

Testing Strategies

for Peak Readiness

How to Plan for Peak Traffic

Innovation
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No one is ready for the holiday music that starts playing in stores in early October. No one, that is, except the businesses that make a big part of their revenue from seasonal sales. For businesses that rely on online retail, it's never too early to start planning for the additional traffic.

Peak traffic doesn't necessarily mean holiday traffic. For some companies, the start of the academic semester or summer travel season might trigger a traffic spike. For others, it may be a monthly or daily deal. But for many countries around the world, the winter holidays represent the critical period during which a large percentage of revenue arrives in a relatively short time frame.

If you know when your seasonal peaks happen, you can plan for them. However, anyone who's been through a seasonal traffic spike knows that being prepared is not as easy as it might seem.

We created this guide to share hard-won performance testing wisdom.



1: Holiday shopping is constantly changing

As investment people say, "past performance may not be indicative of future results." Just because you met last year's high-volume demands doesn't mean you will be prepared this year. Both technology and culture conspire to make traffic difficult to predict.

TRAFFIC PATTERNS ARE SHIFTING

Only a few years ago, online holiday shopping peaked on the Monday after Thanksgiving (Cyber Monday), when people returned to their offices and placed online orders. Then online traffic started peaking on Black Friday (the day after Thanksgiving), traditionally the peak day for in-store sales. Today, several factors contribute to create a number of high-traffic days from November through to December:

- Broadband in the home means that more people shop online outside of the workplace.
- Mobile devices like smartphones and tablets let people shop online from anywhere. Literally
- The number of consumers who are comfortable with online shopping increases every year
- Cultural shifts as Americans add "online shopping" to eating and watching football as traditional Thanksgiving activities.

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THE APPLICATION ENVIRONMENT IS DYNAMIC

There was once a time when companies could freeze their data center infrastructure starting in September and everything would be stable for the peak season. That idea seems almost quaint in today's agile development world. With multiple revisions released each year, no businesses can afford to feature-freeze for one-third of the year.

Ideally, performance testing should be part of each new release. But with so many releases each year, the window for testing shortens. In addition, working to get new features in ahead of a seasonal peak can seriously squeeze performance testing.

Even if you can code-freeze the application elements within your control, you have no control over the third-party services (CDNs, shopping cart applications, payment systems) that contribute to the total customer experience on your site. In complex web application infrastructures, change is nearly constant.

“Just because you met last year's high-volume demands doesn't mean you will be prepared for this year.”



2: The stakes are high

For many businesses, a large percentage of annual revenue and most of their profits arrive in fairly compact, peak seasonal buying windows. Consumers are notoriously fickle about online shopping sources – a majority will switch to another source (one of your competitors) if your website is unavailable or too slow. Also, many people use online sources for research before making purchases offline, so poor website performance can affect in-store revenues as well.

Everyone recognizes the critical nature of site performance. Yet even well-established online retail sites experience visible, sometimes costly, performance problems during peak traffic periods. During the last Cyber Monday, Akamai analyzed global mobile session traffic and calculated that page load time of 3.3 seconds resulted in the peak conversion rate of 4.75%. Increasing the page load time by one second led to a 3.52% conversion rate, a 26% drop. This clearly shows the negative effect slower page load times have on users and their propensity to purchase.

Clearly, this isn't an easy problem to solve. The good news is that you can take steps between now and your next seasonal peak to eliminate potential performance problems – even if you little time to spare. To ensure fast performance under peak loads, you must commit to performance testing.

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3: How to get your site ready for seasonal traffic

We assume, of course, that you have integrated testing throughout your development cycle, and run rigorous quality assurance tests in the lab. You may even try to extrapolate lab results to predict performance in production when peak traffic occurs.

With today's web and mobile applications, this extrapolation no longer works. The only way to significantly reduce the risk of poor customer experience is to test production architectures at or beyond predicted scale – even if your testing window is short. Without it, you're essentially using your customers as crash test dummies.

The performance testing strategies outlined below are based on the practices of leading e-tailers that face significant peak traffic as part of their core businesses. They have embraced performance testing as part of their end-to-end testing processes.

EXTEND TESTING TO THE PRODUCTION INFRASTRUCTURE

As stated earlier, extrapolating from lab testing is no way to estimate your performance in the actual production environment under real load: Broadband in the home means that more people shop online outside of the workplace.

- Performance does not scale continuously in a linear fashion.
- Today's web and mobile architectures are complex and distributed.
- The production environment has additional factors (third-party plugins, content delivery networks (CDNs), load balancers, etc.) that contribute their own bottlenecks outside of the lab environment.

“ To get the most value from your production testing time, you need to find and remediate problems in real time, either during the test or in rapid succession between tests. ”

GRADUALLY INCREASE TESTING SCOPE

If your team is new to testing in the production environment, then you will want to use a phased approach, gradually increasing the scope of testing. This is particularly useful if you have to demonstrate the utility of performance testing to stakeholders who are worried about potential risks.

For example, start with a read-only test on your site. By simply testing read-only activities against your online retail site, you can discover a broad range of performance bottlenecks without touching order processing or other functions that may seem more difficult to test.

When you have discovered and corrected performance issues at this level, you can progress to testing order entry and complete transactions. By this time, you will have demonstrated the payback from performance testing.

