



**TOUCHSTONE
TECHNOLOGIES**

Testing the fabric of IP communications™

WinEyeQ

User's Guide

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WinEyeQ User's Guide

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Introduction

The WinEyeQ VoIP call monitor and protocol analyzer is the ideal tool for anyone who needs to monitor Voice and Video over IP calls and Voice quality, detect errors in VoIP traffic, debug signaling problems or capture media streams. WinEyeQ's intuitive user-interface makes setup and operation a snap.

With WinEyeQ you view your network traffic in an intuitive manner. From network overview to media stream and protocol details, each piece of information is presented in context. WinEyeQ's analysis does not stop at the call flow level; however, it provides unparalleled analysis of each individual call component making difficult diagnostics simple.

WinEyeQ is designed for the Windows operating system. The following operating systems are supported:

Windows 2000 Professional, Windows 2000 Advance Server, Windows XP Professional, Windows 2003 Server, Windows 2008 Server, and Windows 7.

WinEyeQ's capabilities automatically scale with the hardware on which it is installed.

Minimum recommended configuration:

- 2.4 MHz Pentium 4 Processor
- 512MB Ram
- 60 GB hard drive
- 1280x1024

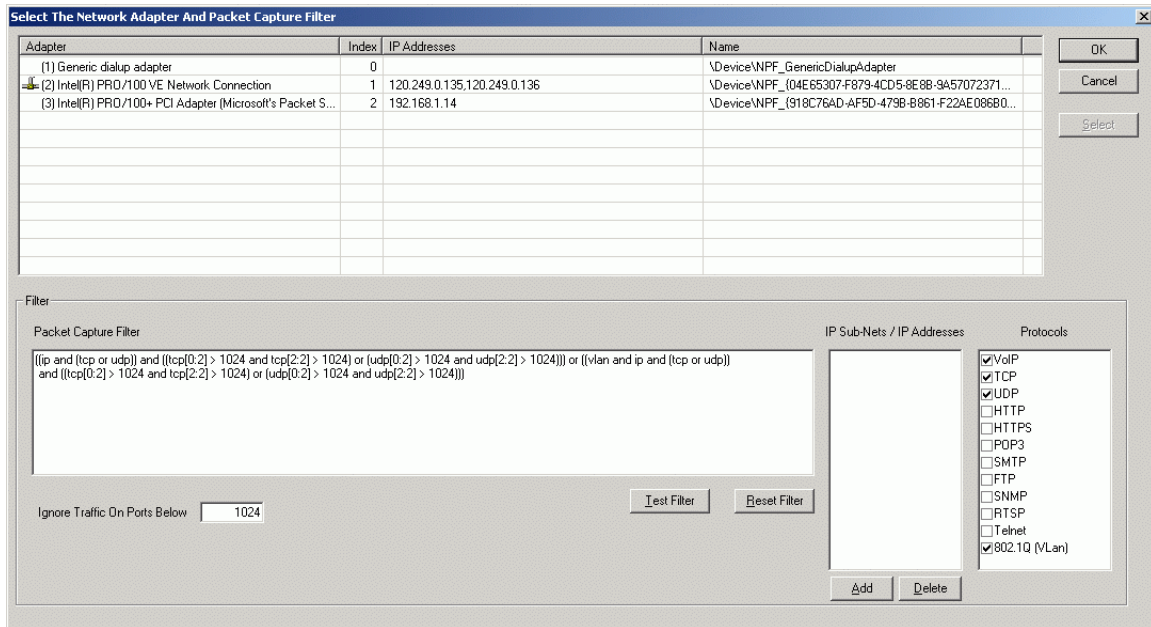
WinEyeQ is optimized for 1280 x 1024 displays.

The WinEyeQ software is copy protected and is licensed for use on a single machine. Please make sure that you install WinEyeQ on the machine with which you intend to use it. Installation of WinEyeQ on multiple machines is not possible without authorization from Touchstone.

The following pages will demonstrate how to install, setup, and get started with WinEyeQ. The next session is an overview of the latest additions.

Selecting the Network Adapter

One of the first steps in preparing to run WinEyeQ is to select the network adapter you wish to monitor. WinEyeQ will automatically display the Select Adapter screen immediately after starting it for the first time. You may also access this dialog from the Edit | Select Adapter menu item.



On the top part of the screen is a list of the Network Adapters that WinEyeQ has discovered on your PC. Select the adapter you want to monitor by clicking the adapter line and then pressing 'Select' or by just double clicking the adapter line.

This window will be discussed in great detail later in the manual.

WinEyeQ User Interface

WinEyeQ was designed to facilitate diagnostics by representing the network in a natural, intuitive, top-down manner. This presentation allows users to “drill-down” into areas of interest at the same time bypassing information that is neither relevant nor interesting at the moment.

Data Scopes™

WinEyeQ implements a series of graphical representations of both the Voice and Video over IP and non-VoIP components of your network. The “Data Scope” metaphor reinforces WinEyeQ’s drill-down user-interface approach. Each Data Scope is represented at its topmost level by a view of logically grouped components (e.g. network protocols) in a view that can be toggled between a pie

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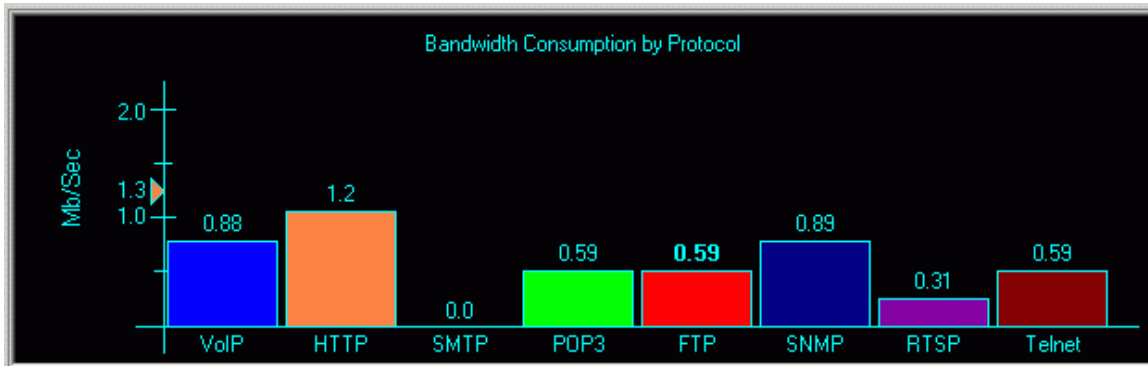
chart and a bar chart. Each of these components has at least one level of depth beyond the first, which minimally would be a historical representation of the values of the component over time, which we refer to as a “histogram”. At its most complex, the topmost Data Scope will be the highest representation of a series of cascading views which each end at a histogram.

Network Monitor View



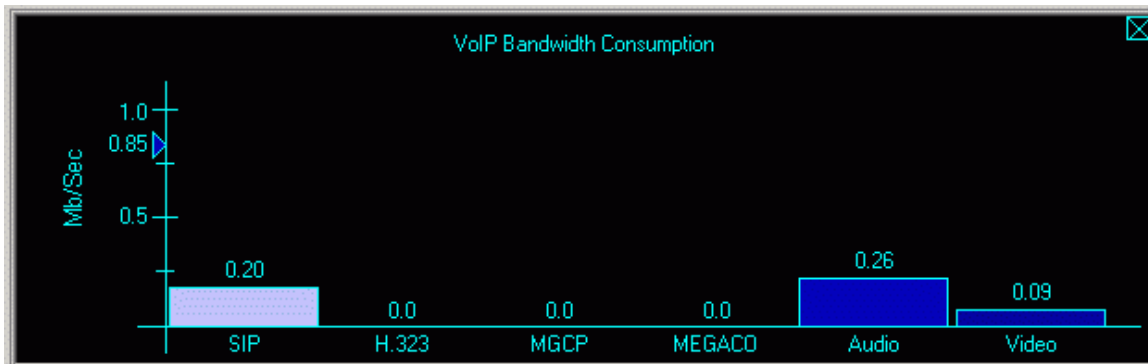
If we zero in on the Network Bandwidth Data Scope (found in the bottom of the upper right quadrant), we see a Data Scope that appears as follows:

Network Bandwidth Consumption; top view



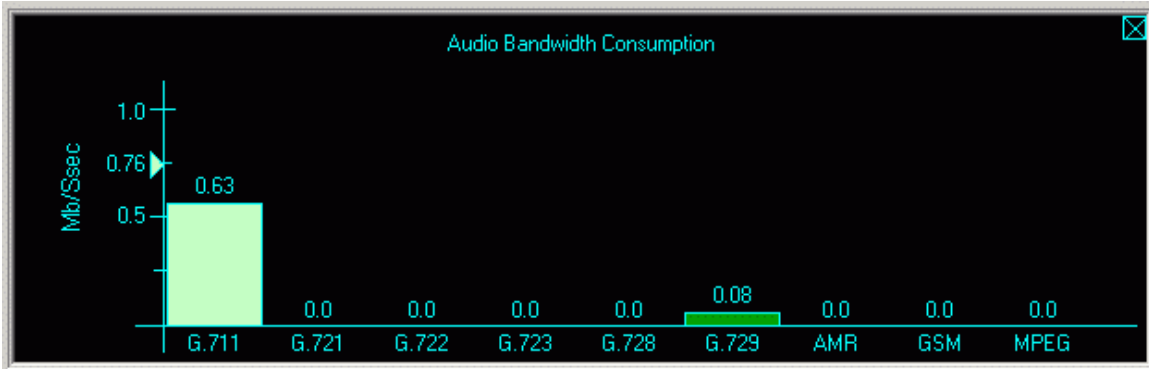
Notice that the components are grouped logically and that this Data Scope provides a high-level view of the bandwidth utilization of the various protocols on the network. The leftmost component is the VoIP component. To further explore the bandwidth utilization of the VoIP component, we can drill down by double-clicking on it. This action would yield a view of the VoIP breakdown as:

VoIP Bandwidth Consumption; level 2



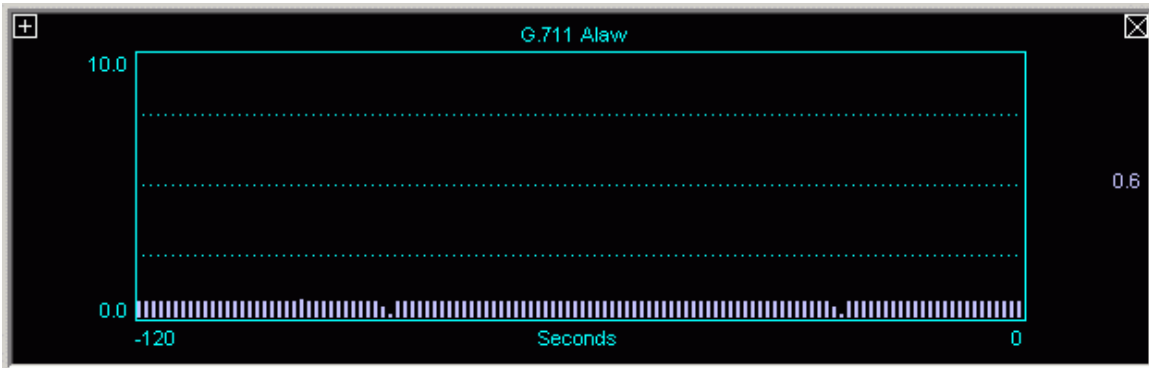
Once again, the components of this sub-level Data Scope are grouped logically, representing the top-level view of the bandwidth utilization of the VoIP components. The leftmost component is the SIP component, followed by H.323, Audio, and Video components. To further explore the bandwidth utilization of the Audio component, we can drill down by double-clicking on it. This action would yield a view of the Audio components as:

Audio Bandwidth Consumption; level 3



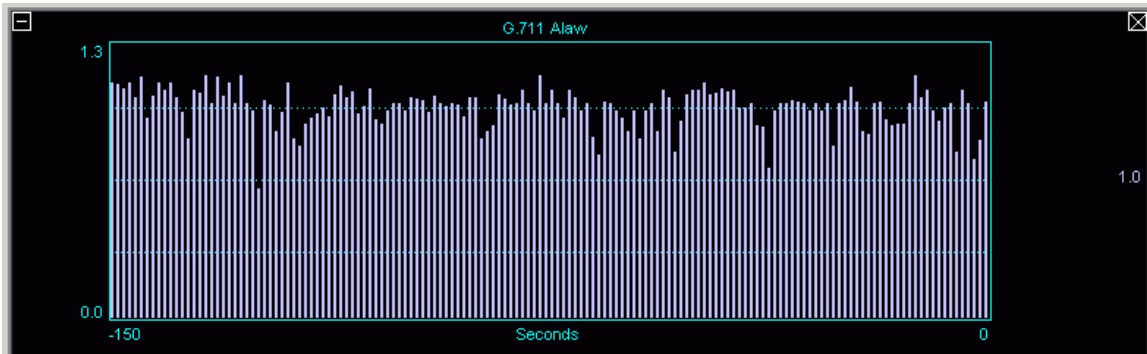
The components of this sub-level Data Scope are grouped logically representing the bandwidth utilization of the audio component by codec type. The leftmost component is the G.711 codec, which also has a sub-level Data Scope™ further refining it to the Alaw and Ulaw components. To further explore the bandwidth utilization of the G.723 component, we can drill down by double-clicking on it. This action would yield a view of the G.723 component as:

G.711 Bandwidth Consumption Histogram; level 4

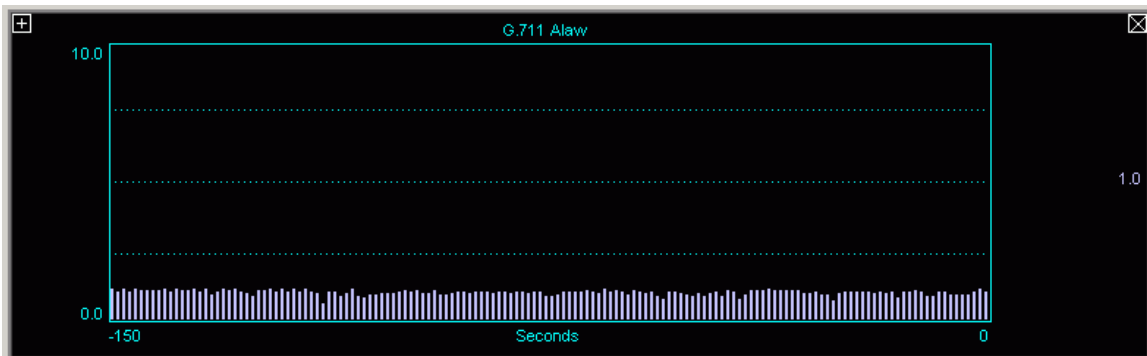


By clicking the “+” sign on the histogram, we can “Zoom In” on the series of values.

G.711 Bandwidth Consumption Histogram; zoomed



By clicking the “-” sign on the histogram, we can “Zoom Out” on the series of values back to:



Once you reach the histogram of a component you are at the end of the journey. You may back out from any sub-level at any time by using the “X” in the upper-right corner. The following section provides the user-interface tips and tricks for using the Data Scopes:

Data Scopes in Bar Graph View provide high-water marks for the component with the highest value on the scope. These marks, indicated by an arrow on the left scale, have the same color as the component that they are associated with. These watermarks are re-calculated every 10 updates of the Data Scope.

Navigational Tips

- Right-click the background area of a Data Scope to toggle between Bar Graph View and Pie Chart View.
- Double-click components to drill-down.
- Click the “X” box on a sub-level component to navigate backwards.
- Right-click any component to view its histogram.
- Click the “+” box to zoom-in the scale on a histogram.
- Click the “-” box to zoom-out the scale on a histogram.

User Interface: Step-By-Step

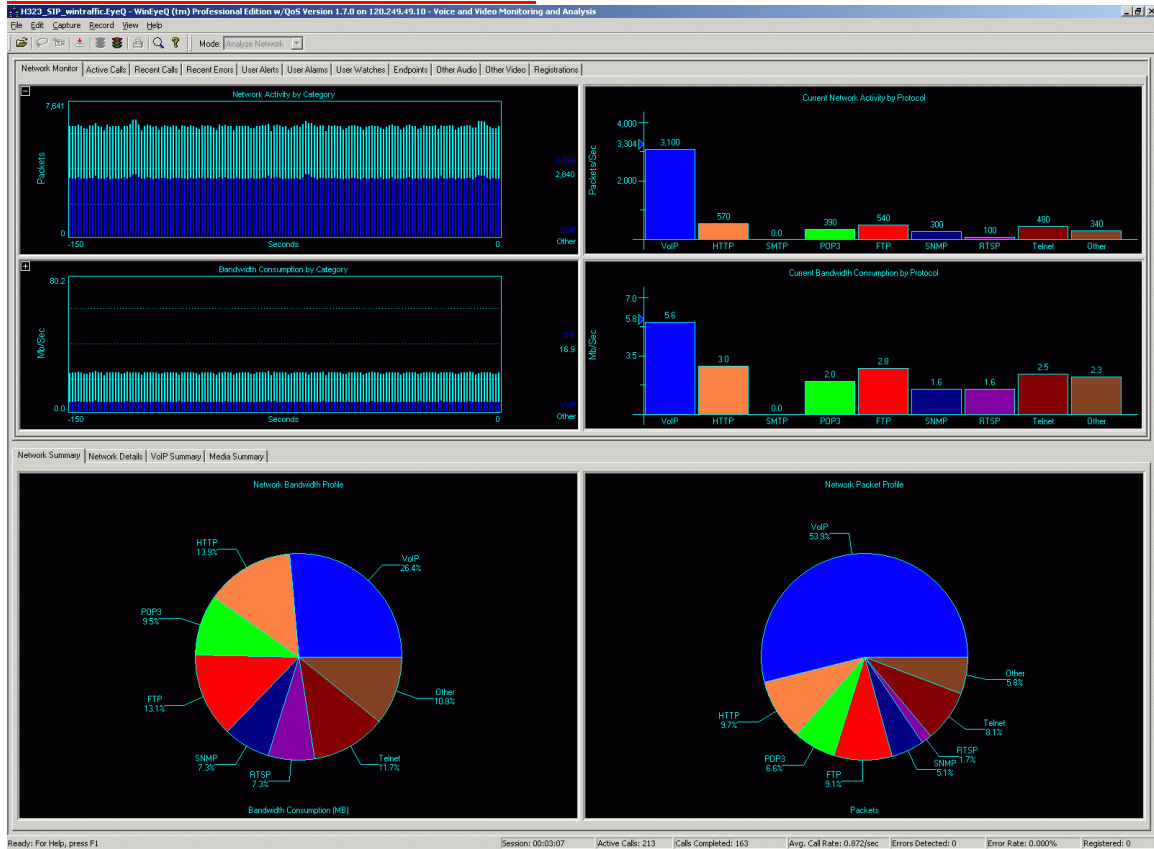
WinEyeQ's user interface is comprised of eleven (11) major views each containing up to eleven (11) sub-views. The ten major views represent the following categories:

- Network Monitor
- Active Call
- Recent Calls
- Recent Errors
- User Alerts
- User Alarms
- User Watches
- Endpoints
- Other Audio Channels
- Other Video Channels
- Registrations

The Network Monitor View

For the main view (Network Monitor) the Data Scopes are paired in Activity/Bandwidth pairs for logical groups of components. For example, Network Protocol Activity and Network Bandwidth Consumption by Protocol are paired together.

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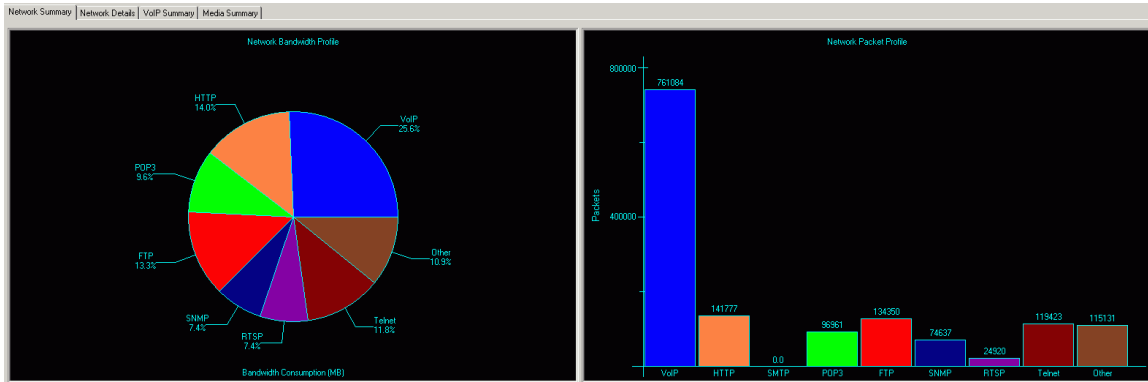


The Network Monitor View is designed to provide an overall picture of VoIP and Non-VoIP network traffic and resource utilization both instantaneously (top half) and historically (bottom half). You may elect to “drill into” any of the component elements as demonstrated earlier. The network monitor view has the following sub-views:

- Network Summary
- Network Details
- VoIP Summary
- Media Summary

Network Summary

This view presents the high-level Data Scopes. The graphs represent the Network Bandwidth and Packet Profiles by component over the duration of the session. In this example, the Network Packet Profile Data Scope is in Bar Chart Mode while the Network Bandwidth Summary is in Pie Chart Mode. These modes can be toggled back and forth by right clicking on the background of the Data Scope.



Network Details

| Protocol | Packets | Bytes |
|----------|------------|---------------|
| IP | 16,372,645 | 7,327,712,016 |
| ICMP | 13,497 | 1,180,157 |
| UDP | 15,808,954 | 6,973,748,744 |
| TCP | 950,170 | 25,330,127 |
| H.323 | 321,574 | 12,124,960 |
| RAS | 0 | 0 |
| TPKT | 308,958 | 13,411,246 |
| H.225 | 58,778 | 4,584,614 |
| H.245 | 262,796 | 7,540,336 |
| SIP | 102,146 | 54,863,916 |
| MGCP | 0 | 0 |
| MEGACO | 0 | 0 |
| RTP | 15,616,208 | 6,774,823,838 |
| RTCP | 90,810 | 17,506,208 |
| HTTP | 0 | 0 |
| HTTPS | 0 | 0 |
| SMTP | 0 | 0 |
| POP3 | 0 | 0 |
| FTP | 0 | 0 |
| SNMP | 0 | 0 |
| RTSP | 0 | 0 |
| Telnet | 0 | 0 |
| Other | 3,176 | 506,024 |

| Processing | Packets | (%) |
|----------------------|------------|--------|
| TotalPacketsReceived | 16,372,667 | |
| PacketsProcessed | 16,372,664 | 100.00 |
| PacketsMissed | 0 | 0.00 |
| PacketsDiscarded | 0 | 0.00 |
| TotalRTPPacketsLost | 0 | 0.00 |
| Packets/Sec. (Avg) | 5,220.88 | |

| Call Metrics | Value |
|--------------------------|--------|
| Current SIP Calls | 29 |
| Total SIP Calls Passed | 14,572 |
| Total SIP Calls Failed | 0 |
| Current H.323 Calls | 24 |
| Total H.323 Calls Passed | 14,670 |
| Total H.323 Calls Failed | 0 |
| Current Calls With Audio | 49 |
| Current Calls With Video | 24 |
| Current Endpoints | 102 |

| Average Network Metrics | Value | Maximum | Value |
|----------------------------------------------|--------|-----------------------|-----------|
| Audio Jitter (ms) | 1.20 | VoIP Calls | 77 |
| Audio Listening MOS (% of Optimal) | 94.77 | VoIP Bandwidth (Mb/s) | 37.22 |
| Audio Listening R-Factor (% of Optimal) | 93.53 | VoIP Packets/Sec | 11,667.53 |
| Audio Conversational MOS (% of Optimal) | 94.26 | | |
| Audio Conversational R-Factor (% of Optimal) | 92.77 | | |
| Video Jitter (ms) | 1.43 | | |
| Media Jitter (ms) | 1.28 | | |
| Initial Response Time (ms) | 0.0383 | | |

This view provides a numerical summary of the packets and byte counts analyzed by layer. The layers include:

- IP, ICMP, UDP, TCP
- H.323, RAS, TPKT, H.225, H.245
- SIP
- SCCP
- MGCP, MEGACO
- RTP, RTCP
- HTTP, HTTPS, SMTP, POP3, FTP, SNMP, RTSP, Telnet, Other

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Additional network metrics include:

Processing:

Total Packets Received: The total number of packets that WinEyeQ has received from the WinPcap driver.

Packets Processed: The number of packets that WinEyeQ has processed and analyzed.

Packets Missed: The number of packets that the WinPcap driver has been unable to send to WinEyeQ.

Packets Discarded: The number of packets that WinEyeQ has discarded due to packet overload.

Total RTP Packet Lost: The total number of RTP packets that were expected minus the total number actually received.

Packets per Second (Average): The average number of packets per second that WinEyeQ has processed since the analyzer was started.

Call Metrics:

Current SIP Calls
Total SIP Calls Passed
Total SIP Calls Failed
Current H.323 Calls
Total H.323 Calls Passed
Total H.323 Calls Failed
Current Calls with Audio
Current Calls with Video
Current Endpoints

Average Network Metrics:

Audio Jitter (ms): The average jitter (as calculated from RFC 3550) for all audio streams of all completed calls.

Audio Listening MOS (% of Optimal): The average Listening MOS score attained for all audio streams of all completed calls. See below.

Audio Listening R Factor (% of Optimal): The average Listening R factor attained for all audio streams of all completed calls. See below.

Audio Conversational MOS (% of Optimal): The average Conversational MOS score attained for all audio streams of all completed calls. See below.

Audio Conversational R Factor (% of Optimal): The average Conversational R factor attained for all audio streams of all completed calls. See below.

Video Jitter (ms): The average jitter (as calculated from RFC 3550) for all video streams of all completed calls.

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Media Jitter (ms): The combined average of the audio and video jitter values.

Initial Response Time (ms): The average time it took for the called endpoint to return its first response to the calling endpoint.

Maximums:

VoIP Calls: The maximum number of concurrent calls that WinEyeQ has analyzed.

VoIP Bandwidth (Mb/s): The highest VoIP bandwidth analyzed.

VoIP Packets / Sec: The highest number of VoIP packets per second analyzed.

Packets/Second: The highest number of packets per second analyzed.

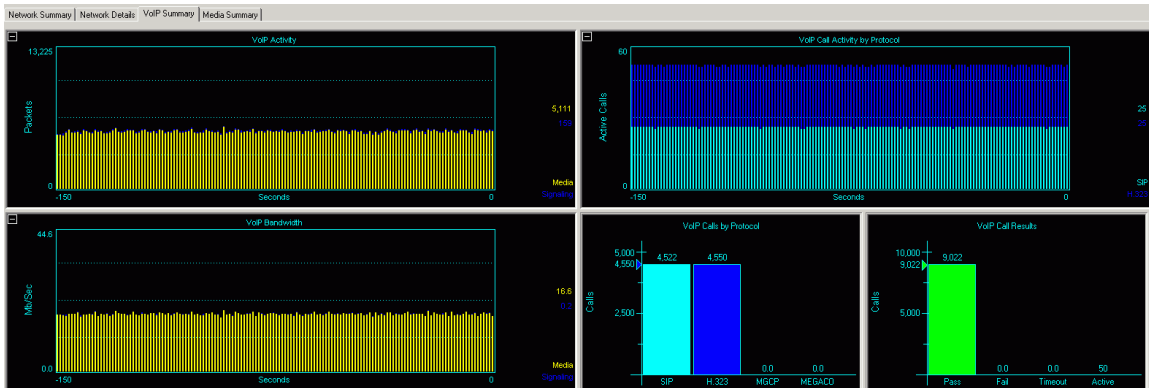
Optimal MOS Scores and R Factors.

Different codec types have different highest attainable Listening and Conversational MOS scores and R factors. WinEyeQ computes the normalized average network MOS scores and R factors by taking the MOS scores and R factors calculated for the audio media stream and dividing them by their theoretical maximum values. For example, if a G.728 audio stream received a Listening MOS score of 3.5, the normalized value would be 86.6 %. If a G.723.1 5.3 kb audio stream received a Listening MOS score of 3.5, the normalized value would be 96.9 %.

Note: Please see Appendix A for a chart of theoretical maximum MOS scores and R factors.

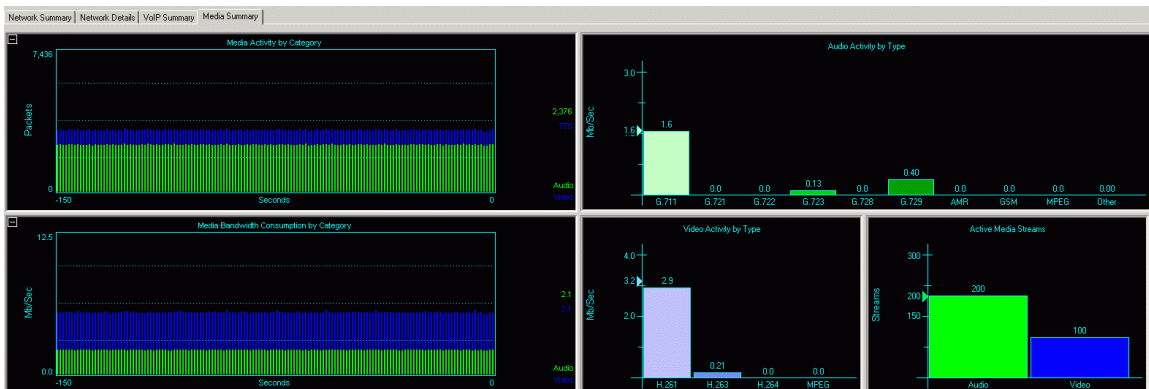
VoIP Summary

The VoIP Summary paints a picture of the packet and bandwidth activity of the VoIP signaling and media components as well as detailing call activity by protocol, call distribution by protocol, and call status history.



Media Summary

The Media Summary shows the bandwidth consumption and activity of the media components of the VoIP activity on your network. The bandwidth and packet activity are broken down by audio and video components. The right half of the screen breaks audio and video down by codec type as well as summarizing the active audio and video streams on the network.



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Active Calls View

Need new screenshot without title bar showing version number and codecs.

The screenshot shows the WinEyeQ interface. The top window, titled "1323_SIP_wintaffic.liveq - WinEyeQ (tm) Professional Edition w/GoS Version 1.7.0 on 120.249.49.10 - Voice and Video Monitoring and Analysis", displays a table of active calls. The table has columns: Status, Protocol, Started, Duration, Terminator, Source Address, Source ID/E.164, Source Name/H.323 ID, Destination Address, Destination ID/E.164, Destination Name/H.323 ID, Call ID, and Registered With. The calls listed are all SIP calls that started at 12:04:28 and are currently connected. Below the table is a "Call Summary" section with tabs for Call Flow, Call Trace, Call Metrics, Audio Summary, Audio Details, Audio QoS, Video Summary, Video Details, Data Details, RTPCP/RTT Summary, and DTMF Summary. The "Call Metrics" tab is selected, showing a table with columns for Signaling, Audio, and Video, each with a list of parameters and their values. At the bottom of the window, a status bar shows: Ready: For Help, press F1; Session: 00:02:13; Active Calls: 162; Calls Completed: 112; Avg. Call Rate: 0.842/sec; Errors Detected: 0; Error Rate: 0.000%; Registered: 0.

The active calls view is designed to provide an in-depth view of each VoIP call and its status. Each call is represented by an entry in the topmost report; the entries are updated once every second. This view contains the following columns:

Call Status: The current status of the call. These may be things such as connecting, ringing, connected, error, etc.

Protocol: The values for this field are SIP, H.323, and SCCP.

Started: This is the time (local time) that the call was started.

Duration: The length of time the call is (or was) active.

Terminator: Which side of the call (Source or Destination) terminated the call.

Source Address: The address of the call initiator (caller).

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Source ID/E.164: The SIP user ID or H.323 E.164 alias of the caller.

Source Name/H.323 ID: The SIP or SCCP display name or H.323 ID of the caller.

Destination Address: The address of the call receiver (party called).

Destination ID/E.164: The SIP or SCCP user ID or H.323 E.164 alias of the party called.

Destination Name/H.323 ID: The SIP or SCCP display name or H.323 ID of the party called.

Call ID: The SIP, SCCP, or H.323 call ID associated with this call.

Registered With: The gatekeeper's IP address for H.323 calls, or the Proxy's IP address for SIP or SCCP calls.

Conference ID: The conference ID (H.323 calls only).

Each individual call has the following sub-views.

- Call Summary
- Call Flow (ladder diagram)
- Call Trace
- Call Metrics
- Audio Summary
- Audio Details
- Audio QoS
- Video Summary
- Video Details
- Data Details
- RTCP Summary
- RTCP XR Summary
- DTMF Summary

Note: To display information about a particular call, select it (click the call line) in the call list. Whenever a call is selected, it will remain "locked" in the view for as long as you wish to view its details.

Call Summary

| Call Summary Call Flow Call Trace Call Metrics Audio Summary Audio Details Audio QoS Video Summary Video Details Data Details RTPCP Summary RTPCP XR Summary DTMF Summary | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------------------------|--------------------|-----------------------------------|--------------------|
| Signaling | Value | Audio | Value | Video | Value |
| Src Address | 120.249.1.13 | Src Audio Channel | 120.249.1.13:50516 | Src Video Channel | 120.249.1.13:50518 |
| Src E.164 | 10002 | Src Media Type | G.729 | Src Media Type | H.261 |
| Src H.323 ID | 20002 | Src Packet Count | 227 | Src Packet Count | 207 |
| | | Src Average Jitter (ms) | 0.727 | Src Average Jitter (ms) | 0.957 |
| Dest Address | 120.249.1.11 | Src Average Packet Interval (ms) | 60.049 | Src Average Packet Interval (ms) | 66.774 |
| Dest E.164 | 50002 | Src Average Bandwidth (kb/s) | 8.034 | Src Average Bandwidth (kb/s) | 0.000 |
| Dest H.323 ID | 60002 | Src Packets Lost | 0 | Src Packets Lost | 0 |
| | | Src TOS/DSCP Flag | Default (000000) | Src TOS/DSCP Flag | Default (000000) |
| Start Time | 12:04:41 | Src Listening R Factor | 63 | | |
| Stop Time | | Src Listening MOS Score | 3.96 | | |
| Duration | | Optimal Listening R Factor/MOS Score | 83/3.96 | | |
| | | Stream Quality Index (SQI) | A+ (100.00) | | |
| Call Terminator | | Dest Audio Channel | 120.249.1.11:50716 | Dest Video Channel | 120.249.1.11:50718 |
| Gatekeeper | | Dest Media Type | G.723 5.3k | Dest Media Type | H.263 |
| Recording | No | Dest Packet Count | 153 | Dest Packet Count | 208 |
| Recorded | No | Dest Average Jitter (ms) | 1.089 | Dest Average Jitter (ms) | 0.810 |
| Captured | No | Dest Average Packet Interval (ms) | 90.709 | Dest Average Packet Interval (ms) | 66.362 |
| Record Filename | | Dest Average Bandwidth (kb/s) | 5.423 | Dest Average Bandwidth (kb/s) | 0.000 |
| Capture Filename | | Dest Packets Lost | 0 | Dest Packets Lost | 0 |
| | | Dest TOS/DSCP Flag | Default (000000) | Dest TOS/DSCP Flag | Default (000000) |
| | | Dest Listening R Factor | 74 | | |
| | | Dest Listening MOS Score | 3.61 | | |
| | | Optimal Listening R Factor/MOS Score | 74/3.61 | | |
| | | Stream Quality Index (SQI) | A+ (100.00) | | |

This sub-view provides a summary of the call elements including source and destination addresses for signaling and media. There are three panes on this sub-view.

Signaling Pane

Source Address: The IP address of the calling endpoint.

Source ID/Source E.164: The source ID (SIP or SCCP) or E.164 (H.323) of the calling endpoint.

Source Name/Source H.323 ID: The source name (SIP or SCCP) or H.323 ID (H.323) of the calling endpoint.

Destination Address: The IP address of the called endpoint.

Destination ID/E.164: The source ID (SIP or SCCP) or E.164 (H.323) of the called endpoint.

Destination Name/H.323 ID: The source name (SIP or SCCP) or H.323 ID (H.323) of the called endpoint.

Start Time: The time the first packet was seen on the network.

Stop Time: The time the last packet was seen on the network.

Duration: The difference between the start and stop time.

Call Terminator: The endpoint that terminated the call.

Proxy/Gatekeeper: The address of the proxy (SIP or SCCP) or gatekeeper (H.323) that participated in the call.

Recording: Whether or not the call is presently being recorded.

Recorded: Whether or not the call was recorded.

Captured: Whether or not the call was captured.

Record Filename: The file name of the record file.

Capture Filename: The file name of the capture file.

Audio Pane

Source Audio Channel: The IP address and port of the calling endpoint.

Source Media Type: The type of codec being used to send the audio.

Source Packet Count: The number of packets sent on this channel.

Source Average Jitter (ms): The average jitter value (as calculated from RFC 3550) for this channel.

Source Average Packet Interval (ms): The average inter-arrival time of packets on this channel.

Source Average Bandwidth (kb/s): The average bandwidth, in kilobits per second, calculated for this channel.

