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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.
18/135,007	04/14/2023	Vipul Pabari	367894-991103	8901
26379	7590	09/03/2024	EXAMINER	
DLA PIPER LLP (US)			MUSA, ABDELNABI O	
3203 Hanover Street			ART UNIT	
Suite 100			PAPER NUMBER	
PALO ALTO, CA 94304			2472	
			NOTIFICATION DATE	
			DELIVERY MODE	
			09/03/2024	
			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):

palloaltopatentdocket@us.dlapiper.com

APPLICATION NO.	ISSUE DATE	PATENT NO.
18/135,007	03-Sep-2024	12079667

DLA PIPER LLP (US)
3203 Hanover Street
PALO ALTO, CA 94304

EGRANT NOTIFICATION

Your electronic patent grant (eGrant) is now available, which can be accessed via Patent Center at <https://patentcenter.uspto.gov>

The electronic patent grant is the official patent grant under 35 U.S.C. 153. For more information, please visit <https://www.uspto.gov/electronicgrants>



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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/135,007	09/03/2024	12079667	367894-991103	8901

26379 7590 08/14/2024
DLA PIPER LLP (US)
3203 Hanover Street
Suite 100
PALO ALTO, CA 94304

ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at <https://patentcenter.uspto.gov/>. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

The USPTO is implementing electronic patent issuance with a transition period, during which period the USPTO will mail a ceremonial paper copy of the electronic patent grant to the correspondence address of record. Additional copies of the patent (i.e., certified and presentation copies) may be ordered for a fee from the USPTO's Certified Copy Center at <https://certifiedcopycenter.uspto.gov/index.html>. The Certified Copy Center may be reached at (800)972-6382.

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 0 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 Center (<https://patentcenter.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 Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PATENT CENTER site <https://patentcenter.uspto.gov> for additional inventors):

Vipul Pabari, Carlsbad, CA;

APPLICANT(s) (Please see PATENT CENTER site <https://patentcenter.uspto.gov> for additional applicants):

ToutVirtual, Inc., Carlsbad, CA;

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.



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ELECTRONIC PAYMENT RECEIPT

APPLICATION # 18/135,007	RECEIPT DATE / TIME 07/25/2024 03:43:33 PM Z ET	ATTORNEY DOCKET # 367894-991103
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Title of Invention

VIRTUAL SYSTEMS MANAGEMENT

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	8901	FILED BY	Blake Jackson
PATENT CENTER #	66508580	AUTHORIZED BY	-
CUSTOMER #	26379	FILING DATE	04/14/2023
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Vipul Pabari

Payment Information

PAYMENT METHOD DA / 071896	PAYMENT TRANSACTION ID E20247OF43488279	PAYMENT AUTHORIZED BY Blake Jackson
PRE-AUTHORIZED ACCOUNT 071896	PRE-AUTHORIZED CATEGORY 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 1.21 (Miscellaneous fees and charges)	

FEE CODE	DESCRIPTION	ITEM PRICE(\$)	QUANTITY	ITEM TOTAL(\$)
2501	UTILITY ISSUE FEE	480.00	1	480.00
TOTAL AMOUNT:				\$480.00

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 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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ISSUE FEE TRANSMITTAL FORM

APPLICATION # 18135007	FILING DATE 04/14/2023	FIRST NAMED INVENTOR Vipul Pabari	ATTORNEY DOCKET # 367894-991103
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Title of Invention

VIRTUAL SYSTEMS MANAGEMENT

Application Information

APPLICATION TYPE	Nonprovisional Application under 35 USC 111(a)	DATE DUE	08/09/2024
CONFIRMATION #	8901	ISSUE FEE DUE	\$ 480
EXAMINER	ABDELNABI MUSA	PUBLICATION DUE	\$ 0
GROUP ART UNIT	2472	TOTAL FEES DUE	\$480
CLASS - SUBCLASS	709/226000	PREV. PAID FEE	\$ 0
ENTITY STATUS	Small		

