SRv6 for Mobile User-Plane

draft-ietf-dmm-srv6-mobile-uplane-05

IETF105

S.Matsushima, C.Filsfils, M.Kohno, D.Voyer, C.Perkins, P.Camarillo

Summary of Updates from v04 to v05

- Naming
  - s/T.M.Tmap/T.M.GTP4.D/;
  - s/UE Session/PDU Session/;
- GTP-U/SRv6 Stateless Mapping Rule Update
  - Align the SID format of End.M.GTP{6|4}.E with the argument “Args.Mob.Session”.
  - The last SID in the outgoing packet of End.M.GTP6.D and T.M.GTP4.D are also aligned with Args.Mob.Session.
  - Pseudo-code updates on End.M.GTP6.D and T.M.GTP4.D for IPv4v6 PDU Session type.
  - The original IPv4 src address is preserved in the IPv6 src address of T.M.GTP4.D and End.M.GTP4.E.

Feedback from Hackathon@IETF105

- All GTP-U Interworking functions has been implemented on FD.io VPP
  - Align with the new mapping rule.
  - i.e, End.M.GTP6.E/D, End.M.GTP4.E and T.M.GTP4.D
- One new End function ”End.M.GTP6.D.Di” is implemented in addition to the above.
  - To support Drop-in scenario for IPv6 GTP.
- All running codes are available on the following Github repo:
  - https://github.com/filvarga/srv6-mobile

Major Comments on the Mailing List (1)

- Drop-in Mode

  “Could we add the drop in mode (GTP/SRv6/GTP translation) which Arashmid has presented in IETF103?”

- Discussion

  The drop-in mode almost covered by the existing functions except “End.M.GTP6.D.Di”
  Whether the src UDP port of GTP-U packet need to be preserved or not in the existing functions.

- Question:

  Does this draft need (or would be better) to describe Drop-in mode?

Major Comments on the Mailing List (2)

- Arg.Mob.Session

  “When it is required to use Args.Mob.Session?.. When would a SID need this information and what it would be? ”

- Discussion

  Unchanged gNB scenarios should be a case at least that the Args.Mob.Session to be used.

  E2E SRv6 UP cases are not necessarily to use Args.Mob.Session if the SID can indicate the QoS flow and the session.

  But in case that one SID aggregates multiple PDU Sessions, Args.Mob.Session also helps to avoid variety of SID format.

- Proposed resolution

  Add text to clarify “Args.Mob.Session is required in cased that one SID aggregates multiple PDU Sessions.”

Major Comments on the Mailing List (3)

- Arg.Mob.Session (Cont'd)

  "Please elaborate this a bit more: "Since the SRv6 function is likely NOT to be instantiated per PDU session, Args.Mob.Session helps the UPF to perform the functions which require per QFI and/or per PDU Session granularity.""

- Discussion

  While a SID aggregates multiple PDU Sessions belong to the same policies, Args.Mob.Session helps to indicate which PDU Session packets were applied that policies, such as usage report, QoS, etc.,

- Proposed resolution

  Add some text like *"In case that one SID aggregates multiple PDU Sessions,"* to the above sentence.

Major Comments on the Mailing List(4)

- SR Policy in 5.3.1 Interworking with IPv6 GTP

  “How does the SRGW learn SID list to a DA? This must be per-session doesn't it?”

- Discussion

  In this case the DA of receiving GTP-U packets is a SID of End.M.GTP6.D associated to a SID list, described in 6.3. This SID can aggregate multiple PDU Session so that it shouldn’t be per-session basis.

- Proposed resolution

  Modifiy the text on the third bullet to align with section 6.3.

Major Comments on the Mailing List(5)

- Terminology “Anchor”

  “The draft seems to use the term “anchor” or “anchoring” quite a lot, but what exactly is meant is much unclear. It looks to me that the meaning changes during the progression of the text, or depends on the context. As it appears to be such key term of the draft I would recommend that you define it somewhere in this document.”

- Discussion

  - MAG and LMA would be examples in IETF term.
  - S/PGW and I/A-UPF would also be appropriate in 3GPP term.
  - What does define the generic term for that?

- Proposed Resolution

  TBD.

Major Comments on the Mailing List(6)

- GTP-U Messages support

  “We assume Message Type is GTPMSG_TPDU(255) and cannot translate GTP ping which use GTPMSG_ECHO(1), GTPMSG_ECHOREPLY(2). Should we add capability to translate GTP ECHO to ICMP6* or at store GTP Message Type to some place?.”*

- Discussion

  Wheter we will cover GTP-U messages in this draft or not while we agreed to cover End-Marker in another document.

- Proposed Resolution

  Cover GTP-U Messages including End-Marker in another document.

Minor Comments on the Mailing List(1)

- 5.1.1: Uplink Packet flow in Traditional Mode

  “What is "a specific table" where the look up is to be done? Does this mean that to support mobile uplane there needs to be an additional look up table?”

- Discussion

  This mentions typical behavior which lookup fib to find next-hop.

- Proposed resolution

  Keep the current text.

Minor Comments on the Mailing List(2)

- 5.1.2: Downlink Packet flow in Traditional Mode

  “In this case you probably need an additional look up table to map the destination address of the UE with address/SID of the gNB.”

