

IP Multicast

Application Note AN255
Revision v1.0
October 2015



AN255IP Multicast

1 Overview

This Application Note discusses IP Multicast routing only. There is a separate Application Note **AN233 Radio Relay over IP using Multicast streaming** that discusses RTP Multicast streaming.

The Vocality IP Multicast routing feature is intended for the provision of a Layer 3 IP Multicast network on top of an existing network. It enables the Vocality IP router elements to perform IP Multicast routing. The RTP Multicast and IP Multicast routing functions are independent and not reliant upon each other.

2 Pre-requisites

The use of IP Multicast requires the unit to be running VOS8_01.01 or above.



**Multicast is only available on BASICS IP or the High Speed CPU at present.
It requires a Feature Key on all products.**

Please contact your local Vocality sales representative if you need a Feature Key.

3 Outline

IP Multicast is a method of providing one-to-many or many-to-many communication over an IP network. It uses network infrastructure efficiently by only requiring the source to send a packet once; the switches and routers that make up the network are responsible for replicating the packet to reach multiple receivers.

To pass multicast IP traffic over a network, the network must support multicast IP routing.

- A multicast source sends out IGMP (Internet Group Management Protocol) advertisements indicating it has a stream available.
- Any locally connected device that wants to listen to that stream will send an IGMP 'Join' command to the source.
- A multicast receiver will send out a 'Join' message on its local network.

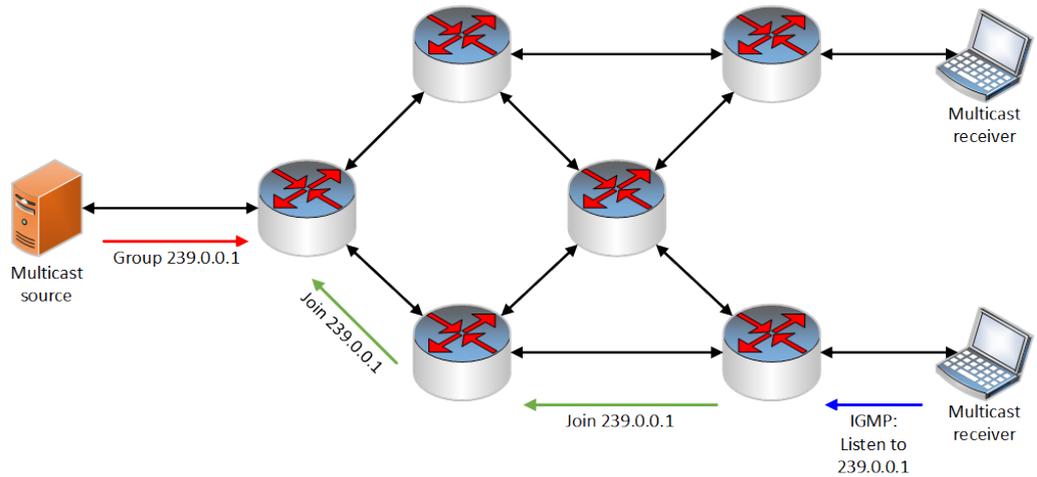


Figure 1 Receiver sends IGMP request; routers use PIM-DM to find the source

- A multicast router will accept this 'Join' message and pass it across the network of multicast routers until it finds the source using PIM-DM (Protocol Independent Multicast – Dense Mode).
- The multicast router attached to the source LAN will then send an IGMP 'Join' to the source.

