Multi Probe Software
17.5.4.0
User Guide
6 Aug 2019
Table of Contents

Chapter 1: About Probe Instances................................................................. 5
   Introducing Probes.......................................................................................... 5
   What is a probe instance?.................................................................................. 6
   Which software probe is right for you?............................................................... 8
   How probes work with switches...................................................................... 10

Chapter 2: Multi Probe Software............................................................... 12
   How to install or upgrade the software............................................................. 12
   Comparing software probe features................................................................. 13
   Minimum and recommended system specifications........................................... 15
   How to upgrade to Windows 10......................................................................... 16
   How to install all versions................................................................................ 16
   How to upgrade version 17 and later................................................................. 17
   How to upgrade version 16 and earlier............................................................. 17
   Capture card driver requirements.................................................................. 17
   Installing the wireless NIC driver on Windows 7/Vista.................................... 18
   Installing a third-party USB wireless adapter................................................... 19
   Installing Windows updates and updating virus protection............................ 20
   Upgrading the probe software......................................................................... 21
   Upgrading the probe software directly............................................................ 21
   FAQ: Licensing and updating......................................................................... 21
   Backing up your GigaStor settings................................................................. 23
   Creating a probe instance................................................................................ 24
   How to use additional storage volumes on the GigaStor active instance........ 26
   Connecting to a Probe..................................................................................... 26
   How to change the monitored network adapter.............................................. 26
   Connecting to a probe for the first time from Observer................................... 27
   Connecting the Multi Probe or Expert Probe to an Observer......................... 27
| Connecting to a probe instance from an Observer analyzer | 28 |
| Connecting the probe to an Observer | 28 |
| Redirecting a probe instance | 28 |
| Configuring a probe's name and other probe options | 30 |
| Customizing statistics and capture buffers for probe instances | 31 |
| Configuring probes to collect data even when not connected to an analyzer | 32 |
| Setting the probe's time clock synchronization settings | 32 |
| Configuring connections to multiple NICs or Observer | 32 |
| Setting the total system memory reserved for probes | 33 |
| Configuring the probe's adapter speed, ToS/QoS precedence, and statistics sampling | 33 |
| Probe Properties field-level descriptions | 34 |
| How to encrypt captured data at rest | 38 |
| Using the Probe | 41 |
| Switching between the probe and analyzer user interfaces | 41 |
| Enabling Network Trending and setting which statistics are collected | 42 |
| Monitoring a wireless access point | 42 |
| How to assign physical ports to probe instances | 42 |
| Using the NetFlow features in Observer | 45 |
| Creating a NetFlow collector or NetFlow Trending collector | 45 |

**Chapter 3: Understanding How a Probe Uses RAM**

| How a probe uses RAM | 47 |
| Packet capture buffer and statistics buffer | 49 |
| Running Observer without reserved memory | 50 |
| Running Observer with reserved memory | 52 |
| How packet capture affects RAM | 53 |
| How to allocate the reserved RAM | 55 |
| Recommendations for the VIAVI capture cards | 55 |

**Chapter 4: Gen3 Capture Card**

| Hardware configuration | 57 |
| Understanding the capture card | 57 |
| Supported QSFP+/SFP/SFP+ media types | 58 |
| How to configure the card for an optical TAP, SPAN, or other | 58 |
| Software configuration | 61 |
| How to view the capture card properties | 61 |
| How to create virtual adapters | 63 |
| How to remove duplicate packets in real time | 65 |
| How to assign physical ports to probe instances | 66 |
| How to change the monitored network adapter | 69 |
| Understanding hardware acceleration | 69 |
| How to enable hardware acceleration | 70 |
| Hardware-accelerated mode restrictions | 73 |
| Features that require hardware acceleration | 74 |
| Capture card device properties | 75 |
| General | 75 |
| Current State | 75 |
Advanced Settings ..................................................................................................................... 77
Driver ............................................................................................................................................. 78
Details ........................................................................................................................................... 79
Events ........................................................................................................................................... 80
Resources ...................................................................................................................................... 81
How to identify your GigaStor ..................................................................................................... 82
Capture card details .................................................................................................................... 83

Chapter 5: Troubleshooting ........................................................................................................ 85
Troubleshooting common issues .............................................................................................. 85
Troubleshooting a slow probe system ...................................................................................... 86
A probe is not connecting to the analyzer or vice versa ......................................................... 86
No network adapter available ................................................................................................... 87
Integrated adapters report all sent packets with bad TCP checksum .................................. 88
“No VLAN” shown while using a Gigabit NIC ....................................................................... 88
VLAN Statistics tool is not working ......................................................................................... 88
Using Discover Network Names on a Layer 3 switch that uses VLANS ......................... 90
Suspected NAT or VPN issues ................................................................................................. 90
Running Observer passively affects NetFlow .......................................................................... 91
Daylight Savings Time ................................................................................................................ 91
Configuring Cisco 6xxx switches using a SPAN port to a full-duplex Gigabit Probe .......... 91

Chapter 6: Backups and Restoring ............................................................................................ 93
Backing up your GigaStor settings ............................................................................................. 93

Index ............................................................................................................................................... 95
Chapter 1: About Probe Instances

Introducing Probes

Discover the basics of probes, probe instances and what type is right for you, and how probes work with switches.

As a network administrator, when something goes wrong on your network, seeing what is happening on the wire can quickly lead you to a solution. Use this guide to assist you with choosing, deploying, configuring, and using your probes. The probes, along with Observer Analyzer software, let you see all traffic on the network to which it is connected. To monitor multiple networks from a single analyzer, probes must be installed at every point where network visibility is required.

Probes collect and report network traffic and statistics (usually from a switch) to an Observer. This enables you to detect and anticipate problems on both local and remote portions of the network. Probes gain insight and visibility into every part of the network, access remote networks as easily as local networks, eliminate the time and expense of traveling to remote sites, and speed troubleshooting.

A probe is a hardware device on your network running VIAVI probe instance software. Each hardware probe has at least one probe instance that captures packets from your network to analyze. The probe hardware device could be an appliance purchased from VIAVI or you could install the probe software on your own hardware.

The probe can be located on the same system as the analyzer (every Observer includes a “local probe”), or the probe can communicate with remote analyzers over TCP/IP.
Probes monitor the following topologies:
- 10/100 Mb, 1/10/40 Gb Ethernet (half- and full-duplex)
- Wireless (802.11 a/b/g/n)

Figure 1 (page 6) shows how probes provide visibility into your network. It may be obvious, but it also shows that you cannot see traffic on portions of your network where you do not have a probe. Finally, you can put Observer anywhere on your network so long as it has TCP connectivity to the probe.

Figure 1: Typical network

What is a probe instance?

Observer has only one kind of probe instance: the probe instance. If you have a GigaStor then you have two special probe instance types available to you: the active probe instance and the passive probe instance.

Observer uses probes to capture network data. In some cases you may want or need more than one probe in a specific location. You can achieve that through probe instances. A probe instance provides you the ability to look at multiple network interfaces, have multiple views of the same interface, or to publish to multiple Observer.

Table 1 (page 6) compares the features of active and passive probe instances with an Observer probe instance found on all non-GigaStor probes.

Table 1. Active vs. passive GigaStor instances and Observer probe

<table>
<thead>
<tr>
<th>Better suited for troubleshooting</th>
<th>GigaStor Active probe instance</th>
<th>GigaStor Passive probe instance</th>
<th>Observer Probe</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Better suited for data capture</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start packet capture</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Stop packet capture</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Start GigaStor packet capture</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
### About Probe Instances

<table>
<thead>
<tr>
<th></th>
<th>GigaStor Active probe instance</th>
<th>GigaStor Passive probe instance</th>
<th>Observer Probe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schedule packet capture</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Change directories where data is stored</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Able to set permissions</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Able to redirect to different analyzer, etc.</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

1. An Observer probe is the Single Probe, Multi Probe, or Expert Probe software running on a non-GigaStor probe.

A passive probe instance may capture packets to RAM and allows you to do reactive analysis or look at real-time statistics for troubleshooting. The passive probe instance binds to a virtual adapter or a network adapter that has data coming to it that you want to capture. You can change whichever adapter a passive probe instance is bound to without affecting any active probe instance. By default a passive probe instance uses 12 MB of RAM. You can reserve more memory for passive probe instances if you wish.

**Caution:** With a GigaStor you have the option of which NIC to bind the passive probe instance. Do not bind any passive probe instances to the capture card adapter if at all possible. A copy of all packets is sent from the adapter to every passive probe instance attached to it. If you have several passive probe instances attached to the capture card adapter, the capture card’s performance is significantly affected. Instead attach the passive probe instances to either a 10/100/1000 adapter or to a non-existent one.

If you have a passive probe instance connected to a GigaStor, you can mine data that has already been written to the RAID disk by using an active probe instance. There should be one passive probe instance for each simultaneous Observer user on a GigaStor. By using a passive probe instance, instead of an active probe instance, only one copy of data is being captured and written to disk, which reduces the processor load and the required storage space. For troubleshooting and most uses in Observer passive probe instances are appropriate.

An active probe instance on a GigaStor captures network traffic and writes it to the RAID array. An active probe instance should have as large of a RAM buffer as possible to cushion between the network throughput rate and the array write rate. Like a passive probe instance, it can also be used to mine data from the hard disk, however a passive instance is better suited for the task. An active probe instance cannot start a packet capture while the GigaStor Control Panel is open.

By default there is one active probe instance for GigaStor. It binds to the network adapter and its ports. If you have a specific need to separate the adapter’s ports and monitor them separately, you can do so through passive probe instances or you can create separate virtual adapters.

- Only one active probe instance per GigaStor.
- Set scheduling to Always for the active probe instance so that it is constantly capturing and writing data. Use a passive probe instance to mine the data.
Do not pre-filter, unless you know exactly what you want to capture. Of course, if something occurs outside the bounds of the filter, you will not have the data in the GigaStor.

Do not allow remote users access to the active probe instance.

Figure 2: GigaStor capture and packet capture through probe instances

Figure 2 (page 8) shows how one active probe instance captures and writes to the GigaStor RAID. Passive probe instances 1 and 2 mine data from the RAID array. As a best practice, the passive probe instances are bound to the slowest network adapter in the GigaStor.

Additionally, passive probe instance 3 and 4 are each capturing packets separate from each other and separate from the active probe instance. However, since they are also bound to the same adapter as the active probe instance, they are capturing the same data as the active probe instance.

Which software probe is right for you?

Software probes are an economical choice for many situations.

For companies that cannot invest in dedicated hardware probes, Observer Platform software probes provide a low-cost monitoring option and are easy to install and configure. Software probes support Ethernet, Gigabit and wireless and are appropriate for analyzing speeds of up to 1000 Mbps or for low-utilization gigabit networks via a SPAN/mirror port on a switch. The Observer software can handle fast network speeds (including 40 Gigabit), but it is the network adapter that is the bottleneck on home-grown systems. VIAVI uses a custom-designed
A network adapter removing the bottleneck in our probes. These levels of software probes are available:

- **Single probe**—Single probes have only one probe instance and it is not user-configurable. Single probes are appropriate for sites with small administrative staffs where only one user needs to look at a probe at a time.

- **Multi Probe**—Multi probes may have one or more probe instances. Multi probes allow multiple users to each connect to the probe and use their own probe instance. Each probe instance can be looking at the same packet capture or different capture.

- **Expert probe**—Expert probes are the same as a Multi probe except that they have local expert analysis and decode capabilities in the probe that allows for remote decoding and expert analysis in real time. The Expert probe software comes pre-installed on most hardware probes from VIAVI.

<table>
<thead>
<tr>
<th>Hardware &gt;</th>
<th>GigaStor, Portable probes, Probe Appliances, 3rd party hardware</th>
<th>Dual port Ethernet Probe, 3rd party hardware</th>
<th>Ethernet Single probe, 3rd party hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installed software &gt;</td>
<td>Expert Probe</td>
<td>Multi Probe</td>
<td>Single Probe</td>
</tr>
<tr>
<td>Sends entire buffer¹</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Alarms</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Trending</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Triggers</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Wireless</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Encrypts buffer transfer</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simultaneous multi-topology support</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simultaneous users²</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supports multiple NICs (page 32)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use reserved memory outside of Windows (page 33)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrated reporting with Apex</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Able to switch between probe and analyzer mode (page 41)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-duplex³</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPLS</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ Sends entire buffer is not applicable for Multi Probe or Expert probe.
² Simultaneous users is applicable to Multi Probe and Expert probe.
³ Full-duplex is applicable to Expert probe.
### Hardware > Installed software >

<table>
<thead>
<tr>
<th>Installed software</th>
<th>GigaStor, Portable probes, Probe Appliances, 3rd party hardware</th>
<th>Dual port Ethernet Probe, 3rd party hardware</th>
<th>Ethernet Single probe, 3rd party hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>NetFlow (page 45)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Port bonding (page 42)⁴</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Remote decode of GigaStor captures</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Sends expert summary &amp; decode packets⁴</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>VoIP expert, APA, ATA⁵</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

1. Buffers are sent to Observer where the decoding and analysis is performed. This is less efficient than sending the expert summary and decode packets, which is available with Expert Probe.
2. Simultaneous users are supported when each user has his own probe instance.
3. Only available on hardware probes from VIAVI.
4. Decoding and expert analysis are performed by the probe and a summary is sent to Observer reducing network bandwidth use.
5. Application Performance Analysis and Application Transaction Analysis. Applications are generally OSI Layer7 applications like HTTP, FTP, RTSP, SMB, and so on.

### How probes work with switches

The purpose of a switch is to isolate traffic to the local network, thereby reducing the amount of traffic each device on that network must see and process. Although a protocol analyzer puts a network interface card in “promiscuous” mode, the analyzer only sees packets addressed to or transmitted from the port that it is connected to on the switch.

To operate a probe in a switched environment, you must choose a method that provides network visibility to the port where the probe is connected. Most switches provide a function that “mirrors” all packets received or transmitted from either a single port of interest (for instance, a server or router), or multiple ports of interest. The mirrored traffic can then be captured or analyzed by connecting your analyzer (or in this case, the probe) to the “mirror port” (which is sometimes called a SPAN port).

**Note:** Switches typically provide two options for configuring the SPAN/mirror port settings. You can either use a command line interface (CLI) or web-based interface included with your switch to set the port (or ports) to be mirrored.

To SPAN/mirror ports, Observer can use SNMP to directly query your switch and report port-based statistics or use RMON to report any internal RMON statistics the switch may have. Selecting the method right for you depends on your switch, and the level of detail you need to troubleshoot the problem at hand. For packet capture, decode and Expert Event identification, only static port
mirroring provides all the information required for a complete picture of what is happening on your network.
Chapter 2: Multi Probe Software

How to install or upgrade the software

This section describes the installation process and minimum requirements if you are installing Observer or probe on your system. This applies to physical and virtualized servers. If you virtualize the server, each server must meet these specifications.

Prerequisite(s):

- An administrator account is required to install and run any version of Observer or probe software except Observer Expert Console Only (ECO). Observer ECO requires an administrator account just for installation; a standard user account can be used for running Observer ECO.
- Standard network cards do not support “raw” wireless packets, nor do they enable “promiscuous” mode by default. Promiscuous mode captures all packets for the analyzer, not just those addressed to the network card. Both “raw” wireless packets and promiscuous mode are required by Observer. ErrorTrak drivers were needed in earlier versions of Observer. They are no longer necessary.
- If you do not meet the minimum requirements, the system may seem to operate in the short term, but be aware that even if a sub-minimum installation works momentarily, a later, heavier load on the system can cause it to fail. VIAVI sells hardware probes that are guaranteed to keep up with heavy loads. See the Observer Platform website for details.
- You may install the probe software on a virtual machine so long as it meets the system requirements. The installation process is the same. You may also want to consider using a virtual TAP.
1. Ensure your system meets the minimum requirements.
   See Minimum and recommended system specifications (page 15).
2. Choose one of the following:
   - How to install all versions (page 16)
   - How to upgrade version 17 and later (page 17)
   - How to upgrade version 16 and earlier (page 17)

After completing this task:
- License your software. See FAQ: Licensing and updating (page 21).

Comparing software probe features

Single Probes are appropriate for sites with smaller administrative staffs. This type of probe communicates with only one Observer at a time.

If you have a need for multiple network administrators to view packet decodes and analysis from the same probe simultaneously, choose a Multi Probe. The Multi Probe allows you to run multiple probe instances of the probe on a single system, which means that:
- You can install multiple network interface cards in a single Multi Probe system, allowing multiple “points of visibility” from that probe.
- You can connect multiple sessions of Observer to the same Multi Probe system. Any Observer session can see all of the networks available on the Multi Probe. The probe instances are securely encrypted and password-protected.

Although Multi Probes behave similarly to Single Probes, the Multi Probe has a different user interface for configuring the probe.

For the highest level of distributed performance, choose an Expert Probe. An Expert Probe provides Expert Analysis and capture/decode capabilities. This saves bandwidth when performing remote expert analysis, and also allows remote decode views and expert analysis in real time.

The Expert Probe can be configured to run as an Observer when you need to perform troubleshooting from where the probe is located.
## How to install or upgrade the software

### Multi Probe (6 Aug 2019) — Archive/Non-authoritative version

<table>
<thead>
<tr>
<th>Hardware &gt;</th>
<th>GigaStor, Portable probes, Probe Appliances, 3rd party hardware</th>
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<td>Multi Probe</td>
<td>Single Probe</td>
</tr>
<tr>
<td>Wireless</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Encrypts buffer transfer</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Simultaneous multi-topology support</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Simultaneous users (^2)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Supports multiple NICs (page 32)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Use reserved memory outside of Windows (page 33)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Able to switch between probe and analyzer mode (page 41)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-duplex (^3)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPLS</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NetFlow (page 45)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port bonding (page 42) (^4)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remote decode of GigaStor captures</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sends expert summary &amp; decode packets (^4)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sFlow</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VoIP expert, APA, ATA (^5)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Buffers are sent to Observer where the decoding and analysis is performed. This is less efficient than sending the expert summary and decode packets, which is available with Expert Probe.
2. Simultaneous users are supported when each user has his own probe instance.
3. Only available on hardware probes from VIAVI.
4. Decoding and expert analysis are performed by the probe and a summary is sent to Observer reducing network bandwidth use.
5. Application Performance Analysis and Application Transaction Analysis. Applications are generally OSI Layer7 applications like HTTP, FTP, RTSP, SMB, and so on.
Minimum and recommended system specifications

If you are installing the software on your own hardware or a virtual machine, these are the minimum and recommended specifications for a production environment.

Table 2. Observer Expert Console Only (ECO)

<table>
<thead>
<tr>
<th>Processor / CPU</th>
<th>Minimum</th>
<th>Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAM</td>
<td>2 GB RAM</td>
<td>8 GB RAM</td>
</tr>
<tr>
<td>Operating system</td>
<td>64-bit Operating System Windows 7 or newer</td>
<td>64-bit Operating System Windows 7 or newer</td>
</tr>
</tbody>
</table>

Network Card: Server-class

1. If your system has 4 GB of RAM, you cannot reserve any memory for Observer. This is a limitation of Windows known as the BIOS memory hole. Either add more RAM or take some out.
2. See Supported Operating Systems (page 16) for a full list of supported operating systems.

Table 3. Observer or GigaStor Software Edition in a virtual server

<table>
<thead>
<tr>
<th>Processor / CPU</th>
<th>Minimum</th>
<th>Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAM</td>
<td>Minimum 16 GB (8 GB for Observer and 8 GB for the operating system)</td>
<td>64 GB</td>
</tr>
<tr>
<td>Operating system</td>
<td>64-bit Operating System Windows 7 or newer</td>
<td>64-bit Operating System Windows 7 or newer</td>
</tr>
<tr>
<td>Network Card</td>
<td>Virtualized network adapter</td>
<td>Intel server-class</td>
</tr>
<tr>
<td>Capture Card</td>
<td>Virtualized network adapter</td>
<td>Server-class onboard network adapter</td>
</tr>
</tbody>
</table>

1. If your system has 4 GB of RAM, you cannot reserve any memory for Observer. This is a limitation of Windows known as the BIOS memory hole. Either add more RAM or take some out.
2. See Supported Operating Systems (page 16) for a full list of supported operating systems.
3. A second network card that acts solely as a capture card is required (and must be in “promiscuous mode”). Alternatively, a dual-port NIC can be used.

