



APPENDIX A

VQE, System, and Network Parameters

This appendix provides descriptions of the VQE Configuration Database (VCDB) parameters.

The essential VCDB parameters—the subset typically required for a VQE-S or VQE Tools system—can be configured by using the VQE Configuration Tool (CT) or by manually editing the `vcdb.conf` file. For information on using the VQE Configuration Tool, see [Chapter 6, “Configuring VQE Server and VQE Tools.”](#)

All VCDB parameters can be configured by manually editing the `vcdb.conf` file. For information on manually editing the `vcdb.conf` file, see the [“Manually Editing the VCDB File”](#) section on page 6-12

The VQE-S, system, and network parameters are described in the following tables:

- [Table A-1](#)—VQE-S global parameters
- [Table A-2](#)—VQE-S Unicast Retransmission parameters
- [Table A-3](#)—VQE-S Rapid Channel Change parameters
- [Table A-4](#)—VQE-S Unicast Retransmission and Rapid Channel Change parameters (parameters that affect the behavior of both Unicast Retransmission and Rapid Channel Change)
- [Table A-5](#)—VQE-S RTCP Exporter parameters
- [Table A-6](#)—System parameters
- [Table A-7](#)—Network parameters

For all parameters intended to be user-configurable, the preceding tables provide the parameter name, default value (if any), description, and allowed range of values. The parameter default value (if any) is in quotation marks following the parameter name. For example:

```
vqe.vqes.log_priority="4"
```

For `vqe.vqes.log_priority`, 4 is the default value. Empty quotation marks indicate that there is no default value.

For more information on the VQE, system, and network parameters, see the `/etc/vqes/vcdb.conf.sample` file. *The `vcdb.conf.sample` file provides the above information and additionally the parameter type, service interruption information, whether multiple definitions are allowed, and the target `/etc` files where the parameter value is applied.*



Note

In the following tables, if a parameter is configurable with Configuration Tool, the Description lists the CT menu and menu choice for the parameter in the brackets as follows: [CT: *menu* > *menu_choice(s)*].

Table A-1 VQE-S Global Parameters

Parameter and Default Value (if any)	Description
vqe.vqes.log_priority="4"	Logging level for all VQE-S processes. Allowed range is 0 to 6. Logging levels are as follows: 0—Emergency (System is unusable.) 1—Alert (Action must be taken immediately.) 2—Critical (critical condition) 3—Error (error condition) 4—Warning (warning condition) 5—Notice (normal but significant condition) 6—Info (informational condition) Logging levels go from least verbose to most verbose. The Emergency level generates the smallest number of messages, and the Informational level generates the greatest number of messages. By default, VQE-S logging messages are written to the file /var/log/vqe/vqe.log. When you select a logging level, log messages are generated for that level and the levels below that level. For example, when the level is set to Error, messages are generated for Emergency, Alert, Critical, and Error. For information on configuring VQE-S debugging messages, see the “Configuring VQE-S Debugging” section on page 4-19. [CT: VQE-S Parameters > Log Priority]
vqe.vqes.vqe_interfaces="eth1,eth2,eth3,eth4,eth5,eth6"	Names of the interfaces to be used for incoming multicast streams, outgoing Unicast Retransmission and RCC traffic, and other non-management VQE-S traffic. Multiple interfaces should be separated by a comma without any space between names. Allowed values are eth1 to eth6. Interfaces eth5 and eth6 are available only on CDE110 servers that include the Intel PRO/1000 PT Dual Port Server Adapter. [CT: VQE-S Parameters > VQE-S Traffic Interface(s)]
vqe.vqes.rtcp_dscp="24"	Differentiated Services Code Point (DSCP) value for transmitted RTCP packets. The default value (24) is for the CS3 selector, which is used for broadcast video. Allowed range is 0 to 63.
vqe.vqes.rtp_retrans_dscp="0"	Differentiated Services Code Point (DSCP) value for transmitted RTP packets sent for Unicast Retransmission or RCC. Allowed range is 0 to 63.
vqe.vqes.rtp_inactivity_timeout="300"	Amount of time (in milliseconds) for the inactivity timeout on received RTP streams. If no packets are received on an input channel for this amount of time, the channel will be declared inactive until the next input packet is received for that stream. Allowed range is 10 to 900.
vqe.vqes.stun_enable="true"	Specifies whether the STUN Server is enabled. The value true enables the STUN Server, and false disables the STUN Server. Unless you are sure that no set-top boxes being serviced by VQE-S are behind NAT devices, we recommend that the STUN Server is enabled.
vqe.iptables.trusted_vcpt=""	Starting with Cisco VQE Release 3.2, this parameter is deprecated. Use the system.iptables.trusted_provisioner parameter.

