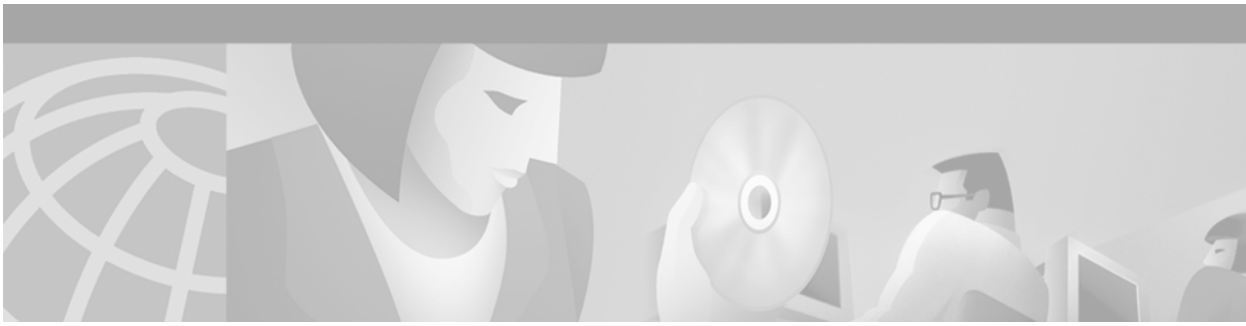

Fax Relay Packet Loss Concealment

Feature History

Release	Modification
12.1(3)T	This feature was introduced.
12.2(2)XB1	This feature was implemented on the Cisco AS5850 platform.

This feature module describes the Fax Relay Packet Loss Concealment feature for Cisco IOS Release 12.1(3)T. It includes information on the benefits of the new feature, supported platforms, related documents, and so forth.

Note This feature was first introduced in Cisco IOS Release 12.1(3)T. However, use Cisco IOS Release 12.1(3)XI for optimal performance.

- Feature Overview
- Supported Platforms
- Supported Standards, MIBs, and RFCs
- Prerequisites
- Configuration Tasks
- Command Reference
- Debug Commands
- Glossary

Feature Overview

This feature improves the current real-time Fax over IP (commonly known as fax relay) implementation in Cisco gateways, allowing fax transmissions to work reliably over higher packet loss conditions.

In addition, this feature includes enhanced real-time fax debug capabilities and statistics. These capabilities and statistics will give better visibility into the real-time fax operation in the gateway, allowing for improved field diagnostics and troubleshooting.

These improvements include configuration of fax relay Error Correction Mode (ECM) on the VoIP dial peer. ECM provides for error-free page transmission. This mode is available on fax machines which include memory for storage of the page data (usually high-end fax machines). The page is transmitted in a series of blocks. After receiving the complete page data, the receiving fax indicates any errored frames. The transmitting fax then retransmits these frames. This process is repeated until all frames are received without errors. If the receiving fax is not able to receive an error-free page, the fax transmission might fail and one of the fax machines disconnects. With packet loss levels greater than 2 percent, fax transmissions consistently fail between page transmissions when ECM is enabled.

When ECM is disabled, the page is sent using high-speed modulation in its raw encoded format. When detecting line errors with ECM disabled, the receiving fax has three options (in order of severity):

- Respond to page reception with ReTrain Positive command. This causes the transmitting fax to go through the training check process before transmitting the next page.
- Respond to the page reception with ReTrain Negative command. This causes the transmitting fax to go through the TCF process with a lower modulation scheme.
- Disconnect immediately.

Benefits

Improved Robustness of Facsimile Relay

Eliminates fax failures caused by excessive received page errors because of lost data. The call will continue to go through successfully.

Improved Field Diagnostics and Troubleshooting

Debugs and statistics give better visibility into the real-time fax operation in the gateway, allowing for improved field diagnostics and troubleshooting.

Restrictions

If you perform an excessive amount of debug operations at once for too many channels, it can affect performance.

