Deploying an IPv4/IPv6 mail exchange server with Sendmail

Hexago Technical Note 1001

Abstract

A mail exchange server is a major component of every corporate network. Therefore, to do a successful migration from IPv4 to IPv6, it is *extremely* important to know how IPv6 affects this service. This document explains how to configure Sendmail in an IPv6 network.

IPv6 support in Sendmail

Sendmail has supported IPv6 since version 8.10 was released in 2000. Over the years, Sendmail has matured to the point that every feature available with IPv4 can now also be used with IPv6, for example, transfer to and from an IPv6-enabled host or server, filtering, and redirection.

MTA configuration

This section provides two ways to configure a message transfer agent (MTA) in an IPv6-enabled network:

*   Configuring an SMTP server to listen on all configured addresses

    This option is recommended for most networks.

- Configuring an SMTP server to bind only on specific addresses

    This option deals with the case where a server has multiple IP addresses configured.

Note: All other configuration tasks in Sendmail, for example, to configure local delivery on localhost , are the same for IPv4 and IPv6 and so are not covered in this document.

Configuring an SMTP server to listen on all configured addresses

To configure a basic IPv6 MTA, use the "Family" parameter to set up a second listener, by adding these statements in the Sendmail configuration file (m4 configuration file):

```
DAEMON_OPTIONS(`Name=IPv4, Family=inet')dnl
DAEMON_OPTIONS(`Name=IPv6, Family=inet6')dnl
```

Adding these statements creates two SMTP listeners for the same Sendmail process: one for the IPv4 family (inet) and one for the IPv6 family (inet6). The value of the "Name" parameter in syslog output identifies the different listeners.

Configuring an SMTP server to bind only on specific addresses

To configure an MTA that binds only on one IPv4 or one IPv6 address, use the "Addr" parameter, by adding the following statements in the Sendmail configuration file:

```
DAEMON_OPTIONS(`Name=IPv4, Family=inet, Addr=192.0.2.1')dnl
DAEMON_OPTIONS(`Name=IPv6, Family=inet6, Addr=3ffe:b00:0:1::2')dnl
```

Adding these statements creates two listeners that bind only on the IPv4 and IPv6 addresses specified. Because the address family is already known, both IPv6 or IPv4 addresses are written with the same syntax without "[ ]" or a prefix. The last line configures Sendmail to listen only to the 3ffe:b00:0:1::2 IPv6 address.

IPv6 addresses in Sendmail configuration files

As stated before, all features available with IPv4 can also be used with IPv6. One of the few differences is that, in all Sendmail configuration files such as `mailertable`, `access`, and `relay-domains`, the prefix IPV6 *must* be used to differentiate IPv6 addresses from IPv4 addresses (no brackets [ ]). (***Note:*** Do not use this syntax in *sendmail.cf.*)

Here are a few examples showing the prefix in use :

```
#
#cat access
IPV6:3ffe:b00:2::4E61      REJECT We don't accept mail from that host
IPV6:3ffe:b00:1            REJECT We don't accept mail from prefix
192.0.2.199               REJECT We don't accept mail from that host

#
#cat relay-domains
IPV6:3ffe:b00:3
192.0.2
```

Filtering IPv6 servers

Entries in the file `access` restrict connections to the Sendmail listener. The file can, for example, filter out known spamming servers or networks. As shown above, the file can be used to specify IPv6

hosts or prefixes. The following example rejects SMTP connections from the 3ffe:b00:2::4e61 server.

```
#cat access
IPV6:3ffe:b00:2::4E61    REJECT We don't accept mail from that host
```

Spammers with an IPv6-enabled SMTP relay could successively try to send an e-mail over both protocols to try to get through incomplete filters. It is very important to filter *both* the IPv4 address and the IPv6 address (when it exists) of know spammers to be protected against such attacks. An alternative would be to use a DNS-based blacklist but such services do not at this time store IPv6 addresses.

Possible issues with DNS

To avoid losing any SMTP requests because of DNS issues, when configuring the DNS entries, it is absolutely *essential* that every server has an 'MX' record that points to both types of addresses (IPv4 *and* IPv6). Thisconfiguration allows the domain to receive e-mail from IPv4 and IPv6 hosts.

This section provides two ways to make sure all SMTP requests get to their destination.:

- Configuring a primary server for both types of requests (IPv4 and IPv6)

    This option is recommended for most networks.

- Configuring one server for IPv6 requests)

    This option is not preferred and is to be used as last resort.

Configuring DNS for primary server to handle both types of requests (IPv4 *and* IPv6)

To configure the primary server (mx1) to handle both types of requests, the preferred configuration is to add 'MX' records for an IPv6-enabled domain that point to both an 'A' and an 'AAAA' record. There are many ways to achieve this. The simplest one is is shown here:

```
acme.com IN        MX        1        mx1.acme.com.
                   MX        10       mx2.mydomain.net.
mx1.acme.com.      IN        A        192.0.2.1
                   IN        AAAA     3ffe:b00:1:1::99
mx2.mydomain.net. IN        A        192.0.2.100
                   IN        AAAA     3ffe:b00:1:2::4
```

In the above configuration, the primary mail exchange server (mx1) is configured to handle both IPv4 and IPv6 SMTP requests. This configuration includes a secondary server (mx2) that also handles both types of requests.

Configuring the DNS where only the secondary server handles IPv6 requests

This configuration may be necessary when the primary SMTP server cannot be upgraded to support IPv6.

To configure the primary and secondary servers to each handle a different type of SMTP request, make the 'MX' record for the primary server point to only an 'A' record; at the same time make the 'MX' record for the secondary server point to both an 'A' record *and* an 'AAAA' record, as shown in the following configuration:

```
acme.com IN        MX        1        mx1.acme.com.
```

```
                MX      10      mx2.mydomain.net.
mx1.acme.com.   IN      A       192.0.2.1
mx2.mydomain.net. IN    A       192.0.2.100
                IN      AAAA    3ffe:b00:1:1::99
```

Note: In the above configuration, most mail sent by a dual stack relay will use IPv4 to reach the primary server. But the configuration of an 'AAAA' record for the secondary server allows IPv6-only relays to send mail to the domain.

Summary

Configuration of a mail exchange server is done the same way with IPv6 as it is with IPv4, with only a few differences: configuring the server and writing IPv6 addresses in the Sendmail configuration files. Also, to date, no DNS blacklist that accepts native IPv6 connections exists; this means that all spam filtering must be done locally.

REFERENCES

Sendmail, 2003 Product documentation,

http://www.sendmail.org/m4/readme.html.

Nakamura, M. and J. Hagino, "SMTP operational experience in mixed IPv4/IPv6 environements", draft-ietf-ngtrans-ipv6-smtp-requirement-06 (work in progress), July 2002.