VegaStream Information Note
QOS Statistics

Why does the voice quality of this call, that sounded great yesterday, not sound so good today?

or

why do calls to this destination sound choppy?

It is likely to be due to dropped packets or high jitter on the data network. Use the Vega QOS statistics to identify dropped and missing packets, high jitter and many other QOS statistics.

QOS statistics

VegaStream gateways can provide Quality of Service statistics on a per unit level and on a per call level. These statistics may be viewed either from an internal buffer on demand, or collected in real time from the serial or telnet interfaces of the Vega. QOS event reporting may also be enabled so that the Vega reports when certain QoS thresholds are exceeded.

Although configuration may be carried out using the CLI interface, and this method is documented below, configuration using the web browser is much easier.

Contents

Terminology

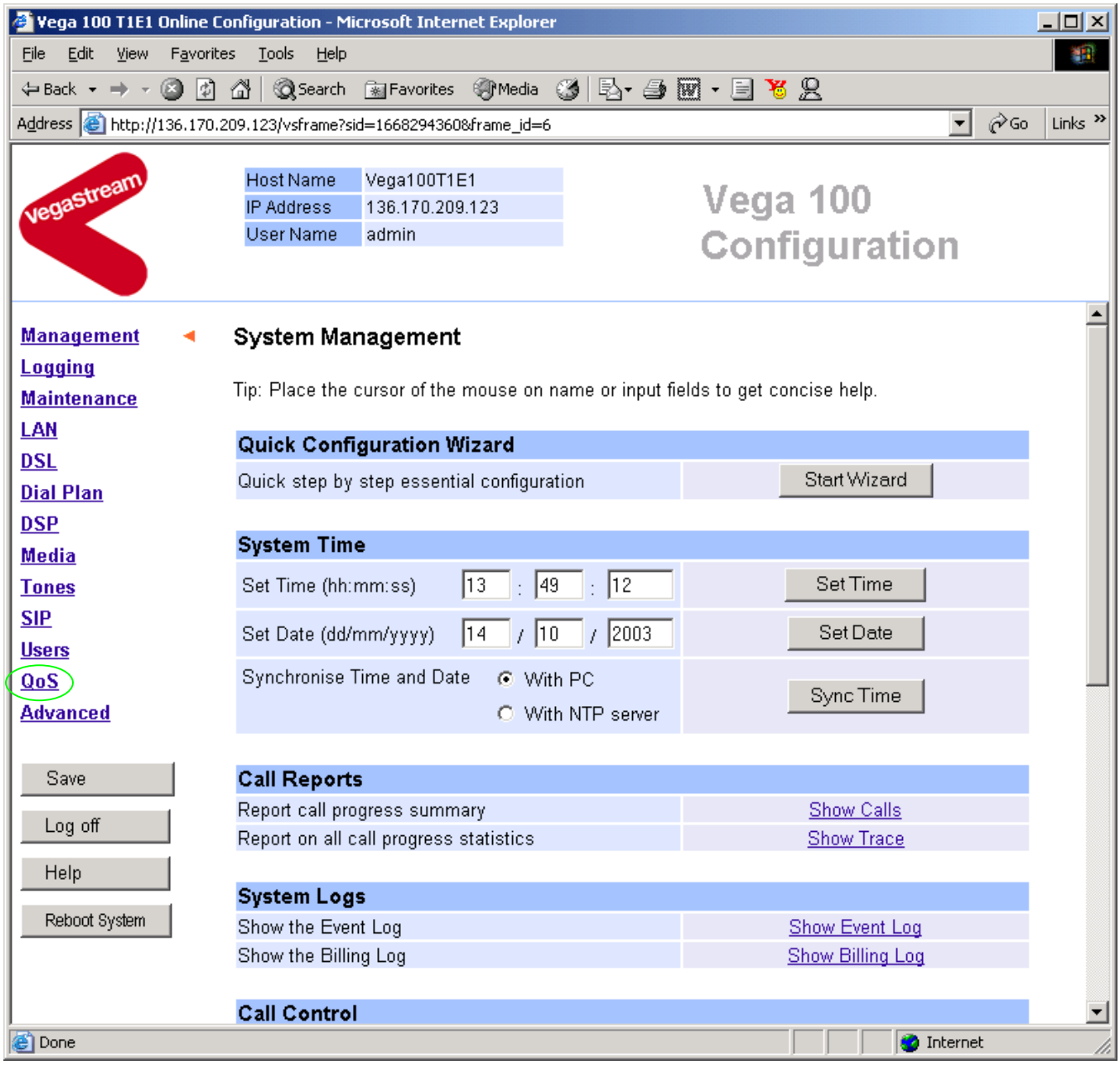
There are a number of terms used in this document when talking about Quality of Service measurements, there meanings are as follows:

- QOS - Quality of Service – the quality of the transport mechanism that passes information from one point to another.
- Latency – this is the delay between packets being transmitted from the originating device and being received at their destination.
- Jitter – this is the difference in latency of various packets through a network. Some packets arrive 'fast', whilst others take a long time. The jitter is the difference in time between the fastest packets arriving and the slowest packets arriving.
- Jitter buffer – this is a buffer in the receiving device that collects audio data as it arrives and forwards it on at a fixed rate. It delays sending out the initial data it receives by the jitter time, but from then on sends the data out at a constant rate. Because on average the data is received at the same rate that it is sent out of this buffer, there is always data to send out, provided that the audio packets arrive within the jitter time that the buffer has been configured to handle. The result of this buffer is a delay in the audio stream, but a continuous stream of audio data.
- Buffer overflow - If a buffer fills it has no room to put new data, so either the new data is discarded or the oldest data is overwritten by the new data. In either case the buffer is said to have overflowed. In the case of audio buffers this will result in a loss of a chunk of audio.
- Buffer underflow - If a buffer (like the jitter buffer) finds that it has no data to send on when it needs to, the buffer is said to have had an underflow. In the case of audio buffers this will result in a period of silence inserted into the audio data.
- Packet error - A packet error is said to have occurred if the contents of the packet is found to be corrupt.
- Packet loss - Packet loss is said to occur if packets that had been expected to be received are observed to be missing – e.g. dropped by a router or switch in the IP network.
- Dropped packet rate - The proportion of packets lost – see packet loss
- Packet playout delay - This is a measure of the delay of audio inside the Vega due to, for example the jitter buffer.
- CDR - Call Detail Record. This a set of information produced and made available on a per-call basis.
- Codec - CODer / DECoder of audio data, e.g. g729 or g723.1
- Packet size - Amount of [audio] data transported in a single IP packet – also known as "Payload size"
- Tx - Transmit – the sender of data
- RX - Receive – the receiver of data
- Silence suppression - The sending VoIP gateway may be configured not to send audio packets when the audio volume that it is detecting is below a given threshold. This reduces the amount af data sent across the LAN.
- Comfort Noise - White noise played to a telephone caller due to no audio being received over the VoIP link. White noise rather than silence is used to avoid the telephony party thinking that the line has been completely cut. (Specifically used where the sending device has silence suppression enabled).

