

Think Beyond Software Performance Monitoring

*A trusted third party's perspective on your
service-level management strategy*

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Executive summary

Cyberspace has become a major front in this decade's business wars, and even the most traditional companies must often battle competitors online. E-businesses are investing heavily in the technology required to provide new functionality and services that will attract today's Internet savvy customers. At the same time, companies want to control IT costs and maximize return on investment. Hence, they are also investing in *service level management* (SLM), a set of monitoring and managing activities that ensures customers consistently have the best possible online experience and that minimizes the costs required to sustain that experience.

Of course, one element of SLM is internal monitoring of hardware and applications. But more and more companies now also acknowledge the need to monitor Web site performance from an end-user perspective. One way to do this is with owner-operated software designed to access a Web site from beyond the firewall and take measurements that reflect a customer's experience. This paper discusses the deficiencies of the owner-operated software approach, and argues that the best way overcome these deficiencies is by means of neutral, third-party performance monitoring. Specifically, neutral, third-party services-based performance monitoring from Keynote Systems enables e-businesses to do the following far more effectively:

- *Cut through the "noise" caused by a multiplicity of internal management tools from different vendors*
- *Eliminate the biases of different internal monitoring teams and help these teams to cooperate effectively to identify the root causes of problems*
- *Compare an e-business' service-level performance to the performance of competitors*
- *Avoid wasting valuable resources fixing non-existent problems and avoid missing problems that do exist*
- *Determine when performance problems are caused by breakdowns elsewhere in the Internet and locate the origin of these problems*

Online sales and service crucial to success

It has been some years now since the dot-com bubble burst, and substantial companies with coherent business plans have gradually replaced the wacky and wishful to create a thriving online business environment. This was inevitable given the basic promise of the Internet, the advent of broadband, and the remarkable innovations in information technology. Executives of many "click-and-mortar" companies now recognize that Web-based sales and services are almost as essential to their success as they are to the success of businesses that are conducted entirely online.

Surveys show that IT spending is on the rise, especially for Web applications, because enhanced online service can have a direct and significant impact on customer satisfaction. For example, *CIO* magazine reports that improved online service is a key IT objective for 72 percent of the companies it recently surveyed, all from the Fortune 1000.¹ In the same survey, 49 percent of the respondents support enhancing or creating new IT programs to generate more e-business revenue. Meanwhile, chief information officers (CIOs) want to keep tight controls on IT budgets. Not surprisingly, the *CIO* magazine survey indicates that 44 percent of the respondents plan to reduce IT operating costs while 38 percent want to improve employee productivity. The days of irrational exuberance are over, and prudent executives are left with conflicting impulses to spend and save.

¹ "Strategy" in *CIO Insight* magazine, Special Issue, Research 2004, Number 48, Page 18 - 49

Service-level management with owner-operated tools

How can an e-business use IT to enhance online performance and increase revenue while also controlling costs? One obvious strategy is to focus internally on the systems that deliver content and functionality. To this end, most organizations originally invested in tools to monitor the hardware components of their IT infrastructure. These tools worked fine in a contained mainframe environment where functioning hardware was a reliable indication of customer experience. However, as companies moved to distributed servers running Web applications, it became important to also monitor application software characteristics, e.g., the length of time to run a database query or load a Java servlet. The idea is to use these so-called *internal systems management tools* to detect problems quickly *from within the firewall* and respond efficiently, thereby diminishing the external impact on service quality and customer satisfaction.

While efficient systems management is important, many IT professionals have recently recognized that it does not always capture customer issues. There are a variety of reasons for this, but the basic deficiency is that speculation about customer service is inferred indirectly from measurements of internal components and applications. The systems management tools say nothing *directly* about the end-user experience, the ultimate determinate of customer satisfaction. In response, many organizations have purchased software to supplement systems management with performance monitoring, which is conducted outside the firewall from the customer's perspective. Essentially, the software runs on computer proxies placed in different geographic locations. A proxy—also called an *agent*—initiates scripted sessions with an e-business site and emulates a real customer by making requests, conducting transactions, and so forth. An agent takes quantitative measurements of the Web site's response to its actions, and these measurements are intended to reflect the customer experience.