Source Packets Lost: The calculated number of packets lost by subtracting the number of packets expected (using the sequence numbers) minus the number actually received.

Source TOS/DSCP Flag: The value of the Type of Service (TOS) / Differentiated Services Code Point (DSCP) flag in the IP header field.

Source Listening R Factor: The current Listening R factor for this media stream.

Source Listening MOS Score: The current Listening MOS Score for this media stream.

Optimal Listening R Factor / MOS Score: The highest scores that are attainable for this codec.

Stream Quality Index: The ratio of the current R Factor and MOS score to there optimal values.

Destination Audio Channel: The IP address and port of the called endpoint.

Destination Media Type: The type of codec being used to send the audio.

Destination Packet Count: The number of packets sent on this channel.

Destination Average Jitter (ms): The average jitter value (as calculated from RFC 3550) for this channel.

Destination Average Packet Interval (ms): The average inter-arrival time of packets on this channel.

Destination Average Bandwidth (kb/s): The average bandwidth, in kilobits per second, calculated for this channel.

Destination Packets Lost: The calculated number of packets lost by subtracting the number of packets expected (using the sequence numbers) minus the number actually received.

Destination TOS/DSCP Flag: The value of the Type of Service (TOS) / Differentiated Services Code Point (DSCP) flag in the IP header field.

Destination Listening R Factor: The current Listening R factor for this media stream.

Destination Listening MOS Score: The current Listening MOS Score for this media stream.

Optimal Listening R Factor / MOS Score: The highest scores that are attainable for this codec.

Stream Quality Index: The ratio of the current R Factor and MOS score to there optimal values.

Video Pane

Source Video Channel: The IP address and port of the calling endpoint.

Source Media Type: The type of codec being used to send the Video.

Source Packet Count: The number of packets sent on this channel.

Source Average Jitter (ms): The average jitter value (as calculated from RFC 3550) for this channel.

Source Average Packet Interval (ms): The average inter-arrival time of packets on this channel.

Source Average Bandwidth (kb/s): The average bandwidth, in kilobits per second, calculated for this channel.

Source Packets Lost: The calculated number of packets lost by subtracting the number of packets expected (using the sequence numbers) minus the number actually received.

Source TOS/DSCP Flag: The value of the Type of Service (TOS) / Differentiated Services Code Point (DSCP) flag in the IP header field.

Destination Video Channel: The IP address and port of the called endpoint.

Destination Media Type: The type of codec being used to send the Video.

Destination Packet Count: The number of packets sent on this channel.

Destination Average Jitter (ms): The average jitter value (as calculated from RFC 3550) for this channel.

Destination Average Packet Interval (ms): The average inter-arrival time of packets on this channel.

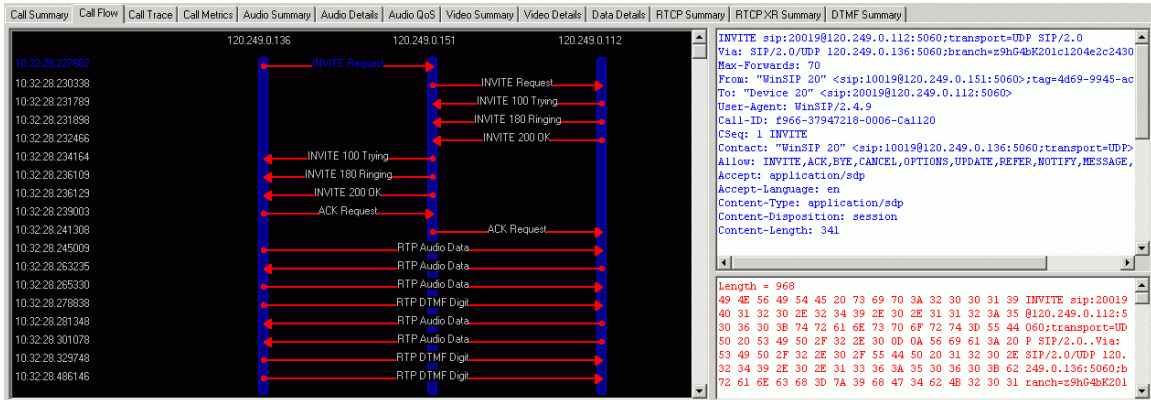
Destination Average Bandwidth (kb/s): The average bandwidth, in kilobits per second, calculated for this channel.

Destination Packets Lost: The calculated number of packets lost by subtracting the number of packets expected (using the sequence numbers) minus the number actually received.

Destination TOS/DSCP Flag: The value of the Type of Service (TOS) / Differentiated Services Code Point (DSCP) flag in the IP header field.

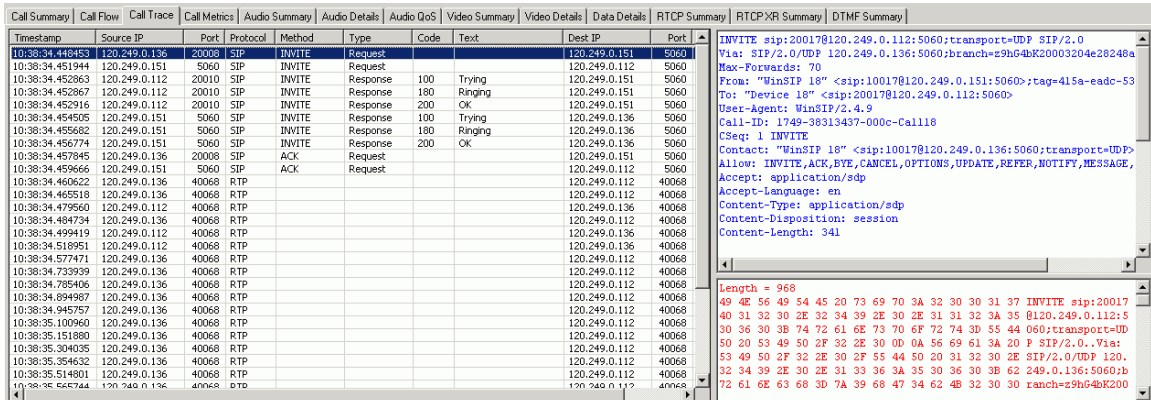
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Call Flow



This sub-view provides a time-stamped ladder diagram view of the call flow (signaling, media and media quality packets). Each “rung” in the ladder may be highlighted to display the decoded packet in both ASCII and hexadecimal representations.

Call Trace



This sub-view provides a time stamped protocol specific display of the call flow (signaling, media and media quality packets). Each entry in the report may be highlighted to display the decoded packet in both ASCII and hexadecimal representations.

Call Metrics

| Metric | Value | Protocol | Packets | Bytes |
|-----------------------|-----------------|----------|---------|---------|
| Initial Response Time | 00:00:00.003445 | IP | 4,032 | 762,257 |
| Post-Dial Delay | 00:00:00.003575 | | | |
| Ring Duration | 00:00:00.000231 | ICMP | 0 | 0 |
| Time To Answer | 00:00:00.003806 | UDP | 4,032 | 625,169 |
| Time To Connect | 00:00:00.006686 | TCP | 0 | 0 |
| Teardown Time | 00:00:00.000712 | | | |
| Time Connected | 00:01:00.019703 | H.323 | 0 | 0 |
| End-To-End Time | 00:01:00.026389 | RTSP | 0 | 0 |
| Signaling Latency | 00:00:00.006495 | H.225 | 0 | 0 |
| Source Audio Delay | 00:00:00.000227 | H.245 | 0 | 0 |
| Source Video Delay | | | | |
| Dest Audio Delay | 00:00:00.011866 | SIP | 7 | 3,685 |
| Dest Video Delay | | | | |
| | | RTP | 4,001 | 588,172 |
| | | RTCP | 24 | 1,056 |
| | | Other | 0 | 0 |

This sub-view provides a summary of the call elements including metric measurements for response times and signaling interval and packets and byte counts analyzed by each protocol layer.

Initial Response Time: The length of time it took for the first message that was sent by the calling endpoint to be acknowledged by the called endpoint or proxy/gatekeeper.

Post-Dial Delay: The length of time from the start of the call until the start of the ring.

Ring Duration: The length of time the call was ringing.

Time to Answer: The length of time from the start of the call until it was answered.

Time to Connect: The length of time it took for the call to be connected.

Teardown Time: The length of time it took for the call close sequence to take place.

Time to Connect: The length of time from when the call was connected until the close sequence started.

End to End Time: The length of time from the start of the call until it was completed.

Signal Latency: The length of time it took for the call to connect plus disconnect.

Source Audio Delay: The length of time from when the call was connected until the first source audio packet was sent.

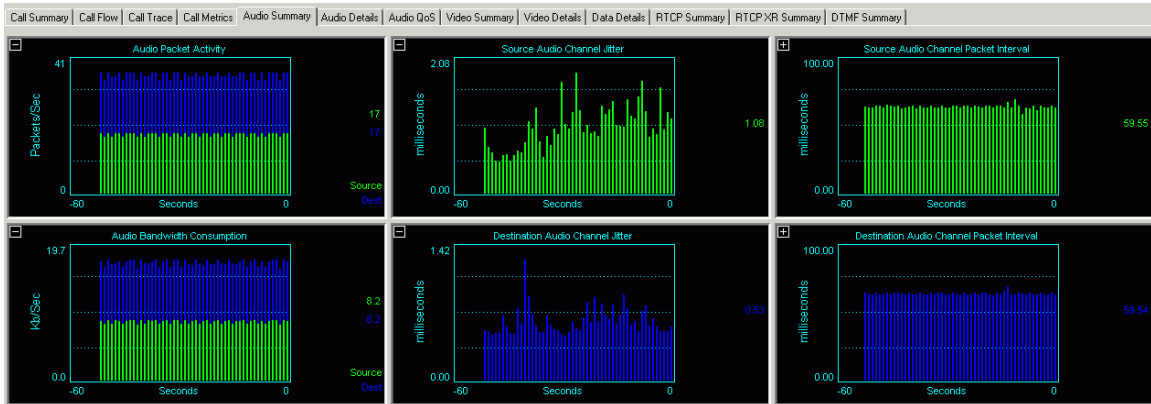
Source Video Delay: The length of time from when the call was connected until the first source video packet was sent.

Destination Audio Delay: The length of time from when the call was connected until the first destination audio packet was sent.

Destination Video Delay: The length of time from when the call was connected until the first destination video packet was sent.

Time to Admit (H.323): The length of time it took for the gatekeeper to acknowledge the ARQ message.

Audio Summary



This view provides jitter and latency measurements for the audio stream being sent by the calling and called parties. Included with the graphical representations of jitter and latency are the high low and current values for each as well as the stream type, the sender's IP address and port, the receiver's IP address and port, the number of packets lost and the DTMF sequences if present within the stream (RFC 2833 section 3 Named Telephony Events).

Audio Details

| Metric | Current | Low | High | Parameter | Source | Destination |
|-------------------------------|----------|----------|----------|---------------------------|--------------|--------------|
| Src Jitter (ms) | 4.408 | 0.161 | 9.019 | Address | 120.249.1.13 | 120.249.1.12 |
| occurred at: | 00:00:01 | 00:00:01 | 00:00:04 | Port | 40952 | 40952 |
| Dest Jitter (ms) | 3.169 | 0.792 | 5.977 | Media Type | 6.711 Allow | 6.711 Allow |
| occurred at: | 00:00:01 | 00:00:01 | 00:00:04 | SSRC | 2870DADC | A6218B02 |
| Avg Src Packet Interval (ms) | 20.124 | 2.137 | 77.041 | Audio/Package (ms) | 20 | 20 |
| occurred at: | 00:00:04 | 00:00:04 | 00:00:02 | Frames/Package | 20 | 20 |
| Avg Dest Packet Interval (ms) | 20.106 | 0.949 | 39.333 | Total Packets | 237 | 237 |
| occurred at: | 00:00:04 | 00:00:04 | 00:00:04 | Packets Lost | 0 | 0 |
| Avg Src Bandwidth (kb/s) | 64.761 | 64.286 | 66.667 | Early Packets | 76 | 42 |
| occurred at: | 00:00:05 | 00:00:05 | 00:00:01 | Late Packets | 58 | 41 |
| Avg Dest Bandwidth (kb/s) | 64.815 | 64.214 | 66.667 | DTMF Events | | |
| occurred at: | 00:00:05 | 00:00:05 | 00:00:01 | Current Bandwidth (kb/s) | 62.49 | 62.49 |
| | | | | Longest Packet Loss Burst | 0 | 0 |
| | | | | Total Packets/Bytes | 37,920 | 37,920 |

This sub-view provides summary information including jitter and interval measurements for the audio streams. The high, low and current values for each stream as well as the stream type, the sender's IP address and port, the receiver's IP address and port, the number of packets lost and the DTMF sequences if present within the stream (RFC 2833 section 3 Named Telephony Events). This sub-view contains two panes.

Metrics Pane

Source Jitter (ms): The average, low, and high jitter measurements calculated for the source audio stream.

Occurred at: The time, relative to the start of the call, that the high and low source jitter values were calculated.

Destination Jitter (ms): The average, low, and high jitter measurements calculated for the destination audio stream.

Occurred at: The time, relative to the start of the call, that the high and low destination jitter values were calculated.

Average Source Packet Interval (ms): The average, low, and high inter-arrival time of packets on the source audio stream.

Occurred at: The time, relative to the start of the call, that the high and low source packet interval values were calculated.

Average Destination Packet Interval (ms): The average, low, and high inter-arrival time of packets on the destination audio stream.

Occurred at: The time, relative to the start of the call, that the high and low destination packet interval values were calculated.

Average Source Bandwidth: The average, low, and high bandwidth, in kilobits per second, calculated for the source audio stream.

Occurred at: The time, relative to the start of the call, that the high and low source bandwidth values were calculated.

Average Destination Bandwidth: The average, low, and high bandwidth, in kilobits per second, calculated for the destination audio stream.

Occurred at: The time, relative to the start of the call, that the high and low destination bandwidth values were calculated.

Parameters Pane

Address: The IP addresses for the source and destination channels.

Port: The port numbers for the source and destination channels.

Media Type: The codec type for the source and destination channels.

SSRC: The synchronization source for the source and destination channels.

Audio/Packet (ms): The length of audio time contained in each packet for the source and destination channels.

Frames/Packet: The number of audio frames contained in each packet for the source and destination channels.

Total Packets: The number of packets counted for the source and destination channels.

Packets Lost: The calculated number of packets lost by subtracting the number of packets expected (using the sequence numbers) minus the number actually received for the source and destination channels.

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Early Packets: The number of packets considered early as configured on the Edit Menu | Settings | Advanced Tab for the source and destination channels.

Late Packets: The number of packets considered late as configured on the Edit Menu | Settings | Advanced Tab for the source and destination channels.

DTMF Events: The value of the DTMF digits (RFC 2833) for the source and destination channels.

Current Bandwidth (kb/s): The bandwidth, in kilobits per second, calculated during the last second for the source and destination channels.

Longest Packet Loss Burst: The count of the longest sequence of lost packets for the source and destination channels.

Total Payload Bytes: The number of bytes in the payload portion of the packet for the source and destination channels.

Audio QoS



This sub-view provides a real-time display of the R-factor and MOS scores for each stream. The R-factor/MOS scoring feature is a non-intrusive measurement technique available for the WinEyeQ call monitor. WinEyeQ passively measures the characteristics of live VoIP calls and reports quality scores in real-time. The algorithm used to obtain the R-Factor/MOS quality scores accurately models the way that time-varying impairments, most notably burst packet loss and possible jitter buffer discards, affect perceived speech quality. This sub-view has three panes.

Listening R Factor Pane

This pane displays the source audio (upper) and destination audio (lower) Listening R Factors in real-time.

Listening MOS Score Pane

This pane displays the source audio (upper) and destination audio (lower) Listening MOS Scores in real-time.

Metrics Pane

Optimal Listening R Factor: The highest score that is attainable for this codec.

Actual Listening R Factor: The current value of the Listening R Factor for the source and destination audio streams.

Conversational R Factor: The current value of the Conversational R Factor for the source and destination audio streams.

Optimal Listening MOS Score: The highest score that is attainable for this codec.

Actual Listening MOS Score: The current value of the Listening MOS Score for the source and destination audio streams.

Conversational MOS Score: The current value of the Conversational MOS Score for the source and destination audio streams.

P.862 Raw MOS Score: The current value of the P.862 Raw MOS Score for the source and destination audio streams.

Stream Quality Index: The ratio of the current R Factor and MOS score to their optimal values.

Packet Loss Rate (%): The total number packets that were lost divided by the total number of packets that were received.

Burst Packet Loss Rate (%): The packet loss rate encountered for burst conditions for the source and destination audio streams.

Good Packets: The number of packets received from the source and destination audio streams.

Lost Packets: The number of network lost packets from the source and destination audio streams.

Discarded Packets: The number of discarded packets due to excessive delay or extremely early arrival detected for the source and destination audio streams.

Media Type: The codec type for the source and destination audio streams.

Jitter Buffer Minimum Delay (ms): The minimum jitter buffer emulator delay in milliseconds occurring during a call for the source and destination audio streams.

Jitter Buffer Maximum Delay (ms): The maximum jitter buffer emulator delay in milliseconds occurring during a call for the source and destination audio streams.

Jitter Buffer Average Delay (ms): The average jitter buffer emulator delay in milliseconds occurring during a call from the source and destination audio streams.

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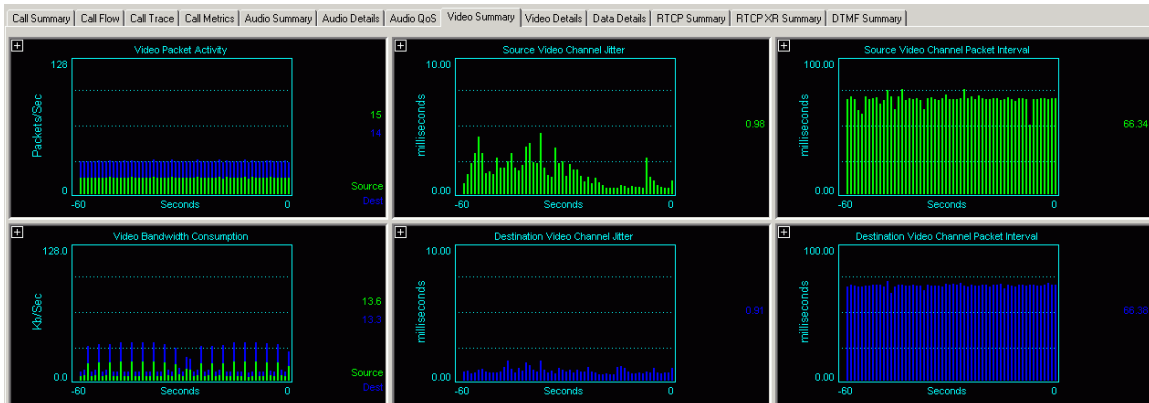
Jitter Buffer Current Delay (ms): The current jitter buffer emulator delay in milliseconds from the source and destination audio streams.

Jitter Buffer Mode: The type of jitter buffer (adaptive or fixer) being used for the source and destination audio streams. This is configured on the Edit Menu | Settings | QoS Tab.

The quality scores for MOS range from 0 to 4.5 and the R factor measurements range from 0 to 105 depending on codec type. The guidelines for interpreting the R-factor and MOS scores are shown in the table below for the G.711 codec:

| Desirability Scale | R-factor Range | MOS Range |
|--------------------|----------------|-----------|
| Desirable | 94 - 80 | 4.4 - 4.0 |
| Acceptable | 80 - 70 | 4.0 - 3.6 |
| Reach Connection | 70 - 50 | 3.6 - 2.6 |
| Not recommended | 50 - 0 | 2.6 - 0 |

Video Summary



This view provides jitter and latency measurements for the video stream being sent by the calling and called parties. Included with the graphical representations of jitter and latency are the high low and current values for each stream, as well as the stream type, the sender's IP address and port, the receiver's IP address and port, the number of packets lost, the bandwidth consumption, the number of pictures detected, and the picture rate.

Video Details

| Metric | Current | Low | High | Parameter | Source | Destination |
|-------------------------------|---------|----------|----------|---------------------------|--------------|--------------|
| Src Jitter (ms) | 0.768 | 0.654 | 2.804 | Address | 120.249.1.13 | 120.249.1.11 |
| occurred at: | | 00:00:01 | 00:00:30 | Port | 50354 | 50554 |
| Dest Jitter (ms) | 0.923 | 0.828 | 2.028 | Media Type | H.264 | H.263 |
| occurred at: | | 00:00:01 | 00:00:32 | SSRC | D63BCDB | 32736D1C |
| Avg Src Packet Interval (ms) | 66.484 | 51.965 | 79.324 | Total Packets | 904 | 909 |
| occurred at: | | 00:00:30 | 00:00:30 | Packets Lost | 0 | 0 |
| Avg Dest Packet Interval (ms) | 66.077 | 56.873 | 75.121 | Early Packets | 6 | 17 |
| occurred at: | | 00:00:30 | 00:00:30 | Late Packets | 6 | 12 |
| Avg Src Bandwidth (kb/s) | 121.864 | 121.465 | 125.648 | Pictures | 904 | 909 |
| occurred at: | | 00:00:56 | 00:00:01 | Picture Rate | 15.092 | 15.184 |
| Avg Dest Bandwidth (kb/s) | 8.438 | 8.438 | 11.939 | Current Bandwidth (kb/s) | 0.00 | 0.00 |
| occurred at: | | 00:00:53 | 00:00:01 | Longest Packet Loss Burst | 0 | 0 |
| | | | | Total Payload Bytes | 910,687 | 64,113 |

This sub-view provides summary information including jitter and interval measurements for the video streams. The measurements include high, low, and current values for each stream. As well as the stream type, the sender's IP address and port number, the receiver's IP address and port number, the packets lost, the number of pictures detected, and the picture rate. This sub-view contains two panes.

Metrics Pane

Source Jitter (ms): The average, low, and high jitter measurements calculated for the source video stream.

Occurred at: The time, relative to the start of the call, that the high and low source jitter values were calculated.

Destination Jitter (ms): The average, low, and high jitter measurements calculated for the destination video stream.

Occurred at: The time, relative to the start of the call, that the high and low destination jitter values were calculated.

Average Source Packet Interval (ms): The average, low, and high inter-arrival time of packets on the source video stream.

Occurred at: The time, relative to the start of the call, that the high and low source packet interval values were calculated.

Average Destination Packet Interval (ms): The average, low, and high inter-arrival time of packets on the destination video stream.

Occurred at: The time, relative to the start of the call, that the high and low destination packet interval values were calculated.

Average Source Bandwidth: The average, low, and high bandwidth, in kilobits per second, calculated for the source video stream.

Occurred at: The time, relative to the start of the call, that the high and low source bandwidth values were calculated.

Average Destination Bandwidth: The average, low, and high bandwidth, in kilobits per second, calculated for the destination video stream.

Occurred at: The time, relative to the start of the call, that the high and low destination bandwidth values were calculated.

Parameters Pane

Address: The IP addresses for the source and destination channels.

Port: The port numbers for the source and destination channels.

Media Type: The codec type for the source and destination channels.

SSRC: The synchronization source for the source and destination channels.

Total Packets: The number of packets counted for the source and destination channels.

Packets Lost: The calculated number of packets lost by subtracting the number of packets expected (using the sequence numbers) minus the number actually received for the source and destination channels.

Early Packets: The number of packets considered early as configured on the Edit Menu | Settings | Advanced Tab for the source and destination channels.

Late Packets: The number of packets considered late as configured on the Edit Menu | Settings | Advanced Tab for the source and destination channels.

Pictures: The number of picture start codes counted for the source and destination channels.

Picture Rate: The number of pictures per second calculated for the source and destination channels.

Current Bandwidth (kb/s): The bandwidth, in kilobits per second, calculated during the last second for the source and destination channels.

Longest Packet Loss Burst: The count of the longest sequence of lost packets for the source and destination channels

Total Payload Bytes: The number of bytes in the payload portion of the packet for the source and destination channels.

Data Details

| | | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----|------|---------------------------|---------------|---------------|
| Call Summary Call Flow Call Trace Call Metrics Audio Summary Audio Details Audio QoS Video Summary Video Details Data Details RTP Summary RTCP/R Summary DTMF Summary | | | | | | |
| Metric | Current | Low | High | Parameter | Source | Destination |
| Avg Src Packet Interval (ms) | | | | Address | 172.29.37.154 | 172.29.37.150 |
| occurred at: | | | | Port | 2340 | 2340 |
| Avg Dest Packet Interval (ms) | | | | Media Type | DATA | DATA |
| occurred at: | | | | SSRC | CEFF4DDC | 80F4EBE0 |
| Avg Src Bandwidth (kb/s) | | | | Total Packets | 6 | 5 |
| occurred at: | | | | Packets Lost | 0 | 0 |
| Avg Dest Bandwidth (kb/s) | | | | Current Bandwidth (kb/s) | 0.000 | 0.000 |
| occurred at: | | | | Longest Packet Loss Burst | 0 | 0 |
| | | | | Total Payload Bytes | 208 | 176 |

This sub-view provides summary information including interval measurements for the data streams, the high, low and current values for each stream as well as the stream type, the sender's IP address and port, the receiver's IP address and port, and the number of packets lost. There are two panes on this sub-view.

Metrics Pane

Average Source Packet Interval (ms): The average, low, and high inter-arrival time of packets on the source video stream.

Occurred at: The time, relative to the start of the call, that the high and low source packet interval values were calculated.

Average Destination Packet Interval (ms): The average, low, and high inter-arrival time of packets on the destination video stream.

Occurred at: The time, relative to the start of the call, that the high and low destination packet interval values were calculated.

Average Source Bandwidth: The average, low, and high bandwidth, in kilobits per second, calculated for the source video stream.

Occurred at: The time, relative to the start of the call, that the high and low source bandwidth values were calculated.

Average Destination Bandwidth: The average, low, and high bandwidth, in kilobits per second, calculated for the destination video stream.

Occurred at: The time, relative to the start of the call, that the high and low destination bandwidth values were calculated.

Parameters Pane

Address: The IP addresses for the source and destination channels.

Port: The port numbers for the source and destination channels.

Media Type: The codec type for the source and destination channels.

SSRC: The synchronization source for the source and destination channels.

Total Packets: The number of packets counted for the source and destination channels.

Packets Lost: The calculated number of packets lost by subtracting the number of packets expected (using the sequence numbers) minus the number actually received for the source and destination channels.

Current Bandwidth (kb/s): The bandwidth, in kilobits per second, calculated during the last second for the source and destination channels.

Longest Packet Loss Burst: The count of the longest sequence of lost packets for the source and destination channels

Total Payload Bytes: The number of bytes in the payload portion of the packet for the source and destination channels.

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RTCP Summary

| Source RTCP Channel Summary | | | | Destination RTCP Channel Summary | | | |
|-----------------------------|-----------------------------------------------------|-----------------------------------------------------|--|----------------------------------|-----------------------------------------------------|-----------------------------------------------------|--|
| Metric | Audio Channel | Video Channel | | Metric | Audio Channel | Video Channel | |
| Sender Address | 120.249.49.11:29889 | 120.249.49.11:29891 | | Sender Address | 120.249.0.150:26593 | 120.249.0.150:26595 | |
| Receiver Address | 120.249.0.150:26593 | 120.249.0.150:26595 | | Receiver Address | 120.249.49.11:29889 | 120.249.49.11:29891 | |
| Sender Reports | 1 | 1 | | Sender Reports | 1 | 1 | |
| Receiver Reports | 1 | 1 | | Receiver Reports | 1 | 1 | |
| SDES Reports | 1 | 1 | | SDES Reports | 1 | 1 | |
| Bye Reports | 0 | 0 | | Bye Reports | 0 | 0 | |
| Application Reports | 0 | 0 | | Application Reports | 0 | 0 | |
| Senders RTP Packet Count | 6 | 5 | | Senders RTP Packet Count | 37 | 123 | |
| Senders RTP Byte Count | 2,800 | 1,601 | | Senders RTP Byte Count | 17,760 | 125,251 | |
| Reported Jitter (ms) | 0.000 | 0.000 | | Reported Jitter (ms) | 0.000 | 0.000 | |
| Delay Since Last SR (sec) | 0.00 | 0.00 | | Delay Since Last SR (sec) | 0.00 | 0.00 | |
| Reported Packets Lost | 0 | 0 | | Reported Packets Lost | 0 | 0 | |
| Highest Sequence Number | 0 | 0 | | Highest Sequence Number | 0 | 0 | |
| Fraction Lost (%) | 0.00 | 0.00 | | Fraction Lost (%) | 0.00 | 0.00 | |
| Canonical Name | Win323 Initiate Call 1 | Win323 Initiate Call 1 | | Canonical Name | Win323 Terminate Call 31624 | Win323 Terminate Call 31624 | |
| Name | Audio | Video | | Name | Audio | Video | |
| E-Mail Address | support@touchstone-inc.com | support@touchstone-inc.com | | E-Mail Address | support@touchstone-inc.com | support@touchstone-inc.com | |
| Phone Number | +215.672.6950 | +215.672.6950 | | Phone Number | +215.672.6950 | +215.672.6950 | |
| Location | 228 North York Road, Suite D, Harboro, PA 19040 ... | 228 North York Road, Suite D, Harboro, PA 19040 ... | | Location | 228 North York Road, Suite D, Harboro, PA 19040 ... | 228 North York Road, Suite D, Harboro, PA 19040 ... | |
| Tool | Voice And Video Over IP Test Tool | Voice And Video Over IP Test Tool | | Tool | Voice And Video Over IP Test Tool | Voice And Video Over IP Test Tool | |
| Note | Version 1.5.0 | Version 1.5.0 | | Note | Version 1.5.3 | Version 1.5.3 | |
| Private | www.touchstone-inc.com | www.touchstone-inc.com | | Private | www.touchstone-inc.com | www.touchstone-inc.com | |

This sub-view provides summary information that has been gathered from the RTCP packets that WinEyeQ has analyzed for the audio and video streams that have been sent by both endpoints of the call. This sub-view has two panes that are identical except for source and destination.

RTCP Channel Summary Pane

Sender Address: The IP address and port number of the sending RTCP channel.

Receiver Address: The IP address and port number of the receiving RTCP channel.

Sender Reports: The number of RTCP Sender Reports sent.

Receiver Reports: The number of RTCP Receiver Reports sent.

SDES: The number of RTCP SDES Reports sent.

Bye Reports: The number of RTCP Bye Reports sent.

Application Reports: The number of RTCP Application Reports sent.

Senders Packet Count: The total number of RTP data packets transmitted by the sender since starting transmission.

Senders Byte Count: The total number of payload octets transmitted in RTP data packets by the sender since starting transmission.

Reported Jitter (ms): The jitter measurement calculated on the stream being received from the other endpoint.

Delay Since Last SR (sec): The delay, expressed in units of 1/65536 seconds, between receiving the last SR packet from the remote endpoint and sending this reception report block.

Reported Packets Lost: The total number of RTP data packets from the remote endpoint that have been lost since the beginning of reception.

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Highest Sequence Number: The low 16 bits contain the highest sequence number received in an RTP data packet from the remote endpoint, and the most significant 16 bits extend that sequence number with the corresponding count of sequence number cycles.

Fraction Lost (%): The fraction of RTP data packets from the remote endpoint lost since the previous SR or RR packet was sent, expressed as a fixed point number with the binary point at the left edge of the field.

Canonical Name: A unique end-point identifier.

Name: The real name used to describe the source.

E-Mail Address: The email address is formatted according to RFC 2822.

Phone Number: The phone number (should be formatted with the plus sign replacing the international access code).

Location: The geographic user location.

Tool: The application or tool name.

Note: This is intended for transient messages describing the current state of the source.

Private: This item is used to define experimental or application-specific extensions.

RTCP XR Summary

| Source RTCP XR Channel Summary | | | | Destination RTCP XR Channel Summary | | | |
|---------------------------------------|---------------------|---------------------|--|---------------------------------------|---------------------|---------------------|--|
| Metric | Audio Channel | Video Channel | | Metric | Audio Channel | Video Channel | |
| Sender Address | 120.249.49.10:25001 | 120.249.49.10:25003 | | Sender Address | 120.249.0.150:25041 | 120.249.0.150:25043 | |
| Receiver Address | 120.249.0.150:25041 | 120.249.0.150:25043 | | Receiver Address | 120.249.49.10:25001 | 120.249.49.10:25003 | |
| Extended Reports | 22 | 22 | | Extended Reports | 22 | 22 | |
| Loss Rate (%) | 14.45 | 14.45 | | Loss Rate (%) | 14.45 | 14.45 | |
| Discard Rate (%) | 0.00 | 0.00 | | Discard Rate (%) | 0.00 | 0.00 | |
| Average Burst Density (%) | 19.53 | 19.53 | | Average Burst Density (%) | 19.53 | 19.53 | |
| Average Gap Density (%) | 0.00 | 0.00 | | Average Gap Density (%) | 0.00 | 0.00 | |
| Average Burst Duration (ms) | 1,444 | 1,444 | | Average Burst Duration (ms) | 1,444 | 1,444 | |
| Average Gap Duration (ms) | 445 | 445 | | Average Gap Duration (ms) | 445 | 445 | |
| Round Trip Delay (ms) | 16 | 16 | | Round Trip Delay (ms) | 16 | 16 | |
| End System Delay (ms) | 60 | 60 | | End System Delay (ms) | 60 | 60 | |
| Signal Level (db) | -105 | -105 | | Signal Level (db) | -105 | -105 | |
| Noise Level (db) | -67 | -67 | | Noise Level (db) | -67 | -67 | |
| Residual Echo Return Loss (db) | 55 | 55 | | Residual Echo Return Loss (db) | 55 | 55 | |
| Gap Threshold | 16 | 16 | | Gap Threshold | 16 | 16 | |
| R Factor | 90 | 90 | | R Factor | 90 | 90 | |
| External R Factor | Unavailable | Unavailable | | External R Factor | Unavailable | Unavailable | |
| Listening MOS | 4.0 | 4.0 | | Listening MOS | 4.0 | 4.0 | |
| Conversational MOS | 4.0 | 4.0 | | Conversational MOS | 4.0 | 4.0 | |
| Packet Loss Concealment | Enhanced | Enhanced | | Packet Loss Concealment | Enhanced | Enhanced | |
| Jitter Buffer Adaptive | Adaptive | Adaptive | | Jitter Buffer Adaptive | Adaptive | Adaptive | |
| Jitter Buffer Rate | 8 | 8 | | Jitter Buffer Rate | 8 | 8 | |
| Jitter Buffer Nominal Delay (ms) | 40 | 40 | | Jitter Buffer Nominal Delay (ms) | 40 | 40 | |
| Jitter Buffer Max Delay (ms) | 40 | 40 | | Jitter Buffer Max Delay (ms) | 40 | 40 | |
| Jitter Buffer Absolute Max Delay (ms) | 80 | 80 | | Jitter Buffer Absolute Max Delay (ms) | 80 | 80 | |

This sub-view provides summary information that has been gathered from the RTCP XR packets that WinEyeQ has analyzed for the audio and video streams that have been sent by both endpoints of the call. This sub-tab has two panes that are identical.

RTCP XR Channel Summary

Sender Address: The IP address and port number of the sending RTCP channel.

Receiver Address: The IP address and port number of the receiving RTCP channel.

Extended Reports: The number of RTCP Extended Reports sent.

Loss Rate (%): The fraction of packets lost since the beginning of the call.

Discard Rate (%): The fraction of packets discarded since the beginning of the call.

Average Burst Density (%): The fraction of packets within burst periods since the beginning of the call.

Average Gap Density (%): The fraction of packets within gap periods since the beginning of the call.

Average Burst Duration (ms): The mean duration, in milliseconds, of the burst periods since the beginning of the call.

Average Gap Duration (ms): The mean duration, in milliseconds, of the gap periods since the beginning of the call.

Round Trip Delay (ms): The most recently calculated round-trip delay, in milliseconds.

End System Delay (ms): The most recently estimated end system delay, in milliseconds.

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Signal Level (db): The relative speech signal level expressed as the ratio of the signal level to a 0 dBm0 reference.

Noise Level (db): The relative silence period noise level expressed as the ratio of the background noise level to a 0 dBm0 reference.

Residual Echo Return Loss (db): The residual echo return loss as the sum of the measured echo return loss (ERL) and the echo return loss enhanced (ERLE) of the echo canceller, expressed in dB.

Gap Threshold: The gap threshold, in packets.

R Factor: The voice quality metric for the call channel as measured in the monitored network segment.

External R Factor: The voice quality metric for the call channel as measured in an external monitored network segment.

Listening MOS: The estimated mean opinion listening quality score for the call channel.

Conversational MOS: The estimated mean opinion conversational quality score for the call channel.

Packet Loss Concealment: The packet loss concealment capabilities.

Jitter Buffer Adaptive: Adaptive or non-adaptive.

Jitter Buffer Rate: This represents the implementation specific adjustment rate of a jitter buffer in adaptive mode.

Jitter Buffer Nominal Delay (ms): The current nominal jitter buffer delay, in milliseconds.

Jitter Buffer Max Delay (ms): The maximum jitter buffer delay, in milliseconds, recorded for the call.

Jitter Buffer Absolute Max Delay (ms): The absolute maximum delay, in milliseconds, the jitter buffer can ever introduce to the call channel packet stream.

