



V.44 LZJH Compression for Cisco AS5350, Cisco AS5400, and Cisco AS5850 Universal Gateways, and Cisco AS5800 Universal Access Servers

Feature History

Release	Modification
12.2(2)XA	This feature was introduced for use with NextPort firmware on Cisco AS5350 and Cisco AS5400 universal gateways.
12.2(2)XB	This feature was supported with Cisco IOS Release 12.2(2)XB.
12.2(2)XB1	This feature was supported with Cisco IOS Release 12.2(2)XB1 on Cisco AS5800 and Cisco AS5850.
12.2(11)T	This feature was integrated into Cisco IOS Release 12.2(11)T and support was added for the Cisco AS5350, Cisco AS5400, Cisco AS5800, and Cisco AS5850 platforms.

This feature module introduces the V.44 Lempel-Ziv-Jeff-Heath (LZJH) compression algorithm International Telecommunication Union Telecommunication Standardization Sector (ITU-T) standard on NextPort/DFC-108NP-bearing platforms using Cisco IOS Release 12.2(2)XB1 or 12.2(11)T.

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Feature Overview

V.44 LZJH is a new compression standard based on Lempel-Ziv that uses a new string-matching algorithm that increases upload and download speeds to make Internet access and Web browsing faster. The V.44 call success rate (CSR) is similar to V.42bis with significant compression improvement for most file types, including HTML files. V.44 applies more millions of instructions per second (MIPS) than V.42bis toward the same application data stream and yields better compression rates in almost any data stream in which V.42bis shows positive results.

V.44 supports automatic switching between compressed and transparent modes on NextPort DFC-108NP-bearing platforms. Automatic switching allows overall performance gain without loss in throughput for file streams that are not compressible.

V.44 is globally controlled through dialed number ID service (DNIS), calling line ID (CLID), and resource pool manager server (RPMS) virtual groups, and performance improvement is determined by the LZJH algorithms. The NextPort Dial Feature Card (DFC) is responsible for the ITU implementation of V.44 and the collection of statistics related to the new feature.

The Cisco AS5800 uses the NextPort high density dial termination card to implement this feature. Both voice and dial technologies are supported when used in a Cisco 5850 universal gateway.

To support V.44 LZJH compression, the control switch module (CSM) has been modified. MIBs that show the status of V.42bis have been extended to show V.44 configuration status. New disconnect reasons help manage V.44 session status and debugging.

Disconnect Reasons

New token errors are derived from the V.42bis and V.44 recommendations:

- Negotiation error—Posted if the client modem tries to negotiate an invalid data compression parameter (string, history, or dictionary size). Such errors occur when a modem is attempting to establish a call. This error carries a disconnect reason of 18 (0x012).
- Compression error—Posted when there is a run-time error in the compression software. If the compression software hits a case that should never occur, the call is dropped. Compression errors can occur in the compressor or the decompressor. Compression errors are carried out in data mode. This error carries a disconnect reason of 19 (0x013).

V.44 compression errors are defined by the following disconnect reasons:

- 0x00A Illegal Token—Illegal Stepup (Codeword).
- 0x00B Illegal Token—Empty Node
- 0x00C Illegal Token—Token Too Large
- 0x00D Illegal Token—Reserved Command
- 0x00E Illegal Token—Illegal Stepup (Character Size)
- 0x00F Illegal Token—Rx Dict Full w/o Reset
- 0x010 Illegal Token—Rx Hist Full w/o Reset
- 0x011 Illegal Token—Rx String Size Exceeded
- 0x012 Negotiation Error, see diagnostic data for further details
- 0x013 Compression Error, see diagnostic data for further details

**Note**

Most V.44 disconnect reasons report additional data in the 8-byte diagnostic field shown in the modem logs.

AT Commands and S-Registers

V.44 compressor/decompressor optimizes throughput and the call success rate (CSR) using standard **AT** command interface. New **AT** commands are provided so that V.44 can be enabled or disabled at the modem level. Modemcaps (dial in) or chat scripts (dial out) are required to enable or disable V.44 globally on the access server.

The **AT** command interface supports new S-registers for tuning V.44 negotiation parameters and lets you monitor V.44 configuration and session status. The **ATSn=v AT** command is used to configure V.44, and the **ATSn?**, **AT%R**, and **AT\S** commands are used for obtaining V.44 status. These commands modify the operation of S21 to enable and disable the algorithm. [Table 1](#) shows the S21 register values, while [Table 2](#) shows additional S-register values used with the V.44 feature. V.44 is enabled by default.

Table 1 *Changed S-Register Values*

Name	Register	Index	Default	New Values
Data Compression	S21	0x800b	15	Bit 2: V.44 Tx Bit 3: V.44 Rx

Table 2 *New S-Register Values*

Name	Register	Index	Default	Description
V.44 Max Tx Codewords	S65	0x8042	2048	256-2048
V.44 Max Rx Codewords	S66	0x8043	2048	256-2048
V.44 Max Tx String Length	S67	0x8044	255	32-255 characters
V.44 Max Rx String Length	S68	0x8045	255	32-255 characters
V.44 Max Tx History Size	S69	0x8046	10240	256-10240 bytes
V.44 Max Rx History Size	S70	0x8047	10240	256-10240 bytes

For more information about the new S-registers and **AT** commands that control the V.44 feature, refer to [AT Command Set and Register Summary for NextPort Platforms](#).

