6 Configuring IP Multicast Protocols

A multicast is a data stream that originates from a single source and is sent to hosts that have subscribed to that stream. Live video broadcasts and automatically updated Internet news services are examples of multicast traffic.

When a network station subscribes to a multicast, routers use Distance Vector Multicast Routing Protocol (DVMRP) to advertise the availability of the multicast stream. When another station in the network subscribes to the same multicast stream it becomes a member of the same Internet Group Membership Protocol (IGMP) group. The multicast stream is then delivered only to members of the multicast group and only one stream is received from the source instead of multiple copies. Multicast protocols, such as DVMRP and IGMP, efficiently propagate multicast streams through a network, reaching subscribers with minimal impact on overall network performance.

Protocol-Independent Multicast (PIM) is an IP multicast routing protocol that uses routing information provided by unicast routing protocols such as RIP and OSPF. Sparse mode PIM (PIM-SM) contrasts with flood-and-prune dense mode multicast protocols such as DVMRP and PIM Dense Mode (PIM-DM) in that multicast forwarding in PIM-SM is initiated only via specific requests. Downstream routers must explicitly join PIM-SM distribution trees in order to receive multicast streams on behalf of directly-connected receivers or other downstream PIM-SM routers. This paradigm of receiver-initiated forwarding makes PIM-SM ideal for network environments where receiver groups are thinly populated and bandwidth conservation is a concern such as in wide area networks (WANs).

IP Multicast Commands

The major IP multicast commands in the OmniCore CLI are listed in the following tables. Other commands are available for fine-tuning your IP multicast configuration. To see a complete list of these commands or for more information regarding the commands used in this chapter, see the *OmniCore CLI Reference Manual*.

Multicast Global Commands

Command	Default	Description
dvmrp flash-interval	5 seconds	Defines the minimum interval for sending routing table updates to neighboring routers.
dvmrp graft-timeout	10 seconds	Defines the time value that must expire before graft messages are retransmitted.
dvmrp neighbor-interval	10 seconds	Defines the neighbor probe interval value for contacting neighboring DVMRP routers.
dvmrp neighbor-timeout	140 seconds	Defines the neighbor timeout value for assuming a neighboring router is down.
dvmrp prune-lifetime	180 seconds	Specifies the amount of time a prune state is active for a given source, group pair.
dvmrp prune-timeout	3 seconds	Determines the time value that must expire before prune messages are retransmitted.

Multicast Global Commands (Continued)

dvmrp report-interval	60 seconds	Defines the interval for sending complete routing tables to neighboring routers.
dvmrp route-holddown	140 seconds	Specifies the time during which DVMRP unicast routes are kept in a hold-down period.
dvmrp route-timeout	200 seconds	Defines the route expiration timeout value for assuming a route is inactive.
dvmrp status	disable	Enables DVMRP.
mcon router-timeout	90 seconds	Sets the multicast router time-out value.
mcon status	disable	Enables multicast containment.
mfc agetime	300 seconds	Defines the length of time that multicast route entries are kept in the multicast forwarding cache.
mfc hardware-multicast	disable	Enables Multicast IP v4 (MCV4) source-awareness circuitry on OC interface modules with the ALR4 ASIC chip. MCV4 supports line-rate multicast traffic.
mfc tagmode	disable	Specifies the tagging mode for the multicast forwarding cache.

Multicast Interface Commands

Command	Default	Description
vlan dvmrp flooding-status	enable	Enables flooding on the specified VLAN.
vlan dvmrp metric	1	Specifies a TOS metric entry for the specified VLAN.
vlan dvmrp neighbor-timeout	140 seconds	Defines the neighbor timeout value for assuming that a neighboring router is inactive. This interface value takes precedence over the global value.
vlan dvmrp prune-lifetime	180 seconds	Specifies the amount of time a prune state is active for a given source, group pair. This interface value takes precedence over the global value.
vlan dvmrp report-timeout	60 seconds	Defines the interval for sending complete routing tables to neighboring routers. This interface value takes precedence over the global value.
vlan dvmrp status	enable	Enables DVMRP on a specified VLAN.
vlan dvmrp suppress-routes	disable	Suppresses or allows the advertisement of routes to all DVMRP neighbors.

Multicast Interface Commands (Continued)

vlan igmp interval	125 seconds	Defines the time between the transmission of IGMP queries.
vlan igmp lastqueryinterval	1 second	Determines the interval that must expire before the last member of a multicast group is assumed to be inactive.

