Viavi Solutions Observer GigaStor 288T
10/40 Gigabit Ethernet Capture Performance Evaluation

Executive Summary
Rapid increases in network traffic volumes (including the move to 40GbE), security threats, and application complexity all underscore the importance for lossless data capture, analysis, and storage to provide crucial raw data for post-event analysis and remediation. Critical functions like network security forensics and service troubleshooting need to have 100 percent of the network data available if they are expected to be 100 percent effective in their jobs.

Viavi commissioned Tolly to evaluate the performance of its Observer GigaStor family of capture, analysis, and storage solutions. Specifically, tests were focused on benchmarking maximum sustained full-packet capture/write rates and greatest burst performance with no packet loss while delivering robust AES-256 data-at-rest encryption of stored network data.

Tests showed that the Observer GigaStor 288T could capture data through 8x10GbE and 2x40GbE taps at 41.6Gbps or 14.3 million packets per second (pps) with burst rates of 60Gbps. See Table 1.

Test Highlights
The Observer GigaStor 288T demonstrated:

1. Lossless 10/40GbE capture, analysis, and storage with real-world TCP traffic profiles including one million unique endpoints
2. Sustained capture to disk of 14.3 million packets per second with robust AES-256 data-at-rest encryption protection and no packet loss
3. Support for traffic bursts of up to 60Gbps for 30 seconds without a single dropped packet

Observer GigaStor 288T 10/40GbE Network Traffic Capture/Write Data
As generated by Ixia IxNetwork

<table>
<thead>
<tr>
<th>Capture Card</th>
<th>Capture to Disk - Maximum Sustained Data Rate (Gbps)</th>
<th>Capture to Disk - Maximum Sustained Packet Rate Million (pps)</th>
<th>Capture to Disk - Maximum 30 Second Burst Data Rate (Gbps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8x10GbE</td>
<td>41.6</td>
<td>14.3</td>
<td>60.0</td>
</tr>
<tr>
<td>2x40GbE</td>
<td>41.6</td>
<td>14.3</td>
<td>60.0</td>
</tr>
</tbody>
</table>

Note: 100 percent capture of entire packet, no slicing or filtering, AES-256 data-at-rest encryption enabled.
Source: Tolly, May 2017

Table 1
Introduction

Capturing and storing packet data is the foundational element of most network analysis systems.

Most vendors in the performance monitoring industry and leading analyst firms agree that effectively quantifying IT service health begins with the central tenet that every packet matters. As higher-density 10GbE and 40GbE deployments become more common, the performance challenge grows.

While it is important to capture wire data, it is also important to protect it. The network traffic will no doubt contain sensitive and proprietary information that should be shielded from unauthorized individuals.

Given this sensitivity and the heightened exposure to security breaches, data-at-rest encryption is a critical capability to consider when capturing and storing network conversations.

GigaStor uses Advanced Encryption Standard (AES) with the strongest key available (256 bit) while delivering 40Gbps performance. This is the same encryption method selected by the United States government for protecting classified information.

Test Results

GigaStor 288T

GigaStor achieved sustained 41.6Gbps capture/write throughput. The maximum capture/write throughput with small packets was 14.3 million pps. The GigaStor 288T also demonstrated burst performance of 60 Gbps for 30 seconds without a single dropped packet in real-world enterprise-traffic conditions, including TCP-based conversations and one million unique endpoints. Additionally, Tolly validated the ability of GigaStor to perform 10/40GbE protection of data-at-rest using AES-256 encryption at the same maximum data rate that was validated for unencrypted capture/write. See Table 1 and Figures 2 and 4.

GigaStor 192T & 96T

Tolly engineers also ran the capture/write scenarios with two other GigaStor models using 8x10GbE interfaces.

The GigaStor 192T demonstrated a sustained capture rate of 22.3Gbps, while the GigaStor 96T model delivered of 11.6Gbps throughput performance. See Table 3.
Test Bed Setup & Methodology

The test bed consisted of the Viavi GigaStor device under test connected to an Ixia Optixia XM traffic generator outfitted with eight 10GbE interfaces. Ixia IxNetwork v8.2 was used to generate and monitor network traffic. Ixia packet brokers were used to tap the Ixia traffic generator interfaces and send the traffic stream to the Viavi GigaStor. For tests involving 10GbE interfaces, the Ixia NTO 5236 packet broker was used. For tests involving 40GbE interfaces, the Ixia Vision One packet broker was used. For details of the systems under test, see Table 2 and Figure 3.

Observer GigaStor 10/40GbE Network Traffic Capture/Write Data
As reported by Ixia IxNetwork

<table>
<thead>
<tr>
<th>Traffic Capture with One Million Unique IP Endpoints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capture Card</td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td>GigaStor Model 192T</td>
</tr>
<tr>
<td>GigaStor Model 96T</td>
</tr>
</tbody>
</table>

Note: Models 192T and 96T support a mix of Gigabit Ethernet and 10GbE ports.