Configuring QOS Statistics and QOS event logging via the web browser

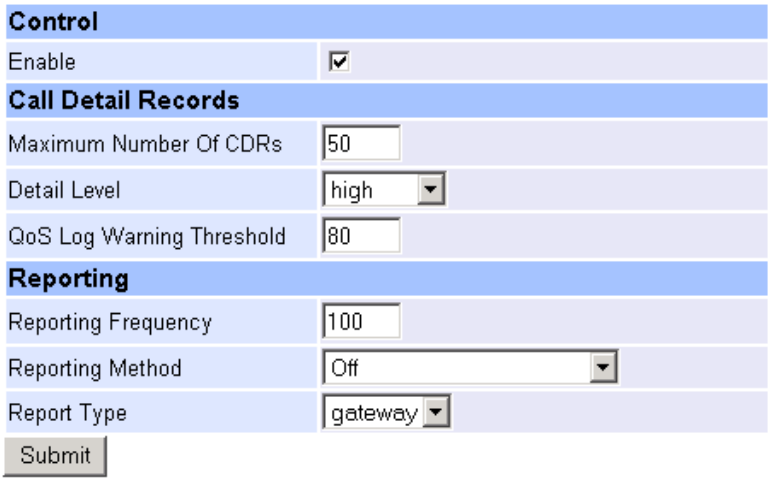
To configure the Vega to generate QOS statistics reports and to define their content, configure the **QOS Statistics** section on the web browser QOS page.

- On the web browser, select QOS from the menu on the left hand side.



➢ Scroll down to **QoS Statistics** section

QoS Statistics



- Enable - Ticking this enables the Vega to generate QOS statistics
- Maximum number of CDRs - This specifies the size of the buffer in the Vega for holding CDRs
- Detail level - This specifies the level of detail that will be provided in the QOS statistics. See Table 1 and Table 2 for details of how this parameter affects the contents of the per-call and the per-gateway statistics
- QoS warning threshold - This defines the level at which a warning event will be issued to indicate that the QOS statistics buffer is filling up. It is a percentage value.
- Reporting frequency - This defines when the QOS statistics records will be sent out of the Vega. When the QOS statistics buffer reaches this number of records full, the Vega will send out all those records according to the current setting of Reporting Method
- Reporting Method - This parameter defines unit-wide how the Vega will report QOS statistics CDRs. Currently only Off and Terminal are available, where Terminal means that the QOS CDRs will be available for display on telnet and/or serial interface sessions. (To enable reporting on a specific session you need to issue the `qos report on` command.)
- Reporting Type - This defines whether the reports are to contain just gateway statistics, just call statistics or both.

(For details of the ranges of values that these parameters can take, see the Vega Primer)

To configure the Vega to monitor specific QOS events and to log thresholds being exceeded and problems being recovered from, configure the **QOS Call Events** section and the **QOS Gateway Events** section on the web browser QOS page.

➢ On the QOS page, scroll down to the **QoS Call Events** section

QoS Call Events

Average Jitter	
Enable	☐
Threshold	50
Jitter Buffer Overflow	
Enable	☐
Jitter Buffer Underflow	
Enable	☐
Packet Error	
Enable	☐
Threshold	5
Packet Loss	
Enable	☐
Threshold	5
Packet Playout Delay	
Enable	☐
Threshold	250

Submit

These parameters enable the logging of per-call events to the Vega logging system.

- Average Jitter Enable - Enables the reporting of excessive average jitter
- Average Jitter Threshold - This defines the level of jitter defined to be excessive (ms)
- Jitter Buffer Overflow Enable - Enable the reporting of jitter buffer overflows
- Jitter Buffer Underflow Enable - Enable the reporting of jitter buffer underflows
- Packet Error Enable - Enables the reporting of excessive packet errors
- Packet Error Threshold - This defines the level of packet errors defined to be excessive (%)
- Packet Loss Enable - Enables the reporting of excessive packet loss
- Packet Loss Threshold - This defines the level of packet loss defined to be excessive (%)
- Packet Playout Delay Enable - Enables the reporting of excessive one way delay
- Packet Playout Delay Threshold - This defines the level of one way delay defined to be excessive (ms)

(For details of the ranges of values that these parameters can take, see the Vega Primer)

Events are reported on the transition from acceptable operation to unacceptable, and on the transition unacceptable to acceptable, except for buffer overflow and buffer underflow which are reported for every overflow and every underflow.

The per-call logging events that are generated are:

```
313:  "QoS: Packet jitter threshold reached for call number x"
312:  "QoS: Packet jitter below threshold for call number x" (i.e. packet
      jitter rate recovered)
316:  "QoS: Jitter buffer overflow for call number x"
317:  "QoS: Jitter buffer underflow for call number x"
315:  "QoS: Packet playout error rate threshold reached for call number x"
314:  "QoS: Packet playout error rate below threshold for call number x"
      (i.e. error rate recovered)
309:  "QoS: Packet Loss threshold reached for call number x"
308:  "QoS: Packet Loss below threshold for call number x" (i.e. packet loss
      rate recovered)
311:  "QoS: Packet playout delay threshold reached for call number x"
310:  "QoS: Packet playout delay below threshold for call number x" (i.e.
      delay problems recovered)
```

- Scroll further down to the **QoS Gateway Events** section

QoS Gateway Events

Average Jitter	
Enable	☐
Threshold	50
Packet Loss	
Enable	☐
Threshold	5
Packet Playout Delay	
Enable	☐
Threshold	250
Lan Link Status	
Enable	☐

Submit

These parameters enable the logging of per-gateway events to the Vega logging system and also to SNMP traps.

