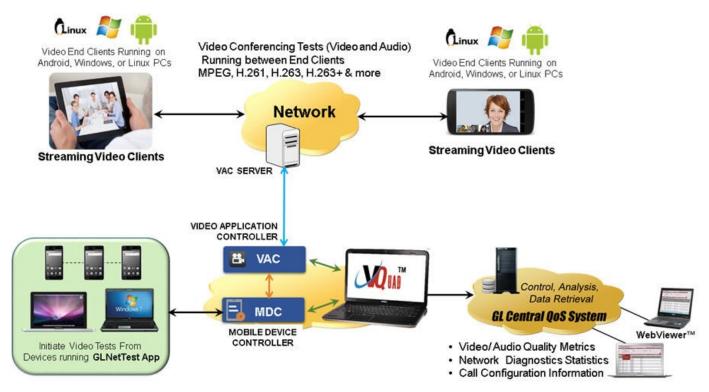
Automated Video Quality Testing Solutions



Overview

Video services can be broadly classified into two categories: **Video Broadcasting** or streaming, and **Video Conferencing**. Video broadcasting is essentially a one way application, downstream to the consumer, and Video Conferencing, is basically two-way web-based interactive application, much like voice, with simultaneous upstream and downstream for communications over IP. Consumer applications such as Google Hangouts, Apple Facetime, Skype, and Enterprise solutions from Cisco, Polycom, BlueJeans, are some examples.

Along with existing voice, and data quality test solution, GL's VQuad[™] now adds the ability to test, and measure video services over IP, and Wireless networks to determine the performance of a video call.

GLNetTest app along with the GL VAC (Video Application Controller) which is installed on any off the shelf Android mobile device, thus supporting both video and data testing from the mobile device. In other words, the GL Video Conference test solution tests video between any two devices (Android, Windows, Linux), while allowing the user to specify the exact Video parameters and returning Video and Audio MOS along with a variety of Video metrics.

The GLNetTest supports Data testing from the mobile device including the following tests, TCP, UDP, HTTP, VoIP, FTP, DNS, SMS, and Video Simulation. In addition, the GL VQuad[™] application supports fully automated testing of the Video and Data test solutions using the VQuad[™] scripting.

Video test results include Video MOS, Audio MOS, and A/V MOS along with a variety of analytical metrics and quality metrics. All the video/audio test results and events can be automatically sent to the central database. Using WebViewer[™], query and display these results, statistics, status, and even plot Pass/Fail results directly on Google Maps.

For more details, visit Automated and Manual Video Quality Testing webpage.



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Main Features

- Supports Android, Windows, and Linux video end client devices
- Supports both manual and automated (scripted) video testing within VQuad™
- Monitor Audio/Video Quality in Real-time
- Monitor service level compliance with SLAs
- Perform pre-deployment service testing
- Unlimited test plans configurations with Codec, Frame Rate, Bandwidth, Latency, GoP (Group of Pictures) Structure and Video Resolution
- Test results include Video Quality (Relative MOS-V), Audio Quality (Relative MOS-A), Audio Video Quality (Relative MOS-AV), IP Network condition parameters, Signaling Performance, and Call Config Info
- Initiate multiple (consecutive and/or concurrent) IP video calls between licensed agents
- Customized, consolidated, and interactive charts showing quality and diagnostic metrics
- Supported on Linux/CentOS, Windows 10 and above operating system

Video Tests from VQuad™

Video tests can be performed manually between 2 end points or completely automated using the flexible and versatile VQuad[™] scripts.

Manual Video Tests from VQuad[™]

Manual video tests can be configured by connecting to the VAC server and optionally to the Central DB to send the results directly to the central location for display in Webviewer[™]. Licensed Test Agents, Test Plans, and Interface test parameters are dynamically set once connected to the VAC Server. However, users can also manually get the test parameters from the ini configuration file and set the source and destination end points to run the test.

