Website Performance Testing

Like any software product, your website or web application requires thorough testing before it goes live to ensure a quality user experience. Web users are accustomed to a high level of functionality, responsiveness and usability. Increasingly, they lack patience for web sites that do not provide a fulfilling experience. Thus, testing the performance aspects of your website is critical.

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| Website Performance Testing

Performance testing assesses your site's efficiency compared to its specifications. Its main focus is overall responsiveness under average loads. This category of testing should be performed early and often in order to uncover imbalances in the software architecture or its implementation. Monopolization of resources, processing bottlenecks and unexpected latency are likely suspects, which are easier to correct early on rather than at later stages in development or testing.

The end result of these performance tests and subsequent software changes is a set of baseline measurements you apply whenever the web site is changed to ensure that responsiveness and processing efficiency are stable and improving.

Let us look at two specific types of website performance testing: Load Testing and Stress Testing.

Load Testing

After early performance test results stabilizes, load tests that simulate thousands or even millions of users over long time periods are appropriate for measuring software endurance and volume capacity. These take you one step closer to real-world conditions. These tests uncover buffer overflows, memory leaks, and responsiveness degradation.

Stress Testing

Stress tests apply maximum burden on the website in order to uncover its breaking points. Equally important, these tests measure how gracefully your site crashes and recovers. Success is declared when the site can fail without losing data, does not create security risks and recovers quickly with minimal disruption to users.

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Website Performance Testing Approach

When designing your web performance testing, use a logical approach that gradually narrows down on defects in design, development and deployment. Start with a clear set of objectives and measurable criteria for what your performance tests are to accomplish. Otherwise, you can waste effort testing the wrong things in the wrong places plus be unaware when the test effort is losing effectiveness.

Plan to start performance testing as early as possible in your development cycle to harvest the low-hanging fruit such as major imbalances in the software's implementation. If possible, engage developers in the early stages of testing. Get them into the habit of examining performance, load and stress results as soon as they become available, so code changes are not delayed and subsequent testing is tweaked effectively with developer input.

To quick-start your testing effort, it helps to focus your testing and optimization efforts on the most-used or high-impact pages based on the percentage of traffic they receive, which you can determine using analysis tools or examining logs. This enables more efficient use of testing resources while deferring changes for rarely visited pages with minor impact on the customer experience.

Finally, regularly review the following do's and don'ts of website performance testing, especially with regard to cloud-based testing. This will help ensure you are receiving the full benefits of the cloud and that your testing aligns more closely to the conditions of your site when it goes live.

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The Do's and Don'ts of Website Performance Testing

When it is time to implement the test plan, avoid common strategic and tactical pitfalls:

- **Do** keep your in-house test infrastructure up-to-date even if you use cloud-based testing. It is your baseline environment for isolating cloud-based testing side-effects, which will drastically reduce the time for root cause analysis for many defects.

- **Do** use your live site, if one exists, to guide load and stress testing parameters on the developing site. For example, an initial test load might be the number of actual peak-hours orders multiplied by your expected growth rate plus 20 percent overhead.

- **Do** track both client and server-side traffic during non-peak and peak performance testing to determine ratios between traffic and processing activities, which often discovers imbalances.

- **Do** test as many pages and combinations of page traversals as possible. Measure single page and page combination load times down to the component level.

- **Do** pay attention to which pages or activities are consuming an inordinate amount of time relative to other areas of the website. This helps optimize use of your test and repair resources.

- **Do** distribute generated loads geographically and by network segment.

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- **Don't** ignore the dependency between page load times and user volume capacity. Measure both aspects at each stage of testing.

- **Don't** forget to process live web traffic logs to collect statistics on the types and volume of requests coming into your site so you can optimize load testing to reflect that reality.

- **Don't** run your load generation on the same cloud as your website to avoid contamination of test metrics.

- **Don't** assume that cloud testing is intrinsically less expensive than running on in-house infrastructure. In other words, keep your eye on the "meter."

- **Don't** rely on a single cloud vendor as vendors' distinctive functional and operational characteristics may affect test results.

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Why Use the Cloud for Website Performance Testing

Website performance testing utilizing cloud-based tools and infrastructure offers many of the same advantages as cloud-based enterprise apps, such as cost reduction, faster test deployment and dynamic scaling:

- **Minimizes** capital expense for on-site hardware and infrastructure while reducing ongoing costs for maintenance.

- **Eliminates** long hardware acquisition lead times.

- **Offers** choice in selecting vendor features most important to your website testing.

- **Provides** immediate scalability to meet your performance testing scenarios.

- **Eliminates** disruptions due to equipment failure or power outages.

Additionally, the cloud provides specific benefits that increase the accuracy and efficiency for website performance testing.

Cloud Benefits for Website Performance Testing

Realistic Performance Evaluation

Cloud-based performance testing supplies more realistic conditions beyond the corporate intranet including those out of your control. Such conditions include unpredictable peak or event loading, network congestion or a varying device and browser mix. It also offers opportunities to performance test across global regions and time zones.