Table A-2 VQE-S Unicast Retransmission (Error Repair) Parameters

Parameter and Default Value (if any)	Description
vqe.vqes.client_er_policing="true"	Specifies whether per-VQE Client policing is enabled for Unicast Retransmission (error repair) packets. The value true enables per-VQE Client policing, and false disables per-VQE Client policing. The VQE Client policing mechanism is intended to limit the fraction of VQE-S error-repair resources that can be consumed by a single VQE Client on the set-top box. When per-VQE Client policing is enabled, the policer is tuned by two parameters: vqe.vqes.client_er_tb_rate_ratio and vqe.vqes.client_er_tb_depth.
vqe.vqes.client_er_tb_rate_ratio="5"	Per-client policing token rate (percent of stream rate) for each VQE Client for Unicast Retransmission. Allowed range is 1 to 100. Per-client policing uses token bucket policers. A token is the equivalent of a packet. The token rate for the policers is defined as a percent of a stream's packet rate. For example, assume an RTP stream with a packet rate of 350 packets per second, the default rate of five percent will set the per-client policer token rate to 18 packets per second. Increasing this parameter will increase the maximum load that a single set-top box can put on the VQE-S. By default, each VQE Client is permitted to request up to five percent of the overall stream bandwidth for whatever channel it is watching. In a situation with only a few VQE Clients, some or all of which have very high error rates, it may be desirable to increase this parameter in order to allow each client to get more errors repaired. In a situation with a large number of VQE Clients, it may be necessary to decrease this parameter in order to prevent a small proportion of misbehaving or very error-prone client connections from consuming a disproportionate fraction of the VQE Server error-repair resources. The VQE-S AMT channel statistics for each channel provide data that you can use to tune the VQE Client policing mechanism. In the Channel Statistics window, click Advanced. The Advanced Channel Debug Stats include the following parameters that indicate how many error-repair requests were refused because the VQE Server is overloaded and how many were refused because of per-client policing. • Dropped repair pkts by Packet Policers—If the server is overloaded with error repairs, this statistic may be an indication that the per-client policing should be lowered. • Aggregated dropped pkts by client policers—If many repairs are being refused because of per-client policing, but the server is not overloaded, this statistic may be an indication that the per-client policing can be raised.

Table A-2 VQE-S Unicast Retransmission (Error Repair) Parameters (continued)

Parameter and Default Value (if any)	Description
vqe.vqes.client_er_tb_depth="10000"	Length of time (in milliseconds) needed to fill the per-VQE Client policer bucket for Unicast Retransmission (error repair). Allowed range is 1 to 60,000. The bucket “depth” of the per-client packet policers is expressed as a duration over which the token limit would be reached if the bucket was initially empty and filled at the token rate with no tokens drained. Therefore, the maximum number of tokens (“depth”) of the policer bucket is calculated as follows: maximum number of tokens = $(\text{client_er_tb_rate_ratio} * \text{stream packet rate} * \text{client_er_tb_depth})$ The bucket size should be set large enough to cover the maximum burst loss that may ordinarily occur on a client set-top box. In most cases, the default value for vqe.vqes.client_er_tb_depth should be adequate.
vqe.vqes.er_cache_time="3000"	Maximum time interval (in milliseconds) to cache the original source stream packets for Unicast Retransmission (error repair). Allowed range is 100 to 5000.

