

# Enterprise WaveQoE Report

July 16, 2009  
16:22:16

## Device Tested:

AP Model ::  
AP SW Version ::  
WLAN Switch Model ::  
WLAN Switch SW Version ::

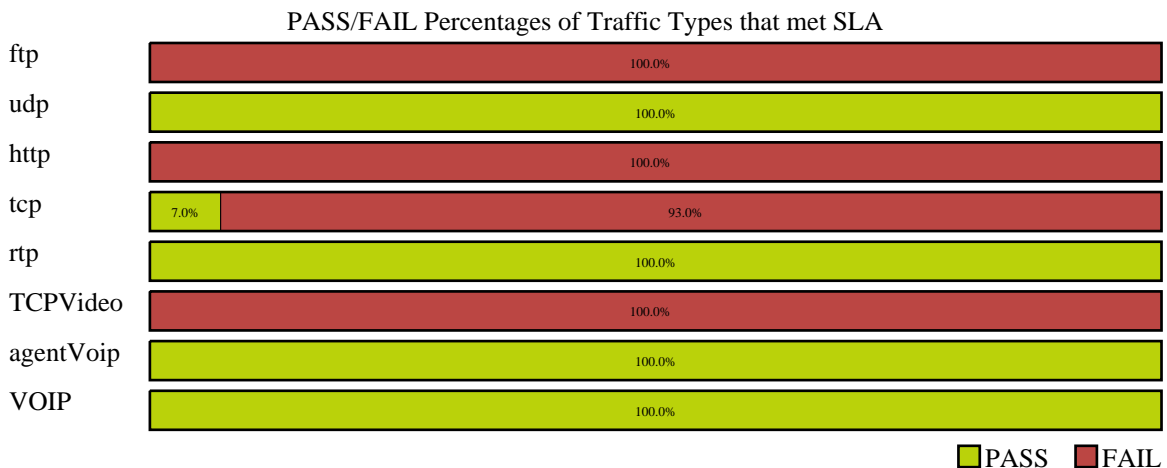


## Overview

The WaveQoE Real-World Deployment Test accurately replicates the complex interaction of clients, servers and traffic profiles. By creating usage profiles and traffic mixtures that were found to be representative in various network environments, the test measures and reports key application layer metrics that affect end-user Quality of Experience. The test also reports if the Service Level Agreement criteria set by the user for the different application layer traffic types have been met. The real-world networks replicated include: health-care, education, airports, warehouses, retail, hot spots, and service provider managed services. Each deployment model is characterized by a mix of clients, servers, client locations and behavior, traffic mix and other characteristics. These clients and servers can be configured to use different security schemes, run various higher layer applications, and utilize different QoS functions of the network. Users may also create their own application and client mixes if so desired.

Note: The results shown in the report are only of the clients and flows that successfully connected. All client and flows that did not make it through the connection process are not executed in the test and hence excluded from the report.

## Result Summary



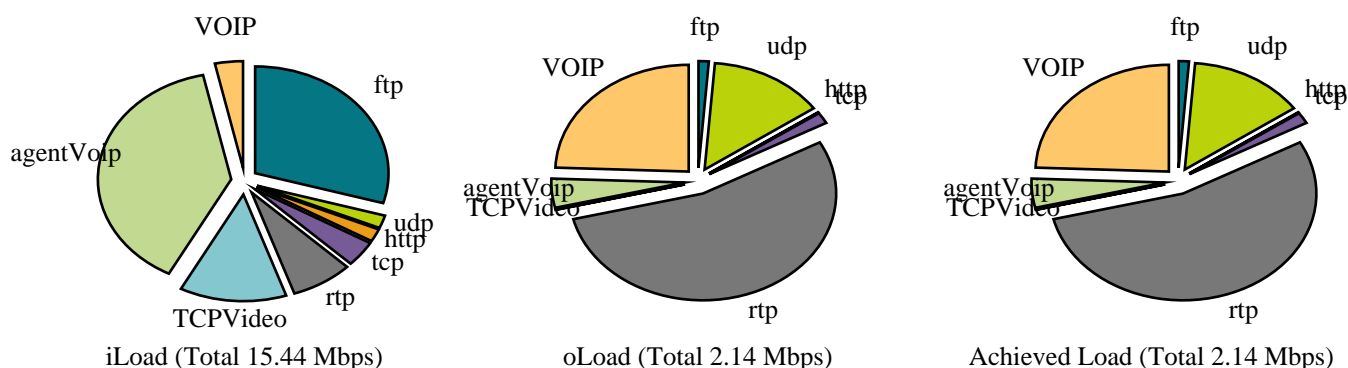
The Table below shows the percentages of Clients/Flows that connected in the test. Only the results of the clients/flows that connected will appear in the report

Type	Value
Successful Client Connections	23 out of 23 ( 100 % )
Successful TCP/HTTP/FTP Connections	52 out of 52 ( 100 % )
Successful ARP Exchanges	26 out of 26 ( 100 % )