DTMF Summary

| Source Audio DTMF Event Detail | | | | | | | | | | | Destination Audio DTMF Event Detail | | | | | | | | | | |
|--------------------------------|-----------------|-------|-------|-------|----------|---------|--------|---------|---------|------|-------------------------------------|-------|-------|-------|----------|---------|--------|---------|---------|--|--|
| Time | Elapsed | Event | Digit | Power | Duration | End Bit | Marker | Seq Num | TimeSec | Time | Elapsed | Event | Digit | Power | Duration | End Bit | Marker | Seq Num | TimeSec | | |
| 09:40:09.362389 | 00:00:00.000000 | dtmf | 2 | 0 | 1500 | 1 | 1 | 2 | 3 | | | | | | | | | | | | |
| 09:40:09.402681 | 00:00:00.050322 | dtmf | 2 | 0 | 1500 | 1 | 0 | 5 | 3 | | | | | | | | | | | | |
| 09:40:09.453417 | 00:00:00.050736 | dtmf | 1 | 0 | 1500 | 0 | 1 | 9 | 24 | | | | | | | | | | | | |
| 09:40:09.554669 | 00:00:00.101551 | dtmf | 1 | 0 | 1500 | 1 | 0 | 15 | 26 | | | | | | | | | | | | |
| 09:40:09.655753 | 00:00:00.050785 | dtmf | 1 | 0 | 1500 | 1 | 0 | 18 | 26 | | | | | | | | | | | | |
| 09:40:09.655647 | 00:00:00.050794 | dtmf | 5 | 0 | 1500 | 0 | 1 | 22 | 57 | | | | | | | | | | | | |
| 09:40:09.758148 | 00:00:00.101601 | dtmf | 5 | 0 | 1500 | 1 | 0 | 28 | 57 | | | | | | | | | | | | |
| 09:40:09.809144 | 00:00:00.050996 | dtmf | 5 | 0 | 1500 | 1 | 0 | 32 | 57 | | | | | | | | | | | | |
| 09:40:09.859644 | 00:00:00.050920 | dtmf | 6 | 0 | 1500 | 0 | 1 | 35 | 96 | | | | | | | | | | | | |
| 09:40:09.961900 | 00:00:00.102236 | dtmf | 6 | 0 | 1500 | 1 | 0 | 41 | 96 | | | | | | | | | | | | |
| 09:40:10.012954 | 00:00:00.051054 | dtmf | 6 | 0 | 1500 | 1 | 0 | 45 | 96 | | | | | | | | | | | | |
| 09:40:10.063811 | 00:00:00.050957 | dtmf | 7 | 0 | 1500 | 0 | 1 | 48 | 111 | | | | | | | | | | | | |
| 09:40:10.166335 | 00:00:00.102524 | dtmf | 7 | 0 | 1500 | 1 | 0 | 54 | 111 | | | | | | | | | | | | |
| 09:40:10.218419 | 00:00:00.052084 | dtmf | 7 | 0 | 1500 | 1 | 0 | 58 | 111 | | | | | | | | | | | | |
| 09:40:10.270254 | 00:00:00.052305 | dtmf | 2 | 0 | 1500 | 0 | 1 | 62 | 151 | | | | | | | | | | | | |
| 09:40:10.372668 | 00:00:00.101944 | dtmf | 2 | 0 | 1500 | 1 | 0 | 68 | 151 | | | | | | | | | | | | |
| 09:40:10.423123 | 00:00:00.050495 | dtmf | 2 | 0 | 1500 | 1 | 0 | 71 | 151 | | | | | | | | | | | | |
| 09:40:10.473990 | 00:00:00.050767 | dtmf | 6 | 0 | 1500 | 0 | 1 | 75 | 151 | | | | | | | | | | | | |
| 09:40:10.575460 | 00:00:00.101570 | dtmf | 6 | 0 | 1500 | 1 | 0 | 81 | 182 | | | | | | | | | | | | |
| 09:40:10.626251 | 00:00:00.050791 | dtmf | 6 | 0 | 1500 | 1 | 0 | 84 | 182 | | | | | | | | | | | | |
| 09:40:10.677047 | 00:00:00.050796 | dtmf | 5 | 0 | 1500 | 0 | 1 | 88 | 213 | | | | | | | | | | | | |
| 09:40:10.778611 | 00:00:00.101564 | dtmf | 5 | 0 | 1500 | 1 | 0 | 94 | 213 | | | | | | | | | | | | |
| 09:40:10.829294 | 00:00:00.050743 | dtmf | 5 | 0 | 1500 | 1 | 0 | 98 | 213 | | | | | | | | | | | | |
| 09:40:10.880137 | 00:00:00.050783 | dtmf | 5 | 0 | 1500 | 0 | 1 | 101 | 244 | | | | | | | | | | | | |
| 09:40:10.981706 | 00:00:00.101569 | dtmf | 5 | 0 | 1500 | 1 | 0 | 107 | 244 | | | | | | | | | | | | |
| 09:40:11.032478 | 00:00:00.050772 | dtmf | 5 | 0 | 1500 | 1 | 0 | 111 | 244 | | | | | | | | | | | | |
| 09:40:11.083268 | 00:00:00.050790 | dtmf | 0 | 0 | 1500 | 0 | 1 | 114 | 275 | | | | | | | | | | | | |
| 09:40:11.184827 | 00:00:00.101559 | dtmf | 0 | 0 | 1500 | 1 | 0 | 120 | 275 | | | | | | | | | | | | |
| 09:40:11.235600 | 00:00:00.050773 | dtmf | 0 | 0 | 1500 | 1 | 0 | 124 | 275 | | | | | | | | | | | | |

This sub-view provides a detailed and organized tabular display for the active DTMF transmissions that occur during a call for both the source and destination side of the calls.

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Recent Calls View

The screenshot shows the WinEyeQ Professional Edition interface. The top menu bar includes File, Edit, Capture, Record, View, and Help. The main window is titled 'WinEyeQ (tm) Professional Edition w/QoS Version 1.7.0 on 120.249.49.10, 120.249.49.11 - Voice and Video Monitoring and Analysis'. The 'Recent Calls' tab is selected, displaying a list of call records. Each record includes a status (e.g., Released, Completed), protocol (SIP, H.323), start time, duration, terminator, source address, source ID/E.164, source name/H.323 ID, destination address, destination ID/E.164, destination name/H.323 ID, call ID, and registered with information. Below the table, the 'Call Summary' section is visible, with the 'Call Metrics' tab active. This tab provides detailed performance metrics for the selected call, including signaling, audio, and video channel statistics such as packet counts, average jitter, and MOS scores. At the bottom of the window, a status bar shows session information: 'Session: 00:09:22', 'Active Calls: 41', 'Calls Completed: 340', 'Avg. Call Rate: 0.615/sec', 'Errors Detected: 0', 'Error Rate: 0.000%', and 'Registered: 0'.

The recent calls view is designed to provide an in-depth view of each recent VoIP call and its status. Each call is represented by an entry in the topmost report; the list is updated as the calls are removed from the active calls view.

This view contains the following columns:

Call Status: The current status of the call. These may be things such as connecting, ringing, connected, error, etc.

Protocol: The values for this field are SIP or H.323.

Started: This is the time (local time) that the call was started.

Duration: The length of time the call is (or was) active.

Terminator: Which side of the call (Source or Destination) terminated the call.

Source Address: The address of the call initiator (caller).

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Source ID/E.164: The SIP user ID or H.323 E.164 alias of the caller.

Source Name/H.323 ID: The SIP display name or H.323 ID of the caller.

Destination Address: The address of the call receiver (party called).

Destination ID/E.164: The SIP user ID or H.323 E.164 alias of the party called.

Destination Name/H.323 ID: The SIP display name or H.323 ID of the party called.

Call ID: The SIP or H.323 call ID associated with this call.

Registered With: The gatekeeper's IP address for H.323 calls, or the Proxy's IP address for SIP calls.

Conference ID: The conference ID (H.323 calls only).

Each individual call has the following sub-views.

- Call Summary
- Call Flow (ladder diagram)
- Call Trace
- Call Metrics
- Audio Details
- Audio QoS
- Video Details
- Data Details
- RTCP Summary
- RTCP XR Summary
- DTMF Summary

Call Summary

| Call Summary | Call Flow | Call Metrics | Audio Details | Audio QoS | Video Details | Data Details | RTCP Summary | RTCP:R Summary | DTMF Summary |
|------------------|-----------|---------------|-----------------------------------|--------------|---------------------|-----------------------------------|--------------|---------------------|--------------|
| Signaling | | Value | | Value | | Value | | Value | |
| Src Address | | 120.249.49.11 | Src Audio Channel | | 120.249.49.11:25176 | Src Video Channel | | 120.249.49.11:25178 | |
| Src E.164 | | 1004 | Src Media Type | | G.729 | Src Media Type | | H.263 | |
| Src H.323 ID | | | Src Packet Count | | 1,000 | Src Packet Count | | 909 | |
| | | | Src Average Jitter (ms) | | 0.596 | Src Average Jitter (ms) | | 0.575 | |
| Dest Address | | 120.249.49.21 | Src Average Packet Interval (ms) | | 60.061 | Src Average Packet Interval (ms) | | 66.074 | |
| Dest E.164 | | 2004 | Src Average Bandwidth (kb/s) | | 8.056 | Src Average Bandwidth (kb/s) | | 8.857 | |
| Dest H.323 ID | | | Src Packets Lost | | 0 | Src Packets Lost | | 0 | |
| Start Time | | 09:20:12 | Src TOS/DSCP Flag | | Default (000000) | Src TOS/DSCP Flag | | Default (000000) | |
| Stop Time | | 09:21:12 | Src Listening R Factor | | 63 | | | | |
| Duration | | 00:01:00 | Src Listening MOS Score | | 3.95 | | | | |
| Call Terminator | | Source | Src Conversational R Factor | | 62 | | | | |
| | | | Src Conversational MOS Score | | 3.91 | | | | |
| | | | Stream Quality Index (SQI) | | A+ (100.00) | | | | |
| Gatekeeper | | | | | | | | | |
| Call Score | | A+ 99.533 | Dest Audio Channel | | 120.249.49.21:25176 | Dest Video Channel | | 120.249.49.21:25178 | |
| Signaling Score | | A+ 99.517 | Dest Media Type | | G.729 | Dest Media Type | | H.263 | |
| Media Score | | A+ 99.537 | Dest Packet Count | | 1,000 | Dest Packet Count | | 909 | |
| Src Audio Score | | A+ 99.736 | Dest Average Jitter (ms) | | 1.815 | Dest Average Jitter (ms) | | 0.879 | |
| Dest Audio Score | | A+ 99.532 | Dest Average Packet Interval (ms) | | 60.058 | Dest Average Packet Interval (ms) | | 66.078 | |
| Src Video Score | | A+ 99.508 | Dest Average Bandwidth (kb/s) | | 8.056 | Dest Average Bandwidth (kb/s) | | 8.856 | |
| Dest Video Score | | A+ 99.276 | Dest Packets Lost | | 0 | Dest Packets Lost | | 0 | |
| Record Filename | | | Dest TOS/DSCP Flag | | Default (000000) | Dest TOS/DSCP Flag | | Default (000000) | |
| Capture Filename | | | Dest Listening R Factor | | 63 | | | | |
| | | | Dest Listening MOS Score | | 3.95 | | | | |
| | | | Dest Conversational R Factor | | 62 | | | | |
| | | | Dest Conversational MOS Score | | 3.91 | | | | |
| | | | Stream Quality Index (SQI) | | A+ (100.00) | | | | |

This sub-view provides a summary of the call elements including source and destination addresses for signaling and media. There are three panes on this sub-view.

Signaling Pane

Source Address: The IP address of the calling endpoint.

Source ID/Source E.164: The source ID (SIP) or E.164 (H.323) of the calling endpoint.

Source Name/Source H.323 ID: The source name (SIP) or H.323 ID (H.323) of the calling endpoint.

Destination Address: The IP address of the called endpoint.

Destination ID/E.164: The source ID (SIP) or E.164 (H.323) of the called endpoint.

Destination Name/H.323 ID: The source name (SIP) or H.323 ID (H.323) of the called endpoint.

Start Time: The time the first packet was seen on the network.

Stop Time: The time the last packet was seen on the network.

Duration: The difference between the start and stop time.

Call Terminator: The endpoint that terminated the call.

Proxy/Gatekeeper: The address of the proxy (SIP) or gatekeeper (H.323) that participated in the call.

Call Score: Please see Appendix C for scoring details.

Signal Score: Please see Appendix C for scoring details.

Media Score: Please see Appendix C for scoring details.

Source Audio Score: Please see Appendix C for scoring details.

Destination Audio Score: Please see Appendix C for scoring details.

Source Video Score: Please see Appendix C for scoring details.

Destination Video Score: Please see Appendix C for scoring details.

Record Filename: The file name of the record file.

Capture Filename: The file name of the capture file.

Audio Pane

Source Audio Channel: The IP address and port of the calling endpoint.

Source Media Type: The type of codec being used to send the audio.

Source Packet Count: The number of packets sent on this channel.

Source Average Jitter (ms): The average jitter value (as calculated from RFC 3550) for this channel.

Source Average Packet Interval (ms): The average inter-arrival time of packets on this channel.

Source Average Bandwidth (kb/s): The average bandwidth, in kilobits per second, calculated for this channel.

Source Packets Lost: The calculated number of packets lost by subtracting the number of packets expected (using the sequence numbers) minus the number actually received.

Source TOS/DSCP Flag: The value of the Type of Service (TOS) / Differentiated Services Code Point (DSCP) flag in the IP header field.

Source Listening R Factor: The current Listening R factor for this media stream.

Source Listening MOS Score: The current Listening MOS Score for this media stream.

Source Conversational R Factor: The current Conversational R factor for this media stream.

Source Conversational MOS Score: The current Conversational MOS Score for this media stream.

Stream Quality Index: The ratio of the current R Factor and MOS score to their optimal values.

Destination Audio Channel: The IP address and port of the called endpoint.

Destination Media Type: The type of codec being used to send the audio.

Destination Packet Count: The number of packets sent on this channel.

Destination Average Jitter (ms): The average jitter value (as calculated from RFC 3550) for this channel.

Destination Average Packet Interval (ms): The average inter-arrival time of packets on this channel.

Destination Average Bandwidth (kb/s): The average bandwidth, in kilobits per second, calculated for this channel.

Destination Packets Lost: The calculated number of packets lost by subtracting the number of packets expected (using the sequence numbers) minus the number actually received.

Destination TOS/DSCP Flag: The value of the Type of Service (TOS) / Differentiated Services Code Point (DSCP) flag in the IP header field.

Destination Listening R Factor: The current Listening R factor for this media stream.

Destination Listening MOS Score: The current Listening MOS Score for this media stream.

Destination Conversational R Factor: The current Conversational R factor for this media stream.

Destination Conversational MOS Score: The current Conversational MOS Score for this media stream.

Stream Quality Index: The ratio of the current R Factor and MOS score to their optimal values.

Video Pane

Source Video Channel: The IP address and port of the calling endpoint.

Source Media Type: The type of codec being used to send the Video.

Source Packet Count: The number of packets sent on this channel.

Source Average Jitter (ms): The average jitter value (as calculated from RFC 3550) for this channel.

Source Average Packet Interval (ms): The average inter-arrival time of packets on this channel.

Source Average Bandwidth (kb/s): The average bandwidth, in kilobits per second, calculated for this channel.

Source Packets Lost: The calculated number of packets lost by subtracting the number of packets expected (using the sequence numbers) minus the number actually received.

Source TOS/DSCP Flag: The value of the Type of Service (TOS) / Differentiated Services Code Point (DSCP) flag in the IP header field.

Destination Video Channel: The IP address and port of the called endpoint.

Destination Media Type: The type of codec being used to send the Video.

Destination Packet Count: The number of packets sent on this channel.

Destination Average Jitter (ms): The average jitter value (as calculated from RFC 3550) for this channel.

Destination Average Packet Interval (ms): The average inter-arrival time of packets on this channel.

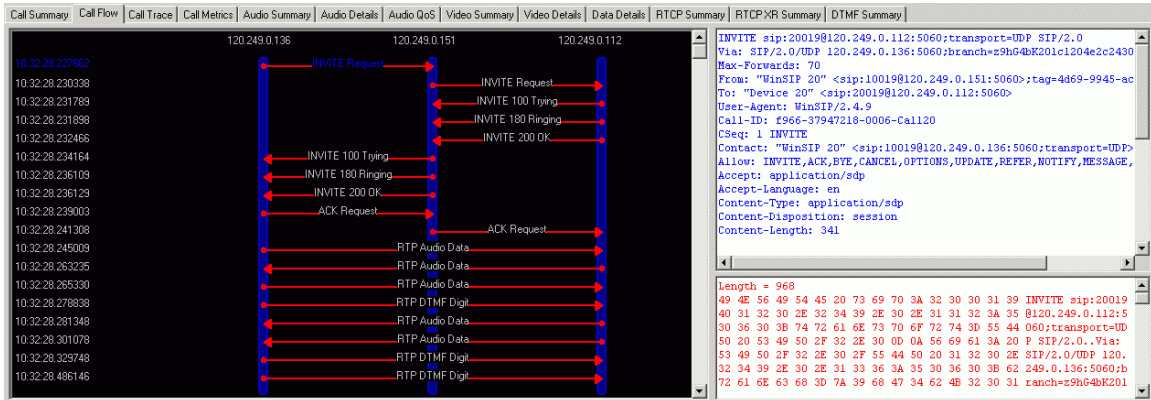
Destination Average Bandwidth (kb/s): The average bandwidth, in kilobits per second, calculated for this channel.

Destination Packets Lost: The calculated number of packets lost by subtracting the number of packets expected (using the sequence numbers) minus the number actually received.

Destination TOS/DSCP Flag: The value of the Type of Service (TOS) / Differentiated Services Code Point (DSCP) flag in the IP header field.

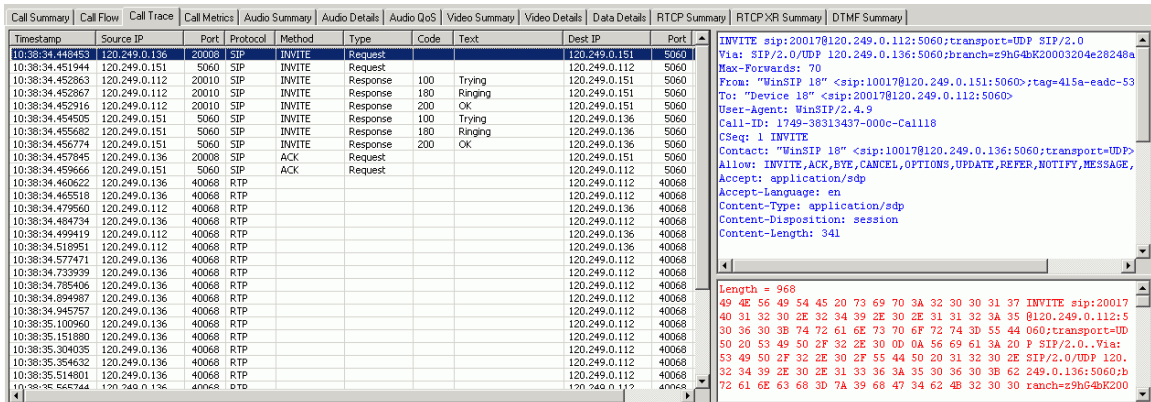
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Call Flow



This sub-view provides a time-stamped ladder diagram view of the call flow (signaling, media and media quality packets). Each “rung” in the ladder may be highlighted to display the decoded packet in both ASCII and hexadecimal representations.

Call Trace



This sub-view provides a time stamped protocol specific display of the call flow (signaling, media and media quality packets). Each entry in the report may be highlighted to display the decoded packet in both ASCII and hexadecimal representations.

Call Metrics

| Metric | Value | Protocol | Packets | Bytes |
|-----------------------|-----------------|----------|---------|-----------|
| Initial Response Time | 00:00:00.003879 | IP | 6,062 | 1,292,360 |
| Post-Dial Delay | 00:00:00.004025 | | | |
| Ring Duration | 00:00:00.000220 | ICMP | 0 | 0 |
| Time To Answer | 00:00:00.004245 | UDP | 6,062 | 1,096,252 |
| Time To Connect | 00:00:00.012155 | TCP | 0 | 0 |
| Teardown Time | 00:00:00.002621 | | | |
| Time Connected | 00:01:00.022732 | H.323 | 0 | 0 |
| End-To-End Time | 00:01:00.004897 | RAS | 0 | 0 |
| Signaling Latency | 00:00:00.011935 | TPCT | 0 | 0 |
| Source Audio Delay | 00:00:00.001500 | H.225 | 0 | 0 |
| Source Video Delay | | H.245 | 0 | 0 |
| Dest Audio Delay | 00:00:00.024420 | SIP | 7 | 3,604 |
| Dest Video Delay | | RTP | 6,031 | 1,032,808 |
| | | RTCP | 24 | 1,344 |
| | | Other | 0 | 0 |

This sub-view provides a summary of the call elements including metric measurements for response times and signaling interval and packets and byte counts analyzed by each protocol layer. There are two panes on this sub-view.

Metrics Pane

Initial Response Time: The length of time it took for the first message that was sent by the calling endpoint to be acknowledged by the called endpoint or proxy/gatekeeper.

Post-Dial Delay: The length of time from the start of the call until the start of the ring.

Ring Duration: The length of time the call was ringing.

Time to Answer: The length of time from the start of the call until it was answered.

Time to Connect: The length of time it took for the call to be connected.

Teardown Time: The length of time it took for the call close sequence to take place.

Time Connected: The length of time from when the call was connected until the close sequence started.

End to End Time: The length of time from the start of the call until it was completed.

Signal Latency: The length of time it took for the call to connect plus disconnect.

Source Audio Delay: The length of time from when the call was connected until the first source audio packet was sent.

Source Video Delay: The length of time from when the call was connected until the first source video packet was sent.

Destination Audio Delay: The length of time from when the call was connected until the first destination audio packet was sent.

Destination Video Delay: The length of time from when the call was connected until the first destination video packet was sent.

Protocol Pane

Packets and Bytes count, for the selected call, broken down by indicated protocol.

Audio Details

| Metric | Current | Low | High | Parameter | Source | Destination |
|-------------------------------|---------|----------|----------|---------------------------|--------------|--------------|
| Src Jitter (ms) | 4.408 | 0.161 | 9.019 | Address | 120.249.1.13 | 120.249.1.12 |
| occurred at: | | 00:00:01 | 00:00:04 | Port | 44052 | 44052 |
| Dest Jitter (ms) | 3.169 | 0.752 | 5.977 | Media Type | G.711 Alaw | G.711 Alaw |
| occurred at: | | 00:00:01 | 00:00:04 | SRPC | 28700ACD | A6212802 |
| Avg Src Packet Interval (ms) | 20.124 | 2.137 | 77.041 | Audio/Packet (ms) | 20 | 20 |
| occurred at: | | 00:00:04 | 00:00:02 | Frames/Packet | 20 | 20 |
| Avg Dest Packet Interval (ms) | 20.106 | 0.949 | 39.103 | Total Packets | 237 | 237 |
| occurred at: | | 00:00:04 | 00:00:04 | Packets Lost | 0 | 0 |
| Avg Src Bandwidth (kb/s) | 64.761 | 64.286 | 66.667 | Early Packets | 76 | 42 |
| occurred at: | | 00:00:05 | 00:00:01 | Late Packets | 58 | 41 |
| Avg Dest Bandwidth (kb/s) | 64.815 | 64.214 | 66.667 | DTMF Events | | |
| occurred at: | | 00:00:05 | 00:00:01 | Current Bandwidth (kb/s) | 62.49 | 62.49 |
| | | | | Longest Packet Loss Burst | 0 | 0 |
| | | | | Total Payload Bytes | 37,920 | 37,920 |

This sub-view provides summary information including jitter and interval measurements for the audio streams. The high, low and current values for each stream as well as the stream type, the sender's IP address and port, the receiver's IP address and port, the number of packets lost and the DTMF sequences if present within the stream (RFC 2833 section 3 Named Telephony Events). This sub-view contains two panes.

Metrics Pane

Source Jitter (ms): The average, low, and high jitter measurements calculated for the source audio stream.

Occurred at: The time, relative to the start of the call, that the high and low source jitter values were calculated.

Destination Jitter (ms): The average, low, and high jitter measurements calculated for the destination audio stream.

Occurred at: The time, relative to the start of the call, that the high and low destination jitter values were calculated.

Average Source Packet Interval (ms): The average, low, and high inter-arrival time of packets on the source audio stream.

Occurred at: The time, relative to the start of the call, that the high and low source packet interval values were calculated.

Average Destination Packet Interval (ms): The average, low, and high inter-arrival time of packets on the destination audio stream.

Occurred at: The time, relative to the start of the call, that the high and low destination packet interval values were calculated.

Average Source Bandwidth: The average, low, and high bandwidth, in kilobits per second, calculated for the source audio stream.

Occurred at: The time, relative to the start of the call, that the high and low source bandwidth values were calculated.

Average Destination Bandwidth: The average, low, and high bandwidth, in kilobits per second, calculated for the destination audio stream.

Occurred at: The time, relative to the start of the call, that the high and low destination bandwidth values were calculated.

Parameters Pane

Address: The IP addresses for the source and destination channels.

Port: The port numbers for the source and destination channels.

Media Type: The codec type for the source and destination channels.

SSRC: The synchronization source for the source and destination channels.

Audio/Packet (ms): The length of audio time contained in each packet for the source and destination channels.

Frames/Packet: The number of audio frames contained in each packet for the source and destination channels.

Total Packets: The number of packets counted for the source and destination channels.

Packets Lost: The calculated number of packets lost by subtracting the number of packets expected (using the sequence numbers) minus the number actually received for the source and destination channels.

Early Packets: The number of packets considered early as configured on the Edit Menu | Settings | Advanced Tab for the source and destination channels.

Late Packets: The number of packets considered late as configured on the Edit Menu | Settings | Advanced Tab for the source and destination channels.

DTMF Events: The value of the DTMF digits (RFC 2833) for the source and destination channels.

Current Bandwidth (kb/s): The bandwidth, in kilobits per second, calculated during the last second for the source and destination channels.

Longest Packet Loss Burst: The count of the longest sequence of lost packets for the source and destination channels.

Total Payload Bytes: The number of bytes in the payload portion of the packet for the source and destination channels.

Audio QoS

| Call Summary Call Flow Call Trace Call Metrics Audio Details Audio QoS Video Details Data Details RTP Summary RTP/VR Summary DTMF Summary | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|--|
| Metric | Source | Destination | |
| Optimal Listening R Factor | 93 | 93 | |
| Actual Listening R Factor | 90 | 93 | |
| Conversational R Factor | 89 | 92 | |
| Optimal Listening MOS Score | 4.20 | 4.20 | |
| Actual Listening MOS Score | 4.14 | 4.20 | |
| Conversational MOS Score | 4.11 | 4.18 | |
| P.862 Raw MOS Score | 4.07 | 4.45 | |
| Stream Quality Index (SQI) | A (97.67) | A+ (100.00) | |
| Packet Loss Rate (%) | 0.00 | 0.00 | |
| Burst Packet Loss Rate (%) | 0.04 | 0.00 | |
| Good Packets | 2,992 | 2,999 | |
| Lost Packets | 0 | 0 | |
| Discarded Packets | 9 | 2 | |
| Media Type | G.711 Alaw | G.711 Alaw | |
| Jitter Buffer Min Delay (ms) | 10 | 10 | |
| Jitter Buffer Max Delay (ms) | 75 | 40 | |
| Jitter Buffer Avg Delay (ms) | 40 | 34 | |
| Jitter Buffer Current Delay (ms) | 10 | 10 | |
| Jitter Buffer Mode | Adaptive | Adaptive | |

This sub-view provides the QoS metrics for each stream. The R-factor/MOS scoring feature is a non-intrusive measurement technique available for the WinEyeQ call monitor. WinEyeQ passively measures the characteristics of live VoIP calls and reports quality scores in real-time. The algorithm used to obtain the R-Factor/MOS quality scores accurately models the way that time-varying impairments, most notably burst packet loss and possible jitter buffer discards, affect perceived speech quality. This sub-view contains a single pane.

Metrics Pane

Optimal Listening R Factor: The highest score that is attainable for this codec.

Actual Listening R Factor: The current value of the Listening R Factor for the source and destination audio streams.

Conversational R Factor: The current value of the Conversational R Factor for the source and destination audio streams.

Optimal Listening MOS Score: The highest score that is attainable for this codec.

Actual Listening MOS Score: The current value of the Listening MOS Score for the source and destination audio streams.

Conversational MOS Score: The current value of the Conversational MOS Score for the source and destination audio streams.

P.862 Raw MOS Score: The current value of the P.862 Raw MOS Score for the source and destination audio streams.

Stream Quality Index: The ratio of the current R Factor and MOS score to there optimal values.

Packet Loss Rate (%): The total number packets that were lost divided by the total number of packets that were received.

Burst Packet Loss Rate (%): The packet loss rate encountered for burst conditions for the source and destination audio streams.

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Good Packets: The number of packets received for the source and destination audio streams.

Lost Packets: The number of network lost packets for the source and destination audio streams.

Discarded Packets: The number of discarded packets due to excessive delay or extremely early arrival detected for the source and destination audio streams.

Media Type: The codec type for the source and destination audio streams.

Jitter Buffer Minimum Delay (ms): The minimum jitter buffer emulator delay in milliseconds occurring during a call for the source and destination audio streams.

Jitter Buffer Maximum Delay (ms): The maximum jitter buffer emulator delay in milliseconds occurring during a call for the source and destination audio streams.

Jitter Buffer Average Delay (ms): The average jitter buffer emulator delay in milliseconds occurring during a call for the source and destination audio streams.

Jitter Buffer Current Delay (ms): The current jitter buffer emulator delay in milliseconds for the source and destination audio streams.

Jitter Buffer Mode: The type of jitter buffer (adaptive or fixer) being used for the source and destination audio streams. This is configured on the Edit Menu | Settings | QoS Tab.

The quality scores for MOS range from 0 to 4.5 and the R factor measurements range from 0 to 105 depending on codec type. The guidelines for interpreting the R-factor and MOS scores are shown in the table below for the G.711 codec:

| Desirability Scale | R-factor Range | MOS Range |
|---------------------------|-----------------------|------------------|
| Desirable | 94 - 80 | 4.4 - 4.0 |
| Acceptable | 80 - 70 | 4.0 - 3.6 |
| Reach Connection | 70 - 50 | 3.6 - 2.6 |
| Not recommended | 50 - 0 | 2.6 - 0 |

Video Details

| Call Summary Call Flow Call Trace Call Metrics Audio Summary Audio Details Audio QoS Video Summary Video Details Data Details RTP Summary RTP/RTT Summary DTMF Summary | | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|----------|---------------------------|--------------|--------------|
| Metric | Current | Low | High | Parameter | Source | Destination |
| Src Jitter (ms) | 0.768 | 0.654 | 2.804 | Address | 120.249.1.13 | 120.249.1.11 |
| occurred at: | | 00:00:01 | 00:00:30 | Port | 50354 | 50554 |
| Dest Jitter (ms) | 0.923 | 0.028 | 2.028 | Media Type | H.264 | H.263 |
| occurred at: | | 00:00:01 | 00:00:32 | SSRC | D63BCD8 | 32736D1C |
| Avg Src Packet Interval (ms) | 66.484 | 51.965 | 79.324 | Total Packets | 904 | 909 |
| occurred at: | | 00:00:30 | 00:00:30 | Packets Lost | 0 | 0 |
| Avg Dest Packet Interval (ms) | 66.077 | 56.873 | 75.121 | Early Packets | 6 | 17 |
| occurred at: | | 00:00:30 | 00:00:30 | Late Packets | 6 | 12 |
| Avg Src Bandwidth (kb/s) | 121.864 | 121.465 | 125.648 | Pictures | 904 | 909 |
| occurred at: | | 00:00:56 | 00:00:01 | Picture Rate | 15.092 | 15.184 |
| Avg Dest Bandwidth (kb/s) | 8.438 | 11.939 | 11.939 | Current Bandwidth (kb/s) | 0.00 | 0.00 |
| occurred at: | | 00:00:53 | 00:00:01 | Longest Packet Loss Burst | 0 | 0 |
| | | | | Total Payload Bytes | 910,687 | 64,113 |

This sub-view provides summary information including jitter and interval measurements for the video streams. The measurements include high, low, and current values for each stream. As well as the stream type, the sender's IP address and port number, the receiver's IP address and port number, the packets lost, the number of pictures detected, and the picture rate. This sub-view contains two panes.

Metrics Pane

Source Jitter (ms): The average, low, and high jitter measurements calculated for the source video stream.

Occurred at: The time, relative to the start of the call, that the high and low source jitter values were calculated.

Destination Jitter (ms): The average, low, and high jitter measurements calculated for the destination video stream.

Occurred at: The time, relative to the start of the call, that the high and low destination jitter values were calculated.

Average Source Packet Interval (ms): The average, low, and high inter-arrival time of packets on the source video stream.

Occurred at: The time, relative to the start of the call, that the high and low source packet interval values were calculated.

Average Destination Packet Interval (ms): The average, low, and high inter-arrival time of packets on the destination video stream.

Occurred at: The time, relative to the start of the call, that the high and low destination packet interval values were calculated.

Average Source Bandwidth: The average, low, and high bandwidth, in kilobits per second, calculated for the source video stream.

Occurred at: The time, relative to the start of the call, that the high and low source bandwidth values were calculated.

Average Destination Bandwidth: The average, low, and high bandwidth, in kilobits per second, calculated for the destination video stream.

Occurred at: The time, relative to the start of the call, that the high and low destination bandwidth values were calculated.

Parameters Pane

Address: The IP addresses for the source and destination channels.

Port: The port numbers for the source and destination channels.

Media Type: The codec type for the source and destination channels.

SSRC: The synchronization source for the source and destination channels.

Total Packets: The number of packets counted for the source and destination channels.

Packets Lost: The calculated number of packets lost by subtracting the number of packets expected (using the sequence numbers) minus the number actually received for the source and destination channels.

Early Packets: The number of packets considered early as configured on the Edit Menu | Settings | Advanced Tab for the source and destination channels.

Late Packets: The number of packets considered late as configured on the Edit Menu | Settings | Advanced Tab for the source and destination channels.

Pictures: The number of picture start codes counted for the source and destination channels.

Picture Rate: The number of pictures per second calculated for the source and destination channels.

Current Bandwidth (kb/s): The bandwidth, in kilobits per second, calculated during the last second for the source and destination channels.

Longest Packet Loss Burst: The count of the longest sequence of lost packets for the source and destination channels

Total Payload Bytes: The number of bytes in the payload portion of the packet for the source and destination channels.

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Parameters Pane

Address: The IP addresses for the source and destination channels.

Port: The port numbers for the source and destination channels.

Media Type: The codec type for the source and destination channels.

SSRC: The synchronization source for the source and destination channels.

Total Packets: The number of packets counted for the source and destination channels.

Packets Lost: The calculated number of packets lost by subtracting the number of packets expected (using the sequence numbers) minus the number actually received for the source and destination channels.

Current Bandwidth (kb/s): The bandwidth, in kilobits per second, calculated during the last second for the source and destination channels.

Longest Packet Loss Burst: The count of the longest sequence of lost packets for the source and destination channels

Total Payload Bytes: The number of bytes in the payload portion of the packet for the source and destination channels.

RTCP Summary

| Source RTCP Channel Summary | | | | Destination RTCP Channel Summary | | | |
|-----------------------------|-----------------------------------------------------|-----------------------------------------------------|--|----------------------------------|-----------------------------------------------------|-----------------------------------------------------|--|
| Metric | Audio Channel | Video Channel | | Metric | Audio Channel | Video Channel | |
| Sender Address | 120.249.49.11:29889 | 120.249.49.11:29891 | | Sender Address | 120.249.0.150:26593 | 120.249.0.150:26595 | |
| Receiver Address | 120.249.0.150:26593 | 120.249.0.150:26595 | | Receiver Address | 120.249.49.11:29889 | 120.249.49.11:29891 | |
| Sender Reports | 1 | 1 | | Sender Reports | 1 | 1 | |
| Receiver Reports | 1 | 1 | | Receiver Reports | 1 | 1 | |
| SDES Reports | 1 | 1 | | SDES Reports | 1 | 1 | |
| Bye Reports | 0 | 0 | | Bye Reports | 0 | 0 | |
| Application Reports | 0 | 0 | | Application Reports | 0 | 0 | |
| Senders RTP Packet Count | 6 | 5 | | Senders RTP Packet Count | 37 | 123 | |
| Senders RTP Byte Count | 2,880 | 1,601 | | Senders RTP Byte Count | 17,760 | 125,251 | |
| Reported Jitter (ms) | 0.000 | 0.000 | | Reported Jitter (ms) | 0.000 | 0.000 | |
| Delay Since Last SR (sec) | 0.00 | 0.00 | | Delay Since Last SR (sec) | 0.00 | 0.00 | |
| Reported Packets Lost | 0 | 0 | | Reported Packets Lost | 0 | 0 | |
| Highest Sequence Number | 0 | 0 | | Highest Sequence Number | 0 | 0 | |
| Fraction Lost (%) | 0.00 | 0.00 | | Fraction Lost (%) | 0.00 | 0.00 | |
| Canonical Name | Win323 Initiate Call 1 | Win323 Initiate Call 1 | | Canonical Name | Win323 Terminate Call 31624 | Win323 Terminate Call 31624 | |
| Name | Audio | Video | | Name | Audio | Video | |
| E-Mail Address | support@touchstone-inc.com | support@touchstone-inc.com | | E-Mail Address | support@touchstone-inc.com | support@touchstone-inc.com | |
| Phone Number | +215.672.6950 | +215.672.6950 | | Phone Number | +215.672.6950 | +215.672.6950 | |
| Location | 228 North York Road, Suite D, Harboro, PA 19040 ... | 228 North York Road, Suite D, Harboro, PA 19040 ... | | Location | 228 North York Road, Suite D, Harboro, PA 19040 ... | 228 North York Road, Suite D, Harboro, PA 19040 ... | |
| Tool | Voice And Video Over IP Test Tool | Voice And Video Over IP Test Tool | | Tool | Voice And Video Over IP Test Tool | Voice And Video Over IP Test Tool | |
| Note | Version 1.5.0 | Version 1.5.0 | | Note | Version 1.5.3 | Version 1.5.3 | |
| Private | www.touchstone-inc.com | www.touchstone-inc.com | | Private | www.touchstone-inc.com | www.touchstone-inc.com | |

This sub-view provides summary information that has been gathered from the RTCP packets that WinEyeQ has analyzed for the audio and video streams that have been sent by both endpoints of the call. This sub-view has two panes that are identical except for source and destination.

