How Can I Ensure My Web and Mobile Applications Are Meeting My Customers' Performance Demands?

CA BlazeMeter enables next-generation performance testing so that your web and mobile applications can perform at their peaks. With CA BlazeMeter, you can:

- Take advantage of SaaS with our easy-to-use, SaaS-based solution that provides simple, no-install, self-service capabilities to run performance testing at any stage of the software lifecycle.

- Easily scale stress tests to millions of virtual users through the cloud, across worldwide data centers to load-test, and measure and analyze the application's performance.

- Find bottlenecks through real-time reporting and comprehensive analytics.

- Perform continuous performance testing through integration with your CI/CD pipeline.

- View system performance and identify problems using APM integrations.

- Simulate realistic production-network conditions.

- Securely capture and replay real mobile traffic.

With adequate performance testing, you can address all aspects of application resiliency to meet peak performance demands of your applications. You now have a solution that addresses critical performance testing challenges with fit-for-purpose load from across geo and comprehensive application performance analytics.

Executive Summary

Challenge

This is the era of application supremacy, where every company promotes its brand, products and services via web and mobile applications. There are 4.2 million apps currently available for download—2 million for iOS and 2.2 million for Android.[1] Assuming a customer finds your application, you only have mere seconds to impress them. Sixty-eight percent of users will demand an app load time of 6 seconds or less.[2] As a result, an excellent customer experience with application performance is one of the most important goals every enterprise strives to achieve. Research shows that businesses that fail to deliver a positive application experience risk losing as much as 25 percent of their customer base.[3]

With the challenges of the digital economy, performance testing approaches have changed dramatically, in large part because yesterday's methods haven't kept pace with the demands or speed of modern application requirements. Application performance testing must be easily accessible, done efficiently with realistic load patterns across multiple geos and provide actionable analytics to improve performance characteristics.

Opportunity

CA BlazeMeter is a next-generation SaaS-based and on-premises continuous performance testing solution that enables democratization of performance testing. The solution is an easy-to-use, free-to-try performance test platform that you can access at any stage of the software lifecycle to create and execute massive-scale load tests within minutes—and pay only for what you use.

With CA BlazeMeter, you can drive load traffic from real browsers—via the same interactions as your users, from your existing Selenium tests and even in combination with the popular, open-source Apache JMeter tests for a more thorough performance scenario that exercises the back-end, web and mobile front-ends of your applications.

Benefits

CA BlazeMeter delivers the industry's leading performance testing platform, so teams can:

- Execute load and performance tests in the cloud under real-life conditions and realistic peak loads that can scale on demand—eliminating the need for dedicated, in-house performance test infrastructure and resources.
- Deliver on-demand scaling of millions of virtual users across hundreds of locations around the globe for unparalleled load testing.
- Focus on performance test instead of supporting test environments, and identify and resolve performance bottlenecks using comprehensive analytics.
- Utilize open-source testing engines like Apache JMeter, Selenium, Gatling and Locust, and add on the key benefits of better reporting, scaling and worldwide load generation.

Optimizing web and mobile application performance can lead to better customer experience, satisfaction and loyalty, which enables better business outcomes.

Performance Testing Remains Ad Hoc, In-House and Incomplete for Most Companies

Conducting performance testing quickly and accurately has become extremely important in today's application economy because your customers rely on your external-facing applications that intrinsically represent your brand. The challenge for all organizations is to build high-quality applications quickly that can support minimal or no performance degradation at peak loads. Companies must then redefine today's approach to testing if they want to shift their development into the fast lane and establish a cadence of continuous delivery with uncompromising quality. Organizations face key challenges in continuous performance testing, including:

Testers need to stress test with thousands (or millions) of users

Most companies lack a way to scale load testing to approximate a realistic number of users hitting the application simultaneously. Therefore, most applications are released without proper stress testing and often fail when large-scale events cause the user load to spike. E-commerce and retail apps, for example, can be hit hard during Black Friday, popular event ticket sales or any other holiday shopping period where volume far exceeds normal daily traffic. A slowdown in the app's performance or a failure of the application altogether can spell disaster for companies who are highly dependent on their application's availability to consumers.