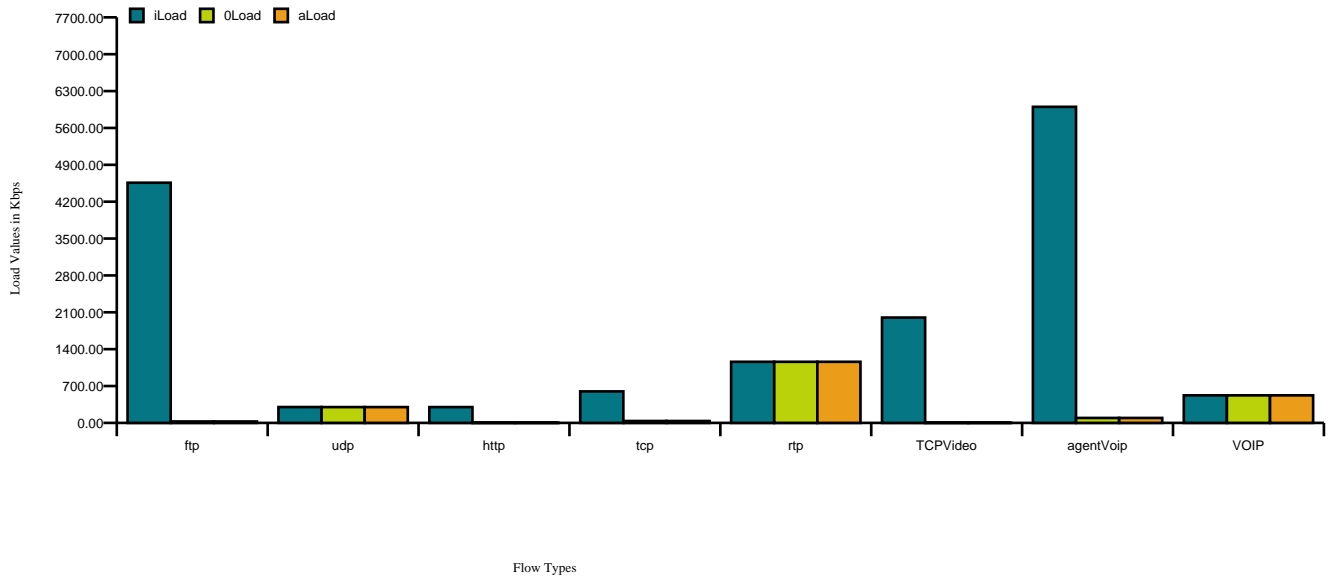
The summary table below shows the per flow average performance measurements of each traffic type

Flow Type	Num Flows	Layer7 Results	ILOAD (Kbps)	OLOAD (Kbps)	Fwd Rate (Kbps)	Latency (msec)	Jitter (msec)	% Packet Loss
VOIP	6	MOS Score: 4.23, R-Value: 85.9	87.2	87.2	87.2	0.6	0.2	0.0
agentVoip	1	MOS Score: 4.23, R-Value: 85.9	6000.0	94.4	94.4	0.1	0.02	0.0
ftp	12	File Transfer Time: -1.0 secs, Goodput: 0.0 Kbps	380.0	2.2	-	-	-	0.0
TCPVideo	2	Goodput - 0.0 Kbps	1000.0	0.4	-	-	-	0.0
http	12	Goodput - 0.0 Kbps	25.0	0.1	-	-	-	0.0
tcp	26	Goodput - 0.13 Kbps	23.0	1.4	-	-	-	0.0
udp	4	-	75.1	75.1	75.1	0.7	0.4	0.0
rtp	12	-	96.6	96.6	96.6	0.6	0.2	0.0

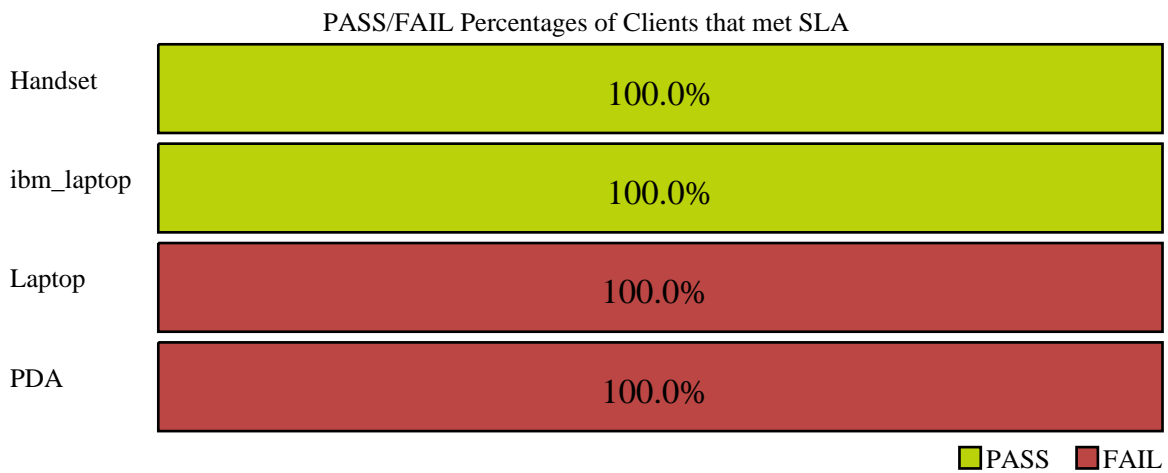
The Total Intended Load is 15.44 Mbps, offered load is 2.14 Mbps and achieved load is 2.14 Mbps



### iLoad, oLoad and aLoad per Traffic Type



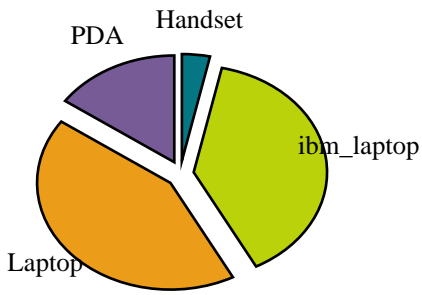
### Per Client Type Results



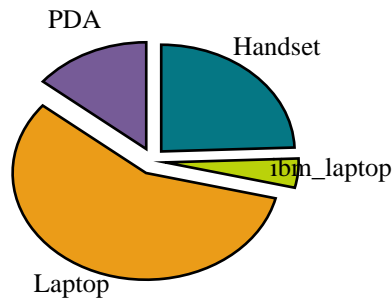
The Table below shows the percentage of Clients of each client type that satisfied the SLA

