simpliVity™

VDI Without Compromise with SimpliVity OmniStack and Citrix XenDesktop

Introduction

Virtual Desktop Infrastructure (VDI) provides customers with a more consistent end-user experience and excellent operational benefits, including security, protection of company data, centralized control and management, increased flexibility and accessibility for the end-user client platforms. While these advantages are obvious and attractive to many companies, there are challenges to overcome in a cost-effective manner that ensure an excellent end-user experience.

SimpliVity hyperconverged infrastructure solves many of these challenges by eliminating the redundant IOPS that plague VDI environments, eliminating silos of data management, and utilizing built-in data protection and mobility.

This white paper documents the results of SimpliVity-led testing to provide evidence of these efficiency gains on Citrix XenDesktop. Two Citrix XenDesktop provisioning methods, Machine Creation Services (MCS) and Provisioning Server (PVS), were used during the tests. All performance testing utilized Login VSI (http://www.loginvsi.com), the industry-standard load testing solution for virtualized desktop environments, and all testing configurations and results have been validated by Login VSI. These tests offer insight in to the latest performance results of Citrix XenDesktop 7.6 on SimpliVity OmniStack 3.0.

Summary of Results

The performance testing illustrates SimpliVity's ability to deliver an excellent end-user experience in VDI deployments as the environment scales. Highlights include:

1. Performance at scale: Consistent, very low VSIMax Average < 2000ms measured throughout XenDesktop Hosted Shared deployments and Hosted Desktop deployments.

2. Reduce capacity and IO requirement: Inline deduplication and compression rate above 20:1.

3. With four (4) SimpliVity nodes on Hosted Shared Desktop deployments, 800 users can be supported with MCS and 1200 users can be supported with PVS RAM Cache option.

4. With four (4) SimpliVity nodes on Hosted Desktop deployments, 600 users can be supported with MCS and 800 users can be supported with PVS RAM cache option.

5. PVS "write cache on RAM with overflow to disk" option can almost eliminate IOPS.

"Once again SimpliVity has gone through the Login VSI Validation program, demonstrating superb results for Citrix XenDesktop covering MCS and PVS. SimpliVity takes their testing and reporting very seriously and sets high standards for completely open and above-the-board information that helps demonstrate great performance to their prospective customers."

– Blair Parkhill, Director of Products, Login VSI

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Solution Preview

VDI initiatives have gained a reputation for being costly, time consuming, difficult to architect, and, worst of all, prone to failure due to poor user experience. When deployed on SimpliVity hyperconverged infrastructure, many of the common administrative pain points are alleviated, while giving business owners confidence that their end-users will experience superior desktop performance. SimpliVity delivers VDI without compromise, with a strong focus on end-user experience, enterprise protection and resiliency, without giving up the operational efficiency and economic benefits of VDI.

The following performance tests were conducted to document the performance characteristics of Citrix XenDesktop Hosted Shared Desktops running on SimpliVity hyperconverged infrastructure. These results are a sample and are not intended to offer a comprehensive overview of all end-user computing use cases that SimpliVity addresses. Contact SimpliVity Sales to discuss how SimpliVity addresses other VDI use cases.

SimpliVity Overview

SimpliVity hyperconverged infrastructure provides a single, shared resource pool across the entire IT stack, eliminating point products and inefficient siloed IT architectures.

SimpliVity assimilates all IT infrastructure and data services below the hypervisor into a single, scalable 2U building block. Two or more hyperconverged building blocks deployed together form a Federation—delivering a massively-scalable pool of shared resources. The solution is available as a pre-integrated appliance under the SimpliVity OmniCube brand name, and with third-party servers, including Cisco UCS and Lenovo System X servers, under the SimpliVity OmniStack name.

