

VSA Definitions

This chapter lists the VSAs supported by Cisco voice products.

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Note

- VSAs are platform-independent and comply with voice gateways supported by Cisco.
- Cisco voice-specific VSAs have been developed for VoIP features during the span of numerous Cisco IOS releases. See the "VSA Release History" section on page 4-93 to find the Cisco IOS release in which specific VSAs were introduced.

Cisco Voice VSAs

Table 4-1 lists (in alphabetical order) the VSAs used by Cisco voice calls.

Table 4-1 VSAs Supported by Cisco Voice Calls

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description
account-code	1	String	`56222`	Account code entered using the Acct soft key during call setup or when connected to an active call.
acom-level	1	Integer -1 to 45 (dB)	`42`	Average ACOM level, in dB, for the call (ACOM is the combined loss achieved by the echo canceler). The value -1 indicates that the level cannot be determined or level detection is disabled.
authorized-services	1	`1`: Framed `2`: Voice `3`: Fax `4`: Modem passthru	`2`	Services that are authorized for the user by the RPMS server. There can be multiple instances of this VSA in an access-accept packet.
backward-call-indicators=*text*	1	`cha:t1,sta:t2,cpc:t3,e2ei:t4,e2em:t5,inter:t6,iupu:t7,h:t8,acc:t9,eco:t10,sccpm:t11` where: `t1`: Charge indicator `t2`: Called-party status indicator `t3`: Called-party category indicator `t4`: End-to-end information indicator `t5`: End-to-end method indicator `t6`: Interworking indicator `t7`: ISDN user part indicator `t8`: Hold indicator `t9`: ISDN access indicator `t10`: Echo control device indicator `t11`: SCCP method indicator	`cha:y,sta:f,cpc:o,e2ei:n,e2em:n,inter:y,iupi:n,h:n,acc:n,eco:n,sccpm:u`	The BCI VSA is generated by the gateway's RADIUS client and, where available, is sent to the RADIUS server in stop accounting messages for call legs 1 and 4. The BCI VSA is also included in interim-update packets.

Table 4-1 VSAs Supported by Cisco Voice Calls (continued)

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description
call-id=*value*	1	String. Syntax is per RFC 2543.	`CBA33553-65FC0702-0-1F4D0B30@198.78.252.51 or 82BABC3E-720311D8-801D8402F4B51A50@yahoo.com`	Value of the Call-ID header.
calling-party-category=*text1* [,country:*text2*,national-value:*text3*]	1	String: `[,country:<country code>,national-value:national code]`	`calling-party-category=29,country:TH*,national-value:FA`	The CPC VSA is generated by the gateway's RADIUS client and, where available, is sent to the RADIUS server in start and stop accounting messages for call legs 1 and 4. *text1* contains the best-fit calling party category value extracted from the Generic Transparency Descriptor (GTD) CPC and stored in a *TDUserContainer*. If Field Compatibility Information (FDC) is populated and the FDC parameter value is *CPC* and the FDC field value is *cpc*, then the optional fields enclosed in [ ] are added to the CPC VSA. *country* contains the 3-character country code representing the country variant extracted from the GTD Protocol Name (PRN) country field and stored in a *TDUserContainer*. *text2* contains the national value extracted from the GTD FDC data field and stored in a *TDUserContainer*.
call-origin-endpt	1	String	`192.168.1.1`	Originating gateway or gatekeeper of a leg 3 VoIP call. Contains either the IP address of the originating gateway or the interzone ClearToken (IZCT) of the originating gatekeeper zone.
call-origin-endpt-type	1	`1`: IP address `2`: IZCT	`1`	Type of information contained in call-origin-endpt.

Table 4-1 VSAs Supported by Cisco Voice Calls (continued)

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description
charge-number=*text*	1	Integer	`3035550199`	The CHN VSA is generated by the gateway's RADIUS client and, where available, is sent to the RADIUS server in start and stop accounting messages for call legs 1 and 4.
charged-units	1	Unsigned integer	`0`	Number of charged units for this connection. For incoming calls or if charging information is not supplied by the switch, the value of this object is zero.
Cisco-NAS-port	2	String of characters and numbers	`BRI0/0:1`	Incoming port identification on NAS or gateway. The syntax is as follows: `signalling type controller: timeslot group/control channel: bearer channel` This VSA has the same function as RADIUS attribute 5, and uses strings assigned by Cisco IOS software to its hardware ports.
codec-bytes	1	Unsigned integer	`160`	Payload size of the voice packet.

Table 4-1 VSAs Supported by Cisco Voice Calls (continued)

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description
coder-type-rate=*string*	1	String For voice calls: g729r8 g729br8 g729ar8 g729abr8 g729br8 g726r16 g726r24 g726r32 g711alaw g711ulaw g728 g723r63 g723r53 g723ar63 g723ar53 clear-channel gsm gsmfr gsmefr transparent no-upspeed voice none For fax calls: 2400 4800 7200 9600 12000 14400 disable	g711ulaw	Negotiated coder rate. Specifies the transmit rate of voice/fax compression to its associated call leg for the call.
disconnect-text	1	String	normal call clearing	ASCII text describing the reason for call termination.
early-packets	1	Unsigned integer	1	Number of received voice packets that arrived too early to store in jitter buffer during the call.
feature-vsa	1	String	"feature-vsa=fn:TWC,ft:10/28/2005 01:30:27.775,cgn:1011011006,cdn:1011011007,frs:0,fid=36,fcid:411CC18B468911DA801DE37EC374A8C6, legID:13"	Captures feature-specific information. There can be multiple instances of this VSA in a start or stop record. For information, see the "Feature VSA for Supplementary Services" section on page 4-82.

Table 4-1 VSAs Supported by Cisco Voice Calls (continued)

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description
gapfill-with-interpolation	1	## ms	0 ms	Duration, in ms, of voice signal played out with signal synthesized from parameters or samples of data preceding and following in time because of voice data not received on time (or lost) from the voice gateway for this call.
gapfill-with-prediction	1	## ms	0 ms	Duration, in ms, of voice signal played out with signal synthesized from parameters or samples of data preceding in time because of voice data not received on time (or lost) from the voice gateway for this call. An example of such playout is frame-erasure or frame-concealment strategies in G.729 and G.723.1 compression algorithms. This counter object locks at the maximum value, which is approximately two days.
gapfill-with-redundancy	1	## ms	0 ms	Duration, in ms, of voice signal played out with signal synthesized from redundancy parameters available because of voice data not received on time (or lost) from the voice gateway for this call.
gapfill-with-silence	1	## ms	0 ms	Duration, in ms, of voice signal replaced with signal played out during silence because of voice data not received on time (or lost) from voice gateway for this call.
gk-xlated-cdn	1	String	8539663	The gatekeeper presented called number in the ACF RAS message. The GK/GKTMP could modify the called number by appending a prefix or it could be left unchanged.
gk-xlated-cgn	1	String	7324501661	The gatekeeper presented calling number in the ACF RAS message. The GK/GKTMP could modify the calling number which is carried in the ACF nonstandard parameter.

Table 4-1 VSAs Supported by Cisco Voice Calls (continued)

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description

gtd-gw-rxd-cnn	1	Integer
		Values:
		`noa:ff`
		`npi:g, pi:h`
		`si:i, #:e`
		where:
		`ff`: 0–34
		`g`: 0,1
		`h`: 0–3
		`i`: 1,2,3,4,252
		`e`: number in E.164 format
			`4505550121`	GTD connected number.

gw-collected-cdn	1	String	`4088539663`	The gateway (application) collected destination number that will eventually be used for routing the call. Only applicable for 2-stage calls.

gw-final-xlated-cdn	1	Integer
		Values:
		`ton:d`
		`npi:aa`
		`#:e`
		where:
		`d` = 0–7
		`aa` = 0–15
		`e` = number in E.164 format
			`8539663`	Called number to be sent out of the gateway.

gw-final-xlated-cgn	1	Integer
		Values:
		`ton:d`
		`npi:aa`
		`pi:b`
		`si:c`
		`#:e`
		where:
		`d` = 0–7
		`aa` = 0–15
		`b` = 0–3
		`c` = 0–3
		`e` = number in E.164 format
			`7324501661`	Calling number to be sent out of the gateway.