Note: For a client to meet SLA all flows on the client need to meet their SLA

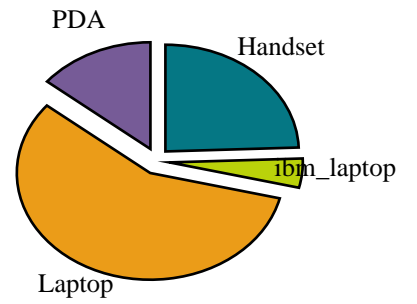
Client Type	Number of Clients	Flow Types	% of Clients that met SLA
Handset	3	VOIP,	100
ibm_laptop	1	AgentVOIP,	100
Laptop	12	HTTP, FTP, TCP, TCP, RTP,	0
PDA	2	UDP, TCPVideo, TCP,	0



iLoad (Total 15.44 Mbps)

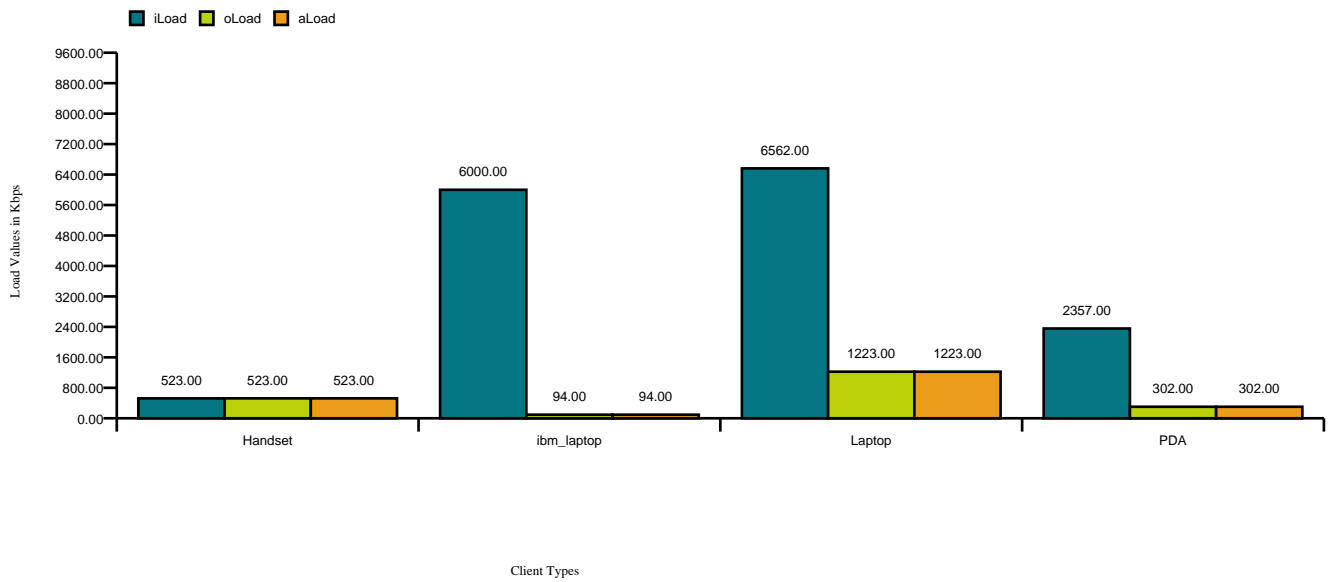


oLoad (Total 2.14 Mbps)



Achieved Load (Total 2.14 Mbps)

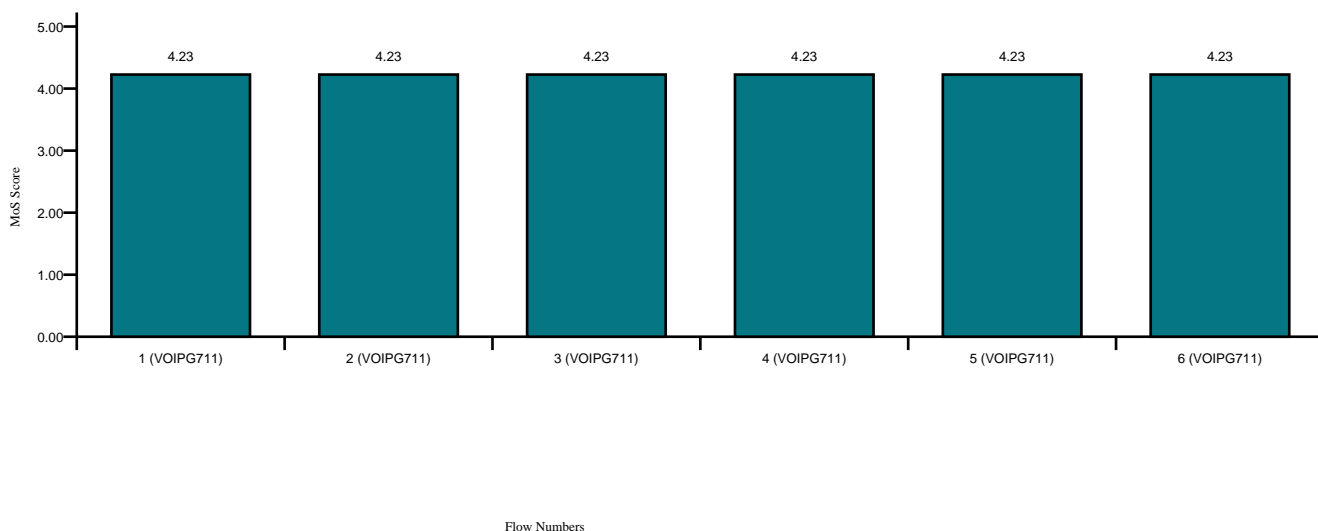
iLoad, oLoad and aLoad per Client Type



## Graphs

The Graphs below show the per traffic flow performance measurements of each traffic type

