



PEAK SEASON PREP GUIDE: PREPARING YOUR ECOMMERCE SITE FOR THE NEXT BIG RUSH

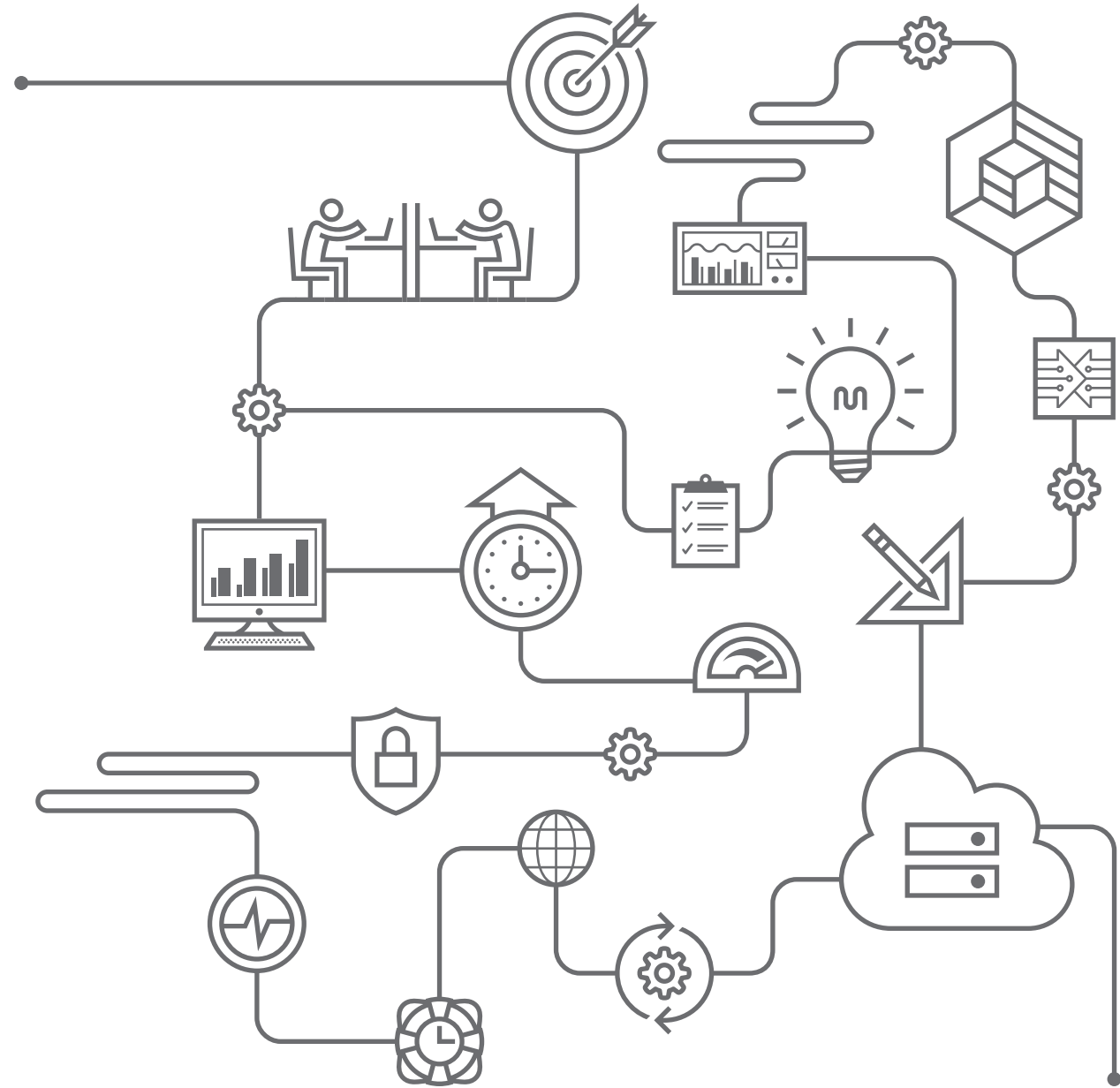


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INTRODUCTION

Retailers are familiar with the holiday rush. In brick-and-mortars, additional hiring ensures that there are enough smiling salespeople to help eager customers and enough cashiers for fast, stress-free checkout. For ecommerce retailers and the digital agencies that support them, preparing for peak traffic is less about hiring more bodies and more about tuning up the systems and processes that bring customers to a site and keep them engaged while enabling seamless transactions.

