

Citrix CloudBridge 3000

Comparative Citrix XenDesktop WAN Optimization Evaluation

EXECUTIVE SUMMARY

WAN optimization buyers want to understand the performance of an appliance at reducing WAN bandwidth requirements while at the same time maintaining, or ideally, improving the user experience. The higher the compression of LAN data, the more value a WAN optimization solution provides. This higher compression means that a smaller leased circuit can be used, or the enterprise can accommodate more users in the future before migrating to a larger WAN connection. Citrix focuses on greater performance of the top enterprise applications, including Citrix XenDesktop and Citrix XenApp.

Citrix commissioned Tolly to evaluate the XenDesktop (HDX) WAN optimization performance of its CloudBridge 3000 and compare that to the performance of a commonly deployed WAN optimizer - referenced herein as Vendor X. The Citrix CloudBridge outperformed the competition in all tests.

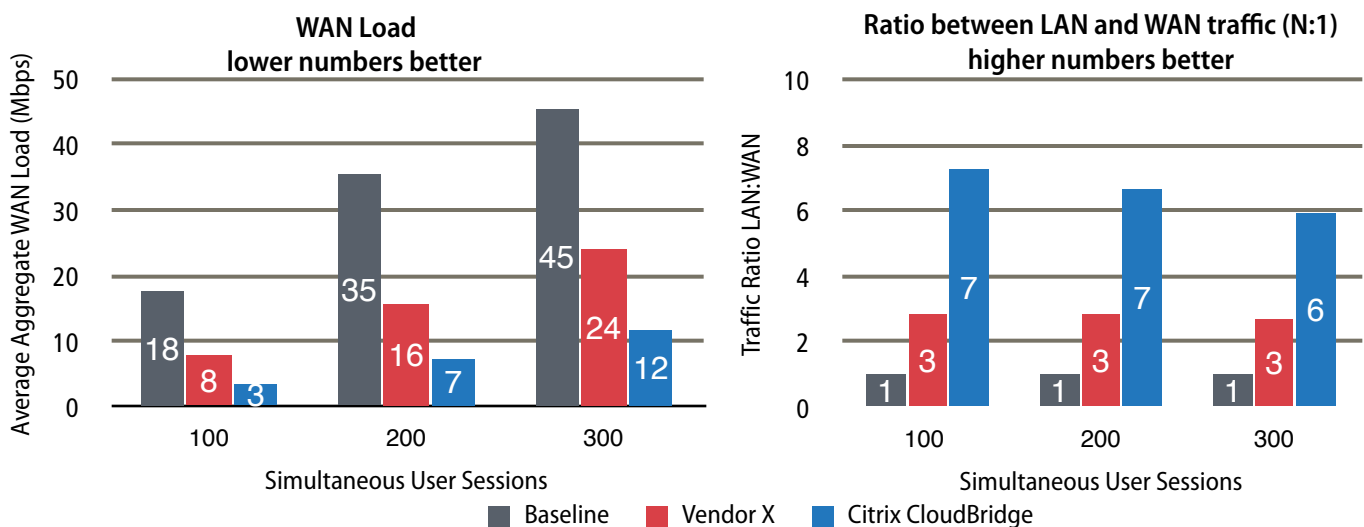
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THE BOTTOM LINE

In HDX tests, the Citrix CloudBridge solution:

- 1 Required less than half the WAN bandwidth of the competing solution across all non-SSL tests
- 2 Delivered at least twice the ratio of LAN:WAN traffic than the competing solution across all non-SSL tests
- 3 Required less than half the WAN bandwidth of the competing solution across all tests involving SSL
- 4 Delivered at least a 96% higher ratio of LAN:WAN traffic than the competing solution across all tests involving SSL

XenDesktop (HDX) Client Traffic WAN Optimization: No SSL Enabled (as reported by Apposite Linktropy WAN Emulator and Switch Port Statistics)



Notes: Server to client traffic. Remote clients running Login VSI scripts. Emulated 50Mbps WAN. 1:1 WAN:LAN traffic ration means no optimization.

