Unified Threat Management Throughput Performance

Desktop Device Comparison

DR150818C

October 2015

Miercom
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Contents

Executive Summary

Miercom was engaged by Sophos to conduct independent performance testing of the Sophos *SG135w* unified threat management (UTM) desktop firewall device as a network security solution. The SG135w was compared to desktop devices, showing that this UTM can be a viable alternative to the larger desktop devices. Testing, which employed industry-leading performance testing equipment, was conducted in July 2015.

Throughput performance measurements were recorded on the firewall only and then subsequently with various traffic loads applied. Firewall throughput without any other functions enabled is referred to as the baseline in this report. Tests were then performed with another function (e.g. intrusion prevention system), enabled on the firewall. Finally, the full UTM mode, all the functions were combined and run. These results were compared to competing vendors and the baseline firewall rate. All results shown in this report are based on actual observations in our laboratory.

Key Findings

- Baseline firewall throughput was the highest at 5400 Mbps, 56% better than the vendor average
- Displayed the best throughput for firewall and with the following loads enabled, intrusion prevention system, application control HTTP Proxy/Antivirus, and HTTPS
- Highest UTM throughput of 540 Mbps, more than 40% above the vendor average

The Sophos SG135w performed better than the vendor average, and its UTM traffic handling capability was among the highest on the market, proving the desktop device has comparable capabilities to other desktop devices.

Based on the results of our testing, we proudly award the Miercom Performance Verified Certification to the Sophos SG135w.

Robert Smithers
CEO
Miercom

Introduction

Unified Threat Management

Unified Threat Management (UTM) devices are a class of network edge security platforms that address multiple security functions in a single chassis.

The baseline is throughput of the firewall without any other features enabled. Each feature described below was enabled and tested with the firewall to demonstrate its effect on the firewall performance. The unified security configuration which included firewall, IPS, application control, and antivirus features were applied as the final test of the throughput performance.

Some of the features typically found in a UTM device are described below.

Feature	Acronym	Description
Firewall	FW	*Controls and filters flow of traffic within a network with a barrier to protect trusted internal network from an unsecure network (e.g. Internet)*
Intrusion Prevention System	IPS	*Monitors network and system activity for malicious behavior based on signatures, statistical anomalies, or stateful protocol analysis. If malicious packets are detected, they are identified, logged, reported, and attempted to be blocked access to the network.*
Application Control	AppCtrl	*Enforces policies regarding security and resources by restricting/controling which applications can traverse through the UTM. It intends to reduce occurrences of infection, attacks, and negative consequences of malicious content.*
Hypertext Transfer Protocol Proxy/Antivirus	HTTP Proxy/AV	*A client issues a request which is sent to the proxy to buffer the file in memory. The file is then sent to an antivirus engine to for viruses, removing packets which contain malicious content. Proxy-based scanning is a more secure and accurate method, in comparison to a stream-based antivirus inspecting traffic between the client and server. Proxy/AV performs scanning during the handshake of data transfer.*
Hypertext Transfer Protocol Secure	HTTPS	*Responds to incoming encrypted connection requests on the secure socket layer (SSL) while actively blocking other packets containing malicious content. This differs from HTTP requests in that the encryption/decryption process places a load on the device and directly affects its throughput rate.*
Unified Threat Management	UTM	*All-inclusive security with multiple functions in central unit. Contains firewalling, IPS, AV, VPN, content filtering, and sensitive data loss prevention.*

UTM devices contain the same functionality as Next-Generation Firewall and Secure Web Gateway devices, performing multiple security features in one system. UTM products are designed for small and mid-sized businesses. When considering a UTM device, a balance

between network performance and security must be considered. Adding security will slow throughput performance.

UTM's were tested in order to show what effect the implementation of additional security features had on the throughput.

Comparing the baseline rate with the throughput when features were added provided metrics showing the decreased throughput as additional processes were enabled. These tests were run on the desktop models and compared.

Throughput performance is one metric needed when implementing network security. Performance degradation needs to be minimal in enterprise networks.

Products Tested

Name	Version
Sophos SG135w	9.313-3
CheckPoint 2200	R77.20
Dell SonicWall TZ600	SonicOS Enhanced 6.2.3.0-15n
Fortinet FortiGate 90D	v5.2.3, build670
WatchGuard XTM 330	11.9.1.B451786

Sophos

The *Sophos SG 135w* is for small enterprises looking for flexible, high-speed devices that provide firewall, VPN, IPS and AV-proxy for their network. It features multicore processors providing ample processing power for the security features enabled. The SG135w can have up to 10 clustered units and be managed through the Sophos UTM Manager (SUM). This UTM allows protection to be added as needed, through software upgrades, without additional hardware.

