Xgig® Expert
Quick Identification and resolution of SAN Problems with Xgig Expert

Key Features

- Automatically calculates 1800+ metrics and statistics critical to evaluating network performance and reliability

- Filters and displays complex trace capture data using intuitive, completely customizable graphs and tables

- Offers recommendations on corrective actions to resolve problems based on 15+ years of troubleshooting experience

- Protocol-aware support enables cross-domain analysis and traffic correlation across multiple protocols

- Automates analysis and comparison of thousands of counters, eliminating time-consuming manual calculations

- Works in conjunction with the Xgig Analyzer to comprehensively analyze 100% of SAN traffic at wire speed

Applications

- Quickly identify, analyze, and resolve the most complex SAN and device problems without expert-level protocol knowledge

- Design and Test SAN components and systems based on advanced high speed technologies: 10GE FCoE, iSCSI and DCB, 6G SAS/SATA and 8G Fibre Channel

- View networks from a flexible top-level perspective all the way down to individual devices, ports, and traffic types

- Monitor network health and reliability through Report View baseline comparisons and cross-port analysis

- Accurately measure and verify DCB priority, bandwidth allocation, and pause frame mechanisms

The JDSU Xgig Expert software is a powerful solution enabling engineers to quickly identify and resolve SAN-related problems and issues without requiring expert-level SAN protocol knowledge. Providing analysis and debugging capabilities that are unsurpassed and unrivaled in the SAN industry, Expert automatically computes 1800+ protocol-specific metrics and statistics, including specialized calculations to facilitate the design and troubleshooting of the emerging FCoE and DCB standards and higher-speed versions of SAS and SATA. Expert has been developed by the JDSU Medusa Labs support team of SAN application engineers, bringing over 15 years of in-field troubleshooting experience directly to the workbench. In fact, most SAN devices shipped today by storage and switch vendors have been developed, tested, and verified with equipment from the Xgig family of testing solutions.

Trace Analysis Made Simple

Expert works in conjunction with the JDSU award-winning Xgig Analyzer platform to accurately analyze high-speed protocol traffic. Rather than require users to manually search through huge raw trace files that can be difficult to interpret, Expert systematically analyzes trace data and reviews it, frame by frame. Expert supports the Fibre Channel, Ethernet, FCoE, DCB, iSCSI, FCIP, SAS, and SATA protocols with a unique, robust set of debugging and analysis tools that seamlessly interact with and extend the capabilities of the Xgig Analyzer. Expert rebuilds embedded Upper Layer Protocols to allow for detailed analysis of all protocols present within the trace and, given its threshold-based approach, can be easily tailored and fine-tuned to analyze any SAN network environment.

In addition to filtering and displaying data in a visually intuitive manner, Expert automatically detects symptoms of network problems and augments traces files to expose and highlight potential impairments and pending failures. For example, if a trace contains valid SCSI exchanges, the trace is updated with a single line event that represents the completion of the entire SCSI exchange and includes vital exchange statistics and metrics, relevant user data, SCSI status, and SCSI Sense Data where applicable. Expert

not only uncovers and reports on a myriad of issues both statistically and graphically, it offers recommendations on what corrective actions to take to resolve problems quickly, thus providing organization of data and insights into network operations that can benefit even the most experienced SAN engineers.

Debug View

Expert's Debug View provides a topological layout of the network and quickly leads users to the root of performance issues, automatically covering every relevant consideration from protocol violations and signaling issues to flow control warnings and timing errors. Critical performance metrics are collected continuously and displayed using easy-to-understand, time-based graphs, thus permitting intuitive analysis of behaviors and performance of a device or devices across time. In addition to revealing network impairments, Expert also quickly exposes a wide range of potential problems while offering insightful suggestions to facilitate immediate resolution. Users have one-click access to complete descriptions of errors and warnings as well as the exact position in the trace associated with a particular error or warning. Expert also lists the initiator and target associated with each error or warning. With the ability to zoom as far as necessary into specific areas of the trace, users have the flexibility and visual granularity to evaluate network performance from a top-level system view all the way down to an individual LUN.
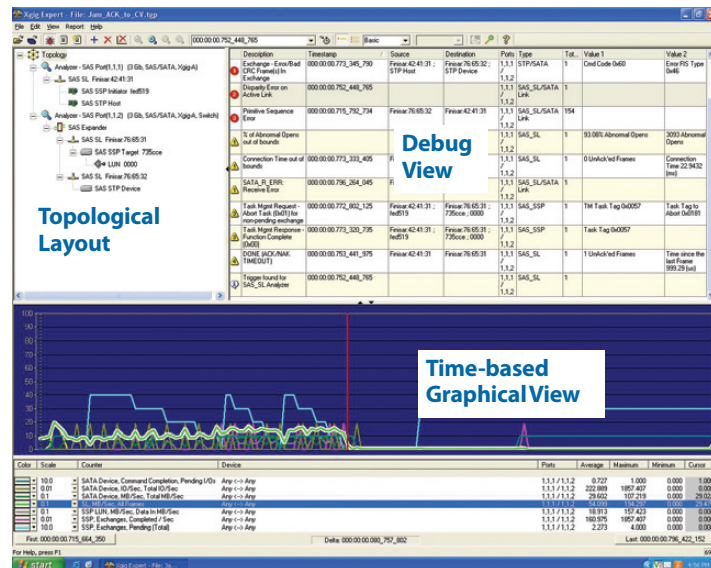

Figure 1: Expert's Debug View

Graphic View

Expert's Graphic View displays useful statistical information that guides users through the vast collection of data in traces to reveal a full range of both general and specific network characteristics. Completely user-definable, Graphic View allows full customization of graphs to enable users to focus on the particular traffic types, devices, and issues relevant to the network under test.