- Average Jitter Enable - Enables the reporting of excessive average jitter
- Average Jitter Threshold - This defines the level of jitter defined to be excessive (ms)
- Packet Loss Enable - Enables the reporting of excessive packet loss
- Packet Loss Threshold - This defines the level of packet loss defined to be excessive (%)
- Packet Playout Delay Enable - Enables the reporting of excessive one way delay
- Packet Playout DelayThreshold - This defines the level of one way delay defined to be excessive (%)
- Lan Link Status Enable - Enables the reporting of lan link down and lan link recovery

(For details of the ranges of values that these parameters can take, see the Vega Primer)

Vega logging events are reported on the transition from acceptable operation to unacceptable, and on the transition unacceptable to acceptable.

The per-gateway logging events that are generated are:

```
307:  "QoS: Service unavailable: jitter threshold reached"
306:  "QoS: Service available: jitter threshold restored"
303:  "QoS: Service unavailable: packet loss threshold reached"
302:  "QoS: Service available: packet loss threshold restored"
305:  "QoS: Service unavailable: playout delay threshold reached"
304:  "QoS: Service available: playout delay threshold restored"
301:  "QoS: Service unavailable due to LAN failure"
300:  "QoS: Service available, LAN link restored"
```

SNMP traps are generated on the error being detected (there are no traps generated on error rates being recovered from).

The Enterprise specific SNMP traps that are generated are:

30 - Gateway packet loss threshold exceeded
31 - Gateway play-out delay threshold exceeded
32 - Average jitter threshold exceeded

For further details on SNMP, see information note IN08_SNMP_management.

Configuring QOS statistics and QOS event logging via the command line interface

QOS statistics and QOS event logging may be configured via the Command Line Interface available on telnet and serial interfaces. Values are configured by typing:

- Set <path><parameter>=<value>

Where <path> and <parameter> are defined below. For details of ranges of <value> that these parameters can take, see the Vega Primer.

The following parameters configure QOS statistics:

[qos_profile.stats]
enable
monitoring_interval
monitoring_threshold
max_no_cdrs
cdr_detail
qos_warn_threshold

[qos_profile.stats.report]
frequency
method
type

- Enable - Set to 1, this enables the Vega to generate QOS statistics
- Monitoring Interval - For engineering use only
- Monitoring Threshold - For engineering use only
- Maximum number of CDRs - This specifies the size of the buffer in the Vega for holding CDRs
- Detail level - This specifies the level of detail that will be provided in the QOS statistics. See Table 1 and Table 2 for details of how this parameter affects the contents of the per-call and the per-gateway statistics
- QoS warning threshold - This defines the level at which a warning event will be issued to indicate that the QOS statistics buffer is filling up. It is a percentage value.
- Reporting frequency - This defines when the QOS statistics records will be sent out of the Vega. When the QOS statistics buffer reaches this number of records full, the Vega will send out all those records according to the current setting of Reporting Method
- Reporting Method - This parameter defines unit-wide how the Vega will report QOS statistics CDRs. Currently only Off and Terminal are available, where Terminal means that the QOS CDRs will be available for display on telnet and/or serial interface sessions. (To enable reporting on a specific session you need to issue the `qos report on` command.)
- Reporting Type - This defines whether the reports are to contain just gateway statistics, just call statistics or both.

The following parameters configure QOS per-call events:

[qos_profile.stats.events.call.average_jitter]
enable
threshold

[qos_profile.stats.events.call.jitter_buffer_overflow]
enable

[qos_profile.stats.events.call.jitter_buffer_underflow]
enable

[qos_profile.stats.events.call.packet_error_rate]
enable
threshold

[qos_profile.stats.events.call.packet_loss]
enable
threshold

[qos_profile.stats.events.call.pkt_playout_delay]
enable
threshold

These parameters enable the logging of per-call events to the Vega logging system.

- Average Jitter Enable - Enables the reporting of excessive average jitter
- Average Jitter Threshold - This defines the level of jitter defined to be excessive (ms)
- Jitter Buffer Overflow Enable - Enable the reporting of jitter buffer overflows
- Jitter Buffer Underflow Enable - Enable the reporting of jitter buffer underflows
- Packet Error Enable - Enables the reporting of excessive packet errors
- Packet Error Threshold - This defines the level of packet errors defined to be excessive (%)
- Packet Loss Enable - Enables the reporting of excessive packet loss
- Packet Loss Threshold - This defines the level of packet loss defined to be excessive (%)
- Packet Playout Delay Enable - Enables the reporting of excessive one way delay
- Packet Playout Delay Threshold - This defines the level of one way delay defined to be excessive (ms)

(For details of the ranges of values that these parameters can take, see the Vega Primer)

Events are reported on the transition from acceptable operation to unacceptable, and on the transition unacceptable to acceptable, except for buffer overflow and buffer underflow which are reported for every overflow and every underflow.

The per-call logging events that are generated are:

```
313:  "QoS: Packet jitter threshold reached for call number x"
312:  "QoS: Packet jitter below threshold for call number x" (i.e. packet
            jitter rate recovered)
316:  "QoS: Jitter buffer overflow for call number x"
317:  "QoS: Jitter buffer underflow for call number x"
315:  "QoS: Packet playout error rate threshold reached for call number x"
314:  "QoS: Packet playout error rate below threshold for call number x"
            (i.e. error rate recovered)
309:  "QoS: Packet Loss threshold reached for call number x"
308:  "QoS: Packet Loss below threshold for call number x" (i.e. packet loss
            rate recovered)
311:  "QoS: Packet playout delay threshold reached for call number x"
310:  "QoS: Packet playout delay below threshold for call number x" (i.e.
            delay problems recovered)
```

The following parameters configure QOS per-gateway events:

[qos_profile.stats.events.gateway.average_jitter]
enable
threshold

[qos_profile.stats.events.gateway.packet_loss]
enable
threshold

[qos_profile.stats.events.gateway.pkt_playout_delay]
enable
threshold

[qos_profile.stats.events.gateway.lan_link]
enable

These parameters enable the logging of per-gateway events to the Vega logging system and also to SNMP traps.

- Average Jitter Enable - Enables the reporting of excessive average jitter
- Average Jitter Threshold - This defines the level of jitter defined to be excessive (ms)
- Packet Loss Enable - Enables the reporting of excessive packet loss
- Packet Loss Threshold - This defines the level of packet loss defined to be excessive (%)
- Packet Playout Delay Enable - Enables the reporting of excessive one way delay
- Packet Playout DelayThreshold - This defines the level of one way delay defined to be excessive (%)
- Lan Link Status Enable - Enables the reporting of lan link down and lan link recovery

(For details of the ranges of values that these parameters can take, see the Vega Primer)

Vega logging events are reported on the transition from acceptable operation to unacceptable, and on the transition unacceptable to acceptable.