- Discussion

  There is no need to lookup the UE address at all. The SID encodes itself the Session ID.

- Proposed resolution

  Keep the current text.

Minor Comments on the Mailing List(3)

- 5.2.1: Uplink Packet flow in Enhanced Mode

  “What is address B? Shouldn't it be address Z? How is TEID used in this case?”

- Discussion

  Address Z yields to mapping with (B,T). Based on T we perform a lookup to find the full SID list.

- Proposed resolution

  Keep the current text.

Minor Comments on the Mailing List(4)

- 5.2: Enhanced Mode

  “How much overhead does the use of multiple SIDs introduce? And what is the impact to header compression?.”

- Discussion

  Each SID is 16B. But we can’t state exact size of overhead due to it depends on the amount of SIDs used for traffic engineering and service programming.

  When it comes to header compression, SRv6 user plane doesn’t impact to ROHC on radio interface.

- Proposed resolution

  Keep the current text.

Minor Comments on the Mailing List(5)

- 5.3.1.1: Uplink Packet flow in Interworking with IPv6 GTP

  “"There is one instance of the End.M.GTP6.D SID per PDU type."

  How is the PDU type learnt? By use of TEID?”

- Discussion

  End.M.GTP6.D SID would be instantiated in per-PDU Session type basis.

- Proposed resolution

  Keep the current text.

Minor Comments on the Mailing List(6)

- 5.3.1.2: Downlink packet flow in Interworking with IPv6 GTP

  “When a packet destined to A arrives at the UPF2, the UPF2 performs a lookup in the table associated to A …:

  How is this table populated? By the mobility signaling?.”

- Discussion

  N4 signaling could be one solution. Others could be CLI, Netconf/Restconf to configure the table. IP Routing protocols, BGP for example, to advertise/install the entries in the table.

- Proposed Resolution

  This should be out of scope of this document.

Minor Comments on the Mailing List(7)

- 5.3.1.3: Scalability of Interworking with IPv6 GTP

  “TEID is scoped by the gNB and UPF2, same TEID may appear for different gNBs. How would GTP echo work for these cases?”

- Discussion

  As the last SID indicates gNB address, it makes clear the gNB scope in which the TEID is kept unique.

- Proposed resolution

  Keep the current text.

Minor Comments on the Mailing List(8)

- 6.2: End.MAP

  “Is the mapping table used at step 1 mobile user plane specific or is it general for any SRv6?

  If only for mobile user plane how is this populated?”

- Discussion

  The segment can be used generically for any SRv6 functionality. However, in the context of mobility, a unique End.MAP segment will be instantiated.

- Proposed resolution

  How to populate the mapping table is out of scope.

Minor Comments on the Mailing List(9)

- 6.2: End.MAP (Cont'd)

  "What is "segment_list" on line 3? Is it segment list of the original packet, or is it new segment list of the End.Map function?

- Discussion

  "Segment list" here in the pseudo-code should be SID list.

  The new mapped SID is bound to the SID list.

- Proposed resolution

  Add some text to clarify the above.

Next Steps

- WG Last Call
  - When the all resolutions reflected.
- Implementation
  - We need more implementations.
  - If you are interested in hackathon to implement SRv6 mobile user plane, you’re welcome to join.

Thank you

Questions and comments?

Summary of Updates from v03 to v04

- **Lightweight updates**
  - Pseudo-code correction.
  - Some clarification text for predefined SRv6 functions, Traditional mode, IPv6 user-traffic and Args.Mob.Session.
  - Simplified the text regarding Network Slicing.

- **Naming complaint**
  - Args.Mob.Session : No any ideas received after IETF103.
  - T.M.Tmap : “T.M.GTP4.D” was proposed instead.

- **Another major feedback from review comments**
  - Whether to support ‘Drop-in’ scenario. (i.e; IPv4 SA and UDP src port transparency for GTP-U)

Feedback from Hackathon@IETF104

- Two target functions has been implemented for VPP and P4 Switch.
- New mapping rule of GTP-U<->SRv6 has been studied
  - It is possible to support both ‘Args.Mob.Session’ and ‘Drop-in’ scenario.
- The codes are now open-sourced:
  - VPP and P4

Target Function	Description
End.MAP	Forwards the receiving IPv6 packet and update the IPv6 DA with mapped SID.
End.M.GTP6.D	Decap the receiving GTP/UDP/**IPv6** packet and encap with IPv6 header, or IPv6 header with SRH based on the address/ID mapping rule and binding SR-Policy
End.M.GTP6.E	Decap the receiving IPv6+SRH packet and encap with **IPv6**/UDP/GTP-U header based on the address/ID mapping rule.
End.M.GTP4.E (SRv6 -> GTP-U)	Decap the receiving IPv6+SRH packet and encap with **IPv4**/UDP/GTP-U header base on the address/ID mapping rule.
T.M.Tmap (GTP-U -> SRv6)	Decap the receiving GTP/UDP/**IPv4** packet and encap with IPv6 header, or IPv6 header with SRH based on the address/ID mapping rule and binding SR-Policy.
End.Limit	Limit the throughput of the packet flow with mapped SID.
NEW	Translate GTP-U Echo Request to ICMP Echo Request and vice versa
NEW	Translate GTP-U Echo Reply to ICMP Echo Request and vice versa