The major difference between systems management and performance monitoring is that the former is conducted inside the company's firewall and the latter is conducted from outside the firewall. However, as described, the methods share a basic feature: both are performed by IT staff with *owner-operated* monitoring software. In other words, an e-business does all the monitoring by itself. Keynote believes that this owner-centric approach suffers from a fundamental bias, at least with respect to performance monitoring. Although e-businesses need to supplement the internal perspective of systems management, performance monitoring can't do the job effectively if it is conducted with owner-operated tools. Given the realities of the Internet and the pressures of a competitive marketplace, performance must be monitored by a *neutral third party* with global resources and a comprehensive, well-tested, credible methodology. This is precisely the service Keynote so effectively provides to help e-businesses improve key Web application service levels, maximize revenue, and effectively manage costs.

Shortcomings of software-centric service-level management

The owner-operated software approach to performance monitoring has several shortcomings that undermine effective systems management and overall service delivery.

Noise and bias

In the *CIO* magazine survey referenced earlier, 74 percent of responding e-businesses indicate they use numerous tools to manage service levels, and these tools come from multiple vendors such as Hewlett-Packard, Computer Associates, Compuware, Agilent, Tivoli, and Mercury. Hence, companies need several IT teams with different types of expertise, and these teams use different processes and metrics to evaluate the performance of their assigned systems. For example, the network team may use HP OpenView tools to take measurements from 10 percent of the network elements every 15 minutes; the system administrators may use BMC software to collect data from 50 percent of the servers every 5 minutes; the applications management team may use Compuware utilities to apply a

large number of metrics at a variety of intervals; and the performance managers may do likewise with Mercury software. Although all these tools are important, they capture different aspects of service-level delivery. As a result, the respective tools can produce so many incommensurable data points that it is difficult to determine which measurements are relevant to a customer problem. By the time teams determine that there is in fact an issue, and collaborate to diagnose and resolve it, customers may have experienced substantial degradation of service. Separating the signal from the noise can significantly delay an adequate response to service-level issues.

The problem is exacerbated by the natural tendency of technicians to feel most comfortable with their own areas of expertise, and to bias their judgments toward their processes and tools. When undetected customer problems occur, defensive IT teams sometimes impede a constructive response by automatically shifting the blame to other teams. Suppose, for example, sporadic problems in network components cause intermittent delays in Gringots Bank's online bill-pay service. Since the problems are transient, IT technicians might easily miss them if they monitor the network only at 20-minute intervals. If the team refuses to examine its processes and instead shifts the blame to other teams, the service-level problem will remain unsolved. In general, the inherent inefficiency caused by noise and team bias decreases productivity and raises IT costs. The problems only get worse when organizations add new online services, which require more tools and personnel and produce more data points, blame games, and chaos.

Competitive ignorance

Suppose that all the systems management tools indicate no problems with the hardware and applications, and the performance-monitoring software detects no customer issues. If so, the operations groups within an enterprise may be perfectly satisfied with the quality of service. Customers may feel otherwise, *even if* the Web site works exactly as designed. Why? One reason might be that a competitor's site simply performs better. In other words, the competitor's transactions are faster, more intuitive, less subject to error, and when performance issues arise, they are corrected more quickly. If this is the case, the self-satisfied e-business will likely lose customers to the competition.

If an e-business is going to thrive, its service level must match or exceed that of its competitors. Yet since standard owner-centric service-level management (SLM) focuses entirely on a single organization's service-level delivery, it provides no competitive data. In theory, the organization could use its performance-management software to track competitors. However, monitoring and analyzing competitive Web sites on a comprehensive and continuous basis is impractical and expensive, especially if customers are distributed around the country or even around the world.

False negatives/positives

Internal systems measurements sometimes indicate service problems that do not exist at the level of customer interaction. For example, a server metric might suggest a slowdown in Gringots' bill-pay service, when no detectable delay has occurred from the customer's point of view. Perhaps other systems have compensated to maintain the service level, or perhaps the measurement was an anomaly due to a sudden but temporary spike in workload. An immediate IT response to a false positive may be ill-informed and ultimately cause more harm than good at the service level. It might also divert crucial resources from higher priority tasks.

The opposite problem can arise when low-level metrics mask customer issues. For example, the IT staff might be so reassured by optimal server metrics that it misses slow customer-response times caused by sub-optimal application design. In the case of a false negative, crucial resources won't be applied until the problem eventually comes to light, which may take hours or even days—and result in disgruntled customers.

