

VIAVI Solutions Observer GigaStor Ethernet Capture Performance Evaluation

Executive Summary

Delivering acceptable levels of IT service while preparing for the next security breach has never been more challenging. Attackers constantly find new ways to exploit vulnerabilities, inevitably gaining access to critical corporate resources. Meanwhile, accelerating growth in traffic volumes, complex multi-tier applications, and cloud-based deployments make service troubleshooting more difficult. NetOps and SecOps teams can't identify and resolve anomalies or reconstruct a security breach if their monitoring solutions don't see the problem or collect all the evidence. They must have 100% real-time awareness and long-term access to every network conversation for application troubleshooting and security investigations.

VIAVI commissioned Tolly to evaluate the performance of its Observer GigaStor Gen4 family of capture, analysis, and storage solutions. Specifically, tests were focused on benchmarking maximum sustained full packet capture/write rates with no packet loss while delivering hardware-based disk encryption of stored network data.

Testing validated that the Observer GigaStor captures data without loss at up to 60.5 Gbps or 17.8 million packets per second. See Table 1.

Test Highlights

Observer GigaStor demonstrated:

- 1 GigaStor 60G delivered sustained, lossless 60.5 Gbps packet capture, analysis, and storage performance,
- 2 While successfully processing an average of 17.8 million packets per second
- 3 GigaStor 20Gbps and 40Gbps solutions met or exceeded advertised capture rates

Observer GigaStor 20/40/60Gbps Network Traffic Capture/Write Data
 Loss-Free Traffic Capture with Two Million Unique IP Endpoints
 As generated by VIAVI TeraVM v14.6

VIAVI Solution	Network Interfaces	Capture to Disk: Maximum Sustained Rate	Disk Capacity & Size
GigaStor 60G	2x 100GbE	60.5Gbps (17.8 million PPS)	576 TB, 8RU
GigaStor 40G	2x 40GbE	40.5Gbps (12.5 million PPS)	384 TB, 8RU
GigaStor 20G	4x 10GbE	20.5Gbps (6.5 million PPS)	192 TB, 4RU

Note: 100 percent capture of entire packet, no slicing or filtering, Data-at-rest is encrypted by RAID and disk hardware. Average packet size was approximately 400 bytes for the 60G model, 380 bytes for the 40G system, and 360 bytes for the 20G model. Sustained capture test run for 10+ minutes. All tests run using Observer v18.

Source: Tolly, March 2020

Table 1



Introduction

Capturing and analyzing stored packet data is a 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 40GbE and 100GbE 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 features Broadcom (Avago) hardware-based encryption, enabled by

default, to provide secure storage for data-at-rest. (See sidebar, next page.)

Test Results

All tests were conducted using a combination of real-world HTTP (TCP) and UDP traffic with over two million IP endpoint addresses across the flows.

After each test, engineers spot-checked the captured data by running the packet decoding feature of Observer to view the details of the captured packet data.

GigaStor 60G

The GigaStor 60G model achieved sustained 60.5Gbps no loss capture/write throughput. The average packet size across flows was approximately 400 bytes. Thus, The maximum capture/write throughput at the packet level averaged 17.8 million PPS. See Table 1 for a summary of all results.

Figure 1 shows a composite of two Observer screens. The graphics illustrate the steady state data capture, PPS rate and zero loss results for a five minute period (actual tests were 10 minutes with same results.)

VIAVI Solutions, Inc.

