WHITE PAPER

**SAN Performance Monitoring is Essential to Maintaining SAN Uptime.**

Finisar's NetWisdom Monitoring Tool provides crucial SAN statistics that greatly enhance existing Storage Resource Management (SRM) Offerings

## BENEFITS

- Continuous line rate monitoring provides the most complete performance information that can be gathered.
- Dedicated in-band, out-of-data-path approach to monitoring ensures better data movement and data integrity through the SAN
- The ability to baseline SAN performance allows for a clearer picture of potential SAN failures

## INTRODUCTION

Maintaining SAN uptime is imperative in today's business environment. Cost of SAN downtime can add up to more than $100,000 per minute according to recent reports from RBC Capital. This paper describes how Finisar's NetWisdom product adds enormous value to popular SRM systems (from EMC, HDS, IBM, HP, Veritas, CA, etc.) by adding key performance monitoring data and statistics. Knowledge and awareness of these statistics enable SAN Managers to better understand their complex SAN environments in order to maintain the health and uptime of their network.

Finisar is a leading provider of innovative solutions to quickly monitor, analyze, and test storage area networks. NetWisdom is Finisar's full line rate SAN monitoring solution that enables the gathering of detailed network statistics from high traffic fabric links to increase SAN performance and reliability. NetWisdom provides visibility to all Host-Target/LUN conversations allowing the accurate measurement of application transaction times within the SAN and highlighting latency issues that dramatically impact service level agreements. Finisar's Xgig multi-protocol analyzer can be used in conjunction with NetWisdom to provide full line rate capture capabilities in order to examine difficult performance problems in detail. With the industry's recognized "Expert" software, the Xgig analyzer provides advanced troubleshooting capabilities to quickly isolate and diagnose SAN performance problems.

By using a dedicated hardware based monitoring platform, Finisar's NetWisdom offers access to in-depth performance data of your production network as more real-time data and statistics can be processed with dedicated monitoring hardware. Together, Finisar products along with existing storage resource management solutions greatly improve SAN management tasks, leading to lower TCO and much greater customer satisfaction.

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## NETWISDOM OFFERS

### 1. CONTINUOUS LINE RATE MONITORING THAT CALCULATES STATISTICS BASED ON SEEING "ALL" THE FRAMES THAT ARE TRAVELING THROUGH THE FABRIC.

**Why this is important:**

With SAN statistics taken at preset intervals that are sampled or averaged, detailed performance information is lost as a large amount of traffic passes through between the intervals. Statistics are also aggregated, such as Total MB/sec capacity on a particular port, which means they cannot provide visibility into the individual application transactions that make up the traffic on that port.

With continuous line rate monitoring, performance statistics and calculations are gathered by hardware, which provides the most complete performance information. This offers thorough statistical analysis on complete application transaction times, absolute maximum/average/minimum response times, all CRC errors that occurred, logins/logouts, aborts, etc. The comprehensive performance statistics accessible with NetWisdom's hardware-based approach offers an opportunity to accurately measure complete application transaction times within the SAN to improve enforcement of service level agreements. Visibility into this in-depth performance data provides the ability to fully analyze and proactively tune your SAN for optimal performance.

### 2. DEDICATED IN-BAND, OUT-OF-DATA-PATH APPROACH TO MONITORING ENSURES BETTER DATA MOVEMENT AND DATA INTEGRITY THROUGHOUT THE SAN.

**Why this is important:**

Software based storage resource management (SRM) products typically provide in-band monitoring with software agents. SANs by design are optimized for two primary objectives: move data through to its destination as fast as possible while ensuring data integrity. The higher the traffic load on the network, the more the software agent's priority will fall in an effort to concede to the primary SAN functions of rapid data movement and maintaining data integrity. Unfortunately, this means lower monitoring capability at the SAN's peak times, when gathering performance data is the most critical. For SAN Managers with high traffic networks, complementing their existing SRM infrastructure with NetWisdom's dedicated hardware for true 24X7 monitoring is a necessity. They need to know that their data is protected and monitored with the utmost accuracy possible. If they cannot view complete performance data about their networks, something might be missed-and that something could lead to a performance degradation or service disruption.

### 3. EVENT RECORDING AND LINE RATE CAPTURE CAPABILITIES.

**Why this is important:**

It is often difficult to pinpoint problems and bottlenecks in a production SAN today, let alone correct them. To try to isolate a problem, SAN administrators often use a process of elimination - swapping out a SAN component starting from the cheapest components (cabling, GBIC, HBA, etc) until they think the problem is solved. However, this potentially could make the problem worst and they don't know if they actually fixed the problem as the root cause was never in fact determined. In addition, requesting outside field service for onsite troubleshooting often requires significant time delays and additional support costs while users continue to experience the performance problem or disruption. For intermittent and reoccurring problems, Finisar's event recordings and trace captures allow for the reproduction and pinpointing of errors for quick, efficient problem resolution. With Finisar solutions in place, SAN administrators have the ability to record and playback metric recordings of intermittent problems before they build up and disrupt the SAN. At the same time, administrators can capture a full line rate trace with Finisar's Protocol Analyzer for more detailed troubleshooting. It is estimated that 20% of all SAN outages are caused by problems that other software based management products cannot possibly catch. The troubleshooting and diagnostic capabilities offered by Finisar Network Tools will significantly reduce the time required to resolve trouble tickets which will in turn minimize disruptions and outages.

### 4. PERFORMANCE TRENDING OF SAN DEVICE COMPONENTS TO IDENTIFY HARDWARE DEGRADATION AND PREEMPTIVELY REPLACE COMPONENTS BEFORE THEY ACTUALLY FAIL.

**Why this is important:**

While storage management tools can see errors at higher layers of the network stack, finding Fibre Channel/SCSI errors at lower hardware levels would depend on whether the error is severe enough to filter up to the higher network protocol layers. This dependency leads to the high probability that many hardware related errors will go undetected leading to performance bottlenecks, hardware device failures, and could eventually lead to a disruptive network failure. NetWisdom's ability to view the lower Fibre Channel/SCSI levels of the network stack provides visibility into error statistics such as CRC errors, physical link errors, protocol errors, code violations, etc. The ability to do historical trending of individual device performance (i.e. response times, exchange times, etc) provides the capability to preempively isolate devices before they degrade. This empowers the preemptive replacement of devices before they actually fail avoiding costly unplanned network downtime. This proactive analysis of hardware failures is key to maintaining SAN network uptime and ensuring maximum return on a customer's SAN investment.

### 5. ABILITY TO GATHER IN-DEPTH FIBRE CHANNEL NETWORK STATISTICS SUCH AS PENDING EXCHANGES TO TUNE QUEUE DEPTHS FOR MAXIMUM PERFORMANCE.

**Why this is important:**

One example of the relevant use of comprehensive Fibre Channel network statistics is the optimal setting of queue depths, which has always been a delicate balancing act for a deployed storage area network. Setting queue depths too low on a HBA could significantly impair the HBA's performance, while setting it too high could risk losing data. NetWisdom's ability to view real-time and historical trends of pending exchange data allows the administrator to see how the queues are actually being used in their production network. This provides the ability to accurately tune queue depths within a network for maximum performance while limiting data integrity risks, thus resulting in higher performing storage systems.

## SUMMARY

Because of its unique design and full line-rate monitoring, Finisar's NetWisdom can perform crucial functions that SRM systems are not designed to provide. NetWisdom can play a significant and irreplaceable role in maintaining SAN health and avoiding expensive SAN outages.

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SNIA
Storage Networking Industry Association

FCIA
FIBRE CHANNEL INDUSTRY ASSOCIATION