Check Point

The *Check Point 2200* is a consolidated solution for small businesses and branch offices that provides networks with attack detection and prevention. Its layered defense uses ThreatCloud sandboxing, generates signatures for current malicious behavior, and blocks suspicious activity from entering a network. The ThreatCloud shares these signatures with all Check Point customers, creating global protection.

Dell

The *Dell SonicWall TZ600* is intended for distributed enterprises and remote offices, managed by a central office. It consists of firewall, VPN, IPS, and application control using proprietary deep packet inspection and policy-based filtering over both secure and unsecure connections.

Fortinet

The *Fortinet FortiGate 90D* protects distributed network locations with its core management system consisting of its proprietary software for firewall, IPS, VPN, and filtering control over network traffic.

WatchGuard

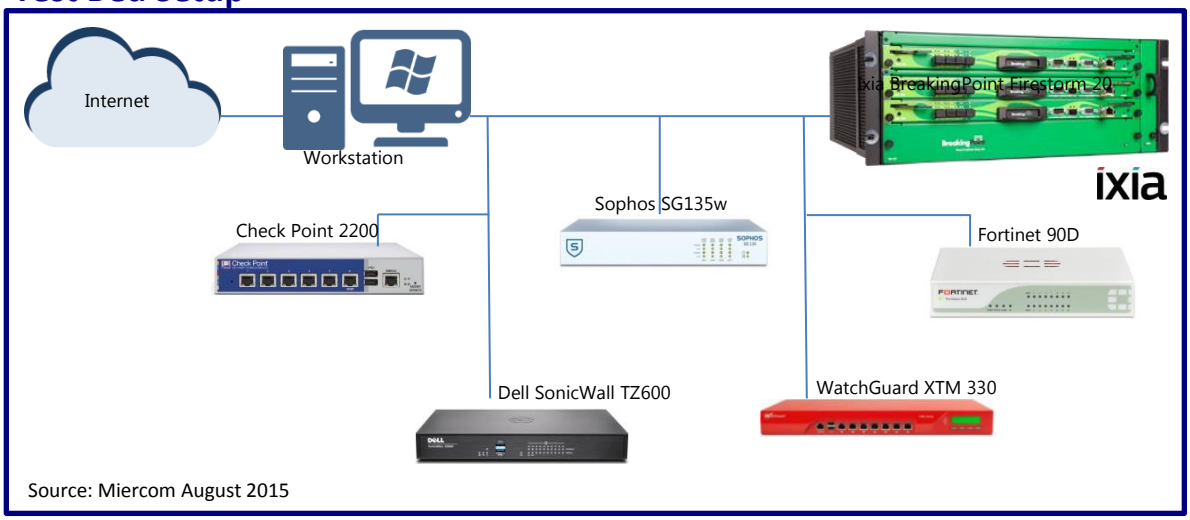
The *WatchGuard XTM 330* is geared towards small businesses looking for flexible management of network activity. Features supported are firewall, VPN, IPS and reputation-based antivirus. Routing is policy based, and reporting is simple. Power consumption is built with environmentally friendly efficiency.

How We Did It

The impact of security on network performance is a key component of this test methodology. Miercom used an industry leading test tool to provide a robust and realistic testing environment. Appliances under test were configured for optimal functionality to enable maximum throughput, while the security features were deployed.

Testing focused on the loading effect that additional security functions place on the performance of the network.

Test Bed Setup



Source: Miercom August 2015

The *Ixia BreakingPoint FireStorm 20* generated traffic for each device under test. This product creates real-world traffic to simulate high-stress network conditions where security devices may be evaluated for their performance under loads of greater application inspection functionality than basic firewalls.

FireStorm 20 functionality includes:

- Application control that can stress and overload Deep Packet Inspection (DPI) devices
- Client-side SSL bulk encryption – performed at up to 25 Gbps without a cipher
- The ability to measure network latency down to a 10-nanosecond granularity

The FireStorm20 allows organizations to:

- Reduce time-to-test to minimize costs and accelerate development of next-generation
- network, security and data center devices
- Cost-effectively perform complex, real-world simulations in order to evaluate, test and
- optimize application-aware devices
- Train and certify IT personnel to predict and prevent cyber-attacks

Traffic Generation

The *Ixia BreakingPoint Firestorm 20* generated traffic for each device under test. The traffic represented a real-world network scenario of client to server connections using high-density ports supporting stateful traffic. BreakingPoint can simulate over 200 applications and more than 35,000 live security attacks. The Firestorm performs complex simulations to test throughput of network security appliances.