1. CHANGE OF CORRESPONDENCE ADDRESS AND/OR INDICATION OF FEE ADDRESS (37 CFR 1.33 & 1.363)

Correspondence Address

CURRENT ADDRESS

Maintenance Fee Address

CURRENT ADDRESS



Change of correspondence address requested, system generated AIA/122-PC form attached



Fee address indication requested, system generated SB/47-PC form attached

2. ENTITY STATUS

Change in Entity Status

NEW STATUS

3. THE FOLLOWING FEES ARE SUBMITTED



Issue Fee



Publication Fee

4. FEE AUTHORIZATION



I authorize USPTO to apply my previously paid issue fee to the current fees due



The Director is hereby authorized to apply my previously paid issue fee to the current fee due and to charge deficient fees to Deposit Account Number:



If in addition to the payment of the issue fee amount submitted with this form, there are any discrepancies in any amount(s) due, the Director is authorized to charge any deficiency, or credit any overpayment, to Deposit Account Number: 71896

5. FIRM AND/OR ATTORNEY NAMES TO BE PRINTED

NOTE: If no name is listed, no name will be printed
For printing on the patent front page, list to be displayed as entered

DLA PIPER LLP (US)

6. ASSIGNEE NAME(S) AND RESIDENCE DATA TO BE PRINTED

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.

TOUTVIRTUAL, INC.

Carlsbad, CA UNITED STATES

Corporation

Signature

I certify, in accordance with 37 CFR 1.4(d)(4) that I am an attorney or agent registered to practice before the Patent and Trademark Office who has filed and has been granted power of attorney in this application. I also

certify that this Fee(s) Transmittal form is being transmitted to the USPTO via Patent Center on the date indicated below.

Signature	Name	Registration #	Date
/Blake W. Jackson/	Blake Jackson	66272	07/25/2024



UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #
18/135,007

RECEIPT DATE / TIME
07/25/2024 03:43:33 PM Z ET

ATTORNEY DOCKET #
367894-991103

Title of Invention

VIRTUAL SYSTEMS MANAGEMENT

Application Information

APPLICATION TYPE Utility - Nonprovisional Application
under 35 USC 111(a)

PATENT # -

CONFIRMATION # 8901

FILED BY Blake Jackson

PATENT CENTER # 66508580

FILING DATE 04/14/2023

CUSTOMER # 26379

FIRST NAMED
INVENTOR Vipul Pabari

CORRESPONDENCE
ADDRESS -

AUTHORIZED BY -

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
web85b.pdf	3	Issue Fee Payment (PTO-85B)	61 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
web85b.pdf	E2F4D60F6E779D04828CB3B09B841EFFEF9578625E423C35A A106B69972B47FDEBA36989FEF0FF5E1EF4537A859FA6430A C452B2292A3FAFF732693DA8546F07

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 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

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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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UNITED STATES DEPARTMENT OF COMMERCE
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NOTICE OF ALLOWANCE AND FEE(S) DUE

26379 7590 05/09/2024
DLA PIPER LLP (US)
3203 Hanover Street
PALO ALTO, CA 94304

EXAMINER

MUSA, ABDELNABI O

ART UNIT

PAPER NUMBER

2472

DATE MAILED: 05/09/2024

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/135,007	04/14/2023	Vipul Pabari	367894-991103	8901

TITLE OF INVENTION: VIRTUAL SYSTEMS MANAGEMENT

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0.00	\$0.00	\$480	08/09/2024

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 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted 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. 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.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via the USPTO patent electronic filing system.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (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 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. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

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

26379 7590 05/09/2024
DLA PIPER LLP (US)
3203 Hanover Street
PALO ALTO, CA 94304

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 transmitted to the USPTO via the USPTO patent electronic filing system or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/135,007	04/14/2023	Vipul Pabari	367894-991103	8901

TITLE OF INVENTION: VIRTUAL SYSTEMS MANAGEMENT

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0.00	\$0.00	\$480	08/09/2024

EXAMINER	ART UNIT	CLASS-SUBCLASS
MUSA, ABDELNABIO	2472	709-226000

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/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or 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 must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). 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. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required)

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☐ Electronic Payment via the USPTO patent electronic filing system ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

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. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/135,007	04/14/2023	Vipul Pabari	367894-991103	8901
26379	7590	05/09/2024	EXAMINER	
DLA PIPER LLP (US) 3203 Hanover Street PALO ALTO, CA 94304			MUSA, ABDELNABI O	
			ART UNIT	PAPER NUMBER
			2472	
DATE MAILED: 05/09/2024				

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.

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 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, 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. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013).

<https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf>

Routine uses of the information in this record may include disclosure to:

- 1) law enforcement, in the event that the system of records indicates a violation or potential violation of law;
- 2) a federal, state, local, or international agency, in response to its request;
- 3) a contractor of the USPTO having need for the information in order to perform a contract;
- 4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record;
- 5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record;
- 6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations;
- 7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals;
- 8) 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));
- 9) the Office of Personnel Management (OPM) for personnel research purposes; and
- 10) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

Notice of Allowability	Application No. 18/135,007	Applicant(s) Pabari, Vipul	
	Examiner ABDELNABI O MUSA	Art Unit 2472	AIA (FITF) 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 the amendments filed on 03/25/2024.
☐ 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 1-20 . 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)	5. ☐ Examiner's Amendment/Comment
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.	6. ☒ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.	7. ☐ Other _____.
4. ☒ Interview Summary (PTO-413), Paper No./Mail Date. <u>04/22/2024</u> .	

/ABDELNABI O MUSA/ Primary Examiner, Art Unit 2472	
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Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

REASONS FOR ALLOWANCE

2. The following is an examiner's statement of reasons for allowance:

There is no teaching or suggestion in the prior art of the claimed limitations, as presented in the independent claims, specifically a virtualization system with a control center application, physical resources, and virtual assets on each of the physical resources, the virtual assets are managed by virtualization layer instances running on each of the physical resources, at least two of the virtual assets on one or more of the physical resources include virtual storage, selecting one or more of the virtual assets for storage of the set of data based on an allocation of data on the virtual storage to store the set of data at the selected virtual storage on any of the physical resources as detailed in the dependent claims for such limitations.

The closest prior art found by the Examiner is the previously cited references namely, (US 2005/0044301 A1), (US 2006/0149842 A1) and (US 2006/0069761 A1).

However, the references alone and in combination do not teach or suggest a virtual system management the way as claimed in the present application.

For these reasons, in conjunction with the other claim limitations puts this case in condition for allowance.

3. 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 submission should be clearly labeled "Comments on Statement of Reason for Allowance."

Correspondence Information

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ABDELNABI O MUSA whose telephone number is (571)270-1901, and email address is abdelnabi.musa@uspto.gov 'preferred'. The examiner can normally be reached on M-F 9:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham, can be reached on 571-2723179. 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.

/ABDELNABI O MUSA/
Primary Examiner, Art Unit 2472

<i>Examiner-Initiated Interview Summary</i>	Application No. 18/135,007	Applicant(s) Pabari, Vipul		
	Examiner ABDELNABI O MUSA	Art Unit 2472	AIA (First Inventor to File) Status No	Page 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	Title	Type
ABDELNABI O MUSA	Primary Examiner	Telephonic
Thomas J. Fuller	Attorney of Record	

Date of Interview: 22 April 2024

Issues Discussed:

Non-statutory Double Patenting

Discussed the double patenting rejection and submitting an eTD to overcome the rejection. An agreement was reached.

/ABDELNABI O MUSA/ Primary Examiner, Art Unit 2472	
<p>Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04</p> <p>Please further see: MPEP 713.04 Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b) 37 CFR § 1.2 Business to be transacted in writing</p>	

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of 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.

Notice of References Cited	Application/Control No. 18/135,007		Applicant(s)/Patent Under Reexamination Pabari, Vipul	
	Examiner ABDELNABI O MUSA		Art Unit 2472	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Name	CPC Classification	US Classification
*	A	US-20060149842-A1	2006-07-06	Dawson; Christopher James	G06F9/5072	709/226
*	B	US-20060069761-A1	2006-03-30	Singh; Sumankumar A.	H04L67/1008	709/222
*	C	US-20050044301-A1	2005-02-24	Vasilevsky, Alexander David	G06F9/45533	711/1
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in YYYY-MM-DD format are publication dates. Classifications may be US or foreign.

<i>Search Notes</i> 	Application/Control No. 18/135,007	Applicant(s)/Patent Under Reexamination Pabari, Vipul
	Examiner ABDELNABI O MUSA	Art Unit 2472

CPC - Searched*		
Symbol	Date	Examiner
H04L 41/00, 41/147, 47/78, 41/046	12/21/2023	AM
H04L 41/00, 41/147, 47/78, 41/046	04/29/2024	AM

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
H04L 41/00, 41/147, 47/78, 41/046 search is limited by text, see attached search history report.	12/21/2023	AM
PE2E SEARCH (USPAT, US-PGPUB, EPO, JPO, FIT, DERWENT, IBM_TDB), see attached; NPL: IEEE; Inventor Search/DP	12/21/2023	AM
H04L 41/00, 41/147, 47/78, 41/046 search is limited by text, see attached search history report.	04/29/2024	AM
PE2E SEARCH (USPAT, US-PGPUB, EPO, JPO, FIT, DERWENT, IBM_TDB), see attached; NPL: IEEE; Inventor Search/DP	04/29/2024	AM

/ABDELNABI O MUSA/ Primary Examiner, Art Unit 2472	
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<i>Search Notes</i> 	Application/Control No. 18/135,007	Applicant(s)/Patent Under Reexamination Pabari, Vipul
	Examiner ABDELNABI O MUSA	Art Unit 2472

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
H04L	41/00, 41/147, 47/78, 41/046	04/29/2024	AM
	PE2E SEARCH US-PGPUB, USPAT, UPAD searched.	04/29/2024	AM

/ABDELNABI O MUSA/ Primary Examiner, Art Unit 2472	
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Issue Classification 	Application/Control No. 18/135,007	Applicant(s)/Patent Under Reexamination Pabari, Vipul
	Examiner ABDELNABI O MUSA	Art Unit 2472

CPC						
Symbol				Type	Version	
G06F	/	9	/	5077	F	2013-01-01
G06F	/	9	/	5072	I	2013-01-01
H04L	/	41	/	00	I	2013-01-01
H04L	/	41	/	0806	I	2013-01-01
H04L	/	41	/	0823	I	2013-01-01
H04L	/	41	/	0886	I	2013-01-01
H04L	/	41	/	147	I	2013-01-01
H04L	/	67	/	1008	I	2013-01-01
H04L	/	67	/	1029	I	2013-01-01
H04L	/	67	/	1017	I	2013-01-01
G06F	/	9	/	455	I	2013-01-01
G06F	/	9	/	50	I	2013-01-01
H04L	/	47	/	78	I	2013-01-01
G06F	/	9	/	45558	I	2013-01-01
H04L	/	41	/	046	A	2013-01-01
H04L	/	41	/	0816	A	2013-01-01
H04L	/	41	/	0896	A	2013-01-01
H04L	/	41	/	12	A	2013-01-01
H04L	/	41	/	18	A	2013-01-01
H04L	/	41	/	22	A	2013-01-01
H04L	/	41	/	5025	A	2013-01-01
H04L	/	43	/	08	A	2013-01-01
H04L	/	67	/	1034	A	2013-01-01
H04L	/	67	/	1001	A	2022-05-01
G06F	/	2009	/	45595	A	2013-01-01