Configuring DVMRP

Distance Vector Multicast Routing Protocol (DVMRP) is a dense-mode (i.e., densely packed network) multicast routing protocol. DVMRP, which is essentially a “broadcast and prune” routing protocol, is designed to assist routers in propagating IP multicast traffic through a network.

DVMRP works by building per-source broadcast trees based upon routing exchanges, then dynamically creates per-source, group multicast delivery trees by pruning, or removing branches from, the source’s truncated broadcast tree. A source, group pair is a distribution tree consisting of the source of the multicast traffic and the hosts that are members of a multicast group.

DVMRP performs Reverse Path Forwarding, which determines when multicast traffic should be forwarded to downstream interfaces. In this way, source-rooted shortest path trees can be formed to reach all group members from each source network of multicast traffic.

A pruned branch may be attached back to the tree by the process of grafting. When a downstream router notices a new member of the group that had been previously pruned, it sends a graft packet to the upstream router. The upstream router will then attach this segment to the source-group multicast delivery tree.

The OmniCore routing switch provides a fully manageable DVMRP feature set. By default, DVMRP is disabled.

Follow these steps to configure DVMRP:

1. Enable global DVMRP.

```
OmniCore> dvmrp

OmniCore/dvmrp> status enable

OmniCore/dvmrp> show
DVMRP Status                              :enable
```

2. Create an IP interface. For more detailed information on creating IP interfaces, see Chapter 4, "Configuring IP". In this example, VLAN 5, consisting of Ethernet port 5, Gigabit Ethernet port 2, and an IP address of 10.0.0.101, is configured.

```
OmniCore/dvmrp> ..

OmniCore> vlan 5 tag 5 create

OmniCore> vlan 5

OmniCore/vlan=5> member 6 3 default add

OmniCore/vlan=5> member 6 10 default add

OmniCore/vlan=5> ip 10.0.0.101 mask 255.255.255.0 create
```

3. Define a metric entry for the IP VLAN interface.

```
OmniCore/vlan=5> dvmrp

OmniCore/vlan=5/dvmrp> metric 0

OmniCore/vlan=5/dvmrp> metric show
DVMRP Metric                              :0
```

4. Enable DVMRP on the VLAN to which the IP interface belongs. Note that doing so will automatically enable IGMP on that same VLAN. When DVMRP is enabled on a VLAN, multicast containment must be disabled on that VLAN.

```
OmniCore/vlan=5/dvmrp> ..

OmniCore/vlan=5> mcon

OmniCore/vlan=5/mcon> status disable

OmniCore/vlan=5/mcon> status show
Multicast Containment Status              :disable

OmniCore/vlan=5/mcon> ..

OmniCore/vlan=5> dvmrp

OmniCore/vlan=5/dvmrp> status enable

OmniCore/vlan=5/dvmrp> status show
DVMRP Status                              :enable
```

While the defaults for DVMRP features should be adequate for most networks, you may, need to modify various global and interface settings. See the *OmniCore CLI Reference Manual* for more information on DVMRP commands.

Configuring IGMP

Defined in RFC 1112, Internet Gateway Management Protocol (IGMP) is an IP protocol that is used between hosts and routers in a single network to establish host membership in groups that correspond with multicast streams. Routers use this information, in conjunction with a multicast routing protocol such as DVMRP, to support IP multicasting. Enabling IGMP allows the OmniCore routing switch to limit the broadcast of multicast streams to those stations identified as subscribers.

By default, IGMP is disabled on the OmniCore routing switch. IGMP is automatically enabled on a VLAN when the *vlan mcon status* or *vlan dvmrp status* command is enabled on that same VLAN.