Table A-3 VQE-S Rapid Channel Change Parameters

Parameter and Default Value (if any)	Description
vqe.vqes.rcc_burst_delay_to_send="10"	Amount of time (in milliseconds) to delay before the Data Plane schedules an RCC repair burst. This parameter may be set to a larger value to compensate for lags in the IGMP “fast leave” mechanism in the access node (for example, a DSLAM). Allowed range is 0 to 100.
vqe.vqes.igmp_join_variability = "100"	Amount of variability (in milliseconds) between the fastest and slowest IGMP joins for RCC. Allowed range is 0 to 500. Note This parameter can have a large impact on the amount of bandwidth consumed by RCC. It needs to be carefully tuned for a deployment.
vqe.vqes.rtp_hold_time="20"	Amount of time (in milliseconds) to delay before making a packet in the Data Plane cache available for RCC in order to allow for reordering of received packets. Allowed range is 0 to 500. This parameter is needed to allow for reordering of received packets in case they were received out of order from the source (headend). The parameter should be set as small as possible but large enough to cover the maximum arrival time jitter of received packets. Setting the parameter too small may cause some RCC operations to fail or be degraded if packets are received out of order. Setting the parameter too large causes RCC operations to use more network bandwidth, on average, than is necessary.
vqe.vqes.rap_max_interval="2000"	Maximum time interval (in milliseconds) between MPEG random access points (RAPs) that VQE-S will support for RCC operations. Allowed range is 500 to 5000.

Table A-3 VQE-S Rapid Channel Change Parameters (continued)

Parameter and Default Value (if any)	Description
vqe.vqes.rcc_mode="conservative"	RCC mode. Can be specified as either of these values: - aggressive—Conserves bandwidth if all DSLAMs that may receive an RCC burst from VQE-S are configured to give priority to the primary multicast video traffic over the unicast RCC burst traffic. - conservative—Use when the DSLAM does not have the required QoS capability for aggressive mode. Use of aggressive mode in a situation where one or more access nodes (DSLAMs) in the network have not been configured to give preference to the primary multicast traffic over the unicast stream will cause degraded video quality during RCC operations for customers attached to DSLAMs that are not properly configured for aggressive mode RCC.  Caution Use of aggressive mode may cause brief, transient congestion of the access links during the RCC operation and therefore should not be used in situations where such congestion may have undesirable side effects, such as loss of data or voice traffic on the access link.
vqe.vqes.fastfill_enable="true"	Specifies whether Fast Decoder Buffer Fill (FDBF) is enabled for RCC to reduce decoder buffering time. The value true enables FDBF, and false disables FDBF.
vqe.vqes.max_idr_penalty="0"	For MPEG-4 only, the maximum penalty (in milliseconds) that will be permitted in order to begin an RCC burst with an instantaneous decoding refresh (IDR) frame rather than I-frame. Allowed range is 0 to 10000. In cases where there are several MPEG random access points (RAPs) from which an RCC could be performed, the RCC is normally started from the most recent feasible RAP. If vqe.vqes.max_idr_penalty is specified as greater than zero, then the RCC will be started with an IDR frame instead of an I-frame provided that the IDR is within vqe.vqes.max-idr-penalty milliseconds of the most recent feasible I-frame.

**Note**

Table A-4 lists parameters that affect the behavior of both Unicast Retransmission and Rapid Channel Change.

Table A-4 VQE-S Unicast Retransmission and Rapid Channel Change Parameters

Parameter and Default Value (if any)	Description
vqe.vqes.unicast_reservation="20"	Percent of network bandwidth reserved for inbound Unicast Retransmission and RCC requests. This parameter specifies the amount of inbound bandwidth that <i>will not be allocated</i> to receiving multicast streams. Allowed range is 0 to 100. Note Recommended value range is 20 to 40. The percent value should not be anywhere close to 0 or 100.
vqe.vqes.max_client_bw = "0"	Maximum access link bandwidth (in bits per second) available for each VQE Client for Unicast Retransmission and RCC. Allowed range is 0 to 30,000,000. - If a non-zero value is specified, the vqe.vqes.excess_bw_fraction is ignored. Instead each time the set-top box tunes to a new channel, the implicit excess_bw_fraction for the client on the channel is calculated using vqe.vqes.max_client_bw. - If zero is specified or the parameter is not explicitly configured, VQE-S uses the configured vqe.vqes.excess_bw_fraction parameter in the Unicast Retransmission or RCC computation.
vqe.vqes.excess_bw_fraction="20"	Specifies the rate e ($e = \text{excess_bw_fraction} / 100$) that determines the rate at which packets are sent during Unicast Retransmission and Rapid Channel Change. Allowed range is 3 to 500. - For Unicast Retransmission, the VQE-S sends packets at rate (e). - During RCC, the VQE-S initially sends packets at rate ($1+e$). [CT: VQE-S Parameters > Excess Bandwidth Fraction]

