NetQoS *Delivers Distributed Network Management Solution with Embedded* *MySQL*

NetQoS delivers products and services that enable some of the world's most demanding enterprises to improve network performance. American Express, Barclays, Boeing, Chevron, Cisco, Citrix, DuPont, Sara Lee, and Schlumberger are among the corporations that rely on NetQoS performance management solutions to ensure consistent delivery of business critical applications, monitor application service levels, troubleshoot problems quickly, contain infrastructure costs, and manage user expectations.

With the adoption of technologies such as service-oriented architectures (SOAs) including Web services, VoIP and multiprotocol label switching (MPLS), smooth application delivery over corporate networks has become increasingly critical, especially for large networks with thousands of servers, clients and network links. NetQoS developed its ReporterAnalyzer™ traffic analysis software product to show large enterprises how application traffic is impacting network performance. ReporterAnalyzer relies on MySQL and works by capturing a rich set of traffic statistics exported by Cisco IOS® NetFlow or IP Flow Information eXport (IPFIX) on routers and switches. By knowing which applications and users are consuming bandwidth, and when, IT organizations can make timely and cost-effective decisions to optimize the wide area network and improve IT service delivery.

"MySQL allowed us to focus on designing a solution that would meet customer needs rather than how to minimize database licensing costs."

Ben Haley
Sr. Product Architect, NetQoS

MySQL Ensures Consistent Delivery of Business Critical Applications

Customer Requirements

NetQoS found that existing network management tools were unable to cope with the avalanche of data required for monitoring network and application usage in large enterprises. These tools could not capture, store and report on traffic with the speed and granularity needed for real network improvements. To keep data volumes down and performance up, these products tended to discard the details by converting high-resolution data to hourly, daily and weekly summaries. Rolling up data in this manner decreases visibility into network traffic. For instance, daily summaries make it impossible to tell if the network is busy during work hours or when nightly backups are running. Even with the summaries, reports could still take minutes to execute, hindering rapid troubleshooting of network problems.
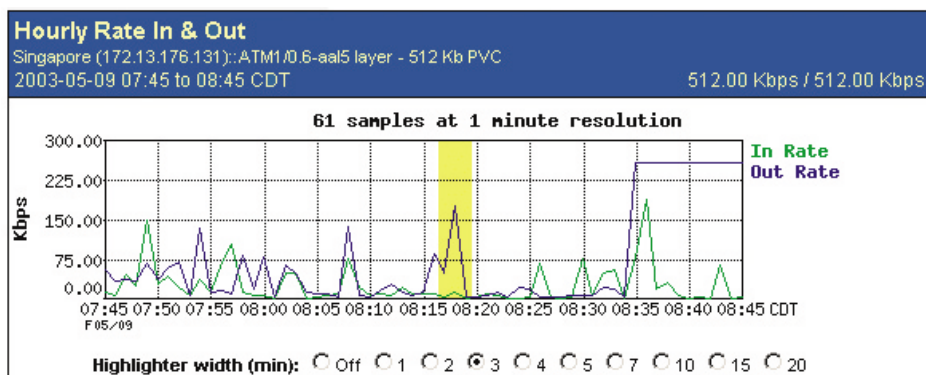
In addition, many existing network traffic monitoring applications required network probes, which allowed the management consoles to retrieve data through simple network management protocol (SNMP). SNMP is a very inefficient protocol for retrieving the thousands of machine-to-machine conversations that a probe must monitor on a busy network link. Just retrieving this data can put a heavy load on the network. In addition, deploying and maintaining these probes can be a costly management burden.

Innovative Solution

NetQoS resolved to build a scalable product that provides customers with quick access to historical as well as real-time data but puts very little load on the network. To accomplish this, NetQoS combined the use of traffic statistics exported by Netflow or IPFIX with a distributed database architecture that could collect data fast, with little network traffic and no database administration.

Using an array of databases, NetQoS could quickly store and retrieve data, providing one-minute granularity from databases at the network edge, for instance, and long-term data from a central database. The long-term data could be kept at 15-minute resolution for more than one year. This combination would enable customers to look at long-term trends, drill into detailed information, and compare traffic today to the same day last week, last month or even last year.

Hourly Rate In & Out
Singapore (172.13.176.131)::ATM1/0.6-aal5 layer - 512 Kb PVC
2003-05-09 07:45 to 08:45 CDT   512.00 Kbps / 512.00 Kbps

NetQoS relies on MySQL to deliver highly scalable real-time performance analysis and troubleshooting information.

Meeting the Needs of the World's Largest Networks

To find the right embedded database solution to fit its innovative product architecture, NetQoS evaluated everything from flat-files to proprietary databases. NetQoS found that MySQL provided the ideal combination of performance, reliability, and ease of administration for ReporterAnalyzer. In addition, MySQL's affordable licensing model enabled NetQoS to reduce its database costs by several thousand dollars per network appliance. This enabled NetQoS to deploy an architecture that would meet the high-performance requirements of enterprise networks without putting artificial constraints on the number of database servers in a deployed solution.

High Performance – In order to manage the huge networks of Global 2000 companies, NetQoS needed to architect a solution that could collect and analyze 100+ GB of data every hour. Using a combination of distributed MySQL databases for real-time data and an array of MySQL database appliances for historical data, NetQoS is able to collect many gigabytes of data for real-time troubleshooting as well as detailed performance records for

historical analysis up to 13 months. For NetQoS customers, this means identifying and solving tactical problems faster, before they impact productivity. It also means having the right information available for strategic planning.