One powerful use of Graphic View is to compute bandwidth allocation for different traffic types. The Data Center Bridging (DCB) standard, for example, mixes different types of traffic with varying priority and allocation thresholds. While the ability to

view only the aggregate bandwidth shows the overall performance of the network, it does not allow users to confirm that DCB thresholds have been properly adhered to. With Graphic View, users can comprehensively verify operation of DCB-based equipment by accurately measuring individual bandwidth allocations for each priority group. In addition, users can verify the sending and receipt of Priority Flow Control (PFC) PAUSE frames, measure pause response time, and detect the erroneously transmitted frames after the PFC request to ensure the robustness of FCoE and DCB networks.

Report View

Expert's Report View offers users comprehensive reports detailing performance metrics or pending exchanges in traces. Because this information is collected as an entire analysis of the whole trace without a sample breakdown, the values reported better represent the entire trace or current zoom of interest. Report View facilitates advanced debugging capabilities by providing a thorough overview of the network that can be used to check its current level of performance and health, compare performance among Initiators or Targets to identify poorly performing components, and generate lists of pending exchanges. Report View supports four types of reports – including a summary report which contains a default set of base statistics for characterizing I/O activity in the trace for any protocol – that can be exported to file or copied and pasted into other applications to facilitate debugging or simplify compliance reporting.

Report View also automates comparison of network performance and behavior between multiple reports with Report Comparison. In addition to eliminating the need to manually compare hundreds to thousands of counters in reports by hand, Report Comparison enables users to quickly and accurately analyze network health and robustness. Rather than having to wait for network failure to identify pending
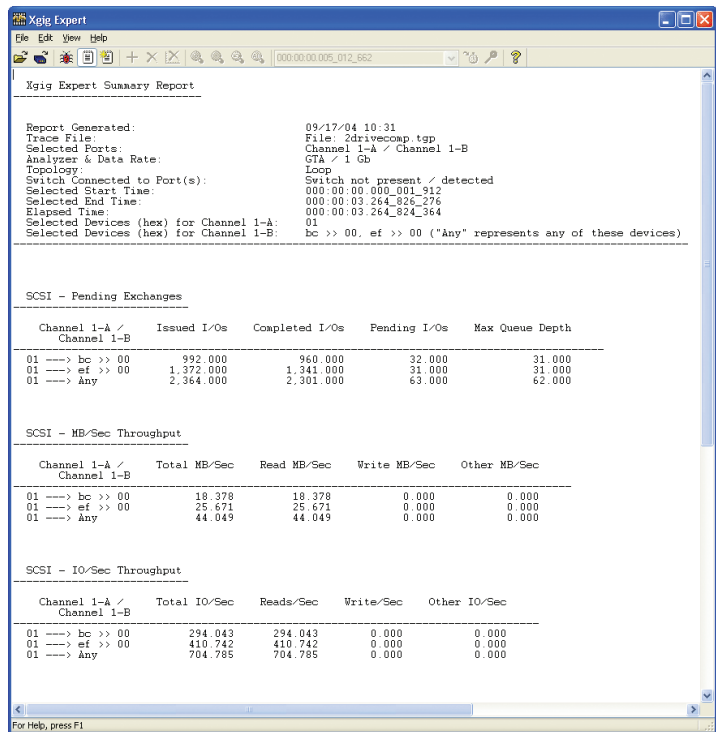
Figure 2: Expert's Report View

problems, the resulting analysis serves as a simple, powerful, and highly-effective technique for identifying any changes in network performance and behavior, giving users unlimited visibility into impairments or issues that might otherwise be hidden. For example, users can compare performance before an error occurs to performance after the error occurs.

Report Comparison offers a full complement of features to accelerate problem identification and resolution:

– Comparison of current network behavior to previously captured "baselines" generated under controlled circumstances identify any deviation in network performance

– Threshold comparison of counters automatically flags irregular or anomalous behaviors

– Configurable filters compare only counters of interest, thus simplifying reports and speeding problem evaluation

– Cross-port comparison of performance between protocols identifies propagated error sources, such as congestion at the TCP/IP layers resulting in delays on Fibre Channel ports in FCoE fabrics

– Comprehensive regression testing of firmware, microcode, and drivers

The Xgig Protocol Analyzer—Hardware Accelerated Network Trace

Expert and the Xgig Protocol Analyzer can be used together to seamlessly analyze network traffic between storage devices, servers, and switches. The Xgig Analyzer captures 100% of traffic at wire speed with highly accurate time-stamping, enabling correlation of traffic even across protocols and domains. Supporting high port counts, real-time views, automatic visualization of network layout, and up to 8 concurrent users, the Xgig Analyzer enables users to fully exploit the advanced debugging capabilities of Expert required to develop and troubleshoot high-speed, multi-protocol networks up to 10 Gb/s, including Fibre Channel, FCP-SCSI, FCoE, DCB, Gigabit Ethernet, IP, TCP, iFCP, FCIP, SAS, SATA, and iSCSI traffic across a wide range of storage network topologies.

Unparalleled Troubleshooting For the Sharpest Competitive Edge

Expert brings together the industry's most powerful combination of advanced debugging, reporting, and performance analysis tools. With its variety of ways to analyze, view, and compare data, Expert reduces development time by quickly identifying potential issues, facilitating troubleshooting, and accelerating problem resolution. Instead of spending hours sorting through bit- and byte-level data traces, Expert enables developers to focus on root-cause analysis of performance and network issues. In this way, users can create not only more robust and reliable SAN equipment, they get can deliver products to market faster.

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