Table 4-1 VSAs Supported by Cisco Voice Calls (continued)

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description

gw-rxd-cdn	1	Integer
		Values:
		`ton:d`
		`npi:aa`
		`#:e`
		where:
		`d` = 0–7
		`aa` = 0–15
		`e` = Number in E.164 format
			`18008567335`	Called number as received by the gateway in the incoming signaling message before any translation rules are applied.

gw-rxd-cgn	1	Integer
		Values:
		`ton:d`
		`npi:aa`
		`pi:b`
		`si:c`
		`#:e`
		where:
		`d` = 0–7
		`aa` = 0–15
		`b` = 0–3
		`c` = 0–3
		`e` = Number in E.164 format
			`5102261709`	Calling number as received by the gateway in the incoming signaling message before any translation rules are applied.

h323-billing-model=*value*	109	`0` = Credit customer (post-paid) `1` = Debit card (prepaid) `2` = Limited service (prepaid)	`1`	Type of billing service for a specific call.
h323-call-origin=*value*	26	`answer`=Legs 1 and 3 `originate`=Legs 2 and 4 `callback`=Legs 1 and 3	`answer`	Gateway's behavior in relation to the connection that is active for this leg. For example, answer on leg 1; originate on leg 2; callback on leg 1.

h323-call-type=*value*	27	`Telephony`
		`VOIP`
		`VOFR`
			`VOIP`	Protocol type or family used on this leg of the call.

Table 4-1 VSAs Supported by Cisco Voice Calls (continued)

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description
h323-conf-id=*value*	24	16-byte number in hexadecimal notation with one space between each 4-byte integer	`0f332211 0a332255 89767673 898783ff`	Unique call identifier generated by the gateway. Used to identify the separate billable events (calls) within a single calling session. In Cisco IOS call-control application programming interface (Cisco IOS CCAPI), this value is called the globally unique identifier (GUID). The h323-conf-id is different from the h323-incoming-conf-id. For example, in long pound calls (calls in which you press the # key to make a new call) with a prepaid application, a new h323-conf-id value is generated for each new call. The new value is generated in the leg following authorization (either leg 2 or leg 4) and is subsequently passed to each downstream leg. Gateway-retries because of a connection request failure do not result in a new value; each retry uses the same h323-conf-id value.
h323-connect-time=*value*[1]	28	`hh:mm:ss:mmm ZON DDD MMM ## YYYY`	`18:27:30:094 PST Fri Aug 25 2000`	Connect time in Network Time Protocol (NTP) format: hour, minutes, seconds, microseconds, time_zone, day, month, day_of_month, and year.
h323-credit-amount=*value*	101	Decimal digits in format `n.nn or n`	`1000.00` = one thousand; `1000` = 1000 cents or 10.00	Amount of credit (in currency) that the account contains.
h323-credit-time=*value*	102	Integer in decimal notation	`300`	Number of seconds for which the call is authorized.
h323-currency=*value*	110	3-character value from ISO 4217	`USD`	Currency for use with h323-credit-amount.
h323-disconnect-cause=*value*	30	2-character, ASCII-encoded hexadecimal number representing a Q.931 code. Range: `01` to `A0` (which is 1to 160 decimal)	`4`	Q.931 disconnect cause code retrieved from CCAPI. The source of the code is the disconnect location such as a PSTN, terminating gateway, or SIP.

Table 4-1 VSAs Supported by Cisco Voice Calls (continued)

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description
h323-disconnect-time=*value*	29	`hh:mm:ss:mmm ZON DDD MMM ## YYYY`	`18:27:30.094 PST Fri Aug 25 2000`	Disconnect time in NTP format: hour, minutes, seconds, microseconds, time_zone, day, month, day_of_month, year.
h323-gw-id=*value*	33	Character string	`bowie.cisco.com , AS5300_5`	Domain name server (DNS) name or local name of the voice gateway that is sending the VSA.
h323-incoming-conf-id=*value*	1	16-byte number in hexadecimal notation with one space between each 4-byte integer	`57166451 A69E11D6 808D87CA 50D5D35A`	Unique number for identifying a calling session on a gateway, where a session is closed when the calling party hangs up. Is used to do the following: • Match the outbound and inbound call legs for a session on a particular gateway • Collect and match all records for multiple calls placed (within the bounds of a session) on the gateway The value used for legs 1 and 2 on the originating gateway can differ from that for legs 3 and 4 on a terminating gateway. The h323-incoming-conf-id is different from h323-conf-id. For example, the h323-incoming-conf-id value remains the same in the start/stop records for long pound calls.
h323-ivr-in=*value_1*:*value_2*	1	Customer defined	`color:red`	User-definable AV pairs sent from the RADIUS server to the voice gateway. You can read and use the value at the gateway with a customized Tcl IVR script.
h323-ivr-out=*value_1*:*value_2*	1	Customer defined	`color:blue`	User-definable AV pairs sent from the voice gateway to the RADIUS server. You can set (write) the value with a customized Tcl IVR script.
h323-preferred-lang=*value*	107	2-character code from ISO 639-1	`en`	Language to use when playing the audio prompt specified by the h323-prompt-id.
h323-prompt-id=*value*	104	Integer in decimal notation	`27`	Index into an array that selects prompt files used at the gateway.
h323-redirect-ip-address=*value*	108	Numerals in dotted decimal notation	`192.168.175.16`	IP address for an alternate or redirected call.

Table 4-1 VSAs Supported by Cisco Voice Calls (continued)

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description
h323-redirect-number=*value*	106	E.164 format (decimal digits with no spacing characters)	`14085550111`	Phone number to which the call is redirected; for example, to a toll-free number or a customer service number.
h323-remote-address=*value*	23	Numerals in dotted decimal notation: nnn.nnn.nnn.nnn	`10.10.17.128`	IP address of the remote gateway.
h323-remote-id=*value*	1	String	`joshi4.mydomain`	DNS name or locally defined hostname of the remote gateway.
h323-return-code=*value*	103	Decimal numbers	`0`	Return codes are instructions from the RADIUS server to the voice gateway.
h323-setup-time=*value*	25	`hh:mm:ss.mmm ZON DDD MMM ## YYYY`	`18:27:28.032 UTC Wed Dec 9 1998`	Setup time in NTP format: hour, minutes, seconds, microseconds, time_zone, day, month, day_of_month, year.
h323-time-and-day=*value*	105	Decimal number: `hh:mm:ss`	`10:36:57`	Time of day at the dialed number or at the remote gateway in the format: hour, minutes, seconds.
h323-voice-quality=*value*	31	Decimal numbers from ICPIF table of G.113	`5`	Value representing impairment/calculated planning impairment factor (ICPIF) of the voice quality on the connection provided by lower-layer drivers (such as the digital signal processor). Low numbers represent better quality.
hiwater-playout-delay	1	`## ms`	`65 ms`	High-water mark Voice Playout FIFO Delay during the voice call.
in-carrier-id	1	String	`carrier A`	Carrier ID of the trunk group through which the call arrived or the partnering voice service provider identifier of the incoming VoIP call.
incoming-area	1	String	`ingress-zone`	Gatekeeper identifier, or the source zone or area, of the incoming VoIP call.
incoming-req-uri=*value*	1	String. Syntax is as per RFC 2543.	`sip:5550112@cisco.com;user=phone`	Request-URI as given in the incoming request-line, including any url-parameters.