Traffic was sent with these protocols for the following tests:

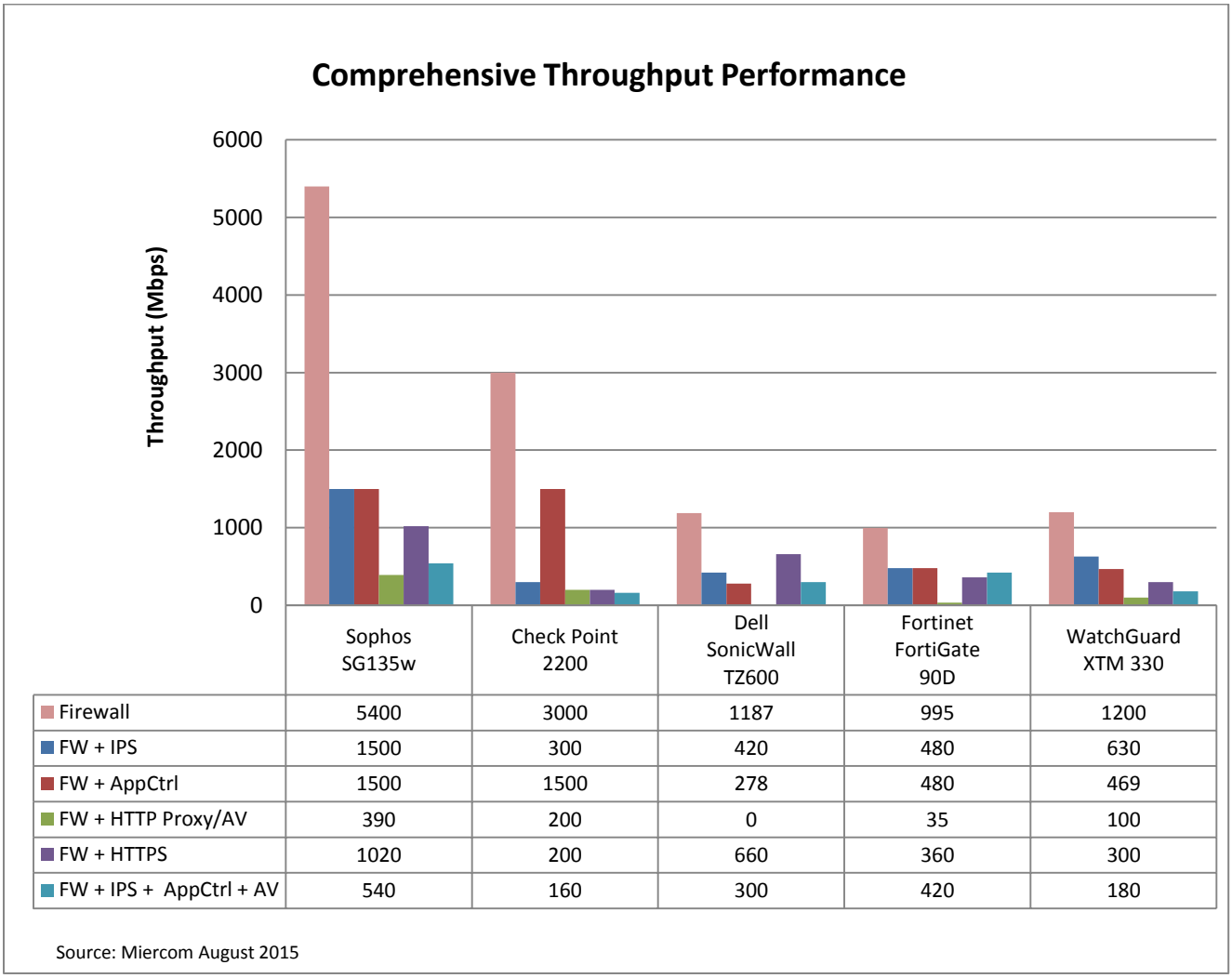
- 1518 byte bidirectional user datagram protocol (UDP): Firewall, IPS, AppCtrl, UTM
- 512 byte bidirectional transmission control protocol (TCP): HTTP Proxy/AV, HTTPS

Throughput Tests

Description

The throughput test measured the maximum rate of traffic handled in megabits per second (mps). A test was performed using the firewall only for a baseline measurement. After features were added, tests were conducted to determine what effect they had on performance. The final test represented all features enabled to record UTM mode performance.