Competitive ignorance exacerbates the problem of false positives and negatives. Objective and comprehensive competitive information enables e-businesses to set appropriate performance standards and monitor internal systems in relation to these standards. In other words, competitive information helps IT personnel determine what counts as good performance, and helps craft internal service-level agreements (SLAs) between IT teams to ensure that their assigned systems sustain optimal service levels. Competitive ignorance makes internal SLAs arbitrary and ineffective. For example, if an online bookseller, operating without competitive information, decides arbitrarily that a specific transaction should never require more than 12 seconds, SLAs will be based on that standard. However, customers of a competitive Web site may consistently make the same transaction in six seconds. If so, the bookseller's performance-monitoring software won't alert IT staff to the competitive discrepancy that occurs when the specified transaction takes 11 seconds. Since effective competition is crucial to e-business success, the problem is certainly real, and constitutes a false negative. Conversely, since the bookseller's systems management teams lack appropriate SLAs, they may choose arbitrary metrics. For example, the server team may speculate that anytime a server's load exceeds 80 percent, a problem occurs at the customer level. If no such problems actually emerge below 95 percent, the team will waste valuable time fixing false positives.

Internet issues

Significant customer problems often originate beyond a company's firewall and are completely undetectable by systems management tools. For instance, suppose that many of Gringots' Chicago customers encounter sluggishness in the bill-pay service, but the problem arises from operational difficulties at an Internet service provider (ISP) peering point rather than from system malfunctions at the bank's London data center. Internal monitoring tools will not detect this issue, and Gringots probably won't discover the problem and locate its origin until Chicago customers call and complain.

This type of issue is magnified by the global nature of the Internet. Customers can access a Web site from almost anywhere in the world, which is a fantastic opportunity for e-commerce but a massive complication for service-level management. When many customers access a Web site from many locations, transmissions travel back and forth across different backbones, between numerous ISPs, and so on. Problems can originate in any of the intervening systems, and all of these systems operate outside the e-business firewall and beyond the reach of internal systems monitoring tools.

IT teams need a reliable method to detect Internet-based problems, and also a way to determine where the problems originate so network administrators can contact the appropriate companies and initiate corrective action. Performance-monitoring software can help, but is neither reliable nor comprehensive and may produce a false sense of security. *If* systems management teams use the right internal metrics; *if* these metrics detect no hardware or application problems; and *if* the performance-monitoring software takes the appropriate measurements, then a monitoring agent can reliably detect Internet problems. In particular, the first and third "ifs" are huge—it is very difficult to set the right internal metrics without the right performance metrics, and it is equally difficult to determine effective performance metrics without competitive benchmarking. Beyond that, even when all the metrics are appropriate, the ability to detect Internet-based problems is severely limited. The *only* Internet problems that a given agent can detect are those that arise in that agent's specific geographic location. An e-business can place agents only where it has a physical presence, and most e-businesses do not have a distribution of physical sites that approximates the global distribution of real and potential customers.

Keynote Systems—an independent, trusted third-party for application service-level management

CIOs must solve the serious problems mentioned above if they intend to meet their business goals of improving performance while controlling costs. Keynote believes that these problems cannot be addressed efficiently or cost-effectively as long as e-businesses rely on owner-operated software for performance monitoring. That is why Keynote offers a third-party, subscription-based *service*; organizations do not buy or manage Keynote software or appliances. The comprehensive, global Keynote service is completely objective in its measurements and provides detailed competitive intelligence. It is also very reasonably priced and eliminates the considerable hassle of in-house performance monitoring.

Since 1996, Keynote has been the leading Internet performance authority, providing e-businesses with comprehensive services that directly monitor and analyze the customer experience with key Web applications. Keynote has built an international network of over 1,600 agents in 103 cities to proactively monitor the performance of those Web applications. The agents access Web sites across major Internet backbones to take over 40 million performance measurements a day for over 2,100 clients, all from the customer's point of view. Keynote can also operate appliances within a client's data center to passively monitor actual transactions with real e-business customers.

Unbiased triage

The Keynote solution separates the signal from the noise more reliably than owner-operated software and helps eliminate the influence of in-house bias. Years of experience enable Keynote to craft the most objective, relevant, and actionable metrics. Although Keynote software is not designed to resolve hardware or application issues, systems management teams can rely on Keynote measurements to help diagnose their internal problems and identify offending infrastructure components.