Follow these steps to configure IGMP on a VLAN:

1. Enable IGMP on an existing VLAN.

```
OmniCore> vlan 5 igmp

OmniCore/vlan=5/igmp> status enable

OmniCore/vlan=5/igmp> status show
Status                                    :enable
```

2. (Optional) Designate the IGMP version that is running on the VLAN. Please note that all stations in a subnet connected to a OmniCore routing switch must be configured to use the same version of IGMP. If any stations in the subnet do not support Version 2 (default), it is recommended that you set all stations to use Version 1.

```
OmniCore/vlan=5/igmp> version v1

OmniCore/vlan=5/igmp> version show
Version                                   :v1

OmniCore/vlan=5/igmp> show
Status                                    :enable
Version                                   :v1
Query Interval                            :125
V2 Max Query Response Time                :10
Robustness Variable                       :2
Last Member Query Interval                :0
Querier Address                           :0.0.0.0
Number Wrong Version Queries              :0
Number of Times Joined                    :2
Number of Groups                          :1
```

While the defaults for IGMP features should be adequate for most networks, you may need to modify various global and interface settings. See the *OmniCore CLI Reference Manual* for more information on IGMP commands.

Configuring Multicast Containment

Multicast containment, by way of IGMP snooping, allows the OmniCore routing switch to inspect IGMP membership report packets and use this information to limit multicast streams to only multicast group members. This eliminates the need to flood the frames to every port of a VLAN/broadcast domain. Please note that this containment is accomplished in the OmniCore routing switch on a per-multicast group address, per-VLAN basis.

On the OmniCore routing switch, multicast containment is disabled by default. Enabling multicast containment automatically enables IGMP.

Follow these steps to configuring Multicast Containment:

1. Enable global multicast containment and, if desired, change the router time-out value.

```
OmniCore> mcon

OmniCore/mcon> status enable

OmniCore/mcon> router-timeout 120

OmniCore/mcon> show
Admin Status                              :enable
Router Timeout                            :120  secs
```

2. Enable multicast containment on an existing VLAN. When multicast containment is enabled on a VLAN, DVMRP must be disabled on that VLAN. VLAN 12 is used for this example.

```
OmniCore/mcon> ..

OmniCore> vlan 12

OmniCore/vlan=12> dvmrp

OmniCore/vlan=12/dvmrp> status disable

OmniCore/vlan=12/dvmrp> status show
DVMRP Status                              :disable

OmniCore/vlan=12/dvmrp> ..

OmniCore/vlan=12> mcon

OmniCore/vlan=12/mcon> status enable
```

3. (Optional) Set an IP address as the source of transmitted queries. If multiple IP addresses have been defined for a VLAN (e.g., a multinet), you will need to specify which address the VLAN uses as the query source. An IP address of 10.36.35.0 is used for this example.

```
OmniCore/vlan=12/mcon> source 10.36.35.0

OmniCore/vlan=12/mcon> show
Multicast Containment Status              :enable
IP Source Address                         :10.36.35.0
Number of Multicast Router Ports          :0
```

PIM-SM

Protocol-Independent Multicast (PIM) is an IP multicast routing protocol that uses routing information provided by unicast routing protocols such as RIP and OSPF. Sparse mode PIM (PIM-SM) contrasts with flood-and-prune dense mode multicast protocols such as DVMRP and PIM Dense Mode (PIM-DM) in that multicast forwarding in PIM-SM is initiated only via specific requests. Downstream routers must explicitly join PIM-SM distribution trees in order to receive multicast streams on behalf of directly-connected receivers or other downstream PIM-SM routers. This paradigm of receiver-initiated forwarding makes PIM-SM ideal for network environments where receiver groups are thinly populated and bandwidth conservation is a concern such as in wide area networks (WANs).

In sparse-mode PIM, shared distribution trees are rooted at a common forwarding router termed a Rendezvous Point (RP). Sources indicate the availability of multicast data via Register messages sent to the RP. Downstream PIM-SM routers indicate requirements for multicast streams on behalf of receivers via explicit Join/Prune messages directed to the RP. The RP decapsulates Registers and forwards multicast packets natively down established distribution trees to receivers. The resulting topology is referred to as the RP-Tree (RPT).

PIM-SM also provides an option for last-hop routers as well as the RP to initiate source-rooted Shortest-Path Trees (SPTs) when data rates exceed preconfigured thresholds. Once the data rate of a particular stream exceeds this level, a PIM-SM router establishes a forwarding path directly to the source's first hop router via source-specific Join/Prune messages. Resulting SPT routes remain active until timed out regardless of subsequent traffic levels to avoid hysteresis about the threshold setting.

OmniCore software supports PIM-SM version 2 and is not compatible with older implementations. Also, it does not support 802.1Q tagged interfaces in PIM-SM.

PIM-SM Commands

The following tables list the PIM-SM commands accessible from the CLI. For more information, refer to the *OmniCore CLI Reference Manual*.

