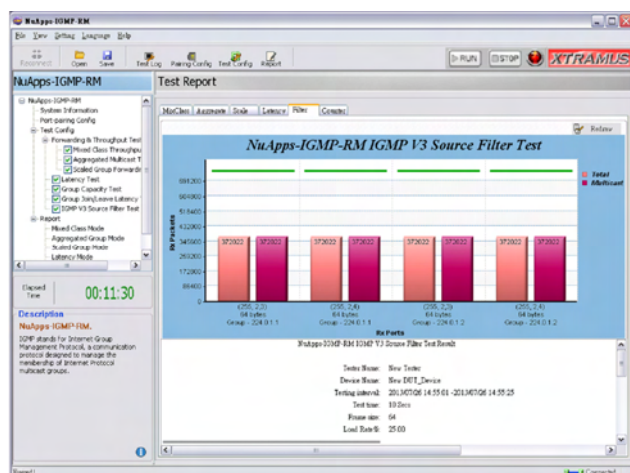


Description of NuApps-IGMP-RM



NuApps-IGMP-RM is the professional testing software for Internet Group Management Protocol (IGMP), a communication protocol designed to manage the membership of Internet Protocol multicast groups. IGMP establishes multicast group memberships by connecting IP hosts and adjacent multicast routers. It will be an important protocol when multicast-enabled applications such as webinars, Internet radio/TV, and video/audio conferences are now being used widely over the Internet. From those applications used widely, how to test the equipment becomes an important issue.

NuApps-IGMP-RM must be activated with NuStreams Chassis. NuApps-IGMP-RM is designed for Xtramus Technologies XM-RM series module cards. The table down below contains the XM-RM module cards, FPGA/Firmware versions that are supported by NuApps-IGMP-RM.



KEY FEATURES

- **Mixed Class Throughput:** The objective of this test mode is to determine the throughput of a Device or System under test (DUT or SUT) when both unicast class frames and multicast class frames are offered simultaneously to a fixed number of interfaces.
- **Aggregated Multicast Throughput:** The objective of this test mode is to determine the maximum rate at which none of the offered frames to be forwarded through N destination interfaces of the same multicast groups are dropped.
- **Scaled Group Forwarding:** The objective of this test mode is to determine the forwarding rate as a function of tested multicast groups for a fixed number of tested device or system under test (DUT or SUT) ports.
- **Latency Test:** The objective of this test mode is to produce a set multicast latency measurement from a single, multicast ingress interface of a device or system under test (DUT or SUT) through multiple, egress multicast interfaces of that same DUT/SUT as provided by the metric Multicast Latency.
- **Group Capacity Test:** The objective of this test mode is to determine the maximum number of multicast groups that a device or system under test (DUT or SUT) can support while maintaining the ability to forward multicast frames to all multicast groups registered to that DUT/SUT.
- **Group Join/Leave Latency:** The objective of this test mode is to determine the time duration that allows the device or system under test to process a successful IGMP group membership report (leave report).
- **IGMP V3 Source Filter Test:** The objective of this test is to analyze the capability of filtering and receiving the amount of packets set by selecting filter type and source address for each group's host.

SPECIFICATION

Module Cards Support NuApps-IGMP-RM			
XM-RM661	XM-RM671	XM-RM681	XM-RM731
XM-RM751	XM-RM761	XM-RM781	XM-RM881/881-2
XM-RM891	*Note: NuStreams-2000i and NuStreams-600i are required as well		
Operating System Requirement for NuApps-IGMP-RM			
	Windows XP		Windows Vista/7
CPU	Pentium 1.3GHz or Higher		
RAM	512MB RAM		1GB RAM
HDD	10GB Available Space		

***Note: Large amount of data will be generated while running NuApps-IGMP-RM. It is recommended to preserve enough available Hard-Disk space to store these data.**

TECHNICAL TERMS

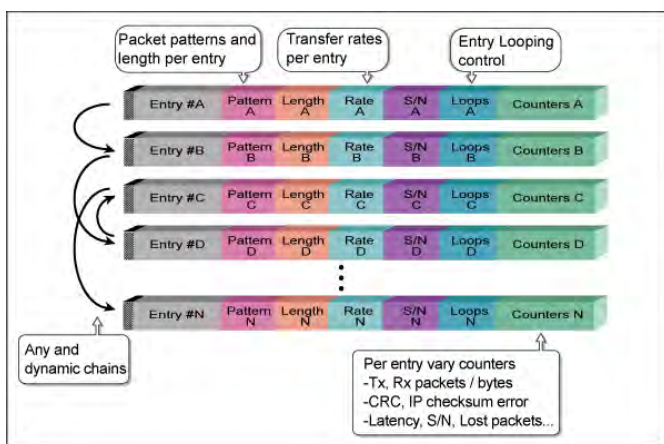
Rapid-Matrix

Rapid-Matrix, specifically designed for generating multi-streams traffic per port simultaneously, is used to verify functions and performance of Ethernet devices/solutions /networks.

