



Integrating Performance Testing in your CI/CD Process

Micro Focus® LoadRunner Cloud Makes It Insanely Simple to Integrate Testing into the Development Process—So You Can Test Early and Often.

Everything You Need to Make Automated Testing Easy

Simple, smart, scalable:

SaaS-based, pay-per-virtual-user model allows you to get started with just a browser and a credit card. The software provides graphical, realistic scripting and intuitive dashboards. It easily scales up to one million virtual users without requiring hardware.

Enterprise-ready:

With cross-team project management capabilities, it supports open APIs for easier enterprise-wide integration.

Solution Overview

There's no question: Continuous performance testing is critical to the success of your mobile and web apps. If you don't test until the end of the cycle—or if you don't test at all—you risk production issues, user complaints, poor reviews, and damage to your brand.

The question is how to make continuous performance and load testing practical in an age of ever-accelerating development cycles and ever-increasing user expectations. Even if you're already using the cloud to cut the cost of large-scale testing, and even if you're already using Agile methods to "shift left" and

start the testing process earlier, it's still difficult to actually build performance testing into the deployment pipeline.

Performance testing also needs to add value to the business, not just development teams. It needs to improve the quality of the app, customer satisfaction levels, and the brand image. For application teams, that means the mentality must change from simple "record/playback" testing that occurs late in the product cycle to a more robust engineering approach that starts early in the cycle and occurs continuously. Simply put: Test early and well, not just quickly.

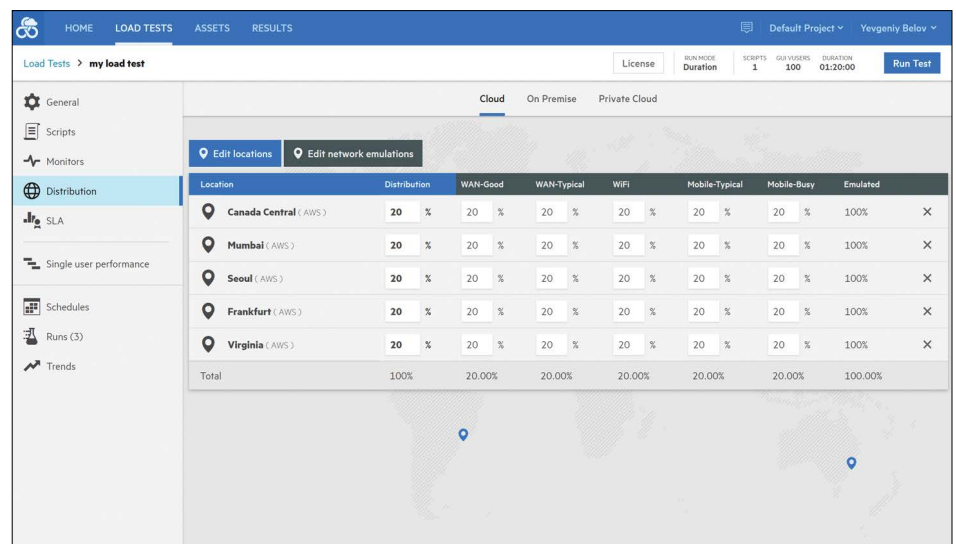


Figure 1. Load Test distribution

Micro Focus has an answer for you. LoadRunner Cloud, a Cloud Performance testing solution, makes it easy to code load testing into your mobile and web apps, so testing can occur earlier, more often, and with much less effort over the entire development lifecycle. This solution brings together the tools and technologies DevOps and Agile teams need to test their way, using their familiar tools, on their schedule.

The Tools and Technologies, All Together

LoadRunner Cloud gives DevOps team's access to a full spectrum of standard tools, technologies, utilities, and other resources so they can quickly and easily code cloud performance testing into mobile and web apps.

In short, you can combine coding and Cloud Performance testing into a single process using familiar tools, so you can overcome the obstacles of traditional performance testing. Now it's easy to create a test, integrate it into CI/CD (continuous integration/continuous deployment), automate the entire process, understand test results, and identify the right fix for each issue.