VLAN PIM-SM Commands

Command	Default	Description
vlan pimsm show	no default	Displays the status of the various global VLAN parameters of the Protocol-Independent Multicast Sparse-Mode (PIM-SM) protocol.
vlan pimsm hello-interval	30 seconds	Sets the interval at which PIM-SM hello messages are sent
vlan pimsm hello-hold	105 seconds	Sets the maximum time a neighbor entry is considered valid.
vlan pimsm joinprune-hold	210 seconds	Sets the hold time sent in join/prune messages.
vlan pimsm dr-priority	1	Sets the priority sent in hello messages.
vlan pimsm joinprune-interval	60 seconds	Sets the interval at which periodic join/prune messages are sent.
vlan pimsm	disable	Enables or disables VLAN PIM-SM functionality.

PIM-SM Commands

Command	Default	Description
pimsm show	no default	Displays the status of the various global parameters of Protocol-Independent Multicast Sparse-Mode (PIM-SM) protocol.
pimsm bsr-interval	60 seconds	Sets the interval at which bootstrap router (BSR) messages are sent.
pimsm cbsr-address	0.0.0.0	Sets the IP address to source the bootstrap message.
pimsm cbsr-masklength	0	Sets the length of the mask used in the hash function when computing the rendezvous point (RP) for a multicast group.
pimsm cbsr-priority	0	Sets the candidate bootstrap router's (C-BSR) priority among C-BSRs.
pimsm cbsr-status	disable	Enables the router to be a C-BSR.
pimsm crp-address	0.0.0.0	Sets the address used to source C-RP advertisements to the bootstrap router (BSR).
pimsm crp-expirytime	0 seconds	Sets the maximum time a PIM-SM router considers the current C-RP active.
pimsm crp-holdtime	150	Sets the amount of time the C-RP router's advertisement is considered valid.
pimsm crp-interval	60 seconds	Sets the interval at which C-RP router's advertisements are sent to the bootstrap router.
pimsm crp-priority	0	Sets the C-RP's priority among other routers.
pimsm crp-status	disable	Enables the router as a C-RP.
pimsm data-timeout	60 seconds	Sets the time after which (S,G) state will be deleted for a source no longer transmitting.
pimsm joinprune-interval	60	Sets the interval between sending join/prune messages.
pimsm max-rps	32	Sets the maximum number of C-RPs in the PIM-SM domain.
pimsm neighbor	0.0.0.0	Displays a list of active PIM-SM neighbors or parameters of a specific PIM-SM neighbor.
pimsm probe-time	5 seconds	Sets the amount of time in seconds before expiry of the Register-Suppression Timer at which a DR sends a Null Register to the RP.
pimsm register-cksum	header	Specifies the application of the checksum function to received Register messages in the domain.
pimsm registersuppress-timeout	60 seconds	Sets the amount of time a DR will stop sending Registers on behalf of sources to the RP once a Register-Stop has been received.

PIM-SM Commands (Continued)

Command	Default	Description
pimsm rp	0.0.0.0	Displays the RP address for a given multicast group.
pimsm rp-candidate	255.255.255.255	Displays the ranges for which the local rendezvous point candidate is configured. Also enables the rendezvous point candidate.
pimsm rp-set	no default	Displays the current list of available RPs distributed in bootstrap messages.
pimsm rptree-routes	no default	Displays active shared tree routes.
pimsm spt-threshold <bps>	0	Sets the data threshold per stream beyond which a last-hop router or RP will initiate a source-specific route.
pimsm sptree-routes	no default	Displays active source tree routes.
pimsm status	disable	Enables PIM-SM protocol.

Configuring PIM-SM

1. Enable PIM-SM on the appropriate VLANs using the *vlan <vlan id> pimsm status {enable | disable}* command. For example:

```
OmniCore> vlan 1 pimsm status enable
```

2. Configure at least one Candidate Bootstrap Router (C-BSR) for the PIM-SM domain.

   a. Enter the C-BSR's IP address using the *pimsm cbsr-address <ipaddr>* command. This IP address should be the interface address of a PIM enabled VLAN. This IP address is used to advertise the bootstrap message. (The loopback interface is not supported for PIM-SM in software release 3.0.) For example:

```
OmniCore> pimsm cbsr-address 10.0.0.1
```

   b. Enable the C-BSR using the *pimsm cbsr-status {enable | disable}* command. For example:

```
OmniCore> pimsm cbsr-status enable
```