The per-gateway logging events that are generated are:

```
307:  "QoS: Service unavailable: jitter threshold reached"
306:  "QoS: Service available: jitter threshold restored"
303:  "QoS: Service unavailable: packet loss threshold reached"
302:  "QoS: Service available: packet loss threshold restored"
305:  "QoS: Service unavailable: playout delay threshold reached"
304:  "QoS: Service available: playout delay threshold restored"
301:  "QoS: Service unavailable due to LAN failure"
300:  "QoS: Service available, LAN link restored"
```

SNMP traps are generated on the error being detected (there are no traps generated on error rates being recovered).

The Enterprise specific SNMP traps that are generated are:
30 - Gateway packet loss threshold exceeded
31 - Gateway play-out delay threshold exceeded
32 - Average jitter threshold exceeded

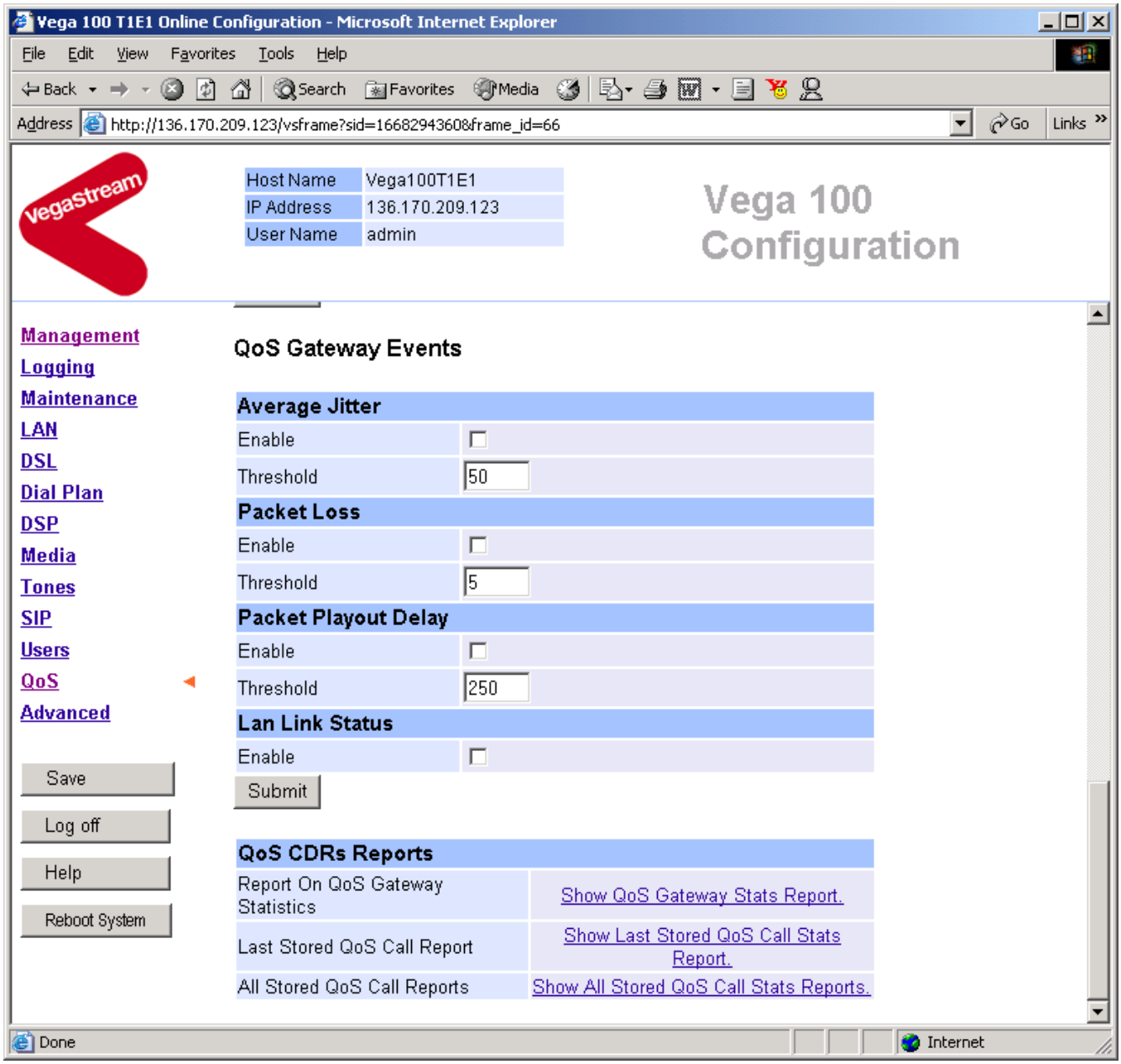
For further details on SNMP, see information note IN08_SNMP_management.

Looking at QOS statistics on demand

These can be examined either from the web browser interface or from the Command line interface.

On the Web browser

- Scroll to the bottom of the page to the **QoS CDRs Reports** section



Three options are provided:

1. Show QoS gateway Stats report
2. Show last stored QoS Call Stats report
3. Show all stored Call Stats reports

This same selection of options is also found at the bottom of the Management page of the web browser.

On a command line interface session

Three commands are available:

- `show qos cdr`

This command displays all per-call QOS CDRs from the buffer

- `show qos cdr last`

This command displays the latest per-call CDR from the buffer

- `show qos stats`

This command displays the gateway statistics

Collecting QOS statistics from the serial or telnet interfaces

Once QOS statistics have been enabled, if reporting method is set to “Terminal”, QOS CDR records can be displayed on this terminal (serial or telnet) by issuing the command:

- `qos report on`

The QOS CDR display can be stopped by typing:

- `qos report off`

Emptying the QOS statistics buffer

To empty the QOS buffer, use a Command Line Interface session and type:

