AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court **WESTERN DISTRICT OF TEXAS, WACO DIVISION** on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:22-cv-00321	3/25/2022	WESTERN DISTRICT OF TEXAS, WACO DIVISION

PLAINTIFF	DEFENDANT
LS Cloud Storage Technologies, LLC	Microsoft Corporation

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	US 6,549,988	4/15/2003	LS Cloud Storage Technologies, LLC
2	US 10,154,092	12/11/2018	LS Cloud Storage Technologies, LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
8/31/2022 Order granting motion to transfer to Austin Division (document #24).

CLERK	(BY) DEPUTY CLERK	DATE
Philip J. Devlin	Jennifer Velasquez	08/31/2022

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court **Western District of Texas, Waco Division** on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:22-cv-00845	8/8/2022	Western District of Texas, Waco Division

PLAINTIFF	DEFENDANT
LS CLOUD STORAGE TECHNOLOGIES, LLC	CISCO SYSTEMS, INC.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	US 10,1554,092	12/11/2018	LS CLOUD STORAGE TECHNOLOGIES, LLC
2	US 6.549.988	4/15/2003	LS CLOUD STORAGE TECHNOLOGIES, LLC
3	US 8,225,002	7/17/2012	LS CLOUD STORAGE TECHNOLOGIES, LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas, Waco Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:22-cv-00318	3/25/2022	Western District of Texas, Waco Division

PLAINTIFF	DEFENDANT
LS CLOUD STORAGE TECHNOLOGIES, LLC	GOOGLE LLC

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	US 10,154,092	12/11/2018	LS CLOUD STORAGE TECHNOLOGIES, LLC
2			
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas, Waco Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:22-cv-00316	3/25/2022	Western District of Texas, Waco Division

PLAINTIFF	DEFENDANT
LS CLOUD STORAGE TECHNOLOGIES, LLC	AMAZON.COM, INC, AMAZON WEB SERVICES, INC., and AMAZON.COM SERVICES, INC.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	US 10,154,092	12/11/2018	LS CLOUD STORAGE TECHNOLOGIES, LLC
2	US 6,549,988	4/15/2003	LS CLOUD STORAGE TECHNOLOGIES, LLC
3			
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court WESTERN DISTRICT OF TEXAS, WACO DIVISION on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:22-cv-00321	3/25/2022	WESTERN DISTRICT OF TEXAS, WACO DIVISION

PLAINTIFF	DEFENDANT
LS Cloud Storage Technologies, LLC	Microsoft Corporation

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	US 6,549,988	4/15/2003	LS Cloud Storage Technologies, LLC
2	US 10,154,092	12/11/2018	LS Cloud Storage Technologies, LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
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DECISION/JUDGEMENT

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Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

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Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas, Waco Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:22-cv-00319	3/25/2022	Western District of Texas, Waco Division

PLAINTIFF	DEFENDANT
LS CLOUD STORAGE TECHNOLOGIES, LLC	CISCO SYSTEMS, INC.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	US 10,154,092	12/11/2018	LS CLOUD STORAGE TECHNOLOGIES, LLC
2	US 6,549,988	4/15/2003	LS CLOUD STORAGE TECHNOLOGIES, LLC
3	US 8,2215,002	7/17/2012	LS CLOUD STORAGE TECHNOLOGIES, LLC
4			
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/997,327	12/11/2018	10154092	4056-0001	5295

60533 7590 11/20/2018

TOLER LAW GROUP
TOLER LAW GROUP
8500 BLUFFSTONE COVE
SUITE A201
AUSTIN, TX 78759

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 237 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Ilya Gertner, Long Beach, CA;
LS CLOUD STORAGE TECHNOLOGIES, LLC, LONGVIEW, TX;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 7 of 289

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

60533 7590 10/11/2018

TOLER LAW GROUP
TOLER LAW GROUP
8500 BLUFFSTONE COVE
SUITE A201
AUSTIN, TX 78759

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/997,327	01/15/2016	Ilya Gertner	4056-0001	5295

TITLE OF INVENTION: DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	MICRO	$250	$0.00	$0.00	$250	01/11/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
TIV, BACKHEAN	2459	709-216000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 Toler Law Group, PC
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: LS CLOUD STORAGE TECHNOLOGIES, LLC

(B) RESIDENCE: (CITY and STATE OR COUNTRY): LONGVIEW, TEXAS

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☑ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☑ Issue Fee

☐ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

☐ A check is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number 502469 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☑ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Jeffrey G. Toler/ Date 2018-11-05

Typed or printed name Jeffrey G. Toler Registration No. 38,342

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 8 of 289

Electronic Patent Application Fee Transmittal

Application Number:	14997327
Filing Date:	15-Jan-2016
Title of Invention:	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS
First Named Inventor/Applicant Name:	Ilya Gertner
Filer:	Jeffrey G. Toler/Jason D. Smith
Attorney Docket Number:	4056-0001

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	2501	1	500	500

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**500**

Electronic Acknowledgement Receipt	
EFS ID:	34216636
Application Number:	14997327
International Application Number:	
Confirmation Number:	5295
Title of Invention:	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS
First Named Inventor/Applicant Name:	Ilya Gertner
Customer Number:	60533
Filer:	Jeffrey G. Toler/Jason D. Smith
Filer Authorized By:	Jeffrey G. Toler
Attorney Docket Number:	4056-0001
Receipt Date:	05-NOV-2018
Filing Date:	15-JAN-2016
Time Stamp:	18:01:48
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$500
RAM confirmation Number	110618INTEFSW00005699502469
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	4056-0001_Issue_Fee.pdf	92573 a2d5a52651761e3cf3e5274f72a76fde5eba5115	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30282 64f1f84188a4242b1a8281dea12ce5182c3456b4	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	122855		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

60533 7590 10/11/2018

TOLER LAW GROUP
TOLER LAW GROUP
8500 BLUFFSTONE COVE
SUITE A201
AUSTIN, TX 78759

EXAMINER
TIV, BACKHEAN

ART UNIT	PAPER NUMBER
2459	

DATE MAILED: 10/11/2018

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/997,327	01/15/2016	Ilya Gertner	4056-0001	5295

TITLE OF INVENTION: DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	MICRO	$250	$0.00	$0.00	$250	01/11/2019

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 02/11)

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 13 of 289

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

60533 7590 10/11/2018

TOLER LAW GROUP
TOLER LAW GROUP
8500 BLUFFSTONE COVE
SUITE A201
AUSTIN, TX 78759

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/997,327	01/15/2016	Ilya Gertner	4056-0001	5295

TITLE OF INVENTION: DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	MICRO	$250	$0.00	$0.00	$250	01/11/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
TIV, BACKHEAN	2459	709-216000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1_____
2_____
3_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/997,327	01/15/2016	Ilya Gertner	4056-0001	5295

60533 7590 10/11/2018

TOLER LAW GROUP
TOLER LAW GROUP
8500 BLUFFSTONE COVE
SUITE A201
AUSTIN, TX 78759

EXAMINER
TIV, BACKHEAN

ART UNIT	PAPER NUMBER
2459	

DATE MAILED: 10/11/2018

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

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OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 14/997,327	Applicant(s) Gertner, Ilya	
	Examiner BACKHEAN TIV	Art Unit 2459	AIA Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 8/16/18.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are See Continuation Sheet . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file areply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/Backhean Tiv/
Primary Examiner, Art Unit 2459

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IPR2023-00733, Page 17 of 289

Continuation of 3. The allowed claim(s) is/are: 18-20,22-28 and 30-43

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/997,327	Gertner, Ilya
	Examiner	**Art Unit**
	BACKHEAN TIV	2459

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☑ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	02/01/2018	05/01/2018	09/30/2018						
1	18	✓	=	=						
2	19	✓	=	=						
3	20	✓	=	=						
-	21	✓	-	-						
4	22	✓	=	=						
5	23	✓	=	=						
6	24	✓	=	=						
7	25	✓	=	=						
8	26	✓	=	=						
9	27	✓	=	=						
10	28	✓	=	=						
-	29	✓	-	-						
11	30	✓	=	=						
13	31	✓	=	=						
14	32	✓	=	=						
15	33	✓	=	=						
16	34	✓	=	=						
17	35	✓	=	=						
18	36	✓	=	=						
24	37	✓	=	=						
19	38	✓	=	=						
20	39	✓	=	=						
21	40	✓	=	=						
22	41	✓	=	=						
23	42	✓	=	=						
12	43		=	=						

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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/997,327	Gertner, Ilya
	Examiner	**Art Unit**
	BACKHEAN TIV	2459

CPC								
Symbol							**Type**	**Version**
H04L	/	67	/	1097			F	2013-01-01
G06F	/	17	/	30569			I	2013-01-01
H04L	/	67	/	2842			I	2013-01-01
G06F	/	3	/	0619			I	2013-01-01
G06F	/	3	/	0635			I	2013-01-01
G06F	/	3	/	065			I	2013-01-01
G06F	/	3	/	067			I	2013-01-01
G06F	/	12	/	0808			I	2013-01-01
G06F	/	12	/	128			I	2013-01-01
G06F	/	2212	/	621			A	2013-01-01
G06F	/	2212	/	69			A	2013-01-01
G06F	/	12	/	12			A	2013-01-01

CPC Combination Sets									
Symbol							**Type**	**Set**	**Ranking**	**Version**
	/		/							

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	24	
/Backhean Tiv/ Primary Examiner, Art Unit 2459	30 September 2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20180912

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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/997,327	Gertner, Ilya
	Examiner	**Art Unit**
	BACKHEAN TIV	2459

INTERNATIONAL CLASSIFICATION					
CLAIMED					
G06F	/	3	/	06	
NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner) (Date)	**Total Claims Allowed:** 24	
/Backhean Tiv/ Primary Examiner, Art Unit 2459 (Primary Examiner) 30 September 2018 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/997,327	Gertner, Ilya
	Examiner	**Art Unit**
	BACKHEAN TIV	2459

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☑ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	18	9	27	18	36										
2	19	10	28	24	37										
3	20	-	29	19	38										
-	21	11	30	20	39										
4	22	13	31	21	40										
5	23	14	32	22	41										
6	24	15	33	23	42										
7	25	16	34	12	43										
8	26	17	35												

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 24	
/Backhean Tiv/ Primary Examiner, Art Unit 2459 (Primary Examiner)	30 September 2018 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

U.S. Patent and Trademark Office Part of Paper No.: 20180912

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/997,327	Gertner, Ilya
	Examiner	Art Unit
	BACKHEAN TIV	2459

CPC - Searched*		
Symbol	Date	Examiner
H04L67/1097(limited)	2/1/2018	BT
G06F12/0808 OR G06F12/0824 OR G06F12/128 OR G06F12/0891 OR G06F13/1663 OR G06F17/30132 OR G06F2211/1009 OR G06F3/067 OR G06F3/0689(limited)	2/1/2018	BT

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
INVENTOR'S NAME SEARCH	2/1/2018	BT
EAST TXT SEARCH	2/1/2018	BT
UPDATE SEARCH	5/1/2018	BT
UPDATE SEARCH	09/11/2018	BT

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
H04L	67/1097(LIMITED)	5/1/2018	BT
G06F	12/0808,12/0824,12/128,12/0891,13/1663,17/30132,2211/1009,3/067,3/0689,67/1097(LIMITED)	5/1/2018	BT

/BACKHEAN TIV/ Primary Examiner.Art Unit 2459	

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Bibliographic Data

Application No: 14/997,327

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /BACKHEAN TIV/ Examiner's Signature | Initials

Title: DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
01/15/2016	709	2459	4056-0001
RULE			

APPLICANTS

LS CLOUD STORAGE TECHNOLOGIES, LLC, LONGVIEW, TX, UNITED STATES

INVENTORS

Ilya Gertner Long Beach, CA, UNITED STATES

CONTINUING DATA

This application is a CON of 13527126 06/19/2012

13527126 is a CON of 10382016 03/05/2003 PAT 8225002

10382016 is a DIV of 09236409 01/22/1999 PAT 6549988

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

01/29/2016

**** MICRO ENTITY ****

STATE OR COUNTRY

UNITED STATES

ADDRESS

TOLER LAW GROUP
TOLER LAW GROUP
8500 BLUFFSTONE COVE
SUITE A201
AUSTIN, TX 78759
UNITED STATES

FILING FEE RECEIVED

$400

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	14	(("4400769") or ("5506975") or ("5553291") or ("5913029") or ("6021469") or ("6091412") or ("6151618") or ("6185609") or ("6256637") or ("6260077") or ("6397242") or ("6496847") or ("20020065873") or ("20090282101")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/11 11:23
L2	12	(server or host) with dedicated adj3 ("I/O" or input or output) near3 channel and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR	OR	ON	2018/09/11 11:24
S1	1	("8225002").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/08/12 07:15
S2	500	write near4 pending same (invalidat$4 or error)	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:22
S3	329	write near4 pending same (invalidat$4 or error)and (@ad or @rlad or @pd or @ptad or @prad)<="20030305"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:23
S4	15	write near4 pending same (send$4 or transmit$4) near3 (invalidat$4 or error) and (@ad or @rlad or @pd or @ptad or @prad)<="20030305"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:23
S5	29	write near4 pending same (send$4 or transmit$4) with (invalidat$4 or error) and (@ad or @rlad or @pd or @ptad or @prad)<="20030305"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:27
S6	14	S5 not S4	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:27

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S7	18	("20020002625" | "6101508" | "6119151" | "6341311" | "7072056" | "7254617" | "7293099" | "7739379" | "7864758").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:30
S8	73	write with pending same (send$4 or transmit$4) with (invalidat$4 or error) and (@ad or @rlad or @pd or @ptad or @prad)<="20030305"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:31
S9	25	write with pending same (send$4 or transmit$4) with (invalidat$4) and (@ad or @rlad or @pd or @ptad or @prad) <="20030305"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:31
S10	1	("6549988").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/08/12 08:39
S11	11	write with pending same (send$4 or transmit$4) with (invalidat$4) and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:41
S12	27	write near2 pending and (send$4 or transmit$4) with (invalidat$4) and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:45
S13	2	write near2 pending same (send$4 or transmit$4) with (invalidat$4 or error) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:47
S14	56	write near2 pending and (send$4 or transmit$4) with (invalidat$4 or error) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:52
S15	60	writ$4 near2 pending and (send$4 or transmit$4) with (invalidat$4 or error) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:53
S16	4	S15 not S14	US-PGPUB; USPAT;	OR R	ON	2013/08/12 08:54

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			USOCR; FPRS; EPO; DERWENT; IBM_TDB			
S17	49	cache and writ$4 near2 pending and (send$4 or transmit$4) with (invalidat$4 or error) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:59
S18	1	("6289380").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/08/12 09:06
S19	2	cache near4 writ$4 near2 pending with (invalidat$4 or error) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 09:12
S20	9	cache near4 writ$4 near2 pending same (invalidat$4 or error) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 09:13
S21	33	scan$4 near4 page with cache and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 09:48
S22	30	(scan$4 near4 page).ab,ti. and cache and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 09:51
S23	3242	(invalidat$4) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2015/07/13 07:52
S24	782	(invalidat$4) adj2 (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2015/07/13 07:53
S25	9	(send$4 or transmit$4) near3 (invalidat$4) adj2 (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2015/07/13 07:54

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			EPO; DERWENT; IBM_TDB			
S26	25	(US-20040022094-$ or US-20030126372-$ or US-20030069889-$ or US-20020002625-$).did. or (US-5768211-$ or US-5761734-$ or US-7003587-$ or US-6311186-$ or US-6101497-$ or US-7864758-$ or US-7739379-$ or US-7293099-$ or US-7254617-$ or US-7072056-$ or US-6341311-$ or US-6119151-$ or US-6101508-$ or US-4648030-$ or US-5577204-$ or US-5251311-$).did. or (US-7739379-$ or US-7293099-$ or US-6341311-$ or US-6101508-$ or US-20040111486-$).did.	US-PGPUB; USPAT; DERWENT	OR	ON	2015/07/13 08:01
S27	1	("20030069889").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2015/07/13 08:02
S28	1	"20030069889" and (error) same director	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2015/07/13 08:04
S29	1	("6549988").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/29 07:29
S30	2	(("8225002") or ("6549988")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/04/05 07:49
S31	4686	("input/output" or "I/O") with cache and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 10:24
S32	7	("input/output" or "I/O") with cache same network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 10:26
S33	159	("input/output" or "I/O") with cache and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 10:26
S34	1	("6389479").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/04/05 10:29
S35	69	("4648030" | "5251311" | "5577204" | "5577226" | "5600817" | "5611049" | "5644751" | "5649152" | "5701516" |	US-PGPUB; USPAT	OR	ON	2017/04/05 13:18

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		"5715455" | "5717884" | "5742792" | "5743933" | "5748985" | "5751993" | "5758050" | "5761734" | "5768211" | "5778353" | "5787473" | "5790795" | "5802553" | "5805857" | "5819292" | "5819310" | "5828475" | "5841997" | "5848251" | "5852715" | "5854942" | "5860026" | "5860137" | "5887146" | "5896506" | "5898828" | "5901327" | "5974503" | "6016500" | "6026461" | "6044438" | "6101497" | "6101508" | "6119151" | "6122659" | "6182111" | "6311186" | "6341311" | "6438652" | "6457047" | "6549988" | "6711632" | "6785714" | "6829637" | "6850980" | "7003587" | "7072056" | "7133905" | "7188251" | "7254617" | "7287065" | "7293099" | "7739379" | "7864758" | "8225002" | "20020002625" | "20030069889" | "20030126372" | "20040022094" | "20160134702").PN.				
S36	3	(("5974503") or ("6101508") or ("6711632")).PN.	US-PGP UB; USPAT; USOCR	OR	OFF	2017/04/05 13:19
S37	416	("input/output" or "I/O") with channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 13:26
S38	20	("input/output" or "I/O") with SCSI near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 13:26
S39	1	("6226680").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/04/05 13:27
S40	13	(access$4 near4 cache) with process$4 near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 14:25
S41	249	("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 14:41
S42	57	("input/output" or "I/O") near3 channel and network near4 traffic and ATM and SCSI and Ethernet and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 14:42

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S43	240	cache near3 hit with read near4 request and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 15:49
S44	21666	cache near3 hit with read near4 request and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT	OR	ON	2017/04/05 15:49
S45	12	cache near3 hit with read near4 request and fast near3 path and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT	OR	ON	2017/04/05 15:50
S46	26	cache near3 hit with read adj2 request with write and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT	OR	ON	2017/04/05 15:52
S47	1	("5577204").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/04/05 16:14
S48	43	(US-20040022094-$ or US-20030126372-$ or US-20030069889-$ or US-20020002625-$ or US-20010037406-$ or US-20020091844-$ or US-20160134702-$ or US-20020007445-$ or US-20010013085-$).did. or (US-5768211-$ or US-5761734-$ or US-7003587-$ or US-6311186-$ or US-6101497-$ or US-7864758-$ or US-7739379-$ or US-7293099-$ or US-7254617-$ or US-7072056-$ or US-6341311-$ or US-6119151-$ or US-6101508-$ or US-4648030-$ or US-5577204-$ or US-5251311-$ or US-6549988-$ or US-8225002-$ or US-5900015-$ or US-7664883-$ or US-6389479-$ or US-6711632-$ or US-5974503-$ or US-6044438-$ or US-6226680-$ or US-5598551-$).did. or (US-5659794-$ or US-5787469-$ or US-5802569-$).did. or (US-7739379-$ or US-7293099-$ or US-6341311-$ or US-6101508-$ or US-20040111486-$).did.	US-PGPUB; USPAT; DERWENT	OR	ON	2017/04/05 16:15
S49	17	S48 and invalidate	US-PGPUB; USPAT; DERWENT	OR	ON	2017/04/05 16:15
S50	123	cache near3 hit with write same invalidat$4 near4 cache and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT	OR	ON	2017/04/05 16:29
S51	56	cache near3 hit with write same invalidat$4 adj3 cache and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT	OR	ON	2017/04/05 16:29
S57	39941	((G06F12/0808 OR G06F12/0824 OR G06F12/128 OR G06F12/0891 OR G06F13/1663 OR G06F17/30132 OR G06F2211/1009 OR G06F3/067 OR G06F3/0689 OR H04L67/1097).CPC.)	US-PGPUB; USPAT; DERWENT	OR	ON	2017/04/05 19:36

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S58	14	S57 AND ("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 19:37
S59	102	(host or computer) with ("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/08/23 13:41
S64	33667	((G06F12/0808 OR G06F12/0824 OR G06F12/128 OR G06F12/0891 OR G06F13/1663 OR G06F17/30132 OR G06F2211/1009 OR G06F3/067 OR G06F3/0689 OR H04L67/1097).CPC.)	US-PGPUB; USPAT	OR	ON	2018/02/01 07:23
S65	101	(host or computer) with ("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT	OR	ON	2018/02/01 07:45
S66	13	S64 AND S65	U S-PGPUB; USPAT	OR	ON	2018/02/01 07:45
S67	251	("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2018/02/01 07:50
S68	101	S65 AND ("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2018/02/01 07:58
S69	1	(14/997327).APP.	US-PGPUB; U SPAT; USOCR	OR	OFF	2018/04/23 05:41
S70	41	server near3 dedicated near4 channel and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2018/05/01 07:01
S71	1676838	server near3 dedicated adj3 ("I/O" or input or output) channel and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2018/05/01 07:02
S72	0	server near3 dedicated adj3 ("I/O" or input or output) adj4 channel and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2018/05/01 07:06

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			EPO; DERWENT; IBM_TDB			
S73	0	server near3 dedicated adj3 ("I/O" or input or output) near3 channel and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2018/05/01 07:06
S74	14	(server or host) with dedicated adj3 ("I/O" or input or output) near3 channel and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2018/05/01 07:06

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S60	31631	((G06F12/0808 OR G06F12/0824 OR G06F12/128 OR G06F12/0891 OR G06F13/1663 OR G06F17/30132 OR G06F2211/1009 OR G06F3/067 OR G06F3/0689 OR H04L67/1097).CPC.)	US-PGPUB; USPAT	OR	ON	2017/08/23 14:08
S61	100	(host or computer) with ("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT	OR	ON	2017/08/23 14:08
S62	19	(host or computer) with ("input/output" or "I/O") near3 channel same (read or write) and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT	OR	ON	2017/08/23 14:09
S63	5	S60 and S62	US-PGPUB; USPAT	OR	ON	2017/08/23 14:09
S75	12	(server or host) with dedicated adj3 ("I/O" or input or output) near3 channel and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT	OR	ON	2018/05/01 07:06
S76	34928	((G06F12/0808 OR G06F12/0824 OR G06F12/128 OR G06F12/0891 OR G06F13/1663 OR G06F17/30132 OR G06F2211/1009 OR G06F3/067 OR G06F3/0689 OR H04L67/1097).CPC.)	US-PGPUB; USPAT	OR	ON	2018/05/01 07:06
S77	101	(host or computer) with ("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT	OR	ON	2018/05/01 07:08
S78	13	S76 and S77	US-PGPUB; USPAT	OR	ON	2018/05/01 07:08

9/11/2018 11:25:28 AM
C:\Users\btiv\Documents\EAST\Workspaces\13527126_14997327_15440277_cache_management.wsp

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	14997327
Filing Date	2016-01-15
First Named Inventor	Ilya Gertner
Art Unit	2459
Examiner Name	TIV, BACKHEAN
Attorney Docket Number	4056-0001

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4400769		1983-08-23	KANEDA, et al.	
	2	5506975		1996-04-09	ONODERA	
	3	5553291		1996-09-03	TANAKA, et al.	
	4	5913029		1999-06-15	SHOSTAK	
	5	6021469		2000-02-01	TREMBLAY, et al.	
	6	6091412		2000-07-18	SIMONOFF, et al.	
	7	6151618		2000-11-21	WAHBE, et al.	
	8	6185609	B1	2001-02-06	RANGARAJAN, et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /BT/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14997327
	Filing Date	2016-01-15
	First Named Inventor	Ilya Gertner
	Art Unit	2459
	Examiner Name	TIV, BACKHEAN
	Attorney Docket Number	4056-0001

	9	6256637	B1	2001-07-03	VENKATESH, et al.	
	10	6260077	B1	2001-07-10	RANGARAJAN, et al.	
	11	6397242	B1	2002-05-28	DEVINE, et al.	
	12	6496847	B1	2002-12-17	BUGNION, et al.	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20020065879	A1	2002-05-30	AMBROSE, et al.	
	2	20090282101	A1	2009-11-12	LIM, et al.	

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FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

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NON-PATENT LITERATURE DOCUMENTS

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14997327
	Filing Date	2016-01-15
	First Named Inventor	Ilya Gertner
	Art Unit	2459
	Examiner Name	TIV, BACKHEAN
	Attorney Docket Number	4056-0001

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T5
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/Backhean Tiv/ (09/11/2018)	Date Considered	09/11/2018

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	14997327
Filing Date	2016-01-15
First Named Inventor	Ilya Gertner
Art Unit	2459
Examiner Name	TIV, BACKHEAN
Attorney Docket Number	4056-0001

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☑ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	David A Lukach	Date (YYYY-MM-DD)	2018-08-15
Name/Print	David A. Lukach	Registration Number	62,579

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	14997327	Filing Date	2016-01-15	Docket Number (if applicable)	4056-0001	Art Unit	2459
First Named Inventor	Ilya Gertner			Examiner Name	TIV. BACKHEAN		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☐ Amendment/Reply
- ☒ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 502469

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

08/24/2018 JVONG1 00000026 502469 14997327

01 FC:3801 325.00 DA

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	David A Lukach	Date (YYYY-MM-DD)	2018-08-15
Name	David A. Lukach	Registration Number	62579

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 39 of 289

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	14997327
Filing Date	2016-01-15
First Named Inventor	Ilya Gertner
Art Unit	2459
Examiner Name	TIV, BACKHEAN
Attorney Docket Number	4056-0001

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4400769		1983-08-23	KANEDA, et al.	
	2	5506975		1996-04-09	ONODERA	
	3	5553291		1996-09-03	TANAKA, et al.	
	4	5913029		1999-06-15	SHOSTAK	
	5	6021469		2000-02-01	TREMBLAY, et al.	
	6	6091412		2000-07-18	SIMONOFF, et al.	
	7	6151618		2000-11-21	WAHBE, et al.	
	8	6185609	B1	2001-02-06	RANGARAJAN, et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14997327
	Filing Date	2016-01-15
	First Named Inventor	Ilya Gertner
	Art Unit	2459
	Examiner Name	TIV, BACKHEAN
	Attorney Docket Number	4056-0001

	9	6256637	B1	2001-07-03	VENKATESH, et al.	
	10	6260077	B1	2001-07-10	RANGARAJAN, et al.	
	11	6397242	B1	2002-05-28	DEVINE, et al.	
	12	6496847	B1	2002-12-17	BUGNION, et al.	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20020065879	A1	2002-05-30	AMBROSE, et al.	
	2	20090282101	A1	2009-11-12	LIM, et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14997327
	Filing Date	2016-01-15
	First Named Inventor	Ilya Gertner
	Art Unit	2459
	Examiner Name	TIV. BACKHEAN
	Attorney Docket Number	4056-0001

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T5
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14997327
	Filing Date	2016-01-15
	First Named Inventor	Ilya Gertner
	Art Unit	2459
	Examiner Name	TIV, BACKHEAN
	Attorney Docket Number	4056-0001

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☑ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	David A Lukach	Date (YYYY-MM-DD)	2018-08-15
Name/Print	David A. Lukach	Registration Number	62,579

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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8500 Bluffstone Cove
Suite A201
Austin, Texas 78759
Phone: (512) 327-5515
Fax: (512) 327-5575
www.tlgiplaw.com

Toler Law Group, PC

Fax

To:	Examiner TIV, BACKHEAN, GAU 2459	**From:**	David A. Lukach, Reg. No. 62,579
Fax:	(571) 273-8300	**Date:**	August 16, 2018
Phone:	(571) 272-5654	**Pages:**	8
Re:	App. No. 14/997,327 Atty Dkt No. 4056-0001	**CC:**	

☐ **Urgent** ☐ **Please Reply**

• **Comments:**

Response to Notice of Allowance mailed May 16, 2018.

Request for Continued Examination and Information Disclosure Statement

CONFIDENTIALITY NOTE

The pages accompanying this facsimile transmission contain information from the law office of Toler Law Group, PC and are confidential and privileged. The information is intended to be used by the individual(s) or entity(ies) named on this cover sheet only. If you are not the intended recipient be aware that reading disclosing copying distribution or use of the contents of this transmission is prohibited. Please notify us immediately if you have received this transmission in error at the number listed above and return the document to us via regular mail.

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FEE TRANSMITTAL

	Complete if known
	Application Number: 14/997,327
	Filing Date: 2016-01-15
☐ Applicant asserts small entity status. See 37 CFR 1.27.	First Named Inventor: Ilya Gertner
☒ Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.	Examiner Name: TIV. BACKHEAN
	Art Unit: 2459
TOTAL AMOUNT OF PAYMENT ($) 325.00	Practitioner Docket No.: 4056-0001

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☒ Deposit Account Deposit Account Number: 502489 Deposit Account Name: _____

For the above-identified deposit account, the Director is hereby authorized to (check all that apply):

☒ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☒ Charge any additional fee(s) or underpayment of fee(s) under 37 CFR 1.16 and 1.17 ☒ Credit any overpayment of fee(s)

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES (U = undiscounted fee; S = small entity fee; M = micro entity fee)

	FILING FEES			SEARCH FEES			EXAMINATION FEES			
Application Type	U ($)	S ($)	M ($)	U ($)	S ($)	M ($)	U ($)	S ($)	M ($)	Fees Paid ($)
Utility	300	150*	75	660	330	165	760	380	190	
Design	200	100	50	160	80	40	600	300	150	
Plant	200	100	50	420	210	105	620	310	155	
Reissue	300	150	75	660	330	165	2,200	1,100	550	
Provisional	280	140	70	0	0	0	0	0	0	

* The $150 small entity status filing fee for a utility application is further reduced to $75 for a small entity status applicant who files the application via EFS-Web.

2. EXCESS CLAIM FEES

Fee Description	Undiscounted Fee ($)	Small Entity Fee ($)	Micro Entity Fee ($)
Each claim over 20 (including Reissues)	100	50	25
Each independent claim over 3 (including Reissues)	460	230	115
Multiple dependent claims	820	410	205

Total Claims		Extra Claims		Fee ($)		Fee Paid ($)
_____	-20 or HP =	_____	x	_____	=	_____

HP = highest number of total claims paid for, if greater than 20.

Multiple Dependent Claims	
Fee ($)	Fee Paid ($)
_____	_____

Indep. Claims		Extra Claims		Fee ($)		Fee Paid ($)
_____	-3 or HP =	_____	x	_____	=	_____

HP = highest number of independent claims paid for, if greater than 3.

