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Performance Measurement for Geneve

Abstract

This document describes the method to achieve Performance Measurement (PM) in point-to-point Generic Network Virtualization Encapsulation (Geneve) tunnels used to make up an overlay network.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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This Internet-Draft will expire on 16 November 2022.

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1. Introduction

"Generic Network Virtualization Encapsulation" (Geneve) [RFC8926] provides an encapsulation scheme that allows building an overlay network by decoupling the address space of the attached virtual hosts from that of the network.

This document describes the use of "Simple Two-way Active Measurement Protocol" (STAMP) [RFC8762] and "Simple Two-Way Active Measurement Protocol Optional Extensions" (STAMP Optional Extensions) [RFC8972], to enable measuring the performance of the path between two Geneve tunnel endpoints, like delay, delay variation, and packet loss.

Analogous to [I-D.ietf-nvo3-bfd-geneve], in this document, Network Virtualization Edge (NVE) represents the Geneve tunnel endpoint, Tenant System (TS) represents the physical or virtual device attached to a Geneve tunnel endpoint from the outside, Virtual Access Point (VAP) represents the NVE side of the interface between the NVE and the TS, the usage of Management Virtual Network Identifier (VNI) is described in [I-D.ietf-nvo3-geneve-oam] and outside the scope of this document.

2. Conventions Used in This Document

2.1. Abbreviations

Geneve: Generic Network Virtualization Encapsulation

NVE: Network Virtualization Edge

PM: Performance Measurement

SSID: STAMP Session Identifier

STAMP: Simple Two-way Active Measurement Protocol

TS: Tenant System

VAP: Virtual Access Point

VNI: Virtual Network Identifier

2.2. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

3. PM Packet Transmission over Geneve Tunnel

PM session is originated and terminated at VAP of an NVE, selection of the PM packet encapsulation is based on how the VAP encapsulates the data packets. This document defines two formats of PM packet encapsulation in Geneve:

*with Ethernet and IP/UDP encapsulation;

*with IP/UDP encapsulation.

3.1. PM Encapsulation With Inner Ethernet/IP/UDP Header

If the VAP that originates the PM packets is used to encapsulate Ethernet data frames, then PM packets are encapsulated in Geneve as described below, here the PM packets are STAMP test packets.