Current compatibility and incompatibility of virtual machines with the GigaStor Software Edition (GSE) is described in this list:

- VMWare ESXi Server
  - ESXi 5.0 and higher is compatible with GSE.
- VMWare Workstation Pro is not supported with GSE
- Microsoft Hyper-V may function but is not supported with GSE
Supported Operating Systems

Your product must be installed on one of these operating systems to receive assistance from Technical Support.

<table>
<thead>
<tr>
<th>Product name</th>
<th>64-bit Windows</th>
<th>32-bit Windows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows 7 (SP1 or higher) or newer</td>
<td>Windows 7 (SP1 or higher) or newer</td>
<td>Not supported</td>
</tr>
<tr>
<td>Windows Server 2008 R2 Enterprise, Standard, Web (SP1 or higher) or newer</td>
<td>Windows Server 2008 R2 Enterprise, Standard, Web (SP1 or higher) or newer</td>
<td>Not supported</td>
</tr>
</tbody>
</table>

How to upgrade to Windows 10

Due to the way Microsoft has designed its Windows® 10 operating system upgrade feature, Multi Probe will not function if you upgrade your operating system from Windows 7, Vista or Windows 8 to Windows 10 without first uninstalling Multi Probe.

This information does not apply if you:

- Already uninstalled Multi Probe.
- Are installing Windows 10 rather than upgrading to it.
- Are already using Windows 10.
- Are upgrading using the Observer Platform OS Upgrade product because it replaces the operating system rather than upgrading it. Additionally, it uses Windows Server 2012 R2.

Note: Unfortunately, if you have already upgraded the operating system and Multi Probe was not uninstalled prior to upgrading to Windows 10, the only path to recovery is to reinstall the operating system. Back up (page 23) any Multi Probe files on the operating system, reinstall the operating system, then install Multi Probe and restore its files.

To upgrade a system with Multi Probe to Windows 10:

1. Back up your settings.
2. Uninstall Multi Probe using Control Panel > Program and Features.
3. Upgrade your operating system.
4. Install the Multi Probe software.
5. Restore your settings from step 1 using whatever method is best for you.

Multi Probe is now available to use on Windows 10.

How to install all versions

Use this procedure to install all versions of the software.

Prerequisite(s):

An administrator account is required to install and run any version of Observer or probe software except Observer ECO. Observer ECO requires an administrator
account just for installation; a standard user account can be used for running Observer ECO.

1. Insert the installation CD in your CD drive or use the latest installation image from our update site. If you copied the installation files from our web site, start the installation program.
   http://update.viavisolutions.com/latest/ObserverSetupx64.exe

2. When the setup program runs, follow the onscreen instructions.

3. Choose to install:
   - Observer.
   - Advanced Probe. Choose this for Single Probe or Multi Probe. Your license determines whether it is a Single Probe or Multi Probe.
   - Expert Probe

4. After the files have been installed on your system you must restart Windows. You will not be able to run the software until you restart your computer.

How to upgrade version 17 and later

Version 17 allows you to upgrade directly from within Observer or from OMS (if used).

If OMS is not controlling Observer, then do the following in Observer:

If OMS is controlling Observer:


The software is updated to the latest version.

How to upgrade version 16 and earlier

Upgrading version 16 uses the same procedure as installing the software. The process is different for version 17 and later.

1. Insert the installation CD in your CD drive or use the latest installation image from our update site. If you copied the installation files from our web site, start the installation program.
   http://update.viavisolutions.com/latest/ObserverSetupx64.exe

2. When the setup program runs, follow the onscreen instructions.

3. Choose to install:
   - Observer.
   - Advanced Probe. Choose this for Single Probe or Multi Probe. Your license determines whether it is a Single Probe or Multi Probe.
   - Expert Probe

4. After the files have been installed on your system you must restart Windows. You will not be able to run the software until you restart your computer.

Capture card driver requirements

If you are going to use a third-party capture card in your probe, the capture card must meet certain requirements so that Observer can report statistics and errors.
The network card used to monitor or capture network traffic must have all of the mandatory and optional NDIS functions. The VIAVI capture card has all of the necessary features.

Most NIC vendors provide solid, functional NDIS drivers for all cards available within the Ethernet, Token Ring, and FDDI marketplace.

Accessing a standard network with a “normal” network device is somewhat different from what a protocol analyzer requires. While both share a number of driver functions, a protocol analyzer requires a set of features and functions that the average network device will never need. Examples of these optional functions are promiscuous mode, error tracking, and network speed reporting. (Examples of mandatory functions would include functions to determine the maximum packet size, functions to verify the number of sent packets, and functions to specify or determine a packets’ protocol.)

Microsoft made a number of the less used (by “normal” network users) functions “optional”, as opposed to “mandatory” regarding driver requirements. The result has been that most vendors support all (or most) mandatory functions with the first release of the driver. As time passes, and the initial chaos of the first release of the card and driver passes, most manufacturers add some or all of the optional functions, as well as fix or complete all of the mandatory functions.

As part of the optional section of defined NDIS functions, Microsoft specified a number of counters that can be kept for Ethernet frame errors. These counters include CRC errors, Alignment errors, Packets Too Big (Jabbers), and Packets Too Small (Runts). Collisions are counted, but there are limitations of NDIS collision statistics. Four important points should be considered:

- These optional counts only provide a numerical value to the total number of errors on the segment (i.e. the number of CRC errors found), they do not specify where (which station) the error originated from.
- After the error packet is identified and the proper error counter is incremented, the packet is discarded, and not sent to Windows (this is the reason it is impossible to determine the source of an Ethernet error packet with standard NDIS drivers).
- A number of vendor’s NDIS drivers return a positive acknowledgment when the NDIS error function is queried for existence, but the error statistic is not actually kept.
- A few vendors (3COM, for example) do not keep any error statistics whatsoever.

If a NIC driver both reports that the optional Ethernet error statistics are being kept, and actually keeps data on these errors, Observer reports these statistics in the Network Vital Sign Display.

**Installing the wireless NIC driver on Windows 7/Vista**

See the information in Monitoring a wireless access point (page 42), which contains details about raw packets and promiscuous mode for the network card.

Follow these instructions to install the wireless driver for your network card:

1. Click **Start** and then right-click on the ‘Computer’ icon and choose Properties.
2. Click Device Manager.
3. Right-click on the wireless adapter you want to use as your capture card and choose Update Driver Software.

4. Choose “Browse my computer for driver software.”

5. Choose “Let me pick from a list of drivers on my computer.”

6. Click Have Disk and use the drivers in this location:

   **Example:** C:\Program Files\Observer\DRIVERS\Wireless\Atheros_Vista

7. Click **Next** and Windows installs the driver for your wireless card.

To confirm that you correctly installed the driver for the wireless network card, open Observer. If the probe instance shows *(Wireless)* behind it, then it is correctly configured.

![Figure 3: Probe instance using wireless adapter](image)

If the probe instance shows *(Ethernet)*, then either the network card driver was not correctly installed or the probe instance is not configured to use that network card. You can confirm the correct network card is selected, by choosing Actions > Select Network Adapter Card.

After completing this task:

- License your probe by following the instructions in Licensing and updating (page 21).
- If your wireless network uses an encryption key, you must add the encryption key information. See Configuring the probe’s adapter speed, ToS/QoS precedence, and statistics sampling (page 33).

### Installing a third-party USB wireless adapter

You can capture wireless 802.11 traffic on systems lacking built-in wireless by installing a third-party USB wireless adapter. Wireless access point statistics and other features become usable as well. Installing a special driver on your USB wireless adapter is necessary.

#### Prerequisite(s):

The USB wireless adapter is only supported on systems running Windows Vista or 7 (32- or 64-bit).

**Caution:** For some wireless adapters you must install the software for the USB wireless adapter before you attach the adapter to your computer. This is not an Observer requirement, but one of the wireless adapter. If you attach the USB wireless adapter before installing the software, unplug the USB adapter, uninstall the software, restart your system, and then proceed with step 1.
1. Install the software that came with your USB wireless adapter.

2. Insert the USB wireless adapter into your system.

3. Choose **Control Panel > Network and Sharing Center > Change adapter settings** and then select your USB wireless adapter. Right-click and choose **Properties**.

4. From the **Networking** tab, click **Install > Service > Add**. Click **Have Disk** and locate this file: NiNdisMon.inf
   - **64-bit**: C:\Program Files\Observer\DRIVERS\Wireless
   - **32-bit**: C:\Program Files(x86)\Observer\DRIVERS\Wireless

5. Click **OK** to install the software as a Windows service.

6. Restart your system.

   Restarting allows the software and adapter to be fully recognized by your system and the Windows service to start. Observer will not be able to use the wireless adapter until you restart.

7. Start Observer, select the probe instance you want to associate with the USB wireless adapter.

9. Choose the USB wireless adapter you just installed.

The probe instance is now configured to use the USB wireless adapter. You can confirm this because the word "[Wireless]" appears after the probe instance name, and the **Wireless 802.11** tab of the probe instance is visible.

### Installing Windows updates and updating virus protection

From time to time Microsoft releases updates for the operating system used for your probe or your virus protection software vendor updates their virus definitions. You should apply those updates as soon as feasible, however, you should always apply the updates manually.

We do not recommend that you allow Windows to automatically install the updates and restart the system. By manually applying the updates you ensure that the system restarts properly and that the probe starts correctly whether running as a Windows service or as an application.

For your anti-virus software, follow these guidelines:

- Ensure TCP ports 25901 and 25903 are open. All Observer Platform products communicate on these ports.
- Ensure UDP ports 25901 and 25903 are open if you use OMS.
- For all probes, disable any scanning of the Observer installation directory (typically C:\Program Files\Observer) and of D: (RAID) drive as scanning greatly diminishes the performance of writing data to disk.
- The performance of the operating system may be greatly diminished when using anti-virus software.
Upgrading the probe software

Observer and probe software must be within the same major release. This may require you to upgrade your probe software.

If the version of Observer or GigaStor that you are upgrading was installed on a 32-bit operating system and you have upgraded the operating system to 64-bit, the installer upgrades existing installation to 64-bit version keeping the same path.

Version 17 requires a 64-bit operating system. If you previously installed a 32-bit version, the same installation directory is used.

Use information from this section when upgrading to a new major version of the probe software. Before upgrading have the following available:

♦ Latest probe software installation program. Download the latest version from the VIAVI http://update.viavisolutions.com/latest/ObserverSetupx64.exe update site.
♦ Your probe license information.

Note: If you are using encryption keys with Observer, you can continue to use your existing keys or transfer them to your probe (and analyzer) as necessary.

Upgrading the probe software directly

On the probe:

1. Start the Observer installation program.
2. Follow the on-screen instructions and choose your probe type.
3. After the installer completes, restart the system.
   New major builds may have new drivers or other files that require a restart.
4. Connect the probe to an Observer.

FAQ: Licensing and updating

Some customer concerns deal with licensing and updating issues. Explore this good resource for licensing and updating help, or call the Technical Support department for further assistance.

How to license Observer and GigaStor

To license and activate a compatible GigaStor, Observer, or Probe:

2. After launching the application in DEMO mode, click the Help menu and select License Observer.
3. Click the Enter Name button in the lower left corner.
4. Type into the Contact/Department and Company boxes exactly what is listed in your license document.
5. Click OK, and then click Accept on the confirmation dialog.
6. Ensure the Identification Number matches the number on your license document. If they do not match, click Re-Type Name? to correct any mistakes.
7. Type the license number, from your license document, into the **License Number** box.

### How to update your license

If Observer or GigaStor is already licensed and you need to modify, update, or change that license, you can do so.

**Prerequisite(s):**

This task requires you have already licensed (page 21) your Observer or GigaStor.

This task cannot be completed if the license to your Observer or GigaStor is managed by OMS. Instead, refer to .

Updating your license refers to changing, editing, or updating the license that is already applied to your product. Some reasons for needing to do this can include:

- Activating a new license. The new license might provide different or increased functionality over your existing license, like increased data storage for a GigaStor Software Edition (GSE).
- Changing a license. Perhaps you accidentally applied the wrong license to your product and need to change it.

To update a license:

2. Click **OK** to confirm you want to re-license.

3. Type the license number, from your license document, into the **License Number** box.

4. Click the **Re-Type Name?** button in the lower left corner.

5. Type into the **Contact/Department** and **Company** boxes exactly what is listed in your license document.

6. Click **OK**, and then click **OK** on the confirmation dialog.

You successfully updated your license. Observer begins using the license the next time Observer is launched.

Close and restart Observer for the new license to take effect. You may need to coordinate a suitable time to do so if restarting would affect many users or significantly interrupt your data collection.

### Why is my license number not working?

Each license number is case-sensitive, so be sure to type it in exactly the way it was given to you. Also, if you copy-pasted the license number into the activation prompt, be sure you did not introduce a leading or trailing space character—those are not part of your license number.

Ensure you are licensing the correct version of Observer. License numbers are version-specific. License numbers work within equal major version numbers of the product only. For example, an 17.0 license can be used to activate 17.x versions but not 16.1, 16.0, 15.1, 15.0, etc.

### Could I have my license re-sent to me?

Yes. If you lost the original information containing your license number, please contact us so we can resend your license document(s).
What type of license do I have?

The type of license you have is described in your license document. Each license document contains a license number, and the document describes which software version the license number applies to. If it does not, or you notice any other error, please call our support team for assistance.

Should I uninstall Observer before updating it?

If you wish to update your existing Observer software to a newly released version within the same major release number, you do not need to uninstall your existing version for the update process to succeed. Simply install the new version over the old.

Backing up your GigaStor settings

You can back up most Observer settings and configuration data. Backups are useful when migrating to new hardware, upgrading the operating system, or recovering from data loss.

Caution: If you are using data encryption on your GigaStor system, you must save the encryption keys before upgrading the operating system. Because the keys are typically stored on the operating system drive, they will be lost during the upgrade process. If you do not have a copy of the keys elsewhere, you will not be able to access stored data (packets) after the upgrade is complete.

Your Observer may not have each directory referenced in this topic, but you can back up those that are present. Use whatever backup method is best for you.

To back up many Observer settings and files, do the following:

♦ Copy the files and directories in Table 4 (page 23) to a backup location. This must be a location other than the operating system drive of the system you are planning to upgrade.

Table 4. Directory or files to back up

<table>
<thead>
<tr>
<th>Directory or file</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Trending</td>
<td>C:\Program Files\Observer\NetworkTrending</td>
</tr>
<tr>
<td></td>
<td>This contains your Network Trending data. If you have changed the default location for Network Trending data, you must back up the new location. Use the Folders tab in to verify which folder is used for trending data.</td>
</tr>
<tr>
<td>Protocol Definitions</td>
<td>C:\Program Files\Observer\ProtocolDefs</td>
</tr>
<tr>
<td></td>
<td>This contains any modifications or additions you have made to the protocol definitions list for each probe instance. Back up in all cases.</td>
</tr>
<tr>
<td>Multicast Definitions</td>
<td>C:\Program Files\Observer\MulticastDefinitions</td>
</tr>
<tr>
<td></td>
<td>This contains the templates for defining trading multicast streams for Network Trending. Back up if you use trading multicasts in Network Trending.</td>
</tr>
<tr>
<td>Settings</td>
<td>C:\Program Files\Observer\Settings</td>
</tr>
<tr>
<td></td>
<td>This contains alarms and triggers. Back up if you heavily use alarms or have alarm/trigger customizations that need to be retained.</td>
</tr>
</tbody>
</table>
Creating a probe instance

You can create a probe instance to monitor network traffic seen on a network adapter, explore saved packet captures, and have multiple people be able to see the captured data from their copy of Observer. Create a passive or active probe instance depending on what your goals are.

**Prerequisite:** Multi or Expert Probe.

When you open Multi Probe for the first time, you assign memory to a probe instance. You can choose to use this one probe instance, or you can create other probe instances. Multiple probe instances are useful if you need multiple users using the same probe simultaneously or if you have specific needs for each probe instance (for instance, packet capture, trending, and so on). See Configuring connections to multiple NICs or Observer (page 32) for why you would want to use multiple probe instances.

<table>
<thead>
<tr>
<th>Directory or file</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNORT Rules</td>
<td>C:\Program Files\Observer\Forensics</td>
</tr>
<tr>
<td></td>
<td>This contains your SNORT information, such as rules, for detecting malicious activity in your packet captures. Back up if you use SNORT.</td>
</tr>
<tr>
<td>Expert Thresholds</td>
<td>C:\Program Files\Observer\ExpertSettings</td>
</tr>
<tr>
<td></td>
<td>This contains your thresholds stored in Expert settings. These include TCP/UDP events and some triggers for problem identification. Back up if you have modified any Expert thresholds and want to retain those customizations.</td>
</tr>
<tr>
<td>SNMP</td>
<td>C:\Program Files\Observer\SNMP</td>
</tr>
<tr>
<td></td>
<td>This contains any custom MIBs, compiled MIBs, request files and SNMP trending data. Back up if you have made SNMP changes or have SNMP trending data. Use the Folders tab in to verify which folder is used for SNMP.</td>
</tr>
<tr>
<td>Address Tables</td>
<td>C:\Program Files\Observer\LocalAddressTable</td>
</tr>
<tr>
<td></td>
<td>This contains your Discover Network Names list. Back up if you have run Discover Network Names and have saved the alias list.</td>
</tr>
<tr>
<td></td>
<td>C:\Program Files\Observer\ProbeAddressTable</td>
</tr>
<tr>
<td></td>
<td>This contains the Discover Network Names list from any remote probe that has connected to this Observer analyzer. Back up if you have run remote Discover Network Names and saved the alias list.</td>
</tr>
<tr>
<td>Scripts</td>
<td>C:\Program Files\Observer\Scripts</td>
</tr>
<tr>
<td></td>
<td>This contains the scripts for Observer. Back up if you have created or modified a script.</td>
</tr>
<tr>
<td>Windows Registry</td>
<td>Using Regedit, export the following registry branch:</td>
</tr>
<tr>
<td></td>
<td>32-bit Windows operating system running any version, or 64-bit Windows operating system running version 16 or higher:</td>
</tr>
<tr>
<td></td>
<td>HKEY_LOCAL_MACHINE\SOFTWARE\Network Instruments</td>
</tr>
<tr>
<td>License</td>
<td>Make note of the license information in . You need the contact/department, company, identification number, and license number.</td>
</tr>
</tbody>
</table>
To set up a probe instance, follow these steps:

1. Do one of the following:
   - On the probe: Click the **Adapters and Redirection tab**.
   - In Observer: Select a probe instance, right-click and choose Administer Selected Probe. Then click the **Adapters and Redirection tab**.

2. In the upper left, click New Instance. The Edit Probe Instance wizard opens.
   - If the New Instance button is grayed out, it probably means you do not have enough Observer-allocated memory to add another instance.
   - If you get a message that says that there is not enough reserved memory to create a probe instance, you must reduce the amount of memory used by another probe instance. By default all of the reserved memory on a GigaStor is assigned to the “Instance 1” active instance. By releasing some of the reserved memory you re-allocate memory from one probe to the pool of reserved memory from which you can create other probe instances, including passive probe instances on the GigaStor. Click the **Configure Memory button** and reduce the amount of memory for the packet capture buffer.
   - You must have a minimum of 256 MB RAM to run the probe with a single instance, plus 12 MB for each additional probe instance. See Setting the total system memory reserved for probes (page 33) for details on allocating memory for Observer probes.

