



# NetSecOPEN Certification

## Network Security Product Performance Testing

### Juniper SRX4600

#### Testing Information

Vendor: Juniper Networks, Inc.

Product name and Model: SRX4600

Product version: 20.4R2.5

Test Lab: University of New Hampshire Interoperability Lab

Test equipment: Spirent CyberFlood C100-S3

Test equipment version: Firmware: 5.13.0309 , Software: 21.1.4286

Test Date and Location: April 26, 2021 Durham, NH

Tested based on draft-ietf-bmwg-ngfw-performance-06 (<https://tools.ietf.org/html/draft-ietf-bmwg-ngfw-performance-06>)

#### Executive Summary

##### Introduction

The goal of NetSecOPEN is to provide performance testing standards developed by the membership, implemented on approved test tools and used by accredited test labs. These goals are intended to promote transparency and reproducibility. To achieve these goals the accredited labs freely provide access to their test reports, Device under Test (DUT) vendors provide the configuration of the DUT as it was tested and the test tool vendors provide the default configuration, while the lab documents changes to the test tool in the report.

All of these are provided at no charge to interested parties. Anyone interested in having access to the configuration files please e-mail the NetSecOPEN Certification Body at [netsecopen-cert-body@netsecopen.org](mailto:netsecopen-cert-body@netsecopen.org).

##### Summary of Findings

The NetSecOPEN Certification Body has reviewed the test report of the SRX4600 provided by University of New Hampshire InterOperability Lab. These results have been found to meet the NetSecOPEN certification requirements. Detailed results are provided below.

NetSecOPEN Certification is awarded to Juniper Networks's SRX4600 (version 20.4R2.5).

Note: this certification is product and version specific.

## Results Summary

The tables 1 & 2 below highlight the measured values for the Key Performance indicators (KPIs). The values for individual object sizes and test scenarios are described in the section “Detailed Test Results”

### HTTP Traffic Performance

Key Performance Indicator	Values
<b>Connections Per Second (CPS)</b>	26,715 CPS @ 1 KByte and 7,217 CPS @ 64 KByte object sizes
<b>Throughput</b>	10.34 Gbit/s @ 256 KByte and 0.69 Gbit/s @ 1 KByte object sizes
<b>Transactions Per Second (TPS)</b>	55,795 TPS @ 1 KByte and 4,835 TPS @ 256 KByte object sizes
<b>Time to First Byte (TTFB)</b>	1.7 ms average TTFB @ 1 KByte and 2.8 ms average TTFB @ 64 KByte object sizes <sup>1</sup> 1.8 ms average TTFB @ 1 KByte and 2.3 ms average TTFB @ 64 KByte object sizes <sup>2</sup>
<b>Time to Last Byte (TTLB)</b>	0.9 ms average TTLB @ 1 KByte and 103.0 ms average TTLB @ 64 KByte object sizes <sup>1</sup> 1.0 ms average TTLB @ 1 KByte and 1005.2 ms average TTLB @ 64 KByte object sizes <sup>2</sup>
<b>Concurrent connection</b>	1,024,000 average concurrent connection

Table 1: Results summary for HTTP tests

### HTTPS Traffic Performance

Key Performance Indicator	Values
<b>Connections Per Second (CPS)</b>	3,862 CPS @ 1 KByte and 2,587 CPS @ 64 KByte object sizes
<b>Throughput</b>	7.08 Gbit/s @ 256 KByte and 0.32 Gbit/s @ 1 KByte object sizes
<b>Transactions Per Second (TPS)</b>	21,565 TPS @ 1 KByte and 3,175 TPS @ 256 KByte object sizes
<b>Time to First Byte (TTFB)</b>	8.2 ms average TTFB @ 1 KByte and 9.8 ms average TTFB @ 64 KByte object sizes <sup>1</sup> 9.0 ms average TTFB @ 1 KByte and 9.5 ms average TTFB @ 64 KByte object sizes <sup>2</sup>
<b>Time to Last Byte (TTLB)</b>	1.4 ms average TTLB @ 1 KByte and 84.4 ms average TTLB @ 64 KByte object sizes <sup>1</sup> 2.5 ms average TTLB @ 1 KByte and 807.8 ms average TTLB @ 64 KByte object sizes <sup>2</sup>
<b>Concurrent connection</b>	381,312 average concurrent connection

Table 2: Results summary for HTTPS tests

<sup>1</sup> Tested with 50% of max. throughput that the SRX4600 supported.

<sup>2</sup> Tested with 50% of max. CPS that the SRX4600 supported.

