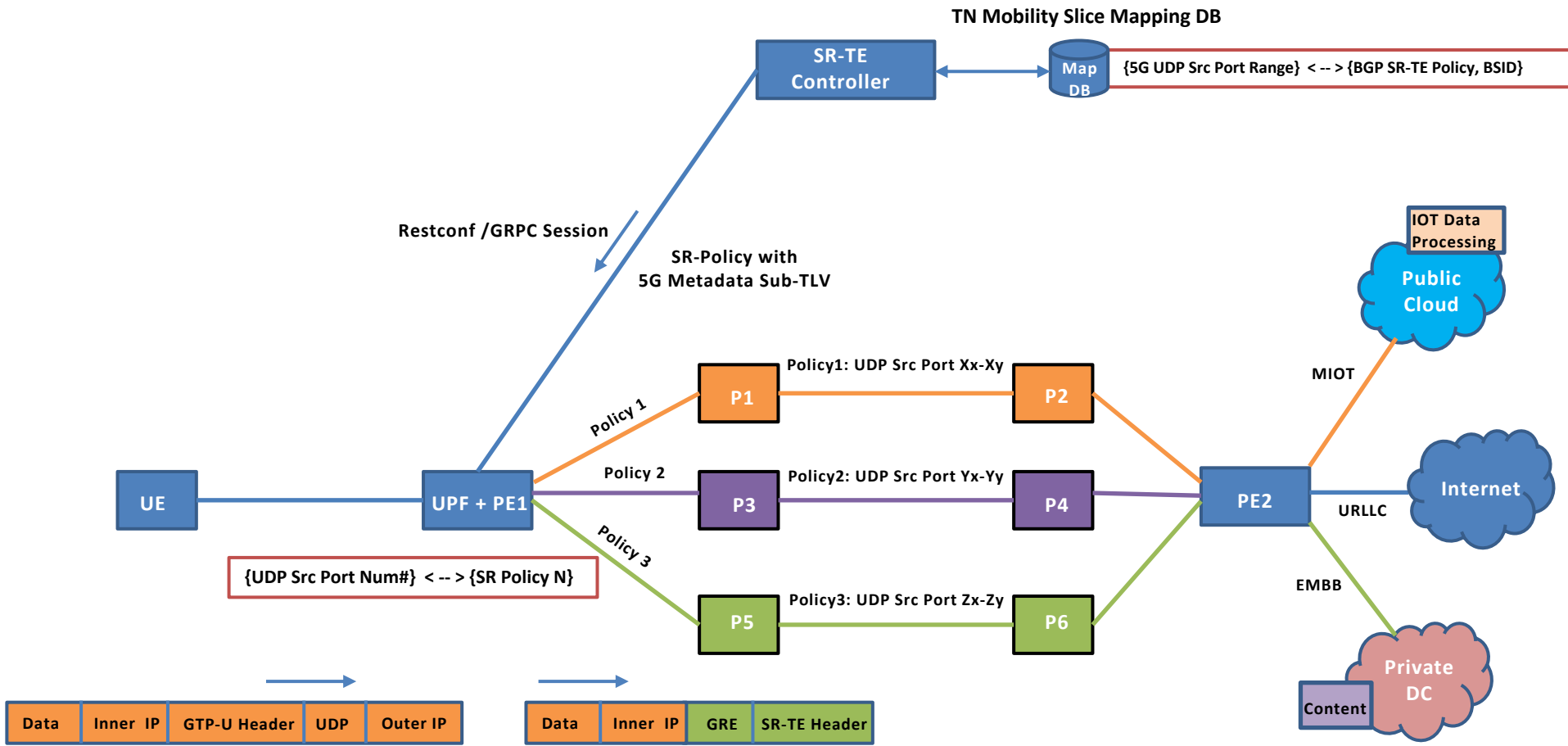


# Scenario 2: Extend TN Aware Mobility for SR-PCE



SR-TE Based Data Network

# Scenario 3: Extend TN Aware Mobility for SR-TE Using Restconf/GRPC

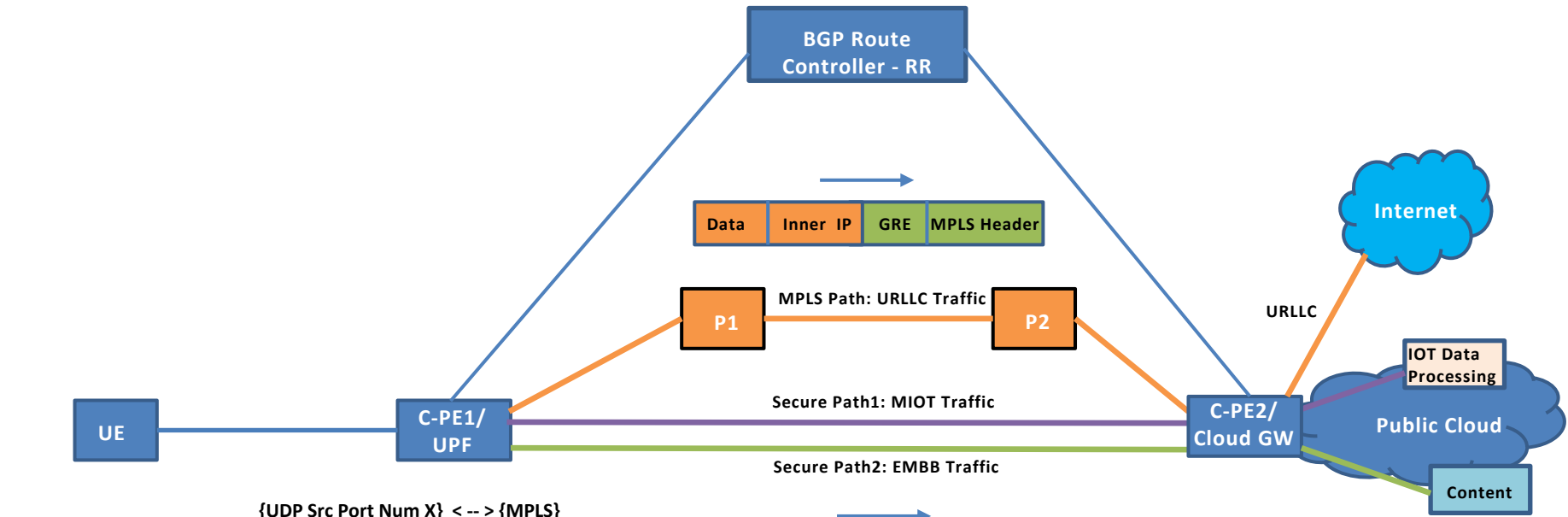


SR-TE Based Data Network

# Mapping of TN Characteristics on SD-WAN Edge Node

- In SD-WAN hybrid use cases [*draft-ietf-bess-bgp-sdwan-usage*], UPF can run part of SD-WAN edge node or it could be connected to it over IP network. This would be use case scenario for Enterprise 5G.
- In that scenario, the Transport Path Characteristic for the 5G mobile traffic need to be mapped to Secure (IPSec Tunnel) or Un-secure path (could be MPLS or VxLAN tunnel).
- The existing [*draft-clt-dmm-tn-aware-mobility*] draft has been expanded with a new Transport Path Characteristics “Security” for the mobile traffic where security is an important characteristics for certain mobile traffic.
- Based on the UDP Src Port characteristics coming from the mobile network, the SD-WAN edge node would be able to map the 5G TN aware mobility traffic to a secure tunnel vs. un-secure tunnel.

# Extend Transport Network Aware Mobility for SD-WAN Traffic



SD-WAN Data Network

# Next Steps

- Get the IANA Code Allocation for 5G Metadata Sub-TLV Type filed.
- Expand the draft for SR-TE based mapping in the SDWAN Network.
- Comments are welcome.
- Move towards WG adoption.

Thank You