Table 4-1 VSAs Supported by Cisco Voice Calls (continued)

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description
info-type	1	String. Values are: 1=other (not described) 2=speech 3=unrestrictedDigital 4=unrestrictedDigital56 5=restrictedDigital 6=audio31 7=audio7 8=video 9=packetSwitched	`2`	Type of information carried by media.
in-intrfc-desc	1	String (replaces `in-portgrp-id`)	`desc-A`	Description assigned to the voice port of the incoming call.
in-portgrp-id=*text*	1	ASCII string associated with the port on the gateway used by this call.	<Service Provider ID>	Description associated with the incoming hardware telephony port that is used with this leg of the call. **Note** This VSA was replaced by in-intrfc-desc in Cisco IOS Release 12.2(11)T.
internal-error-code	1	String	`1.1.179.2.37.0`	Cause of failed calls. For more information, see the "Internal Error Codes" section on page 4-92.
in-trunkgroup-label	1	String	`trunk-1`	Contains the trunk group label associated with the group of voice ports from which the incoming time-division multiplexing (TDM) call arrived on the gateway.

ip-pbx-mode	1	String. Values:
		`cme`
		`srst`
			`srst`	Identifies whether call record is generated by a Cisco Unified SRST or Cisco Unified CME router.

ip-phone-info	1	String	`"ip-phone-info=dn:shared,usr:jsmith,tag:7"`	SCCP phone involved in a call on a shared line. For information, see the "IP Phone Information Attribute for Shared Lines" section on page 4-81.
isup-carrier-id=*text*	1	String	`1212`	The CID VSA is generated by the gateway's RADIUS client and, where available, is sent to the RADIUS server in start and stop accounting messages for call legs 1 and 4.
late-packets	1	Unsigned integer	`0`	Number of received voice packets that arrived too late to play out with codec during the call.

Table 4-1 VSAs Supported by Cisco Voice Calls (continued)

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description
local-hostname	1	String	`hostname.com`	Local hostname accessed or used by the SNMP MIBs.
logical-if-index	1	Integer	`30`	ifIndex value of the logical interface through which this call was made. For ISDN media, this is the ifIndex of the B channel that was used for this call.
lost-packets	1	Unsigned integer	`0`	Number of lost voice packets during the call.
lowater-playout-delay	1	`## ms`	`25 ms`	Low-water mark Voice Playout FIFO Delay during the voice call.
max-bit-rate	1	Integer		Maximum bandwidth used by video call.
Mos-Con	1	Integer	`4.4072`	MOSQe (conversational quality MOS). Conversational quality indicates the impact of the quality of the transmission on the dynamics of conversational exchanges between two parties; such metrics take into account delay, echo, and recency. **Note:** This VSA was introduced in Cisco IOS Release 16.3.1
method=*value*	1	String	`INVITE`	Method name as specified in the request-line.
next-hop-dn=*value*	1	String of the form `FQDN[:port] [/protocol]` where FQDN is a host, domain name, or dotted IP address (for other field descriptions, see prev-hop-ip)	`next-hop-dn= company.com`	Domain name (DN) or fully qualified domain name (FQDN) where the request is forwarded. When DNS SRV is used to resolve the address, then this contains the DN name. (Note that this means that the FQDN is not included.) If only a DNS A query is used to resolve the next hop IP address, then this is the FQDN name. If no resolution is needed, meaning that a dotted IP address was found in a static route entry or the request-uri, then this attribute is not included in the accounting message.
next-hop-ip=*value*	1	String (same syntax as prev-hop-ip)	`192.168.16.2`	Next-hop IP address where the request is forwarded.
noise-level	1	`Integer -100..8`	`-74`	Average noise level for the call, in dBm.

Table 4-1 VSAs Supported by Cisco Voice Calls (continued)

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description
ontime-rv-playout	1	Unsigned integer (ms)	`27460`	Duration, in ms, of voice playout from data received on time for this call, in ms. This plus the durations for the GapFills entries provides the Total Voice Playout Duration for Active Voice.
originating-line-info=*text*	1	String	`0`	The OLI VSA is generated by the gateway's RADIUS client and, where available, is sent to the RADIUS server in start and stop accounting messages for call legs 1 and 4.
outgoing-area	1	String	`egress-zone`	Gatekeeper identifier, or the destination zone or area, of the outgoing VoIP call.
outgoing-req-uri=*value*	1	String. Syntax is as per RFC 2543.	`sip:5550112@cisco.com; user=phone`	Request-URI used in the outgoing request-line, including any url-parameters.
out-carrier-id	1	String	`carrier B`	Carrier ID field of the trunk group through which the call leaves the gateway or the partnering voice services provider identifier of the outgoing VoIP call.
out-intrfc-desc	1	String (replaces `out-portgrp-id`)	`desc-B`	Description assigned to the voice port of the outgoing call.
out-portgrp-id=*text*	1	ASCII string associated with the port on the gateway used by this call.	`<Service Provider ID>`	Description associated with the outgoing hardware telephony port that is used with this leg of the call. **Note** Replaced by out-intrfc-desc in Cisco IOS Release 12.2(11)T.
out-trunkgroup-label	1	String	`trunk-2`	Trunk-group label associated with the group of voice ports from which the outgoing TDM call leaves on the gateway.
peer-address	1	E.164 format (decimal digits with no spacing characters)	`4085550164`	Number that this call was connected to. If the number is not available, then it has a length of zero.
peer-id	1	Integer	`1`	ID value of the peer table entry to which this call was made. If a peer table entry for this call does not exist, the value of this object is zero.

Table 4-1 VSAs Supported by Cisco Voice Calls (continued)

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description
peer-if-index	1	Integer	`84`	ifIndex value of the peer table entry to which this call was made. If a peer table entry for this call does not exist, the value is zero.
prev-hop-ip=*value*	1	String of the form `ip-address[:port][/protocol]` where "port" is an optional parameter giving the transport layer port number and the default is 5060. where "protocol" is an optional parameter giving the transport layer protocol and the default is UDP. Valid values: `TCP` and `UDP`; because the proxy does not support TCP, this parameter is never included.	`10.10.16.2:5061/UDP`	Previous hop IP address, as seen by the proxy. What would normally be placed in the "received" parameter when the proxy detected that the sender does not agree with the top-most via.
prev-hop-via=*value*	1	String. Syntax is as per RFC 2543.	`10.10.137.18:5060`	"Sent-by" portion of topmost via when the request arrived at the proxy.
receive-delay	1	`## ms`	`25 ms`	Average Playout FIFO Delay plus the decoder delay during the voice call.

Table 4-1 VSAs Supported by Cisco Voice Calls (continued)

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description
redirecting-number=text	1	noa=t1,npi=t2,pi=t3,#=t4	`noa=3,npi=5,pi=1,#=3035550112`	The RGN VSA is generated by the gateway RADIUS client and, where available, is sent to the RADIUS server in start accounting messages for all call legs. The *text* contains the redirecting number extracted from the redirect number parameter. The redirecting number is encoded in the *text* value. For example, redirecting-number=noa=*t1*,npi=*t2*,pi=*t3*,#=*t4* where: • *t1*–Type of address • *t2*–Numbering plan indicator • *t3*–Presentation indicator • *t4*–Address of the redirecting number

Table 4-1 VSAs Supported by Cisco Voice Calls (continued)

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description
release-source	1	1: Calling party located in PSTN 2: Calling party located in VoIP network 3: Called party located in PSTN 4: Called party located in VoIP network 5: Internal release in POTS leg 6: Internal release in VOIP leg 7: Internal call-control application (Tcl or VoiceXML script) 8: Internal release in VoIP AAA 9: Console command line (CLI or MML) 10: External RADIUS server 11: External network management application 12: External call control agent	1	If a call was released by the calling party, called party, or an internal or external source.
remote-media-address	1	String	remote-media-address	Remote-media gateway IP address.
remote-media-id	1	String	remote-media-id	Remote-media gateway DNS name.
remote-media-udp-port	1	Integer 0...65535	19366	Remote-media gateway UDP port.
remote-udp-port	1	Integer 0...65535	19366	Remote system UDP listener port to which voice packets are transmitted.
resource-service	1	1: Reservation 2: Query	2	What the client is requesting from the RPMS server.
round-trip-delay	1	## ms	2 ms	Voice-packet round-trip delay, in ms, between the local and remote device on the IP backbone during the call.

