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# Discovering Web Performance Issues Before Your End Users Do

The Essentials Series

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# Proactively Monitoring Response-Time and Complex Web Transactions

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As stated in the previous article, a Web page is a convergence of several distinct components that work together to help the end user community interact with an organization. The complexity of this orchestration requires the organization to monitor the Web pages from the viewpoint of the end user so that the organization knows what they are delivering to those users as well as how well they are delivering it.

This article looks at different types of complex transactions performed by Web sites and what steps can be taken to monitor them. It will delve into understanding the process of monitoring Web response times. In addition, this article will look at the interplay of complex transactions, including those of third-party sites, and the perspective required to ensure that they perform to satisfaction. Finally, the article will examine how to get the greatest advantages from external Web transaction monitoring.

## Anatomy of Common Web Transactions

Web transactions come in many types. Each transaction type has components that need to be monitored to ensure that they are operating correctly. This requires a combination of designed internal monitoring and looking at the site from the perspective of the user. For the purposes of this article, the use of Web monitoring from the cloud will be highlighted, as it is often neglected—to the peril of those who neglect it.

### Asking for Decisions

Most people think of placing purchases on the Web when they think of Web transactions. Common functions include providing a user with a catalog of products, adding those products to a shopping cart, and completing the purchase. This practice is so common, how can cloud-based Web monitoring help ensure the success of the site?

The site will require an interaction with the user to build the cart and complete the purchase. This transaction requires posting information back and forth from the client browser to the internal Web servers. Testing from outside the firewall ensures the process works as expected for the end user: clicking buttons to move between pages, changing quantities to change the values in the cart, and so on. Testing can also measure the speed at which these events occur and how much patience is required by the user to complete a transaction.

In addition, testing can highlight simple things that often get overlooked. For instance, what happens when your public secure socket layer (HTTPS) certificate expires? No one thinks they will forget to renew it, but is it worth the risk to expose your customers to that type of simple oversight? Proactive, monitoring from the cloud can find these types of errors before your users encounter them.

## Collecting Information

The simple act of filling out a form to create a user account or edit one's account can create problems. Many Web forms use list boxes to provide users with a selection of permissible choices (e.g., State) from which to pick. On all too many occasions, that list box will be empty, with no selections available. This situation may or may not trigger an internal error within the Web page, but it will definitely register as an error with the user.

Web programmers often use scripts to validate that required fields are completed and that entries are in acceptable ranges. Sometimes those scripts do not behave, and the user can find they cannot submit the form and they have no idea why. These types of errors frustrate users and make them distrustful of the organization that published the errant pages.

Externally executed monitoring scripts can encounter these errors and proactively inform IT that the page is misbehaving. The diagnostic data is often easy to read and helps locate the error more quickly than trying to decipher cryptic conversations with end users that encounter the issue, as translated through a customer service representative.

## Providing Sensitive Information

Many sites provide sensitive or personally identifiable information, such as health records, financial account balances, and the like. Access to some of this information is regulated by industry and government organizations. These types of sites require users to log in before they see the information. Logging in can take many forms, most commonly usernames and passwords.

Many users have found that the sites will occasionally fail to allow them to log in. The user database may become unavailable or a new version of their browser misinterprets a Java applet. For whatever reason, site security denies them access to their information. This can irritate users and can prevent them from paying bills, properly maintaining their health, or managing their travel plans. As people become more dependent on their Web connections to sensitive information, the relationship your organization has with the user is more imperiled when the Web site cannot serve them.

## Working with Partner Organizations

Partner organizations can help extend the reach of your organization. They can provide additional goods and services that you can sell. They can handle aspects of a transaction, such as processing payments, calculating taxes, or arranging shipments. This setup can help your organization develop a richer, more rewarding relationship with your users.

As you incorporate these additional services into your site, you extend your brand and your customer's trust to these vendors. If their services fail, it can cause your services to fail. Although the error is not your fault, your customer will still perceive it as a failure of your site. Having monitoring software that automatically checks that these services are operating as advertised—and warns you when they are not—can ensure that your site is providing the service you expect.

## Monitoring Response Times

There are a number of factors that determine the response time of your Web sites for customers. The responsiveness of your servers and other software components is critical and can be easily monitored.

But there are a host of factors outside your immediate control that affect your Web site performance: network bandwidth, geography, types of devices that access your Web site, and even brands and versions of browsers. Monitoring from outside your organization, at varied times, using varied hardware and software can help you understand the end user experience in the field and make the appropriate changes to your site to enhance that experience.