- `qos clear`

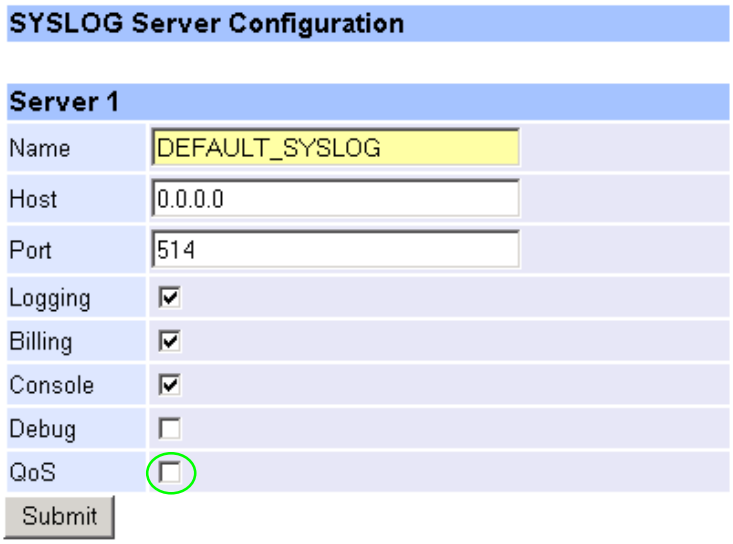
Notes

1. If the QOS buffer fills, any new record will overwrite the oldest record.
2. Gateway statistics are weighted average statistics, weighting the recent call statistics more heavily than older call statistics.
3. Gateway statistics are measured from the last power-on or re-boot of the Vega.

QoS Statistics to Syslog

From Release 7, QoS statistics may also be routed to a Syslog server. To do this, a syslog server must be configured and QoS logs requested, then the QoS statistics must be enabled and the type of QoS statistics to send may be chosen. To configure the Syslog server:

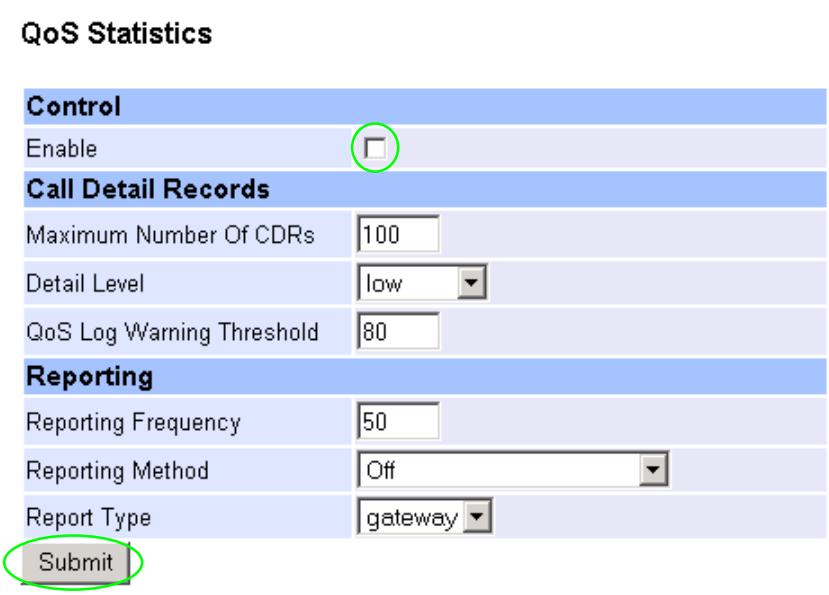
On the web browser, select Logging from the menu on the left hand side. In the SYSLOG Configuration section, select SYSLOG. Choose a syslog server and select Modify



Configure as required, and ensure that QoS is checked, select Submit

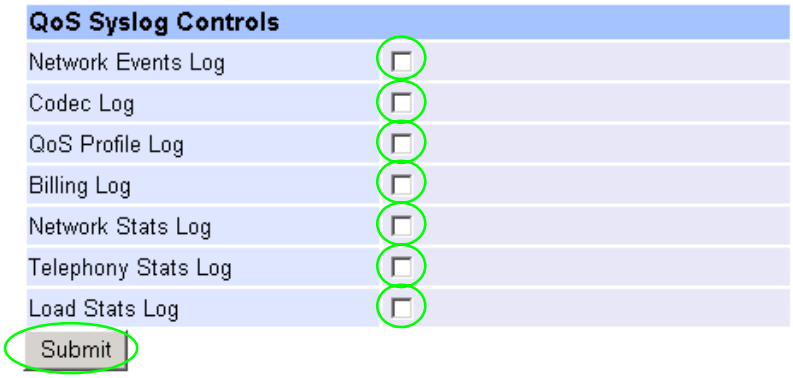
Further details about configuring Syslog can be found in Information note "IN_21 Syslog".

On the web browser, select QOS from the menu on the left hand side.



In the **Control** section, check the Enable entry, then select Submit

On the web browser, select QOS from the menu on the left hand side.



In the **Qos Syslog Controls** section, check the QoS entries required to be sent to the Syslog server, then select Submit

Examples of the output for each selection are shown in Table 3 below.

NOTE

For Vega 400 ensure that the LAN profile in the **LAN Configuration** section on the LAN page is set up correctly to allow Syslog messages to be sent to the Syslog server.

Table 1 - QOS call stats report

Lines marked in black are supplied whatever the parameter cdr_details is set to, High, Medium or Low. Those in grey and indicated MH → are available in Medium and High levels, and those marked H → are only available when the cdr_detail level is High.

Table 2 - QOS gateway Stats report

QoS gateway stats report.

```
Gateway QoS statistics
----------------------
Date: 10:32:39.000 UTC Fri Oct 10 2003

Total number of calls: 5 [Completed: 5 ]

Load guideline: 0.00 %

Availability
------------
IP service availability                                    100 %
IP service unavailability                                    0 %

QoS Details
-------------------------------------------------------

Network side
-------------

Rx
--

No. rx voice packets                                       332 [pkts]
M H →  Send for playout packet rate                     100.00 %
M H →      Dropped packet rate                              0.00 %
  H →          Rate dropped due to invalid generic header   0.00 %
  H →          Rate dropped due to invalid MAC header       0.00 %
  H →          Rate dropped due to invalid Rx SSRC          0.00 %
  H →          Rate dropped due to invalid Rx payload       0.00 %

Average interarrival time                                    0 [ms]
M H →      min                                              16 [ms]
M H →      max                                              21 [ms]

Network packet loss rate                                 0.00 %

Tx
--

No. tx voice packets                                      4366 [pkts]
M H →      Silence packets rate                          77.06 %
M H →      Dropped packet rate due to buffer overflow       0.00 %

Telephony Tx side
------------------

Voice packet playout delay                                  27 [ms]
Voice packet playout jitter                                  1 [ms]
M H →  Voice packet playout error rate                   0.00 %
  H →      Dropped packet rate due to buffer over run      0.00 %
  H →      Lost packet rate                                0.00 %
  H →      No. packets replayed due to network packet loss    0 [pkts]
  H →      No. comfort noise packets played             1575 [pkts]
```

Calls: is the number of call setups
Completed: is the number of call answered

IP service is deemed unavailable if:
- *LAN link is down*
- *Any of the user defined thresholds for packet loss, jitter or play-out delay are exceeded*

Details to do with the LAN side of the communications

Proportion of rx voice packets that do not have errors in them

Average Jitter

% of tx voice packets that were silence (these are not transmitted if silence suppression (VADU) is enabled)

Delay through playout buffer

Jitter seen by the telephony side; this is the incoming (network) jitter reduced by the playout buffer

Lines marked in black are supplied whatever the parameter cdr_details is set to, High, Medium or Low. Those in grey and indicated MH → are available in Medium and High levels, and those marked H → are only available when the cdr_detail level is High.

