Xena RFC 2889

RFC 2889 Benchmarking Package

Xena RFC 2889 Software Package

This package provides automated performance testing of LAN switchig devices per IETF RFC 2889, Benchmarking Methodology for LAN Switching Devices. Included in this package are test cases for the following:

- Determine throughput, loss, and forwarding rates with fully or partially meshed traffic configurations
- Address caching capacity and Address learning rate
- Determine Latency when forwarding broadcast traffic

The test package is delivered as a MS Excel sheet which uses Excel's embedded Visual Basic for Applications (VBA) language to execute scripting command to the Xena testers. All results are stored in the Excel sheet, from where the user can easily print test reports, and export test results.

Features and Benefits

- Run RFC 2889 tests over LAN Switching topologies, VLAN based topologies
- Support large port count full mesh testing
- Test with jumbo frames and verify latency and wire-rate
- Easy point-to-point, point-to-multipoint, and multipoint-to-point, and mesh testing
- Reduce time-to-test through easy configuration and fast execution
- Summary detailed results reporting

RFC 2889 - FORWARDING Test

Customer service bandwidth (Mbps):	100,0	
Number of trials:	1	
Date:	28-Feb-2012	
Time:	8:22 PM	
Forwarding performance and loss		
Frame size	64	1518
Maximum physical port speed (Mbps)	1000	1000
Configurable maximum speed (Mbps)	n/a	n/a
<MESH-to-MESH> attempted forwarding rate (%)	50,00	50,00
<MESH-to-MESH> attempted rate (fps)	744048	40637
<MESH-to-MESH> attempted rate (Mbps)	500,0	500,0
<MESH-to-MESH> loss result (loss %)	16050823,00	245111,00
<MESH-to-MESH> attempted forwarding rate (%)	100,00	100,00
<MESH-to-MESH> attempted rate (fps)	1488095	81274
<MESH-to-MESH> attempted rate (Mbps)	1000,0	1000,0
<MESH-to-MESH> loss result (loss %)	11494734,00	3204133,00

RFC 2889 Chassis Connect

Chassis number	IP addr	Password	Username	Chassis Name	Chassis Model	Ports per Module
0	192.168.1.200	xena	mesh	Xena Power Grid D	C4-12 [FC]	[6] [0] [6] [0] [6] [0]
1	192.168.1.170	xena	mesh	XB live demo	C4-12 [FC]	[6] [6] [6] [2] [8] [0]
2						
3						

Port number	Chassis num	Module num	Physical Port	Speed (Mbps)	Interface
0	0	4	0	1000	SFP-E 10/100/1000M
1	0	4	1	1000	SFP-E 10/100/1000M
2	0	4	2	1000	SFP-E 10/100/1000M
3	0	4	3	1000	SFP-E 10/100/1000M
4	0	4	4	1000	SFP-E 10/100/1000M
5	0	4	5	1000	SFP-E 10/100/1000M
6	0	6	0	1000	SFP-E 10/100/1000M
7	0	6	1	1000	SFP-E 10/100/1000M
8	0	6	2	1000	SFP-E 10/100/1000M
9	0	6	3	1000	SFP-E 10/100/1000M
10	0	6	4	1000	SFP-E 10/100/1000M

Test Configuration

Packet Size	Type	Custom
	Start from (bytes)	64
	Stop at (bytes)	64
	Step size (bytes)	64
Burst Size	Type	Uniform
	Start from	64
	Stop at	1518
	Step size	64
Packet Payload	Type	Incrementing
Max Rate	Configured Maximum Rate (Mbps)	100
	Use physical port rate	Yes
Learning packets	Learning mode	Every Trial
	Learning retries	1