Results



	Sophos SG135w	Check Point 2200	Dell SonicWall TZ600	Fortinet FortiGate 90D	WatchGuard XTM 330
Firewall	5400	3000	1187	995	1200
FW + IPS	1500	300	420	480	630
FW + AppCtrl	1500	1500	278	480	469
FW + HTTP Proxy/AV	390	200	0	35	100
FW + HTTPS	1020	200	660	360	300
FW + IPS + AppCtrl + AV	540	160	300	420	180

Source: Miercom August 2015

The Sophos SG135w had the best UTM performance with IPS, AppCtrl and AV enabled at 360 Mbps, and best performance for the following functions: firewall; firewall and IPS; firewall and application control; firewall and HTTP Proxy/AV; and firewall and HTTPS.

Firewall

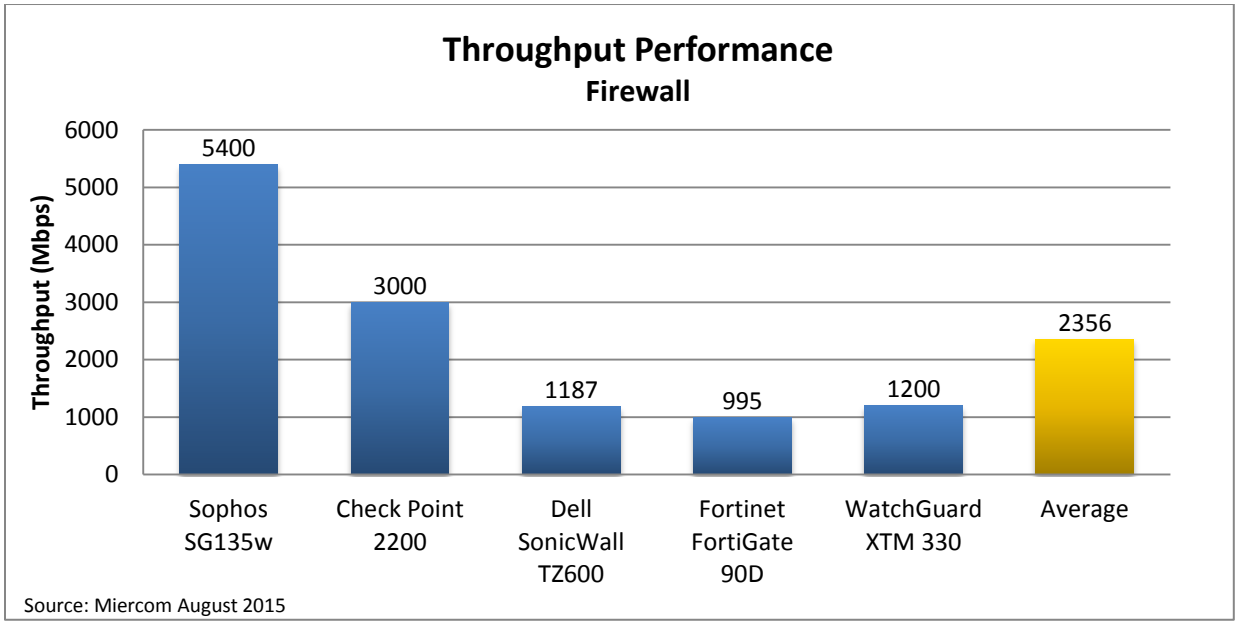
Description

A Firewall is a basic form of protection for a network from external threats. The rates observed in this testing are considered a baseline measurement.

Results

The firewall, the basic mechanism of a UTM device, has higher throughput without security features enabled, since less processing resources are being used.

Firewall Throughput (Mbps)				
Sophos SG135w	Check Point 2200	Dell SonicWall TZ600	Fortinet FortiGate 90D	Watch Guard XTM 330
5,400	3,000	1,187	995	1,200



The Sophos SG135w set its baseline throughput with firewall enabled at 5400 Mbps, more than double the vendor average. Having such a large baseline rate is beneficial since as more features are enabled with the firewall and will predictably reduce throughput, Sophos should continue to maintain a higher rate than the average.

Firewall and Intrusion Prevention System

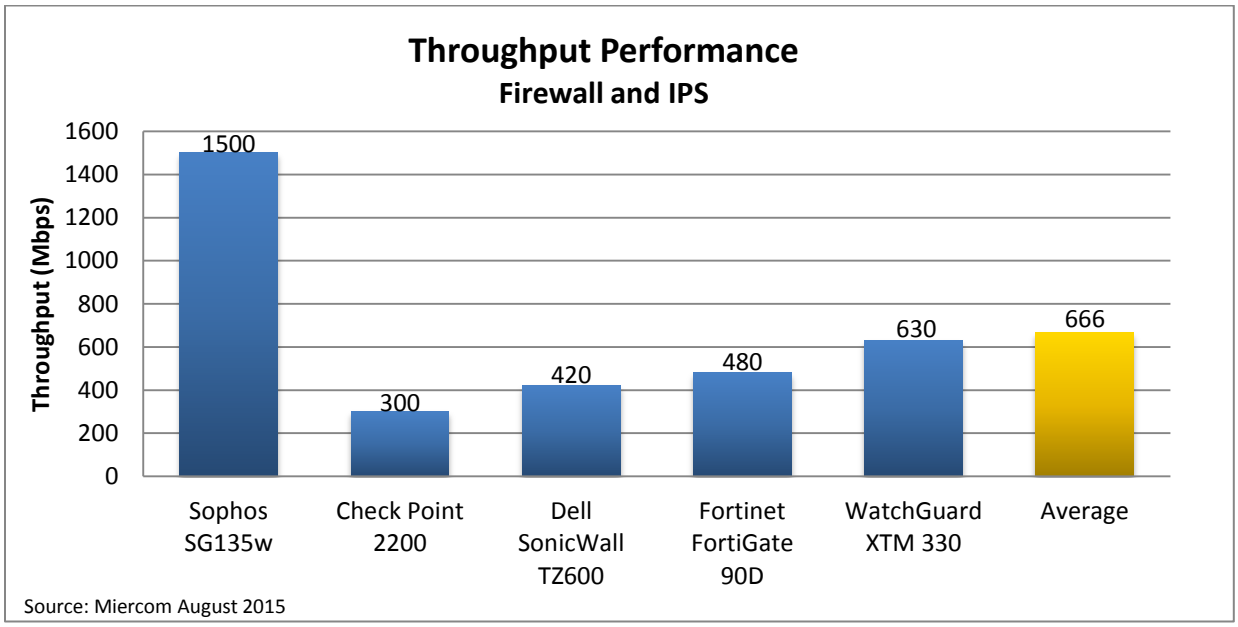
Description

IPS monitors, detects, and blocks threats. Placed in-line, the IPS works to analyze protocol activity using either signature-based, statistical anomaly-based or stateful protocol analysis-based methods for isolating threats from the network. The method chosen for inspection has an effect on processing time and throughput speed.

Results

An IPS method is a refining process that requires additional CPU usage and can affect network performance. It is expected to cause a decrease in throughput.

Firewall and IPS Throughput (Mbps)				
Sophos SG135w	Check Point 2200	Dell SonicWall TZ600	Fortinet FortiGate 90D	Watch Guard XTM 330
1,500	300	420	480	630



The Sophos SG135w saw a decrease of 72.2% from its baseline, yet it continued to achieve the highest throughput against each of its competitors. As predicted, its throughput was higher than the average, by 55.6%, at a rate of 1500 Mbps.

