



Support of DSP Voice Quality Statistics

Document Release History

Publication Date	Comments
March 31, 2006	Initial version of the document.
October 17, 2006	Updated media gateway list.

Feature History

Release	Modification
9.6(1)	This feature is introduced in Release 9.6(1)

This feature is described in the following sections:

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Feature Overview

The Cisco PSTN Gateway (PGW) 2200, when it is configured for call control mode, supports the collection of additional digital signal processor (DSP) statistics from Cisco media gateways in the PGW call detail records (CDRs). These DSP statistics are provided by various Cisco media gateways in the Media Gateway Control Protocol (MGCP) Delete Connection (DLCX) message. The collection of these statistics can be used to evaluate voice quality metrics within the Voice over IP (VoIP) network.

When you install the Cisco MGC software patch, CSCOnn026, the functionality for this feature is automatically activated. You do not have to make any configuration or provisioning changes to activate this feature. For details of the changes to the Cisco MGC software, proceed to the [“Billing Interface” section on page 4](#).

An IOS software feature, DSP Voice Quality in DLCX Messages, has modified the DSP statistics gathering function on Cisco media gateways. This feature provides a way to trace a MGCP call between a Cisco PGW 2200 and the Cisco IOS gateway by including the MGCP call ID and the DS0 and DSP channel ID in call-active and call-history records. These DSP statistics are sent as part of the MGCP Delete Connection (DLCX) message. By correlating an MGCP call on the Cisco PGW 2200 with the call record on the gateway, additional statistics from the DSP can be understood and debugged for problems related to voice quality. This feature also provides a method to limit the amount of statistics sent to the Cisco PGW 2200, to control the impact to call processing performance. The Support of DSP Voice Quality Statistics feature supports the gathering of the DSP voice quality statistics on the Cisco PGW 2200.

For more information on the DSP voice quality statistics that can be gathered on Cisco media gateways and how to configure the priority settings on the media gateway, refer to the [DSP Voice Quality Statistics in DLCX Messages](#) feature module.

Benefits

This feature provides the following benefits:

Improved Quality of Service Capability

The DSP voice quality statistics improve your ability to monitor, analyze, and ultimately meet your quality of service (QoS) objectives for your network.

Restrictions

We recommend that you do not enable the DSP Voice Quality Statistics in DLCX Messages feature on all of the media gateways associated with a single Cisco PGW 2200 pair. Doing so can severely impact the call processing ability of your system. You can use the statistics control function in the feature to limit the impact on call processing.

The DSP voice quality statistics are available in Cisco IOS release 12.4(4)T and can be used only with the following Cisco media gateways which use the c5510 DSP.

- Cisco 26xx (must use the NM-HDV2, NM-HD, or EVM-HDM)
- Cisco 36xx (must use the NM-HDV2, NM-HD, or EVM-HDM)
- Cisco 37xx (must use the NM-HDV2, NM-HD, or EVM-HDM)
- Cisco 28xx
- Cisco 38xx
- Cisco AS5350xm
- Cisco AS5351xm
- Cisco AS5400xm

Related Features and Technologies

This feature is related to the [DSP Voice Quality Statistics in DLCX Messages](#) feature that is implemented in Cisco IOS Release 12.4(4)T.

Related Documents

This document contains information that is related strictly to this feature. The documents that contain additional information related to the Cisco Media Gateway Controller (MGC) are listed below:

- [Release Notes for Cisco Media Gateway Controller Software Release 9.6\(1\)](#)
- [Cisco Media Gateway Controller Hardware Installation Guide](#)
- [Regulatory Compliance and Safety Information for the Cisco Media Gateway Controller](#)
- [Cisco Media Gateway Controller Software Release 9 Installation and Configuration Guide](#)
- [Cisco Media Gateway Controller Software Release 9 Provisioning Guide](#)
- [Cisco Media Gateway Controller Software Release 9 Dial Plan Guide](#)
- [Cisco Media Gateway Controller Software Release 9 MML Command Reference](#)
- [Cisco Media Gateway Controller Software Release 9 Messages Reference Guide](#)
- [Cisco Media Gateway Controller Software Release 9 Billing Interface Guide](#)
- [Cisco Media Gateway Controller Software Release 9.6\(1\) Management Information Base Guides](#)
- [Cisco Media Gateway Controller Software Release 9 Operations, Maintenance, and Troubleshooting Guide](#)
- [DSP Voice Quality Statistics in DLCX Messages](#)

Supported Platforms

The hardware platforms supported for the Cisco MGC software are described in the [Cisco Media Gateway Controller Hardware Installation Guide](#).

Supported Standards, MIBs, and RFCs

Standards

No new or modified standards are supported by this feature.

MIBs

No new or modified MIBs are supported by this feature.

