TEST REPORT
Tolly.

#216126
May 2016
Commissioned by
Extreme Networks

Extreme Networks ExtremeSwitching X620-16x Switch

10 Gigabit Ethernet L2/L3 Performance Evaluation

Executive Summary

Today's demanding enterprise environments require the exchange of massive amounts of information within a network on a daily basis. Wireless access point aggregation, streaming video, voice over IP, and other applications put increasing bandwidth demands on the network. Even with these ever-increasing demands, it is expected that a networks' latency remains low.

Extreme Networks, Inc. commissioned Tolly to evaluate the performance, specifically the Layer 2 and Layer 3 throughput and latency, of the stackable ExtremeSwitching X620-16x 10GbE Edge Switch. Testing was conducted using sixteen 10Gigabit Ethernet ports.

The ExtremeSwitching X620-16x handles 100% theoretical line rate L2 and L3 throughput at various frame/packet sizes with zero packet loss while maintaining very low network latency. See Figures 1 and 2.

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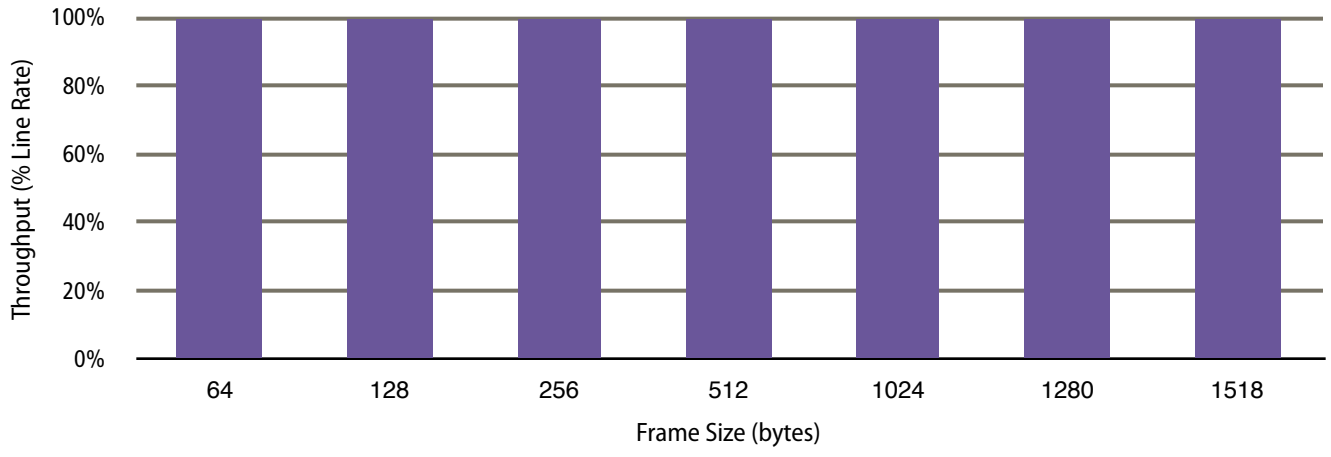
The Bottom Line

The ExtremeSwitching X620-16x Switch:

1. Provides compact, 1RU, enterprise 10GbE edge switching
2. Delivers 100% of theoretical maximum throughput and consistent low latency across all packet sizes tested
3. Demonstrates L2/L3 latency of less than 3µsec for all 10 Gigabit Ethernet packet sizes

ExtremeSwitching X620-16x Layer 2 RFC 2889 Throughput
16 10GbE Ports in Full-Mesh Configuration
(as reported by Ixia IxAutomate)



Source: Tolly, May 2016

Figure 1

Executive Summary (Con't)

The ExtremeSwitching X620-16x L2 and L3 latency averaged less than 3µsec for all 10 Gigabit Ethernet packet sizes. The ExtremeSwitching X620-16x achieved consistently low latency while providing L2 and L3 bidirectional throughput for various frame/packet sizes at 100% theoretical line rate with zero packet loss. The latency values are consistently low for 10GbE edge switching.

Test Results

Performance Test Results

Performance tests focused on evaluating the aggregate throughput and latency exhibited by the ExtremeSwitching X620-16x as per the RFC 2889 (throughput) and 2544 (latency) methodologies. For the full-mesh performance tests, the ExtremeSwitching X620-16x was tested with sixteen 10GbE ports. See Test Methodology section for details.

