

Service Function Chaining
Internet-Draft
Intended status: Informational
Expires: May 7, 2016

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November 4, 2015

NSH Context Header Allocation -- Mobility
draft-napper-sfc-nsh-mobility-allocation-02

Abstract

This document provides a recommended allocation of the mandatory fixed context headers for a Network Service Header (NSH) within the mobility service provider network context. NSH is described in detail in [ietf-sfc-nsh]. This allocation is intended to support uses cases as defined in [ietf-sfc-use-case-mobility].

Requirements Language

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].

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Table of Contents

1. Introduction	2
2. Definition Of Terms	2
3. Network Service Header (NSH) Context Headers	3
4. Recommended Mobility Context Allocation	3
5. Broadband Allocation Specifics	4
6. Context Allocation and Control Plane Considerations	6
7. Security Considerations	6
8. IANA Considerations	6
9. Acknowledgments	6
10. References	6
10.1. Normative References	6
10.2. Informative References	6
Authors' Addresses	7

1. Introduction

Service function chaining provides a mechanism for network traffic to be forced through multiple service functions in a sequence. Metadata can be useful to service functions. Network Service Headers (NSH) provides support for carrying shared metadata between service functions (and devices) using 4 fixed-length 32-bit context headers as defined in [ietf-sfc-nsh]. NSH is then encapsulated within an outer header for transport.

This document provides a recommended default allocation scheme for the fixed-length context headers in the context of service chaining within fixed and mobile broadband service provider networks. Supporting use cases describing the need for a metadata header in these contexts are described in [ietf-sfc-use-case-mobility]. This draft does not address control plane mechanisms.

2. Definition Of Terms

This document uses the terms as defined in [RFC7498] and [RFC7665].

3. Network Service Header (NSH) Context Headers

In Service Function Chaining, the Network Service Header is composed of a 4-byte base header (BH1), a 4-byte service path header (SH1) and four mandatory 4-byte context headers (CH1-CH4) as described in [ietf-sfc-nsh].

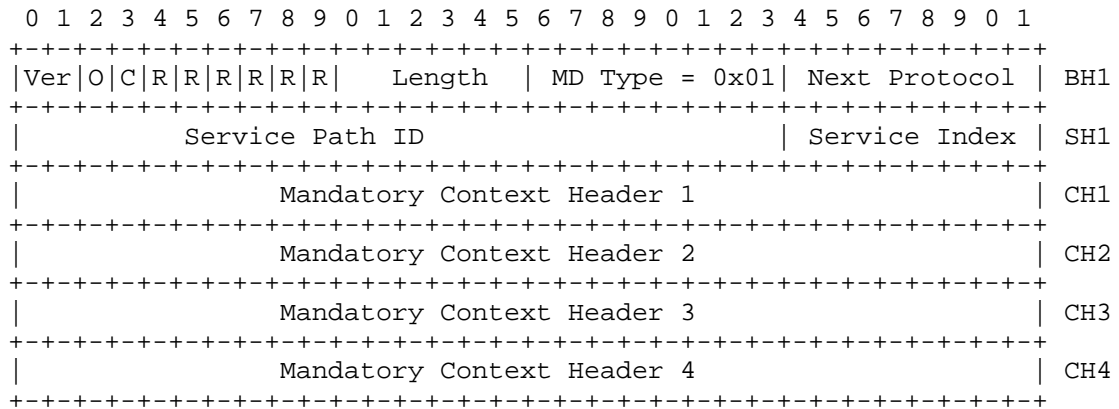


Figure 1: Network Service Header - MD Type 0x01

4. Recommended Mobility Context Allocation

The following context header allocation provides information to support service function chaining in a mobile service provider network as described in [ietf-sfc-use-case-mobility].

The set of context headers can be delivered to service functions that can use the metadata within to enforce policy, communicate between service functions, provide subscriber information and other functionality. Several of the context headers are typed allowing for different metadata to be provided to different service functions or even to the same service function but on different packets within a flow. Which metadata are sent to which service functions is decided in the SFC control plane and is thus out of the scope of this document.

