WEB APPLICATION FIREWALL COMPARATIVE ANALYSIS

Total Cost of Ownership (TCO)

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Tested Products

Barracuda Networks Web Application Firewall 960

Citrix NetScaler AppFirewall MPX 11520

Fortinet FortiWeb 1000D

F5 Big-IP ASM 10200

Imperva SecureSphere x6500

Sangfor M5900-F-I

Environment

Web Application Firewall: Test Methodology v6.2

Overview

The implementation of web application firewall (WAF) solutions can be a complex process, with multiple factors affecting the overall cost of deployment, maintenance, and upkeep. Enterprises should include total cost of ownership (TCO) as part of their evaluations, focusing on the following at a minimum:

- Acquisition costs for WAF devices and central management system (CMS)
- Fees paid to the vendor for annual maintenance, support, and signature updates
- Labor costs for installation, maintenance, and upkeep

No two network security products deliver the same *security effectiveness* or throughput (capacity), making precise comparisons extremely difficult. In order to capture the relative value of devices on the market and facilitate such comparisons, NSS Labs has developed a unique metric to enable value-based comparisons: *TCO per protected connection per second (CPS).* See Figure 1 for details.

Within a given performance range (*NSS-tested capacity*), clear guidance is provided as to whether a product is priced above or below the majority of its competitors. A high price could indicate a premium based upon *security effectiveness*, brand recognition, level of customer service, or a price penalty for an underperforming product.

> **Security Effectiveness =** *Block Rate[1] x Evasions x Stability and Reliability*
>
> **TCO per Protected-CPS** = *TCO/(Security Effectiveness x NSS-Tested Capacity)*

Figure 1 – Security Effectiveness Formula

Product	NSS-Tested Capacity (CPS)	Purchase Price	Security Effectiveness	3-Year TCO	TCO per Protected-CPS
Barracuda Networks Web Application Firewall 960	12,640	$143,995	99.97%	$246,866	$4.88
Citrix NetScaler AppFirewall MPX 11520	46,282	$240,000	99.77%	$356,448	$1.93
Fortinet FortiWeb 1000D	15,865	$87,973	99.85%	$175,532	$2.77
F5 Big-IP ASM 10200	36,130	$349,975	99.89%	$488,080	$3.38
Imperva SecureSphere x6500	13,385	$492,000	99.82%	$847,200	$15.85
Sangfor M5900-F-I	76,616	$343,782	96.11%	$610,725	$2.07

Figure 2 – TCO per Protected-CPS

For the purpose of this analysis, NSS developed an enterprise use case with one (1) CMS and four (4) devices deployed across multiple remote locations.

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[1] Block rate is defined as the number of attacks blocked under test.

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Labor and Equipment Costs

WAF solutions are complex products. With the shortage of skilled and experienced practitioners, enterprises should consider the time and resources required to properly install, maintain, and tune the solution. Failure to do so could result in products not achieving their full security potential.

Figure 3 depicts the labor required to unbox the device, configure it, install it into the network, apply updates and patches, perform initial tuning, and configure desired logging and reporting.

Labor for Device Setup

Costs are based upon the time that would be required by an experienced security engineer to perform the tasks listed above (assuming US $75 per hour for the purposes of these calculations). Readers should substitute their own costs to obtain accurate TCO figures by using the Security Value Map™ (*SVM Toolkit™),* available to clients.

Product	Installation (Hours)
Barracuda Networks Web Application Firewall 960	8
Citrix NetScaler AppFirewall MPX 11520	8
Fortinet FortiWeb 1000D	8
F5 Big-IP ASM 10200	8
Imperva SecureSphere x6500	8
Sangfor M5900-F-I	8

Figure 3 – Labor per WAF Device

Labor for Central Management

Enterprises should include labor costs for day-to-day management tasks (operational expenses, or opex costs) when evaluating WAF solutions. These costs would include day-to-day management tasks, including administration, policy and configuration handling, log handling, alert handling, monitoring, reporting, analysis, auditing and compliance, maintenance, software updates, and troubleshooting.

NSS does not include opex costs in this analysis. NSS clients can model these costs using the *SVM Toolkit* or can schedule an inquiry call with NSS analysts for more details.