SimpliVity's differentiation from other converged infrastructure solutions is in its Data Virtualization Platform, which enables SimpliVity hyperconverged infrastructure's single shared resource pool across multiple sites, and provides highly efficient data storage and mobility. SimpliVity's Data Virtualization Platform consists of SimpliVity's data architecture and OmniStack Accelerator Card, and enables Accelerated Data Efficiency, Global Unified Management, and Built-in Data Protection.
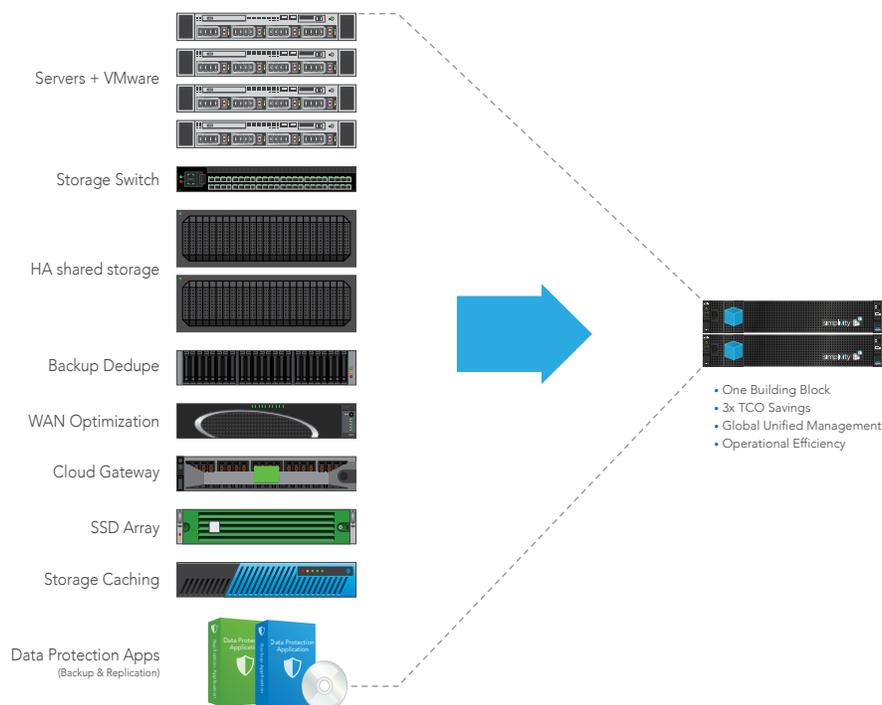
Test Environment Configuration

The following tables detail the physical and logical specifications of the environment utilized for these tests. The SimpliVity systems were configured in a 4+0 configuration—four (4) nodes in the primary site and no nodes in a remote site—to represent the basic VDI building block.

Four OmniStack Integrated Solution with Cisco UCS C240 M4 systems with two 14 core Intel Xeon E5-2697 v3 CPU and 384GB RAM, running OmniStack version 3.0 software, were used in all of the tests highlighted in this document.

SimpliVity Hardware Configuration	
Attribute	Specification
Total Hosts	4
Per Host Specifications	
Model	OmniStack Integrated Solution with Cisco UCS C240 M4
CPU	Dual Intel E5-2697v3 2.6GHz 14-core processor
RAM	384 GB
Disk (HDD)	8 x 7.2k 1TB HDD
Disk (SDD)	2 x 400GB SSD

XenDesktop Hosted Shared Desktop VM Configuration

XenDesktop 7.6 Hosted Shared VM Configuration	
Attribute	Specification
Operating System	Windows Server 2012 R2
VMware Virtual Hardware	Version 10
VMware Tools Version	Latest
Virtual CPU	6
Virtual Memory	20GB
vNICs	1
Virtual Network Adapter 1	VMXNet3 Adapter
Virtual SCSI Controller 0	VMware Paravirtual
Virtual Disk - VMDK	25GB
Virtual Floppy Drive	Removed
Virtual CD/DVD Drive 1	Removed

XenDesktop Hosted Desktop VM Configuration

Office Worker Desktop Configuration	
Attribute	Specification
Operating System	Windows 7, 64-bit
VMware Virtual Hardware	Version 10
VMware Tools Version	Latest
Virtual CPU	1
Virtual Memory	1.5GB
Virtual Disk - VMDK	25GB
Microsoft Office Version	Microsoft Office 2010

MCS Datastore Configuration

For the tests utilizing MCS for provisioning, 4 x 2TB NFS datastores were created. XenDesktop clones the master image to each datastore for a total of 10 Hosted Shared Desktops in each of the four datastores. Each VM has both a differential disk and identity disk.