Source: Tolly, May 2017

Table 3

Observer GigaStor 288T: Control Panel
Sample Management Screens

Reporting Sustained Throughput

Reporting Burst Throughput

Source: Tolly, May 2017

Figure 2
About GigaStor

Modern hybrid IT environments, growing network speeds, complex applications, and escalating security threats demand the full packet capture and long-term retention offered by GigaStor.

GigaStor is available in multiple capacities from 16 TB to more than a petabyte, form-factors, and 1/10/40GbE supported network speeds for comprehensive visibility from the infrastructure core, edge, remote branch, and everything in-between.

GigaStor rack appliances are built on a solid, custom-designed chassis foundation capable of supporting today’s intense IT service loads. All GigaStor appliances are developed to support five years of uninterrupted, 100 percent duty-cycle, line-rate capture without dropping a single packet for the ultimate in network conversation visibility and peace of mind.

To grab all those network conversations without missing a beat, Viavi has developed a new Gen3 capture card that incorporates the latest in integrated circuit, bus technologies, and a tuned GigaStor accelerated analytics engine. When combined with the fastest motherboards and RAID controllers available in the market, the seamlessly integrated software-hardware of GigaStor delivers the ultimate in back-in-time performance.

Viavi Gen3 Capture Cards

Source: Viavi, May 2017
10/40GbE Capture/Write Performance Test Environment

8x10GbE Links

2x40GbE Links

Note: Packets (“wire data”) delivered to Observer GigaStor via Ixia packet brokers.

Source: Tolly, May 2017

Figure 3
Capture/Write Data Tests

All tests were run using the same process. Traffic was generated via the Ixia system and delivered to the GigaStor under test by an Ixia packet broker. Ixia IxNetwork was configured to generate traffic between 500,000 pairs of different IP addresses totaling one million IP address endpoints.

Final results for all tests were determined by comparing the capture count of the Observer GigaStor with the packet counters of Ixia IxNetwork.

Capacity of the GigaStor was determined by sending traffic and observing the buffer (overflow) indicator of the GigaStor. Traffic was decreased until the GigaStor buffer utilization was showing 1 percent or less on a sustained basis. Traffic was run for a minimum of three minutes for all tests.

For the encryption tests, Tolly engineers verified that encryption was enabled and encryption keys active and ran the throughput tests as before confirming that all data was captured and written to the AES-256 encrypted disk array.

After the test was completed, Tolly engineers verified that the encrypted disk was no longer accessible after it was closed and the encryption keys removed, thus verifying that the data-at-rest was encrypted and unavailable to a user not in possession of the encryption key.

Observer GigaStor 288T: Control Panel
AES-256 Encryption Configuration Screen

Source: Tolly, May 2017  Figure 4
About Tolly

The Tolly Group companies have been delivering world-class IT services for more than 25 years. Tolly is a leading global provider of third-party validation services for vendors of IT products, components and services.

You can reach the company by E-mail at sales@tolly.com, or by telephone at +1 561.391.5610.

Visit Tolly on the Internet at:
http://www.tolly.com

Terms of Usage

This document is provided, free-of-charge, to help you understand whether a given product, technology or service merits additional investigation for your particular needs. Any decision to purchase a product must be based on your own assessment of suitability based on your needs. The document should never be used as a substitute for advice from a qualified IT or business professional. This evaluation was focused on illustrating specific features and/or performance of the product(s) and was conducted under controlled, laboratory conditions. Certain tests may have been tailored to reflect performance under ideal conditions; performance may vary under real-world conditions. Users should run tests based on their own real-world scenarios to validate performance for their own networks.

Reasonable efforts were made to ensure the accuracy of the data contained herein but errors and/or oversights can occur. The test/audit documented herein may also rely on various test tools the accuracy of which is beyond our control. Furthermore, the document relies on certain representations by the sponsor that are beyond our control to verify. Among these is that the software/hardware tested is production or production track and is, or will be, available in equivalent or better form to commercial customers. Accordingly, this document is provided "as is"; and Tolly Enterprises, LLC (Tolly) gives no warranty, representation or undertaking, whether express or implied, and accepts no legal responsibility, whether direct or indirect, for the accuracy, completeness, usefulness or suitability of any information contained herein. By reviewing this document, you agree that your use of any information contained herein is at your own risk, and you accept all risks and responsibility for losses, damages, costs and other consequences resulting directly or indirectly from any information or material available on it. Tolly is not responsible for, and you agree to hold Tolly and its related affiliates harmless from any loss, harm, injury or damage resulting from or arising out of your use of or reliance on any of the information provided herein.

Tolly makes no claim as to whether any product or company described herein is suitable for investment. You should obtain your own independent professional advice, whether legal, accounting or otherwise, before proceeding with any investment or project related to any information, products or companies described herein. When foreign translations exist, the English document is considered authoritative. To assure accuracy, only use documents downloaded directly from Tolly.com. No part of any document may be reproduced, in whole or in part, without the specific written permission of Tolly. All trademarks used in the document are owned by their respective owners. You agree not to use any trademark in or as the whole or part of your own trademarks in connection with any activities, products or services which are not ours, or in a manner which may be confusing, misleading or deceptive or in a manner that disparages us or our information, projects or developments.