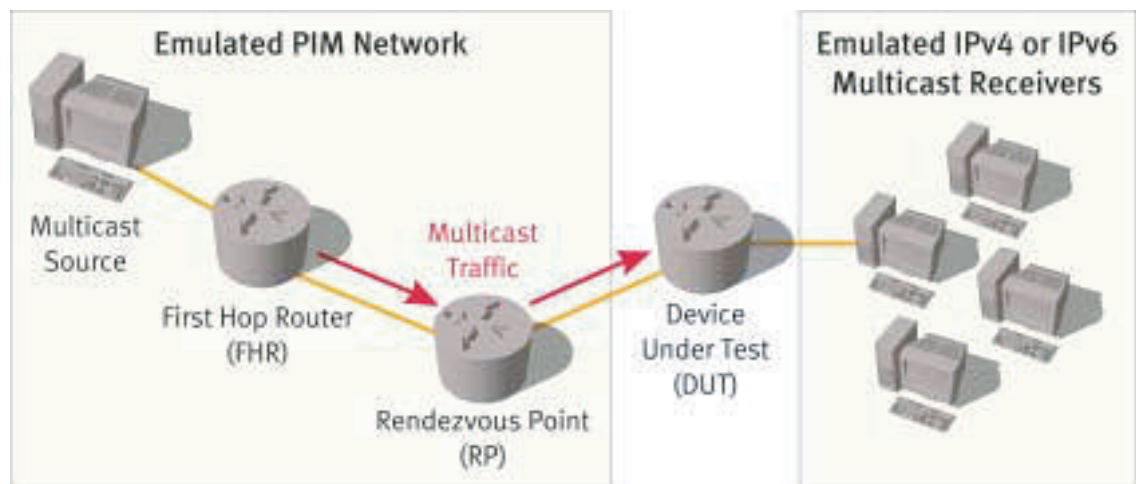# Multicast Routing

Product Overview

The Multicast Routing protocol software module works together with all of the basic TeraRouting Tester (TRT) features such as the flap scheduler, traffic generator, and integrated results. The Multicast Routing software module supports functional and performance tests for multicast routing and registration protocols.

By using the Multicast Routing module, users can build complex multicast scenarios, emulating all aspects of a multicast network. Multicast sources, receivers, first hop routers, rendezvous points, and last hop routers can all be emulated individually or collectively. "What if" scenarios can be dynamically implemented (with real-time results) in order to test the functionality or scalability of a particular device or even an entire network.

Configuring a complex multicast test takes only minutes with TRT's intuitive GUI. Tests can also be fully automated for repeatability. Results can be saved as .csv or .html files for management reports.

Key Features

- Concurrent operation with unicast routing protocols
- Mixed traffic types
- PIM-SM and PIM-SSM
- IGMP versions 1, 2, and 3
- MLD versions 1 and 2
- IPv4 and IPv6 support
- All common attributes are dynamically configurable
- Integrated traffic generation for emulated groups — IGMP/MLD emulation features
- 20,000 groups per port
- Up to 1,000 hosts per group
- VLAN support
- IGMP/MLD Joins and Leaves
- Source filters (for IGMPv3 and MLDv2) for up to 64 sources per group
- Robustness variable (for IGMPv3 and MLDv2)

Conduct performance, conformance, and functional multicast testing

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PIM Emulation Features

- Emulate up to 400 PIM routers per module
- Emulate First Hop Routers (FHRs), Last Hop Routers (LHRs), and Rendezvous Points (RPs)
- VLAN and ATM support
- Configurable Hello Interval, Hold Time, and Priority
- Configurable Join/Prune Delay and Hold Time
- Join (*,G), (S,G) or (*,*,RP) Multicast groups
- Configurable message frequency
- Bootstrap messages
- Predefined "flap" events for negative testing
- Support for Q-in-Q VLAN stacking

IGMP/MLD Real-time and Final Results

- TX/RX frame counts
- Session state
- Type errors
- Checksum errors
- Version errors
- Join/Leave timestamps
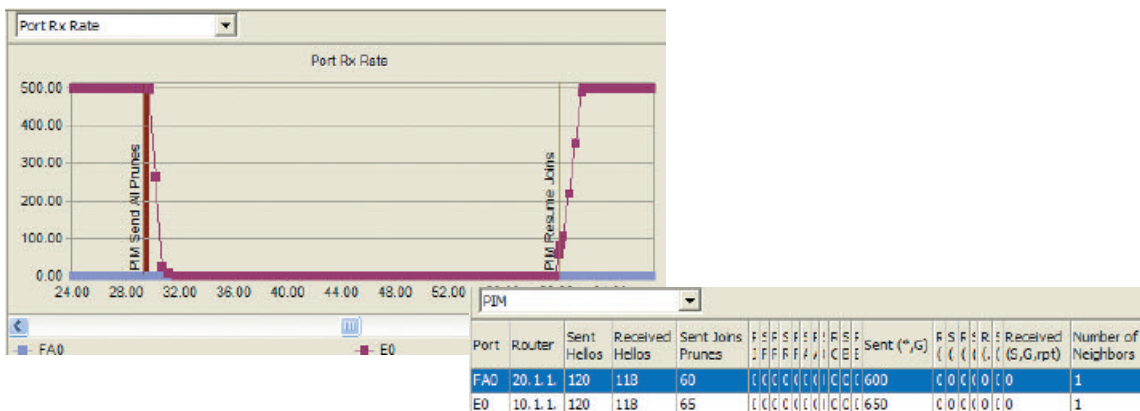
PIM-SM Real-time and Final Results