3. Ensure “Probe” is selected in the Instance type. Type a name and description and click **Next**.

4. Choose an appropriate capture buffer size given the local system’s available memory and how much traffic you plan on capturing from the given network.
   - Statistical reporting uses different memory—and much less of it—than packet capture.
   - Although it is possible to customize the amounts of memory used by various Observer statistical displays (by choosing a statistics memory configuration), for most situations the defaults work perfectly well. For additional information, see Customizing statistics and capture buffers for probe instances (page 31).
   - If you need to create your own memory configuration, click New. The New Statistics Memory Configuration window opens.
   - Type a name and choose a default memory configuration to use. Click Finish. After choosing the memory configuration, you can change how the memory is allocated.
   - Select your newly created memory configuration and click Edit. The Edit Statistics Memory Configuration window opens.
   - Choose your network type. For each Observer statistic, choose how much memory is allocated for it. Click **OK**.
   - Click **Next** to continue, and the Select Network Adapter and Redirection configuration dialog is displayed.

5. Ensure the correct network adapter is selected and type the IP address of your Observer. Click Finish.
How to use additional storage volumes on the GigaStor active instance

When expanding your RAID array beyond 256 TB of usable disk space, you must add the additional volumes to your GigaStor active instance.

**Prerequisite:** Expert Probe

The maximum NTFS disk volume is 256 TB, but with a GigaStor you can have more storage than that by using the expanded disk arrays or striping through Windows.

1. On the GigaStor probe, click the **GigaStor Instances** tab.
2. Select the **Use additional storage volumes** option and click **Configure**.
3. In the message box that appears, click **Yes**.
4. Select the additional storage volumes you want to assign to your active probe instance, and click **OK**.
5. In the message box that appears, click **Yes**.

The additional storage is allocated. This may take a few moments.

Connecting to a Probe

You can connect to a probe from multiple direction: from or to a different Observer analyzer, to its own probe instance (connect to itself), and change the network adapter that is monitored on each probe instance.

How to change the monitored network adapter

If your probe has multiple network cards in it, you can choose which card you want to monitor.

This section applies to all probes and all versions of them, including Single Probe, Multi Probe, and Expert Probe on VIAVI or third party hardware.

**Note:** If you have a network card in your system, but it is not being seen or recognized by Observer, follow the instructions in No network adapter available (page 87).

**Tip!** If you are seeing only broadcast traffic, you do not have the correct network card selected or you do not have your switch port configured correctly as a SPAN/mirror port. Change the network adapter you are monitoring or configure the SPAN/mirror port.

- When choosing the monitored adapter from within Observer for all probe versions:
  1. In the probes list, select the probe instance.
  2. Choose .
     
     The **Select Network Adapter** window appears.
  3. Select the network adapter you want to monitor, and click **Select**.

- When choosing the monitored adapter on the probe for Multi Probe and Expert Probe:
1. Click **Adapters and Redirection**.
2. Select your probe instance and click **Configure Adapter/Redirection**.
   
The **Edit Probe Instance** window appears.
3. In the **Selected Network Adapter** area, change the network card you are monitoring.

The probe instance is now using the newly selected adapter.

**Connecting to a probe for the first time from Observer**

2. Click **New** to add the probe to the Probe Administration and Redirection list.
3. Type the IP address that you assigned to the probe and click **OK**. You may leave the other fields blank. If you type a name, the name will change after Observer connects to the probe. The probe appears in the list of available probes.
4. Select the probe and then click Redirect Selected Probe.
5. Select the probe instance and click Redirect Selected Instance.
6. Choose the “Redirect to this Observer” option, then click the **Redirect** button. Within 30 seconds the probe will connect with the analyzer.

   Probe redirection can be password protected or disabled. Please see **Connecting the Multi Probe or Expert Probe to an Observer (page 27)** for details. If the probe is not connecting, see **A probe is not connecting to the analyzer or vice versa (page 86)**. After the probe is connected, see **Configuring the probe’s adapter speed, ToS/QoS precedence, and statistics sampling (page 33)**.
7. Close the Probe Instance Redirection window.

**Connecting the Multi Probe or Expert Probe to an Observer**

**Prerequisite:** Multi or Expert Probe.

There are two ways to connect the probe to an Observer. The method described here is from the perspective of the probe. All actions are done on the probe itself.

Each probe instance can be connected to only one Observer at a time. Connecting the probe instance with the analyzer is called “redirecting” it. This is because the probe instance may not be connected to any Observer or it may be connected to a different Observer than the one you want to connect it to. The connection can be done from within the analyzer or from the probe. This section describes how to redirect a probe instance from the probe and assumes that the probe software is running and that you already have a probe instance.

1. Click the **Adapters and Redirection tab**.
2. Select the probe instance you want to redirect and click the **Configure Adapter/Redirection** button at the top. The Edit Probe Instance window opens.
3. Select the “Redirect to a specified IP address or DNS name” option and provide the IP address or DNS name. When the probe instance is connected the “Redirected to” column lists the IP address of Observer system. If the
Connecting to a probe instance from an Observer analyzer

Prerequisite: Multi or Expert Probe.

Probe instances can be redirected from one Observer to another or disconnected from any analyzer. This is done from Observer.

1. Select the probe instance you want to redirect and click the Redirect Selected Probe Instance button at the bottom. The Edit Probe Instance window opens.

2. If this is the first time you are connecting to the probe from Observer, you must add the probe to your list. See Connecting to a probe for the first time from Observer (page 27).

3. If the probe is not connecting, Probe redirection might be password protected or disabled. Please see Connecting the Multi Probe or Expert Probe to an Observer (page 27) for details. If the probe is not connecting, see A probe is not connecting to the analyzer or vice versa (page 86).

4. After the probe is connected, see Configuring the probe’s adapter speed, ToS/QoS precedence, and statistics sampling (page 33).

Connecting the probe to an Observer

There are two ways to connect the probe to an Observer. The method described here shows you from the perspective of the probe. The second way is described in Connecting the Multi Probe or Expert Probe to an Observer (page 27). All actions are done on the probe itself.

1. Choose Options > Probe Redirection Settings. The Probe Redirection Settings dialog opens.

2. Use Table to complete the settings. If the probe is not connecting, see A probe is not connecting to the analyzer or vice versa (page 86).

3. After the probe is connected, see Configuring the probe’s adapter speed, ToS/QoS precedence, and statistics sampling (page 33).

Redirecting a probe instance

Your local Observer may already have local probe instances defined, but you can add numerous remote probes, including GigaStor, too. You must first redirect the remote probe to your local Observer.
A probe may have multiple probe instances, which are useful if you need multiple users using the same probe simultaneously or if you have specific needs for each probe instance (for instance, packet capture, trending, and so on). When you connect to a probe, ensure you select the probe instance you need and not one being used by someone else.

**Note:** Probe redirection can either be password protected or disabled, depending on the target probe.

To redirect a probe instance, complete the following steps:

2. Do one of the following:
   - If you see a remote probe instance you want to redirect, skip directly to step 6.
   - If your list is empty or missing the remote probe instance you want to redirect, proceed to step 3.

3. Click **New**.
   The **Edit Remote Probe Entry** dialog appears.

4. Type the IP address, or DNS address, of the remote probe.
   If you type a DNS name, it resolves to its IP address.

5. If necessary for probe access, type a user name and password, and click **OK**.
   Figure 4: Credentials may be needed
6. Select the remote probe instance from the list, and click **Redirect Selected Probe Instance(s)**.

Allow time for the remote probe to redirect. How long this operation can take is limited by a timeout countdown.

The probe instances of the remote probe are shown.

7. Select a probe instance from the list, and click **Redirect Selected Instance**.

8. Select the **Redirect to this Observer**, and click the **Redirect** button.

Figure 5: Redirecting Probe Instance

9. Close the **Probe Instance Redirection** window.

If the operation succeeds, the remote probe instance is now redirected to the local Observer. Now you can use the remote probe instance just as you would if it was running on your local machine.

---

**Configuring a probe’s name and other probe options**

Set the probe network adapter speed, reserve system memory for probes, configure connections to multiple network adapters, set “always on" traffic capture, customize statistic and capture buffers, and more.

**Prerequisite(s):**

These steps assume you are viewing the probe interface, which is the only choice when using Expert Probe software. But if you are using a GigaStor, ensure that you are viewing the probe interface (page 41).
The probe has many options that you can configure.

1. Choose **Options > Probe Options**. The Probe Options dialog opens, which lets you configure the probe.

2. Use this table to complete the settings.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probe name</td>
<td>Allows you to specify a name for the probe which appears in Observer probe list. The default name is a random mix of numbers and letters. We suggest renaming the probe to something meaningful to you. The name may be its physical location or any other standard you choose. The probe name is not the same as the probe instance name, although with a Single Probe you only have one probe instance. You define the probe instance name elsewhere. See Creating a probe instance (page 24).</td>
</tr>
<tr>
<td>Network Trending folder</td>
<td>Allows you to specify where the network trending data is saved. The default is C:\Program Files\Observer\NetworkTrending. Unless you have a specific reason to use another directory, we suggest using the default.</td>
</tr>
<tr>
<td>Folder for GigaStor data</td>
<td>Allows you to specify where the GigaStor and network packet data will be saved. The default is C:\Program Files\Observer\Data if a software install or non-GigaStor probe or D:\Data if a GigaStor hardware appliance. Unless you have a specific reason to use another directory, we suggest using the default.</td>
</tr>
<tr>
<td>Maximum IP DNS resolution entries</td>
<td>Defines the maximum number of DNS entries the probe should maintain. The probe will keep up to the number of entries defined or what the probe can maintain in 10 MB of storage space, whichever is less. The probe keeps the first 10,000 entries (or whatever amount you define) it sees; it does not keep a rolling list of the last 10,000. After the limit is reached, no more entries are kept. They are discarded.</td>
</tr>
<tr>
<td>Run Probe as Windows Service</td>
<td>Select this option if you want to run the probe as a Windows service. This allows the probe to start without requiring a user to log in and start the probe. The probe starts whenever the system starts, which can be especially important for a remote probe. The change takes effect on the next system restart. When running the probe as a Windows service, some options are available to you that you do not have when running the probe as an application. Specifically, you can set Networking Trending and see CPU load of each probe instance. In both modes, you can configure memory management, configure security for each probe instance, reserve Windows memory for the probe, adjust for time drifts through clock synchronization, and enable the probe to be a virtual TAP.</td>
</tr>
<tr>
<td>View certificates from other Observer assets</td>
<td>Click the Certificates button to view trusted, untrusted, and pending trust, certificates that allow secure asset-to-asset communication. See Understanding the certificate trust model for details.</td>
</tr>
</tbody>
</table>

**Customizing statistics and capture buffers for probe instances**

**Prerequisite:** Multi or Expert Probe.
Before changing any of the buffer sizes, you should understand how any changes you make affects the probe. See How a probe uses RAM (page 47).

- To change memory allocation for probe instances, see Running (page 52) Observer (page 52) with reserved memory (page 52).
- To fine-tune the Statistics Memory Configuration, see How to adjust the statistical buffer.

Configuring probes to collect data even when not connected to an analyzer

Probes (and probe instances) can be configured to collect data only when you tell it to—including manually starting/stopping the collection, having collection always running, or based on a schedule. The schedule and settings are saved with the probe instance. This means if you choose to have packet capture always running or running on a schedule that the probe instance does not need to be connected to an Observer.

To configure when packet capture should run, complete these steps:

1. In Observer, select a probe instance in the Probes list.
2. Click the **Settings** button. The Packet Capture Settings window opens.
3. Click the **Schedule tab**.
4. Choose the schedule you want (Always, daily, or specific days).
5. If you want to control the capture buffer’s size, click the **Capture Options** tab. The data is saved on the probe in `C:\Program Files\Observer\Data`.

Setting the probe’s time clock synchronization settings

At times your capture card drivers time clock may drift. They can be synchronized with the system clock, if you wish. Unless you notice a reason to enable this feature, we recommend that you do not synchronize your capture card’s time clock.

Some Other things to consider:

- The capture card synchronizes itself with the system clock at when the system starts.
- Generally, you are interested in relative time between packets, not the actual time a packet was seen.

1. Do one of the following:
   - On the probe: Click the **Synchronization tab**.
   - In Observer: Select a probe instance, right-click and choose Administer Selected Probe. Then click the **Synchronization tab**.
2. Click the **Edit Schedule** button.
3. Choose when and how you want the capture card’s time clock to synchronize with the system clock and click **OK**.

Configuring connections to multiple NICs or Observer

**Prerequisite:** Multi or Expert Probe.
With a Multi Probe, you can configure the probe to view multiple networks if multiple NICs are installed on the local system and to provide multiple Observer with views of the local network interfaces.

The probe accomplishes these capabilities by allowing multiple instances of itself. A probe instance is a virtual probe with attributes that define:

- Which network interface on the local system to capture data from.
- Which Observer (local or remote) to direct the data to.

**Setting the total system memory reserved for probes**

**Prerequisite:** Multi or Expert Probe.

Memory use is an important and vital part of using an Observer probe successfully. Before changing any of the reserved memory, you should understand how any changes you make affects the probe.

**Configuring the probe’s adapter speed, ToS/QoS precedence, and statistics sampling**

After connecting the probe instance to Observer Analyzer, there still may be some additional configuration that you must do. This is completely dependent on your network environment and your needs.

This section applies to all probes and all versions of them, including Single Probe, Multi Probe, and Expert Probe on VIAVI or third party hardware.

In Observer:

1. Select a probe instance in the Probes list.
2. Right-click and choose **Probe or Device Properties**.
3. Use the following tabs to further configure the probe for your environment. Not all of these tabs are present at all times. What tabs are visible depends on the type of probe you are configuring. For instance, the Gigabit tab is only visible when you are configuring a Gigabit Probe. For details about the fields on each tab, see the **Configuring a probe’s name and other probe options** (page 30).

<table>
<thead>
<tr>
<th>Tab</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>Set the statistics sampling divider and MPLS settings. For field descriptions, see [Probe Properties field-level descriptions](page 34).</td>
</tr>
<tr>
<td>Adapter speed</td>
<td>Verify that the adapter speed is registering correctly. Change the adapter speed if necessary. Changing the adapter speed here may be useful and necessary, because statistics, graphs, and reports generated by Observer are set using the adapter speed as the maximum. If, for some reason, Observer is not able to correctly identify your adapter speed your reports may be inaccurate. For field descriptions, see [Probe Properties field-level descriptions](page 34).</td>
</tr>
<tr>
<td>ToS/QoS</td>
<td>Ensure these settings match your needs paying particular attention to the IP precedence bit for the ToS/QoS of your network. What you set here affects how the Observer analyzer displays information about VoIP, NetFlow, sFlow, and capture</td>
</tr>
</tbody>
</table>
Configuring a probe's name and other probe options

Your probe instance is now configured. You can begin collecting network traffic and statistics using it. Typically, this is done in Observer by choosing Capture > Packet Capture and clicking the Start button. See Configuring probes to collect data even when not connected to an analyzer (page 32) for details. You do not, however, need to start a packet capture to see statistics. See the list of statistics available under the Statistics menu in Observer.

Probe Properties field-level descriptions

This section include details about many of the fields and options for a probe.

### Table 5. General tab

<table>
<thead>
<tr>
<th><strong>Option</strong></th>
<th><strong>Description</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication timeout</td>
<td>Allows you to define how long Observer will wait for the Probe to communicate before it assumes the connection is lost. Values are from 2 to 60 seconds.</td>
</tr>
<tr>
<td>Probe report period or local Observer information refresh time</td>
<td>Allows you to set how often the Probe sends a refresh packet or how often the local Observer's dialogs are refreshed. This value has a minimum of 2 seconds with no maximum.</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Statistics report (refresh) period</td>
<td>Allows you to set the statistics display refresh period. This value has a minimum of three seconds with no maximum.</td>
</tr>
<tr>
<td>Vital signs report (refresh) period</td>
<td>Allows you to set the Network Vital Signs refresh period. Values are from 10 to 600 seconds.</td>
</tr>
<tr>
<td>Sampling Divider</td>
<td>On probes with less processing power, high traffic rates (such as those typical of gigabit connections) can overwhelm the probe's ability to keep up. A sampling divider tells Observer to only consider one of every ( n ) packets when calculating statistical displays, where ( n ) is the sampling divider. This setting only affects statistical displays such as Top Talkers, Internet Observer, etc. (packet captures are unaffected). A sampling divider of 2 registers every other packet; a sampling divider of 10 registers every tenth packet. Some statistical displays consider every packet regardless of this setting. Bandwidth Utilization looks at traffic as whole, so does Wireless Site Survey.</td>
</tr>
<tr>
<td>Encapsulated Traffic Analysis</td>
<td>GRE (Generic Routing Encapsulation) and GTP (GPRS Tunneling Protocol) are two encapsulation protocols that may have been deployed on your network. To show the encapsulation IP addresses, leave the box unchecked; to show the nested IP addresses, check the box. This setting also applies to L2TP and IPv4.</td>
</tr>
<tr>
<td>Nortel OEL2 Metro Ethernet Analysis Settings</td>
<td>Choose if frame headers should be analyzed as OEL2 headers.</td>
</tr>
<tr>
<td>MPLS Analysis Settings</td>
<td>Choose whether Observer should auto determine IPv4 and IPv6, what all other traffic is (ATM or Mac Header), and whether to use a four byte pseudowire word. Also choose whether to use the MAC addresses from encapsulated MPLS header.</td>
</tr>
</tbody>
</table>

Table 6. Parameters tab

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network type</td>
<td>Displays the probe's network topology, such as Ethernet, Token Ring, wireless, and WAN.</td>
</tr>
<tr>
<td>Network speed</td>
<td>Displays the network speed. The distinction here is between the actual, measured speed of the network and the speed that the NIC card, possibly incorrectly, reads from its connection. For example, a 10/100Mb NIC card on a 10/100Mb connection to a switch on a network where all the other stations are running at 10Mb will report the network speed as 100Mb. This item is the actual number that the NIC card driver sends Observer, so 10Mb Ethernet will be reported as 10,000,000. 100Mb Ethernet will be reported as 100,000,000.</td>
</tr>
<tr>
<td>NIC card name</td>
<td>Displays the name of the card as reported by the NDIS driver to the registry.</td>
</tr>
<tr>
<td>Probe version</td>
<td>Displays the probe version used by the local Observer or probe.</td>
</tr>
<tr>
<td>Number of adapters</td>
<td>Displays the number of cards the local Observer or probe has configured.</td>
</tr>
<tr>
<td>Instance memory (MB) and Capture Buffer (MB)</td>
<td>Displays the amount of RAM the instance or probe has available for statistics and capture buffer. Observer has no limitations on the amount of RAM that can be used for a buffer. The maximum allowable buffer size is displayed in the Options &gt; Selected Probe or SNMP Device Properties &gt; Probe Parameters tab.</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>View Probe Instance Memory Allocation</td>
<td>Lets you view and edit how the memory used for statistics is allocated for this probe instance.</td>
</tr>
<tr>
<td>Network errors Supported by the NIC NDIS driver</td>
<td>Displays the aggregate errors that your NDIS driver provides statistics for.</td>
</tr>
</tbody>
</table>

Table 7. Adapter Speed tab

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Network Speed</td>
<td>Your current speed reported by the network card.</td>
</tr>
</tbody>
</table>
| Network Adapter Speed   | Choose to let Observer and the NIC automatically determine the network speed, or to select from various values (in megabits per second) for the network speed to be used for calculations.  
                          | The primary use of this is to correct a mistaken NIC's impression of overall network speed. A network card connected to a 10 megabit hub on a gigabit network will think that the entire network is only 1% as fast as it actually is. |