PVS Datastore configuration

Again, 4x2TB datastores were utilized with each datastore containing a VM template and write cache files for every desktop VM. The write cache file contains all disk writes of a target device when using a write-protected vDisk (Standard Image).

Benchmarking Test

All performance testing documented utilized the Login VSI (http://www.loginvsi.com) benchmarking tool. Login VSI is the industry-standard load testing solution for centralized virtualized desktop environments. When used for benchmarking, the software measures the total response time of several specific user operations being performed within a desktop workload in a scripted loop. The baseline is the measurement of the response time of specific operations performed in the desktop workload, which is measured in milliseconds (ms).

There are two values in particular that are important to note: VSIbase and VSImax.

- **VSIbase:** A score reflecting the response time of specific operations performed in the desktop workload when there is little or no stress on the system. A low baseline indicates a better user experience, resulting in applications responding faster in the environment. The 13 lowest VSI Index Calculation response time samples are taken from the entire test and are averaged. The ideal VSIbase response time is less than 1000ms.

- **VSImax:** The maximum number of desktop sessions attainable on the host before experiencing degradation in host and desktop performance.

- **VSImax Average:** The VSImax average response time in Login VSI 4.0 is calculated on the amount of active users that are logged on the system. The acceptable average VSI index number is less than 2000ms.

SimpliVity used the latest version, Login VSI 4.1.4, to perform the tests. The VMs were balanced across each of the servers, maintaining a consistent number of VMs on each node. For Hosted Shared Desktops (XenApp) tests, 60 Login VSI launchers were used to generate the office workload. Each launcher can handle up to 25 sessions. For Hosted Desktops, the tests were executed in Login VSI's Direct Desktop Mode. Since no specific remoting protocol is used, this makes the test results relevant for everyone. The results are a "pure" comparison of the tests in a VDI context. All VDI desktops were powered on, registered, and idle prior to starting the actual test sessions.

Testing Methodology

For the tests, SimpliVity used the new Login VSI Office Worker workload. Office worker workload is medium workload with 1vCPU, 1.5GB memory, 4-6 applications and 240p video.

The workload simulate the following applications found in almost every environment, as listed below:

Login VSI Workload Applications

- Microsoft Word 2010
- Microsoft Excel 2010
- Microsoft PowerPoint 2010
- Microsoft Outlook 2010
- Internet Explorer
- Mind Map
- Flash Player
- Doro PDF Printer
- Photo Viewer

Test Results

Test Case	VSIMax	VSIMax Average	VSIBase
1000 Hosted Shared Desktop with MCS	840	1481	586
1200 Hosted Shared Desktop with PVS RAM Cache	Not reached	1358	557
600 Hosted Desktop with MCS	Not reached	1129	840
800 Hosted Desktop with PVS RAM Cache	Not reached	1538	848

XenDesktop Hosted Shared Desktop

The following are the test results on a 4-node SimpliVIty configuration with 40 Citrix XenDesktop Hosted Shared Desktops on vSphere 5.5U2. The x-axis is the number of active sessions and y-axis is the response time in ms.

