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Topology Identifier in IPv6 Extension Header  
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## Abstract

This document proposes a new Hop-by-Hop option of IPv6 extension header to carry the topology identifier, which is used to identify the forwarding table instance created by the Multi Topology Routing or Flexible Algorithm.

## 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 [RFC 2119](#) [[RFC2119](#)].

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## [1.](#) Introduction

This document proposes a new Hop-by-Hop option of IPv6 extension header to carry the topology identifier, which is used to identify the forwarding table instance created by the Multi Topology Routing or Flexible Algorithm.

## [2.](#) Terminologies

The following terminologies are used in this document.

MT: Multi Topology

## [3.](#) Problem Statement

[RFC4915] defines Multi-Topology Routing in OSPF and [\[RFC5120\]](#) defines Multi Topology Routing in ISIS. Through Multi Topology Routing, there can be multiple forwarding tables in the data plane. [\[I-D.ietf-lsr-flex-algo\]](#) can also implement the similar purpose to install multiple forwarding tables for different Flexible Algorithm instances.

In the MT IP Forwarding Considerations of [\[RFC5120\]](#), it is explained

when multiple MTs share an Interface with overlapping addresses, some additional mechanism is needed to select the correct RIBs for the incoming IP packets to determine the correct RIB to make a forwarding decision. But there is lack of the generic approach of packet to multiple MT RIB mapping over the same inbound interface.

4. New IPv6 Extension Header Option for Topologies

In order to solve the above issue, in the scenario of IPv6, the topology identifier information can be carried in the packet. A new Hop-by-Hop option type "Topology" is defined to carry the topology related Identifier in an IPv6 packet. Its format is shown as below:

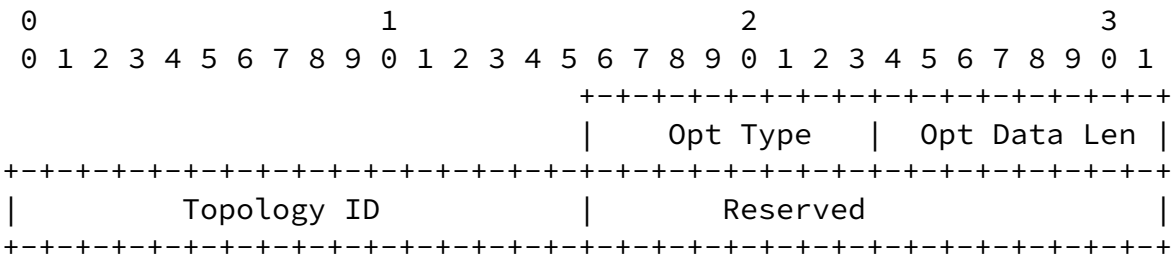


Figure 1. Topology Option

where:

- o Opt Type: Type value is TBD. 8-bit unsigned integer. Identifier of the type of this Topology Option.
- o Opt Data Len: 8-bit unsigned integer. It indicates the length of the option Data field of this option, in octets. The value of Opt Data Len of Topology option SHOULD be set to 4.
- o Topology ID: 2-octet identifier which uniquely identifies the topology associated with the specific forwarding table created by the Multi Topology Routing or Flexible Algorithm.
- o Reserved: 2-octet reserved field. It MUST be set as 0 and ignored when received.

5. Security Considerations

TBD

## 6. IANA Considerations

This document requests IANA to assign a new option type from "Hop-by-Hop Options" registry.

Value	Description	Reference
TBD	Topology Option	this document

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## 7. References

### 7.1. Normative References

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[RFC5120] Przygienda, T., Shen, N., and N. Sheth, "M-ISIS: Multi Topology (MT) Routing in Intermediate System to Intermediate Systems (IS-ISs)", [RFC 5120](#), DOI 10.17487/RFC5120, February 2008, <<https://www.rfc-editor.org/info/rfc5120>>.

### 7.2. Informative References

[RFC8200] Deering, S. and R. Hinden, "Internet Protocol, Version 6 (IPv6) Specification", STD 86, [RFC 8200](#),

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