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IPv4-mapped IPv6 Instance IDs in OSPFv3
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Abstract

This memo defines two new Instance Identifiers (Instance IDs) in OSPFv3 [[RFC2740](#)]). These new Instance IDs [[I-D.ietf-ospf-af-alt](#)] are meant to instantiate distinct OSPFv3 instances to convey routing information which is specific to IPv4-mapped IPv6 address Address Family [[I-D.ietf-behave-address-format](#)]. The goal of running separate instances for IPv4-mapped IPv6 is to distinguish the native IPv6 routing topology from the IPv4 routing topology. Separate instances are also meant to prevent any overload of the native IPv6 routing tables by IPv4-mapped IPv6 routes. This isolation is motivated also from an operational perspective to enforce specific routing policies for each topology.

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

[I-D.ietf-ospf-af-alt] specifies a mechanism to map each address family (AF) to a separate OSPFv3 [[RFC2740](#)] Instance identified by an ID. Many Instance IDs have been reserved for different AF (e.g., Instance ID #0 - #31 for IPv6 unicast AF, Instance ID#32 - #63 for IPv6 multicast AF, etc.). Instance ID #0 is used by default for IPv6 unicast AF. This document requests to assign two new Instance IDs for the IPv4-mapped IPv6 AF. They are:

- o Unicast IPv4-mapped IPv6 AF;
- o Multicast IPv4-mapped IPv6 AF.

Within the double context of IPv4 address exhaustion and the IPv6-IPv4 interconnection, numerous solutions are being elaborated within IETF. Both translation (e.g., [[I-D.ietf-behave-v6v4-xlate-stateful](#)] and [[I-D.ietf-behave-v6v4-xlate](#)]) and encapsulation (e.g., [[I-D.boucadair-dslite-interco-v4v6](#)] and [[I-D.boucadair-behave-ipv6-portrange](#)]) schemes are proposed to facilitate IPv6-IPv4 interconnection. These solutions require the injection of routes to IPv4-mapped IPv6 [[I-D.ietf-behave-address-format](#)] destinations in intra-domain routing protocols. In order to prevent any overload of the native IPv6 routing table with IPv4-mapped IPv6 routes, this memo defines new Instance IDs which are required for the activation of several OSPFv3 instances for unicast/multicast IPv4- inferred IPv6 route computation purposes. This isolation is also motivated for operational reasons and to ease the migration to full IPv6. As a result, when a separate

OSPFv3 instance for unicast IPv4-mapped IPv6 AF is activated, a separate OSPFv3 topology is calculated. Likewise, when a separate OSPFv3 instance for multicast IPv4- inferred IPv6 AF is activated, another distinct OSPFv3 topology is computed.

In order to prevent from polluting the native IPv6 routing table with IPv4-mapped IPv6 routes, this memo defines new Instance IDs which are required for the activation of several OSPFv3 instances for unicast/multicast IPv4-mapped IPv6. This isolation is also motivated for operational reasons and to ease the migration to full IPv6. As a result, when a separate OSPFv3 instance for unicast IPv4-mapped IPv6 AF is activated, there creates a separate OSPFv3 topology based on which unicast IPv4-mapped IPv6 routing is calculated and performed, and similarly, when a separate OSPFv3 instance for multicast IPv4-mapped IPv6 AF is activated, there creates a separate OSPFv3 topology for multicast IPv4-mapped IPv6 routing.

As a reminder, [[I-D.ietf-ospf-mt-ospfv3](#)] specifies a mechanism to maintain multiple OSPFv3 topologies within the same domain. This

memo does not make any preference between the solution described in [[I-D.ietf-ospf-mt-ospfv3](#)] and [[I-D.ietf-ospf-af-alt](#)]. Network administrators have to make their decisions based on local policies and preferences. If the multi-instance mechanism [[I-D.ietf-ospf-af-alt](#)] is deployed in an OSPFv3 network as a preference for multiple topologies, the extensions defined in this memo may be used to support unicast/multicast IPv4-mapped IPv6 routing.

[2.](#) Procedure

This document does not require any modification to the procedure specified in [[I-D.ietf-ospf-af-alt](#)]. Nevertheless, only routes to IPv4-mapped IPv6 prefixes MUST be instantiated within a IPv4-mapped IPv6 routing MI-OSPFv3. Concretely, the IANA prefix defined in [[I-D.ietf-behave-address-format](#)] MUST be supported by default. Service providers MAY also choose a LIR prefix to build the IPv4-mapped IPv6 addresses.

[3.](#) Forwarding

Only incoming datagrams destined to IPv4-mapped IPv6 addresses are associated (and therefore forwarded according to) with the IPv4-mapped IPv6 unicast/multicast OSPFv3 Instance, respectively. WKP and/or LIR prefix defined in [[I-D.ietf-behave-address-format](#)] MUST be configured in all participating nodes.

[4.](#) IANA Considerations

This document requests the following OSPFv3 Instance IDs:

- o Instance ID# for IPv4-mapped IPv6 unicast AF;
- o Instance ID# for multicast IPv4-mapped IPv6 AF.

[5.](#) Security Considerations

This document does not introduce any security issue in addition to those defined in [[RFC2740](#)].

[6.](#) Acknowledgements

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