



MERCURY INTERACTIVE

WHITE PAPER

# Mercury Interactive's Top 10 Performance Management Tips

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## **ABSTRACT**

Once Web applications pass from development and testing into production, organizations must ensure that end users experience peak application performance 24x7. Mercury Interactive's application performance management (APM) solution, Topaz™, enables organizations to monitor their applications, receive alerts when performance problems arise, identify the problems and quickly diagnose their causes. This paper provides 10 performance management tips, compiled by Mercury Interactive's APM experts, to help IT groups maximize their monitoring efforts with Topaz and deliver the performance end users demand.

## INTRODUCTION

The success of today's organizations is inextricably bound to the performance and availability of their e-business applications. Business-critical applications, whether internal or external, need to be available to end users 24x7. Although nonstop, peak performance is a goal shared by organizations worldwide, most have discovered that performance management is not a simple matter.

To help organizations more effectively manage the performance of their Web applications, Mercury Interactive's experts have compiled 10 of their best tips. All of these tips are based on the assumption that to obtain relevant results from performance monitoring, performance must be measured from the system, network and application level. But most important, it must be correlated to the end-user experience.

## APPLICATION PERFORMANCE MANAGEMENT

Traditional site monitoring tools employ a single "silo" approach to performance management, focusing on individual components, rather than measuring the complete end-user experience. As a result, performance management has typically consisted of a collection of isolated management systems: network management, firewall management, load management, systems management, database management and storage management. The information these systems gathers is valuable; however, it does not include the most important element: the end-user experience.

Figure 1 provides a glimpse of a typical Web architecture managed using the silo approach. The entire infrastructure is managed at the component level—the firewall, the network layer, etc.—with monitors positioned at each of these layers. Users are accessing the organization's site through their ISPs, the organization's ISP, from different locations inside or outside of the firewall, through multiple firewalls and down to their back-end servers.

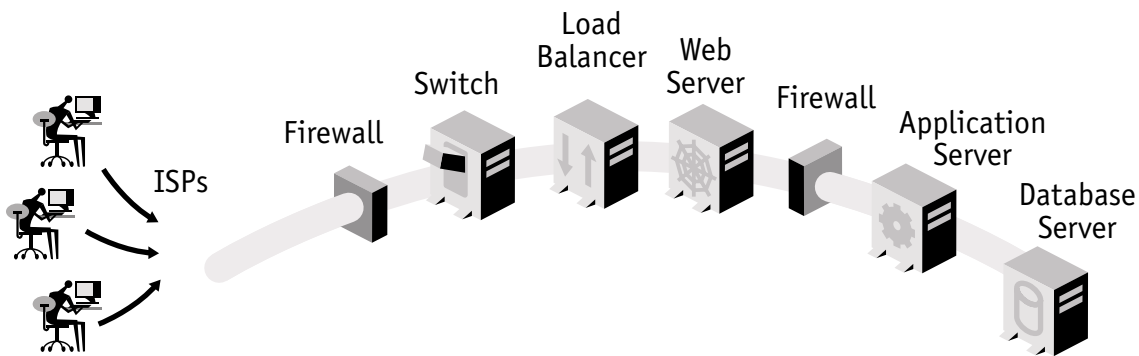


Fig. 1. The many components of a typical Web architecture.

Organizations that use the silo approach typically encounter the following scenario: Their monitoring tools show that each component is running well, but end users are calling to complain of slow performance, incorrect content and other performance problems.

In addition, the silo approach to monitoring makes it difficult to locate the source of performance problems. The reason is that performance problems are not always isolated to a single component and can cross silos. Users, for example, experiencing slow performance when accessing their bank accounts, may call the IT group to complain. If a traditional monitoring tool looks only at the Web server, or only at the load balancer in isolation, it might appear that all is well. Meanwhile, the problem may be the interrelationship across components, in this example between the load balancer and a Web server, which is directing traffic to a faulty Web server.

Since silos do not apply an end-to-end approach to monitoring, they cannot measure performance from the end-user point of view. As a result, they fail to detect many performance problems affecting users.

