Testing for Peak Performance

How Cloud-Based Testing Ensures That Your Applications Can Handle Peak Demand

MICRO FOCUS®

The Business Challenge of Unavailable Applications

Thousands, or even millions, of customers, partners, and employees engage with your company every day. These interactions often involve no human contact at all. In fact, the primary relationship many people have with your organization is through your applications. So it is imperative that these systems perform as expected and are accessible when needed.

However, these applications are under massive stresses. Growing volumes of customers access your systems at peak times of the day. For instance, banking applications experience large demand at the start of the day as clients check their balances. Or peak loads may appear seasonally, as is typical for retailers and travel agents in the holiday season. Or there may be discrete events like a major promotion or a critical weather event that causes a major spike in usage.

It is not just the volume of users that leads to higher demand on your applications; there is also increased application complexity. Today's Web 2.0 applications, which are designed to be more responsive to users, can be highly resource intensive. This compounds the effects of increased demand.

Increased Business Demand Means Increased Demand on Your Applications

When customers put applications under this type of stress, they often fail if ineffectively tested. When your application is subject to sudden spikes or sustained usage volumes, it can behave in unexpected ways. The system may crash or become too slow to use. It could be inaccessible as customers compete for access. Regardless, it leads to frustrated users and potentially lost business. Every moment that the application is inaccessible is potentially millions of dollars in lost revenue.

Peak-Load Testing Fills the Gap

Development and quality assurance teams have long recognized this challenge. This led to a wave of essential tooling and methodologies that test application performance under peak loads. Typically, this approach

THE APPLICATIONS THAT RUN YOUR BUSINESS MUST PERFORM…

…BUT MASSIVE PEAK LOADS LEAD TO:
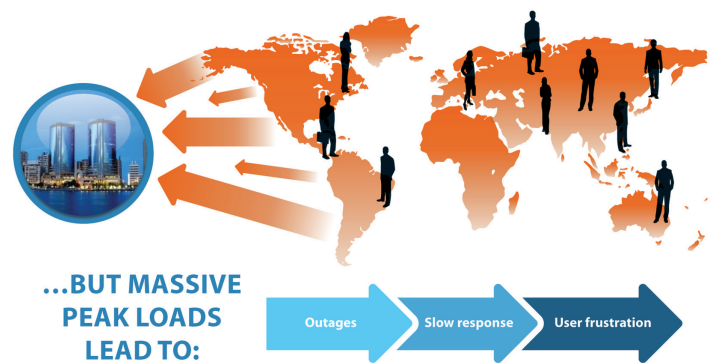
Outages → Slow response → User frustration

Figure 1

involves deploying internally-managed computing resources to simulate large numbers of users. These "virtual users" replicate real-world client behaviors, letting managers quickly spot risk points and points of failure.

These approaches have been hugely successful in preparing applications to meet real-world demands. In fact, they have become extremely mature and provide test managers with access to reliable ways to identify, diagnose, and correct errors before they reach business users. However, many companies have recognized limitations in the standard model.

Can't Always Support Peak or Global Loads

You must ensure that your applications are "battle ready" and can withstand massive, global usage. This requires that you simulate massive loads, but the infrastructure that you have in place is often insufficient to test for large numbers of users.

This may lead you to "under test" your applications by running lower volumes of peak loads. This introduces the risk that your applications will fail in real-world conditions. Or it could lead you to delay testing until you can assemble the computing resources necessary, which stalls the delivery of business requirements, impairing your organization's agility.

Your computing infrastructure may also be insufficient from the perspective of geography. If you are a global company, you need to ensure that worldwide clients have access to a performant application. If you are testing your applications with virtual users from only a single geography, you get an incomplete picture of performance.

You simply must have the appropriate levels of infrastructure in the right locations to make sure that your applications perform.

Can't Balance Infrastructure Costs with Testing Needs

The traditional model for global peak load testing requires a significant upfront investment. Hardware and software licenses must be acquired and configured correctly. That requires advance planning and budgeting to ensure that you have the necessary resources. It also means that you may over-provision load testing licenses when you only conduct large load tests periodically.

The need to manage to budget cycles also hinders your flexibility. You want to scale-up to the right level of resources at the right time; instead, you may have to wait months for hardware installation.