## Test setup and configurations

All the tests were performed with test setup (option 2) defined in the draft in [section 4.1](#). Four 10GbE interfaces of the SRX4600 were directly connected with the test equipment.

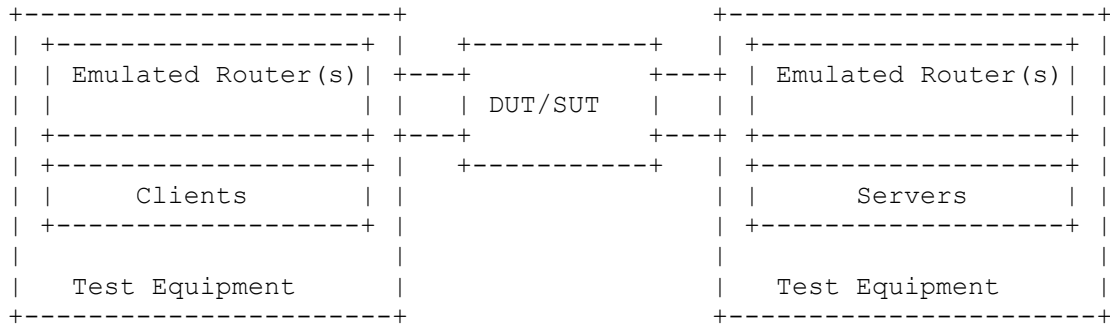


Figure 1: Testbed Setup

The table below shows the recommended and optional Next Generation Firewall (NGFW) features described in the draft that were enabled/disabled on the security device.

Features		Security device Status
SSL Inspection	Recommended	Enabled
IDS/IPS	Recommended	Enabled
Antivirus	Recommended	Enabled
Anti Spyware	Recommended	Enabled
Anti Botnet	Recommended	Enabled
Logging and Reporting	Recommended	Enabled
Application Identification	Recommended	Enabled
Web Filtering	Optional	Enabled
DLP	Optional	Disabled
DDoS	Optional	Disabled
Certificate Validation	Optional	Disabled

Table 3: NGFW security features

As defined in the draft ([section 4.2](#) table 3, DUT classification “L”) 564 ACL rules were configured on the SRX4600.

Before the performance tests were started, the Common Vulnerabilities and Exposures (CVE) tests were performed to ensure the security feature “Detection of Common Vulnerabilities and Exposures (CVE)” was enabled on the SRX4600 security device. The SRX4600 successfully detected and blocked attack attempts during this test, indicating that inspection/blocking capability was enabled and functioning.

All tests were performed with IPv4 traffic only. The ECDHE-RSA-AES128-GCM-SHA256 with RSA 2048 cipher suite was used for all the HTTPS performance tests.

## Detailed Test Results

### TCP/HTTP Connections Per Second

Object Size [KByte]	Avg. TCP/HTTP Connections Per Second
<b>1</b>	26,715
<b>2</b>	24,381
<b>4</b>	22,420
<b>16</b>	15,128
<b>64</b>	7,217

Table 4: TCP/HTTP Connections per Second

### HTTP Throughput and Transactions per Second

Object Size [KByte]	Avg. HTTP Throughput [Gbit/s]	Avg. HTTP Transaction Per Second
<b>1</b>	0.69	55,795
<b>16</b>	2.93	21,250
<b>64</b>	6.46	12,005
<b>256</b>	10.34	4,835
<b>Mixed objects</b>	6.02	13,608

Table 5: HTTP Throughput

### TCP/HTTP Transaction Latency

The test was performed with two traffic load profile as defined in the draft. Table 6 below describes the latency results measured with 50% of the maximum connection per second supported by SRX4600.

Object Size [KByte]	Time to First Byte [ms]			Time to Last Byte [ms]		
	Min	avg	Max	Min	avg	Max
<b>1</b>	0.92	1.8	56.34	0.59	1.0	50.90
<b>16</b>	1.01	2.2	59.64	401.04	402.3	460.02
<b>64</b>	1.02	2.3	62.73	1002.24	1005.2	1063.77

Table 6: TCP/HTTP TTFB and TTLB @ 50% of the maximum connection per second

Table 7 below describes latency results measured with 50% of the maximum throughput supported by SRX4600.

Object Size [KByte]	Time to First Byte [ms]			Time to Last Byte [ms]		
	Min	avg	Max	Min	avg	Max
<b>1</b>	0.90	1.7	50.08	0.44	0.9	49.8
<b>16</b>	1.01	2.5	49.86	1.01	62.1	448.2
<b>64</b>	1.02	2.8	51.16	1.27	103.5	3,824.88

Table 7: TCP/HTTP TTFB and TTLB @ 50% of the maximum Throughput

Figures 2-4 illustrate the distribution of maximum latency (TTFB and TTLB) values measured in approximately 81 measurement samples.