Table A-4 VQE-S Unicast Retransmission and Rapid Channel Change Parameters (continued)

Parameter and Default Value (if any)	Description
vqe.vqes.excess_bw_fraction_high_def=""	For high definition channels, specifies the rate e ($e = \text{excess_bw_fraction_high_def} / 100$) that determines the rate at which packets are sent during Unicast Retransmission and Rapid Channel Change. Allowed range is 3 to 500. - For Unicast Retransmission, the VQE-S sends packets at rate (e). - During RCC, the VQE-S initially sends packets at rate ($1+e$). VQE-S uses the value configured in the vqe.vqes.high_def_min_bw parameter to determine what constitutes a high-definition channel. If either vqe.vqes.excess_bw_fraction_high_def or vqe.vqes.high_def_min_bw is not explicitly configured, VQE-S uses vqe.vqes.excess_bw_fraction for all channels.
vqe.vqes.high_def_min_bw=""	Minimum bit rate (in bits per second) for a channel to be considered a high definition channel. Allowed range is 0 to 40,000,000. For high definition channels, the vqe.vqes.high_def_min_bw value determines whether the vqe.vqes.excess_bw_fraction_high_def value is used for the bandwidth that will be available on the access link for Unicast Retransmission and Rapid Channel Change. For more information, see vqe.vqes.excess_bw_fraction_high_def. If either vqe.vqes.excess_bw_fraction_high_def or vqe.vqes.high_def_min_bw is not explicitly configured, VQE-S uses vqe.vqes.excess_bw_fraction for all channels.

Table A-5 VQE-S RTCP Exporter Parameters

Parameter and Default Value (if any)	Description
vqe.vqes.exporter_enable = "false"	Specifies whether RTCP exports are enabled. The value true enables RTCP exports, and false disables RTCP exports. If vqe.vqes.exporter-enable equals true, both vqe.vqes.vqm_host and vqe.vqes.vqm_port must be provided. For information on configuring VQE-S RTCP Exporter, see the “Configuring VQE-S RTCP Exporter” section on page 2-30.
vqe.vqes.vqm_host = ""	Specifies the IP address or fully qualified Internet domain name of the host on which the video-quality monitoring (VQM) application resides. For information on configuring RTCP Exporter, see the “Configuring VQE-S RTCP Exporter” section on page 2-30.
vqe.vqes.vqm_port= ""	Specifies the TCP port number on which the VQM application listens for video-quality data from RTCP Exporter. For information on configuring RTCP Exporter, see the “Configuring VQE-S RTCP Exporter” section on page 2-30.

Table A-6 **System Parameters**

Parameter and Default Value (if any)	Description
system.global.hostname="localhost"	A fully qualified domain name (FQDN) or hostname of the system. Hostname is used in multiple Linux configuration files. Allowed range is 3 to 200 characters. [CT: System Parameters > Hostname]
system.dns.server="" system.dns.search_domain=""	VQE-S host only—IP address of a DNS server and an optional search domain. Allowed range for the search domain is 3 to 200 characters. [CT: System Parameters > DNS Server(s) and DNS Search Domain]
system.ntp.server=""	IP address of a Network Time Protocol (NTP) server. [CT: System Parameters > NTP Server(s)]
system.snmp.ro_community_string="" system.snmp.location="" system.snmp.contact="" system.snmp.trap_listener=""	- Read-only community string—Password for read-only access to the VQE-S or VQE Tools server. Allowed range is 3 to 200 characters. - Location information—Physical location of the VQE-S or VQE Tools server. Allowed range is 3 to 200 characters. - Contact information—User name of a contact person who has management information for the CDE110 server. Allowed range is 3 to 200 characters. - Trap listener —IP address or fully qualified hostname of a management host that will receive the SNMP messages. [CT: System Parameters > SNMP RO Community String and SNMP System Location, SNMP System Contact, and SNMP Trap Listener(s)]