Table 4-1 VSAs Supported by Cisco Voice Calls (continued)

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description

session-protocol	1	Available strings:
		`other`
		`cisco`
		`h323`
		`multicast`
		`sipv2`
		`sdp`
		`frf11-trunk`
		`cisco-switched`
		`MarsAnalog`
		`C1000Isdn`
		`aal2-trunk`
			`cisco`	Session protocol used for calls between the local and remote router through the IP backbone. Always equal to "sip" for SIP or "Cisco" for H.323.

subscriber=*value*	1	String from T1/CAS (Channel Associated Signaling) or E1/R2 line/signal.	`Coin`	T1/Channel Associated Signaling (CAS) or E1/R2 signal information about a subscriber.
transmission-medium-req=*text*	1	String	`0`	TMR VSA is generated by the gateway's RADIUS client and, where available, is sent to the RADIUS server in start and stop accounting records for call legs 1 and 4.
tx-duration	1	`### ms`	`300 ms`	Duration, in ms, of transmit path open from this peer to the voice gateway for the call.
vad-enable	1	`enable/disable`	`enable`	Whether or not voice-activity detection (VAD) is enabled for the voice call.
voice-quality-total-packet-loss	1	String	`0.0000%`	The total number of packets lost by the jitter buffer in the RTP stream. **Note:** This VSA was introduced in Cisco IOS Release 16.3.1
voice-tx-duration	1	`### ms`	`100 ms`	Duration, in ms, for this call. This value divided by tx-duration equals the Voice Utilization Rate.

1. A timestamp that is preceded by an asterisk (*) or a dot (.) might not be accurate. An asterisk (*) means that after a gateway reboot, the gateway clock was not manually set and the gateway has not synchronized with an NTP server yet. A dot (.) means the gateway NTP has lost synchronization with an NTP server.

IP PBX Mode Attribute for SRST Mode

The IP PBX Mode attribute (ip-pbx-mode) identifies whether the router generating a call record is either a Cisco Unified SRST or Cisco Unified CME router.

Cisco Unified Communications Manager generates call records for all phones under its control. If the WAN link fails, phones fall back to Cisco Unified SRST or Cisco Unified CME in SRST fallback mode. When the phones register to the Cisco Unified SRST router, the router generates call records with the ip-pbx-mode value reported as either “cme” or “srst” in the stop records for all calls using SCCP.

For Cisco Unified CME in SRST fallback mode, IP phones that automatically learn their configuration from Cisco Unified Communications Manager during fallback are reported as “srst.” If an IP phone is manually configured in Cisco Unified CME, the ip-pbx-mode is reported as “cme.” Typically, you do not configure IP phones manually on the Cisco Unified SRST router.

The mode is determined at call setup for incoming calls, and at connect for outgoing call legs. You can filter call records on this attribute to identify the CDRs generated by the Cisco Unified SRST router for IP phones that rehomed after the WAN link went down. You can combine the filtered records from the Cisco Unified SRST router with the call records from Cisco Unified Communications Manager to generate a complete report.

If the connection to Cisco Unified Communications Manager is lost after a call is established to an external phone on a PSTN trunk, the ip-pbx-mode attribute is not reported in the call record. The ip-pbx-mode attribute is reported only after the phone registers to the Cisco Unified SRST router.

The router generates the ip-pbx-mode in call records only when there is a SCCP leg involved in the call. For non-SCCP-controlled ports connected to the Cisco Unified SRST router, CDRs are generated regardless of the state of the WAN link to Cisco Unified Communications Manager. The ip-pbx-mode is blank in file-based accounting records and omitted in RADIUS accounting records when the WAN link is up or when the call does not involve SCCP.

IP Phone Information Attribute for Shared Lines

The Shared-Line feature in Cisco Unified CME allows multiple phones to share the same directory number. The IP phone information attribute (ip-phone-info) identifies the phone involved in a call on a shared line. It reports the username associated with the phone as defined by the **name** command and indicates whether the call is going to or from the shared line. Because the username field can be blank, the ephone tag associated with the directory number is also reported.

This information is generated for all calls, whether or not a shared line is involved. It is reported for each call leg as a composite VSA in RADIUS start and stop records and as an attribute in file-based accounting stop records.

Table 4-2 lists (in sequential order) the attribute-value (AV) pairs that are included in ip-phone-info.

Note For file-based accounting, the ip-phone-info attribute is appended to the feature-vsa record and repeated for every feature-vsa instance.

Table 4-2 AV Pairs in ip-phone-info

AV Pair	Format	Example	Description
dn:	String	`shared`	Directory number type. Value is unique or shared.
usr:	String	`7000-abcd`	Username associated with the phone using the shared line. It could be blank.
tag:	Integer	`7`	Ephone tag of the SCCP phone. Useful for identifying the phone if the usr field is blank.

Feature VSA for Supplementary Services

The feature VSA (feature-vsa) is a composite VSA in CDRs that captures accounting information about the supplementary services used for all the call legs involved in a call. It includes a feature correlation ID that enables you to track each of the supplementary features invoked on the different call legs of a call within a single gateway.

The feature VSA is written as a simple string containing AV pairs separated by commas; each AV pair uses a colon (:) delimiter. The specific AV pairs included in the feature VSA depend on the type of supplementary feature. There can be multiple instances of this VSA in RADIUS start and stop records. File-based accounting generates only stop records.

Cisco IOS Release 12.4(9)T and later releases support the following supplementary features:

- Two-Way Call (TWC)—A basic two-party call within a single gateway.
- Call Forward All (CFA)—A two-party call where the call is forwarded to the configured destination when the call detects call forward all.
- Call Forward Busy (CFBY)—A two-party call where the original called party is configured to forward calls to another destination when it is busy.
- Call Forward No Answer (CFNA)—A two-party call where the original called party is configured to forward calls to another destination when it does not answer for a specific amount of time.
- Blind Transfer (BXFER)—Call transfer that is basically redirecting a connected call. In a blind transfer, the call gets forwarded by the called party in the original call. Blind call transfer does not involve any interaction between the called party (transferee) and the transferred-to party.
- Consultative Transfer (CXFER)—Call transfer that is similar to blind transfer except that it involves consultation between the transferor and transferred-to party. If the transferred-to party responds positively to the consultation request, the call is transferred to the new destination.

Cisco IOS Release 12.4(20)T and later releases support hairpin call transfers using the trunk optimization feature, for the following types of calls:

- Transfer at Alert (HP_XFER_ALERT)—PSTN call to the trunk DN is transfered (consultative transfer) to a local phone that does not share the trunk DN. The call is hairpin transferred through the DN.
- Transfer at Connect (HP_XFER_CONNECT)—PSTN call to the trunk DN is transfered (consultative transfer at alert) to a local phone that does not share the trunk DN. The call is hairpin transferred through the DN.
- Transfer Recall (HP_XFER_RECALL_ALERT)—PSTN call to the trunk DN is transfered (consultative transfer at alert) to a local phone sharing the trunk DN if the transfer-to party does not answer the call. The call is hairpin transferred through the DN. Transferred-to phone does not answer and the call is recalled to the phone that initiated the transfer.

Cisco IOS Release 12.4(22)T and later releases support the Hold and Resume features.

- Hold (HOLD)—Phone user puts a call on hold by pressing the Hold soft key, or it occurs indirectly through features such as Call Transfer, Call Park, or Conferencing.
- Resume (RESUME)—Phone user connects to a call on hold by pressing the Resume soft key.

The feature VSA captures the hold and resume event including the time stamp, the reason for the event based on the user's supplementary service request, and which user put the caller on hold.

