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Lentronics Multiplexers

86456-21 VistaNET Traffic Manager

Users Guide for VistaNET Traffic Management

Lentronics Multiplexers

JungleMUX SONET Multiplexer
TN1U SDH Multiplexer
TN1Ue SDH Multiplexer
T1 Multiplexer (T1MX)

Users Guide for VistaNET Traffic Manager

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1. INTRODUCTION

Welcome to the User's Guide for the VistaNET Traffic Manager, a premium software component belonging to the VistaNET Network Management System (NMS) suite of software tools for the Lentronics Multiplexers family of products, which includes JungleMUX, TN1U, TN1Ue and T1MX. Lentronics Multiplexers are designed specifically for the requirements of the utility industry (Power, Transportation, Pipelines, Oil & Gas, etc.).

VistaNET provides centralized network management capability for both contiguous and non-contiguous networks whose size may range from a few to hundreds of Lentronics Multiplexer nodes. The NMS communication with a Lentronics Multiplexer network can take place through a direct cable connection, a traditional dialup (modem) connection or through a high-speed corporate LAN/WAN. Please refer to the VistaNET Help file for detailed information.

This manual explains how to install and operate VistaNET's Traffic Management software.

Revision History

Issue No.	Issue Date	Details of Change
Issue 1	Mar 2013	Document created.

2. PRODUCT OVERVIEW

The management of JungleMUX physical and logical assets is now available through a new VistaNET premium software component called the 86456-21 VistaNET Traffic Manager. Similar to other VistaNET premium components (vSNMP, ATR, VSA), the Traffic Manager is a licensed add-on that enables advanced functionality above and beyond standard network management. Licensing of the Traffic Manager is performed on a JMUX nodal basis, allowing an unlimited number of concurrent users to manage JMUX traffic on equipment nodes up to the number of purchased nodal licenses. A node could be either a SONET or T1MX node.

The Traffic Manager is designed to achieve three main objectives

1. Usage
   Provide users with information to understand their 'as-built' JungleMUX equipment inventory and provisioned logical circuits (or services). This enables improved equipment management through faster and more accurate information access.

2. Availability
   Provide users with equipment and traffic availability information to help with network planning initiatives.

3. Performance
   Provide additional troubleshooting tools that assist maintenance and support staff assess critical performance parameters and to enable trending of such information over extended durations.

Within the sections that follow, a detailed description of these main tasks are described, along with additional information on licensing / activation and other operational options performed by this VistaNET Traffic Manager

Major Components

The VistaNET traffic manager is comprised of two main components, one to capture raw traffic data (Traffic Capture) and one to analyze data and produce specialized traffic reports (Traffic Analyzer).

The traffic capture function is contained within the Core VistaNET application (version 4.04 or higher). After successful licensing of the Traffic Manager, a new traffic manager icon will become visible within VistaNET main tool bar.

The traffic analyzer is a standalone software component that runs independent of the Core VistaNET application. This application can be downloaded from **www.jmux.com**, or obtained through our technical services team via **VistaNET@ge.com** or at 604 421 8610.

3. GETTING STARTED

Pre-requisites

The sequence of nodes within a JungleMUX ring should be correctly assigned within VistaNET (Map view) before the traffic capture process is started. Typically, nodes follow a sequential format (Node 1 connects to Node 2 connects to Node 3 etc.) however this is not always the case. The traffic capture and analyzers program re-uses the node sequence from VistaNET to correctly orientate the reported information, and so for that reason, intra-ring node sequences should be correct. Use the VistaNET "View" tab to arrange and interconnect the nodes in the correct sequence.

Licensing

VistaNET's Traffic Manager is a premium VistaNET component that must be licensed before this functionality is enabled. Please refer to the VistaNET user's manual for detailed instructions on how to apply license files within VistaNET.

Specific to this Traffic Manager component, each purchased license of the traffic manager is intended to be locked to a specific JungleMUX node (the traffic manager is nodal licensed), to be used explicitly for the purpose of managing traffic assigned within that node. Users of this tool who plan on performing traffic management of another JungleMUX node must ensure that sufficient purchased licenses are applied within VistaNET for each node. GE does not intend users of this tool to re-use a purchased traffic manager license across more than one node.

GE defines the 'use' of this tool as an operator opening the traffic manager via a click on the VistaNET traffic managers icon, then performing a 'capture' of asset information contained within a JungleMUX ring(s). Additionally, use of this tool includes opening and or analyzing the data stored in the file created by the 'capture' process.