For example, your testing can take advantage of virtual infrastructure over specific or multiple regions, which might uncover issues with local network infrastructure, regional user conventions, translations or issues with large content delivery. The latter might, for instance, be alleviated by the use of a cloud-based CDN on a per-region basis.

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Instant Swap of Test and Deployment Versions

Cloud-based testing has process advantages as well. The use of virtual server infrastructure plus state-of-the-art deployment tools offered by the best cloud providers enables testing different software versions by swapping instances within seconds.

For instance, instrumented test versions of your website could be exchanged almost immediately with the deployed version by redirecting your site address to the test version via saved infrastructure configurations. These are stored in version control along with the site and test code.

| Website Performance Testing Tools

Many seasoned tools for testing websites exist on the market today. From simple page-load tools to advanced script-capable tool suites that test both client and server endpoints, there is something for everyone.

Successful site testing also requires highly experienced testers who know these tools inside and out including specific techniques for load and stress tests that web testing software may not cover.

RedBot

RedBot is one example of a class of online test tools that measure load times, find bottlenecks or suggest optimizations for HTTP traffic generated by your site. While it does not provide exhaustive performance analysis, it is useful for initial website analysis to find obvious pain points and for ongoing spot-check sanity checks as testing proceeds.

Apache JMeter

This open-source downloadable tool is popular for website load and performance tests. It uses Java to simulate single and multiple servers. Many load test types are supported including HTTP/ HTTPS, FTP, JDBC, LDAP, Java and JUnit. Other tools utilize JMeter, such as BlazeMeter which enables using JMeter in the cloud.

SmartBear LoadComplete

This is another desktop tool used for load, stress and scalability testing for websites based on .NET or Java. It tests traditional HTML sites as well as those utilizing advanced web technologies such as AJAX, ASP.NET, FLASH, Flex and Silverlight. Tests are created quickly without advanced programming skills. Loads can be generated in-house or in the cloud.

Selenium WebDriver

This free, open-source tool provides native browser testing remotely or locally using Selenium Server. The API may be accessed with Ruby, Java, PHP, Perl, Python, C# or Groovy scripts. Coupled with WebLOAD, multiple virtual web servers can be employed for realistic load and stress testing.

Locust

Locust is an open-source server-side tool that runs headless, which means user-driven performance tests can be automated via scripts. Virtual users, referred to as "locusts", may number in the millions and be distributed over as many machines as desired to replicate realistic deployment

SOASTA CloudTest

This well-known cloud-based tool supports web-based functional and performance testing. It enables realistic load and stress test simulating millions of virtual users across multiple geographic regions with cloud infrastructure.

LoadStorm

This cloud-based tool allows you to simulate user behaviors without knowing a scripting language. It scales up to 150,000 virtual users with geographic load distribution. Their Pro version can perform complete validation of your site, which is useful when developing your performance test plan.

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Flood.io

Flood.io enables website performance testing with virtual users over hundreds of servers. It has exceptional real-time monitoring and results presentation, which enables early termination of tests as performance problems are discovered. Flood.io supports Selenium, Apache JMeter or Gatling test tools.

NeoLoad

NeoLoad simulates realistic user loads while revealing bottlenecks in website performance. Test generation and maintenance is via a highly automated, no-code, drag-n-drop interface, though Javascript is supported. This design lets testers create, update and monitor website performance tests faster than other tools.

| Engaging with a Testing Partner

Your company spends a great deal of resources on the design, development and deployment of your web site, app or service based on your unique technical and market expertise. Software testing, however, may not be your forte especially when it comes to understanding the nuances of performance, load and stress testing.

You want the most realistic testing scenarios possible, but may not be keen on spinning up on all the testing technologies and tools available. You definitely do not want testing to become a bottleneck to your on-time release.

That is why it often pays to engage with a trusted, experienced QA partner such as Optimus Informtion.

At Optimus, we provide end-to-end testing services from development to production. Our performance testing scope includes load, stress, spike, configuration and cloud-based testing. We work with you hand-in-hand to clear the obstacles, take on the challenges and remove the risks of testing so you can focus on what you do best.

| Conclusion

It is a well-known truism that if your website fails to respond within a few seconds that half of your visitors leave perhaps never to return. Responsiveness is the gateway feature to keep your customers engaged with your web presence.

Despite the ready availability of website performance testing tools, there are a multitude of factors involved in delivering world-class responsiveness that require a high-level of performance testing expertise. These include app and library performance, platform capabilities, network load and so on.

Taking a step-by-step performance testing approach that ramps up demand on your site or service is overall the best strategy. This requires a thorough performance testing regimen that is realistic and replicates the highly variable conditions of the Internet. Often, a cloud-based, geographically dispersed test platform with the ability to handle millions of concurrent users is essential to that effort.

Attention to detail, diligence and understanding the nuances of performance testing will finally lead you to successful performance testing by your team or QA partner.

Contact Us

Optimus can be a seamless extension of your team throughout the discovery, agile delivery, transition and support process.

Get in touch today to see how Optimus can assist you with all your Azure and data analytics needs.

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