The hold duration is determined by the difference between the Hold time stamp and the Resume time stamp. For Call Transfers, the duration is the difference between the hold time stamp and the disconnect time stamp. You can use this information to identify how long a caller is put on hold and help determine the efficiency of your support personnel.

For an example of a CDR for Hold and Resume, see the "Hold and Resume CDR: Example" section on page 3-54.

Note Hold and Resume information is not supported for VoIP to VoIP hairpin calls.

Feature VSA Examples

The following examples show the format of the feature VSA for different types of calls. Display this output by using the **debug radius accounting** command or the **gw-accounting syslog** command.

Basic Two-Way Call

```
Oct 28 01:30:27.779: RADIUS:   Cisco AVpair       [1]   127
"feature-vsa=fn:TWC,ft:10/28/2005
01:30:27.775,cgn:1011011006,cdn:1011011007,frs:0,fid=36,fcid:411CC18B468911DA801DE37EC374A
8C6,legID:13"
```

Basic Call Transfer

```
Oct 28 01:31:10.271: RADIUS:   Cisco AVpair       [1]   179
"feature-vsa=fn:CXFER,ft:10/28/2005
01:31:10.247,frs:0,fid:40,xconsID:1,fcid:411CC18B468911DA801DE37EC374A8C6,legID:14,
xrson:0,xsts:5,Xor:1011011007,Xee:1011011006,Xto:1011011008"
```

Basic Call Forwarding

```
Oct 28 02:42:03.479: RADIUS:   Cisco AVpair       [1]   191
"feature-vsa=fn:CFNA,ft:10/28/2005
02:42:03.467,frs:0,fid:332,fcid:3E775493469311DA812EE37EC374A8C6,legID:9D,frson:3,fdcnt:1,
fwder:1011011009,fwdee:1011011006,fwdto:1011011008,frm:1011011009"
```

Hold

```
"feature-vsa=fn:HOLD,ft:11/05/2007
12:01:47.747,frs:0,fid:17,fcid:C655249C8B1011DC800AF5E95DD6F9BF,legID:4,hrson:1,holding:50
00,held:3000,sl:1,usr:mbrown,tag:5"
```

Resume

```
"feature-vsa=fn:RESUME,ft:11/05/2007
12:01:52.415,frs:0,fid:20,fcid:C91D6D008B1011DC800BF5E95DD6F9BF,legID:4,hrson:0,holding:50
00,held:3000,sl:1,usr:jsmith,tag:7"
```

Transfer at Alert

```
May 28 22:26:38.706: RADIUS:   Cisco AVpair       [1]   167
"feature-vsa=fn:HP_XFER_ALERT,ft:05/28/2008
14:26:31.106,frs:0,fid:42,xconsID:,fcid:E802FCF32C3B11DD8021A71BF42E2491,legID:14,xrsn:0,
xsts:5,Xor:1001,Xee:C803,Xto:5003
```

Transfer at Connect

```
May 28 22:26:38.706: RADIUS:   Cisco AVpair       [1]   167
"feature-vsa=fn:HP_XFER_CONNECT,ft:05/28/2008
14:26:31.106,frs:0,fid:42,xconsID:,fcid:E802FCF32C3B11DD8021A71BF42E2491,legID:14,xrsn:0,
xsts:5,Xor:1001,Xee:C803,Xto:5003
```

Transfer Recall

```
May 28 22:26:38.706: RADIUS:   Cisco AVpair        [1]  167
"feature-vsa=fn:HP_XFER_RECALL_ALERT,ft:05/28/2008
14:26:31.106,frs:0,fid:42,xconsID:,fcid:E802FCF32C3B11DD8021A71BF42E2491,legID:14,xrsn:0,
xsts:5,Xor:1001,Xee:C803,Xto:5003
```

Feature VSA Attributes

Table 4-3 lists (in alphabetical order) the attributes that can be included in the feature VSA. The particular attributes that are included in each instance of the VSA are feature-specific.

Note

- Conferencing call-legs are not supported by the feature VSA.
- For file-based accounting, the ip-phone-info and ip-pbx-mode attributes are appended to the feature-vsa record and are repeated for every feature-vsa instance.
- You can also send Feature-VSA information to a syslog server by using the **gw-accounting syslog** command. Limitations on the length of syslog messages, however, can restrict the amount of feature-vsa information included in the output. If the feature-vsa information exceeds the size limit for a syslog message, some of the information is not collected.

Table 4-3 Attributes in Feature VSA

Attribute	Format	Example	Description
cdn:	E.164 (decimal digits with no spacing characters)	1015550107	Called number of the basic two-way call. Present in the TWC feature VSA.
cgn:	E.164	1015550106	Calling number of the basic two-way call. Present in the TWC feature VSA.
fcid:	16-byte number in hexadecimal notation	411CC18B468911DA801DE37EC374A8C6	Feature correlation ID.
fid:	Integer	36	Feature ID of the invocation. Identifies a unique instance of a feature VSA within a gateway. This number is incremented for each new feature VSA that is added.

Table 4-3 Attributes in Feature VSA (continued)

Attribute	Format	Example	Description
fn:	String: CFA = Call forward all CFBY = Call forward busy CFNA = Call forward no answer BXFER = Blind transfer CXFER = Consultative transfer HOLD = Call hold RESUME = Call resume TWC = Two-way call	TWC	Feature name. String representing the type of feature.
frm:	E.164	1015550109	Forwarding from number. Phone number that identifies who invoked the forwarding. Useful for call forwarding scenarios where there are multiple forwards. This number is the same as the forwarded from (fwder) number in a single forwarding; it is a different number when there are multiple forwards.
frs:	0 = Successful 1 = Failed	0	Feature status. Success (0) or failure (1). Always set to 0 for Hold and Resume.
ft:	MM/DD/YYYY hh:mm:ss:mmm	10/28/2005 01:30:27.775	Feature operation time. Time stamp of the operation start and stop time, if applicable for a specific feature.
fdcnt:	Integer	3	Forwarding count. Maximum forwarding count after which no further forwarding occurs. The default limit is 5.
frson:	Integer 0 = Unknown 1 = Call forward unconditional 2 = Call forward on busy 3 = Call forward on no reply 4 = Call deflection	2	Forwarding reason. The type of call forwarding such as call forward all, call forward busy, or call forward no answer.
fwdee:	E.164	1015550106	Forwarded number. Phone number that is forwarded.
fwder:	E.164	1015550109	Forwarded from number. Phone number that invoked the forwarding.
fwdto:	E.164	1015550108	Forwarded to number. Phone number to which the call is forwarded.
held:	Integer	3000	Directory number of the caller on hold.
holding:	Integer	5000	Directory number of the user who placed the call on hold.

Table 4-3 Attributes in Feature VSA (continued)

Attribute	Format	Example	Description
hrson:	Integer: 0= Unknown 1= Hold 2= Call Transfer 3= Conference 4= Call Park 5= Call Pickup 6= Barge	2	Hold reason. The type of call hold such as normal hold, call transfer, conference, call park, barge, or call pickup. For resume it is always set to 0.
legID:	Integer	9	Call leg ID. Each feature VSA is added to a call leg and it captures the call leg ID.
sl:	0= Unique 1= Shared line	shared	Whether the line is shared or not shared.
tag:	Integer	7	Ephone tag of the SCCP phone if the usr field is blank.
usr:	String	7000-abcd	Username associated with the phone that initiated the hold or resume. It could be blank.
XconsID:	Integer	1	Consultation ID. For consultative transfer; not used for blind transfer.
Xee:	Integer	1015550106	Transferred number. Phone number that is transferred. Included in secondary call's accounting record, might be included in primary call's record.
Xor:	Integer	1015550107	Transferred from party (transferor). Party that invoked the transfer. Can be a phone number or an account number. Included in secondary call's accounting record, might be included in primary call's record.
Xto:	Integer	1015550108	Transferred to party. Phone number to which the call is transferred. Included in primary call's accounting record.
xsts:	0 = Consult start 1 = Consult restart 2 = Consult success 3 = Consult failed 4 = Transfer initiated 5 = Transfer success 6 = Transfer failed	5	Transfer status.

