

# Citrix Systems, Inc.

## Citrix Access Gateway 4.2 with Advanced Access Control



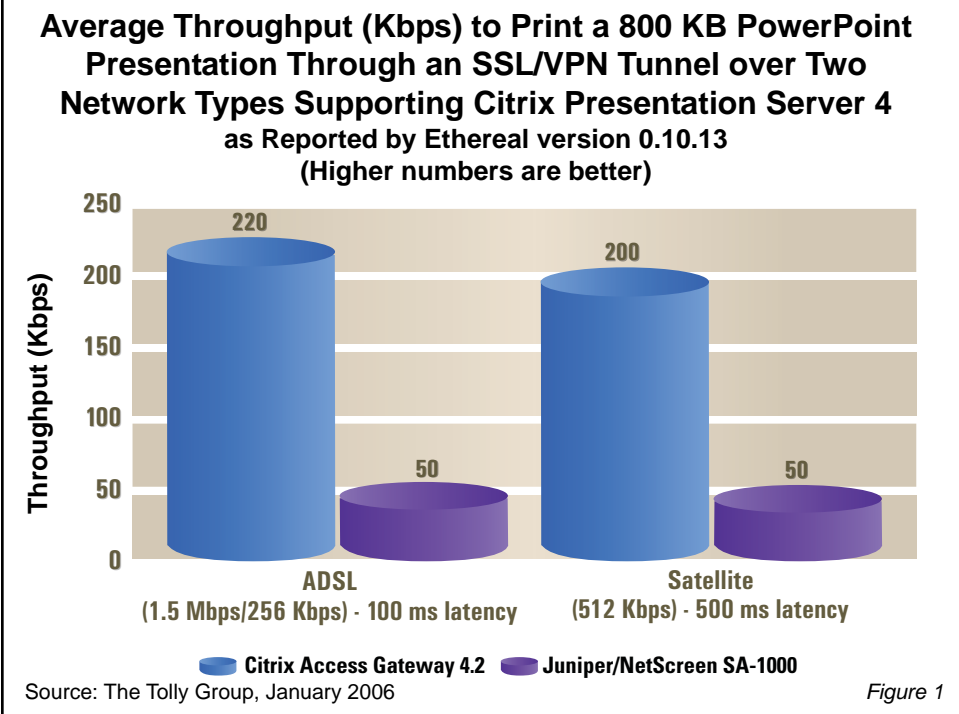
### SSL/VPN Performance Comparison versus Juniper Networks NetScreen SA-1000

*Premise: Every day businesses attempt to protect their intellectual property, proprietary information and network systems from a multitude of threats, while delicately balancing the need to provide and ensure appropriate application and resource access to customers and employees. One way to mitigate the problem is to subject all attempts to access the network to a verification and validation process, and then allow or limit access to resources as necessary.*

Citrix Systems, Inc. commissioned The Tolly Group to evaluate its Citrix Access Gateway, an SSL/VPN appliance that provides a secure, always-on, single point of access for applications and resources. The Tolly Group was asked to compare the Citrix Access Gateway (a pre-release version, which subsequently shipped as version 4.2) performance against a Juniper Networks NetScreen SA-1000, a remote access security device serving small-to-medium-sized companies.

Tolly Group engineers performed several tests to compare each SSL/VPN appliance. The performance of running common business tasks remotely over Citrix Presentation Server 4, specifically file transfer, remote printing and PowerPoint presentations, was measured by computing the elapsed time (in seconds) and bytes sent. In this test, each task was run separately per remote session and per network type. Lastly, Tolly Group engineers examined the effectiveness of endpoint security when a client is connected through the SSL/VPN appliance. All tests utilized the Ethereal Network Protocol Analyzer (version 0.10.13) to capture and analyze the traffic. Testing was performed from November 2005 through January 2006.

- ### Test Highlights
- Citrix Access Gateway provides the best performance and end-user experience with Citrix Presentation Server when compared to Juniper NetScreen SA-1000.
  - Citrix Access Gateway is significantly more efficient in utilizing the underlying bandwidth than Juniper NetScreen SA-1000, as much as 400% better when supporting print, file transfer and PowerPoint operations with Citrix Presentation Server.
  - Citrix Access Gateway completes the print, file transfer and PowerPoint operations 2X to 4X faster than the Juniper NetScreen SA-1000 when tested with Citrix Presentation Server.
  - Citrix Access Gateway Advanced Access control uses login end-point analysis to decrease the potential of user session data being compromised. When used with Citrix Presentation Server, it offers a high level of security for intellectual property containment.