For more information on the MIBs used in the Cisco MGC software, refer to the Cisco Media Gateway Controller Software Release 9 Management Information Base Guides.

RFCs

No new or modified RFCs are supported by this feature.

Prerequisites for Using this Feature

You must have Cisco MGC software Release 9.6(1), patch CSCOnn026 installed. Prerequisites for this release can be found in the *Release Notes for the Cisco Media Gateway Controller Software Release 9.6(1)*.

Billing Interface

The following call data elements (CDEs) were modified for this feature.

Originating Leg DSP Statistics (Tag: 4098)

Table 1 Originating Leg DSP Statistics Description Form

Name: Originating Leg DSP Statistics	Tag: 4098	Source: Engine
Description/Purpose: Provides DSP statistics for the originating leg of the call.		
Format: IA5	Length in Octets: 280 through 794	

Data Value:

An example of the statistics generated by the media gateway appears below:

```
OrigDSPstats...: DSP/TX: PK=data1, SG=data2, NS= data3, DU= data4, VO=,
                DSP/RX: VO= , SG= , CF= , RX= , BS= , BP= , LP= , EP= ,
                DSP/PD: CU= , MI= , MA= , CO= , IJ= ,
                DSP/PE: PC= , IC= , SC= , RM= , BO= , EE= ,
                DSP/LE: TP= , TX= , RP= , RM= , BN= , ER= , AC= , TA= , RA= ,
                DSP/ER: RD= , TD= , RC= , TC= ,
                DSP/IC: IC= ,.
```

In Release 9.6, the statistics are enhanced to support the DSP Voice Quality Statistics in DLCX Messages feature in Cisco IOS Release 12.4(4)T. The DSP Voice Quality Statistics feature introduces a priority setting on the media gateway that allows control of the impact of statistic generation. There are two priority values: 1, which limits the statistics generated by the media gateway, and 2, which enables all statistics to be generated.

An example of the appearance of the statistics generated when the media gateway is set to priority 1 appears below.

```
OrigDSPstats....: DSP/TX: PK=, SG=, NS=, DU=, VO=,
                DSP/RX: PK=, SG=, CF=, RX=, VO=, BS=, BP=, LP=, EP=,
                DSP/PD: CU=, MI=, MA=, CO=, IJ=,
                DSP/LE: TP=, TX=, RP=, RM=, BN=, ER=, AC=,
                DSP/EC: CI=, FM=, FP=, VS=, GT=, GR=, JD=, JN=, JM=, JX=,
                DSP/CS: CR=, AV=, MX=, CT=, TT=, OK=, CS=, SC=, TS=, DC=,
                DSP/DL: RT=, ED=
```

An example of the appearance of the statistics generated when the media gateway is set to priority 2 appears below.

```
OrigDSPstats....: DSP/TX: PK=, SG=, NS=, DU=, VO=,
                DSP/RX: PK=, SG=, CF=, RX=, VO=, BS=, BP=, LP=, EP=,
                DSP/PD: CU=, MI=, MA=, CO=, IJ=,
                DSP/PE: PC=, IC=, SC=, RM=, BO=, EE=,
                DSP/LE: TP=, TX=, RP=, RM=, BN=, ER=, AC=,
                DSP/ER: RD=, TD=, RC=, TC=,
                DSP/IC: IC=,
                DSP/EC: CI=, FM=, FP=, VS=, GT=, GR=, JD=, JN=, JM=, JX=,
                DSP/KF: KF=, AV=, MI=, BS=, NB=, FL=, NW=, VR=,
                DSP/CS: CR=, AV=, MX=, CT=, TT=, OK=, CS=, SC=, TS=, DC=,
                DSP/RF: ML=, MC=, R1=, R2=, IF=, ID=, IE=, BL=, R0=, VR=,
                DSP/UC: U1=, U2=, T1=, T2=,
                DSP/DL: RT=, ED=
```

Extended Data Value: No extended value.

General Information: This CDE is populated when an originating endpoint is controlled by the Cisco MGC software through the MGCP protocol and the associated MGCP media gateway is enabled to send DSP statistics to the Cisco MGC.

Information on the configuring DSP voice quality statistics on the media gateway and definitions for the various fields used in the statistics can be found in the [DSP Voice Quality Statistics in DLCX Messages](#) feature module.

MGC Release: Release 9.4(1) and later.

Support of the DSP voice quality statistics is added in Release 9.6(1), patch CSCOnn026.