1000 Session Hosted Shared Desktops with MCS

During the test using MCS with Hosted Shared desktop, VSImax 840 was reached, VSIBase 586 and VSIMax threshold 1587 and VSIMax Average is 1481ms.
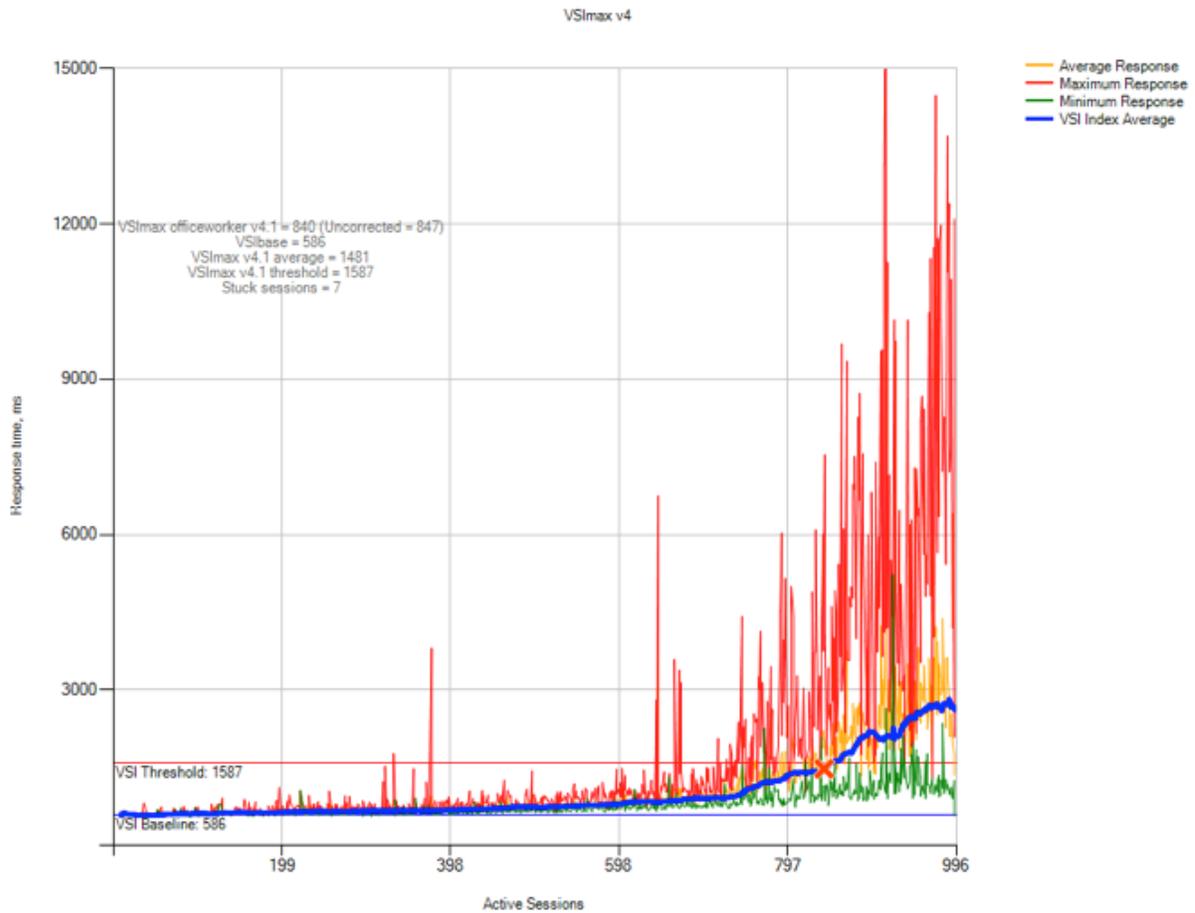
1200 Hosted Shared Desktop with PVS 2GB RAM Cache