Table 8. Autoupgrade tab

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autoupgrade probe within minor version release</td>
<td>Activates the autoupdate feature for minor version (i.e., point) releases (which do not require a new license).</td>
</tr>
</tbody>
</table>
| Autoupgrade probe for major version release | Activates the autoupdate feature for major version releases. You must supply an ID and license key to update probes with a major version release. 
                          | If the probe includes a capture card and the upgrade includes a Field Programmable Gate Array (FPGA) firmware update, the system must be manually shut down and restarted before the firmware update can take effect. A system restart will not complete the firmware upgrade (a shut down is required); however, the autoupgrade process will restart the probe system, thus completing the probe software upgrade. In most cases, the probe will still be operable with a software-only upgrade, but any of the benefits of the firmware update are not activated until you manually shut down and restart the probe. |
| Force Probe Autoupgrade to the current Observer version | This provides a manual mechanism for updating a probe. |

Table 9. ToS/QoS tab

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collect Protocol Distribution by QoS</td>
<td>When enabled, QoS data is collected.</td>
</tr>
<tr>
<td>Use 802.11e Wireless TID/QoS</td>
<td>When enabled, QoS for wireless networks is collected.</td>
</tr>
<tr>
<td>IP ToS/QoS Standard</td>
<td>This tab is used for NetFlow and VoIP analysis. IPv4 supports the Type of Service (ToS) byte, also known as the Precedence byte. Different RFCs define different ways to interpret the byte: Default (RFCs 1349, 1195, 1123, and 791)</td>
</tr>
</tbody>
</table>
### Table 10. Wireless 802.11 tab

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site Profile</strong></td>
<td>Site profiles allows you to save and retrieve wireless parameters, rather than re-keying the parameters every time you change sites.</td>
</tr>
<tr>
<td><strong>Monitor Wireless Traffic by</strong></td>
<td>Choose one of the following:</td>
</tr>
<tr>
<td></td>
<td>Scan Channels—Click the <strong>Channel Map</strong> button and choose which channels you want to scan, then choose how often you want to scan them.</td>
</tr>
<tr>
<td></td>
<td>Scan Interval—Define the scan interval.</td>
</tr>
<tr>
<td></td>
<td>Fixed Channel—Pick a channel to monitor.</td>
</tr>
<tr>
<td></td>
<td>BSSID—Specify the Basic Service Set ID of the Access Point you want to monitor.</td>
</tr>
<tr>
<td></td>
<td>ESSID—Specify the Extended Service Set ID of the network you want to monitor.</td>
</tr>
<tr>
<td><strong>Use encryption keys</strong></td>
<td>If your wireless network is secured, you must provide an encryption key for Observer to be able to capture and decrypt the wireless traffic. Select the <strong>Edit Encryption Keys</strong> button and provide your wireless encryption key.</td>
</tr>
<tr>
<td><strong>Antenna to use</strong></td>
<td>The type of antenna connected to your system. Specify one of the following:</td>
</tr>
<tr>
<td></td>
<td>Antenna Diversity—Use the stronger signal from the two antenna ports. This is the recommended setting for the standard snap-on antenna.</td>
</tr>
<tr>
<td></td>
<td>Primary Antenna Only—If you are not using the standard snap on antenna, choose this option if the antenna you are using is connected to the primary antenna port (see your NIC manual for details).</td>
</tr>
<tr>
<td></td>
<td>Secondary Antenna Only—If you are not using the standard snap on antenna, choose this option if the antenna you are using is connected to the secondary antenna port (see your NIC manual for details).</td>
</tr>
</tbody>
</table>

### Table 11. DS3/E3/HSSI tab

<table>
<thead>
<tr>
<th>Setting</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WAN Type</strong></td>
<td>Choose DS3 (T3), E3 or HSSI to match the type of link you are analyzing, then choose the frame check sequence (FCS) standard: CRC-16 (the default) or CRC-32.</td>
</tr>
<tr>
<td><strong>Encapsulation</strong></td>
<td>You must set this to match the settings on the frame relay CSU/DSU.</td>
</tr>
<tr>
<td><strong>Subprotocol</strong></td>
<td>If ATM or LAPB is the selected encapsulation method, you must choose the sub-protocols on the link.</td>
</tr>
</tbody>
</table>
How to encrypt captured data at rest

Captured data at rest can be encrypted using the 256-bit Advanced Encryption Standard (AES) algorithm. This significantly increases the security of your at-rest data.

Prerequisite(s):
- You must have a special Observer license to enable and use this feature. There is no extra charge for the license.
- You must have a GigaStor hardware appliance. This feature is not available to GigaStor Software Edition. See the differences in software and hardware offerings for GigaStor.

Data at rest encryption is prevents visibility into any packets or even the metadata about the packets stored on the GigaStor. Any packets that are captured by the GigaStor are considered "data" and while they are stored on the GigaStor they are considered "at rest." Should any of the drives in the GigaStor be removed or misplaced, the data on the drives is protected. There is no remote access to this data apart from Observer’s own analyzer, and the data tagging methods for organizing and retrieving data can only be used in conjunction with Observer.

The GigaStor can capture 10 Gb line rate while simultaneously encrypting the traffic with AES-256 encryption without any significant performance impact on write or read speeds of the GigaStor. The RAID hardware is responsible for the encryption, and the data is encrypted before it is written to disk.

These instructions describe how to apply data at rest encryption to a GigaStor already in your possession. If your GigaStor shipped from the warehouse with the data at rest security already enabled, you do not need to complete this process unless two or more drives in your RAID have failed.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fractionalized</td>
<td>Check if your link is configured for fractionalized operation. Fractionalized DS3 and E3 are not supported.</td>
</tr>
<tr>
<td>Bandwidth (HSSI)</td>
<td>Set to match the bandwidth and channel settings of the fractionalized HSSI link under analysis.</td>
</tr>
</tbody>
</table>

Table 12. T1/E1 tab

<table>
<thead>
<tr>
<th>Setting</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAN/Frame Relay Type</td>
<td>Choose T1 or E1 to match the type of link you are analyzing.</td>
</tr>
<tr>
<td>Encapsulation</td>
<td>You must set this to match the settings on the frame relay CSU/DSU.</td>
</tr>
<tr>
<td>Subprotocol</td>
<td>If ATM or LAPB is the selected encapsulation method, you must choose the sub-projects on the link.</td>
</tr>
</tbody>
</table>

**Link 1 and Link 2 Channel Settings (Note that for the link and settings to be activated, you must check the On check box for that link).**

| Fractionalized         | Check if this link is configured for fractionalized operation.               |
| Channel selector check boxes | Choose the channels you want to be included in the analysis.          |
| Include in Util. Thermometer | Check if you want to include statistics from this link in the Bandwidth Utilization Thermometer. |
Caution: This procedure deletes all of the data on your GigaStor! Ensure you have a backup of any data you wish to keep.

1. Download the latest firmware for the Areca 1882 Series RAID card or contact VIAVI Support for the file.

2. Choose Start > All Programs > Areca Technology Corp > ArcHttpSrvGui > Areca HTTP Proxy Server GUI. The program starts. You should see something similar to the Figure 6 (page 39) image.

Figure 6: Areca RAID application

3. Select Controller#01 and click Launch Browser. If the controller is not running, click the Start button then launch the browser. The Areca RAID application attempts to connect to its web server.

4. Type the user name and password. The default user name is admin. There is no default password. Click OK to open the browser.

In the browser you can see the RAID set, IDE channels, Volume, and capacity.

5. In the web browser, choose System Controls > Upgrade Firmware. In the Browse field, choose each of the four files from the firmware package you downloaded or received from Technical Support in step 1 and click Submit. Choose the files in the order they are listed below. After adding the arch1882firm.bin file you are prompted to restart the system. Ignore that restart request and add the fourth file.

   ARC1882BIOS.BIN
   ARC1882BOOT.BIN
   arc1882firm.bin
   ARC1882MBR0.BIN

6. Restart the GigaStor.

7. Choose Volume Set Functions > Delete Volume Set. Select the volume, then select Confirm The Operation and click Submit. This deletes all of the existing data on the RAID.
8. Choose **Volume Set Functions** > **Create Volume Set**. Set the following options to these values, select **Confirm The Operation**, and click **Submit**.

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume RAID Level</td>
<td>Raid 5</td>
</tr>
<tr>
<td>Greater Two TB Volume Support</td>
<td>64bit LBA</td>
</tr>
<tr>
<td>Volume Initialization Mode</td>
<td>Foreground Initialization. It may take several hours (six hours for 48 TB) to initialization the volume. While the volume is being initialized, the GigaStor cannot be used. If you choose Background Initialization, you may use your GigaStor, but it will take significantly longer to complete and performance will be negatively affected.</td>
</tr>
<tr>
<td>Volume Stripe Size</td>
<td>128</td>
</tr>
<tr>
<td>Volume Cache Mode</td>
<td>Write Back</td>
</tr>
<tr>
<td>Volume Write Protection</td>
<td>Disabled</td>
</tr>
<tr>
<td>Full Volume Encryption</td>
<td>256Bit Key, AES Key</td>
</tr>
<tr>
<td>Tagged Command Queueing</td>
<td>Enabled</td>
</tr>
<tr>
<td>SCSI Channel</td>
<td>0:0:0</td>
</tr>
<tr>
<td>Volumes To Be Created</td>
<td>1</td>
</tr>
</tbody>
</table>


Because this is the first time that Observer is opened with the new license, it does not yet have a key for the encrypted volume. A window appears indicating that the volume is locked.

10. Click **Generate Key** and save the key file in a secure location following your organization's security policy.

- When rebooting, the system needs access to key in order to unlock the drive. This is the key necessary to write to and read from the RAID volume.
- Observer will not open unless it can find the key. Without the key present neither packet capture nor packet analysis can occur. You can choose to remember the key file location so that Observer opens automatically, or, if left cleared, each time Observer is opened you must provide the path to the key file.
- Securely storing the key is a critical part of your responsibility.

11. Close Observer until the rest of this procedure is complete.

12. In **Control Panel** > **Administrative Tools** > **Computer Management** > **Storage** > **Disk Management** select the RAID volume, right-click and choose **Initialize**. In the Initialize Disk window, select Disk 1 and GPT (GUID Partition Table). Convert the volume to a Simple Layout, assign a drive letter (typically, D:), and provide a name (typically, DATA).

13. Repeat this process for each RAID volume for your GigaStor.

14. Open Observer.
Using the Probe

The probe has two interfaces: the probe service and the analyzer user interfaces. You can switch between the two depending on what you want to accomplish. Also learn about monitoring a wireless access point (AP) and where to enable network trending.

Switching between the probe and analyzer user interfaces

Most probes can be run as either a Windows service or in application mode. Some settings can only be made when the probe is in application mode.

**Prerequisite:** Multi or Expert Probe.

Depending on how you want or need to use your Expert Probe, it can be either an Observer to help you view your network data or it can be a probe to capture data and to which other Observer can connect. The Expert Probe software cannot simultaneously be an analyzer and a probe.

To change the Expert Probe interface to load as a fully-featured Observer, click **File** and **Open Probe Configuration.** You must restart the application to see the change.

**Note:** For a GigaStor, the Expert Probe software is running as a Windows service. You must stop the Expert Probe service before you can change its interface.

1. Right-click the **Probe Service Configuration Applet** in the system tray and choose **Open Probe Configuration.**
   
   Figure 7: Probe Service Configuration Applet
   
   The **Probe Administration** window opens.

2. Choose **Options > Probe Options.**

3. Clear the option **Run Probe as a Windows Service** option, and click **OK.**
   
   This removes the VIAVI Expert Probe service from Windows.

4. Start Observer.

   
   This closes Observer.

7. Start Observer.

Observer is now set to use the analyzer interface.

When switching back to an Expert Probe on the GigaStor, you must reverse these steps and then you must manually start Expert Probe from the Windows Service Control Manager. It may take a moment before the service starts. You may need to restart the GigaStor for the setting changes to fully set.
Enabling Network Trending and setting which statistics are collected

A probe can provide many different statistics about your network, but you must enable the collection of those statistics. Network Trending does not capture packets, but collects statistics about the traffic on your network. Many reports in Observer use the trending information, and we recommend you enable Network Trending.

1. To turn on the collection of a specific statistic, in Observer choose Statistics > and then select the statistic you want to have the probe collect and report.

Monitoring a wireless access point

You can capture all wireless traffic with a wireless network card on a laptop or any system with a wireless network card if you use the VIAVI wireless driver. The default driver for your wireless card is not sufficient for Observer.

Standard network cards do not support "raw" wireless packets, nor do they enable "promiscuous" mode by default. Promiscuous mode captures all packets for the analyzer, not just those addressed to the network card. Both "raw" wireless packets and promiscuous mode are required by Observer. The VIAVI wireless driver enables these options.

When a network card is running in promiscuous mode, it cannot connect to a wireless access point. It can only capture traffic. If you are using a laptop and want to capture traffic and at the same time connect to a wireless access point, your laptop must have two wireless cards.

If you are using the probe software on your laptop, you need two network adapters. Typically, one adapter is an Ethernet card for communication and one wireless adapter for analysis. You could also use two wireless cards. You may also need special drivers.

If your wireless network uses an encryption key or specific wireless channels, you can specify that information for the wireless adapter.

Note: use private keys to authenticate with a RADIUS server, then dynamic keys are used to encrypt communication on a user by user basis, with no two users ending up with the same keys. Observer cannot decrypt the data from a site that implemented EAP/LEAP, but this does not mean Observer is not useful. Because all management and control packets are not encrypted, wireless troubleshooting is not affected even if you use EAP/LEAP. If you want to troubleshoot the actual data in the conversation, collect the data on the wired side where there is no encryption and all protocols can be decoded. Observer supports both wired topologies (i.e. Ethernet, Token Ring and FDDI) as well as wireless topologies to troubleshoot both sides of a conversation (wireless management+control AND full wired data) you only need one product.

How to assign physical ports to probe instances

By default, the active instance monitors network traffic from every physical port of your capture card—all the traffic is aggregated. If you want to instead “divide” your monitored network traffic by physical ports, to help you monitor certain
SFPs separately from others, then you can use virtual adapters to assign specific physical ports to probe instances.

**Prerequisite(s):**

Your hardware appliance must have one of the following:

- Gen2 capture card
- Gen3 capture card

For example, suppose you are deploying an 8-port Gen3 capture card as follows:

- Ports 1-4 are monitoring a collection of trunked links
- The remaining ports are each connected to the SPAN (or mirror) port on a switch

In this scenario, it makes sense for Observer to view ports 1-4, for example, as a single stream of network traffic and to separate each of the four remaining ports into separate data streams. Virtual adapters are a convenient way to accomplish this separation or aggregation in real time, rather than depending on filters to sort through the traffic post-capture.

These are the general steps for assigning physical ports to a probe instance:

- Create a virtual adapter (or have one already).
- Assign physical ports to this virtual adapter.
- Set a probe instance to use this virtual adapter as its NIC.

**Tip!** As a general reminder, you risk severe performance loss when using more than one active instance. These instructions do not create multiple active instances.

To assign physical ports to a specific probe instance:

1. In Observer, right-click the Gen3 capture card-equipped probe instance from the probe list, and click **Probe or Device Properties**.

   A Gen3 capture card-equipped probe instance shows (Gigabit) or similar after the name.

2. Click the **Virtual Adapters** tab.
3. Select a virtual adapter, and click Edit Adapter.

4. Select physical ports from the Available Ports list, and click Add.

   You can select more than one physical port by holding CTRL as you click.

5. Click OK to return to the Virtual Adapters window.

6. Click OK to save the virtual adapter and close the Virtual Adapters window.

   Changes to virtual adapters are not be saved until OK is clicked in the Virtual Adapters window.

   The virtual adapter appears in the list of available network adapters when creating a probe instance. This allows you to assign the virtual adapter to a specific probe instance, among other benefits.
Next, you should change the monitored network adapter (page 26) of a probe instance to use the virtual adapter.

Using the NetFlow features in Observer

Watch a video about NetFlow in Observer, and see a list of some important NetFlow considerations to know.

Like many things in Observer a feature is not in just one place, but spread throughout the product. NetFlow is no different. Use this section as a starting place to find what you need regarding NetFlow in Observer.

♦ Choose the right probe for you.
♦ Ensure your ToS/QoS is set for your network so that your statistics are correct.
♦ There are two different types of NetFlow collectors. Learn the differences and see how to create one.
♦ Capturing NetFlow statistics does have some limitations that are different from packet capture.
♦ Decoding a NetFlow flow. This section also details how you may need to configure your NetFlow device so that Observer can see the flows.
♦ Open a saved NetFlow capture.
♦ Most NetFlow information comes from Network Trending.

Creating a NetFlow collector or NetFlow Trending collector

There are two types of NetFlow collectors in Observer. Choose the correct one for your needs, or create two different probe instances—one for the NetFlow collector and another for the NetFlow Trending collector.

**Prerequisite:** Expert Probe

**Note:** If you want to have scheduled collection of your NetFlow devices, use the settings on the Schedule tab.

NetFlow and sFlow collectors support the following versions of these technologies:

♦ NetFlow: 1, 5, 7, 9, and 10 (IPFIX)
♦ sFlow: 2, 4, and 5

There are two types of NetFlow collectors in Observer. Choose the correct one for your needs, or create two different probe instances—one for the NetFlow collector and another for the NetFlow Trending collector. In most cases, it will likely be the NetFlow Trending collector. The NetFlow Trending collector supports up to 50 NetFlow devices, whereas the NetFlow collector only supports one NetFlow device. That means you must add and configure a NetFlow collector for each NetFlow device in your environment.
One flow per collector | NetFlow Trending collector | NetFlow collector
--- | --- | ---
Up to 50 flows per trending collector | X |  
Collects live statistics \(^1\) |  | X
Collects historical trending \(^2\) | X | X

1. Live statistics are details about the flow that appear in Observer in as few as five seconds.
2. Historical trending data collection interval can be as few as 60 seconds.

See Creating a probe instance (page 24) for details about creating a NetFlow collector or a NetFlow Trending collector. In Creating a probe instance (page 24) choose NetFlow collector or NetFlow Trending collector and follow the on screen instructions. After the probe instance is created, there is no other configuration you must do and it is ready to use.

After the probe instance is created, you may want to configure the probe to tell it what type of traffic is seen.

2. On the General tab, configure the Timing and Statistics Packet Sampling sections for your needs and Click OK.

4. Click the Settings button.

5. Configure any settings for Network Trending here.

6. Click OK to close the Network Trending Settings window.

7. Click the Start button to begin monitoring the NetFlow devices.

8. After you have collected some data, click the Analysis button. The View Network Trending data dialog opens.

9. Choose “Transfer and view current day statistics” and click OK. This opens the Network Trending Viewer in a new tab. In the Network Trending Viewer you can see for your NetFlow devices:

   Station Activity Time
   Top Talkers
   Packet Size Distribution
   Bandwidth Utilization
   Protocols
Chapter 3: Understanding How a Probe Uses RAM

How a probe uses RAM

A Windows computer uses Random Access Memory (RAM) as a form of temporary data storage. Windows separates all available memory into three sections: protected memory, user memory, and reserved memory. An Observer probe, depending on how it is configured, uses these types of memory differently.

The protected memory is used to load critical operating system files, such as device drivers. If any of this RAM is dedicated to a driver or some other critical file, it cannot be used by another program. However, after Windows finishes loading its drivers, the memory is freed and any program may access the remaining protected memory.

User memory is all available memory beyond the protected memory. It is available to any application at any time. The probe uses this memory to temporarily store statistical information, such as Top Talkers data.

Reserved memory is user memory that you have specifically set aside for use by the Observer probe. Only the probe may use that portion of RAM. When the RAM is reserved for the probe not even the operating system may access it—even when Observer is closed.