Terminating Leg DSP Statistics (Tag: 4099)

Table 2 Terminating Leg DSP Statistics Description Form

Name: Terminating Leg DSP Statistics	Tag: 4099	Source: Engine
Description/Purpose: Provides DSP statistics for the terminating leg of the call.		
Format: IA5	Length in Octets: 280 through 794	

Data Value:

```
TermDSPstats.....: DSP/TX: PK=data1, SG=data2, NS= data3, DU= data4, VO=,
                    DSP/RX: VO= , SG= , CF= , RX= , BS= , BP= , LP= , EP= ,
                    DSP/PD: CU= , MI= , MA= , CO= , IJ= ,
                    DSP/PE: PC= , IC= , SC= , RM= , BO= , EE= ,
                    DSP/LE: TP= , TX= , RP= , RM= , BN= , ER= , AC= , TA= , RA= ,
                    DSP/ER: RD= , TD= , RC= , TC= ,DSP/IC: IC= ,.
```

In Release 9.6, the statistics are enhanced to support the DSP Voice Quality Statistics in DLCX Messages feature in Cisco IOS Release 12.4(4)T. The DSP Voice Quality Statistics feature introduces a priority setting on the media gateway that allows control of the impact of statistic generation. There are two priority values: 1, which limits the statistics generated by the media gateway, and 2, which enables all statistics to be generated.

An example of the appearance of the statistics generated when the media gateway is set to priority 1 appears below.

```
TermDSPstats.....: DSP/TX: PK=, SG=, NS=, DU=, VO=,
                    DSP/RX: PK=, SG=, CF=, RX=, VO=, BS=, BP=, LP=, EP=,
                    DSP/PD: CU=, MI=, MA=, CO=, IJ=,
                    DSP/LE: TP=, TX=, RP=, RM=, BN=, ER=, AC=,
                    DSP/EC: CI=, FM=, FP=, VS=, GT=, GR=, JD=, JN=, JM=, JX=,
                    DSP/CS: CR=, AV=, MX=, CT=, TT=, OK=, CS=, SC=, TS=, DC=,
                    DSP/DL: RT=, ED=
```

An example of the appearance of the statistics generated when the media gateway is set to priority 2 appears below.

```
TermDSPstats.....:DSP/TX: PK=, SG=, NS=, DU=, VO=,
                    DSP/RX: PK=, SG=, CF=, RX=, VO=, BS=, BP=, LP=, EP=,
                    DSP/PD: CU=, MI=, MA=, CO=, IJ=,
                    DSP/PE: PC=, IC=, SC=, RM=, BO=, EE=,
                    DSP/LE: TP=, TX=, RP=, RM=, BN=, ER=, AC=,
                    DSP/ER: RD=, TD=, RC=, TC=,
                    DSP/IC: IC=,
                    DSP/EC: CI=, FM=, FP=, VS=, GT=, GR=, JD=, JN=, JM=, JX=,
                    DSP/KF: KF=, AV=, MI=, BS=, NB=, FL=, NW=, VR=,
                    DSP/CS: CR=, AV=, MX=, CT=, TT=, OK=, CS=, SC=, TS=, DC=,
                    DSP/RF: ML=, MC=, R1=, R2=, IF=, ID=, IE=, BL=, R0=, VR=,
                    DSP/UC: U1=, U2=, T1=, T2=,
                    DSP/DL: RT=, ED=
```

Extended Data Value: No extended value.

General Information: This CDE is populated when a terminating endpoint is controlled by the Cisco MGC software through the MGCP protocol and the associated MGCP media gateway is enabled to send DSP statistics to the Cisco MGC.

Information on the configuring DSP voice quality statistics on the media gateway and definitions for the various fields used in the statistics can be found in the [DSP Voice Quality Statistics in DLCX Messages](#) feature module.

MGC Release: Release 9.4(1) and later.

Support of the DSP voice quality statistics is added in Release 9.6(1), patch CSCOnn026.

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation at this URL:

<http://www.cisco.com/techsupport>

You can access the Cisco website at this URL:

<http://www.cisco.com>

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

Product Documentation DVD

Cisco documentation and additional literature are available in the Product Documentation DVD package, which may have shipped with your product. The Product Documentation DVD is updated regularly and may be more current than printed documentation.

The Product Documentation DVD is a comprehensive library of technical product documentation on portable media. The DVD enables you to access multiple versions of hardware and software installation, configuration, and command guides for Cisco products and to view technical documentation in HTML. With the DVD, you have access to the same documentation that is found on the Cisco website without being connected to the Internet. Certain products also have .pdf versions of the documentation available.

The Product Documentation DVD is available as a single unit or as a subscription. Registered Cisco.com users (Cisco direct customers) can order a Product Documentation DVD (product number DOC-DOCDVD=) from the Ordering tool or Cisco Marketplace.

