

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
27 October 2005 (27.10.2005)

PCT

(10) International Publication Number  
**WO 2005/101717 A3**

(51) International Patent Classification:  
**H03M 13/15** (2006.01) **H04L 12/56** (2006.01)

(21) International Application Number:  
PCT/US2005/011799

(22) International Filing Date: 8 April 2005 (08.04.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
10/824,181 13 April 2004 (13.04.2004) US

(71) Applicant (for all designated States except US): **CISCO TECHNOLOGY, INC.** [US/US]; 170 West Tasman Drive, San Jose, CA 95134 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **CHAWLA, Mukul** [IN/US]; 1640 Willow Lake Lane, San Jose, CA 95131 (US). **WAGHOLIKAR, Sarang** [IN/US]; 444 Saratoga Avenue, Apt. No.1-C, Santa Clara, CA 95050 (US).

(74) Agent: **KWAN, Godfrey, K.**; Beyer Weaver & Thomas, LLP, P.O. Box 70250, Oakland, CA 94612-0250 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

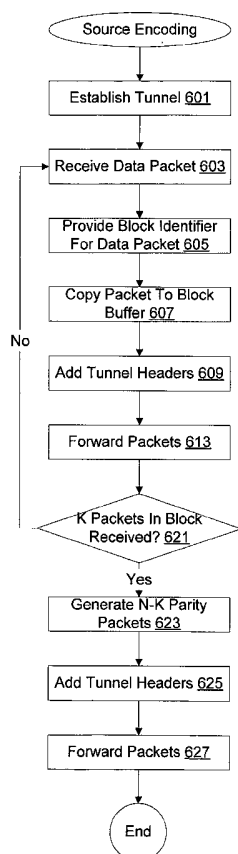
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

[Continued on next page]

(54) Title: FORWARD ERROR CORRECTION IN PACKET NETWORKS



(57) Abstract: Methods and apparatus are provided to allow reliable data transport in a packet-based network. A network node encodes (621) error correction packets associated with data packets at a network-layer and forwards (627) the error correction packets with the data packets. The error correction packets are decoded (723) as needed to recover data packets lost or dropped during transmission. The mechanisms are applicable for unicast and multicast networks and function even with network topology changes.



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**(88) Date of publication of the international search report:**

26 October 2006

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/11799

## A. CLASSIFICATION OF SUBJECT MATTER

IPC: H03M 13/15( 2006.01);H04L 12/56( 2006.01)

USPC: 714/776

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 714/776

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 6,243,846 B1 (SCHUSTER et al) 05 June 2001 (05.06.2001), see the abstract, column 3 line 62 to column 4 line 11, column 7 lines 9-12, and column 9 lines 23-27.	1-7, 9, 16-27 ----- 10, 11, 13, 14
X --- Y	FELDMER, et al., Protocol Boosters, IEEE Journal on Selected Areas in Communications, Vol. 16, No. 2, April 1998, pages 437-444, especially the paragraphs 1-2 of part IIA on page 438, paragraph 2 of part IID on page 439, and paragraphs 2-4 of part V on page 442.	1-9, 15-27 ----- 10-14
Y	US 6,061,650 A (MALKIN et al) 09 May 2000 (09.05.2000), see the abstract, column 1 lines 38-50, and column 6 lines 46-54.	10-14
Y	US 6,151,628 A (XU et al) 21 November 2000 (21.11.2000), see the abstract, and column 4 line 27 to column 5 line 8.	10, 11, 13, 14
Y,E	US 6,732,314 B1 (BORELLA et al) 04 May 2004 (04.05.2004), see the abstract, and column 6 line 49 to column 7 line 15.	1-27

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

06 July 2006 (06.07.2006)

Date of mailing of the international search report

01 SEP 2006

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, Virginia 22313-1450

Facsimile No. (571) 273-3201

Authorized officer

Stephen M. Baker

Telephone No. (703) 305-3800