Test results show that the Citrix Access Gateway 4.2 offers low latency in performing normal business tasks and applications and allows for multiple applications to run seamlessly. The Citrix Access Gateway 4.2 performs integrated endpoint scanning. It verifies the identity and validity of the user at login, then validates and controls the allowable session access. In addition, the Citrix Access Gateway 4.2 provides a unique, centrally administered endpoint security feature that limits a user's access to "user shared" files that are read-only, and ensures that .exe and .zip files are not executed. When coupled with access policies in Citrix Presentation Server 4, security and access administrators can completely ensure that no intellectual property leaves the corporate network even when accessed remotely through the Citrix Access Gateway.

**RESULTS**

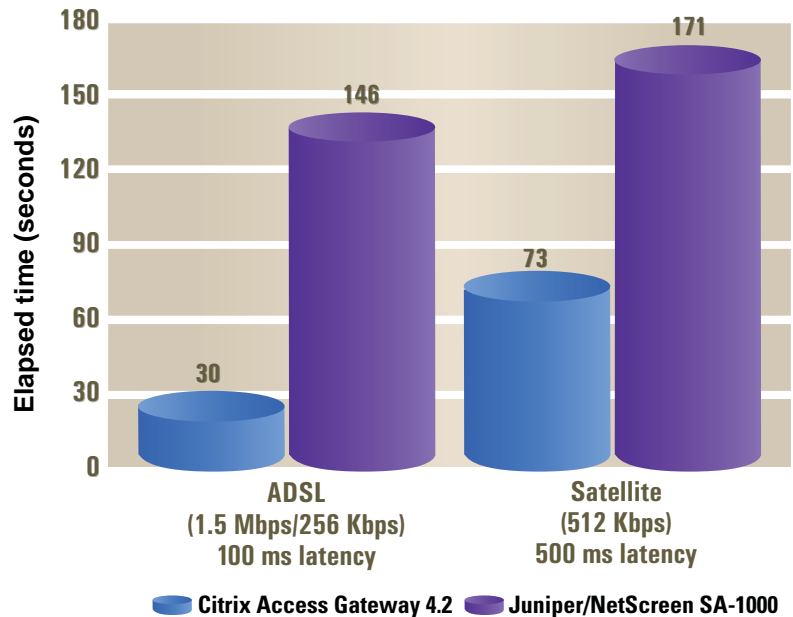
**REMOTE PRINTING**

In this test scenario, engineers printed an 800-KB PowerPoint file in a Citrix Presentation Server session across an SSL/VPN tunnel supported over simulated ADSL and satellite connections.

Tolly Group engineers found that while processing a range of 1.9 million to 2 million bytes, the Citrix Access Gateway 4.2 experienced an average throughput of 220 Kbps via ADSL and an average throughput of 200 Kbps via satellite. (See Figure 1.) The Juniper NetScreen SA-1000 experienced average throughput of 50 Kbps for each test.

When examining elapsed time in seconds, the Citrix Access Gateway 4.2 was significantly faster at an average rate of 73 seconds to complete the remote printing task via DSL and 76 seconds via satellite, versus the Juniper NetScreen SA-1000's average times of 329 seconds via DSL and 358 seconds via satellite. In effect, this shows that the Citrix Access Gateway 4.2 was able to transmit more than 4X more session data in less than a quarter of the time required by the Juniper NetScreen SA-1000.

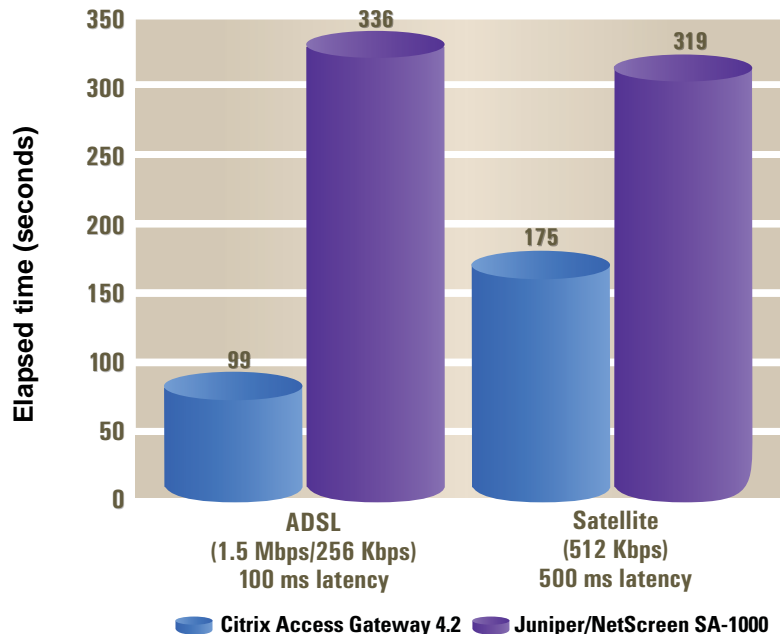
**Elapsed Time (Seconds) While Transferring a 5-MB Word Document File Through an SSL/VPN Tunnel over Two Network Types Supporting Citrix Presentation Server 4 as Reported by Ethereal version 0.10.13 (Lower numbers are better)**



