

TESTING THE LIMITS OF STORAGE NETWORKS

REVOLUTIONARY ADVANCES IN DATA STORAGE TECHNOLOGY REQUIRE A CONSIDERED RESPONSE WHEN IT COMES TO TESTING. TOM FAWCETT, VICE PRESIDENT AND GENERAL MANAGER AT VIAVI SOLUTIONS EXPLORES THE ISSUES

As businesses embrace a brave new digital world, enterprise IT is striving to accommodate unprecedented growth in data, while at the same time supporting increasingly complex workflows. Likewise, pressure to reduce costs and energy consumption has prompted increased adoption of cloud and cloud-native applications; a trend compounded by the expectation that Service Level Agreements (SLAs) will ensure on-demand access to information anytime, anywhere.

As a result, the traditional data centre is compelled to undergo revolutionary transformation. Correspondingly, data storage technology has advanced rapidly to enable management of more data, with faster delivery speeds, across hybrid network environments.

LINKING STORAGE

Since the advent of the IP-based networking standard iSCSI, ultra-low latency Ethernet switching technology has advanced to become a viable means of linking data storage facilities, enabling a converged data centre storage model. Ethernet networks are now being effectively used to build Storage Area Networks (SANs).

Converged Ethernet fabric architectures, such as NVMe over Fibre, Fibre Channel over Ethernet (FCoE) and RDMA over converged Ethernet (RoCE), accelerate data transfer over the network fabric, connecting servers and storage systems. Network professionals have adopted these technologies, reducing both latency and cost. However, the introduction of new storage technologies introduces new troubleshooting challenges concerning

performance and reliability of business critical applications.

When implementing an Ethernet storage network there are a number of potential problems to be mindful of, including TCP/IP and iSCSI errors, protocol violations, connection sequence errors, and establishing with certainty if pings are working. Any errors in these areas can interfere with secure and reliable storage and the retrieval of mission-critical data.

STORAGE SHOULDN'T BE TESTING

To prevent potential errors from impeding business productivity, IT administrators and storage solution suppliers rely on a variety of network test and measurement tools. However, as more competing application protocols converge over Ethernet, a dizzying array of tests and tools has proliferated for each specific technology or protocol, challenging IT managers to choose or risk busting the budget. Fortunately, there is a trend toward multi-protocol test and analysis tools capable of supporting all predominant speeds and application-level protocols.

VIRTUAL REALITY CHECK

In addition to adopting converged Ethernet technologies to reduce latency, data centres are embracing virtualisation to increase storage network capacity. Virtualisation enables the sharing of physical resources among many virtual machines (VMs) to manage I/O infrastructure efficiently. It also creates new challenges for storage administrators.

With the consolidation of many virtual servers



on just a few storage devices, virtual storage networks are prone to bottlenecks as VMs compete for storage resources. Moreover, the relationships among VMs, physical hosts and the storage device are highly fluid and dynamic, increasing the complexity of storage networks. This means that visibility into the network tends to be limited, making it difficult to isolate whether performance issues are originating on the local area network (LAN), the server, or the storage network.

Because they are shared by many applications, virtualised infrastructures undergo frequent changes in load patterns. As the numbers of VMs multiply the result is an I/O blender effect where predictable patterns become randomised, creating dynamic points of congestion and raising the likelihood of intermittent problems. These random issues can only be detected by analysing I/O load patterns, therefore greater visibility into I/O workloads is needed to diagnose and correct these issues. This requires an ability to capture, storage traffic being generated at different infrastructure locations in real time.

As storage networks grow, complexity and importance to overall business value, performance and reliability of each piece of infrastructure is critical to productivity and profit. Today's advanced testing tools designed for next-generation technologies and protocols enable faster, more accurate troubleshooting and deeper analysis, preventing network downtime. **NC**