The following are the test result of a 4-node SimpliVity configuration with PVS option "Cache in device RAM with overflow on hard disk". RAM Cache size is 2GB. VSIMax was not reached with a baseline of 557 and average VSImax of 1358. The VSImax threshold was 1558.
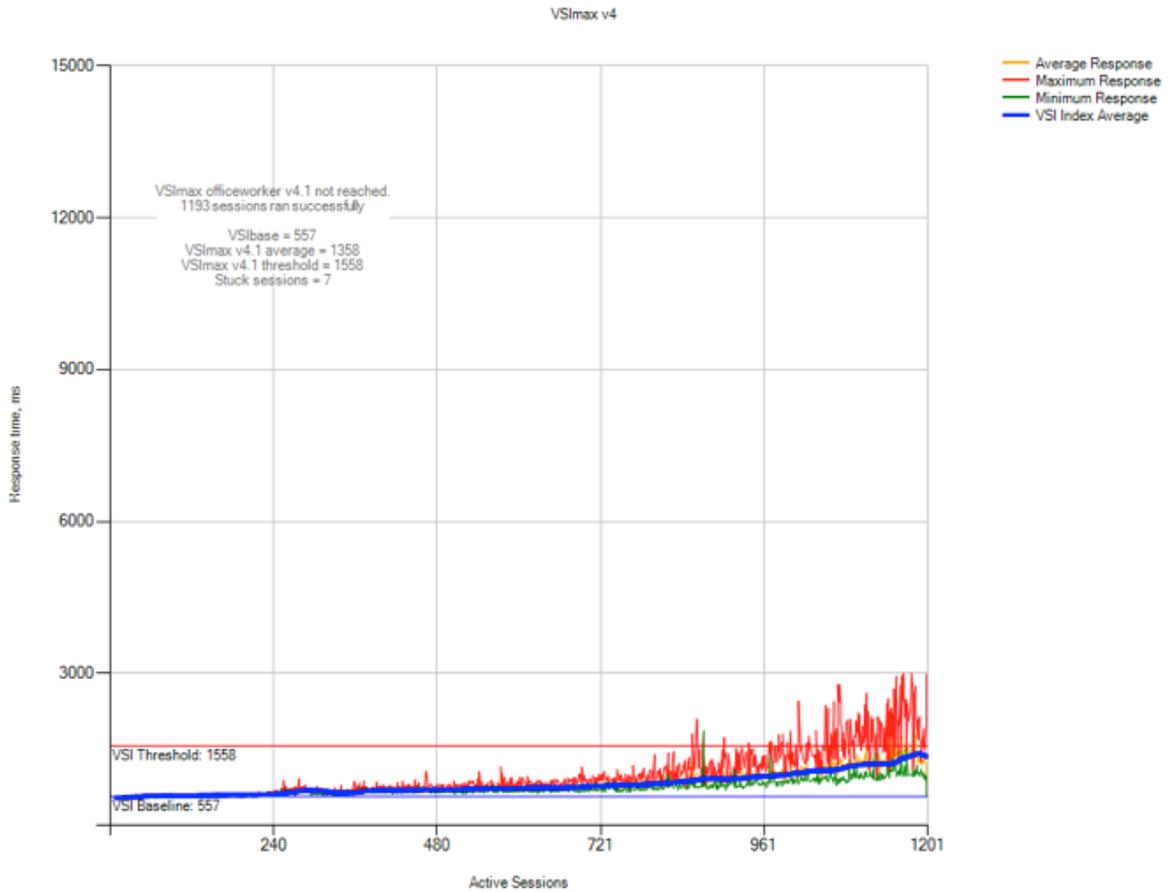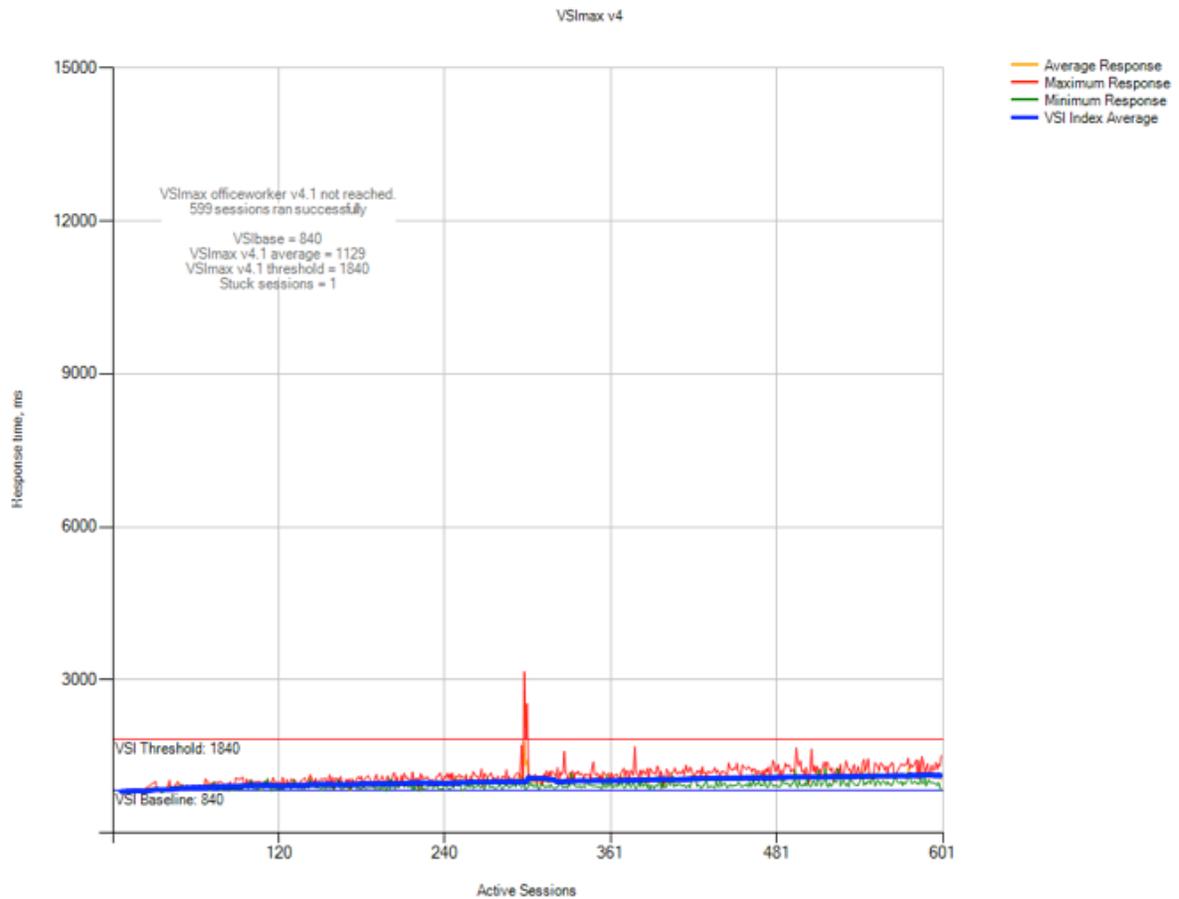
XenDesktop Hosted Desktop