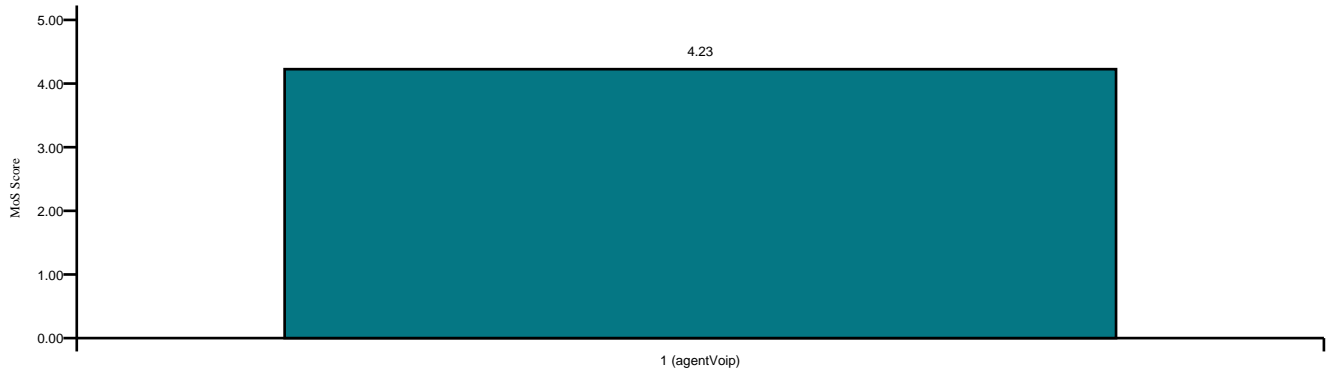
### MoS Score for all VOIP flows



The following table shows more information about each flow of this traffic type for debugging purposes.

Flow Num	IP	MAC	Port	Network	Direction
1	172.16.195.60 to 172.16.193.66	00:02:01:08:00:00 to 00:01:01:01:00:00	wt-tga-10-23_card2_port1 to wt-tga-10-23_card1_port1	vwaveopen, 00:18:74:fa:ab:e2	Uplink
2	172.16.3.93 to 172.16.193.66	00:02:01:07:00:00 to 00:01:01:01:00:00	wt-tga-10-23_card2_port1 to wt-tga-10-23_card1_port1	vwaveopen, 00:18:74:fa:ab:e2	Uplink
3	172.16.193.66 to 172.16.195.60	00:01:01:01:00:00 to 00:02:01:08:00:00	wt-tga-10-23_card1_port1 to wt-tga-10-23_card2_port1	vwaveopen, 00:18:74:fa:ab:e2	Downlink
4	172.16.193.66 to 172.16.142.166	00:01:01:01:00:00 to 00:02:01:09:00:00	wt-tga-10-23_card1_port1 to wt-tga-10-23_card2_port1	vwaveopen, 00:18:74:fa:ab:e2	Downlink
5	172.16.193.66 to 172.16.3.93	00:01:01:01:00:00 to 00:02:01:07:00:00	wt-tga-10-23_card1_port1 to wt-tga-10-23_card2_port1	vwaveopen, 00:18:74:fa:ab:e2	Downlink
6	172.16.142.166 to 172.16.193.66	00:02:01:09:00:00 to 00:01:01:01:00:00	wt-tga-10-23_card2_port1 to wt-tga-10-23_card1_port1	vwaveopen, 00:18:74:fa:ab:e2	Uplink

