# TeleMediQual Monitor

## QoE and QoS measurement and monitoring for telemedicine



## Product information

### Product

- ☑ Software
- ☐ Hardware [1]

### Results

- ☑ Video quality
- ☑ Audio quality
- ☑ Skew (misalignment between audio and video, in milliseconds)
- ☑ Video time offset (in milliseconds)
- ☑ Audio time offset (in milliseconds)
- ☑ Transmission-related QoS parameters (packets loss, delay, jitter, reordering, corruption, etc.)
- ☑ Machine-related QoS parameters (CPU usage, RAM usage, etc.)

### Input types

- ☑ Capture card/device
- ☑ IP streaming [2]
- ☑ Desktop capture
- ☑ Audio/video files (in virtually any format)

### Applications

- ☑ Telemedicine communications setup
- ☑ Telemedicine equipment benchmarking
- ☑ Telemedicine equipment optimization
- ☑ Telemedicine monitoring
- ☑ Alerts receiving when problems happen

[1] Hardware (PC) may be supplied as an option

[2] Supported protocols: UDP, RTP, HTTP, HTTP Live Streaming (HLS), RTSP, RTMP

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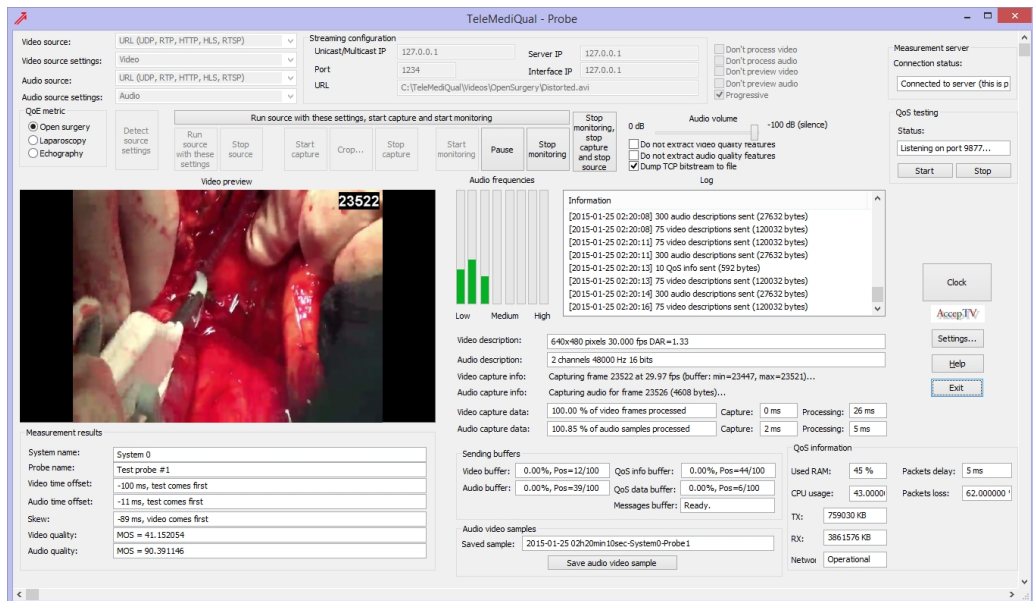
Telemedicine is getting more and more importance.

However, it is always difficult for engineers to find and setup the best audio/video equipment for telemedicine because it relies on the judgment of medical experts. They are the only ones to know which quality level is needed for each medical act.

Designed with the help of medical experts (doctors, surgeons, specialists), TeleMediQual Monitor is a unique solution to measure and monitor both QoE and QoS for telemedicine applications.

Indeed, TeleMediQual Monitor can compute the most important QoE indicators (KPIs): video quality, audio quality, video delay, audio delay and skew (lipsync, misalignment between audio and video).

And, TeleMediQual Monitor can also measure the most important QoS indicators (KPIs): packets loss, packets delay, jitter, reordering, corruption.