Related Documents

Service Provider Features for Voice over IP

Supported Platforms

- Cisco AS5300
- Cisco AS5850

Supported Standards, MIBs, and RFCs

Standards

There are no new or modified standards for this feature.

MIBs

There are no new or modified MIBs for this feature.

For descriptions of supported MIBs and how to use MIBs, see the Cisco MIB web site on CCO at http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml.

RFCs

There are no new or modified RFCs for this feature.

Prerequisites

You must have VCWare 7.04 or higher.

Configuration Tasks

See the following sections for configuration tasks for the Fax Relay Packet Loss Concealment feature. Each task in the list indicates if the task is optional or required.

- Configuring ECM Disable

Configuring ECM Disable

Fax relay ECM disable is configured on the dial peer. When used, the DSP fax relay firmware disables ECM through modification of the DIS T.30 message. This is performed on DIS signals in both directions, so that ECM disable occurs with only one gateway configured with ECM disabled.

ECM disable is recommended if you have a known lossy network (especially with packet loss at two percent or greater) and if fax traffic is anticipated for that dial peer.

Table 1 ECM Disable

	Command	Purpose
Step 1	`Router# config term`	Enters terminal configuration mode.
Step 2	`Router(config)# dial-peer voice 99 voip`	Enters dial peer configuration mode for the VoIP dial peer.
Step 3	`Router(config-dial-peer)# fax-relay ecm disable`	Disables ECM.
Step 4	`Router(config-dial-peer)# exit`	Exits dial peer configuration mode.
Step 5	`Router(config)# exit`	Exits terminal configuration mode.

Table 2 ECM Enable

	Command	Purpose
Step 1	`Router# config term`	Enters terminal configuration mode.
Step 2	`Router(config)# dial-peer voice 99 voip`	Enters dial peer configuration mode for the VoIP dial peer.
Step 3	`Router(config-dial-peer)# no fax-relay ecm disable`	Enables ECM.
Step 4	`Router(config-dial-peer)# exit`	Exits dial peer configuration mode.
Step 5	`Router(config)# exit`	Exits terminal configuration mode.

Command Reference

This section documents new or modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.2 command reference publications.

- **fax-relay ecm disable**

fax-relay ecm disable

To disable fax-relay Error Correction Mode (ECM) on the VoIP dial peer, use the **fax-relay ecm disable** dial-peer configuration mode command. To disable, use the **no** form of this command.

fax-relay ecm disable

no fax-relay ecm disable

Syntax Description

This command has no arguments or keywords.

Defaults

Fax-relay ECM is enabled.

Command Modes

Dial peer configuration mode.

Command History

Release	Modification
12.1(3)T	This command was introduced.
12.2(2)XB1	This command was implemented on the Cisco AS5850 platform.

Usage Guidelines

When you enter this command, the DSP fax relay firmware disables ECM through modification of the Digital Information Signal (DIS) T.30 message. This is performed on DIS signals in both directions, so that ECM disable occurs with only one gateway configured with ECM disabled.

This setting is provisioned when the DSP channel starts fax relay and cannot be changed during the fax relay session.

Examples

The following configuration disables ECM on the voice dial peer:

```
Router(config-dial-peer)# fax-relay ecm disable
```

The following configuration enables ECM on the voice dial peer:

```
Router(config-dial-peer)# no fax-relay ecm disable
```

Debug Commands

This section documents modified **debug** commands. All other commands used with this feature are documented in the Cisco IOS Release 12.1 command reference publications.

- **debug fax relay t30**

debug fax relay t30

To display debug messages for T.30 real-time fax, use the **debug fax relay** command. To disable debugging, use the **no** form of this command.

debug fax relay t30 { **all | calling-number** *string* **| called-number** *string* **}**

no debug fax relay t30

Syntax Description

all	Enables debugging for all incoming and outgoing calls.
calling-number *string*	Enables debugging for incoming numbers that begin with a specified string of digits.
called-number *string*	Enables debugging for outgoing numbers that begin with a specified string of digits.