Underestimating anticipated load is another important challenge. Developers often use simple mathematics to estimate how many visitors are expected to use external-facing web or mobile applications during the next shopping event. Unlike mathematical formulas, customer usage patterns are unpredictable. You need to be able to support all levels of traffic to your applications, 24x-7, or these users will simply move on to check out your competition.

Performance testing should include network infrastructure in pre-event testing

Failing to include your network infrastructure in your performance testing for peak-load days puts your web or mobile app at risk. In many cases, developers will test all the servers and infrastructures from inside the organization, but not from the outside. Relying solely on an in-house testing approach is inadequate because you're failing to test and monitor all the chains of delivery, and it's unlikely you'll get a clear and accurate picture of how it will perform on the actual event day(s).

Many failures aren't caused by the application itself. Maybe your application has a huge capacity, but how do you ensure that there isn't a problem with your external infrastructure or your hosting server(s) in the public cloud? In addition, when executing load tests without using a network emulator, we cannot possibly simulate every network scenario and check the results from different devices and global locations. The amount of traffic on smartphones and tablets will differ dramatically compared to laptops and desktops. Regional network latency differences are also a significant factor. If you ignore these variables during regular performance tests, you might just miss the actual problem that may hit you during peak times. CA BlazeMeter is Akamai certified, which means if you use Akamai as your content delivery network and you want to create a test that will also check Akamai, you can do it with CA BlazeMeter.

Ability to identify your application's critical point

It is vital to identify exactly when and what component of your application will break under peak stress. However, this is only half the picture. Once you've identified when you'll hit a bottleneck, you then need to pinpoint precisely where the underlying issue lies. If you don't know what's causing the problems, you can't resolve them, so issues could still arise from this critical point at the worst possible moment.

Ability to recover quickly from technical glitches during peak load

Power outages, technical problems and crashes can happen. The key question is: How fast can you recover from such scenarios? In many cases, the power outage won't last for more than a couple of minutes—but it may take you hours to recover. If this happens on a busy holiday, it can ruin your entire sales opportunity. Your applications and infrastructure must have the ability to quickly rebound from technical glitches during normal and busy workload periods.

End-user experience with application performance is critical

Tracking server performance alone isn't enough; you also need to monitor the performance from the end-user's perspective. While your server times might not appear to be degrading, it's possible that there are still problems in parts of your application—and you cannot predict how they will affect the rendering of your web page. Problematic requests might make your page look very slow on the browser, but they don't always trigger a significant rise in response times during a load test. You also need to verify that the full page—not just the first piece of text or the download of the embedded site's resources—loads within a reasonable time. After all, your users aren't interested in viewing half or a third of your web page or app; the slow-loading image or piece of text might just be the area that they want to see.

Third-party integrations with your application must be included in your stress tests

Even if your web application or your mobile-app is 100-percent prepared, your third-party plugin or module might not be ready for peak loads of your application. Third-party plugins and widgets like social media icons, advertisements or even Google Analytics code might just trigger a single point of failure (SPOF) that can create a widespread ripple effect and slow down the performance of your applications—eventually bringing down your entire system in worst-case scenarios. Failures in the back-end third-party integrations due to slow third-party API response times can also occur.

