

Network Working Group
Internet-Draft
Intended status: Standards Track
Expires: August 27, 2010

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February 23, 2010

Multi-Topology/Multi-Instance ISIS for IPv4-Embedded IPv6
draft-boucadair-isis-v4v6-mt-02

Abstract

This document defines two new Multi Topology Routing Identifiers (MT IDs), based on [[RFC5120](#)] and two new Instance Identifiers (MI IDs), based on [[I-D.ietf-isis-mi](#)], respectively, in the Intermediate System to Intermediate System. With these identifiers, an IPv4-Embedded IPv6 topology is maintained for both IPv6 unicast and multicast traffic. The purpose of running separate instances or topologies for IPv4-Embedded IPv6 traffic is to distinguish from the native IPv6 routing topology, and the topology that is used for routing IPv4-Embedded IPv6 datagrams only. Separate instances/topologies are also meant to prevent any overload of the native IPv6 routing tables by IPv4-Embedded IPv6 routes.

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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Internet-Draft

IPv4-Embedded Pv6 MT/MI-ISIS

February 2010

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Internet-Draft

IPv4-Embedded Pv6 MT/MI-ISIS

February 2010

Table of Contents

1.	Introduction	4
2.	IPv4-Embedded IPv6 IS-IS Topologies	4
3.	IPv4-Embedded IPv6 IS-IS Instances	5
4.	Provisioning	5
5.	Procedure	5
6.	Forwarding	5
7.	IANA Considerations	6
8.	Security Considerations	6
9.	References	6
9.1.	Normative References	6
9.2.	Informative References	6
	Authors' Addresses	7

1. Introduction

Within the double context of public IPv4 address exhaustion and 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](#)]) based schemes are proposed to allow IPv6-IPv4 interconnection. These solutions require the injection of routes to IPv4-Embedded IPv6 prefixes [[I-D.ietf-behave-address-format](#)] in intra-domain routing protocols .

In order to prevent any overload of the native IPv6 routing table with IPv4-Embedded IPv6 routes, this document defines new MT IDs (resp., MI IDs) which are required for the activation of multiple topologies (resp., Instances), where the native IPv6 topology (resp., Instance) would be distinct from the IPv4-Embedded IPv6 topology (resp., Instance). Operational reasons also motivate this approach which is meant to ease the migration to full IPv6. As a result, the unicast IPv4-Embedded IPv6 topology (resp., Instance) is used for unicast IPv4-Embedded IPv6 route computation purposes, and the multicast IPv4-Embedded IPv6 topology (resp., Instance) is used for multicast IPv4-Embedded IPv6 route computation purposes.

This document does not make any preference between the solution described in [[RFC5120](#)] and [[I-D.ietf-isis-mi](#)]. Network administrators have to make their decisions based on local policies. If the multi-instance mechanism is deployed in an IS-IS network as a preference for multiple topologies, the MI extensions defined in this

document may be used to support unicast/multicast IPv4-Embedded IPv6 routing. If M-ISIS mechanism is deployed in an IS-IS network as a preference for multiple topologies, the MT extensions defined in this document may be used to support unicast/multicast IPv4-Embedded IPv6 routing.

[2.](#) IPv4-Embedded IPv6 IS-IS Topologies

M-ISIS [[RFC5120](#)] is a mechanism that has been specified to run within a single IS-IS [[RFC1195](#)] domain where various logical IS-IS topologies are deployed, based on several criteria such as the need to differentiate IPv6 topologies from IPv4 topologies. Distinct MT IDs (Multi Topology Identifiers) are assigned by IANA (e.g., MT ID # 0 for standard topology, MT ID # 2 for IPv6 routing topology, etc.). MT ID # 6-#3995 range is reserved for IETF consensus. This document requests the assignment of two new MT IDs for the following usages:

- o IPv4-Embedded IPv6 unicast topology;
- o IPv4-Embedded IPv6 multicast topology.

[3.](#) IPv4-Embedded IPv6 IS-IS Instances

[I-D.ietf-isis-mi] specifies a mechanism to map each address family (AF) to a separate IS-IS Instance identified by an ID. Accepted ID values are 0 to 65535. Instance ID#0 is used by default (legacy systems). This document requests the assignment of two new MI-IS-IS Instance IDs for the following usages:

- o IPv4-Embedded IPv6 unicast AF;
- o IPv4-Embedded IPv6 multicast AF.

[4.](#) Provisioning

Adequate provisioning must be done according to [[RFC5120](#)] and [[I-D.ietf-isis-mi](#)], respectively, based on the corresponding

mechanism that is actually used in an IS-IS network, in order to have a fully-connected IPv4-Embedded IPv6 unicast or multicast topology.

[5.](#) Procedure

This document does not require any modification to the procedure specified in [[RFC5120](#)] nor in [[I-D.ietf-isis-mi](#)]. Nevertheless, routes to IPv4-Embedded IPv6 addresses or prefixes MUST be instantiated within an IPv4-Embedded IPv6 M-ISIS (resp., MI-ISIS). Concretely, the WKP prefix (i.e., 64:FF9B::/96) 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-Embedded IPv6 addresses.

[6.](#) Forwarding

Only incoming datagrams destined to IPv4-Embedded IPv6 addresses are associated (and forwarded accordingly) with the IPv4-Embedded IPv6 unicast/multicast topology, respectively. WKP (i.e., 64:FF9B::/96) and/or LIR prefix defined in [[I-D.ietf-behave-address-format](#)] must be configured in all participating nodes.

[7.](#) IANA Considerations

TBC.

[8.](#) Security Considerations

This document does not introduce any security issue in addition to those defined in [[RFC5120](#)] and [[I-D.ietf-isis-mi](#)].

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Boucadair, et al. Expires August 27, 2010

[Page 6]

Internet-Draft

IPv4-Embedded Pv6 MT/MI-ISIS

February 2010

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