The following are the test results on 4-node SimpliVity configuration with 800 Citrix XenDesktop Hosted Desktops on vSphere 5.5U2.

600 Office Worker Hosted Desktops with MCS

The test used MCS to provision 600 Hosted Desktops. With LoginVSI office workload VSImax was not reached, VSIBase is 840 and VSIMax threshold 1840 and average VSIMax Average is 1129.

800 Office Worker Hosted Desktop with PVS 256MB RAM Cache

The following are the test result of a 4-node SimpliVity configuration with PVS option "Cache in device RAM with overflow on hard disk". RAM Cache size is 256MB on each Windows 7 VM. VSIMax was not reached with a baseline of 848 and average VSImax of 1538. The VSImax threshold was 1848.

VSImax v4
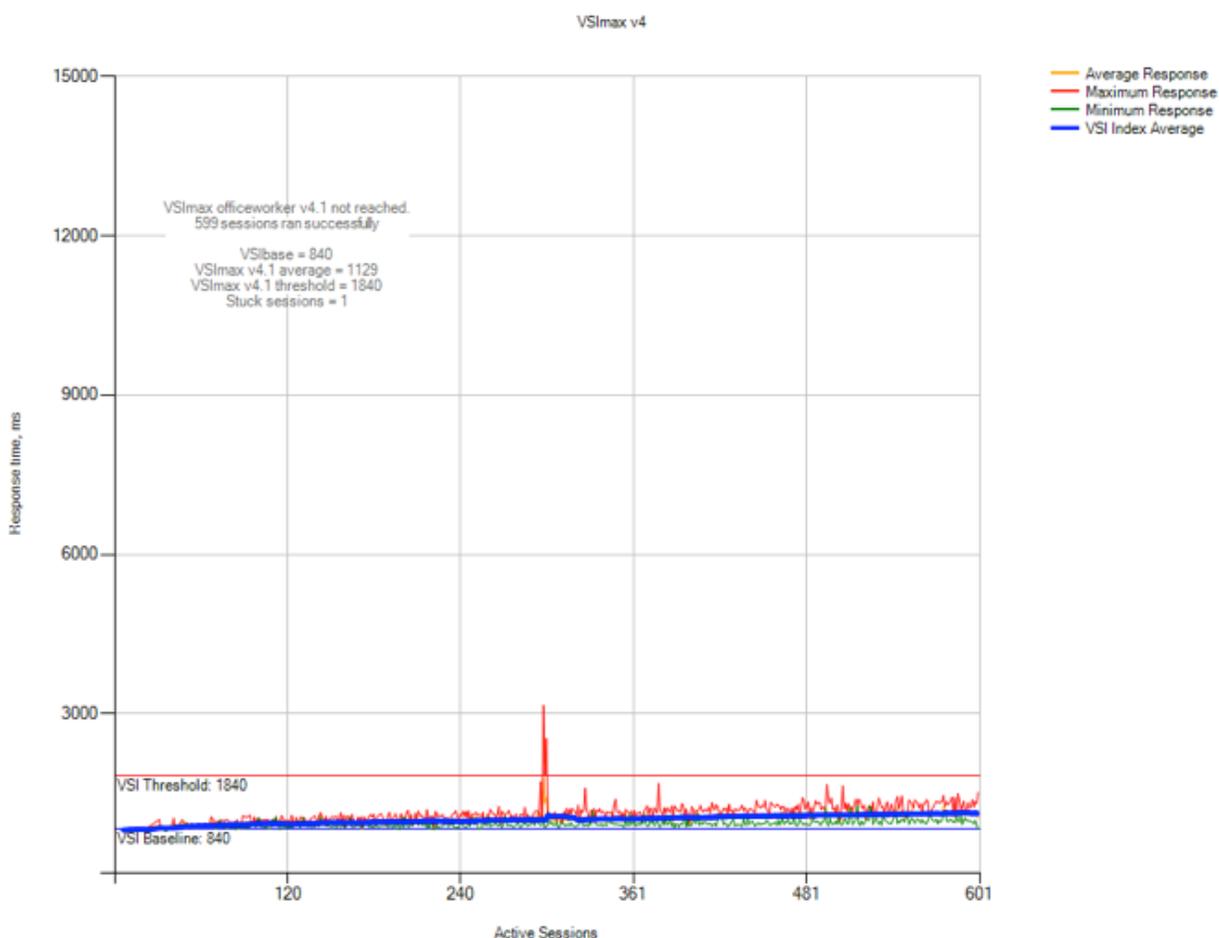
Analysis of Results from Login VSI

Login VSI runs a set of operations selected to be representative of real-world user applications, and reports data on the latencies of those operations. In SimpliVity' tests, they used this tool to simulate a real world scenario, and then accepted the resultant application latency as a metric to measure the end user experience. As Login VSI was heavily involved in the "Validated by" tests, we've noticed a few differentiating test results:

- Significant low baselines meaning a strong base performance. This forms the base for a very good User Experience

- On average very good and acceptable response times

- Straight and predictable VSI performance. SimpliVity's power is in a linear growth and performance model

- Not reaching VSImax, meaning the performance degradation points have not been reached in most of the tests

Summary

Utilizing Simplivity hyperconverged infrastructure dramatically simplifies IT systems management. SimpliVIty's Data Virtualization Platform delivers industry-leading Accelerated Data Efficiency, Global Unified Management and Built-in Data Protection. For VDI environments, Simplivity provides an unmatched user experience without compromising desktop density or resiliency.

About Login VSI

Login VSI provides performance insights for virtualized desktop and server environments. Enterprise IT departments use Login VSI products in all phases of their virtual desktop deployment—from planning to deployment to change management—for more predictable performance, higher availability and a more consistent end-user experience. The world's leading virtualization vendors use the flagship product, Login VSI, to benchmark performance. With minimal configuration, Login VSI products works in VMware Horizon View, Citrix XenDesktop and XenApp, Microsoft Remote Desktop Services (Terminal Services) and any other Windows-based virtual desktop solution.

For more information, download a trial at www.loginvsi.com.

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