Firewall and Application Control

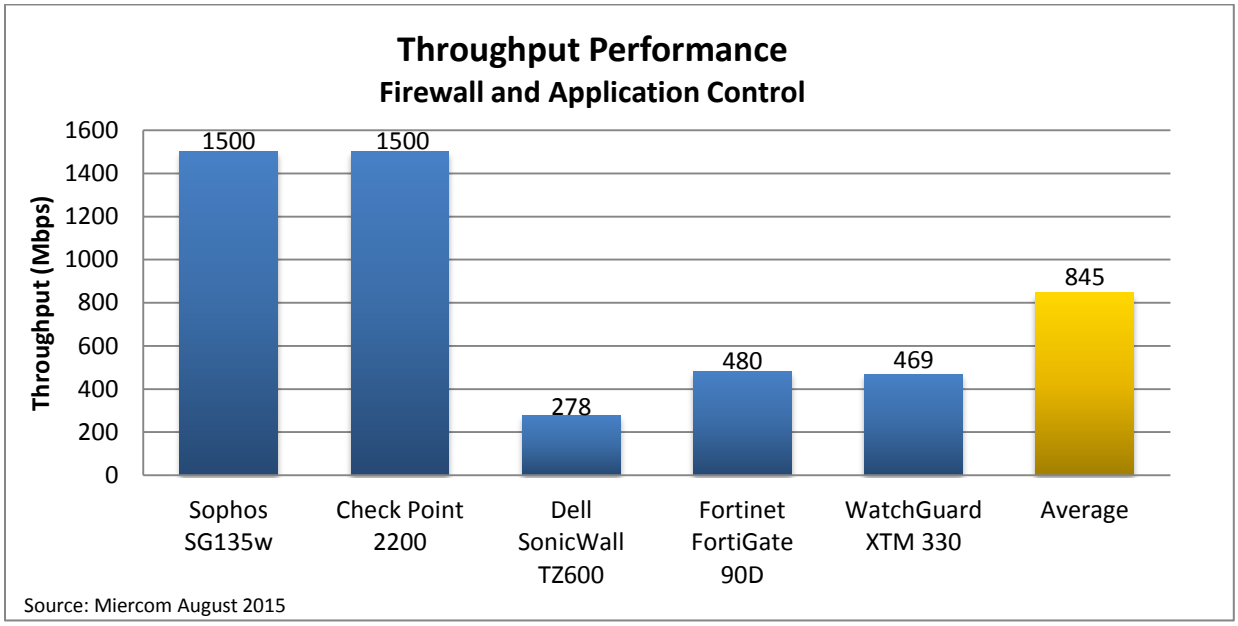
Description

Application control provides regulations and policies to reduce malicious activity. Businesses need to achieve this security measure without degrading network speed. The filtering process places a load on traffic throughput which will cause a decrease.

Results

Application control is expected to slow the throughput rate.

Firewall and Application Control Throughput (Mbps)				
Sophos SG135w	Check Point 2200	Dell SonicWall TZ600	Fortinet FortiGate 90D	Watch Guard XTM 330
1,500	1,500	278	480	469



The Sophos SG135w decreased by its baseline by 72.2% with the Application Control feature enabled. It continued to see a higher rate than the vendor average, as predicted, by over 43%.

Firewall and HTTP Proxy/Antivirus

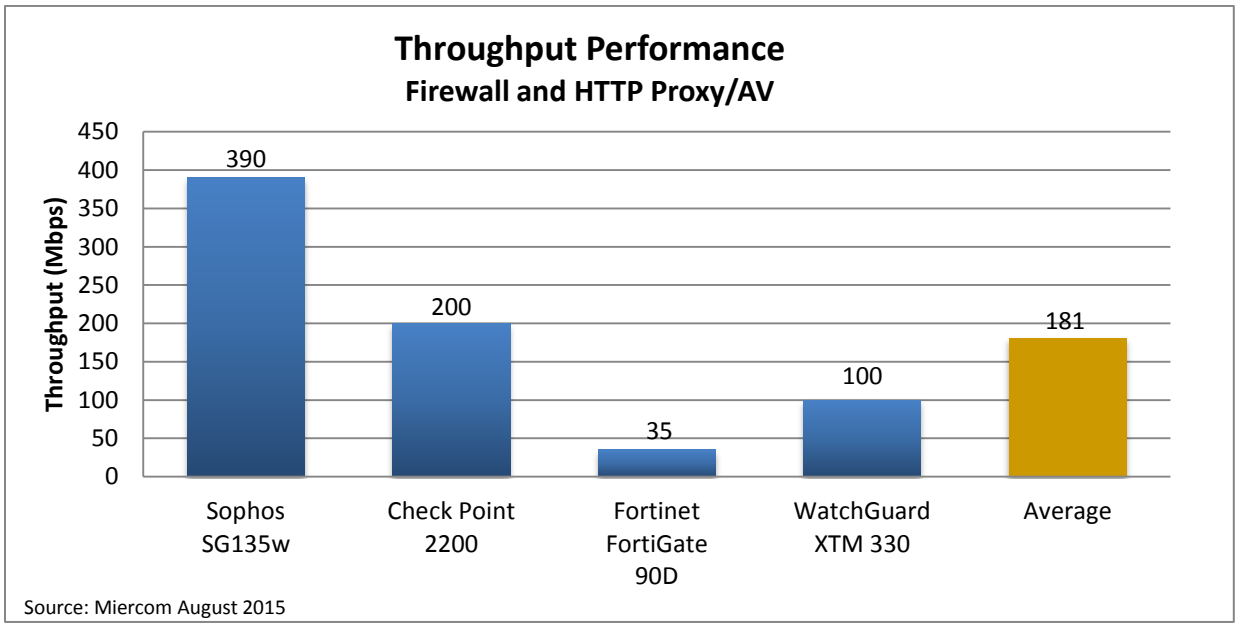
Description

HTTP Proxy/AV adds an extra defense layer against malware attacks via file downloads from websites or file sharing. The proxy buffers the file in memory and scans it from beginning to end with an antivirus engine. This scanning process is done between the handshake of proxy to server, as opposed to a stream-based antivirus scan which examines packets passing through between client and server.

Results

The protocol-based defense will scan and block threats, but this defense layer will significantly reduce throughput.