Cisco Ordering tool:

<http://www.cisco.com/en/US/partner/ordering/>

Cisco Marketplace:

<http://www.cisco.com/go/marketplace/>

Ordering Documentation

Beginning June 30, 2005, registered Cisco.com users may order Cisco documentation at the Product Documentation Store in the Cisco Marketplace at this URL:

<http://www.cisco.com/go/marketplace/>

Cisco will continue to support documentation orders using the Ordering tool:

- Registered Cisco.com users (Cisco direct customers) can order documentation from the Ordering tool:

<http://www.cisco.com/en/US/partner/ordering/>

- Instructions for ordering documentation using the Ordering tool are at this URL:
http://www.cisco.com/univercd/cc/td/doc/es_inpck/pdi.htm
- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 1 800 553-NETS (6387).

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You can send comments about Cisco documentation to bug-doc@cisco.com.

You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Cisco Product Security Overview

Cisco provides a free online Security Vulnerability Policy portal at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

From this site, you can perform these tasks:

- Report security vulnerabilities in Cisco products.
- Obtain assistance with security incidents that involve Cisco products.
- Register to receive security information from Cisco.

A current list of security advisories and notices for Cisco products is available at this URL:

<http://www.cisco.com/go/psirt>

If you prefer to see advisories and notices as they are updated in real time, you can access a Product Security Incident Response Team Really Simple Syndication (PSIRT RSS) feed from this URL:

http://www.cisco.com/en/US/products/products_psirt_rss_feed.html

Reporting Security Problems in Cisco Products

Cisco is committed to delivering secure products. We test our products internally before we release them, and we strive to correct all vulnerabilities quickly. If you think that you might have identified a vulnerability in a Cisco product, contact PSIRT:

- Emergencies—security-alert@cisco.com

An emergency is either a condition in which a system is under active attack or a condition for which a severe and urgent security vulnerability should be reported. All other conditions are considered nonemergencies.

- Nonemergencies—psirt@cisco.com

In an emergency, you can also reach PSIRT by telephone:

- 1 877 228-7302
- 1 408 525-6532



We encourage you to use Pretty Good Privacy (PGP) or a compatible product to encrypt any sensitive information that you send to Cisco. PSIRT can work from encrypted information that is compatible with PGP versions 2.x through 8.x.

Never use a revoked or an expired encryption key. The correct public key to use in your correspondence with PSIRT is the one linked in the Contact Summary section of the Security Vulnerability Policy page at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.htm

The link on this page has the current PGP key ID in use.

Obtaining Technical Assistance

Cisco Technical Support provides 24-hour-a-day award-winning technical assistance. The Cisco Technical Support & Documentation website on Cisco.com features extensive online support resources. In addition, if you have a valid Cisco service contract, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not have a valid Cisco service contract, contact your reseller.

Cisco Technical Support & Documentation Website

The Cisco Technical Support & Documentation website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, at this URL:

<http://www.cisco.com/techsupport>

Access to all tools on the Cisco Technical Support & Documentation website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

<http://tools.cisco.com/RPF/register/register.do>

**Note**

Use the Cisco Product Identification (CPI) tool to locate your product serial number before submitting a web or phone request for service. You can access the CPI tool from the Cisco Technical Support & Documentation website by clicking the **Tools & Resources** link under Documentation & Tools. Choose **Cisco Product Identification Tool** from the Alphabetical Index drop-down list, or click the **Cisco Product Identification Tool** link under Alerts & RMAs. The CPI tool offers three search options: by product ID or model name; by tree view; or for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco engineer. The TAC Service Request Tool is located at this URL:

<http://www.cisco.com/techsupport/servicerequest>

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)

EMEA: +32 2 704 55 55

USA: 1 800 553-2447

For a complete list of Cisco TAC contacts, go to this URL:

<http://www.cisco.com/techsupport/contacts>

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is “down,” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, documentation, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:
<http://www.cisco.com/go/marketplace/>
- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:
<http://www.ciscopress.com>
- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:
<http://www.cisco.com/packet>
- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:
<http://www.cisco.com/go/iqmagazine>
or view the digital edition at this URL:
<http://ciscoiq.texterity.com/ciscoiq/sample/>
- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:
<http://www.cisco.com/ipj>
- Networking products offered by Cisco Systems, as well as customer support services, can be obtained at this URL:
<http://www.cisco.com/en/US/products/index.html>
- Networking Professionals Connection is an interactive website for networking professionals to share questions, suggestions, and information about networking products and technologies with Cisco experts and other networking professionals. Join a discussion at this URL:
<http://www.cisco.com/discuss/networking>
- World-class networking training is available from Cisco. You can view current offerings at this URL:
<http://www.cisco.com/en/US/learning/index.html>

Glossary

Table 3 lists some acronyms used in this document.

Table 3 *Acronyms Used In This Document*

Term	Expansion
CDE	call data element
CDR	call detail record
DLCX	Delete Connection
DSP	digital signal processor
MGC	media gateway controller
MGCP	Media Gateway Control Protocol
PGW	PSTN Gateway
PSTN	public switched telephone network
QOS	quality of service
VoIP	Voice over Internet Protocol