

## Chapter 18

# MDT Configuration Guidelines

This chapter provides the following information about data multicast distribution trees (MDTs):

- Configuring Data MDTs on page 121
- Data MDTs and Tunnel Services PIC Limits on page 123
- Examples: Configuring Data MDTs on page 124
- Displaying Data MDTs on page 126

## Configuring Data MDTs

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To configure multicast data MDTs, include the `mdt` statement:

```
mdt {
  group-range multicast-prefix;
  threshold {
    group group-address {
      source source-address {
        rate threshold-rate;
      }
    }
  }
  tunnel-limit limit;
}
```

You can include the statement at the following hierarchy levels:

- [edit routing-instances *routing-instance-name* protocols pim]
- [edit logical-routers *logical-router-name* routing-instances *routing-instance-name* protocols pim]



**NOTE:** Because MDT applies to virtual private networks (VPNs) and VPN routing and forwarding (VRF) instances, you cannot configure MDT statements in the master routing instance. If you configure MDT in the master routing instance, the configuration commit fails.

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For an overview of routing instances and a detailed example of routing instance configuration, see the routing instances chapter of the *JUNOS Feature Guide*.

By default, creation of data MDTs is disabled.

This section describes the following tasks for configuring data MDTs:

- Configuring the Data MDT Group Range on page 122
- Configuring the Data MDT Threshold Parameters on page 122
- Configuring the Data MDT Limit on page 123

Data MDTs require a correctly configured Layer 3 VPN for multicast. For more information about configuring Layer 3 VPNs for multicast, see “Configuring Multicast for Layer 3 VPNs” on page 241.

### Configuring the Data MDT Group Range

The provider edge (PE) router implementing data MDTs for a local multicast source must establish the group range to use for data MDTs created in this VRF instance. This address range cannot overlap with any of the default MDT addresses for all VPNs on the router. If you configure overlapping group ranges, the configuration commit fails.

To configure the data MDT group range, include the `group-range` statement:

```
group-range multicast-prefix;
```

You can include this statement at the following hierarchy levels:

- [edit logical-routers *logical-router-name* routing-instances *routing-instance-name* protocols pim mdt]
- [edit routing-instances *routing-instance-name* protocols pim mdt]

Any multicast address range can be used as the multicast prefix, for example, 227.0.0.0/8.

### Configuring the Data MDT Threshold Parameters

The PE router implementing data MDTs for a local multicast source must establish threshold limits for a multicast group and source. A multicast group can have more than one source of traffic.

To configure the data MDT threshold, include the `threshold` statement:

```
threshold {
  group group-address {
    source source-address {
      rate threshold-rate;
    }
  }
}
```

You can include this statement at the following hierarchy levels:

- [edit logical-routers *logical-router-name* routing-instances *routing-instance-name* protocols pim mdt]

- [edit routing-instances *routing-instance-name* protocols pim mdt]

The group address is the multicast group address to which the threshold limits apply. This could be a well-known address for a certain type of multicast traffic.

The source address is the unicast address of the source of multicast information. It can be a source locally attached to or reached through the PE router. A group can have more than one source.

The group and source addresses can be explicit (all 32 bits of the address specified) or a prefix (network address and prefix length specified). Explicit and prefix address forms can be combined if they do not overlap. Overlapping configurations, where prefix and more explicit address forms are used for the same source or group address, are not supported. For examples of supported and unsupported configurations, see “Examples: Configuring Data MDTs” on page 124.

The rate is the threshold applied to the multicast source to create a data MDT. The range is from 10 kilobits per second (Kbps), the default, to 1 gigabit per second (Gbps) (1,000,000 Kbps).

### Configuring the Data MDT Limit

The PE router implementing a data MDT for a local multicast source must establish a limit for the number of data MDTs created in this VRF instance. If the limit is 0 (the default), then no data MDTs are created for this VRF instance.

To configure the data MDT limit, include the `tunnel-limit` statement:

```
tunnel-limit limit;
```

You can include this statement at the following hierarchy levels:

- [edit logical-routers *logical-router-name* routing-instances *routing-instance-name* protocols pim mdt]
- [edit routing-instances *routing-instance-name* protocols pim mdt]

The valid range is from 0 through 1024 for a VRF instance. There is a limit of 8000 tunnels for all data MDTs in all VRF instances on a PE router.

### Data MDTs and Tunnel Services PIC Limits

When configuring multicast over VPNs according to Internet draft draft-rosen-vpn-mcast-07.txt, *Multicast in MPLS/BGP IP VPNs*, each Tunnel Services Physical Interface Card (PIC) supports 512 multicast tunnel (mt-) interfaces. Configuring a router to allow more than 512 multicast tunnels requires another Tunnel Services PIC. Both default and data MDTs contribute to this total.

There are typically two default multicast tunnels (one for encapsulation and the other for de-encapsulation). If a router with a single Tunnel Services PIC creates more than 512 default and data MDTs, no traffic will flow for multicast tunnels created in excess of 512.

For example, configuring a router to allow 500 data MDTs requires only a single Tunnel Services PIC ( $500 + 2 = 502$ ). However, configuring a router to allow 1000 data MDTs requires *two* Tunnel Services PICs ( $1000 + 2 = 1002$ ). Up to 1024 multicast tunnels are supported with two Tunnel Services PICs.

For more information about Tunnel Services PICs and multicast tunnels, see “Tunnel Services PICs and Multicast” on page 206.

## Examples: Configuring Data MDTs

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This section describes the following examples for configuring data MDTs:

- Configuring Data MDTs with Explicit Addresses on page 124
- Configuring Data MDTs with Prefixes on page 125

### Configuring Data MDTs with Explicit Addresses

Configure routing instance VPN-A on a PE router to use tunnel identifiers taken from the 227.0.0.0/8 multicast address range. Create a data MDT when traffic for the multicast group 224.4.4.4 from local source 10.10.20.43 exceeds a threshold rate of 10 Kbps. Only 10 tunnels can be in use for this routing instance at any one time:

```
[edit routing-instances VPN-A protocols pim]
mdt {
  group-range 227.0.0.0/8;
  threshold {
    group 224.4.4.4 {
      source 10.10.20.43 {
        rate 10;
      }
    }
  }
  tunnel-limit 10;
}
```

No tunnels are created if 10 tunnels already exist for this routing instance on the PE router. Tunnels are deleted when the rate of traffic from the source falls below 10 Kbps, as determined by the normal, 60-second multicast statistics-collection cycle.

## Configuring Data MDTs with Prefixes

Configure routing instance VPN-A on a PE router to use tunnel identifiers taken from the 227.0.0.0/8 multicast address range. Create a data MDT when traffic for any multicast group matching the prefix 224.0.0.0/4 (224/4) from any local source matching the prefix 10.0.0.0/8 (10/8) exceeds a threshold rate of 10 Kbps. Only 10 tunnels can be in use for this routing instance at any one time:

```
[edit routing-instances VPN-A protocols pim]
mdt {
  group-range 227.0.0.0/8;
  threshold {
    group 224.0.0.0/4 {
      source 10.0.0.0/8 {
        rate 10;
      }
    }
  }
  tunnel-limit 10;
}
```

No tunnels are created if 10 tunnels already exist for this routing instance on the PE router. Tunnels are deleted when the rate of traffic from the source falls below 10 Kbps, as determined by the normal, 60-second multicast statistics-collection cycle.

Explicit and prefix address forms can be combined if they do not overlap:

```
group 224.0.0.0/4 {
  source 10.10.20.43 {
    rate 10;
  }
  source 10.10.30.0/24 {
    rate 20;
  }
}
```

However, overlapping configurations such as the following are not supported:

```
group 224.0.0.0/4 {
  source 0/0 {
    rate 100;
  }
}
group 224.0.0.0/4 {
  source 10.10.20.43 {
    rate 10;
  }
}
```

/\* every source at 100 kbps... \*/

/\* ...but THIS source at 10 kbps \*/

## Displaying Data MDTs

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To display the data MDTs have been created for a VPN (VPN-A) on a PE router, use the `show pim mdt outgoing instance VPN-name` command:

```
user@PE-router> show pim mdt outgoing instance VPN-A
Instance: PIM.VPN-A
Tunnel direction: Outgoing
Default group address: 239.1.1.1
Default tunnel interface: mt-3/2/0.32768

C-Group address  C-source address  P-group address  Data tunnel interface
224.1.1.1       10.10.20.43      226.1.1.0       mt-3/2/0.32769
224.1.1.2       10.10.30.27      226.1.1.1       mt-3/2/0.32770
```

To verify that a VPN's data MDTs have been created as specified by rate configuration parameters on a PE router, use the `show multicast route extensive instance VPN-name` command:

```
user@PE-router> show multicast route extensive instance VPN-A
Family: INET

Group: 224.1.1.1
  Source: 10.10.20.43
  Upstream interface: fe-3/0/2.0
  Downstream interface list:
    mt-3/2/0.32769
  Session Description: ST Multicast Groups
  Statistics: 2 kbps, 25 pps, 127559 packets
  Next-hop ID: 378
  Upstream protocol: PIM
  Route state: Active
  Forwarding state: Forwarding
  Cache lifetime/timeout: 360 seconds
  Wrong incoming interface notifications: 0

Group: 224.1.1.2
  Source: 10.10.30.27
  Upstream interface: fe-3/0/2.0
  Downstream interface list:
    mt-3/2/0.32770
  Session Description: ST Multicast Groups
  Statistics: 4 kbps, 40 pps, 10149 packets
  Next-hop ID: 380
  Upstream protocol: PIM
  Route state: Active
  Forwarding state: Forwarding
  Cache lifetime/timeout: 360 seconds
  Wrong incoming interface notifications: 0

Family: INET6
```