SRv6 Mobile User Plane, POC and Open Source Implementation

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1. Introduction

Segment Routing IPv6 (SRv6) is the IPv6 dataplane instantiation of Segment Routing, defined in RFC8402, which enables network simplification by limiting state required in a network domain. SRv6 also enables network programmability by allowing different behaviors to be bound to a segment. There is a study ongoing for new 5G user plane in 3GPP CT4, "Study on User-plane Protocol in 5GC" [1], and SRv6 is one of the protocols under study. SRv6 functions (behaviors) required to apply SRv6 to 5G network and deployment scenarios are discussed in IETF DMM working group under "Segment Routing IPv6 for Mobile User Plane" Internet-Draft [2].
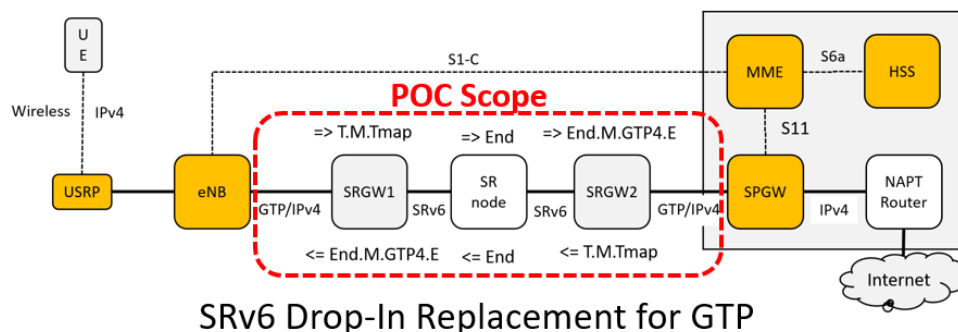
2. Proof of Concept (POC)

During 2018, we have conducted Proof of Concept (POC) of "SRv6 Drop-In Replacement for GTP" scenario which does stateless translation of GTP and SRv6. (See diagram at the end) This scenario can be deployed without changing exiting 4G (EPC)/5G Control Plane and User Plane Functions by translating GTP-U to SRv6 and vice versa using T.M.Tmap and End.M.GTP4.E SRv6 functions. To test these SRv6 functions at scale, we have used P4-16 to implement these two SRv6 functions on physical P4 switch, which was Wedge 100BF-32X [3]. We have also used software (VPP) implementation running on BareMetal Cloud to make sure the scenario works among different implementations and environments.

There were many improvement points found during the POC related to both protocol and implementation, and P4-16 based Open Source implementation was developed incorporating such improvements. The p4-16 code was made public on GitHub as p4srv6 [4] and used to implement experimental ideas at IETF 104 Hackathon. [5]

3. What you can see at the demo

We will show how packets are translated in POC environment. We will also show the experimental implementation which was implemented at IETF 104 Hackathon running on BMv2 and planned to be included in future specifications.

SRv6 Drop-In Replacement for GTP

[1] https://www.3gpp.org/dynareport/29892.htm
[2] https://datatracker.ietf.org/doc/draft-ietf-dmm-srv6-mobile-uplane/
[3] https://www.edge-core.com/productsInfo.php?cls=1&cls2=180&cls3=181&id=335
[4] https://github.com/ebiken/p4srv6
[5] https://github.com/ebiken/p4srv6/tree/ietf104/demo/srv6/ietf104