Source: Tolly, April 2014

Figure 1



Tests were run across an emulated 50Mbps WAN with a pair of WAN optimization appliances at each side of the WAN.

Citrix XenDesktop clients ran continual scripts from Login VSI involving common actions within Microsoft Office, Internet Explorer and Adobe Reader applications at loads of 100, 200 and 300 simultaneous client sessions.

The entire suite of tests was run two times, first without encryption enabled between appliance pairs and then with SSL encryption enabled. A baseline test was run without any optimization appliance in place.

Tests focused on measuring how effectively the solution under test was able to reduce the load on the WAN and, simultaneously, observing how much traffic the solution was able to deliver on the destination LAN as more LAN traffic is an indication of more user work being accomplished.

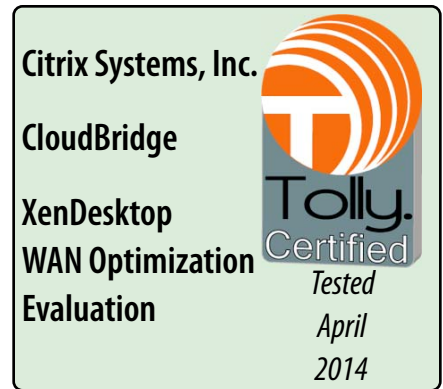
HDX WAN Optimization - Without SSL

Compared with the unoptimized baseline, the Citrix CloudBridge required dramatically less bandwidth across all three tests. At 300 clients, CloudBridge required only 27% of the baseline bandwidth and, at 100 clients a mere 16% of the what the baseline required. See Figure 1 and Table 1.

In all competitive tests, CloudBridge delivered better performance. The CloudBridge used, at most, 50% of the bandwidth required by the competition. When tests were evaluated with respect to the LAN/WAN traffic ratio, the Citrix traffic ratio was always at least twice that of the competing solution.

HDX WAN Optimization - With SSL

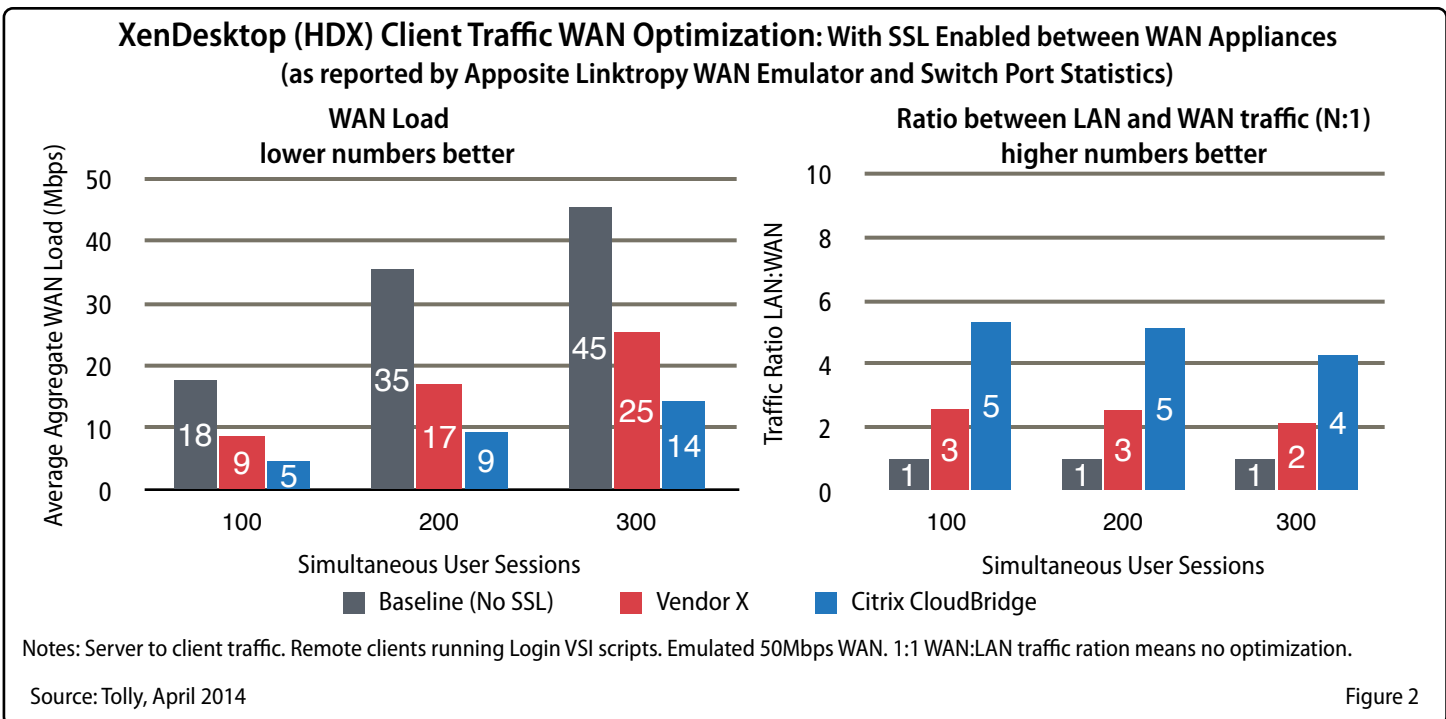
Even with the presence of the SSL overhead, Citrix CloudBridge required dramatically less bandwidth across all three tests compared with the unoptimized baseline. At 300 clients, CloudBridge