RTCP Channel Summary Pane

Sender Address: The IP address and port number of the sending RTCP channel.

Receiver Address: The IP address and port number of the receiving RTCP channel.

Sender Reports: The number of RTCP Sender Reports sent.

Receiver Reports: The number of RTCP Receiver Reports sent.

SDES: The number of RTCP SDES Reports sent.

Bye Reports: The number of RTCP Bye Reports sent.

Application Reports: The number of RTCP Application Reports sent.

Senders Packet Count: The total number of RTP data packets transmitted by the sender since starting transmission.

Senders Byte Count: The total number of payload octets transmitted in RTP data packets by the sender since starting transmission.

Reported Jitter (ms): The jitter measurement calculated on the stream being received from the other endpoint.

Delay Since Last SR (sec): The delay, expressed in units of 1/65536 seconds, between receiving the last SR packet from the remote endpoint and sending this reception report block.

Reported Packets Lost: The total number of RTP data packets from the remote endpoint that have been lost since the beginning of reception.

Highest Sequence Number: The low 16 bits contain the highest sequence number received in an RTP data packet from the remote endpoint, and the most significant 16 bits extend that sequence number with the corresponding count of sequence number cycles.

Fraction Lost (%): The fraction of RTP data packets from the remote endpoint lost since the previous SR or RR packet was sent, expressed as a fixed point number with the binary point at the left edge of the field.

Canonical Name: A unique end-point identifier.

Name: The real name used to describe the source.

E-Mail Address: The email address is formatted according to RFC 2822.

Phone Number: The phone number (should be formatted with the plus sign replacing the international access code).

Location: The geographic user location.

Tool: The application or tool name.

Note: This is intended for transient messages describing the current state of the source.

Private: This item is used to define experimental or application-specific extensions.

RTCP XR Summary

| Source RTCP XR Channel Summary | | | | Destination RTCP XR Channel Summary | | | |
|---------------------------------------|---------------------|---------------------|--|---------------------------------------|---------------------|---------------------|--|
| Metric | Audio Channel | Video Channel | | Metric | Audio Channel | Video Channel | |
| Sender Address | 120.249.49.10:25001 | 120.249.49.10:25003 | | Sender Address | 120.249.0.150:25041 | 120.249.0.150:25043 | |
| Receiver Address | 120.249.0.150:25041 | 120.249.0.150:25043 | | Receiver Address | 120.249.49.10:25001 | 120.249.49.10:25003 | |
| Extended Reports | 22 | 22 | | Extended Reports | 22 | 22 | |
| Loss Rate (%) | 14.45 | 14.45 | | Loss Rate (%) | 14.45 | 14.45 | |
| Discard Rate (%) | 0.00 | 0.00 | | Discard Rate (%) | 0.00 | 0.00 | |
| Average Burst Density (%) | 19.53 | 19.53 | | Average Burst Density (%) | 19.53 | 19.53 | |
| Average Gap Density (%) | 0.00 | 0.00 | | Average Gap Density (%) | 0.00 | 0.00 | |
| Average Burst Duration (ms) | 1,444 | 1,444 | | Average Burst Duration (ms) | 1,444 | 1,444 | |
| Average Gap Duration (ms) | 445 | 445 | | Average Gap Duration (ms) | 445 | 445 | |
| Round Trip Delay (ms) | 16 | 16 | | Round Trip Delay (ms) | 16 | 16 | |
| End System Delay (ms) | 60 | 60 | | End System Delay (ms) | 60 | 60 | |
| Signal Level (db) | -105 | -105 | | Signal Level (db) | -105 | -105 | |
| Noise Level (db) | -67 | -67 | | Noise Level (db) | -67 | -67 | |
| Residual Echo Return Loss (db) | 55 | 55 | | Residual Echo Return Loss (db) | 55 | 55 | |
| Gap Threshold | 16 | 16 | | Gap Threshold | 16 | 16 | |
| R Factor | 90 | 90 | | R Factor | 90 | 90 | |
| External R Factor | Unavailable | Unavailable | | External R Factor | Unavailable | Unavailable | |
| Listening MOS | 4.0 | 4.0 | | Listening MOS | 4.0 | 4.0 | |
| Conversational MOS | 4.0 | 4.0 | | Conversational MOS | 4.0 | 4.0 | |
| Packet Loss Concealment | Enhanced | Enhanced | | Packet Loss Concealment | Enhanced | Enhanced | |
| Jitter Buffer Adaptive | Adaptive | Adaptive | | Jitter Buffer Adaptive | Adaptive | Adaptive | |
| Jitter Buffer Rate | 8 | 8 | | Jitter Buffer Rate | 8 | 8 | |
| Jitter Buffer Nominal Delay (ms) | 40 | 40 | | Jitter Buffer Nominal Delay (ms) | 40 | 40 | |
| Jitter Buffer Max Delay (ms) | 40 | 40 | | Jitter Buffer Max Delay (ms) | 40 | 40 | |
| Jitter Buffer Absolute Max Delay (ms) | 80 | 80 | | Jitter Buffer Absolute Max Delay (ms) | 80 | 80 | |

This sub-view provides summary information that has been gathered from the RTCP XR packets that WinEyeQ has analyzed for the audio and video streams that have been sent by both endpoints of the call. This sub-view has two panes that are identical.

RTCP XR Channel Summary

Sender Address: The IP address and port number of the sending RTCP channel.

Receiver Address: The IP address and port number of the receiving RTCP channel.

Extended Reports: The number of RTCP Extended Reports sent.

Loss Rate (%): The fraction of packets lost since the beginning of the call.

Discard Rate (%): The fraction of packets discarded since the beginning of the call.

Average Burst Density (%): The fraction of packets within burst periods since the beginning of the call.

Average Gap Density (%): The fraction of packets within gap periods since the beginning of the call.

Average Burst Duration (ms): The mean duration, in milliseconds, of the burst periods since the beginning of the call.

Average Gap Duration (ms): The mean duration, in milliseconds, of the gap periods since the beginning of the call.

Round Trip Delay (ms): The most recently calculated round-trip delay, in milliseconds.

End System Delay (ms): The most recently estimated end system delay, in milliseconds.

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Signal Level (db): The relative speech signal level expressed as the ratio of the signal level to a 0 dBm0 reference.

Noise Level (db): The relative silence period noise level expressed as the ratio of the background noise level to a 0 dBm0 reference.

Residual Echo Return Loss (db): The residual echo return loss as the sum of the measured echo return loss (ERL) and the echo return loss enhanced (ERLE) of the echo canceller, expressed in dB.

Gap Threshold: The gap threshold, in packets.

R Factor: The voice quality metric for the call channel as measured in the monitored network segment.

External R Factor: The voice quality metric for the call channel as measured in an external monitored network segment.

Listening MOS: The estimated mean opinion listening quality score for the call channel.

Conversational MOS: The estimated mean opinion conversational quality score for the call channel.

Packet Loss Concealment: The packet loss concealment capabilities.

Jitter Buffer Adaptive: Adaptive or non-adaptive.

Jitter Buffer Rate: This represents the implementation specific adjustment rate of a jitter buffer in adaptive mode.

Jitter Buffer Nominal Delay (ms): The current nominal jitter buffer delay, in milliseconds.

Jitter Buffer Max Delay (ms): The maximum jitter buffer delay, in milliseconds, recorded for the call.

Jitter Buffer Absolute Max Delay (ms): The absolute maximum delay, in milliseconds, the jitter buffer can ever introduce to the call channel packet stream.

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DTMF Summary

| Source Audio DTMF Event Detail | | | | | | | | | | | Destination Audio DTMF Event Detail | | | | | | | | | | |
|--------------------------------|-----------------|-------|-------|-------|----------|---------|--------|---------|-------|------|-------------------------------------|-------|-------|-------|----------|---------|--------|---------|-------|--|--|
| Time | Elapsed | Event | Digit | Power | Duration | End Bit | Marker | Seq Num | Timez | Time | Elapsed | Event | Digit | Power | Duration | End Bit | Marker | Seq Num | Timez | | |
| 09:40:09.352389 | 00:00:00.000000 | dt02 | 2 | 0 | 1500 | 1 | 1 | 2 | 3 | | | | | | | | | | | | |
| 09:40:09.402681 | 00:00:00.050322 | dt02 | 2 | 0 | 1500 | 1 | 0 | 5 | 3 | | | | | | | | | | | | |
| 09:40:09.453417 | 00:00:00.050736 | dt01 | 1 | 0 | 1500 | 0 | 1 | 9 | 26 | | | | | | | | | | | | |
| 09:40:09.554968 | 00:00:00.101581 | dt01 | 1 | 0 | 1500 | 1 | 0 | 15 | 26 | | | | | | | | | | | | |
| 09:40:09.605763 | 00:00:00.050785 | dt01 | 1 | 0 | 1500 | 1 | 0 | 18 | 26 | | | | | | | | | | | | |
| 09:40:09.656547 | 00:00:00.050794 | dt05 | 5 | 0 | 1500 | 0 | 1 | 22 | 53 | | | | | | | | | | | | |
| 09:40:09.758148 | 00:00:00.101601 | dt05 | 5 | 0 | 1500 | 1 | 0 | 28 | 53 | | | | | | | | | | | | |
| 09:40:09.809144 | 00:00:00.050996 | dt05 | 5 | 0 | 1500 | 1 | 0 | 32 | 53 | | | | | | | | | | | | |
| 09:40:09.859664 | 00:00:00.050520 | dt06 | 6 | 0 | 1500 | 0 | 1 | 35 | 88 | | | | | | | | | | | | |
| 09:40:09.961900 | 00:00:00.102236 | dt06 | 6 | 0 | 1500 | 1 | 0 | 41 | 88 | | | | | | | | | | | | |
| 09:40:10.012964 | 00:00:00.051094 | dt06 | 6 | 0 | 1500 | 1 | 0 | 45 | 88 | | | | | | | | | | | | |
| 09:40:10.063811 | 00:00:00.050857 | dt07 | 7 | 0 | 1500 | 0 | 1 | 48 | 115 | | | | | | | | | | | | |
| 09:40:10.166336 | 00:00:00.102524 | dt07 | 7 | 0 | 1500 | 1 | 0 | 54 | 115 | | | | | | | | | | | | |
| 09:40:10.218419 | 00:00:00.052084 | dt07 | 7 | 0 | 1500 | 1 | 0 | 58 | 115 | | | | | | | | | | | | |
| 09:40:10.270724 | 00:00:00.052305 | dt02 | 2 | 0 | 1500 | 0 | 1 | 62 | 151 | | | | | | | | | | | | |
| 09:40:10.372668 | 00:00:00.101844 | dt02 | 2 | 0 | 1500 | 1 | 0 | 68 | 151 | | | | | | | | | | | | |
| 09:40:10.423123 | 00:00:00.050495 | dt02 | 2 | 0 | 1500 | 1 | 0 | 71 | 151 | | | | | | | | | | | | |
| 09:40:10.473890 | 00:00:00.050767 | dt06 | 6 | 0 | 1500 | 0 | 1 | 75 | 182 | | | | | | | | | | | | |
| 09:40:10.575460 | 00:00:00.101570 | dt06 | 6 | 0 | 1500 | 1 | 0 | 81 | 182 | | | | | | | | | | | | |
| 09:40:10.626251 | 00:00:00.050791 | dt06 | 6 | 0 | 1500 | 1 | 0 | 84 | 182 | | | | | | | | | | | | |
| 09:40:10.677047 | 00:00:00.050796 | dt05 | 5 | 0 | 1500 | 0 | 1 | 88 | 211 | | | | | | | | | | | | |
| 09:40:10.778611 | 00:00:00.101564 | dt05 | 5 | 0 | 1500 | 1 | 0 | 94 | 211 | | | | | | | | | | | | |
| 09:40:10.829354 | 00:00:00.050743 | dt05 | 5 | 0 | 1500 | 1 | 0 | 98 | 211 | | | | | | | | | | | | |
| 09:40:10.880137 | 00:00:00.050703 | dt05 | 5 | 0 | 1500 | 0 | 1 | 101 | 244 | | | | | | | | | | | | |
| 09:40:10.981796 | 00:00:00.101869 | dt05 | 5 | 0 | 1500 | 1 | 0 | 107 | 244 | | | | | | | | | | | | |
| 09:40:11.032478 | 00:00:00.050772 | dt05 | 5 | 0 | 1500 | 1 | 0 | 111 | 244 | | | | | | | | | | | | |
| 09:40:11.083268 | 00:00:00.050790 | dt00 | 0 | 0 | 1500 | 0 | 1 | 114 | 275 | | | | | | | | | | | | |
| 09:40:11.184827 | 00:00:00.101559 | dt00 | 0 | 0 | 1500 | 1 | 0 | 120 | 275 | | | | | | | | | | | | |
| 09:40:11.235600 | 00:00:00.050773 | dt00 | 0 | 0 | 1500 | 1 | 0 | 124 | 275 | | | | | | | | | | | | |

This sub-view provides a detailed and organized tabular display for the active DTMF transmissions that occur during a call for both the source and destination side of the calls.

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Recent Errors View

The screenshot shows the WinEyeQ Professional Edition interface. The main window is titled 'WinEyeQ (tm) Professional Edition w/QoS Version 1.7.0 on 120.249.49.10, 120.249.49.11 - Voice and Video Monitoring and Analysis'. The 'Recent Errors' tab is active, displaying a table of error events. The table has the following columns: Status, Protocol, Code, Description, Started, Duration, Source Address, Source ID/E.164, Source Name/H.323 ID, Destination Address, Destination ID/E.164, Destination Name/H.323 ID, and Call ID. The table contains 20 rows of error data, all with a status of 'Error' and a protocol of 'SIP'. Below the table, there are several summary sections: Call Summary, Call Flow, Call Trace, Call Metrics, Audio Details, Audio QoS, Video Details, Data Details, RTPCP Summary, RTPCP-R Summary, and DTMF Summary. The bottom status bar shows 'Ready: For Help, press F1', 'Session: 00:52:53', 'Active Calls: 31', 'Calls Completed: 2,090', 'Avg. Call Rate: 0.661/sec', 'Errors Detected: 131', 'Error Rate: 6.260%', and 'Registered: 0'.

The recent errors view is designed to provide an in-depth view of each VoIP call for which an error was detected. Each call is represented by an entry, which is updated once every second, in the topmost report. This report contains the following columns:

Status: The current status of the call. These may be things such as connecting, ringing, connected, error, etc.

Protocol: The values for this field are SIP or H.323.

Code: The numeric code for this error (if applicable).

Description: A text description of this error.

Started: This is the time (local time) that the call was started.

Duration: The length of time the call is (or was) active.

Source Address: The address of the call initiator (caller).

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Source ID/E.164: The SIP user ID or H.323 E.164 alias of the caller.

Source Name/H.323 ID: The SIP display name or H.323 ID of the caller.

Destination Address: The address of the call receiver (party called).

Destination ID/E.164: The SIP user ID or H.323 E.164 alias of the party called.

Destination Name/H.323 ID: The SIP display name or H.323 ID of the party called.

Call ID: The SIP or H.323 call ID associated with this call.

Registered With: The gatekeeper's IP address, for H.323 calls, or the Proxy's IP address, for SIP calls.

Conference ID: The conference ID (H.323 calls only).

Each individual call has the following sub-views.

- Call Summary
- Call Flow (ladder diagram)
- Call Trace
- Call Metrics
- Audio Details
- Audio QoS
- Video Details
- Data Details
- RTCP Summary
- RTCP XR Summary
- DTMF Summary

To display information about a particular call, select it (click the call line) in the call list. Whenever a call is selected, it will remain "locked" in the view for as long as you wish to view its details.

Note: For a detailed description of these sub-views please refer back to the 'Recent Calls View' section of the manual.

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User Alerts View

| Time | Notification | Threshold | Value | User ID | Source Address | Destination Address | Call/Conference ID |
|-----------------|-----------------------------------------------------------------------------------------|-----------|-------|---------|---------------------|---------------------|---------------------------|
| 12:13:12.87775 | Burst Packet Loss High Alert | 1.00 | 2.00 | 10005 | 120.249.49.10:40000 | 120.249.0.150:47456 | c41a-43991796-0547-Call6 |
| 12:13:12.24460 | Listening MOS Score, (G.711 Allow), Low Alert | 3.78 | 3.48 | 10024 | 120.249.49.10:40006 | 120.249.0.150:47532 | 11be-43991626-0547-Call25 |
| 12:13:18.898931 | Listening MOS Score, (G.711 Allow), Low Alert | 3.78 | 3.57 | 10015 | 120.249.49.10:40060 | 120.249.0.150:47592 | 6b16-43997750-0548-Call16 |
| 12:13:18.934542 | Listening MOS Score, (G.711 Allow), Low Alert | 3.78 | 3.57 | 10016 | 120.249.49.10:40064 | 120.249.0.150:47596 | 192a-43997796-0548-Call17 |
| 12:13:20.294825 | Listening MOS Score, (G.711 Allow), Low Alert | 3.78 | 3.53 | 10010 | 120.249.49.10:40040 | 120.249.0.150:47608 | 090b-43998966-0548-Call11 |
| 12:13:20.294853 | Listening MOS Score, (G.711 Allow), Low Alert | 3.78 | 3.53 | 10019 | 120.249.49.10:40076 | 120.249.0.150:47612 | 870e-43999000-0548-Call20 |
| 12:13:21.019626 | Burst Packet Loss High Alert | 1.00 | 2.00 | 10021 | 120.249.49.10:40084 | 120.249.0.150:47620 | 6a0b-43999187-0548-Call22 |
| 12:13:25.258386 | Listening MOS Score, (G.711 Allow), Low Alert | 3.78 | 3.29 | 20014 | 120.249.0.150:47728 | 120.249.49.10:40056 | 404a-44004870-0549-Call15 |
| 12:13:25.694669 | Burst Packet Loss High Alert | 1.00 | 2.00 | 10000 | 120.249.49.10:40000 | 120.249.0.150:47736 | 9550-44004667-0549-Call1 |
| 12:13:25.737097 | Listening R Factor, (G.711 Allow), Low Alert | 83.70 | 83.00 | 20009 | 120.249.0.150:47676 | 120.249.49.10:40036 | aab7-44002703-0549-Call10 |
| 12:13:25.737179 | Listening R Factor, (G.711 Allow), Low Alert | 83.70 | 83.00 | 20011 | 120.249.0.150:47680 | 120.249.49.10:40044 | 3c3c-44002703-0549-Call12 |
| 12:13:25.737570 | Listening R Factor, (G.711 Allow), Low Alert | 83.70 | 79.00 | 20017 | 120.249.0.150:47700 | 120.249.49.10:40068 | f8f0-44004946-0549-Call18 |
| 12:13:25.787370 | Listening R Factor, (G.711 Allow), Low Alert | 83.70 | 83.00 | 20012 | 120.249.0.150:47684 | 120.249.49.10:40048 | d867-44002703-0549-Call13 |
| 12:13:25.778950 | Listening R Factor, (G.711 Allow), Low Alert | 83.70 | 83.00 | 20013 | 120.249.0.150:47688 | 120.249.49.10:40052 | 2e0d-44002796-0549-Call14 |
| 12:13:25.838473 | Listening R Factor, (G.711 Allow), Low Alert | 83.70 | 82.00 | 20015 | 120.249.0.150:47692 | 120.249.49.10:40060 | d63e-44002859-0549-Call16 |
| 12:13:25.878281 | Listening R Factor, (G.711 Allow), Low Alert | 83.70 | 82.00 | 20016 | 120.249.0.150:47696 | 120.249.49.10:40064 | f861-44002890-0549-Call17 |
| 12:13:25.897544 | Listening MOS Score, (G.711 Allow), Low Alert | 3.78 | 3.44 | 20018 | 120.249.0.150:47704 | 120.249.49.10:40072 | 358f-44003238-0549-Call19 |
| 12:13:31.460111 | Burst Packet Loss High Alert | 1.00 | 2.00 | 10018 | 120.249.49.10:40072 | 120.249.0.150:47804 | b119-44009531-0549-Call19 |
| 12:13:32.259633 | Bi-Directional Audio was not detected (from 120.249.0.150 to 120.249.49.10), High Alert | 5.00 | 6.00 | 20001 | 120.249.49.10 | 120.249.0.150 | 5308-44007603-0549-Call2 |
| 12:13:32.913319 | Bi-Directional Audio was not detected (from 120.249.0.150 to 120.249.49.10), High Alert | 5.00 | 6.00 | 20007 | 120.249.49.10 | 120.249.0.150 | f75a-44007843-0549-Call8 |
| 12:13:39.432630 | Listening MOS Score, (G.711 Allow), Low Alert | 3.78 | 3.48 | 10001 | 120.249.49.10:40004 | 120.249.0.150:47964 | 1f81-44010296-0549-Call2 |
| 12:13:39.473952 | Listening MOS Score, (G.711 Allow), Low Alert | 3.78 | 3.53 | 10007 | 120.249.49.10:40028 | 120.249.0.150:47968 | e19b-44010296-0549-Call8 |
| 12:13:41.953091 | Burst Packet Loss High Alert | 1.00 | 2.00 | 10000 | 120.249.49.10:40000 | 120.249.0.150:48036 | 1a0f-44020946-0549-Call1 |
| 12:13:42.213961 | Listening MOS Score, (G.711 Allow), Low Alert | 3.78 | 3.53 | 10001 | 120.249.49.10:40012 | 120.249.0.150:48008 | 1584-44021076-0549-Call4 |
| 12:13:44.040543 | Burst Packet Loss High Alert | 1.00 | 2.00 | 10001 | 120.249.49.10:40004 | 120.249.0.150:48064 | e5d1-44023671-0549-Call2 |
| 12:13:46.613960 | Listening MOS Score, (G.711 Allow), Low Alert | 3.78 | 3.53 | 10020 | 120.249.49.10:40080 | 120.249.0.150:48116 | f0a8-44023953-0549-Call1 |
| 12:13:47.262023 | Listening R Factor, (G.711 Allow), Low Alert | 83.70 | 81.00 | 20018 | 120.249.0.150:48104 | 120.249.49.10:40072 | 129a-44023281-0549-Call19 |
| 12:13:47.303080 | Listening R Factor, (G.711 Allow), Low Alert | 83.70 | 81.00 | 20010 | 120.249.0.150:48108 | 120.249.49.10:40040 | 459f-44023296-0549-Call11 |
| 12:13:48.854615 | Listening MOS Score, (G.711 Allow), Low Alert | 3.78 | 3.53 | 10005 | 120.249.49.10:40020 | 120.249.0.150:48156 | 709d-44023703-0549-Call6 |
| 12:13:50.073465 | Listening MOS Score, (G.711 Allow), Low Alert | 3.78 | 3.53 | 10009 | 120.249.49.10:40036 | 120.249.0.150:48176 | e72c-44023937-0549-Call10 |
| 12:13:50.474217 | Burst Packet Loss High Alert | 1.00 | 2.00 | 10017 | 120.249.49.10:40068 | 120.249.0.150:48200 | 311c-44032023-0549-Call18 |
| 12:13:50.969198 | Burst Packet Loss High Alert | 1.00 | 2.00 | 10011 | 120.249.49.10:40044 | 120.249.0.150:48180 | a6c7-44028984-0549-Call12 |
| 12:13:53.333929 | Listening MOS Score, (G.711 Allow), Low Alert | 3.78 | 3.53 | 10003 | 120.249.49.10:40012 | 120.249.0.150:48248 | b827-44032000-0549-Call4 |

Alert Summary

Ready: For Help, press F1 Session: 02:01:14 Active Calls: 60 Calls Completed: 66,720 Avg. Call Rate: 9.449/sec Errors Detected: 0 Error Rate: 0.000% Registered: 0

This view provides an active list of the alerts that have occurred during the test session. The notification list for the events that triggered the alerts is displayed in tabular form. Each alert is represented by an entry in the topmost report. This report contains the following columns:

Time: This is the time the Alert was detected.

Notification: An explanation of the Alert.

Threshold: The threshold value set by the user.

Value: The value that triggered the Alert

User ID: The SIP user ID or H.323 alias of the caller.

Source Address: The address of the call initiator (caller).

Destination Address: The address of the call receiver (party called).

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Call/Conference ID: The SIP or H.323 call ID associated with this call.

Various alert thresholds are set by the user for audio/video jitter, interval, packet loss, and R-Factor/MOS score measurements

User Alarms View

| Time | Notification | Threshold | Value | User ID | Source Address | Destination Address | Call/Conference ID |
|-----------------|----------------------------------|-----------|-------|---------|---------------------|---------------------|---------------------------------|
| 14:06:30.674082 | Audio Jitter High Alarm Exceeded | 2.00 | 2.07 | 10006 | 120.249.0.135:40024 | 120.249.0.111:49732 | 9ee4d0779700-0013-CaP |
| 14:06:32.420311 | Video Jitter High Alarm Exceeded | 2.00 | 2.06 | 20008 | 120.249.0.135:25674 | 120.249.0.112:28016 | E64408C87970C7F0D122B1BFC... |
| 14:06:32.742869 | Video Jitter High Alarm Exceeded | 2.00 | 2.05 | 20002 | 120.249.0.135:25660 | 120.249.0.112:27992 | 810ED70C32E51AFFFC05A0C9F3... |
| 14:06:32.742941 | Video Jitter High Alarm Exceeded | 2.00 | 2.06 | 20004 | 120.249.0.135:25664 | 120.249.0.112:27996 | ED4780A8B865F07431AECC08... |
| 14:06:32.743022 | Video Jitter High Alarm Exceeded | 2.00 | 2.05 | 20006 | 120.249.0.135:25656 | 120.249.0.112:28000 | 058E3D1E2037863C399A6D1992... |
| 14:06:32.743091 | Video Jitter High Alarm Exceeded | 2.00 | 2.13 | 20005 | 120.249.0.135:25662 | 120.249.0.112:28004 | F8551CD27895FC2A1E602B1603E7... |
| 14:06:32.743166 | Video Jitter High Alarm Exceeded | 2.00 | 2.20 | 20007 | 120.249.0.135:25666 | 120.249.0.112:28008 | 29525E5E70588E848A1A932DC9... |
| 14:06:32.743235 | Video Jitter High Alarm Exceeded | 2.00 | 2.29 | 20010 | 120.249.0.135:25670 | 120.249.0.112:28012 | 0648110DF88761184549AEB31C16... |
| 14:06:32.755143 | Audio Jitter High Alarm Exceeded | 2.00 | 2.02 | 10008 | 120.249.0.135:40032 | 120.249.0.111:49740 | e70150791937-0014-CaP |
| 14:06:32.755212 | Audio Jitter High Alarm Exceeded | 2.00 | 2.02 | 10009 | 120.249.0.135:40036 | 120.249.0.111:49744 | 75ee40781984-0014-CaP |
| 14:06:32.759143 | Audio Jitter High Alarm Exceeded | 2.00 | 2.03 | 20005 | 120.249.0.135:25660 | 120.249.0.112:28002 | F8551CD27895FC2A1E602B1603E7... |
| 14:06:32.759140 | Audio Jitter High Alarm Exceeded | 2.00 | 2.04 | 20007 | 120.249.0.135:25664 | 120.249.0.112:28006 | 20555E3D72608E848A1A932DC9... |
| 14:06:32.759212 | Audio Jitter High Alarm Exceeded | 2.00 | 2.04 | 20010 | 120.249.0.135:25668 | 120.249.0.112:28010 | 0648110DF88761184549AEB31C16... |
| 14:06:32.759294 | Audio Jitter High Alarm Exceeded | 2.00 | 2.05 | 20008 | 120.249.0.135:25672 | 120.249.0.112:28014 | E64408C87970C7F0D122B1BFC... |
| 14:06:32.759366 | Audio Jitter High Alarm Exceeded | 2.00 | 2.08 | 20009 | 120.249.0.135:25676 | 120.249.0.112:28018 | A9FF058466021513C27230E2AF... |
| 14:06:32.801513 | Video Jitter High Alarm Exceeded | 2.00 | 2.27 | 20003 | 120.249.0.135:25644 | 120.249.0.112:27988 | E0837A62F064F300B72ECC04853... |
| 14:06:32.834840 | Audio Jitter High Alarm Exceeded | 2.00 | 2.10 | 10003 | 120.249.0.135:40012 | 120.249.0.111:49760 | e13150792515-0014-CaP |
| 14:06:32.834911 | Audio Jitter High Alarm Exceeded | 2.00 | 2.09 | 10004 | 120.249.0.135:40016 | 120.249.0.111:49764 | 494483079262-0014-CaP |
| 14:06:32.834978 | Audio Jitter High Alarm Exceeded | 2.00 | 2.08 | 10005 | 120.249.0.135:40020 | 120.249.0.111:49768 | b25350792687-0014-CaP |
| 14:06:32.834982 | Audio Jitter High Alarm Exceeded | 2.00 | 2.05 | 10007 | 120.249.0.135:40028 | 120.249.0.111:49772 | 638350792796-0014-CaP |
| 14:06:32.853280 | Audio Jitter High Alarm Exceeded | 2.00 | 2.33 | 10006 | 120.249.0.135:40024 | 120.249.0.111:49776 | 171550792765-0014-CaP |
| 14:06:39.570407 | Audio Jitter High Alarm Exceeded | 2.00 | 2.02 | 20005 | 120.249.0.135:25700 | 120.249.0.112:28042 | 8E82D612549DD0C93E16AC4D497B... |
| 14:06:39.570477 | Audio Jitter High Alarm Exceeded | 2.00 | 2.03 | 20010 | 120.249.0.135:25708 | 120.249.0.112:28050 | FA14532D74E108774D7638414E... |
| 14:06:39.570569 | Audio Jitter High Alarm Exceeded | 2.00 | 2.03 | 20008 | 120.249.0.135:25712 | 120.249.0.112:28054 | 63917147CB15D4E3310A3A98A77... |
| 14:06:39.570629 | Audio Jitter High Alarm Exceeded | 2.00 | 2.11 | 20009 | 120.249.0.135:25716 | 120.249.0.112:28058 | A4066425F118E943881D9C05E0C... |
| 14:06:39.884915 | Audio Jitter High Alarm Exceeded | 2.00 | 2.09 | 20007 | 120.249.0.135:25706 | 120.249.0.112:28046 | 229223751BFC3F1C39816C9A84B... |
| 14:06:39.920615 | Video Jitter High Alarm Exceeded | 2.00 | 2.23 | 20006 | 120.249.0.135:25696 | 120.249.0.112:28040 | 8C28699020A036A90E1142A231... |
| 14:06:39.920707 | Video Jitter High Alarm Exceeded | 2.00 | 2.41 | 20007 | 120.249.0.135:25704 | 120.249.0.112:28048 | 229223751BFC3F1C39816C9A84B... |
| 14:06:39.920732 | Video Jitter High Alarm Exceeded | 2.00 | 2.49 | 20005 | 120.249.0.135:25702 | 120.249.0.112:28044 | 8E82D612549DD0C93E16AC4D497B... |
| 14:06:39.920843 | Video Jitter High Alarm Exceeded | 2.00 | 2.56 | 20010 | 120.249.0.135:25710 | 120.249.0.112:28052 | FA14532D74E108774D7638414E... |
| 14:06:39.920920 | Video Jitter High Alarm Exceeded | 2.00 | 2.57 | 20008 | 120.249.0.135:25714 | 120.249.0.112:28056 | 63917147CB15D4E3310A3A98A77... |
| 14:06:39.920999 | Video Jitter High Alarm Exceeded | 2.00 | 2.67 | 20009 | 120.249.0.135:25718 | 120.249.0.112:28060 | A4066425F118E943881D9C05E0C... |
| 14:06:39.930296 | Audio Jitter High Alarm Exceeded | 2.00 | 2.36 | 20002 | 120.249.0.135:25690 | 120.249.0.112:28030 | E63550F8C6E8A18E3E3AFAC6D... |

This view provides an active list of the alarms that have occurred during the test session. The notification list for the events that triggered the alarms is displayed in tabular form. Each alert is represented by an entry in the topmost report. This report contains the following columns:

Time: This is the time the Alarm was detected.

Notification: An explanation of the Alarm.

Threshold: The threshold value set by the user.

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Value: The value that triggered the Alarm

User ID: The SIP user ID or H.323 alias of the caller.

Source Address: The address of the call initiator (caller).

Destination Address: The address of the call receiver (party called).

Call/Conference ID: The SIP or H.323 call ID associated with this call.

Various alarm thresholds are set by the user for audio/video jitter, interval, packet loss, and R-Factor/MOS score measurements

User Watches View

The screenshot shows the WinEyeQ Professional Edition interface. The top menu bar includes File, Edit, Capture, Record, View, and Help. The main window is titled 'WinEyeQ (tm) Professional Edition w/Qt5 Version 1.7.0 on 120.249.49.10, 120.249.49.11 - Voice and Video Monitoring and Analysis'. The 'User Watches' tab is active, displaying a table of call events. The table has columns for Status, Protocol, Found In, Watch Trigger, Started, Duration, Terminator, Source Address, Source ID, Source Name, Destination Address, Destination ID, Destination Name, and Call ID. Below the table, there are tabs for Call Summary, Call Flow, Call Trace, Call Metrics, Audio Summary, Audio Details, Audio QoS, Video Summary, Video Details, Data Details, RTP/RTCP Summary, and DTMF Summary. The Call Summary tab is selected, showing a detailed view of a call with various metrics for signaling, audio, and video.

| Signaling | Value | Audio | Value | Video | Value |
|------------------|---------------|---------------------------------------|---------------------|-----------------------------------|---------------------|
| Src Address | 120.249.49.11 | Src Audio Channel | 120.249.49.11:27788 | Src Video Channel | 120.249.49.11:27790 |
| Src E.164 | 1018 | Src Media Type | G.711 Alaw 64k | Src Media Type | H.263 |
| Src H.323 ID | | Src Packet Count | 84 | Src Packet Count | 76 |
| | | Src Average Jitter (ms) | 0.38 | Src Average Jitter (ms) | 0.429 |
| Dest Address | 120.249.0.150 | Src Average Packet Interval (ms) | 60.993 | Src Average Packet Interval (ms) | 67.313 |
| Dest E.164 | 2018 | Src Average Bandwidth (kb/s) | 65.657 | Src Average Bandwidth (kb/s) | 19.722 |
| Dest H.323 ID | | Src Packets Lost | 0 | Src Packets Lost | 0 |
| Start Time | 12:20:06 | Src TOS/DSCP Flag | Default (000000) | Src TOS/DSCP Flag | Default (000000) |
| Stop Time | 12:20:11 | Src Listening R Factor | 93 | | |
| Duration | 00:00:05 | Src Listening MOS Score | 4.20 | | |
| | | Optimal Listening R Factor(MOS Score) | 93%-20 | | |
| Call Terminator | Source | Stream Quality Index (SQI) | A+ (100.00) | | |
| Gatekeeper | | Dest Audio Channel | 120.249.0.150:29488 | Dest Video Channel | 120.249.0.150:29490 |
| Call Score | A+ 98.490 | Dest Media Type | G.711 Alaw 64k | Dest Media Type | H.263 |
| Signaling Score | A+ 98.003 | Dest Packet Count | 84 | Dest Packet Count | 273 |
| Media Score | A+ 98.614 | Dest Average Jitter (ms) | 3.076 | Dest Average Jitter (ms) | 2.834 |
| Src Aud Score | A+ 99.540 | Dest Average Packet Interval (ms) | 60.890 | Dest Average Packet Interval (ms) | 67.106 |
| Dest Aud Score | A+ 99.142 | Dest Average Bandwidth (kb/s) | 65.580 | Dest Average Bandwidth (kb/s) | 515.699 |
| Src Vid Score | A 96.700 | Dest Packets Lost | 0 | Dest Packets Lost | 0 |
| Dest Vid Score | A 96.336 | Dest TOS/DSCP Flag | Default (000000) | Dest TOS/DSCP Flag | Default (000000) |
| Record Filename | | Dest Listening R Factor | 93 | | |
| Capture Filename | | Dest Listening MOS Score | 4.20 | | |
| | | Optimal Listening R Factor(MOS Score) | 93%-20 | | |
| | | Stream Quality Index (SQI) | A+ (100.00) | | |

Ready: For Help, press F1
Session: 02:00:29 Active Calls: 76 Calls Completed: 72,895 Avg. Call Rate: 9.457/sec Errors Detected: 0 Error Rate: 0.000% Registered: 0

The watch view is designed to provide an in-depth view of each VoIP call and that has been associated with a user-defined “watch” trigger. Each call is represented by an entry, which is updated once every second, in the topmost report. This report contains the following columns:

Call status: The current status of the call. These may be things such as connecting, ringing, connected, error, etc.