Equipment and Software Costs

All capex costs are based on list prices as provided to NSS researchers by the product vendors at the time of the test. Actual costs to end-users may be lower depending on the negotiated discount. However, it is fair to assume that all vendors will provide a similar percentage discount resulting in relatively constant cost ratio. Costs are depicted in Figure 4.

Product	Initial Purchase Price per Device (Hardware as Tested)	Initial Purchase Price (CMS)	Annual Cost Of Maintenance and Support (Hardware/Software)	Annual Cost Of Maintenance and Support (CMS)
Barracuda Networks Web Application Firewall 960	$34,994	$3,999	$1,365	$34,994
Citrix NetScaler AppFirewall MPX 11520	$60,000	$0	$0	$60,000
Fortinet FortiWeb 1000D	$19,995	$7,993	$393	$19,995
F5 Big-IP ASM 10200	$84,995	$9,995	$2,399	$84,995
Imperva SecureSphere x6500	$120,000	$12,000	$2,400	$120,000
Sangfor M5900-F-I	$84,064	$7,526	$753	$84,064

Figure 4 – Equipment and Software Costs

NSS clients can use the *SVM Toolkit* to model actual negotiated prices, labor costs, and upkeep times.

TCO

TCO incorporates capex costs over a 3-year period, including initial acquisition and deployment costs, and annual maintenance and update costs (software and hardware updates). Calculations are as follows:

Value	Description of Calculation
Year One Cost	Initial Purchase Price + Maintenance Cost + (Installation x Labor rate $/hr)
Year Two Cost	Maintenance Cost
Year Three Cost	Maintenance Cost
Three-Year TCO	Year One Cost + Year Two Cost + Year Three Cost

Calculations are based on a labor rate of US $75 per hour and vendor-provided pricing information. Where possible, the 24/7 maintenance and support option with 24-hour replacement is utilized, since this is the option typically selected by enterprise customers. Pricing includes one (1) enterprise-class CMS to manage up to four (4) devices.

Product	Purchase Price	Maintenance per Year	Year 1 Product Cost	Year 1 Labor Cost	1-Year TCO
Barracuda Networks Web Application Firewall 960	$143,975	$37,592	$2,400	$179,872	$143,975
Citrix NetScaler AppFirewall MPX 11520	$240,000	$38,016	$2,400	$280,416	$240,000
Fortinet FortiWeb 1000D	$87,973	$29,565	$2,400	$118,759	$87,973
F5 Big-IP ASM 10200	$349,975	$52,432	$2,400	$397,610	$349,975
Imperva SecureSphere x6500	$492,000	$124,800	$2,400	$612,000	$492,000
Sangfor M5900-F-I	$343,782	$90,440	$2,400	$434,363	$343,782

Figure 5 – Year 1 TCO

Note that opex costs are excluded from TCO calculations for the purposes of this report, but can be modeled by NSS clients using the *SVM Toolkit*.

Normalizing the TCO Data

The benefit of normalization is that, within a given performance range (*NSS-tested capacity*), clear guidance is provided as to whether a product is priced above or below the majority of its competitors. A high price could indicate a premium based upon security effectiveness (see Figure 1 for details), brand recognition, level of customer service, or a price penalty for an underperforming product.

There are multiple methods by which value can be determined:

Purchase Price based on Vendor-Claimed Capacity

The most simplistic means of determining "value," but also the most misleading, is to determine the purchase price per CPS, based on the vendor-claimed capacity and the initial purchase price of the product.

TCO based on Vendor-Claimed Capacity

A more accurate calculation would be to determine the TCO per vendor-claimed capacity (in the case of WAF, connections per second or CPS. This calculation is performed in many purchasing departments. Unfortunately, this approach is equally flawed, since it relies on the vendor-claimed capacity, without independent testing, to determine the **actual** capacity of the device under real-world conditions.

TCO based on NSS-Tested Capacity

Vendor capacity claims are frequently exaggerated in marketing materials, or simply fail to take into account real-world deployment conditions. Knowing this, many enterprise IT professionals will over-purchase based on capacity claims to ensure adequate performance headroom. *NSS-Tested capacity* is a real-world representation of the products performance within true enterprise use cases, and is often a significant delta between vendor-claimed capacity (see Figure 6).