Sluggish sites frustrate users, of course, but there's an additional problem: Google's search algorithms now penalize sites for slow loads.

Today's retailers have offered holiday sales and promotions earlier and earlier each year, with some offering deals in October and early November. According to the National Retail Federation, roughly

57 percent of shoppers started their holiday shopping by early November in 2015 – an increase from 54 percent the previous year and from 50 percent in 2008.¹ These statistics, along with the massive overall growth in online sales, underscore the need for a well-planned ecommerce strategy, both for the customer-facing side and the underlying infrastructure.

Getting ready for a peak period – whether it's the holidays, summer tourism or a far-reaching marketing campaign – involves evaluating and optimizing your client's infrastructure and code. The cornerstone of peak traffic planning is rigorously load testing the system ahead of time to identify and correct breakpoints and bottlenecks.

Below are key lessons learned from our experience in optimizing ecommerce platforms for some of the world's leading brands.

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TEST YOUR SITE BEFORE A TRAFFIC SPIKE

Load testing provides a window into how your client's site will perform when peak traffic arrives. Here are the high-level steps involved in load testing:

- 1. Determine testing goals.** The initial evaluation should be a complete end-to-end test. Follow-up tests may cover only post-optimization testing of specific pages or processes. Also, keep in mind that different types of users use sites differently. Computer buyers might be divided into segments, such as consumer, business and government. The consumer user theoretically takes a different path than a government user, hence a different load on the system that needs optimization. By narrowly defining test objectives and user types, you will get more defined results to guide optimization. Use your goals to create a list of questions your test needs to answer. For example:
 - How many concurrent requests can my system handle at maximum load?
 - Are response times for all test paths acceptable?

- Which links in the chain are consuming the most hardware resources?
 - Are there obvious failures caused by large data sets, multiple concurrent users, number of products on the site, shopping cart functionality or other factors?
 - Is there any obvious low-hanging fruit to optimize? Examples include unnecessary database queries, frequently used code paths that produce a consistent result and frequently repeating database queries that can be cached.
- 2. Start with a benchmark.** Review logs and analytics to see how the site has performed during previous peak periods and determine what a typical busy load looks like. Use a tool like ApacheBench or AutoBench to simulate multiple concurrent users and generate a benchmark of how many requests per second the site is capable of serving. Pay special attention to heavily trafficked pages, like home and landing pages, where optimization efforts have the biggest payoff. To compare site performance and set benchmarks aligned with other retailers, take a look at Compuware's Retail Web and Mobile Site Performance Index.
 - 3. Determine data collection methods.** Organized data collection is essential to understanding results and learning from them. LoadRunner

is a software tool that provides sophisticated formatting, flexibility and analysis. Microsoft Visual Studio has a SQL script for creating a database repository for results. Evaluate a prospective test data collection tool based on its ability to:

- Thoroughly document test conditions
 - Accurately document results
 - Offer a straightforward analysis of results
 - Archive test data for future comparisons
 - Use a set of monitoring tools to obtain accurate data about actual test performance in simple visual graphs:
 - Cacti for capturing metrics
 - MONyog for monitoring the database
 - statsd to put stats logging into code to monitor code performance in real time
- 4. Create scripts.** Scripts generate test data and simulate user interaction. Scripts flood the site with requests so that you can identify bottlenecks that occur only during heavy-traffic periods. A script will be made for each test path, cookies and all. JMeter is an open-source load-testing software designed to load-test functional behavior and measure performance. JMeter scripts are easy to make into templates, and can be copied and pasted to create new ones.