Moreover, TeleMediQual works in real time, enabling real time QoE and QoS monitoring of an audio/video communication.

All measures are saved so that TeleMediQual Monitor permits to browse past measures to get curves and statistics about QoE and QoS.

TeleMediQual Monitor supports audio video input from:

- Audio video capture devices
- IP streaming (UDP, RTP, RTSP, RTMP, HTTP, HTTP Live Streaming)
- Desktop capture
- Audio video files (virtually any format)

TeleMediQual is not dependent on specific hardware, you can install it on any Windows™ PC. You can even run it on a laptop!

TeleMediQual Monitor contains 2 types of agents:

- several probes
- and one measurement server

At least two probes must be used (so the audio/video signals have to be captured at two different places). One probe acts as a "reference probe" while at least one other probe is a "test probe".

Each probe captures audio and video. Then it computes audio descriptions and video descriptions, and send them to the measurement server. The server compares the audio and video descriptions from each test probe with the ones from the reference probe.

This comparison produces the QoE KPIs (audio and video quality scores, audio and video delays, skew).

In parallel, the probes can exchange test packets to test the QoS of the transmission between them. Doing this, they measure transmission-related QoS KPIs (packets loss, delay, jitter, reordering, corruption). They also measure the health of their local machine.

All measured data are saved to disk and can be retrieved between two user-chosen dates and times, thanks to the integrated HTTP server.

Curves and statistics can be remotely monitored in real time in any web browser.

At last, TeleMediQual Monitor can save audio video samples when a problem happens (from a few seconds before the problem, to several seconds after the problem). And TeleMediQual can trigger alerts when problems arise.

Take the lead in the race for quality

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AccepTV
Perceived Video Quality Metrics

TeleMediQual

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## Telemedicine acts

TeleMediQual Monitor's video quality metriscs have been designed for the following telemedicine acts:
- Open surgery
- Laparoscopic surgery
- Echography (ultrasound)

## Security

Sent data are encrypted using a user-defined password.

Any connection attempt without the appropriate password is refused.

## Integrated HTTP server

The measurement servers contains a password-protected HTTP server, providing a web interface your favorite web browser

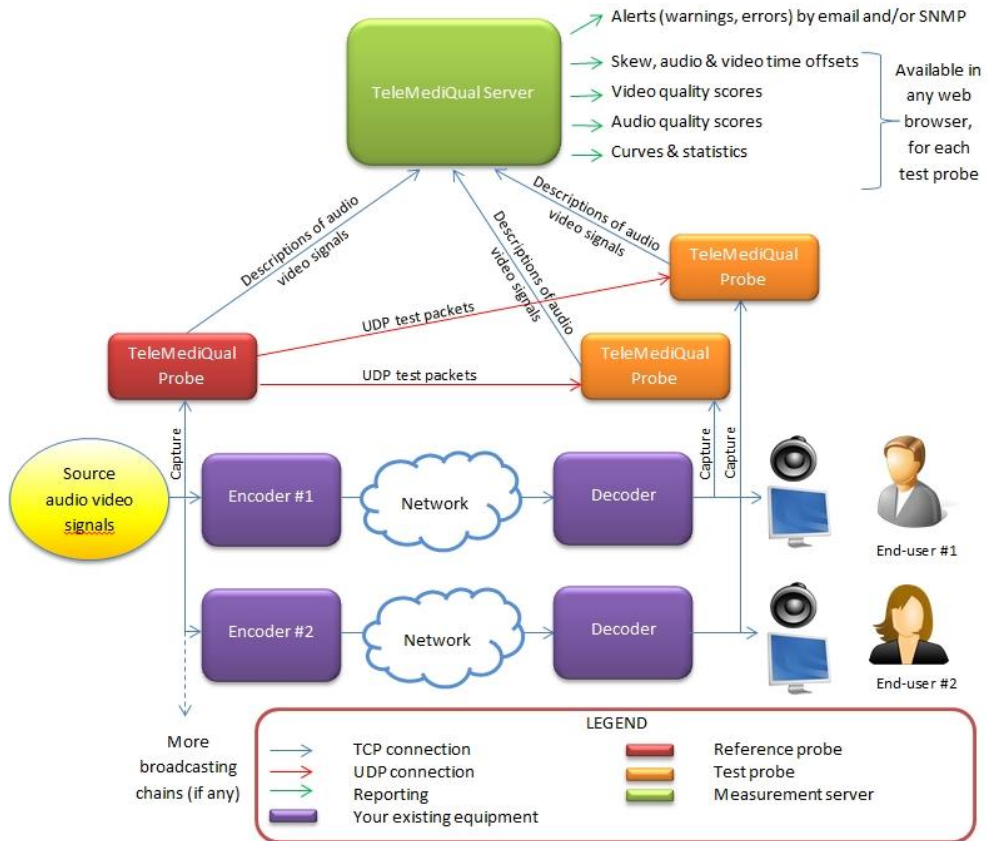Thanks to this web interface, you can see the measures performed in real time.