RFC 2889 - THROUGHPUT Test

Customer service bandwidth (Mbps):	100,0	
Duration (sec):	1,0	
Traffic distribution:	Full Mesh	
Number of trials:	1	
Date:	28-Feb-2012	
Time:	8:29 PM	
Maximum port-pair throughput with no loss		
Frame size	64	1518
Maximum physical port speed (Mbps)	1000	1000
Configurable maximum speed (Mbps)	n/a	n/a
1000 Mbps maximum Rate (fps)	1488095	81274
Passed rate (%)	16,0	16,0
Acceptable loss percent	0,00	0,00
Test result (fps)	5697576	311160
Test result (%)	382,88	382,85
Test result (Mbps)	3828,8	3828,5

Specifications

RFC 2889	Features
Key Tests	Address Caching Capacity Address Learning Rate Broadcast Frame Latency Fully Meshed Throughput, Frame Loss and Forwarding Rates Partially Meshed: One to Many/Many to One Partially Meshed: Multiple Devices Partially Meshed: Unidirectional Traffic
Traffic Control	Ethernet, VLAN, and Q-in-Q support Automatic learning packets Custom field setting for any protocol Forwarding, including throughput and forwarding rates with a 16ns resolution
Learning Parameters	L2 learning Repeat count Frame sizes same as stream Per test, per trial and per frame size learning
Test Topologies	Up to 5 chassis, 72 ports Full Mesh Point-2-Point, Point-2-MultiPoint, MultiPoint-2-Point, MultiPoint-2-MultiPoint Multi-port pair definitions, East/West Uni-directional or Bi-directional testing Testing between any combinations of port-speeds
Reporting	Printable summary reports Export of results in standard .CSV format
Supported Modules & Platforms	All Xena Ethernet testers and all port speeds from 10/100/1000M, 10G, 40G, and 100G Requires MS Excel 2003 or newer

Address Caching Capacity uses a binary search to find the size of the address table for each port or for an entire switch. Beginning at half the initial user-specified table size, frames are transmitted at a user-specified frame rate to see if the DUT has properly learned all the addresses. If no frame loss and no flooding is detected, the address table size is increased and the test is repeated until the address table size is determined. Results include maximum number of MAC addresses supported by DUT.

Address Learning Rate determines the maximum "no drop rate" by transmitting frames with multiple addresses based on the initial table size at the user-specified frame rate. The number of frames received on each receive port is counted and the receive rate calculated. The rates are compared and a binary search algorithm is used to calculate the address learning rate of the DUT. Results include address learning rate of DUT.

Broadcast Frame Latency determines the latency for broadcast frames across the DUT. The broadcast frames are transmitted for a fixed duration, and latency is calculated by subtracting the transmit timestamp from the receive timestamp. The broadcast frames can be MAC only or VLAN/Q-in-Q/IPv4/UDP. Results include latencies for each frame size and the average, minimum, and maximum broadcast latencies for all the trials.

Fully Meshed Throughput, Frame Loss and Forwarding Rates Test determines the total number of frames that the DUT can handle when it receives frames on all ports. The results show the total number of frames transmitted from and received by all the ports, and the percent loss of frames obtained for each frame size. Dual-mesh capability that supports two separate sets of ports running independently. Results include percent frame loss, average latency, frame loss.

Partially Meshed Many to One Throughput Test determines the maximum rate that the DUT receives and forwards frames from many interfaces to one interface without loss of frames. A binary search algorithm is used to obtain a rate at which the DUT does not lose frames within an acceptable rate window. The results of the test show the throughput rates obtained for each frame size. Results include throughput per frame size.

Partially Meshed One to Many Throughput Test determines the maximum rate at which the DUT receives and forwards frames from one interface to many interfaces without any frame loss. A binary search algorithm is used to obtain a rate at which the DUT does not lose frames within an acceptable rate window. This window is the rate within one inter-frame gap of the initial transmit rate. The results show the throughput rates obtained for each frame size. Results include throughput per frame size.

Partially Meshed Test determines the maximum throughput of the DUT by sending frames from multiple transmit ports to multiple receive ports in a mesh fashion, where the transmit ports do not receive and the receive ports do not transmit. Results include throughput per frame size.

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