Protocol: The values for this field are SIP or H.323.

Found in: This field specifies which call element the value was found in.

Watch trigger: This field specifies what value caused the watch to be triggered.

Started: This is the time (local time) that the call was started.

Duration: The length of time the call is (or was) active.

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Terminator: The side that terminated the call (source or destination).

Source Address: The address of the call initiator (caller).

Source ID/E.164: The SIP user ID or H.323 E.164 alias of the caller.

Source Name/H.323 ID: The SIP display name or H.323 ID of the caller.

Destination Address: The address of the call receiver (party called).

Destination ID/E.164: The SIP user ID or H.323 E.164 alias of the party called.

Destination Name/H.323 ID: The SIP display name or H.323 ID of the party called.

Call ID: The SIP or H.323 call ID associated with this call.

Registered With: The gatekeeper's IP address for H.323 calls, or the Proxy's IP address for SIP calls.

Conference ID: The conference ID (H.323 calls only).

Each individual call has the following sub-views:

- Call Summary
- Call Flow
- Call Trace
- Call Metrics
- Audio Summary
- Audio Details
- Audio QoS
- Video Summary
- Video Details
- Data Details
- RTCP Summary
- RTCP XR Summary
- DTMF Summary

To display information about a particular call, select it in the watch list. Whenever a call is selected, it will remain "locked" in the view for as long as you wish to view its details.

Note: For a detailed description of these sub-views please refer back to the 'Active Calls View' section of the manual.

Endpoints View

The screenshot shows the WinEyeQ interface. The main table lists endpoints with the following columns: Status, ID, IP Address, MAC Address, Description, Discovered, Online, Placed, Received, Successful, Failed, Registered With, and Bandwidth Used (KB). The 'Endpoint Summary and Recent Call History' section is visible below, showing a 'Top Talkers' tab and a summary table with columns: In/Out, Protocol, Result, Remote ID, Remote Address, Started, Ended, Duration, and various quality metrics. The status bar at the bottom indicates 'Ready: For Help, press F1', 'Session: 02:10:14', 'Active Calls: 72', 'Calls Completed: 73,893', 'Avg. Call Rate: 9.458/sec', 'Errors Detected: 0', 'Error Rate: 0.000%', and 'Registered: 0'.

The Endpoint View shows a list of each endpoint that has participated in a VoIP call during this WinEyeQ session. This view contains the following columns:

Status: Current status of endpoint, Inactive / Calling / Receiving.

ID: The E.164 alias of the endpoint (H.323) or Call ID (SIP)

IP Address: The IP address of the endpoint.

MAC Address: The MAC address of the endpoint.

Description: A readable text description (if available) of the endpoint.

Discovered: This is the time this endpoint was first observed by WinEyeQ.

Online: The length of time this endpoint has been online.

Placed: The number of calls this endpoint has placed.

Received: The number of calls this endpoint has received.

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Successful: The number of calls for this endpoint without errors.

Failed: The number of calls for this endpoint with errors.

Registered With: The gatekeeper's IP address, for H.323 calls, or the Proxy's IP address, for SIP calls.

Bandwidth Used (KB): How many bytes of data has been transferred.

The number of endpoints in the list is user configurable via Edit | Settings | Endpoints.

Endpoint Summary and Recent Call History

| Endpoint Summary and Recent Call History | | Top Talkers | | | | | | | | | | | |
|------------------------------------------|----------|-------------|----------|---------|-----------|----------------|----------|----------|----------|------------|-----------|----------|-------------|
| | | In/Out | Protocol | Result | Remote ID | Remote Address | Started | Ended | Duration | Aud. Codec | MOS Score | R Factor | Aud. Jitter |
| Total Calls | 25 | Outbound | SIP | Success | 20008 | 120.249.0.151 | 11:15:18 | 11:16:18 | 00:01:00 | G.711 Alaw | 4.137 | 90.000 | 0.493 |
| Successful Calls | 25 | Outbound | SIP | Success | 20008 | 120.249.0.151 | 11:08:10 | 11:09:10 | 00:01:00 | G.711 Alaw | 4.137 | 90.000 | 0.522 |
| Failed Calls | 0 | Outbound | SIP | Success | 20008 | 120.249.0.151 | 11:09:11 | 11:10:11 | 00:01:00 | G.711 Alaw | 4.137 | 90.000 | 0.474 |
| Inbound | | Outbound | SIP | Success | 20008 | 120.249.0.151 | 11:10:12 | 11:11:12 | 00:01:00 | Dynamic | 0.000 | 0.000 | 0.483 |
| Total Calls | 0 | Outbound | SIP | Success | 20008 | 120.249.0.151 | 11:11:13 | 11:12:14 | 00:01:01 | Dynamic | 0.000 | 0.000 | 0.479 |
| Cumulative Time | 00:00:00 | Outbound | SIP | Success | 20008 | 120.249.0.151 | 11:12:15 | 11:13:15 | 00:01:00 | G.711 Alaw | 4.137 | 90.000 | 0.485 |
| Outbound | | Outbound | SIP | Success | 20008 | 120.249.0.151 | 11:13:16 | 11:14:16 | 00:01:00 | Dynamic | 0.000 | 0.000 | 0.494 |
| Total Calls | 27 | Outbound | SIP | Success | 20008 | 120.249.0.151 | 11:14:17 | 11:15:17 | 00:01:00 | G.711 Alaw | 4.137 | 90.000 | 0.488 |
| Cumulative Time | 00:24:37 | | | | | | | | | | | | |

The Endpoint Summary and Recent Call History view keeps a list of each call the endpoint has either placed or received.

This view contains the following columns:

In/Out: Whether the call was placed (Outbound) or received (Inbound).

Protocol: The protocol used for the call (H.323 or SIP).

Result: Either Success or Fail.

Remote ID: The E.164 alias (H.323) or Call ID (SIP) of the other endpoint.

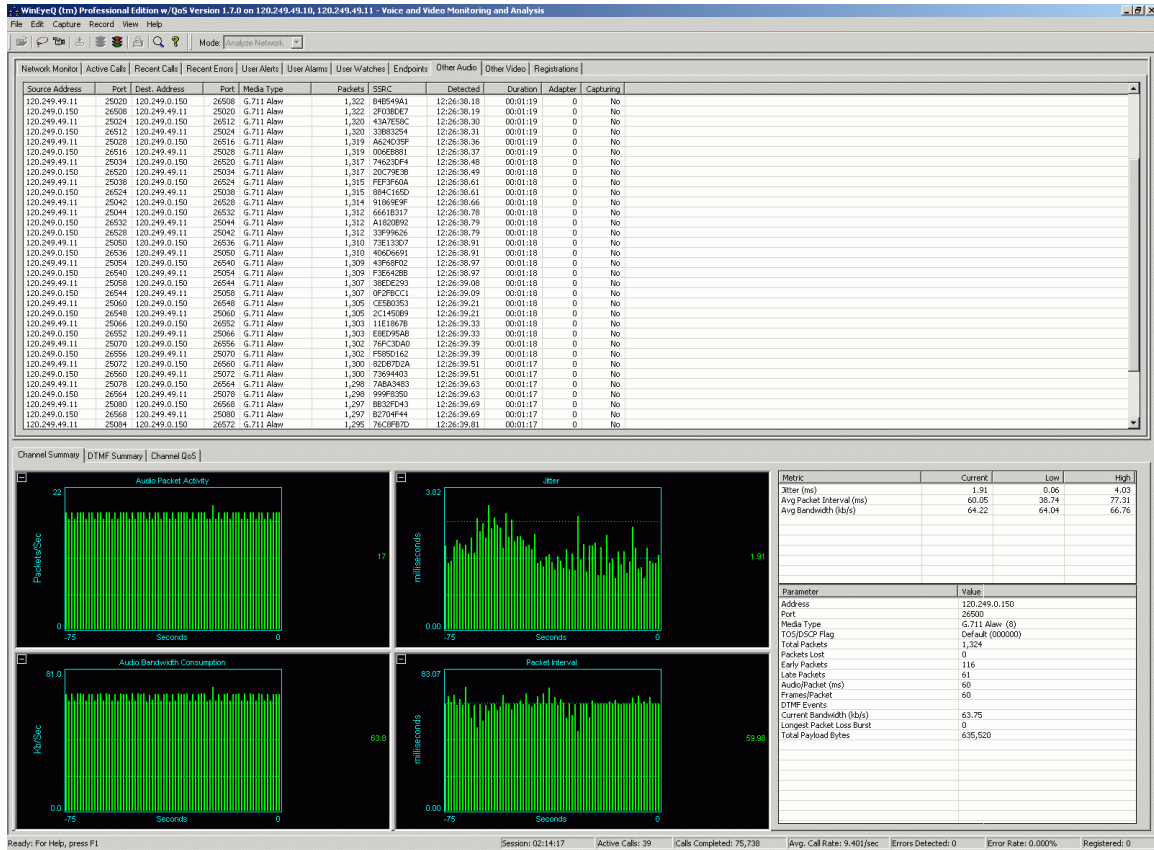
Remote Address: The IP address of the endpoint.

Started: The time the call started.

Ended: The time the call ended.

Duration: The call duration.

Other Audio View



This view contains the following columns:

Source Address: The IP address of the call initiator (caller).

Port: The port of the call initiator (caller).

Destination Address: The IP address of the call receiver (party called).

Port: The port of the call receiver (party called).

Media Type: The type of media flowing on this channel.

Packets: The number of packets sent on this channel.

SSRC: The synchronization source from the RTP header.

Detected: The time this stream was detected.

Duration: The length of time the call is (or was) active.

Adapter: The adapter (NIC) that received the packets.

Capturing: Whether or not this stream is being captured to disk.

To start capturing the data from one of these streams right-click the mouse on that stream and select 'Start Rogue Stream Capture'. To stop capturing the data from one of these streams right-click the mouse on that stream and select 'Stop Rogue Stream Capture'.

Other Audio Sub-Views

Channel Summary

This view provides jitter and latency measurements for an audio stream not identified with a VoIP call. Included with the graphical representations of jitter and latency are the high low and current values for each as well as the stream type, the sender's IP address and port, the receiver's IP address and port, the number of packets lost and the DTMF sequences if present within the stream (RFC 2833 section 3 Named Telephony Events).

DTMF Summary

This sub-view provides a detailed and organized tabular display for the active DTMF transmissions that occurs during an audio stream that was not identified with a VoIP call.

Channel QoS

This sub-view provides the QoS metrics for the stream. The R-factor/MOS scoring feature is a non-intrusive measurement technique available for the WinEyeQ call monitor. WinEyeQ passively measures the characteristics of live audio stream and reports quality scores in real-time. The algorithm used to obtain the R-Factor/MOS quality scores accurately models the way that time-varying impairments, most notably burst packet loss and possible jitter buffer discards, affect perceived speech quality.

| Packets | SSRC | Detected | Duration | Adapter | Capturing |
|---------|----------|----------------------------|----------|---------|-----------|
| 226 | 56DF23BE | 09:24:08.25 | 00:00:04 | 1 | No |
| 258 | 58BD4C3A | 09:24:08.25 | 00:00:05 | 1 | No |
| 289 | 15D33145 | 09:24:08.25 | 00:00:05 | 1 | No |
| 328 | 78 | 09:24:08.25 | 00:00:06 | 1 | No |
| 358 | 28 | Start Rogue Stream Capture | 00:00:07 | 1 | No |
| 86 | EA | Stop Rogue Stream Capture | 00:00:05 | 1 | No |
| 119 | A4BC3178 | 09:24:08.25 | 00:00:07 | 1 | No |
| 223 | 4E3B6DF4 | 09:24:08.27 | 00:00:04 | 1 | No |
| 257 | 037D518D | 09:24:08.27 | 00:00:05 | 1 | No |

The 'Capturing' column reflects the status of the capture.

Other Video View

The screenshot displays the WinEyeQ Professional Edition interface. At the top, there is a menu bar (File, Edit, Capture, Record, View, Help) and a toolbar. Below the menu is a navigation bar with tabs for Network Monitor, Active Calls, Recent Calls, Recent Errors, User Alerts, User Alarms, User Watches, Endpoints, Other Audio, Other Video, and Registrations. The main area is dominated by a table with the following columns: Source Address, Port, Dest. Address, Port, Media Type, Packets, SSRC, Detected, Duration, Adapter, and Capturing. The table lists numerous active calls with their respective IP addresses, ports, media types, and other metrics.

Below the table, there are four performance graphs: Video Packet Activity, Jitter, Video Bandwidth Consumption, and Packet Interval. Each graph shows a real-time fluctuating signal over a 75-second period. To the right of these graphs is a 'Metric' table with columns for Metric, Current, Low, and High. Below the metric table is a 'Parameter' table listing various call parameters and their values.

At the bottom of the interface, there is a status bar with the following information: Ready: For Help, press F1; Session: 02:17:15; Active Calls: 36; Calls Completed: 76,610; Avg. Call Rate: 9.304/sec; Errors Detected: 0; Error Rate: 0.000%; Registered: 0.

This view contains the following columns:

Source Address: The IP address of the call initiator (caller).

Port: The port of the call initiator (caller).

Destination Address: The IP address of the call receiver (party called).

Port: The port of the call receiver (party called).

Media Type: The type of media flowing on this channel.

Packets: The number of packets sent on this channel.

SSRC: The synchronization source from the RTP header.

Detected: The time this stream was detected.

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Duration: The length of time the call is (or was) active.

Adapter: The adapter (NIC) that received the packets.

Capturing: Whether or not this stream is being captured to disk

To start capturing the data from one of these streams, right-click the mouse on that stream and select 'Start Rogue Stream Capture'. To stop capturing the data from one of these streams, right-click the mouse on that stream and select 'Stop Rogue Stream Capture'.

| Packets | SSRC | Detected | Duration | Adapter | Capturing |
|---------|----------|-------------|----------|---------|-----------|
| 226 | 56DF23BE | 09:24:08.25 | 00:00:04 | 1 | No |
| 258 | 5BBD4C3A | 09:24:08.25 | 00:00:05 | 1 | No |
| 289 | 15D33145 | 09:24:08.25 | 00:00:05 | 1 | No |
| 328 | 78455131 | 09:24:08.25 | 00:00:06 | 1 | No |
| 358 | 28 | 09:24:08.25 | 00:00:07 | 1 | No |
| 86 | EA | 09:24:08.25 | 00:00:05 | 1 | No |
| 119 | A4BC3178 | 09:24:08.25 | 00:00:07 | 1 | No |
| 223 | 4E3B6DF4 | 09:24:08.27 | 00:00:04 | 1 | No |
| 257 | 037D518D | 09:24:08.27 | 00:00:05 | 1 | No |

The 'Capturing' column reflects the status of the capture.

Other Video Sub-View

Channel Summary

This view provides jitter and latency measurements for a video stream not identified with a VoIP call. Included with the graphical representations of jitter and latency are the high low and current values for each as well as the stream type, the sender's IP address and port, the receiver's IP address and port, the number of packets lost and the DTMF sequences if present within the stream (RFC 2833 section 3 Named Telephony Events).

Registrations View

The screenshot displays the WinEyeQ interface with the 'Registrations' tab selected. The main window shows a table of registration entries. Below the table, there are three sub-panels: 'Registration Flow', 'Registration Trace', and 'Registration Info'. The 'Registration Trace' panel shows a sequence of events between two IP addresses (120.249.0.135 and 120.249.0.150), including 'REGISTER Request' and 'REGISTER 200 OK'. The 'Registration Info' panel shows the raw SIP message details for a successful registration.

| Status | User ID/E.164 | User Name/H.323 ID | Address | Registrar/Gatekeeper | Time | TTL | Expires | Remaining |
|----------------|---------------|--------------------|---------------|----------------------|----------|-----|----------|-----------|
| ✓ Unregistered | 10008 | "WinSIP 9" | 120.249.0.135 | 120.249.0.150 | 09:57:39 | | | |
| ✓ Unregistered | 10007 | "WinSIP 8" | 120.249.0.135 | 120.249.0.150 | 09:57:39 | | | |
| ✓ Unregistered | 10006 | "WinSIP 7" | 120.249.0.135 | 120.249.0.150 | 09:57:39 | | | |
| ✓ Unregistered | 10005 | "WinSIP 6" | 120.249.0.135 | 120.249.0.150 | 09:57:39 | | | |
| ✓ Unregistered | 10004 | "WinSIP 5" | 120.249.0.135 | 120.249.0.150 | 09:57:39 | | | |
| ✓ Unregistered | 10003 | "WinSIP 4" | 120.249.0.135 | 120.249.0.150 | 09:57:38 | | | |
| ✓ Unregistered | 10002 | "WinSIP 3" | 120.249.0.135 | 120.249.0.150 | 09:57:38 | | | |
| ✓ Unregistered | 10001 | "WinSIP 2" | 120.249.0.135 | 120.249.0.150 | 09:57:38 | | | |
| ✓ Unregistered | 10000 | "WinSIP 1" | 120.249.0.135 | 120.249.0.150 | 09:57:38 | | | |
| ✓ Unregistered | 10009 | "WinSIP 10" | 120.249.0.135 | 120.249.0.150 | 09:57:39 | | | |
| ✓ Unregistered | 10008 | "WinSIP 9" | 120.249.0.135 | 120.249.0.150 | 09:57:39 | | | |
| ✓ Unregistered | 10007 | "WinSIP 8" | 120.249.0.135 | 120.249.0.150 | 09:57:39 | | | |
| ✓ Unregistered | 10006 | "WinSIP 7" | 120.249.0.135 | 120.249.0.150 | 09:57:39 | | | |
| ✓ Unregistered | 10005 | "WinSIP 6" | 120.249.0.135 | 120.249.0.150 | 09:57:39 | | | |
| ✓ Unregistered | 10004 | "WinSIP 5" | 120.249.0.135 | 120.249.0.150 | 09:57:39 | | | |
| ✓ Unregistered | 10003 | "WinSIP 4" | 120.249.0.135 | 120.249.0.150 | 09:57:38 | | | |
| ✓ Unregistered | 10002 | "WinSIP 3" | 120.249.0.135 | 120.249.0.150 | 09:57:38 | | | |
| ✓ Unregistered | 10001 | "WinSIP 2" | 120.249.0.135 | 120.249.0.150 | 09:57:38 | | | |
| ✓ Unregistered | 10000 | "WinSIP 1" | 120.249.0.135 | 120.249.0.150 | 09:57:38 | | | |
| Registering | 20009 | "Device 10" | 120.249.0.111 | 120.249.0.150 | 09:57:33 | | 01:00:00 | |
| Registering | 20008 | "Device 9" | 120.249.0.111 | 120.249.0.150 | 09:57:33 | | 01:00:00 | |
| Registering | 20007 | "Device 8" | 120.249.0.111 | 120.249.0.150 | 09:57:33 | | 01:00:00 | |
| Registering | 20006 | "Device 7" | 120.249.0.111 | 120.249.0.150 | 09:57:33 | | 01:00:00 | |
| Registering | 20005 | "Device 6" | 120.249.0.111 | 120.249.0.150 | 09:57:33 | | 01:00:00 | |
| Registering | 20004 | "Device 5" | 120.249.0.111 | 120.249.0.150 | 09:57:33 | | 01:00:00 | |
| Registering | 20003 | "Device 4" | 120.249.0.111 | 120.249.0.150 | 09:57:33 | | 01:00:00 | |
| Registering | 20002 | "Device 3" | 120.249.0.111 | 120.249.0.150 | 09:57:33 | | 01:00:00 | |

```

REGISTER sip:120.249.0.150;transport=UDP SIP/2.0
Via: SIP/2.0/UDP 120.249.0.135;socket=94646272232c
Max-Forwards: 70
From: "WinSIP 10" <sip:10009@120.249.0.150>;tag=2b1c-01dc-e6de-6d
To: "WinSIP 10" <sip:10009@120.249.0.150>
User-Agent: WinSIP/2.6.0
Call-ID: 453a-35859587-0001-Call10
CSeq: 1 REGISTER
Contact: "WinSIP 10" <sip:10009@120.249.0.135:5060;transport=UDP>
Expires: 3600
Content-Length: 0
    
```

The registrations view is designed to provide an in-depth view of each VoIP call registration and its status. Each call is represented by an entry, which is updated once every second, in the topmost report. This report contains the following columns:

Status: The current status of the entry. These may be things such as registering, registered, unregistered, etc.

User ID/E.164: The SIP user ID or H.323 E.164 alias of the registered party.

User Name/H.323 ID: The SIP display name or H.323 ID of the registered party.

Address: The address of the registered party.

Registrar/Gatekeeper: The address of the registrar to which the party is registered.

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Time: This is the time of the most recent registration for this party.

TTL: The registration's time-to-live value.

Expires: The time at which this binding expires.

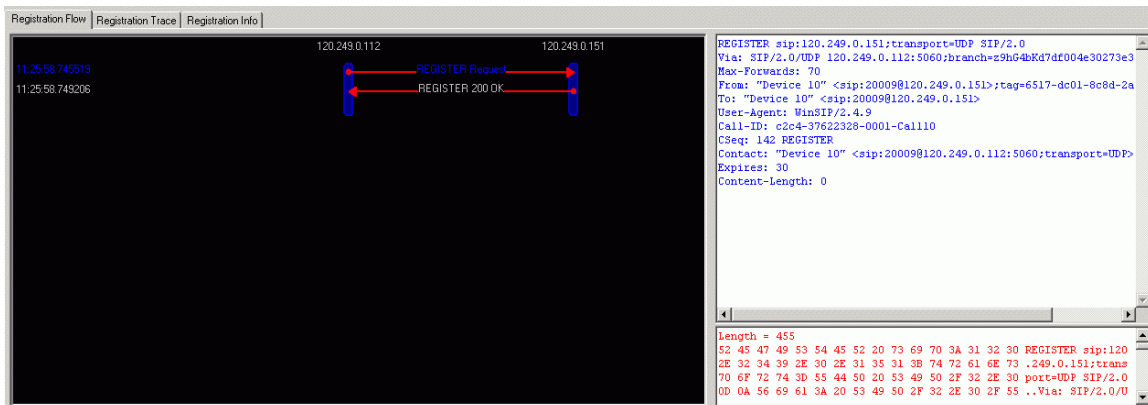
Remaining: The time until this binding expires.

Each individual registration has the following three sub-views:

- Registration Flow
- Registration Trace
- Registration Info

To display information about a particular registration, select it in the registration list. Whenever a registration entry is selected, it will remain “locked” in the view for as long as you wish to view its details.

Registration Flow



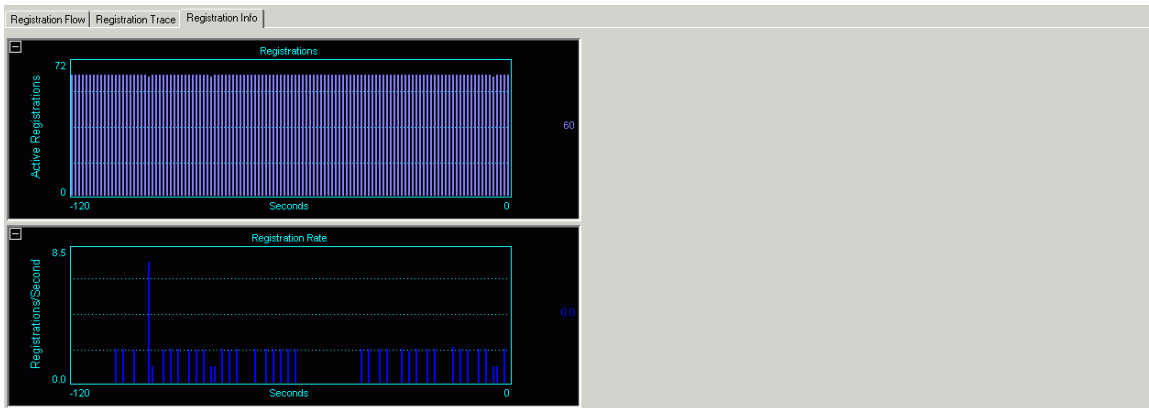
This view provides a time-stamped ladder diagram view of the registration flow. Each “rung” in the ladder may be highlighted to display the decoded packet in both ASCII and hexadecimal representations.

Registration Trace

| Registration Flow | | | | | | | | | | Registration Trace | | | | | | | | | | Registration Info | | | | | | | | | | | | | | | | | | | |
|-------------------|---------------|------|----------|----------|---------|------|------|---------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|-------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Timestamp | Source IP | Port | Protocol | Method | Type | Code | Text | Dest IP | Port | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11:28:03.887460 | 120.249.0.112 | 5060 | SIP | REGISTER | Request | | | 120.249.0.112 | 5060 | <pre> REGISTER sip:120.249.0.151;transport=UDP SIP/2.0 Via: SIP/2.0/UDP 120.249.0.112:5060;branch=z9hG4bKd417504e2a275ec Max-Forwards: 70 From: "Device 18" <sip:20017@120.249.0.151>;tag=a491-71e3-7ce0-63 To: "Device 18" <sip:20017@120.249.0.151> User-Agent: WinSIP/2.4.9 Call-ID: 4760-37622328-0001-Call18 CSeq: 147 REGISTER Contact: "Device 18" <sip:20017@120.249.0.112:5060;transport=UDP> Expires: 30 Content-Length: 0 </pre> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | 200 | OK | | | <pre> Length = 455 52 45 47 49 53 54 45 52 20 73 69 70 3A 31 32 30 REGISTER sip:120 2E 32 34 39 2E 30 2E 31 35 31 3B 74 72 61 6E 73 .249.0.151;trans 70 6F 72 74 3D 55 44 50 20 53 49 50 2F 32 2E 30 port=UDP SIP/2.0 0D 0A 56 69 61 3A 20 53 49 50 2F 32 2E 30 2F 55 . .Via: SIP/2.0/U </pre> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

This view provides a time-stamped protocol specific report view of the registration flow. Each entry in the report may be highlighted to display the decoded packet in both ASCII and hexadecimal representations.

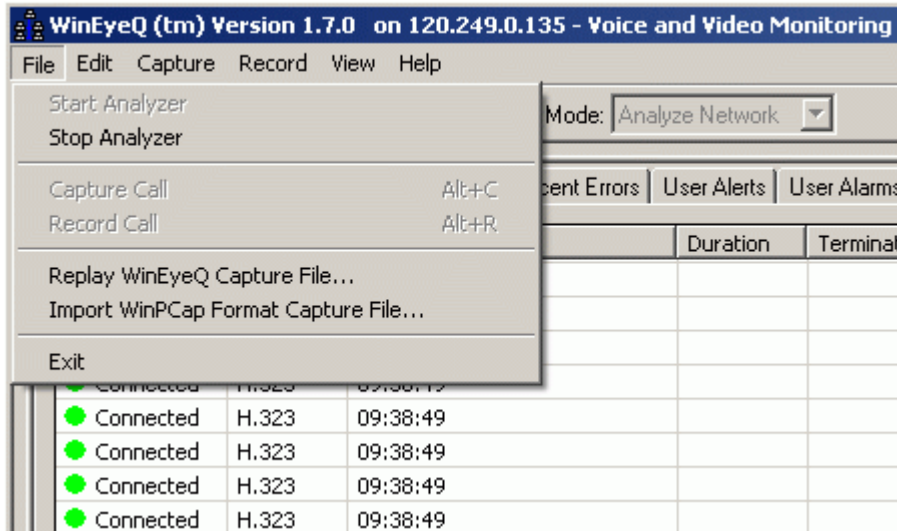
Registration Info



This view provides an overall graphical representation of the number of registrations and the registration rate.

WinEyeQ Menu Commands

File Menu



This menu contains the commands associated with running WinEyeQ.

Start Analyzer: This command starts the analyzer on the currently selected adapter.

Stop Analyzer: This command stops the current analyzer session.

Capture Call: This command is only enabled when a call is in one of the completed states (completed, error, timeout, etc.). When enabled, this command will capture the selected call in WinEyeQ's proprietary format to the specified file.

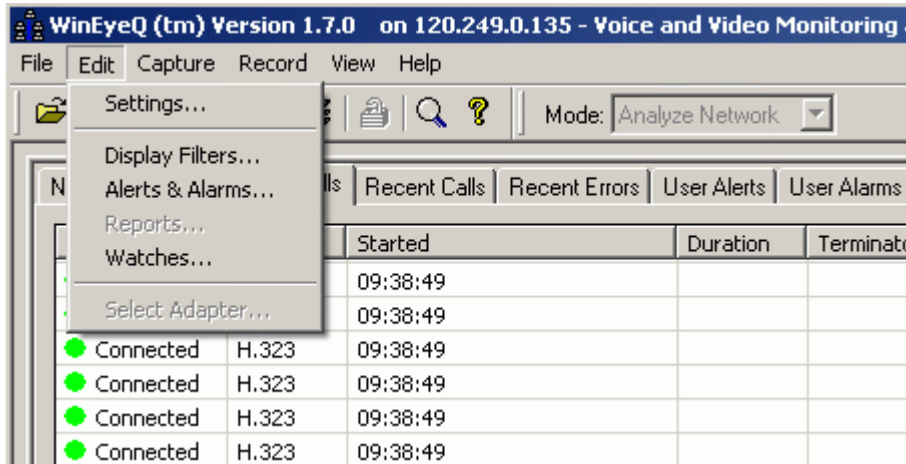
Record Call: This command starts recording the selected call. The signaling and subsequent media will be saved in WinEyeQ's proprietary format to the disk.

Replay WinEyeQ Capture File: This command loads a file captured in WinEyeQ's format and replays it.

Import WinPCap Format Capture File: This command loads a file captured in WinPCap's format and replays it.

Exit: This command ends the WinEyeQ session.

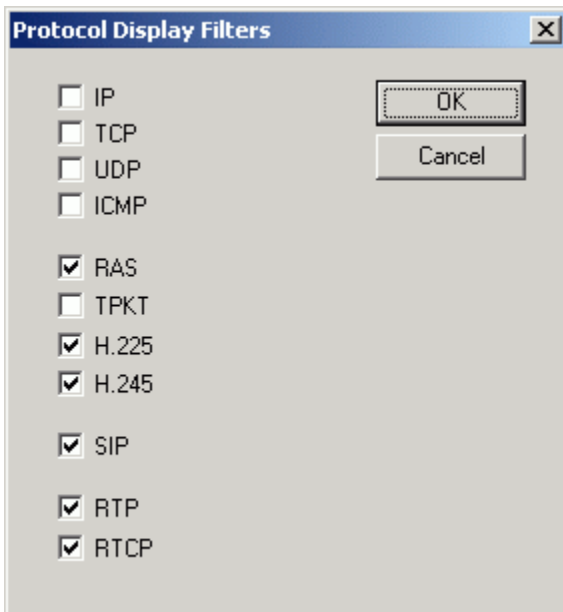
Edit Menu



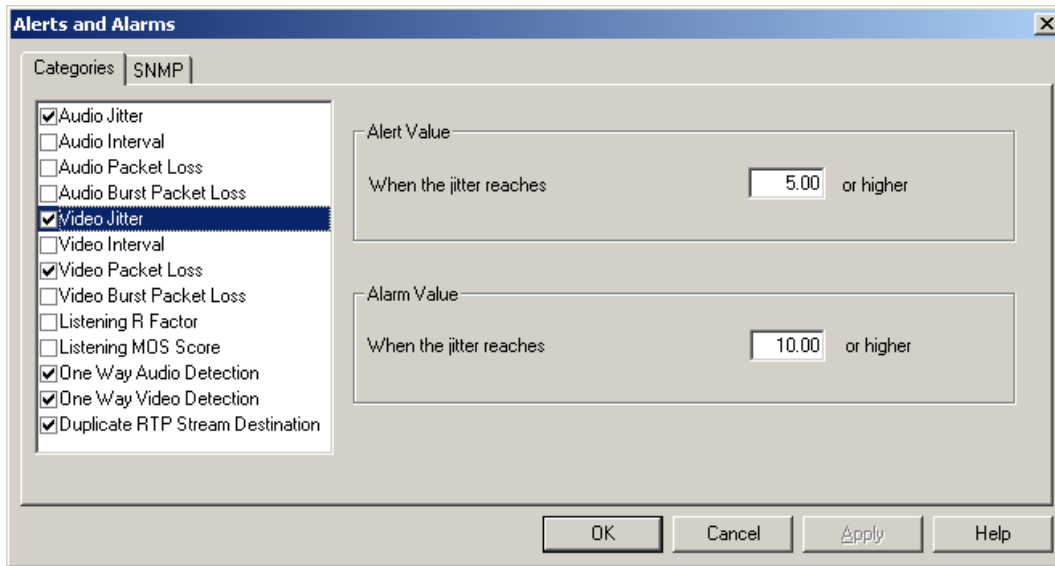
This menu allows you to configure settings, display filters, alerts, alarms, reports, watches, and adapters.

Settings: This command allows you to set the various settings of WinEyeQ so that you can program the tool. See [Configuration Settings](#) for a detailed description.

Display Filters: This command allows you to select the protocol displayed.



Alerts and Alarms: This command allows you to set the Alerts and Alarms that WinEyeQ uses.



The categories of alerts and alarms are:

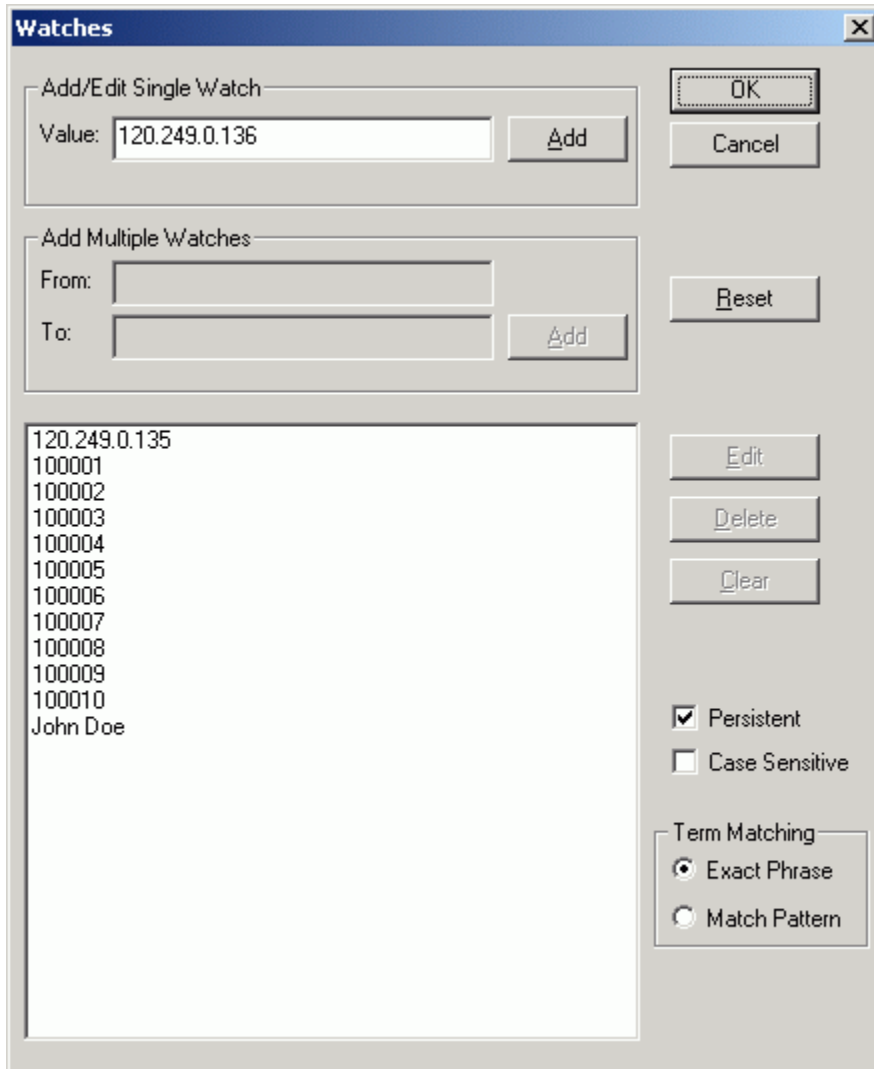
- Audio Jitter
- Audio Interval
- Audio Packet Loss
- Audio Burst Packet Loss
- Video Jitter
- Video Interval
- Video Packet Loss
- Video Burst Packet Loss
- Listening R Factor
- Listening MOS Score
- One Way Audio Detection
- One Way Video Detection
- Duplicate RTP Stream Detection

Note: For expanded information on Alerts and Alarms, along with SNMP settings see the Alerts and Alarms section of this manual.

Reports: This command allows you to set logging, call, report and preferences settings. See [Configuration Settings](#) for a detailed description.