You can also browse past measures and get curves and statistics between two dates and times.

## More software, less hardware

The probes and the skew measurement server can all run on the same PC.

And more, a single server can process probes capturing different systems (to monitor different TV channels for example).

**Ask for a free evaluation version now!**

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Alerts (warnings, errors) by email and/or SNMP
Skew, audio & video time offsets
Video quality scores
Audio quality scores
Curves & statistics

Available in any web browser, for each test probe

**TeleMediQual Server**

Descriptions of audio video signals

**TeleMediQual Probe**

UDP test packets

**TeleMediQual Probe**

**TeleMediQual Probe**

UDP test packets

Source audio video signals

Capture

Encoder #1 — Network — Decoder — End-user #1

Encoder #2 — Network — Decoder — End-user #2

Capture

More broadcasting chains (if any)

**LEGEND**
- → TCP connection
- → UDP connection
- → Reporting
- ▪ Your existing equipment
- ▪ Reference probe
- ▪ Test probe
- ▪ Measurement server

**TeleMediQual deployment diagram**

**Input**
Uncompressed YUV or encoded video (virtually any format)
Uncompressed audio or encoded audio (virtually any format)
Support for DirectShow decoding filters
Any resolution (mobile, SD, HD or more), any frame rate
Any audio sampling rate (if not 48 kHz, audio will be resampled), stereo or mono

**Input source**
Files (useful for offline measurement or product evaluation)
Capture card or device (ex: Blackmagic Design, Aja, etc.)
Streaming using RTP, UDP, RTSP, RTMP, HTTP or HTTP Live Streaming (HLS)

**Network**
Bandwidth required for traffic from probe to server: < 30 kB/s
Bandwidth required for traffic from server to probe: < 1 kB/s
Buffering at both sending and receiving sides to cope with unstable networks
Automatic reconnection

**Measurement**
Skew (misalignment between audio and video between 2 probes), in milliseconds
Video time offset between 2 probes, in milliseconds
Audio time offset between 2 probes, in milliseconds
Video quality
Audio quality
Transmission-related QoS: packets loss, delay, jitter, reordering, corruption
Machine-related QoS: CPU usage, RAM usage, RX/TX data sizes, network status

**Results**
Curves, values (in milliseconds) and statistics between two user-defined dates and times (average and max value over each second)
Real time monitoring: curves and statistics in real time
Reports generation (CSV)
Audio video samples when problems happen (saving from several seconds before the problem, until several seconds after the problem).

**Extra**
Integrated HTTP server for distant results consultation and built-in database to store results
Audio volume control
Possible command line usage
Measurement warning and errors by email
Real time operating mode
Remote saving of audio video samples (the server can force a probe to save a sample)

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