Source: The Tolly Group, January 2006

Figure 2

**Elapsed Time (Seconds) to View a 300-KB PowerPoint Presentation Through an SSL/VPN Tunnel over Two Network Types Supporting Citrix Presentation Server 4 as Reported by Ethereal version 0.10.13 (Lower numbers are better)**



Source: The Tolly Group, January 2006

Figure 3

## FILE TRANSFERS

In this test scenario, Tolly Group engineers transferred a 5MB Microsoft Word file from the server to the client in a remote Citrix Presentation Server session across the SSL/VPN tunnel supported over simulated ADSL and satellite connections.

Tolly Group engineers found that while processing a range of 1 million to 1.05 million bytes, the Citrix Access Gateway 4.2 achieved average throughput of 270 Kbps via DSL and average throughput of 120 Kbps via satellite. For the same processing range, the Juniper NetScreen SA-1000 processed average throughput of 60 Kbps and 50 Kbps, respectively.

Again, the Citrix Access Gateway 4.2 achieved more than 4X the throughput of the NetScreen device, often in about one-quarter of the time. (See Figure 2.)

## POWERPOINT PRESENTATIONS

For this test, engineers ran a 300KB, eight-slide PowerPoint presentation in a Citrix Presentation Server session across the SSL/VPN tunnel over simulated ADSL and satellite connections.

Tests show that Citrix Access Gateway 4.2 achieved 140 Kbps of throughput while processing the PowerPoint in 99 seconds over the simulated ADSL. When run over the simulated satellite link, Citrix Access Gateway 4.2 achieved throughput of 70 Kbps and required 175 seconds to run the PowerPoint.

By contrast, the Juniper NetScreen SA-1000 generated just 30 Kbps of throughput and required 336 seconds to process the file over the ADSL link. For the satellite scenario, the Juniper NetScreen SA-1000 appliance generated throughput of 40 Kbps and required 319 seconds to run the PowerPoint. (See Figure 3.)

This amounts to more than 4X higher throughput for the Citrix Access Gateway 4.2, and about two-thirds less time to run the PowerPoint than the Juniper NetScreen SA-1000.

## END-USER SECURITY COMPARISON

The Juniper NetScreen SA-1000 utilizes end-point security capabilities such as session cleanup of browser history, browser cookies, temporary Internet files, downloaded files, autocompleted passwords and removal regardless of session termination clause; plus it offers explicit logoff, timeout and browser closing. All of these occur after the client either logged off the session, or the session time-out has been reached.

The Citrix Access Gateway 4.2 takes a different but equally effective approach to security. The appliance evaluates a client device as it attempts to log in. The client PC is scanned for attributes such as user status (admin or non-admin), browser version, operating system versions, and antivirus/security version installed.

Depending upon the profile of the client device, Citrix Access Gateway 4.2 not only grants controlled access based upon corporate security policies for the client type assessed, but also grants varying levels of user-allowed actions with regards to the data accessed, such as whether or not a file can be downloaded or must only be viewed within a server based session, or perhaps whether the data can be printed or not. In this way, users who are granted access are allowed to view documents and other info, without the files or data being downloaded onto the client device.

Moreover, administrators have the option to control the Citrix Presentation Server 4 session properties at a very granular level (control access to client PC hard drive, client printers, etc.) to restrict usage of documents and other data to "view only" mode.