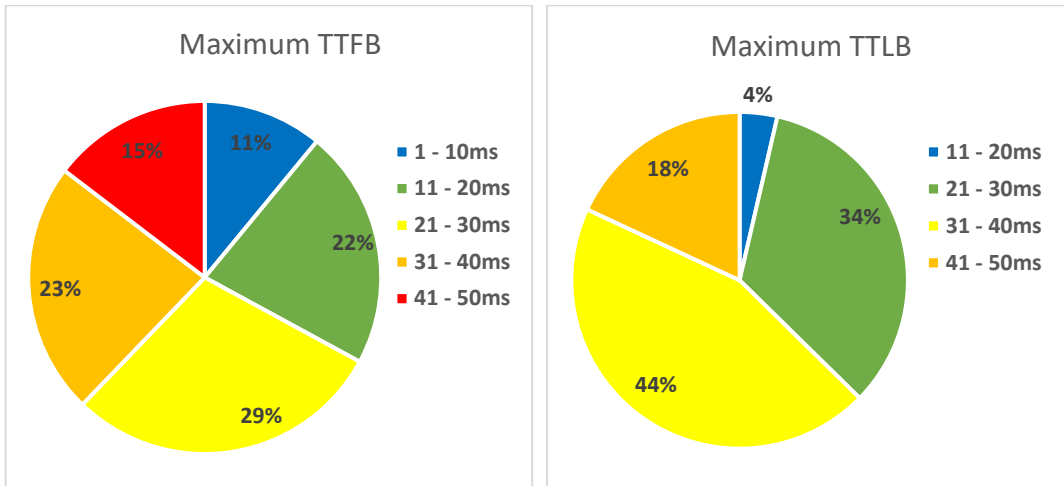


Figure 2: Latency distribution measured with 1KByte object size in Throughput test scenario

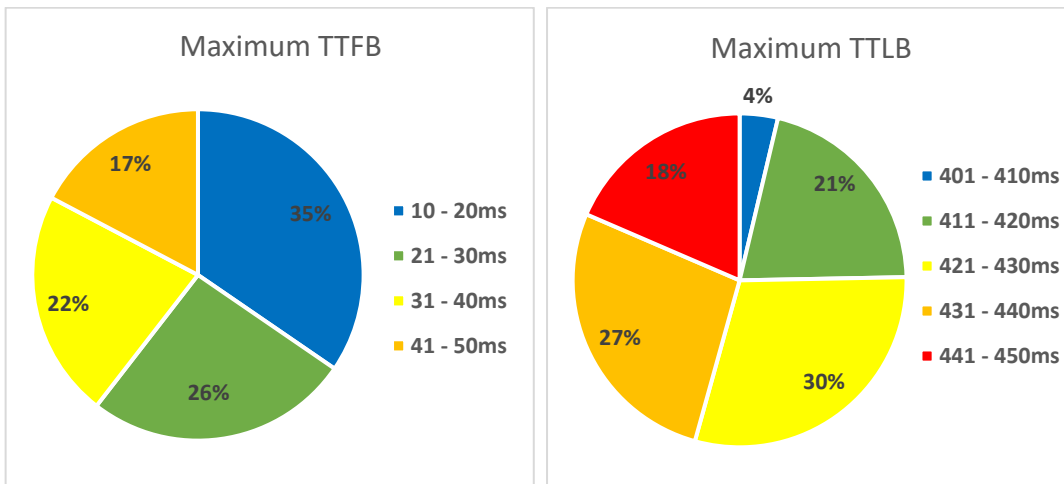


Figure 3: Latency distribution measured with 16KByte object size in Throughput test scenario