By having RAM reserved specifically for the Observer probe, you ensure that the probe has the memory necessary to capture packets and store these packets for statistical processing. If Observer runs without any reserved memory, it requests and uses the operating system’s protected memory for capturing packets. There is no adverse effect of running an Observer probe without reserved memory, but it is not the most efficient way to run the probe. By default, the probe uses no reserved memory. Our recommendation is that you reserve memory for Observer
so that the probe runs efficiently and leaves the protected memory for the operating system and other programs to use.

Packet captures are always written sequentially from the first open byte of RAM in reserved memory or in Windows protected memory. They are written until all available space is used. If you are using a circular buffer, then the first packet is overwritten with the newest packet. This is first-in, first out (FIFO). With Windows protected memory, your capture space is limited to about 50 to 80 MB, but with reserved memory you have the potential to store many gigabytes in memory. Figure 9 (page 48) describes the two different ways that Observer runs.

Figure 9: Windows protected memory, user memory, and reserved memory

Whether using protected memory or reserved memory, Observer uses the RAM to store data for things such as (and creates a section within the RAM dedicated to):

- Packet capture
- Statistics queue buffer
- Collected statistical memory

Network packets seen by Observer are passed to both the packet capture memory and to the statistics queue buffer. After a packet is processed by the statistics queue buffer, the statistical information is passed to the statistical memory. All packets in both the packet capture memory and the statistical queue buffer stay in memory until the buffer is full and the oldest packets are replaced by newer packets (using FIFO).

Figure 10 (page 49) shows what options in Observer control the size of various portions of memory.
Packet capture buffer and statistics buffer

There are two kinds of buffers that a probe uses to store data in real-time: capture buffers and statistical buffers. The capture buffer stores the raw data captured from the network while the statistical buffer stores data entries that are snapshots of a given statistical data point.

Selecting an appropriate capture buffer size given system resources is all most users need to worry about; the default settings for the statistical buffers work perfectly fine in the vast majority of circumstances.

However, if you are pushing the limits of your probe system by creating many probe instances, you may be able to avoid some performance problems by fine-tuning the memory allocation for each probe instance.

For example, suppose you want to give a number of remote administrators access to Top Talkers data from a given probe. You will be able to add more probe instances within a given system’s memory constraints if you set up the statistics buffers to only allocate memory for tracking Top Talkers and to not allocate memory for statistics that no one will be looking at.

Observer has no limitations on the amount of RAM that can be used for a buffer.

Note that when run on a 64-bit Windows, there is no 4 GB limitation for the capture buffer; you are limited only by the amount of physical memory installed on the probe.

In all cases, the actual buffer size (Max Buffer Size) is also reduced by 7% for memory management purposes. Should you try and exceed the Max Buffer Size an error dialog will be displayed indicating the minimum and maximum buffer size for your Observer (or probe) buffer.

For passive probe instances, which are most often used for troubleshooting, the default settings should be sufficient. If you are creating an active probe instance (one that writes to disk and not just reads from it), then you may want to use the following formula as a rough guideline to determine how much RAM to reserve.
Use this formula to determine your RAM buffer size:

\[
\text{Network Speed} \times \text{Average Throughput (MB/second)} \times \text{Seconds of data storable in RAM}
\]

**Tip!** You want a buffer that will handle your largest, worst case unfiltered burst.

Use this formula to determine how much hard drive space a capture requires (in GB) and Observer’s write-to-disk capability. There is no limitation to the amount data Observer can write to disk other than the disk size itself.

\[
\frac{(\text{Traffic Level} / 8 \text{ bit}) \times 3600 \text{ Seconds}}{1024 \text{ bytes}} \text{ Gigabytes per hour}
\]

For instance a fully utilized 1 Gb port (1 Gbps is 125 MBps):

\[
\frac{(125 \text{ MBps} / 8 \text{ bit}) \times 3600 \text{ Seconds}}{1024 \text{ bytes}} \approx 54.93 \text{ GB per hour}
\]

### Running Observer without reserved memory

Single probes cannot use reserved memory. By default, no memory is reserved for Observer if you install it on your own system.

**Prerequisite(s):**

- All versions of Observer Expert, Observer Suite, Expert Probe software, and Multi Probe software installed on your own hardware, unless modified.
- Single Probe software at all times
- NetFlow probes

Observer without reserved memory is the default, but not recommended, configuration. It is the default because each network is unique and you must determine how you want Observer to be configured for your system.

**Note:** This section does not apply to the GigaStor or other hardware products from VIAVI. They are properly configured at the factory.

**Tip!** If you need more RAM for the statistics queue buffer, you may need to lower the amount of RAM dedicated to packet capture so that it is freed and available to add to the statistics queue.

After you install Observer and first open the program it does not have any reserved memory. Observer allocated a portion of the available protected memory for its use. This creates a “Windows memory pool” for Observer of about 50 to 80 MB (depending on the amount available from Windows, and cannot be increased). This is a limitation of the Windows memory pool and the Windows operating system.
Single Probes, unlike Multi-Probes and Expert Probes, cannot use reserved memory because of their design. By default, 16 megabytes is available for the Packet Capture and Statistics Queue buffer. Single Probes have a maximum of 52 megabytes that can be assigned from the Windows memory pool. Because of the Windows memory pool constraint, Single Probes are limited to a Packet capture buffer maximum of 72 megabytes, assuming you set the Statistics queue buffer to its minimum (12 megabytes). The Statistics queue buffer maximum is 76 megabytes if the Packet capture buffer is set to 0 megabytes.

1. Click the **Memory Management tab** to display the list of probe instances and their buffer sizes.

2. Click the **Configure Memory** button at the top of the window to view and modify how Observer uses the protected memory for this probe instance. The Edit Probe Instance window opens.

On the Edit Probe Instance window, you can see how memory is allocated for:

- Packet capture
- Statistics queue buffer

You can also see how much protected memory is still available in the Windows memory pool.

**Figure 11: Edit Probe Instance**

3. Use the arrows to the right of the Packet capture and Statistics queue buffer to increase or decrease the amount of RAM you want dedicated to each. See *How to allocate the reserved RAM (page 55)* to help determine how to divide the memory.
Running Observer with reserved memory

Reserved memory helps Observer run more efficiently by dedicating memory for its exclusive use.

Prerequisite(s):

- Observer Expert
- Observer Suite
- Expert Probe software
- Multi Probe software

Observer uses reserved memory for packet capture and the statistics queue buffer. It is highly-recommended that you use reserved memory. (GigaStor appliances running Observer are preconfigured this way.) You must determine how you want Observer to be configured for your system.

**Caution:** Never change the reserved memory settings of VIAVI hardware unless VIAVI instructs you do so. Reserved memory settings should only be modified on non-VIAVI hardware, such as a desktop computer running Observer.

**Tip!** If you need more RAM for the statistics queue buffer, you may need to lower the amount of RAM dedicated to packet capture so that it is freed and available to add to the statistics queue.

Reserving memory allows Observer to allocate RAM for its exclusive use. This ensures that Observer has the necessary memory to store packets for statistical analysis, or for capturing large amounts of data for decoding. The more memory you reserve for Observer, the larger the packet capture and statistical queue buffers can be.

If the memory buffer for the statistics queue buffer is too small, you may end up with inaccurate statistical data because some data may get pushed out before it can be processed. Observer processes packets on a first-in, first out (FIFO) basis, so it is important that the buffer be large enough to allow for processing.

When reserving RAM for Observer you are taking RAM away from the operating system. **Table 13 (page 52)** shows how much memory is required by the operating system. Anything beyond this amount may be reserved for Observer.

### Table 13. Reserved memory requirements

<table>
<thead>
<tr>
<th>Operating System</th>
<th>RAM required for the operating system</th>
</tr>
</thead>
<tbody>
<tr>
<td>64-bit with less than 4 GB RAM</td>
<td>800 MB</td>
</tr>
<tr>
<td>64-bit with 4 GB RAM</td>
<td>4 GB ¹</td>
</tr>
<tr>
<td>64-bit with 6+ GB RAM</td>
<td>4 GB</td>
</tr>
<tr>
<td>32-bit</td>
<td>256 MB (although 400+ MB is recommended)</td>
</tr>
</tbody>
</table>

1. Because of how 64-bit Windows loads its drivers when 4 GB of RAM is installed all 4 GB is used by Windows. This is sometimes referred to as the BIOS memory hole and means you cannot reserve
any memory for Observer. To capture packets on 64-bit Windows install either more than or less than 4 GB of RAM.

2. 32-bit operating systems do not support more than 4 GB of RAM. Observer cannot use any RAM above 4 GB.

1. To see how much protected memory the probe has, click the **Memory Management tab**.

2. Click the **Configure Memory** button at the top of the window to view and modify how Observer uses the protected memory for this probe instance. The Edit Probe Instance window opens.

On the Edit Probe Instance window, you can see how memory is allocated for:

- Packet capture
- Statistics queue buffer

You can also see how much protected memory is still available in the Windows memory pool.

3. Use the arrows to the right of the Packet capture and Statistics queue buffer to increase or decrease the amount of RAM you want dedicated to each. See **How to allocate the reserved RAM (page 55)** to help determine how to divide the memory.

4. After reserving memory for Observer you must restart the system for the changes to take affect. After you restart the system you can allocate the memory to the different probe instances.

### How packet capture affects RAM

When you start a packet capture (Capture > Packet Capture and click **Start**), all packets that Observer sees are placed into the packet capture buffer (a specific portion of the protected memory). The packets stay in this protected memory until the buffer is cleared. If you are using a circular packet buffer, new packets overwrite old ones after the buffer is full.

**Figure 12 (page 54)** shows how Observer receives a packet and distributes it throughout RAM, and how it is written to disk for packet capture and GigaStor capture.

Packets received by the network card are passed to Observer, where Observer puts each packet into RAM, specifically in the packet capture memory buffer and the statistical queue buffer. If a packet must be written to disk for either a GigaStor capture or a Packet Capture, it is copied from the RAM and written to the disk.
The capture card receives data off the network.

The capture card passes data into RAM. In the RAM it goes into the packet capture buffer and the statistics queue buffer.

The statistics queue buffer passes the information to the statistics memory configuration.

The statistics memory configuration passes the data to the real-time graphs.

The Network Trending Files receive data from the statistics queue buffer through the NI trending service, where they are written to disk.

The following steps occur only if you are writing the data to disk through a packet capture to disk or a GigaStor capture.

If you are using packet capture to disk, the packet capture buffer passes the data to the operating system's disk.

If you are using GigaStor capture, the statistics queue buffer and the packet capture buffer passes the information to the RAID.

A few notes about how some buffers are used:

- Packets received by the statistics queue buffer are processed and put in the collected statistics buffer.
- Data for network trending comes from the statistics queue buffer, then it is written to disk, and finally flushed from the buffer every collection period.
- The collected statistical buffer does not use first-in, first-out to determine statistics. Therefore, after the statistic limit is reached the remaining data is no longer counted; however, data for known stations continue to be updated indefinitely.
- Regardless of whether Observer is using reserved memory, the statistics memory, statistics queue buffer, and packet capture buffer function the same. The storage space available for storing packets in memory increases though when you reserve memory.
How to allocate the reserved RAM

After you have the RAM reserved for Observer, you must allocate it for the probe instances. Here are our basic recommendations for allocating the memory. These are just recommendations and may be changed or modified for your circumstances.

If you are using a GigaStor hardware appliance, read this section, but also be sure to consider the information in Recommendations for the VIAVI capture cards (page 55).

How many probe instances will you have on this system? How are you using the probe instance(s)? Are you using it to capture packets or to analyze statistics? After you know how you want to use the probe instance, you can decide how to properly divide the memory amongst the probe instances, and further how you will allocate the memory between the packet capture and statistics queue buffers.

You want to create and use as few probe instances as absolutely necessary. Each probe instance you create divides the memory pool into smaller chunks. The more probe instances you have, the more processing the system must do.

**Note:** If you have a lot of network traffic, then you may need to allocate at least one gigabyte of RAM to the packet capture buffer, the statistics queue buffer, or both.

For each probe instance determine:

- If you want to mostly capture packets, then allocate 90% of the reserved RAM to packet capture and 10% to the statistics queue buffer. At a minimum, you should allocate 12 MB to collect statistics. If you are using a GigaStor, you should allocate the vast majority of the reserved RAM for the active probe instance to packet capture.
- If you want to collect statistics or trending data, or use analysis, then allocate 90% (or even 100%) of the reserved RAM to the statistics queue buffer.
- If you want to do both, determine which you want to do more of and allocate the memory accordingly.

Recommendations for the VIAVI capture cards

There are capture card requirements and considerations if you are using a GigaStor appliance, as the appliance may have a Gen3 capture card or Gen2 capture card installed.

Here are some special configuration issues to consider when dealing with these capture cards:

- For either the Gen3 capture card or Gen2 capture card, you need a minimum of 100 MB allocated to the capture buffer of any probe instance that is bound to the capture card. Allocating less than 100 MB to a probe instance monitoring a VIAVI capture card may cause instability.
- If you are using any hardware accelerated probe instance, you must have at least 80 MB for both packet capture and the statistics queue buffer. No packets are captured if either or both are below 80 MB. 80 MB is the
minimum, but consider substantially raising this amount. The more RAM that you can allocate to packet capture and statistics, the better your GigaStor probe will perform.

📍 When using multiple probe instances on a GigaStor, ensure that only one probe instance is associated with the capture card. (If you are using virtual adapters to monitor disparate networks, then you may have more than one active instance bound to the capture card.) For performance reasons, all other probe instances should be associated with a different network card.

If you feel a capture card is not performing as expected, ensure that there is only one probe instance bound to it. If there is more than one, verify that the other probe instances are not collecting any statistics. It is possible that the probe instance you are looking at is not collecting any statistics, but one of the other probe instances may be. (This is only an issue if there are multiple probe instances connected to the Gen3 capture card or Gen2 capture card. This does not apply if the other probe instances are connected to a regular network card.)
Chapter 4: Gen3 Capture Card

The Gen3 capture card is a GigaStor appliance exclusive. Learn about its features, configuration options, supported SFP/SFP+ media types, and more.

Hardware configuration

Using SFP modules, the Gen3 capture card can be configured to monitor nearly any source of network traffic at a variety of connection speeds. The Gen3 capture card hardware also unlocks certain features in Observer/GigaStor.

Understanding the capture card

The Gen3 capture card is designed and manufactured exclusively by VIAVI. This capture card is optimized for the Observer Platform and comes pre-installed in many GigaStor hardware and probe appliances.

The Gen3 capture card is a special network adapter for high-speed packet capture. The card is full-duplex and can monitor up to eight ports\(^1\) in real time. Also, the Gen3 capture card is for capturing only, so it does not send IP traffic from any of its ports.

More features of the Gen3 capture card include:

- Hardware acceleration in Observer/GigaStor
- Deduplication to remove duplicate packets in real time
- Virtual adapters allow the creation of several logical network adapters
- Accurate and reliable time stamps
- Ports have individually configurable auto-negotiation

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1. The number of ports varies from 2, 4, or 8, depending on the physical configuration of your hardware appliance.
Able to mix-and-match 1Gb and 10Gb modules
Compatible with most SFP/SFP+ module choices

Note: All packets captured by the probe are time-stamped immediately as they are seen by the capture card interface. The packets are then passed to the capture buffer. This ensures the most accurate time stamp.

Supported QSFP+/SFP/SFP+ media types
The Gen3 capture card requires SFP modules. These are the supported media types.

- 100 Gb QSFP28 Transceivers
  - 1000BASE-SR4
  - 1000BASE-LR4
  - 1000BASE-SR
- 40 Gb QSFP+ Transceivers
  - 40GBASE-SR4
  - 40GBASE-LR4
  - 40Gb BIDI-SR
  - 40GBASE-RX (Receive only. For use with an optical network tap)
- 10 Gb Ethernet SFP+ Transceivers
  - 10GBASE-SR
  - 10GBASE-LR
  - 10GBASE-ER
  - 10GBASE-ZR
  - 10GBASE-T
  - 10 Gb Direct Attach Copper
- 1 Gb Ethernet SFP Transceivers
  - 1000BASE-SX
  - 1000BASE-LX
  - 1000BASE-ZX
  - 1000BASE-T (includes copper at 10/100/1000)

Note: For 40 Gb connections, then QSFP+ may be used and only if your exact capture card model supports it.

How to configure the card for an optical TAP, SPAN, or other
You must make configuration changes to the capture card depending upon whether you connect to a SPAN/mirror port, a passive optical TAP, or to a switch aggregator or conversion TAP using fiber.

Prerequisite(s):
For fiber optic connections that require a splitter: these steps assume you are using the VIAVI optical Y-splitter cable, as it is unable to inject light back into the upstream network link and the provided steps assume the cable is being used. If
a third-party optical splitter cable is used instead when **Tx Enable** is enabled on those capture card ports, it could cause interference with the upstream network link because the cable could inject light back into the upstream network link. To summarize, the steps listed for fiber optic connections in this document might not represent the best course of action if you are using a third-party optical splitter.

Auto-negotiation sets the correct port speed between a capture card port and a network device. The network devices connected to the capture card typically include network TAPs, SPANs or mirror ports from a switch, and feeds from a network packet broker or switch aggregator. Here are some general best practices:

- Auto-negotiation must be *disabled* when connecting the capture card to a passive, fiber-optic TAP.
- Auto-negotiation must be *enabled* when connecting the capture card to copper SPAN or mirror ports.

To configure the capture card to properly connect to a network device:

1. In your version of Windows, open **Device Manager**.
2. In the tree on the right, expand **Viavi Solutions Inc. Capture Adapters**.
3. Right-click the capture card entry and choose **Properties**.
4. Click the **Advanced Properties** tab.
5. Do one of the following, and ensure the same settings are set for each capture card port that makes up a link:
   - If you are connecting a passive, optical TAP to the capture card:
     - Clear **Auto-Neg Enable** (off).
     - Clear **Tx Enable** (off).
   - If you are connecting a copper SPAN/mirror port to the capture card:
     - Select **Auto-Neg Enable** (on).
     - Select **Tx Enable** (on).
   - If you are connecting a fiber optic mirror port from a switch or conversion TAP to the capture card:
     - Clear **Auto-Neg Enable** (on).
     - Select **Tx Enable** (on).

For connecting a fiber optic mirror port from a switch, some switches need **Tx Enable** turned on for those capture card ports to establish a connection. If this results in problems, turn off **Tx Enable**. Similarly, the correct setting for **Auto-Neg Enable** can change depending on your hardware and environment, so enable or disable it if you encounter problems.
Each configured and cabled capture card port to your device(s) should establish a working connection.

When to use a SPAN/mirror port

The advantage of using a SPAN/mirror port is its cost, as a SPAN/mirror port is included for free with nearly every managed switch. A SPAN/mirror port is also remotely configurable, allowing you to change which ports are mirrored from the switch management console.

There are some limitations in using a SPAN/mirror port. Limitations of a SPAN/mirror port stem from the aggregation necessary to merge full-duplex network traffic into a single receive channel. For examples, when traffic levels on the network exceed the output capability of the SPAN/mirror port, the switch is forced to drop packets. Another reason that a SPAN/mirror port may not be the right choice is because Layer 1 and 2 errors are not mirrored and therefore never reach the analyzer. When performing network troubleshooting, seeing these errors can be important.

When monitoring with a SPAN/mirror port on a switch, the switch does three things:

- Copies both the send and receive data channels
Reconstructs an integrated data stream from the two channels
Routes the integrated signal to the send channel of the SPAN/mirror port

Each of these activities burdens the switch's internal processor. These demands on the switch's CPU have implications for both your monitoring equipment and general network performance. Using a SPAN/mirror port to capture network traffic for analysis presents the following risks:

- As total bandwidth usage for both channels exceeds the capacity of the outbound link to the analyzer, the excess traffic is dropped from the analyzer stream. There simply is not enough bandwidth to transmit both sides of the full-duplex traffic across a single standard interface.
- The switch's CPU must act as both a network switch and a packet-copier. The switch's CPU must also integrate the two data streams (send and receive) together correctly. Both packet copy/re-direction and channel integration is affected by switch load. This means the SPAN/mirror port may not deliver accurate captures when the switch is under heavy load. Monitoring a 10/100 network through a Gigabit SPAN/mirror port and analyzer does not alleviate these concerns. Also, there is no notification when the SPAN/mirror port is dropping packets or delivering inaccurate time stamps.

