

Case Study

# QLogic Uses VIAVI Xgig Network Analyzers to Test and Troubleshoot iSCSI SANs

QLogic Corporation (Nasdaq: QLGC) simplifies the process of networking storage for OEMs, resellers and systems integrators with the only end-to-end SAN infrastructure in the industry. The company serves customers with solutions based on all storage network technologies including iSCSI, SCSI, and Fibre Channel.

With the emergence of the new industry standard iSCSI protocol, Ethernet networks can now be utilized to effectively build SANs. iSCSI-based SANs provide many of the same benefits as Fibre Channel SANs, but they use TCP/IP and standard Ethernet infrastructures, which are more familiar to many IT managers. In addition, iSCSI enables seamless integration to wide area networks (WANs), enabling new applications such as remote storage. iSCSI is emerging as useful in both stand-alone SANs or as a means to connect Fibre Channel SANs over long distance.

The iSCSI marketplace is quickly gaining wide industry support, with products from new storage start-ups and established players such as Microsoft, Cisco, Network Appliance, EMC, and McData. Several established storage vendors have new products in development and test.

QLogic is the industry leader in iSCSI design wins, with ASIC and HBA products already available and more than a dozen OEM customer storage systems under development. QLogic's SANblade iSCSI host bus adapters (HBAs) are the newest addition to QLogic's award-winning line of SCSI and Fibre Channel adapter products.

"We recognized early on that iSCSI was going to become an important SAN technology. It gives IT managers additional flexibility when designing their SANs, and allows QLogic to provide our customers with the ability to implement both Fibre Channel and iSCSI SANs as appropriate for their needs," said Hugo Oregel, a QLogic firmware engineer. "Additionally, iSCSI is just the first of several applications that will use our TOE (TCP Offload Engine) technology. We continue to develop and implement with customers other emerging uses, such as RDMA and general TCP offload."

## Challenge

- Maintain the quality and compatibility standards that have made QLogic's iSCSI storage products market leading.

## Product

- The VIAVI Xgig<sup>®</sup> Analyzer with Expert software.

## Benefits

- Xgig Analyzer accurately, and without bias, evaluates on a very detailed level how well systems are connected.
- Expert view takes all iSCSI data and puts it into a nice, concise, readable form, providing powerful insights into the health of an iSCSI SAN.

## Dedicated to Compatibility

Oregel is part of the engineering and test group dedicated to QLogic's iSCSI and TCP offload engine product lines. According to Oregel, QLogic continually tests its products in multi-vendor industry forums to assure product reliability and ease of use. "We exhaustively test to make sure every new feature, release and product complies to industry standards and protocols," Oregel said. "The more we can test a new system for iSCSI compatibility, the happier our customers will be and the easier the load will be on our support organization. Everyone wins."

According to Oregel, some of the possible problem areas in an iSCSI SAN implementation include a variety of TCP/IP and iSCSI errors, protocol violations, making sure no users are violating the opening sequence of a connection, or the closing down of one, evaluating whether pings are working, or why not; and iSCSI log-in errors, which Oregel said can cause numerous problems on its own. "We test with mixed networks consisting of our products, our customer's implementations, and other vendors' products to ensure interoperability in all of these areas," states Oregel.

To help in its iSCSI test environment, QLogic tried using software-based network analyzers, but found these solutions were unable to keep up with the wire speed traffic that QLogic's solution can support. "We could see holes in our sequence numbers which meant the trace itself wasn't complete and that you couldn't trust it," Oregel said. "Once we recognized packets were being dropped by the software based analyzers, as well some packets not being decoded properly, we began our search for a hardware-based solution."

QLogic has prior successes working with the VIAVI hardware-based Fibre Channel network analyzers and looked to VIAVI to see what the company had available for iSCSI-based networks. The company selected the VIAVI Xgig Analyzer, a highly scalable, portable protocol analyzer platform for Gigabit Ethernet SANs and Fibre Channel SANs up to 10 Gigabit. The company now utilizes many Xgig Analyzers in its iSCSI test environment.

Xgig is a combined hardware and software solution that streamlines resolution of events that cause problems. It enables users to design, implement, test and evaluate SANs and their components by automatically analyzing captured traces for errant behavior as well as providing extensive performance analysis capabilities.

"The ability to capture traces in real time for analysis is critical for us," Oregel said. "In our experience, software-based analyzers are unable to provide this throughput. Xgig enables us to accurately, and without bias, evaluate on a very detailed level how well connected systems are. In other words, what on the network is making the mistakes."

## Gaining an Expert View

Using the VIAVI Expert view, a real-time, user-definable graphical user interface (GUI) with unified views, QLogic is able to easily detect iSCSI protocol and digest errors. Oregel said he is particularly impressed with Xgig's expert-level analysis and debugging facilities. "Expert view takes all the iSCSI data and puts it into a nice, concise, readable form, providing powerful insights into the health of an iSCSI SAN," Oregel said.

Using Expert view, QLogic engineers can get directly to the error list without having to look at the trace itself, although it is easy to backtrack to the trace itself if need be. "The bottom line is Xgig enables us to quickly diagnose all network-based errors, wherever they reside," Oregel said.

## Great for Regression Testing

According to Oregel, Xgig is great for regression testing as well. "You can quickly determine if things are as good as they used to be and that the overall network is operating properly," he said.

"Xgig is easy to use," Oregel said. "Its user interface masks the complexity of the operations being performed, as well as providing a powerful, easy to understand view of the data coming back."

"The VIAVI Xgig Analyzers have been a key component of our success at QLogic," Oregel added. "Before the VIAVI iSCSI-based Xgig Analyzer, iSCSI networks were very difficult to debug. We recommend our OEM system developers purchase a VIAVI Xgig Analyzer. We know it will help in their development efforts, and selfishly, it helps out our group immensely as we are able to exchange traces to expedite problem resolution."



Contact Us **+1 844 GO VIAVI**  
(+1 844 468 4284)

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visit [viavisolutions.com/contact](https://www.viavisolutions.com/contact)

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