Mercury Interactive's Topaz takes a different approach to application performance management. This solution is designed to measure the end-user experience and enables organizations to manage the performance of their applications by:

1. **Monitoring performance from the end-user's viewpoint.** Topaz uses both proactive and real-time technologies to collect a wide range of data on performance from the end-user point of view. This data in turn correlates to systems data from across the infrastructure.
2. **Alerting operations groups in real time to actual or potential problems in end-user performance.** When performance issues are detected, organizations can assign them to the appropriate team for further investigation. This added efficiency helps accelerate resolution efforts. Moreover, operations groups can often address performance problems proactively before end users experience them—not just after they call the help desk to complain.
3. **Correlating end-user performance data to systems data.** Topaz analyzes the in-depth information it collects to quickly diagnose the root cause of the application performance problem anywhere within the Web infrastructure. Organizations can then quickly resolve the problem and ensure peak performance levels.
4. **Taking automated corrective action.** Topaz's open interface enables organizations to trigger corrective action from remote locations. For example, if Topaz identifies a faulty Web server, it can automatically take it out of the load balancer's rotation, reboot it and return it to operation.

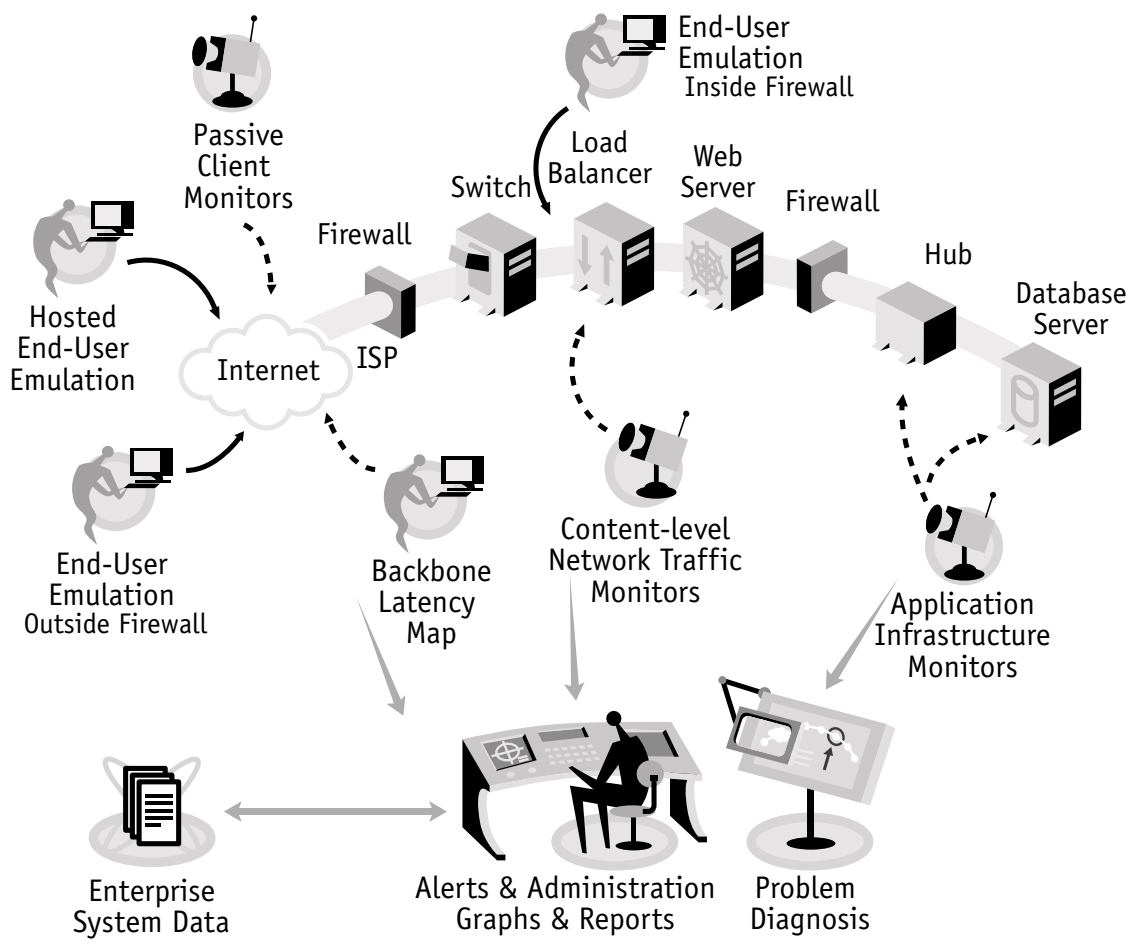


Fig. 2. The Topaz solution manages application performance from inside and outside the firewall.

To help organizations improve their monitoring success, Mercury Interactive provides the following top 10 performance management tips.

**TIP #10: FOCUS ON CRITICAL BUSINESS PROCESSES**

To identify the business functions to be monitored, organizations should determine the impact of important transactions across their entire infrastructure. If a failure in any of these transactions could jeopardize the business (i.e., impact profits, customer relations or operating efficiency), organizations need to give these priority over other aspects of their site and monitor them first.