Status	Results	Manual VAC Test
C Server IP: 192.168.1.77	Disconnect	esults To Central DB
est Agent A	Test Agent B	Test Plan:
Point A: SINU	Point B: RUDRESH	VideoTP_SingleTest
nterface A: ethernet	Interface B: local area connection 4	
Cast Task David Link		
Stop Test Get Test Param List	Get Test Param (ini)	

Figure: Manual Video Testing from VQuad™



Automated Video tests from VQuad™

VQuad[™] scripting provides automation capability, remote accessibility, analysis and centralized data retrieval, which are just a few attributes of GL's next generation Voice, Video, and Data Testing solution. Using VQuad[™] scripts the video tests can be automated on multiple devices, the status and results for all the connected devices can be viewed in the VAC Test Events log.

谷 GL VQuad(TM)				ſ
File View Functions Setup Window	v Help			
GL 💰 🌯 🖥 🔻 🌆	📕 📓 🖩 🕼 😣 😲			
Configure Start/Stop	🕽 GL VQuad(TM) Script View	×	×	
Setup Devices	Terminal		ave / Exit	
		×	Cancel	
terendaria en la constanta en				
Auto Config:			Graceful stop	
- Script: Test_VAC	1	<u>×</u>		
	AT command:	Send Clear Terminal		
ie ≝a,4 ie ≝a,5	Device Name: 🛱 2 💌	Append Return and Line Feed characters		
🕀 🔄 6	Scripts Global Device Start Variables	Events:		
er-blag 7 er-blag 8	Call Control Scripting	Doloop; Iteration=7 of 9999 Created Call Id LeePCVACTest		
	18:54:16 / 04-08-2015	VACTest: Connect to Server:192.168.1.80		
	start of script Do: Iterations=9999;	VACTest: Start Test for Device#1 Waiting For VACTest Done		
	Create Call IDs: Call IDs=LeePCVACTest;	Clear All Variables		
	Send Call ID: Device ID=?; Direction=Outbound; VACTest: ConnectToServer=192.168.1.80;	Doloop; Iteration=1 of 9999 Created Call Id LeePCVACTest		
	VACTest: StartTest=VIJAY,local area connection,NEHA,	VACTest: Connect to Server:192.168.1.80		
	Wait Event: Event=VACTest Done;Interval=120; If: VACTest Done;	VACTest: Start Test for Device#1		
		walking for wastest bolte		
		-		
	Clear Variables Stop	Auto scroll to show latest events Clear Events		
Call Auto	C:\Program Files (x86)\GL Communications Inc\VQuad\Profiles\Test_VA	D.scp		

Figure: Automated Video Testing from VQuad[™] using Scripts

Video Application Controller (VAC™)

Video Application Controller (VAC) allows VQuad[™] and NetTest applications to use the web services of the VAC Server to automate and control all active Video Test Agents such as to start/stop tests and to obtain the corresponding results.

User has an option to configure unlimited Video Test Plans based on a variety of video parameters. Typical low end video conferencing system characteristics includes:

- Video Codecs supported are JPEG, H.261, H.263, H.263+, H.264, MPEG, MPEG-2, MPEG-4, VC1
- Video Frame rate used for the test can range from 5 fps up to 60 fps
- One to one chat bandwidth of at least 1 Mbps uplink / 1 Mbps downlink; One to many chat may require at least 1 Mbps uplink / 2 Mbps downlink; more bandwidth will be required for better quality
- Minimal one way latency of 150 to 300 ms is needed to avoid double talk, this is independent of video quality
- Resolution (Image size) can vary from 320 x 240 pixels, 15 frames/sec, 640 x 480 pixels, 30 fps, to 1280 x 780 pixels, 30 fps
- Acoustic echo cancellation is necessary if speakerphones are used to improve audio quality
- Group of Pages (GOP) structure a group of frames are treated together to achieve greater compression