A SPAN/mirror port can deliver satisfactory results when used to monitor lightly used, non-critical networks. If network utilization exceeds the capacity of the outbound (analyzer) link, packet loss results—which invalidates many types of analysis, and makes monitoring for certain kinds of network activity impractical. For example, you might miss a virus signature because packets are being dropped. When analyzing a transaction or connection problem, the analyzer may detect problems where none exist because expected packets are being dropped by the SPAN/mirror port. Hardware and media errors will also be impossible to troubleshoot through a SPAN/mirror port, as these errors are not mirrored to the analyzer.

Software configuration

The Gen3 capture card hardware unlocks certain features in Observer/GigaStor. You can configure and use these settings inside the Observer application and Windows Device Manager.

How to view the capture card properties

Viewing the Gen3 capture card properties allows you to verify what you think is happening at the card level (such as SFP activity, link speed, auto-negotiation) is actually happening. Additionally, configuration changes to the card can be made here.

**Tip!** These settings can be viewed remotely using Windows RDP or an equivalent remote desktop application. You might find this useful for checking SFP and link states when physical access to the GigaStor is not feasible.

Some benefits of viewing the Gen3 capture card properties include:
- Verifying if an SFP...
  - is present and in which port.
is active or idle.
- is operating at the speed you expect.

Verifying the board’s...
- hardware acceleration (HA) status.
- auto-negotiation settings per port.
- ID string that also contains the firmware version.
- PCIe lane speed\(^2\).
- power range (good /bad)
- operating temperature (good/bad)

Seeing configurable options for...
- per port auto-negotiation.

**Tip!** Be sure to disable auto-negotiation for TAP connections, and enable auto-negotiation for SPAN connections.

To view the Gen3 capture card properties:

1. In your version of Windows, open **Device Manager**.
2. In the tree on the right, expand **Viavi Solutions Inc. Capture Adapters**.
3. Right-click the capture card entry and choose **Properties**.

The Gen3 capture card device properties window is now visible.

**Figure 14: Gen3 capture card properties**

2. PCIe lane speed is reported per lane, and the Gen3 capture card uses multiple lanes together.
See Capture card device properties (page 75) for more explanation of the capture card properties in Windows Device Manager.

How to create virtual adapters

By default, Observer recognizes a Gen3 capture card as a single network adapter. However, you can make multiple clones of the capture card, called virtual adapters, and use each independently.

Prerequisite(s):
Your hardware appliance must have one of the following:
- Gen2 capture card
- Gen3 capture card

Each virtual adapter is a cloned Gen3 capture card that can have physical ports assigned to it in any quantity and combination. In this way, Observer can then see and use multiple network adapters as if they physically existed in your hardware appliance.

By default, you already have one virtual adapter: it matches the installed Gen3 capture card exactly, unless you accidentally deleted this virtual adapter or unassigned some of its ports. It can be recreated by following these same steps.

To create a virtual adapter:

1. In Observer, right-click the Gen3 capture card-equipped probe instance from the probe list, and click **Probe or Device Properties**.
   
   A Gen3 capture card-equipped probe instance shows (Gigabit) or similar after the name.

2. Click the **Virtual Adapters** tab.
3. Click **New Adapter**.

   The **Assign Ports to Virtual Adapter** window opens.

4. Type a name in the **Adapter Name** box.

5. Select physical ports from the **Available Ports** list, and click **Add**.

   You can select more than one physical port by holding **CTRL** as you click.

6. (Optional) If this virtual adapter should operate during certain days and times only, select **Schedule virtual adapter ports** and follow the prompts.

   (Optional) If you choose to set a schedule for your virtual adapter, the remaining steps in this procedure may not be followable as written.
7. (Optional) If the virtual adapter should skip (discard) duplicate packets, select **Skip duplicate packets**.

8. Select each added port, click **Edit Port**, and type a useful description for each port such as its connected device.

   This description appears in the GigaStor Control Panel in Observer.

   **Note:** If you want to filter on physical ports, an option in the hardware acceleration settings is described at .

9. Click **OK** to save the virtual adapter and close the **Virtual Adapters** window.

   Changes to virtual adapters are not be saved until **OK** is clicked in the **Virtual Adapters** window.

   The virtual adapter appears in the list of available network adapters when creating a probe instance. This allows you to assign the virtual adapter to a specific probe instance, among other benefits.

   You should create a new probe instance for any virtual adapter you create, and assign the virtual adapter to that probe instance (page 26). This is because, by default, new virtual adapters are not assigned to any probe instance, so no data is collected with that virtual adapter until the virtual adapter is assigned to a probe instance.

### How to remove duplicate packets in real time

Use hardware acceleration on the Gen3 capture card to remove duplicate packets before they are captured to disk or acknowledged by Observer. This is called packet deduplication.

**Prerequisite(s):**

Hardware acceleration must be enabled on your Gen3 capture card for this feature to function. Hardware acceleration for your virtual adapter is enabled by default.

To use hardware acceleration to skip duplicate packets:

1. Right-click the Gen3 capture card-equipped probe instance and choose **Probe or Device Properties**.

2. Click the **Virtual Adapters** tab.

3. Click **Edit Adapter**.

4. In the **Assign Ports to Virtual Adapter** window, select **Skip duplicate packets** and click **OK**.

5. (Optional) Click **Skip Duplicate Packets Configuration**.

   The **Skip Duplicate Packets Using Hardware Accelerated Capture Adapter** dialog appears.
6. (Optional) Select how duplicate packets are recognized by the Gen3 capture card and click **OK**.

   **Example**: (Optional) For example, by selecting **Examine IP time to live (TTL)**, the packet time to live is considered when determining a duplicate packet. If the option is cleared, TTL is ignored for all consideration of what is, and what is not, a duplicate packet.

7. Click **OK** to enable packet deduplication.

   The Gen3 capture card now skips duplicate packets that it receives on the active instance. The duplicate packets will not be saved to disk or acknowledged by Observer.

**How to assign physical ports to probe instances**

By default, the active instance monitors network traffic from every physical port of your capture card—all the traffic is aggregated. If you want to instead “divide” your monitored network traffic by physical ports, to help you monitor certain
SFPs separately from others, then you can use virtual adapters to assign specific physical ports to probe instances.

**Prerequisite(s):**
Your hardware appliance must have one of the following:
- Gen2 capture card
- Gen3 capture card

For example, suppose you are deploying an 8-port Gen3 capture card as follows:
- Ports 1-4 are monitoring a collection of trunked links
- The remaining ports are each connected to the SPAN (or mirror) port on a switch

In this scenario, it makes sense for Observer to view ports 1-4, for example, as a single stream of network traffic and to separate each of the four remaining ports into separate data streams. Virtual adapters are a convenient way to accomplish this separation or aggregation in real time, rather than depending on filters to sort through the traffic post-capture.

These are the general steps for assigning physical ports to a probe instance:
- Create a virtual adapter (or have one already).
- Assign physical ports to this virtual adapter.
- Set a probe instance to use this virtual adapter as its NIC.

**Tip!** As a general reminder, you risk severe performance loss when using more than one active instance. These instructions do not create multiple active instances.

To assign physical ports to a specific probe instance:

1. In Observer, right-click the Gen3 capture card-equipped probe instance from the probe list, and click **Probe or Device Properties**.
   A Gen3 capture card-equipped probe instance shows (Gigabit) or similar after the name.
2. Click the **Virtual Adapters** tab.
3. Select a virtual adapter, and click **Edit Adapter**.

4. Select physical ports from the **Available Ports** list, and click **Add**.
   
   You can select more than one physical port by holding **CTRL** as you click.

5. Click **OK** to return to the **Virtual Adapters** window.

6. Click **OK** to save the virtual adapter and close the **Virtual Adapters** window.
   
   Changes to virtual adapters are not be saved until **OK** is clicked in the **Virtual Adapters** window.

   The virtual adapter appears in the list of available network adapters when creating a probe instance. This allows you to assign the virtual adapter to a specific probe instance, among other benefits.
Next, you should change the monitored network adapter (page 26) of a probe instance to use the virtual adapter.

**How to change the monitored network adapter**

If your probe has multiple network cards in it, you can choose which card you want to monitor.

This section applies to all probes and all versions of them, including Single Probe, Multi Probe, and Expert Probe on VIAVI or third party hardware.

**Note:** If you have a network card in your system, but it is not being seen or recognized by Observer, follow the instructions in No network adapter available (page 87).

**Tip!** If you are seeing only broadcast traffic, you do not have the correct network card selected or you do not have your switch port configured correctly as a SPAN/mirror port. Change the network adapter you are monitoring or configure the SPAN/mirror port.

- When choosing the monitored adapter from within Observer for all probe versions:
  1. In the probes list, select the probe instance.
  2. Choose .
     The Select Network Adapter window appears.
  3. Select the network adapter you want to monitor, and click Select.

- When choosing the monitored adapter on the probe for Multi Probe and Expert Probe:
  1. Click Adapters and Redirection.
  2. Select your probe instance and click Configure Adapter/Redirection.
     The Edit Probe Instance window appears.
  3. In the Selected Network Adapter area, change the network card you are monitoring.

The probe instance is now using the newly selected adapter.

**Understanding hardware acceleration**

*Hardware acceleration* optimizes a GigaStor active instance for its fastest possible operating speed by using the Gen3 capture card instead of the system CPU.

*Hardware acceleration significantly increases the performance of an active instance than without it.* By using hardware acceleration with the Gen3 capture card, the fastest capture rates and post-capture analysis can be achieved in your GigaStor hardware or probe appliance. Turning off hardware acceleration is not recommended, as packet capture performance will be greatly degraded because this work is offloaded from Gen3 capture card to the CPU instead where it competes for resources.

*Do not turn off hardware acceleration unless you have a specific need to.* The feature provides performance benefits only; there are only advantages to
gain by using hardware acceleration. However, two situations require that you disable hardware acceleration on the active instance:

1. If you need the GigaStor active instance to filter network traffic in real time using a “deeper” set of filters than the following:
   - MAC/IP Address
   - MPLS
   - Port
   - VLAN Tag (802.1Q)
   - VNTag

   It is a best practice to use the supported broad filters (page 73) listed or no filters when capturing real-time network traffic with the GigaStor active instance. As soon as the network traffic is written to the RAID array, it becomes available for data mining and more complex filters can be used. If unwanted traffic is entering your GigaStor system, it is instead recommended that the connected switches, SPAN, or aggregator switch be configured to discard those packets before they reach the Gen3 capture card.

2. If you have an eight (8) port Gen3 capture card and intend to create one virtual adapter for each physical port, then hardware acceleration must be disabled. This is because only four virtual adapters can be created while hardware acceleration is enabled. In practice, this is not a typical setup, and better use of your hardware is gained by leaving hardware acceleration enabled than separating more than four ports of traffic.

**Tip!** You can verify if hardware acceleration is enabled by viewing the capture card properties (page 61).

The active instance is the only probe instance that can be configured for hardware acceleration. This means you cannot configure a passive instance to use hardware acceleration—the option simply does not exist—but passive instances can always be created from your hardware-accelerated active instance. Each GigaStor appliance with a Gen3 capture card is configured to use the card for the active instance, so the best capture performance is ready out-of-the-box.

**Hardware acceleration does not affect or speed-up statistics-based features like Network Trending.** Statistic-based features behave exactly the same whether hardware acceleration is enabled or disabled, and this is because hardware acceleration affects packet capture modes only.

**Note:** When allocating memory for any probe instance with the VIAVI capture card as the chosen adapter, at least 80 MB of memory must be allocated to both the capture buffer and statistics queue buffers. Failure to do so will result in the inability to capture data. This must also be followed for any Gen3 capture card that has hardware acceleration enabled.

### How to enable hardware acceleration

Hardware acceleration must be turned on for certain features in Observer and the GigaStor Control Panel to become usable. Hardware acceleration is exclusive to the Gen3 capture card.
Prerequisite(s):

To complete these steps, your probe instance list must show the active instance of your GigaStor probe. This can be accomplished by using Windows Remote Desktop to log on to the GigaStor system—so you can see the active instance directly—or by temporarily redirecting the active instance (page 28) of the GigaStor system to your Observer analyzer.

Hardware acceleration is enabled by default on the local active instance of your GigaStor system. If you find that hardware acceleration is disabled, you can re-enable hardware acceleration.

To enable hardware acceleration mode:

1. In the probe instance list, in Observer, right-click the active probe instance and click **Probe or Device Properties**.
2. Click the **Virtual Adapters** tab.

   **Tip!** Using the Expert Probe interface instead? Find this window tab at **Options > Virtual Adapters**.

3. Select **Enable Hardware Acceleration**.

   Figure 18: Hardware acceleration is enabled

The active instance now uses hardware acceleration provided by the Gen3 capture card.

To further verify that hardware acceleration is enabled, you can view the capture card driver properties (page 61) in Windows Device Manager.

Redirecting a probe instance

Your local Observer may already have local probe instances defined, but you can add numerous remote probes, including GigaStor, too. You must first **redirect** the remote probe to your local Observer.
A probe may have multiple probe instances, which are useful if you need multiple users using the same probe simultaneously or if you have specific needs for each probe instance (for instance, packet capture, trending, and so on). When you connect to a probe, ensure you select the probe instance you need and not one being used by someone else.

**Note:** Probe redirection can either be password protected or disabled, depending on the target probe.

To redirect a probe instance, complete the following steps:

2. Do one of the following:
   - If you see a remote probe instance you want to redirect, skip directly to step 6.
   - If your list is empty or missing the remote probe instance you want to redirect, proceed to step 3.

3. Click **New**.
   
   The **Edit Remote Probe Entry** dialog appears.

4. Type the IP address, or DNS address, of the remote probe.
   
   If you type a DNS name, it resolves to its IP address.

5. If necessary for probe access, type a user name and password, and click **OK**.

   Figure 19: Credentials may be needed
6. Select the remote probe instance from the list, and click **Redirect Selected Probe Instance(s)**.

Allow time for the remote probe to redirect. How long this operation can take is limited by a timeout countdown.

The probe instances of the remote probe are shown.

7. Select a probe instance from the list, and click **Redirect Selected Instance**.

8. Select the **Redirect to this Observer**, and click the **Redirect** button.

![Figure 20: Redirecting Probe Instance](image)

9. Close the **Probe Instance Redirection** window.

If the operation succeeds, the remote probe instance is now redirected to the local Observer. Now you can use the remote probe instance just as you would if it was running on your local machine.

**Hardware-accelerated mode restrictions**

The Gen3 capture card has a very short list of restrictions while running in hardware-accelerated mode. These restrictions are designed to keep your hardware operating at peak performance when hardware acceleration is enabled.

While a Gen3 capture card runs in hardware-accelerated mode, it cannot:

- Connect itself to multiple probe instances without the aid of virtual adapters (page 63).
- Use overly complex filters that would affect hardware-accelerated performance (rare occurrence). An error message will alert you if the filter is too complex for hardware acceleration, but the filter can be rewritten or tweaked to be accepted.
Use software-based pre-filters. They are mutually exclusive; only one may be used.

Affect statistics-based information, such as Network Trending.

There are two types of filtering that occur in GigaStor: hardware filtering on the capture card and software filtering in Observer. **Hardware filtering** only affects which packets are captured on the capture card and saved to the RAID; it does not work with any statistics-based filtering that may occur in the Observer software, such as for Network Trending, Bandwidth Utilization with Filter, and so on. Any packets excluded by the hardware filter are never saved to disk and searchable by the software. In general, you want your hardware filter to allow as many packets through as possible. This ensures the largest number of packets are available for troubleshooting. In some cases, it is desirable to use hardware filtering because you know you do not need certain types of traffic captured and saved by GigaStor. Hardware filtering is only available when using hardware acceleration; it also disables the use of software-based pre-filters. **Software filtering** has two of its own possibilities when using hardware filtering: 1) sifting through packets after they were written to the RAID by the capture card and 2) controlling what is available for network trending when collecting statistics.

<table>
<thead>
<tr>
<th>Filtering Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware filtering</td>
<td>Filters packets before they are saved to the RAID. This disables the ability to use software pre-filters in Observer, which rely on the CPUs rather than the capture card to do the processing.</td>
</tr>
<tr>
<td>Software post-filtering of packets</td>
<td>Filters packets saved to disk by the capture card, which may or may not have a hardware filter applied. See Observer Filters.</td>
</tr>
<tr>
<td>Software filtering of network trending</td>
<td>Filters statistics-based trending data, which is entirely unrelated to packet capture. See Choosing your network trending types.</td>
</tr>
</tbody>
</table>

These are the filtering types usable on a hardware-accelerated virtual adapter:

- MAC/IP Address
- MPLS
- Port
- VLAN Tag (802.1Q)
- VNTag

**Features that require hardware acceleration**

Some functions or features of your hardware appliance require that hardware acceleration is turned on.

These cannot operate if hardware acceleration is turned off:

- Real-time packet deduplication
- Physical ports reused in multiple virtual adapters
- Hardware filters
- Disk read and write speeds that match advertised values
Capture card device properties

The capture card device properties in Windows Device Manager shows a mix of standard driver information (like any connected device) and custom information about your capture card.

General

The **General** tab lists basic information about the capture card.

Figure 21: General

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device type</td>
<td>Device type should state <strong>Viavi Solutions Inc. Capture Adapters</strong>.</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Manufacturer should state <strong>Viavi Solutions</strong>.</td>
</tr>
<tr>
<td>Location</td>
<td>Location indicates the PCI bus number that the capture card is using.</td>
</tr>
<tr>
<td>Device status</td>
<td>If Windows itself has a problem with the capture card, messages appear here indicating the problem. Device status states <strong>This device is working properly when no Windows problems exist.</strong></td>
</tr>
</tbody>
</table>

Current State

The **Current State** tab displays capture card health, SFP presence, and established port speeds.
**Figure 22: Current State**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFP state</td>
<td>SFP state shows capture card ports that have a supported SFP installed (page 58), if that SFP is operational, and if the SFP is fiber (F) or copper (C). If a capture card port does not have an SFP installed, its icon remains dimmed.</td>
</tr>
<tr>
<td>Link state</td>
<td>Link state is a way to see if the Gen3 capture card is synchronized with the SPAN/TAP/Observer Matrix. If the link state is not green, there is a problem. Click the <strong>Advanced Settings</strong> tab to try and change the adapter speed or auto-negotiation.</td>
</tr>
<tr>
<td>SFP power (dBm)</td>
<td>Actual amount light power seen by the transceiver in the capture card, measured in decibels-milliwatts. With this information you can determine if the signal strength is strong enough to transmit the traffic or if it is too low and is the cause of dropped packets.</td>
</tr>
<tr>
<td>Enabled (Autonegotiation)</td>
<td>The icon is lit when auto-negotiation is enabled for that capture card port. Conversely, the icon is dimmed when auto-negotiation is disabled for that capture card port.</td>
</tr>
<tr>
<td>10 Gig</td>
<td>This icon is lit when a 10 gigabit connection is established.</td>
</tr>
<tr>
<td>1 Gig</td>
<td>This icon is lit when a 1 gigabit connection is established.</td>
</tr>
<tr>
<td>100 Mb</td>
<td>This icon is lit when a 100 megabit connection is established.</td>
</tr>
<tr>
<td>10 Mb</td>
<td>This icon is lit when a 10 megabit connection is established.</td>
</tr>
<tr>
<td>PCIe lane speed</td>
<td>The reported 1x lane bus speed of the PCIe slot used by the capture card. Multiple lanes are used by the capture card, so this value represents a fraction of actually available bandwidth between the capture card and the motherboard.</td>
</tr>
<tr>
<td>Temperature</td>
<td>A green icon means the temperature of vital board components is lower than 75°C and therefore normal. Seeing a yellow icon is a caution that this temperature has risen above 75°C. A red icon is shown when this temperature is greater than 80°C, and you</td>
</tr>
</tbody>
</table>
Field | Description
---|---
Risk | Immediate damage to the capture card. Always maintain proper case airflow and ambient temperature.