No more testing after code-complete. No more painfully slow UI-driven tests. No more summoning a performance engineer for assistance. No more manual integration. No more specialists to interpret results. Just script the test, run it, read the results, refine the software. Continuously.

The tools and technologies supported by LoadRunner Cloud fall into three broad categories:

#1: Script Authoring

- **Open architecture with public, HTTP-based, RESTful API:** With LoadRunner Cloud, external systems can call different methods using the API, so developers can implement actions like logging in to LoadRunner Cloud, upload a test, run a test and then analyze the results of a test.
- **Quick and scriptless test creation methods, using REST calls, HAR data**

or CSV files: LoadRunner Cloud provides three easy ways to create a test: 1) Provide a REST call to be tested, specify the number of virtual users (VUsers), and run the test. The VUsers execute the calls simultaneously and create a load on your app. 2) Provide a CSV file containing a list of REST APIs, simplifying test scripts on required parameters, and import into LoadRunner Cloud. 3) Export a HAR (HTTP archive) file from any browser, then upload to LoadRunner Cloud, add the number of VUsers, and run the test.

- **Git integration:** LoadRunner Cloud integrates with the open source Git version control system, enabling you to upload scripts from your Git repository. Now any time you update a script, you can push the changes to Git and simply click on "Sync". No more version issues; no more sluggish manual uploading.
- **TruClient Lite support:** Micro Focus TruClient Lite is an extension to the Chrome browser that makes it simple to create load test scripts for web apps. TruClient

Lite records users' actions as they click through the interface and creates a script. DevOps teams can easily enhance the script with timing steps, parameterizing step arguments, and more.

- **Reusing Selenium scripts for performance testing:** LoadRunner Cloud supports the widely adopted open source tool—Selenium. Selenium functional scripts are very similar to load test scripts. Both simulating user steps, keyboard inputs, behavior in different browsers, and so on. By reusing the code written for the functional test and modifying it in the context of performance testing, DevOps teams obviously save time, have better test coverage, and can rest assured that the user experience have not been compromised.
- **JMeter and Gatling scripting tool support:** LoadRunner Cloud supports popular open source testing tools such as JMeter and Gatling, so DevOps teams can easily upload existing scripts created with these tools into LoadRunner Cloud and run them.

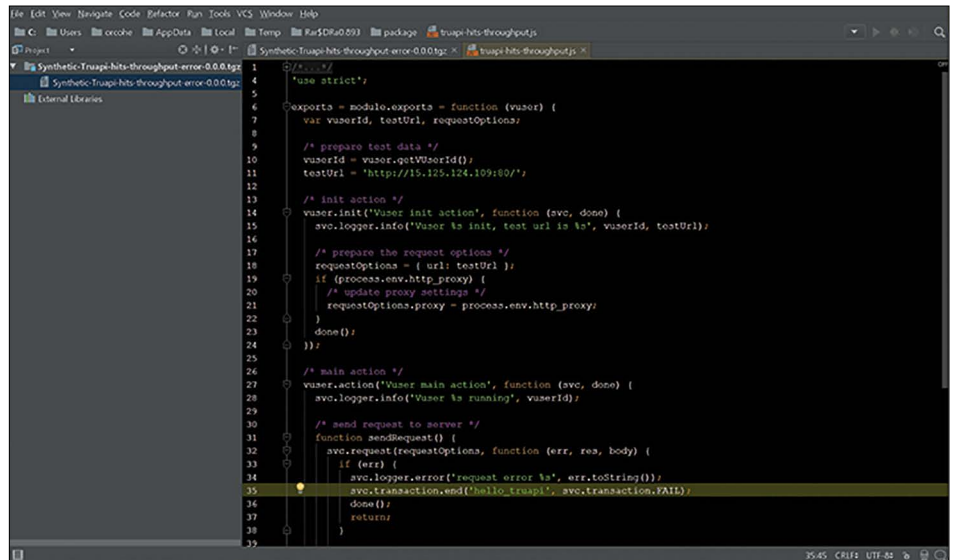


Figure 2. TruAPI example VU scripts written in JavaScript using a popular IDE—code your performance test with familiar tools.