**Citrix Systems, Inc.**

**Citrix Access Gateway 4.2**

**SSL VPN Performance**



### Citrix Systems, Inc. Citrix Access Gateway 4.2 Product Specifications\*

#### Access Gateway Client

- Automatic download and update
- Hides internal IP addresses from routing table (prevents worm traversal)
- Split-tunneling control
- Integrated end-point scanning
- Automatic reconnection and session reliability
- Deploys with or without PC admin rights

#### Authentication

- Username/password
- Microsoft Active Directory
- Client-side digital certificates
- RSA SecurID® tokens
- Secure Computing SafeWord® tokens
- LDAP
- RADIUS

#### Encryption

- Session length: 128 bit, 168 bit
- Ciphers: RC4, 3DES
- Hash: MD5, SHA1

#### Redundancy

- Supports up to four configured failover gateways
- Support for industry-standard external load balancers

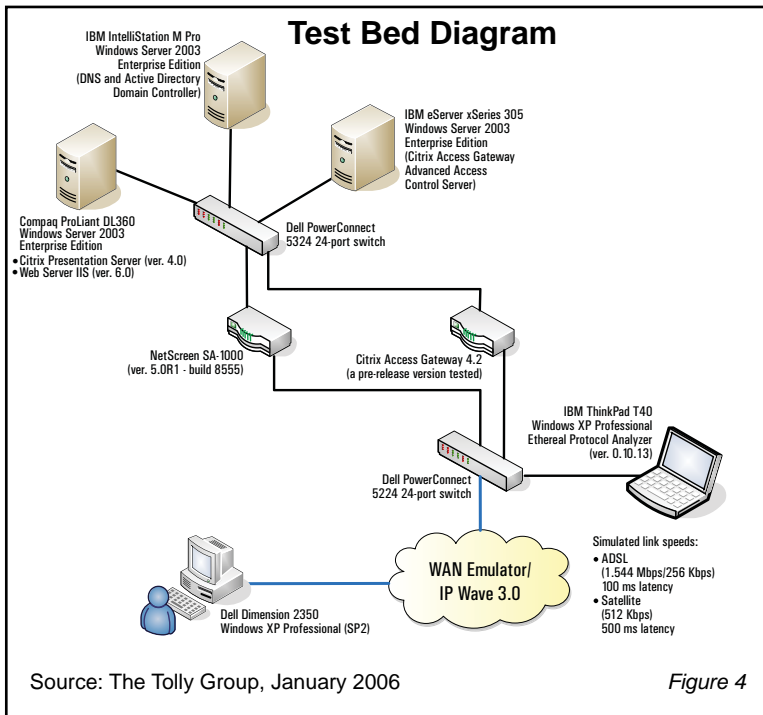
#### Management and Reporting

- Logging to remote SYSLOG server
- SNMP integration
- Workstation based Administration Tool
- Centrally manage multiple appliances
- Citrix Access Suite management console integration

#### For more information contact:

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*\*Vendor-supplied information not verified by The Tolly Group*



**EQUIPMENT ACQUISITION AND SUPPORT**

Tolly Group engineers tested Citrix Access Gateway (a pre-release version that shipped as Version 4.2). The Citrix Access Gateway 4.2 and Juniper Networks NetScreen-SA 1000 (version 5.0R1) were provided by the project sponsor. Tolly Group engineers noted that the Juniper appliance has been on the market for some time and is readily available for purchase. Both appliances were configured for SSL/VPN with encryption algorithm settings for the Citrix appliance supporting RSA, RC4, 128-bit, MD5 and the Juniper appliance supporting AES/SHA1 (128-bit). While the Citrix protocol settings were SSLv3, the Juniper protocol settings were ESP (Encapsulating Security Payload).

The Tolly Group verified product release levels and shared test configurations with the vendors in order to give them an opportunity to optimize their devices for the tests. Juniper elected not to respond to Tolly Group’s invitation to participate in the test.

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

Vendor	Product	Web address
Ethereal	Network Protocol Analyzer (ver. 0.10.13)	<a href="http://www.ethereal.com">http://www.ethereal.com</a>

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**USE THIS DOCUMENT ONLY IF YOU AGREE TO THE TERMS LISTED HEREIN.**

This document is provided, free-of-charge, to help you understand whether a given product, technology or service merits additional investigation for your particular needs. Any decision to purchase must be based on your own assessment of suitability.

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The test/audit documented herein may also rely on various test tools the accuracy of which is beyond our control. Furthermore, the document relies on certain representations by the sponsor that are beyond our control to verify. Among these is that the software/hardware tested is production or production track and is, or will be, available in equivalent or better form to commercial customers.

The Tolly Group provides a fee-based service to assist users in understanding the applicability of a given test scenario to their specific needs. Contact us for information.

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**PROJECT PROFILE**

**Sponsor:** Citrix Systems, Inc.

**Document number:** 206123

**Product class:** SSL/VPN gateway

**Products under test:**

- Citrix Access Gateway Version (a pre-release version that shipped as Version 4.2) with Advanced Access Control
- Juniper Networks NetScreen-SA 1000

**Software status:** Generally available.

**Testing window:** November 2005 – January 2006

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