required only 31% of the unencrypted baseline bandwidth and, at 100 clients only 27% of what the unencrypted baseline required. See Figure 2 and Table 1.

In all competitive tests, CloudBridge delivered better performance. The CloudBridge used, at most, 56% of the bandwidth required by the competition.

When tests were evaluated with respect to the LAN/WAN traffic ratio, the Citrix traffic ratio was always at least a 96% higher ratio than that of the competing solution.



Detailed Test Results

XenDesktop WAN Optimization: No SSL Enabled between Optimization Appliances

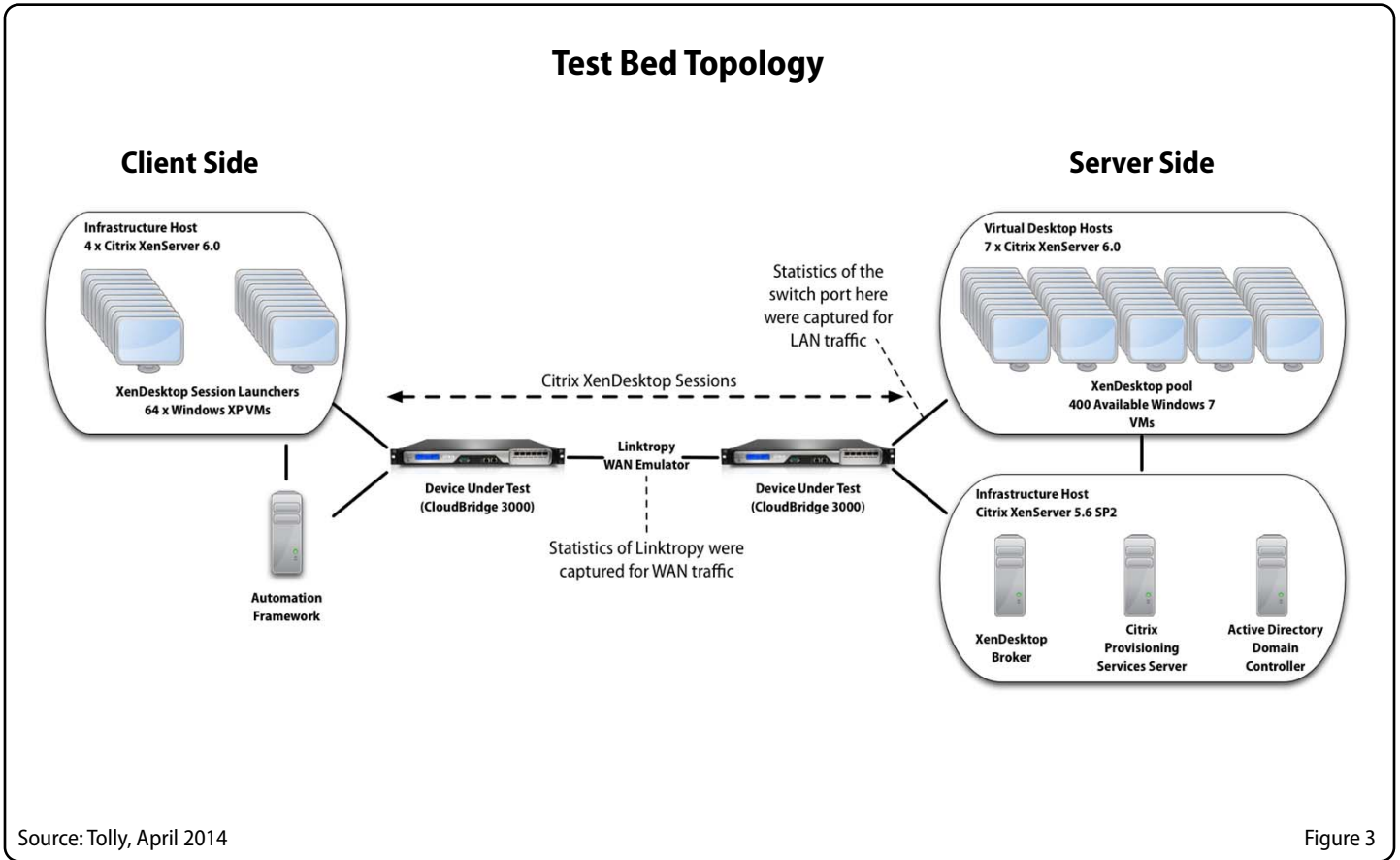
Sessions		Average Aggregate Results			
		LAN (Mbps)	WAN (Mbps)	Latency (ms)	LAN to WAN Ratio (N:1)
100	Baseline	17.5	17.6	121	1.0
	Vendor X	22	7.8	135.6	2.8
	Citrix	24.7	3.4	123.3	7.3
200	Baseline	35.2	35.4	125	1.0
	Vendor X	44	15.6	135	2.8
	Citrix	48.5	7.3	126.4	6.6
300	Baseline	45.1	45.4	162.6	1.0
	Vendor X	64	24	135.3	2.7
	Citrix	69	11.7	129.6	5.9

XenDesktop WAN Optimization: SSL Enabled between Optimization Appliances

Sessions		Average Aggregate Results			
		LAN (Mbps)	WAN (Mbps)	Latency (ms)	LAN to WAN Ratio (N:1)
100	Baseline (No SSL)	17.5	17.6	121	1.0
	Vendor X	22.1	8.6	121.3	2.6
	Citrix	24.5	4.6	124	5.3
200	Baseline (No SSL)	35.2	35.4	125	1.0
	Vendor X	43.3	16.9	121.2	2.6
	Citrix	47.8	9.3	126.4	5.1
300	Baseline (No SSL)	45.1	45.4	162.6	1.0
	Vendor X	54.3	25.3	121.6	2.1
	Citrix	60.7	14.2	139.3	4.3

Source: Tolly, April 2014

Table 1



Test Setup & Methodology


Systems Under Test

Two Citrix CloudBridge 3000-155 appliances with firmware 7.2.0.119.366603 and two Vendor X appliances outfitted with current software were tested.