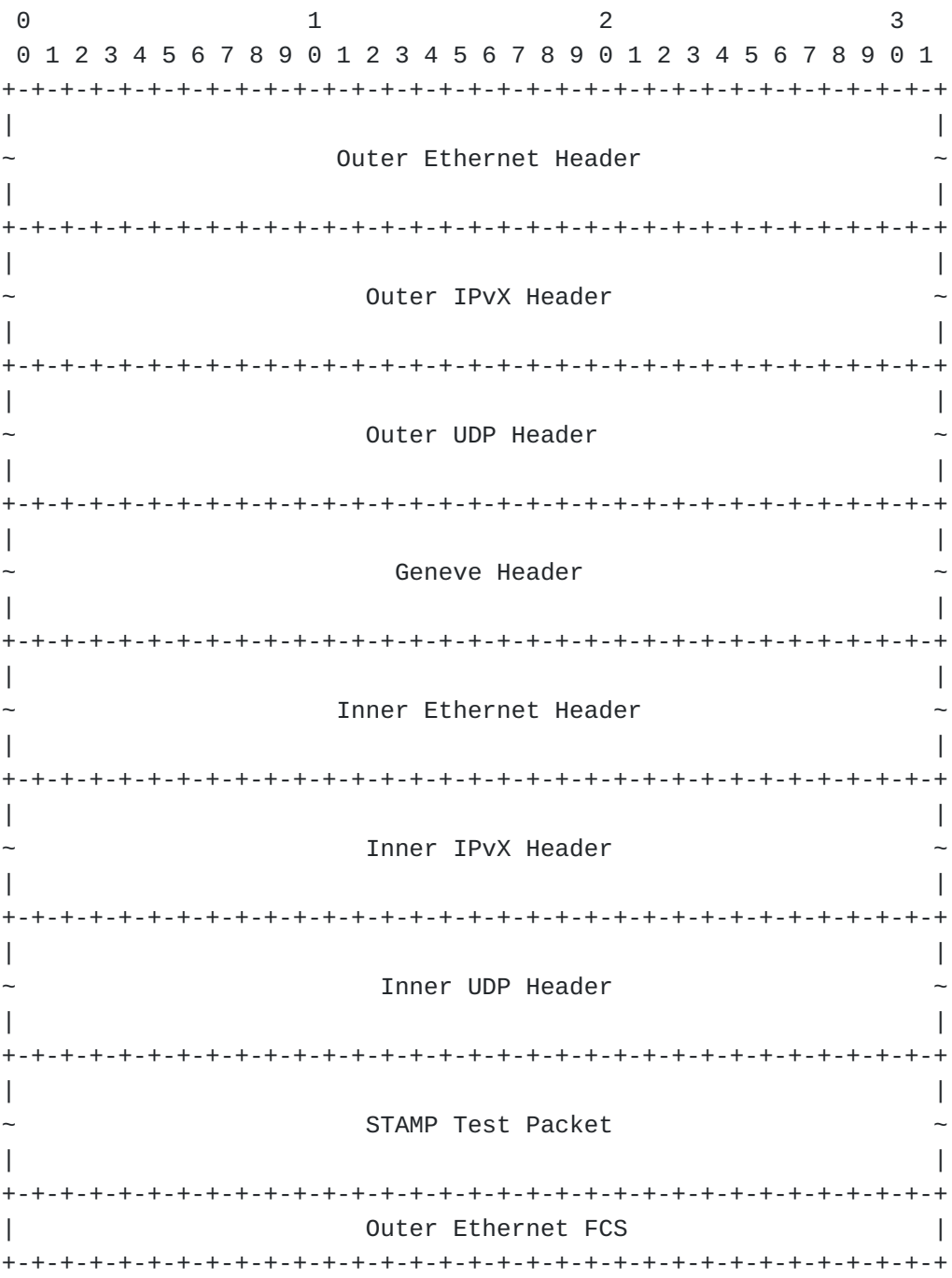

Figure 1: Geneve Encapsulation of PM Packet With the Inner Ethernet/IP/ UDP Header

The STAMP test packet MUST be carried inside the inner Ethernet frame of the Geneve packet, immediately after the inner Ethernet/IP/ UDP header. The inner Ethernet frame carrying the STAMP test packet has the following format:

The Ethernet header and IP header are encoded as defined in Section 3.1 of [I-D.ietf-nvo3-bfd-geneve].

The destination UDP port MUST follow the STAMP UDP port usage defined in Section 4.1 of [RFC8762].

The STAMP test packet can be STAMP Session-Sender test packet or STAMP Session-Reflector test packet. The STAMP test packet is encoded as specified in [RFC8762] and [RFC8972].

When the PM packets are encapsulated in Geneve in this way, the values in the Geneve header are set as specified in Section 3.1 of [I-D.ietf-nvo3-bfd-geneve].

3.2. PM Encapsulation With Inner IP/UDP Header

If the VAP that originates the PM packets is used to encapsulate IP data packets, then PM packets are encapsulated in Geneve as described below, here the PM packets are STAMP test packets.

