

Hosted Service Performance Hinges on In-Depth Network and Application Intelligence

Hosted cloud applications present both challenges and new business opportunities. Managed enterprise groups are under constant pressure to reduce costs, maximize profits, guarantee quality of service, increase customer satisfaction, and provide new and real-time applications—all while balancing ever-increasing bandwidth demands.

Managed enterprise groups play a critical role delivering and interconnecting users to applications and data. Their customers include enterprises of all sizes that demand satisfactory performance for all applications and services.

However, today's application delivery chain is somewhat decoupled. The wide-area delivery network has little to no visibility into the transactions traversing it, yet its performance is critical to the end-user experience. Slight changes in network performance may have significant consequences to application performance. In the past, carriers typically provided only basic-level service level agreements (SLAs); in the future, as they roll out their application hosting services, they will need to offer elevated levels of acceptable overall service delivery.

The adoption of applications and technologies such as video, VoIP, and virtual desktop infrastructure (VDI), as well as different flavors of unified communication (UC) technologies, are increasing the complexity of wide area network (WAN) traffic and are posing new challenges for managing WAN performance. Multiple WAN

technologies may be involved; customers may reside in large enterprise locations or small offices/remote offices, while others rely on mobile devices to access their applications and data. This non-heterogeneous nature of application delivery further complicates the ability to monitor application performance or to offer any application for SLAs.



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Comprehensive Infrastructure Awareness is Critical for Successful Service Delivery

The impact of poor network performance on overall application performance can be significant. Packet loss can occur for many reasons, including network congestion, protection events such as route reconvergence, and network misconfigurations. Furthermore, most WANs are oversubscribed and leverage statistical-gain techniques to maximize the use of available capacity. As data traffic is bursty and unpredictable in nature, the wide area switches will begin to selectively discard traffic when network congestion occurs. The percentage of packets discarded may be low, perhaps 1 to 2 percent, but the impact on application performance can be dramatic.

While this is acceptable to some applications which do not require real-time interactive performance, many critical applications such as those necessary for data-center virtualization and hosting are intolerant to packet loss. This often results in drastic application decreases in throughput as network packet loss increases, and is further compounded by a significant increase in latency. Within the network, identifying the location and sources of unexpected latency, as well as the associated implications to specific applications, is paramount to be able to offer meaningful SLAs for cloud-delivered services. The effect of packet loss and application latency for applications using TCP/IP is shown in the chart.

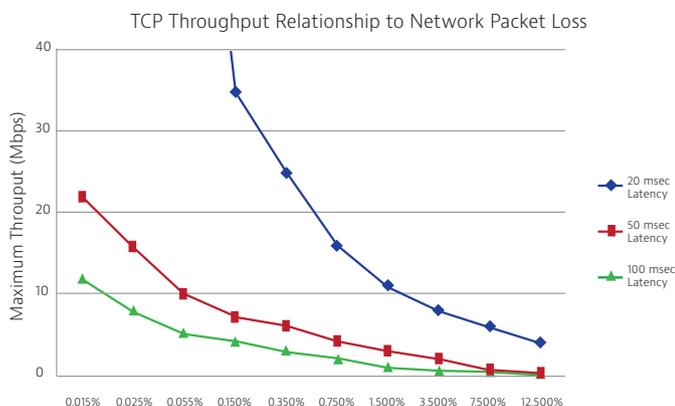


Figure 1. Relationship of TCP throughput to network packet loss

The Situation Today

When it comes to having full visibility into network traffic, it is no longer sufficient just to monitor bandwidth consumption per protocol (for example, HTTP and SSL) to understand how much bandwidth is being consumed by each application. For example, not all HTTP traffic has the same level of business priority or bandwidth requirements and should not be treated as a homogeneous category. Without having a sufficient level of application-level visibility, it is difficult

for organizations to ensure that their available network resources are being used in a way that provides the most value to their businesses. Today, CMEs must use monitoring tools that provide comprehensive visibility into application status including response times and underlying health.