Continuous delivery without continuous testing is incomplete

Evidently, there are many reasons why your web or app might fail, the consequences of which can be critical to your business. Most companies espouse the virtues of agile development and continuous delivery, but continuous testing seems to be overlooked when attempting to adopt continuous delivery to improve the software development lifecycle (SDLC). Perhaps this is because continuous testing (functional, regression, performance) includes many discrete areas that all contribute to the release of a quality application. Regardless, continuous testing must be a key part of your continuous delivery efforts, and an area that can see considerable process improvements when new testing tools are dedicated to this purpose.
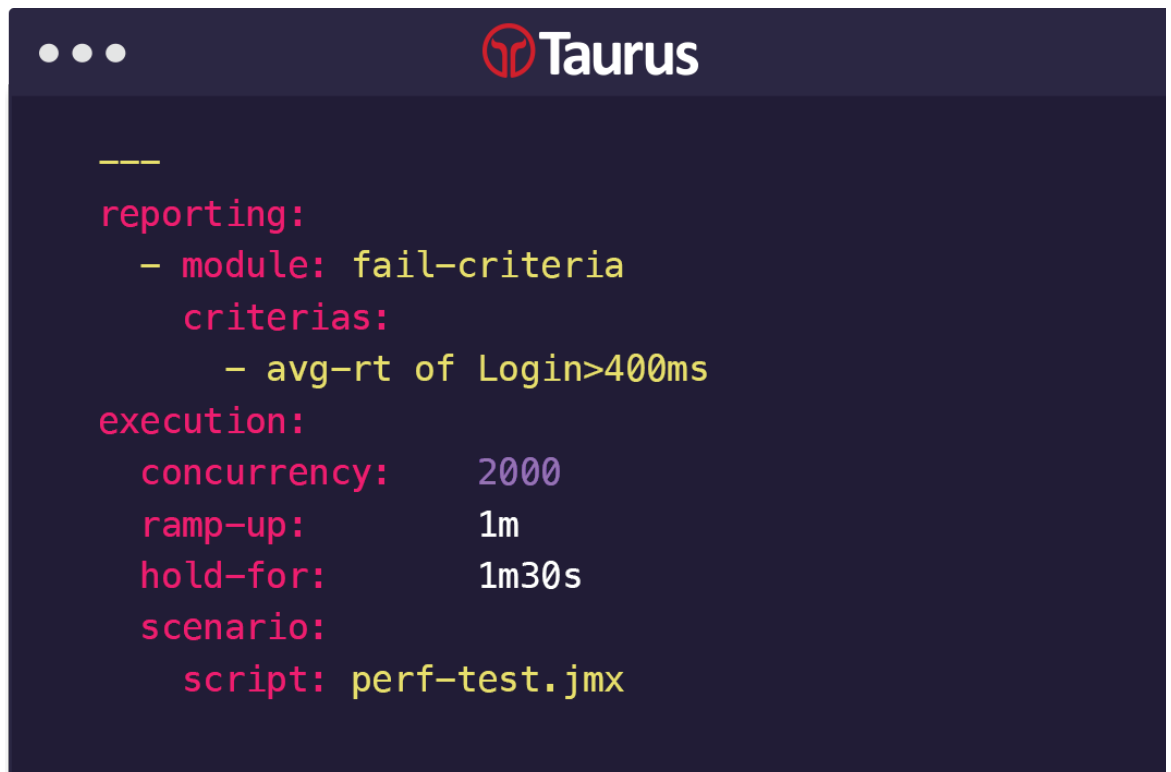
CA Technologies Reinvents Performance Testing With CA BlazeMeter

CA BlazeMeter delivers performance testing for web and mobile applications from the cloud or from behind the firewall. Leveraging deep, real-time analytics with application performance management (APM) tools integration, the solution enables users to test faster and with greater accuracy. Intuitive dashboards and real-time analytics can help organizations improve software quality and performance—from development to the lab—in staging and user acceptance testing, and out into production across a single, cloud-based platform. CA BlazeMeter is designed to help you:

- Reduce hardware and infrastructure costs for performance testing.
- Harness the efficiency of the cloud to enable broader testing.
- Test applications against thousands or millions of virtual users across multiple geos.