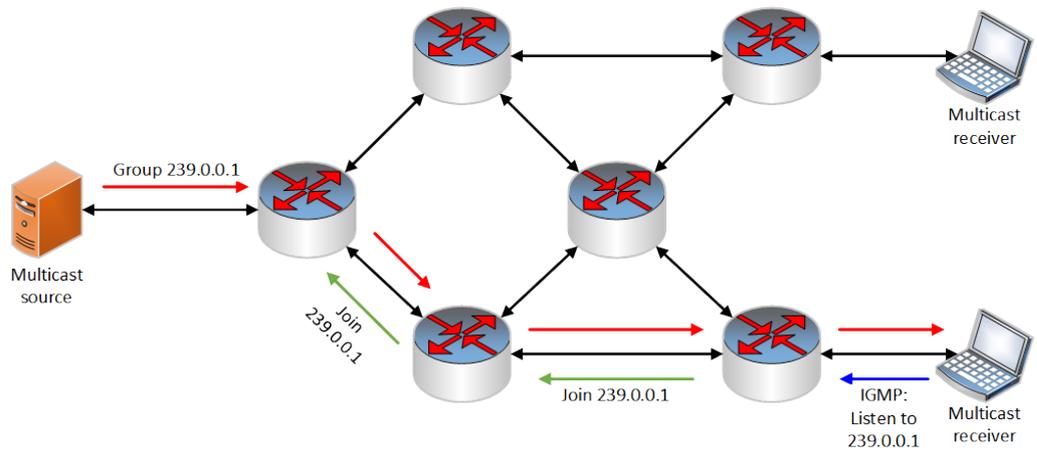


Figure 2 Routers forward traffic to receiver

- Once the source has been established, the multicast routers forward traffic back through the network to the receiver.

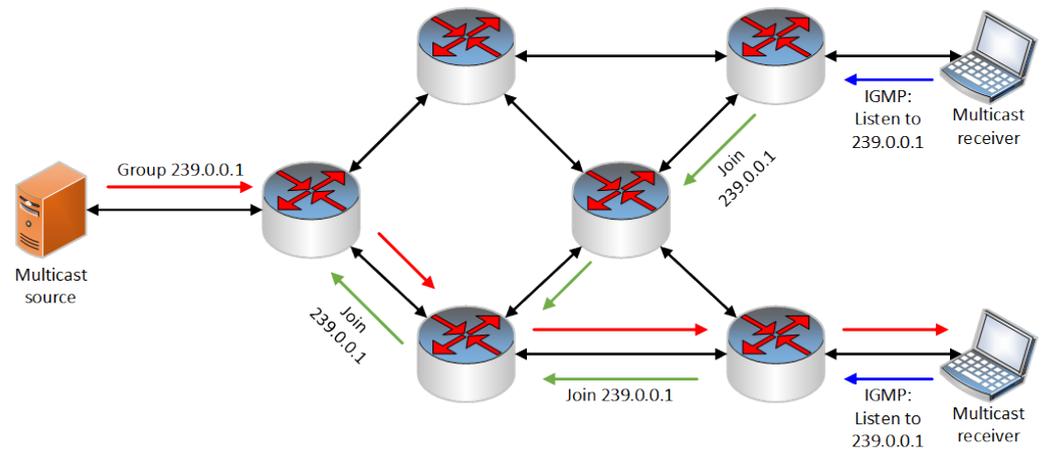


Figure 3 Other receivers can also send out IGMP requests to join the group

- If a multicast router finds the multicast stream already available in its network, it will duplicate it and provide it from there.

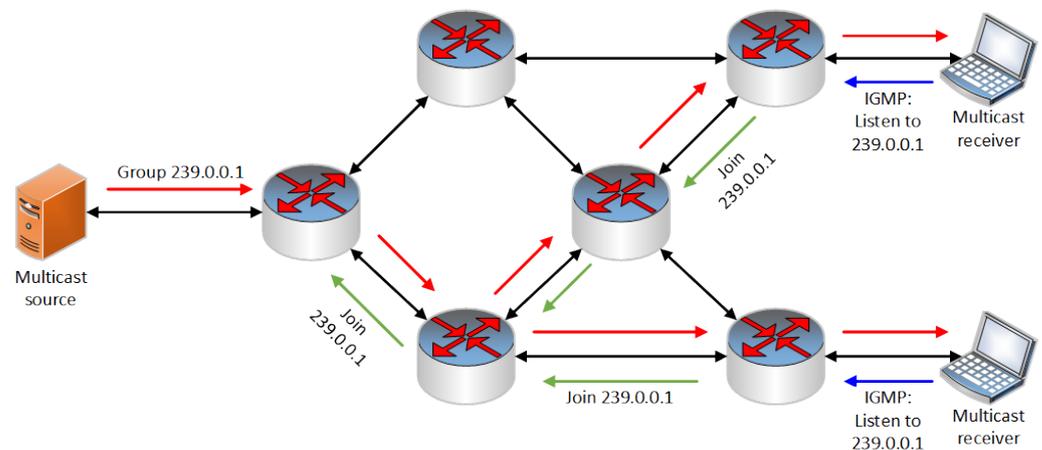


Figure 4 Router is responsible for duplicating packets

The multicast IPv4 address range is 224.0.0.0 to 239.255.255.255, although certain addresses are reserved (see <http://www.iana.org/assignments/multicast-addresses/multicast-addresses.txt> for details).