Further, the costs of operating large data centers are substantial. There are heating, cooling, electricity, and staff costs. There are the costs of upgrading software, hardware, and communication tools. These expenses are difficult to justify when they are not the core competency of your business. This rising cost can become unsustainable as you test higher and higher volumes of users.

The Cloud: a New Approach

Increasingly, companies are looking to the cloud as a way to improve IT performance. Imagine being able to focus the power of the world's largest data centers onto your computing needs—just when you need

TRADITIONAL PERFORMANCE TESTS SIMULATE LOADS, BUT...

Expensive to operate

No support for global, enterprise tests

Can't scale to large peak loads

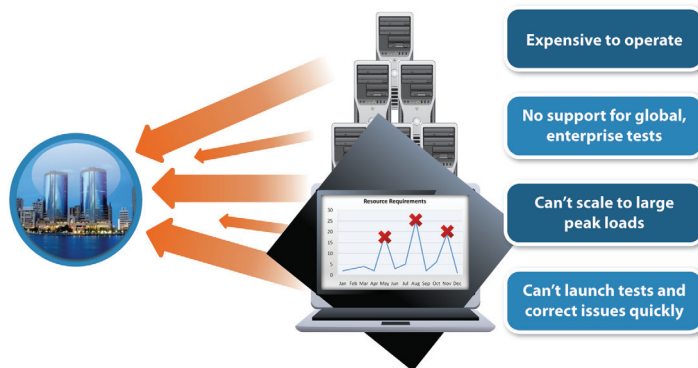Can't launch tests and correct issues quickly

Figure 2

it most. That's what the cloud provides. It is a virtual set of computing resources that can be securely accessed via the Internet. Cloud-based infrastructures are operating right now, giving organizations like yours:

- **Massive computing power.** Cloud infrastructure providers are built on the world's largest data centers. This allows them to marshal gigantic quantities of computing power as needed.

- **Improved cost basis.** Cloud providers focus on offering access to highly efficient computing resources. They have not only economies of scale but also a dedicated concentration on providing these infrastructures. These efficiencies can be passed on to you, so your company can focus less on managing hardware and more on what differentiates you.

- **Elastic pricing models.** There are many price models for cloud-based services. But they tend to share one aspect in common: they are based on usage. This means that you pay for what you use as you use it, avoiding large upfront costs.

Best of Both Worlds: Testing and the Cloud

Clearly, the cloud offers significant efficiencies to IT organizations. But can it also help to test applications under peak loads? The answer comes from harnessing cloud resources to generate virtual users that can simulate large loads. You can direct these cloud-based virtual users against Internet-accessible applications hosted at your company or in the cloud itself.

How does cloud-based peak load testing function? Essentially, it is replicating the model of onsite peak load testing but taking advantage of the cloud. Users define the numbers of virtual users required for a given test and schedule the computing resources necessary. They match the geography of these computing instances with plans. And they define the scripts that will be used to simulate user behavior. These scripts are then accessed by the cloud-based test agents and run on a performance testing schedule.

As the test is proceeding, managers will want to monitor the results. A good approach is to have onsite monitoring tools close to the application itself. These tools can report on the internal response of the application and diagnose issues.

Solutions that are exclusively cloud-based suffer from a fatal flaw. They don't allow managers to diagnose identified issues in an application. For instance, if a transaction is non-performant or a system doesn't scale you need more than response times and other related metrics.

You need deep-dive information to show what occurred in the application. You need to identify which transactions, workloads, or code are consuming high levels of resources and resulting in scalability issues. An approach that offers both cloud-based load generation and onsite monitoring and diagnostics is the only reliable approach for this.

WHAT IS SILK PERFORMER™ CLOUDBURST?

Silk Performer CloudBurst lets software quality teams instantly launch any size "peak demand" performance test for Internet-accessible applications without the burden of managing complex infrastructures
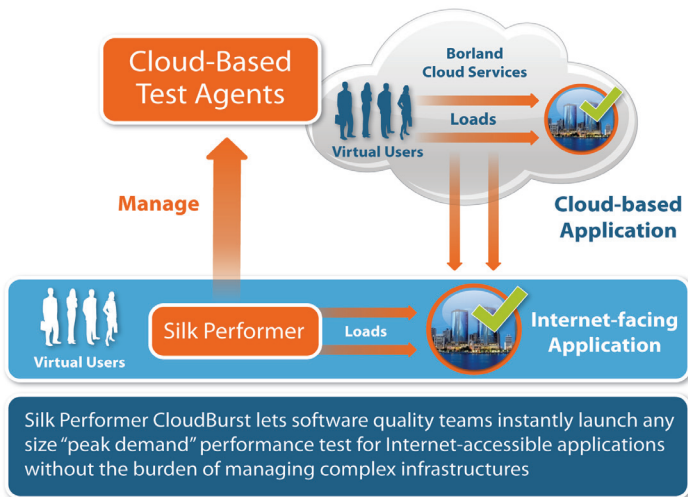
Figure 3