Performance test as code for testers and developers

With CA BlazeMeter, you can run massively scalable, open-source-based performance tests against all of your apps, from web and mobile apps to microservices and APIs. You can write performance tests as code in domain-specific language (DSL) (for example, YAML, JSON) to generate and instantly run JMeter tests without leaving your favorite application development tool. You can also use the same DSL to configure and launch tests and validate application performance at every stage in your SDLC. Plus, keep load tests in your preferred version control repository to track and revert when necessary.

```yaml
                    Taurus

    ---
    reporting:
      - module: fail-criteria
        criterias:
          - avg-rt of Login>400ms
    execution:
      concurrency:    2000
      ramp-up:        1m
      hold-for:       1m30s
      scenario:
        script: perf-test.jmx
```

JMeter and open source compatible

CA BlazeMeter is 100-percent compatible with Apache JMeter, so you can upload any JMeter test, including tests that use plugins and advanced features. The solution can automatically scale your JMeter tests, or you can choose your preferred options. Specific versions of JMeter can also be chosen for replay. You can also design and execute load tests while using other open-source tools, such as Selenium, Gatling, Locust and more. A full list of compatible open source tools is available at http://gettaurus.org/docs/Index/.

Fast API testing

API tests are quite easy to setup in CA BlazeMeter. You simply add the HTTP transaction including URL, headers, method and body for your API requests. You can pinpoint functional defects quickly using the built-in error report; and apply thresholds to response time, throughput and other critical API performance metrics to ensure you're meeting your SLAs.

UI performance testing using Selenium integration

CA BlazeMeter enables users to execute Selenium scripts as load tests. Thanks to Taurus, the open-source performance testing automation framework within CA BlazeMeter, Selenium users can also run thousands of different nodes in the cloud for large-scale load tests across multiple geographical locations. Taurus automates the execution of native Selenium tests locally and seamlessly switches into the BlazeMeter cloud to run the tests at a massive scale.

Selenium tests can also be added as a step in the Jenkins pipeline, enabling Selenium users to include performance testing in the continuous integration/continuous delivery cycle, while also enjoying key features like enhanced reporting and collaboration.

In less than 10 minutes, CA BlazeMeter can convert Selenium scripts into JMeter, which eliminates the JMeter scripting step and dramatically reduces the costs and test-creation time from hours or days down to minutes.

Scalable load testing from anywhere

Scale your traffic from two to two million virtual users with CA BlazeMeter, which does all the infrastructure work required to orchestrate the load test, gather and format the results in rich reports and interactive graphs.