Examples of transactions upon which to focus monitoring efforts include:

- Critical transactions that have great impact on the business  
(e.g., logging in, paying bills, purchasing a product, registering)
- Heavy throughput transactions  
(e.g., a complex and interactive transaction, such as filing taxes online )
- Transactions high in database I/O, since those tend to stress the system  
(e.g., searching for an item or sorting through customer lists in the case of CRM)
- Transactions integrated with legacy systems, since these integrations increase the risk for application failures

IT groups will want to receive advance warning of any failures or problems related to these transactions before they impact users.

**TIP #9: USE THE "RIGHT" MONITORING SOLUTION TO MEET YOUR BUSINESS NEEDS**

It is critical that organizations create a monitoring scheme that best suits their business needs. They can select from three main approaches to monitoring site performance: active monitoring, passive—or real-time—monitoring or a combination of both.

The differences between active and passive monitoring approaches can be explained using a toll-booth analogy. Active monitoring takes a sample of users to create a baseline for comparison. In this way, active monitoring is similar to riding with a group of morning commuters to evaluate their commute—Was it smooth? Were there delays? This information is then used as the "norm" for commute times.

Passive, or real-time monitoring, by contrast, looks at actual users, all the time. Passive monitoring is similar to sitting in a tollbooth and asking each driver which route he or she traveled to get there. By using active monitoring, IT groups gain a consistent baseline for comparison. Passive monitoring gives them broader coverage.

APPROACH	FEATURES AND BENEFITS	MERCURY INTERACTIVE PRODUCTS
<p><b>Active</b> Generates traffic that represents real users</p>	<ul style="list-style-type: none"> <li>• Provides early warning of problems, 24x7</li> <li>• Measures against a predetermined baseline—what is normal for a site</li> <li>• Enables IT groups to address problems proactively before they impact users</li> </ul>	<ul style="list-style-type: none"> <li>• Topaz ActiveAgent™</li> <li>• ActiveWatch™</li> <li>• Topaz WeatherMap™</li> </ul>
<p><b>Passive</b> Collects data of real-user traffic—all users, all the time, from all locations—so that IT groups can analyze performance problems based on a large number of data points</p>	<ul style="list-style-type: none"> <li>• Quantifies the business impact in terms of numbers and locations of users—e.g., 5,000 users in New York or the organization's two most important business partners?</li> <li>• Is non-intrusive</li> <li>• Helps IT groups prioritize resolution efforts</li> </ul>	<ul style="list-style-type: none"> <li>• Topaz Prism™</li> <li>• Topaz Application Infrastructure Monitors (Topaz AIMs™)</li> <li>• Topaz Observer</li> </ul>
<p><b>Active and Passive</b></p>	<ul style="list-style-type: none"> <li>• Enable IT groups to pinpoint problems to their root cause in the Web infrastructure—inside and outside the firewall</li> <li>• Break down transactions to determine the amount of time being spent on servers and the network</li> </ul>	<ul style="list-style-type: none"> <li>• All products listed above</li> </ul>

Fig. 3. Used together, active and passive monitoring approaches provide a complete picture of end-user performance.

To obtain a complete picture of site performance, IT organizations need to use a combination of active and passive monitoring approaches. Together, these monitoring approaches can help organizations pinpoint the source of performance problems and provide a complete analysis of the end-user experience.

In addition to selecting a monitoring approach, IT groups must decide whether to use an in-house product, a hosted solution or a hybrid solution. When making this decision, they need to consider the following issues:

- Is immediate access to data required?
- Are changes made frequently to the site?
- Is the infrastructure available for monitoring agents?
- Do users sit inside the firewall?
- What is the availability of IT staff?
- How immediate is the need for ROI?
- Is a third-party perspective needed?

If immediate access to data is critical to an organization's business needs, and the IT group has the infrastructure in place, an in-house product is the best option. Alternatively, if the organization does not have the staff, expertise or infrastructure in-house, an outsourced, hosted solution is an ideal solution. Because business needs constantly change, organizations will want the flexibility to migrate between these solutions, with reusable scripts, or leverage a hybrid solution, such as Topaz Rent-a-POP™, which allows Topaz customers to rent points-of-presence from Mercury Interactive's global ActiveWatch infrastructure.

Topaz's modular approach to monitoring gives organizations the flexibility to choose the monitoring approach that best fits their business needs.

**TIP #8: GET A CONSISTENT BASELINE AND WATCH FOR TRENDS**

Measuring the baseline is essential for identifying a site's normal performance level. A customer, for example, calls an organization to complain that 4 minutes were required to download its home page from a specific domain or location. How does the IT group know whether this is an isolated incident or a pervasive problem?