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $400 ($200 for small entity) ($100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets		Extra Sheets		Number of each additional 50 or fraction thereof		Fee ($)		Fee Paid ($)
_____	- 100 =	_____	/ 50 =	_____ (round up to a whole number)	x	_____	=	_____

4. OTHER FEE(S)

	Fees Paid ($)
Non-English specification, $130 fee (no small or micro entity discount)	
Non-electronic filing fee under 37 CFR 1.16(t) for a utility application, $400 fee ($200 small or micro entity)	
Other (e.g., late filing surcharge): Request for Continued Examination	$325.00

SUBMITTED BY

Signature	David A. Lukach	Registration No. (Attorney/Agent) 62,579	Telephone 512-327-5515
Name (Print/Type)	David A. Lukach		Date 2018-08-16

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

60533 7590 05/16/2018

TOLER LAW GROUP
TOLER LAW GROUP
8500 BLUFFSTONE COVE
SUITE A201
AUSTIN, TX 78759

EXAMINER
TIV, BACKHEAN

ART UNIT	PAPER NUMBER
2459	

DATE MAILED: 05/16/2018

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/997,327	01/15/2016	Ilya Gertner	4056-0001	5295

TITLE OF INVENTION: DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	MICRO	$250	$0	$0	$250	08/16/2018

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 46 of 289

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

60533 7590 05/16/2018
TOLER LAW GROUP
TOLER LAW GROUP
8500 BLUFFSTONE COVE
SUITE A201
AUSTIN, TX 78759

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/997,327	01/15/2016	Ilya Gertner	4056-0001	5295

TITLE OF INVENTION: DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	MICRO	$250	$0	$0	$250	08/16/2018

EXAMINER	ART UNIT	CLASS-SUBCLASS
TIV, BACKHEAN	2459	709-216000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee
❑ Publication Fee (No small entity discount permitted)
❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

❑ A check is enclosed.
❑ Payment by credit card. Form PTO-2038 is attached.
❑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29
NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

❑ Applicant asserting small entity status. See 37 CFR 1.27
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

❑ Applicant changing to regular undiscounted fee status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 47 of 289

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/997,327	01/15/2016	Ilya Gertner	4056-0001	5295

60533 7590 05/16/2018

TOLER LAW GROUP
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8500 BLUFFSTONE COVE
SUITE A201
AUSTIN, TX 78759

EXAMINER	
TIV, BACKHEAN	

ART UNIT	PAPER NUMBER
2459	

DATE MAILED: 05/16/2018

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 02/11)

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 48 of 289

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 14/997,327	Applicant(s) GERTNER, ILYA	
	Examiner BACKHEAN TIV	Art Unit 2459	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *3/13/18*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *18-20,22-28,30-43*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   Certified copies:
   a) ☐ All b) ☐ Some *c) ☐ None of the:
   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☐ Examiner's Amendment/Comment
6. ☒ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/BACKHEAN TIV/
Primary Examiner, Art Unit 2459

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REASONS FOR ALLOWANCE

The following is an examiner's statement of reasons for allowance: the prior art singly or in combination does not teach the totality of the independent claims when read in light of the specification.

The applicant's reply makes evident the reason for allowance, satisfying the record as a whole as required by rule 37 CFR 1.104 (e). In this case, the substance of applicant's remarks filed on 3/13/18 in combination with other claimed features point out the reason that claims are patentable over the prior art of record, see also Remarks filed 7/28/17 in application 15/440,277. Thus, the reason for allowance is in all probability evident from the record (see MPEP 1302.14).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BACKHEAN TIV whose telephone number is (571)272-5654. The examiner can normally be reached on M-THUR 5:30-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JEFFREY NICKERSON can be reached on (571) 270-3631. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BACKHEAN TIV/
Primary Examiner, Art Unit 2459

Notice of References Cited	Application/Control No. 14/997,327	Applicant(s)/Patent Under Reexamination GERTNER, ILYA	
	Examiner BACKHEAN TIV	Art Unit 2459	Page 1 of 4

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-4,648,030 A	03-1987	Bomba; Frank C.	G06F13/36	711/141
*	B	US-4,797,813 A	01-1989	Igarashi; Tetsu	G06F12/0804	711/118
*	C	US-4,933,846 A	06-1990	Humphrey; Donald J.	G06F12/1466	370/463
*	D	US-5,222,224 A	06-1993	Flynn; Michael E.	G06F12/0822	711/120
*	E	US-5,251,311 A	10-1993	Kasai; Hiroyoki	G06F12/0817	711/144
*	F	US-5,319,766 A	06-1994	Thaller; Kurt M.	G06F12/0831	711/145
*	G	US-5,577,204 A	11-1996	Brewer; Tony M.	G06F13/1657	710/317
*	H	US-5,598,551 A	01-1997	Barajas; Saul	G06F12/0835	711/157
*	I	US-5,659,794 A	08-1997	Caldarale; Charles R.	H04L29/06	709/234
*	J	US-5,761,734 A	06-1998	Pfeffer; Erwin	G06F9/52	709/201
*	K	US-5,768,211 A	06-1998	Jones; Christopher W.	G11C8/16	365/189.04
*	L	US-5,787,469 A	07-1998	Merrell; Quinn W.	G06F12/0897	711/119
*	M	US-5,802,569 A	09-1998	Genduso; Thomas Basilio	G06F9/3802	711/137

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NON-PATENT DOCUMENTS

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	Examiner BACKHEAN TIV	Art Unit 2459	Page 2 of 4

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*	A	US-5,900,015 A	05-1999	Herger; Lorraine Maria Paola	G06F12/0824	711/141
*	B	US-5,974,503 A	10-1999	Venkatesh; Dinesh	G06F11/1076	348/E5.008
*	C	US-6,044,438 A	03-2000	Olnowich; Howard Thomas	G06F12/0813	707/999.201
*	D	US-6,101,497 A	08-2000	Ofek; Yuval	G06F11/1451	707/657
*	E	US-6,101,508 A	08-2000	Wolff; James J.	G06F9/52	707/999.001
*	F	US-6,119,151 A	09-2000	Cantrell; Thomas George	G06F17/30132	707/E17.01
*	G	US-6,226,680 B1	05-2001	Boucher; Laurence B.	G06F5/10	709/230
*	H	US-6,253,260 B1	06-2001	Beardsley; Brent Cameron	G06F3/061	710/20
*	I	US-6,260,120 B1	07-2001	Blumenau; Steven M.	G06F3/0622	707/999.003
*	J	US-2001/0013085 A1	08-2001	Yamamoto, Akira	G06F3/0626	711/114
*	K	US-6,311,186 B1	10-2001	MeLampy; Patrick J.	H04Q3/0029	1/1
*	L	US-2001/0037406 A1	11-2001	Philbrick, Clive M.	H04L29/06	709/250
*	M	US-6,341,311 B1	01-2002	Smith; Brian J.	G06F17/30902	707/E17.12

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Notice of References Cited	Application/Control No. 14/997,327	Applicant(s)/Patent Under Reexamination GERTNER, ILYA	
	Examiner BACKHEAN TIV	Art Unit 2459	Page 3 of 4

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*	A	US-2002/0007445 A1	01-2002	Blumenau, Steven M.	G06F3/0622	711/153
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*	C	US-6,389,479 B1	05-2002	Boucher; Laurence B.	H04L29/06	709/230
*	D	US-2002/0091844 A1	07-2002	Craft, Peter K.	G06F5/10	709/230
*	E	US-2002/0194294 A1	12-2002	Blumenau, Steven M.	G06F3/0605	709/213
*	F	US-6,549,988 B1	04-2003	Gertner; Ilya	G06F17/30569	707/E17.006
*	G	US-2003/0069889 A1	04-2003	Ofek, Yuval	G06F11/1451	1/1
*	H	US-2003/0126372 A1	07-2003	Rand, Tony S.	G06F12/0831	711/141
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*	K	US-6,711,632 B1	03-2004	Chow; Kit M.	G06F12/0804	709/237
*	L	US-7,003,587 B1	02-2006	Battat; Reuven	H04L67/1095	707/E17.005
*	M	US-7,072,056 B1	07-2006	Greaves; Warren J.	H04L51/066	358/1.1

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Notice of References Cited	Application/Control No. 14/997,327	Applicant(s)/Patent Under Reexamination GERTNER, ILYA	
	Examiner BACKHEAN TIV	Art Unit 2459	Page 4 of 4

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*	B	US-7,293,099 B1	11-2007	Kalajan; Kevin E.	G06F17/30067	709/203
*	C	US-7,664,883 B2	02-2010	Craft; Peter K.	H04L67/1097	370/463
*	D	US-7,739,379 B1	06-2010	Vahalia; Uresh K.	G06F17/30171	709/203
*	E	US-7,864,758 B1	01-2011	Lolayekar; Santosh C.	H04L67/1097	370/229
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FOREIGN PATENT DOCUMENTS

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Bibliographic Data

Application No: 14/997,327

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /BACKHEAN TIV/ Examiner's Signature | Initials

Title: DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
01/15/2016	709	2459	4056-0001
RULE			

APPLICANTS

LS CLOUD STORAGE TECHNOLOGIES, LLC, LONGVIEW, TX, UNITED STATES

INVENTORS

Ilya Gertner Long Beach, CA, UNITED STATES

CONTINUING DATA

This application is a CON of 13527126 06/19/2012

13527126 is a CON of 10382016 03/05/2003 PAT 8225002

10382016 is a DIV of 09236409 01/22/1999 PAT 6549988

FOREIGN APPLICATIONS

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AUSTIN, TX 78759
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	41	server near3 dedicated near4 channel and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2018/05/01 07:01
L2	1676838	server near3 dedicated adj3 ("I/O" or input or output) channel and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2018/05/01 07:02
L3	0	server near3 dedicated adj3 ("I/O" or input or output) adj4 channel and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2018/05/01 07:06
L4	0	server near3 dedicated adj3 ("I/O" or input or output) near3 channel and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2018/05/01 07:06
L5	14	(server or host) with dedicated adj3 ("I/O" or input or output) near3 channel and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2018/05/01 07:06
S1	1	("8225002").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/08/12 07:15
S2	500	write near4 pending same (invalidat$4 or error)	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:22
S3	329	write near4 pending same (invalidat$4 or error)and (@ad or @rlad or @pd or @ptad or @prad)<="20030305"	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	ON	2013/08/12 08:23

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			DERWENT; IBM_TDB			
S4	15	write near4 pending same (send$4 or transmit$4) near3 (invalidat$4 or error) and (@ad or @rlad or @pd or @ptad or @prad)<="20030305"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:23
S5	29	write near4 pending same (send$4 or transmit$4) with (invalidat$4 or error) and (@ad or @rlad or @pd or @ptad or @prad)<="20030305"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:27
S6	14	S5 not S4	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:27
S7	18	("20020002625" | "6101508" | "6119151" | "6341311" | "7072056" | "7254617" | "7293099" | "7739379" | "7864758").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:30
S8	73	write with pending same (send$4 or transmit$4) with (invalidat$4 or error) and (@ad or @rlad or @pd or @ptad or @prad)<="20030305"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:31
S9	25	write with pending same (send$4 or transmit$4) with (invalidat$4) and (@ad or @rlad or @pd or @ptad or @prad) <="20030305"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:31
S10	1	("6549988").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/08/12 08:39
S11	11	write with pending same (send$4 or transmit$4) with (invalidat$4) and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:41
S12	27	write near2 pending and (send$4 or transmit$4) with (invalidat$4) and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:45

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S13	2	write near2 pending same (send$4 or transmit$4) with (invalidat$4 or error) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:47
S14	56	write near2 pending and (send$4 or transmit$4) with (invalidat$4 or error) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:52
S15	60	writ$4 near2 pending and (send$4 or transmit$4) with (invalidat$4 or error) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:53
S16	4	S15 not S14	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:54
S17	49	cache and writ$4 near2 pending and (send$4 or transmit$4) with (invalidat$4 or error) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:59
S18	1	("6289380").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/08/12 09:06
S19	2	cache near4 writ$4 near2 pending with (invalidat$4 or error) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 09:12
S20	9	cache near4 writ$4 near2 pending same (invalidat$4 or error) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 09:13
S21	33	scan$4 near4 page with cache and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 09:48
S22	30	(scan$4 near4 page).ab,ti. and cache and (@ad or @rlad or @pd or @ptad or	US-PGPUB; USPAT;	OR	ON	2013/08/12 09:51

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		@prad)<="19990122"	USOCR; FPRS; EPO; DERWENT; IBM_TDB			
S23	3242	(invalidat$4) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2015/07/13 07:52
S24	782	(invalidat$4) adj2 (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2015/07/13 07:53
S25	9	(send$4 or transmit$4) near3 (invalidat$4) adj2 (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2015/07/13 07:54
S26	25	(US-20040022094-$ or US-20030126372-$ or US-20030069889-$ or US-20020002625-$).did. or (US-5768211-$ or US-5761734-$ or US-7003587-$ or US-6311186-$ or US-6101497-$ or US-7864758-$ or US-7739379-$ or US-7293099-$ or US-7254617-$ or US-7072056-$ or US-6341311-$ or US-6119151-$ or US-6101508-$ or US-4648030-$ or US-5577204-$ or US-5251311-$).did. or (US-7739379-$ or US-7293099-$ or US-6341311-$ or US-6101508-$ or US-20040111486-$).did.	US-PGPUB; USPAT; DERWENT	OR	ON	2015/07/13 08:01
S27	1	("20030069889").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2015/07/13 08:02
S28	1	"20030069889" and (error) same director	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2015/07/13 08:04
S29	1	("6549988").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/29 07:29
S30	2	(("8225002") or ("6549988")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/04/05 07:49
S31	4686	("input/output" or "I/O") with cache and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	ON	2017/04/05 10:24

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			DERWENT; IBM_TDB			
S32	7	("input/output" or "I/O") with cache same network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 10:26
S33	159	("input/output" or "I/O") with cache and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 10:26
S34	1	("6389479").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/04/05 10:29
S35	69	("4648030" | "5251311" | "5577204" | "5577226" | "5600817" | "5611049" | "5644751" | "5649152" | "5701516" | "5715455" | "5717884" | "5742792" | "5743933" | "5748985" | "5751993" | "5758050" | "5761734" | "5768211" | "5778353" | "5787473" | "5790795" | "5802553" | "5805857" | "5819292" | "5819310" | "5828475" | "5841997" | "5848251" | "5852715" | "5854942" | "5860026" | "5860137" | "5887146" | "5896506" | "5898828" | "5901327" | "5974503" | "6016500" | "6026461" | "6044438" | "6101497" | "6101508" | "6119151" | "6122659" | "6182111" | "6311186" | "6341311" | "6438652" | "6457047" | "6549988" | "6711632" | "6785714" | "6829637" | "6850980" | "7003587" | "7072056" | "7133905" | "7188251" | "7254617" | "7287065" | "7293099" | "7739379" | "7864758" | "8225002" | "20020002625" | "20030069889" | "20030126372" | "20040022094" | "20160134702").PN.	US-PGPUB; USPAT	OR	ON	2017/04/05 13:18
S36	3	(("5974503") or ("6101508") or ("6711632")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/04/05 13:19
S37	416	("input/output" or "I/O") with channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 13:26
S38	20	("input/output" or "I/O") with SCSI near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 13:26
S39	1	("6226680").PN.	US-PGPUB;	OR	OFF	2017/04/05

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			USPAT; USOCR			13:27
S40	13	(access$4 near4 cache) with process$4 near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 14:25
S41	249	("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 14:41
S42	57	("input/output" or "I/O") near3 channel and network near4 traffic and ATM and SCSI and Ethernet and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 14:42
S43	240	cache near3 hit with read near4 request and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 15:49
S44	216	cache near3 hit with read near4 request and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT	OR	ON	2017/04/05 15:49
S45	12	cache near3 hit with read near4 request and fast near3 path and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT	OR	ON	2017/04/05 15:50
S46	26	cache near3 hit with read adj2 request with write and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT	OR	ON	2017/04/05 15:52
S47	1	("5577204").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/04/05 16:14
S48	43	(US-20040022094-$ or US-20030126372-$ or US-20030069889-$ or US-20020002625-$ or US-20010037406-$ or US-20020091844-$ or US-20160134702-$ or US-20020007445-$ or US-20010013085-$).did. or (US-5768211-$ or US-5761734-$ or US-7003587-$ or US-6311186-$ or US-6101497-$ or US-7864758-$ or US-7739379-$ or US-7293099-$ or US-7254617-$ or US-7072056-$ or US-6341311-$ or US-6119151-$ or US-6101508-$ or US-4648030-$ or US-5577204-$ or US-5251311-$ or US-6549988-$ or US-8225002-$ or US-5900015-$ or US-7664883-$ or US-6389479-$ or US-6711632-$ or US-5974503-$ or US-	US-PGPUB; USPAT; DERWENT	OR	ON	2017/04/05 16:15

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		6044438-$ or US-6226680-$ or US-5598551-$).did. or (US-5659794-$ or US-5787469-$ or US-5802569-$).did. or (US-7739379-$ or US-7293099-$ or US-6341311-$ or US-6101508-$ or US-20040111486-$).did.				
S49	17	S48 and invalidate	US-PGPUB; USPAT; DERWENT	OR	ON	2017/04/05 16:15
S50	123	cache near3 hit with write same invalidat$4 near4 cache and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT	OR	ON	2017/04/05 16:29
S51	56	cache near3 hit with write same invalidat$4 adj3 cache and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT	OR	ON	2017/04/05 16:29
S57	39941	((G06F12/0808 OR G06F12/0824 OR G06F12/128 OR G06F12/0891 OR G06F13/1663 OR G06F17/30132 OR G06F2211/1009 OR G06F3/067 OR G06F3/0689 OR H04L67/1097).CPC.)	US-PGPUB; USPAT; DERWENT	OR	ON	2017/04/05 19:36
S58	14	S57 AND ("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 19:37
S59	102	(host or computer) with ("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/08/23 13:41
S64	33667	((G06F12/0808 OR G06F12/0824 OR G06F12/128 OR G06F12/0891 OR G06F13/1663 OR G06F17/30132 OR G06F2211/1009 OR G06F3/067 OR G06F3/0689 OR H04L67/1097).CPC.)	US-PGPUB; USPAT	OR	ON	2018/02/01 07:23
S65	101	(host or computer) with ("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT	OR	ON	2018/02/01 07:45
S66	13	S64 AND S65	US-PGPUB; USPAT	OR	ON	2018/02/01 07:45
S67	251	("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB		ON	2018/02/01 07:50
S68	101	S65 AND ("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT;	OR	ON	2018/02/01 07:58

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			IBM_TDB			
S69	1	(14/997327).APP.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/23 05:41

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L6	12	(server or host) with dedicated adj3 ("I/O" or input or output) near3 channel and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT	OR	ON	2018/05/01 07:06
L7	34928	((G06F12/0808 OR G06F12/0824 OR G06F12/128 OR G06F12/0891 OR G06F13/1663 OR G06F17/30132 OR G06F2211/1009 OR G06F3/067 OR G06F3/0689 OR H04L67/1097).CPC.)	US-PGPUB; USPAT	OR	ON	2018/05/01 07:06
L8	101	(host or computer) with ("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT	OR	ON	2018/05/01 07:08
L9	13	l7 and l8	US-PGPUB; USPAT	OR	ON	2018/05/01 07:08
S60	31631	((G06F12/0808 OR G06F12/0824 OR G06F12/128 OR G06F12/0891 OR G06F13/1663 OR G06F17/30132 OR G06F2211/1009 OR G06F3/067 OR G06F3/0689 OR H04L67/1097).CPC.)	US-PGPUB; USPAT	OR	ON	2017/08/23 14:08
S61	100	(host or computer) with ("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT	OR	ON	2017/08/23 14:08
S62	19	(host or computer) with ("input/output" or "I/O") near3 channel same (read or write) and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT	OR	ON	2017/08/23 14:09
S63	5	S60 and S62	US-PGPUB; USPAT	OR	ON	2017/08/23 14:09

5/1/2018 7:30:07 AM
C:\Users\btiv\Documents\EAST\Workspaces\13527126_14997327_15440277_cache_management.wsp

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14997327	GERTNER, ILYA
	Examiner	Art Unit
	BACKHEAN TIV	2459

CPC- SEARCHED		
Symbol	Date	Examiner
H04L67/1097(limited)	2/1/2018	BT
G06F12/0808 OR G06F12/0824 OR G06F12/128 OR G06F12/0891 OR G06F13/1663 OR G06F17/30132 OR G06F2211/1009 OR G06F3/067 OR G06F3/0689(limited)	2/1/2018	BT

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

SEARCH NOTES		
Search Notes	Date	Examiner
INVENTOR'S NAME SEARCH	2/1/2018	BT
EAST TXT SEARCH	2/1/2018	BT
UPDATE SEARCH	5/1/2018	BT

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
H04L	67/1097(LIMITED)	5/1/2018	BT
G06F	12/0808,12/0824,12/128,12/0891,13/1663,17/30132,2211/1009,3/067,3/0689,67/1097(LIMITED)	5/1/2018	BT

	/BACKHEAN TIV/ Primary Examiner.Art Unit 2459

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14997327	GERTNER, ILYA
	Examiner	Art Unit
	BACKHEAN TIV	2459

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☒ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	02/01/2018	05/01/2018							
1	18	✓	=							
2	19	✓	=							
3	20	✓	=							
-	21	✓	-							
4	22	✓	=							
5	23	✓	=							
6	24	✓	=							
7	25	✓	=							
8	26	✓	=							
9	27	✓	=							
10	28	✓	=							
-	29	✓	-							
11	30	✓	=							
13	31	✓	=							
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15	33	✓	=							
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17	35	✓	=							
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24	37	✓	=							
19	38	✓	=							
20	39	✓	=							
21	40	✓	=							
22	41	✓	=							
23	42	✓	=							
12	43		=							

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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14997327	GERTNER, ILYA
	Examiner	**Art Unit**
	BACKHEAN TIV	2459

CPC						
Symbol					**Type**	**Version**
H04L		67	/	1097	F	2013-01-01
G06F		17	/	30569	I	2013-01-01
H04L		67	/	2842	I	2013-01-01
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CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
			/					
			/					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	24	
/BACKHEAN TIV/ Primary Examiner.Art Unit 2459	05/01/2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14997327	GERTNER, ILYA
	Examiner	**Art Unit**
	BACKHEAN TIV	2459

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION										
CLASS	SUBCLASS	CLAIMED					NON-CLAIMED					
		G	0	6	F	3 / 06 (2006.01.01)						

CROSS REFERENCE(S)					
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	24	
/BACKHEAN TIV/ Primary Examiner.Art Unit 2459	05/01/2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14997327	GERTNER, ILYA
	Examiner	**Art Unit**
	BACKHEAN TIV	2459

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☒ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	18	16	34												
2	19	17	35												
3	20	18	36												
-	21	24	37												
4	22	19	38												
5	23	20	39												
6	24	21	40												
7	25	22	41												
8	26	23	42												
9	27	12	43												
10	28														
-	29														
11	30														
13	31														
14	32														
15	33														

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	24	
/BACKHEAN TIV/ Primary Examiner.Art Unit 2459	05/01/2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

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PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/997,327	Filing Date 01/15/2016	☐ To be Mailed

ENTITY: ☐ LARGE ☐ SMALL ☒ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	x $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	x $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	03/13/2018	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 25	Minus	** 25	= 0	x $25 =	0
	Independent (37 CFR 1.16(h))	* 4	Minus	***4	= 0	x $115 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	**0**

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

SLIE
LATASHA SMITH

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	Ilya Gertner		
Title:	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS		
App. No.:	14/997,327	Filed:	January 15, 2016
Examiner:	BACKHEAN, Tiv	Group Art Unit:	2459
Customer No.:	60533	Confirmation No.:	5295
Atty. Dkt. No.:	4056-0001		

M/S: Amendment
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

RESPONSE TO NON-FINAL OFFICE ACTION

Dear Commissioner:

In response to the Non-Final Office Action mailed February 7, 2018 (the "Office Action"), please reconsider the above-identified application in light of the following amendments and remarks:

CLAIM AMENDMENTS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-17. (Canceled).

18. (Currently amended) An apparatus comprising:

a first interface configured to receive input/output (I/O) traffic from a ~~first~~ host device via a dedicated I/O channel, the I/O traffic comprising a read command;

a second interface configured to receive first data via a network;

a cache memory configured to store second data;

a storage device configured to store third data; and

a processor coupled to the cache memory ~~and to the storage device~~, the processor coupled to the storage device via a communication path that is distinct from the dedicated I/O channel, the processor configured to access the cache memory during processing of the I/O traffic, the processor further configured to perform an access operation at the storage device based on the I/O traffic.

19. (Previously presented) The apparatus of claim 18, wherein the dedicated I/O channel is associated with dedicated throughput that corresponds to the I/O traffic.

20. (Previously presented) The apparatus of claim 18, wherein the I/O traffic is distinct from the first data.

21. (Canceled).

22. (Previously presented) The apparatus of claim 18, wherein the dedicated I/O channel comprises a small computer system interface (SCSI) channel.

23. (Previously presented) The apparatus of claim 18, wherein the second interface comprises an Ethernet interface or an asynchronous transfer mode (ATM) interface.

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24. (Previously presented) The apparatus of claim 18, wherein the I/O traffic further comprises a write command.

25. (Previously presented) The apparatus of claim 18, wherein the first data comprises a second read request, a write request, or a combination thereof.

26. (Previously presented) The apparatus of claim 18, wherein the network comprises a plurality of interconnected computing devices.

27. (Previously presented) The apparatus of claim 18, wherein the storage device and the dedicated I/O channel are independently accessible, and wherein the processor is configured to read at least a portion of the second data from the cache memory based on the read command.

28. (Previously presented) The apparatus of claim 18, wherein the processor is further configured to route the read command to the cache memory or to the storage device.

29. (Canceled).

30. (Previously presented) The apparatus of claim 18, further comprising:

configuration manager circuitry configured to route an I/O request included in the I/O traffic to the cache memory, to route the I/O request to the storage device, or to deny the I/O request;

front-end circuitry configured to process the I/O request; and

back-end circuitry configured to perform a read operation or a write operation at the storage device based on the I/O request.

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31. (Currently amended) A method comprising:

receiving input/output (I/O) traffic from a ~~first~~ host device via a dedicated I/O channel at a first interface, the I/O traffic comprising a write command;

receiving first data via a network at a second interface;

storing second data at a cache memory;

storing third data at a storage device;

accessing the cache memory during processing of the I/O traffic; and

performing one or more access operations at the storage device ~~via~~ based on the I/O traffic, the one or more access operations utilizing a communication path between a processor and the storage device, the communication path distinct from the dedicated I/O channel.

32. (Previously presented) The method of claim 31, wherein the I/O traffic is distinct from the first data.

33. (Previously presented) The method of claim 31, further comprising performing a first access operation at the storage device independently of the dedicated I/O channel.

34. (Previously presented) The method of claim 31, wherein the second data is written at the cache memory in response to the write command.

35. (Previously presented) The method of claim 31, further comprising:

receiving a read request via the network; and

transmitting at least a portion of the second data from the cache memory via the network responsive to the read request being associated with a cache hit.

36. (Previously presented) The method of claim 31, further comprising storing fourth data at the cache memory, wherein the second data is indicated by the write command, and wherein the fourth data is indicated by a second write command received at the second interface.

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37. (Currently amended) An apparatus comprising:

means for receiving input/output (I/O) traffic from a ~~first~~ host device via a dedicated I/O channel, the I/O traffic comprising a write command;

means for receiving data via a network;

means for short-term data storage;

means for long-term data storage; and

means for performing one or more access operations at the means for short-term data storage during processing of the I/O traffic and for performing one or more access operations at the means for long-term data storage based on the I/O traffic, the means for performing distinct from the dedicated I/O channel.

38. (Previously presented) An apparatus comprising:

a first interface configured to receive input/output (I/O) traffic from a host computer via a dedicated I/O channel, the I/O traffic comprising one or more read commands, one or more write commands, or a combination thereof;

a second interface configured to receive data via a network;

a cache memory;

a storage device; and

a processor coupled via a communication path to the storage device, the processor configured to access the cache memory during processing of the I/O traffic, the processor further configured to perform one or more access operations at the storage device based on the I/O traffic, wherein the communication path is distinct from the dedicated I/O channel.

39. (Previously presented) The apparatus of claim 38, wherein the dedicated I/O channel is associated with dedicated throughput that corresponds to the I/O traffic.

40. (Previously presented) The apparatus of claim 38, wherein the I/O traffic is distinct from the data.

41. (Previously presented) The apparatus of claim 38, wherein the data corresponds to one or more read requests, one or more write requests, or a combination thereof.

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42. (Previously presented) The apparatus of claim 38, wherein the storage device and the dedicated I/O channel are independently accessible.

43. (New) The apparatus of claim 18, wherein the host device comprises a server.

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REMARKS

Status of the Claims

Claims 21 and 29 have been canceled without prejudice or disclaimer. Claims 1-17 were previously canceled without prejudice or disclaimer. Claims 18, 31, and 37 have been amended. New claim 43 has been added. No new matter has been added. Support for the claim amendments and the new claim can be found in the Specification at least at FIG. 1 and at paragraphs [0027]-[0033] and [0047].

Examiner Interview

Applicant thanks the Examiner for the courtesy extended during the interview conducted on February 20, 2018. During the interview the 35 U.S.C. § 101 rejection and the 35 U.S.C. § 103 rejection of claim 18 were discussed. Applicant thanks the Examiner for agreeing, during the interview, that claim 18, as amended herein, and claim 38, as pending, appear to overcome the 35 U.S.C. § 103 rejection, subject to further search and consideration. No agreement was reached regarding the 35 U.S.C. § 101 rejection.

Claim Interpretations - 35 U.S.C. § 112(f)

The Office indicated that claim 37 is being interpreted under 35 U.S.C. § 112(f). Applicant respectfully submits that support for claim 37 may be found in the Specification, at least at FIG. 1 and paragraphs [0027]-[0033].

35 U.S.C. § 101 Rejections

The Office rejected claims 18-42, at pages 4-8 of the Office Action, under 35 U.S.C. § 101, as allegedly being directed to non-statutory subject matter. In particular, the Office asserts that "the claimed invention is directed to a judicial exception (i.e., a law of nature, a natural phenomenon, or an abstract idea) without significantly more." Office Action, page 3. Claims 21 and 29 have been canceled without prejudice or disclaimer. Applicant respectfully traverses the remaining rejections.

The Manual of Patent Examining Procedure (MPEP) states that "[a]n indication that the claimed invention provides an improvement **can include a discussion in the specification that identifies a technical problem and explains the details of an unconventional technical**

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solution expressed in the claim, or identifies technical improvements realized by the claim over the prior art." MPEP § 2106.05(a) (emphasis added). As discussed during the interview:

- The Specification identifies a technical problem: "the needs exists to provide a cached data storage system that permits independent data accesses from I/O channel attached local hosts, network attached remote hosts, and network attached remote data storage systems." Specification, para. [0012].

- The Specification further describes a technical improvement that addresses this problem - a computer system that "**supports arbitrary reads and writes arriving via I/O channels or network links**." Specification, para. [0014] (emphasis added).

Further, Applicant respectfully submits that the claims are directed to patent-eligible subject matter if the claims go beyond what is well-understood, routine, and conventional. *See* MPEP § 2106.05(d), stating "[i]f the additional element (or combination of elements) is **a specific limitation other than what is well-understood, routine and conventional in the field**, for instance because it is an unconventional step that confines the claim to a particular useful application of the judicial exception, then this consideration favors eligibility." (Emphasis added). Whether something is well-understood, routine, and conventional in the field **is a question of fact**. *See Aatrix Software Inc. v. Green Shades Software, Inc.*, No. 2017-1452 (Fed. Cir. 2018); *see also Berkheimer v. HP, Inc.*, No. 2017-1437 (Fed. Cir. 2018). Applicant respectfully submits that the claimed subject matter of the present application is not well-understood, routine, or conventional because the claims are not anticipated by or obvious over any known prior art. To illustrate, the Examiner agreed, during the interview, that claim 18 as amended herein overcomes the rejection based on the cited references of the Office Action. Accordingly, the claimed subject matter is not well-known, routine, or conventional, thus the claims are patent eligible.

Further, Applicant notes that section § 2106.07(2) of the MPEP states that:

> If applicant responds to an examiner's assertion that something is well-known, routine, conventional activity with a specific argument or evidence that the additional elements in a claim are not well-understood, routine, conventional activities previously engaged in by those in the relevant art, the examiner should

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> reevaluate whether it is readily apparent that the additional elements are in actuality well-known, routine, conventional activities to those who work in the relevant field. It is especially, for the examiner, necessary to fully reevaluate their position when such additional elements are not discussed in the specification as being known generic functions/components/activities or are not treated by the courts as well-understood, routine, conventional activities. If the rejection is to be maintained, **the examiner should consider whether evidence should be provided to further support the rejection and clarify the record for appeal**.

(Emphasis added). For the reasons stated above, Applicant respectfully submits that the claims are directed to subject matter that is not well-understood, routine, and conventional. To satisfy the burden required in the MPEP, *Berkheimer*, and *Aatrix*, Applicant respectfully requests the Examiner to either allow the application or provide evidence or take Official Notice that the claimed subject matter is well-understood, routine, and conventional. Thus, the Examiner's assertion that the claims are directed to well-understood, routine, and conventional subject matter is respectfully traversed.

For the reasons stated above, claims 18-20, 22-28, and 30-42 recite statutory subject matter and are in compliance with 35 U.S.C. § 101. Accordingly, Applicant requests withdrawal of the 35 U.S.C. § 101 rejections.