Observer GigaStor

Ethernet Capture Performance



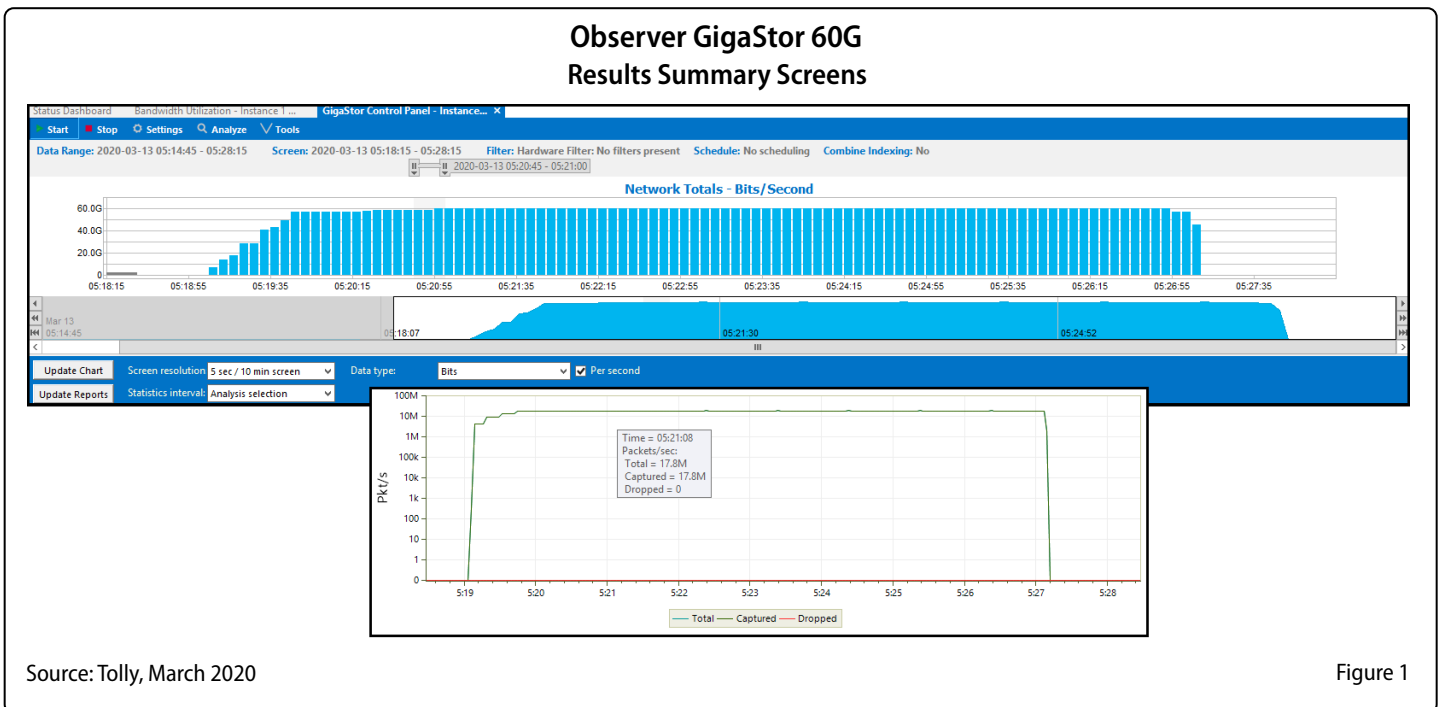
Tested March 2020

GigaStor 40G & 20G

Tolly engineers also ran the capture/write scenarios with two other GigaStor models that provide alternative capacity levels for customers.

GigaStor 40G achieved sustained 40.5Gbps no loss capture/write throughput. The capture/write throughput at the packet level averaged 12.5 million PPS.

GigaStor 20G achieved sustained 20.5Gbps no loss capture/write throughput. The capture/write throughput at the packet level averaged 6.5 million PPS.



Source: Tolly, March 2020

Figure 1



Test Bed Setup & Methodology

The test bed consisted of the VIAVI GigaStor v18 system under test outfitted with VIAVI Gen4 capture hardware connected to three VIAVI TeraVM VMware virtual machines each outfitted with two Mellanox 100GbE network adapters. Each TeraVM system was hosted on a separate VMware ESXi 6.5 server running on a Dell R640 server system.

The Dell Technologies PowerEdge R640 servers were dual Xeon systems with 18 cores per processor. The network cards were Mellanox MT22700 ConnectX-4 VPI.

An Ixia E100 packet broker outfitted with 40/100GbE interfaces sent a traffic stream to the GigaStor system under test as required by the test configuration. One packet broker was used. Traffic was spread across multiple network interfaces on the target system.

Capture/Write Data Tests

All tests were run using the same procedure. Traffic was generated via the TeraVM systems and delivered to the GigaStor under test by the Ixia packet broker.

In each test, the traffic generated was above the claimed performance level for each solution.

Two TeraVM systems were configured to generate UDP traffic with a total of two million different IP address endpoints. The remaining system was used to generate stateful HTTP (web) traffic.

Average packet size was approximately 400 bytes for the 60G model, 380 bytes for the 40G system, and 360 bytes for the 20G model. All tests were run using Observer version 18.