Benefits

Increased Modem Throughput

V.44 provides increased modem throughput for compressible data streams. V.44 provides speedier downloads and uploads for most data stream types. For example, e-mail, Web page, .rtf, and ASCII downloads and uploads are noticeably faster. This speed enhances modem-centered use of ports without requiring user input.

No Negative Impact on Modem Density or Systems Not Running V.44

DFC-108NP-bearing modems support V.44 without negatively impacting other modem channels, other modem features, or modem density. There is no impact on software subset feature packages or other existing NextPort features.

Restrictions

- Configuration of these features using S-registers is carried out by using modemcaps (AT commands). Cisco IOS software does not check these values to guarantee that they are valid.
- Improvement in compression over V.42bis is a result of higher MIPs requirements for V.44.
- Cisco IOS software is packaged as multiple program image types with varying capabilities. Because not all modem interfaces support V.44 and because images may be built to support specific modem types, not all software images contain functions to control V.44. In addition, the modems that do support V.44 implement their control functions differently. Therefore, registry functions are used to interface between local authorization and V.44 control for modems.

Related Features and Technologies

- V.92 Modem on Hold
- V.92 Quick Connect
- Mindspeed CSMv6 hardware solution

Related Documents

- *AT Command Set and Register Summary for NextPort Platforms*
- Cisco AS5350 documentation index
- Cisco AS5400 documentation index
- Cisco AS5800 documentation index
- Cisco AS5850 documentation index
- Cisco AS5800 Universal Access Server Release Notes
- Cisco IOS Release 12.2 Master Indexes
- *Comparing NextPort SPE Commands to MICA Modem Commands*
- *Managing Port Services on the Cisco AS5400 Universal Access Server*
- *Managing and Troubleshooting the NextPort Dial Feature Card*
- New Features in Release 12.2(2)XB
- *Release Notes for Cisco AS5350 Universal Gateways for Cisco IOS Release 12.2 XA*
- *Release Notes for Cisco AS5350 and AS5350HPX Universal Gateways for Cisco IOS Release 12.2 XB*
- Cisco IOS Release 12.2T Cross-Platform Release Notes
- *SPE and Firmware Download Enhancements*

- *V.92 Modem on Hold for Cisco AS5350, Cisco AS5400, and Cisco AS5850 Universal Gateways and Cisco AS5800 Universal Access Servers*
- *V.92 Quick Connect for Cisco AS5350, Cisco AS5400, and Cisco AS5850 Universal Gateways and Cisco AS5800 Universal Access Servers*

Supported Platforms

- Cisco AS5350
- Cisco AS5400
- Cisco AS5800
- Cisco AS5850

Table 3 Cisco IOS Release and Platform Support for this Feature

Platform	12.2(2)XA	12.2(2)XB	12.2(2)XB1	12.2(11)T
Cisco AS5350	X	X	X	X
Cisco AS5400	X	X	X	X
Cisco AS5800	Not supported	Not supported	X	X
Cisco AS5850	Not supported	Not supported	X	X

Determining Platform Support Through Cisco Feature Navigator

Cisco IOS software is packaged in feature sets that support specific platforms. To get updated information regarding platform support for this feature, access Cisco Feature Navigator. Cisco Feature Navigator dynamically updates the list of supported platforms as new platform support is added for the feature.

Cisco Feature Navigator is a web-based tool that enables you to determine which Cisco IOS software images support a specific set of features and which features are supported in a specific Cisco IOS image. You can search by feature or release. Under the release section, you can compare releases side by side to display both the features unique to each software release and the features in common.

To access Cisco Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions at <http://www.cisco.com/register>.

Cisco Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Cisco Feature Navigator home page at the following URL:

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

Availability of Cisco IOS Software Images

Platform support for particular Cisco IOS software releases is dependent on the availability of the software images for those platforms. Software images for some platforms may be deferred, delayed, or changed without prior notice. For updated information about platform support and availability of software images for each Cisco IOS software release, refer to the online release notes or, if supported, Cisco Feature Navigator.

Supported Standards, MIBs, and RFCs

Standards

- V.44
- V.92 Modem on Hold
- V.92 Quick Connect

MIBs

- CISCO-MODEM-MGMT-MIB
- CISCO-CALL-TRACKER-MODEM-MIB

To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:

<http://tools.cisco.com/ITDIT/MIBS/servlet/index>

If Cisco MIB Locator does not support the MIB information that you need, you can also obtain a list of supported MIBs and download MIBs from the Cisco MIBs page at the following URL:

<http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>

To access Cisco MIB Locator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

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

RFCs

No new or changed RFCs are supported by this feature.