Each device was tested using a pair of Gigabit Ethernet ports. (CloudBridge provides 6 GbE ports but only 2 were used for this test.)

Test Equipment Summary

The Tolly Group gratefully acknowledges the providers of test equipment/software used in this project.

Vendor	Product	Web
Apposite Technologies	Linktropy 8500 WAN Emulator	 http://www.apposite-tech.com

Server Side

On the XenDesktop server side, 7 hosts, each with 2 Intel Xeon E5620 Quad-core @2.40GHz and 96GB RAM, were used to host one XenDesktop pool with 400 available desktops. One Citrix Provisioning Services (PVS) x64 version 5.6.2 server was

used for the XenDesktop pool to stream from. Each Windows 7 Professional SP1 32-bit VM in the XenDesktop pool was configured to use 2 vCPU and 1.5GB RAM (1036MB as the RAM and 500MB as the RAM disk).



Client Side

On the XenDesktop client side, 4 hosts, each with 16 Windows XP virtual machines were used to launch the XenDesktop sessions. All traffic used the Citrix HDX protocol.

WAN Emulation

One Apposite Technologies Linktropy 8500 WAN Emulator was used between the XenDesktop client side and server side to simulate the WAN link. In all tests, 50Mbps rate, 50ms delay, 0.01% loss, 250ms queue were used for each direction.

In the baseline test, no WAN optimizer was used. In other tests, two matched WAN optimization systems were used (one on the XenDesktop client side and one on the XenDesktop server side). See Figure 3 for the test bed diagram.

One test framework developed by Citrix was used to launch the XenDesktop sessions. 4 sessions were launched per minute. When the total number of sessions reached the test number (100, 200 or 300), engineers waited 15 minutes and started capturing results for the next 30 minutes.

Each XenDesktop ran the Login VSI 2.1 Pro Workload - Medium with unlimited loops to simulate a typical user working with Adobe Reader, Microsoft Word, Powerpoint, Excel, Internet Explorer, etc.

The log of the Linktropy was downloaded after each test to analyze the average WAN throughput during the 30 minutes test duration. The switch port statistics on the XenDesktop server side was captured to analyze the LAN throughput passing to the DUT.

No SSL Test

The WAN connection between the pair of WAN optimization appliances under test did not use SSL. On the CloudBridge, Acceleration - disk and Traffic Shaping Policy - ICA Priorities were used for the Citrix ICA traffic (destination port: 1494 and 2598).

The Vendor X appliances were configured to optimize Citrix ICA traffic according to Vendor X's published best practices.

Tolly engineers verified that the XenDesktop sessions were shown as Citrix application, SDR optimized and LZ compressed on both Vendor X appliances.

SSL Test

The pair of WAN optimization appliances under test were configured as secure peers. All Citrix ICA traffic between the two DUTs used SSL. On the CloudBridge, Acceleration - disk and Traffic Shaping Policy - ICA Priorities were used for the Citrix ICA traffic (destination port: 1494 and 2598).

The Vendor X appliances were configured to optimize Citrix ICA traffic when SSL was enabled for that traffic according to Vendor X's published best practices.

Tolly engineers verified that the XenDesktop sessions were shown as Citrix application, SDR optimized, LZ compressed and WAN encrypted on both Vendor X appliances.



About Tolly

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About Citrix CloudBridge

Citrix CloudBridge provides a unified platform that connects and accelerates applications, optimizes bandwidth utilization across third-party public cloud and private networks, and offers a platform for third-party applications. As the only WAN optimization solution with integrated, secure, transparent cloud connectivity, CloudBridge allows enterprises to augment their datacenter with the infinite capacity and elastic efficiency provided by public cloud providers, while also providing the option to simplify branch office networks without sacrificing service delivery.

<https://www.citrix.com/products/cloudbridge/overview.html>

Source: Citrix, April 2014

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