Defaults

Debugging is disabled.

Command History

Release	Modification
12.1(3)T	This command was introduced.
12.2(2)XB1	This command was implemented on the Cisco AS5850 platform.

Usage Guidelines

The incoming or outgoing numbers must be a valid E.164 destination. The period symbol (.) as a wild card should not be used. Instead of a wild card, leave the space blank to indicate that any numbers can be valid.

There are no limits to the number of debug entries. The number entered generates a match if the calling or called number matches up to the final number of the debug entry. For example, the 408555 entry would match 408555, 4085551, 4085551212, or any other number starting with 408555.

Examples

The following command enables debugging for any incoming calls starting with 408555:

```
Router# debug fax relay t30 calling-number 408555
Debugging fax relay t30 from 408555
```

The following command enables debugging for any calls received to a number starting with 555-1212:

```
Router# debug fax relay t30 called-number 4155551212
Debugging fax relay t30 to 4155551212
```

The following command displays all debug entries:

```
Router# show debug
Debugging fax relay t30 from 408555
Debugging fax relay t30 to 4155551212
Router#
```

Glossary

AAA—Authentication, authorization and accounting.

Baseband—A network technology in which only one carrier frequency is used (for example, Ethernet).

CLI—Command-line interface. Cisco IOS user command and configuration system.

D-channel—Signaling channel, pathway for out-of-band call control.

DIS—T.30 Digital Information Signal that provides the capabilities of a receiving fax machine.

DSP—Digital Signal Processor. Term used to refer to the actual microprocessor on which the modulation/demodulation process is to be executed.

ECM—Error Correction Mode. An option defined in T.30 and available in many fax machines on the market that allows a fax page to be broken into HDLC-like frames that allow transmission errors to be detected.

ECM Disable—Feature that disables ECM capability advertised in fax DIS signal.

FEC—Forward Error Correction.

Gatekeeper—A gatekeeper maintains a registry of devices in the multimedia network. The devices register with the gatekeeper at startup and request admission to a call from the gatekeeper.

The gatekeeper is an H.323 entity on the LAN that provides address translation and control access to the LAN for H.323 terminals and gateways. The gatekeeper may provide other services to the H.323 terminals and gateways, such as bandwidth management and locating gateways.

Gateway—H.323 VoIP gateway is the point at which a circuit-switched call is encoded and repackaged into IP packets.

H.323 RAS—Registration, Admission, and Status. The RAS signaling function performs registration, admissions, bandwidth changes, status, and disengage procedures between the VoIP Gateway and Gatekeeper.

HSRP—Hot Standby Router Protocol. Previously existing protocol for failover to standby router in a redundant router configuration.

IVR—Interactive Voice Response, in which the system plays a message to the calling party, and may also collect information from (interact with) the calling party.

MIB—Management Information Base, data available to SNMP.

MSLT—Minimum Scan Line Time is set by the receiving fax machine and transmitted to the sending machine during the initial handshaking. MSLT defines how much time the receiving machine requires to print a single scan line.

MSLT adjustment—Minimum Scan Line Time adjustment. An alternative to Scan Line Fix Up meant to eliminate fax failures caused by excessive received page errors because of data loss. MSLT adjustment sets a minimum MSLT value that an ingress gateway communicates to a sending fax machine. This value overrides an MSLT of lesser value that is supplied by a receiving fax machine.

PBX—Private branch exchange.

PRI—ISDN Primary Rate Interface.

PSTN—Public Switched Telephone Network.

Scan Line Fix Up—Mechanism used for non-ECM calls meant to eliminate fax failures caused by excessive received page errors because of data loss. If data loss is detected, the data of the current scan line is discarded and replaced with the previous line or white space.

T.30—Describes the overall procedure for establishing and managing communication between two fax machines.

T.38—Defines procedures for real-time Group 3 facsimile communication over IP networks.

VoIP—Voice over IP.