### Analyzing the Audience

To test the end user experience, you need to develop a profile of the hardware and software your users employ to access your Web sites. When doing so, consider:

- Form factors (PCs, tablets, pads, phones, music players, and so on) provide variation in screen size, network speeds, process power, and browser rendering
- Software, particularly Web browsers (Internet Explorer, Firefox, Safari, and Chrome), and the individual versions of these various browsers, offer differing levels of support for various versions of HTML and JavaScript
- Add-ins (JavaScript, ActiveX, Flash, Silverlight, QuickTime, iMacros, and so on) vary in their response to a site—what happens when these components are missing?
- Network connectivity (cable modem, DSL, 3G, 4G, wired, and wireless connections) will affect download speeds and responsiveness
- Geographic dispersion of the audience will also affect the network lag time and packet dropout rates

From this list, you need to determine the most common scenarios among your users, and what performance levels you are willing to support. External testing can provide a good picture of what your site does and does not support. It can be tuned to simulate all these factors and provide baselines of the resulting performance.

### Setting Acceptable Response Times

Once criteria have been established for the hardware and software that the site will support, testing can build baselines on how the site responds to these varied conditions. The information can be used to set service level agreements (SLAs) within IT or with your vendors.

Regularly scheduled cloud-based testing will track the baselines and inform IT when service levels are no longer being met. Also, users tend to migrate from one type of access (for example, laptops) to others (for example, pads). As that migration occurs, your testing will provide insight into the experience that the users will receive as they shift.

## Establishing a Monitoring Plan

Conditions within your organization and within the user community change. Users switch from DSL to cable modem or fiber optic, and their bandwidth increases. They start to favor their smart phones, and bandwidth (and screen size) decrease. Your testing should be frequent enough that, when these changes are recognized, you have enough information to respond to the trend.

You also need to be sensitive to changes within your organization. Servers become busier. Your site becomes more popular, and demand increases. Special events, promotions, seasons, and other changes occur. Your scheduled monitoring should provide you with enough information to keep pace with expected changes and identify unexpected changes proactively before they become major issues for your users.

## Monitoring Complex Transactions

Complex transactions typically include the interaction of software on the page. To understand how the user perceives those interactions, it is necessary to view the page as a whole, testing how each element of the page interacts with the other parts of the page.

Viewing the page from “outside” with the same aspect as the end user allows you to find the same interactions the user experiences. The wait times, component intercommunications, and even common errors become apparent when this type of monitoring approach is applied.

## Complex Transactions Within Web Sites

Many Web sites will work with other subsystems within your organization, such as credential stores for logging into the Web site or components that access the customer balance, shipping information, current inventory, and so on. Most people who use a Web site regularly have encountered error messages indicating that these Web services or database connections have failed. Such failures can be captured by external monitoring and reported quickly through email alerts to Web site response teams who can quickly correct the issue.

Sites that interact with external Web services to provide driving directions, calendar services, and a wide variety of other benefits can fail as well. These systems are maintained externally, so internally-monitored systems will often not be aware of their failure. cloud-based monitoring service can detect the error and warn IT. It can also monitor the response time of these external services to ensure that they are fulfilling their SLAs.

Complex animations are intriguing and can draw users to sites. But they can take long periods of time to download and can, when other components are not at the correct service pack levels, fail. External monitoring can provide a baseline of their performance and map that performance to different devices and version of software.

### Gaining Proper Perspective

Internal monitoring will provide IT with the ability to diagnose what is happening within the organization when sites deliver content. They can track server response time and validate that components are running correctly. But these monitoring systems do not always correlate the performance of related components. They do not often account for variations in network access, hardware, software, time of day, or geography.

External monitoring provides IT with clear insight into what the user is experiencing. It provides quantitative measurement of the users' view of the Web site. That view can be used to address customer concerns and to proactively correct issues. The statistics can help IT learn where it can best focus its efforts to improve the performance of the sites for the people who actually use the sites.

The Web site represents a contract of trust between the user and the publishing organization. Transactions and pages that fail erode the users' trust in the organization. Failures in transaction can cause a user to question their decision to use the site and remain loyal to the organization that created it. Monitoring can help support that trust by eliminating errors and making the user confident in their decision to use the site.

Monitoring from the cloud can also help IT validate to the business that they are indeed meeting SLAs. External monitoring provides objective proof that IT is meeting its obligation and gaining the trust of the management team that is funding their activities.

### Capitalizing on Web Transaction Performance Monitoring

Web transaction performance monitoring from the cloud helps document the activities of the Web site from the users' perspective. Under the conditions of their varied geography, software, hardware, network connectivity, and time zone, it provides quantitative recording of what they experience:

- Site revisions can be tested under real world conditions before they are released to the user community. Doing so can protect users (and their trust in your organization) from experiencing easily identified issues in performance or errors in transactions. It takes testing out of the lab and puts it on the street—without endangering the user community.
- Data collected can help identify least performing areas of the site and help IT direct its attention to those areas. This identification is most useful in highlighting changes in the user community (such as migration from large PC screens to pads and smartphones) that change the profile in which the data is consumed.



- Baseline measurements can validate that changes have the desired affect and the SLAs for the site are being met.
- Graphical presentation of performance results can make the data easy to understand and ensure that areas for improvement clearly stand out.

Users have many platforms from which they consume Web site content. Measuring your site across that spectrum will help you understand their experience and better serve their needs. The next article will examine how external Web monitoring can help improve IT efficiency.