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Multicast Router Discovery SSM Range Option

Status of this Document

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Abstract

This document defines the Multicast Router Discovery option for advertising the configured IPv4 Source Specific Multicast destination address range.

1. Introduction

With current multicast deployment in the Internet, different multicast routing protocols coexist and operate under separate parts of the multicast address space [1]. Multicast routers are consistently configured with information that maps specific multicast destination address ranges to multicast routing protocols. Part of this configuration describes the subset of the address space that is used by source-specific multicast (SSM) [2].

There are currently two requirements for a router to advertise its configured SSM range on its attached links:

- On links with multiple multicast routers, advertisement of the configured SSM range by each router can be used to discover miss-configurations.
- IP systems with multicast sources or receivers can use the advertisements to learn the SSM group range with which the network is configured.

This document defines an optional extension for the IPv4 Multicast Router Discovery protocol [3] which can be used to advertise the SSM range. Note that the SSM range for IPv6 is well defined and a mechanism to allow additional ranges to operate in SSM mode on a per-link bases is not required.

2. SSM Range Option Format

The SSM Range option SHOULD be included in all Multicast Router Advertisement messages [3]. It contains the list of multicast destination address ranges that are configured to operate under Source Specific Multicast on this router. The format of the option is as follows:

```
 0                   1                   2                   3
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|    Type=X     |  Length=var   |  Mask-Len-1   |    Prefix-1 ...
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|  Mask-Len-2   |  Prefix-2 ...
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                             ...                               |
```

Type
The type value of the Multicast Router Advertisement SSM Range option is X (TBD by IANA).

Length
The length of the SSM Range Discovery option is variable and depends on the number of destination ranges present in the option as well as the sizes of the ranges.

Mask-Len-n
The mask length for the nth address range.

Prefix-n
The multicast destination address prefix for the nth range present in this option. The size of

the prefix field is variable and depends on the number of significant bits in the prefix (specified in the corresponding Mask-Len field). The field is padded by enough trailing bits to make the end of the field fall on an octet boundary. Note that the value of the trailing bits is irrelevant.

3. Notes on Option Processing

Routers originating Multicast Router Advertisement messages SHOULD NOT include more than one SSM Range Discovery option in each message. Systems with a multicast capable IP host stack that receive a Multicast Router Advertisement message with more than one SSM Range Discovery options MUST only use the prefixes from the last SSM Range Discovery option in the message as the active SSM range.

The SSM range specified by routers originating Multicast Router Advertisement messages with the SSM Range Discovery option MUST not include any part of the link-local multicast range 224.0.0/24. Systems with a multicast capable IP host stack that receive a Multicast Router Advertisement message with a SSM Range Discovery option that includes destination addresses in the link-local multicast range 224.0.0/24 MUST use as the active SSM range the contents of the option excluding any addresses in the range 224.0.0/24.

A router receiving a Multicast Router Advertisement message with an SSM Range Discovery Option MUST compare the contents of the option with the multicast address ranges in the local SSM configuration and signal any differences to the administrator in a rate-limited manner. Signaling of range differences may be accomplished by a mechanism as simple as an entry in the router log containing the address of the router with the mismatch in configuration.

4. Security Considerations

Multicast Router Advertisement messages are IGMP messages sent to the All-Systems multicast group (224.0.0.1) which is not forwarded by routers. Only rogue systems on a connected link can masquerade as multicast routers. Such rogue systems can include the SSM Range Discovery option in their messages and cause the SSM range mapping to be incorrectly set by hosts on the link. The next Multicast Router Advertisement from a real valid router on the link will restore the correct mapping. This spec mandates that routers log the reception of inconsistent range advertisements which makes it easier to detect rogue systems.

5. IANA Considerations

This document introduces the new SSM Range Option for the Multicast Router Discovery protocol. This option requires a new MRD type value to be assigned by IANA.

6. Acknowledgments

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7. Authors’ Addresses

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8. Normative

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[2] H. Holbrook, B. Cain, "Source-Specific Multicast for IP", work in progress, <draft-ietf-ssm-arch-00.txt>, 21 November 2001.

[3] S. Biswas, B. Haberman, "IGMP Multicast Router Discovery", Work In Progress, <draft-ietf-idmr-igmp-mrdisc-??.txt>, 2002.