You can drive load from one or more regions around the world (including Asia Pacific, Europe, North America and South America), through many public clouds like Amazon, Microsoft Azure® and Google. You can also take advantage of CA BlazeMeter private agent to drive load behind your firewall for applications in development and staging and preproduction environments, for internal apps that aren't exposed to public internet and to create your own private location wherever you want.
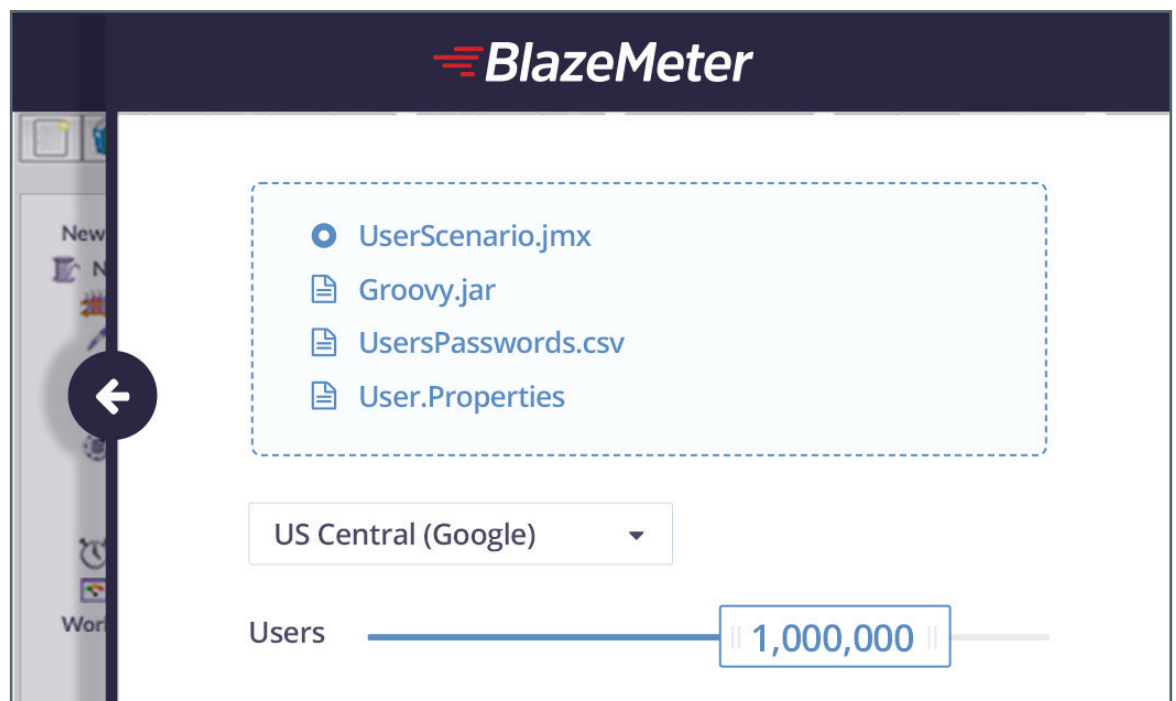
See the complete performance picture with APM integrations

CA BlazeMeter can correlate your load-test metrics with Amazon CloudWatch and metrics within other APM tools to provide a 360-degree view of your application performance. Together with CA BlazeMeter, these solutions make it much easier to find the source of bottlenecks in the application stack, such as a slow method or a problematic database routine.

Real-time reporting and comprehensive analytics

Find bottlenecks quickly with rich, interactive Timeline Graph in CA BlazeMeter. A Request Stats Report provides a clear, tabular layout of all the critical metrics for the test, which can be easily downloaded as a comma-separated values (CSV) file for further use. Keep track of defects and issues that arise during the test with the clearly categorized Errors Report, and use Comparison Reports to see trends over time from multiple test runs or builds. After a test execution is complete, you can share test results and graphs using a customizable Executive Report.
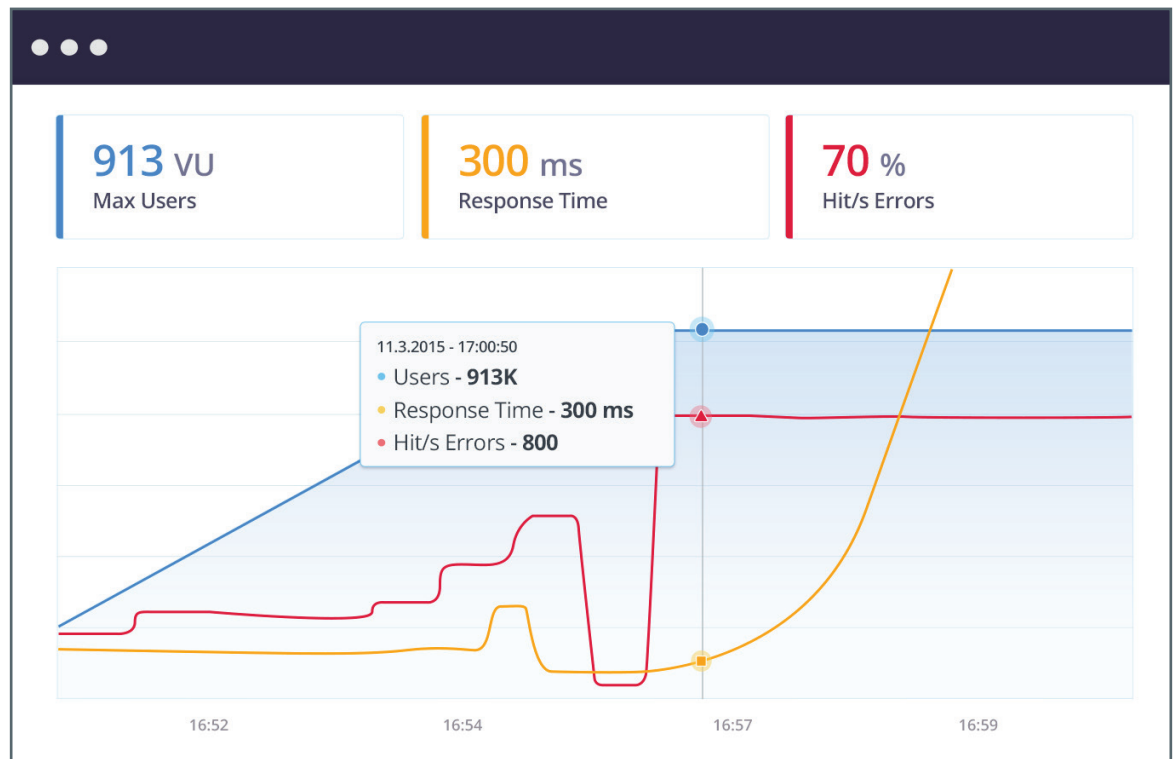
Seamlessly Integrate with your delivery pipeline for continuous testing