### MoS Score for all agentVoip flows

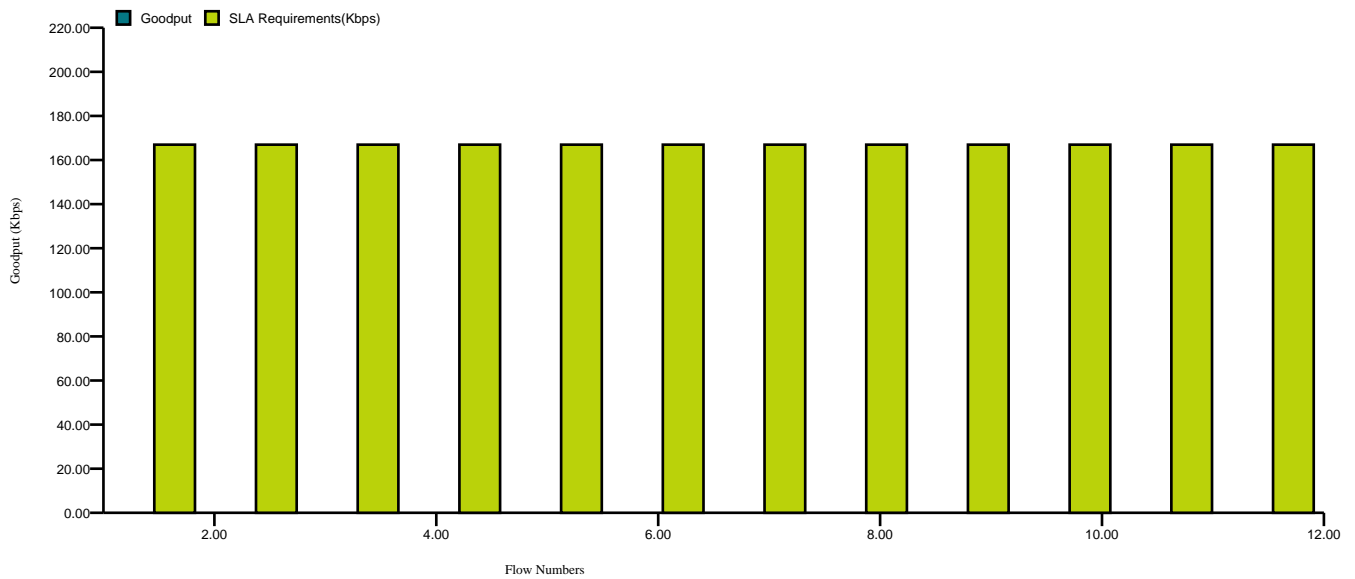


Flow Numbers

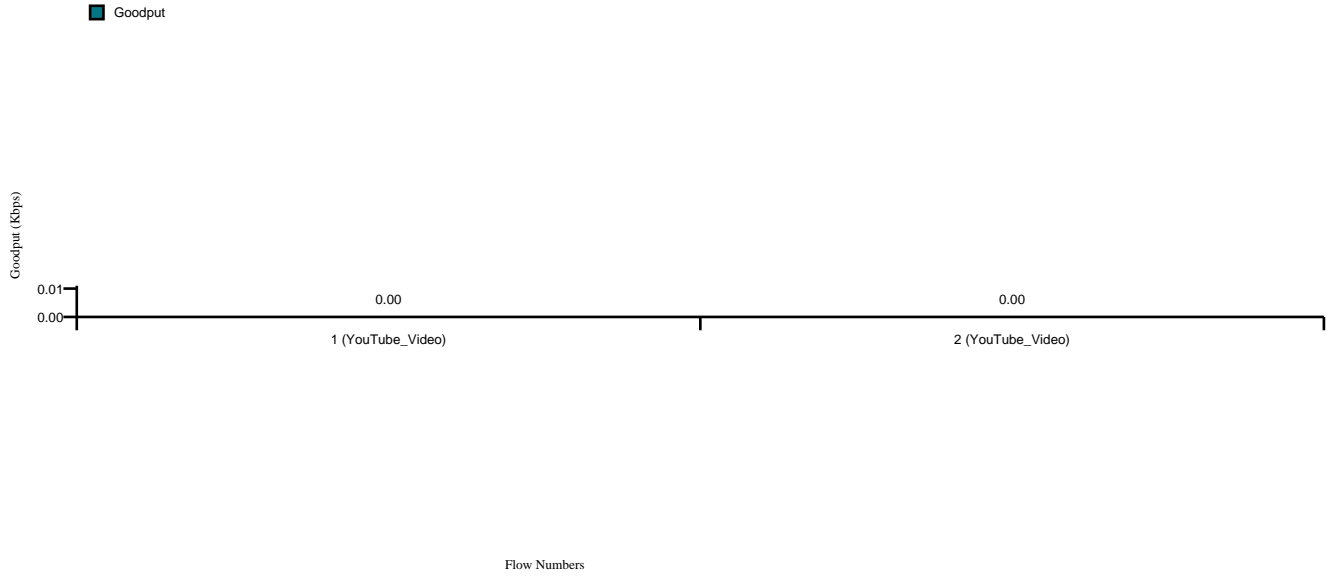
The following table shows more information about each flow of this traffic type for debugging purposes.

Flow Num	IP	MAC	Port	Network	Direction
1	172.16.193.66 to 172.16.157.126	00:01:01:01:00:00 to xx:xx:xx:xx:xx:xx	wt-tga-10-23_card1_port1 to Virtual_WaveAgent_Port	None, 00:00:00:00:00:00	loopback