Layer 2 Throughput and Latency

In a single switch configuration, the ExtremeSwitching X620-16x switch delivered an aggregate throughput of 160 Gbps, equivalent to 100% of the theoretical maximum throughput across its sixteen 10GbE ports, and across all frame sizes tested. See Figure 1.

To test performance of the ExtremeSwitching X620-16x, Tolly engineers measured the port-to-port network latency. The ExtremeSwitching X620-16x delivered consistently low latency, averaging under 3 microseconds across all frame sizes for 10GbE ports. See Figure 2.

Layer 3 Throughput and Latency

In a single switch configuration, the ExtremeSwitching X620-16x switch delivered an aggregate throughput of 160 Gbps, equivalent to 100% of the theoretical maximum throughput across its sixteen 10GbE ports and across all packet sizes. See Figure 3.

Extreme Networks

ExtremeSwitching X620-16x Switch

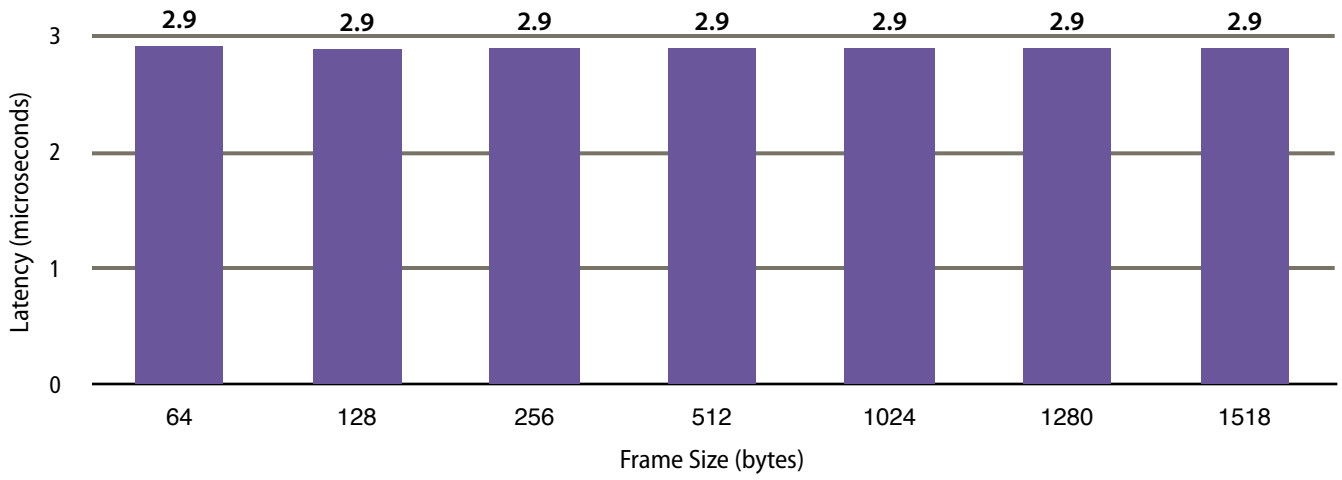
10GbE Layer 2 & Layer 3 Performance Evaluation

Tolly. Certified

Tested May 2016

The ExtremeSwitching X620-16x delivered consistently low latency, averaging under 3 microseconds for 10GbE ports. See Figure 4.