CA BlazeMeter can seamlessly integrate with your continuous integration server (Jenkins, Bamboo, Travis, Teamcity, CircleCI) and run fast, small-scoped load tests in parallel to ensure that performance is as expected before promoting a build to the next stage. You can also set thresholds on critical test metrics to fail the build when necessary. With CA BlazeMeter, you can:

- Shift-left your performance testing and make sure your code is tested for performance at every stage of the development lifecycle.
- Embed tests into your delivery workflow and run them from behind the firewall or in the public cloud.
- Automate test runs in QA and staging environments by integrating CA BlazeMeter with CA Release Automation, Chef, Puppet, AWS CodePipeline, IBM Bluemix® and other development tools and services.
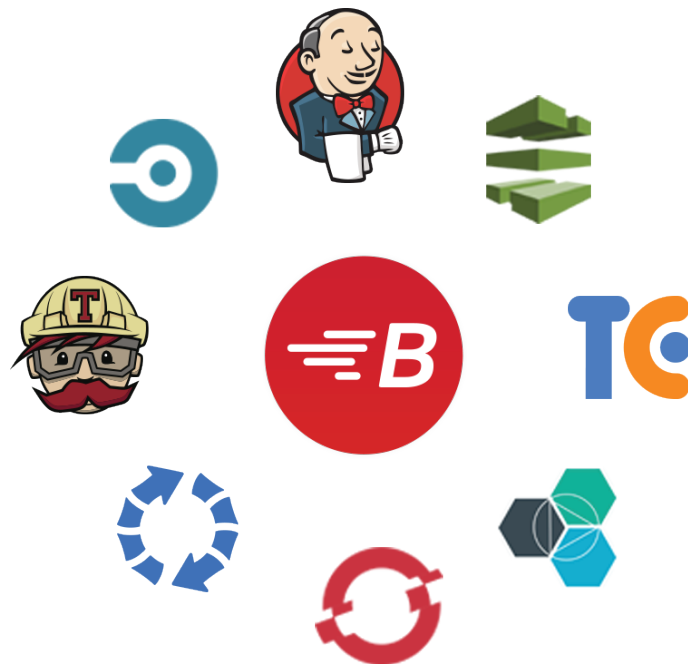
Simulate production network conditions

Using CA BlazeMeter's Network Emulation, you can model your load profile to reflect real-world connection types like 3G, LTE, WiFi and more, as well as set custom bandwidth, network latency and packet loss properties. This enables an accurate simulation of your network loads during performance tests to provide more realistic test results.