Feature Correlation ID

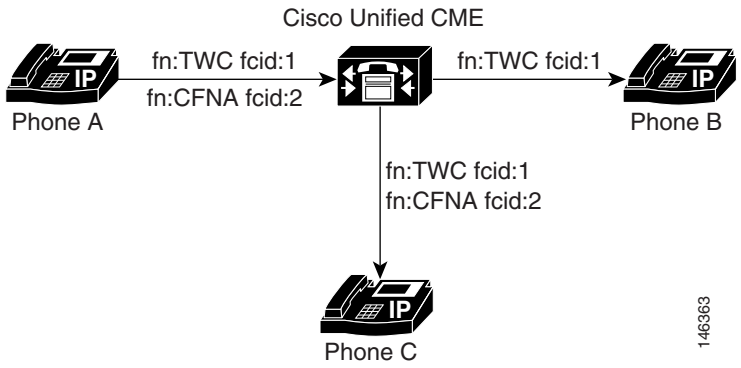
The feature correlation ID (fcid) identifies a given feature across all call legs in a call. It is similar to the GUID defined by the h323-conf-id attribute and it allows the call legs to be correlated based on the specific features invoked for the call. For any given feature, the feature VSA carries a unique feature correlation ID, which a postprocessing system can use to correlate the records.

For example, a simple two-way call generates two start records and two stop records. Each record carries a feature VSA of type TWC and all call legs for the two-way call carry the same feature correlation ID. When another feature is invoked during the two-way call, that feature gets a new feature correlation ID, which is common across the participating legs.

Figure 4-1 shows an example of how the feature correlation ID is used in a Call Forward No Answer scenario. In this figure, A and B are in a two-way call, and B invokes Call Forward No Answer to C. The CFNA VSA is captured on legs A and C stop records. A, B and C would have the same feature correlation ID (fcid:1) for their TWC VSA. The CFNA VSA would have a different feature correlation ID (fcid:2). This is present in A and C stop records.

When the records for A are processed by the accounting system, it would detect that there is a basic two-way call between A and B. It would also detect that there is a CFNA to C in A's stop record. The new forwarded-to leg has the same feature correlation ID for CFNA (fcid:2). It is also carries the same feature correlation ID (fcid:1) for the TWC VSA on the forwarded-to leg.

Figure 4-1 Feature Correlation ID in Call Forward No Answer Scenario

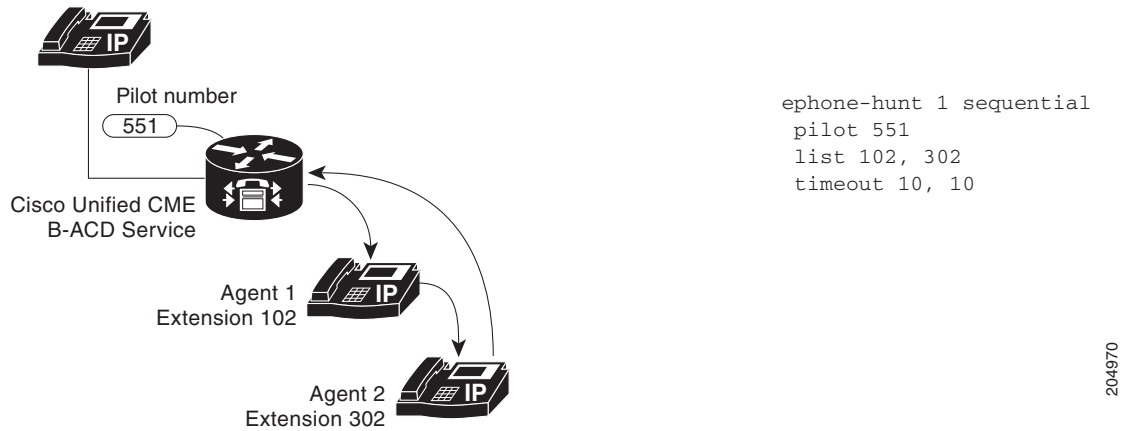


Cisco Unified CME B-ACD and Hunt Groups

Cisco IOS Release 12.4(20)T and later releases allow the correlation of multiple call records for calls routed to Cisco Unified CME Basic Automatic Call Distribution (B-ACD) and hunt groups. The feature correlation ID is the same across all call legs for a given feature.

Figure 4-2 shows an example of a hunt group used with the B-ACD service.

Figure 4-2 B-ACD Hunt Group Example



In this example, a call comes into the B-ACD service and proceeds as follows, generating the call records shown:

1. Call goes to the hunt group (CFA from pilot number 551 to agent 1 at extension 102). The call records capture the TWC on incoming leg ID:1, the TWC on legID:2, which is the setup leg, and the CFA to extension 102 on legID:2.

```
000210: May 31 01:24:01.831: RADIUS: Cisco AVpair [1] 121
"feature-vsa=fn:TWC,ft:05/30/2008
18:24:01.743,cgn:771,cdn:551,frs:0,fid:1,fcid:15CD126F2DE711DD8002931556F18823,legID:1"

000311: May 31 01:24:11.855: RADIUS: Cisco AVpair [1] 156
"feature-vsa=fn:CFA,ft:05/30/2008
18:24:01.843,frs:0,fid:2,fcid:15CD126F2DE711DD8002931556F18823,legID:2,frson:1,fdcnt:1,fwd
er:,
fwdee:771,fwdto:102,frm:551"

000313: May 31 01:24:11.855: RADIUS: Cisco AVpair [1] 127
"feature-vsa=fn:TWC,ft:05/30/2008
18:24:01.843,cgn:771,cdn:551,frs:0,fid:4,fcid:15CD126F2DE711DD8002931556F18823,legID:2"
```

2. Agent 1 (102) does not answer so the call is forwarded (CFNA) to agent 2 at extension 302. The call records capture the TWC setup on legID:3, and the CFNA on legID:3 and legID:2.

```
000334: May 31 01:24:11.855: RADIUS: Cisco AVpair [1] 157
"feature-vsa=fn:CFNA,ft:05/30/2008
18:24:11.851,frs:0,fid:6,fcid:15CD126F2DE711DD8002931556F18823,legID:2,frson:3,fdcnt:2,fwd
er:,
fwdee:771,fwdto:302,frm:551"

000441: May 31 01:24:21.867: RADIUS: Cisco AVpair [1] 157
"feature-vsa=fn:CFNA,ft:05/30/2008
18:24:11.851,frs:0,fid:6,fcid:15CD126F2DE711DD8002931556F18823,legID:3,frson:3,fdcnt:2,fwd
er:,
fwdee:771,fwdto:302,frm:551"

000443: May 31 01:24:21.867: RADIUS: Cisco AVpair [1] 127
"feature-vsa=fn:TWC,ft:05/30/2008
18:24:11.855,cgn:771,cdn:102,frs:0,fid:9,fcid:15CD126F2DE711DD8002931556F18823,legID:3"
```

3. Agent 2 (302) also does not answer so the call is returned to the call queue and directed back to pilot number 551. The call records capture the new TWC for legID:7 and the CFA to agent 1 (102) on legID:8 from the BACD application. This is the second instance of CFA captured on legID:1.

```
000606: May 31 01:24:50.899: RADIUS: Cisco AVpair [1] 154
"feature-vsa=fn:CFA,ft:05/30/2008
18:24:42.087,frs:0,fid:14,fcid:15CD126F2DE711DD8002931556F18823,legID:7,frson:1,fdcnt:1,
fwder:,fwdee:771,fwdto:102,frm:"

000608: May 31 01:24:50.899: RADIUS: Cisco AVpair [1] 128
"feature-vsa=fn:TWC,ft:05/30/2008
18:24:42.087,cgn:771,cdn:551,frs:0,fid:13,fcid:2DD915072DE711DD800E931556F18823,legID:7"
```