Claims 18-20, 22-28, 30-34, and 36-42 are Allowable

The Office rejected claims 18-34 and 36-42, at pages 8-16 of the Office Action, under 35 U.S.C. § 103, as being unpatentable over U.S. Pat. App. Pub. No. 2001/0037406 ("Philbrick") in view of U.S. Pat. No. 5,659,794 ("Caldarale"). Claims 21 and 29 have been canceled without prejudice or disclaimer. Applicant respectfully traverses the remaining rejections.

Claims 18-20, 22-28, and 30

Applicant thanks the Examiner for agreeing, during the interview, that claim 18, as amended herein, overcomes the 35 U.S.C. § 103 rejection of the Final Office Action. Hence, claim 18 is allowable. Claims 19, 20, 22-28, and 30 are allowable, at least by virtue of depending from an allowable claim.

Claims 31-34 and 36

Applicant thanks the Examiner for agreeing, during the interview, that claim 18, as amended herein, overcomes the 35 U.S.C. § 103 rejection of the Final Office Action. Claim 31

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has been amended based on claim 18. Hence, claim 31 is allowable. Claims 32-34 and 36 are allowable, at least by virtue of depending from an allowable claim.

Claim 37

Applicant thanks the Examiner for agreeing, during the interview, that claim 18, as amended herein, overcomes the 35 U.S.C. § 103 rejection of the Final Office Action. Claim 37 has been amended based on claim 18. Hence, claim 37 is allowable.

Claims 38-42

Applicant thanks the Examiner for agreeing, during the interview, that claim 38 overcomes the 35 U.S.C. § 103 rejection of the Final Office Action. Hence, claim 38 is allowable. Claims 39-42 are allowable, at least by virtue of depending from an allowable claim.

Claim 35 is Allowable

The Office rejected claim 35, at pages 17-18 of the Office Action, under 35 U.S.C. § 103, as being unpatentable over Philbrick, in view of Caldarale, and in further view of U.S. Pat. App. Pub. No. 5,802,569 ("Genduso"). Applicant respectfully traverses the rejections.

Claim 35 depends from claim 31. Applicant thanks the Examiner for agreeing, during the interview, that claim 18, as amended herein, overcomes the 35 U.S.C. § 103 rejection of the Final Office Action. Claim 31 has been amended based on claim 18. Hence, claim 31 is allowable. Claim 35 is allowable, at least by virtue of depending from an allowable claim.

New Claim 43 is Allowable

New claim 43 has been added and is supported by the Specification. No new matter has been added. Claim 43 depends from claim 18, which Applicant has shown to be allowable. Hence, claim 43 is allowable, at least by virtue of its dependence from an allowable claim.

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CONCLUSION

Applicant respectfully requests reconsideration and withdrawal of each of the objections and rejections, as well as an indication of the allowability of each of the pending claims.

Any changes to the claims in this response, which have not been specifically noted to overcome a rejection based upon the cited portions of the above-cited references, should be considered to have been made for a purpose unrelated to patentability, and no estoppel should be deemed to attach thereto.

The Examiner is invited to contact the undersigned attorney at the telephone number listed below if such a call would in any way facilitate allowance of this application.

The Commissioner is hereby authorized to charge any fees, which may be required, or credit any overpayment, to Deposit Account Number 50-2469.

Respectfully submitted,

2018-03-12
Date

/Jeffrey G. Toler/
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Cisco et al. v. LS Cloud Storage Technologies
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Electronic Acknowledgement Receipt

EFS ID:	32033581
Application Number:	14997327
International Application Number:	
Confirmation Number:	5295
Title of Invention:	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS
First Named Inventor/Applicant Name:	Ilya Gertner
Customer Number:	60533
Filer:	Jeffrey G. Toler/Suzanne Nobert
Filer Authorized By:	Jeffrey G. Toler
Attorney Docket Number:	4056-0001
Receipt Date:	13-MAR-2018
Filing Date:	15-JAN-2016
Time Stamp:	11:10:51
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		4056-0001_Response.pdf	202978 8f00b9083577ab1d0225ae5695f78f5a749c1bd5	yes	11

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	11
Warnings:			
Information:			
	Total Files Size (in bytes):	202978	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/997,327	01/15/2016	Ilya Gertner	4056-0001	5295

60533 7590 03/02/2018

TOLER LAW GROUP
TOLER LAW GROUP
8500 BLUFFSTONE COVE
SUITE A201
AUSTIN, TX 78759

EXAMINER
TIV, BACKHEAN

ART UNIT	PAPER NUMBER
2459	

NOTIFICATION DATE	DELIVERY MODE
03/02/2018	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

lmarlow@tlgiplaw.com
docketinggroup@tlgiplaw.com
snobert@tlgiplaw.com

PTOL-90A (Rev. 04/07)

Applicant-Initiated Interview Summary	Application No.	Applicant(s)	
	14/997,327	GERTNER, ILYA	
	Examiner	Art Unit	
	BACKHEAN TIV	2459	

All participants (applicant, applicant's representative, PTO personnel):

(1) *BACKHEAN TIV.* (3) *David Lukach(62579).*

(2) _____. (4)_____.

Date of Interview: *20 February 2018.*

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☒101 ☐112 ☐102 ☒103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *proposed claim 1.*

Identification of prior art discussed: *prior art of record.*

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Discussed the proposed amendment, in particular whether Philbrick, Fig.1, which shows element 35 which is considered to be the communication path that is distinct from the dedicated I/O channel(element 40 Fig.1) which is coupled to the processor and cache memory. Therefore the proposed amendment does not overcome the art of record, however if the applicant amended the claims from "first device" to "host", it would appear to overcome the art of record. Briefly discussed the Alice 101 rejection, the applicant points to para.12 and 14 as showing support that having a dedicated I/O channel is an improvement to the function of the computer system. Applicant is advised to submit all arguments and amendments formally.

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☒ Attachment

/BACKHEAN TIV/ Primary Examiner, Art Unit 2459	

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Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

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TELEPHONE (512) 327-5515
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FACSIMILE COVER SHEET

DATE: February 19, 2018

TO: Examiner Backhean Tiv **FAX NO.:** 571.273.5654

FROM: David Lukach
Reg. No.: 62,579

RE U.S. App. No.: 14/997,327

Inventors: Ilya Gertner

Atty Dkt No.: 4056-0001

NO. OF PAGES (including Cover Sheet): 9

MESSAGE:

Attached is an agenda for U.S. Application No. 14/997,327. I will call you at 1:00pm Eastern Time on Tuesday, February 20, 2018 to conduct the interview.

Thank you.

David Lukach

David Lukach

8500 Bluffstone Cove
Suite A201
AUSTIN, TEXAS 78759

Tel: (512) 327-5515
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CONFIDENTIALITY NOTE

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For Examiner Review to Facilitate Discussion During Interview
No Estoppel Should be Deemed to Attach

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	Ilya Gertner		
Title:	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS		
App. No.:	14/997,327	Filed:	January 15, 2016
Examiner:	BACKHEAN, Tiv	Group Art Unit:	2459
Customer No.:	60533	Confirmation No.:	5295
Atty. Dkt. No.:	4056-0001		

Dear Examiner Tiv:

In preparation for the Examiner Interview scheduled for Tuesday, February 20, 2018, at 1:00 pm Eastern Time, please find the attached interview agenda. The attached document is for Examiner consideration to facilitate discussion during the Examiner Interview, and no estoppel should be deemed to attach. The attached document includes proposed claims and remarks. Applicant thanks the Examiner for the Interview.

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Reg. No. 62,579
(512) 732-7927

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PROPOSED CLAIM

18. (Currently Amended) An apparatus comprising:

a first interface configured to receive input/output (I/O) traffic from a first device via a dedicated I/O channel, the I/O traffic comprising a read command;

a second interface configured to receive first data via a network;

a cache memory configured to store second data;

a storage device configured to store third data; and

a processor coupled to the cache memory ~~and to the storage device~~, the processor coupled to the storage device via a communication path that is distinct from the dedicated I/O channel, the processor configured to access the cache memory during processing of the I/O traffic, the processor further configured to perform an access operation at the storage device based on the I/O traffic.

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REMARKS

Applicant's representative requests to discuss the allowability of the proposed claim in view of the 35 U.S.C. § 101 rejection and the 35 U.S.C. § 103(a) rejection based on U.S. Pat. App. Pub. No. 2001/0037406 ("Philbrick") and U.S. Pat. No. 5,659,794 ("Caldarale"). The proposed amendment is supported at least by FIGS. 1 and 3, and paras. [0027], [0029], [0031], [0033], and [0034] of the Specification.

35 U.S.C. § 101 Rejection

Applicant's representative requests to discuss the 35 U.S.C. § 101 rejection of claim 18. To facilitate the discussion, Applicant refers to a technical problem – "the need[s] exists to provide a cached data storage system that permits independent data accesses from I/O channel attached local hosts, network attached remote hosts, and network-attached remote data storage systems." *See* Specification, para. [0012].

Applicant respectfully submits that, like the claims of *Enfish*, claim 18 provides a technical improvement – a computing system that "supports arbitrary reads and writes arriving via I/O channels or network links." *See* Specification, para. [0014]. By supporting a read command that is received by a dedicated I/O channel (and not a communication path that is distinct from the dedicated I/O channel), claim 18 **improves the functioning of a computer system**, and is therefore patent-eligible subject matter. *See* Manual of Patent Examining Procedure (MPEP) § 2106.05(a), stating "[i]n determining patent eligibility, examiners should consider whether the claim 'purport(s) to improve the functioning of the computer itself' or 'any other technology or technical field'" and "[a]n indication that the claimed invention provides an improvement can include a discussion in the specification that identifies a technical problem and explains the details of an unconventional technical solution expressed in the claim, or identifies technical improvements realized by the claim over the prior art."

Additionally, because a read command is received via a dedicated I/O channel that is different than a communication path by which a processor is coupled to a storage device, **the computing system of claim 18 is able to do something different (e.g., receive the read command via the dedicated I/O channel)** than other computing systems, similar to the claims

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at issue in *Finjan, Inc. v. Blue Coat Systems, Inc.*, No. 2016-2520 (Fed Cir. 2018), which were found by the Federal Circuit to be directed to "a new kind of file that enables a computer security system **to do things it could not do before** . . . The asserted claims are therefore directed to **a non-abstract improvement in computer functionality**, rather than the idea of computer security write large." *Finjan* at 8 (emphasis added). Further, because claim 18 provides a technical improvement that was not known in the prior art (as further described herein), claim 18 is directed to something **other than what is well-understood, routine, and conventional activities**, and thus is patent-eligible under the Federal Circuit's reasoning in *Berkheimer v. HP, Inc.*, No. 2017-1437 (Fed. Cir. 2018) and in *Aatrix Software, Inc. v. Green Shades Software, Inc.*, No. 2017-1452 (Fed Circ. 2018). Applicant's representative appreciates any suggestions by the Examiner for overcoming the 35 U.S.C. § 101 rejection.

35 U.S.C. § 103(a) Rejection

The cited portions of Philbrick and Caldarale, individually or in combination, fail to disclose each and every element of claim 1. For example, the cited portions of Philbrick and Caldarale do not disclose a processor coupled to a cache memory, the processor coupled to a storage device via a communication path that is distinct from a dedicated I/O channel (from which a first interface is configured to receive input/output (I/O) traffic from a first device), as in claim 18.

Philbrick describes a host device 20 that is coupled to an intelligent network interface card (INIC) 22. *See* Philbrick, FIG. 1 (reproduced below) and para. [0042].

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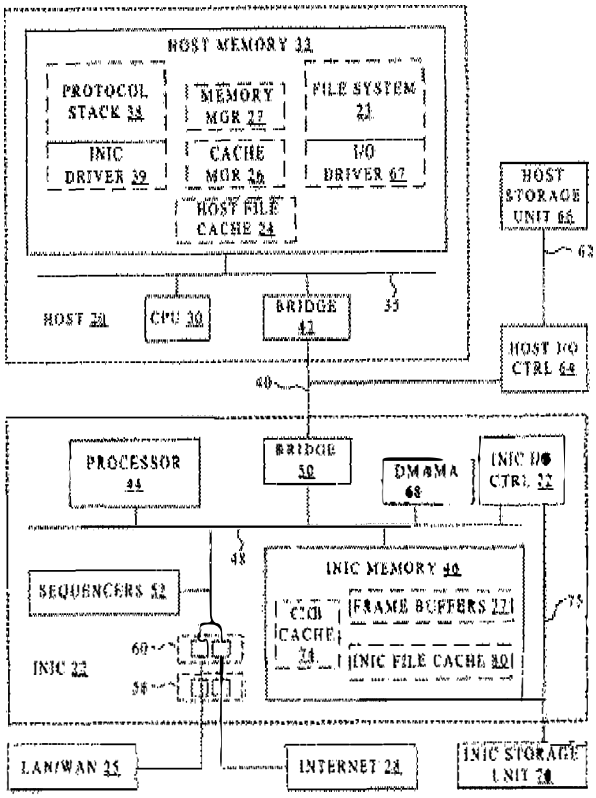


FIG. 1

The host device 20 is connected to the INIC 22 by an I/O bus 40, such as a PCI bus. *See* Philbrick, para. [0043]. A host storage unit 66 is coupled to the I/O bus 40 by a host I/O controller 64. *See* Philbrick, para. [0044] (emphasis added). Philbrick also describes a CPU 30 (e.g., a processor) that is coupled to the I/O bus 40. *See* Philbrick, para. [0042] (emphasis added). Thus, Philbrick describes a processor (e.g., the CPU 30) that is coupled to a storage device (e.g., the host storage unit 66) by the I/O bus 40. The cited portions of Philbrick do not disclose that the processor is coupled to the storage device by a communication path that is distinct from the I/O bus 40. The cited portions of Caldarale fail to cure this deficiency in Philbrick. Therefore, the cited portions of Philbrick and Caldarale do not disclose a processor coupled to a cache memory, the processor coupled to a storage device via a communication path that is distinct from a dedicated I/O channel (from which a first interface is configured to receive input/output (I/O) traffic from a first device), as in claim 18.

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As another example, the cited portions of Philbrick and Caldarale do not disclose a first interface configured to receive input/output (I/O) traffic from a first device via a dedicated I/O channel, the I/O traffic including a read command, as in claim 18.

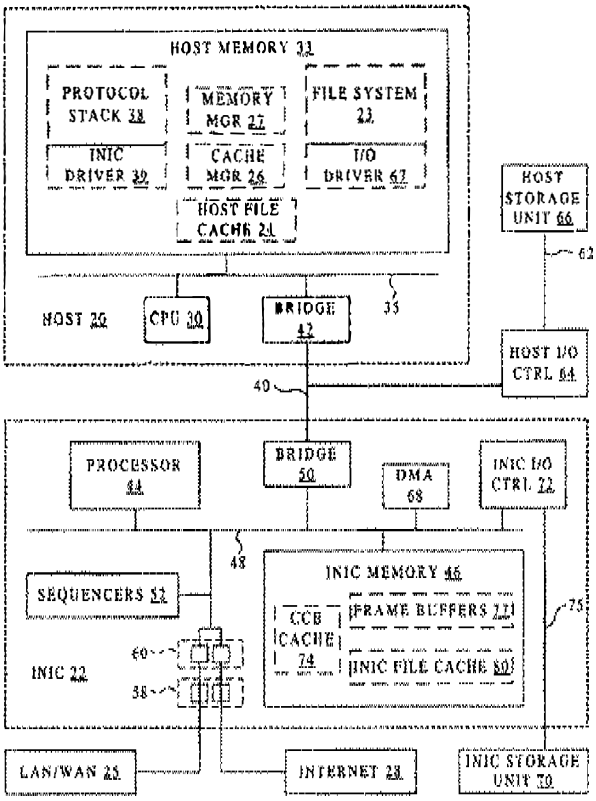


FIG. 1

Philbrick describes a host device 20 that is coupled to an intelligent network interface card (INIC) 22. *See* Philbrick, FIG. 1 and para. [0042]. The INIC 22 is connected to a network 25 (i.e., a local area network (LAN) or a wide area network (WAN)) and configured to receive packets from the network 25 as part of read requests or write requests that are directed to the host device 20. *See* Philbrick, FIG. 1 and paras. [0042] and [0048]. If information that is generated based on a header of the packet matches information stored at the communication control block (CCB) cache 74, the processor 44 accesses an INIC file cache 80 (or the INIC storage unit 70 in the event of a miss at the INIC file cache 80) as part of "fast-path" processing. *See* Philbrick, paras. [0048] and [0049]. If the information does not match any information stored at the CCB

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cache 74, the headers of the packet and control information are sent by the processor 44 to the host device 20 via an I/O bus 40 (and respective bridges) for "slow-path" processing. *See* Philbrick, FIG. 1 and paras. [0043] and [0048]-[0049]. FIG. 2 of Philbrick (reproduced below) illustrates the flow of data and control information between the INIC 22 and the host device 20.

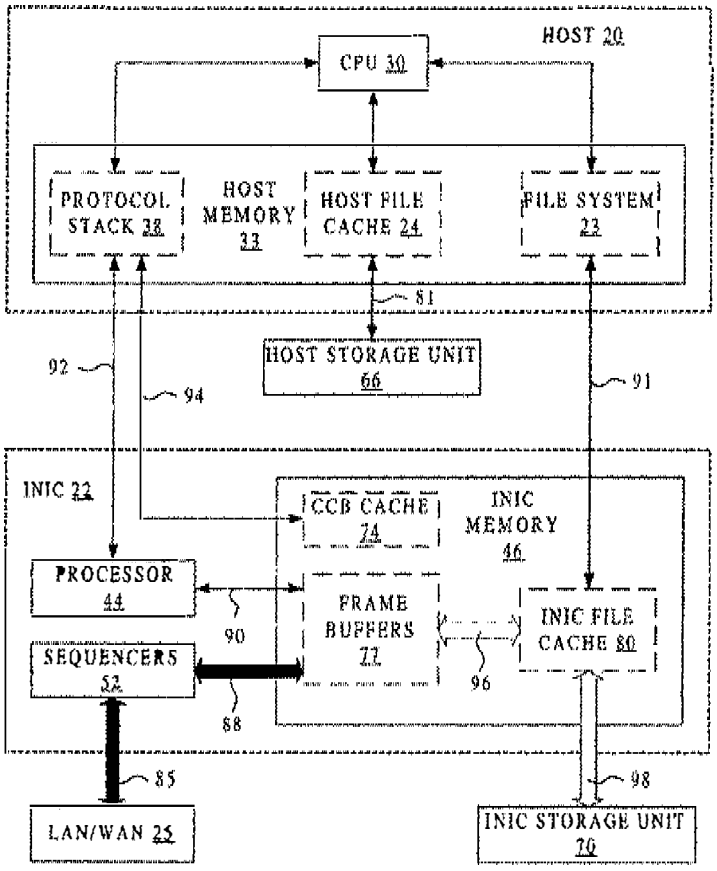


FIG. 2

Philbrick states that "FIG. 2 shows information flow paths consisting primarily of control information with thin arrows, information flow paths consisting primarily of data with thick white arrows, and information flow paths consisting of both control information and data with thick black arrows." Philbrick, para. [0054]. As illustrated in FIG. 2, "[i]nformation flow between a network such as LAN/WAN 25 and the INIC 22 may include control information and

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data, and so is shown with thick black arrow 85." Philbrick, para. [0055]. Information received from the network includes "file reads or writes, which are sent as packets containing file data encapsulated in control information." Philbrick, para. [0055] (emphasis added). Additionally, "control information such as network connection initialization packets and session layer headers are sent to the protocol stack 38, as shown by the thin arrow 92. When a connection has been set up by the host, control information regarding that connection, such as a CCB, may be passed between host protocol stack 38 and INIC memory 46, as shown by thin arrow 94." Philbrick, para. [0055]. As illustrated above, "the data of network file reads or writes primarily pass through the INIC 22 and avoid the host 20, whereas control information is primarily passed between the host and INIC." Philbrick, para. [0056] (emphasis added).

Thus, Philbrick describes receiving read requests from the network 25 (i.e., via a network interface) and sending control information to the host device 20 via the I/O bus 40. Philbrick does not disclose that read requests are received via the I/O bus 40 from the host device 20. The cited portions of Caldarale fail to cure this deficiency in Philbrick. Therefore, the cited portions of Philbrick or Caldarale do not disclose a first interface configured to receive input/output (I/O) traffic from a first device via a dedicated I/O channel, the I/O traffic including a read command, as in claim 18.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/997,327	01/15/2016	Ilya Gertner	4056-0001	5295

60533 7590 02/07/2018

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TIV, BACKHEAN

ART UNIT	PAPER NUMBER
2459	

NOTIFICATION DATE	DELIVERY MODE
02/07/2018	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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docketinggroup@tlgiplaw.com
snobert@tlgiplaw.com

Office Action Summary	Application No. 14/997,327	Applicant(s) GERTNER, ILYA	
	Examiner BACKHEAN TIV	Art Unit 2459	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *1/23/18*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *18-42* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *18-42* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *1/15/16* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

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The present application is being examined under the pre-AIA first to invent provisions. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

Detailed Action

Claims 18-42 are pending in this application. Claims 1-17 were cancelled. This is a response to the Preliminary Amendment filed on 1/23/18.

Drawings

The Drawings filed on 1/15/16 are acceptable.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 4/4/17, 6/27/17, 10/25/17 has been considered.

Terminal Disclaimer

The terminal disclaimer filed on 10/25/17 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Interpretation

The following is a quotation of 35 U.S.C. 112(f):

> (f) Element in Claim for a Combination. – An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

The following is a quotation of pre-AIA 35 U.S.C. 112, sixth paragraph:

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

Use of the word “means” (or “step for”) in a claim with functional language creates a rebuttable presumption that the claim element is to be treated in accordance with 35 U.S.C. 112(f) (pre-AIA 35 U.S.C. 112, sixth paragraph). The presumption that 35 U.S.C. 112(f) (pre-AIA 35 U.S.C. 112, sixth paragraph) is invoked is rebutted when the function is recited with sufficient structure, material, or acts within the claim itself to entirely perform the recited function.

Absence of the word “means” (or “step for”) in a claim creates a rebuttable presumption that the claim element **is not** to be treated in accordance with 35 U.S.C. 112(f) (pre-AIA 35 U.S.C. 112, sixth paragraph). The presumption that 35 U.S.C. 112(f) (pre-AIA 35 U.S.C. 112, sixth paragraph) is not invoked is rebutted when the claim element recites function but fails to recite sufficiently definite structure, material or acts to perform that function.

Claim elements in this application that use the word “means” (or “step for”) are presumed to invoke 35 U.S.C. 112(f) except as otherwise indicated in an Office action. Similarly, claim elements that do not use the word “means” (or “step for”) are presumed not to invoke 35 U.S.C. 112(f) except as otherwise indicated in an Office action.

Claim 37 uses the word "means for", therefore is being interpreted as invoking 112(f)/6th, the corresponding structures is supported by Fig.1, para.29-31, cache, storage device, processor.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 18-42 are rejected under 35 U.S.C. 101 because the claimed invention is directed to a judicial exception (i.e., a law of nature, a natural phenomenon, or an abstract idea) without significantly more.

Claims 18,31,37,38 is directed to receiving, storing, and accessing data, in particular the limitation of

18. receive input/output (I/O) traffic from a first device via a dedicated I/0 channel, the I/O traffic comprising a read command;

receive network traffic from a second device first data via a network; a cache memory configured to store second data;

store second third data; and

access the cache memory during processing of the I/O traffic, the processor further configured to perform an access operation at the storage device based on the I/O traffic.

31. receiving input/output (I/O) traffic from a first device via a dedicated 1/O channel at a first interface, the I/O traffic comprising a write command;

receiving first data;

storing second data;

storing second third data at a storage device;

accessing the cache memory during processing of the I/O traffic; and

performing one or more access operations at the storage device via based on the I/O traffic.

37. receiving input/output (I/O) traffic from a first device via a dedicated I/O channel, the I/O traffic comprising a write command;

receiving network traffic from a second device data;

performing one or more access operations at the means for short-term data storage during processing of the I/O traffic and for performing one or more access operations at the means for long-term data storage based on the I/O traffic.

38. receive input/output (I/O), the I/O traffic comprising one or more read commands, one or more write commands, or a combination thereof;

receive data via a network;

access the cache memory during processing of the I/O traffic, the processor further configured to perform one or more access operations at the storage device based on the I/O traffic.

which is drawn to an idea itself such as data recognition and storage(Content Extraction), collection, storage, and recognition of data(Smart Systems Innovations), (Step 2A).

The claims does not include additional elements when considered both individually and as a combination do not amount to significantly more than the abstract idea. The claim recites the additional limitation of

An apparatus comprising:

a first interface configured to

a network second interface configured to

a storage device configured to

a processor coupled to the cache memory and to the storage device, the processor configured to

at a cache memory

via a network at a network second interface

means for short-term data storage;

means for long-term data storage; and

a first interface configured to

from a host computer via a dedicated I/O channel

a second interface configured to

a cache memory;

a storage device; and

a processor coupled via a communication path to the storage device,

the processor configured to

wherein the communication path is distinct from the dedicated I/O channel.

The claims do not include additional elements that are sufficient to amount to significantly more than the judicial exception because the additional elements are generic computer components claimed to perform their basic functions of *storing, processing and communicating.* The recitation of *processor, cache, network interface, storage device*, are limitations amounts to mere instructions to implement the abstract

idea on a computer. Taking the elements both individually and as a combination, the computer components at each step of the process perform purely generic computer functions. The claim as a whole does not amount to significantly more than the abstract idea itself.

In further the *storing, processing, communicating, processor, cache, network interface, storage device* are recited at a high level of generality and are recited as performing generic computer functions routinely used in computer applications. Generic computer components recited as performing generic computer functions that are well-understood, routine and conventional activities amount to no more than implementing the abstract idea with a computerized system. *Ultramercial, 772 F.3d at 716-17; buySAFE, Inc. v. Google, Inc., 765 F.3d 1350, 1355 (Fed. Cir. 2014); Cyberfone Systems, LLC v. CNN Interactive Group, Inc., 558 Fed. Appx. 988, 993 (Fed. Cir. 2014). But see DDR Holdings, LLC v. Hotels.com, L.P., 773 F.3d 1245, 1258 (Fed. Cir. 2014). See also the JULY 2015 Update: Subject Matter Eligibility, page 7, para. that begines with "The 2014 IEG follows....".*

The limitation of *from a host computer via a dedicated I/O channel, via a communication path to the storage device, via a network* is an attempt to limit the use of the abstract idea to a particular technological environment for which to apply the underlying abstract concept, which does not add significantly more. The claimed invention provides no meaningful limitations on the abstract idea, nor improvement to the computer or another technology is realized. Therefore the claim does not amount to significantly more than the abstract idea itself (Step 2B).

All dependent claims recites limitations such as such as read/write commands, routing, processing, storing, receiving, transmitting, which are generic computer components to perform basic functions and/or which is drawn to an idea itself such as data recognition and storage(Content Extraction), collection, storage, and recognition of data(Smart Systems Innovations), therefore the claims does not include additional elements when considered both individually and as a combination do not amount to significantly more than the abstract idea.

Note: Applicant may be interested in reviewing the 35 USC 101 training materials which provide worksheet examples with claims that have been deemed statutory and claims that have been deemed non-statutory using this analysis:

http://www.uspto.gov/patent/laws-and-regulations/examination-policy/examination-guidance-and-training-materials

Claim Rejections - 35 USC § 103

The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

All pending claims except 35 rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over US 2001/0037406 issued to Philbrick in view of US 5,659,794 issued to Caldarale et al.(Caldarale).

As per claim 8, Philbrick teaches an apparatus comprising: a first interface configured to receive input/output (I/O) traffic from a first device via a dedicated I/O bus, the I/O traffic comprising a read command(Fig.3,4, para.42-43,47 The host connected to the INIC by a I/O bus the bus is used for communication of messages/requests between the host and INIC, file blocks are requested by the host); a network second interface configured to receive network traffic from a second device first data via a network(Fig.1, element 40,50, para.44 shows connection between the host storage unit 66 and the host and INIC through the host I/O controller 64; also INIC storage connected to INIC through element 75); a cache memory configured to store second data(Fig.1,2 element 24, 74, shows cache); a storage device configured to store second third data(Fig.1,2 element 66, para.44, host storage unit, INIC storage); and a processor coupled to the cache memory and to the storage device, the processor configured to access the cache memory during processing of the I/O traffic, the processor further configured to perform an access operation at the storage device based on the I/O traffic(para.46-49; file request, the respective caches are referenced and checked; if the file isn't found in the cache then request is sent to the appropriate storage unit).

Philbrick however does not explicitly teach I/O channel, instead teaches I/O bus, which is similar to that of channel(defined as a physical transmission medium such as a wire or logical connection to transmit data and information), while bus(communication system that transfers data between components inside a computer or between

computers which includes hardware components(wire, optical fiber, etc) and software including communication protocol).

Caldarale explicitly teaches the use of a channel for input/output communication(col.7, lines 20-30, col.17, line 35).

Therefore it would have been obvious to one ordinary skill in the art at the time of the invention to modify the teachings of Philbrick of I/O bus to substitute Caldrale's teaching of I/O channel in order to provide the predictable result of using I/O channel for communication.

One ordinary skill in the art would have been motivated to combine the teachings in order to I/O processing for computer network systems(Caldrale, col.1, lines 14-19).

As per claim 19, the apparatus of claim 18, wherein the dedicated I/O channel is associated with dedicated throughput that corresponds to the I/O traffic(Caldarale, col.7, lines 20-30, certain I/O channel used for specific type of traffic, ie. BMC, IPI, SCSI, USCON).

As per claim 20, the apparatus of claim 18, wherein the I/O traffic is distinct from the network traffic first data(Fig.3,4, para.42-43,47 The host connected to the INIC by a I/O bus the bus is used for communication of messages/requests between the host and INIC, file blocks are requested by the host).

As per claim 21, the apparatus of claim 18, wherein the first device comprises a host computer(Fig.3,4, para.42-43,47 The host connected to the INIC by a I/O bus the bus is used for communication of messages/requests between the host and INIC, file blocks are requested by the host).

As per claim 22, the apparatus of claim 18, wherein the dedicated I/O channel comprises a small computer system interface (SCSI) channel(Philbrick, para.65, Caldarale, col.7, lines 20-30, certain I/O channel used for specific type of traffic, ie. BMC, IPI, SCSI, USCON,).

As per claim 23, the apparatus of claim 18, wherein the network second interface comprises an Ethernet interface or an asynchronous transfer mode (ATM) interface Caldarale col.6, lines 20, the use of ATM).

As per claim 24, the apparatus of claim 18, wherein the I/O traffic further comprises a write command(Philbrick, para.47-49,51; read and write commands for cache or storage).

As per claim 25, the apparatus of claim 18, wherein the network traffic first data comprises a second read request, a write request, or a combination thereof(Philbrick, para.47-49,51; read and write commands for cache or storage).

As per claim 26, the apparatus of claim 18, wherein the network comprises a plurality of interconnected computing devices that includes the second device(Philbrick,Fig.3).

As per claim 27, the apparatus of claim 18, wherein the storage device and the dedicated /O channel are independently accessible, and wherein the processor is configured to read at least a portion of the second data from the cache memory based on the read command and to initiate transmission of the second data to the second device(Fig.3,4, para.42-43,47 The host connected to the INIC by a I/O bus the bus is

used for communication of messages/requests between the host and INIC, file blocks are requested by the host).

As per claim 28, the apparatus of claim 18, wherein the processor is further configured to route the read command to the cache memory or to the storage device(Fig.3,4, para.42-43,47 The host connected to the INIC by a I/O bus the bus is used for communication of messages/requests between the host and INIC, file blocks are requested by the host).

As per claim 29, the apparatus of claim 18, wherein the processor is coupled to the storage device via a communication path that is distinct from the dedicated I/O channel(Philbrick, para.47-50; communication between the storage and host and the host and INIC are different, Caldarale, col.7, lines 20-30, certain I/O channel used for specific type of traffic, ie. BMC, IPI, SCSI, USCON,)..