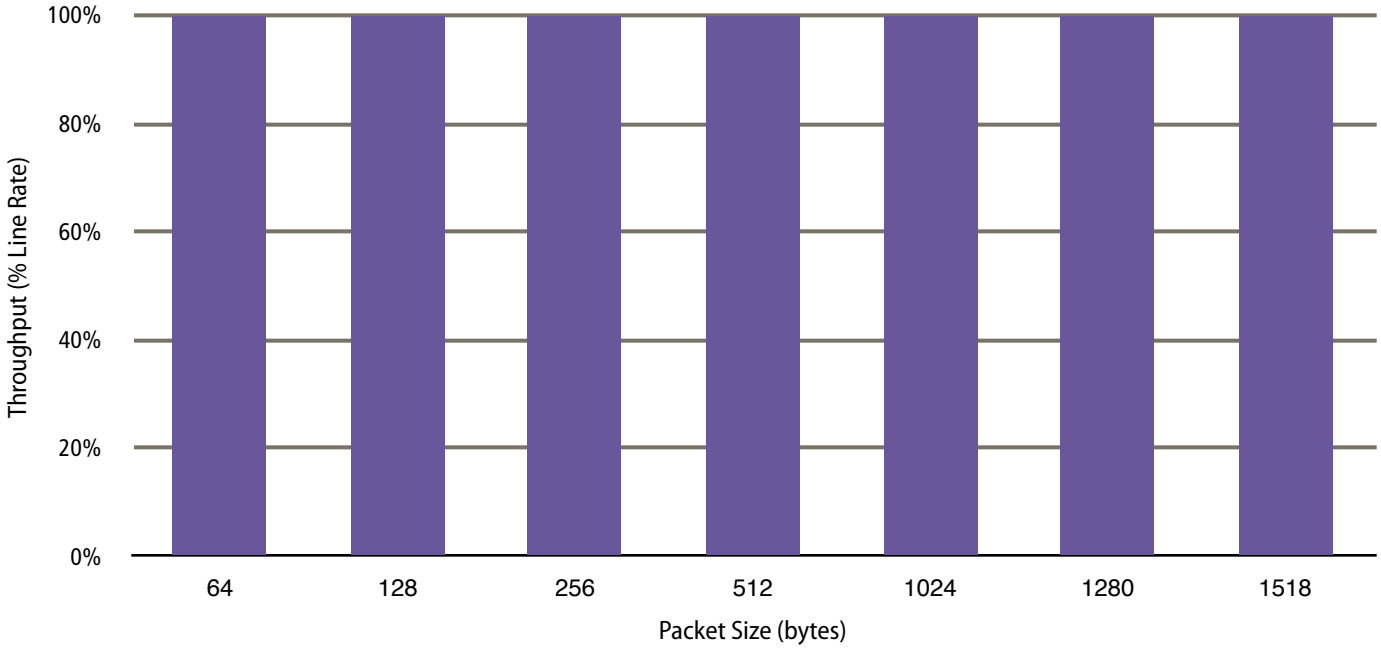
ExtremeSwitching X620-16x Layer 2 RFC 2544 Average Latency
16 10GbE Ports in Port-to-Port Configuration
(as reported by Ixia IxAutomate)



Source: Tolly, May 2016

Figure 2

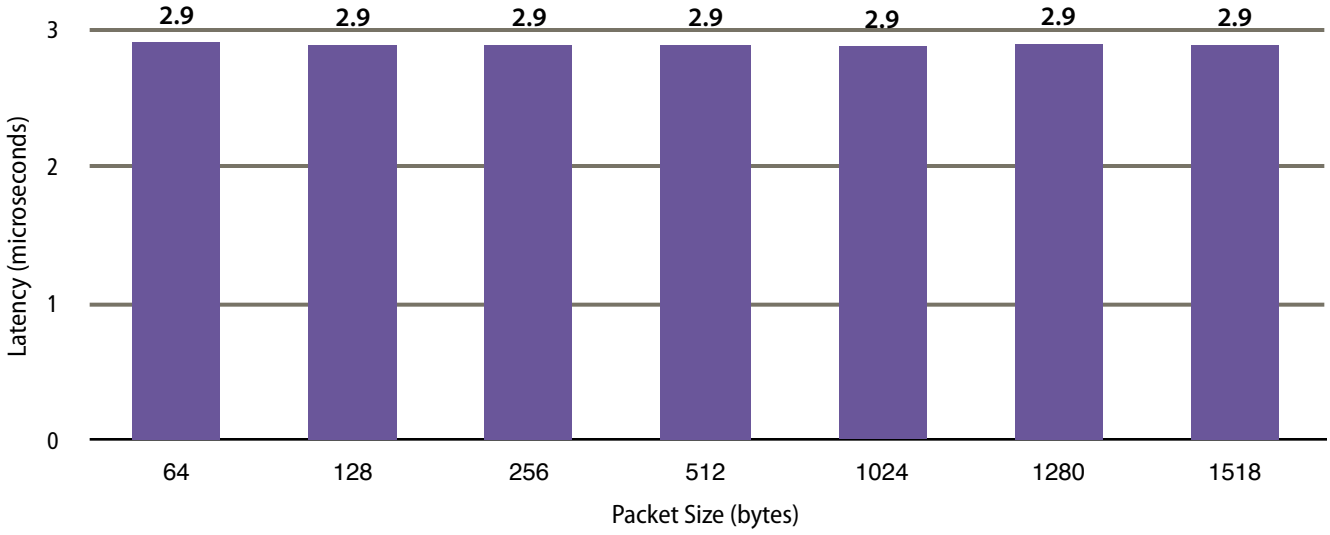
ExtremeSwitching X620-16x Layer 3 RFC 2889 Throughput
16 10GbE Ports in Full-Mesh Configuration
(as reported by Ixia IxAutomate)