**Power**
This icon shows a red color if there is a power problem. A power problem could occur if the 12V power supply (PSU) rail, typically for MOLEX and auxiliary connections, is operating out-of-range and could indicate a dying power supply. A power problem could also be caused by the PCIe slot providing too little or too much wattage to the capture card relative to the PCIe specification. This could indicate a motherboard problem or a dying PSU. A green icon means that power to the card is normal.

**Board ID**
The unique ID of the capture card is shown here.

**System ID**
The system ID is shown here.

*Figure 23: Explanation of lights*

**Advanced Settings**

The **Advanced Settings** tab allows you to view and modify auto-negotiation and port Tx settings for the capture card. Each port has its own settings.
Figure 24: Advanced Settings

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable (Port)</td>
<td>Each box represents a physical port on the capture card. These cannot be modified.</td>
</tr>
<tr>
<td>Auto-Neg</td>
<td>Each box represents the auto-negotiation setting for a port on the capture card. If selected, auto-negotiation for this port is turned on. If cleared, auto-negotiation is disabled for this port. See How to configure the card for an optical TAP, SPAN, or other (page 58) when using this setting.</td>
</tr>
<tr>
<td>Enable Port Tx</td>
<td>Each box represents the a port on your capture card. All are enabled, and none can be disabled. See How to configure the card for an optical TAP, SPAN, or other (page 58) when using this setting.</td>
</tr>
</tbody>
</table>

Driver

The Driver tab
**Figure 25: Driver**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver provider</td>
<td>Driver provider should state <strong>Viavi Solutions.</strong></td>
</tr>
<tr>
<td>Driver date</td>
<td>Shows the date that your currently installed capture card drivers were made.</td>
</tr>
<tr>
<td>Driver version</td>
<td>Shows the version of your currently installed capture card drivers. These do not always match your application versions for the Observer Platform.</td>
</tr>
<tr>
<td>Driver signer</td>
<td></td>
</tr>
</tbody>
</table>

**Details**

The **Details** tab lists device properties that are reported by the driver.
Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property</td>
<td>Lists each device property that can be viewed.</td>
</tr>
<tr>
<td>Value</td>
<td>Displays the value of the selected property as reported by the device driver.</td>
</tr>
</tbody>
</table>

Events

The **Events** tab shows driver events like when a capture card driver is installed.
Figure 27: Events

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Events</td>
<td>Each Windows event regarding the capture card is logged. This can help you understand when the drivers were updated and can be useful when troubleshooting.</td>
</tr>
<tr>
<td>Information</td>
<td>The full event message shows here for the selected Windows event.</td>
</tr>
</tbody>
</table>

**Resources**

The **Resources** tab lists the interrupt request number and memory range assigned to the capture card. These values cannot be modified.
How to identify your GigaStor

The capture card found in a GigaStor appliance tells you a great deal about the vintage and the capabilities of the appliance.

There are two versions of GigaStor under active maintenance. A purple version called GigaStor Gen3 and a blue version called GigaStor Gen2. The “Gen3” or “Gen2” refers to the capture card used in the appliance.

If you can see the appliance, you can easily discern which version you have by looking at its color; however, if you do not have physical access to it then you must view the capture card properties (page 75). Even if you can see the color you may not be able to identify which model of the capture card you have.

The Windows operating system used on the GigaStor appliance is a useful clue about the version, but it is not conclusive and cannot be used alone.

1. In your version of Windows, open **Device Manager**.
2. Find and expand one of these.
   - Viavi Solutions Inc Capture Adapters
• Network Instruments Capture Adapters

3. Use the information in [Capture card details (page 83)](#).

With this information you can precisely know what components are in the system. Use that knowledge to learn what their capabilities are.

**Capture card details**

Using names, drivers, and manufacturer information helps identify the capture card found in your system.

**Table 14. Capture card versions in GigaStor Gen3**

<table>
<thead>
<tr>
<th>Name</th>
<th>Internal Name</th>
<th>Driver Name</th>
<th>Manufacturer Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIAVI Solutions 1/10 Gigabit Ethernet Capture Adapter Gen3</td>
<td>oneTenGig2015</td>
<td>oneTenGig2015.sys</td>
<td>VIAVI Solutions, Inc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Table 15. Capture Cards versions in GigaStor Gen2**

<table>
<thead>
<tr>
<th>Name</th>
<th>Internal Name</th>
<th>Driver Name</th>
<th>Manufacturer Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Instruments 40 Gigabit Ethernet Capture Adapter Gen2</td>
<td>fortyGig2010</td>
<td>fortyGig2010.sys</td>
<td>Network Instruments, LLC.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Network Instruments 10 Gigabit Ethernet Capture Adapter Gen2</td>
<td>tenGig2010</td>
<td>tenGig2010.sys</td>
<td>Network Instruments, LLC.</td>
</tr>
<tr>
<td>Network Instruments 1 Gigabit Ethernet Capture Adapter Gen2</td>
<td>oneGig2010</td>
<td>oneGig2010.sys</td>
<td>Network Instruments, LLC.</td>
</tr>
<tr>
<td>Network Instruments 10 Gigabit Ethernet Capture Adapter Gen2</td>
<td>tenGig2007</td>
<td>tenGig2007.sys</td>
<td>Network Instruments, LLC.</td>
</tr>
<tr>
<td>Network Instruments 1 Gigabit Ethernet Capture Adapter Gen2</td>
<td>oneGig2007</td>
<td>oneGig2007.sys</td>
<td>Network Instruments, LLC.</td>
</tr>
<tr>
<td>Network Instruments 1 Gigabit Ethernet Capture Adapter Gen2</td>
<td>oneGig2005</td>
<td>oneGig2005.sys</td>
<td>Network Instruments, LLC.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No</td>
</tr>
</tbody>
</table>

1. Some capture cards have the same name and can only be distinguished by their internal name or driver.
Can I upgrade a Network Instruments-manufactured, blue GigaStor to Observer 17.2 or later?
   Yes, if you have an active maintenance contract. No new features are available on the Gen2 capture card as a result of this name change.

Can I put a Gen3 capture card in a Network Instruments-manufactured, blue GigaStor?
   No, the Gen3 capture card is only available in the GigaStor Gen3 appliance.

Are firmware upgrades separately available?
   Firmware and driver updates are only provided through the Observer installation program. Not every release contains firmware or driver updates; in fact, most do not.
Chapter 5: Troubleshooting

Troubleshooting common issues

Use the information in this section to assist you if you have a problem with your probe not connecting to your analyzer, your probe does not have a network adapter available, or if you are using an nTAP and want to capture NetFlow traffic or several other common issues.

If you feel your probe is slow, see Troubleshooting a slow probe system (page 86).

Although most installations of Observer Analyzer proceed without any trouble, due to the vast number of network configurations and hardware/software options that Observer supports, sometimes difficulty arises.

If you experience trouble in setting up Observer, keep a number of things in mind.

First and foremost, try to simplify your configuration in any way possible. This means if you have a screen saver loaded, disable it. If you are running some network add-on peer-to-peer jet engine turbo stimulator, remove it. This does not mean that you will not be able to use Observer with your other products but, if you can determine where the problem is, you can focus on that piece of the puzzle and you may be well on your way to solving the problem.

Second, do not trust anyone or anything. The only way to really know what your hardware settings are is to have the card or device in one hand and the documentation in the other. Programs which discover interrupts and other settings only function properly when everything is working correctly — exactly when you do not need them. Do not blindly trust other network drivers — they may or may not be reporting the correct information.

Third, do not, under any circumstances, share interrupts, I/O ports, or memory addresses between adapters. No matter what has worked before or what
might work in the future, sharing interrupts or memory settings is not a valid configuration.

Troubleshooting checklist:

Does your network work without any Observer programs or drivers loaded? If not, check your network installation instructions. After your network appears to be running correctly, install Observer again. Try installing Observer on a different system and see if you experience the same problem. This does not mean that you will not be able to use Observer on the desired system. It may give you some insight into the problem that you are having.

Troubleshooting a slow probe system

If a probe is overloaded, consider whether any of the following affect the system. You can clear these one at a time to see if that resolves the system’s issue.

Although all of the settings discussed in this section are configured in Observer, they are saved to the probe.

♦ A scheduled capture can be causing a system slow down. Determine if any scheduled capture is occurring. On the Home tab, in the Capture group, click Live > Packet Capture and then Settings > Schedule.

♦ Some extra processing happens when you have triggers and alarms configured. Determine what alarms are enabled by clicking the Alarm Settings button in the lower left.

♦ Are you running real-time Expert Analysis? Observer requires some processing resources to get through the data, which could be a lot of data. Real-time expert processes data as it is received. This requires continuous processing of incoming data while the real-time expert is running.

♦ Are you collecting combined station statistics or protocol distribution summary for your network? If so, these could be causing the system to slow down. To determine if you are, click the File tab, and click Options > General Options. Scroll to Startup and runtime settings and clear these settings, if necessary:
  - Collect combined station statistics at all times
  - Collect protocol distribution for the whole network

♦ Are you collecting network trending statistics? If so, is the sampling divider less than 10? If so, increase the sampling divider to 10 or greater. To determine your sampling divider, on the Home tab, in the Capture group, click Network Trending > Network Trending. Then click Settings > General tab. In the Collection Settings section, change the sampling divider.

A probe is not connecting to the analyzer or vice versa

If the probe is not connecting, it could be one of several reasons. The log window in Observer has useful information to give you an idea of why the connection is failing.

Verify the following:

♦ The probe is licensed. See Licensing and updating (page 21).
Troubleshooting common issues

Chapter 5: Troubleshooting

87

♦ Check that the Observer Platform ports are open on the firewall and if traffic is actually passing through it. Observer uses these ports to communicate with the probe. See or depending on your version. Check any local system firewall as well as any network firewall. See also the information in Suspected NAT or VPN issues (page 90).

♦ Check that the security certificates are trusted between the Observer and the probe. If the settings do not match, you might get a message that says "Probe redirection Error <IPAddress> Authentication Negotiation Error" or "Probe authentication failed <IPAddress>." Either a certificate is untrusted by one of the assets or a certificate is pending your approval. In Observer, click and click the Security tab. Verify that the specific certificates are in a trusted state.

♦ The probe and Observer are within the same minor build range.

♦ You can access the VLAN if the probe or Observer are on different VLANs. There is nothing you need to configure in Observer or the probe to enable a connection when they are on different VLANs. However, if you do not have network permissions to access a probe on a different VLAN, it is a network configuration issue (usually for security reasons) and you should contact the network administrator.

No network adapter available

After starting Observer, if you do not see any available adapters listed in the “Select Network Adapter” list, it means your NIC does not have the necessary driver or VMONI Protocol settings installed. Use this information to enable your adapter and to install the proper drivers.

1. If Observer is running, close it.
2. Ensure you are logged in to the system with an account with administrator rights.
3. From the Windows Start menu, choose Control Panel > Network and Sharing Center.
4. Click Change Adapter Settings.
5. Right-click any of the Local Area Connections and choose Properties.
6. Look at the list of installed components to verify that the VMONI Protocol Analyzer is listed. Then do one of the following:
   • If it is not installed, skip to step 7.
   • If the VMONI driver is listed, remove it. Select VMONI Protocol Analyzer and click the Uninstall button. After the VMONI driver is removed, restart the system and continue with step 7.
7. From the Local Area Connection Properties (step 5), choose Install > Protocol > Add > VIAVI – VMONI Protocol Analyzer and click OK. If the VMONI driver is not listed, click Have Disk, then browse to the VMONI.SYS file located in the Observer directory on your hard drive, select it, and click OK.
   The VMONI Protocol Analyzer will now be available to install.
8. Restart the computer after you have completed installing the driver.
  You should now be able to select an adapter when starting Observer.
Integrated adapters report all sent packets with bad TCP checksum

**Symptoms:** All TCP packets sent from Observer or probe station across an integrated network adapter contain bad TCP checksums.

**Causes:** Default driver settings for the card are incorrect. You must update the driver and then disable the “Offload Transmit TCP Checksum” option.

**Solutions:** Upgrade the driver for the integrated network adapter to the Network Instruments/Intel Pro 1000 adapter driver. This driver is located in the: `\<Observer installation directory>\Drivers\IntelPro1000` directory.

1. After upgrading the driver, right-click the adapter and go to Control Panel > Network Connections > Properties.
2. On the General tab, click the Configure button.
3. Click the Advanced tab and find the Offload Transmit TCP Checksum option and disable it.
4. Restart your system.

”No VLAN” shown while using a Gigabit NIC

**Symptoms:** “No VLAN” is displayed in VLAN Statistics and/or no 802.1Q tag information is shown in your decode. The network adapter you use to capture traffic is a Gigabit NIC.

**Causes:** Observer is not seeing the 802.1Q tag on packets being captured. This is sometimes caused by your switch not sending tagged packets to Observer. See VLAN Statistics tool is not working (page 88) for explanation/resolution before proceeding.

**Solutions:** If you are using a Gigabit NIC to capture the traffic and you have checked the switch configuration, then try using this solution. For BCM5751M NetXtreme Gigabit chips found in IBM T43, HP laptops, and Dell Latitude laptops; there is a registry key HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet can cause the driver and chip not to strip the 802.1Q headers. To set that key, you must find the correct instance of the driver in Windows registry and change it.

1. Open the Windows registry editor. Start > Run > Command and type `regedit`.
2. Search for “TxCoalescingTicks” and ensure this is the only instance that you have.
3. Right-click the instance number (e.g., 0008) and add a new string value.
4. Type `PreserveVlanInfoInRxPacket` and give it the value 1.
5. Restart the computer.

The Gigabit NIC no longer strips VLAN tags, so the symptom in Observer is resolved.

VLAN Statistics tool is not working

**Symptoms:** “No VLAN” is the only VLAN ID that shows up in the VLANs column in VLAN Statistics. You are not seeing all VLANs you have on the network.
**Causes:** To display VLAN Statistics, Observer checks each packet for a VLAN tag; if no tag is present, the packet is logged as “No VLAN.” Both 802.1Q or ISL VLAN tags are stripped unless the SPAN destination port to which the analyzer is attached has been configured to include VLAN tags.

**Solutions:** Configure the switch to retain the VLAN tags through the monitor port. This may be an option in the Mirror or SPAN command on the switch, or you may have to configure the port as a trunk prior to defining it as a SPAN port. Even if the switch is monitoring a trunk or uplink port it may strip VLAN tags unless you configure that port to retain the tags. Refer to the documentation from your switch for details on configuring VLANs, trunks, and analyzer ports.


If you use a Cisco Catalyst 4500/4000, 5500/5000, or 6500/6000 Series Switch running CatOS you must configure the destination port as a trunk port prior to configuring the SPAN port using the set trunk and set span commands:

```plaintext
set trunk
module/port
[on | off | desirable | auto | nonegotiate]
[vlan_range] [isl | dot1q | negotiate]

set span
source_port
destination_port [rx | tx | both]
```

For example, to configure module 6, port 2 for monitoring an 802.1Q VLAN setup, you would enter the following commands:

```
switch (enable) set trunk 6/2 nonegotiate dot1Q
switch (enable) set span 6/1 6/2
```

For Cisco Catalyst 2900/3500, 4500/4000 and 5500/5000 Series Switches Running IOS 12.1 or later, encapsulation forwarding is set as a part of the SPAN command, which has the following syntax:

```
monitor session session_number (source | destination)
interface type/num [encapsulation (dot1q | isl)]
```

To monitor 802.1Q VLAN traffic passing through Fast Ethernet 02 via a SPAN port set up on Fast Ethernet 0/6, you would enter the following commands:

```
C4000 (config) # monitor session 1 source interface fastethernet 0/2
C4000 (config) # monitor session 1 destination interface
         fastethernet 0/6  encapsulation dot1Q
```

For a 6500/6000 Series Switch running Native IOS 12.1 or later you must configure the destination port as a trunk port prior to configuring the SPAN, which have the following syntax:

```
C6500(config)#Interface Type slot/port
C6500(config-if)#Switchport
C6500(config-if)#Switchport trunk encapsulation { ISL | dot1q }
C6500(config-if)#Switchport mode trunk
C6500(config-if)#Switchport nonnegotiate
```
To monitor 802.1Q VLAN traffic passing through Fast Ethernet 02 via a SPAN port set up on Fast Ethernet 0/6, you would enter the following commands:

C6500 (config) # interface fastethernet 0/6
C6500 (config-if) # switchport
C6500 (config-if) # switchport trunk encapsulation dot1q
C6500 (config-if) # switchport mode trunk
C6500 (config-if) # switchport nonnegotiate
C6500 (config-if) # exit
C6500 (config) # monitor session 1 source interface fastethernet 0/2
C6500 (config) # monitor session 1 destination interface fastethernet 0/6

**Using Discover Network Names on a Layer 3 switch that uses VLANs**

**Symptoms**: While running Discover Network Names against a Layer 3 Switch that uses VLANs, you see only a limited number of MAC addresses, which typically have multiple IP Addresses associated with them.

**Causes**: Layer 3 Switches that have been configured to perform routing replace the originating station’s MAC Address with the MAC Address of the switch port. For example, suppose CADStation1 has a MAC Address of 00:00:03:AB:CD:00 and an IP Address of 10.0.0.1. It is connected to switch port 1 through a hub. Port 1 of this switch has a MAC Address of 00:11:22:33:44:55.

When a probe is connected to a SPAN or mirror port of that switch, it shows CADStation1 with an IP of 10.0.0.1 and MAC address of 00:11:22:33:44:55 rather than 00:00:03:AB:CD:00 because of this substitution.

Now, suppose there is another station (CADStation2) with MAC address of 00:00:03:AB:EF:01 and has an IP address of 10.0.0.2 that is also connected to port 1 of the switch through a hub. Because Discover Network Names stores station information by MAC address (i.e., the MAC address is the unique station identifier), it changes the IP address of switch port 1’s MAC address.

Because a switch configured as such hides originating station MAC addresses from Observer, MAC-based station statistics (such as Top Talkers-MAC, Pair Statistics matrix, etc.) can only be calculated by port. To make the Observer displays more useful, follow this solution.

**Solutions**: By examining the switch configuration you can obtain a list of MAC addresses that are associated with each port of your switch. Then, use Discover Network Names to edit the alias entry for 00:11:22:33:44:55, labeling it “SwitchPort1.”

The IP based statistical modes (Internet Observer, Top Talkers – IP (by IP Address) still show you statistics calculated from individual stations by their IP address. But MAC-based statistical modes (Pairs Statistics Matrix, Protocol Distribution, Size Distribution Statistics, Top Talkers –MAC (by hardware Address) will now show data by Port.

**Suspected NAT or VPN issues**

If you use network address translation (NAT) in your environment, you must make some configuration changes in Observer. Using the TCP/IP port information in , you should be able to set up the NAT properly.
If the probe is outside the network where Observer is running, you must forward port 25901 from the probe's address to the system running Observer.

When redirecting the probe, you must specify the NAT outside IP address instead of the address that Observer puts in automatically. By default, Observer tries to use its local IP address, which the probe will not be able to find. Select “Redirect to a specified IP address” in the Redirecting Probe or Probe Instance dialog and type the VPN client’s IP address.