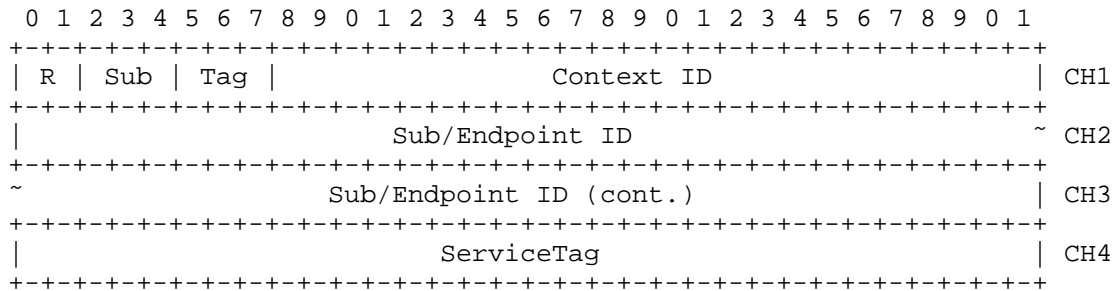


Figure 2: NSH Mobility Context Allocation

Figure 2 provides a high-level description of the fields in the recommended allocation of the fixed context headers for a mobility context.

5. Broadband Allocation Specifics

The intended use for each of the context header allocations is as follows:

R - Reserved.

Sub - Sub/Endpoint ID type field. These bits determine the type of the 64-bit Sub/Endpoint ID field that spans CH2 and CH3.

Tag - The Tag field indicates the type of the ServiceTag field in CH4.

Context ID - The Context ID field allows the Subscriber/Endpoint ID field to be scoped. For example, the Context ID field could contain the incoming VRF, VxLAN VNID, VLAN, or policy identifier within which the Subscriber/Endpoint ID field is defined.

Sub/App ID - 64-bit length Subscriber/Endpoint identifier (e.g., IMSI, MSISDN, or implementation-specific Endpoint ID) of the corresponding subscriber/machine/application for the flow. This field is typed by the value of the Sub field as follows:

000 - If the Sub field is not set, then the 64-bit Sub/Endpoint ID field is an opaque field that can be used or ignored by service functions as determined by the control plane.

001 - The Sub/Endpoint ID field contains an IMSI [itu-e-164].

010 - The Sub/Endpoint ID field contains an MSISDN (8-15 digit) [itu-e-164].

011 - The Sub/Endpoint ID field contains a 64-bit identifier that can be used to group flows (e.g., in Machine-to-Machine, M2M).

100-111 - Reserved.

ServiceTag - A ServiceTag is a unique identifier that can carry metadata specific to the flow or subscriber identified in the Sub/App ID field. Some types for this field are specified by the Tag field as follows:

000 - If the Tag field is not set, then the ServiceTag field in CH4 is an opaque field that can be used or ignored by service functions as determined by the control plane.

001 - The ServiceTag field in CH4 contains information related to the Radio Access Network (RAN) for the subscriber as follows in Figure 3. Note that these values should correspond to those that can be obtained for the flow from the corresponding 3GPP PCRF (Policy and Charging Rules Function) component using Diameter as described in [TS.29.230].

```

0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-----+-----+-----+-----+-----+-----+-----+-----+
| CAN |           QoS           |U| Con |           App Id           | Rsvd | CH4
+-----+-----+-----+-----+-----+-----+-----+-----+

```

Figure 3: Service Tag RAN Allocation

CAN - IP-CAN-Type (Diameter AVP code 1027).

QoS - QoS-Class-Identifier AVP (Diameter AVP code 1028).

U - QoS-Upgrade AVP (Diameter AVP code 1030).

Con - Congestion level.

App Id - Application ID describing the flow type. Allocation of IDs is done in the control plane and is out of the scope of this document.

Rsvd - Reserved.

010-111 - Reserved.

6. Context Allocation and Control Plane Considerations

This document describes an allocation scheme for the mandatory context headers in the context of mobile service providers. This suggested allocation of context headers should be considered as a guideline and may vary depending on the use case. The control plane aspects of specifying and distributing the allocation scheme among different service functions within the Service Function Chaining environment to guarantee consistent semantics for the metadata is beyond the scope of this document.

7. Security Considerations

The context header allocation recommended by this document includes numbers that must be distributed consistently across a Service Function Chaining environment. Protocols for distributing these numbers securely are required in the control plane, but are out of scope of this document.

Furthermore, some of the metadata carried in the context headers require secure methods to prevent spoofing or modification by service function elements that may themselves be exposed to subscriber traffic and thus might be compromised. This document does not address such security concerns.

8. IANA Considerations

This document has no actions for IANA.

9. Acknowledgments

The authors would like to thank Jim Guichard for his assistance structuring the document.

10. References

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