Table A-6 **System Parameters (continued)**

Parameter and Default Value (if any)	Description
system.clock.timezone="America/New York"	The time zone that will be used for this CDE110 server. [CT: System Parameters > Timezone]
system.iptables.trusted_provisioner=""	Depending on the hardware platform, specifies the IP addresses of the following trusted provisioners: - On a VQE-S host, specifies IP addresses of one or more trusted channel-provisioning servers (such as VCPT). - If VCPT is the channel-provisioning server, the IP addresses of all Ethernet interfaces (that have been assigned IP addresses) on the VCPT host must be configured as trusted HTTPS clients on the VQE-S host. - On a VQE Tools host where a VCDS receives channel information from VCPT, specifies the IP addresses of <i>all Ethernet interfaces</i> (that have been assigned IP addresses) on the VCPT host sending the channel information. This requirement applies even when the VCDS is in the same VQE Tools server as the VCPT. - On a VQE Tools host, specifies IP addresses of one or more trusted VQE-C system configuration provisioning servers. This type of provisioning server is not currently used in most deployments. Multiple system.iptables.trusted_provisioner parameters are used when there is more than one Ethernet port IP address that must be specified. This parameter is used for enhanced communications security beyond HTTPS. The VQE-S server or VQE Tools server is configured so that only trusted HTTPS clients (as specified in system.iptables.trusted_provisioner) can send information to, respectively, the VQE-S server or VQE Tools server. [CT: System Parameters > Trusted Provisioning Client(s)]

Table A-7 Network Parameters

Parameter and Default Value (if any)	Description
network.eth1.addr="" network.eth2.addr="" network.eth3.addr="" network.eth4.addr="" network.eth5.addr="" network.eth6.addr=""	For one or more of the Ethernet ports on the Cisco CDE110, an IP address and prefix length (for example, 1.2.3.4/24). - On a VQE-S host, four Ethernet interfaces are typically configured and used for VQE-S traffic. - On a VQE Tools host, at least one Ethernet interface is typically configured and used for VCPT and VQE Client Channel Configuration Delivery Server (VCDS) traffic. Note If one Ethernet interface is used for a management network, that interface <i>should be included</i> in the set for which you provide IP addresses and prefix-lengths. The VCDB parameters for eth5 and eth6 are used only on CDE110 servers that include the Intel PRO/1000 PT Dual Port Server Adapter. [CT: Network Parameters > Eth1 Interface, Eth2 Interface, Eth3 Interface, Eth4 Interface, Eth5 Interface, and Eth6 Interface]
network.route.mgmt_route=""	If your deployment will make use of a management network, you specify a static route for the management network: - Subnet IP address and prefix-length for the management network. The following example shows the allowed format for the subnet IP address and prefix-length: 10.1.0.0/16 - Gateway (next hop) IP address of the interface on the router that is directly attached to the CDE110 Ethernet interface that will be used for the management network. For example: network.route.mgmt_route="10.1.0.0/16 via 5.6.7.8" In this example, 10.1.0.0/16 is the subnet IP address and prefix-length for the management network. 5.6.7.8 is the IP address of the interface on the router directly attached to the CDE110 Ethernet interface that will be used for the management network. Note On the VQE Tools server, proper route configuration is needed for external access to the VQE Tools server. You can use the static management route created by this parameter to configure this access. [CT: Network Parameters > Management Route(s)]

Table A-7 Network Parameters (continued)