Table 3 - QOS Syslog statistics

Example output for each of the QoS Syslog Control Options

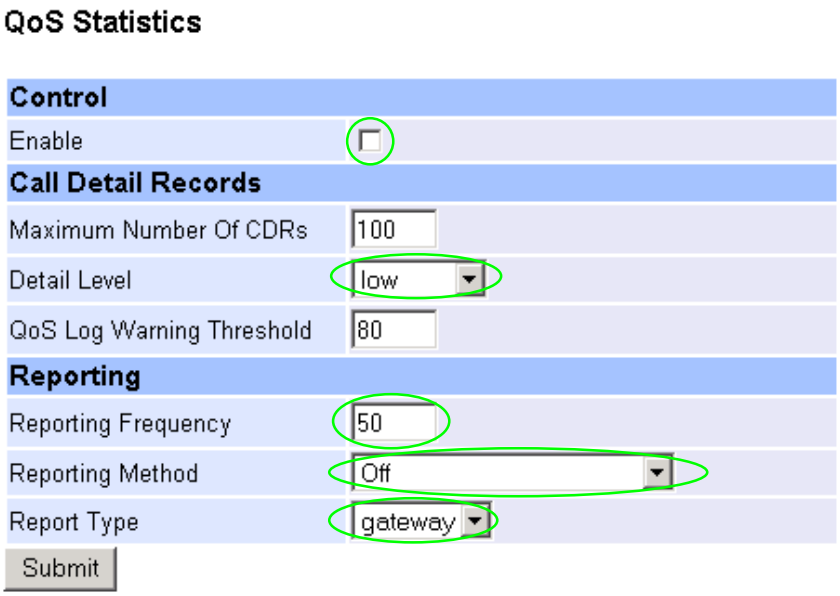
Network Events Log	content=QoS: packet Loss threshold reached for call number 2963 or content=QoS: packet playout delay threshold reached for call number 2963 or content=QoS: packet jitter threshold reached for call number 2963 or content=QoS: packet playout error rate threshold reached for call number 2963 or content=QoS: jitter buffer overflow for call number 2963 or content=QoS: jitter buffer underflow for call number 2963 facility=14 pk1=862 severity=6 src_ip=172.19.1.68 srv_time=0 tag=LOGGER
Codec Log	content=QOS : Network Side Codec Used G729 facility=14 pk1=862 severity=6 src_ip=172.19.1.68 srv_time=0 tag=LOGGER
QoS Profile Log	content=QOS : Network Side Lan Interface 1, QoS profile used None facility=14 pk1=870 severity=6 src_ip=172.19.1.68 srv_time=0 tag=LOGGER
Billing Log	content=QOS : Call Start time 19/04/2005 14:45:41 , End time 14:49:18 , Duration 0 /00:03:37, Route from: TEL:201 to: TEL:9204 dest: TEL:204 facility=14 pk1=864 severity=6 src_ip=172.19.1.68 srv_time=0 tag=LOGGER
Network Stats Log	content=QOS : Network side Tx: No. tx voice packets 6959, Silence packets rate 0.00 %, Dropped pkt rate due to buf overflow 0.00 % facility=14 pk1=869 severity=6 src_ip=172.19.1.68 srv_time=0 tag=LOGGER
Network Stats Log	content=QOS : Network side Rx: Network packet loss rate 0.00 % facility=14 pk1=868 severity=6 src_ip=172.19.1.68 srv_time=0 tag=LOGGER

Network Stats Log	content=QOS : Network side Rx: Average interarrival time 8 ms, min 15 ms, max 33 ms facility=14 pk1=867 severity=6 src_ip=172.19.1.68 srv_time=0 tag=LOGGER
Network Stats Log	content=QOS : Network side Rx: No. rx voice packets 2165, Send for playout packet rate 100.00 %, Dropped packet rate 0.00 % facility=14 pk1=866 severity=6 src_ip=172.19.1.68 srv_time=0 tag=LOGGER
Telephony Stats Log	content=QOS : Telephony Tx side : Voice packet playout delay 43 ms, Voice packet playout jitter 4 ms, Voice packet playout error rate 0.00 % facility=14 pk1=870 severity=6 src_ip=172.19.1.68 srv_time=0 tag=LOGGER
Load Stats Log	content=QOS : Load guideline 2.00 % facility=14 pk1=865 severity=6 src_ip=172.19.1.68 srv_time=0 tag=LOGGER

Annex 1 - Example QOS statistics and Event Log configuration using the web browser

Example 1:

In order to configure the Vega gateway to supply high detail, per call, QoS statistics every 10 calls, on the web browser enter the QoS page, and scroll to the **QoS Statistics** section:



Configure:

- `Control > Enable = 1`
- `Call Detail Records > Detail Level = high`
- `Reporting > Eeporting Frequency = 10`
- `Reporting > Reporting method = Terminal`
- `Reporting > Report Type = calls`

Select Submit, then Save, then Apply.

On a command line interface (must be serial or telnet; it must not be the web browser), type:

- `qos report on`

This will display QOS records on the Command Line Interface every 10 calls.