Firewall and HTTP Proxy/AV Throughput (Mbps)				
Sophos SG135w	Check Point 2200	Dell SonicWall TZ600	Fortinet FortiGate 90D	Watch Guard XTM 330
390	200	Not Supported	35	100



The Sophos SG135w saw an expected decrease from its baseline, but it continued to have a higher throughput than each competitor. At 390 Mbps, it had over 53% more throughput than the average vendor. The Dell SonicWall TZ600 did not support this function and was not tested.

Firewall and HTTPS

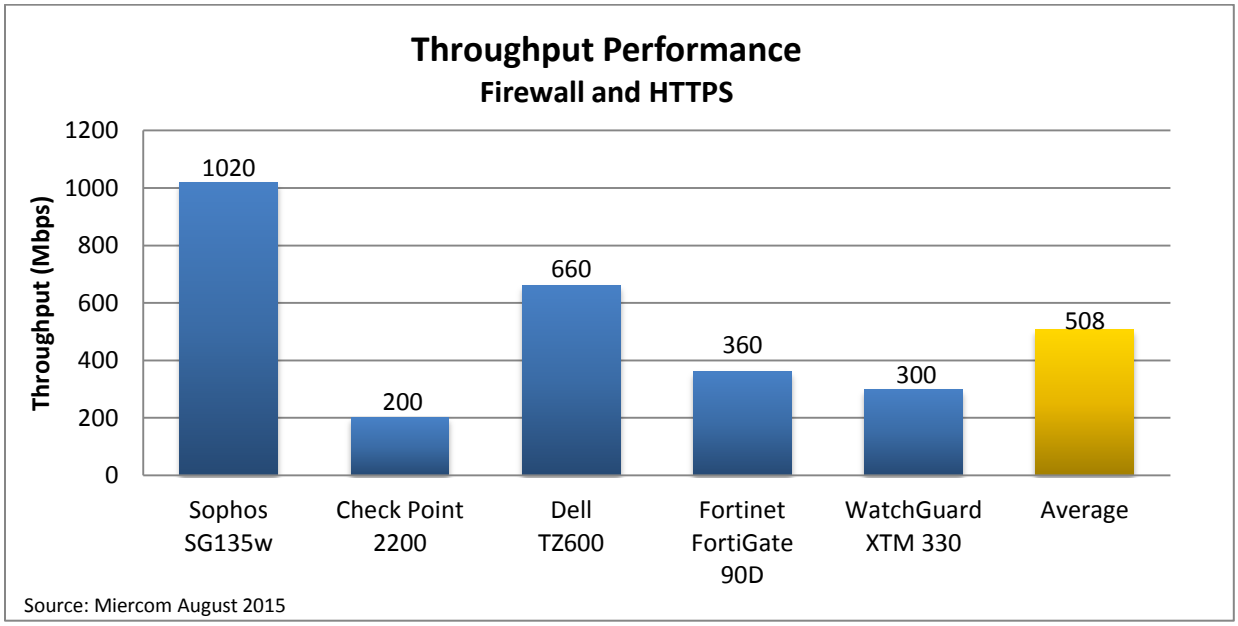
Description

HTTPS is a secured protocol for communications that eliminates vulnerabilities during data transfer. Businesses require all communications to be authentic, untampered and secure, and HTTPS provides a procedure for classifying traffic. However, this protocol requires processing which reduces network speed.

Results

HTTPS requires bidirectional encryption that slows down the processing speed of a network. Throughput is expected to be significantly reduced for this feature.

Firewall and HTTPS Throughput (Mbps)				
Sophos SG135w	Check Point 2200	Dell SonicWall TZ600	Fortinet FortiGate 90D	Watch Guard XTM 330
1,020	200	660	360	300



The Sophos SG135w had more than double the average vendor throughput rate. Its rate of 1020 Mbps was 81% from its baseline, but higher than other vendors by at least 360 Mbps. Its high rate for secured traffic is significant considering the associated process of encryption is a load that affects network performance.