Currently, the VistaNET traffic manager node licenses are applied to the core VistaNET software. By applying a valid license file within VistaNET, the Traffic Manager will be enabled and permit users to start the traffic 'capture' process (Traffic Light icon becomes enabled). Supplementary node license can be purchased and added at any time by contacting GE Digital Energy.

VistaNET will maintain a log of the rings and nodes with which the traffic manager has processed.

GE defines a node as a JungleMUX SONET node containing a Service Unit (SU), IP Service unit (IPSU), or a Cyber Secured Service Unit (CSSU), and a JungleMUX T1MX or E1MX node containing a CDAX unit(s) without a Service Unit (or IPSU or CSSU).

With the appropriate number of Traffic management node licenses in place, users can freely analyze the captured data through GE's Traffic Analyzer or other 3rd party software product.

4. CAPTURING TRAFFIC

The capture process is really an extended unit discovery that extracts additional physical unit attributes and logical circuit routing paths. Key performance data points are additionally saved during the capture process. VistaNET users initiate the traffic capture by clicking on the Traffic Manager Icon (resembling a traffic light) located on the main VistaNET toolbar.

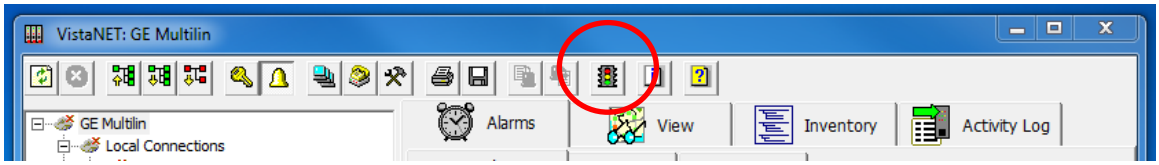


Figure 1: Initiating a Traffic Capture

Users are presented with a pre-defined list of previously discovered JungleMUX rings (T1MX groups will be added in the future). Users can select a ring(s) to capture the nodes assets (hold 'Ctrl' key to customize selections).

Next, define a location to store the results of the traffic capture. A standard windows control is presented to locate the desired file destination.

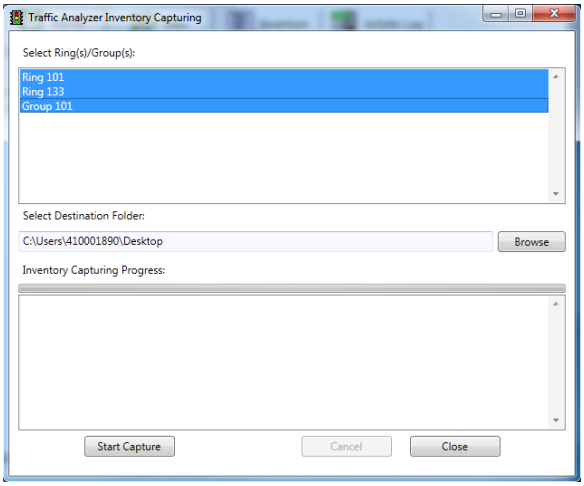


Figure 2: Setup a Traffic Capture

Finally, users can start the capture process by pressing the "Start Capture" button, at which time VistaNET performs an extended traffic discovery on the pre-selected rings. The discovery status is presented to the user, notifying them when the process is finally complete. Users can optionally cancel the active discovery and close the window.

Note: An output file is only created if the capture process is permitted to run through to completion.

Upon successful completion of the traffic capture process, an output file (XML) is saved in the desired location. The file is additionally time-stamped to allow multiple traffic captures of the same inventory to co-exist in the same directory.

Note: GE will make every attempt to maintain the current structure of this xml file, but alternations should be expected over time to incorporate customer requested changes.

5. ANALYZING TRAFFIC

The previously saved file containing raw JungleMUX traffic data can now be analyzed. GE Digital Energy offers as part of the 86456-21 VistaNET Traffic Manager, a standalone JungleMUX traffic analyzer. Installed on any PC (running Windows Operating System) and without any additional product licensing, the Traffic Analyzer can accept any number of data files (captured traffic in XML format) and perform task-driven traffic analytics.