### FTP Goodput



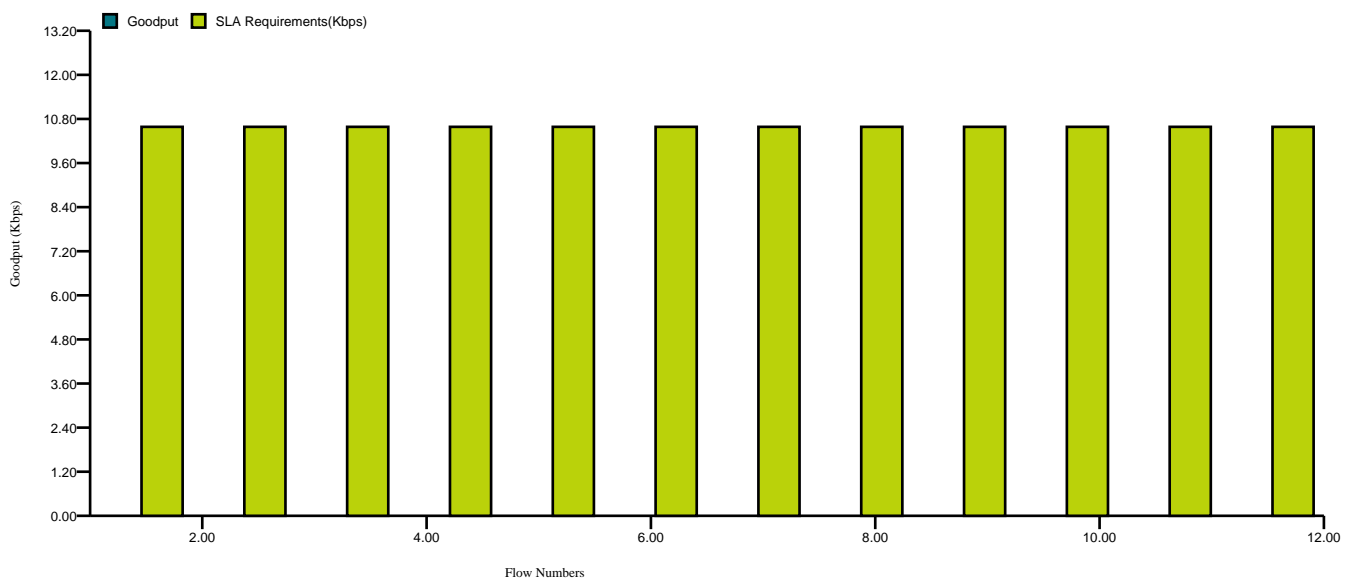
### TCPVideo Goodput



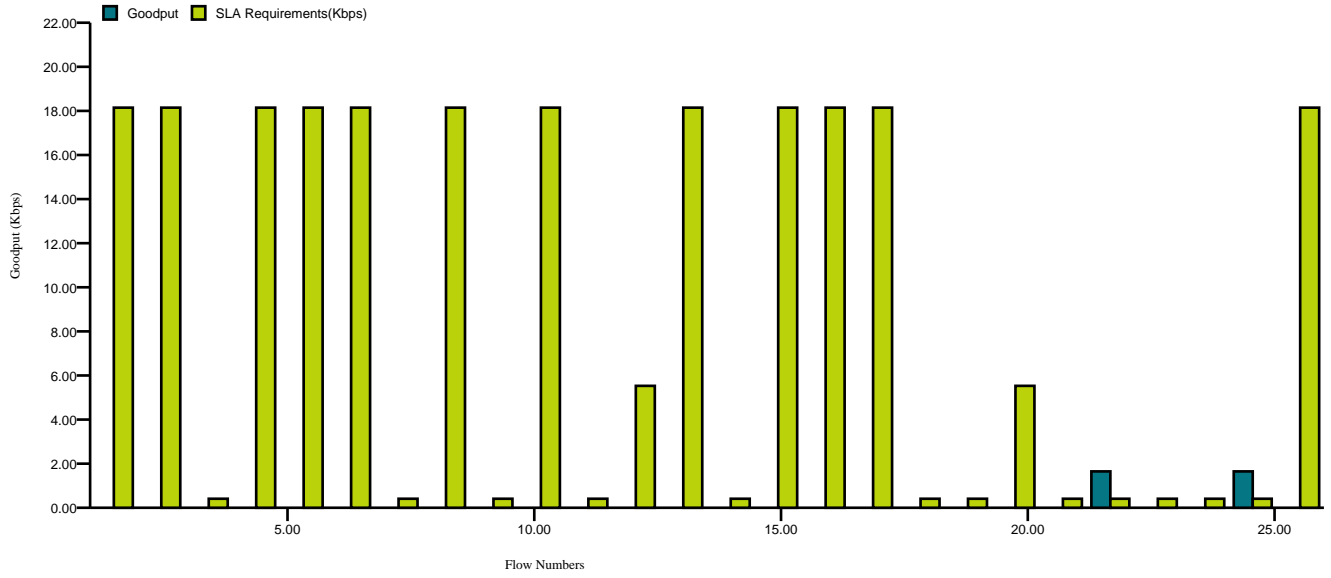
The following table shows more information about each flow of this traffic type for debugging purposes.

Flow Num	IP	MAC	Port	Network	Direction
1	172.16.3.90 to 172.16.188.72	00:01:01:02:00:00 to 00:02:01:17:00:00	wt-tga-10-23_card1_port1 to wt-tga-10-23_card2_port1	vwaveopen, 00:18:74:fa:ab:e2	downlink
2	172.16.3.90 to 172.16.190.68	00:01:01:02:00:00 to 00:02:01:16:00:00	wt-tga-10-23_card1_port1 to wt-tga-10-23_card2_port1	vwaveopen, 00:18:74:fa:ab:e2	downlink