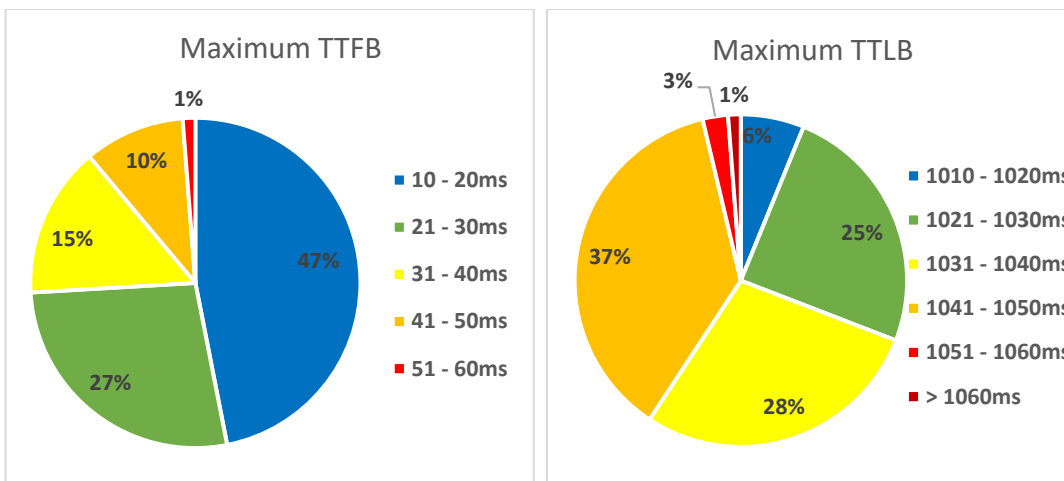


Figure 4: Latency distribution measured with 64KByte object size in Throughput test scenario

## Concurrent TCP/HTTP Connection Capacity

The SRX4600 supported 1,024,000 concurrent TCP/HTTP connection in average. 1 KByte object size was used as HTTP GET request for each established TCP connection, which resulted an average throughput of 135 Mbit/s.

## TCP/HTTPS Connections per second

Object Size [KByte]	Avg. TCP/HTTPS Connections Per Second
<b>1</b>	3,862
<b>2</b>	3,827
<b>4</b>	3,815
<b>16</b>	3,588
<b>64</b>	2,587

Table 8: TCP/HTTPS Connections per Second

## HTTPS Throughput

Object Size [KByte]	Avg. HTTPS Throughput [Gbit/s]	Avg. HTTPS Transaction Per Second
<b>1</b>	0.32	21,565
<b>16</b>	1.81	12,466
<b>64</b>	4.05	7,199
<b>256</b>	7.08	3,175
<b>Mixed objects</b>	3.95	8,533

Table 9: HTTPS Throughput

## HTTPS Transaction Latency

The test was performed with two traffic load profile as defined in the draft. Table 10 below describes the latency results measured with 50% of the maximum connection per second supported by SRX4600.

Object Size [KByte]	Time to First Byte [ms]			Time to Last Byte [ms]		
	Min	avg	Max	Min	avg	Max
<b>1</b>	5.69	9.0	74.97	0.76	2.5	63.38
<b>16</b>	5.7	9.5	74.09	401.61	405.1	456.32
<b>64</b>	5.71	9.5	72.44	802.33	807.8	4009.11

Table 10: TCP/HTTPS TTFB and TTLB @ 50% of the maximum connection per second

Table 11 below describes latency results measured with 50% of the maximum throughput supported by SRX4600.

Object Size [KByte]	Time to First Byte [ms]			Time to Last Byte [ms]		
	Min	avg	Max	Min	avg	Max
<b>1</b>	5.72	8.2	58.06	0.56	1.4	59.49
<b>16</b>	5.71	8.8	61.28	1.23	62.6	461.83
<b>64</b>	5.73	9.8	60.72	1.64	84.4	860.22

Table11: TCP/HTTP TTFB and TTLB @ 50% of the maximum Throughput

Figures 5 -7 illustrate the distribution of maximum latency (TTFB and TTLB) values measured in approximately 81 measurement samples.

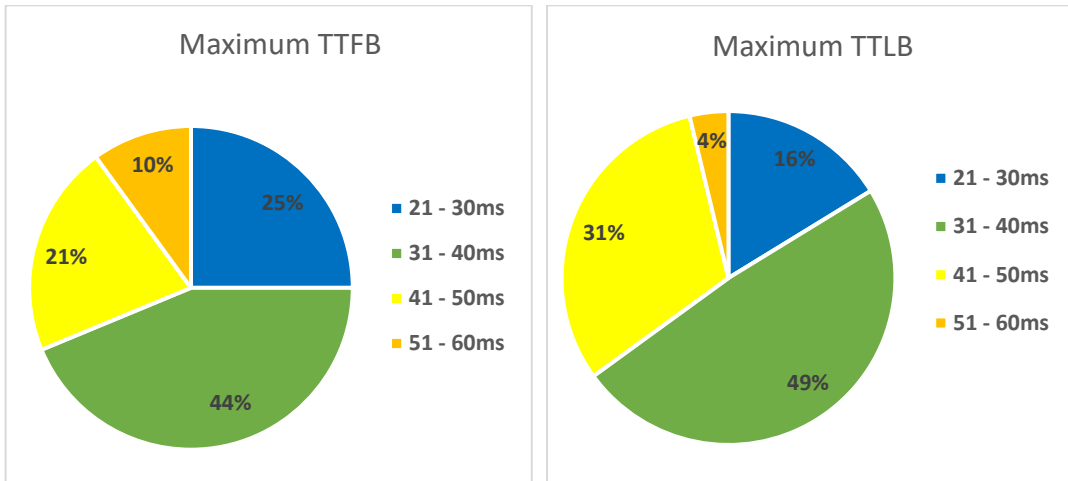


Figure 5: Latency distribution measured with 1KByte object size in Throughput test scenario