In this example, the organization has a service level agreement to deliver transactions in 8 seconds or less, 99% of the time. This baseline enables the IT group to know how its site typically performs. It also helps the IT group determine whether this is an isolated incident or a sign of a potentially significant performance problem. As a result, obtaining proactive, 24x7, continuous measurements of the site's performance provides an accurate baseline for comparison and a valuable tool for IT groups.

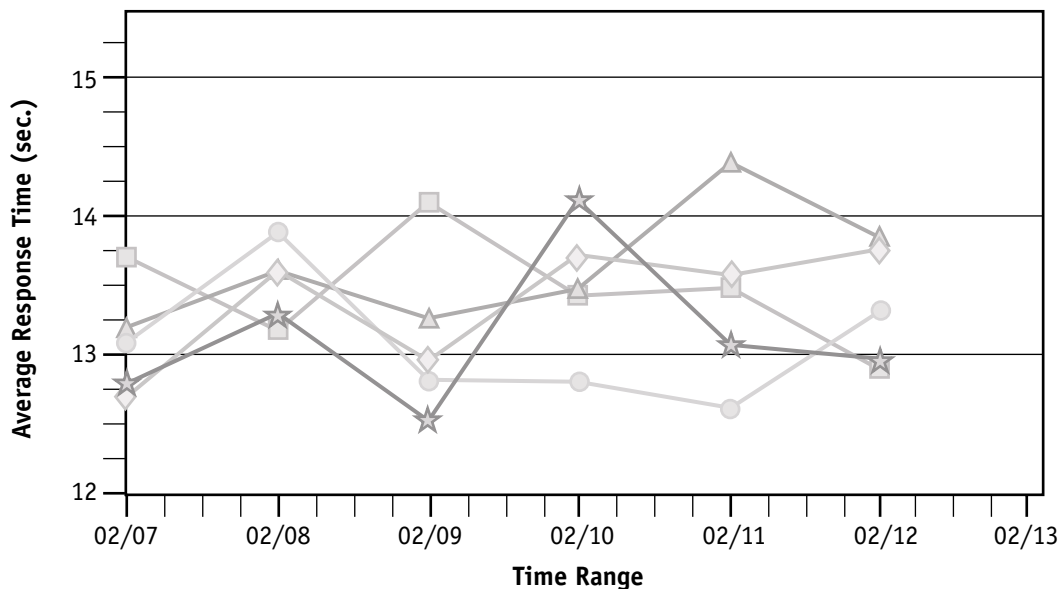


Fig. 4. Continuous monitoring provides an accurate baseline of transaction performance over time.

**TIP #7: AVOID AN ALERTING FLOOD**

Organizations can configure their alert systems many different ways. Often, they are unsure which events should be selected to trigger alerts. Some of the most critical would include delivery of incorrect Web content, excessive response times for critical transactions and “application is unavailable” messages.

Through this alert system, IT groups are notified of transaction failures, as well as problems that have the potential to escalate. An example of the latter is increasingly slow response times, which can serve as an early indicator of an availability issue. By notifying IT groups of these performance problems, alerts play an integral role in helping to ensure continuous site performance.

Mercury Interactive’s ActiveWatch team has identified typical thresholds for site performance that IT groups can use as a yardstick for setting their alerts:

- 4 seconds for general transactions (e.g., loading the home page)
- 10 seconds for more complex transactions (e.g., searching)
- 12 seconds for the most complex activities (e.g., logging into the database)

IT groups should set alerts to approximately 10% to 20% over their average times. They need to be notified when these processes fall that far beyond baseline performance levels. IT groups also can set alerts based on business goals and service level agreements. For example, an online banking site may have service level agreements to deliver a fund transfer confirmation within 7 seconds, whereas an online retail site may allow 15 seconds to deliver a purchase confirmation before breaching its internal performance goals.

In addition, when IT groups do receive alerts, they need to know the right specialists to call to resolve the problems. If one end-user performance problem impacts several components in the infrastructure (e.g., a Web server, database and application), IT groups will know with a single alert from Topaz and be able to immediately notify the appropriate people.

**TIP #6 THINK “RECURRING” WHEN ACTING ON ALERTS**

Alerts that are recurring are the most accurate indicator of problems with a site. IT groups should be notified for recurring alerts, not one-time events. If an IT group is responsible for monitoring a site at 3 a.m., it only wants to be notified when there is a significant problem with the system. Therefore, alerts should be configured so that IT groups are alerted only if the problem persists and happens more than once.

The following charts illustrate the differences between vertical and horizontal alerts. Figure 5 shows an example of a vertical alert. There is a problem occurring consistently across the site at 1:20 a.m., but only at that time. Since the problem did not persist, it could have been simply an Internet anomaly that affected the system. For example, if a user’s ISP lost connectivity for a brief moment, the user might receive a “404” error that was solved upon a single page refresh.

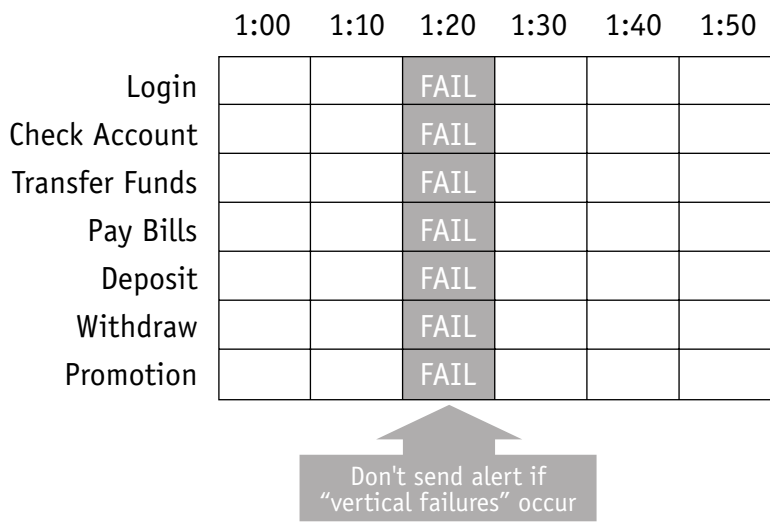


Fig. 5. An example of a vertical alert with a problem occurring only at a specific time.

Mercury Interactive's recommendation is that IT groups respond only to horizontal failures. (See Figure 6.) This chart indicates that there is a problem that persisted over time. Topaz can be set to send alerts only after a series of failures.

Finally, the rule of thumb is to base the number of allowable consecutive failures on the number of monitoring agents. For example, if an IT group had three failures, but it was monitoring from 100 locations, it would not be as critical as having five failures in all five locations ( especially if the five locations are the most important geographies in the installed base).

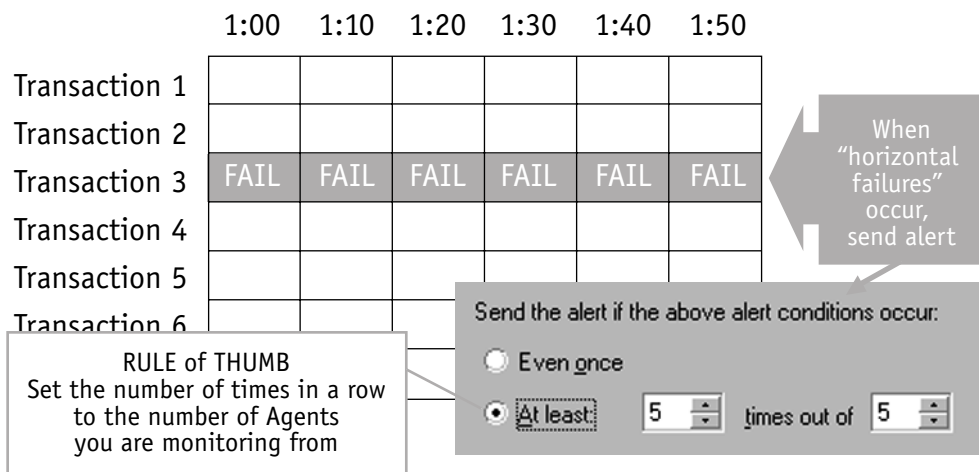


Fig. 6. An example of a horizontal alert in which a transaction continued to fail over time.

**TIP #5: CORRELATE END-USER EXPERIENCE TO BACK-END ISSUES**

When monitoring, IT groups want to cover all the relevant layers of the infrastructure, including back-end servers, load balancers and firewall systems. They need to monitor all of these components to determine how issues on the back-end are ultimately affecting the end-user experience. Using this information, IT groups can leverage tools and procedures to automate many processes and save their time to focus on other strategic initiatives.

Topaz also can automatically trigger corrective action for other systems, such as Remedy for help desk ticketing, using Topaz Open DataSource™. Topaz Open DataSource is an open API that enables the integration of key performance metrics from across the enterprise. Topaz Open DataSource can automatically deposit performance data collected by other monitoring tools into the Topaz Console™. These system metrics can then be viewed from Topaz's browser-based interface.