4. Agent 1 (102) answers the call. The call is connected to LegID:8. Agent 1 (102) does a consult transfer to extension 202 resulting in legID:9. The CXFER instance is captured on the original incoming legID:1, legID:7, and legID:9.

```
000657: May 31 01:24:57.611: RADIUS: Cisco AVpair [1] 119
"feature-vsa=fn:TWC,ft:05/30/2008
18:24:57.611,cgn:102,cdn:,frs:0,fid:16,fcid:37193E252DE711DD8011931556F18823,legID:8"

000693: May 31 01:24:58.023: RADIUS: Cisco AVpair [1] 122
"feature-vsa=fn:TWC,ft:05/30/2008
18:24:58.015,cgn:102,cdn:202,frs:0,fid:17,fcid:37193E252DE711DD8011931556F18823,legID:9"

000753: May 31 01:24:59.127: RADIUS: Cisco AVpair [1] 128
"feature-vsa=fn:CXFER,ft:05/30/2008
18:24:59.119,frs:0,fid:18,xconsID:1,fcid:0000,legID:7,xrsn:0,xsts:5,Xor:102,Xee:771,Xto:20
2"

000791: May 31 01:24:59.143: RADIUS: Cisco AVpair [1] 119
"feature-vsa=fn:TWC,ft:05/30/2008
18:24:57.611,cgn:102,cdn:,frs:0,fid:16,fcid:37193E252DE711DD8011931556F18823,legID:8"

000916: May 31 01:25:02.595: RADIUS: Cisco AVpair [1] 156
"feature-vsa=fn:CXFER,ft:05/30/2008
18:24:59.127,frs:0,fid:23,xconsID:1,fcid:15CD126F2DE711DD8002931556F18823,legID:9,xrsn:0,
xsts:2,Xor:102,Xee:771,Xto:202"

000978: May 31 01:25:02.599: RADIUS: Cisco AVpair [1] 156
"feature-vsa=fn:CXFER,ft:05/30/2008
18:24:59.119,frs:0,fid:21,xconsID:1,fcid:15CD126F2DE711DD8002931556F18823,legID:1,xrsn:0,
xsts:5,Xor:102,Xee:771,Xto:202"

000980: May 31 01:25:02.599: RADIUS: Cisco AVpair [1] 154
"feature-vsa=fn:CFA,ft:05/30/2008
18:24:42.087,frs:0,fid:14,fcid:15CD126F2DE711DD8002931556F18823,legID:1,frson:1,fdcnt:1,
fwder:,fwdee:771,fwdto:102,frm:"
```

Store-and-Forward Fax VSAs

Table 4-4 lists (in alphabetical order) the fax VSAs used by Cisco voice products.

Table 4-4 Store-and-Forward Fax VSA Descriptions

Attribute	VSA No. (Decimal)	Description
abort-Cause	21	If the fax session aborts, indicates the system component that signaled the abort. Examples of system components that could trigger an abort are FAP (Fax Application Process), TIFF (the TIFF reader or the TIFF writer), fax-mail client, fax-mail server, ESMTP client, or ESMTP server.
call-type	19	Type of fax activity: fax receive or fax send.
email-server-address	16	IP address of the e-mail server handling the on-ramp fax-mail message.
email-server-ack-flag	17	The on-ramp gateway received a positive acknowledgment from the e-mail server accepting the fax-mail message.
fax-account-id-origin	3	Account ID origin as defined by the system administrator for the **mmoip aaa receive-id** or the **mmoip aaa send-id** commands.

Table 4-4 Store-and-Forward Fax VSA Descriptions (continued)

Attribute	VSA No. (Decimal)	Description
fax-auth-status	15	Whether or not authentication for this fax session was successful. Possible values for this field are success, failed, bypassed, or unknown.
fax-connect-speed	8	Modem speed at which this fax-mail was initially transmitted or received. Possible values are 1200, 4800, 9600, and 14400.
fax-coverpage-flag	6	Whether or not a cover page was generated by the off-ramp gateway for this fax session. True indicates that a cover page was generated; false means that a cover page was not generated.
fax-dsn-address	11	Address to which DSNs are sent.
fax-dsn-flag	12	Whether or not DSN is enabled. True indicates that DSN has been enabled; false means that DSN has not been enabled.
fax-mdn-address	13	Address to which MDNs are sent.
fax-mdn-flag	14	Whether or not message delivery notification (MDN) is enabled. True indicates that MDN is enabled; false means that MDN is not enabled.
fax-modem-time	7	Amount of time, in seconds, the modem sent fax data (x) and the amount of time, in seconds, of the total fax session (y), which includes both fax-mail and PSTN time, in the form x/y. For example, 10/15 means that the transfer time took 10 seconds, and the total fax session took 15 seconds.
fax-msg-id	4	Unique fax message identification number assigned by Store and Forward Fax.
fax-pages	5	Number of pages transmitted or received during this fax session. This page count includes cover pages.
fax-process-abort-flag	10	Whether the fax session was aborted or successful. True means that the session was aborted; false means that the session was successful.
fax-recipient-count	9	Number of recipients for this fax transmission. Until e-mail servers support Session mode, the number is 1.
fax-tx-duration	1	Duration of fax transmitted from this peer to voice gateway for this call. The fax utilization rate can be obtained by dividing this by tx-duration.
gateway-id	18	Name of the gateway that processed the fax session. The name appears in the following format: hostname.domain-name.
port-used	20	Slot/port number of the Cisco AS5300 used to transmit or receive this fax-mail.

T.38 Fax Statistics VSAs

The T.38 Fax Statistics feature provides the ability to gather detailed statistics about fax success indicator for T.38 fax relay calls for voice gateways with NextPort Digital Signal Processors (DSPs). The fax statistics and success indicator are available to CDRs through VSAs and added to the call log. These changes provide detailed CDRs that are useful for diagnostic purposes and give service providers more flexibility in their billing methods for fax relay calls.

RADIUS accounting functions allow statistics to be sent as VSAs at the start and end of sessions, indicating the amount of resources (such as time, packets, bytes, and so on) used during the session. These accounting records are recorded in CDRs. This feature adds several VSAs specifically for T.38 fax relay calls with SIP and H.323 signaling.

This feature interoperates with third-party gateways and therefore the Cisco gateway is able to report T.38 fax success and failure based on the following:

- Fax status end of document indicator
- Fax status received from TDM
- Fax status transmitted to TDM

The accounting template is expanded to include the new statistics so that the end user can choose the statistics they wish to use.

Table 4-5 lists (in alphabetical order) the T.38 fax-statistics VSAs used by Cisco voice products.

Table 4-5 VSAs Used by T.38 Fax Statistics

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description

faxrelay-ecm used=text	1	String
		Permissible strings:
		`Enabled`
		`Disabled`
			Disabled	Whether error correction mode is enabled.

faxrelay-encap protocol=text	1	String
		Permissible strings:
		`UDPTL`
		`FRF.11`
		`RTP`
			UDPTL	Encapsulation protocol used for fax transfer.

faxrelay-fax direction=text	1	String
		Permissible strings:
		`Transmit`
		`Receive`
			Transmit	Whether a fax was originated (transmit) or terminated (receive) by this gateway.

faxrelay-fax-success=text	1	String
		Permissible strings:
		`Success`
		`Indeterminate`
		`Fail`
			Success	Whether fax transfer was successful, the transfer failed, or indeterminate.

faxrelay-jit buf-overflow=value	1	Integer in decimal	3	Number of jitter buffer overflow events during the call.
faxrelay-max-jit depth=value	1	Integer in decimal	12	Depth of the jitter buffer, in ms.
faxrelay-rx pkts=value	1	Integer in decimal	0	Number of packets received.
faxrelay-tx pkts=value	1	Integer in decimal	412	Number of packets transmitted.
faxrelay-init hs modulation=text	1	String formatted as modulation/baud rate	V.17/14400	Initial high-speed modulation and baud rate negotiated at the time the call is connected.
faxrelay-mr hs modulation=text	1	String formatted as modulation/baud rate	V.17/14400	Most recent high-speed modulation and baud rate.
faxrelay-num of pages=value	1	Integer in decimal	2	Sum of the number of transmitted and received fax pages.