Common script functions include::

- Randomly create products
- Randomly create orders (fill up a cart, then check out)
- Randomly create customer accounts (can combine this with script to create an order)
- Make changes in the admin interface (creating categories, configuration changes)

These scripts will be run both individually and simultaneously to find performance limits.

5. **Define the test environment.** In practice, the load-test environment contains:
 - Name of the person running the test
 - Date, time and duration of the run
 - A clearly defined hypothesis
 - A statement of what has changed
 - A set of metrics being tracked during the test
 - A post-run capture of the results of the metrics, best visualized with a graph of the metric over time
6. **Save the results in spreadsheets.** This achieves provable results and can identify the most effective tests. At the completion of the test, you should have a data set that answers the questions set forth when goals were defined at

the beginning. The answers will then guide your next steps for optimization. After optimizing, it's critical to retest to account for any anomalies, as fixing one problem can sometimes create another. Don't wait until you're in the middle of a spike to discover the new problem.

SOLUTIONS FOR COMMON PROBLEMS THAT TESTING UNCOVERS

ADD LOAD BALANCING

If site traffic reports reveal an increase in the number of refused connections during load testing, it's time to reassess your load balancing solution. Refused connections are the first sign that your serving capacity is too small for the amount of traffic the site receives. The next sign will probably be visitors calling or emailing to complain that they can't access or transact on the site. The number of load balancers you deploy is determined by your traffic and performance goals – there is no magic formula. Using the data from the load test will help you determine

the number and location of load balancers. Once in place, re-test to confirm that the load balancer can handle the expected load.

IMPROVE COMPRESSION

Implementing server-side compression can reduce the size of the store pages by reducing the time to return data from the server and making a web server process available sooner. Most modern browsers and web servers are capable of compressing data to send and decompressing at the destination. This helps lower bandwidth requirements but can increase CPU loads. Smaller files lead to faster page-load times. The two most common options here are to minimize your CSS and JavaScript, removing white space and increasing readability (using a tool like the YUI Compressor), and to reduce the size of your images by removing unnecessary data with a tool like smush.it.

USE A CONTENT DELIVERY NETWORK (CDN)

Using a CDN can help speed up sluggish page loads. On a CDN, first-time content is served to a user, and a copy of the content is stored on edge servers geographically closest to that user. Subsequent requests use the stored copy, resulting in faster

load times. Hosting landing pages or other heavily trafficked static pages on the CDN helps to maintain a persistent, consistent web presence. As more people visit the site, your landing page will be cached worldwide and load times will consequently improve.

Publishing static content to a CDN rather than the web server can be easily accomplished with services like Rackspace Cloud Files, built with Akamai's CDN technology. W3 Total Cache and PressFlow have built-in CDN technology as well.

DEPLOY MORE EFFICIENT CODE

Many services associated with ecommerce and social media provide code to place either site-wide or on particular pages. These code snippets, used for social sharing, analytics, widgets, etc., are HTML/JavaScript. Many use external requests to a third party, which lag and may not be cached on their end. Where possible, choose solutions for common page elements that avoid third-party code. Another common solution for troublesome JavaScript is to load the code on document-ready (when the DOM is fully loaded), rather than including it in the mark-up directly. Database-heavy sites may benefit from database

optimizations, such as schema changes and indexing of commonly queried columns. Avoid using bloated frameworks and libraries.

ADD FULL-PAGE CACHING

Caching is an easy way to speed up your application or website and improve your bounce rate, saving potential lost revenue. Determine which data is accessed frequently and cache it in memory for repeated high-speed access. Whether the application is generating static content for web pages or storing sessions in caches, you have to decide how to store those caches. You can store them on a local file system or utilize distributed memory caches like memcached clusters.