In addition to using Topaz to view third-party monitoring data, IT groups can use Topaz Application Infrastructure Monitors (AIMs) to measure specific performance metrics for key components and applications within the infrastructure. Topaz AIMs are installed in the same network segment as the servers being monitored but independently of the existing application infrastructure. Topaz AIMs collect system performance data via NT PerfMon, SNMP, HTTP/XML communications, or client query. Performance data is then sent in real time to the Topaz Console via HTTP or HTTPS. If performance parameters of individual components degrade beyond acceptable levels, alerts are sent to operations groups.

It's important to remember to specify which counters to measure, since too much data can hinder the diagnosis of the performance problem.

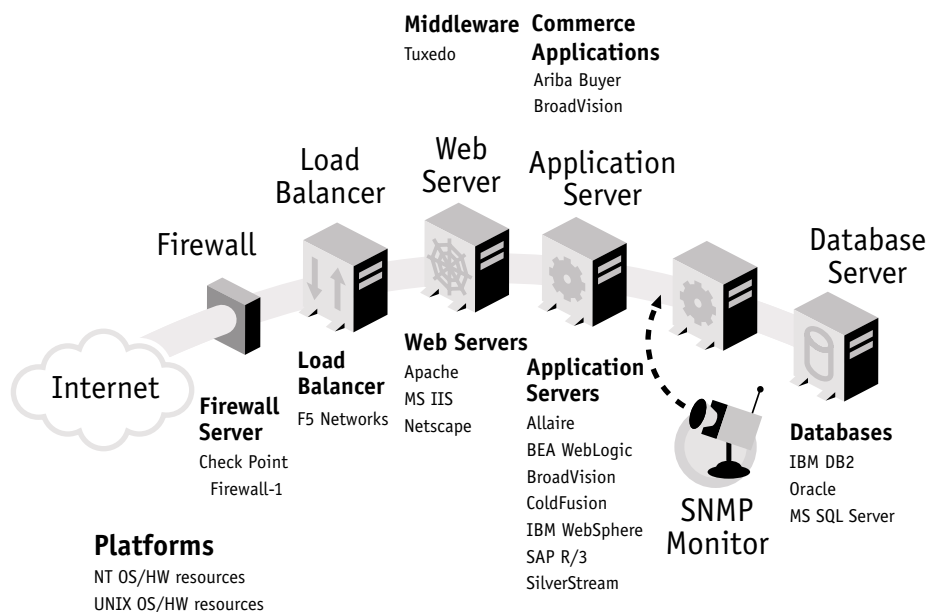


Fig. 7. Topaz AIMs monitor back-end infrastructure of all components of the Web infrastructure.

**TIP #4: PRIORITIZE IT RESOURCES**

Imagine that members of an IT group received an alert on a back-end infrastructure issue. They are ready to act, but they do not have answers to the following critical questions:

- How many of their customers are experiencing this problem?
- Which locations are affected—is it isolated to one location, or is it a global issue?
- How severe is the problem?
- Which customers are affected—are any “gold” customers affected?
- When did the problem start?
- What caused the problem?

Until these questions are answered, IT groups cannot effectively prioritize a problem. For this reason, they need to be able to quantify the business impact of Web performance problems in terms of the precise number and location of users affected. They might learn, for example, that 12,000 users in Atlanta, Georgia, experienced a 22-second download time when trying to finalize a payment transaction at 6:15 a.m.