High Reliability – Network information such as host, conversation and protocol data must be tracked at a high level of detail over extended periods of time to effectively manage the network. ReporterAnalyzer handles 40,000 loads for a total of 7.5 million records per hour on each database appliance. NetQoS depends on the reliability of MySQL at hundreds of enterprise customer sites, most of which are Global 2000 companies.

Ease of Deployment and Ease of Administration – Since the NetQoS solution required multiple databases within its distributed architecture, it was critical that each database be extremely reliable and require no administration. Customers would not accept a solution that required a team of database administrators.

MySQL's Zero Administration features were a good fit for the solution. NetQoS uses a standard out-of-the-box MySQL configuration that enables customers to deploy NetQoS products in a matter of hours. Other network management products can take weeks (or months) to deploy.

Low Cost Database – NetQoS needed a cost-effective database to deploy a distributed solution that would scale to large customer networks. The affordable MySQL licensing model enabled NetQoS to deliver an array of database appliances on commodity hardware to collect large amounts of troubleshooting information across enterprise wide area networks. This distributed architecture greatly reduces network traffic and ensures that network performance is not compromised. This is a key competitive advantage for NetQoS, made possible by the MySQL database licensing model.

A True Distributed Network Management Solution

Plug-n-Play Database Appliance – With NetQoS, customers receive a plug-n-play solution that:

- **Works out of the box** with no additional hardware, software or integration

- **Installs in hours** using a default configuration

- **Requires zero administration** so customers do not need to hire additional DBAs

- **Retains detailed data** for better problem solving

- **Delivers superior performance** by distributing the network load to edge devices

Conclusion

With the help of MySQL, ReporterAnalyzer handles the volume of NetFlow data typical in the world's largest networks, providing real-time visibility into enterprise-wide network traffic. ReporterAnalyzer provides visibility into all IP traffic at 15-minute granularity with real-time reports at one-minute granularity. ReporterAnalyzer is unique in its ability to access up to one year of enterprise-wide flow data and report on 100 percent of flow traffic for the entire network, which helps identify denial of service attacks, port scanning, or unauthorized server activity.

MySQL is serving as a:

- **Real-time database** collecting user information and application information for immediate problem identification

- **Data warehouse** of historical network information allowing network managers to analyze trends to see how changes to the network impact performance

- **Configuration database** describing how data is to be collected and reported

Using MySQL, NetQoS was able to deliver a distributed network management solution that requires less hardware and less administration than traditional approaches. The solution provides network managers fast access to the right data at the right time, in an easier to use format at a lower cost than other vendors, giving NetQoS a competitive edge. In many cases, NetQoS can replace existing solutions to provide better information for less than customers are paying in maintenance for their existing network monitoring software.
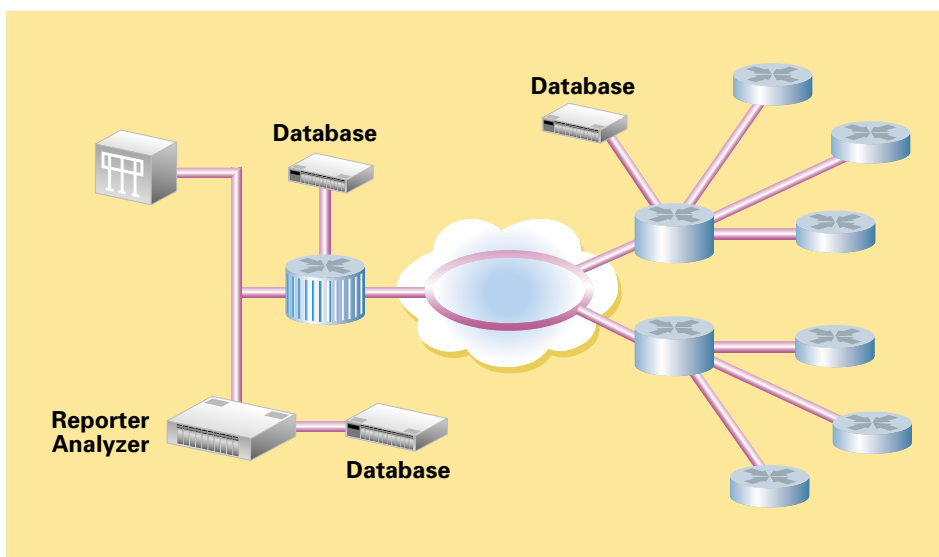
NetQoS relies on MySQL to help Global 2000 customers improve network performance and reduce costs.

Technical Environment

ReporterAnalyzer v7.0

Hardware: Dell PowerEdge 2850 or HP DL 380 G4

OS: Windows Server 2003, Web Edition

CPU: Dual Intel Xeon

RAM: 1 GB

Hard Disk: 6 x 73 GB SCSI Hard Drive

Database: MySQL Server

Database Size: (per database appliance)
- 350 GB
- Up to 10,000 tables

Transactions: (per database appliance)
- 40,000 transactions/hour
- 7.5 million records/hour

About MySQL

MySQL AB develops and supports the MySQL database server, the world's most popular open source database. Over six million installations use MySQL to power high-volume Web sites and other critical business systems — including industry-leaders like The Associated Press, Yahoo, NASA, Sabre Holdings and Suzuki.

MySQL is an attractive alternative to higher-cost, more complex database technology. Its award-winning speed, scalability and reliability make it the right choice for corporate IT departments, Web developers and packaged software vendors. MySQL is available through an open source GPL licence or MySQL Network, a comprehensive offering of certified software and premium support services.

For more information about MySQL, please go to **www.mysql.com**.

The World's Most Popular Open Source Database