Mobile and IoT performance testing

CA BlazeMeter provides a mobile recorder to capture traffic from any device type and from native and mobile web apps using secure proxies. This capability captures unique sequence and attributes of the requests coming from your mobile devices so that you can accurately replay user-level interactions at scale for performance testing from any geographic region through real mobile network conditions. You can also generate secure and non-secure traffic for performance testing mobile app, mobile web, wearables and internet of things (IoT) endpoints.

CA Service Virtualization simulates constrained systems for performance testing

Performance testing often requires access to external dependent systems that may be constrained or unavailable during tests. Because CA Service Virtualization simulates constrained or unavailable systems or environments across the SDLC or during performance test runs in production, developers, testers and performance engineers can run performance tests using virtual services—which simulate these constrained systems with realistic latency to save time and costs.

CA Test Data Manager builds the right test data for performance testing

Quickly provision high-quality, secure test data for better performance testing of your applications with CA Test Data Manager. Using synthetic data creation, the solution allows you to more rapidly generate test data that is fit-for-purpose and available on demand, reducing the cost of trying to build test data manually. CA Test Data Manager can also capture test data from production through subset and masking process from a variety of different data sources, and augment that data using synthetic test data generation to improve test data coverage.

CA Application Test for multiprotocol testing and comprehensive test coverage

With CA Application Test, testers can use a single tool to test UIs, APIs and the implementation layers that feed them. Users can model a single test case with steps that invoke and verify an APIs behavior and performance, as well as validate database calls, SOAP messages and many more transaction types.

Code.org used CA BlazeMeter to prepare for its key Hour of Code event where 25 million users worldwide joined in. "Running these tests on (CA) BlazeMeter proved to be invaluable in preparing us for this huge event. It was especially useful for testing the database on the back-end; I don't know how we'd have simulated this in any other way."

—Brendan Reville, Software Engineer, Code.org

ca technologies

The CA Technologies Advantage

To thrive in the application economy, digital transformation must be driven by continuous delivery—the ability to rapidly and reliably release applications that meet the demands of internal and external customers alike. CA Technologies is the only continuous delivery solution provider that currently brings the disciplines of accelerated development, continuous testing and rapid release management together through integrated, flexible solutions that help accelerate the delivery of innovative applications to build strong customer loyalty and drive a competitive advantage.

CA BlazeMeter is the first developer-friendly load-testing solution suitable for managing performance across the pipeline to help keep developer teams productive and effective. Performance engineers and DevOps practitioners now have an easy-to-use performance testing solution with a consumption-based charge model that is significantly less expensive than the competition and that offers on-demand load testing from anywhere.

Additionally, integrations across CA solutions and external tools put the power of automation in your hands to continuously deliver and accelerate new innovations to market to drive exceptional customer experiences.

To get started, visit blazemeter.com

Connect with CA Technologies at ca.com

CA Technologies (NASDAQ: CA) creates software that fuels transformation for companies and enables them to seize the opportunities of the application economy. Software is at the heart of every business, in every industry. From planning to development to management and security, CA is working with companies worldwide to change the way we live, transact and communicate — across mobile, private and public cloud, distributed and mainframe environments. Learn more at **ca.com**.

[1] Statista, "Number of apps available in leading app stores as of June 2016," June 2016, https://www.statista.com/statistics/276623/number-of-apps-available-in-leading-app-stores/

[2] Zogby Analytics global research survey sponsored by CA Technologies, "Software—The New Battleground for Brand Loyalty," Mar 4 2015, http://www.ca.com/content/dam/rewrite/files/app-economy-quiz/survey-new/assets/app-economy-research-and-infographic.pdf

[3] Ibid