Suppose, for example, that Gringots' bill-pay service is a four-step transaction: the customer logs in; opens the payee page; enters an amount and submits the payment; and then confirms the payment request. Keynote's scripted monitoring agent will attempt to run the transaction at a regular pace, and its measurements will indicate if the process is unusually slow—say 50 seconds instead of the standard 30 seconds or a competitor's average of 35 seconds. In this scenario, the agent will also indicate that the delay occurs when a customer opens the payee page and the second image takes too long to load. Since this is a static image, the delay is most likely not occurring in the network or the Web application. Instead, it is probably caused by a physical problem with Web-server resource utilization—perhaps a processor bottleneck. The organization's IT team can then use the appropriate internal systems management tool to investigate and correct the root cause.

This diagnostic process helps e-business teams collaborate and overcome bias. Since the Keynote performance data is objective, there are far fewer grounds for dispute, even if the problem is not captured by the responsible team's systems monitoring tool. Keynote data provides impartial evidence to help adjudicate internal disputes and promote collaboration among internal teams. This approach expedites problem resolution, thereby reducing IT costs and keeping customers satisfied.

Competitive wisdom

The Keynote solution suite helps IT administrators evaluate the performance competitors provide to end-users. IT staff can then use the information to identify areas for improvement, set appropriate performance standards, and define viable internal SLAs. For example, Keynote publishes transaction indexes for a variety of industries that compare customer experiences on the Web sites of 10 to 15 leading competitors. Administrators can view these indexes on the Keynote Web site and determine how their applications perform relative to the major competition. Keynote also conducts syndicated service-level ranking studies that help customers understand industry best practices and adopt these practices to improve their competitive position. Upon request, Keynote experts will perform a comprehensive audit of a subscriber's Web applications to evaluate how their performance matches up against the performance of competing Web applications—and whether the subscriber's applications can deliver on e-business goals.

Since Keynote is an objective, third-party Internet authority, subscribers can trust the accuracy of its competitive data—as painful as that might sometimes be. However, by discovering the truth about where an e-business stands versus competitors, enterprises can keep their IT teams and business managers honest and foster a collaborative basis for strategies, action, and SLAs.

Real cause for action

The Keynote solution can help e-businesses deal with false positives and negatives. Systems management teams need not rely on internal metrics that detect nonexistent service issues or mask actual problems. Keynote software agents provide direct, regular, and objective measurements of Web site performance from the customer perspective. Because Keynote metrics are comprehensive and based on competitive benchmarking, an IT team can use Keynote data to discount false alarms or take corrective steps. In this way, e-businesses can delay potentially disruptive actions until Keynote measurements indicate that a problem is real. Keynote's data will provide objective grounds for teams to discuss and collaborate on the most appropriate solution, and then validate that the selected solution improves the end-user's perception of the site.

Monitoring beyond the firewall

The Keynote methodology also helps IT teams deal with service problems that originate elsewhere on the Internet. Keynote's measurements detect Internet-based problems that systems management tools cannot reach. Keynote can also place an application monitoring appliance inside an e-business firewall, which allows IT teams to confirm that their internal systems are working and that the problem indeed originates in the external world.

In addition, Keynote helps an organization's IT team determine the specific origin of an Internet-based problem. For example, since Keynote agents monitor a Web site from many cities across multiple backbones, when only one agent detects a performance problem, that issue most likely originates in the agent's ISP or along the particular route of transmission. The e-business can then contact the suspect ISP and ask that the problem be fixed. Keynote measurements add instant credibility to such requests. The Keynote brand is well known and highly regarded by leading ISPs, and ISPs are very unlikely to dispute Keynote's impartial evidence.

A third-party basis for service-level management

Can e-businesses use existing information technology to improve customer service, cut IT spending, and maximize Web site revenue? They certainly can if they supplement a robust systems management program with Keynote's third-party monitoring and competitive analysis services. While Keynote cannot eliminate the need for internal systems management, the Keynote solution can replace owner-operated performance-monitoring software, which is easily biased and limited in reach. Keynote's worldwide presence and objective data enable organizations to be far more effective, productive, and efficient by injecting a neutral perspective into the e-business service-level management process.

To learn more about third-party e-business monitoring solutions from Keynote, visit www.keynote.com.



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