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- **TruAPI support:** The TruAPI scripting tool, based on Node.js, provides another way to create JavaScript-based VU scripts using your favorite IDE. It provides an API for handling transactions, think time, logging, and more. TruAPI scripts can be packaged and uploaded to LoadRunner Cloud and added to a test definition.

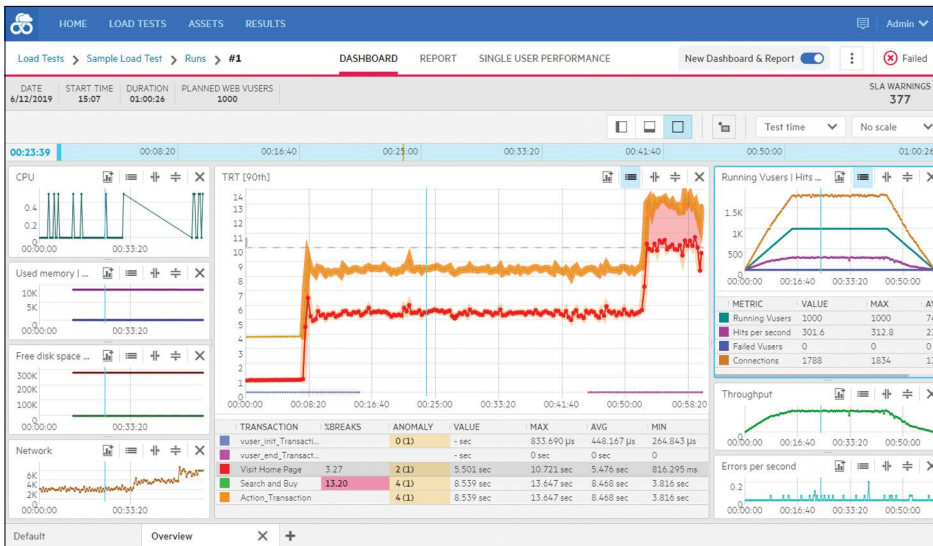
#2: Test Execution

- **Affordable SaaS delivery:** LoadRunner Cloud is a cloud performance testing solution hosted and supported in Micro Focus data center facilities. You can purchase a subscription with just a credit card—one month, three months, a year and even a few hours—whatever makes sense for you. All you need is a browser to get started. You can create and run a test in just minutes. You can scale up to a million virtual users (VUs). There's no need for expensive, dedicated hardware. And you pay only for the resources you actually use.
- **Docker-based load generator support:** With LoadRunner Cloud, engineers can now deploy a Docker-based load generator (LG), making it fast and easy to deploy the LG, load-test internal applications, and scale on different servers. In addition to this private cloud execution capability, LoadRunner Cloud users can test Docker container-based data and monitor it via Micro Focus SiteScope.
- **CI/CD frameworks:** Jenkins and Bamboo support: LoadRunner Cloud integrates with your open source CI/CD frameworks such as Jenkins and Bamboo. The integration lets you fire up performance tests to check that new code you've pushed out hasn't caused any regressions or broken your compliance with performance SLAs.
- **CLI tool support:** LoadRunner Cloud uses a public REST API that can be used to trigger tests and collect results from CI/CD tools, and the command line interface (CLI) tool provides a less technical way to interact with LoadRunner Cloud. If you're running Linux, for example, you can simply use the CLI tool to run a specific test without the need to open a browser and perform multiple steps.