Vocality devices support PIM-DM (Dense Mode). PIM-SM (Sparse Mode) is not currently supported.

4 Configuration

If you are enabling IP Multicast support for the first time, you will need a unique Feature Key (available from your local Vocality support representative). Your unit serial number will be required to obtain the Feature Key.

In the **Diagnostics > Slot n > Feature Keys menu**, copy and paste the Feature Key code for the unit under Key in the IP MULTICAST row, then **<Validate>**. The 'State' on the IP MULTICAST row will then read UNLOCKED. Save your changes.

Once you have unlocked the IP Multicast feature, you will see a new IP Multicast menu under the IP menu. This provides two separate menus for controlling IGMP and PIM-DM operation.



Using the **IP Multicast > IGMP menu**, enable the IGMP protocol on all interfaces that will be connected to a multicast source or receiver, or that will be connected to another multicast router.

The interface may be a physical port, an IP tributary, a GRE tunnel interface or a VLAN interface.

Select the required protocol version for each interface to match that used by the wider network.

IGMP	
Validate	No changes pending
ENTRY TO EDIT/VIEW :	ENET1
INTERFACE :	ENET1
PROTOCOL :	<input type="radio"/> Off <input checked="" type="radio"/> On
VERSION :	3
NEXT	PREV

Figure 5 #IP Multicast > IGMP menu

Using the **IP Multicast > PIM-DM menu**, enable the PIM-DM protocol on all interfaces that will be connected to multicast source, or that will be connected to another multicast router. There is no need to enable the PIM-DM protocol on interfaces that will only be connected to multicast receivers.

The interface may be a physical port, an IP tributary, a GRE tunnel interface or a VLAN interface.

PIM-DM	
Validate	No changes pending
ENTRY TO EDIT/VIEW :	ENET1
INTERFACE :	ENET1
PROTOCOL :	<input type="radio"/> Off <input checked="" type="radio"/> On
HELLO PRIORITY :	1
NEXT	PREV

Figure 6 #IP Multicast > PIM-DM menu

Select the required protocol HELLO PRIORITY for each interface. This value is used to elect a Designated Router (DR) when interacting with a network that supports PIM-SM.

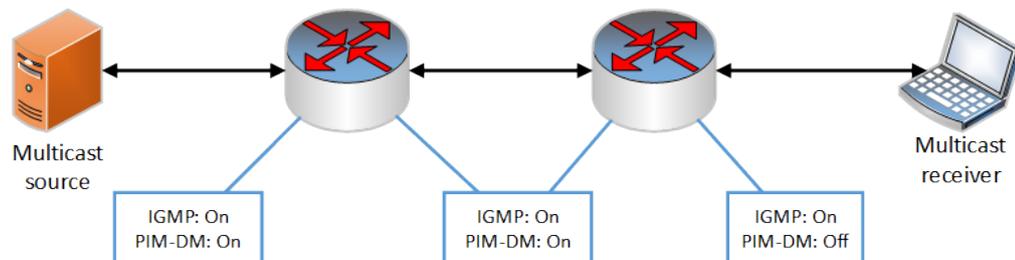


Figure 7 Configuration for a simple multicast network



5 **Diagnostics**

To determine whether the device has successfully joined a multicast group, view the **Diagnostics > Slot n > IP Diags > IP Route Table**.

To determine whether the device is receiving and/or transmitting multicast packets, view the **Diagnostics > Slot n > IP Diags > Port Statistics** for the appropriate interface.

6 **About Application Notes**

Application Notes are intended as a supplement to, rather than a substitute for, your User Manual. Should you have queries which are not answered by our current documentation, your local Vocality support team would be happy to hear from you.

E-mail support@vocality.com.