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Watches: From this menu you can add single or multiple watches to WinEyeQ. Watches are a stimulus that triggers WinEyeQ to isolate and analyze any VoIP call that contains that watch. Watches are an extremely simple but powerful way of sifting through a 'haystack' of calls to find the 'needle' call that you are looking for. Calls that are found this way are added to the Watch View.



Add/Edit Single Watch: This is where a watch value is entered. This value can represent any field of any protocol message that WinEyeQ examines. WinEyeQ currently examines the following message fields:

- Source MAC Address, Destination MAC Address
- Source IP Address, Destination IP Address
- Call ID, Conference ID
- Source URI, Destination URI

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- Registrar address, Gatekeeper address
- Source User ID, Destination User ID
- Source E.164, Destination E.164, Source H.323 ID, Destination H.323 ID
- Calling Party Number, Called Party Number
- Call Reference Value, Q.931 Display Name

All the user must do is to add the text string of the value of the field he is looking for.

Note: No quotes are needed for strings that contain blanks.

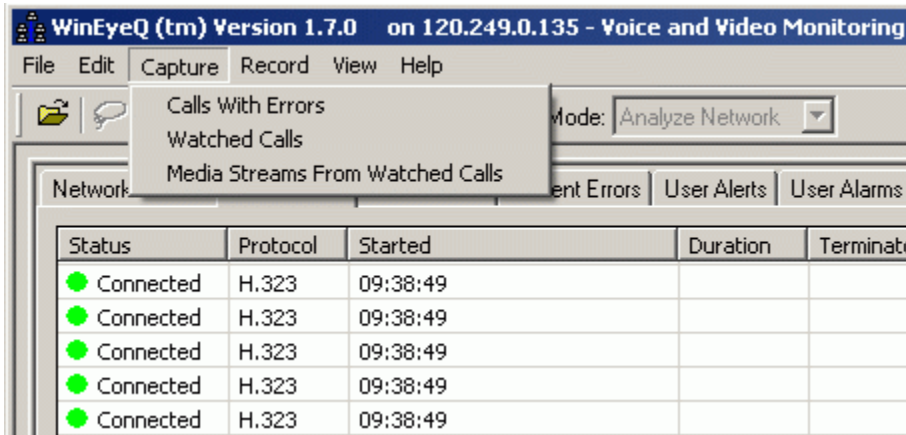
Add Multiple Watches: This is where a range of watches can be added to the program, instead of adding each value separately.

Persistent: If persistent is selected, the watches that have been entered will be written to a file and reloaded the next time that WinEyeQ is run. Otherwise they will be discarded when the program terminates.

Case Sensitive: If case sensitive is selected, the case (upper / lower) of alphabetic characters is considered in the compare. If case sensitive is true then the string "Joe" is not equal "joe".

Term Matching: Exact Phrase or Match Pattern. This offers the user a 'wild card' method of comparing strings. For example, if you add "192.168.10." and have selected Exact Phrase', all fields examined must contain that string exactly. If you have selected Pattern Match, any field that contains "****192.168.10.***" (where * can be any character) will match.

Capture Menu



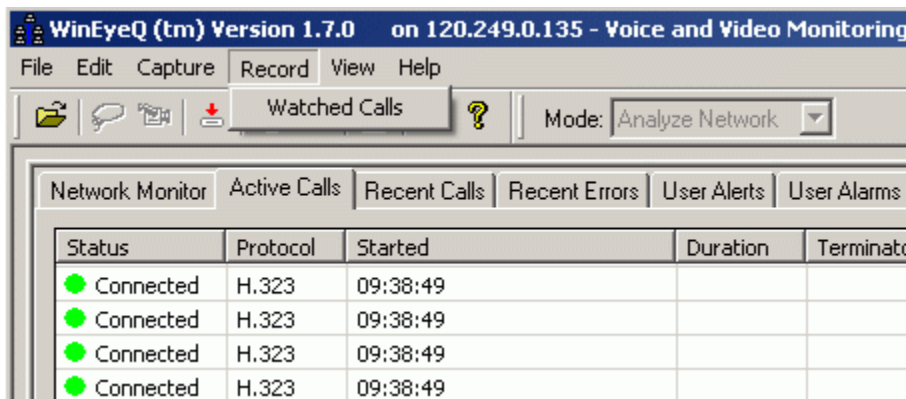
This menu toggles on and off the various capture options.

Calls with errors: Enables/disables capturing calls with errors.

Watched calls: Enables/disables capturing watched calls.

Media streams from watched calls: Enables/disables capturing media streams from the watched calls.

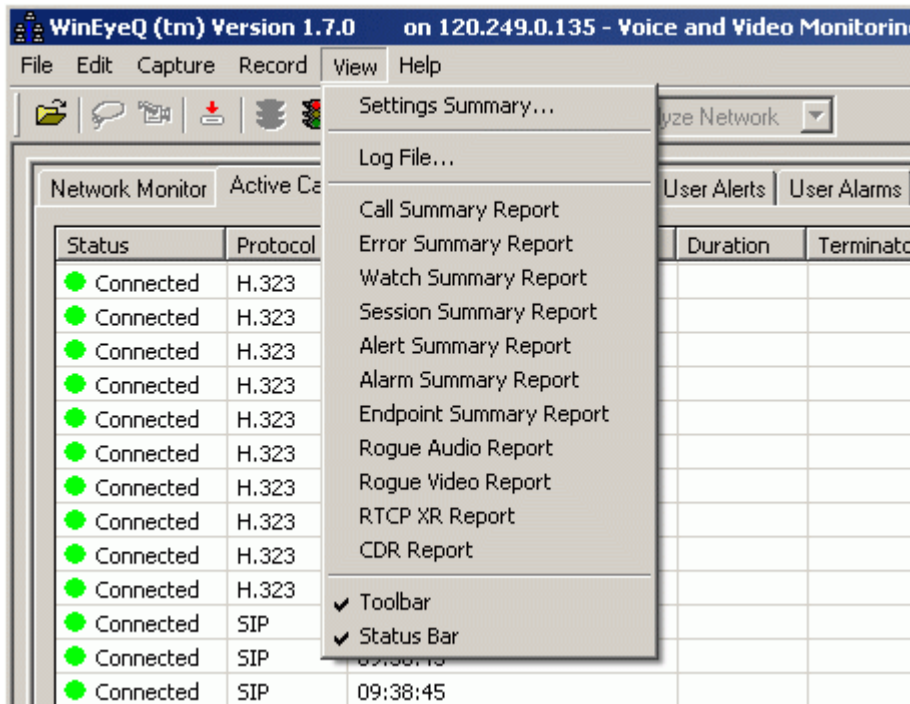
Record Menu



This menu toggles on and off the various record options.

Watched Calls: Enables/disables recording watched calls.

View Menu



This menu allows you to view the settings summary, text based log file and the various reports that are available. It also allows the user to hide the toolbars and status bars.

Settings Summary: Shows the active settings for WinEyeQ.

Log File: Text based data file of the results from the previous test.

Call Summary Report: The call summary report provides a single line entry for each call. Summary information including start time, end time, duration, ID's, addresses, packet counts, QoS metrics, etc. are displayed for each line item.

Error Summary Report: Shows the errors that have occurred during the test session.

Watch Summary Report: Shows the summary information that pertains only to the calls in the watch list.

Session Summary Report: Shows the high level summary information about the test session.

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Alert Summary Report: Shows the active alert messages, programmed threshold and measured values.

Alarm Summary Report: Shows the active alarm messages, programmed threshold and measured values.

Endpoint Summary Report: This report contains the information that is removed from the Endpoint View when the number of endpoints in the view exceeds the number of endpoints the user has elected to observe (via Edit | Settings | Endpoints).

Rogue Audio Summary: This report details the start time, end time, duration, QoS measurements, etc. of audio streams that WinEyeQ has detected that are not associated with any VoIP call.

Rogue Video Summary: This report details the start time, end time, duration, QoS measurements, etc. of audio streams that WinEyeQ has detected that are not associated with any VoIP call.

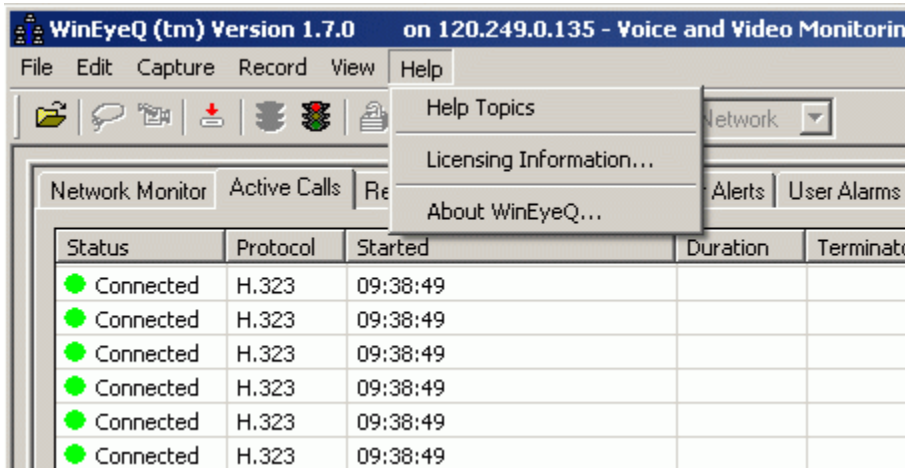
RTCP XR Report: This report captures the information from RTCP XR reports that are sent on the RTCP channel (if any).

CDR Report: Shows the call data records for all the monitored calls.

Toolbar: Shows or hides the toolbar.

Status bar: Shows or hides the status bar.

Help Menu



This menu displays licensing and help information.

Help Topics: Provides user with on line assistance for operating procedures, configuration information and guidance.

Licensing information: Displays information about your WinEyeQ license status. This is also where you can upgrade your license with optional features as they become available.

About WinEyeQ: Displays information about this version of WinEyeQ.

Toolbar Shortcuts



The toolbar contains shortcuts to the most commonly used application commands. The following commands are available:

Replay



Capture



Record



Import WinPCap Capture File



Start Analysis



Stop Analysis



Unlock display (de-select currently selected item)



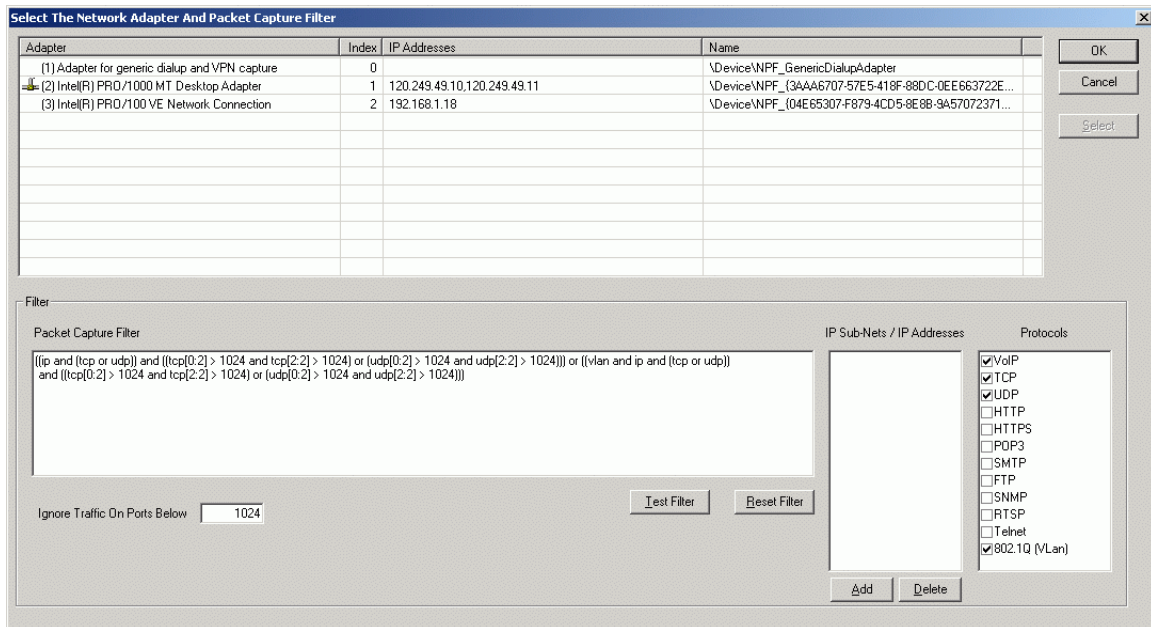
Manage Watches



Help/About



Selecting the Network Adapter and Packet Capture Filter



The first step in preparing to run WinEyeQ is to select the network adapter you wish to monitor. WinEyeQ will automatically display the Select Adapter screen immediately after starting it for the first time. You may also access this dialog from the Edit | Select Adapter menu item.

The Adapter

On the top part of the screen is a list of the Network Adapters that WinEyeQ has discovered on your PC. Select the adapter you want to monitor by clicking the adapter line and then pressing 'Select' or by just double clicking the adapter line.

The Filter

The bottom part of the screen is for the Filter. The Filter is used by the network driver (WinPCap) to decide which packets to send to WinEyeQ and which ones to discard. There are four areas that are used set the Filter, The Packet Capture Filter textbox, The Sub-Nets / Addresses textbox, the Protocols box and the Ports textbox.

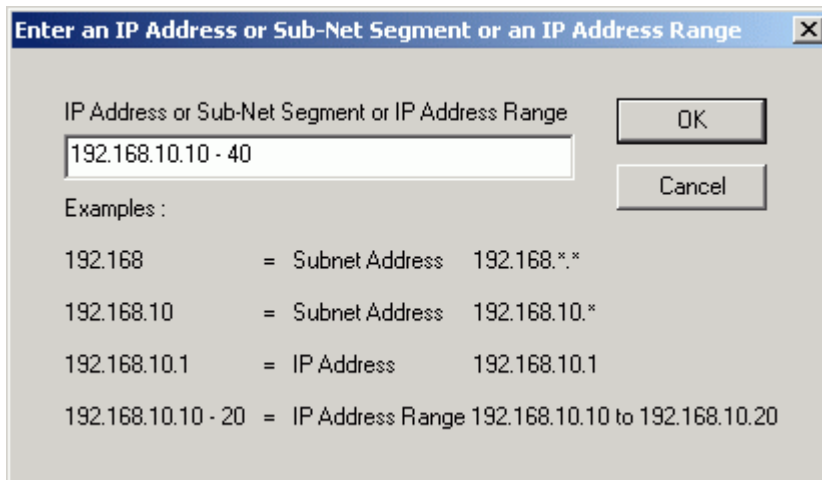
The Packet Capture Filter textbox is the actual Packet Capture Filter. It has been predefined to capture IP, TCP, and UDP packets from all IP addresses with port numbers greater than 1024 on normal and VLAN networks. You may change the Packet Capture Filter by editing the Filter textbox directly, or in combination with the other three textboxes. In case of an error, simply press the 'Reset Filter' button to start over.

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The Sub-Nets / Addresses textbox allows the user to filter on selected IP Addresses or IP Subnets. Subnets / IP Addresses are added or removed from the filter from here.



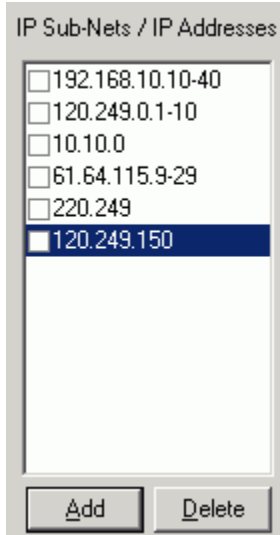
If you click the 'Add' button, the following dialog is displayed:



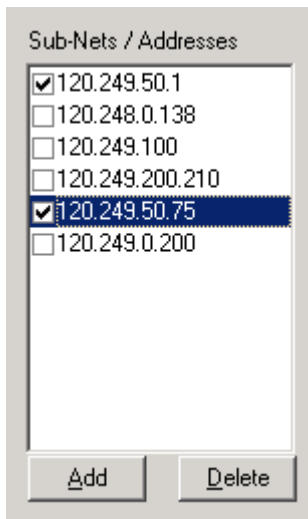
Then enter an IP subnet address, or enter an IP address (or range of addresses), then click OK.

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The new value is added to the list.



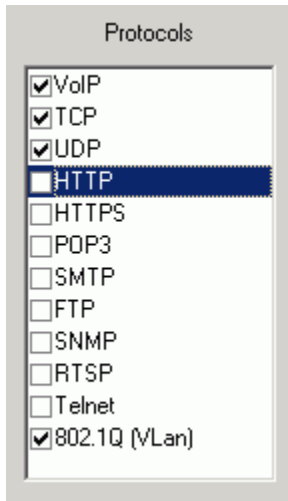
You may use the check boxes to select / deselect the IP addresses you want WinEyeQ to monitor:



The Subnets / IP Addresses will be added to or removed from the Packet Capture Filter.

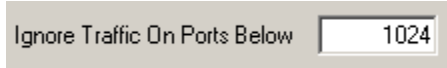
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The Protocols textbox allows the user to selectively monitor VoIP and other network protocols.

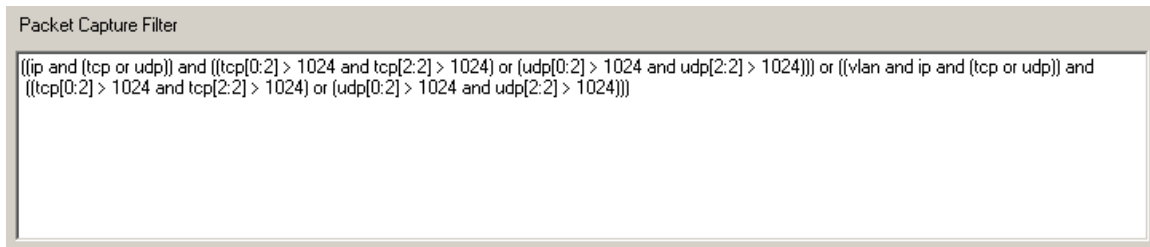


By checking or un-checking these boxes, the indicated protocols are added or removed from the Packet Capture Filter.

The Ports textbox allows the user to selectively exclude packets from a range of port numbers.



The Packet Capture Filter textbox shows the combination of the Subnet / Addresses textbox, the Protocols textbox and the Ports textbox.



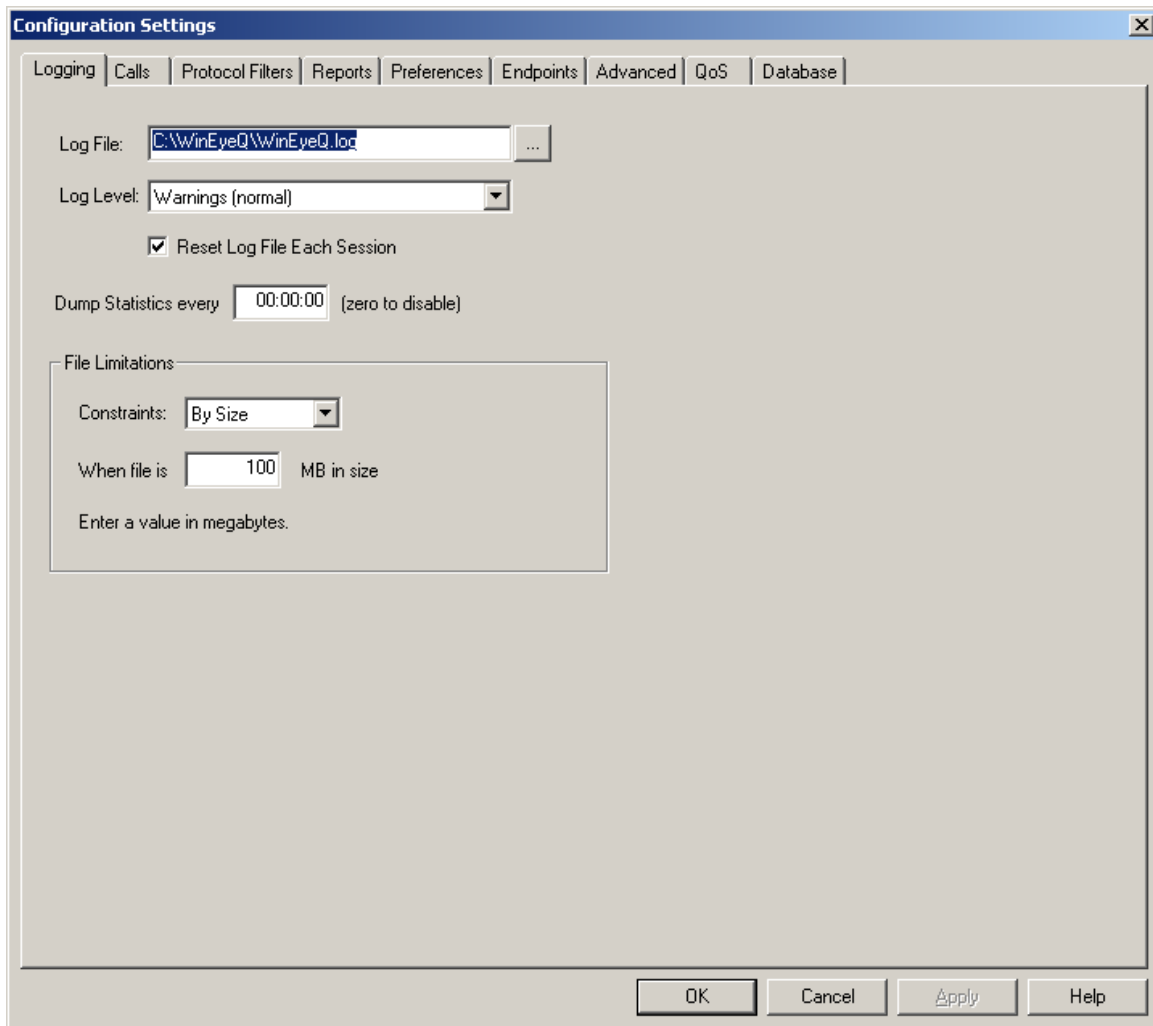
When you make changes to the Subnet /Addresses textbox, the Protocol textbox, or the Ports textbox, the Packet Capture Filter is automatically recalculated. To ensure that the filter has the correct syntax, you may press the Test Filter to check it.

Note: When you press the OK button on the Select Network Adapters dialog, the filter is always checked to ensure it is syntactically correct. If it is not correct, an error message is displayed.

Configuration Settings

The second step in preparing to run WinEyeQ is to review the settings. WinEyeQ will display the following screen(s) when the Edit | Settings menu item is chosen.

Logging



The following options are available to control the application's logging:

Log file: Enter the name and location of the log file you wish to use.

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Log level: Select the level of verbosity you wish. The values are:

All: The slowest and most verbose level.

Trace: An extremely high level of detail.

Debug: Standard troubleshooting level.

Information: Medium verbosity.

Warnings: Only warnings and errors.

Errors: Errors messages only.

Reset log file each session: This feature keeps the log file constrained by resetting it after each clean exit. If the previous exit was not clean, the contents of the previous session are preserved.

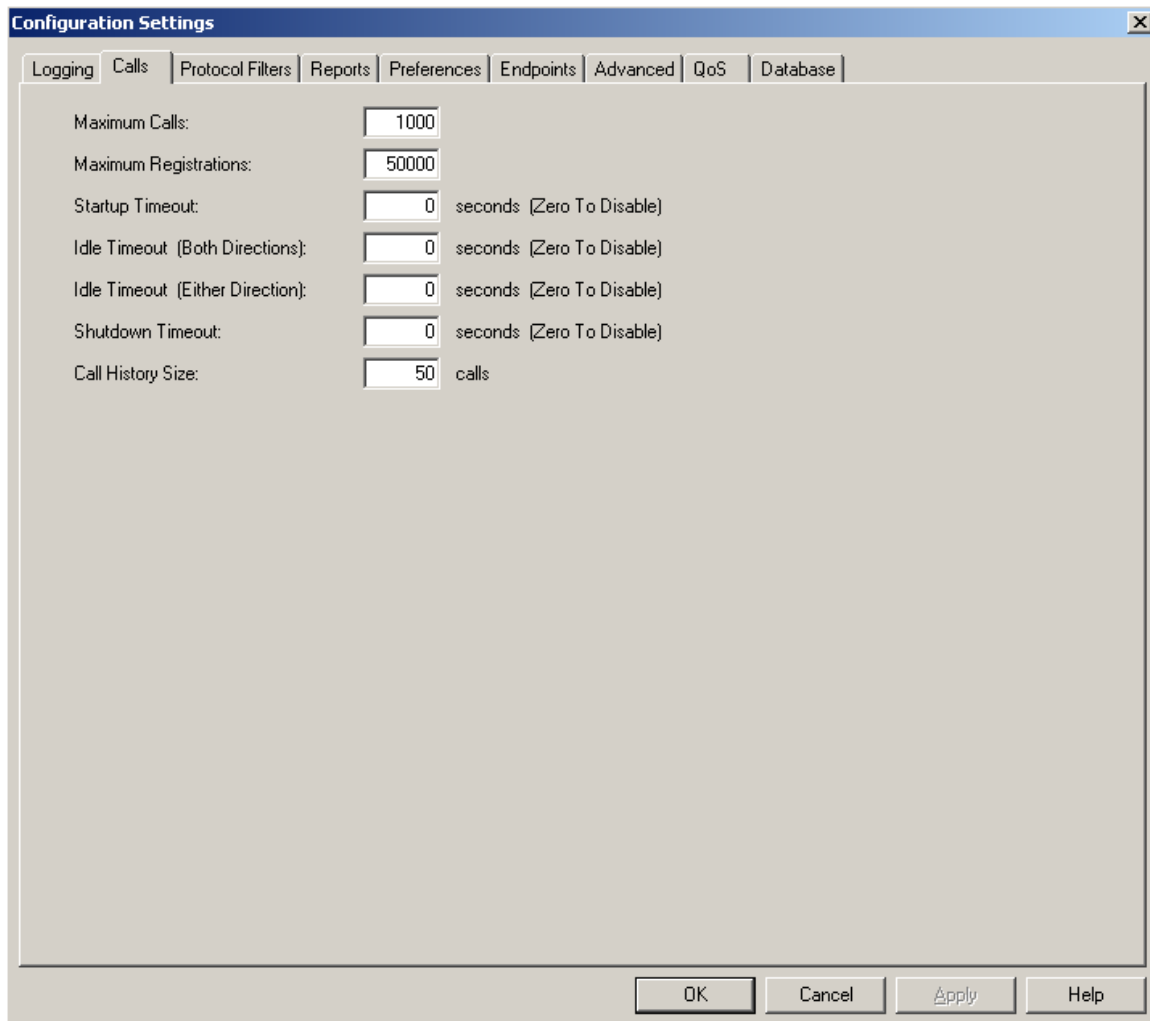
Dump statistics: Sets a timer interval to dump the current statistics to the log file. If this value is zero, the function is disabled.

File Limitations:

Constraints: Sets how the log file is separated. At a certain point the program will close one log file and open a new one and start recording there. The trigger for this event can be set to Size, Interval, Time of Day, or None (which, if selected will hold all information in only one log file).

Constraint Range: Based on the log file constraints, the range sets the event trigger for when the file obtains the value specified in this field.

Calls



The following settings govern the way calls are handled:

Maximum Calls: The maximum number of calls that WinEyeQ will follow (lower values allow for more in-depth media tracing).

Maximum Registrations: The maximum number of registrations that WinEyeQ will follow (lower values allow for more in-depth media tracing).

Startup Timeout: The maximum time after a call is discovered that WinEyeQ will wait for the other endpoint to respond.

Idle Timeout (Both Directions): The maximum time between packets from both the source and destination that WinEyeQ will wait before timing out the call.

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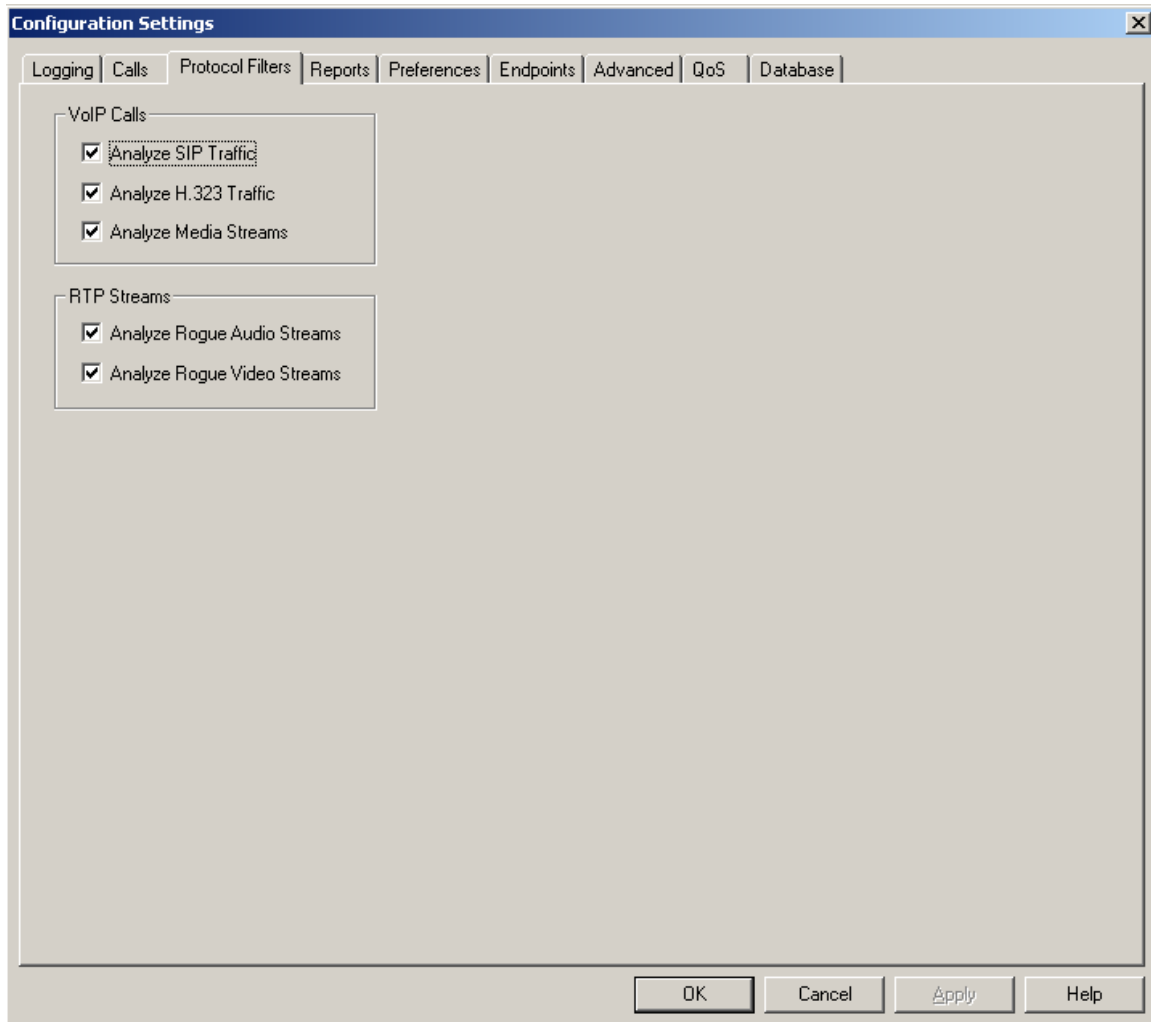
Idle Timeout (Either Direction): The maximum time between packets from either the source or destination that WinEyeQ will wait before timing out the call.

Shutdown Timeout: The maximum time after a call termination attempt is made that WinEyeQ will wait for the other endpoint to respond.

Display time: The time, in seconds, that the call will be displayed on the screen. The amount of memory required by WinEyeQ is proportional to the number of active calls and the length of their display time. Typical values are from 1 to 30 seconds.

Call History Size: The number of calls that will be added to the Recent Calls screen or the Recent Errors screen.

Protocol Filters



The following settings govern the kind of calls are handled:

VoIP Calls:

Analyze SIP Traffic: If checked, WinEyeQ will analyze SIP calls.

Analyze H.323 Traffic: If checked, WinEyeQ will analyze H.323 calls.

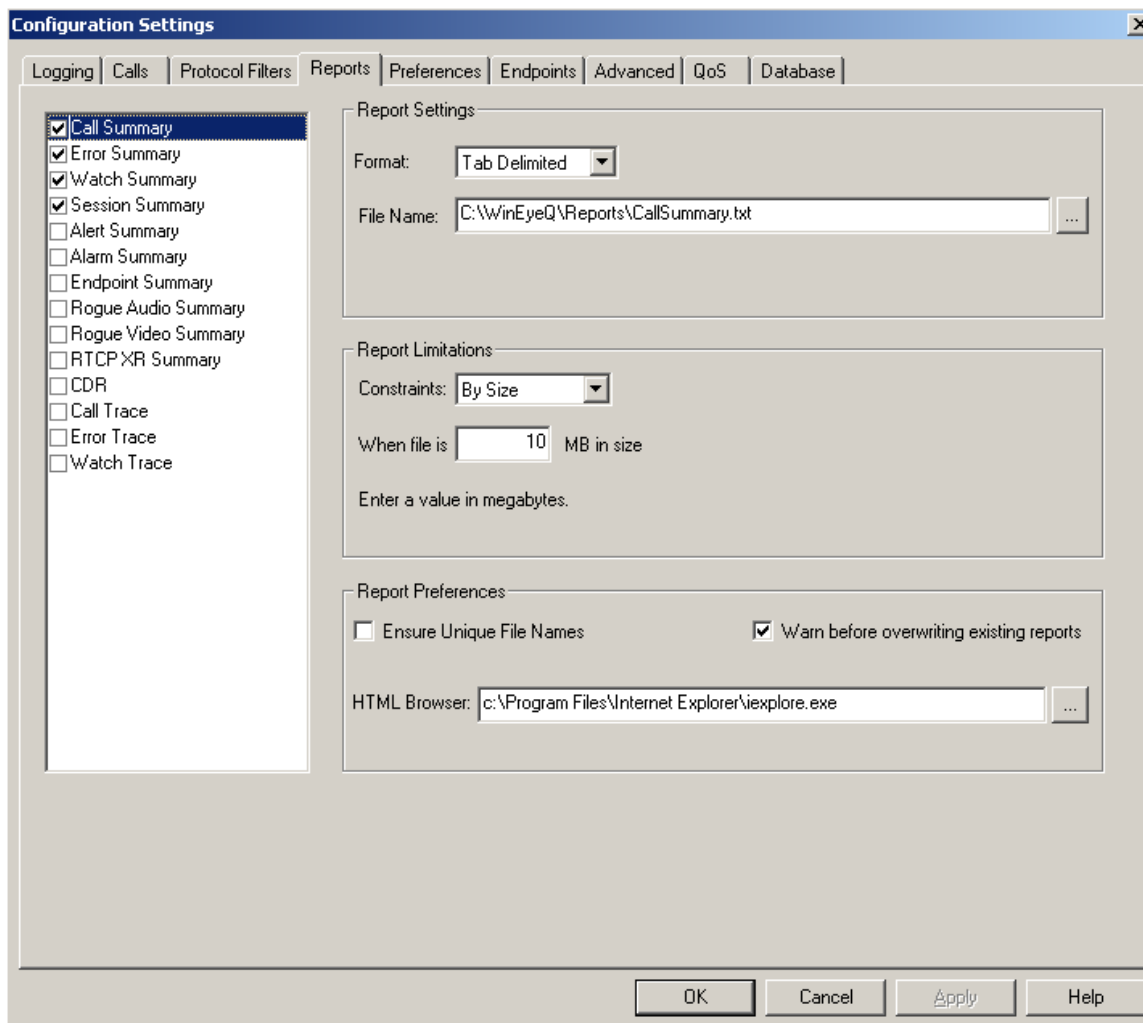
Analyze Media Streams: If checked, WinEyeQ will analyze audio and video streams.

RTP Streams:

Analyze Rogue Audio Streams: If checked, WinEyeQ will analyze audio streams that are not associated with VoIP calls that WinEyeQ is tracking.

Analyze Rogue Video Streams: If checked, WinEyeQ will analyze video streams that are not associated with VoIP calls that WinEyeQ is tracking.

Reports



The following reports are currently available in WinEyeQ:

Call Summary Report: This report has a one-line-per-call format that details the call parameters, start time, end time, duration, QoS measurements, etc. Call Summary reports are saved in the “Reports’ folder.

Error Summary Report: This report has a one-line-per-failed-call format that details the call parameters, start time, end time, duration, QoS measurements, etc. Error Summary reports are saved in the “Reports’ folder.

Watch Summary Report: This report has a one-line-per-watched-call format that details the call parameters, start time, end time, duration, QoS measurements, etc. Watch Summary reports are saved in the “Reports’ folder.

Session Summary Report: This report generates one-line-per-time-interval that details the number of calls passed / failed, network statistics, etc. The 'Time Interval' is set by the user. Session Summary reports are saved in the "Reports" folder.

Alert Summary Report: This report has a one-line-per-alert format that details the call metric, the alert threshold, and the actual value that triggered the alert. Alert Summary reports are saved in the "Reports" folder.

Alarm Summary Report: This report has a one-line-per-alarm format that details the call metric, the alarm threshold, and the actual value that triggered the alarm. Alarm Summary reports are saved in the "Reports" folder.

Endpoint Summary Report: This report contains the information that is removed from the Endpoint View when the number of endpoints in the view exceeds the number of endpoints the user has elected to observe (via Edit | Settings | Endpoints). Endpoint Summary reports are saved in the "Reports" folder.