TEST BEYOND EXPECTED LOAD

No one really knows what the next peak load will be. The best you can do is extrapolate from the last peak. That leaves a lot of room for error.

At Akamai, we recommend that companies predict their expected peak load, then test to 2-3 times that peak. Again, you can start with a smaller scale (fewer virtual users), then scale up to the larger load as you demonstrate the ability of the application infrastructure to handle the load.

REMEDiate AND RETEST IN REAL TIME

Testing in complex web environments is like peeling back the layers of an onion; once you identify and find one bottleneck, the next one is waiting underneath. To get the most value from your production testing time, you need to find and remediate problems in real time, either during the test or in rapid succession between tests. That means being able to see actual test results in real time, as they happen, rather than analyzing data for days afterwards

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4: How Akamai CloudTest can help

Using traditional performance testing solutions, the guidelines in this paper would be difficult to achieve. For example:

- **CREATING TESTS:** Traditional testing tools use complex programming languages. These languages are often more complex than the web applications being tested. It can take weeks to create a simple battery of tests.
- **DEPLOYING TESTS:** Using traditional testing methodologies, you would need to deploy sufficient load generators to deliver the target load. If you're testing a global web application at scale, you need multiple servers around the world. Simply deploying and provisioning these servers would add significant time and expense to the test environment.
- **RUNNING TESTS:** Testing in production, at scale, generates massive amounts of data. Everything from customer experience to CPU utilization. Even when your environment has the instrumentation to collect this data, correlating and analyzing it to discover the bottlenecks can take hours, days, or more. This makes it difficult to perform the iterative, drill-down type of testing you need to uncover and remediate multiple layers of performance issues.

A new generation of testing tools leverage the capabilities of cloud computing to rewrite the rules of performance testing. They make production testing at scale practical and affordable for a wide range of online retail sites.

Akamai CloudTest uses the power of cloud computing to quickly and affordably test consumer-facing web and mobile applications at scale. This proven testing technology, available from the cloud and using the cloud, addresses the limitations of traditional performance testing technologies and methods for today's major online retail sites.

FAST TEST CREATION

Akamai's CloudTest solution lets you create and deploy tests in minutes or hours using a proxy that captures the HTML from browsers or applications. You can then edit and reconfigure the test scripts in a simple, graphical editor, eliminating elements you do not want to test and finely tuning the test scripts.

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Also, there's no need to deploy legions of mobile users on iOS or Android devices to test mobile apps at scale. Instead, CloudTest uses a proxy to capture all HTTP or HTTPS from each tested device performing the actions you want to test. When needed, real devices from locations across the globe can be added to the equation and results integrated.

RAPID, GLOBAL DEPLOYMENT IN THE CLOUD

With CloudTest, you can deploy a load test using hundreds of thousands of virtual users around the globe in minutes.

Simply create the tests you want to run, then select and deploy load generators using internal, public, and private cloud resources. For example, you can choose servers in different geographies, using resources from IBM SmartCloud, Amazon EC2, or Microsoft Azure cloud services.

CloudTest takes care of deploying and provisioning the load generators, benchmarking the virtual servers for their health, and monitoring the CPU of the load generators while they are running. And because you are using cloud resources, you pay only for the resources used during the test.

REAL-TIME ANALYTICS

CloudTest uses highly scalable business intelligence technologies to help you analyze and optimize performance as they are running, no matter the size or scope of your performance test. CloudTest's analytics deliver a series of dashboards in real time, showing performance statistics generated during the test as well as monitored data from multiple sources. CloudTest can aggregate and correlate the data, so you can drill down and analyze it while the test is executing. With instant insight, you can often take steps to remediate a problem while the test is running, and see the results immediately. This responsiveness enables you to get much more value from limited production testing time.

 You can literally deploy a test cloud using hundreds of thousands of virtual users around the globe in minutes. And because you are using cloud resources, you pay only for the resources used during the test."



5: Retail success stories

Are you concerned that you don't have enough time to prepare for peak days? Even with little time, you can do a lot. And if a performance problem has already struck, CloudTest can help you remediate the problem and ensure that the rest of the peak season runs smoothly.

Talk to us today

Don't wait for your next peak traffic emergency. Find out why top retailers use Akamai to manage their digital performance. Let Akamai CloudTest prepare your site for peak seasonal spikes.



Start Testing Today

Ready to load test your website and apps? Visit Akamai.com/cloudtest for more information.

Learn more



Akamai secures and delivers digital experiences for the world's largest companies. Akamai's intelligent edge platform surrounds everything, from the enterprise to the cloud, so customers and their businesses can be fast, smart, and secure. Top brands globally rely on Akamai to help them realize competitive advantage through agile solutions that extend the power of their multi-cloud architectures. Akamai keeps decisions, apps, and experiences closer to users than anyone – and attacks and threats far away. Akamai's portfolio of edge security, web and mobile performance, enterprise access, and video delivery solutions is supported by unmatched customer service, analytics, and 24/7/365 monitoring. To learn why the world's top brands trust Akamai, visit akamai.com, blogs.akamai.com, or [@Akamai](https://twitter.com/Akamai) on Twitter. You can find our global contact information at akamai.com/locations. Published 05/19.

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