Prerequisites

- Cisco IOS Release 12.2(2)XA, 12.2(2)XB1, or 12.2(11)T
- Minimum of 32K memory needed for bundled Cisco NextPort firmware
- Additional data space needed on the modem module (refer to NextPort documentation)
- Basic configuration of the Cisco AS5350, Cisco AS5400, Cisco AS5850, or Cisco AS5800
- Upgraded modem firmware
- NextPort DFC installed

Configuration Tasks

V.44 is enabled and disabled using the standard **AT** commands and **S**-registers. The **AT** command interface supports new **S**-registers for tuning V.44 negotiation parameters and for providing V.44 configuration and session status. V.44-capable portware defaults to all data compressions enabled (S21=15). With this setting, if V.42 frames are detected, V.44 negotiation is attempted first with a fallback to V.42bis. If MNP frames are detected, V.42bis is negotiated with a fallback to MNP5.

When configurations other than the default are required, use the **AT** interface to set V.44-specific S-registers to one of the values detailed in [Table 4](#). To configure V.44 compression in only the TX direction, for example, set S21 to 4. To configure V.44 in only the Rx direction, set S21 to 8.

**Note**

Some clients do not support compression in only one direction. Such modems disconnect if the server is configured only for compression in one direction.

Use the **ATSn=v** command to configure V.44. The following **AT** commands can be used for obtaining V.44 status: **ATSn?**, **AT%R**, and **AT\S**.

The **ATSn=v** command sets S-registers that tune V.44 session parameters.

Table 4 V.44 S-Registers

Name	Register	Index	Default	Description
Data Compression	S21	NextPort 0x800b	0xf	Bit 2: V.44 Tx Bit 3: V.44 Rx
V.44 Max Tx Codewords	S65	NextPort 0x8042	2048	256-2048
V.44 Max Rx Codewords	S66	NextPort 0x8043	2048	256-2048
V.44 Max Tx String Length	S67	NextPort 0x8044	255	32-255 characters
V.44 Max Rx String Length	S68	NextPort 0x8045	255	32-255 characters
V.44 Max Tx History Size	S69	NextPort 0x8046	10240	512-15000 bytes
V.44 Max Rx History Size	S70	NextPort 0x8047	10240	512-15000 bytes

To disable V.44, enter the **ATSn=v** command to set S-register 21 to a value that does not support V.44 (0, 1, 2, or 3).

**Note**

ATS21 is a bit-mapped register, and combinations of compression standards are valid.

Configurations have precedence in the following order: V.44, V.42bis, none, or V.42, MNP5, none.

For more information about the **AT** commands and S-registers used to control the V.44 feature, refer to *AT Command Set and Register Summary for NextPort Platforms*.

Configuration Examples

None

For information about configuration, refer to the following documents:

- *V.92 Modem on Hold for Cisco AS5350, Cisco AS5400, and Cisco AS5850 Universal Gateways and Cisco AS5800 Universal Access Servers*
- *V.92 Quick Connect for Cisco AS5350, Cisco AS5400, and Cisco AS5850 Universal Gateways and Cisco AS5800 Universal Access Servers*

Command Reference

None

Glossary

CLID—calling line ID.

CSMv6—Mindspeed modem hardware solution.

CSR—call success rate.

DFC—dial feature card.

DNIS—dialed number ID service.

DSP—Digital Signal Processor. Microprocessor on which the modulation/demodulation process is carried out.

host—The platform in which the modem is installed. Usually used in the context of an interface declaration or definition. Cisco IOS software is enabled on the host.

ITU-T—International Telecommunication Union Telecommunication Standardization Sector.

Lempel-Ziv algorithm (LZ)—A compression algorithm, based on a dynamically encoded dictionary, that replaces a continuous stream of characters with codes. The symbols represented by the codes are stored in memory in a dictionary-style list. LZ-style compression is used in a number of compression algorithms, such as Stacker (STAC) compression. In contrast, statistical compression methods use a fixed and, oftentimes, a non adaptive encoding method, which is best used where data is consistent and predictable.

LZJH—Lempel-Ziv-Jeff-Heath data compression algorithm used in V.44.

MICA—Modem ISDN channel aggregation. Modem module and card used in the Cisco AS5300 universal access servers. A MICA modem provides an interface between an incoming or outgoing digital call and ISDN telephone line; the call does not have to be converted to analog, as it does with a conventional modem and an analog telephone line. Each line can accommodate, or aggregate, up to 24 (T1) or 30 (E1) calls.

MICA modem—An installed Cisco MICA system. A single modem instance on that system.

MIPs—millions of instructions per second.

modem—A device with generic modem functionality. A single modem instance on a Cisco MICA system. The modem with which the host is currently conversing (the host knows with which modem it is exchanging mail and commands at any particular time). Command descriptions might say that a command is issued to “the modem.”

MOH—Modem on Hold functionality specified in V.92.

NextPort—Device driver architecture for Cisco IOS software that supports the NextPort hardware and software interfaces. Supports the Universal Port concept.

PCM—pulse code modulation.

universal port—Concept of a single device that can terminate one digital signal level zero (DS-0) with a data modem, fax modem, ISDN, or voice solution.

QC—Quick Connect functionality specified in V.92

RPMS—resource pool manager server.

V.44—ITU modem standard for LZJH data compression algorithm.

V.92—ITU modem standard that contains Quick Connect and Modem On Hold.