System Requirements

Minimal PC hardware requirements to install and run the VistaNET analyzer include

- Operating System: Windows XP, Windows 7
- Memory: 512M
- Disk: 20G

Obtain the VistaNET Analyzer application by downloading a copy from GE Digital Energy's JMUX website **www.jmux.com** (login into the My Lentronics customer portal and select Software), or request a copy through GE technical services at VistaNET@ge.com or at (604) 421 8610

Double click on the downloaded file (TrafficAnalyzer[1].msi), and follow the installation wizard to complete the setup. A desktop icon will be added along with an entry into the Windows program list.

[1] The 'Major Release version' . 'Release date' is embedded in the file name, for example TrafficAnalyzer_500_13058.msi

Operating the Traffic Analyzer

Select the Traffic Analyzer application from Desktop icon or Windows program list.

Select *Load Inventory* and point the GE traffic analyzer to a saved XML file.

The analyzer will validate the file contents and notify the user as to the inventory (Ring numbers) contained therein. It's possible that a notification is returned to the user indicating that an older/newer inventory file containing the same equipment is already loaded. Users can then to decide which version of the mxl file they would like to analyze.

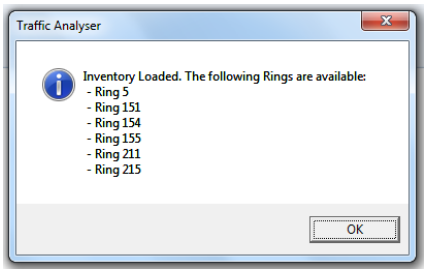


Figure 3: Load Inventory

Additional equipment files can be loaded at any time by visiting the *Home* tab and select *Load Inventory* again. Loading new equipment into the analyzer will supplement the previously loaded data with new information to analyze.

Once the raw inventory data is successfully loaded, the GE Traffic Analyzer is now ready to use. The user shall select any of the three primary tasks they'd then like to perform, including:

- Usage Reports
- Availability Reports,
- Performance Reports

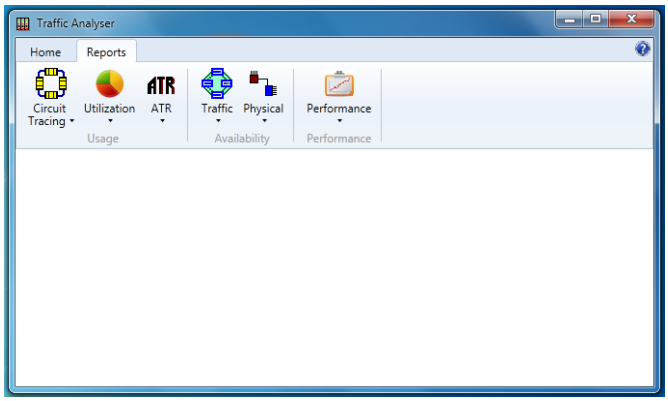


Figure 4: Analyzer Home

Users can safely exit the traffic analyzer by selecting the *Home* tab, then *Exit*, or simply select the standard windows close icon (red X in the top right corner of the application).

Traffic Analyzer Exclusions

- The analyzer generates these reports for SONET rings only.
- Support for SDH networks, Inter-ring ties and support for T1MX or E1MX groups are on GE's development roadmap.

Known Product Issues

- TRAC #850: Ether-100 units are not detected with connected to B86432-41 OC-3 units. Any inventory allocated in the OC-3 or Ether-100 units are NOT shown up in the 'Usage" reports

6. REPORTS

Reports

Currently, the GE Traffic Analyzer, offers (or 'future' indicates a plan to offer) the following sub-task reports,

- Usage

a. Circuit Tracing
   i. By unit type and bandwidth
   ii. By port type (future)
   iii. By line bandwidth (future)
   iv. By drop Bandwidth (future)

b. Utilization
   i. By STS-1
   ii. By STS-1 (ATR)

c. ATR
   i. By bandwidth (STS-1 or VT)
   ii. ATR enabled optics

- Availability

d. Traffic
   i. By bandwidth (STS-1, VT, DS0)

e. Physical
   i. By Port type
   ii. By Unit type

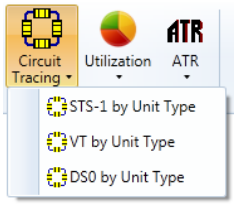
- Performance

   iii. Asymmetric Loss
   iv. Network Sync Setup
   v. Optical Miscellaneous Configuration

A brief description of each report type is provided on the following pages

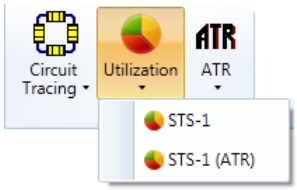
Usage: Circuit Tracing

Circuit tracing allows users to trace a DS0, VT or STS-1 circuit based on a known unit type within a user-defined ring. This is particularly useful to help locate the entry and exit points of a circuit, improving user efficiency and accuracy.