Rogue Audio Summary Report: This report details the start time, end time, duration, QoS measurements, etc. of audio streams that WinEyeQ has detected that are not associated with any VoIP call. Rogue Audio Summary reports are saved in the "Reports" folder.

Rogue Video Summary Report: This report details the start time, end time, duration, QoS measurements, etc. of video streams that WinEyeQ has detected that are not associated with any VoIP call. Rogue Video Summary reports are saved in the "Reports" folder.

CDR Report: This report has a one line per call format that summarizes the call information. Start time, end time, duration, IP addresses and ID's. CDR Summary reports are saved in the "Reports" folder.

Call, Error and Watch Traces: These reports provide a summary and packet-by-packet trace of the calls. Call, Error and Watch Traces are saved in the "Traces" folder.

Report Settings:

Format: Sets the file format that the report will be rendered in such as ASCII, HTML, or XML.

File Name: Sets the name of the file when it is saved as well as the directory in which it can be found.

Report Limitations:

Constraints: Sets how each report is separated. At a certain point the program will close one report and open a new one and start recording there. The trigger for this event can be set to Size, Interval, Time of Day, or None (which, if selected will hold all information in only one report file).

Constraint Range: Based on the report constraints, the range sets the event trigger for when the file obtains the value specified in this field.

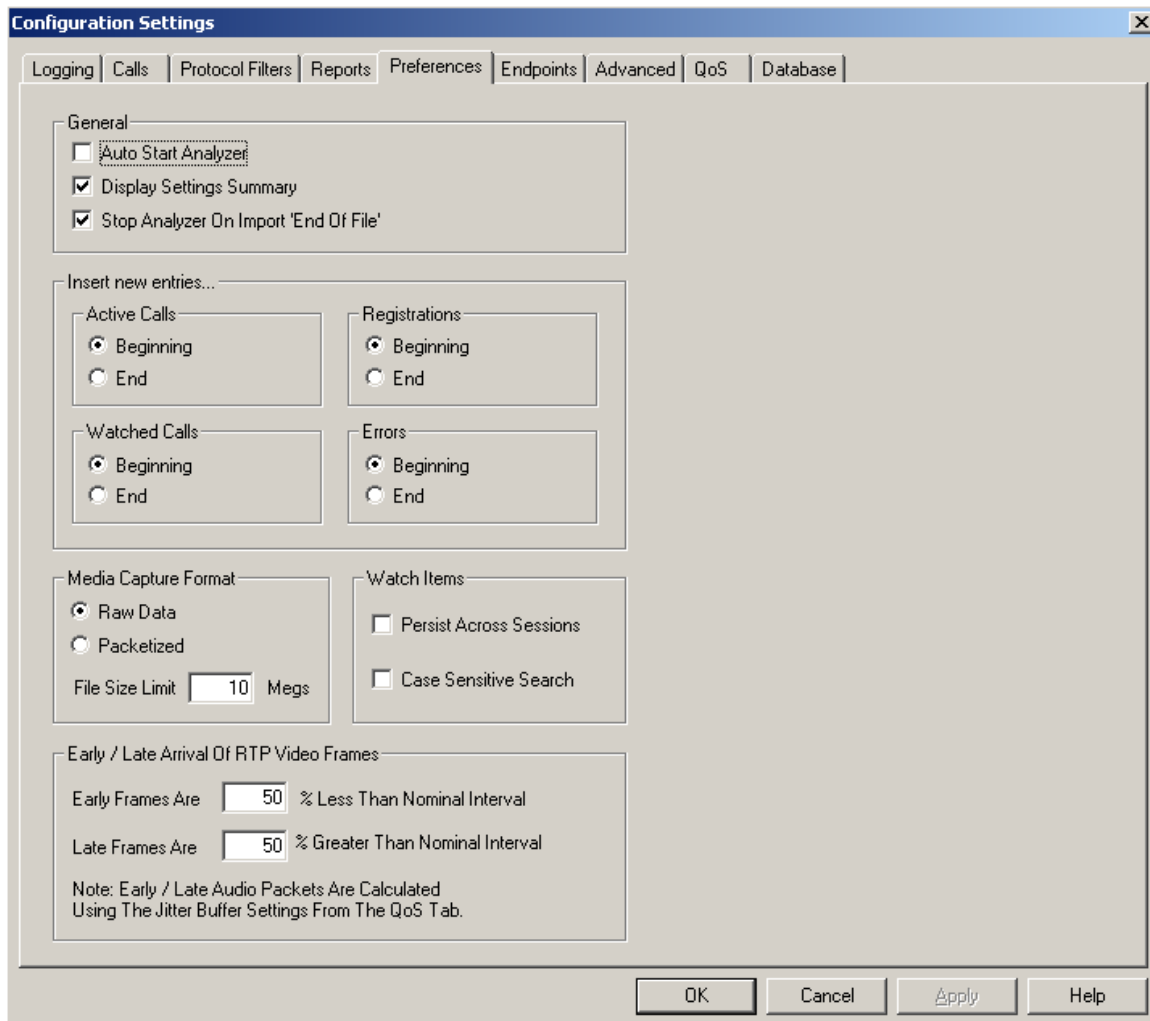
Report Preferences:

Ensure Unique File Names: If this check box is selected, a timestamp will be appended to the file name when it is created.

Warn before overwriting existing reports: If this check box is selected, the user will be prompted if an existing file is about to be overwritten.

HTML Browser: Specifies the location of an HTML browser application to be used to open reports created in HTML format.

Preferences



The following preferences are available in WinEyeQ:

General:

Auto start analyzer: This feature starts the analysis as soon as WinEyeQ is launched.

Display Settings Summary: If checked, WinEyeQ displays a summary of all the program settings in effect when the program is started.

Stop Analyzer on Import 'End Of File': If selected, WinEyeQ will stop analyzing when an 'end of file' condition is detected while reading an imported file (WinEyeQ or WinPCap format).

Insert new entries:

Active Calls: This option determines where new entries will be added to the active call list.

Watched Calls: This option determines where new entries will be added to the watched call list.

Registrations: This option determines where new entries will be added to the registration list.

Errors: This option determines where new entries will be added to the error list.

Media Capture Format:

Raw or Packetized Data: Choose the media capture format.

File Size Limit: Constraint placed on file size

Watch Items:

Persist Across Sessions: This option automatically reloads the previous session's watches when WinEyeQ is started.

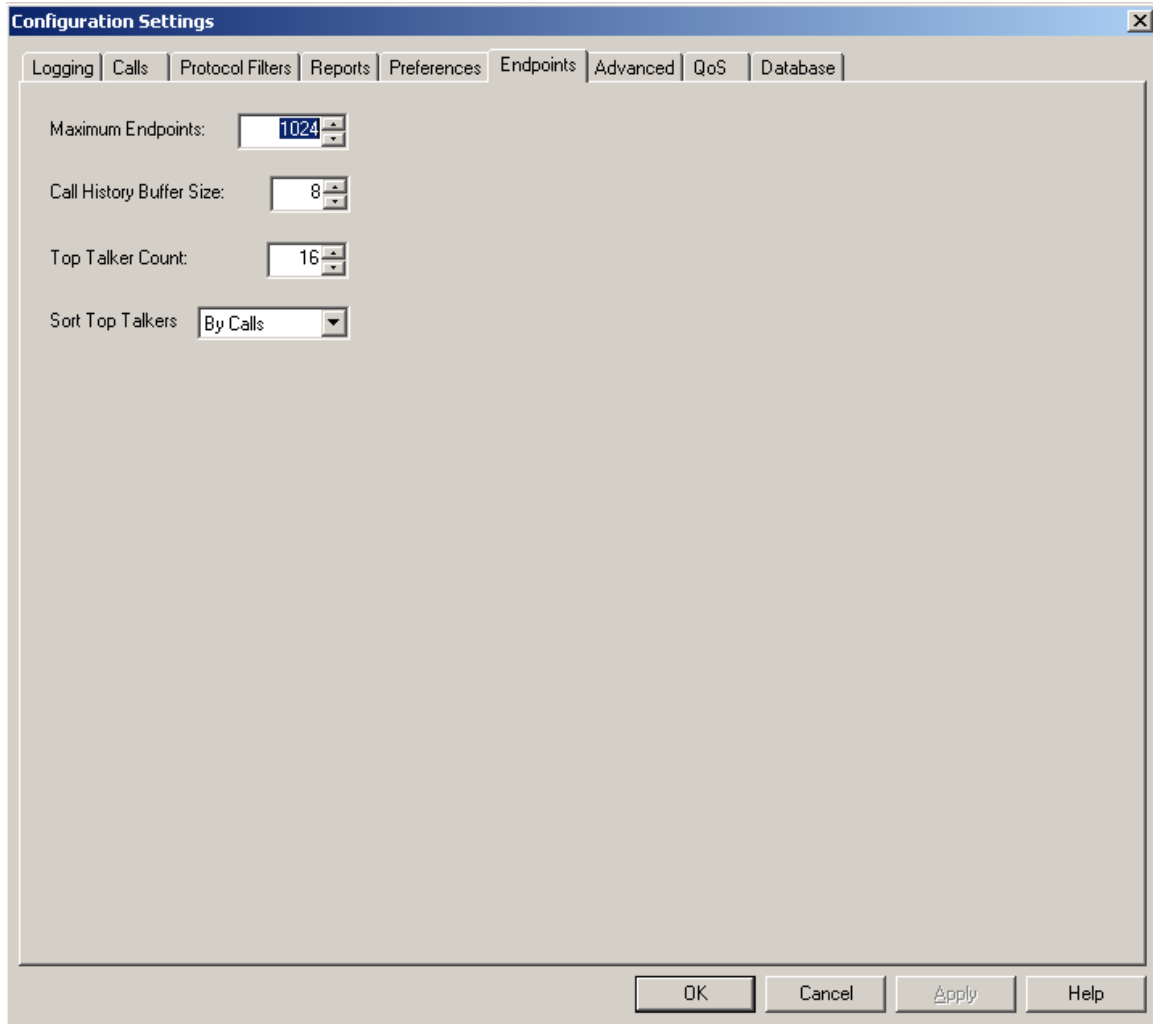
Case Sensitive Searches: This option makes watch item searches sensitive to case.

Early / Late Arrival of RTP Packets:

Early Packets Are XX % Less Than Nominal Interval: Choose a percentage value of the perfect packet interval such that if the interval falls below this value the packet will be considered early. For example, if an RTP stream is sending packets every 20 milliseconds and the early value is 10 %, then if the interval between packets is less than 18 milliseconds, the packet will be considered early.

Late Packets Are XX % Greater Than Nominal Interval: Choose a percentage value of the perfect packet interval such that if the interval falls above this value the packet will be considered late. For example, if an RTP stream is sending packets every 20 milliseconds and the late value is 10 %, then if the interval between packets is greater than 22 milliseconds, the packet will be considered late.

Endpoints



The following endpoint options are available in WinEyeQ:

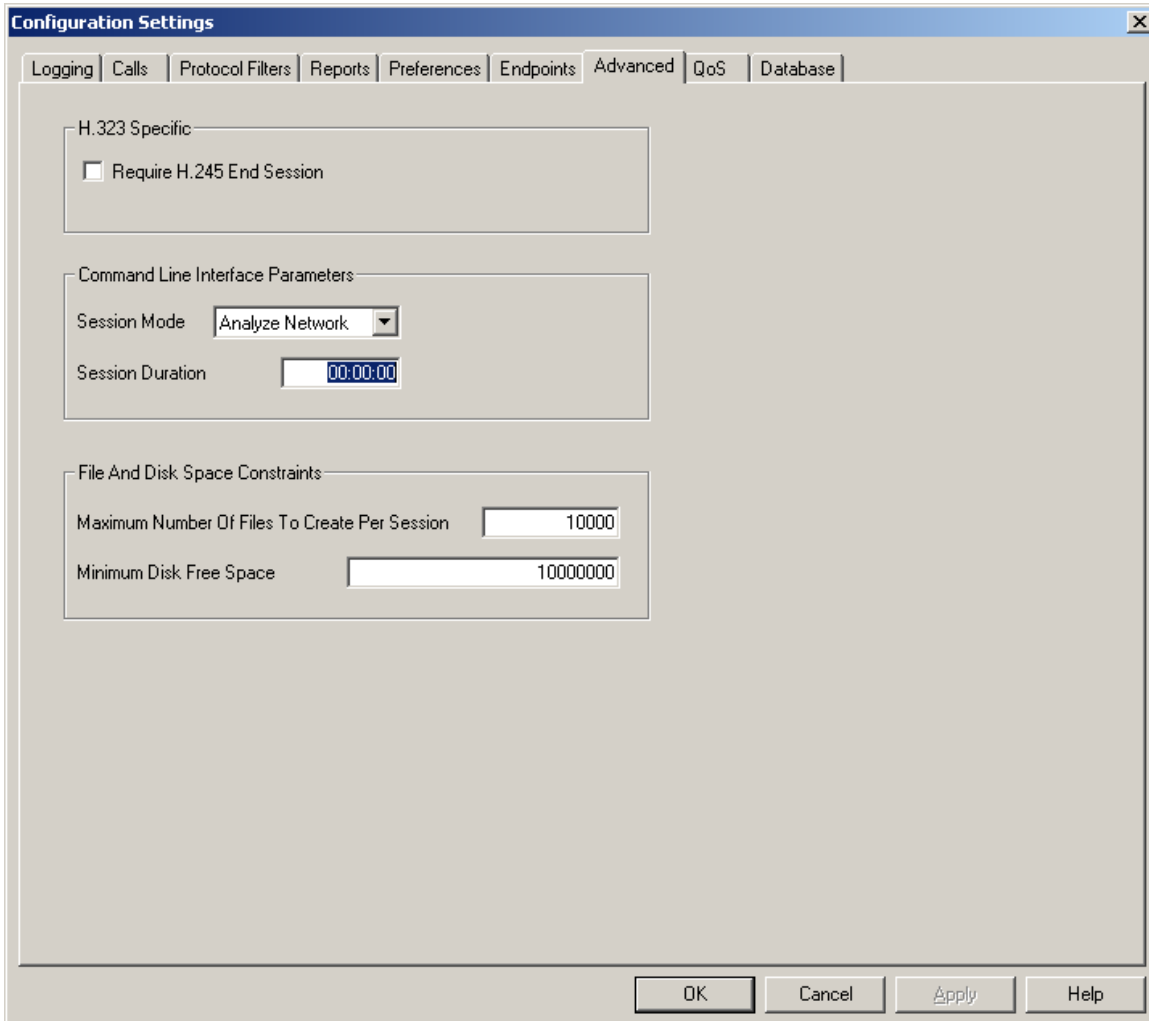
Maximum Endpoints: The maximum number of endpoints that will be monitored on the Endpoint View.

Call History Buffer Size: The maximum number of calls each endpoint has placed / received that will be monitored in the Endpoint Summary and Recent Call History view.

Top Talker Count: The number of Top Talkers that will be added to the Top Talker screen.

Sort Top Talkers: The way that the Top Talkers will be sorted:
By the number of calls, By the time those calls were connected, or By the amount of bandwidth used in those calls

Advanced



The following advanced options are available in WinEyeQ:

H.323 Specific:

Require H.245 End Session: If selected WinEyeQ will require both endpoints to send the End Session message to close the H.245 channel. If not selected, the H.225 Release Complete message will be considered the equivalent.

Command Line Interface Parameters:

Session Mode: Select WinEyeQ mode when program is run by command line.

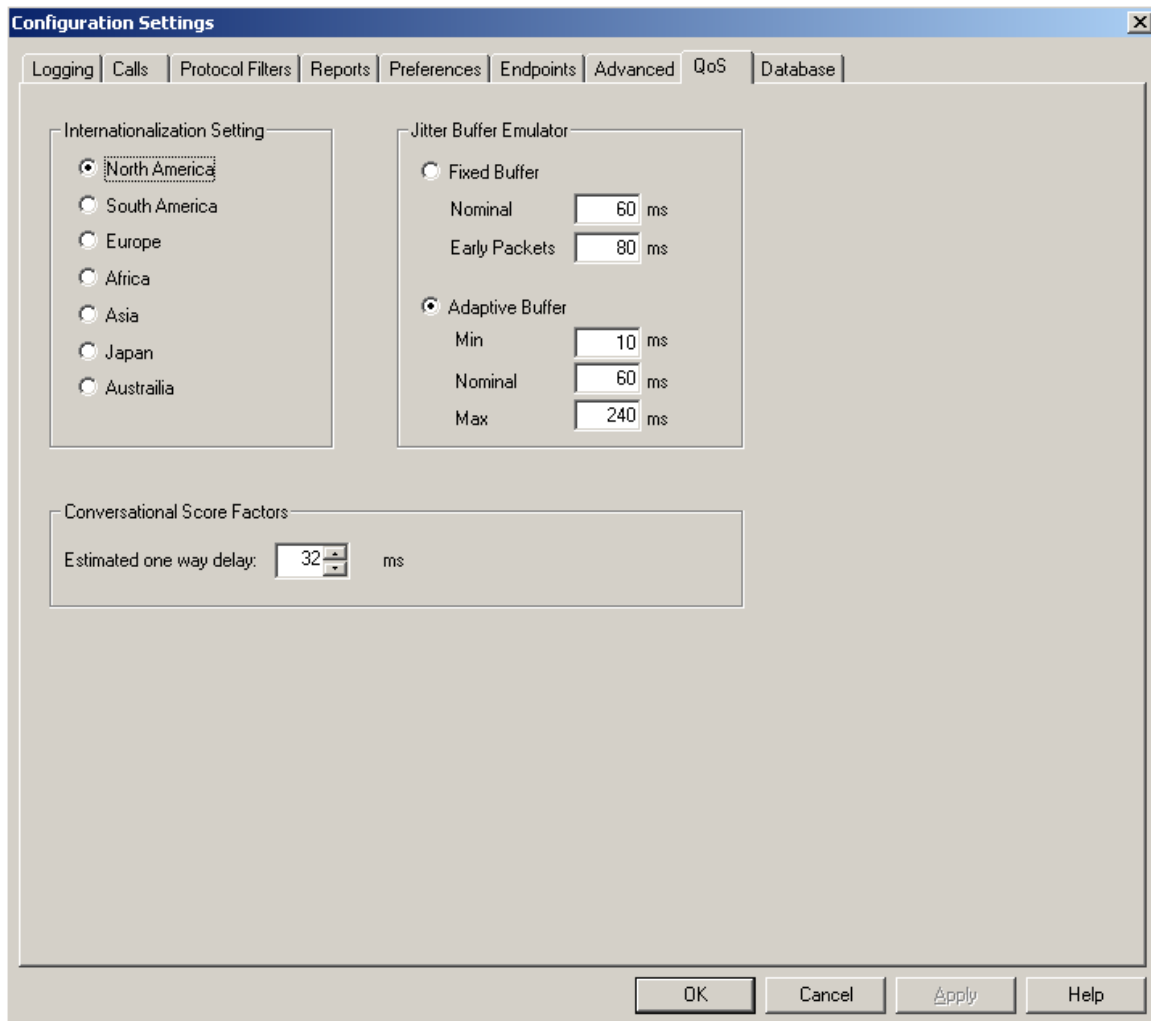
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Session Duration: Enter the duration of a command line test. HH:MM:SS
File and Disk Space Constraints:

Maximum Number of Files to Create per Session: This is the maximum number of files (reports, traces, recordings) that WinEyeQ will create during one session.

Minimum Disk Free Space: If the free space on the hard disk that WinEyeQ is running from falls below this amount, WinEyeQ will stop writing to that disk.

QoS



The following QoS options are available for WinEyeQ:

Internationalization Setting: Sets WinEyeQ to generate quality metrics suitable for scales used in different countries.

Jitter Buffer Emulator: simulates the parameters of a jitter buffer. This allows WinEyeQ to have greater accuracy when collecting and analyzing information on packet loss and call quality.

Fixed Buffer:

Nominal: This is the largest “late” delay for a packet beyond which it would be discarded. It is the delay applied to packets that arrives on time or within an “early window”.

Early Packets: This is used to determine whether, a packet that is “early”, can be accommodated in the emulated jitter buffer. It is the maximum delay that will be applied to a packet that is accommodated by the jitter buffer emulator. IP phones and gateways generally have a maximum buffer that limits the total number of packets that can be stored.

The default values for the fixed settings are, 60 ms for the Nominal Delay, and 80 ms for the Early Packets.

Adaptive Delay: Configured Nominal delay adapts over time.

Min: This is the smallest delay that will be applied to a packet in the Jitter Buffer emulator. The configured nominal delay will not adapt to below this delay.

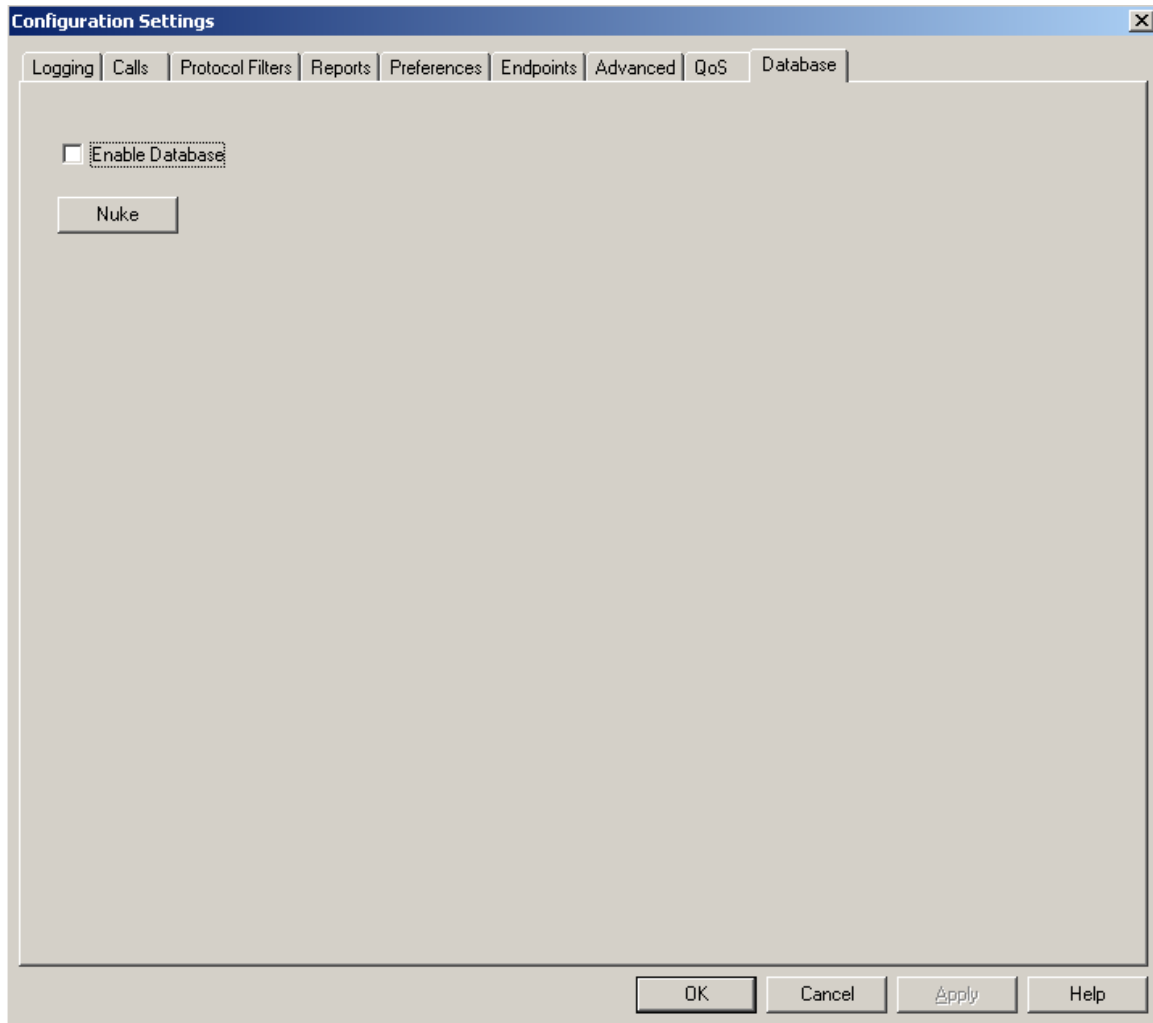
Nominal: This is used as above. Based on the observed jitter, it adapts and is bounded by the Max and Min delays

Max: This is the upper bound for the Nominal delay, and is also used in estimating the “early window” as mentioned above.

The default values for the adaptive settings are 10 ms for the Minimum Delay, 60 ms for the Nominal Delay and 240 ms for the Maximum Delay.

Note: If these values are chosen such that a jitter buffer cannot be constructed, N/C will be displayed in the QoS tables.

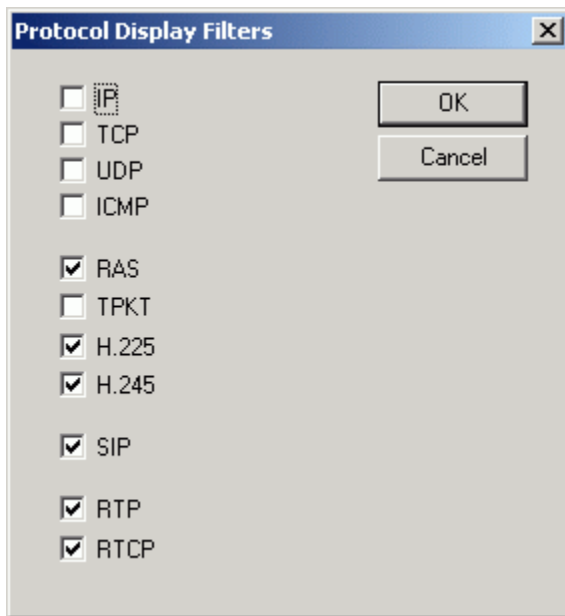
Database



The following Database option is available for WinEyeQ:

Enable Database: With this option you can enable and disable database option.

Display Filters

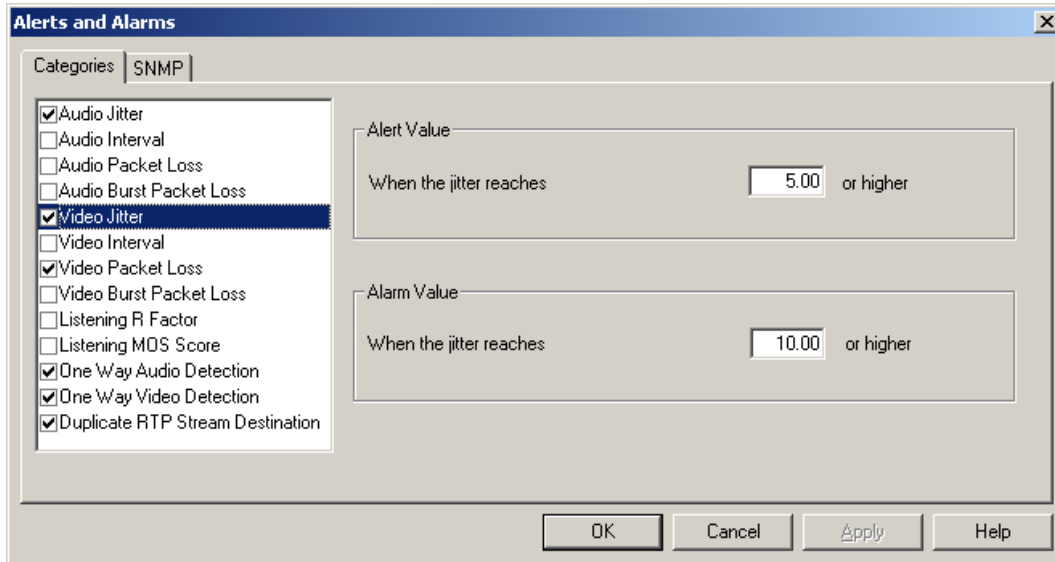


The last step in preparing to run WinEyeQ is to review the filters. WinEyeQ will display the following screen when the Edit | Display Filters menu item is chosen. Select the protocols you want WinEyeQ to display.

Note: Due to memory constraints, only the first few RTP and RTCP packets are displayed for each call.

Alerts and Alarms

Categories



Configurable alerts and alarms are available for the audio and video metric measurements that WinEyeQ performs in real-time. The alert and alarm values are thresholds that are set by the user. The alert and alarm mechanism provides for a two stage detection of user settable limits. Alerts may be set for the following events:

Audio Jitter: When the jitter of an audio stream exceeds the alert/alarm threshold, a message will be sent to the Alert/Alarm screen.

Audio Interval: When the time between receiving two successive packets (the interval) of an audio stream exceeds the alert/alarm threshold, a message will be sent to the Alert/Alarm screen.

Audio Packet Loss: When the total number of packets lost of an audio stream exceeds the alert/alarm threshold, a message will be sent to the Alert/Alarm screen.

Audio Burst Packet Loss: When the number of consecutive packets lost of an audio stream exceeds the alert/alarm threshold, a message will be sent to the Alert/Alarm screen.

Video Jitter: When the jitter of a video stream exceeds the alert/alarm threshold, a message will be sent to the Alert/Alarm screen.

Video Interval: When the time between receiving two successive packets (the interval) of a video stream exceeds the alert/alarm threshold, a message will be sent to the Alert/Alarm screen.

Video Packet Loss: When the total number of packets lost of a video stream exceeds the alert/alarm threshold, a message will be sent to the Alert/Alarm screen.

Video Burst Packet Loss: When the number of consecutive packets lost of a video stream exceeds the alert/alarm threshold, a message will be sent to the Alert/Alarm screen.

Listening R Factor: When the listening R factor of an audio stream exceeds the alert/alarm threshold, a message will be sent to the Alert/Alarm screen.

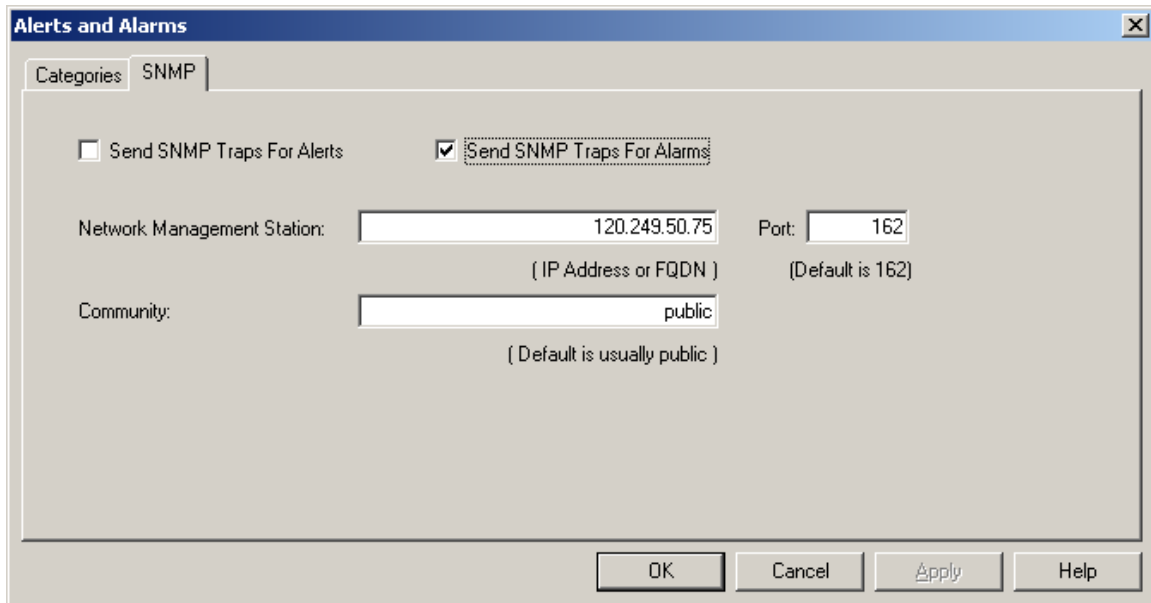
Listening MOS Score: When the listening MOS score of an audio stream exceeds the alert/alarm threshold, a message will be sent to the Alert/Alarm screen.

One Way Audio Detection: When a call that has audio flowing in only one direction exceeds the alert/alarm threshold, a message will be sent to the Alert/Alarm screen.

One Way Video Detection: When a call that has video flowing in only one direction exceeds the alert/alarm threshold, a message will be sent to the Alert/Alarm screen.

Duplicate RTP Stream Destination: When two media streams that have the same destination IP address and port number are detected and exceed the alert/alarm threshold, a message will be sent to the Alert/Alarm screen.

SNMP



The image shows a Windows-style dialog box titled "Alerts and Alarms". It has a "Categories" tab with "SNMP" selected. The dialog contains two checkboxes: "Send SNMP Traps For Alerts" (unchecked) and "Send SNMP Traps For Alarms" (checked). Below these are three input fields: "Network Management Station:" with the value "120.249.50.75" and a note "(IP Address or FQDN)", "Port:" with the value "162" and a note "(Default is 162)", and "Community:" with the value "public" and a note "(Default is usually public)". At the bottom are buttons for "OK", "Cancel", "Apply", and "Help".

Alerts and alarms may optionally send SNMP traps to an SNMP Network Management Station.

Send SNMP Traps For Alerts: If checked an SNMP trap will be sent to the NMS for all Alerts that have been generated by WinEyeQ.

Send SNMP Traps For Alarms: If checked an SNMP trap will be sent to the NMS for all Alarms that have been generated by WinEyeQ.

Network Management Station: This is the IP Address or Fully Qualified Domain Name of the Network Management Station.

Port: This is the port number where the Network Management Station is listening for SNMP traps. The well known port is 162.

Community: This is the community name used by the Network Management Station. The default community name for most SNMP agents is public.

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The following information is provided in each SNMP trap that is sent:

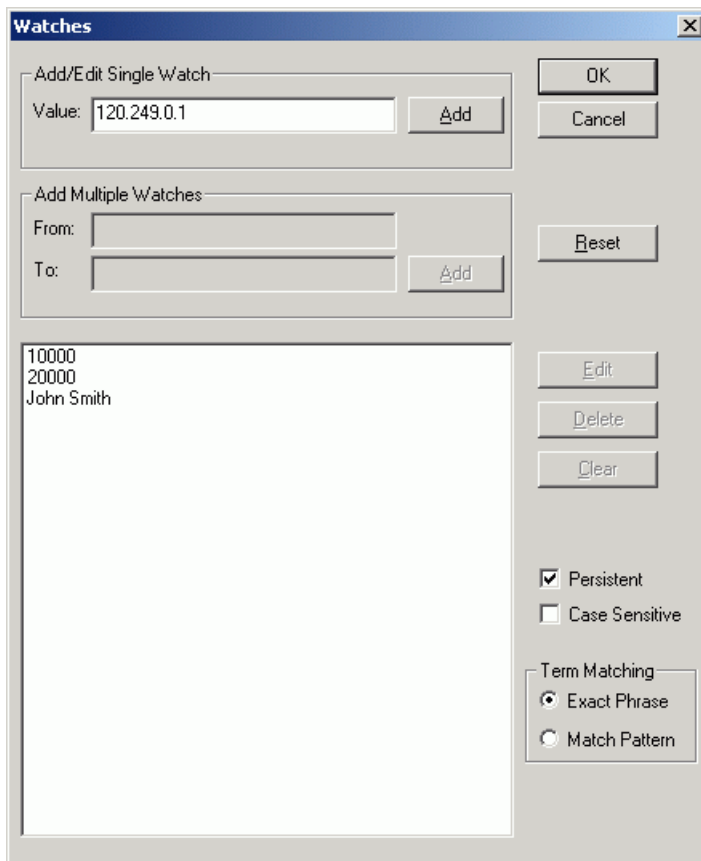
- The name of the application generating the trap - WinEyeQ
- Whether the trap was an alert or an alarm
- The type of trap - audio, video, or signaling
- The description of the trap
- The source IP address and port of the call
- The destination IP address and port of the call
- The threshold value that was set for the trap
- The actual value that triggered the trap
- The date and time the trap was generated
- The ID and User name from the call

Note: Each field of the trap is generated as a character string.

The following is an example of an SNMP trap generated by WinEyeQ:

```
1.3.6.1.4.1.27631.1 WinEyeQ
1.3.6.1.4.1.27631.1.2 Alarm
1.3.6.1.4.1.27631.1.2.2 Video
1.3.6.1.4.1.27631.1.2.2.2 Jitter
1.3.6.1.4.1.27631.1.2.2.2.1 Jitter High Alarm
1.3.6.1.4.1.27631.1.2.2.2.2 Source 120.249.50.100:50354
1.3.6.1.4.1.27631.1.2.2.2.3 Dest 120.249.50.75:25008
1.3.6.1.4.1.27631.1.2.2.2.4 Threshold 1.10
1.3.6.1.4.1.27631.1.2.2.2.5 Value 3.09
1.3.6.1.4.1.27631.1.2.2.2.6 Time 05/08/2007 17:43:16.697
1.3.6.1.4.1.27631.1.2.2.2.7 ID = BB94C810992CEE9D58731FB3D16753F2 -
User = 500095
```

Watches



The watch mechanism allows you to filter out specific calls based upon the value of various call elements or fields within a call. This powerful mechanism allows you to trap calls based upon call ID, IP address, E.164 alias, H.323 ID and most other fields where values are known ahead of time. You may add, edit and delete values associated with watches.