Parameter and Default Value (if any)	Description
network.route.type="static"	VQE-S host only—Specifies whether static routes or OSPF routing are enabled for VQE-S traffic. Allowed values are static or ospf. If static routes are enabled, the network.route.default_gateway parameter is configured for one or more default gateway (next hop) router interfaces. If OSPF routing is enabled, the following parameters can be configured: - network.ospf.router_id - network.ospf.area - network.ospf.area_type - network.ospf.md5_enable - network.ospf.md5_key - network.ospf.md5_keyid - network.ospf.hello_interval - network.ospf.dead_interval For descriptions of the preceding parameters, see Table A-7 (this table). [CT: Network Parameters > Routing Type]
network.route.default_gateway=""	VQE-S host only—If static routes are enabled, specifies the IP address for the interface on the router that is directly attached to the VQE-S host. Specify as many gateway (next hop) router interfaces as are reachable through all of the configured CDE110 Ethernet interfaces. Note If one Ethernet interface is used for a management network, that interface <i>should not be included</i> in the set for which gateway router interfaces are specified. The same number (usually one) of next hop gateways should be specified for each CDE110 interface that is to be used for VQE-S traffic. This will ensure that output is equally balanced across all interfaces and none will be overloaded. VQE-S uses Equal Cost Multipath (ECMP) to load-balance its output traffic across all the gateway router interfaces that are specified. If a default route (the gateway IP address) is configured for each Ethernet interface that is available to VQE-S for Unicast Retransmissions, RCC, and other traffic, ECMP load-balances output traffic across all of the listed gateway interfaces. If you later configure another Ethernet interface for VQE-S traffic, be sure to also configure an associated default gateway for that interface. [CT: Network Parameters > Default Gateway(s)]
network.ospf.router_id=""	VQE-S host only—If OSPF routing is enabled, specifies the IP address used as the router ID to uniquely identify the VQE-S server in the OSPF network. The router ID must not be the same as the IP address of one of the CDE110 Ethernet interfaces because the router ID will be added as an internal address to the loopback interface. [CT: Network Parameters > OSPF Parameters > Router ID]

Table A-7 **Network Parameters (continued)**

Parameter and Default Value (if any)	Description
network.ospf.area_type="normal"	VQE-S host only—If OSPF routing is enabled, specifies the type of OSPF area that the VQE-S traffic interfaces and feedback target host addresses will reside in. Allowed values are normal or nssa (Not So Stubby Area). [CT: Network Parameters > OSPF Parameters > Area Type]
network.ospf.area="0"	VQE-S host only—If OSPF routing is enabled, specifies the OSPF area that the VQE-S Ethernet interfaces and feedback target addresses will reside in. Allowed range of integer values is 0 to 4,294,967,295. [CT: Network Parameters > OSPF Parameters > Area ID]
network.ospf.md5_enable="false"	VQE-S host only—If OSPF routing is enabled, specifies whether Message Digest 5 (MD5) authentication is enabled on the Ethernet interfaces used for VQE-S traffic. When MD5 authentication is enabled, specifying an MD5 key and MD5 key ID are required. Allowed values are true or false. (Ethernet interfaces used for VQE-S traffic are configured with the vqe.vqes.vqe_interfaces parameter.) [CT: Network Parameters > OSPF Parameters > Enable MD5]
network.ospf.md5_key=""	VQE-S host only—If OSPF routing and MD5 authentication are enabled, specifies the key (a string) that will be configured for all Ethernet interfaces used for VQE-S traffic. When MD5 authentication is enabled, specifying an MD5 key and MD5 key ID are required. [CT: Network Parameters > OSPF Parameters > MD5 Key]
network.ospf.md5_keyid="1"	VQE-S host only—If OSPF and MD5 authentication are enabled, specifies an MD5 key ID (an integer) that will be used for all Ethernet interfaces used for VQE-S traffic. When MD5 authentication is enabled, an MD5 key and MD5 key ID are required. Allowed range of integer values is 1 to 255. [CT: Network Parameters > OSPF Parameters > MD5 Key ID]
network.ospf.hello_interval="10"	VQE-S host only—If OSPF routing is enabled, specifies the interval at which OSPF Hello packets are sent (in seconds). This value must be the same for all interfaces running OSPF in the network. The hello interval will be set for all VQE-S interfaces running OSPF. Allowed range is 1 to 65,535. [CT: Network Parameters > OSPF Parameters > Hello Interval]
network.ospf.dead_interval="40"	VQE-S host only—If OSPF routing is enabled, specifies the OSPF dead interval (in seconds). The dead interval is the maximum amount of time allowed to receive a Hello packet from a neighbor before that neighbor is declared down. This value must be the same for all interfaces running OSPF in the network. The dead interval will be set for all VQE-S interfaces running OSPF. Allowed range is 1 to 65,535. [CT: Network Parameters > OSPF Parameters > Dead Interval]