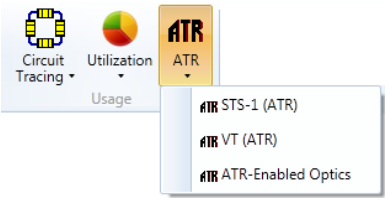
Usage: Utilization

This report presents the overall utilization of STS-1s (Healthy and Alternative traffic images) against the overall rings capacity (shown as a pie-chart). When represented in this view, capacity planners will gain an immediate appreciation of the network's capabilities, allowing for improved strategic decision making.



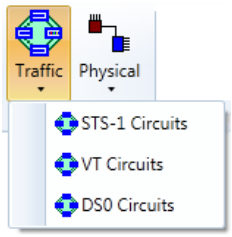
Usage: ATR

Alternative Traffic Routing (or ATR) technology is employed within the OC-3 (B86432-41), OC-12 (B86417-01) and OC-48 (B86419-01) optical aggregate units. When enabled (ATR is a software component for VistaNET that's available for purchase from GE using part # 86456-07), users can pre-program the optical units with an alternative traffic image to re-route circuits typically to a backup control center during catastrophic network disturbances. This report provides a convenient and simplified approach to analyze these critical traffic allocations 'offline', ensuring accuracy if implementation is every needed.



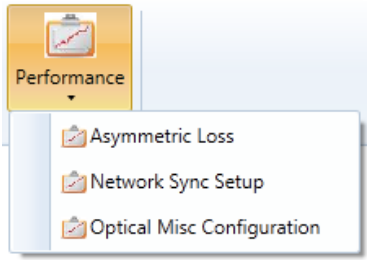
Availability: Traffic

Knowing unequivocally, which circuits are used and which are available to carry future services is extremely important. The impact of accidently 'stepping on' another circuit during the provisioning process is obviously service-impacting, leading to probably outages. Users of this report can absolutely confirm which services (DS0, VT or STS-1) are available within the ring. In doing so, each utility will greatly improve the overall system reliability, identify economical routing choices (i.e. identifying available channels on a previous assigned VT) and improve operational efficiencies.



Availability: Physical

Similar to that of the traffic availability report, users of the physical availability report can quickly learn which ports are un-used across their JungleMUX nodes. Imagine how useful that would be if you were planning on adding a new service at a pre-existing site, and knowing that say 3 CBW ports were unused at the three sites where your new Ether-1000 unit was to be deployed. Reports identifying available ports can be defined by port type or by unit type.



Performance: Asymmetric Loss

Network operators should ensure that the fiber optic losses in both transmit and receive directions approximate each other. Excessive differences in Tx to Rx attenuation can cause communications problems that are often very difficult to troubleshoot. Generally, the loss difference is manageable when kept below 3dB (or up to half the power in one direction verses the other). When asymmetric power loss exceeds 3dB, the analyzer will highlight the path so that corrective action can be initiated.

Note: The nodal sequence of nodes within a JungleMUX ring must be correctly defined. VistaNET's map view plays an integral part. When performing a traditional unit level discovery through VistaNET, a map view is also defined containing all discovered nodes. Users are instructed to arrange and interconnect these nodes into a topology that represents the implemented hardware. All reports created within the Traffic Analyzer require VistaNET correctly describe the inter-ring topology.

Performance: Network Sync Setup

Allows users to clearly visualize the orientation of the timing source and distribution for the entire ring to ensure these critical fields are correctly programmed within the optical aggregate units. For those with a keen eye, the sync status messaging (SSM) quality levels can also be validated around the JungleMUX ring, identifying possible synchronization inconsistencies.

Performance: Optical Misc. Configuration

The JMUX maintenance program that GE asks each customer to annually perform is now conveniently captured within a performance report. Temperature, laser current, code violations in the section and line overhead, etc. are but a few of these critical unit-level performance fields. After a sufficient sample of values has been accumulated, maintenance staff can use this data to identify areas of interest where preventative maintenance may be targeted.

