Multi-Layer OAM for Service function Chaining
draft-wang-sfc-multi-layer-oam-00

Abstract

   Since there are different notions of service chain, such as fully
   abstract notion named SFC, half-fully abstraction notion named SFP
   and fully specific notion named RSP, and there are different
   components defined in SFC architecture, it seems reasonable to define
   differentiated OAM for these different service chains. This document
   tries to discuss the multi-layer OAM requirements in SFC domain and
   provides a multi-layer OAM solution for different service chains.

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1. Introduction

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abstract notion named SFC, half-fully abstraction notion named SFP
and fully specific notion named RSP, and there are different
components defined in SFC architecture, it seems reasonable to define
differentiated OAM for these different service chains. This document
tries to discuss the multi-layer OAM requirements in SFC domain and
provides a multi-layer OAM solution for different service chains.

2. Convention and Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

The terms are all defined in [I-D.ietf-sfc-architecture].

3. Requirement

In fact, besides the link layer OAM, network layer OAM, SFC service
layer OAM is requisite in SFC Domain, which may be typically
illustrated in Figure 1.

```
   +-----------+   +---+   +---+   +---+   +---+   +---+
   |Classifier |---|SF1|---|SF2|---|SF3|---|SF4|---|SF5|
   +-----------+   +---+   +---+   +---+   +---+   +---+
       |-----------SFC Service layer OAM-----------|
```
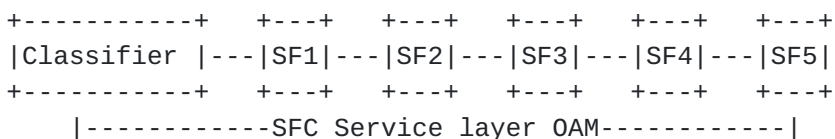
Figure 1: typical SFC service layer OAM

Currently, according to the latest SFC architecture, we know that
there are several components defined in the SFC architecture, such as
SN, SFF, SF,etc, and the relationship between them like this:
serveral SFs may share the same SFF, and furthermore, serveral SFFs
may share the same SN. As a result of that, multiple RSPs, such as
RSP1(SF1--SF3--SF5) and RSP2(SF2--SF4--SF6) in Figure 2, may not
share the same transmitting path, but they may share the same SFFs
path.

```
            +---+  +---+       +---+  +---+       +---+  +---+
            |SF1|  |SF2|       |SF3|  |SF4|       |SF5|  |SF6|
            +---+  +---+       +---+  +---+       +---+  +---+
              \    /             \   /             \   /
   +-----------+   +----+             +----+             +----+
   |Classifier |---|SFF1|-----------|SFF2|-----------|SFF3|
   +-----------+   +----+             +----+             +----+
```
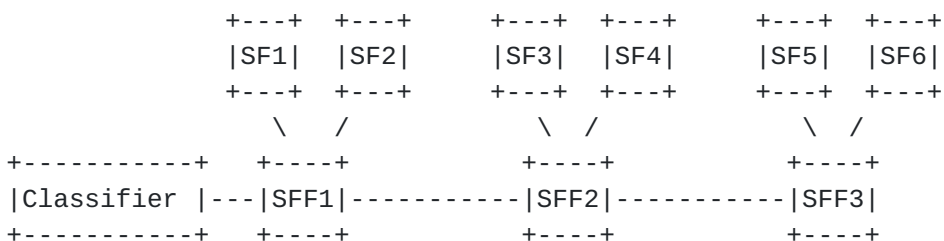
Figure 2: different RSPs share the same SFFs path

And also, multiple SFPs, such as SFP1(SFF1--SFF3--SFF5) and
SFP2(SFF2--SFF4--SFF6) in Figure 3, may not share the same SFFs, but
they may share the same SNs path.

```
            +----+  +----+      +----+  +----+       +----+  +----+
            |SFF1|  |SFF2|      |SFF3|  |SFF4|       |SFF5|  |SFF6|
            +----+  +----+      +----+  +----+       +----+  +----+
               \    /             \   /               \   /
   +-----------+   +----+             +----+             +----+
   |Classifier |---|SN1 |-----------|SN2 |-------------|SN3 |
   +-----------+   +----+             +----+             +----+
```
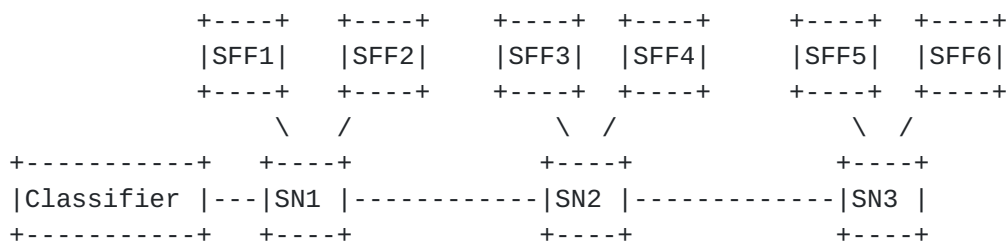
            Figure 3: different SFPs share the same SNs path

   As for users who want to diagnose, troubleshoot a set of RSPs which
   transmit the same SFFs, or a set of SFPs which transmit the same SNs,
   there is an aggregative method which can aggregate a set of RSPs or a
   set of SFPs into one, then, users only need to diagnose, troubleshoot
   the aggregative one, rather than the separated one by one.
   Obviously, they can diagnose, troubleshoot the separated one by one
   as their preferance.

   As follow, this document tries to provide an architecture and a
   solution for differentiated layer OAM for this requirement.

