Multicast Proxy in IPv6/IPv4 Transition
draft-jiang-behave-v4v6mc-proxy-00.txt

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Abstract

During the long co-existing period of IPv6 and IPv4, the interoperation between IPv6 network and IPv4 network is essential. Multicast services across IPv6 and IPv4 networks are also needed. Besides the multicast translation mechanism, this document describes a multicast proxy solution. The multicast proxy is deployed at the border of IPv6/IPv4 networks. It acts as a multicast leaf in the network that the data source locates. It also acts as a multicast source in other IP network. Without translation, it multicasts the data retrieved and cached from different IP network.

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1. Introduction

The confirmation of IPv4 address exhaustion clearly indicates that global IPv6 deployment is inevitably going to happen. However, it is also widely agreed that IPv4 will be still in use for a long period. During the long co-existing period of IPv6 and IPv4, the interoperation between IPv6 network and IPv4 network is essential.

Now, multimedia has been deployed widely, such as IPTV and video conference etc. They also face the IPv6 and IPv4 intercommunication issues. The multicast applications are complicated and face more difficulties than unicast applications deployment.

[I-D. draft-venaas-behave-v4v6mc-framework] proposes a translation framework between IPv4/IPv6 multicast services. It describes the translation operations and intercommunication in network layer to support a single source send to multiple receivers in different IP networks.

Besides the multicast translation mechanism, this document describes a multicast proxy solution, which is conceptually similar to an application-level gateway.

A multicast proxy can be deployed at the border between IPv4/IPv6 networks. It acts as a multicast leaf in the network that the data source locates. It also acts as a multicast source in other IP network. Without translation, it multicasts the data retrieved and cached from different IP network.

2. Terminology

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 [RFC2119].

3. Multicast Proxy without IPv6/IPv4 Translation

3.1. Overview

```
-------------IPvX-------------|-------------IPvY-------------|
                   |                   |
                   |  +-----------+       +-----------+       +-----------+ |
                   |  | multicast |------>| multicast |------>| multicast | |
                   |  | source    |------>|   proxy    |------>|   client   | |
                   | +-----------+       +-----------+       +-----------+ |
```
As showed in Figure 1, the proposed multicast proxy is deployed at the border of IPv4/IPv6 networks. It MUST support both IPv4 and IPv6. It MUST support both IGMP (Internet Group Management Protocol, [RFC3376]), which is used for IPv4 multicast management functions, and MLD (Multicast Listener Discovery, [RFC3810]), which is used in a similar way in IPv6 Environment. In the IPvX network, the multicast proxy joins the multicast distribution tree as a leaf. In the IPvY network, the multicast proxy broadcasts contents as a multicast source. The establishment of multicast distribution trees obeys the current multicast specifications for each IP family, such as Protocol Independent Multicast (PIM [RFC4601]).

Notice that there is one multicast distribution tree in each sides of the multicast proxy.

Logically, they are relevant to each other and there are interoperation behaviors between them. The contents published through the multicast distribution tree in IPvY network inherits from the IPvX network. They are received by the multicast proxy, which is a multicast leaf in the multicast distribution tree in IPvX network. Within the multicast proxy contents are mapped between receiver function and publisher function. The operations of the multicast distribution tree in IPvY network MAY trigger some operations of the multicast distribution tree in IPvX network. For example, a multicast client joins a multicast group in IPvY network, and requests multicast contents may cause the multicast proxy joins a multicast group in IPvX network.

However, in network or IP layer, they are independent from each other. Conceptually, the multicast proxy can be presented virtually like below Figure 2.

```
<----------IPvX---------->  <----------IPvY---------->
+----------+  +----------+  +----------+  +----------+
| multicast | | multicast | mapping | multicast | | multicast |
| source    | ----> proxy |         | proxy     | ----> client |
| (Receiver)| interp    | (Publisher)|         |             |
+----------+  +----------+  +----------+  +----------+
```

Figure 2: Separate function model of multicast proxy
3.2. Operation procedure

A client, locates in IPvY network, connects to the multicast proxy, requesting a multicast service whose source locates in IPvX network. The multicast proxy maintains a multicast service table, including available multicast services from itself and IPvX network. The multicast proxy searches the client request in its multicast service table. If the requested multicast service is from IPvX network, the multicast proxy connects to the multicast source in IPvX network and requesting the service on behalf of the client.

When a second client in IPvY network requests the same multicast service, the multicast proxy can provide the service without any additional operation.

If all the clients, requesting a certain multicast service in IPvY network, leave the multicast group in IPvY network, the multicast proxy MAY leave the multicast group in IPvX network.

Multicast Proxy MAY also perform load-balancing, authentication and caching functions.

4. Security Considerations

The multicast proxy solution actually separate the IPv4 and IPv6 multicast services effectively. It prevents the attacks at only one side of it.

However, multicast proxy itself is as vulnerable as normal multicast sources and multicast leafs in each IPv4 or IPv6 environment. The security mechanisms for IGMP/MLD can be used to enhance the security of multicast proxy.

5. IANA Considerations

This draft does not request any IANA action.

6. Change Log [RFC Editor please remove]

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7. References

7.1. Normative References

7.2. Informative References

[I-D.draft-venaas-behave-v4v6mc-framework]

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