Value of Cloud-Based Peak Load Testing

Combining cloud-based resources with performance testing generates numerous benefits for development and testing teams.

Assured Performance

Cloud-based infrastructures are extremely well-suited to the kinds of peak demands required by performance testing. The sheer size of cloud data centers ensures that sufficient computing power is available as you scale from 50,000 to 100,000 to 200,000 virtual users and beyond. Of course not all cloud-based load testing providers can scale to this degree and not all testing solutions can effectively harness these kinds of resources, so you should carefully select vendors.

Peak load testing via the cloud also takes advantage of the ability to run tests virtually on-demand. You can simply schedule time for a test, and resources are automatically provisioned. This avoids testing bottlenecks and prevents long delays as internally managed hardware is acquired and set up.

Worldwide Readiness

Some cloud-based infrastructure providers run data centers in multiple geographies. For instance, they may have centers in Europe, Asia, and North America. This global nature allows cloud-based testing that takes advantage of it to place virtual users in a variety of locations to test international performance. No longer do you need to maintain test hardware in multiple countries to test. Not all cloud-providers or test solutions can provide this capability, so it is key to evaluate if global-readiness is a requirement for you.

Cost control

The "elasticity" of the cloud means that you can scale computing resources up or down as needed. Much like a water bill, you are just paying for what you use. So if your test requires 100,000 users one day and 200,000 the next, then you only pay for those resources that you booked. In a traditional model, you would have to acquire computing power to support 200,000 users for both days.

This scalability not only keeps costs down but also helps to improve budgeting, as you can better predict and keep usage within predicted levels. But what happens if you schedule, say, a 100,000 virtual user test and the application fails as it approaches 40,000 virtual users? When investigating alternatives, you should be careful to avoid approaches that charge you for the resources of the full 100,000 virtual users. After all, a central principle of the cloud is to pay for just what you use.
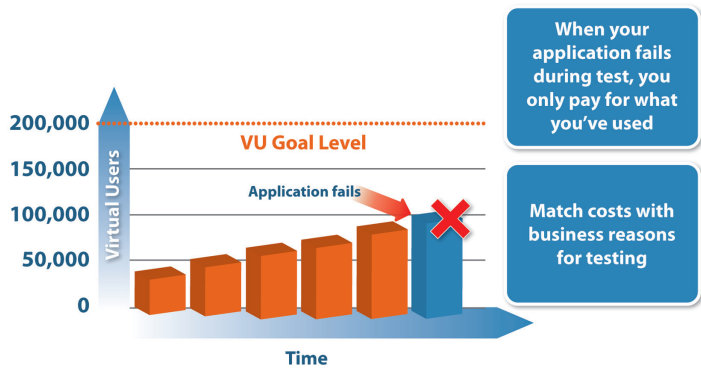
VALUE: CONTROLLED COSTS

Figure 4

Enterprise Application Coverage
While many applications today are entirely browser-based, that is not often the case for large enterprise applications. For instance, a bank's core banking application will likely have a hybrid model. Part of the application is browser-based Internet banking and another part may be only accessible via bank tellers' terminals.

This means that you need to test both routes to your system for completeness. An approach that relies solely on cloud-based testing will be lacking since it needs to access the application via Internet protocols. As a result, it is important to determine upfront whether a mixed model that combines Internet protocols with support for .NET, Java, Oracle, SAP, Siebel, COM, and other enterprise application protocols is appropriate.

Unlike mature vendors that have been offering enterprise application coverage for years, cloud-only vendors have less experience. This can be a major concern as you evaluate vendors. You should ensure that the testing technologies are indeed robust and also that there are sufficient resources at your preferred vendor to support you through your testing process.

