SUCCESS STORY.
Load Testing Of Virtual Cloud-Based Browsing Application

About the Client

The client is a premier provider of global satellite and terrestrial communications. It offers managed, private end-to-end satellite and terrestrial networks in over 140 countries. In addition, it operates teleport facilities, with highly secure disaster recovery and business continuity infrastructures.

Business Challenge

The client has a Microsoft .NET application which uses Citrix infrastructure to deploy a virtual cloud-based browser. The product is an innovative, virtual browser that dramatically reduces delay in browsing over satellite and terrestrial links.

The application is designed to improve web page load time and bandwidth consumption of cloud-based internet browsing, particularly over wireless networks. With multiple patent-pending technologies incorporated into the zero-latency gateway, the virtual browser offers highly increased browsing speeds.

The client has discovered that latency greatly impacts a page's loading speed. While page loading speeds in web browsers is always limited by the available bandwidth, it is not the only limiting factor. Just 100ms of additional latency doubles a page's loading time, even with high bandwidth.

The distinction in the client's virtual browser solution is that the physical browser sits at the internet exchange point (IXP) in a server. IXP's are physical infrastructures that allow networks to interconnect directly, rather than through third-party networks. This reduces the latency in the client's solution to the absolute minimum, from the browser's point of view. The virtual browser is able to intelligently display a website, without transmitting it over TCP connections to the user's browser. All of the "heavy lifting" is done at the datacenter.

The client needed to meticulously test and find ways to improve the performance of its Virtual Browser. Given time-to-market pressures, lack of scalability and a large number of different testing tool and resource skill requirements, it sought a partner specializing in outsourced Independent Testing Services

- Installation and Roll-Out Testing
- Navigation and Browser Functionality Testing
- Performance and Load Testing

Silicus was selected for its extensive experience in developing test suites and executing application-level compatibility and interoperability tests across different hardware and software matrices. The client wanted to take advantage of Silicus’ fully functional test lab facility – stocked with a variety of devices for all major platforms and covering the latest operating systems, peripherals and hardware.
The Silicus Team delivered the following:

INSTALLATION AND ROLL-OUT TESTING
Silicus performed installation and roll-out compatibility testing on the product to evaluate the compatibility of the application with the computing environment. This consisted of the following elements:

- Software and Hardware: Audio/Video Devices, USB and Other Ports, Adobe Flash Player

Installation and roll-out testing was executed to discern how the application interacted and functioned with a variety of platform and computing environment combinations. This process determined if the virtual browser was capable of running on different platforms with disparate software and hardware components.

NAVIGATION & BROWSER FUNCTIONALITY TESTING
Silicus' functional testing methodology aims to efficiently identify application bugs and issues, as well as reduce the total quality assurance time, effort and cost.

After analyzing the scope and timeline objectives for the project, Silicus' testing experts ruled out automation and decided to perform complete functional testing and validation for the application manually. Test matrices and detailed reports were shared with all stakeholders at regular intervals.

PERFORMANCE TESTING
The Citrix server's central role in the application's infrastructure made it important to ensure that performance testing was effective in creating an environment where stress testing could be adequately carried out. Otherwise, the final environment may have been below real world specifications and not been able to process the expected demands of virtual browser users.

Silicus used an open source NS-3 WAN Network Emulation tool to build a WAN simulation core that was easy to use and debug. The WAN emulator could imitate networks with low bandwidth limit, delays, losses and other problems. It fulfilled the requirements of the entire simulation workflow from configuration to trace collection and analysis.

The Citrix Edge Sight for Load Testing (ESLT) product line was employed as a Performance Testing Solution to test and validate high load, availability and scalability requirements. By simulating hundreds of virtual users and monitoring the responsiveness of the system under high usage, ESLT allowed the testing team to determine how the current configuration and hardware infrastructure would be able to support the anticipated end-user demand.

TESTING METHODOLOGY AND REPORTING
Silicus ensured the best possible professional and cost effective service

Weekly status reports were delivered to summarize testing activities, issues, risks, bugs, test case coverage, and other relevant metrics. Phase completion reports were distributed after completion of each phase of testing. A final test report was issued to certify testing completion and to provide an assessment of the product's general readiness.
Technologies Used

Operating System
- Windows 7, 32-bit and 64-bit editions
- Windows XP Professional, 32-bit and 64-bit editions
- Windows Vista, 32-bit and 64-bit editions
- Windows Server 2008 R1, 32-bit and 64-bit editions
- Windows Server 2008 R2, 64-bit edition
- Windows Server 2003, 32-bit and 64-bit editions

Web Server
- Citrix XenApp

Testing
- Defect reporting and tracking: JIRA
- Performance testing: Perfmon, Edge Sight load tester

Project Environment
- JIRA

Tools
- SCE WAN Connection
- Emulator

Client Benefits

High Quality & Cost-Effective Testing
Silicus’ testing experts used the latest tools and methodologies to ensure that the product was comprehensively tested. The client was able to thoroughly test its product by a trusted, independent testing provider at a reasonable cost.

Time-to-Market
The client required validation of the performance and scalability of its product in order to launch in the market. Silicus’ experience in large-scale testing projects and rigorous project management ensured that the testing was completed in the given time frame.

Test Virtualization Environment
Silicus built a virtual test environment with the ability to test server performance across a wide variety of real world configurations and simulations. The virtual test environment tested the client’s browser under the most stringent of load and stress specifications. Silicus ensured that the client was ready to launch a world class product, which offered an internet experience of unrivaled quality and speed.