Report Wizard: Qualifying Data for Traffic Reports

The raw data accumulated during the capture process needs to be refined and focused before usable information is output. Focusing the data from possibly tens of thousands of values is accomplished by the traffic analyzer, which starts with a series of logical questions to narrow the data set needed for the targeted report. Intuitively, users will select a report type based on what they *know* (i.e. I know what port the equipment is connected to but not the traffic, or I know the unit type but not the traffic).

The report wizard is customized for the type of desired report. Typically, the user needs to select the ring #, the node or nodes then some specific report type attribute like unit type, port type or bandwidth (traffic) type. An example is given below.

Note: Only full rings (all nodes) are permitted when running traffic-based *availability* reports. These report must consider all nodes when returning the available intra-ring circuits to ensure each specified circuit is not used elsewhere (perhaps outside the search parameters if a sub-set of nodes were permitted).

Example: JMUX Ring 215 is equipped with 4 nodes (1-4). The originator of this report wants to know more about the traffic terminated by Ether-10 cards that he/she knows exists at nodes 1, 2 and 4. The user selected a *utilization* report type, then selects *VT by unit type*. The *Ether-10* unit is selected from a larger list of VT-based units and the report then run.

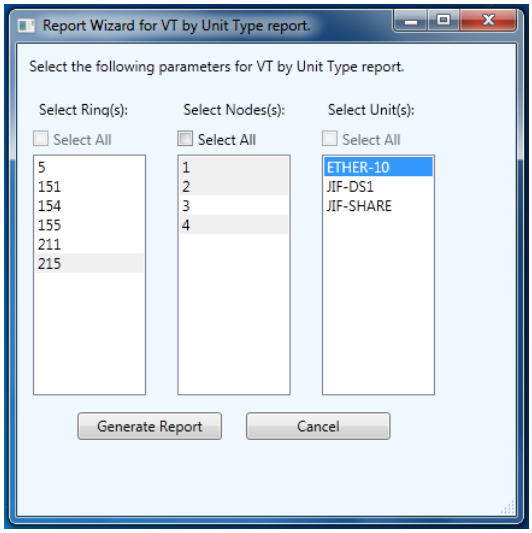


Figure 5: Unit-based Traffic reports

Managing reports

A *Generate report* button is available after the user has finished *qualifying* data within the Report Wizard. Once pressed, the report is displayed in the main display window of the Traffic analyzer. Notice in the images below, each report generated is presented within a windows tab, allowing users to manage multiple reports. Users can conveniently toggle between each tab to display the specifics of each report.

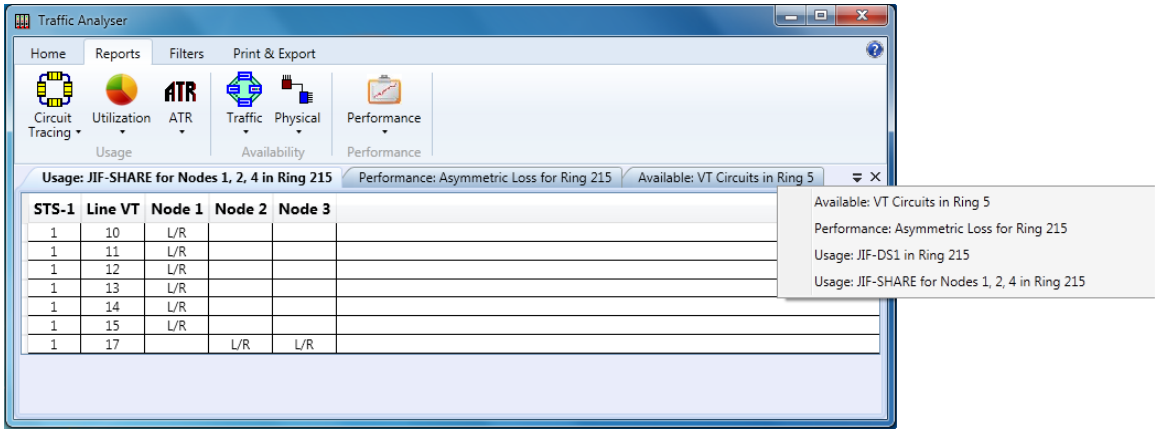


Figure 6: Managing reports

Alternatively, reports can be *undocked* within analyzer and arranged as desired. Undocking windows tabs provide considerable flexibility in viewing multiple reports at the same time. To undock a tab, select the report tab and drag the report to the desired screen location. Microsoft's Windows positioner (seen below in the center of the captured screen) can be used to help snap each report to the desired screen location. A right mouse click on the tab also provides management options, including the option to re-dock the tab. Each report tab can be independently closed by clicking the 'x' to the right of each tab label.