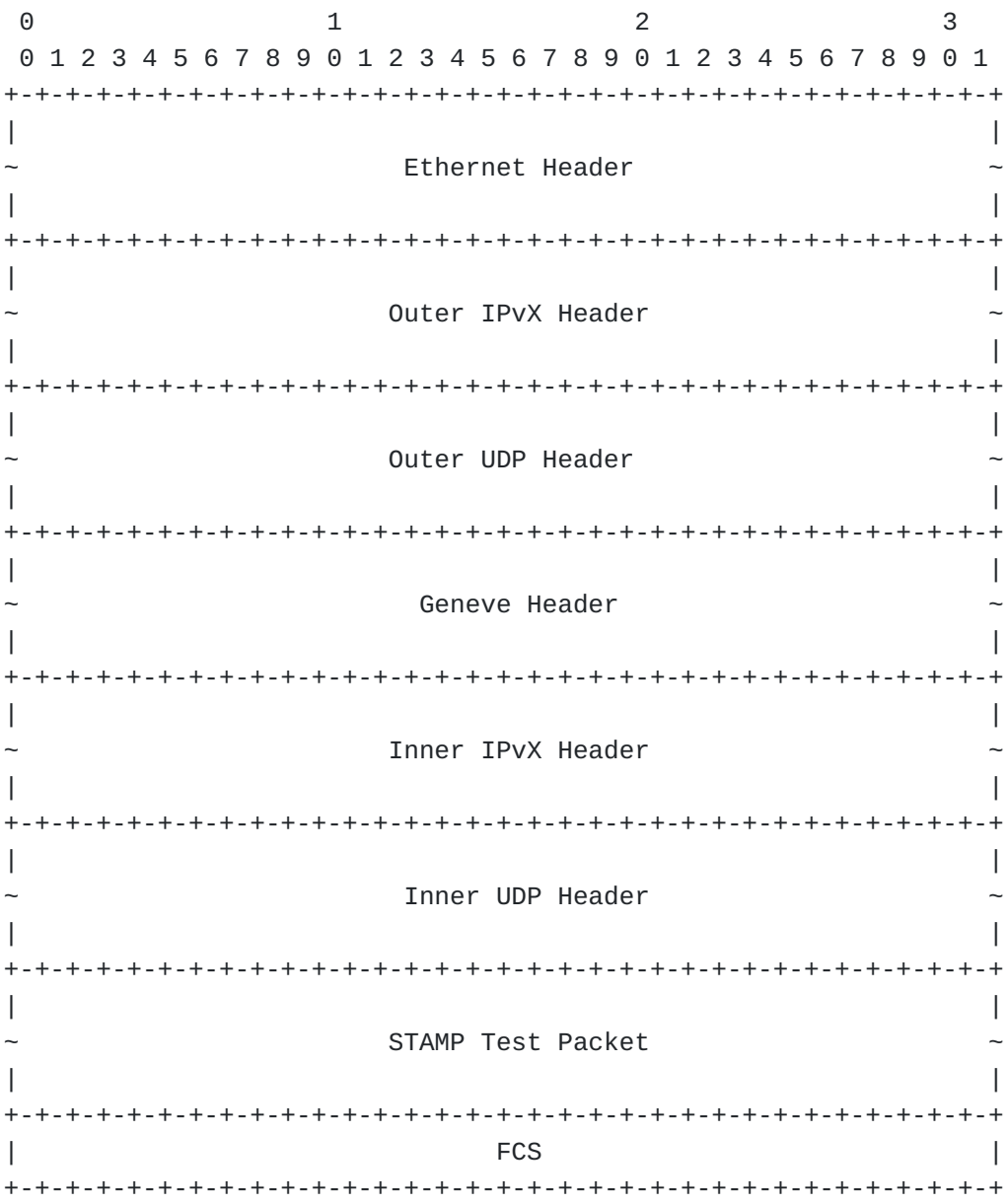

Figure 2: Geneve Encapsulation of PM Packet With the Inner IP/UDP Header

The STAMP test packet MUST be carried inside the inner IP packet that immediately follows the Geneve header. The inner IP packet carrying the STAMP test packet has the following format:

The IP header is encoded as defined in Section 3.2 of [I-D.ietf-nvo3-bfd-geneve].

The destination UDP port MUST follow the STAMP UDP port usage defined in Section 4.1 of [RFC8762].

The STAMP test packet can be STAMP Session-Sender test packet or STAMP Session-Reflector test packet. The STAMP test packet is encoded as specified in [RFC8762] and [RFC8972].

When the PM packets are encapsulated in Geneve in this way, the values in the Geneve header are set as specified in Section 3.2 of [I-D.ietf-nvo3-bfd-geneve].

4. Reception of PM packet from Geneve Tunnel

Once a packet is received, the NVE MUST validate the packet as specified in Section 4 of [I-D.ietf-nvo3-bfd-geneve], except that the received STAMP test packet would be processed by STAMP Session-Sender or STAMP Session-Reflector, instead of BFD.

4.1. Demultiplexing of the PM packet

Analogous to BFD over Geneve, multiple STAMP sessions for the same VNI may be running between two NVEs, so there needs to be a mechanism for demultiplexing received STAMP test packets to the proper session.

If the STAMP test packet is received with STAMP Session Identifier (SSID) equals to 0, the procedure for demultiplexing the received STAMP test packets would follow the procedure for demultiplexing the received BFD packets with Your Discriminator equals to 0, which is specified in Section 4.1 of [I-D.ietf-nvo3-bfd-geneve].

If the STAMP test packet is received with a non-zero SSID, then the STAMP session MUST be demultiplexed only with SSID as the key.

5. Security Considerations

Security issues discussed in [RFC8762], [RFC8972], [RFC8926] and [I-D.ietf-nvo3-bfd-geneve] apply to this document.

6. IANA Considerations

This document has no IANA action requested.

7. Acknowledgements

TBA.

8. References

8.1. Normative References

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8.2. Informative References

[I-D.ietf-nvo3-geneve-oam] Mirsky, G., Boutros, S., Black, D., and S. Pallagatti, "OAM for use in GENEVE", Work in Progress, Internet-Draft, draft-ietf-nvo3-geneve-oam-04, 3 May 2022, <https://www.ietf.org/archive/id/draft-ietf-nvo3-geneve-oam-04.txt>.

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