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Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

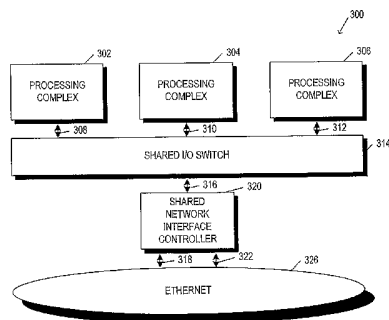
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- with international search report
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[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR A SHARED I/O NETWORK INTERFACE CONTROLLER



(57) Abstract: An apparatus and method is provided for interfacing a number of computer servers (or operating system domains) (302, 304, 306) to a network such as Ethernet (326) through a shared network interface controller (NIC) (320) which is part of the load-store architecture of the operating system domains. The network interface controller (320) includes a bus interface to couple the controller to a load-store domain bus (such as PCI-Express), the bus including header information to associate data on the bus with an originating operating system domain. The controller also includes transmit/receive logic to connect it to the network. In between the bus interface and the transmit-receive logic is buffering to temporarily store data coming either from the system domains or the network. The buffered data coming from the operating system domains or the network. The buffered data is tagged within an identifier, to associate it with one or more of the operating system domains. Association logic is further provided to allow the controller to designate, and later lookup which destination MAC address (on the ethernet side) is associated with which operating system domain. Control Status Registers (CSR's) specific to an operating system domain are duplicated and made available for each domain. Descriptor Register files are also duplicated for each operating system domain. A number of direct memory access (DMA) engines are provided to improve throughput. And, packet replication logic, along with filters (perfect and hash) and VLAN tables are used for looping back packets originating from one of the operating system domains to one or more of the operating systems domains, for server communication, multicast and broadcast operations.

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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.

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER INV. H04L12/413 H04L29/06 H04L29/12 G06F13/38 G06F9/46		
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) H04L G06F		
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 practical, search terms used) EPO-Internal, WPI Data, PAJ		
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 2003/217183 A1 (RIMMER TODD ET AL) 20 November 2003 (2003-11-20) abstract paragraphs [0003], [0009], [0010] paragraphs [0012] - [0021] paragraphs [0055] - [0067] paragraphs [0074], [0087] paragraphs [0092] - [0095] ----- -/--	1-9, 44-46 10-43, 47-49, 84-89, 91-97
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.		
<input checked="" type="checkbox"/> 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 document but 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 16 February 2006	Date of mailing of the international search report 26.04.06	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Buhleier, R	

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International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 574 691 A (INTERNATIONAL BUSINESS MACHINES CORPORATION) 22 December 1993 (1993-12-22)	1-9, 44-46
A	abstract column 6, line 1 - column 8, line 3 column 9, line 1 - line 22 column 9, line 51 - column 10, line 38 column 12, line 4 - line 50 column 18, line 10 - line 55 column 20, line 20 - line 54 column 26, line 27 - column 28, line 41 figures 3,5,6,16A	10-43, 47-49, 84-89, 91-97
Y	"FABRICS AND APPLICATION CHARACTERISTICS FOR ADVANCED TCA ARCHITECTURES" INTEL TECHNOLOGY JOURNAL, XX, US, vol. 7, no. 4, 14 November 2003 (2003-11-14), pages 1-14, XP002328193 figure 1 page 21, left-hand column, paragraph 2	10-26
Y	US 2002/186694 A1 (MAHAJAN UMESH ET AL) 12 December 2002 (2002-12-12) paragraphs [0016], [0023] - [0026]; figures 2-4	27-34, 47-49, 84-89, 91-95
Y	US 5 790 807 A (FISHLER ET AL) 4 August 1998 (1998-08-04) column 10, line 7 - column 11, line 54	35-43, 96,97
A	US 6 640 206 B1 (CALLENDER ROBIN LYNN ET AL) 28 October 2003 (2003-10-28) figures 1-4 column 2, line 3 - line 52 column 4, line 44 - line 63 column 5, line 40 - column 6, line 42	1-49, 84-89, 91-97
A	US 2002/052914 A1 (ZALEWSKI STEPHEN H ET AL) 2 May 2002 (2002-05-02) abstract; figures 2,9-13 paragraphs [0001], [0007] - [0009], [0040] paragraphs [0258] - [0272]	1-49, 84-89, 91-97
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INTERNATIONAL SEARCH REPORT

Int'l application No
PCT/US2005/027267

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PURANIK K S: "ADVANCED SWITCHING EXTENDS PCI EXPRESS" XCELL JOURNAL, XX, XX, 2003, pages 1-3, XP002328192 the whole document -----	1-49, 84-89, 91-97
A	US 2002/099901 A1 (TANAKA ATSUSHI ET AL) 25 July 2002 (2002-07-25) paragraphs [0011], [0037] -----	1-49, 84-89, 91-97

INTERNATIONAL SEARCH REPORT

International application No.
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Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-49, 84-89, 91-97

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
 No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-49,84-89,91-97

Shareable network interface controller and corresponding methods for associating communications between a network and a plurality of operating system domains

2. claims: 50-83

A network interface controller within each of a plurality of operating system domains

3. claim: 90

Blade server environment

4. claims: 98-109

Shared network interface controller and method for determining loopback conditions

INTERNATIONAL SEARCH REPORT

International application No
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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