Final results for all tests were determined by comparing the capture count of the Observer GigaStor with the packet counters of the TeraVM traffic generation system.

Traffic was captured for a minimum of 10 minutes for all tests after the TeraVM ramp-up period. After the test was finished, engineers conducted a random inspection of the captured data by decoding a selection of the captured packet data.

After the successful tests, engineers deliberately overloaded each system to confirm that packet loss counters were operational.

Hardware-Level Disk Encryption

The VIAVI GigaStor leverages hardware-based encryption to provide simple and automatic secure data storage.

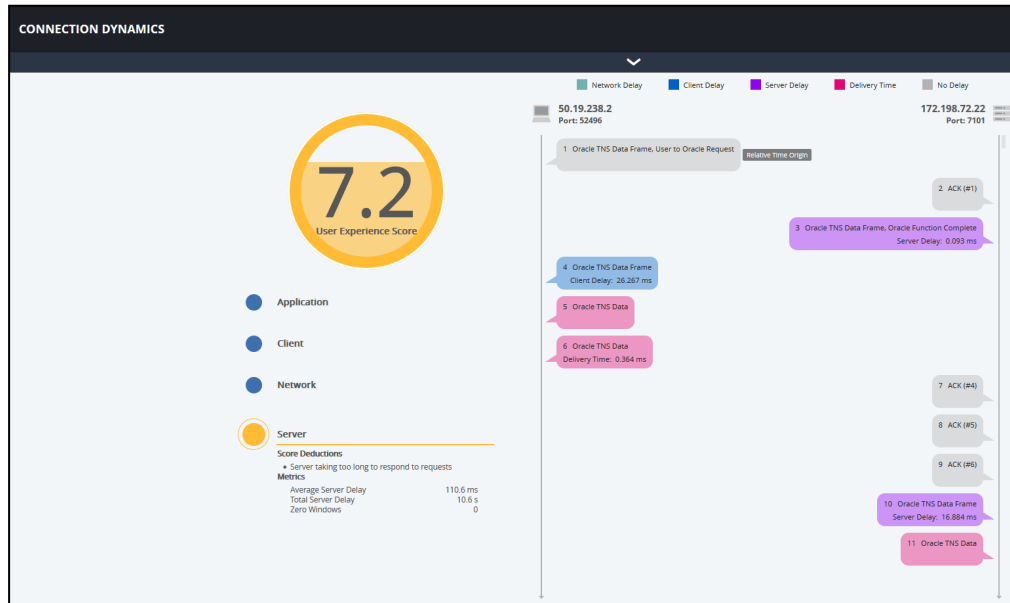
For the encryption tests, Tolly engineers confirmed that hardware encryption was protecting data stored to the GigaStor hard disk drives. The drives used were Western Digital Ultrastar DC HC320 SAS Self Encrypting Drives with TCG Enterprise (HUS728T8TAL5201); all drives were connected using Broadcom MegaRAID SAS 9361-8i or 9380-8e controllers with installed MegaRAID SafeStore hardware encryption key (L5-25188-01). Engineers verified that the drive security properties were "Full Disk Encryption Capable" and that the disks' "Secured" status was shown as "Yes".

Source: Tolly, March 2020

About The Observer Platform

What you don't see on the network can negatively impact the business bottom line through degraded IT service delivery and compromised security.

What's needed is a monitoring solution capable of lossless packet capture for comprehensive visibility and complete peace-of-mind. As part of the Observer Platform, Observer GigaStor is that solution.



In real-time for every transaction Observer automatically calculates the end-user experience score, assigns it a value of good, marginal, or critical and then highlights the corresponding problem domain. This patented, automated analysis translates large volumes of complex data into clear, concise, actionable information for tier 1 support/help desk, enabling efficient and accurate ticket creation. End-user experience scores can also be viewed at the site level providing enterprise-wide operational data for line-of-business managers.

To satisfy the requirements of Tier 3 support and security teams, complete forensic-level data is also stored for extended periods for back-in-time analysis. This is particularly useful when reviewing past suspicious activities or performing security investigations into known breaches.