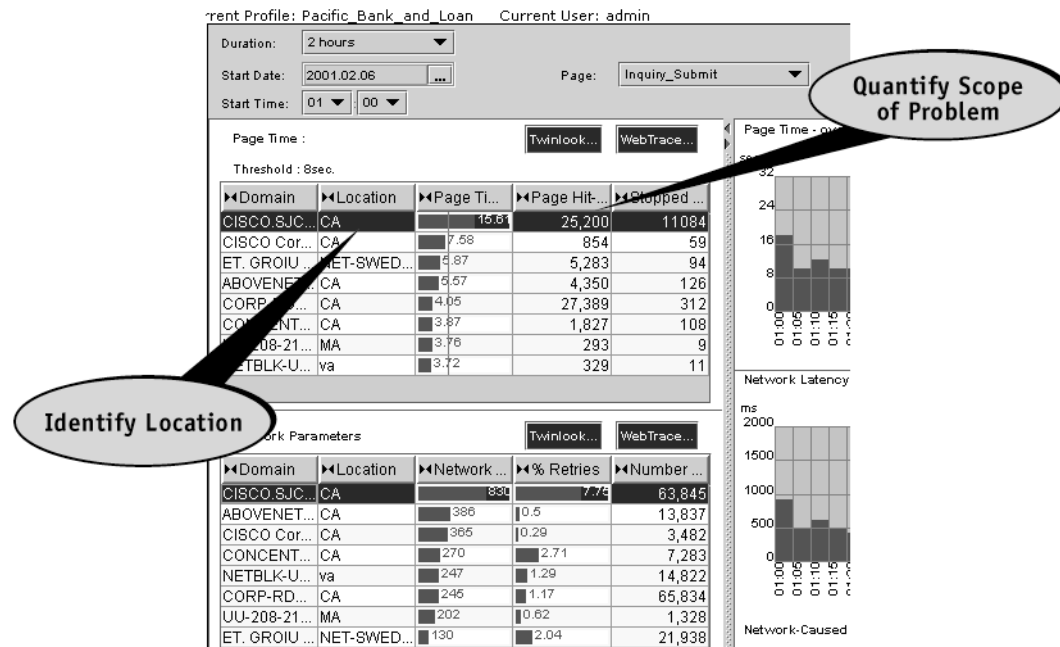


Fig. 8. Topaz allows organizations to quantify the business impact in real time.

Identifying the impact of performance problems enables IT groups to better prioritize their resolution efforts and protect the revenue stream.

### **TIP #3: OPTIMIZE YOUR EXISTING INFRASTRUCTURE**

When problems occur, many people think adding hardware is the solution. Often, this is not necessary. Instead, IT groups should first try to get the best performance out of the infrastructure they already have. This involves using the right solutions to get information from relevant infrastructure layers. With accurate metrics, IT groups then can fine-tune their site and evaluate the impact of these changes on the performance—instead of upgrading to new and costly hardware. By following these steps, organizations can avoid investing in additional hardware and thereby save money and resources.

Effective application performance monitoring will allow IT groups to:

- Solve problems more efficiently
- Use existing resources to solve problems
- Protect their revenue stream with reliable Web sites
- Increase customer retention
- Minimize support costs

Additionally, accurate monitoring data will allow organizations to justify their IT expenditures. After conducting thorough performance monitoring, they can evaluate the impact of changes on site performance. Has the new firewall improved the site's performance? Does this patch actually improve the end-user experience? Will money spent on additional hardware make an impact?

### **TIP #2 CREATE ESCALATION PROCEDURES TO ADDRESS ISSUES**

IT groups can create escalation procedures to handle the multitude of potential problems and to distribute them to the appropriate teams. Creating a successful escalation procedure requires assembling a checklist or guide to address the various types of issues. For example, as illustrated below, IT groups can establish step-by-step instructions for addressing a Web server problem by using the data provided by Topaz:

1. Receive an alert from Topaz that performance thresholds have been exceeded.
2. Log into Topaz Web site to investigate the issue.
3. Use Transaction Breakdown to focus resolution efforts on the network or the server.
4. Use Server view in Topaz Prism to isolate problematic Web server(s) or misconfigured load balancer.
5. Use the Topaz AIMs (Application Infrastructure Monitors) view to isolate root cause on faulty Web server or load balancer.

**TIP #1: USE APPLICATION PERFORMANCE MANAGEMENT TO AVOID “THE SCRAMBLE”**

As discussed earlier, the danger of relying on traditional silo-focused management tools is that they only monitor components in isolation. They cannot provide organizations with an end-to-end perspective of performance as it's experienced by users.

Often an organization's traditional monitoring consoles show “green lights,” but end users are complaining about poor performance. In these cases, each department's console shows a “green light” for their systems—that is, no performance problems have been detected in their areas. The IT departments in turn scramble to locate multiple specialists to track down the root cause of the performance degradation. Meanwhile, different IT departments are reporting back with contradictory information.

Mercury Interactive calls this phenomenon the “scramble.” With green lights on every console, each team—operations, network, database, applications—has to scramble to track down their best specialists to locate a problem that is impacting end users. IT departments can combat the scramble and increase efficiency by building a monitoring platform that feeds the right information to the right people.

Topaz's CIO Cockpit alleviates the scramble at the highest level by providing an enterprise-wide view of application performance and availability. The CIO can see immediately which applications are performing or underperforming and can then call in the right applications specialist to resolve the problem.

The CIO Cockpit provides a filtered view for the CIO, showing only the overall health of each application. The right specialist can then drill-down to isolate the root cause of a problem.

Mercury Interactive's Topaz can help IT department avoid the scramble by monitoring the complete end-to-end experience of users and isolating the root cause of problems anywhere in the infrastructure. With this information, IT groups can solve performance problems quickly and more effectively utilize their resources.

