

## SIX QUICK TIPS

# Improving Application Performance Monitoring

## Reduce Latency & Understand Your Network To Keep Users Productive

by Chris A. MacKinnon

**MANY NETWORK MANAGERS** have scrambled to find the issues behind an application's slow performance. One end user notices it and makes a call, and suddenly hundreds of users are frustrated because it's taking them exponentially longer to access and use their application(s). For this reason, the ability to monitor application performance is paramount, and improving this ability has saved many a bewildered network manager from the perils of heated end users.

### Consider Latency Across The Board

Latency can be a big problem for applications and can happen virtually anywhere in the data center. But Zohar Gilad, executive vice president of products, marketing, and channels for Precise ([www.precise.com](http://www.precise.com)), says most application latency resides in data storage systems. "However, while many problems look like a storage issue (since applications spend so much time there), the root cause is more often than not the application code," Gilad says. "To resolve, IT must find the SQL that is the root cause of the I/O and tune it."

To fine-tune things, Owen Garrett, chief innovation officer at Zeus Technology ([www.zeus.com](http://www.zeus.com)), says it's important to baseline your key end-user metrics. "It's important to consider the SLAs [service-level agreements] you must meet (for example: response time, latency, and error rate)," Garrett says. "It's just as important to baseline your key application metrics. Ask yourself: What are the key internal metrics I can manage and change by scaling my infrastructure (metrics including message backlog and CPU utilization)?"

Latency can also cause issues with Web applications. Jon Lin, director of innovation with Equinix ([www.equinix.com](http://www.equinix.com)), says when considering site speed, look beyond actions on the page such as script requests and image renders, and also analyze two additional elements: network latency and bandwidth between your end users and your site. "When latency is reduced it will have a tremendous effect on page load times, even more so than bandwidth, with every 20ms of reduced

latency resulting in a 7 to 15% decrease in page load times," Lin adds. He says in the end, the interplay of these variables will contribute significantly to site performance.

Lin says Web site availability is not solely dependent on how well you operate and create your site's infrastructure; it is also affected by the performance of your Internet service provider and other service providers. "Optimizing external sources such as Internet performance, data center uptime, and local traffic will help a site structurally compete

with the likes of online powerhouses like Google and Amazon," he notes.

### Avoid Black Holes

Stephen Brown, product marketing manager for Network Instruments ([www.networkinstruments.com](http://www.networkinstruments.com)), says as your organization virtualizes its infrastructure, be sure to maintain visibility into application communications in virtual environments. "The method for eliminating potential black holes on your network will depend on your infrastructure and budget," he says. "You could utilize a software analyzer within the hypervisor, implement [a] switch, or deploy a virtual tap to export data to physical monitoring devices."

And because virtualization is an element of cloud computing, Brown also says network and application teams need to be aware when migrating services to the cloud, because it won't decrease the workload. "When performance problems involve cloud services, it's up to you to prove that the service vendor and not your network is the culprit," he says. "Multiple-segment (multi-hop) analysis and investigating HTTP error codes can locate the cause of cloud service issues and produce proof that can be shared with the cloud provider. For example, 5xx errors would point to the vendor's servers as the likely issue."

### Know Your Topology & Infrastructure Location

Equinix's Lin says if you don't fully understand your network, you'll be slow to identify problem areas. When testing application performance, Lin points out three key parameters you should always analyze: round-trip time, or the time it takes to establish an initial connection to a server; traceroute, or how many network hops exist between the last-mile node and the beacon server; and availability data from all global locations. "Understanding your network topology can help you quickly identify potential trouble spots," he says.

Lin also says it's important to create a global infrastructure. "When dissecting performance, it should be noted that

## BONUS TIPS

■ **Don't miss out on the right data.** When you can monitor almost anything, the temptation is to monitor everything that's easy, says Owen Garrett, chief innovation officer at Zeus Technology ([www.zeus.com](http://www.zeus.com)). Don't miss the key data, which is often the hardest to capture.

■ **It's not just the application;** it's the connectivity and the client, as well. Application performance and delivery that may be acceptable for a fixed-line user may be unacceptable for a mobile one, Garrett says.

infrastructure location plays a huge role in how well a site or application performs," he explains. "Placing your infrastructure in data centers that are close to the critical network paths of the Internet will significantly reduce latency by providing access to optimal routes to end users. Leveraging data center services and robust ecosystems provides global infrastructure for Web sites and helps them increase site performance and availability without having to redo or revamp any software or hardware."

### Prioritize Your Numbers & Workloads

In Gilad's opinion, those who monitor application performance should start with the business priorities, not the technical metrics. "Don't spend time tuning things like slow SQL statements that are only for low-priority work," he explains. "Instead, data center and IT managers should collaborate with the business managers to identify which workloads are important, and start there."

Gilad says it's also important to "know your normal" and keep baselines of all activity and store the history where you can retrieve it easily. "These detailed baselines and histories can be used to quickly identify what changed whenever you have any application performance problems," he notes. "Having this historical context can be the difference between solving a problem in minutes vs. solving them in days."

According to Zeus' Garrett, understanding which numbers matter makes a difference in the long run. "It's very important to know the numbers that impact application performance, which numbers are indicators of problems (but not problems in their own right), and which numbers have no correlation at all," he says. "Learn how to baseline and correlate the first two sets of numbers, not only to detect when problems occur, but to learn the warning signs that a problem is imminent." P

### Best Tip:

## Continuously Monitor The Network

Your application performance monitoring solution shouldn't be dusted off only for troubleshooting, according to Stephen Brown, product marketing manager for Network Instruments ([www.networkinstruments.com](http://www.networkinstruments.com)). "Daily monitoring ensures staff stays on top of performance issues and can identify them before they impact users," he says. "Implementing technology like long-term packet capture appliances can help to identify sporadic application issues, so you don't have to wait for them to occur again."

### Most Obvious Tip:

## Understand Normal Application Behavior

It sounds obvious, but performance is relative, Brown says. "Without understanding normal application behavior in your environment, it's difficult to identify bad performance," he says. "Benchmark and baseline performance not only for the application but also for the underlying infrastructure and network that supports the application. Through benchmarks and baselining, you can better configure alarms on your monitoring tools to alert you to degraded performance."