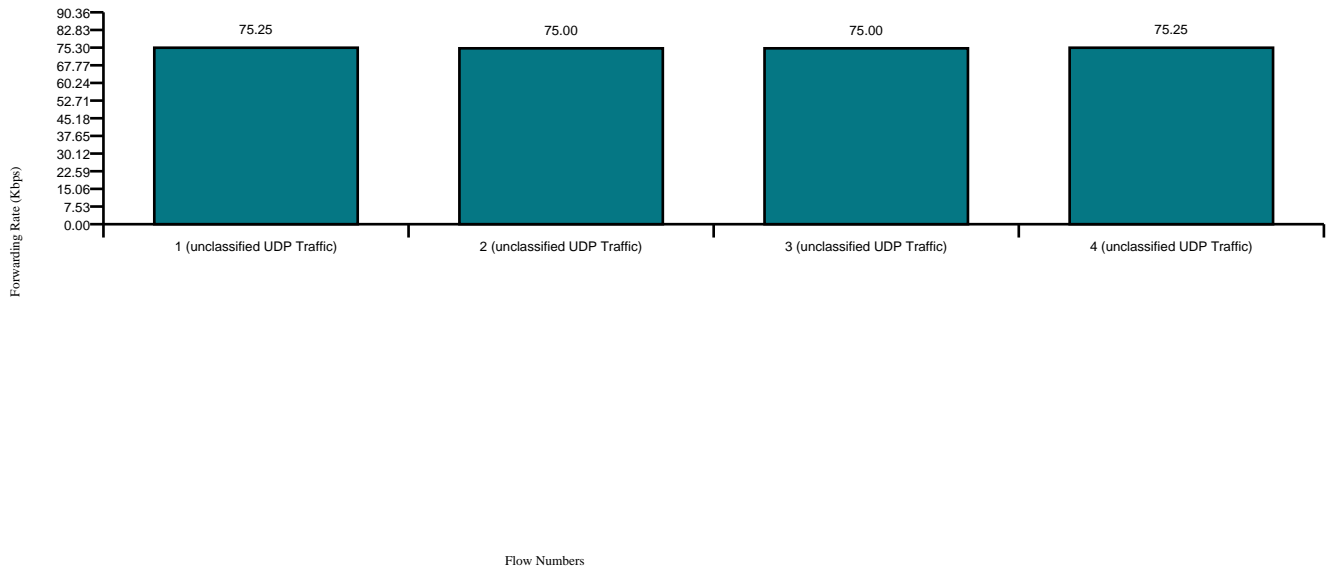
### HTTP Goodput



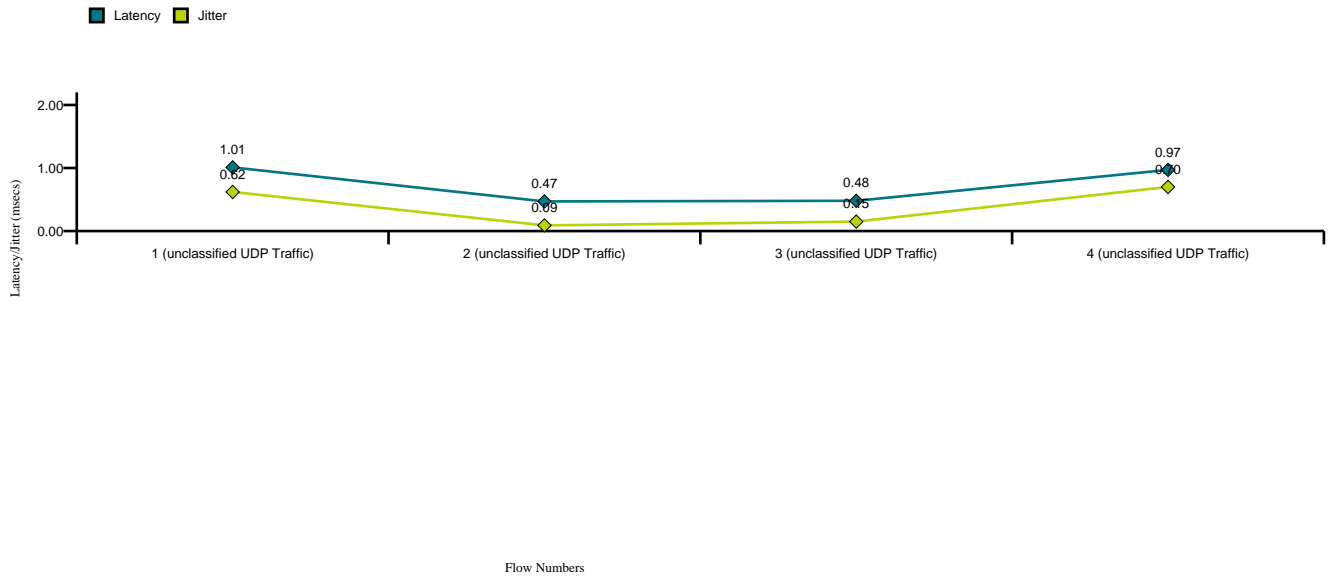
### TCP Goodput



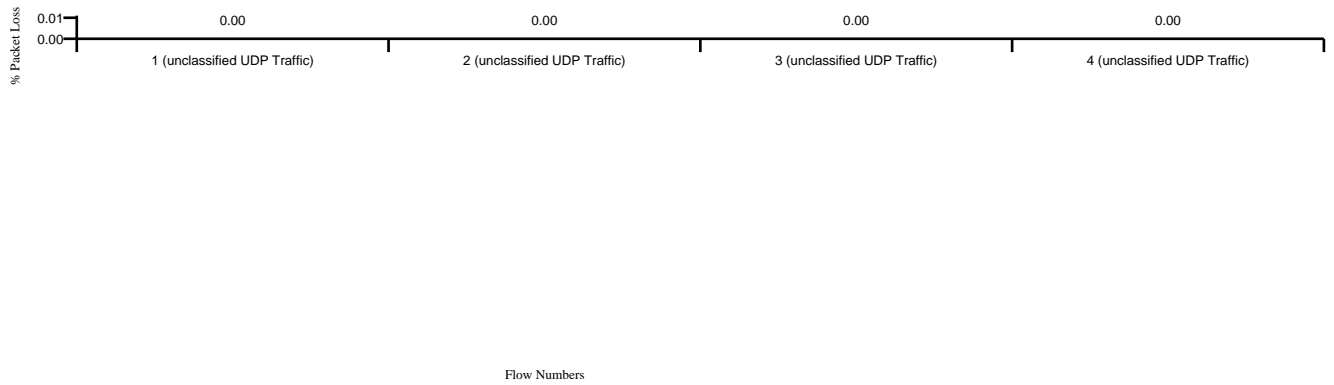
### Forwarding Rate for UDP flows



### Latency and Jitter for UDP flows



### Percentage Packet Loss for UDP flows

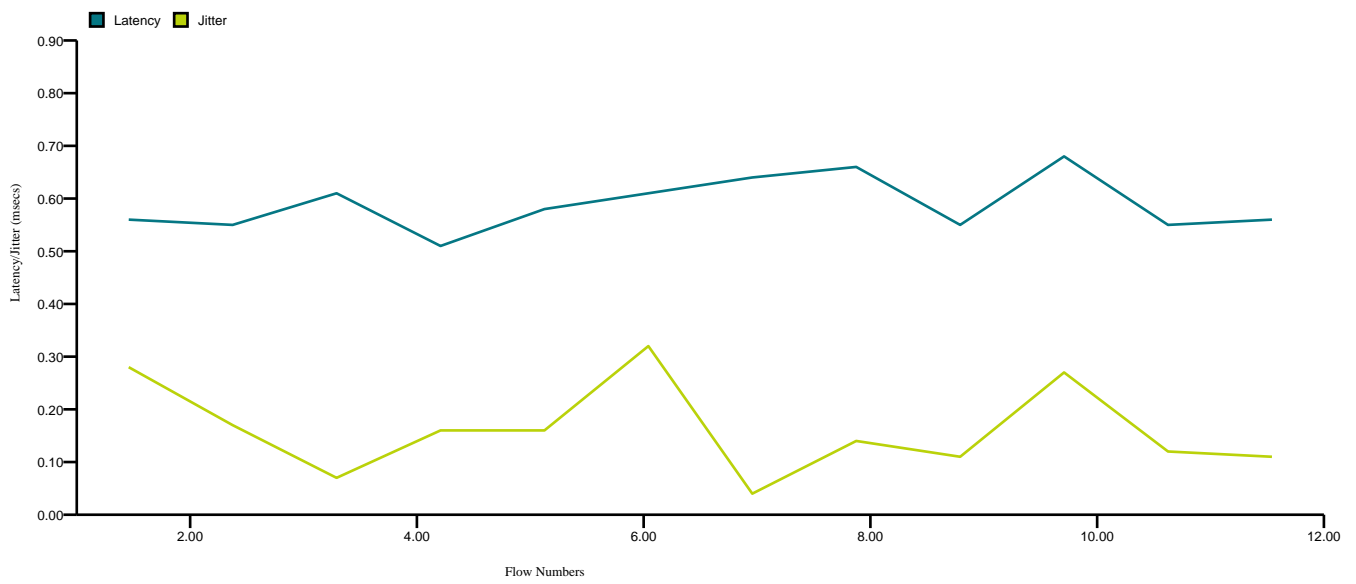


The following table shows more information about each flow of this traffic type for debugging purposes.