Unified Threat Management

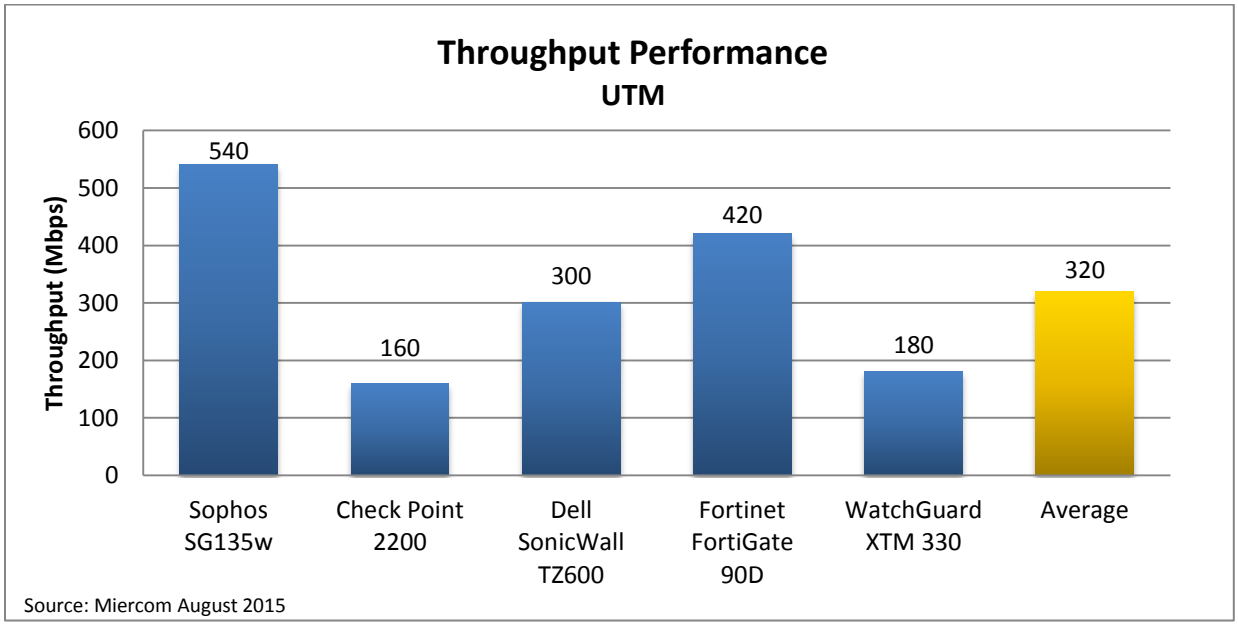
Description

In the UTM mode, all of these features were enabled and running: Firewall, IPS, Application Control, and Antivirus. With all functionality enabled, the increased processing required will cause a significant decrease in throughput performance.

Results

A UTM combines security features' functionalities, which each place a load on network performance, and can be expected to have the lowest throughput performance. Testing was conducted with UDP traffic only to maximize throughput performance rate.

UTM Throughput (Mbps)				
Sophos SG135w	Check Point 2200	Dell SonicWall TZ600	Fortinet FortiGate 90D	Watch Guard XTM 330
540	160	300	420	180



The Sophos SG135w showed the highest throughput and was 40% more than the vendor average, although 10% of its baseline rate. This performance is significant because it incorporates four features in addition to firewall where throughput is expected to be very low, and Sophos maintains a respectable rate which is considerably higher than its competitors.

Conclusion

The throughput performance of UTM products either as standalone devices or with additional features enabled was measured and discussed in this report. Sophos validated its performance when compared to other vendors in this security industry.

The scope of testing included a series of six throughput tests of the following features: firewall, firewall with IPS, firewall with application control, firewall with HTTP proxy/antivirus, firewall with HTTPS, and UTM. These tests were performed on one desktop device from Sophos and four desktop devices from four vendors: Check Point, Dell, Fortinet, and WatchGuard. In some instances, the tests could not be performed due to known lack of support for that feature set. These are noted on the appropriate test section with an explanation.

It is clear to see that deploying additional features does affect the throughput in all cases, as is expected. It is interesting to see which additional security features causes the most impact. Security comes at a price, not just in dollars, but in the ability of the network to handle traffic while maintaining security.

Overall, the performance of the Sophos SG135w desktop device was better than most desktop products. Additionally, Sophos has a quick and simple set up. Configuration was very straightforward, and the graphical user interface (GUI) was clean and easy to navigate with a minor learning curve. A unique feature was interface cloning, making last minute changes and customization much more simple and intuitive to deploy.

The Sophos SG135w meets the security needs of a network, while maintaining the performance required in a networking environment.

Fair Test Notification

All vendors with products featured in this report were afforded the opportunity before, during, and after testing was complete to comment on the results and demonstrate the performance of their product(s). Any vendor with a product tested by Miercom in one of our published studies that disagrees with our findings is extended an opportunity to retest and demonstrate the performance of the product(s) at no charge to the vendor. All vendors are welcome to demonstrate their product performance on their own to Miercom. These results will be updated if new data presents itself.

In this evaluation Miercom testing used HTTP, 1518 byte bidirectional UDP traffic, while WatchGuard in their own test bed used multiple HTTP GET requests for a 1 MB file, which allowed them to demonstrate better performance. However, Miercom used the same configuration for all vendors tested.

About Miercom

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