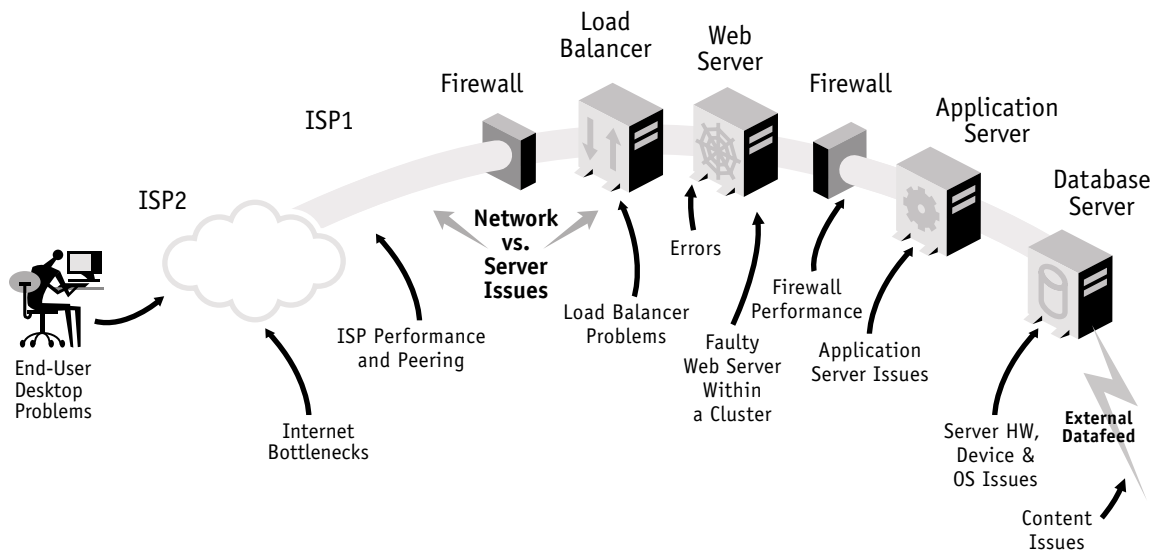


Fig. 9. Monitoring a site using a “silo” or component approach can create an IT scramble.

## CONCLUSION: THE TOPAZ SOLUTION

The traditional silo approach to performance monitoring relies on a fragmented view of the infrastructure. Each IT division has a different person responsible for each piece of the Web infrastructure. In addition, each division has its own monitors for tracking system performance. The result is a piecemeal view of application performance from the component level.

To effectively monitor application performance, organizations need a solution that can collect and consolidate performance data from across the entire infrastructure, analyze this information and provide a single view of the results. This centralized reporting enables IT groups to obtain an accurate picture of the end-user's experience.

With Mercury Interactive's Topaz, organizations can monitor the performance of their applications from one console, receive alerts when issues arise, identify problems and diagnose their causes. It is the only solution that measures the end-user experience 24x7 and correlates performance issues to their root cause in the Web infrastructure, inside and outside the firewall, and in the application itself.

By using Topaz, organizations can ensure that their end users receive solid performance around the clock. In addition, they can customize Topaz to ensure their performance management solution best meets their business needs.

Used in conjunction with Mercury Interactive's top 10 tips for performance management, Topaz provides organizations with an efficient and effective means to deliver the performance end users demand.

#### **Mercury Interactive's Top 10 Performance Management Tips**

- Tip #10: Focus on Critical Business Processes
- Tip #9: Use the "Right" Monitoring Solution to Meet Your Business Needs
- Tip #8: Get a Consistent Baseline and Watch for Trends
- Tip #7: Avoid an Alerting Flood
- Tip #6: Think "Recurring" When Acting on Alerts
- Tip #5: Correlate End-user Performance with Back-end Issues
- Tip #4: Prioritize IT Resources
- Tip #3: Optimize Your Existing Infrastructure
- Tip #2: Create Escalation Procedures to Address Issues
- Tip #1: Use Application Performance Monitoring to Avoid "the Scramble"

#### **ABOUT MERCURY INTERACTIVE**

Mercury Interactive is the leading provider of enterprise testing and performance management solutions. The company's automated software and managed services help companies deliver and maintain high-performance applications. Customers worldwide use Mercury Interactive solutions across their application and technology infrastructures to minimize hardware and operational expenses, protect revenue streams and enhance their competitive positions.

Mercury Interactive was founded in 1989 and is headquartered in Sunnyvale, California. The company has over 1400 employees with offices in more than 20 countries. For more information on Mercury Interactive, visit the company's Web site at [www.mercuryinteractive.com](http://www.mercuryinteractive.com).