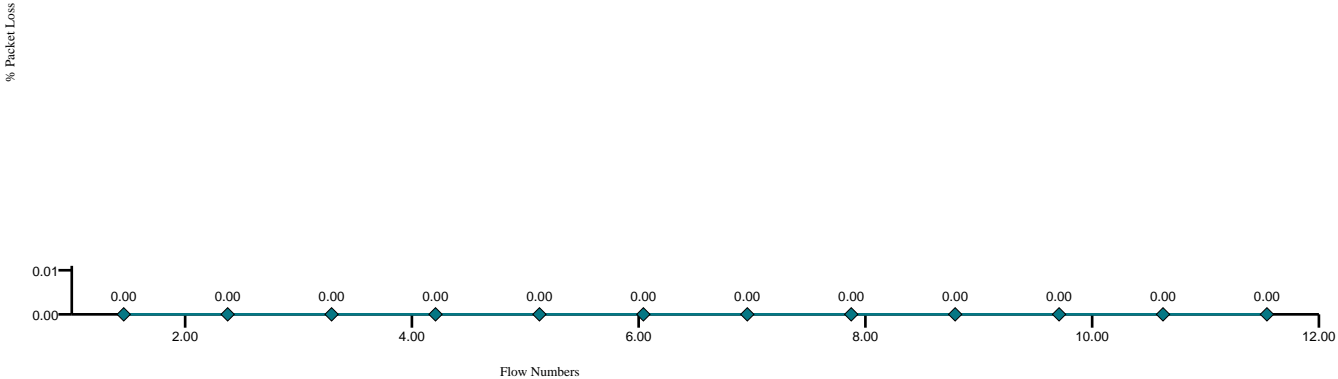
Flow Num	IP	MAC	Port	Network	Direction
1	172.16.179.90 to 172.16.190.68	00:01:01:05:00:00 to 00:02:01:16:00:00	wt-tga-10-23_card1_port1 to wt-tga-10-23_card2_port1	vwaveopen, 00:18:74:fa:ab:e2	Downlink

Flow Num	IP	MAC	Port	Network	Direction
2	172.16.190.68 to 172.16.179.90	00:02:01:16:00:00 to 00:01:01:05:00:00	wt-tga-10-23_card2_port1 to wt-tga-10-23_card1_port1	vwaveopen, 00:18:74:fa:ab:e2	Uplink
3	172.16.188.72 to 172.16.179.90	00:02:01:17:00:00 to 00:01:01:05:00:00	wt-tga-10-23_card2_port1 to wt-tga-10-23_card1_port1	vwaveopen, 00:18:74:fa:ab:e2	Uplink
4	172.16.179.90 to 172.16.188.72	00:01:01:05:00:00 to 00:02:01:17:00:00	wt-tga-10-23_card1_port1 to wt-tga-10-23_card2_port1	vwaveopen, 00:18:74:fa:ab:e2	Downlink

Latency and Jitter for RTP flows



Percentage Packet Loss for RTP flows



## Test Parameters

The table below shows the input parameters for the test

Parameter	Value
WaveQoE Mode	ClientMix
Trial Duration	30 secs
Settle Time	1 secs
Aging Time	0 secs
Reconnect Clients each Trial	True
Number of Trials	1 Trial(s)
Search Mode	None
Client Load Per Port	20
Continue Test On Fail Run	False

The table below shows the Intended Client Mix configured in the test. The actual percentages of clients and the types of traffic in the test may change if some of the clients/flows fail to connect.

Client Type	Traffic Profiles	% Clients	Num Clients
Handset	VOIPG711	15.0	3.0
Laptop	Http Get,FTP Get,SMB,DNS Req,Windows Media Player	60.0	12.0
PDA	unclassified UDP Traffic,YouTube_Video,SMTP	10.0	2.0
ibm_laptop	agentVoip	5.0	1.0

The table below shows SLA Specifications for the Traffic Flows in the Test

Traffic profile	SLA Metrics and Requirement
YouTube_Video	playDelay = 5 secs , contPlay = Yes ,
VOIPG711	slaMode = R-value , value = 78 ,
SMTP	perLoad = 50 % (14.0 Kbps)
Windows Media Player	Latency = 10000 msecs , Jitter = 500 msecs , PacketLoss = 10 % ,
Http Get	perLoad = 50 % (12.5 Kbps)
DNS Req	perLoad = 50 % (1.5 Kbps)
SMB	perLoad = 50 % (21.0 Kbps)
unclassified UDP Traffic	Latency = 10000 msecs , Jitter = 500 msecs , PacketLoss = 10 % ,
agentVoip	slaMode = R-value , value = 78 ,
FTP Get	perLoad = 50 % (190.0 Kbps)

## 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	Channel	BSSID	SSID	Min RSSI	Avg RSSI	Max RSSI
wt-tga-10-23_card2_port1	1	00:18:74:FA:AB:E2	vwaveopen	-13.0 dBm	-13.0 dBm	-13.0 dBm

RSSI values should be between -25 dBm and -35 dBm. If the RSSI is not in this range, modify the external attenuation to bring it into this range.

## Other Information

Results Directory      C:\Program Files\VeriWave\WaveQoE\Results\20090716-162035  
 WaveQoE Version      5.1-RC1-WT-3.6, 2009.07.14.03  
 WaveTest Version      3.6.0-RC2, 2009.07.10.07