3. Configure at least one Candidate Rendezvous Point (C-RP) for the PIM-SM domain. It is recommend that the C-RP be enabled on the same switch as the C-BSR.[1]

   a. Enter the C-RP's IP address using the *pimsm crp-address <ipaddr>* command. When the router is configured as a C-RP, the router uses this address to send C-RP advertisements to the bootstrap router (BSR). This IP address should be the interface address of the PIM enabled VLAN. For example:

```
OmniCore> pimsm crp-address 10.0.0.1
```

   b. Enable the C-RP using the *pimsm crp-status {enable | disable}* command. For example:

```
OmniCore> pimsm crp-status enable
```

[1.] Reference documentation: *Protocol Independent Multicast-Sparse Mode (PIM-SM): Protocol Specification*, Network Working Group Internet Draft, www.ietf.org/internet-drafts/draft-ietf-pim-v2-sm-01.txt

4. Enable PIM-SM globally using the *pimsm status {enable | disable}* command. Enable PIM-SM on each OmniCore switch in the network. For example:

```
OmniCore> pimsm status enable
```

Optional PIM-SM Settings

- Multiple C-BSRs may be configured in the PIM-SM domain for redundancy. See previous step 2.[2]
- To force the selection of a specific C-BSR, specify the priority of the C-BSRs. Use the *pimsm cbsr-priority* command. For example:

```
OmniCore> pimsm cbsr-priority 1
```

- Configure multiple C-RPs in the PIM-SM domain for the purpose of redundancy. See previous step 4.
- Specify the priority of the C-RPs to force the selection of a specific C-RP for advertised group ranges. It is recommended that RP's be located in close physical proximity to multicast data sources. Use the *pimsm crp-priority* command. For example:

```
OmniCore> pimsm crp-priority 1
```

❖ Note ❖

Crp-priority may not be supported on other vendor platforms.

- Configure individual C-RPs to advertise for a specific multicast range, use the *pimsm rp-candidate* command. For example:

```
OmniCore> pimsm rp-candidate 224.0.0.0 255.0.0.0 create
```

  Bootstrap Routers (BSRs) in PIM-SM support RP-specific expiry timers. As a result, disabling or deleting individual rp-candidate entries requires that local C-RP status be disabled until former RP entries are aged in the domain. C-RP status can then re-enabled. New or re-enabled rp-candidate entries do not require a change in C-RP or BSR status.

- Specify the priority of the Designated Routers (DRs) per VLAN. Use the *vlan pimsm dr-priority* command on each DR. For example:

```
OmniCore> vlan 1 pimsm dr-priority 2
```

- To specify the threshold at which source-specific routes will be established, use the *pimsm spt-threshold* command. For example:

```
OmniCore> pimsm spt-threshold 1000
```

- Set the timeout for SPT entries when no traffic is present:

  a. Use the *pimsm data-timeout* command. This sets the time after which (S,G) state will be deleted for a source no longer transmitting. For example:

```
OmniCore> pimsm data-timeout 200
```

  b. Use the *pimsm registersuppress-timeout* command. This sets the amount of time a DR will stop sending Registers on behalf of sources to the RP once a Register-Stop has been received. For example:

```
OmniCore> pimsm registersuppress-timeout 120
```

- The *pimsm cbsr-masklength* command may be changed to facilitate vendor inter-operability. This command sets length-in-bits of the mask used in the hash function when computing the rendezvous point (RP) for a multicast group. When configuring PIM on an OmniCore routing switch for a multi-vendor environment in which a non-routing switch

[2] See footnote 1.

router is directly attached to the switch, you will most likely have to change the length-in-bits value of the cbsr-masklength from the default (30) to a value of 1 or whatever is compatible for the vendor. For example:

```
OmniCore> pimsm cbsr-masklength 1
```

- The way in which the register checksum is calculated may vary from vendor to vendor. The *pimsm register-cksum* command may have to be changed from the default option of "header" to "full". The register-checksum command specifies the application of the checksum function on received Register messages in the domain. In "full", the checksum is done over the entire PIM Register message. In "header", the checksum for Registers is done only on the PIM header. The full option may be required for compatibility with older implementations of PIM-SM v2. This parameter must be set the same throughout the PIM-SM domain. For example:

```
OmniCore> pimsm register-cksum full
```