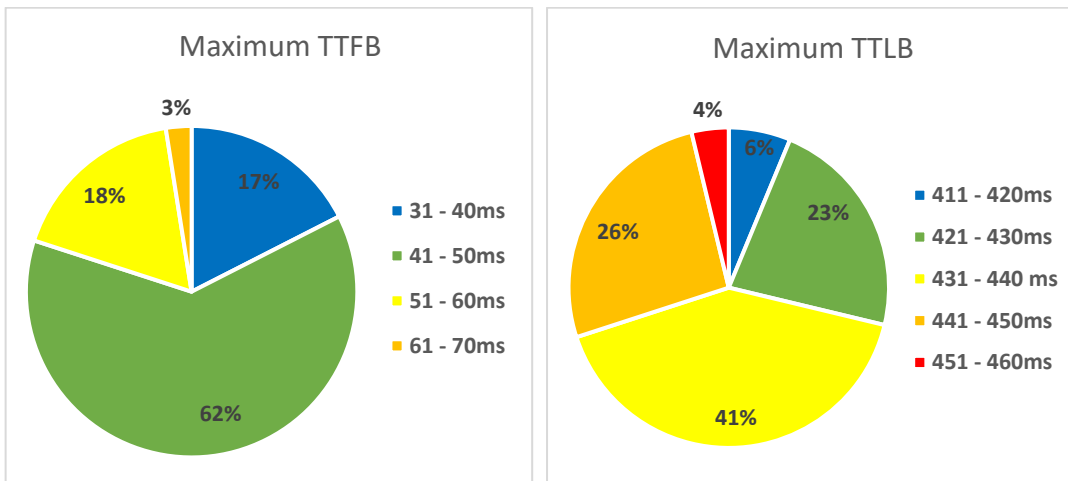


Figure 6: Latency distribution measured with 16KByte object size in Throughput test scenario

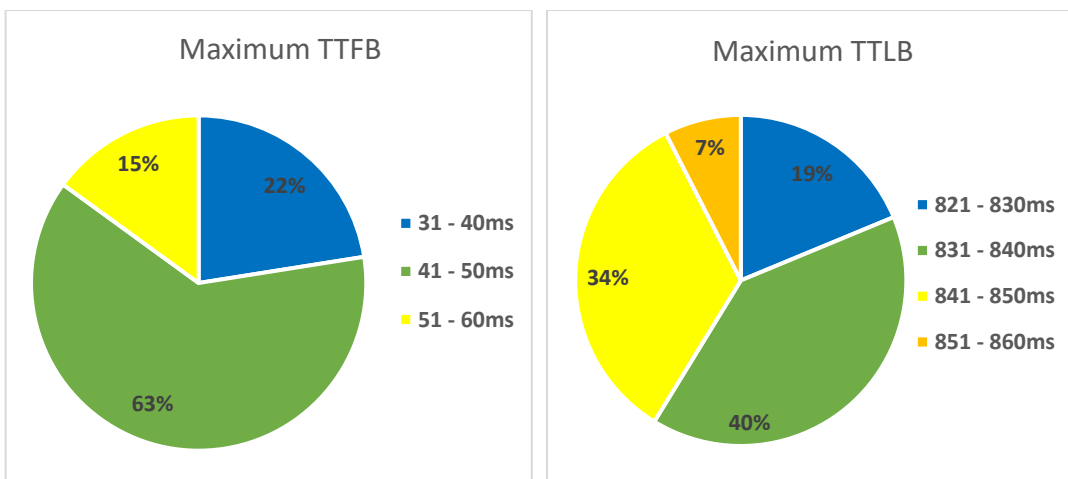


Figure 7: Latency distribution measured with 64KByte object size in Throughput test scenario

## Concurrent TCP/HTTPS Connection Capacity

The Juniper Network's SRX4600 supported 381,312 concurrent TCP/HTTPS connection in average. 1 KByte object size was used as HTTPS GET request for each established TCP connection, which resulted an average throughput of 53 Mbit/s.