Source: Tolly, May 2016

Figure 3

ExtremeSwitching X620-16x Layer 3 RFC 2544 Average Latency
16 10GbE Ports in Port-to-Port Configuration
(as reported by Ixia IxAutomate)



Source: Tolly, May 2016

Figure 4

Extreme Networks: Advances in Policy & Automation

Extreme Networks, Inc. supports its industry-leading secure, role-based policy management technology on all of the ExtremeSwitching X620-16x family of switches. The integration of proven policy and security management technology into the ExtremeXOS® operating system, allows customers the flexibility to define and manage end-to-end policy in mixed Extreme Networks' wired and wireless environments, including those with ExtremeWireless Access Points, the A, B, C, K and S-Series switches.

Extreme Networks is committed to solving IT's toughest networking challenges through intelligent software. The addition of role-based policy capabilities in the operating system establishes a secure, end-to-end framework where every user, including guests, employees and executive management, has their own predetermined set of rules for accessing the network. Policies are defined and centrally managed by Extreme Networks' Management Center, a single pane-of-glass management system that automatically pushes policies to Extreme Networks' access points and switches in the network, significantly simplifying the task of managing a secure network and enhancing operational efficiency.

The ExtremeXOS® operating system also supports automation capabilities, as well as APIs for integration of applications with Extreme Networks switches. Together, these critical capabilities enable customers to strategically evolve their networks to interact with emerging security and wireless technologies as well as converged Software Defined Networking (SDN) infrastructures as part of a complete edge-to-cloud network portfolio.

Source: Extreme Networks

Device Under Test

Product
Extreme Networks ExtremeSwitching X620-16x
ExtremeXOS 21.1.4

Source: Tolly, May 2016 Table 1

Test Setup & Methodology

Test Bed Setup

One Extreme Networks ExtremeSwitching X620-16x was connected to an Ixia Optixia XL10 traffic generator for test traffic generation and validation purposes. A Dell desktop running Microsoft Windows 7 was connected to the LAN to manage the Extreme switch, as well as to configure the Ixia traffic generator using the IxAutomate application.

Test Methodology

RFC 2544 Latency

To measure latency, the ExtremeSwitching X620-16x switch was connected to the Ixia chassis using sixteen 10GbE ports. All ports were configured in a port-to-port topology, meaning that each port on the switch sent traffic to, and received traffic from one other port in the switch. Both Layer 2 and Layer 3 latency were tested using latency type store-and-forward.

The test traffic consisted of bidirectional streams of Layer 2/3 traffic consisting of frames/packets of 64-, 128-, 256-, 512-, 1024-, 1280-, and 1518-bytes, as specified by RFC 2544.

RFC 2889 Throughput

To measure the throughput, the ExtremeSwitching X620-16x switch was connected to the Ixia Optixia XL10 chassis using sixteen 10GbE ports. All ports were configured in a full-mesh topology, meaning that each port on the switch sent traffic to, and received traffic from every other port in the switch. Both Layer 2 and Layer 3 throughput were tested.

The test traffic contained bidirectional streams of Layer 2/3 traffic consisting of frames/packets of 64, 128-, 256-, 512-, 1024-, 1280-, and 1518-bytes, as specified by RFC 2889.

Test Equipment Summary

The Tolly Group gratefully acknowledges the providers of test equipment/software used in this project.

Vendor	Product	Web
Ixia	Optixia XL10 chassis IxAutomate 7.4	http://www.ixiacom.com

About Tolly

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