Monitoring PIM-SM Parameters

- To display the PIM-SM configuration, use the *pimsm show* and *vlan pimsm show* commands:

```
OmniCore> pimsm show
   Status               :enable
   BSR Status           :up
   BSR State            :cand
   BSR Address          :10.0.5.10
   BSR Mask Length      :30
   BSR Priority         :0
   BSR Expiry Time      :130 secs
   BSR Interval         :60  secs
   CBSR Status          :disable
   CBSR Address         :10.0.4.1
   CBSR Mask Length     :30
   CBSR Priority        :0
   CRP Address          :10.0.4.1
   CRP Status           :enable
   CRP Hold Time        :150
   CRP State            :up
   CRP Expiry Time      :0  secs
   CRP Interval         :60  secs
   Join/Prune Interval  :60
   Oper Status          :0
   SPT Threshold        :0
   Reg Msg Checksum     :header
   Data Timeout         :210  secs
   Reg Suppress Timeout :60  secs
   Probe Time           :5  secs
   Debug Flags          :0x0
   Max RPs              :32

OmniCore> vlan 1 pimsm show
   Interface Address          :10.0.200.10
   Interface Mask             :255.255.255.0
   Designated Router          :0.0.0.0
   Hello Interval             :30
   Status                     :enable
   Oper Status                :up
   Hello Hold                 :105
   Join Prune Hold            :210
   Join Prune Interval        :60
   Designated Router Priority :1
```

- To display PIM-SM neighbors, use the *pimsm neighbor* command shown below:

```
OmniCore> pimsm neighbor show
Neighbor         Vlan  Up Time (mins)    Expiry Time (s)
--------         ----  --------------    -----------
10.80.18.20       18    272               97
10.80.77.50       77    38                77
   Number of Entries Displayed: 2

OmniCore> pimsm neighbor 10.80.18.20 show
   Neighbor Address    :10.80.18.20
   Vlan                :18
   Up Time             :16639  secs
   Expiry Time         :78  secs
```

- To display the PIM-SM rendezvous-point tree routes, use the *pimsm rptree-routes* command shown below:

```
OmniCore> pimsm rptree-routes show

SHARED TREE (*,G) ROUTES
Group Address   Flags Input If      Entry Timer Reg Supp Timer
-------------   ----- --------      ----------- --------------
224.0.1.3       ----  14(3-1)       0           0
    RP: 10.1.1.1            RPF NEIGHBOR: 10.1.2.10
    Output Vlans        :16

    Output Ports        : 4 - 1

   Number of Entries Displayed: 1


OmniCore> pimsm rptree-routes 224.0.1.3 show
   Group Address       :224.0.1.3
   Type                :g-entry
   Flags               :0
   Input Vlan          :14
   Input Port          :301
   Output Vlans        :16
   Output Ports        : 4 - 1
   Rendezvous Point    :10.1.1.1
   RPF Neighbor        :10.1.2.10
   Entry Timer         :0  secs
   Suppression Timer  :0  secs
   Upstream Timer     :0  secs
   Assert Metric      :0
```

- To display the PIM-SM shortest path tree routes, use the *pimsm sptree-routes* command:

```
OmniCore> pimsm sptree-routes show

SOURCE TREE (S,G) ROUTES
Source Address  Group Address   Flags Input If     Entry Timer Reg Supp Timer
--------------- -------------  ----- --------     ----------- ------------
10.2.1.100       224.0.1.3       spt   77(7-1)       206         0
    RP: 10.1.1.1             RPF NEIGHBOR: 10.1.2.10
   Output Vlans      :16
   Output Ports      : 4 - 1
   Number of Entries Displayed: 1
```

- To display the rendezvous-point router for a specific multicast group, use the *pimsm rp* command shown below:

```
OmniCore> pimsm rp 244.1.1.1
RP: 10.1.1.1
```

- To display the global RP set, use the *pimsm rp-set* command shown below:

```
OmniCore> pimsm rp-set show

Group Address/Mask  Address          Hold Time (s)  Expiry Time (s)
------------------  -------          -------------  ---------------
224.0.0.0/4         10.0.101.100     210            207
224.2.127.0/24      10.0.16.50       150            147
225.1.1.0/24        10.0.16.50       150            147
   Number of Entries Displayed: 3
```