- Sent/Received Hellos
- Sent/Received Joins
- Sent/Received Prunes
- Sent/Received Register messages
- Sent/Received Bootstrap messages
- Group information
- Neighbor counts

Related RFCs

- RFC 1112 – Host Extensions for IP Multicast (IGMPv1)
- RFC 2236 – IGMPv2
- RFC 2362 – Protocol Independent Multicast – Sparse Mode
- RFC 2710 – Multicast Listener Discovery (MLD) Protocol
- RFC 3376 – IGMPv3
- RFC 3810 – MLD version 2
- draft-ietf-pim-sm-v2-new-xx – PIM-SM version 2

Supported Modules

Module	Description
ATM-3451A	ATM OC-3c (STM-1c), 2-port, multi-mode, 1300nm, TeraMetrics
ATM-3451As	ATM OC-3c (STM-1c), 2-port, single mode, 1310nm, TeraMetrics
ATM-3453A	ATM OC-3c/OC-12c (STM-1c/STM-4c), 2-port, multi-mode, 1300nm, TeraMetrics
ATM-3453As	ATM OC-3c/OC-12c (STM-1c/STM-4c), 2-port, single mode, 1310nm, TeraMetrics
LAN-3301A	10/100/1000Base-T Ethernet, Copper, 2-port, TeraMetrics
LAN-3302A	10/100Base-T Ethernet, Copper, 2-port, TeraMetrics
LAN-3306A	10/100Base-T Ethernet, Copper, 4-port, TeraMetrics XD
LAN-3321A	10/100/1000 Mbps and Gigabit Ethernet Fiber, 2-port, TeraMetrics XD
LAN-3325A	10/100/1000 Mbps and Gigabit Ethernet Fiber, 4-port, TeraMetrics XD
LAN-3327A	10/100/1000 Mbps and Gigabit Ethernet Fiber, 1-port, TeraMetrics XD
POS-3505As	POS OC-48c (STM-16c), 1-port, single mode, 1310nm, TeraMetrics
POS-3505Ar	POS OC-48c (STM-16c), 1-port, single mode, 1550nm, TeraMetrics
POS-3511A	POS OC-3c/OC-12c (STM-1c/STM-4c), 2-port, multi-mode, 1300nm, TeraMetrics
POS-3511As	POS OC-3c/OC-12c (STM-1c/STM-4c), 2-port, single mode, 1310nm, TeraMetrics
POS-3519As	POS OC-192c (STM-64c), 1-port, 2-slot, single mode, 1310nm, TeraMetrics
POS-3519Ar	POS OC-192c (STM-64c), 1-port, 2-slot, single mode, 1550nm, TeraMetrics
XFP-3731A	10GBase Ethernet, XFP MSA, 1-slot, TeraMetrics
XLW-3721A	10GBase Ethernet, XENPAK MSA, 1-port, 2-slot, TeraMetrics

TeraRouting Tester Multicast Routing test result windows

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Requirements

- TeraRouting Tester software (SWF-1230A)
- A SmartBits® 600x or 6000x chassis with the appropriate hardware modules
- A Pentium™ or greater PC running Windows® 2000/NT/XP, with mouse and color monitor

Ordering Information

SWF-1230A

TeraRouting Tester with RIP software module

SWF-1231A

OSPF software module for TRT

SWF-1232A

IS-IS software module for TRT

SWF-1233A

MPLS (RSVP-TE, LDP, VPN) software module for TRT

SWF-1234A

BGP software module for TRT

SWF-1235A

IPv6 software module for TRT

SWF-1236A

Multicast (IGMP, MLD, PIM) software module for TRT

SWF-1237A

Spanning Tree (STP/RSTP) software module for TRT

SWF-1239A

All available software modules for TRT

SWF-1255A

SmartBits API and Scripting Automation Interface

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Event Log							
Protocol	Port	Entity	Direction	State	Event Type	Time (sec)	Parameters
PIM	E0	10.1.1.3	Tx	Neighbor	Hello	3198.13	Hello hold
PIM	E0	10.1.1.3	Rx	Neighbor	Hello	3209.14	Hello hold
PIM	FA0	20.1.1.3	Rx	Neighbor	Hello	3214.9	Hello hold
PIM	FA0	20.1.1.3	Tx	Neighbor	Join/Prun	3224.57	Number of
PIM	FA0	20.1.1.3	Tx	Neighbor	Hello	3228.13	Hello hold
PIM	E0	10.1.1.3	Tx	Neighbor	Hello	3228.15	Hello hold
PIM	E0	10.1.1.3	Rx	Neighbor	Hello	3238.37	Hello hold
PIM	FA0	20.1.1.3	Rx	Neighbor	Hello	3244.04	Hello hold
PIM	E0	10.1.1.3	Tx	Neighbor	Join/Prun	3249.35	Number of
PIM	FA0	20.1.1.3	Tx	Neighbor	Hello	3258.17	Hello hold
PIM	E0	10.1.1.3	Tx	Neighbor	Hello	3258.19	Hello hold

TeraRouting Tester Multicast Routing Event Log

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