Web 2.0 Support
Today's applications are often dynamic and highly interactive Web 2.0 applications. These rich internet applications require special testing in order to access functionality developed in AJAX, Silverlight, and Flex, among other technologies. Simple application testing is no longer sufficient. This is well-suited to cloud-based testing as it requires more computing power

to perform these more complex tests. However, very few solutions are sufficiently mature to handle the dynamism of this style of application.

Mobile Users
In today's highly connected and mobile world, it's not surprising that the sale and usage of mobile devices, such as tablets, smartphones and laptops, has just exploded in recent years. Therefore, it is becoming mission critical that your organization is able to support performance testing of mobile web applications and mobile native applications that communicate with servers over HTTP. Due to smaller screen sizes and different input methods (touch screen) of mobile devices, many web applications look different when loaded on a mobile device compared to a full site.

From an application performance testing perspective, such mobile versions of a web page need to be treated as separate applications, even though they might share some components on the back end. This all comes down to the fact that a variety of mobile devices are driven by a range of operating systems that include Android, iOS, Windows Phone, and Blackberry, thus your testing solution must enable you to record test scripts from a PC, an emulator, or a mobile device. Moreover, it must simulate the bandwidth limitations of mobile network connections and support all existing and upcoming mobile phone standards like GPRS, EDGE, UMTS, HSDPA, HSPA+, and LTE.

As mobile users are travelling, it is also important to emulate traffic of mobile devices from different parts of the world.

Problem Resolution
Discovering that your application failed under peak loads is clearly not enough. You want to discover why it failed and how to correct it. While this may seem obvious, diagnostic tools are often excluded from testing solutions. This is often the case when cloud-based peak load tests are operating against an application you manage in-house.

Cloud-based tooling on its own cannot analyze the internal behavior of the application under test. This can mean that applications may be incompletely repaired following tests, increasing the risk of a real-world failure. It is more effective to combine the power of cloud-based testing with "on the ground" diagnostics of your application performance.

Ease of Management
Because applications are often a mix of Internet and internally-facing front-ends, they are often more complex to test. You will often develop a set of scripts to test applications in these mixed modes. Significant effort can be expended when your team is engaged in developing, maintaining,

and refining multiple sets of scripts. Teams should investigate solutions that encourage reuse of scripting resources.

Also, when dealing with cloud-based solutions, there is a level of additional complexity that is added. This can slow the training of new resources and introduce business process complications that hinder testing. A more effective approach is to minimize the number of vendors involved in the testing process. One single solution for internally facing and Internet facing applications and no additional vendors to manage can avoid slowdowns in the testing process.

Silk Performer CloudBurst

Micro Focus® Silk Performer CloudBurst enables software quality teams to rapidly launch any size peak-load performance test without the burden of managing complex infrastructures. Now, you can test and diagnose Internet-facing applications under immense global peak loads. Plus, because it is a Silk Performer product, you can even test applications that have mixed Internet and internal-facing aspects. Further, you can reuse your existing Silk Performer test assets to get results quickly.

Silk Performer CloudBurst is a member of the Silk Performer family of products. As a result, it gives development and quality teams:

- Integrated root cause diagnosis to locate and correct quality issues that could impair business stability.
- Continuous performance testing allowing development organizations to quickly correct quality issues before they advance through the development lifecycle.

- Web 2.0 client emulation to ensure that even today's rich internet applications are effectively tested.
- Simulation of peak demand loads through onsite and cloud-based resources to give you a scalable, powerful, and cost effective solution for peak load testing.
- Performance testing of mobile web applications and native apps, with profiles for all popular mobile devices and application types.

Silk Performer CloudBurst is built on the proven Enterprise Cloud Services of Micro Focus. This technology helps you harness the power of cloud-based infrastructures while insulating you from the complexities of managing cloud resources. Now, it is easy to configure, launch, and manage cloud-based virtual users with the same technology and vendor that you trust.

To find out more about Silk Performer CloudBurst please visit: **www.borland.com/silkperformer-cloudburst**

Conclusion

It is imperative that the applications that your customers rely on perform as expected. That requires effective performance testing. But as the costs and complexity of managing these tests rise, you should investigate more cost-effective and powerful alternatives. Cloud-based performance testing provides the answer. You can quickly scale to even the largest peak loads—all while paying just for what you use when you use it.

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