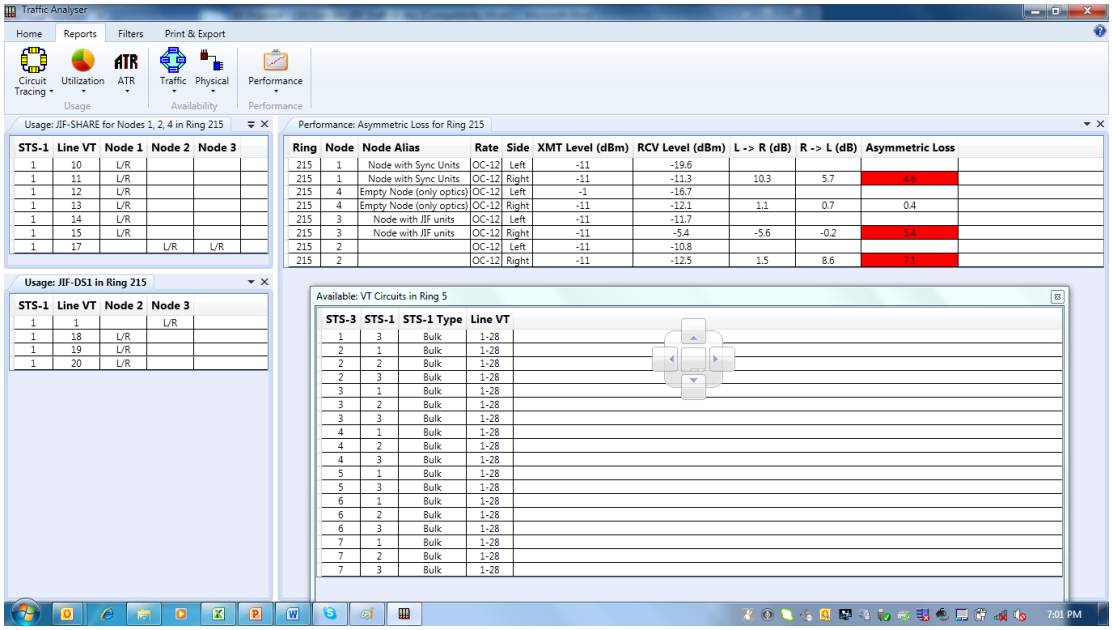
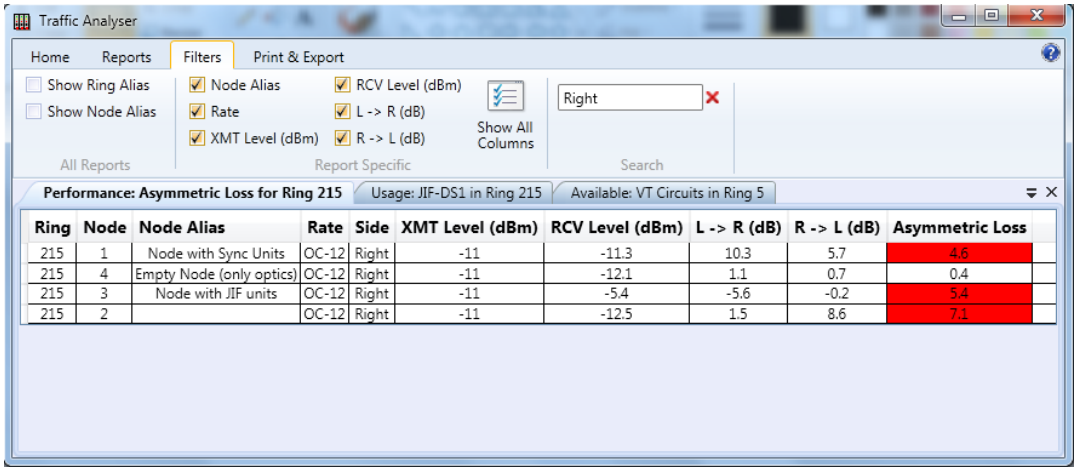


Figure 7: Arranging and Docking/Undocking reports

Filters

Users can optionally apply additional report filters to customize the desired level of information displayed within each report. Locate the *Filters* tab from within the Traffic Analyzer and apply filtering as desired. A *Search* box is also presented, allowing users to select key words (i.e. 'Right') within the report (see below) to further limit the report results. Generally, users are attempting to narrow the report results to a minimal amount of data that can be easily understood and acted upon. Filters will help users accomplish this.