Typical SLAs focus only on the physical layer to the networking layer (Layers 1 to 3). Basic performance monitoring reported includes latency, packet-delivery ratios, and errored seconds. However, modern distributed applications and services require ongoing monitoring from the core to the very network edge, with detailed operational key performance indicators (KPIs) that provide in-depth insight into packet payload. Once captured, rolling this information into a single point of visibility infrastructure-wide is a must. Achieving these objectives when services span many different locations can be a challenge. It is a particular challenge to cost-effectively maintain awareness into remote sites that are connected via WANs and cannot justify costly monitoring equipment.

An effective solution requires the ability to look beyond packet headers and deep into the content within the applications. For instance, the growing mobile-user presence and the increased complexity of network environments means that users typically pick up IP addresses dynamically. For this reason, a user could have several IP addresses during a single work period. This evolution of the network makes it nearly impossible to monitor, secure, and manage solely by an IP address. Unless a simple, pervasive, and cost-effective deep-packet-inspection capability is available, it will be difficult to monitor exactly what traffic may be traversing networks.

New Business Opportunities for CSPs

Providing managed enterprise services or enhanced WAN traffic visibility creates significant opportunities for service providers. Whether it is delivering the actual services or simply ensuring that applications running across their highly distributed infrastructure are satisfying SLA requirements, businesses are demanding and are willing to pay for outstanding application performance.

As enterprises seek to reduce costs by eliminating non-core functions, they are embracing the outsourcing of many of their IT resources to carriers and service providers. When done right, they can achieve significant upside by removing the overhead associated with upfront and ongoing maintenance of IT assets along with the support staff. An added benefit includes making the delivery of applications much more agile, rapidly spinning-up or down new services, as required, to address ever-changing customer or competitive demands. Finally, as managed service providers invest in new resources, enterprises gain access to the latest, best technologies without the downside of watching today's hottest trend become just another depreciating asset.

Carrier-managed service providers gain a significant revenue and profitability opportunity, capturing dollars that previously went elsewhere for services that ran over networks that are quickly becoming commodities. By investing in the latest technology, hiring the right IT experts, and seamlessly delivering services, carriers will provide their customers with the dynamic data-center paradigm they have long sought.

However, to successfully deliver these types of services, CSEs will need to have comprehensive visibility into how their network is being used, the status of applications, where the bottlenecks are for optimal performance, and where to invest for future customer growth. Strict SLAs and uptime requirements demand 24/7/365 educated and informed decisions on all aspects of their IT resources health.

Value to Enterprise Customers and CSEs

Numerous industry studies over the years have shown that delays as small as 0.5 sec in generating search results or responding to an application or service request results in degraded user experience. Clearly, there is untapped potential for operators to improve the quality of the end-user experience for enterprise customers and employees through proactive, real-time monitoring while quickly resolving issues that can degrade these services.

From a cost-containment perspective, CSEs can use the increased intelligence about network usage and IT resources to better plan for capital investments and proactively deploy new assets to satisfy emerging customer service needs.

Requirements for Effective Service Performance Monitoring

An infrastructure-wide performance monitoring solution that extends to remote branch offices can provide cost-effective access to the key performance information necessary for CSEs to achieve optimal enterprise service delivery and satisfy SLAs requirements. Critical capabilities include:

- High-level dashboards for real-time and historic perspectives of all applications and services
- Seamless troubleshooting workflows to detect, triage, and resolve problems
- Intelligent baselines with custom, automatic threshold generation or user-defined values
- Back-in-time functionality that enables retrospective analysis of packets
- Advanced analytics that provide in-depth network and application awareness including detailed payload intelligence
- Identification of abnormal network latency or behavior including those associated with security threats
- Customizable alerting on degraded services before they reach a critical value that could impact customer experience
- Long-term reporting to quantify future IT asset investment requirements to meet future customer needs

These performance monitoring capabilities are a must to consistently and effectively deliver services that enterprise customers depend on to run their businesses and succeed in the market.

The Viavi Solutions™ carrier-managed enterprise solution, which includes Observer Management Platform™ and PacketPortal®, satisfies these requirements through a scalable yet powerful monitoring framework. PacketPortal enables cost-effective visibility to the network edge and beyond. Observer Platform delivers the important dashboard and deep-dive service intelligence and awareness needed for CSEs to succeed with their mission: application delivery to enterprises.



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