As per claim 30, the apparatus of claim 18, further comprising: configuration manager circuitry configured to route an I/O request included in the I/O traffic to the cache memory, to route the I/O request to the storage device, or to deny the I/O request(Philbrick, para.46-47,91; route request to storage device); front-end circuitry configured to process the I/O request(Philbrick, para.46-47; host/INIC can process request); and back-end circuitry configured to perform a read operation or a write operation at the storage device based on the I/O request(Philbrick, para.46-47;host/INIC can read or write to storage).

As per claim 31,37 Philbrick teaches a method comprising: receiving input/output (I/O) traffic from a first device via a dedicated I/O bus at a first interface, the I/O traffic

comprising a write command(Fig.3,4, para.42-43,47 The host connected to the INIC by a I/O bus the bus is used for communication of messages/requests between the host and INIC, file blocks are requested by the host); receiving network traffic from a second device first data via a network at a network second interface(Fig.1, element 40,50, para.44 shows connection between the host storage unit 66 and the host and INIC through the host I/O controller 64; also INIC storage connected to INIC through element 75); storing second data at a cache memory; storing second third data at a storage device; accessing the cache memory during processing of the I/O traffic(Fig.1,2 element 24, 74, shows cache; element 66, para.44, host storage unit, INIC storage); and performing one or more access operations at the storage device via based on the I/O traffic(para.46-49; file request, the respective caches are referenced and checked; if the file isn't found in the cache then request is sent to the appropriate storage unit).

Philbrick however does not explicitly teach I/O channel, instead teaches I/O bus, which is similar to that of channel(defined as a physical transmission medium such as a wire or logical connection to transmit data and information), while bus(communication system that transfers data between components inside a computer or between computers which includes hardware components(wire, optical fiber, etc) and software including communication protocol).

Caldarale explicitly teaches the use of a channel for input/output communication(col.7, lines 20-30, col.17, line 35).

Therefore it would have been obvious to one ordinary skill in the art at the time of the invention to modify the teachings of Philbrick of I/O bus to substitute Caldrale's

teaching of I/O channel in order to provide the predictable result of using I/O channel for communication.

One ordinary skill in the art would have been motivated to combine the teachings in order to I/O processing for computer network systems(Caldrale, col.1, lines 14-19).

As per claim 32, the method of claim 31, wherein the I/O traffic is distinct from the network traffic first data(Philbrick,Fig.1; the storage devices are accessible by host and INIC, Caldarale, Fig.1, col.7, lines 20-30; teaches different types I/O channel).

As per claim 33, the method of claim 31, further comprising performing a first access operation at the storage device independently of the dedicated I/O channel(Philbrick,Fig.1; the storage devices are accessible by host and INIC, Caldarale, Fig.1, col.7, lines 20-30; teaches different types I/O channel).

As per claim 34, the method of claim 31, wherein the second data is written at the cache memory in response to the write command(Philbrick, para.47-49,51; read and write commands for cache or storage).

As per claim 36, the method of claim 31, further comprising storing third fourth data at the cache memory, wherein the second data is indicated by the write command, and wherein the third fourth data is indicated by a second write command received at the network second interface-from the second device(Philbrick, para.47-49,51)

As per claim 38, Philbrick teaches an apparatus comprising: a first interface configured to receive input/output (I/O) traffic from a host computer via a dedicated I/O bus, the I/O traffic comprising one or more read commands, one or more write commands, or a combination thereof(Fig.3,4, para.42-43,47 The host connected to the

INIC by a I/O bus the bus is used for communication of messages/requests between the host and INIC, file blocks are requested by the host); a second interface configured to receive data via a network(Fig.1, element 40,50, para.44 shows connection between the host storage unit 66 and the host and INIC through the host I/O controller 64; also INIC storage connected to INIC through element 75); a cache memory; a storage device(Fig.1,2 element 24, 74, shows cache; element 66, para.44, host storage unit, INIC storage); and a processor coupled via a communication path to the storage device, the processor configured to access the cache memory during processing of the I/O traffic, the processor further configured to perform one or more access operations at the storage device based on the I/O traffic, wherein the communication path is distinct from the dedicated I/O channel(Fig.1,para.42-45 CPU 30, uses host bus 35, I/0 bus 40, parallel data channel 62 to communicate with host storage 66, processor 44 uses INIC bus 48 and parallel data channel 75 to communicate with INIC storage unit 70; Note: the term distinct is given the broadest reasonable interpretation, and by definition means distinguished as not being the same; not identical; separate, therefore the communication path of using the host bus 35, I/0 bus 40, parallel data channel 62 or INIC bus 48 and parallel data channel 75 is distinct/different from the I/O bus).

Philbrick however does not explicitly teach I/O channel, instead teaches I/O bus, which is similar to that of channel(defined as a physical transmission medium such as a wire or logical connection to transmit data and information), while bus(communication system that transfers data between components inside a computer or between

computers which includes hardware components(wire, optical fiber, etc) and software including communication protocol).

Caldarale explicitly teaches the use of a channel for input/output communication(col.7, lines 20-30, col.17, line 35).

Therefore it would have been obvious to one ordinary skill in the art at the time of the invention to modify the teachings of Philbrick of I/O bus to substitute Caldrale's teaching of I/O channel in order to provide the predictable result of using I/O channel for communication.

One ordinary skill in the art would have been motivated to combine the teachings in order to I/O processing for computer network systems(Caldrale, col.1, lines 14-19).

As per claim 39, the apparatus of claim 38, wherein the dedicated I/O channel is associated with dedicated throughput that corresponds to the I/O traffic(Philbrick, Fig.3,4, para.42-43,47).

As per claim 40, the apparatus of claim 38, wherein the I/O traffic is distinct from the data(Philbrick, Fig.3,4, para.42-43,47).

As per claim 41, the apparatus of claim 38, wherein the data corresponds to one or more read requests, one or more write requests, or a combination thereof(Philbrick, para.47-49,51).

As per claim 42, the apparatus of claim 38, wherein the storage device and the dedicated I/O channel are independently accessible(Philbrick,Fig.1; the storage devices are accessible by host and INIC, Caldarale, Fig.1, col.7, lines 20-30; teaches different types I/O channel).

Claim 35 rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over US 2001/0037406 issued to Philbrick et al.(Philbrick) in view of US 5,659,794 issued to Caldarale et al.(Caldarale) in view of US 5,802,569 issued to Genduso et al.(Genduso).

As per claim 35, Philbrick in view of Caldarale teaches the method of claim 31, and teach different 67-69, and further teaches reading from cache and transmitting from cache, Philbrick46,47 however does not explicitly teach receiving a read request via the network from a third device; and transmitting at least a portion of the data from the cache memory via the network to the third device responsive to the read request being associated with a cache hit devices such as first, second, third SCSI adapter with file cache Philbrick, Fig.7, 8,para.64,.

Genduso explicitly teaches a request is determined to be a cache hit, then examined to determine whether the request is a read or write request, if a read request the cache fetches data from the cache and provide to the CPU and if write request then the data is written to the cache(Fig.6, col.5, lines 19-46).

Therefore it would have been obvious to one ordinary skill in the art at the time of the invention to modify the teachings of Philbrick in view of Caldrale's system of different devices such as first, second, third SCSI adapter with file cache and reading from cache and transmitting from cache, to apply the teaching of Genduso of using cache hit/miss to determine whether to read/write in order to provide the predictable result of system of different devices such as first, second, third SCSI adapter with file

cache and reading from cache and transmitting from cache for data storage on the different devices through the use of cache hit/miss.

One ordinary skill in the art would have been motivated to combine the teachings in order determine caching capability for computer system(Genduso, col.1, lines 5-10).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BACKHEAN TIV whose telephone number is (571)272-5654. The examiner can normally be reached on M-THUR 5:30-4.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JEFFREY NICKERSON can be reached on (571) 270-3631. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BACKHEAN TIV/
Primary Examiner, Art Unit 2459

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14997327	GERTNER, ILYA
	Examiner	Art Unit
	BACKHEAN TIV	2459

CPC- SEARCHED		
Symbol	Date	Examiner
H04L67/1097(limited)	2/1/2018	BT
G06F12/0808 OR G06F12/0824 OR G06F12/128 OR G06F12/0891 OR G06F13/1663 OR G06F17/30132 OR G06F2211/1009 OR G06F3/067 OR G06F3/0689(limited)	2/1/2018	BT

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US CLASSIFICATION SEARCHED			
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SEARCH NOTES		
Search Notes	Date	Examiner
INVENTOR'S NAME SEARCH	2/1/2018	BT
EAST TXT SEARCH	2/1/2018	BT

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

	/BACKHEAN TIV/ Primary Examiner.Art Unit 2459

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14/997,327	01/15/2016 RULE	709	2459	4056-0001

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INVENTORS
Ilya Gertner, Long Beach, CA;

**** CONTINUING DATA **************************
This application is a CON of 13/527,126 06/19/2012 ABN
which is a CON of 10/382,016 03/05/2003 PAT 8225002
which is a DIV of 09/236,409 01/22/1999 PAT 6549988

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Foreign Priority claimed	35 USC 119(a-d) conditions met	Verified and Acknowledged	Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
☐ Yes ☑ No	☐ Yes ☑ No	/BACKHEAN TIV/ Examiner's Signature	☐ Initials	CA	13	17	3

ADDRESS

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TITLE

DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS

FILING FEE RECEIVED		
640	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	33667	((G06F12/0808 OR G06F12/0824 OR G06F12/128 OR G06F12/0891 OR G06F13/1663 OR G06F17/30132 OR G06F2211/1009 OR G06F3/067 OR G06F3/0689 OR H04L67/1097) CPC.)	US-PGPUB; USPAT	OR	ON	2018/02/01 07:23
L3	101	(host or computer) with ("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT	OR	ON	2018/02/01 07:45
L4	13	L2 AND L3	US-PGPUB; USPAT	OR	ON	2018/02/01 07:45
L5	251	("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2018/02/01 07:50
L6	101	L3 AND ("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2018/02/01 07:58
S1	1	("8225002").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/08/12 07:15
S2	500	write near4 pending same (invalidat$4 or error)	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:22
S3	329	write near4 pending same (invalidat$4 or error)and (@ad or @rlad or @pd or @ptad or @prad)<="20030305"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:23
S4	15	write near4 pending same (send$4 or transmit$4) near3 (invalidat$4 or error) and (@ad or @rlad or @pd or @ptad or @prad)<="20030305"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:23
S5	29	write near4 pending same (send$4 or	US-PGPUB;	OR	ON	2013/08/12

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		transmit$4) with (invalidat$4 or error) and (@ad or @rlad or @pd or @ptad or @prad)<="20030305"	USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB			08:27
S6	14	S5 not S4	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:27
S7	18	("20020002625" | "6101508" | "6119151" | "6341311" | "7072056" | "7254617" | "7293099" | "7739379" | "7864758").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:30
S8	73	write with pending same (send$4 or transmit$4) with (invalidat$4 or error) and (@ad or @rlad or @pd or @ptad or @prad)<="20030305"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:31
S9	25	write with pending same (send$4 or transmit$4) with (invalidat$4) and (@ad or @rlad or @pd or @ptad or @prad) <="20030305"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:31
S10	1	("6549988").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/08/12 08:39
S11	11	write with pending same (send$4 or transmit$4) with (invalidat$4) and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:41
S12	27	write near2 pending and (send$4 or transmit$4) with (invalidat$4) and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:45
S13	2	write near2 pending same (send$4 or transmit$4) with (invalidat$4 or error) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:47
S14	566	write near2 pending and (send$4 or transmit$4) with (invalidat$4 or error) with (read$4 or writ$4) and (@ad or	US-PGPUB; USPAT; USOCR;	OR	ON	2013/08/12 08:52

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		@rlad or @pd or @ptad or @prad) <="19990122"	FPRS; EPO; DERWENT; IBM_TDB			
S15	60	writ$4 near2 pending and (send$4 or transmit$4) with (invalidat$4 or error) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:53
S16	4	S15 not S14	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:54
S17	49	cache and writ$4 near2 pending and (send$4 or transmit$4) with (invalidat$4 or error) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 08:59
S18	1	("6289380").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/08/12 09:06
S19	2	cache near4 writ$4 near2 pending with (invalidat$4 or error) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 09:12
S20	9	cache near4 writ$4 near2 pending same (invalidat$4 or error) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 09:13
S21	33	scan$4 near4 page with cache and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 09:48
S22	30	(scan$4 near4 page).ab,ti. and cache and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2013/08/12 09:51
S23	3242	(invalidat$4) with (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	ON	2015/07/13 07:52

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			DERWENT; IBM_TDB			
S24	782	(invalidat$4) adj2 (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2015/07/13 07:53
S25	9	(send$4 or transmit$4) near3 (invalidat$4) adj2 (read$4 or writ$4) and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2015/07/13 07:54
S26	25	(US-20040022094-$ or US-20030126372-$ or US-20030069889-$ or US-20020002625-$).did. or (US-5768211-$ or US-5761734-$ or US-7003587-$ or US-6311186-$ or US-6101497-$ or US-7864758-$ or US-7739379-$ or US-7293099-$ or US-7254617-$ or US-7072056-$ or US-6341311-$ or US-6119151-$ or US-6101508-$ or US-4648030-$ or US-5577204-$ or US-5251311-$).did. or (US-7739379-$ or US-7293099-$ or US-6341311-$ or US-6101508-$ or US-20040111486-$).did.	US-PGPUB; USPAT; DERWENT	OR	ON	2015/07/13 08:01
S27	1	("20030069889").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2015/07/13 08:02
S28	1	"20030069889" and (error) same director	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2015/07/13 08:04
S29	1	("6549988").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/29 07:29
S30	2	(("8225002") or ("6549988")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/04/05 07:49
S31	4686	("input/output" or "I/O") with cache and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 10:24
S32	7	("input/output" or "I/O") with cache same network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 10:26
S33	159	("input/output" or "I/O") with cache and	US-PGPUB;	OR	ON	2017/04/05

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		network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB			10:26
S34	1	("6389479").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/04/05 10:29
S35	69	("4648030" | "5251311" | "5577204" | "5577226" | "5600817" | "5611049" | "5644751" | "5649152" | "5701516" | "5715455" | "5717884" | "5742792" | "5743933" | "5748985" | "5751993" | "5758050" | "5761734" | "5768211" | "5778353" | "5787473" | "5790795" | "5802553" | "5805857" | "5819292" | "5819310" | "5828475" | "5841997" | "5848251" | "5852715" | "5854942" | "5860026" | "5860137" | "5887146" | "5896506" | "5898828" | "5901327" | "5974503" | "6016500" | "6026461" | "6044438" | "6101497" | "6101508" | "6119151" | "6122659" | "6182111" | "6311186" | "6341311" | "6438652" | "6457047" | "6549988" | "6711632" | "6785714" | "6829637" | "6850980" | "7003587" | "7072056" | "7133905" | "7188251" | "7254617" | "7287065" | "7293099" | "7739379" | "7864758" | "8225002" | "20020002625" | "20030069889" | "20030126372" | "20040022094" | "20160134702").PN.	US-PGPUB; USPAT	OR	ON	2017/04/05 13:18
S36	3	(("5974503") or ("6101508") or ("6711632")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/04/05 13:19
S37	416	("input/output" or "I/O") with channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 13:26
S38	20	("input/output" or "I/O") with SCSI near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 13:26
S39	1	("6226680").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/04/05 13:27
S40		(access$4 near4 cache) with process$4 near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05
S41	249	("input/output" or "I/O") near3 channel	US-PGPUB;	OR	ON	2017/04/05

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		and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB			14:41
S42	57	("input/output" or "I/O") near3 channel and network near4 traffic and ATM and SCSI and Ethernet and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 14:42
S43	240	cache near3 hit with read near4 request and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 15:49
S44	216	cache near3 hit with read near4 request and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT	OR	ON	2017/04/05 15:49
S45	12	cache near3 hit with read near4 request and fast near3 path and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT	OR	ON	2017/04/05 15:50
S46	26	cache near3 hit with read adj2 request with write and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT	OR	ON	2017/04/05 15:52
S47	1	("5577204").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/04/05 16:14
S48	43	(US-20040022094-$ or US-20030126372-$ or US-20030069889-$ or US-20020002625-$ or US-20010037406-$ or US-20020091844-$ or US-20160134702-$ or US-20020007445-$ or US-20010013085-$).did. or (US-5768211-$ or US-5761734-$ or US-7003587-$ or US-6311186-$ or US-6101497-$ or US-7864758-$ or US-7739379-$ or US-7293099-$ or US-7254617-$ or US-7072056-$ or US-6341311-$ or US-6119151-$ or US-6101508-$ or US-4648030-$ or US-5577204-$ or US-5251311-$ or US-6549988-$ or US-8225002-$ or US-5900015-$ or US-7664883-$ or US-6389479-$ or US-6711632-$ or US-5974503-$ or US-6044438-$ or US-6226680-$ or US-5598551-$).did. or (US-5659794-$ or US-5787469-$ or US-5802569-$).did. or (US-7739379-$ or US-7293099-$ or US-6341311-$ or US-6101508-$ or US-20040111486-$).did.	US-PGPUB; USPAT; DERWENT	OR	ON	2017/04/05 16:15
S49	17	S48 and invalidate	US-PGPUB; USPAT; DERWENT	OR	ON	2017/04/05 16:15
S50	123	cache near3 hit with write same invalidat$4 near4 cache and (@ad or @rlad or @pd or @ptad or @prad)	US-PGPUB; USPAT	OR	ON	2017/04/05 16:29

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		<="19990122"				
S51	56	cache near3 hit with write same invalidat$4 adj3 cache and (@ad or @rlad or @pd or @ptad or @prad) <="19990122"	US-PGPUB; USPAT	OR	ON	2017/04/05 16:29
S57	39941	((G06F12/0808 OR G06F12/0824 OR G06F12/128 OR G06F12/0891 OR G06F13/1663 OR G06F17/30132 OR G06F2211/1009 OR G06F3/067 OR G06F3/0689 OR H04L67/1097).CPC.)	US-PGPUB; USPAT; DERWENT	OR	ON	2017/04/05 19:36
S58	14	S57 AND ("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/04/05 19:37
S59	102	(host or computer) with ("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	OR	ON	2017/08/23 13:41

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S60	31631	((G06F12/0808 OR G06F12/0824 OR G06F12/128 OR G06F12/0891 OR G06F13/1663 OR G06F17/30132 OR G06F2211/1009 OR G06F3/067 OR G06F3/0689 OR H04L67/1097).CPC.)	US-PGPUB; USPAT	OR	ON	2017/08/23 14:08
S61	100	(host or computer) with ("input/output" or "I/O") near3 channel and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT	OR	ON	2017/08/23 14:08
S62	19	(host or computer) with ("input/output" or "I/O") near3 channel same (read or write) and network near4 traffic and (@ad or @rlad or @pd or @ptad or @prad)<="19990122"	US-PGPUB; USPAT	OR	ON	2017/08/23 14:09
S63	5	S60 and S62	US-PGPUB; USPAT	OR	ON	2017/08/23 14:09

2/1/2018 7:59:15 AM
C:\Users\btiv\Documents\EAST\Workspaces\13527126_14997327_15440277_cache_management.wsp

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	14997327
Filing Date	2016-01-15
First Named Inventor	Ilya Gertner
Art Unit	2451
Examiner Name	Tiv Backhean
Attorney Docket Number	4056-0001

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4648030		1987-03-03	BOMBA, et al.	
	2	5251311		1993-10-05	KASAI	
	3	5577204		1996-11-19	BREWER, et al.	
	4	5577226	A	1996-11-19	PERCIVAL	
	5	5600817		1997-02-04	MACON, JR., et al.	
	6	5611049		1997-03-11	PITTS	
	7	5644751		1997-07-01	BURNETT	
	8	5649152		1997-07-15	OHRAN, et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /BT/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	14997327
Filing Date	2016-01-15
First Named Inventor	Ilya Gertner
Art Unit	2451
Examiner Name	Tiv Backhean
Attorney Docket Number	4056-0001

	9	5701516		1997-12-23	CHENG, et al.	
	10	5715455		1998-02-03	MACON, JR., et al.	
	11	5717884		1998-02-10	GZYM, et al.	
	12	5742792		1998-04-21	YANAI, et al.	
	13	5743933		1998-04-28	MELLEM	
	14	5748985		1998-05-05	KANAI	
	15	5751993		1998-05-12	OFEK, et al.	
	16	5758050		1998-05-26	BRADY, et al.	
	17	5761734		1998-06-02	PFEFFER, et al.	
	18	5768211		1998-06-16	JONES, et al.	
	19	5778353		1998-07-07	SCHIEFER, et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /BT/

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14997327
	Filing Date	2016-01-15
	First Named Inventor	Ilya Gertner
	Art Unit	2451
	Examiner Name	Tiv Backhean
	Attorney Docket Number	4056-0001

	20	5787473		1998-07-28	VISHLITZKY, et al.	
	21	5790795		1998-08-04	HOUGH	
	22	5802553		1998-09-01	ROBINSON, et al.	
	23	5805857		1998-09-08	COLEGROVE	
	24	5819292		1998-10-06	HITZ, et al.	
	25	5819310		1998-10-06	VISHLITZKY, et al.	
	26	5828475		1998-10-27	BENNETT, et al.	
	27	5841997		1998-11-24	BLEIWEISS, et al.	
	28	5848251		1998-12-08	LOMELINO, et al.	
	29	5852715		1998-12-22	RAZ, et al.	
	30	5854942		1998-12-29	PENOKIE	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /BT/

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14997327
	Filing Date	2016-01-15
	First Named Inventor	Ilya Gertner
	Art Unit	2451
	Examiner Name	Tiv Backhean
	Attorney Docket Number	4056-0001

	31	5860026		1999-01-12	KITTA, et al.	
	32	5860137		1999-01-12	RAZ, et al.	
	33	5887146		1999-03-23	BAXTER, et al.	
	34	5896506		1999-04-20	ALI, et al.	
	35	5898828		1999-04-27	PIGNOLET, et al.	
	36	5901327		1999-05-04	OFEK	
	37	5974503		1999-10-26	VENKATESH, et al.	
	38	6016500		2000-01-18	WALDO, et al.	
	39	6026461		2000-02-15	BAXTER, et al.	
	40	6044438		2000-03-28	OLNOWICH	
	41	6101497		2000-08-08	OFEK	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /BT/

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14997327
	Filing Date	2016-01-15
	First Named Inventor	Ilya Gertner
	Art Unit	2451
	Examiner Name	Tiv Backhean
	Attorney Docket Number	4056-0001

	42	6101508		2000-08-08	WOLFF	
	43	6119151		2000-09-12	CANTRELL, et al.	
	44	6122659		2000-09-19	OLNOWICH	
	45	6182111	B1	2001-01-30	INOHARA, et al.	
	46	6311186	B1	2001-10-30	MELAMPY, et al.	
	47	6341311	B1	2002-01-22	SMITH, et al.	
	48	6438652	B1	2002-08-20	JORDAN, et al.	
	49	6457047	B1	2002-09-24	CHANDRA, et al.	
	50	6549988	B1	2003-04-15	GERTNER	
	51	6711632	B1	2004-03-23	CHOW, et al.	
	52	6785714	B1	2004-08-31	THOMPSON, et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /BT/

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 134 of 289

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	14997327
Filing Date	2016-01-15
First Named Inventor	Ilya Gertner
Art Unit	2451
Examiner Name	Tiv Backhean
Attorney Docket Number	4056-0001

	53	6829637	B2	2004-12-07	KOKKU, et al.	
	54	6850980	B1	2005-02-01	GOURLAY	
	55	7003587	B1	2006-02-21	BATTAT, et al.	
	56	7072056	B1	2006-07-04	GREAVES, et al.	
	57	7133905	B2	2006-11-07	DILLEY, et al.	
	58	7188251	B1	2007-03-06	SLAUGHTER, et al.	
	59	7254617	B2	2007-08-07	SCHUH, et al.	
	60	7287065	B2	2007-10-23	NISHI, et al.	
	61	7293099	B1	2007-11-06	KALAJAN	
	62	7739379	B1	2010-06-15	VAHALIA, et al.	
	63	7864758	B1	2011-01-04	LOLAYEKAR, et al.	

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Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 135 of 289

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14997327
	Filing Date	2016-01-15
	First Named Inventor	Ilya Gertner
	Art Unit	2451
	Examiner Name	Tiv Backhean
	Attorney Docket Number	4056-0001

	64	8225002	B2	2012-07-17	GERTNER	

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20020002625	A1	2002-01-03	VANGE, et al.	
	2	20030069889	A1	2003-04-10	OFEK	
	3	20030126372	A1	2003-07-03	RAND	
	4	20040022094	A1	2004-02-05	RADHAKRISHNAN, et al.	
	5	20160134702	A1	2016-05-12	GERTNER	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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	Filing Date	2016-01-15
	First Named Inventor	Ilya Gertner
	Art Unit	2451
	Examiner Name	Tiv Backhean
	Attorney Docket Number	4056-0001

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	DAHLIN et al., "Cooperative Caching: Using Remote Client Memory to Improve File System Performance," First Symposium on Operating Systems Design and Implementation (OSDI 1994), 1994, pgs. 1-14.	
	2	NCR 5100M, http://www.hardwood-intl.com/ncrproducts/5100M_NCR.asp, printed November 27, 2006, 5 pages.	
	3	Internet Archive Waybackmachine http://archive.org/web/web.php, printed November 27, 2006, 1 page.	
	4	KAREDLA, ET AL., "Caching Strategies to Improve Disk System Performance, Computer, Vol. 27, No. 3, March 1994 (Research paper), pgs. 38-46, Abstract, 2 pages.	
	5	SMITH, "Cache Memories," Computing Surveys, Vol. 14, No. 3, September, 1982, pgs. 473-530.	

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EXAMINER SIGNATURE

Examiner Signature	/Backhean Tiv/ (02/01/2018)	Date Considered	02/01/2018

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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Application Number	14997327
Filing Date	2016-01-15
First Named Inventor	Ilya Gertner
Art Unit	2451
Examiner Name	Tiv Backhean
Attorney Docket Number	4056-0001

CERTIFICATION STATEMENT

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jeffrey G. Toler/	Date (YYYY-MM-DD)	2017-04-04
Name/Print	Jeffrey G. Toler	Registration Number	38,342

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 139 of 289

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	14997327
Filing Date	2016-01-15
First Named Inventor	Ilya Gertner
Art Unit	2451
Examiner Name	Tiv Backhean
Attorney Docket Number	4056-0001

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4797813	A	1989-01-10	IGARASHI	
	2	5222224	A	1993-06-22	FLYNN et al.	
	3	5319766	A	1994-06-07	THALLER et al.	
	4	5598551	A	1997-01-28	BARAJAS et al.	
	5	5659794	A	1997-08-19	CALDARALE et al.	
	6	5787469	A	1998-07-28	MERRELL	
	7	5802569	A	1998-09-01	GENDUSO et al.	
	8	5900015	A	1999-05-04	HERGER et al.	

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	Art Unit	2451
	Examiner Name	Tiv Backhean
	Attorney Docket Number	4056-0001

	9	6226680	B1	2001-05-01	BOUCHER et al.	
	10	6389479	B1	2002-05-14	BOUCHER et al.	
	11	7664883	B2	2010-02-16	CRAFT et al.	
	12	8225002	B2	2012-07-17	GERTNER	

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20010013085	A1	2001-08-09	YAMAMOTO	
	2	20010037406	A1	2001-11-01	PHILBRICK et al.	
	3	20020007445	A1	2002-01-17	BLUMENAU et al.	
	4	20020091844	A1	2002-07-11	CRAFT et al.	

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Application Number	14997327
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Examiner Name	Tiv Backhean
Attorney Docket Number	4056-0001

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	1		

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Examiner Signature	/Backhean Tiv/ (02/01/2018)	Date Considered	02/01/2018

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First Named Inventor	Ilya Gertner
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Attorney Docket Number	4056-0001

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jason E. Robertson/	Date (YYYY-MM-DD)	2017-06-26
Name/Print	Jason E. Robertson	Registration Number	53522

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Cisco Exhibit 1002
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IPR2023-00733, Page 144 of 289

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
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Application Number	14997327
Filing Date	2016-01-15
First Named Inventor	ILYA GERTNER
Art Unit	2459
Examiner Name	TIV, BACKHEAN
Attorney Docket Number	4056-0001

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4933846		1990-06-12	HUMPHREY et al.	
	2	6260120	B1	2001-07-10	BLUMENAU et al.	
	3	6253260	B1	2001-06-26	BEARDSLEY et al.	

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20020194294	A1	2002-12-19	BLUMENAU et al.	
	2	20030145114	A1	2003-07-31	GERTNER	
	3	20120259953	A1	2012-10-11	GERTNER	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14997327
	Filing Date	2016-01-15
	First Named Inventor	ILYA GERTNER
	Art Unit	2459
	Examiner Name	TIV, BACKHEAN
	Attorney Docket Number	4056-0001

	4	20170161189	A1	2017-06-08	GERTNER	

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	1		

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Examiner Signature	/Backhean Tiv/ (02/01/2018)	Date Considered	02/01/2018

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Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 146 of 289

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	14997327
Filing Date	2016-01-15
First Named Inventor	ILYA GERTNER
Art Unit	2459
Examiner Name	TIV, BACKHEAN
Attorney Docket Number	4056-0001

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Signature	/Jeffrey G. Toler/	Date (YYYY-MM-DD)	2017-10-25
Name/Print	Jeffrey G. Toler	Registration Number	38,342

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /BT/

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /BT/

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 148 of 289

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14997327	GERTNER, ILYA
	Examiner	Art Unit
	BACKHEAN TIV	2459

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	02/01/2018								
	18	✓								
	19	✓								
	20	✓								
	21	✓								
	22	✓								
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	36	✓								
	37	✓								
	38	✓								
	39	✓								
	40	✓								
	41	✓								
	42	✓								

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Cisco et al. v. LS Cloud Storage Technologies
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventors:	Ilya Gertner		
Title:	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS		
App. No.:	14/997,327	Filed:	January 15, 2016
Examiner:	BACKHEAN, Tiv	Group Art Unit:	2459
Customer No.:	60533	Confirmation No.:	5295
Atty. Dkt. No.:	4056-0001		

M/S: Amendment
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT

Dear Commissioner:

Prior to the first action on the merits, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims, which begins on page 2 of this paper.

Remarks begin on page 7 of this paper.

CLAIM AMENDMENTS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-17. (Canceled).

18. (Currently Amended) An apparatus comprising:

[[an]] a first interface configured to receive input/output (I/O) traffic from a first device via a dedicated I/O channel, the I/O traffic comprising a read command;

a ~~network~~ second interface configured to receive ~~network traffic from a second device~~ first data via a network;

a cache memory configured to store second data;

a storage device configured to store ~~second~~ third data; and

a processor coupled to the cache memory and to the storage device, the processor configured to access the cache memory during processing of the I/O traffic, the processor further configured to perform an access operation at the storage device based on the I/O traffic.

19. (Previously Presented) The apparatus of claim 18, wherein the dedicated I/O channel is associated with dedicated throughput that corresponds to the I/O traffic.

20. (Currently Amended) The apparatus of claim 18, wherein the I/O traffic is distinct from the ~~network traffic~~ first data.

21. (Previously Presented) The apparatus of claim 18, wherein the first device comprises a host computer.

22. (Previously Presented) The apparatus of claim 18, wherein the dedicated I/O channel comprises a small computer system interface (SCSI) channel.

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 151 of 289

23. (Currently Amended) The apparatus of claim 18, wherein the ~~network~~ second interface comprises an Ethernet interface or an asynchronous transfer mode (ATM) interface.

24. (Previously Presented) The apparatus of claim 18, wherein the I/O traffic further comprises a write command.

25. (Currently Amended) The apparatus of claim 18, wherein the ~~network traffic~~ first data comprises a second read request, a write request, or a combination thereof.

26. (Currently Amended) The apparatus of claim 18, wherein the network comprises a plurality of interconnected computing devices ~~that includes the second device~~.

27. (Currently Amended) The apparatus of claim 18, wherein the storage device and the dedicated I/O channel are independently accessible, and wherein the processor is configured to read at least a portion of the second data from the cache memory based on the read command ~~and to initiate transmission of the second data to the second device~~.

28. (Previously Presented) The apparatus of claim 18, wherein the processor is further configured to route the read command to the cache memory or to the storage device.

29. (Previously Presented) The apparatus of claim 18, wherein the processor is coupled to the storage device via a communication path that is distinct from the dedicated I/O channel.

30. (Previously Presented) The apparatus of claim 18, further comprising:

configuration manager circuitry configured to route an I/O request included in the I/O traffic to the cache memory, to route the I/O request to the storage device, or to deny the I/O request;

front-end circuitry configured to process the I/O request; and

back-end circuitry configured to perform a read operation or a write operation at the storage device based on the I/O request.

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31. (Currently Amended) A method comprising:

receiving input/output (I/O) traffic from a first device via a dedicated I/O channel at [[an]] a first interface, the I/O traffic comprising a write command;

receiving ~~network traffic from a second device~~ first data via a network at a ~~network~~ second interface;

storing second data at a cache memory;

storing ~~second~~ third data at a storage device;

accessing the cache memory during processing of the I/O traffic; and

performing one or more access operations at the storage device via based on the I/O traffic.

32. (Currently Amended) The method of claim 31, wherein the I/O traffic is distinct from the ~~network traffic~~ first data.

33. (Previously Presented) The method of claim 31, further comprising performing a first access operation at the storage device independently of the dedicated I/O channel.

34. (Currently Amended) The method of claim 31, wherein the second data is written at the cache memory in response to the write command.

35. (Currently Amended) The method of claim 31, further comprising:

receiving a read request via the network ~~from a third device~~; and

transmitting at least a portion of the second data from the cache memory via the network ~~to the third device~~ responsive to the read request being associated with a cache hit.

36. (Currently Amended) The method of claim 31, further comprising storing ~~third~~ fourth data at the cache memory, wherein the second data is indicated by the write command, and wherein the ~~third~~ fourth data is indicated by a second write command received at the ~~network~~ second interface ~~from the second device~~.

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IPR2023-00733, Page 153 of 289

37. (Currently Amended) An apparatus comprising:

means for receiving input/output (I/O) traffic from a first device via a dedicated I/O channel, the I/O traffic comprising a write command;

means for receiving ~~network traffic from a second device~~ data via a network;

means for short-term data storage;

means for long-term data storage; and

means for performing one or more access operations at the means for short-term data storage during processing of the I/O traffic and for performing one or more access operations at the means for long-term data storage based on the I/O traffic.

38. (New) An apparatus comprising:

a first interface configured to receive input/output (I/O) traffic from a host computer via a dedicated I/O channel, the I/O traffic comprising one or more read commands, one or more write commands, or a combination thereof;

a second interface configured to receive data via a network;

a cache memory;

a storage device; and

a processor coupled via a communication path to the storage device, the processor configured to access the cache memory during processing of the I/O traffic, the processor further configured to perform one or more access operations at the storage device based on the I/O traffic, wherein the communication path is distinct from the dedicated I/O channel.

39. (New) The apparatus of claim 38, wherein the dedicated I/O channel is associated with dedicated throughput that corresponds to the I/O traffic.

40. (New) The apparatus of claim 38, wherein the I/O traffic is distinct from the data.

41. (New) The apparatus of claim 38, wherein the data corresponds to one or more read requests, one or more write requests, or a combination thereof.

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42. (New) The apparatus of claim 38, wherein the storage device and the dedicated I/O channel are independently accessible.

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REMARKS

Claims 1-17 were previously canceled without prejudice or disclaimer. Claims 18, 20, 23, 25-27, 31, 32, and 34-37 have been amended. New claims 38-42 have been added. The amendments and the new claims are supported by the Specification. No new matter has been added.

CONCLUSION

All changes to the claims in this amendment should be considered to have been made to further clarify the claims or for another purpose unrelated to patentability, and no estoppel should be deemed to attach thereto.

The Examiner is invited to contact the undersigned attorney at the telephone number listed below if such a call would in any way facilitate allowance of this application.

The Commissioner is hereby authorized to charge any fees, which may be required, or credit any overpayment, to Deposit Account Number 50-2469.

Respectfully submitted,

1-23-2018
Date

Jeffrey G. Toler, Reg. No. 38,342
TOLER LAW GROUP, PC
8500 Bluffstone Cove, Suite A201
Austin, Texas 78759
Telephone: (512) 327-5515
Facsimile: (512) 327-5575

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
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Electronic Patent Application Fee Transmittal

Application Number:	14997327
Filing Date:	15-Jan-2016
Title of Invention:	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS
First Named Inventor/Applicant Name:	Ilya Gertner
Filer:	Jeffrey G. Toler/Suzanne Nobert
Attorney Docket Number:	4056-0001

Filed as Micro Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	3202	5	25	125
INDEPENDENT CLAIMS IN EXCESS OF 3	3201	1	115	115
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**240**

Electronic Acknowledgement Receipt

EFS ID:	31580340
Application Number:	14997327
International Application Number:	
Confirmation Number:	5295
Title of Invention:	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS
First Named Inventor/Applicant Name:	Ilya Gertner
Customer Number:	60533
Filer:	Jeffrey G. Toler/Suzanne Nobert
Filer Authorized By:	Jeffrey G. Toler
Attorney Docket Number:	4056-0001
Receipt Date:	23-JAN-2018
Filing Date:	15-JAN-2016
Time Stamp:	14:34:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$240
RAM confirmation Number	012418INTEFSW00000870502469
Deposit Account	502469
Authorized User	Suzanne Nobert
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		4056-0001_Preliminary_Amendment.pdf	292297 b251685db57040e4dc6aa3506e281fa8716080ab	yes	7
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Preliminary Amendment		1	1	
	Claims		2	6	
	Applicant Arguments/Remarks Made in an Amendment		7	7	
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32054 b34167eaafcc66a76290baa2ef01b517d1783b15	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	324351		

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/997,327	Filing Date 01/15/2016	☐ To be Mailed

ENTITY: ☐ LARGE ☐ SMALL ☒ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	x $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	x $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	01/23/2018	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 25	Minus	** 20	= 5	x $25 =	125
	Independent (37 CFR 1.16(h))	* 4	Minus	***3	= 1	x $115 =	115
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	**240**

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
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This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	14/997,327	GERTNER, ILYA	

Document Code - DISQ	Internal Document – DO NOT MAIL

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed : 25 October, 2017	**This patent is subject to a Terminal Disclaimer**	

Approved/Disapproved by:

PAMELA YOUNG

Technology Center: PLRC

Telephone: _____

U.S. Patent and Trademark Office

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	14997327
Filing Date	2016-01-15
First Named Inventor	ILYA GERTNER
Art Unit	2459
Examiner Name	TIV, BACKHEAN
Attorney Docket Number	4056-0001

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4933846		1990-06-12	HUMPHREY et al.	
	2	6260120	B1	2001-07-10	BLUMENAU et al.	
	3	6253260	B1	2001-06-26	BEARDSLEY et al.	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20020194294	A1	2002-12-19	BLUMENAU et al.	
	2	20030145114	A1	2003-07-31	GERTNER	
	3	20120259953	A1	2012-10-11	GERTNER	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14997327
	Filing Date	2016-01-15
	First Named Inventor	ILYA GERTNER
	Art Unit	2459
	Examiner Name	TIV, BACKHEAN
	Attorney Docket Number	4056-0001

	4	20170161189	A1	2017-06-08	GERTNER	

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FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 165 of 289

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14997327
	Filing Date	2016-01-15
	First Named Inventor	ILYA GERTNER
	Art Unit	2459
	Examiner Name	TIV, BACKHEAN
	Attorney Docket Number	4056-0001

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jeffrey G. Toler/	Date (YYYY-MM-DD)	2017-10-25
Name/Print	Jeffrey G. Toler	Registration Number	38,342

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 166 of 289

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 167 of 289

PTO/AIA/26 (04-14)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT

Docket Number (Optional)
4056-0001

In re Application of: ILYA GERTNER

Application No.: 14/997,327

Filed: January 15, 2016

For: DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS

The applicant, LS CLOUD STORAGE TECHNOLOGIES LLC, owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 6,549,988 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

expires for failure to pay a maintenance fee;
is held unenforceable;
is found invalid by a court of competent jurisdiction;
is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
has all claims canceled by a reexamination certificate;
is reissued; or
is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☑ The undersigned is an attorney or agent of record. Reg. No. 38,342

/Jeffrey G. Toler/ — Signature
2017-10-25 — Date

JEFFREY G. TOLER — Typed or printed name

Title
512-327-5575 — Telephone Number

☑ Terminal disclaimer fee under 37 CFR 1.20(d) included.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.321. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	14997327
Filing Date:	15-Jan-2016
Title of Invention:	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS
First Named Inventor/Applicant Name:	Ilya Gertner
Filer:	Jeffrey G. Toler/Suzanne Nobert
Attorney Docket Number:	4056-0001

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
STATUTORY OR TERMINAL DISCLAIMER	2814	1	160	160
		Total in USD ($)		**160**

Electronic Acknowledgement Receipt

EFS ID:	30758657
Application Number:	14997327
International Application Number:	
Confirmation Number:	5295
Title of Invention:	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS
First Named Inventor/Applicant Name:	Ilya Gertner
Customer Number:	60533
Filer:	Jeffrey G. Toler/Suzanne Nobert
Filer Authorized By:	Jeffrey G. Toler
Attorney Docket Number:	4056-0001
Receipt Date:	25-OCT-2017
Filing Date:	15-JAN-2016
Time Stamp:	15:18:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$160
RAM confirmation Number	102617INTEFSW00002146502469
Deposit Account	502469
Authorized User	Suzanne Nobert
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	4056-0001_IDS.pdf	612247 370edb0a9216b48085d4eb10fefbe3ebe609fbdf	no	4
Warnings:					
Information:					
2	Terminal Disclaimer Filed	4056-0001_TD.pdf	159968 3f74894c41efe2c38cfc6923e8b4331f72d53a1c	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30704 0ed2e80c583526510a0561721cdea422d6e751b1	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	802919		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventors:	Ilya Gertner		
Title:	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS		
App. No.:	14/997,327	Filed:	January 15, 2016
Examiner:	BACKHEAN, Tiv	Group Art Unit:	2459
Customer No.:	60533	Confirmation No.:	5295
Atty. Dkt. No.:	4056-0001		

M/S: Amendment
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT

Dear Commissioner:

Prior to the first action on the merits, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims, which begins on page 2 of this paper.

Amendments to the Drawings begin on page 6 of this paper and include an attached replacement sheet.

Remarks begin on page 7 of this paper.

An **Appendix** including an amended drawing is attached following page 7.

CLAIM AMENDMENTS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-17. (Canceled).

18. (New) An apparatus comprising:

an interface configured to receive input/output (I/O) traffic from a first device via a dedicated I/O channel, the I/O traffic comprising a read command;

a network interface configured to receive network traffic from a second device via a network;

a cache memory configured to store data;

a storage device configured to store second data; and

a processor coupled to the cache memory and to the storage device, the processor configured to access the cache memory during processing of the I/O traffic, the processor further configured to perform an access operation at the storage device based on the I/O traffic.

19. (New) The apparatus of claim 18, wherein the dedicated I/O channel is associated with dedicated throughput that corresponds to the I/O traffic.

20. (New) The apparatus of claim 18, wherein the I/O traffic is distinct from the network traffic.

21. (New) The apparatus of claim 18, wherein the first device comprises a host computer.

22. (New) The apparatus of claim 18, wherein the dedicated I/O channel comprises a small computer system interface (SCSI) channel.

23. (New) The apparatus of claim 18, wherein the network interface comprises an Ethernet interface or an asynchronous transfer mode (ATM) interface.

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Cisco et al. v. LS Cloud Storage Technologies
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24. (New) The apparatus of claim 18, wherein the I/O traffic further comprises a write command.

25. (New) The apparatus of claim 18, wherein the network traffic comprises a second read request, a write request, or a combination thereof.

26. (New) The apparatus of claim 18, wherein the network comprises a plurality of interconnected computing devices that includes the second device.

27. (New) The apparatus of claim 18, wherein the storage device and the dedicated I/O channel are independently accessible, and wherein the processor is configured to read second data from the cache memory based on the read command and to initiate transmission of the second data to the second device.

28. (New) The apparatus of claim 18, wherein the processor is further configured to route the read command to the cache memory or to the storage device.

29. (New) The apparatus of claim 18, wherein the processor is coupled to the storage device via a communication path that is distinct from the dedicated I/O channel.

30. (New) The apparatus of claim 18, further comprising:

configuration manager circuitry configured to route an I/O request included in the I/O traffic to the cache memory, to route the I/O request to the storage device, or to deny the I/O request;

front-end circuitry configured to process the I/O request; and

back-end circuitry configured to perform a read operation or a write operation at the storage device based on the I/O request.

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IPR2023-00733, Page 176 of 289

31. (New) A method comprising:

receiving input/output (I/O) traffic from a first device via a dedicated I/O channel at an interface, the I/O traffic comprising a write command;

receiving network traffic from a second device via a network at a network interface;

storing data at a cache memory;

storing second data at a storage device;

accessing the cache memory during processing of the I/O traffic; and

performing one or more access operations at the storage device via based on the I/O traffic.

32. (New) The method of claim 31, wherein the I/O traffic is distinct from the network traffic.

33. (New) The method of claim 31, further comprising performing a first access operation at the storage device independently of the dedicated I/O channel.

34. (New) The method of claim 31, wherein the data is written at the cache memory in response to the write command.

35. (New) The method of claim 31, further comprising:

receiving a read request via the network from a third device; and

transmitting at least a portion of the data from the cache memory via the network to the third device responsive to the read request being associated with a cache hit.

36. (New) The method of claim 31, further comprising storing third data at the cache memory, wherein the data is indicated by the write command, and wherein the third data is indicated by a second write command received at the network interface from the second device.

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37. (New) An apparatus comprising:

means for receiving input/output (I/O) traffic from a first device via a dedicated I/O channel, the I/O traffic comprising a write command;

means for receiving network traffic from a second device via a network;

means for short-term data storage;

means for long-term data storage; and

means for performing one or more access operations at the means for short-term data storage during processing of the I/O traffic and for performing one or more access operations at the means for long-term data storage based on the I/O traffic.

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 178 of 289

DRAWING AMENDMENTS

The attached sheet of drawings includes changes to FIG. 1 to add additional reference numbers. Support for the amendments may be found in the Specification, at least at paragraphs [0027]-[0029]. No new matter has been added. The attached sheet, which includes FIG. 1, replaces the original sheet including FIG. 1. The changes made in FIG. 1 are listed below:

- Reference number 111 has been added to identify the host "HOST 1" coupled to the PC data storage system 131;
- Reference number 112 has been added to identify the host "HOST 2" coupled to the PC data storage system 131;
- Reference number 132 has been added to identify the data storage system coupled to the network link 152;
- Reference number 133 has been added to identify the data storage system coupled to the network link 153;
- Reference number 157 has been modified to identify the host "HOST 1" coupled to the storage system 132; and
- Reference number 158 has been modified to identify the host "HOST 2" coupled to the storage system 132.

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Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 179 of 289

REMARKS

Claims 1-17 have been canceled without prejudice or disclaimer. New claims 18-37 have been added and are supported by the Specification. No new matter has been added. Additionally, FIG. 1 has been amended to add reference numbers. Support for the amendments to FIG. 1 may be found in the Specification, at least at paragraphs [0027]-[0029]. No new matter has been added.

CONCLUSION

All changes to the claims in this amendment should be considered to have been made to further clarify the claims or for another purpose unrelated to patentability, and no estoppel should be deemed to attach thereto.

The Examiner is invited to contact the undersigned attorney at the telephone number listed below if such a call would in any way facilitate allowance of this application.

The Commissioner is hereby authorized to charge any fees, which may be required, or credit any overpayment, to Deposit Account Number 50-2469.

Respectfully submitted,

2017-10-16
Date

/Jeffrey G. Toler/
Jeffrey G. Toler, Reg. No. 38,342
TOLER LAW GROUP, PC
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Austin, Texas 78759
Telephone: (512) 327-5515
Facsimile: (512) 327-5575

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 180 of 289

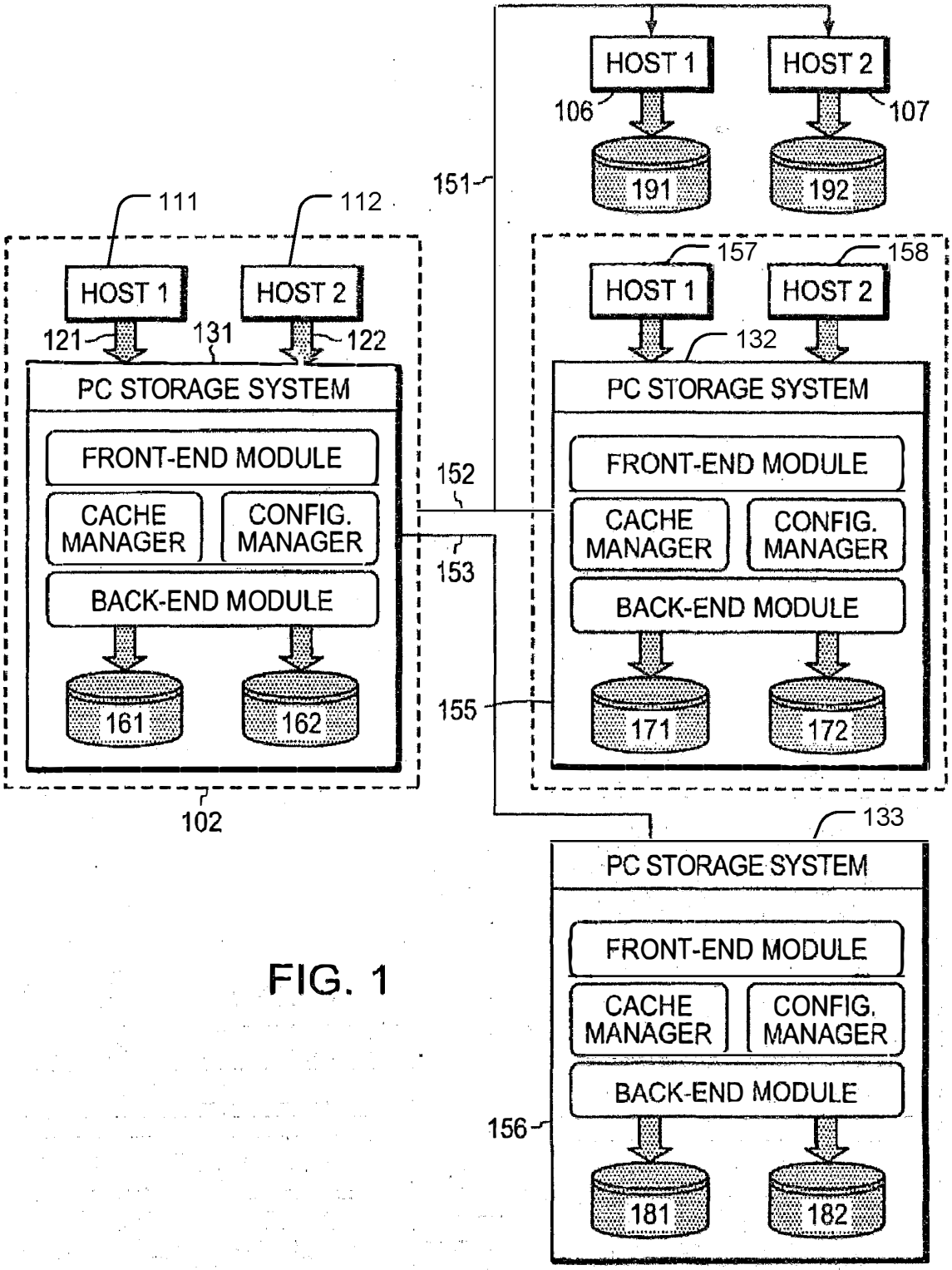

HOST 1
HOST 2
106
107
191
192
151
111
112
157
158
HOST 1
HOST 2
HOST 1
HOST 2
121
131
122
132
PC STORAGE SYSTEM
PC STORAGE SYSTEM
FRONT-END MODULE
CACHE MANAGER
CONFIG. MANAGER
BACK-END MODULE
FRONT-END MODULE
CACHE MANAGER
CONFIG. MANAGER
BACK-END MODULE
152
153
155
161
162
171
172
102
133
PC STORAGE SYSTEM
FRONT-END MODULE
CACHE MANAGER
CONFIG. MANAGER
BACK-END MODULE
156
181
182

FIG. 1

Electronic Acknowledgement Receipt

EFS ID:	30674710
Application Number:	14997327
International Application Number:	
Confirmation Number:	5295
Title of Invention:	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS
First Named Inventor/Applicant Name:	Ilya Gertner
Customer Number:	60533
Filer:	Jeffrey G. Toler/Suzanne Nobert
Filer Authorized By:	Jeffrey G. Toler
Attorney Docket Number:	4056-0001
Receipt Date:	17-OCT-2017
Filing Date:	15-JAN-2016
Time Stamp:	10:51:18
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		4056-0001_Preliminary_Amendment.pdf	162350 e724743346b7c2ffb735ada6fc4f94a25c4cd61b	yes	7

	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Preliminary Amendment		1	1	
	Claims		2	5	
	Drawings-only black and white line drawings		6	6	
	Applicant Arguments/Remarks Made in an Amendment		7	7	
Warnings:					
Information:					
2	Drawings-only black and white line drawings	4056-0001_Replacement_Sheet.pdf	134648 de022298b12d25bb958a488612c63deaf5eeb5f9	no	1
Warnings:					
Information:					
		Total Files Size (in bytes):	296998		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/997,327	Filing Date 01/15/2016	☐ To be Mailed

ENTITY: ☐ LARGE ☐ SMALL ☒ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	x $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	x $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	10/17/2017	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	x $20 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	x $105 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	**0**

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	14997327
Filing Date	2016-01-15
First Named Inventor	Ilya Gertner
Art Unit	2451
Examiner Name	Tiv Backhean
Attorney Docket Number	4056-0001

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4797813	A	1989-01-10	IGARASHI	
	2	5222224	A	1993-06-22	FLYNN et al.	
	3	5319766	A	1994-06-07	THALLER et al.	
	4	5598551	A	1997-01-28	BARAJAS et al.	
	5	5659794	A	1997-08-19	CALDARALE et al.	
	6	5787469	A	1998-07-28	MERRELL	
	7	5802569	A	1998-09-01	GENDUSO et al.	
	8	5900015	A	1999-05-04	HERGER et al.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14997327
	Filing Date	2016-01-15
	First Named Inventor	Ilya Gertner
	Art Unit	2451
	Examiner Name	Tiv Backhean
	Attorney Docket Number	4056-0001

	9	6226680	B1	2001-05-01	BOUCHER et al.	
	10	6389479	B1	2002-05-14	BOUCHER et al.	
	11	7664883	B2	2010-02-16	CRAFT et al.	
	12	8225002	B2	2012-07-17	GERTNER	

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	1	20010013085	A1	2001-08-09	YAMAMOTO	
	2	20010037406	A1	2001-11-01	PHILBRICK et al.	
	3	20020007445	A1	2002-01-17	BLUMENAU et al.	
	4	20020091844	A1	2002-07-11	CRAFT et al.	

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	First Named Inventor	Ilya Gertner
	Art Unit	2451
	Examiner Name	Tiv Backhean
	Attorney Docket Number	4056-0001

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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	First Named Inventor	Ilya Gertner
	Art Unit	2451
	Examiner Name	Tiv Backhean
	Attorney Docket Number	4056-0001

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That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jason E. Robertson/	Date (YYYY-MM-DD)	2017-06-26
Name/Print	Jason E. Robertson	Registration Number	53522

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 189 of 289

Electronic Acknowledgement Receipt

EFS ID:	29619558
Application Number:	14997327
International Application Number:	
Confirmation Number:	5295
Title of Invention:	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS
First Named Inventor/Applicant Name:	Ilya Gertner
Customer Number:	60533
Filer:	Jason E. Robertson/Suzanne Nobert
Filer Authorized By:	Jason E. Robertson
Attorney Docket Number:	4056-0001
Receipt Date:	27-JUN-2017
Filing Date:	15-JAN-2016
Time Stamp:	13:49:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	4056-0001_IDS.pdf	612681 9684e4cd67c53fea6a4c0684aceb1032853dadbb	no	5

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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Examiner Name	Tiv Backhean
Attorney Docket Number	4056-0001

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4648030		1987-03-03	BOMBA, et al.	
	2	5251311		1993-10-05	KASAI	
	3	5577204		1996-11-19	BREWER, et al.	
	4	5577226	A	1996-11-19	PERCIVAL	
	5	5600817		1997-02-04	MACON, JR., et al.	
	6	5611049		1997-03-11	PITTS	
	7	5644751		1997-07-01	BURNETT	
	8	5649152		1997-07-15	OHRAN, et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	First Named Inventor	Ilya Gertner
	Art Unit	2451
	Examiner Name	Tiv Backhean
	Attorney Docket Number	4056-0001

	9	5701516		1997-12-23	CHENG, et al.	
	10	5715455		1998-02-03	MACON, JR., et al.	
	11	5717884		1998-02-10	GZYM, et al.	
	12	5742792		1998-04-21	YANAI, et al.	
	13	5743933		1998-04-28	MELLEM	
	14	5748985		1998-05-05	KANAI	
	15	5751993		1998-05-12	OFEK, et al.	
	16	5758050		1998-05-26	BRADY, et al.	
	17	5761734		1998-06-02	PFEFFER, et al.	
	18	5768211		1998-06-16	JONES, et al.	
	19	5778353		1998-07-07	SCHIEFER, et al.	

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	Art Unit	2451
	Examiner Name	Tiv Backhean
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	20	5787473		1998-07-28	VISHLITZKY, et al.	
	21	5790795		1998-08-04	HOUGH	
	22	5802553		1998-09-01	ROBINSON, et al.	
	23	5805857		1998-09-08	COLEGROVE	
	24	5819292		1998-10-06	HITZ, et al.	
	25	5819310		1998-10-06	VISHLITZKY, et al.	
	26	5828475		1998-10-27	BENNETT, et al.	
	27	5841997		1998-11-24	BLEIWEISS, et al.	
	28	5848251		1998-12-08	LOMELINO, et al.	
	29	5852715		1998-12-22	RAZ, et al.	
	30	5854942		1998-12-29	PENOKIE	

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	First Named Inventor	Ilya Gertner
	Art Unit	2451
	Examiner Name	Tiv Backhean
	Attorney Docket Number	4056-0001

	31	5860026		1999-01-12	KITTA, et al.	
	32	5860137		1999-01-12	RAZ, et al.	
	33	5887146		1999-03-23	BAXTER, et al.	
	34	5896506		1999-04-20	ALI, et al.	
	35	5898828		1999-04-27	PIGNOLET, et al.	
	36	5901327		1999-05-04	OFEK	
	37	5974503		1999-10-26	VENKATESH, et al.	
	38	6016500		2000-01-18	WALDO, et al.	
	39	6026461		2000-02-15	BAXTER, et al.	
	40	6044438		2000-03-28	OLNOWICH	
	41	6101497		2000-08-08	OFEK	

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	42	6101508		2000-08-08	WOLFF	
	43	6119151		2000-09-12	CANTRELL, et al.	
	44	6122659		2000-09-19	OLNOWICH	
	45	6182111	B1	2001-01-30	INOHARA, et al.	
	46	6311186	B1	2001-10-30	MELAMPY, et al.	
	47	6341311	B1	2002-01-22	SMITH, et al.	
	48	6438652	B1	2002-08-20	JORDAN, et al.	
	49	6457047	B1	2002-09-24	CHANDRA, et al.	
	50	6549988	B1	2003-04-15	GERTNER	
	51	6711632	B1	2004-03-23	CHOW, et al.	
	52	6785714	B1	2004-08-31	THOMPSON, et al.	

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	Art Unit	2451
	Examiner Name	Tiv Backhean
	Attorney Docket Number	4056-0001

	53	6829637	B2	2004-12-07	KOKKU, et al.	
	54	6850980	B1	2005-02-01	GOURLAY	
	55	7003587	B1	2006-02-21	BATTAT, et al.	
	56	7072056	B1	2006-07-04	GREAVES, et al.	
	57	7133905	B2	2006-11-07	DILLEY, et al.	
	58	7188251	B1	2007-03-06	SLAUGHTER, et al.	
	59	7254617	B2	2007-08-07	SCHUH, et al.	
	60	7287065	B2	2007-10-23	NISHI, et al.	
	61	7293099	B1	2007-11-06	KALAJAN	
	62	7739379	B1	2010-06-15	VAHALIA, et al.	
	63	7864758	B1	2011-01-04	LOLAYEKAR, et al.	

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	64	8225002	B2	2012-07-17	GERTNER	

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	1	20020002625	A1	2002-01-03	VANGE, et al.	
	2	20030069889	A1	2003-04-10	OFEK	
	3	20030126372	A1	2003-07-03	RAND	
	4	20040022094	A1	2004-02-05	RADHAKRISHNAN, et al.	
	5	20160134702	A1	2016-05-12	GERTNER	

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	First Named Inventor	Ilya Gertner
	Art Unit	2451
	Examiner Name	Tiv Backhean
	Attorney Docket Number	4056-0001

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	DAHLIN et al., "Cooperative Caching: Using Remote Client Memory to Improve File System Performance," First Symposium on Operating Systems Design and Implementation (OSDI 1994), 1994, pgs. 1-14.	
	2	NCR 5100M, http://www.hardwood-intl.com/ncrproducts/5100M_NCR.asp, printed November 27, 2006, 5 pages.	
	3	Internet Archive Waybackmachine http://archive.org/web/web.php, printed November 27, 2006, 1 page.	
	4	KAREDLA, ET AL., "Caching Strategies to Improve Disk System Performance, Computer, Vol. 27, No. 3, March 1994 (Research paper), pgs. 38-46, Abstract, 2 pages.	
	5	SMITH, "Cache Memories," Computing Surveys, Vol. 14, No. 3, September, 1982, pgs. 473-530.	

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EXAMINER SIGNATURE

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	Attorney Docket Number	4056-0001

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jeffrey G. Toler/	Date (YYYY-MM-DD)	2017-04-04
Name/Print	Jeffrey G. Toler	Registration Number	38,342

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Cisco et al. v. LS Cloud Storage Technologies
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Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 201 of 289

Electronic Acknowledgement Receipt

EFS ID:	28828731
Application Number:	14997327
International Application Number:	
Confirmation Number:	5295
Title of Invention:	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS
First Named Inventor/Applicant Name:	Ilya Gertner
Customer Number:	60533
Filer:	Jeffrey G. Toler/Suzanne Nobert
Filer Authorized By:	Jeffrey G. Toler
Attorney Docket Number:	4056-0001
Receipt Date:	04-APR-2017
Filing Date:	15-JAN-2016
Time Stamp:	15:07:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	4056-0001_IDS.pdf	614316 5d5d492f94a60d21a667f9a3a4d420de1dcd965f	no	10

Warnings:

Information:					
2	Non Patent Literature	Dahlin_Cooperative_Caching.pdf	223650 cc94fca4183084b5cd0ec88893387215 53bbc394	no	14
Warnings:					
Information:					
3	Non Patent Literature	Harwood_NCR_Worldmark_5100M.pdf	484198 6842ed1bb54ef8effc5553b055a444ae76a92e22	no	5
Warnings:					
Information:					
4	Non Patent Literature	Harwood_Wayback_Machine.pdf	40781 717cf52343229683f4df2547d936026f33bd7b5f	no	1
Warnings:					
Information:					
5	Non Patent Literature	Karedla_Abstract.pdf	235807 61f2a05402e3f06e04e5954c21e695bcb778e0fb2	no	2
Warnings:					
Information:					
6	Non Patent Literature	Smith_Cache_Memories.pdf	14155659 0fbcf64b59545b940186cd045921990f221d8501	no	58
Warnings:					
Information:					
		Total Files Size (in bytes):	15754411		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/997,327	01/15/2016	Ilya Gertner	ILYAP001C2

CONFIRMATION NO. 5295

POA ACCEPTANCE LETTER

60533
TOLER LAW GROUP
TOLER LAW GROUP
8500 BLUFFSTONE COVE
SUITE A201
AUSTIN, TX 78759

OC000000089530644

Date Mailed: 03/02/2017

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 02/21/2017.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/yteferra/

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
14/997,327	01/15/2016	2451	400	ILYAP001C2	17	3

CONFIRMATION NO. 5295

REPLACEMENT FILING RECEIPT

60533
TOLER LAW GROUP
TOLER LAW GROUP
8500 BLUFFSTONE COVE
SUITE A201
AUSTIN, TX 78759

OC000000089330847

Date Mailed: 03/02/2017

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Ilya Gertner, Long Beach, CA;

Applicant(s)

LS CLOUD STORAGE TECHNOLOGIES, LLC, LONGVIEW, TX;

Power of Attorney: The patent practitioners associated with Customer Number 60533

Domestic Priority data as claimed by applicant

This application is a CON of 13/527,126 06/19/2012 ABN
which is a CON of 10/382,016 03/05/2003 PAT 8225002
which is a DIV of 09/236,409 01/22/1999 PAT 6549988

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: No

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 01/29/2016

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 206 of 289

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/997,327**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No
**** MICRO ENTITY ****
Title

DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS

Preliminary Class

709

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 207 of 289

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

PTO/AIA/80 (07-12)
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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

☒ Practitioners associated with Customer Number: 60533

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignments documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

☒ The address associated with Customer Number: 60533

OR

☐	Firm or Individual Name			
	Address			
	City		State	Zip
	Country			
	Telephone		Email	

Assignee Name and Address: LS CLOUD STORAGE TECHNOLOGIES, LLC
911 NW LOOP 281, SUITE 211-44
LONGVIEW, TX 75604

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be Filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of The practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record
The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	Brandon Thomas	Date	December 19, 2016
Name	BRANDON THOMAS	Telephone	213-595-6177
Title	MANAGER		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/AIA/96 (08-12)
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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: LS CLOUD STORAGE TECHNOLOGIES, LLC

Application No./Patent No.: 14/997,327 Filed/Issue Date: 2016-01-15

Titled: DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS

LS CLOUD STORAGE TECHNOLOGIES, LLC, a CORPORATION

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☑ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: GERTNER, ILYA To: NETWORK DISK, INC.

   The document was recorded in the United States Patent and Trademark Office at
   Reel 039841, Frame 0762, or for which a copy thereof is attached.

2. From: NETWORK DISK, INC. To: GERTNER, ILYA

   The document was recorded in the United States Patent and Trademark Office at
   Reel 039393, Frame 0323, or for which a copy thereof is attached.

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/AIA/96 (08-12)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: GERTNER, ILYA To: SPOT ON CORP.

The document was recorded in the United States Patent and Trademark Office at
Reel 039415, Frame 0060, or for which a copy thereof is attached.

4. From: SPOT ON CORP. To: LS CLOUD STORAGE TECHNOLOGIES, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 040124, Frame 0638, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☑ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Jeffrey G. Toler/	2017-02-20
Signature	Date
JEFFREY G. TOLER	38,342
Printed or Typed Name	Title or Registration Number

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/AIA/80 (07-12)
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U.S. Patent and Trademark Office; U.S DEPARTMENT OF COMMERCE
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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

☒ Practitioners associated with Customer Number: 60533

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignments documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

☒ The address associated with Customer Number: 60533

OR

☐	Firm or Individual Name			
	Address			
	City		State	Zip
	Country			
	Telephone		Email	

Assignee Name and Address: LS CLOUD STORAGE TECHNOLOGIES, LLC
911 NW LOOP 281, SUITE 211-44
LONGVIEW, TX 75604

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be Filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of The practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	Brandon Thomas	Date	December 19, 2016
Name	BRANDON THOMAS	Telephone	213-595-6177
Title	MANAGER		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	28412122
Application Number:	14997327
International Application Number:	
Confirmation Number:	5295
Title of Invention:	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS
First Named Inventor/Applicant Name:	Ilya Gertner
Correspondence Address:	Ilya GERTNER - 26 Claremont Ave. - Long Beach CA 90803 US 562-900-3610 gert5063@yahoo.com
Filer:	Jeffrey G. Toler/Suzanne Nobert
Filer Authorized By:	Jeffrey G. Toler
Attorney Docket Number:	ILYAP001C2
Receipt Date:	21-FEB-2017
Filing Date:	15-JAN-2016
Time Stamp:	13:37:34
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	4056-0001_Corrected_ADS.pdf	456262 7100ddc705ce5ccd80fa44f9a95c5795ca4e0081	no	7
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
2	Power of Attorney	LS_CLoud_General_POA_signed.pdf	187505 ff95670a6ce4a057a1ba89e9f4735b1b569c5b97	no	2
Warnings:					
Information:					
3	Assignee showing of ownership per 37 CFR 3.73	4056-0001_Statement_373_aia0096.pdf	122175 76c7f401efa756c7ddc0eedb1c1232708e04fa8f	no	3
Warnings:					
Information:					
4	Change of Address	LS_CLoud_CCA.pdf	187505 ff95670a6ce4a057a1ba89e9f4735b1b569c5b97	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	953447		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

CORRECTED ADS

PTO/AIA/14 (03-13)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	ILYAP001C2 4056-0001
	Application Number	14/997,327
Title of Invention	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Ilya		GERTNER	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	Long Beach	State/Province	CA	Country of Residence	US

Mailing Address of Inventor:

Address 1	26 Claremont Ave.
Address 2	

City	Long Beach	State/Province	CA
Postal Code	90803	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a). 60533

☒ **An Address is being provided for the correspondence Information of this application.**

Name 1	Ilya GERTNER	Name 2	
Address 1	26 Claremont Ave.		
Address 2			
City	Long Beach	State/Province	CA
Country	US	Postal Code	90803
Phone Number	562-900-3610	Fax Number	
Email Address	gert5063@yahoo.com	Add Email	Remove Email

DocketingGroup@tlgiplaw.com

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 218 of 289

PTO/AIA/14 (03-13)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	ILYAP001C2
	Application Number	
Title of Invention	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS	

Application Information:

Title of the Invention	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS		
Attorney Docket Number	ILYAP001C2 4056-0001	**Small Entity Status Claimed**	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)		**Suggested Figure for Publication (if any)**	

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	60533		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

Prior Application Status	Pending ABANDONED		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
NewlyFiled 14/997,327	Continuation of	13527126	2012-06-09
Prior Application Status	Patented		Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13527126	Continuation of	10382016	2003-03-05	8225002	2012-07-17

Prior Application Status	Patented	Remove

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 219 of 289

PTO/AIA/14 (03-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	ILYAP001C2
	Application Number	
Title of Invention	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS	

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
10382016	Division of	09236409	1999-01-22	6549988	2003-04-15

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

Authorization to Permit Access:

Authorization to Permit Access to the Instant Application by the Participating Offices

PTO/AIA/14 (03-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	ILYAP001C2
	Application Number	
Title of Invention	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS	

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date o f filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here. ☒ LS CLOUD STORAGE TECHNOLOGIES, LLC

Prefix	Given Name	Middle Name	Family Name	Suffix

PTO/AIA/14 (03-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	ILYAP001C2
	Application Number	
Title of Invention	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS	

Mailing Address Information For Applicant:			
Address 1	911 NW LOOP 281		
Address 2	SUITE 211-44		
City	LONGVIEW	**State/Province**	TX
Country	US	Postal Code	75604
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Non-Applicant Assignee Information:

Providing assignment information in this section does not subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Assignee 1

Complete this section only if non-applicant assignee information is desired to be included on the patent application publication in accordance with 37 CFR 1.215(b). Do not include in this section an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest), as the patent application publication will include the name of the applicant(s).

Remove

If the Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Non-Applicant Assignee:			
Address 1			
Address 2			
City		**State/Province**	
Country		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the Add button. Add

PTO/AIA/14 (03-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	ILYAP001C2
	Application Number	
Title of Invention	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS	

Signature:

Remove

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Signature	/Ilya Gertner/ /JEFFREY G. TOLER/	Date (YYYY-MM-DD)	2016-01-07 2017-02-20
First Name	Ilya JEFFREY G	Last Name	GERTNER TOLER
		Registration Number	38,342

Additional Signature may be generated within this form by selecting the Add button. Add

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 224 of 289

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/997,327	01/15/2016	Ilya Gertner	ILYAP001C2

CONFIRMATION NO. 5295

Ilya GERTNER
26 Claremont Ave.
Long Beach, CA 90803

MISCELLANEOUS NOTICE

OC000000088511314

Date Mailed: 01/17/2017

A communication which cannot be delivered in electronic form has been mailed to the applicant.

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 225 of 289

Doc Code: N572

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14/997,327	01/15/2016	Ilya Gertner	ILYAP001C2

CONFIRMATION NO. 5295

OC0000000088511314

Ilya GERTNER
26 Claremont Ave.
Long Beach, CA 90803

Cc: TOLER LAW GROUP
TOLER LAW GROUP
8500 BLUFFSTONE COVE
SUITE A201
AUSTIN, TX 78759

Date Mailed:01/17/17

DENIAL OF REQUEST FOR POWER OF ATTORNEY

The request for Power of Attorney filed 01/11/17 is acknowledged. However, the request cannot be granted at this time for the reason stated below.

- ☐ The Power of Attorney you provided did not comply with the new Power of Attorney rules that became effective on June 25, 2004. See 37 CFR 1.32.
- ☐ The revocation is not signed by the applicant, the assignee of the entire interest, or one particular principal attorney having the authority to revoke.
- ☐ The Power of Attorney is from an assignee and the Certificate required by 37 CFR 3.73(c) has not been received.
- ☐ The person signing for the assignee has omitted their empowerment to sign on behalf of the assignee.
- ☐ The inventor(s) is without authority to appoint attorneys since the assignee has intervened as provided by 37 CFR 3.71.
- ☐ The signature(s) of Hazim Yassin a co-inventor in this application, has been omitted. The Power of Attorney will be entered upon receipt of confirmation signed by said co-inventor(s).
- ☐ The person(s) appointed in the Power of Attorney is not registered to practice before the U.S. Patent and Trademark Office.
- ☐ Only one Customer Number can be designated for the Power of Attorney in an application. The Customer Number that was captured is the first Customer Number provided on the Power of Attorney document.
- ☐ A request under 37 CFR 1.48 to add an inventor was granted in this application, however, no power of attorney consistent with the power of attorney granted by the originally named inventive entity has been received. Thus, the addition of the inventor has resulted in the loss of power of attorney in the application. See 37 CFR 1.32(e).

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

☒ The power of attorney has not been accepted because the party who is giving power of attorney has not been identified. Power of attorney may only be signed by the applicant for patent (37 CFR 1.42) or the patent owner. A patent owner who was not the applicant must appoint any power of attorney in compliance with 37 CFR 3.71 and 3.73. See 37 CFR 1.32(b)(4).

☐ The power of attorney from the inventors has not been accepted because it is a copy from a prior national application for which benefit is claimed and the continuing application names an inventor who was not named as an inventor in the prior application.

☐ The power of attorney from the inventors has not been accepted because the power of attorney must be signed by the applicant for patent. See 37 CFR 1.32(b)(4).

☒ Any request to correct or update the name of the applicant must include an application data sheet (ADS) in compliance with 37 CFR 1.76 specifying the correct or updated name of the applicant in the applicant information section. Any request to change the applicant after an original applicant has been specified under 37 CFR 1.46(b) must include a new ADS in compliance with 37 CFR 1.76 specifying the applicant in the applicant information section and comply with 37 CFR 3.71 and 3.73. See 37 CFR 1.46(c).

Any inquiries regarding this notice should be directed to the Application Assistance Unit at 571-272-4200.

Application Assistance Unit
571-272-4200

PTO/AIA/80 (07-12)
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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

☒ Practitioners associated with Customer Number: 60533

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignments documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

☒ The address associated with Customer Number: 60533

OR

☐	Firm or Individual Name			
	Address			
	City		State	Zip
	Country			
	Telephone		Email	

Assignee Name and Address: LS CLOUD STORAGE TECHNOLOGIES, LLC
911 NW LOOP 281, SUITE 211-44
LONGVIEW, TX 75604

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be Filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of The practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	Brandon Thomas	Date	December 19, 2016
Name	BRANDON THOMAS	Telephone	213-595-6177
Title	MANAGER		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/AIA/96 (08-12)
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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: LS CLOUD STORAGE TECHNOLOGIES, LLC

Application No./Patent No.: 14/997,327 Filed/Issue Date: 2016-01-15

Titled: DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS

LS CLOUD STORAGE TECHNOLOGIES, LLC, a CORPORATION

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☑ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: GERTNER, ILYA To: NETWORK DISK, INC.

   The document was recorded in the United States Patent and Trademark Office at
   Reel 039841, Frame 0762, or for which a copy thereof is attached.

2. From: NETWORK DISK, INC. To: GERTNER, ILYA

   The document was recorded in the United States Patent and Trademark Office at
   Reel 039393, Frame 0323, or for which a copy thereof is attached.

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/AIA/96 (08-12)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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STATEMENT UNDER 37 CFR 3.73(c)

3. From: GERTNER, ILYA To: SPOT ON CORP.

The document was recorded in the United States Patent and Trademark Office at
Reel 039415, Frame 0060, or for which a copy thereof is attached.

4. From: SPOT ON CORP. To: LS CLOUD STORAGE TECHNOLOGIES, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 040124, Frame 0638, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☑ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Jeffrey G. Toler/	2017-01-10
Signature	Date
JEFFREY G. TOLER	38,342
Printed or Typed Name	Title or Registration Number

Privacy Act Statement

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I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

☒ Practitioners associated with Customer Number: 60533

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignments documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

☒ The address associated with Customer Number: 60533

OR

☐	Firm or Individual Name			
	Address			
	City		State	Zip
	Country			
	Telephone		Email	

Assignee Name and Address: LS CLOUD STORAGE TECHNOLOGIES, LLC
911 NW LOOP 281, SUITE 211-44
LONGVIEW, TX 75604

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be Filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of The practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	Brandon Thomas	Date	December 19, 2016
Name	BRANDON THOMAS	Telephone	213-595-6177
Title	MANAGER		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Electronic Acknowledgement Receipt	
EFS ID:	28030856
Application Number:	14997327
International Application Number:	
Confirmation Number:	5295
Title of Invention:	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS
First Named Inventor/Applicant Name:	Ilya Gertner
Correspondence Address:	Ilya GERTNER - 26 Claremont Ave. - Long Beach CA 90803 US 562-900-3610 gert5063@yahoo.com
Filer:	Jeffrey G. Toler/Suzanne Nobert
Filer Authorized By:	Jeffrey G. Toler
Attorney Docket Number:	ILYAP001C2
Receipt Date:	11-JAN-2017
Filing Date:	15-JAN-2016
Time Stamp:	11:19:21
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	LS_CLoud_General_POA_signed.pdf	187505 ff95670a6ce4a057a1ba89e9f4735b1b569c5b97	no	2
Warnings:					
Information:					
2	Assignee showing of ownership per 37 CFR 3.73	4056-0001_Statement_373_aia0096.pdf	122173 14d0a4a76ad154f040d0fcacfba7527a0cdd8801	no	3
Warnings:					
Information:					
3	Change of Address	LS_CLoud_CCA.pdf	187505 ff95670a6ce4a057a1ba89e9f4735b1b569c5b97	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	497183		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/997,327	01/15/2016	Ilya Gertner	ILYAP001C2

CONFIRMATION NO. 5295

Ilya GERTNER
26 Claremont Ave.
Long Beach, CA 90803

PUBLICATION NOTICE



Title:DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS

Publication No.US-2016-0134702-A1
Publication Date:05/12/2016

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
14/997,327	01/15/2016	2827	400	ILYAP001C2	17	3

CONFIRMATION NO. 5295

Ilya GERTNER
26 Claremont Ave.
Long Beach, CA 90803

FILING RECEIPT

OC000000080204337

Date Mailed: 02/01/2016

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Ilya Gertner, Long Beach, CA;

Applicant(s)

Ilya Gertner, Long Beach, CA;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 13/527,126 06/19/2012
which is a CON of 10/382,016 03/05/2003 PAT 8225002
which is a DIV of 09/236,409 01/22/1999 PAT 6549988

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: No

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 01/29/2016

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Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 238 of 289

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/997,327**

Projected Publication Date: 05/12/2016

Non-Publication Request: No

Early Publication Request: No
**** MICRO ENTITY ****
Title

DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS

Preliminary Class

365

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 14/997,327

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	70
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	150
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	180
TOTAL CLAIMS (37 CFR 1.16(i))	17 minus 20 =	*			OR	x 20 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*				x 105 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	400

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Ilya GERTNER	Attorney Docket No.: ILYAP001C2
Application No.: Not Yet Assigned	Examiner: Not Yet Assigned
Filed: January 14, 2016	Group: Not Yet Assigned
Title: DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS	Confirmation No.: Not Yet Assigned

PRELIMINARY AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Prior to examination, please amend the application as indicated on the following pages. **Amendments to the Specification** begin on page 2 of this paper. **Remarks** begin on page 3 of this paper.

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 242 of 289

AMENDMENTS TO THE SPECIFICATION

Please replace the paragraph beginning at page 1 with the following amended paragraph:

Related Applications

~~This application is a continuation-in-part of U.S. Serial No. 09/236,409, filed on January 22, 1999, the entire disclosure of which is incorporated by reference in its entirety.~~

This application is a continuation of U.S. Application No. 13/527,126, filed June 9, 2012, which is a further continuation of U.S. Application Serial No. 10/382,016,filed on March 5, 2003, now U.S. Patent No. 8,225,002, issued July 17, 2012, which is a divisional of U.S. Application Serial No. 09/236,409, filed on January 22, 1999, now U.S. Patent No. 6,549,988, issued April 15, 2003, the entire disclosure of which is incorporated by reference in its entirety.

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REMARKS

Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,

By: /Ilya GERTNER/
Ilya GERTNER, Applicant/Inventor

Tel: 562-900-3610

Cisco Exhibit 1002
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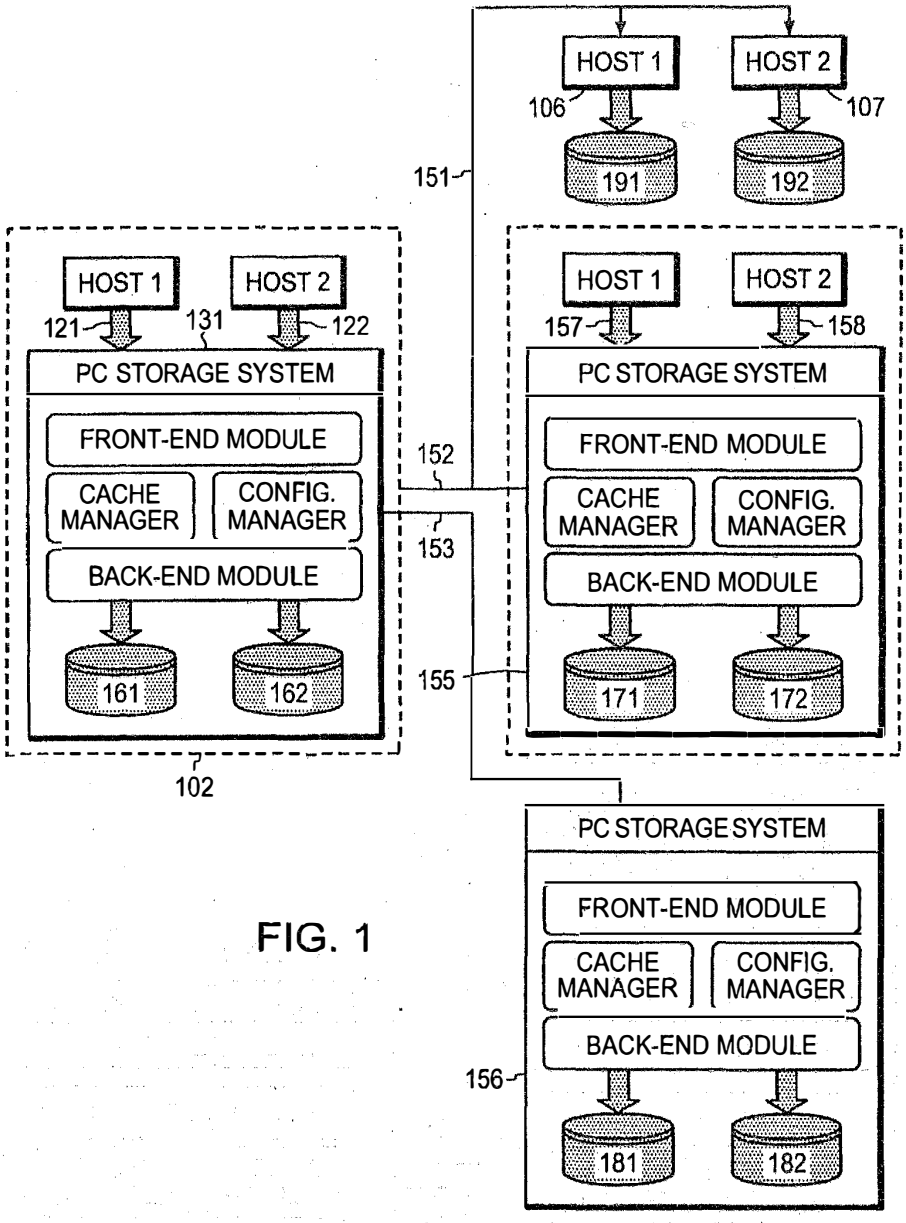

HOST 1
HOST 2
106
107
151
191
192
HOST 1
HOST 2
121
131
122
PC STORAGE SYSTEM
FRONT-END MODULE
CACHE MANAGER
CONFIG. MANAGER
BACK-END MODULE
161
162
152
153
155
HOST 1
HOST 2
157
158
PC STORAGE SYSTEM
FRONT-END MODULE
CACHE MANAGER
CONFIG. MANAGER
BACK-END MODULE
171
172
102
PC STORAGE SYSTEM
FRONT-END MODULE
CACHE MANAGER
CONFIG. MANAGER
BACK-END MODULE
156
181
182

FIG. 1

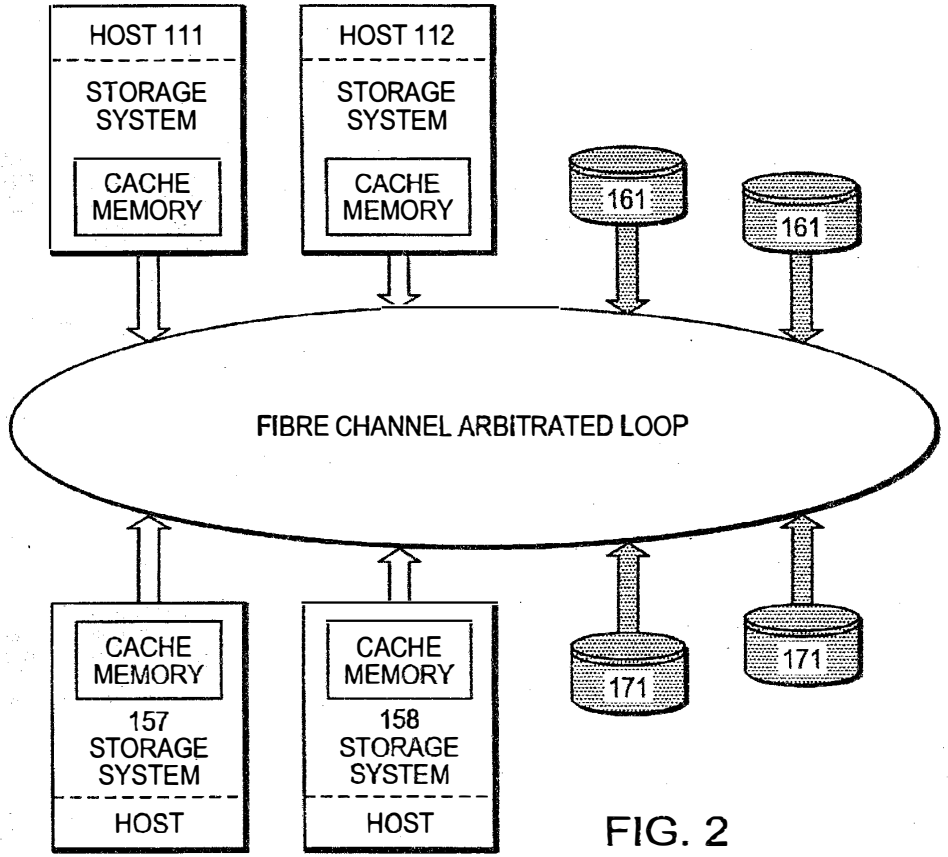

HOST 111
STORAGE SYSTEM
CACHE MEMORY
HOST 112
STORAGE SYSTEM
CACHE MEMORY
161
161
FIBRE CHANNEL ARBITRATED LOOP
CACHE MEMORY
157 STORAGE SYSTEM
HOST
CACHE MEMORY
158 STORAGE SYSTEM
HOST
171
171

FIG. 2

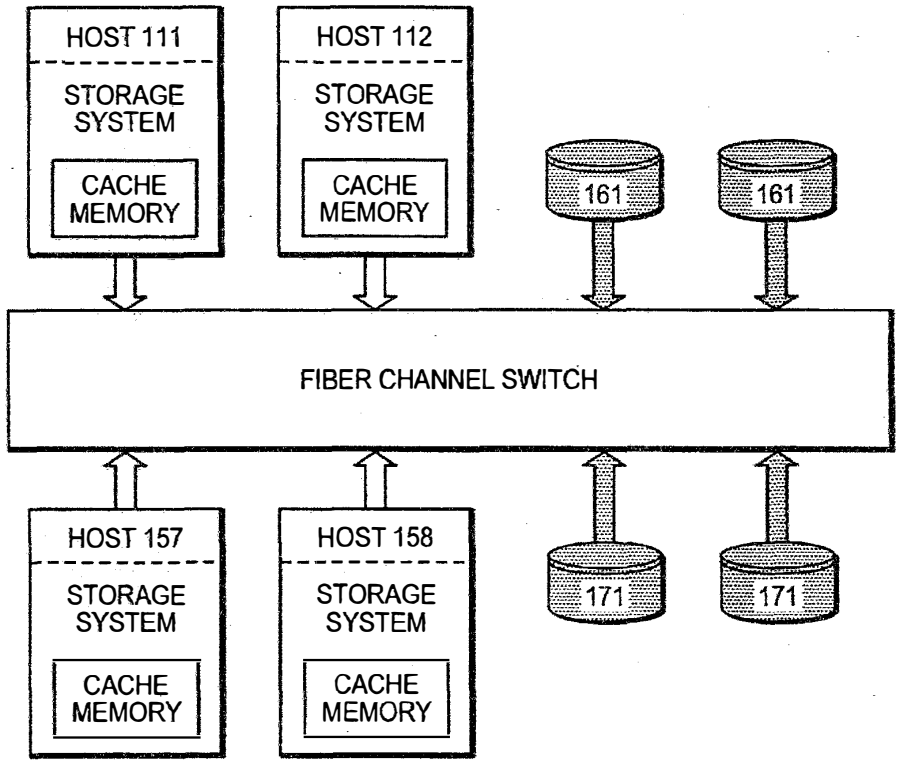

HOST 111
STORAGE SYSTEM
CACHE MEMORY
HOST 112
STORAGE SYSTEM
CACHE MEMORY
161
161
FIBER CHANNEL SWITCH
HOST 157
STORAGE SYSTEM
CACHE MEMORY
HOST 158
STORAGE SYSTEM
CACHE MEMORY
171
171

FIG. 2A

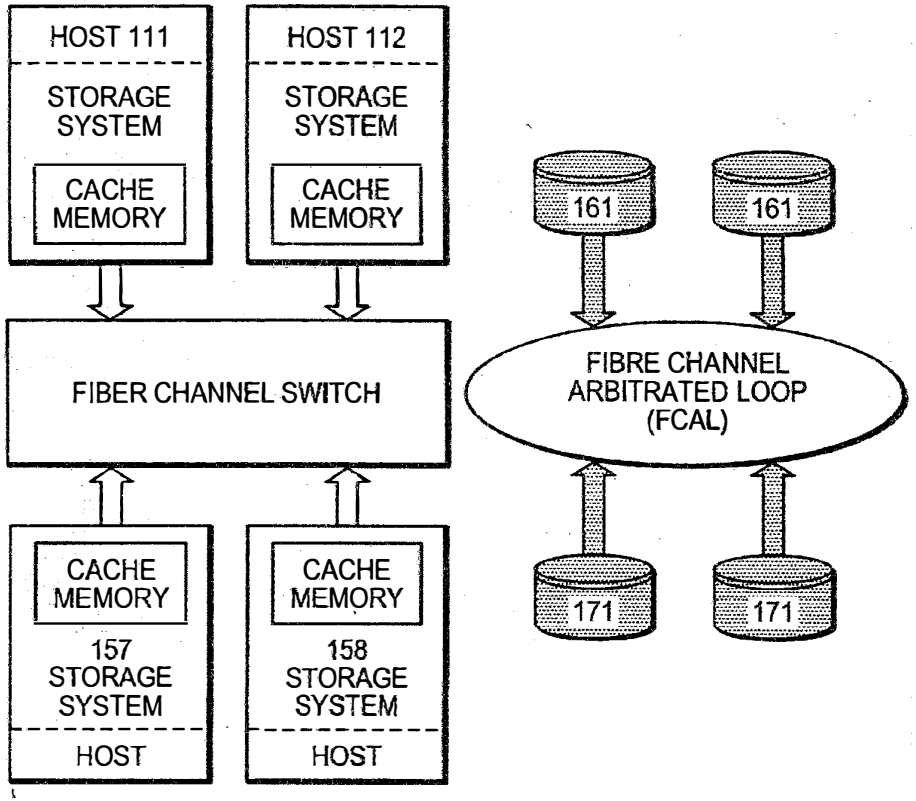

HOST 111
STORAGE SYSTEM
CACHE MEMORY
HOST 112
STORAGE SYSTEM
CACHE MEMORY
FIBER CHANNEL SWITCH
CACHE MEMORY
157 STORAGE SYSTEM
HOST
CACHE MEMORY
158 STORAGE SYSTEM
HOST
161
161
FIBRE CHANNEL ARBITRATED LOOP (FCAL)
171
171

FIG. 2B

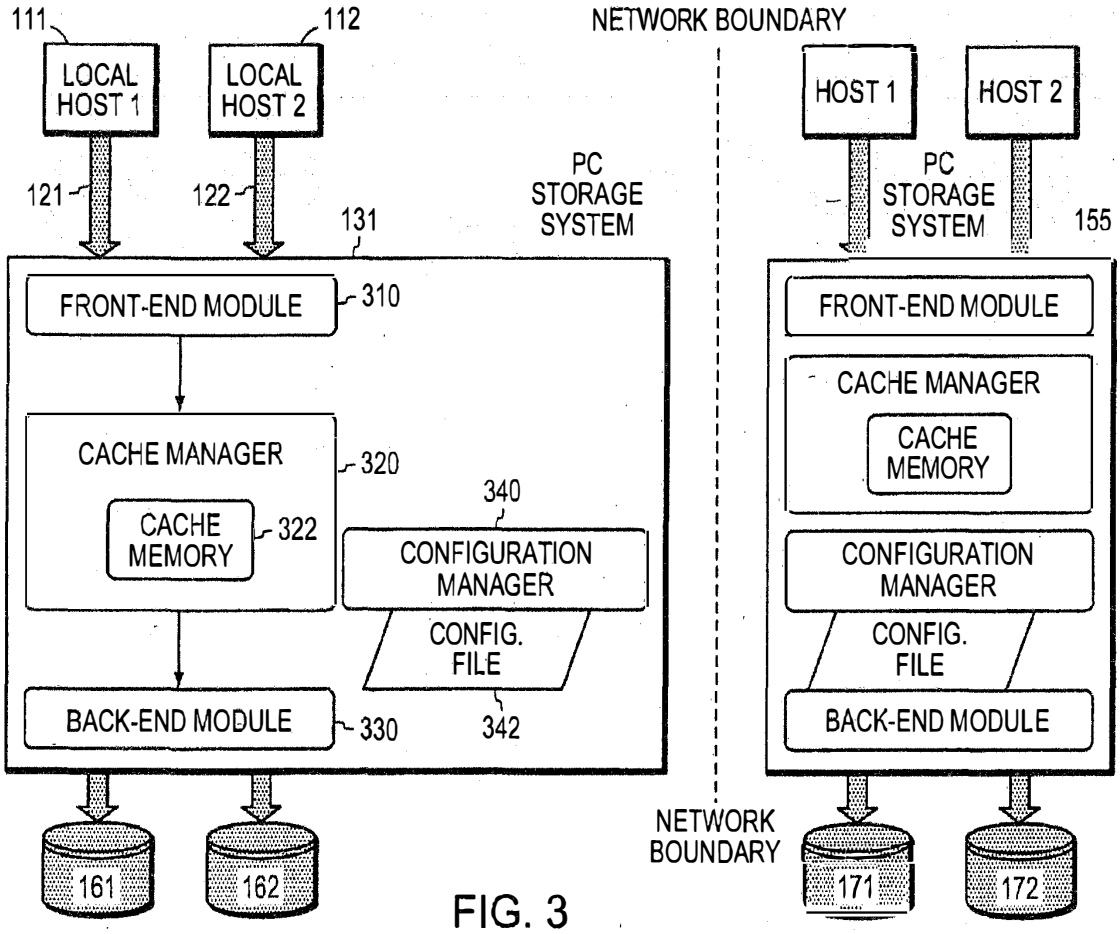

111
112
NETWORK BOUNDARY
LOCAL HOST 1
LOCAL HOST 2
HOST 1
HOST 2
121
122
131
PC STORAGE SYSTEM
PC STORAGE SYSTEM
155
FRONT-END MODULE
310
FRONT-END MODULE
CACHE MANAGER
320
CACHE MEMORY
CACHE MEMORY
322
340
CONFIGURATION MANAGER
CONFIGURATION MANAGER
CONFIG. FILE
CONFIG. FILE
BACK-END MODULE
330
342
BACK-END MODULE
NETWORK BOUNDARY
161
162
171
172

FIG. 3

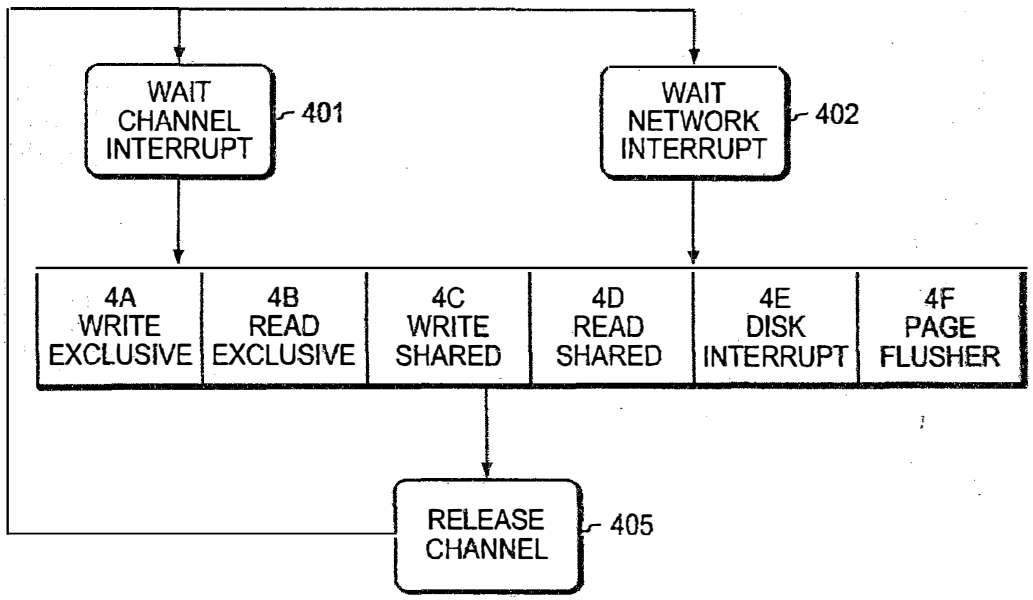
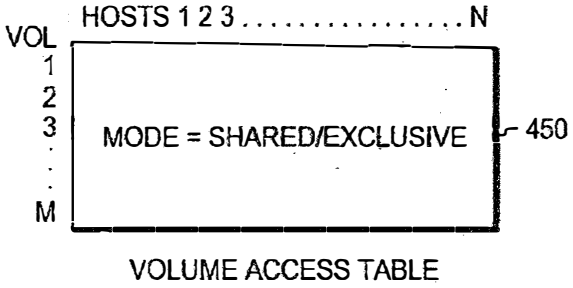


FIG. 4



VOLUME ACCESS TABLE

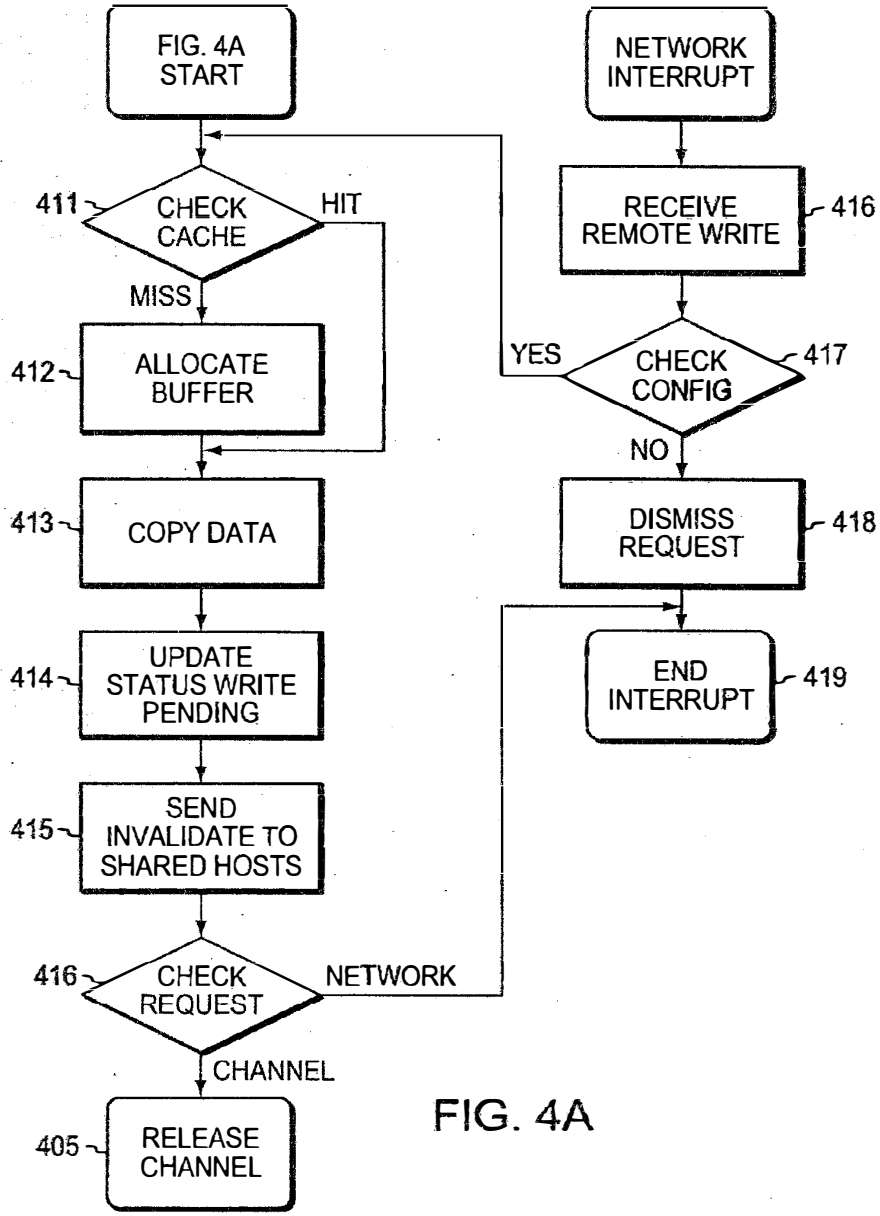

FIG. 4A START
411
CHECK CACHE
HIT
MISS
412
ALLOCATE BUFFER
413
COPY DATA
414
UPDATE STATUS WRITE PENDING
415
SEND INVALIDATE TO SHARED HOSTS
416
CHECK REQUEST
NETWORK
CHANNEL
405
RELEASE CHANNEL
NETWORK INTERRUPT
RECEIVE REMOTE WRITE
416
YES
CHECK CONFIG
417
NO
DISMISS REQUEST
418
END INTERRUPT
419

FIG. 4A

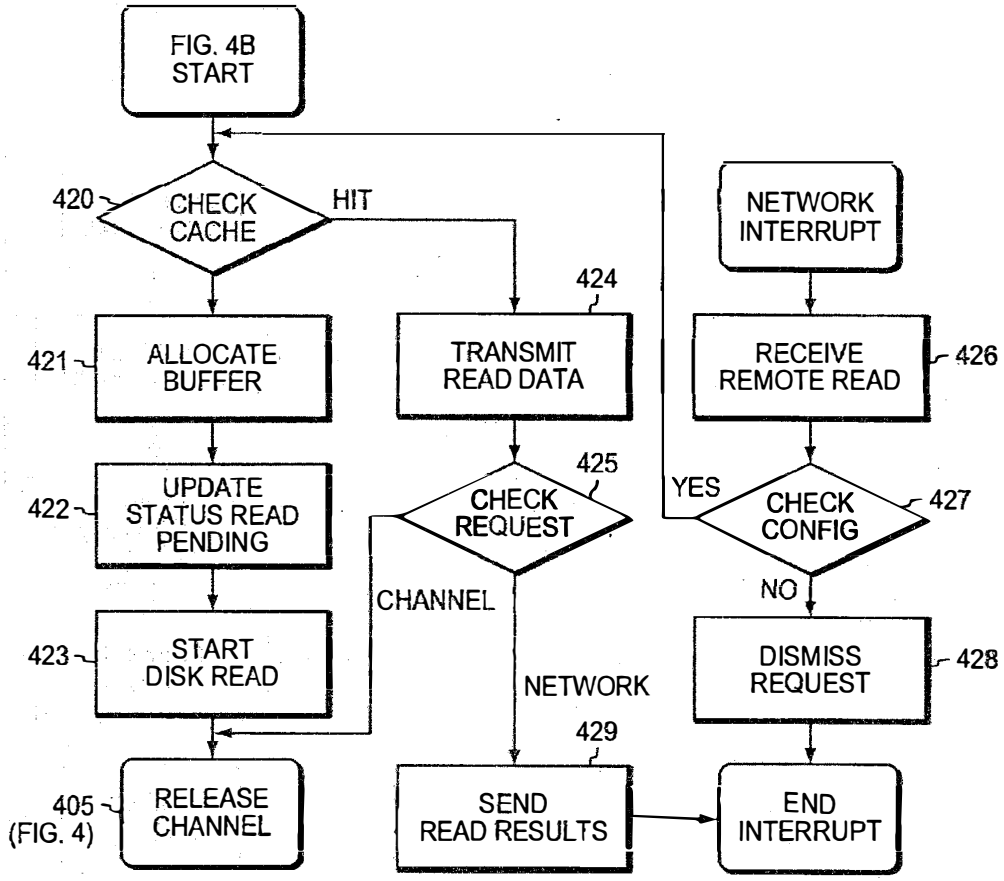

FIG. 4B START
420
CHECK CACHE
HIT
421
ALLOCATE BUFFER
422
UPDATE STATUS READ PENDING
423
START DISK READ
405 (FIG. 4)
RELEASE CHANNEL
424
TRANSMIT READ DATA
425
CHECK REQUEST
CHANNEL
NETWORK
429
SEND READ RESULTS
NETWORK INTERRUPT
426
RECEIVE REMOTE READ
YES
427
CHECK CONFIG
NO
428
DISMISS REQUEST
END INTERRUPT

FIG. 4B

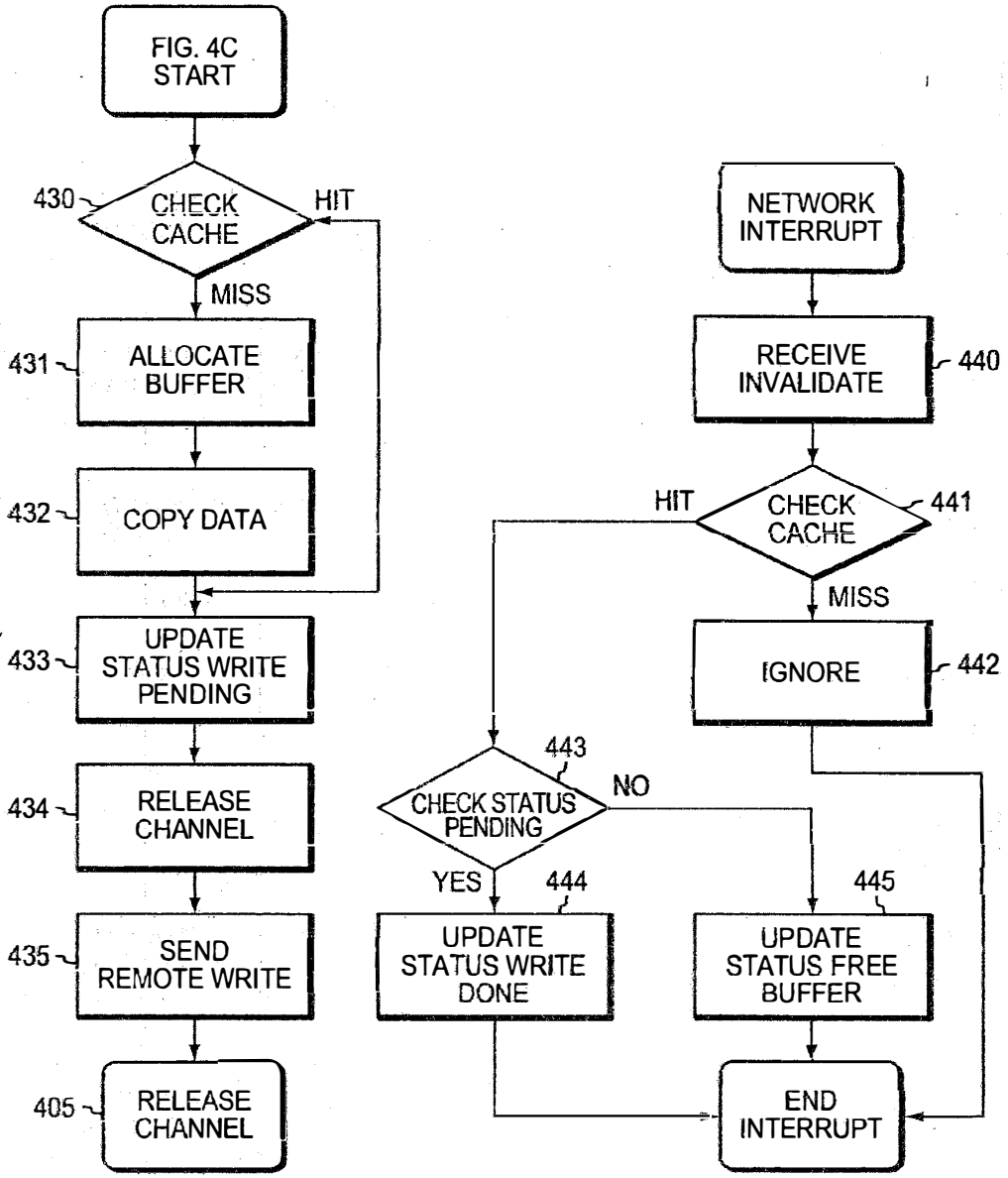

FIG. 4C START
430
CHECK CACHE
HIT
MISS
431
ALLOCATE BUFFER
432
COPY DATA
433
UPDATE STATUS WRITE PENDING
434
RELEASE CHANNEL
435
SEND REMOTE WRITE
405
RELEASE CHANNEL
NETWORK INTERRUPT
RECEIVE INVALIDATE
440
HIT
CHECK CACHE
441
MISS
IGNORE
442
443
CHECK STATUS PENDING
NO
YES
444
445
UPDATE STATUS WRITE DONE
UPDATE STATUS FREE BUFFER
END INTERRUPT

FIG. 4C

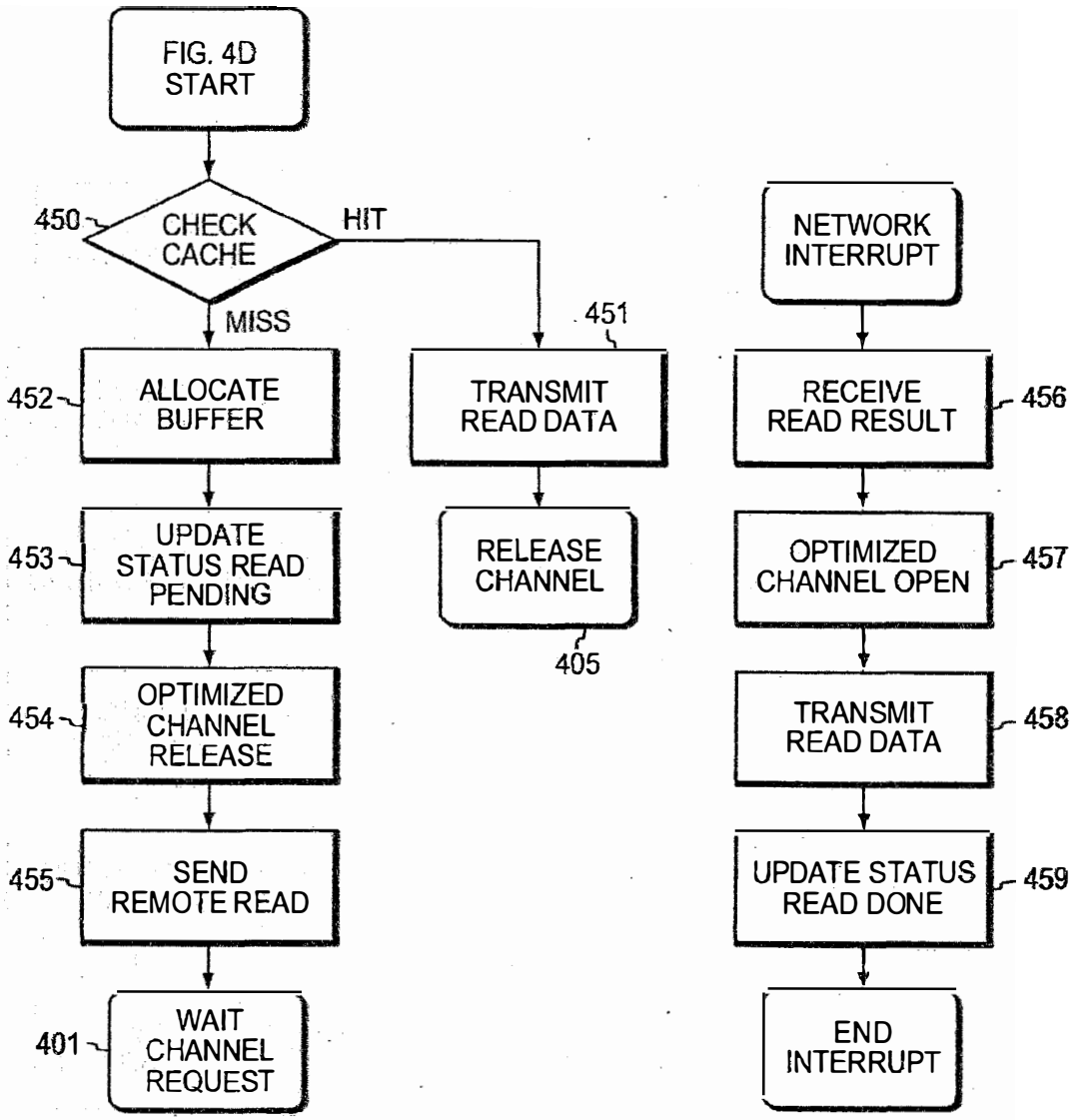

FIG. 4D
START
450
CHECK CACHE
HIT
MISS
451
452
ALLOCATE BUFFER
TRANSMIT READ DATA
453
UPDATE STATUS READ PENDING
RELEASE CHANNEL
405
454
OPTIMIZED CHANNEL RELEASE
455
SEND REMOTE READ
401
WAIT CHANNEL REQUEST
NETWORK INTERRUPT
RECEIVE READ RESULT
456
OPTIMIZED CHANNEL OPEN
457
TRANSMIT READ DATA
458
UPDATE STATUS READ DONE
459
END INTERRUPT

FIG. 4D

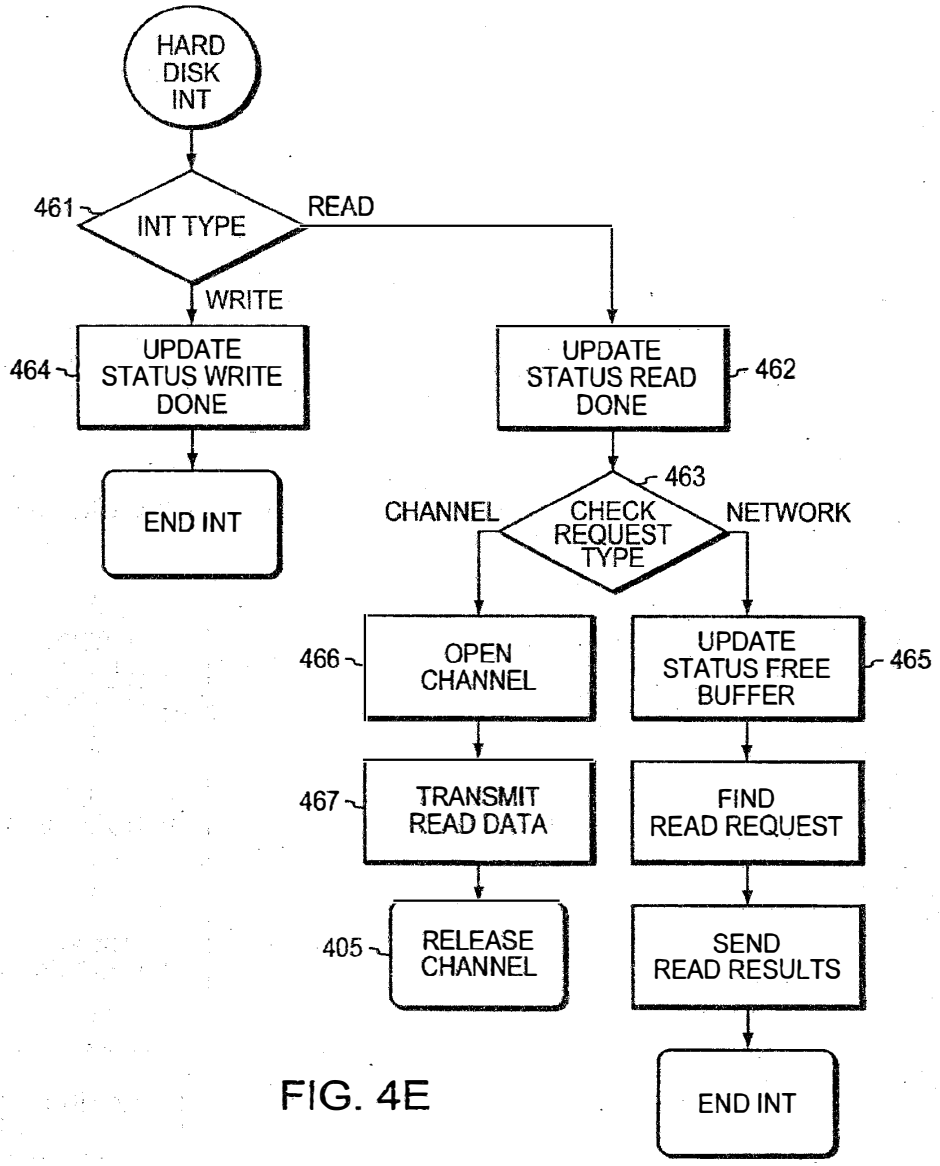

HARD DISK INT
461
INT TYPE
READ
WRITE
464
UPDATE STATUS WRITE DONE
END INT
UPDATE STATUS READ DONE
462
463
CHANNEL
CHECK REQUEST TYPE
NETWORK
466
OPEN CHANNEL
467
TRANSMIT READ DATA
405
RELEASE CHANNEL
UPDATE STATUS FREE BUFFER
465
FIND READ REQUEST
SEND READ RESULTS
END INT

FIG. 4E

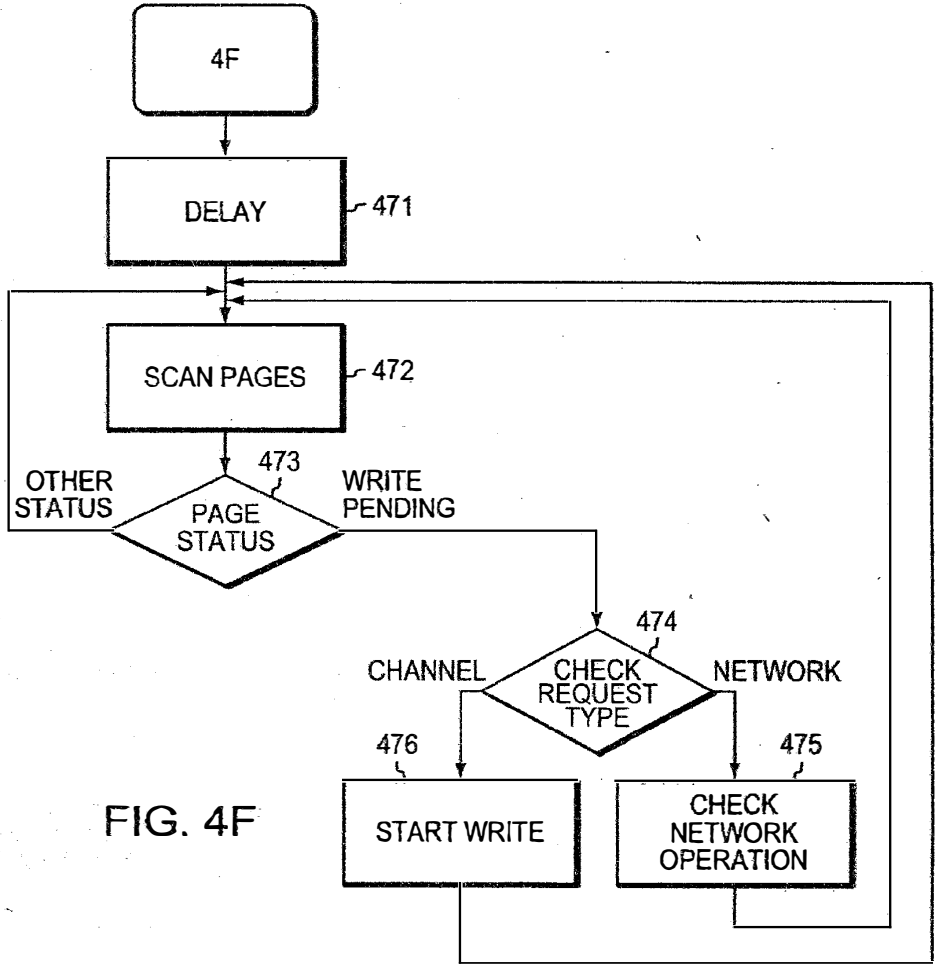

4F
DELAY
471
SCAN PAGES
472
473
OTHER STATUS
PAGE STATUS
WRITE PENDING
474
CHANNEL
CHECK REQUEST TYPE
NETWORK
476
475
START WRITE
CHECK NETWORK OPERATION

FIG. 4F

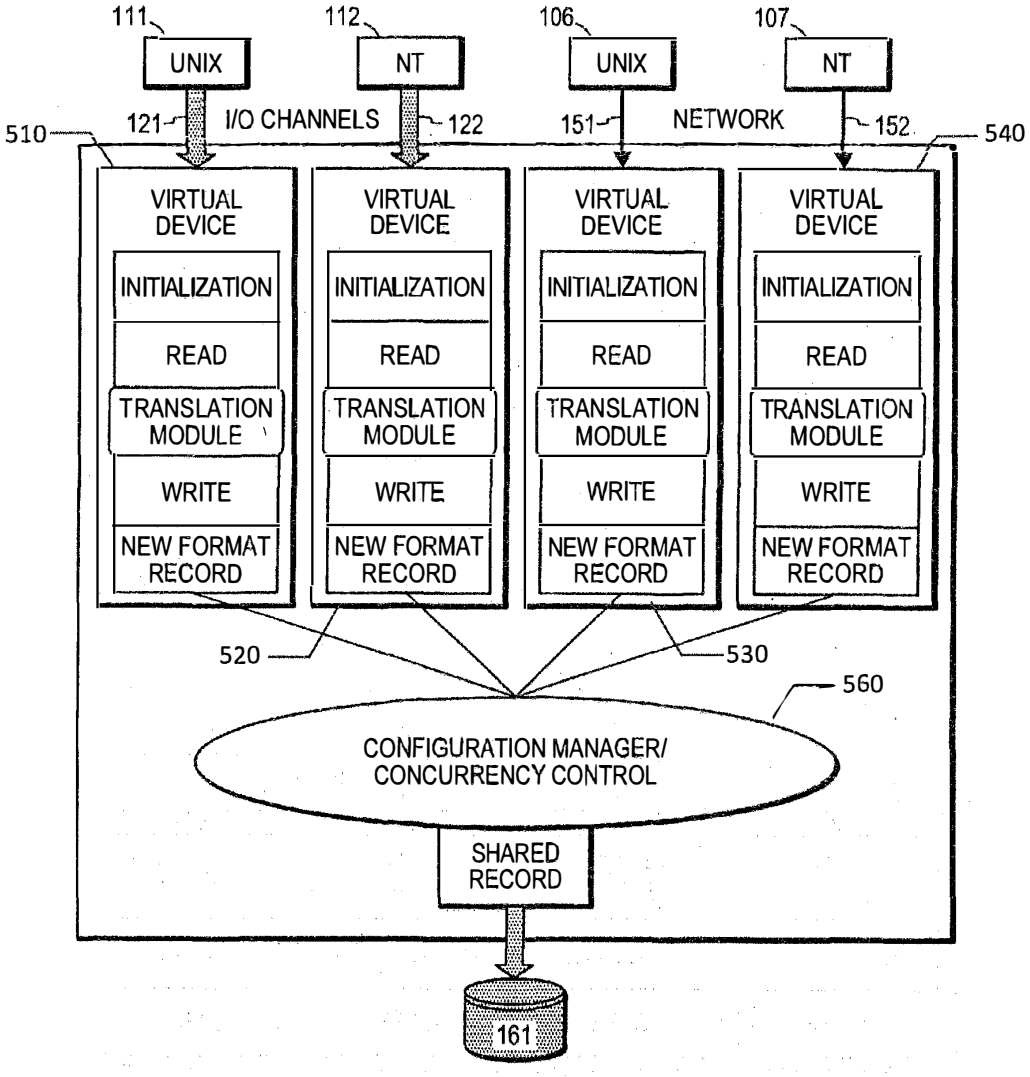

111
112
106
107
UNIX
NT
UNIX
NT
121
I/O CHANNELS
122
151
NETWORK
152
510
540
VIRTUAL DEVICE
VIRTUAL DEVICE
VIRTUAL DEVICE
VIRTUAL DEVICE
INITIALIZATION
READ
TRANSLATION MODULE
WRITE
NEW FORMAT RECORD
520
530
560
CONFIGURATION MANAGER/ CONCURRENCY CONTROL
SHARED RECORD
161

FIG. 5

CERTIFICATION OF MICRO ENTITY STATUS
(GROSS INCOME BASIS)

Application Number or Control Number (if applicable):	Patent Number (if applicable):
Not Assigned	Not yet Issued
First Named Inventor:	**Title of Invention:**
Ilya Gertner	DATA SHARING USING DISTRIBUTED CACHE IN

The applicant hereby certifies the following—

(1) **SMALL ENTITY REQUIREMENT –** The applicant qualifies as a small entity as defined in 37 CFR 1.27.

(2) **APPLICATION FILING LIMIT –** Neither the applicant nor the inventor nor a joint inventor has been named as the inventor or a joint inventor on more than four previously filed U.S. patent applications, excluding provisional applications and international applications under the Patent Cooperation Treaty (PCT) for which the basic national fee under 37 CFR 1.492(a) was not paid, and also excluding patent applications for which the applicant has assigned all ownership rights, or is obligated to assign all ownership rights, as a result of the applicant's previous employment.