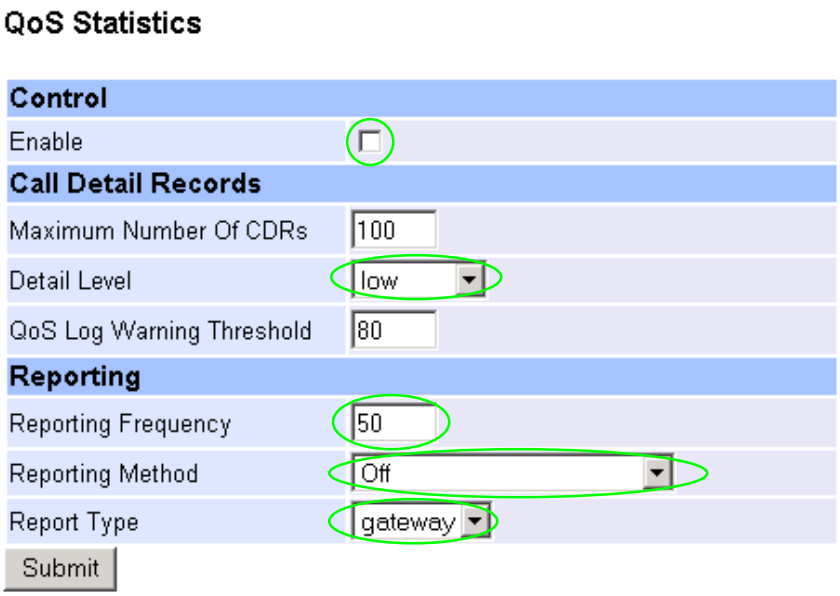
To look at QoS call statistics on demand, the following commands can be used:

- show qos cdr
- show qos cdr last

or from the web browser select:

Example 2:

In order to configure the Vega gateway to supply high detail, per-gateway, QoS statistics every 10 calls, on the web browser enter the QoS page, and scroll to the **QoS Statistics** section:



Configure:

- `Control > Enable = 1`
- `Call Detail Records > Detail Level = high`
- `Reporting > Eeporting Frequency = 10`
- `Reporting > Reporting method = Terminal`
- `Reporting > Report Type = gateway`

Select Submit, then Save, then Apply.

On a command line interface (must be serial or telnet; it must not be the web browser), type:

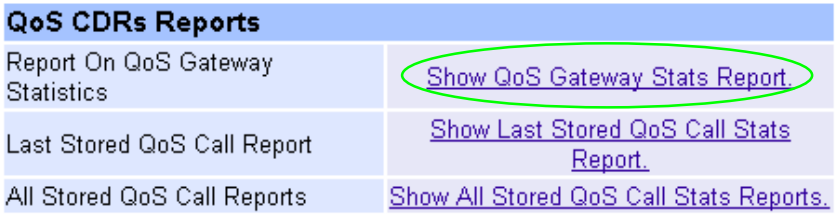
- `qos report on`

This will display QOS records on the Command Line Interface every 10 calls.

To look at the per-gateway QoS statistics on demand, type:

- show qos stats

or from the web browser select:

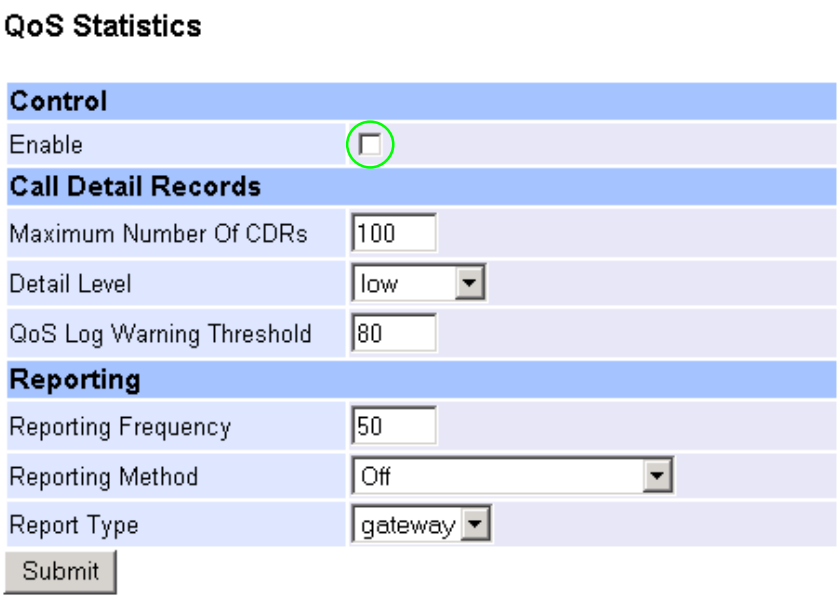


Example 3:

In order to configure the Vega gateway to report on all the QoS call events:

- Excess average jitter,
- Buffer overflow and underflow
- Excessive packet error rate
- Excessive packet loss and
- Excessive packet playout delay

on the web browser enter the QoS page, and scroll to the **QoS Statistics** section:

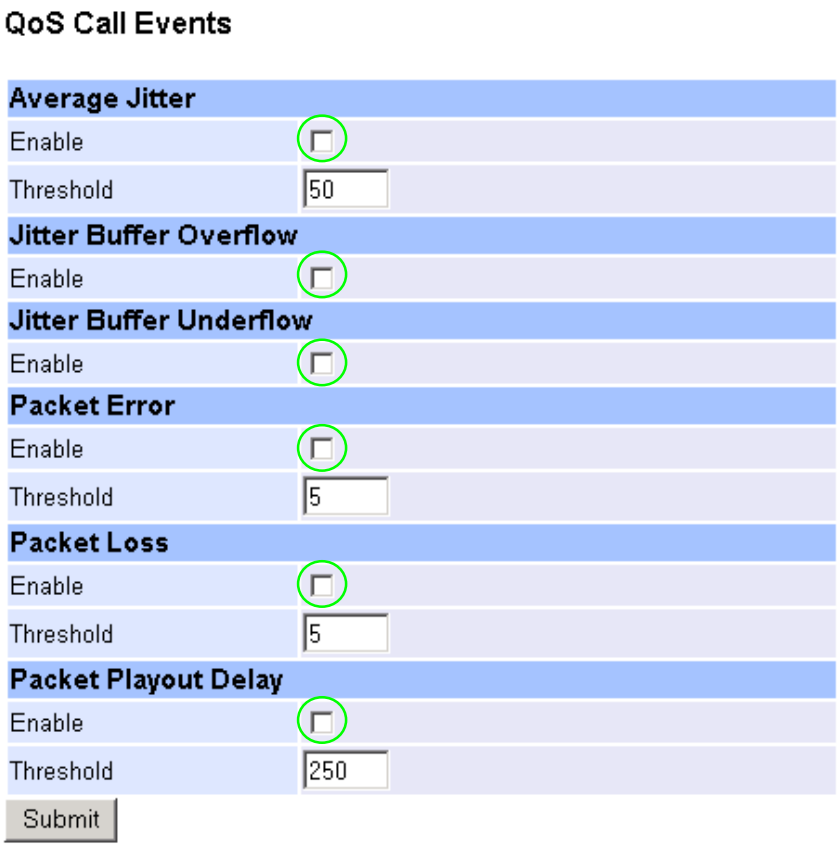


Configure:

- `Control > Enable = 1`

Select 

Then scroll to the **QoS Call Events** section:



Configure:

- `Average Jitter > Enable = 1`
- `Jitter Buffer Overflow > Enable = 1`
- `Jitter Buffer Underflow > Enable = 1`
- `Packet Error > Enable = 1`
- `Packet Loss > Enable = 1`
- `Packet Playout Delay > Enable = 1`

Select Submit, then Save, then Apply.