Features & Advantages

- **Generate up to 254 Streams Per Port**

Rapid-Matrix consists of 254 individual entries for each port. Each entry has independent settings for a unique data stream. Multiple entries can be correlated to compose a complicated data streams.



- **Flexible/Versatile Protocol Support**

Rapid-Matrix supports various network protocol headers/ tags defined based on testing requirements in order to create multi-streams testing traffic.

- **Flexible Packet Length and User Define Pattern**

In order to meet advanced/complex testing requirements, jumbo frames are also supported by Rapid-Matrix for packet generation.

The packet length generated by the same Rapid-Matrix entry can range from 48 bytes to 2K bytes. Other than defined headers/ tags, the rest of packet is filled up with selected patterns based on testing requirements.

- **Configuring Settings Online Dynamically**

All settings regarding to Rapid-Matrix entries can be changed under Rapid-Matrix's transmission mode. Therefore, it is possible to modify bandwidth and traffic simultaneously during transmitting.

- **Dynamic Multi-streams Traffic Generation**

In real network traffic, different data streams' packet sequence is changing dynamically. In other words, each data stream's loading is a very important factor to be managed in order to verify the function/ performance of DUT. The module card generates dynamic variations of test traffic, and each stream's bandwidth can be controlled individually based on testing requirements.

- **Transmission Statistics per Entry**

For generating multi-streams traffic, information regarding to statistics in every stream is very important. Rapid-Matrix supports the following statistics functions per entry:

- Total transmitted packet count
- Total transmitted byte
- Transmitting packet rate (packets/sec.)
- Transmitting byte rate (bytes/sec.)

Comparing statistics regarding to packets generated by Rapid-Matrix and statistics from receiving ports can help users analyzing how DUT handles the multi-streams traffic.

SDFR

SDFR (Self-Discover Filtering Rules) is a technology that makes capturing or filtering over Ethernet easy and convenient.

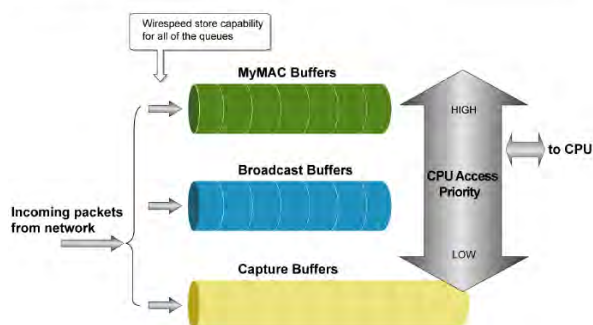
- User- friendly interface that display values such as source IP, destination IP and other criteria for filtering. All these values can be input directly without calculating mask.
- SDFR value for capture or filter includes several network protocols (such as TCP, UDP, FTP, OSFP...), various frame length (oversize, undersize), and various frame/packet types (CRC error, IP checksum error...).
- SDFR values can be a single value or a range of values between specified values. All packets that fit the value will be captured.
- Multiple filter condition can be activated easily simply by clicking different options.
- Displaying captured packet in real-time while the network is still running.
- Value of SDFR and filter condition can be changed dynamically during capture procedure.
- Displaying captured packet in real-time while the network is still running.

RxHost

RxHost: Smart Function for receiving packet.

- Received packets are divided into different priorities for different buffers. MyMAC packets with destination addresses have higher priority on the receiving side.
- Incoming packets are stored in separated buffer so the system can keep receiving important packets (such as ARP, Ping, and etc.) even the buffer itself is overflowed with broadcast packets.
- Received packets can be captured for applications or stored in buffer for other purposes at the same time.

Host Priority Queues



USC

Universal Streams Counter

When monitoring data flows in a network environment with Network TAP devices, it is common to use packet analyzers (or sniffers) for capturing and analyzing packet frames. However, information acquired this way may be too vast and complicated for pinpointing the possible cause of network/product problems.

Unlike these common packet analyzers or sniffers mentioned above, Universal Stream Counter (USC) offers real-time statistics of network events during packet monitoring and capturing.

Based on X-TAG and VLAN for each ports and system, the streams counter shows its related counters (such as Packet counts, Bytes, S/N Error, Packet Loss, Latency and Transmission Rate in Mbps) as illustrated below.