- **Slack chat bot support:** ChatOps is becoming immensely popular with DevOps teams because it replaces difficult command line operations with easy informal conversations using the team's chat collaboration platform. Micro Focus takes the simplicity a step further by giving teams the ability to communicate with LoadRunner Cloud through Slack chat bots, which harness artificial intelligence and natural language to perform tasks on voice or text commands. It's an awesome new capability that is still in its early stages, but you can explore the possibilities using LoadRunner Cloud.
- **AWS CodePipeline:** This powerful utility helps you automatically build, test, and deploy your applications in the Amazon Web Services (AWS) cloud. Specifically, you can automate your release process from end to end, starting from your source repository through build, test, and deployment. You can define a consistent set of steps for every code change. You can automate your release process to allow your developers to test and release code incrementally and speed up the release of new features to your customers. You can incorporate your existing source, build, and deployment tools into your pipeline. And you can review real-time status of your pipelines, check the details of any alerts, retry failed actions, view details about the source revisions used in the latest pipeline execution in each stage, and manually rerun any pipeline.

#3: Real-Time Analysis

- **Anomaly detection:** LoadRunner Cloud enables teams to use powerful analytics to visualize and spot anomalies and performance problems and find root causes using real-time metrics. Engineers can use these insights to speed their diagnosis and investigation into system performance, even see the precise triggers that caused the anomalies.
- **Real-time breakdown:** With its multi-layered approach, LoadRunner Cloud is able to provide the insight needed to determine the root cause of detected deviations in real time.
- **Multi-monitor support:** If you already have monitors configured, such as Dynatrace or New Relic monitors, you can just integrate them into LoadRunner Cloud and get access to your application data. And if you don't already have a monitoring tool, Micro Focus can deploy SiteScope for you out of the box to monitor your servers while you're running your tests.
- **Network virtualization (NV) network emulation capabilities:** With the integration of Micro Focus Network Virtualization, LoadRunner Cloud can emulate real-world network conditions. During load testing, the solution can emulate multiple users and user types as well as multiple network conditions such as Wi-Fi, 3G, 4G, WAN good, WAN typical, mobile typical, mobile good, and so on.
- **WebPagetest:** LoadRunner Cloud leverages this third-party tool, which lets you specify the URL of your mobile or web app and then provides analysis and reporting on performance test results.
- **Real-time visibility into client and network performance:** DevOps teams can see transaction performance metrics in real time and receive deep breakdowns of both client-side and network-side actions, so performance issues can be diagnosed and remediated sooner—even while the



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Figure 3. An intuitive dashboard provides a complete, real-time network breakdown to isolate and remediate application performance issues.

test is still running. Equally important, LoadRunner Cloud provides insights and recommendations about specific actions to take to solve performance problems.

Client-side breakdown reports give you the statistics needed to measure the quality of the user experience on your application, and network insights reports drill down into HTTP, SSL, TCP, and UDP performance metrics. You can quickly compare actual performance against SLAs, merge graphs and see correlations between actions and response times, and much more.

- **Project management/usage reporting:** With the new project management and usage reporting capabilities of LoadRunner Cloud, large teams and centers of excellence (CoEs) can now use the solution across multiple projects, and share licenses and hardware to reduce costs and increase efficiency. Teams can generate reports per project, see test results, determine future license needs, allocate licenses to specific projects, and gain deep visibility into many projects simultaneously.

Broad Support for Standard Utilities:

- Open architecture with public REST API
- Scriptless test creation with REST API, CSV, and HAR files

- CI/CD tools: Jenkins, Bamboo plug-in, CLI tool
- Git integration
- Quick load testing with Micro Focus TruClient Lite
- Open source support: Selenium, JMeter, Gatling
- TruAPI protocol for Node.js scripting using your favorite IDE
- Real-time analysis
- Monitor support: Dynatrace, New Relic, SiteScope out of the box
- WebPagetest
- Slack chat bot
- Integrated with AWS CodePipeline
- Available via the AWS Marketplace
- Docker-based load generation

See It, Believe It

The best way to experience how simple, smart, and scalable LoadRunner Cloud cloud performance testing can be is to start your free trial at software.microfocus.com/signup/try/stormrunner-load.

Learn more at www.microfocus.com/srl