4. **Multi-layer SFC OAM architecture**

   Figure 4 is a possible architecture for multi-layer SFC OAM. In this
   figure, it tries to figure out three possible layers. The layer 1 is
   the most aggregative layer for service chain. It stretches the path
   which SNs go through according to the sets of RSPs or SFPs or SFCs.
   The layer 2 is the medium aggregative layer for service chain. It
   outlines the path which SFFs go though according to the sets of RSPs
   or SFPs or SFCs. The layer 3 is the specific path for service chain.
   It is exactly the path which SFs go though according to the sets of
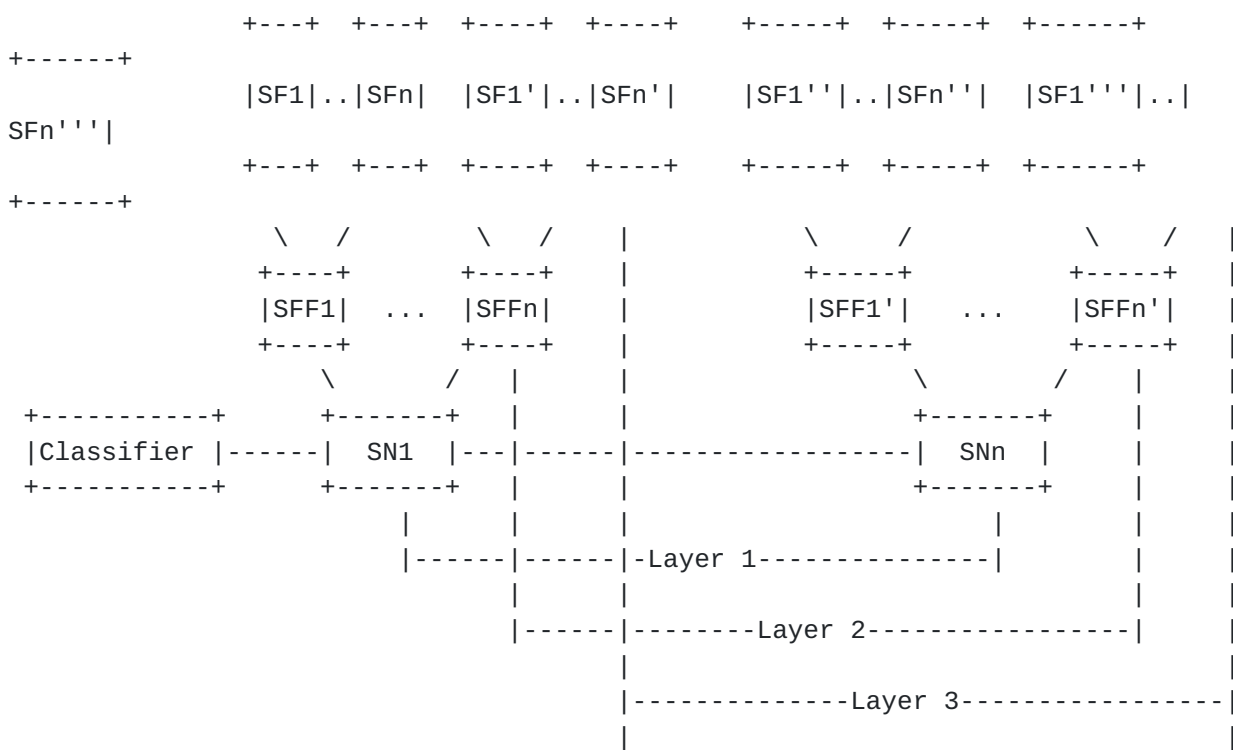   RSPs or SFPs or SFCs.

```
                +---+ +---+  +----+ +----+    +-----+ +-----+  +------+
+------+
                |SF1|..|SFn|  |SF1'|..|SFn'|    |SF1''|..|SFn''|  |SF1'''|..|
SFn'''|
                +---+ +---+  +----+ +----+    +-----+ +-----+  +------+
+------+
                  \   /       \   /   |          \    /          \   /   |
                +----+      +----+    |        +-----+         +-----+   |
                |SFF1|  ... |SFFn|    |        |SFF1'|   ...    |SFFn'|   |
                +----+      +----+    |        +-----+         +-----+   |
                   \        /   |     |            \        /    |       |
  +-----------+      +-------+   |     |              +-------+       |   |
  |Classifier |------|  SN1  |---|------|-----------------|  SNn  |     |   |
  +-----------+      +-------+   |     |              +-------+       |   |
                        |        |     |                    |         |   |
                     |------|------|-Layer 1---------------|         |   |
                        |        |     |                              |   |
                     |------|--------Layer 2-----------------|         |
                        |                                              |
                     |--------------Layer 3------------------|
                        |                                              |
```

        Figure 4: a possible architecture for multi-layer SFC OAM

5. Solution

   if anyone is interested in this requirement, I will update the
   solution in the next version.

6. Security Considerations

   It will be considered in a future revision.

7. IANA Considerations

   It will be considered in a future revision.

8. References

8.1. Normative References

   [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate
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8.2. Informative References

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Authors' Addresses

   Cui Wang
   ZTE Corporation
   No.50 Software Avenue, Yuhuatai District
   Nanjing
   China

   Email: wang.cui1@zte.com.cn

   Wei Meng
   ZTE Corporation
   No.50 Software Avenue, Yuhuatai District
   Nanjing
   China

   Email: meng.wei2@zte.com.cn,vally.meng@gmail.com

   Bhumip Khasnabish
   ZTE TX, Inc.
   55 Madison Avenue, Suite 160
   Morristown, New Jersey 07960
   USA

   Email: bhumip.khasnabish@ztetx.com