Table 4-5 VSAs Used by T.38 Fax Statistics (continued)

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description
faxrelay-nsf country code=text	1	String	Japan	NSF country code of local fax device; country name per T.35, Annex A.
faxrelay-nsf manuf code=text	1	String formatted as a series of 2-digit ASCII-encoded hexadecimal bytes; length varies; 64 characters max.	2412	NSF manufacturer code of local fax device.
faxrelay-pkt loss conceal=value	1	Integer in decimal	2	Packet loss concealment; number of white scan lines inserted (nonzero for outbound gateway only).
faxrelay-start-time	1	hh:mm:ss:mmm ZON DDD MMM ## YYYY	18:27:30:094 PST Fri Aug 25 2000	Fax start time in a call. There can be multiple fax start/stop time stamps in one call. Recorded for both VoIP and telephony call legs.
faxrelay-stop-time	1	hh:mm:ss:mmm ZON DDD MMM ## YYYY	18:27:30:094 PST Fri Aug 25 2000	Fax stop time in a call. There can be multiple fax start/stop time stamps in one call. Recorded for both VoIP and telephony call legs.

Internal Error Codes

Internal error codes (IEC) identify errors that cause a gateway to release or refuse to accept a call. The following example shows a partial RADIUS stop accounting record for an IEC:

```
[Vendor 9/1] cisco-avpair = "internal-error-code=1.1.179.2.37.0"
```

The IEC value takes the form of a dotted string of decimal numbers:

```
version.entity.category.subsystem.errorcode.diagnosticcode
```

Table 4-6 describes the six fields that identify the components of the IEC.

Table 4-6 IEC Field Descriptions

IEC Field	Description
version	IEC version. The value 1 indicates the current version.
entity	Network physical entity (hardware system) that generated the IEC. The value 1 is assigned to the gateway.
category	Error category, defined in terms of ITU-based Q.850 cause codes and VoIP network errors.
subsystem	Specific subsystem within the physical entity where the IEC was generated.
error code	Error code within the subsystem.
diagnostic code	Cisco internal diagnostic value. Report this value to Cisco TAC engineers.

VSA Release History

Table 4-7 lists each voice VSA (in alphabetical order) and the Cisco IOS release in which the VSA was introduced. Use this table when you configure the RADIUS server to understand which VSAs are supported, or if you want to upgrade to a later Cisco IOS release when new VSAs are introduced.

Table 4-7 VSA Release History

VSA Attribute String	First Cisco IOS Release
acom-level	12.2(11)T
authorized-services	12.2(11)T
backward-call-indicators	12.2(11)T
call-id	12.2(2)XB
calling-party-category	12.2(11)T
call-origin-endpt	12.2(11)T
call-origin-endpt-type	12.2(11)T
charged-units	12.2(11)T
charge-number	12.2(11)T
cisco-nas-port	12.0(7)T
codec-bytes	12.2(11)T
coder-type-rate	12.2(11)T
disconnect-text	12.2(11)T
early-packets	12.2(11)T
fax-tx-duration	12.2(11)T
faxrelay-ecm used	12.3(14)T
faxrelay-encap protocol	12.3(14)T
faxrelay-fax direction	12.3(14)T
faxrelay-fax-success	12.3(14)T
faxrelay-init hs modulation	12.3(14)T
faxrelay-jit buf-overflow	12.3(14)T
faxrelay-max-jit depth	12.3(14)T
faxrelay-mr hs modulation	12.3(14)T
faxrelay-nsf country code	12.3(14)T
faxrelay-nsf manuf code	12.3(14)T
faxrelay-num of pages	12.3(14)T
faxrelay-pkt loss conceal	12.3(14)T
faxrelay-rx pkts	12.3(14)T
faxrelay-tx pkts	12.3(14)T
faxrelay-start-time	12.2(11)T
faxrelay-stop-time	12.2(11)T

Table 4-7 VSA Release History (continued)

VSA Attribute String	First Cisco IOS Release
feature-vsa	12.4(4)XC, 12.4(9)T
gapfill-with-interpolation	12.2(11)T
gapfill-with-prediction	12.2(11)T
gapfill-with-redundancy	12.2(11)T
gapfill-with-silence	12.2(11)T
gk-xlated-cdn	12.2(11)T
gk-xlated-cgn	12.2(11)T
gw-collected-cdn	12.2(11)T
gtd-gw-rxd-cnn	12.2(11)T
gw-final-xlated-cdn	12.2(11)T
gw-final-xlated-cgn	12.2(11)T
gw-rxd-cdn	12.2(11)T
gw-rxd-cgn	12.2(11)T
h323-billing-model	12.0(7)T
h323-call-origin	12.0(7)T
h323-call-type	12.0(7)T
h323-conf-id	12.0(7)T
h323-connect-time	12.0(7)T
h323-credit-amount	12.0(7)T
h323-credit-time	12.0(7)T
h323-currency	12.0(7)T
h323-disconnect-cause	12.0(7)T
h323-disconnect-time	12.0(7)T
h323-gw-id	12.1(2)T
h323-incoming-conf-id	12.0(7)T
h323-ivr-in	12.1(2)T
h323-ivr-out	12.1(2)T
h323-preferred-lang	12.0(7)T
h323-prompt-id	12.0(7)T
h323-redirect-ip-address	12.0(7)T
h323-redirect-number	12.0(7)T
h323-remote-address	12.0(7)T
h323-remote-id	12.0(7)T
h323-return-code	12.0(7)T
h323-setup-time	12.0(7)T
h323-time-and-day	12.0(7)T

Table 4-7 VSA Release History (continued)

VSA Attribute String	First Cisco IOS Release
h323-voice-quality	12.0(7)T
hiwater-playout-delay	12.2(11)T
img-pages-count	12.2(11)T
in-carrier-id	12.2(11)T
incoming-area	12.2(11)T
incoming-req-uri	12.2(2)XB
info-type	12.2(11)T
in-intrfc-desc	12.2(11)T
in-portgrp-id	12.2(2)T
internal-error-code	12.3(4)T
in-trunkgroup-label	12.2(11)T
ip-pbx-mode	12.4(22)T
ip-phone-info	12.4(22)T
isup-carrier-id	12.2(11)T
late-packets	12.2(11)T
local-hostname	12.4(2)T
logical-if-index	12.2(11)T
lost-packets	12.2(11)T
lowater-playout-delay	12.2(11)T
method	12.2(2)XB
next-hop-dn	12.2(2)XB
next-hop-ip	12.2(2)XB
noise-level	12.2(11)T
ontime-rv-playout	12.2(11)T
originating-line-info	12.2(11)T
out-carrier-id	12.2(11)T
out-intrfc-desc	12.2(11)T
outgoing-area	12.2(11)T
outgoing-req-uri	12.2(2)XB
out-portgrp-id	12.2(2)T
out-trunkgroup-label	12.2(11)T
peer-address	12.2(11)T
peer-id	12.2(11)T
peer-if-index	12.2(11)T
prev-hop-ip	12.2(2)XB
prev-hop-via	12.2(2)XB

Table 4-7 VSA Release History (continued)

VSA Attribute String	First Cisco IOS Release
receive-delay	12.2(11)T
release-source	12.2(13)T
remote-media-address	12.2(2)XB
remote-media-id	12.2(2)XB
remote-media-udp-port	12.2(11)T
remote-udp-port	12.2(11)T
resource-service	12.2(11)T
round-trip-delay	12.2(11)T
session-protocol	12.2(2)XB
subscriber	12.1(5)T
transmission-medium-req	12.2(11)T
tx-duration	12.2(11)T
vad-enable	12.2(11)T
voice-tx-duration	12.2(11)T