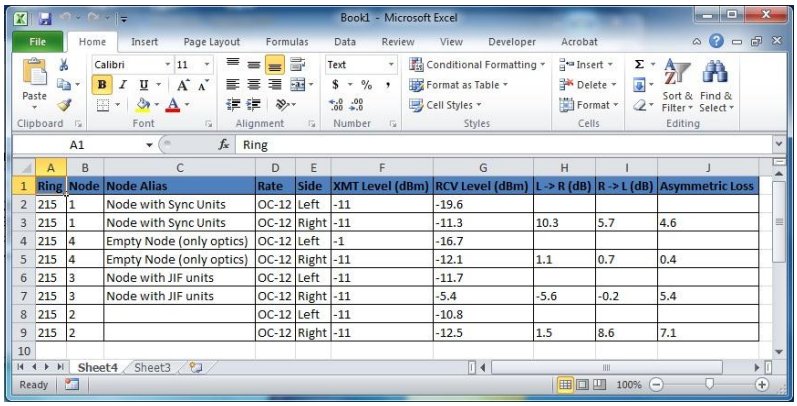
Ring	Node	Node Alias	Rate	Side	XMT Level (dBm)	RCV Level (dBm)	L -> R (dB)	R -> L (dB)	Asymmetric Loss
215	1	Node with Sync Units	OC-12	Right	-11	-11.3	10.3	5.7	4.6
215	4	Empty Node (only optics)	OC-12	Right	-11	-12.1	1.1	0.7	0.4
215	3	Node with JIF units	OC-12	Right	-11	-5.4	-5.6	-0.2	5.4
215	2		OC-12	Right	-11	-12.5	1.5	8.6	7.1

Figure 8: Searching reports

Filters are only available if a valid report is open.

Print and Export

Each opened report can be printed or exported in a comma delimited format, then saved. Printing and exporting are only available if a valid report is open.



	A	B	C	D	E	F	G	H	I	J
1	Ring	Node	Node Alias	Rate	Side	XMT Level (dBm)	RCV Level (dBm)	L -> R (dB)	R -> L (dB)	Asymmetric Loss
2	215	1	Node with Sync Units	OC-12	Left	-11	-19.6			
3	215	1	Node with Sync Units	OC-12	Right	-11	-11.3	10.3	5.7	4.6
4	215	4	Empty Node (only optics)	OC-12	Left	-1	-16.7			
5	215	4	Empty Node (only optics)	OC-12	Right	-11	-12.1	1.1	0.7	0.4
6	215	3	Node with JIF units	OC-12	Left	-11	-11.7			
7	215	3	Node with JIF units	OC-12	Right	-11	-5.4	-5.6	-0.2	5.4
8	215	2		OC-12	Left	-11	-10.8			
9	215	2		OC-12	Right	-11	-12.5	1.5	8.6	7.1
10										

Figure 9: Printing and Exporting reports

7. KNOWN PRODUCT ISSUES AND LIMITATIONS

Known Traffic Analyzer Product Issues

- *TRAC #850:* Ether-100 units are not detected with connected to B86432-41 OC-3 units. Any inventory allocated in the OC-3 or Ether-100 units are NOT shown up in the 'Usage" reports

Known Traffic Analyzer Limitations

- The analyzer generates these reports for SONET rings only.
- Currently no support for SDH networks,
- Currently no support for Inter-ring ties
- Currently no support for T1MX groups

10. ORDERING INFORMATION

This section covers the ordering information for VistaNET and its Traffic Management premium component.

Please contact the Account Manager for your area regarding ordering the VistaNET Traffic Management software.

Equipment and Option Code List

Equipment	Option Code	Description
B86456	-21	Provides a single Traffic Management license that can be applied against a single JungleMUX SONET node. One license required per SONET node

Table 1: Option Code Table

APPENDIX A

LIST OF ILLUSTRATIONS

List of Figures

List of Tables