On a command line interface (must be serial or telnet; it must not be the web browser) call event logs will be displayed if event conditions are met.

Example 4:

In order to configure the Vega gateway to report gateway event occurrences:

- Excessive average jitter
- Excessive packet loss
- Excessive packet playout delay
- Lan link failure

on the web browser enter the QoS page, and scroll to the **QoS Statistics** section:

QoS Statistics

Control	
Enable	☐
Call Detail Records	
Maximum Number Of CDRs	100
Detail Level	low
QoS Log Warning Threshold	80
Reporting	
Reporting Frequency	50
Reporting Method	Off
Report Type	gateway

Submit

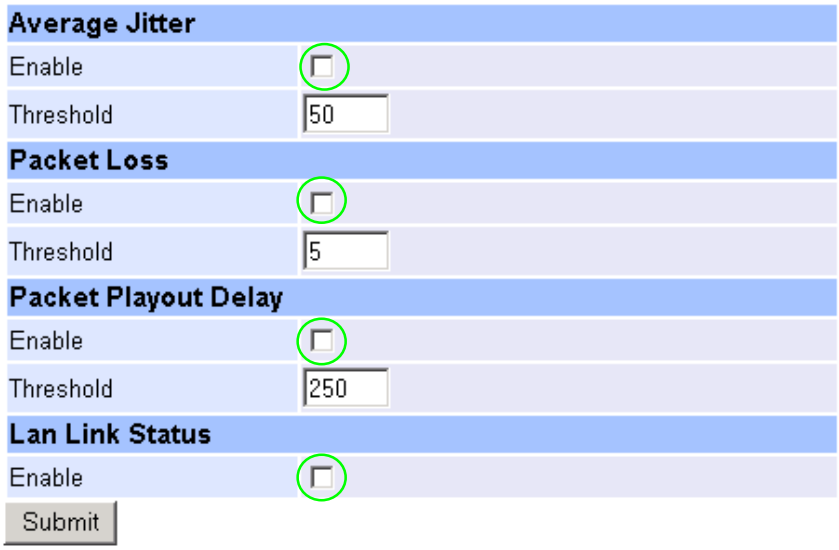
Configure:

- `Control > Enable = 1`

Select Submit

Then scroll to the **QoS Gateway Events** section:

QoS Gateway Events



Configure:

- `Average Jitter > Enable = 1`
- `Packet Loss > Enable = 1`
- `Packet Playout Delay > Enable = 1`
- `Lan Link Status > Enable = 1`

Select 

, then 

, then 

.

On a command line interface (must be serial or telnet; it must not be the web browser) gateway event logs will be displayed if event conditions are met.

Annex 2 - Example QOS statistics and Event log configuration using the Command Line Interface

Example 1:

In order to configure the Vega gateway to supply high detail, per call, QoS statistics every 10 calls, perform the following configuration on a Vega Command line interface (serial or telnet):

- `set qos_profile.stats.cdr_detail=high`
- `set qos_profile.stats.enable=1`
- `set qos_profile.stats.report.frequency=10`
- `set qos_profile.stats.report.method=terminal`
- `set qos_profile.stats.report.type=calls`
- `qos report on`
- `save`
- `apply`

This will display QOS records every 10 calls.

To look at QoS call statistics on demand, the following commands can be used:

- show qos cdr
- show qos cdr last

Example 2:

In order to configure the Vega gateway to supply high detail, per-gateway, QoS statistics every 10 calls, perform the following configuration on a Vega Command line interface (serial or telnet):

- `set qos_profile.stats.cdr_detail=high`
- `set qos_profile.stats.enable=1`
- `set qos_profile.stats.report.frequency=10`
- `set qos_profile.stats.report.method=terminal`
- `set qos_profile.stats.report.type=gateway`
- `qos report on`
- `save`
- `apply`

This will display QOS records every 10 calls.

To look at the per-gateway QoS statistics on demand, type:

- show qos stats

Example 3:

In order to configure the Vega gateway to report on the QoS call events:

- Excess average jitter,
- Buffer overflow and underflow
- Excessive packet error rate
- Excessive packet loss and
- Excessive packet playout delay

perform the following configuration on a Vega Command line interface (serial or telnet):

```
set qos_profile.stats.enable=1
set qos_profile.stats.events.call.average_jitter.enable=1
set qos_profile.stats.events.call.jitter_buf_overflow.enable=1
set qos_profile.stats.events.call.jitter_buf_underflow.enable=1
set qos_profile.stats.events.call.packet_error_rate.enable=1
set qos_profile.stats.events.call.packet_loss.enable=1
set qos_profile.stats.events.call.pkt_playout_delay.enable=1
save
apply
```

This will display QOS call events if ever they occur.

Example 4:

In order to configure the Vega gateway to report gateway event occurrences:

- Excessive average jitter
- Excessive packet loss
- Excessive packet playout delay
- Lan link failure

perform the following configuration on a Vega Command line interface (not web browser):

```
set qos_profile.stats.enable=1
set qos_profile.stats.events.gateway.average_jitter.enable=1
set qos_profile.stats.events.gateway.lan_link.enable=1
set qos_profile.stats.events.gateway.packet_loss.enable=1
set qos_profile.stats.events.gateway.pkt_playout_delay.enable=1
save
apply
```

This will display QOS gateway events if ever they occur.

Contact Details
Email: support@vegastream.com
Web: www.vegastream.com
www.vegaassist.com

EMEA Office
VegaStream Limited
The Western Centre
Western Road
Bracknell
Berks RG12 1RW
UK

+44 (0) 1344 784900

USA Office
VegaStream Inc.
10445 Pacific Center Court
San Diego
CA 92121
USA

+1 858 824 6388