	Video Options
Video Preset	Custom
Codec	H264 V
Video Image Size	SDTV 480i •
Frame Rate	30 fps 🔹
GoP Structure	IBPBPBP
GoP Length	15
Playout Buffer Delay	80 (?
Video Stream Smoothing(%)	
Video Quality (0-100)	50.0
Estimated Peak Video Bandwidth	25.8 Mbps
Estimated Avg Video Bandwidth	1.17 Mbps
	Audio Options
Audio Codec	G.711 p-law PLC 64k V
Audio Packet Length (ms)	20 •
Audio Payload	1kHz Sine Wave
NOTE: Char	iges will go into effect when tests are restarted.
	Save Cancel

Figure: Video Conference Test Plans Configurations

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Video Results Display in VAC Server Web

The Video Conferencing test records are displayed in the VAC Server web UI, which contains a detailed performance metrics per video conferencing test call. The results include General Test Information with Endpoint Details, Video Quality (Relative MOS-V), Audio Quality (MOS-A), Audio-Video Quality (Relative MOS-AV), IP Network Health, Signaling Performance, and Call Config Info.

GLUSER1 NON APR 13 2015	Performance Metrics Signaling Trace		
51 PM (INDIA TIME) SERVICES	SERVICE CLASS: VIDEO CONFERENCE START TIM	MON APR 13 2015 17:51:05 E: GMT+0530 (INDIA STANDARD TIME) METRICS: ACTIVE (00:00:19)	Save to Collection Expert Diagnosis
Net Applic			1. m. r. m
P Net Servic			
Net Transp		Sample #1 - (0-19 seconds)	Sample #1 · (0-19 seconds)
		CALL ORIGINATOR	CALL ANSWERER
VidConf	Service	VidConf	VidConf
	Resource Group	TestResGrp (Equipment)	TestResGrp (Equipment)
VOIP	Endpoint Name / URI	tcmyuad75cc56@192.168.1.76	tomyuad219b208@192.168.1.80:5060
DMMUNICATIONS INC,	IP Address (Video port / Audio port)	192.168.1.76 (unknown / unknown)	192.168.1.80 (unknown / unknown)
2015	VLAN Encap/ID/CoS	Untagged	Untagged
	Endpoint/UA Type	DVQattest Agent	DVQattest Agent
	Call ID	998422367@NEHA-552bb4b5	
	Test Plan Name	VideoTP_SingleTest	
	UIDEO QUALITY (RELATIVE MOS-V)	4 1 5	4.03 1 🚺 5
	AUDIO QUALITY (RELATIVE MOS-A)	4.17 1 🚺 5	4.17 1 🚺 5
	AUDIO-VIDEO QUALITY (RELATIVE MOS-AV)	3.37 1 5	3.37 1 🗾 5
	IP NETWORK HEALTH	100 1 100	100 1 📕 100
	€ SIGNALING PERFORMANCE		
	■ CALL CONFIG INFO		

Figure: Performance Metrics - Viewing Endpoint Details

VIDEO QUALITY (RELATIVE MOS-V)	4	1 📕 🧧 5	4.05	1 📕 🧧 5
Image Size (Width X Height)		704 × 480	7	'04 X 480
Packet Loss Rate (%)	0	0 4	0	0 4
Corrected Packet Loss Rate (%)	NR	0 4	NR	0 4
Discard Rate (%)	0	0 4	0	0 4
Video Bandwidth (kbps)	1,158.6	0 📕 🚺 1000	1,185.4	0 📕 🚺 1000
Video Frame Rate (Frames per Second)	30	0 📕 🚺 30	30	0 📕 🚺 30
Impaired I Frames (%)	0	0 🚺 5	0	o 1000 100 5
Impaired B/P Frames (%)	0	0 5	0	0 5
Loss Rate within I Frames (%)	0	0 5	0	0 5
Loss Rate within B/P Frames (%)	0	0 🚺 5	0	0 6
Error extension through GoP	0	1 100	0	1 100
EPSNR	33.57	0 📕 🧾 50	33.57	0 📕 🚺 50
G.1070 Video MOS	4.357	1 📕 🧧 5	4.368	1 📕 5
I Frames Received	30		31	
B/P Frames Received	420		420	

Figure: Video Quality (Relative MOS-V) Result View

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Video Results Display in WebViewer™

The video test results from VQuad[™], VAC, or MDC are automatically sent to the VQuad[™] Central Database and can be viewed/queried using the GL's WebViewer[™] (web browser).