Watches may be designated as persistent (lasting across sessions) and case-sensitive by selecting the appropriate settings on the Edit | Preferences page from the options menu item. Also, you can specify the watch to match the value exactly or match a subset of the value. For example, if 'Exact' were selected, the watch 'Joe' would match the value 'Joe' but not the value 'Joey'. If 'Match Pattern' were selected, 'Joe' would match both 'Joe' and 'Joey'.

Capturing Calls

Overview

WinEyeQ allows you to capture the protocol signaling and initial RTP and RTCP packets from each stream. You may capture the calls manually or associate watches with known call elements and automatically capture the calls as the watches are triggered.

Capturing watched calls also allows you to save the individual media streams with or without the RTP header. This feature is enabled by selecting "Media Streams from Watched Calls" from the Capture menu.

When the file is automatically generated via a watch, the file format will be as follows:

Cap [user id] [timestamp].EyeQ:

Where [user id] is the user ID of the source and timestamp is the local time of the call when recording begins. e.g. "Cap 2156726550 01102005090000.EyeQ".

Capture - Calls with Errors

Click Capture menu command then select Capture Calls with Errors. Calls are captured as they move off the active list to the error list. If you don't have Capture Calls with Errors selected, you can still capture the call by right clicking it in the Error list. Only the initial three RTP packets are captured unless the packet contains DTMF. Only the initial three RTCP packets are captured.

The Default file location where captures are saved is:

C:\WinEyeQ\Capture Files*.EYEQ

Capture - Watched Calls

Click Capture menu command then select Capture Watched Calls. If you don't have Capture Watched Calls selected, you can still capture the call by right clicking it in the Error list. Only the initial three RTP packets are captured unless the packet contains DTMF. Only the initial three RTCP packets are captured

The Default file location where captures are saved is:

C:\WinEyeQ\Capture Files*.EYEQ

Capture - Media Streams from Watched Calls

Click the Capture menu command then select Capture Media Streams from Watch Calls. With this option selected the capture file(s) will contain the full number of RTP packets for the watched call.

If enabled while the analyzer is running media streams from calls already on the watch list will not be captured. Only calls added to the watch list after enabling Capture | Watch Calls Media Streams will have their media streams captured.

Default file location:

C:\WinEyeQ\Audio Capture Files*.g711a (for a call running G.711 Alaw)

C:\WinEyeQ\Video Capture Files*.h261 (for a call running H.261)

Capture - Rogue Streams

While viewing media streams in either Other Audio or Other Video right click on the stream of interest and select Start Rogue Stream Capture.

Default file location:

C:\WinEyeQ\Audio Capture Files*.rogue for Other Audio Capture.

C:\WinEyeQ\Video Capture Files*.rogue for Other Video Capture.

The media stream capture will begin immediately after selecting Start Rogue Stream Capture. Media previous to this point will not be included within the capture file.

Recording Calls

Overview

WinEyeQ allows you to record the protocol signaling, RTP and RTCP channels into one singular file for replay. You may record the calls manually or associate watches with known call elements and automatically capture the calls as the watches are triggered.

When the file is automatically generated via a watch, the file format will be as follows:

Rec [user id] [timestamp].EyeQ:

Where [user id] is the user ID of the source and timestamp is the local time of the call when recording begins, e.g. "Rec 2156726550 01102005090000.EyeQ".

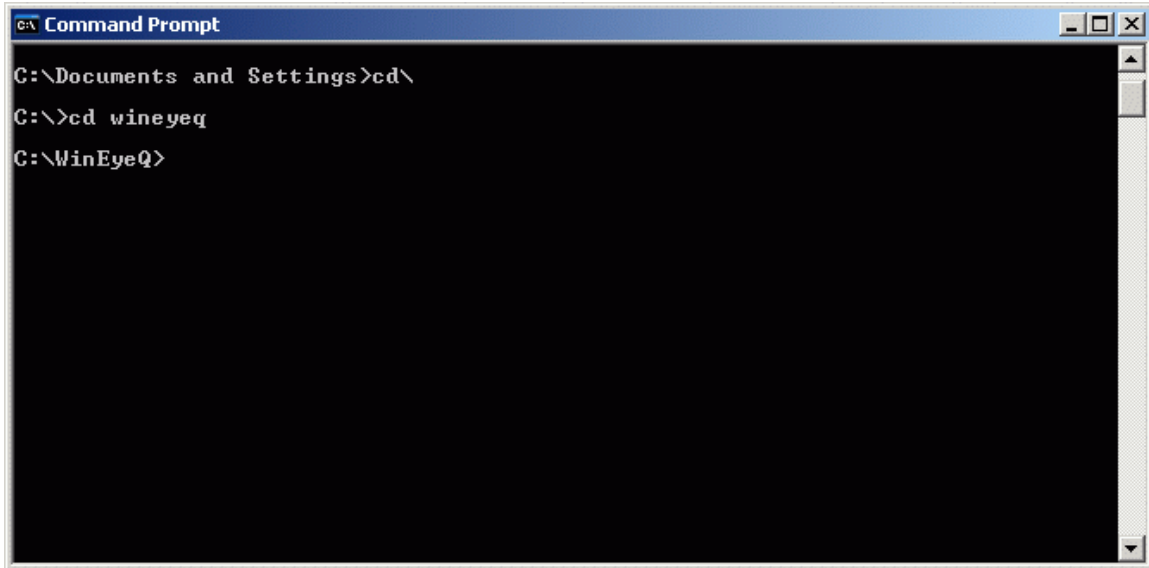
Record - Watch Calls

All of the signaling and media packets are recorded from the watched call to the file.

Command Line Interface

WinEyeQ offers a very basic Command Line Interface (CLI). The application can be started and given all of the information it needs to execute (see Creating Custom Scenarios) but that is the extent of the interaction.

All commands must be entered while in the WinEyeQ directory.

A screenshot of a Windows Command Prompt window. The title bar reads "Command Prompt". The command history shows: "C:\Documents and Settings>cd\
C:\>cd wineyeq
C:\WinEyeQ>".

```
ca Command Prompt
C:\Documents and Settings>cd\
C:\>cd wineyeq
C:\WinEyeQ>
```

From here you can access all of the WinEyeQ commands and parameters.

To understand how to use the CLI you must first understand the way WinEyeQ retains the parameters the user has entered from one session to the next. WinEyeQ stores these parameters in files located in the WinEyeQ folder on the installed hard drive.

WinEyeQ.cfg

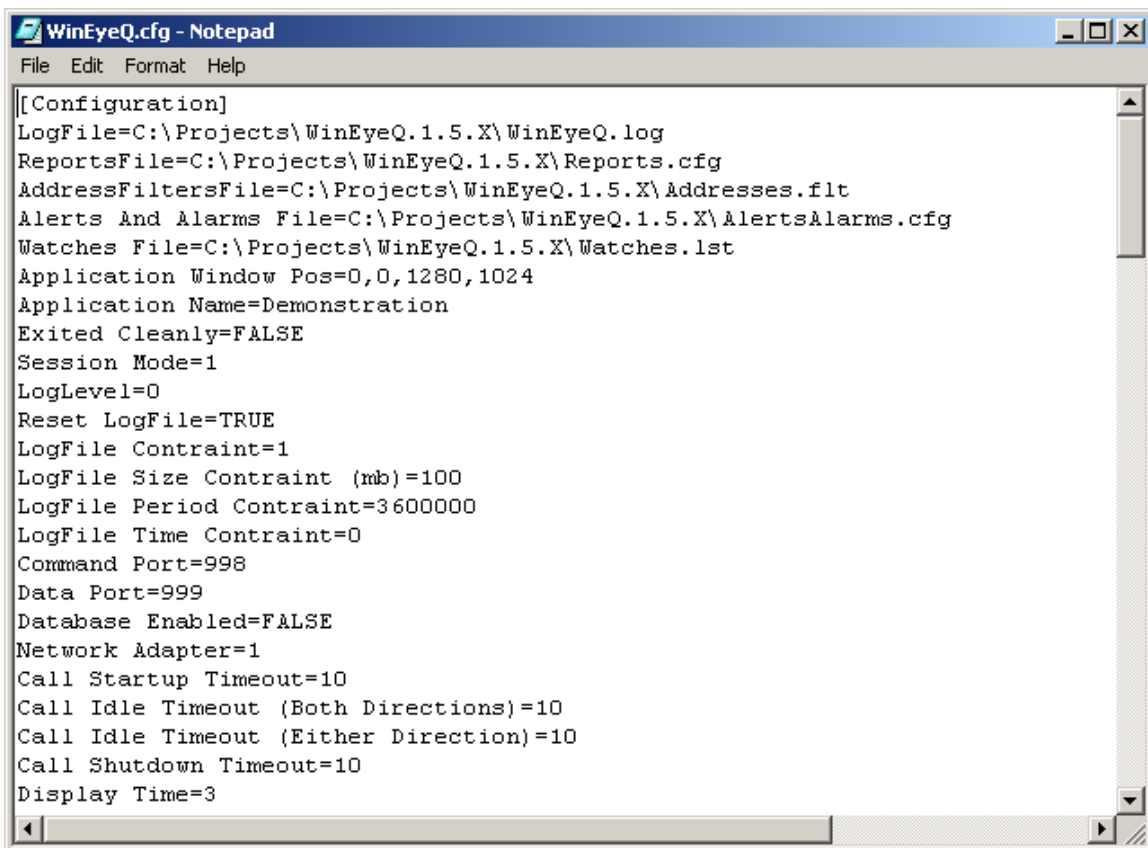
The primary parameter file for WinEyeQ is WinEyeQ.cfg. This file contains the basic parameters required to run WinEyeQ. Normally the values in this file are read and written by the Graphical User Interface (GUI) of the application. If this file is ever deleted, WinEyeQ will rebuild it the next time the application is run.

WinEyeQ.cfg also contains the names of other files that may be used while WinEyeQ is running.

The following parameter files are listed in WinEyeQ.cfg:

- Reports.cfg
- AlertsAlarms.cfg
- Watches.lst
- Addresses.flt

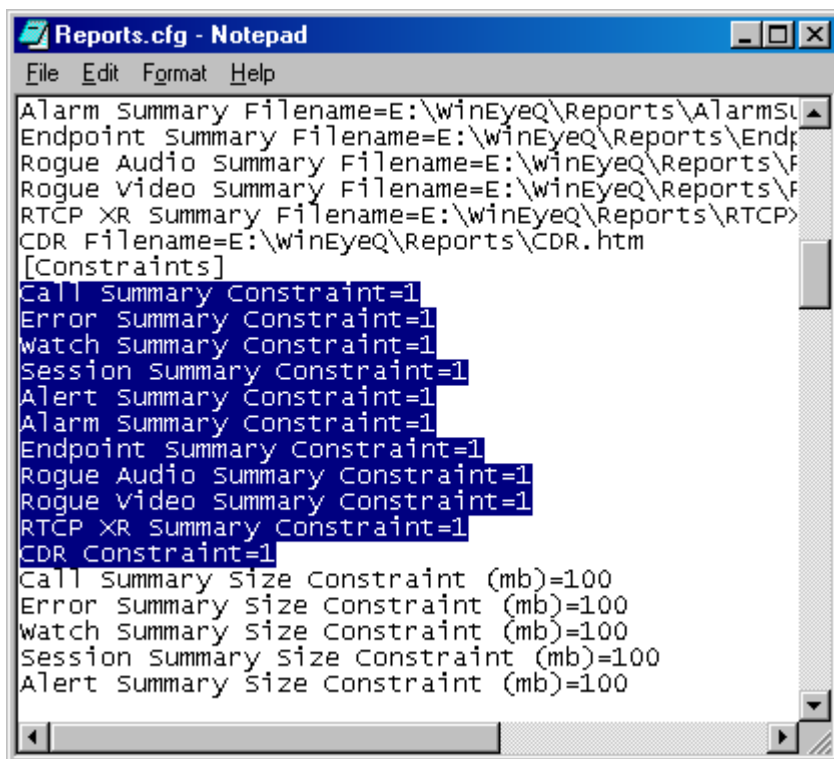
Each of these files contains information that can be altered to affect the WinEyeQ sessions. Again, the values in these files are normally read and written by the Graphical User Interface (GUI) of the application. To find the location of these files in the configuration, open up WinEyeQ.cfg using Notepad.



```
[[Configuration]
LogFile=C:\Projects\WinEyeQ.1.5.X\WinEyeQ.log
ReportsFile=C:\Projects\WinEyeQ.1.5.X\Reports.cfg
AddressFiltersFile=C:\Projects\WinEyeQ.1.5.X\Addresses.flt
Alerts And Alarms File=C:\Projects\WinEyeQ.1.5.X\AlertsAlarms.cfg
Watches File=C:\Projects\WinEyeQ.1.5.X\Watches.lst
Application Window Pos=0,0,1280,1024
Application Name=Demonstration
Exited Cleanly=FALSE
Session Mode=1
LogLevel=0
Reset LogFile=TRUE
LogFile Constraint=1
LogFile Size Constraint (mb)=100
LogFile Period Constraint=3600000
LogFile Time Constraint=0
Command Port=998
Data Port=999
Database Enabled=FALSE
Network Adapter=1
Call Startup Timeout=10
Call Idle Timeout (Both Directions)=10
Call Idle Timeout (Either Direction)=10
Call Shutdown Timeout=10
Display Time=3
```

Reports.cfg

This contains the parameters for the reports that are generated by WinEyeQ. The active reports can be toggled on and off (a “0” is off, while a “1” is on).

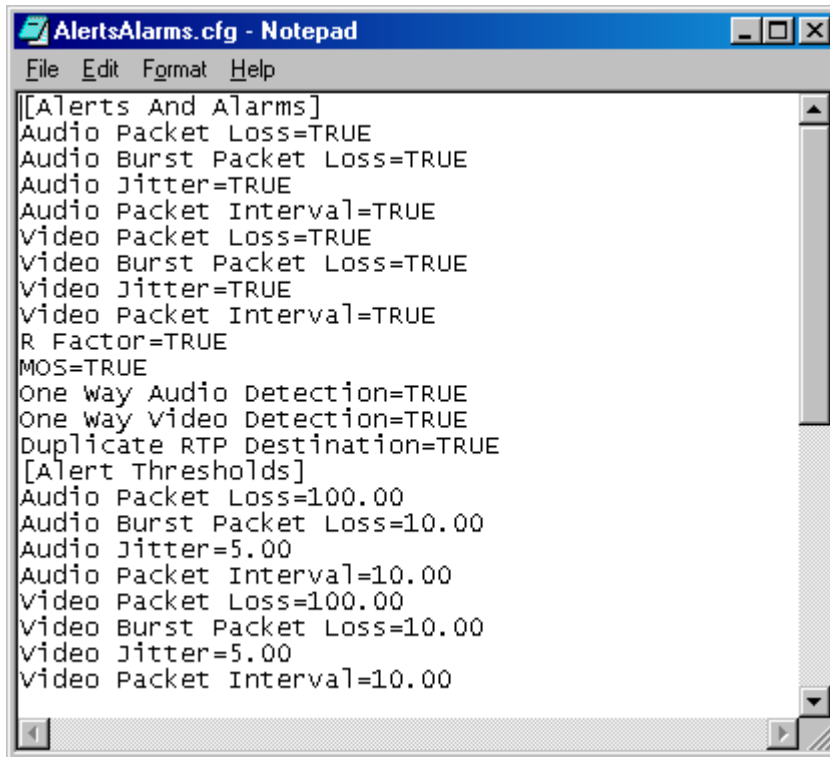
A screenshot of a Notepad window titled "Reports.cfg - Notepad". The window contains the following text:

```
Alarm Summary Filename=E:\winEyeQ\Reports\AlarmSu
Endpoint Summary Filename=E:\winEyeQ\Reports\Endp
Rogue Audio Summary Filename=E:\winEyeQ\Reports\F
Rogue Video Summary Filename=E:\winEyeQ\Reports\F
RTCP XR Summary Filename=E:\winEyeQ\Reports\RTCP>
CDR Filename=E:\winEyeQ\Reports\CDR.htm
[Constraints]
Call Summary Constraint=1
Error Summary Constraint=1
watch Summary Constraint=1
Session Summary Constraint=1
Alert Summary Constraint=1
Alarm Summary Constraint=1
Endpoint Summary Constraint=1
Rogue Audio Summary Constraint=1
Rogue Video Summary Constraint=1
RTCP XR Summary Constraint=1
CDR Constraint=1
Call Summary Size Constraint (mb)=100
Error Summary Size Constraint (mb)=100
watch Summary Size Constraint (mb)=100
Session Summary Size Constraint (mb)=100
Alert Summary Size Constraint (mb)=100
```

You can also find and change the settings on how often the reports are refreshed (such as time of day, file size, or set intervals) as well as various other report constraints.

AlertsAlarms.cfg

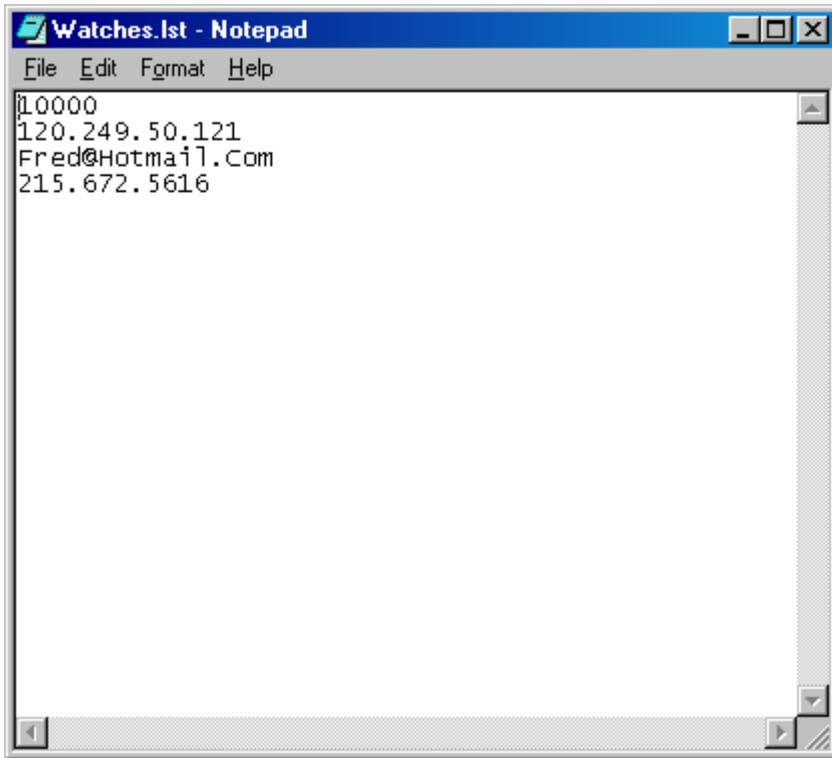
This file controls which alerts and alarms are active, as well as the various thresholds to trigger them.

A screenshot of a Windows Notepad window titled "AlertsAlarms.cfg - Notepad". The window has a menu bar with "File", "Edit", "Format", and "Help". The text content is as follows:

```
[[Alerts And Alarms]
Audio Packet Loss=TRUE
Audio Burst Packet Loss=TRUE
Audio Jitter=TRUE
Audio Packet Interval=TRUE
Video Packet Loss=TRUE
Video Burst Packet Loss=TRUE
Video Jitter=TRUE
Video Packet Interval=TRUE
R Factor=TRUE
MOS=TRUE
One way Audio Detection=TRUE
One way Video Detection=TRUE
Duplicate RTP Destination=TRUE
[Alert Thresholds]
Audio Packet Loss=100.00
Audio Burst Packet Loss=10.00
Audio Jitter=5.00
Audio Packet Interval=10.00
Video Packet Loss=100.00
Video Burst Packet Loss=10.00
Video Jitter=5.00
Video Packet Interval=10.00
```

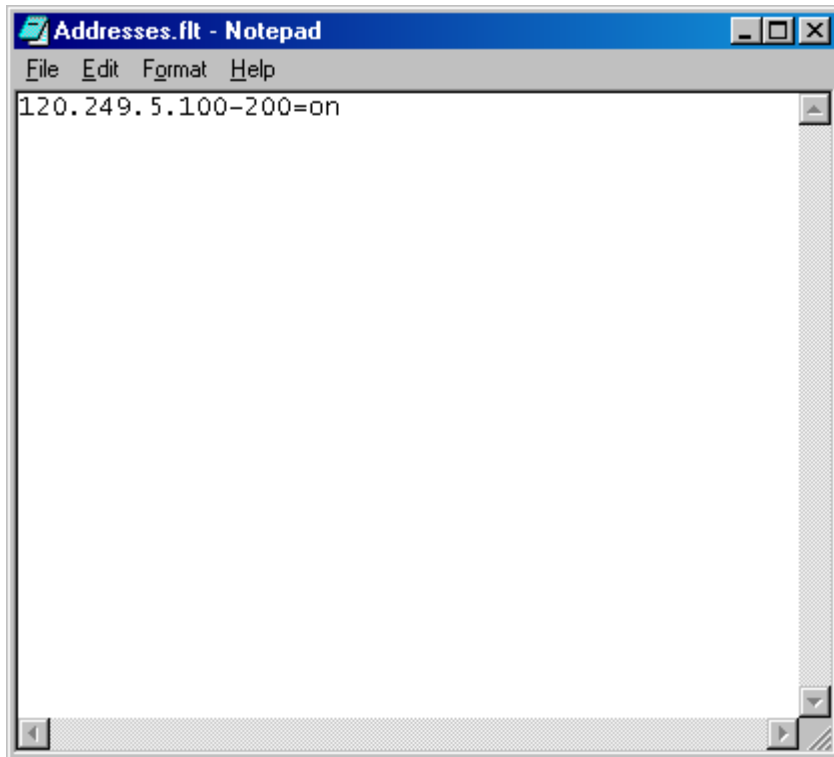
Watches.lst

Sets and controls the watches that are generated.



Addresses.flt

This controls the range of IP addresses that the filter looks at for information to analyze.

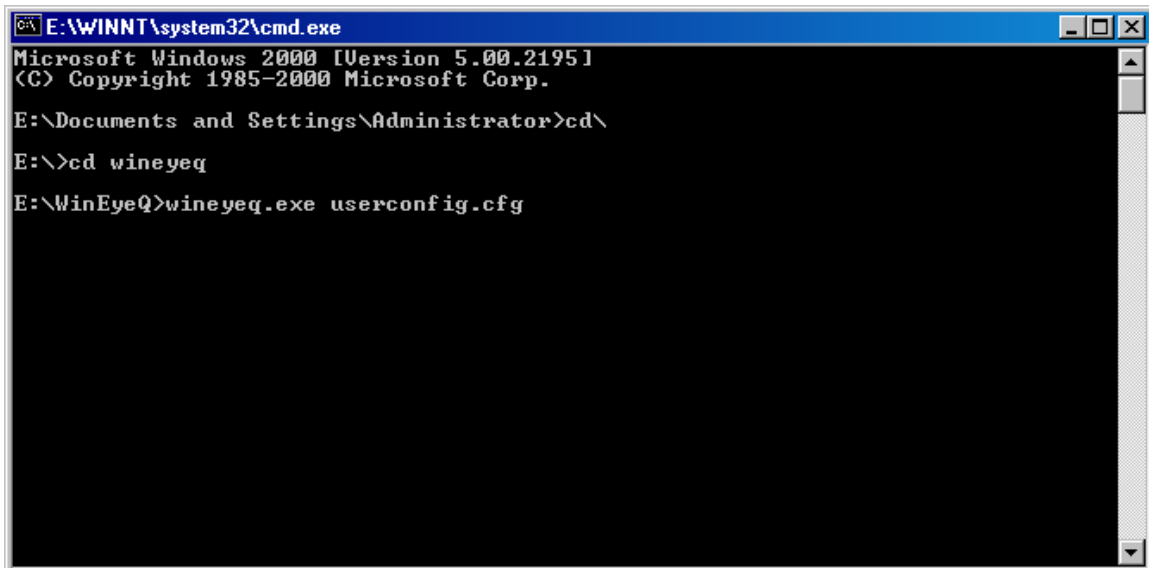


Creating Custom Scenarios

The first step in creating a custom scenario is to save and rename the WinEyeQ.cfg file. Be sure that the new configuration is a .cfg file and not a .txt file. Next, open the parameter files you wish to alter in Notepad, look through the various options available, and alter the parameters as you wish. Be sure to save the files and rename them, again making sure that they are not .txt files. Finally, in your new WinEyeQ configuration file, change the file names so that it points to the appropriate new parameter file(s) you created, and be sure to save the file. Now, you may run your new scenario when you are on the command line in your directory.

Running Custom Scenarios

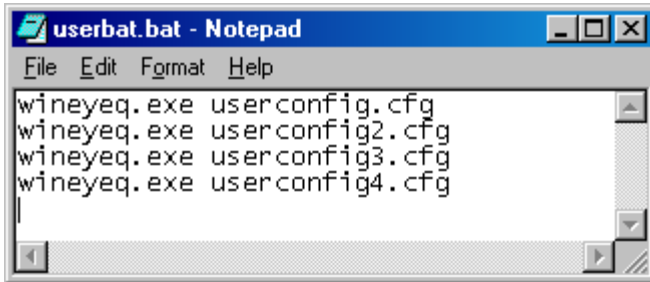
In order to run a custom scenario that you created, first make sure that all of the files you made and altered are in the WinEyeQ directory. Next, open up the command prompt, again opening up the WinEyeQ directory. To run your file, type in the command "wineyeq.exe [your replacement for the WinEyeQ.cfg file].cfg and press enter.



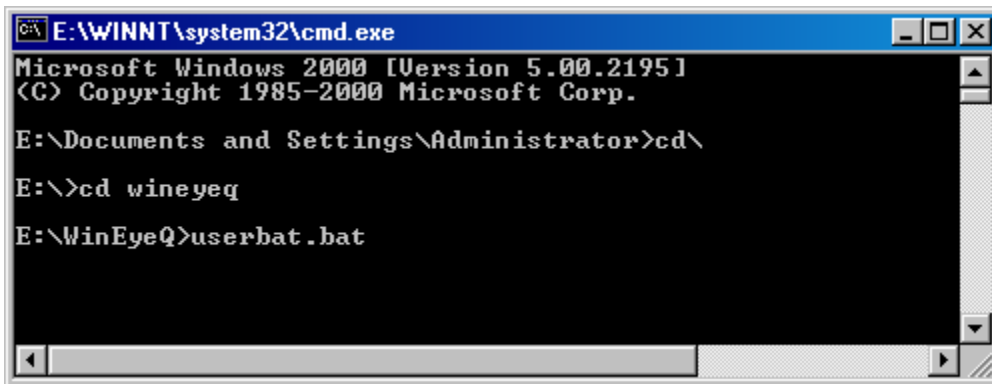
```
E:\WINNT\system32\cmd.exe
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.
E:\Documents and Settings\Administrator>cd\
E:\>cd wineyeq
E:\WinEyeQ>wineyeq.exe userconfig.cfg
```

Creating and Running .bat files

You can create files that run several custom configurations in sequence by creating a .bat file. First, you must create each individual configuration you wish to run, using the steps mentioned earlier, and be sure that they are all given unique file names within the WinEyeQ directory. Next, open up a Notebook document, and enter the commands you wish to use in sequence, being sure to press enter after each command. Save the file when you are done as a .bat file in the WinEyeQ directory.



Finally, when you are in the command interface, simply enter the .bat file name and press enter to run the sequence.



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Appendix A

Theoretical Maximum MOS Scores and R Factors

The following chart contains the theoretical maximum values for Listening and Conversational MOS and R factor by codec type.

| Codec Name | MOS-LQ | MOS-CQ | R-LQ | R-CQ |
|----------------|--------|--------|------|------|
| G.711 u-law | 4.2 | 4.18 | 93 | 92 |
| G.711 A-law | 4.2 | 4.18 | 93 | 92 |
| G.722 64k | 3.88 | 3.84 | 94 | 93 |
| G.722 56k | 3.73 | 3.69 | 90 | 89 |
| G.722 48k | 3.53 | 3.48 | 84 | 83 |
| G.722.1 32k | 4.04 | 4.01 | 100 | 99 |
| G.722.1 24k | 3.91 | 3.91 | 96 | 95 |
| G.722.2 23.85k | 4.164 | 4.14 | 106 | 105 |
| G.722.2 23.05k | 4.16 | 4.14 | 106 | 105 |
| G.722.2 19.85k | 4.16 | 4.14 | 106 | 105 |
| G.722.2 18.25k | 4.09 | 4.09 | 103 | 102 |
| G.722.2 15.85k | 4.09 | 4.06 | 102 | 101 |
| G.722.2 14.25k | 4.06 | 4.04 | 101 | 100 |
| G.722.2 12.85k | 3.98 | 3.95 | 98 | 97 |
| G.722.2 8.85k | 3.73 | 3.69 | 90 | 89 |
| G.722.2 6.6k | 3.35 | 3.3 | 79 | 78 |
| G.723.1-5.3k | 3.61 | 3.57 | 74 | 73 |
| G.723.1-6.3k | 3.77 | 3.73 | 78 | 76 |
| G.726-16k | 2.82 | 2.77 | 57 | 56 |
| G.726-24k | 3.35 | 3.3 | 68 | 67 |
| G.726-32k | 4.04 | 4.01 | 86 | 85 |
| G.726-40k | 4.16 | 4.14 | 91 | 90 |
| G.728 | 4.04 | 4.01 | 86 | 85 |
| G.729/G.729B | 3.95 | 3.91 | 83 | 82 |
| G.729A/G.729AB | 3.91 | 3.88 | 82 | 81 |
| G.729E 8.0k | 3.91 | 3.88 | 82 | 81 |
| G.729E 11.8k | 4.11 | 4.09 | 89 | 88 |
| AMR NB 12.2k | 4.09 | 4.06 | 88 | 59 |
| AMR NB 10.2k | 3.91 | 3.88 | 82 | 81 |
| AMR NB 7.95k | 3.69 | 3.65 | 76 | 75 |
| AMR NB 7.4k | 3.61 | 3.57 | 74 | 73 |
| AMR NB 6.7k | 3.44 | 3.39 | 70 | 69 |
| AMR NB 5.9k | 3.25 | 3.21 | 66 | 65 |
| AMR NB 5.15k | 3.06 | 3.02 | 62 | 61 |
| AMR NB 4.75k | 3.02 | 2.96 | 61 | 60 |
| iLBC 13.3k | 3.88 | 3.84 | 81 | 80 |
| iLBC 15.2k | 3.95 | 3.91 | 83 | 82 |
| Speex NB 2.15k | 2.92 | 2.87 | 59 | 58 |
| Speex NB 5.95k | 2.92 | 2.87 | 59 | 58 |
| Speex NB 8k | 3.39 | 3.35 | 69 | 68 |
| Speex NB 11k | 3.88 | 3.84 | 81 | 77 |
| Speex NB 15k | 4.11 | 4.09 | 89 | 88 |
| Speex NB 18.2k | 4.11 | 4.09 | 89 | 88 |
| Speex NB 24.6k | 4.16 | 4.14 | 91 | 90 |
| Speex NB 3.95k | 2.41 | 2.36 | 49 | 48 |

Appendix B

Sample SNMP traps.

This would be an Alert for an Audio stream that had low packet interval:

```
1.3.6.1.4.1.27631.1 WinEyeQ
1.3.6.1.4.1.27631.1.1 Alert
1.3.6.1.4.1.27631.1.1.1 Audio
1.3.6.1.4.1.27631.1.1.1.3 Interval
1.3.6.1.4.1.27631.1.1.1.3.1 Packet Interval Low Alert
1.3.6.1.4.1.27631.1.1.1.3.2 Source 120.249.50.100:50354
1.3.6.1.4.1.27631.1.1.1.3.3 Dest 120.249.50.75:25008
1.3.6.1.4.1.27631.1.1.1.3.4 Threshold 58.80
1.3.6.1.4.1.27631.1.1.1.3.5 Value 58.42
1.3.6.1.4.1.27631.1.1.1.3.6 Time 05/08/2007 17:43:15.397
1.3.6.1.4.1.27631.1.1.1.3.7 ID = BB94C810992CEE9D58731FB3D16753F2 -
User = 500095
```

And this would be an Alarm for a Video stream that had high jitter:

```
1.3.6.1.4.1.27631.1 WinEyeQ
1.3.6.1.4.1.27631.1.2 Alarm
1.3.6.1.4.1.27631.1.2.2 Video
1.3.6.1.4.1.27631.1.2.2.2 Jitter
1.3.6.1.4.1.27631.1.2.2.2.1 Jitter High Alarm
1.3.6.1.4.1.27631.1.2.2.2.2 Source 120.249.50.100:50354
1.3.6.1.4.1.27631.1.2.2.2.3 Dest 120.249.50.75:25008
1.3.6.1.4.1.27631.1.2.2.2.4 Threshold 1.10
1.3.6.1.4.1.27631.1.2.2.2.5 Value 3.09
1.3.6.1.4.1.27631.1.2.2.2.6 Time 05/08/2007 17:43:16.697
1.3.6.1.4.1.27631.1.2.2.2.7 ID = BB94C810992CEE9D58731FB3D16753F2 -
User = 500095
```

Appendix C

Call Scoring - Letter Grades

The letter grades assigned to the various scores associated with signaling and audio and video quality are determined by the following scale:

| | |
|----|-------------|
| A+ | 98 or above |
| A | 92 or above |
| A- | 90 or above |
| B+ | 88 or above |
| B | 82 or above |
| B- | 80 or above |
| C+ | 78 or above |
| C | 72 or above |
| C- | 70 or above |
| D+ | 68 or above |
| D | 62 or above |
| D- | 60 or above |
| F | Below 60 |

Audio Scores

This score is designed to provide a comprehensive value which considers all components that contribute the overall QoS/QoE of an audio stream.

The audio score is calculated using Touchstone's proprietary formula which considers the stream's jitter, inter-packet interval, early arrival packets, late arrival packets, listening and conversational MOS scores, listening and conversational R Factor scores and weights these factors against their optimal values.

The audio scores use the scale identified above to determine a corresponding "grade" for the stream.

Video Scores

This score is designed to provide a comprehensive value which considers all components that contribute the overall QoS/QoE of a video stream.

The video score is calculated using Touchstone's proprietary formula which considers the stream's jitter, picture rate, early and late packets to assess the overall stream quality. This score is graded using the scale outline above.

Media Score

This score is designed to provide a comprehensive value which considers all components that contribute the overall QoS/QoE of stream.

The media score is calculated using Touchstone's proprietary formula which considers the weighted values obtained from the scoring of the audio and video components.

The media score uses the scale identified above to determine a corresponding "grade" for the media component.

Signaling Score

This score is designed to provide a comprehensive value which considers all components that contribute the overall QoE of the signaling component of a SIP or H.323-based telephony call or video conference.

The signaling score is calculated using Touchstone's proprietary formula which considers signaling metrics such as initial response time, post-dial delay and call teardown time. These metrics are then compared against industry-accepted values and the score is then calculated based upon the results.

The signaling score uses the scale identified above to determine a corresponding "grade" for the media component.

Overall Score

The overall score is designed to provide a comprehensive value which considers all components that contribute the overall QoE of a SIP or H.323-based telephony call or video conference.

The overall score is calculated using Touchstone's proprietary formula which considers a weighted combination of the signaling and media scores. This score paints a highly accurate portrait of the overall quality of the session.

The overall score uses the scale identified above to determine a corresponding "grade" for the call or conference.

Appendix D - Installing WinEyeQ for Limited Users

Prior to Installation of any Touchstone Software

For any Touchstone Technologies software installation the user MUST BE logged on as the Administrator and / or have Administrator rights.

If Touchstone Technologies Software is going to be installed on a computer that has multiple users including users with limited rights the minimum setting required to run the software is a "Power User". The basic "User" setting does not have enough rights to run the programs no matter how it is installed.

For limited user account installations please follow the following procedure precisely.

Procedure

To install Touchstone Technologies Test Tools with limited user accounts follow the below procedure:

1. Log on as Administrator.
2. Run the setup.exe file of choice.
3. During the Installation wizard a screen will be display whose subject heading is "Customer Information". Please make sure the "Anyone" radial button is selected before clicking the Next button.
4. At the Destination Folder screen make sure to enter a different path by using the Change button.
5. Change the Installation directory to the units shared directory, (i.e. C:\Documents and Settings\All Users\WinEyeQ)
6. Continue following the instructions until the installation is finished.

Changing a User's Rights

If a user's account is set to a "Limited" or basic "User" rights, Touchstone Technologies software will not run. The minimum rights setting must be "Power User". To change a user's rights, follow the procedure below.

1. Log on as administrator.
2. On the desktop right click on My Computer, select "Manage".
3. Select "Local User & Groups"; then select "Users" to view list.
4. Right click on the user of choice, and then select properties.
5. Select "Member of Tab", and then click on "Add".
6. Click on the "Advanced" button, and then click on "Find Now" button.
7. Select "Power User" from list.
8. Click "OK", "OK", and "OK" to close windows.

Important Note

All Touchstone applications that need to be run by users who do not have administrative rights have to be installed in My Computer\Shared Documents folder.

This folder can be located either thru My Computer or thru explore at "C:\Documents & Settings\All Users\ WinEyeQ".

WinEyeQ User's Guide

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