PROVIDE AUTOSCALING

Even with the best planning efforts, websites may still experience spikes outside planned peak capacity. For example, a site typically run on two servers may experience a traffic spike requiring a third server. If that spike is predictable, the team can hop in ahead of time to provision the extra server and decommission it when it's no longer needed. If that spike is unpredictable, they may be forced to hold onto a

third server to cover the spike. With an autoscaling tool like Rackspace Cloud Tools Marketplace partner RightScale, you don't have to hold onto a third server. Because traffic, performance and other variables have been set, the third server is launched only when needed, and automatically decommissioned when the launch parameters subside. For more autoscaling tools, visit the Rackspace Cloud Tools Marketplace.

PROVISION A HYBRID CLOUD

Many organizations still think that if they can't go all cloud, they can't go cloud at all. Not so. A hybrid cloud configuration lets you buy the base and rent the spike. You're able to put all the elements in place to run your client's site now, with the ability to burst into the cloud for traffic spikes or expand functionality without re-architecting or changing platforms. With hybrid cloud, an ecommerce store can tap cloud efficiencies for caching, image and video storage, or other resource-intensive, non-critical elements. Payment processing and other security-sensitive site elements can be kept on private cloud or on-premises gear to meet PCI compliance and other security requirements.

PLAN FOR PEAK SUCCESS WITH RACKSPACE

A Rackspace ecommerce hosting environment is designed to support customers with resources that effortlessly scale from small to large volumes of traffic. We can help you with the technology needed to develop, test and scale your clients' sites, so you can manage and optimize spikes instead of losing customers.

When lifestyle brand Alex & Ani ran an ad during the 2014 Super Bowl, the company knew that site performance was key. "Every second costs money. For every second you add to the loading process, you're reducing your conversion rate by 7 percent, and that adds up," said Ryan Bonifacio, Alex & Ani's vice president of digital strategy.

The ad brought 28,000 people to Alex & Ani's website. Any lag in loading would have been disastrous. Bonifacio came to Rackspace because he was looking for a hosting partner with the necessary performance experience. "Maximizing uptime was one of our biggest requirements," he said. "In doing due diligence with hosting providers, Rackspace was rated the top."

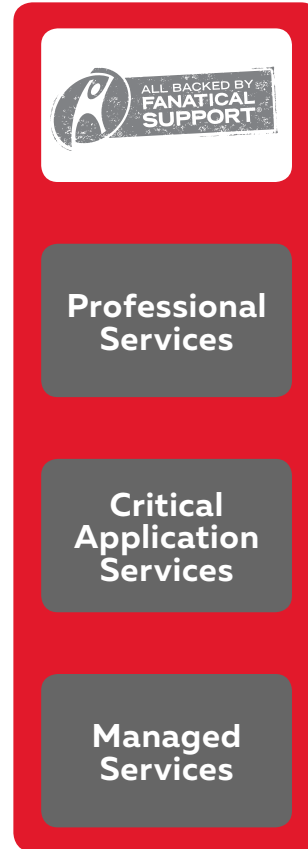
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ENABLING YOUR JOURNEY TO THE NEXT GENERATION OF RETAIL

We can host your common workloads



Public Cloud

amazon web services
Microsoft Azure
openstack CLOUD SOFTWARE

Rackspace Private Cloud

openstack CLOUD SOFTWARE

Rackspace Dedicated Servers

Server rack icon

Managed VMware

vmware

References:

1 <http://associationsnow.com/2015/11/survey-more-americans-getting-an-early-start-on-holiday-shopping/>

ABOUT RACKSPACE

Rackspace (NYSE: RAX), **the #1 managed cloud company**, helps businesses tap the power of cloud computing without the challenge and expense of managing complex IT infrastructure and application platforms on their own. Rackspace engineers deliver specialized expertise on top of leading technologies developed by AWS, Microsoft, OpenStack, VMware and others, through a results-obsessed service known as **Fanatical Support®**. The company has more than 300,000 customers worldwide, including two-thirds of the FORTUNE 100. Rackspace was named a leader in the 2015 Gartner Magic Quadrant for Cloud-Enabled Managed Hosting, and has been honored as one of Fortune's Best Companies to Work For in six of the past eight years.

Learn more at www.rackspace.com.

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