WebViewer[™] is a simple, easy-to-use Web browser which can operate on both PC and Mac systems (including iPhone and iPad).

- Multi-user support, and user-friendly interfaces are remotely accessible via browser based clients
- Central Database query via web interface to display results in both tabular and graphical formats.
- Results also include Video test results such as Video MOS, Audio MOS, and Audio/ Video MOS along with a variety of analytical metrics and quality metrics
- Filter results using user-defined search criteria.
- Customized Reports and test statistics.
- Google Mapping for all the Results and Events along with Mobile Device information for the available GPS co-ordinates

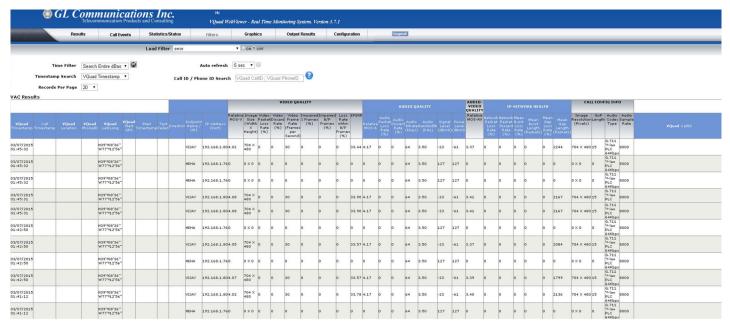


Figure: WebViewer[™] Video Test Results View

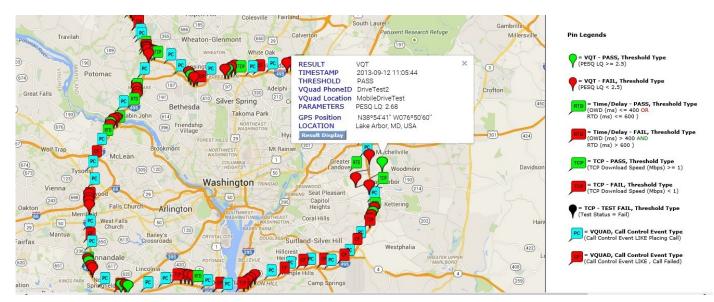


Figure: Google Mapping Test Results

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Buyer's Guide

Item No	Product Description
<u>VQT650</u>	VAC (includes VAC Server and VAC companion software)
<u>VQT661</u>	VAC Windows/Linux Agent, single license, 5Mbps
<u>VQT662</u>	VAC Windows/Linux Agent, single license, 10Mbps
<u>VQT663</u>	VAC Windows/Linux Agent, single license, 50Mbps
<u>VQT671</u>	VAC Android Agent, single license, 5Mbps
Item No	Related Software
<u>VQT600</u>	VQuad [™] NetTest Data Server Solution (Requires annual license renewal to remain functional)
<u>VQT601</u>	Mobile Device Controller (MDC) Software
<u>VQT040</u>	WebViewer™
<u>VQT241</u>	VQuad™ Dual UTA with Balanced, Analog FXO, PTT, and Phone Handset Interfaces
<u>VQT002</u>	Voice Quality Testing (PESQ only)
<u>VQT006</u>	VQT w/ POLQA Server License
<u>VBA032</u>	Near Real-time Voice-band Analyzer
<u>EMU037</u>	Echo Measurement Utility (EMU) Software

Note: PCs which include GL hardware/software require Intel or AMD processors for compliance.

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