Running Observer passively affects NetFlow

When analyzing a link using a TAP, which is common, Observer runs “passively.” Passive operation guarantees that analysis will not affect the link; however, it does have some implications when running NetFlow. Because there is no link over which the system can transmit packets or frames, the following features are unavailable:

♦ Traffic Generation
♦ Collision Test
♦ Replay Packet Capture

Daylight Savings Time

Observer is not coded with a specific date in mind. Daylight Savings Time is controlled by the operating system. When the clock rolls backwards or forwards Observer rolls with it, with one exception: packet capture/decode.

Packet capture provides nanosecond time resolution, which none of the rest of the product does. Because of this, packet capture does not rely on the system clock to provide time stamps. It relies on the processor time ticks. When Observer opens it requests the system time and the number of processor time ticks and uses those. This allows Observer to know what date and time it is when a packet is seen.

Because the Observer only asks the operating system for the system time when Observer is started, packet capture does not know that the time has jumped forward or backward. To get this to happen you need restart Observer after the time change. It is that simple.

Configuring Cisco 6xxx switches using a SPAN port to a full-duplex Gigabit Probe

When using a full-duplex Gigabit Probe to capture directly from a SPAN/mirror port, use a straight-through cable from the Gigabit port on the switch to either port A or B on the Gigabit card in the probe. Do not use the Y-cable or TAP (the TAP and Y-cable should only be used inline).

To use Observer with the Cisco 6xxx switch, you must disable auto negotiation. With auto negotiation enabled, the switch and probe may create a link when first starting the probe, but if the cable is unplugged or if a configuration change to the SPAN/mirror port is applied, you will lose connectivity to the switch. To turn auto negotiation off on the switch, follow the directions based on the OS you are using on your switch.
Tip! Disabling Auto Negotiation is recommended on all models/brands of switches when using a SPAN/mirror port to a full-duplex Gigabit Probe.

**Cisco CatOS switches**

1. **To disable port negotiation:**
   
   Console> enable
   Console>(enable) set port negotiation mod_num/port_num disable

2. **To verify port negotiation:**
   
   Console.(enable) show port negotiation [mod_num/port_num]

3. **To enable port negotiation (should you remove the gigabit Observer product from the switch):**
   
   Console>(enable) set port negotiation mod_num/port_num enable

**Cisco IOS switches**

1. **To disable port negotiation:**
   
   Console> enable
   Console# configure terminal
   Console(config)# interface gigabitethernet mod_num/port_num
   Console(config-if)# speed nonegotiate

2. **To verify port negotiation:**
   
   Console# show interfaces gigabitethernet mod_num/port_num

3. **To enable port negotiation (should you remove the gigabit Observer product from the switch):**
   
   Console(config)# interface gigabitethernet mod_num/port_num
   Console(config-if)# no speed nonegotiate
Chapter 6: Backups and Restoring

Many of the tools in Observer have the ability to import and export settings. You can use this functionality to back up or restore certain parts of your software configuration.

Backing up your GigaStor settings

You can back up most Observer settings and configuration data. Backups are useful when migrating to new hardware, upgrading the operating system, or recovering from data loss.

Caution: If you are using data encryption on your GigaStor system, you must save the encryption keys before upgrading the operating system. Because the keys are typically stored on the operating system drive, they will be lost during the upgrade process. If you do not have a copy of the keys elsewhere, you will not be able to access stored data (packets) after the upgrade is complete.

Your Observer may not have each directory referenced in this topic, but you can back up those that are present. Use whatever backup method is best for you.

To back up many Observer settings and files, do the following:

- Copy the files and directories in Table 16 (page 93) to a backup location. This must be a location other than the operating system drive of the system you are planning to upgrade.

Table 16. Directory or files to back up

<table>
<thead>
<tr>
<th>Directory or file</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Trending</td>
<td>C:\Program Files\Observer\NetworkTrending</td>
</tr>
<tr>
<td></td>
<td>This contains your Network Trending data. If you have changed the default location for Network Trending data, you must to</td>
</tr>
<tr>
<td>Directory or file</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>Protocol Definitions</strong></td>
<td>C:\Program Files\Observer\ProtocolDefs</td>
</tr>
<tr>
<td>This contains any modifications or additions you have made to the protocol definitions list for each probe instance. Back up in all cases.</td>
<td></td>
</tr>
<tr>
<td><strong>Multicast Definitions</strong></td>
<td>C:\Program Files\Observer\MulticastDefinitions</td>
</tr>
<tr>
<td>This contains the templates for defining trading multicast streams for Network Trending. Back up if you use trading multicasts in Network Trending.</td>
<td></td>
</tr>
<tr>
<td><strong>Settings</strong></td>
<td>C:\Program Files\Observer\Settings</td>
</tr>
<tr>
<td>This contains alarms and triggers. Back up if you heavily use alarms or have alarm/trigger customizations that need to be retained.</td>
<td></td>
</tr>
<tr>
<td><strong>SNORT Rules</strong></td>
<td>C:\Program Files\Observer\Forensics</td>
</tr>
<tr>
<td>This contains your SNORT information, such as rules, for detecting malicious activity in your packet captures. Back up if you use SNORT.</td>
<td></td>
</tr>
<tr>
<td><strong>Expert Thresholds</strong></td>
<td>C:\Program Files\Observer\ExpertSettings</td>
</tr>
<tr>
<td>This contains your thresholds stored in Expert settings. These include TCP/UDP events and some triggers for problem identification. Back up if you have modified any Expert thresholds and want to retain those customizations.</td>
<td></td>
</tr>
<tr>
<td><strong>SNMP</strong></td>
<td>C:\Program Files\Observer\SNMP</td>
</tr>
<tr>
<td>This contains any custom MIBs, compiled MIBs, request files and SNMP trending data. Back up if you have made SNMP changes or have SNMP trending data. Use the Folders tab in to verify which folder is used for SNMP.</td>
<td></td>
</tr>
<tr>
<td><strong>Address Tables</strong></td>
<td>C:\Program Files\Observer\LocalAddressTable</td>
</tr>
<tr>
<td>This contains your Discover Network Names list. Back up if you have run Discover Network Names and have saved the alias list.</td>
<td></td>
</tr>
<tr>
<td><strong>C:\Program Files\Observer\ProbeAddressTable</strong></td>
<td></td>
</tr>
<tr>
<td>This contains the Discover Network Names list from any remote probe that has connected to this Observer analyzer. Back up if you have run remote Discover Network Names and saved the alias list.</td>
<td></td>
</tr>
<tr>
<td><strong>Scripts</strong></td>
<td>C:\Program Files\Observer\Scripts</td>
</tr>
<tr>
<td>This contains the scripts for Observer. Back up if you have created or modified a script.</td>
<td></td>
</tr>
<tr>
<td><strong>Windows Registry</strong></td>
<td>Using Regedit, export the following registry branch:</td>
</tr>
<tr>
<td>32-bit Windows operating system running any version, or 64-bit Windows operating system running version 16 or higher:</td>
<td></td>
</tr>
<tr>
<td>HKEY_LOCAL_MACHINE\SOFTWARE\Network Instruments</td>
<td></td>
</tr>
<tr>
<td><strong>License</strong></td>
<td>Make note of the license information in . You need the contact/department, company, identification number, and license number.</td>
</tr>
</tbody>
</table>
Index

Numerics
10 Gb Probe 21
10/100 network 60
25901 (port) 86
25903 (port) 86
32-bit 52
64-bit 52
64-bit, RAM 52
802.11 5, 5, 8, 13, 33
802.1Q 88

A
active instance vs. passive instance 6
adapter speed 33
Adapter Speed tab 33
additional volumes, using 26
address tables 23, 93
Advanced Settings 61, 75
AES 30, 30, 38
alarms 8, 13, 86
allocating 55
analyzer connection 86
Anyone account 86, 86
as probe or analyzer 41
ATM 33, 34
auto-negotiation 58, 61, 75, 77
SPAN port 58
autoupgrade 30
Autoupgrade tab 33
autoupgrading 30, 33

B
backup
installation 21
backups 23, 93
bad TCP checksums 88
troubleshooting 88
best practices 6
BIOS memory hole 52
Board ID 61, 75
broadcast traffic 26, 69
buffer 49
buffer size 6
buffer statistics 49
buffer, see capture buffer and statistics buffer 49
buffers 6, 8, 8, 8, 13, 13, 13, 52, 53

C
capture buffer
64-bit Windows 49
Max Buffer Size 49
RAM limitations 49
size 49
capture card 32, 57, 57, 61, 83
advanced settings 77
Advanced Settings 61, 75
auto-negotiation 58
Board ID 61, 75
current state 75
details 79
driver 78
driver requirements 17
events 80
general 75
passive probe instance 6
performance 6
probe instance warning 6
properties 61, 75
recommendations 55
resources 81
SPAN port, 10 Gb link 58
time synchronization 32
troubleshooting SPAN port 58
virtual adapters 63
capture card driver 17
capture decodes 33
CDU 33
Cisco 6xxx switches 91
troubleshooting 91
Cisco EAP/LEAP 42
clock synchronization 32
collecting data 32
collection interval 45
collision test 91, 91
common issues 85
common problems with 86, 86
configuring 30, 33, 33, 33, 33, 33, 33, 33
network trending folder 30
probe name 30
configuring statistics memory 31
connecting 28
connecting to analyzer 27, 27, 27, 28, 32
CRC-16 34
CRC-32 34
CSU 33
encapsulation 34, 34

D
D3 33
D3/E3/HSSI 33
daylight savings time 91
Daylight Savings Time 91, 91
decoding 8, 8, 8, 13, 13
deduplication 65, 74
defining its purpose 55
defining probe as 63
definition 5
device manager 75, 77, 78, 79, 80, 81
Discover Network Names 90, 90, 90
VLANs 90
DNS resolution 30
driver requirements 17, 17, 17
drivers 61
drivers, wireless 18
DS3
fractionalized 34
DSU
  encapsulation 34, 34

E

E1 33
  WAN relay type 34
E3 33
  fractionalized 34
EAP/LEAP 42
Edit Probe Instance 50
effects of packet capture 53
encapsulation 33, 34, 34, 34, 34, 34, 34, 34, 34
encryption 30, 30
  AES 38
  see also security 38
encryption key 21, 30, 42, 86
encryption keys 21
ErrorTrak 12
Ethernet 5, 5, 8, 33
  full-duplex 8, 13
  jumbo frames 33
Expert Probe 8, 8, 8, 13, 13, 30
  as probe or analyzer 41
  changing NIC 26, 69
  configuring 33, 33
  connecting to analyzer 27
  NetFlow 45
  port bonding 42, 66
  redirection 27
  expert summary 8, 13

F

filters 45, 45
filters, hardware 74
firewall, ports 86
fractionalized 33, 34, 34, 34, 34
frame check sequence 33
frame checksum 33
frame relay 33
frame size 33
Frame too large 33
full-duplex 8, 13
full-duplex Ethernet 8, 13

G

Gen2 capture card 83
Gen3 57, 57, 61
Gen3 capture card 83
General tab 33
Gigabit 8, 33

defining probe as 63
jumbo frames 33
Gigabit Probe 21
Gigabit tab 33
gigabytes 49, 49
GigaStor 27, 55
  AES 30
  collision test 91
  encryption 30
  RAM 55
  recommendations 55
  reserved memory 55
  traffic generation 91
GigaStor capture 6, 8, 13
GigaStor Portable 91

H

HA
  See hardware acceleration 96
hardware 15, 50
hardware acceleration 55, 69, 70, 73, 74
hardware filters 74
hardware requirements 12
HSSI 33, 34
HSSI, fractionalized 33

I

in a switched environment 10
install 16
installation 16, 17, 17, 21
installer 16
installing 16, 17, 17
interface switching 8, 13
IP address
  GigaStor 27
  NAT 90
IP masquerading, see NAT 90
IP precedence 33, 33

J

jumbo frames 33, 33, 33

L

LAPB 33
laptop
  NICs 42
  using as probe 42
wireless 42
Layer 3 Switch 90
license 23, 93
license update 22
licenses
  redeeming 21
  troubleshooting 21
licensing 22
line frame 33
load, preprocessor 6

M

MAC addresses 90
matching between probe and analyzer 86
Max Buffer Size 49
megabytes 6
memory 50, 50
memory allocation 31
memory management 49
memory tuning 49
memory, see RAM 53
Microsoft 20
minimum specifications 15
minimum specs 15
mirror port 10, 63
mirror port, see also SPAN ports 10
mirror port, see SPAN 60
missing 87
missing from Observer 26, 69
moving through RAM 53
MPLS 8, 13, 24, 33, 33
Multi Probe 8, 8, 13
  changing NIC 26, 69
  configuring 33, 33
  connecting to analyzer 27
  redirection 27
multicast 23, 93
multiple in a system 32

N
name, changing 30
NAT 90, 90, 90
NetFlow 8, 13, 33, 45, 91
  TAPs and 91
  versions supported 45
NetFlow collector 45
NetFlow Trending collector 45
network adapter, see also NIC 26, 69
network card
  See capture card 95
network masquerading, see NAT 90
network trending 8, 13, 42, 86
  filters 45
  sampling divider 45
Network Trending 23, 93
network trending folder 30
NIC 8, 13, 18
  broadcast traffic 26, 69
  changing 26, 69
  missing 26, 69, 87
  missing from Observer 26, 69
  multiple in a system 32
  See capture card 95
NICs 42
NIProbe.exe 21
no network card 26, 69
not connecting 86

O
Observer
  no network card 26, 69
  switching to probe 8, 13
  system requirements 12
Observer Analyzer 21
Observer GigaStor 21
Observer Management Server 30
observer.exe 21
OMS 8, 13, 30
operating system 16

P
packet capture 33, 33, 53
  active instance vs. passive instance 6
  buffer 49
  daylight savings time 91
  decoding 8, 13
  GigaStor Portable 91
  memory 50
  RAM 53
packet captures
  wireless 12, 42
packets
  deduplication 65
  moving through RAM 53
  RAM 53
passive probe instance 6
performance 6
port bonding 8, 13, 42, 66
port Tx 77
probe connection 86
probe instance
  active 6, 49
  active vs. passive 6
  assigning to adapter 63
  best practices 6
  configuring 33
  configuring statistics memory 31
  connecting 28
  connecting to analyzer 32
  defining its purpose 55
  definition of 6
  memory allocation 31
  memory tuning 49
  passive 6
  passive to active 63
  redirecting 27
  reserving memory 49
  specifying NIC 32
  virtual adapters 63
probe instance warning 6
probe instances
  redirecting 28, 71
probe name 30
probe redirection 27
Probe redirecting error 86
Probe Service Configuration Applet 41
probes 28, 71
  Adapter Speed tab 33
  Autoupgrade tab 33
  autoupgrading 30, 33
  backing up 23, 93
  clock synchronization 32
  collecting data 32
  common problems with 86, 86
  configuring 30
  connecting to analyzer 27, 28
  D3/E3/HSSI 33
  definition 5
  encryption keys 21
  General tab 33
  Gigabit tab 33
hardware 50
hardware acceleration 55
in a switched environment 10
IP precedence 33
MPLS 33
name, changing 30
not connecting 86
options 30
port bonding 42, 66
see probe instances 28, 71
protecting 20
running as Windows service 30
security 28, 71
software, versions 8
SPAN ports 8
statistics sampling divider 33
switching to analyzer 8, 13
T1/E1 tab 33
upgrading 21, 21
Virtual Adapters tab 33
VLAN access 86
WAN 33
wireless 33
Wireless 802.11 tab 33
see probe instances 28, 71
promiscuous mode 10, 12, 42
protected memory 47, 50, 50, 52, 53
protecting 20

Q
QoS 33
QSFP
See SFP/SFP+ 98

R
RAID 6, 6, 26
RAM 15, 53, 53, 53, 55
allocating 55
buffer size 6
effects of packet capture 53
formula 49
GigaStor 55
limitations 49
packet capture 6, 49
see also buffer 49
see also protected memory, user memory, and
reserved memory 47
recommendations 52
reserving for Observer 33
resizing 47
statistics 49
tuning 49
used in Observer 47
Windows 49
RAM limitations 49
RAM needed for busy networks 55
Random Access Memory, see also RAM 47
recommendations 52
recommended specifications 15
recommended specs 15
redirecting 27, 28, 71
redirecting, see probes 28
redirection 27, 27, 27
registry 23, 93
requirements, hardware/software 12
reserved memory 8, 13, 50, 50, 52, 53, 55
see also RAM 47
reserved memory from 8, 13
reserved memory in Observer 33
reserving for Observer 33
reserving memory 49
resizing 47
risks, SPAN 60
RMON 10
running as Windows service 30
running Observer or Probe 41

S
sampling divider 45, 45, 86
scripts 23, 93
security 8, 13, 28, 71
encryption 38
encryption key 86
matching between probe and analyzer 86
personal information 21
Probe redirection error 86
probes 28, 71
service 30
services 41
settings 10
sFlow 8, 13, 33
sFlow, versions supported 45
SFP/SFP+ 58, 61, 75
simultaneous 8, 13
Single Probe 8, 8, 13
Anyone account 86
changing NIC 26, 69
configuring 33, 33
redirection 27
Single Probe memory limit 50
slow 24
slow probe system 86
SNMP 10, 23, 93
SNORT 23, 93
software probes 8, 21
software requirements 12
software, versions 8
SPAN 63
auto-negotiation 58
risks 60
VLANs 88
SPAN port 58, 88
SPAN port, 10 Gb link 58
see also mirror port 10
SPAN ports 8
broadcast traffic 26, 69
settings 10
software probes 8
see also mirror port 10
SPANOSI Layer 1 & 2 errors
OSI Layer 1 & 2 errors 60
specifications 15
specifying NIC 32
specs 15
statistics 33, 42, 49
collection interval 45
memory 50
packet capture 33
RAM needed for busy networks 55
sampling divider 45, 86
statistics buffer 49, 49
statistics queue buffer 47, 50, 52, 53, 53, 55, 55
statistics sampling divider 33
storage 15
switching to analyzer 8, 13
switching to probe 8, 13
synchronization 32, 91
system requirements 12
system specification 15

T
T1 33
  WAN relay type 34
T1/E1 tab 33
TAP
  NetFlow 91
TAPs and 91
TCP 90
TCP/IP 90
third-party capture card
  driver requirements 17
third-party hardware 15
time synchronization 32, 32, 91
Top Talkers 49
topologies 5, 8, 13
  802.11 5
  Ethernet 5
ToS 33
traffic generation 91, 91
transceiver
  See SFP/SFP+ 98
triggers 8, 13, 86
troubleshooting 88, 91
  analyzer connection 86
  bad TCP checksums 88
Cisco 6xxx switches 91
commom issues 85
probe connection 86
slow probe system 86
VLAN Statistics tool 88, 88
VLAN visibility 90
VLANs 88, 88, 90
  Discover Network Names 90
  SPAN port 88
VM specs 15
VMONI 87
VMONI Protocol Analyzer 87
VMware 15
VoIP 8, 13, 33
VPN 90
vSphere 15

W
WAN 33, 33, 33
  fractionalized 33
WAN relay type 34, 34
WAN Type 34, 34
Windows 18
  32-bit 23, 52, 93
  64-bit 23, 49, 52, 93
  registry 23, 93
  reserved memory from 8, 13
  reserved memory in Observer 33
  service 30
  services 41
Windows 10 16
Windows 2003 16
Windows 2008 16
Windows 2012 16
Windows 2016 16
Windows 7 16
Windows 8 16
Windows memory pool 50, 50
Windows protected memory 47
Windows updates 20
Windows Vista 16
wireless 5, 8, 12, 13, 33, 33, 42, 42
Wireless 802.11 tab 33
wireless access point 42
wireless driver 18
wireless network, encryption key 42
wireless packets, raw 12, 42

Symbols
  “No VLAN” 88, 88

U
upgrading 17, 17
V
v16 17
v17 17
version 16 17
version 17 17