Unicast Throughput Report

July 22, 2009
19:05:16

Device Tested:
AP Model:
AP SW Version:
WLAN Switch Model:
WLAN Switch Version:

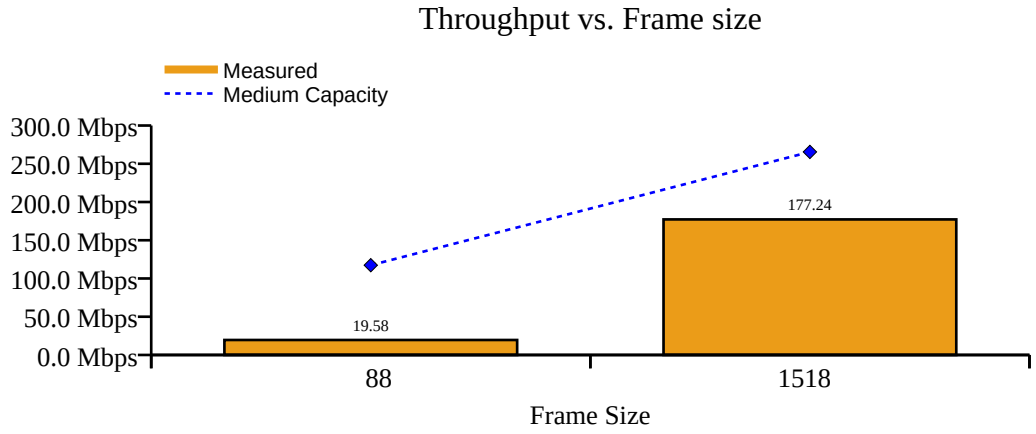
Overview

The throughput test measures a key performance metric: the maximum rate at which frames can be injected into the system under test (SUT) without exceeding a pre-set loss threshold. If the loss threshold is zero, this corresponds to the classical definition of throughput as per RFC 1242.

Throughput is very important in assessing performance under higher-layer protocols such as TCP, where even small amounts of loss can significantly impact user applications.

Measured Throughput

The following graph summarizes the measured throughput performance of the SUT at the specified frame sizes in bytes. Higher values indicate better overall performance. If there are more than 15 frame sizes the graph will represent a sample of the frame sizes only.



The theoretical throughput of the system, as limited by the physical media, is also indicated on the above graph. The SUT throughput should ideally be as close as possible to the indicated theoretical throughput values. NOTE: For 11n clients the theoretical maximum assumes the Best Effort AC, AIFSn of 2, and ECWMin of 4.

Test Conditions

Parameter	Value	Description
Frame Sizes	[88, 1518]	Frame sizes in bytes

Test Configuration

Parameter	Value	Description
Learning Time	2 sec	Transmission time (seconds) for initial learning packets, to allow the SUT to set up forwarding tables
Achieved Transmit Time	4.97 sec	Trial duration (seconds) - i.e., duration of test traffic
Settle Time	2 sec	Idle time after test traffic transmission completes
Aging Time	2 sec	Time allowed for the SUT to recover between iterations
Number of Trials	1	Number of times measurements are repeated for averaging
Search Minimum	1.0%	Lower limit of aggregate ILOAD offered to the SUT, in percent of theoretical maximum throughput
Search Maximum	150.0%	Upper limit of aggregate ILOAD offered to the SUT, in percent of theoretical maximum throughput
Starting Point	50.0%	Initial value of aggregate ILOAD offered to the SUT, in percent of theoretical maximum throughput
Search Resolution	1.0%	Granularity of measured values, in percent of theoretical maximum throughput
Acceptable Loss	0.0%	Frame loss threshold used when determining throughput

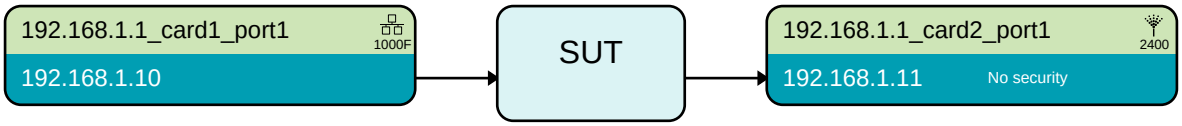
Binary Search Options

The maximum, minimum, starting point and search resolution of aggregate ILOAD values are calculated in percent of the theoretical maximum frame rate for the particular frame size. Please refer to the Test Configuration table for the percent values.

Frame Sizes	Search Max (fps)	Search Min (fps)	Start Point (fps)	Search Resolution (fps)
88	250065.1	1667.1	83355.0	1667.1
1518	32793.7	218.6	10931.2	218.6

Test Topology

The test topology is shown below. Traffic is transmitted in the direction of the arrows. The test client port identifiers and IP addresses are indicated in the boxes, together with the security mode and channel ID for WLAN clients.



A total of 2 ports were used in this test.

Client Configuration

Client Group	PHY Type	PHY Rate (Mbps)	MCS	A-MPDU	Port
Group_001	Ethernet	1000	N/A	N/A	192.168.1.1_card1_port1
Group_002	11n	300.0	15	On	192.168.1.1_card2_port1

Methodology

The test is performed by associating test clients with the SUT ports, performing any desired learning transmissions, and then generating test traffic between the test clients. The test then calculates throughput according to the procedure specified in RFC 2544. Proprietary signatures and tags are inserted into the test traffic to ensure accurate measurement results.

A binary search algorithm is used to obtain the throughput, by finding the ILOAD resulting in the highest forwarding rate for which the packet loss ratio is less than the acceptable threshold. The Search Maximum and Search Minimum parameters may be used to constrain the search algorithm. The Starting Point is the starting value of the offered load and its value must be greater or equal to the Search Minimum and less than or equal to the Search Maximum. By default, the search algorithm will start at 50% of the theoretical throughput calculated for the test topology.

The test is repeated for each frame size, and also if the number of trials is greater than 1. The results are recorded separately for each combination of frame size and trial number, as well as being averaged into the graphs shown above.

Detailed Results

Frame Size	Trial	Theoretical Throughput pkts/sec	Theoretical Throughput bits/sec	ILOAD pkts/sec	Throughput pkts/sec	Throughput bits/sec
88	1	166710	117363898	247460.3	27819.2	19584732.1
1518	1	21862	265497895	32452.1	14594.5	177235432.1

Access Point Information

The following table shows the SUT details. The received signal strength indication (RSSI) from the SUT is sampled on each port at the start of each trial and averaged over all of the trials.

Port Name	Type	RxAtt*	Chan	BSSID	SSID	Min RSSI	Avg RSSI	Max RSSI
192.168.1.1_card2_port1	80211n	off	3	00:1C:F0:6B:B1:B4	veriwave	-13.0 dBm	-12.3 dBm	-12.0 dBm

The RSSI is measured at the WaveBlade SMA connector. RSSI values should be between -25 dBm and -35 dBm for port types of 80211 and 80211n ports when the RX attenuation (RxAtt*) option is 'off'. For 80211n

port types with attenuation 'on' the RSSI values at the port should be between -5 dBm and -15 dBm. If the RSSI is not in this range, modify the external attenuation to bring it into this range.

Other Info

Results Directory	C:\Documents and Settings\Ron\VeriWave\WaveApps\Results\20090722-190151
WaveApps Version	4.2.1-WT-3.5, 2009.05.19.03
WaveTest Version	3.6.0, 2009.07.17.07

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