Streams Counter (per network port)		Transmitting Side		
		Transmit Streams	Packets	Bytes
	N'		2,445	500,991
	N'+1		90,343	7,103,151
	N'+2		88,672	8,092,043
			

Receiving side							
Received Streams	Packets	Bytes	S/N Error	Packet Loss	Source port information	Latency	Rate (Mbps)
N'	9,320	710,573	13	0	Slot=2 Port=1	3.2 us	1.3
N'+1	41,117	5,900,988	3	1	Slot=8 Port=1	4.5 us	17.2
N'+2	15,095	18,678,003	87	21	Slot=9 Port=2	4.4 us	25.8
.....							

X-TAG Streams Counter

Features & Advantages of USC

- **Wirespeed Performance:**
The performance of Multi-stream Counter can support up to wirespeed (100% utilization of Gigabit Ethernet traffic). Receiving frames are processed in real time.
- **Flexible Protocol Support:**
Several often-used protocols (like IPv4) are served as pre-defined patterns for Multi-stream Counter's trigger conditions. Multi-stream Counter also supports user-defined patterns by SDFR. Proprietary protocols or private headers/ tags can also be triggered by Multi-stream Counter based on user- SDFR.
- **Pre-filtering to Trigger Designated Packets:**
Multi-stream Counter can correlate with filtering. Incoming packets will be filtered first. Only packets meet filtering criteria are forwarded to Multi-stream Counter. Filtering options are very flexible in order to meet different testing requirements. Several default parameters are available for frequently-used protocols such as IPv4 and etc. User defined triggers are also supported for custom testing requirements.
- **Real-Time Hardware-generated Statistics:**
All statistics are provided by hardware instead of software, making real-time network statistics possible.
- **Real-time Statistics for Individual Stream:**
The information provided by USC is real-time statistics for the target data streams. Instead of getting the final statistics at the end of the test, USC is capable of providing real-time statistics of individual stream for each port in every second during testing process. This feature helps when analyzing any dynamic changes of target data streams.
- **Sequence Miss and Packet Loss Check:**
Sequence number is embedded in X-TAG generated by Rapid-Matrix. USC uses this to check any sequence miss or packet loss occurrences for each individual stream.
- **Latency Measurement:**
USC can analyze data carried by X-TAG in the receiving frames of designated data streams for Latency Measurement.

RELATED PRODUCTS

Module Name	Type	Description	Chassis Supported
XM-RM661	Standard	4 x 100 Mbps Rapid-Matrix SFP Ethernet Test Module	NuStreams-2000i, 600i
XM-RM671	Standard	4 x 100 Mbps Rapid-Matrix POF Ethernet Test Module	NuStreams-2000i, 600i
XM-RM681	Standard	4 x 10/100 Mbps Rapid-Matrix RJ45 Ethernet Test Module	NuStreams-2000i, 600i
XM-RM731	Professional	2 Combo Gigabit SFP & 10/100/1000 Mbps RJ45 Rapid-Matrix Ethernet Test Module	NuStreams-2000i, 600i
XM-RM751	Standard	2 x Gigabit Rapid-Matrix SFP + 2 x 10/100/1000 Mbps Rapid-Matrix RJ45 Ethernet Test Module	NuStreams-2000i, 600i
XM-RM761	Standard	4 x Gigabit Rapid-Matrix SFP Ethernet Test Module	NuStreams-2000i, 600i
XM-RM781	Standard	4 x 10/100/1000 Mbps Rapid-Matrix RJ45 Ethernet Test Module	NuStreams-2000i, 600i
XM-RM881	Standard	4 x 10 Gigabit Rapid-Matrix SFP+ Ethernet Test Module	NuStreams-2000i, 600i
XM-RM881-2	Standard	2 x 10 Gigabit Rapid-Matrix SFP+ Ethernet Test Module	NuStreams-2000i, 600i
XM-RM891	Standard	1 x 10Gbps Rapid-Matrix XFP Ethernet Test Module	NuStreams-2000i, 600i

CONTACT INFORMATION

Website: <http://www.xtramus.com>

E-mail: Sales@xtramus.com

TS@xtramus.com

TEL: +886-2-8227-6611

FAX: +886-2-8227-6622

Note: Information and specifications contained in this document are subject to change without notice.
All products and company names are trademarks of their respective corporations.
Copyright © 2013 Xtramus Technologies, all rights reserved.
Do not reproduce, redistribute or repost without written permission from Xtramus.
Doc # PBF_NuApps-IGMP-RM_Ver1.0_ENG_20130729.doc