(3) **GROSS INCOME LIMIT ON APPLICANTS AND INVENTORS –** Neither the applicant nor the inventor nor a joint inventor, in the calendar year preceding the calendar year in which the applicable fee is being paid, had a gross income, as defined in section 61(a) of the Internal Revenue Code of 1986 (26 U.S.C. 61(a)), exceeding the "Maximum Qualifying Gross Income" reported on the USPTO Web site at http://www.uspto.gov/patents/law/micro_entity.jsp which is equal to three times the median household income for that preceding calendar year, as most recently reported by the Bureau of the Census.

(4) **GROSS INCOME LIMIT ON PARTIES WITH AN "OWNERSHIP INTEREST" –** Neither the applicant nor the inventor nor a joint inventor has assigned, granted, or conveyed, nor is under an obligation by contract or law to assign, grant, or convey, a license or other ownership interest in the application concerned to an entity that, in the calendar year preceding the calendar year in which the applicable fee is being paid, had a gross income, as defined in section 61(a) of the Internal Revenue Code of 1986, exceeding the "Maximum Qualifying Gross Income" reported on the USPTO Web site at http://www.uspto.gov/patents/law/micro_entity.jsp which is equal to three times the median household income for that preceding calendar year, as most recently reported by the Bureau of the Census.

SIGNATURE by an authorized party set forth in 37 CFR 1.33(b)

Signature	/Ilya Gertner/				
Name	Ilya Gertner				
Date	1/14/2016	Telephone	56-900-3610	Registration No.	

☐ There is more than one inventor and I am one of the inventors who are jointly identified as the applicant. The required additional certification form(s) signed by the other joint inventor(s) are included with this form.

PTO/AIA/01 (06-12)
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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS

As the below named inventor, I hereby declare that:

This declaration is directed to:

- [■] The attached application, or
- [ ] United States application or PCT international application number _____

  filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Ilya GERTNER _____ Date (Optional) :_____

Signature: /Ilya Gertner/ _____

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS
First Named Inventor/Applicant Name:	Ilya GERTNER
Filer:	Ilya Gertner
Attorney Docket Number:	ILYAP001C2

Filed as Micro Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
BASIC UTILITY PATENT FILING FEE-MCRO-ENT	3011	1	70	70
Utility Search Fee	3111	1	150	150
Utility Examination Fee	3311	1	180	180
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**400**

Electronic Acknowledgement Receipt	
EFS ID:	24643227
Application Number:	14997327
International Application Number:	
Confirmation Number:	5295
Title of Invention:	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS
First Named Inventor/Applicant Name:	Ilya GERTNER
Correspondence Address:	Ilya Gertner - 26 Claremont Ave - Long Beach CA 90803 US 562-900-3610 gert5063@yahoo.com
Filer:	Ilya Gertner
Filer Authorized By:	
Attorney Docket Number:	ILYAP001C2
Receipt Date:	15-JAN-2016
Filing Date:	
Time Stamp:	19:08:55
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$400

RAM confirmation Number	5934
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	exe_ILYAP001C2_APPLICATION_DATA_SHEET_aia0014x.pdf	1503312 3665a1f7919e7cfe8561c4e4f796188170fa7a96	no	7
Warnings:					
Information:					
2		ILYAP001C2_APP.pdf	723304 c5e80cc763a71dbceb2aedc6055844e77778f592	yes	17
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Specification		1	13	
	Claims		14	16	
	Abstract		17	17	
Warnings:					
Information:					
3	Preliminary Amendment	exe_ILYAP001C2_PRELIM.pdf	21777 cd69068018df03150bd2d67186c700a6aaa9d88f	no	3
Warnings:					
Information:					
4	Drawings-only black and white line drawings	ILYAP001C2_DRAWS.pdf	462925 e239f53021c7ec005745f0749d158fc66fc69897	no	13
Warnings:					
Information:					

5	Certification of Micro Entity (Gross Income Basis)	exe_ILYAP001C2_MICRO_sb0015a.pdf	88332 ca6afbe9f0065d4fd48a314bc0f1801ee11be6ab	no	1
Warnings:					
Information:					
6	Oath or Declaration filed	exe_ILLYA_INVENTOR_DEC_ACCOMPANYING_ADS.pdf	134471 0c0cdcf5c178af2ecc782b585b3d88834bb59429	no	2
Warnings:					
Information:					
7	Fee Worksheet (SB06)	fee-info.pdf	34695 66403ff9a319d38089c2ea8b18683635ff6c1fb7	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	2968816		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	ILYAP001C2
	Application Number	
Title of Invention	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Ilya		GERTNER	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	Long Beach	State/Province	CA	Country of Residence	US

Mailing Address of Inventor:

Address 1	26 Claremont Ave.
Address 2	
City	Long Beach
State/Province	CA
Postal Code	90803
Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☒ **An Address is being provided for the correspondence Information of this application.**

Name 1	Ilya GERTNER	Name 2	
Address 1	26 Claremont Ave.		
Address 2			
City	Long Beach	State/Province	CA
Country	US	Postal Code	90803
Phone Number	562-900-3610	Fax Number	
Email Address	gert5063@yahoo.com	Add Email	Remove Email

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 266 of 289

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	ILYAP001C2
	Application Number	
Title of Invention	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS	

Application Information:

Title of the Invention	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS		
Attorney Docket Number	ILYAP001C2	**Small Entity Status Claimed**	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)		**Suggested Figure for Publication (if any)**	

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number			

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

Prior Application Status	Pending		Remove
Application Number	**Continuity Type**	**Prior Application Number**	**Filing Date (YYYY-MM-DD)**
NewlyFiled	Continuation of	13527126	2012-06-09
Prior Application Status	Patented		Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13527126	Continuation of	10382016	2003-03-05	8225002	2012-07-17
Prior Application Status	Patented				Remove

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	ILYAP001C2
	Application Number	
Title of Invention	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS	

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
10382016	Division of	09236409	1999-01-22	6549988	2003-04-15

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

Authorization to Permit Access:

Authorization to Permit Access to the Instant Application by the Participating Offices

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	ILYAP001C2
	Application Number	
Title of Invention	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS	

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date o f filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	ILYAP001C2
	Application Number	
Title of Invention	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS	

Mailing Address Information For Applicant:			
Address 1			
Address 2			
City		**State/Province**	
Country		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Non-Applicant Assignee Information:

Providing assignment information in this section does not subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Assignee 1

Complete this section only if non-applicant assignee information is desired to be included on the patent application publication in accordance with 37 CFR 1.215(b). Do not include in this section an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest), as the patent application publication will include the name of the applicant(s).

Remove

If the Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Non-Applicant Assignee:			
Address 1			
Address 2			
City		**State/Province**	
Country		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the Add button. Add

Cisco Exhibit 1002
Cisco et al. v. LS Cloud Storage Technologies
IPR2023-00733, Page 270 of 289

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Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	ILYAP001C2
	Application Number	
Title of Invention	DATA SHARING USING DISTRIBUTED CACHE IN A NETWORK OF HETEROGENEOUS COMPUTERS	

Signature:

Remove

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Signature	/Ilya Gertner/			Date (YYYY-MM-DD)	2016-01-07
First Name	Ilya	Last Name	GERTNER	Registration Number	

Additional Signature may be generated within this form by selecting the Add button. Add

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Data Storage and Data Sharing in a Network of Heterogeneous Computers

Related Applications

This is a continuation-in-part of U.S. Serial No. 09/236,409, filed on January 22, 1999, the entire disclosure of which is incorporated by reference in its entirety.

Field of the Invention

This invention relates generally to the field of cached data storage systems and more particularly to a data storage system that permits independent access from local hosts connected via I/O channels and independent access from remote hosts and remote storage systems connected via network links. A network of PCs permits building a high-performance, scalable, data storage system using off-the-shelf components at reduced cost. A configuration manager ensures consistency of data stored in the distributed cache.

Background of the Invention

A typical data processing system generally involves a cached data storage system that connects to local host computers via I/O channels or remote host computers via network links. The purpose of the data storage system is to improve the performance of applications running on the host computer by offloading I/O processing from the host to the data storage system. The purpose of the cache memory in a data storage system is to further improve the performance of the applications by temporarily storing data buffers in the cache so that the references to those buffers can be resolved efficiently as "cache hits". Reading data from a cache is an order of magnitude faster than reading data from a back end storage device such as a disk. Writing data to a cache is also an order of magnitude faster than writing to a disk. All writes are cache hits because data is simply copied into cache buffers that are later flushed to disks.

Prior art data storage systems are implemented using proprietary hardware and very low-level software, frequently referred to as microcode, resulting in expensive and not portable systems. In contrast to the prior art systems, the preferred embodiment of the

present invention uses standard hardware and software components. A network of commercial PCs is used to implement a high-performance data storage system. A method using the network of PCs includes an algorithm for a configuration manager that manages access to the distributed cache memory stored in PCs interconnected by the network.

Numerous prior art systems and methods exist for managing cache memory in a data storage system. The prior art has suggested several methods for managing cache for channel attached hosts. U.S.Pat. No, 5,717,884, Gzym, et. al., Feb 2, 1996, Method and Apparatus for Cache Management, discloses data structures and algorithms that use a plurality of slots, each of which is used to store data files. U.S. Pat. No, 5,757,473, Vishlitzky, et. al., Cache Management system using time stamping for replacement queue, Jul 28, 1998, discloses a method that uses time stamps to manage queues in a cached data storage system. U.S.Pat. No, 5,751,993, Ofek, et. al., May 12, 1998, Cache Management Systems, discloses yet another aspect in queue management algorithms. U.S. Pat. No, 5,600,817, Macon Jr., et. al., Feb. 4, 1997, Asynchronous read-ahead disk caching using multiple disk I/O processes and dynamically variable prefetch length, discloses read-ahead methods in cached storage systems. U.S. Pat. No, 5,758,050, Brady, et. al., May 26, 1998, Reconfigurable data storage system, discloses a method for reconfiguring a data storage system.

However, the above systems use very specialized embedded operating systems and custom programming in a very low-level programming language such as assembler. The obvious drawback of the above systems is high cost because assembler-level programming is very time consuming. Another drawback is inflexibility and lack of functionality. For example, some features such as reconfigurability in data storage are very limited in proprietary embedded systems when compared to general purpose operating systems. Finally, networking support is very expensive and limited because it relies on dedicated communication links such as T1, T3 and ESCON.

One prior art system using networking of data storage systems is disclosed in U.S. Pat. No, 5,742,792, Yanai, et. al., April 21, 1998, Remote Data Mirroring. This patent discloses a primary data storage system providing storage services to a primary host and a secondary data storage system providing services to a secondary host. The primary

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storage system sends all writes to the secondary storage system via IBM ESCON, or optionally via T1 or T3 communications link. The secondary data storage system provides a backup copy of the primary storage system. Another prior art system is disclosed in U.S. Pat. No, 5,852,715, Raz , et al., December 22, 1998, System for currently updating database by one host and reading the database by different host for the purpose of implementing decision support functions.

However, the above systems use dedicated communication links that are very expensive when compared to modern networking technology. Furthermore, the data management model is limited to the primary-node sending messages to the secondary node scenario. This model does not support arbitrary read and write requests in a distributed data storage system.

There is a growing demand for distributed data storage systems. In response to this demand some prior art systems have evolved into complex assemblies of two systems, one proprietary a data storage system and the other an open networking server. One such system is described in a white paper on a company web site on Internet. The industry white paper, EMC Data Manager: A high-performance, centralized open system backup/restore solution for LAN-based and Symmetrix resident data, describes two different systems, one for network attached hosts and second for channel attached hosts. The two systems are needed because of the lack of generic networking support. In related products such as Celerra File Server, product data sheets suggest using data movers for copying data between LAN-based open system storage and channel attached storage system.

However, the above systems are built from two systems, one for handling I/O channels, and another for handling open networks. Two systems are very expensive even in minimal configuration that must include two systems.

In another branch of storage industry, network attached storage systems use network links to attach to host computers. Various methods for managing cache memory and distributed applications for network attached hosts have been described in prior art. U.S. Pat. 5,819,292, Hitz, et. al., Method for maintaining consistent states of a file system and for creating user-accessible read-only copies of a file system, Oct 6, 1998, U.S. Pat.

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No, 5,644,751, and Burnett, et. al., July 1, 1997, Distributed file system (DFS) cache management system based on file access characteristics, discloses methods for implementing distributed file systems. U.S. Pat. No, 5,649,105, Aldred, et. al., July 15, 1997, Collaborative working in a network, discloses programming methods for distributed applications using file sharing. U.S. Pat. No, 5,701,516, Chen, et. al., Dec 23. 1997, High-performance non-volatile RAM protected write cache accelerator system employing DMA and data transferring scheme, discloses optimization methods for network attached hosts. However, those systems support only network file systems. Those systems do not support I/O channels.

In another application of storage systems, U.S. Pat. No, 5,790,795, Hough, August 4, 1998, Media server system which employs a SCSI bus and which utilizes SCSI logical units to differentiate between transfer modes, discloses a media server that supports different file systems on different SCSI channels. However the system above is limited to a video data and does not support network attached hosts. Furthermore, in storage industry papers, Data Sharing, by Neema, Storage Management Solutions, Vol. 3, No. 3, May, 1998, and another industry paper, Storage management in UNIX environments: challenges and solutions, by Jerry Hoetger, Storage Management Solutions, Vol. 3, No. 4, survey a number of approaches in commercial storage systems and data sharing. However, existing storage systems are limited when applied to support multiple platform systems.

Therefore, a need exists to provide a high-performance data storage system that is assembled out of standard modules, using off-the-shelf hardware components and a standard general-purpose operating system that supports standard network software and protocols. In addition, the needs exists to provide a cached data storage system that permits independent data accesses from I/O channel attached local hosts, network attached remote hosts, and network-attached remote data storage systems.

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Summary of the Invention

The primary object of the invention is to provide a high performance, scalable, data storage system using off-the-shelf standard components. The preferred embodiment of the present invention comprises a network of PCs including an I/O channel adapter and network adapter and method for managing distributed cache memory stored in the plurality of PCs interconnected by the network. The use of standard PCs reduces the cost of the data storage system. The use of the network of PCs permits building large, high-performance, data storage systems.

Another object of the invention is to provide a distributed cache that supports arbitrary reads and writes arriving via I/O channels or network links, as well as a method for sharing data between two or more heterogeneous host computers using different data formats and connected to a data storage system. The method includes a translation module that inputs a record in a format compatible with the first host and stores the translated record in a data format compatible with the second host. Sharing of data in one format and having a translation module permitting representations in different formats in cache memory provides a means for improving performance of I/O requests and saving disk storage space.

In accordance with a preferred embodiment of the invention, a data storage system comprises a network of PCs each of which includes a cache memory, an I/O channel adapter for transmitting data over the channel and a network adapter for transmitting data and control signals over the network. In one embodiment, a method for managing resources in a cache memory ensures consistency of data stored in the distributed cache. In another embodiment, a method for sharing data between two or more heterogeneous hosts includes the steps of: reading a record in a format compatible with one computer; identifying a translation module associated with the second computer; translating the record into the format compatible with the second computer and writing said translated record into a cache memory.

The preferred embodiment of the present invention involves a method for building a data storage system that provides superior functionality at lower cost when compared to prior art systems. The superior functionality is achieved by using an underlying general-

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purpose operating system to provide utilities for managing storage devices, backing data, troubleshooting storage devices and performance monitoring. The lower cost is achieved by relying on standard components. Furthermore, the preferred embodiment of the present invention overcomes the limitations of prior art systems by providing concurrent access for both I/O channel attached hosts and network link attached hosts.

The preferred embodiment of this invention uses SCSI channels to connect to local hosts and uses standard network links card such as Ethernet, or ATM to connect to remote hosts. The alternate embodiment of the present invention uses fiber channel link such as Fibre Channel as defined by the Fibre Channel Association, FCA, 2570 West El Camino Real, Ste. 304, Mountain View, CA 94040-1313 or SSA as defined SSA Industry Association, DEPT II65/B-013 5600 Cottle Road, San Jose, CA 95193. Prior art systems such as U.S. Pat. No, 5,841,997, Bleiwess, et. al., November 24, 1998, Apparatus for effecting port switching of fibre channel loops, and U.S. Pat. No, 5,828,475, Bennett, et. al., October 27, 1998, Bypass switching and messaging mechanism for providing intermix fiber optic switch using a bypass bus and buffer, disclosure methods that connects disks and controllers. However, the problems remain in software, solution of which require methods described in the preferred embodiment of the present invention.

The drawings constitute a part of this specification and include exemplary embodiments to the invention, which may be embodied in various forms.

Brief Description of the Drawings

FIG. 1 shows data storage systems configurations;

FIG. 2 illustrates in block diagram form the alternate embodiment of the data storage system of the present invention;

FIG. 2A illustrates in block diagram form the alternate embodiment of the data storage system of the present invention;

FIG. 2B illustrates in block diagram form another variation of the alternate embodiment of the present invention;

FIG. 3 shows a PC data storage system;

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FIG. 4 illustrates in data flow diagram form the operations of a data storage system including: FIG. 4A illustrating operations in write exclusive mode, FIG 4B in read exclusive mode, FIG 4C in write shared mode, FIG 4D in read shared mode, FIG 4E in disk interrupt, FIG 4F in page flusher; and

FIG. 5 illustrates in block diagram form data sharing operations.

Detailed Description of the Preferred Embodiments

Detailed descriptions of the preferred embodiment are provided herein. It is to be understood, however, that the present invention may be embodied in various forms. Therefore, specific details disclosed herein are not to be interpreted as limiting.

FIG. 1 illustrates data storage system configurations of the preferred embodiment. The PC data storage system 131 services a plurality of channel attached host processors 111, 112 using channels 121, 122, and a plurality of network attached host processors 106, 107 using network link 151, and a plurality of network attached data storage systems 132, 133 using network links 152, 153. PC storage system 132 services channel attached hosts 157, 158.

Hosts 157 and 158 access a data storage system 131 indirectly via network attached data storage system 132, thereby offloading communications protocol overhead from remote hosts 157, 158. Hosts 106 and 107 directly access storage system 131 via network link 151 thereby incurring communications protocol overhead on hosts 106, 107 and therefore decreasing performance of applications running on said hosts.

Host 111 accesses remote disk 181 via local data storage system 131, network link 153, and remote data storage system 133 without incurring protocol overhead on host 111. Host 157 accesses disk 161 via data storage system 133, network link 152, and data storage system 131 without incurring protocol overhead on host 157. Host 106 directly accesses local disk 161 via network link 151 thereby incurring protocol overhead. The disks 191, 192 that are attached to hosts 106, 107 without a data storage system, cannot be accessed by outside hosts.

The preferred embodiment of the present inventions uses well-established technologies such as SCSI channels for I/O traffic and Ethernet link for network traffic. In

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FIG 2, the alternate embodiment of the present invention uses fiber channel technology for both I/O traffic and network traffic. The fiber channel connects computers and hard disks into one logical network. In one variation of the alternate embodiment in FIG. 2, the fiber optics link is organized as a Fiber Channel Arbitrated Loop (FCAL). In another variation shown in FIG. 2A, the fiber optics link is organized as a switching network. In yet another variation in FIG. 2B, the fiber channel is organized in two FCAL loops connected via switch.

FIG. 3 shows a software architecture and modules of a PC data storage system corresponding to the data storage system 131 in FIG 1. Data is received from the hosts 111, 112 via I/O channels 121, 122 in front-end software module 310 in FIG. 3. The front-end module 310 handles channel commands and places the results in cache memory 322 in the form of new data or modification to data already stored on the disk 161. The cache manager software module 320 calls routines in the configuration manager 340 to ensure consistency of the cache memory in other network attached data storage systems. At some later point in time, the back-end software module 342 invokes a page flusher module to write modified data to disks 161 and 162 and free up cache memory.

In FIG 3, front-end module 310 including I/O adapter driver has been modified to accept target SCSI I/O requests from hosts 111 and 112. Said front-end module handles I/O requests in such a manner that hosts 111 and 112 are not aware of a data storage system. Hosts 111 and 112 issue I/O requests as if the request is going to a standard disk.

The presence of fast access cache memory permits front end channels and network links to operate completely independent of the back-end physical disk devices. Because of this front-end/back-end separation, the data storage system 131 is liberated from the I/O channel and network timing dependencies. The data storage system is free to dedicate its processing resources to increase performance through more intelligent scheduling and data transfer network protocol.

FIG. 4 shows a flowchart of a data storage system in the process of reading or writing to data volumes stored on disk drives shown in FIG. 3. The flowchart uses a volume access table 450 (see also FIG. 5) and controlled by the configuration manager. Local operations begin in step 401 where the corresponding front-end module 310 of FIG.

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3 allocates a channel and waits for I/O requests from the initiating hosts 111 or 112. Remote operations begin in step 402. Depending upon the status of the value in a volume access table 450 the requests are routed either as shown in FIG. 4A for write exclusive mode, FIG. 4B for read exclusive, FIG. 4C for write shared or FIG. 4D for read shared. Concurrently with the processing of I/O operations, the independent page flusher daemon shown in FIG. 4F scans cache memory and writes buffers to disks. Disk interrupt processing is shown in FIG 4E.

Volume access table 450 (see FIG 4) contains a mapping between hosts and volumes specifying an access mode value. If the access mode is set neither to shared nor exclusive, the configuration manager forwards I/O requests directly to disk. In addition to the access mode, the volume access table may contain other values that help the configuration manager and improve performance of the data storage system.

In another embodiment of this application, shown in FIG 5, the volume access table includes a translation module for a given host to facilitate volume mapping. The translation module is a dynamically loadable library that can be changed, compiled and linked at run-time.

A user of a data storage system can externally set the values and parameters in a volume access table. For each host and volume pair, a user can explicitly specify the access mode value. For some applications, where data on a remote volume is accessed infrequently, the user may want to specify other than shared or exclusive in order to disable cache for the remote volume. By disabling caching, the user eliminates cache coherency traffic entirely for the volume. In a data storage system, a user or a system administrator actively monitors and changes the behavior of a cache manager by changing values in a volume access table in order to improve performance of the data storage system.

FIG. 4A shows a flowchart of the cache manager 320 (see FIG. 3) as it processes a write request in an exclusive mode. In step 411 of FIG. 4A, the cache manager checks whether the requested buffer is in cache or not. For a cache miss, in step 412, the cache manager allocates a new buffer for storing data that will be written. For a cache hit, the cache manager branches directly to step 413 where data is copied into the newly allocated

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buffer. In step 414, the cache manager calls a configuration manager routine that sends an invalidate request to the list of shared hosts for this particular volume. In step 415, the cache manager checks the type of a request. For a channel type of a request, the cache manager returns to step 405 to release the channel. For a network type of a request, the cache manager proceeds to release network request in step 419 on the right side of FIG. 4A.

On the right side of FIG. 4A, in step 416, network interrupt identifies and receives a remote write request. In step 417, the cache manager calls configuration manager routine to determine the validity of the request. Bad requests are ignored in step 418. Correct requests proceed to step for 410 for write exclusive processing. Step 415 returns the flow to step 419, which releases network resources.

FIG. 4B shows a flowchart of the cache manager as it processes a read request in an exclusive mode. In step 420, the cache manager checks whether the requested buffer is in cache or not. For a cache miss, in step 421, the cache manager allocates a buffer for storing data that will be read in. In step 422, the cache manager updates the buffer status with read pending. In step 423, the cache manager starts an operation to read from a hard disk driver and proceeds to release the channel in step 405. For a cache hit, in step 424, the cache manager transmits read data and proceeds to release the channel in step 405. For an identified network request, in step 425, the cache manager sends back read results in step 429.

On the right side of FIG. 4B, in step 426, network interrupt identifies and receives a remote read request. In step 427, the cache manager calls a configuration manager routine that checks the configuration file and ignores bad requests in step 428. Correct requests proceed to step 420 for read exclusive processing. Step 425 returns the flow to step 429 that sends read results.

FIG. 4C shows a flowchart of the cache manager as it processes a write request in a shared mode. In step 430, the cache manager checks whether the requested buffer is in cache or not. For a cache miss, in step 431, the cache manager allocates a new buffer for storing data that will be written. For a cache hit, the cache manager branches directly to step 432 where data is copied into the newly allocated buffer. In step 433, the cache

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manager updates the buffer status with write pending and proceeds to step 434 to release the channel. In step 435, the cache manager calls a configuration manager routine that sends a remote write request to the host that holds this particular volume in an exclusive mode. In follow up to step 435, the cache manager returns to the beginning of FIG. 4.

On the right side of FIG. 4C, the cache manager updates the buffer status with write done in step 444. The flow begins with the network interrupt that calls configuration manager to validate the request in step 441. Bad requests are ignored in step 442. A correct request proceeds to step 443 that checks whether the status of this particular buffer is write pending. If the status is pending, in step 444, the cache manager updates the buffer status to write done. For any other buffer status, in step 445, the cache manager updates the status to free. This buffer is released in accordance with the invalidate request that has come from a remote host that holds this volume in an exclusive mode as has been described in FIG. 4A.

FIG. 4D shows a flowchart of the cache manager as it processes a read request in a shared mode. In step 450, the cache manager checks whether the requested buffer is in cache or not. For a cache miss, in step 452, the cache manager allocates a buffer for storing data that will be read into. For a cache hit, in step 451, the cache manager transmits read data and proceeds to step 405 to release the channel. In the case of the cache miss, the cache manager allocates a new buffer in step 452 and updates its status to read pending in step 453. In step 454, the cache manager closes the channel with an optimizer that maintains a pool of open channels which are kept open only for the specified amount of time. In step 455, the cache manager calls configuration manager routine that sends a remote read request to the host that holds this particular volume in an exclusive mode. The operations of the host holding volume in read exclusive mode have been shown in FIG. 4B.

On the right side of FIG. 4D, in step 456, a network interrupt identifies a remote read result. In step 457, the cache manager performs an optimized channel open. Depending upon the status of the optimizer that has been initiated in step 454, the cache manager may immediately get access to the still open channel or, if the optimizer fails, the cache manager may need to reopen the channel. In step 458, the cache manager

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transmits read data. In step 459, the cache manager updates the buffer status to read done and proceeds to step 459 where it releases the channel.

FIG. 4E shows a flowchart of the cache manager as it processes a hard disk interrupt request marking the completion of a read or write request. The read request has been started in step 423 in FIG 4B. The write request has been started in step 475 in FIG 4F. In step 460, the cache manager checks the type of the hardware interrupt. For a write interrupt in step 461, the cache manager updates the buffer status to write done and releases resources associated with the interrupt. For a read interrupt in step 462, the cache manager updates the buffer status to read done. In step 463, the cache manager checks request type of the read operation that has been started in FIG 4B. For a channel request, the cache manager proceeds to open a channel in step 466. In step 467, the cache manager transmits read data and proceeds to release the channel in step 405. For a network request in step 464, the cache manager finds the remote read requests that initiated the request. In step 466, the cache manager sends read results and ends interrupt processing.

FIG. 4F shows a flowchart of a cache memory page flusher. The flusher is a separate daemon running as part of the cache manager. In step 471, the flusher waits for the specified amount of time. After the delay in step 472, the flusher begins to scan pages in cached memory. In step 473, the flusher checks the page status. If the page list has been exhausted in branch no more pages, the flusher returns to step 471 where it waits. If the page status is other than the write pending, the flusher returns to step 472 to continue scanning for more pages. If the page status is write pending, the flusher proceeds to step 474. In step 474, the flusher checks the request type. For a channel type, the flusher starts a read operation in step 475 and returns to scan pages in step 472. For a network type, the flusher checks for the network operations in progress and returns to step 472 for more pages.

FIG. 5 shows a data sharing operation between a plurality of heterogeneous host computers. In one embodiment the plurality of hosts includes but is not limited to a Sun Solaris workstation 111, Windows NT server 112, HP UNIX 106, and Digital UNIX 107 each accessing a distinct virtual device respectively 510, 520, 530 and 540. Configuration

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manager 560 provides concurrency control for accessing virtual devices that are mapped to the same physical device 161. The configuration manager uses a volume access table 450 that has been shown in FIG. 4.

A virtual device is a method that comprises three operations: initialization, read and write. The initialization operation registers a virtual device in an operating system on a heterogeneous host. Following the registration, the virtual device appears as if it is another physical device that can be brought on-line, offline or mounted on a file system. An application program running on the host cannot distinguish between a virtual device and a physical device.

For a virtual device, the read operation begins with a read from a physical device followed by a call to a translation module. The translation module inputs a shared record in a original format used on a physical disk and outputs the record in a new format that is specified for and is compatible with a host computer. The write operation begins with a call to a translation module that inputs a record in a new format and outputs a record in a shared format. The translation module is a dynamically loadable library that can be changed, compiled and linked at run-time.

The virtual device method described above allows a plurality of heterogeneous host computers to share one copy of data stored on a physical disk. In a data storage system using said virtual device method, a plurality of virtual devices is maintained in cache without requiring a copy of data on a physical disk.

While the invention has been described in connection with a preferred embodiment, it is not intended to limit the scope of the invention to the particular form set forth.

What is claimed is:

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CLAIMS

1. A data storage system for use in a first computer connected to a network comprising a plurality of other computers, each computer on the network storing data in a respective data format, the storage system comprising:

(1) management software enabling any other computer connected to the network to access data stored on the first computer; and

(2) translation software for translating the accessed data into a format compatible with the other computer.

2. The system of claim 1 wherein:

(1) the management software further enables any other computer to store data on the first computer; and

(2) the translation software further facilitates translating data from the other computer into a format compatible with the first computer.

3. The system of claim 2 wherein the data on the first computer is stored in a cache memory.

4. The system of claim 3 wherein the cache memory comprises a portion of a distributed cache memory stored in the first computer and the other computers on the network.

5. The system of claim 1 wherein the computers comprise off-the-shelf hardware and operating systems.

6. The system of claim 5 wherein the management software includes a configuration manager that employs a file system from the off-the-shelf operating system.

7. The system of claim 6 wherein:

(1) at least some of the computers comprise at least one storage device; and

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(2) the file system manages at least some of the storage devices on other computers as virtual data storage devices.

8. The system of claim 6 wherein:

(1) each storage device comprises a mappable data volume; and

(2) the configuration manager includes a configuration file providing mapping between data volumes referenced by computers on the network and data volumes of the first computer.

9. A data sharing system for use in a first computer connected to a network comprising a plurality of other computers, each computer on the network storing data in a respective data format, the sharing system comprising a plurality of computers intercommunicating on the computer network, each computer comprising a virtual device that itself comprises a translation module for translating between a native data format and a data format of at least one other computer connected to the network.

10. The system of claim 9 wherein each computer further comprises a configuration manager program for providing concurrency control for accessing the virtual device.

11. The system of claim 10 further comprising a volume access table employed by the configuration manager.

12. The system of claim 10 wherein each virtual device further comprises:

(1) an initialization means for registering the virtual device in at least one other computer connected to the network;

(2) a read means for allowing the first computer to access data stored on at least one other computer connected to the network using the translation module as an intermediary; and

(3) a write means for allowing at least one other computer to store data on the first computer in a shared data format using the translation module as an intermediary .

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13. A method of storing and retrieving data in a first computer connected to a network comprising a plurality of other computers, each computer on the network storing data in a respective data format, the method comprising the steps of:

(1) receiving on the first computer a data request from a second computer over the network;

(2) causing the first computer to respond to the request by translating the requested data into a format compatible with the second computer; and

(3) causing the first computer to make the translated data available to the second computer.

14. The method of claim 13 wherein the data on the first computer is stored in a cache memory.

15. The method of claim 14 wherein the cache memory comprises a portion of a distributed cache memory located in the first computer and the other computers on the network.

16. The method of claim 13 wherein the computers comprise off-the-shelf hardware and operating systems.

17. The method of claim 16 wherein the first computer comprises management software including a configuration manager that employs a file system from the off-the-shelf operating system.

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ABSTRACT

A network of PCs includes an I/O channel adapter and network adapter, and is configured for management of a distributed cache memory stored in the plurality of PCs interconnected by the network. The use of standard PCs reduces the cost of the data storage system. The use of the network of PCs permits building large, high-performance, data storage systems.

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