

Chapter 35

Multicast Scoping

Multicast scoping is a technique that can be used to limit multicast traffic by configuring it to an administratively defined topological region. Major objectives of scoping are to relieve stress on scarce resources, such as bandwidth, and to improve privacy or scaling properties.

This chapter discusses the following topics that provide information about configuring multicast scoping:

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Overview

IP multicast implementations can achieve some level of scoping by using the time-to-live (TTL) field in the IP header. However, TTL scoping has proven difficult to implement reliably, and the resulting schemes often are complex and difficult to understand.

Administratively scoped IP multicast provides clearer and simpler semantics for multicast scoping. The key properties of administratively scoped IP multicast are that packets addressed to administratively scoped multicast addresses do not cross configured administrative boundaries, and administratively scoped multicast addresses are locally assigned, and hence are not required to be unique across administrative boundaries.

The administratively scoped IPv4 multicast address space is the range 239.0.0.0 through 239.255.255.255.

The structure of the IPv4 administratively scoped multicast space is based loosely on the IPv6 addressing architecture as described in RFC 1884.

There are two well-known scopes:

IPv4 local scope—This scope comprises addresses in the range 239.255.0.0/16. The local scope is the minimal enclosing scope, and hence is not further divisible. Although the exact extent of a local scope is site dependent, locally scoped regions must not span any other scope boundary and must be contained completely within or equal to any larger scope. If scope regions overlap in area, the area of overlap must be within the local scope.

IPv4 organization local scope—This scope comprises 239.192.0.0/14. It is the space from which an organization should allocate subranges when defining scopes for private use.

The ranges 239.0.0.0/10, 239.64.0.0/10, and 239.128.0.0/10 are unassigned and available for expansion of this space.

Two other scope classes already exist in IPv4 multicast space, the statically assigned link-local scope, which is 224.0.0.0/24, and the static global scope allocations, which contains various addresses.

Multicast Scoping Standards

Multicast scoping is defined in RFC 2365, *Administratively Scoped IP Multicast*.

To access Internet RFCs and drafts, go to the IETF Web site at <http://www.ietf.org>.

Multicast Scoping Configuration Statements

To configure multicast address scoping, you can include the following statements at the [edit routing-options] hierarchy level:

```
[edit]
routing-options {
  multicast {
    scope scope-name {
      interface scope-name;
      prefix scope-name;
    }
  }
}
```

Specify a name for the scope, its address range, and the router interfaces on which you are configuring scoping.

All scope boundaries must include the local scope. If this scope is not configured, it is added automatically at all user-defined boundaries.

For more information, see “Configure Multicast Scoping” on page 124.

Example: Configure Multicast Scoping

Configure multicast scoping, creating four scopes, local, organization, engineering, and marketing:

```
[edit]
routing-options {
  multicast {
    scope local {
      prefix 239.255.0.0/16;
      interface ip-f/p/0.0;
    }
    scope organization {
      prefix 239.192.0.0/14;
      interface [ ip-f/p/0.0 so-0/0/0 ];
    }
    scope engineering {
      prefix 239.255.255.0/24;
      interface [ ip-f/p/0.0 so-0/0/1 so-0/0/2 ];
    }
    scope marketing {
      prefix 239.255.254.0/24;
      interface [ ip-f/p/0.0 so-0/0/2 so-1/0/0 ];
    }
  }
}
```