Product	Vendor-Claimed Capacity (CPS)	NSS-Tested Capacity (CPS)	% Delta
Barracuda Networks Web Application Firewall 960	20,000	12,640	-37%
Citrix NetScaler AppFirewall MPX 11520	32,500	46,282	42%
Fortinet FortiWeb 1000D	3,750	15,865	323%
F5 Big-IP ASM 10200	35,000	36,130	3%
Imperva SecureSphere x6500	10,000	13,385	34%
Sangfor M5900-F-I	25,000	76,616	206%

Figure 6 – Vendor-Claimed vs. NSS-Tested Capacity (Measured in CPS)

TCO based on Security Effectiveness

Determining value purely upon TCO and capacity is acceptable when dealing with a pure networking device. However, for security devices, security effectiveness must also be factored into the equation. The *security effectiveness* of a device factors in block rate, evasions, and stability and reliability scores (see figure 1).

Each of these factors can have a serious impact on security protection or business continuity when deploying in-line security devices. Aware of these limitations, NSS developed a unique metric to enable value-based comparisons in order to capture the relative value of devices on the market and facilitate such comparisons: *TCO per protected connection per second (CPS).* See Figure 1 for details.

Figure 7 depicts the calculation: *TCO per protected-CPS,* which is based upon the 3-year TCO, the *NSS-tested capacity*, and the *security effectiveness* rating. For more details related to the calculations please schedule an inquiry call with NSS analysts or refer to the *SVM Toolkit.*

Product	NSS-Tested Capacity (CPS)	Security Effectiveness	3-Year TCO	TCO per Protected-CPS
Barracuda Networks Web Application Firewall 960	12,640	99.97%	$246,866	$4.88
Citrix NetScaler AppFirewall MPX 11520	46,282	99.77%	$356,448	$1.93
Fortinet FortiWeb 1000D	15,865	99.85%	$175,532	$2.77
F5 Big-IP ASM 10200	36,130	99.89%	$488,080	$3.38
Imperva SecureSphere x6500	13,385	99.82%	$847,200	$15.85
Sangfor M5900-F-I	76,616	96.11%	$610,725	$2.07

Figure 7 – TCO per Protected-CPS (NSS-Tested Capacity and Security Effectiveness)

Determining Value

Value is a metric that is distinct from both purchase price and TCO. Figure 8 and Figure 9 demonstrates the ways in which the actual value of a product can change significantly as *NSS-tested capacity* and *security effectiveness* are factored in.

In figure 8, reading left to right, the value changes as additional test metrics are introduced. The value in the final column is a unique metric in the industry, incorporating both performance **and** *security effectiveness* as determined by NSS' testing.

Product	Vendor-Claimed Capacity (CPS)		NSS-Tested Capacity
	TCO per CPS	TCO per Protected-CPS	TCO per Protected - CPS
Barracuda Networks Web Application Firewall 960	$3.09	$3.09	$4.88
Citrix NetScaler AppFirewall MPX 11520	$2.74	$2.75	$1.93
Fortinet FortiWeb 1000D	$11.70	$11.72	$2.77
F5 Big-IP ASM 10200	$3.49	$3.49	$3.38
Imperva SecureSphere x6500	$21.18	$21.22	$15.85
Sangfor M5900-F-I	$6.11	$6.35	$2.07

Figure 8 – Value Based on TCO

Security Effectiveness and Value

Figure 9 compares the vendor-claimed value metric with the metric generated from NSS test results. The *security effectiveness value* indicates whether a product is underpriced, overpriced, or priced accurately depending on the *NSS-tested capacity* and overall *security effectiveness*.

Products with a higher *security effectiveness value* than the *purchase price* can be considered good value for money. Products with a higher purchase price than *security effectiveness value* can be considered overpriced.

Product	Purchase Price	Security Effectiveness Value	Delta
Barracuda Networks Web Application Firewall 960	$143,975	$96,350	($47,625)
Citrix NetScaler AppFirewall MPX 11520	$240,000	$352,090	$112,090
Fortinet FortiWeb 1000D	$87,973	$120,793	$32,820
F5 Big-IP ASM 10200	$349,975	$275,201	($74,774)
Imperva SecureSphere x6500	$492,000	$101,878	($390,122)
Sangfor M5900-F-I	$343,782	$561,457	$217,675

Figure 9 – Comparison of Purchase Price to Security Effectiveness Value

Test Methodology

Web Application Firewall: v6.2

A copy of the test methodology is available on the NSS Labs website at www.nsslabs.com

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