Network Service Header TLVs
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Abstract

This draft describes Network Service Header (NSH) MD-Type 2 metadata TLVs that can be used within a service function path.

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1. Introduction

Network Service Header [RFC8300] is the SFC encapsulation protocol used to create Service Function Chains. As such, NSH provides two key elements:

1. Service Function Path identification

2. Metadata

NSH further defines two metadata formats (MD Types): 1 and 2. MD Type 1 defines fixed length, 16 byte metadata, whereas MD Type 2 defines a variable-length TLV format for metadata. This draft defines some common TLVs for use with NSH MD Type 2.

This draft does not address metadata usage, updating/chaining of metadata or other SFP functions. Those topics are described in NSH.
2. Conventions used in this document

2.1. 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. NSH Type 2 Format

A NSH is composed of a 4-byte Base Header, a 4-byte Service Path Header and Context Headers. The Base Header identifies the MD-Type in use:

```
+----------+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Ver | O | C | R | R | R | R | R |   Length  |    MD Type    | Next Protocol |
+----------+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Figure 1: NSH Base Header

Please refer to NSH [RFC8300] for a detailed header description.

When the base header specifies MD Type= 0x2, zero or more Variable Length Context Headers MAY be added, immediately following the Service Path Header. Therefore, Length = 0x2, indicates that only the Base Header followed by the Service Path Header are present. The number, indicated in the length field, of optional Variable Length Context Headers MUST be of an integer indicating length in 4-bytes words Figure 2 below depicts the format the context header.

```
+----------+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|          TLV Class            |C|    Type     |R|R|R|   Len   |
+----------+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                      Variable Metadata                        |
+----------+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Figure 2: NSH TLV Format

4. NSH Type 2 TLVs

As per NSH, TLV Class 0-7 are reserved for standards use. In this draft we use TLV Class 0 for the following Types:
4.1. Forwarding Context

This TLV carries network-centric forwarding context, used for segregation and forwarding scope. Forwarding context can take several forms depending on the network environment. Commonly used data includes VXLAN/VXLAN-GPE VNID, VRF identification or VLAN.

```
+-------------------------------+----------+----------+--------+
| TLV Class = 0x0               | C=1      | Type=0x1 | R|R|R|L=0x2 |
| Context Type (CT), 4 bits:   | Reserved |          |        |
| 0x0: 24 bit VXLAN/LISP virtual network identifier (VNI) |
| 0x1: 32 bit MPLS VPN label   |
| 0x2: VLAN                     |
```

4.2. Tenant

Tenant identification is often used for segregation within a multi-tenant environment. Orchestration system generated tenant IDs are an example of such data.
4.3. Content Type

Provides explicit information about the content being carried, for example, type of video or content value for billing purposes.

4.4. Ingress Network Information

This data identifies ingress network node, and, if required, ingress interface.
4.5. Flow ID

Flow ID provides a representation of flow. Akin, but not identical to the usage described in [RFC6437].

```
+---------------------------+---------------------------+---------------------------+---------------------------+---------------------------+
|                               |                               |                               |                               |
|         TLV Class = 0x0       | C|    Type=0x8 | R|R|R|   L=0x1       |                               |
|---------------------------+---------------------------+---------------------------+---------------------------+---------------------------+
|                               |                               |                               |                               |
|                     Flow ID                               |                               |
+---------------------------+---------------------------+---------------------------+---------------------------+---------------------------+
```

Figure 8: Flow ID

4.6. Source and/or Destination Groups

Intent-based systems can use this data to express the logical grouping of source and/or destination objects. [GROUPBASEDPOLICY] and [GROUPPOLICY] provide examples of such a system.

```
+---------------------------+---------------------------+---------------------------+---------------------------+---------------------------+
|                               |                               |                               |                               |
|         TLV Class = 0x0       | C|    Type=0x9 | R|R|R|   L=0x3       |                               |
|---------------------------+---------------------------+---------------------------+---------------------------+---------------------------+
|                               |                               |                               |                               |
|GT(4)  |                Reserved                               |                               |
+---------------------------+---------------------------+---------------------------+---------------------------+---------------------------+

Figure 9: End Point Group

Group type (4):

0x1: Group Based Policy (GBP) end point group (EPG)

4.7. Universal Resource Identifier (URI)

```
+---------------------------+---------------------------+---------------------------+---------------------------+---------------------------+
|                               |                               |                               |                               |
|         TLV Class = 0x0       | C|    Type=0xA | R|R|R|   L=var       |                               |
|---------------------------+---------------------------+---------------------------+---------------------------+---------------------------+
|                               |                               |                               |                               |
|UT(4)  |                URI                               |                               |
+---------------------------+---------------------------+---------------------------+---------------------------+---------------------------+

Figure 10: Universal Resource Identifier
URI type (4):

0x1: URI in standard string format as defined in [RFC3986].

0x2: URI represented in a compacted hash format.

4.8. Policy Identifier (POLICY_ID)

Policy is often referred by a system generated identifier which is then used by the devices to lookup the content of the policy locally. For example this identifier could be an index to an array, a lookup key, a database Id. The identifier allows enforcement agents or services to lookup up the content of their part of the policy quite efficiently.

![Figure 11: POLICY_ID](attachment:image)

5. Security Considerations

[RFC8300] describes the requisite security considerations for protecting NSH metadata.

6. Acknowledgments

The authors would like to thank Behcet Sarikaya, Dirk von Hugo and Mohamed Boucadair for their work regarding usage of subscriber and host information TLVs.

7. IANA Considerations

IANA is requested to create a new "Network Service Header (NSH) TLV Type" registry. TLV types 0-127 are specified in this document. New values are assigned via Standards Action [RFC8126].

8. References
8.1. Normative References


8.2. Informative References


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