

Chapter 12

Multicast Administrative Scoping

Multicast scoping is a way to limit multicast traffic by configuring it to an administratively defined topological region. Scoping can relieve stress on scarce resources, such as bandwidth, and improve privacy or scaling properties.

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

Multicast Scoping Overview on page 79

Multicast Scoping Configuration Statements on page 81

For a configuration example, see “Example: Configure Multicast Scoping” on page 80.

Multicast Scoping 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. Packets addressed to administratively scoped multicast addresses do not cross configured administrative boundaries. 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 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 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 be equal to any larger scope. If scope regions overlap in an 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 contain various addresses.

Configure Multicast Scoping

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 [interface-name];
      prefix destination-prefix;
    }
  }
}
```

Specify a name for the scope, the set of router interfaces on which you are configuring scoping, and the scope's address range.

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

For information about supported standards for multicast scoping, see "IP Multicast Standards" on page 25.

Example: Configure Multicast Scoping

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

If you have a Tunnel PIC in your router and you configure a tunnel interface to use IP-IP encapsulation, you can configure the local scope. For more information about configuring tunnel interfaces, see the *JUNOS Internet Software Configuration Guide: Services Interfaces*.

Configure the organization scope on an IP-IP encapsulation tunnel interface and a SONET/SDH interface. Configure the engineering and marketing scopes on an IP-IP encapsulation tunnel interface and two SONET/SDH interfaces. The JUNOS software can scope any user-configurable IPv6 or IPv4 group.

```
[edit]
routing-options {
  multicast {
    scope local {
      interface gr-2/1/0;
      prefix fe00::239.255.0.0/128;
    }
    scope organization {
      interface [gr-2/1/0 so-0/0/0];
      prefix 239.192.0.0/14;
    }
  }
}
```

```

scope engineering {
  interface [ip-2/1/0 so-0/0/1 so-0/0/2];
  prefix 239.255.255.0/24;
}
scope marketing {
  prefix 239.255.254.0/24;
  interface [gr-2/1/0 so-0/0/2 so-1/0/0];
}
}
}

```

For more information, see the *JUNOS Internet Software Configuration Guide: Routing and Routing Protocols*.

Multicast Scoping Configuration Statements

The following sections explain each of the multicast scoping configuration statements. The statements are organized alphabetically.

interface

Syntax	interface [<i>interface-name</i>];
Hierarchy Level	[edit routing-options multicast scope <i>scope-name</i>], [edit routing-instances <i>routing-instance-name</i> routing-options multicast scope <i>scope-name</i>]
Description	Configure the set of interfaces for multicast scoping.
Usage Guidelines	See “Configure Multicast Scoping” on page 80.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.

prefix

Syntax	prefix <i>destination-prefix</i> ;
Hierarchy Level	[edit routing-options multicast scope <i>scope-name</i>], [edit routing-instances <i>routing-instance-name</i> routing-options multicast scope <i>scope-name</i>]
Description	Configure the scope’s address range.
Options	<i>destination-prefix</i> —Address range for multicast scoping.
Usage Guidelines	See “Configure Multicast Scoping” on page 80.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.

scope

Syntax	<pre>scope <i>scope-name</i> { interface [<i>interface-name</i>]; prefix <i>destination-prefix</i>; }</pre>
Hierarchy Level	[edit routing-options multicast], [edit routing-instances <i>routing-instance-name</i> routing-options multicast]
Description	Configure multicast scoping.
Options	<i>scope-name</i> —Name of the multicast scope.
Usage Guidelines	See “Configure Multicast Scoping” on page 80.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.