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CROSSBEAM X80
RUNNING CHECKPOINT FIREWALL-1

PERFORMANCE REPORT

CRITERIA: MINIMAL FRAME SIZE

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1 Introduction

July 30-31, 2008 NSS Labs performed a private test of the Crossbeam X80 (XOS 8.1) running CheckPoint Firewall-1 (NGX R65) to determine the product's maximum throughput with the smallest possible frame size using real HTTP transactions. The purpose of the pre-test is to:

- Validate performance under strenuous conditions that may be experienced on a GPRS network

2 The Product Under Test

The Crossbeam X80 is a 14U rack mount chassis with fourteen (14) blades consisting of four (4) Network Processor Modules, eight (8) application modules, and two (2) control modules. The vendor positions it as a carrier grade security switch for protecting large enterprise / carrier datacenters. The Firewall application is provided using CheckPoint Firewall-1, and managed using CheckPoint Provider-1.

3 Test Configuration

3.1 Network Deployment

Twenty (20) Class "C" (/24) networks divided into ten (10) internal and ten (10) external which separated by the firewall. The Firewall Policy is comprised of two rules

#	Source	Destination	Protocol	Action	Tracking
1	ANY	ANY	HTTP	Allow	Log
2	ANY	ANY	HTTP	Allow	Log/Sync

The HTTP Traffic was generated using five (5) Breaking Point BPS-1000 devices in a single multi-box test.

For the first portion of the HTTP test, traffic consisted of average 97-100 byte frames. For the second portion of the HTTP test, traffic consisted of 88-89 byte frames – both extremely minimal HTTP traffic. Lastly, TCP Throughput and Maximum frame rate over port 80 was measured with a frame size of 88 bytes.

4 Performance Testing

This limited scope test focused on specific performance conditions. Note that it represents a subset of possible test scenarios and did not include any evaluation of the security effectiveness of the product under test.

4.1 Maximum HTTP throughput with 97-100 byte frame size

NSS Labs traffic consisted of 160 HTTP transactions per connection / session. The HTTP traffic size was minimized in order to determine the maximum frames per second as well as throughput with small packets/frames.

TCP Sessions per Second were observed at a Maximum rate of 15,000 per second, with a steady state of 10,100 sessions per second over an extended duration. At steady state, the Crossbeam X80's CPUs were observed to have over 35% excess capacity.

TCP Concurrent Sessions were set by NSS to a maximum of 20,000,000 concurrent connections (aggregate) on the five (5) Breaking Point BPS-1000's in order to avoid having concurrency play a negative factor in the test.

Throughput was observed at a Maximum of 8 Gbps during ramp-up. However, it settled to 7.4 Gbps during steady state.

Frames per Second: NSS observed a maximum of 9,400,000 frames per second with an average frame size of *97-101 bytes*.

4.2 Maximum HTTP throughput with 88-89 byte frame size

NSS Labs traffic consisted of 160 HTTP transactions per connection / session. The HTTP traffic size was minimized in order to determine the maximum frames per second as well as throughput with small packets/frames.

TCP Sessions per Second were observed at a Maximum rate of 15,000 per second, with a steady state of 10,100 sessions per second over an extended duration. At steady state, the Crossbeam X80's CPUs were observed to have roughly 5% excess capacity.

TCP Concurrent Sessions were set by NSS to a maximum of 20,000,000 concurrent connections (aggregate) on the five (5) Breaking Point BPS-1000's in order to avoid having concurrency play a negative factor in the test.

Throughput was observed at a Maximum of 7.6 Gbps during ramp-up.

Frames per Second: NSS observed a maximum of 9,200,000 frames per second with an average frame size of *88-89 bytes*.

4.3 Maximum TCP throughput on port 80 with 88 byte frame size

TCP Sessions per Second were observed at a Maximum rate of 15,000 per second, with a steady state of 10,100 sessions per second over an extended duration. At steady state, the Crossbeam X80's CPUs were observed to have less than 5% excess capacity in this state.

TCP Concurrent Sessions were set by NSS to a maximum of 20,000,000 concurrent connections (aggregate) on the five (5) Breaking Point BPS-1000's in order to avoid having concurrency play a negative factor in the test.

Throughput was observed at a Maximum of 7 Gbps during ramp-up. However, it settled to 6.8 Gbps during steady state.

Frames per Second: NSS observed a maximum of 9,900,000 frames per second with an average frame size of *97-101 bytes,* and settled into 9,500,000 frames per second at steady state.

It should be noted that the when the traffic was changed from HTTP to TCP on port 80, the Frame Rate increased from 9.4 million fps to 9.9 million fps – despite identical frame sizes. This was due to the overhead required to inspect HTTP vs. TCP.

5 VERDICT

Based upon our analysis, it is the opinion of NSS Labs that the Crossbeam X80 running CheckPoint Firewall-1 performed admirably in our minimal frame size Performance test. We feel the product made a strong showing should be considered on the short list for any carrier or large enterprise whose network contains similarly extreme traffic conditions.

6 Appendix A: Test Infrastructure

Special thanks go to our test infrastructure partners who provide much of the equipment, software, and support that make this testing possible: