

DVQattest® Agents are compact, high performance software test agents that analyze and troubleshoot the performance of networks and network applications in both enterprise and service provider environments.

Integrating seamlessly with Telchemy's SQmediator® management application, DVQattest Agents proactively monitor end-to-end network performance and ensure the reliable and secure operation of critical applications such as VoIP, video conferencing, web, and email. These versatile software agents deploy across a broad range of Windows, Linux, macOS, and Android/ChromeOS devices, creating a comprehensive, scalable, real-time active test and troubleshooting architecture that spans from core network and cloud applications to home-based and mobile users.

Key Features

- ▶ **Deploy and Test Anywhere:** easily install and manage agents on PCs, mobile phones/tablets, servers, routers, and other devices using standard MDM tools
- ▶ **Centralized Management:** manage a million or more DVQattest Agents from a single SQmediator® dashboard
- ▶ **Resource-Efficient:** transparently perform low-impact diagnostic tests on end user devices with minimal CPU/memory usage
- ▶ **High Performance:** execute up to hundreds of simultaneous tests per agent
- ▶ **Security Assurance:** agents operate over secure/encrypted connections (VPN, SASE), run tests using TLS, and automatically detect security issues such as invalid or expired certificates
- ▶ **End-to-End Monitoring:** continuously measure bandwidth, delay, packet loss, and more from remote users to cloud/edge applications
- ▶ **Server Monitoring:** assess availability and response times for DHCP, DNS, HTTP, POP3, and SMTP servers, with or without TLS
- ▶ **Video Conferencing Tests:** simulate popular services like Zoom and Teams, and custom sessions up to 8K resolution and 7 Mbit/sec
- ▶ **VoIP Testing:** generate SIP-based VoIP test calls with RTP/RTCP payload streams and a wide range of voice codecs
- ▶ **Real-Time QoE Analysis:** view precise MOS scores for voice and video tests to analyze user experience in real time

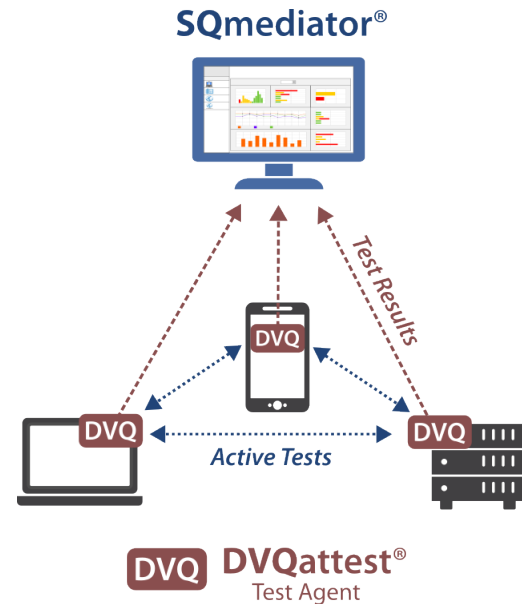


Figure 1: Distributed Active Testing with DVQattest Agents and SQmediator

Key Benefits

DVQattest Agents provide a scalable, cost-effective solution for proactive service level monitoring and troubleshooting. Benefits include:

Comprehensive Testing Capabilities

DVQattest Agents support a wide range of tests, including advanced network path diagnosis, secure application and service testing, and performance assessments for VoIP and video conferencing.

Scalability and Centralized Management

SQmediator can scale to manage over 1 million DVQattest Agents, enabling efficient test distribution, server load balancing, and automatic recovery from failures, making it ideal for large-scale deployments.

Efficient, Non-Disruptive Troubleshooting

Agents perform tests with minimal impact on system resources. For example, a test measuring bandwidth, packet loss, delay, and jitter every two minutes uses only 0.01 Mbps of bandwidth and trivial amounts of CPU and memory.

Secure Network Compatibility

Agents operate seamlessly within secure environments, including VPNs, SASE frameworks, and firewalls, performing tests using TLS encryption and identifying security vulnerabilities like invalid or expired SSL certificates.

Simple Automated Deployment

Easily install and manage DVQattest Agents across multiple platforms using standard MDM tools such as Jamf, NinjaOne, Microsoft Intune, and Google Play, simplifying mass deployment in varied environments.

Precise VoIP and Video Conferencing Quality Analysis

Assess SIP infrastructure functionality and media quality in real time by simulating VoIP calls with various codecs and emulating popular video conferencing services like Zoom, Teams and Webex. Get immediate Quality of Experience (QoE) feedback, including Mean Opinion Scores (MOS) for voice, video and audio quality. Detailed signaling analysis evaluates call registration, setup and termination and identifies setup/disconnect failures.

Network Performance and Impairment Detection

Use DVQattest Agents to continuously monitor network health and connection status from every end user device to Cloud-hosted applications or corporate resources such as email and web servers. Accurately detect and diagnose specific issues, including access network failures, restricted bandwidth, packet loss, and degraded Wi-Fi signals.

Versatile End-to-End and Group Testing

SQmediator supports an extensive variety of testing scenarios using DVQattest Agents, including:

- Tests from a remote agent (installed on a user desktop or mobile device) to a central, high-capacity hub agent
- Agent-to-agent (peer-to-peer) tests
- Agent to network entity tests - any host or device with an IP address or Fully Qualified Domain Name (FQDN)
- Group tests in one-to-many / many-to-many configurations

SQmediator's group tests and automated test scheduling make it quick and easy to quickly set up and execute high volumes of tests across complex networks with large numbers of users.

Key Quality Metrics

Network Tests

- Peer-to-Peer Test - measures packet loss, jitter, and bandwidth in each direction; measures round-trip delay and estimates one-way delay
- Path Diagnosis - detailed per-hop packet loss and delay between a test agent and another agent or network entity
- Ping and Traceroute - packet loss and delay between any test agent and another agent or network entity

Network Application and Service Tests

- HTTP/POP3/SMTP/DHCP/DNS Server Testing - synthetic transactions with detailed connection & response messages

Voice over IP Tests

- Listening/Conversational Quality MOS Scores
- Listening/Conversational Quality R Factors
- Modem/Fax Reliability and Throughput Metrics
- Packet Loss and Discard Rates
- Burst and Gap Statistics
- PPDV and MAPDV Jitter
- Round Trip Delay
- End System Delay
- Signal Level during active speech
- Noise Level during silence periods

IP Video Conferencing Tests

- Video, Audio, and Audio-Video MOS Scores
- Video Service Transmission Quality (VSTQ)
- Group of Pictures (GoP) Type and Length
- Frame size / frame rate
- Received/impaired I, B, and P Frame Statistics
- Packet Loss and Discard Rates
- Burst and Gap Statistics
- PPDV and MAPDV Jitter
- Media analysis and degradation factors

Key Components

Key components of the solution include the following.

DVQattest Agents - compact, configurable software test agents for Linux, Windows, macOS and Android devices. Agents can be individually installed or configured and deployed in bulk using common Enterprise endpoint management/MDM tools.

DVQattest Agents can perform a range of diagnostic tests to other test agents or network entities (any device with a reachable IP address or FQDN). To evaluate the performance of network services and applications, test agents can perform synthetic transactions with DHCP, DNS, HTTP, POP3, and SMTP servers. Agents can use unencrypted TCP/UDP or TLS, providing support for secure applications testing.

For advanced diagnosis of IP and MPLS network performance, peer-to-peer probe tests can be performed between two test agents. By exchanging a brief series of packet trains between agents, DVQattest can provide a quick diagnosis of packet loss, jitter, and delay between any two points in the test network.

To test or troubleshoot the performance of VoIP and video conferencing services, each test agent can generate multiple network tests as well as VoIP and video conferencing tests using simulated media streams with a wide range of codec and payload types and configurable parameters. Voice and video test calls can be generated to other test points (any machine running a DVQattest test agent) or to SIP-capable devices such as IP phones and video conferencing terminals.

DVQattest test agents use integrated VQmon® technology to analyze test streams and provide extensive real-time performance metrics—for both the local and remote test points—to the SQmediator Controller in the form of detailed test records and path statistics.

SQmediator - a software-based, multi-user performance management system that supports both passive and active quality monitoring. In active mode, the SQmediator Controller application is used to authenticate and manage DVQattest Agents, initiate tests and collect test results. The SQmediator Reporter provides the front-end user interface, with a browser-based GUI that enables users to configure test agents and test plans, execute tests, and view data from completed tests (see Figure 2).

Practical Applications

DVQattest Agents and SQmediator provide a powerful, scalable tool for predeployment testing, problem isolation, and SLA monitoring of IP voice and video services in enterprise network environments.

Figure 3 on page 4 depicts a typical application of DVQattest Agents and SQmediator for proactive performance monitoring in an enterprise network. In this scenario, agents are installed on or embedded into various devices in the company headquarters and branch office, as well home-based and flexible office user PCs and mobile employee devices.

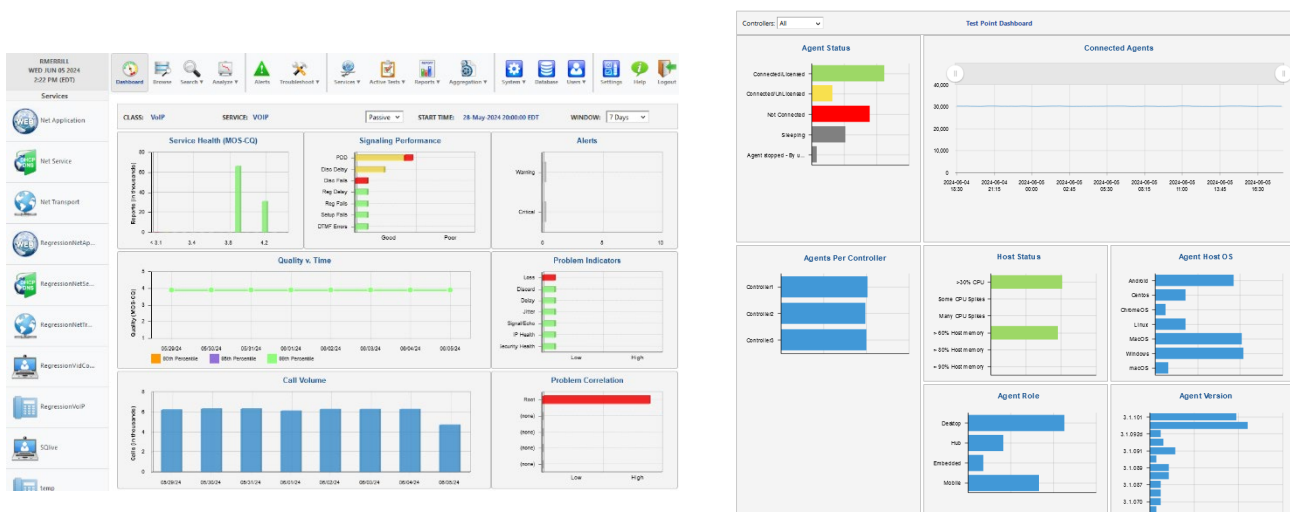


Figure 2: SQmediator Reporter Main Dashboard and Test Point Management Dashboard

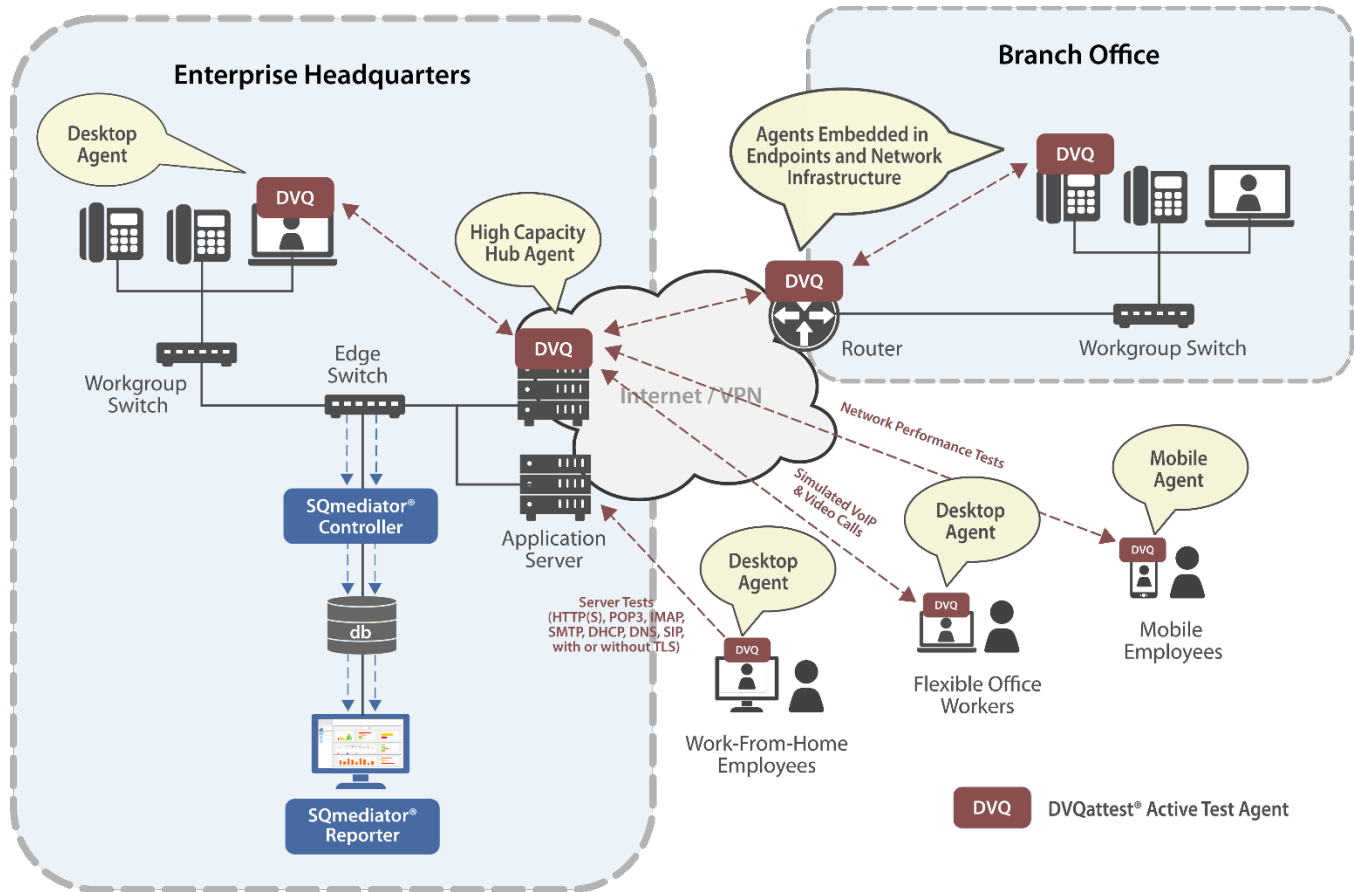


Figure 3: Enterprise Voice/Video and Network Applications Testing with DVQattest Agents and SQmediator

Each agent runs invisibly to the end user and supports a wide range of tests, including:

- Simulated VoIP and video conferencing calls
- Network performance tests - measure end-to-end packet loss, jitter and latency along the path to each user
- Network server/application tests - monitor availability and response time of critical business applications such as web and email

Transport Layer Security (TLS) is supported for all tests.

Organizations can run tests on a predefined schedule for continuous, low-impact service level monitoring, or on demand to troubleshoot a known problem.

Examples of proactive monitoring methods include:

- Making a brief test VoIP or video conferencing call every hour from each end user's phone or desktop to monitor QoE
- Running a test every 15 minutes from each user's device to a web, email or other application server on the corporate network
- Performing periodic network performance tests to evaluate the health of the underlying IP network

At the completion of a test, each agent sends a detailed record to the SQmediator Controller containing network metrics, estimated quality scores, and other diagnostic information. Figure 4 on page 5 shows an example of the quality metrics displayed in a video conferencing test record in the SQmediator Reporter user interface.

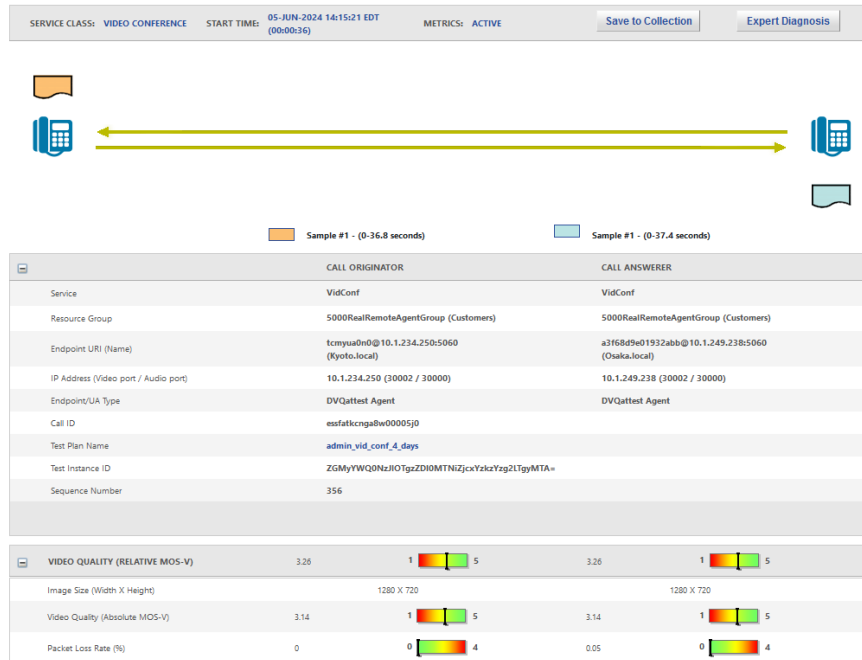


Figure 4: Quality Metrics from a Completed Videoconferencing Test

Performance and Accuracy

Telchemy's solution is engineered to meet the high-performance demands of large service providers and enterprise organizations, delivering a precise representation of real-world traffic patterns along with detailed reporting on call/video quality and network performance. Each DVQattest Agent, when deployed on a standard user PC or server, can handle up to 500 simultaneous calls. On smaller platforms, such as mobile phones, the agents operate just as effectively, scaling down to meet the resource limitations while still delivering reliable test results.

DVQattest Agents leverage Telchemy's VQmon embedded analytics technology to accurately derive MOS and R-factor scores for both listening and conversational quality. These scores are based on various metrics—including packet loss/discard, delay, burst and gap statistics, and echo—collected throughout and at the conclusion of calls. Telchemy has conducted extensive testing to ensure that these estimated quality scores closely align with published data derived from subjective user opinions.

Summary

DVQattest Agents and SQmediator bring the power and flexibility of distributed testing to enterprise VoIP and IP video performance management systems. By utilizing a distributed network of lightweight, resilient test agents combined with a centralized configuration and reporting interface, this solution easily scales to networks of any size.

With DVQattest Agents and SQmediator, network managers can proactively predict and prevent costly, time-consuming issues associated with deploying IP voice and video services. In existing VoIP/IP video network environments, this integrated solution is an invaluable tool for identifying trouble spots, precisely diagnosing the causes of degradation wherever they occur, and maintaining the highest level of service quality across the network.

DVQattest Agent 3.1 Technical Specifications

Software Environment

- DVQattest Agent:
 - Windows 10 / 11
 - Various Linux distributions, including:
 - Red Hat Enterprise Linux (RHEL) / Rocky / Oracle / AlmaLinux 8 or 9
 - Debian 12
 - Ubuntu 22, 23 or 24
 - macOS 10.14.6 (Mojave) or higher
 - Android/ChromeOS
- SQmediator Controller/Reporter:
 - Red Hat® Enterprise Linux/ Oracle® Linux/Rocky Linux 8 or 9

Minimum Hardware Requirements (Test Agent)

- ARM/MIPS or Intel/AMD CPU

VoIP Call Generation

- SIP Signaling (RFC 3216) Register, Invite, Bye
- RTP (RFC3550) with RTCP SR/RR
- RTCP XR (RFC3611) VoIP Metrics
- Multiple codecs supported
- Automatic variation of call duration, inter-call gap, codec and frame length

VoIP Quality Measurement

- VQmon® Call Quality Analysis
- ITU-T P.564
- ITU-T G.107 with ETSI TS101329-5 Annex E
- MOS-LQ, Listening Quality
- MOS-CQ, Conversational Quality
- Jitter Buffer Emulator

IP Video Stream Generation

- Video bit rates from 256K to 7 Mbits/sec
- Selectable GoP Structure
- Streaming or interactive video
- Selectable video codec

IP Video Quality Measurement

- VQmon® video & audio quality measurement
- Video quality metrics including:
 - MOS-V Picture Quality score
 - MOS-A Audio Quality score

- MOS-AV Multimedia Quality score
- Video transmission quality – VSTQ
- Estimated Peak Signal-to-Noise Ratio (EPSNR)

Network Diagnostic Testing

- Test from a DVQattest Agent to another test agent, SIP device, or any network entity with an IP address or FQDN
- Ping / traceroute
- Advanced per-hop IP path diagnosis
- Peer-to-peer probe tests between two agents
- Network server/application testing: DHCP, DNS, HTTP, POP3, SMTP, SIP OPTIONS
- Supports TLS for secure applications testing

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