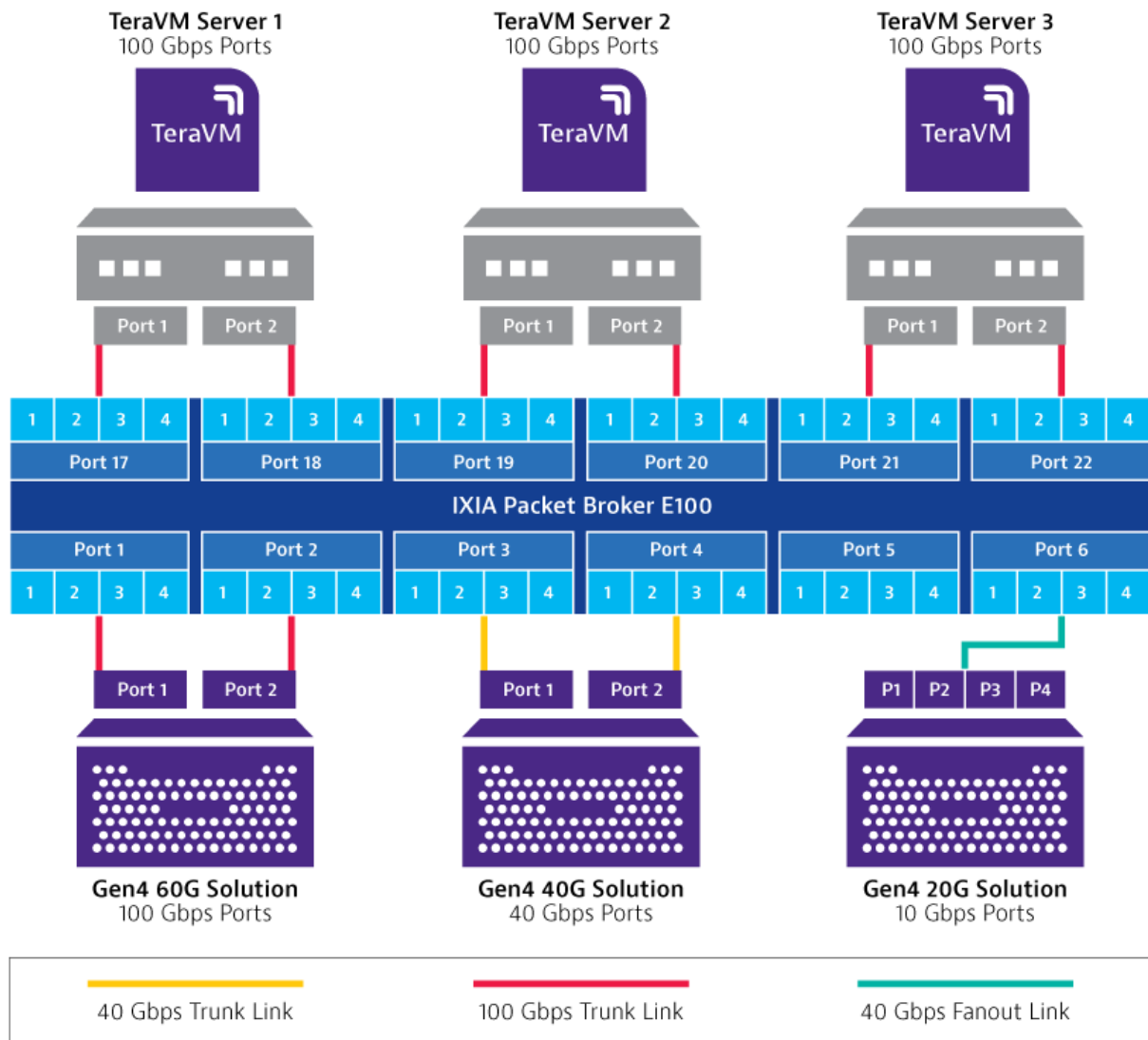
GigaStor is robustly designed to operate at 100% duty cycle (24 hours X 7 days X 365 days), without skipping a beat for five years. When paired with enriched flow, Observer can cost-effectively provide enterprise-wide performance and threat management.



Source: VIAVI, March 2020

Ethernet Capture/Write Performance Test Environment

Composite Diagram Covering all Three VIAVI Gen4 Solution Scenarios



Source: Tolly, March 2020

Figure 2



About Tolly

The Tolly Group companies have been delivering world-class IT services for over 30 years. Tolly is a leading global provider of third-party validation services for vendors of IT products, components and services.

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