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version
/				

NONE	Total Claims Allowed:	
(Assistant Examiner)	(Date)	20
/ABDELNABI O MUSA/ Primary Examiner, Art Unit 2472	29 April 2024	O.G. Print Claim(s)
(Primary Examiner)	(Date)	1
		15

Issue Classification 	Application/Control No. 18/135,007	Applicant(s)/Patent Under Reexamination Pabari, Vipul
	Examiner ABDELNABI O MUSA	Art Unit 2472

INTERNATIONAL CLASSIFICATION			
CLAIMED			
H04L		1	00
NON-CLAIMED			

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS
709	226

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

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/ABDELNABI O MUSA/ Primary Examiner, Art Unit 2472	29 April 2024	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	15

Issue Classification 	Application/Control No. 18/135,007	Applicant(s)/Patent Under Reexamination Pabari, Vipul
	Examiner ABDELNABI O MUSA	Art Unit 2472

☒ 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	1	10	10	19	19										
2	2	11	11	20	20										
3	3	12	12												
4	4	13	13												
5	5	14	14												
6	6	15	15												
7	7	16	16												
8	8	17	17												
9	9	18	18												

NONE	Total Claims Allowed:	
(Assistant Examiner)	(Date)	20
/ABDELNABI O MUSA/ Primary Examiner, Art Unit 2472	29 April 2024	O.G. Print Claim(s)
(Primary Examiner)	(Date)	1
		O.G. Print Figure
		15

<i>Index of Claims</i> 	Application/Control No. 18/135,007	Applicant(s)/Patent Under Reexamination Pabari, Vipul
	Examiner ABDELNABI O MUSA	Art Unit 2472

✓	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	12/21/2023	04/29/2024						
1	1	✓	=						
2	2	✓	=						
3	3	✓	=						
4	4	✓	=						
5	5	✓	=						
6	6	✓	=						
7	7	✓	=						
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11	11	✓	=						
12	12	✓	=						
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14	14	✓	=						
15	15	✓	=						
16	16	✓	=						
17	17	✓	=						
18	18	✓	=						
19	19	✓	=						
20	20	✓	=						



Report Information from Dialog

April 29 2024 12:56

Table of contents

Search Strategy.....	iii
1. An Improved Ant Colony Algorithm for Virtual Resource Scheduling in Cloud Computing.....	1
2. Research on virtual machine consolidation strategy based on combined prediction and energy-aware in cloud computing platform.....	1
3. Prediction of resource contention in cloud using second order Markov model.....	1
4. Next-Generation Blockchain-Enabled Virtualized Cloud Security Solutions: Review and Open Challenges	1
5. Cross-VM Network Attacks & Their Countermeasures Within Cloud Computing Environments.....	2
6. Virtual Machine Flow Analysis Using Host Kernel Tracing.....	2
7. A Novel Self-Adaptive VM Consolidation Strategy Using Dynamic Multi-Thresholds in IaaS Clouds.....	2
8. International Business Machines (IBM) issued new U.S. patent [9,886,200].....	2
9. International Business Machines (IBM) issued new U.S. patent [9,886,198].....	3
10. International Business Machines (IBM) issued new U.S. patent [9,886,176].....	3
11. International Business Machines (IBM) issued new U.S. patent [9,886,188].....	3
12. International Business Machines (IBM) issued new U.S. patent [9,886,203].....	3
13. International Business Machines (IBM) issued new U.S. patent [9,886,193].....	3
14. Reliable and Energy Efficient Resource Provisioning in Cloud Computing Systems.....	4
15. Towards Protection Against Low-Rate Distributed Denial of Service Attacks in Platform-As-a-Service Cloud Services.....	4
16. Porting LTZVisor To i.MX 6Quad SD.....	4
17. Efficient Resource Management techniques in Cloud Computing Environment: Review and discussion.	4
18. Adaptive task scheduling strategy in cloud: when energy consumption meets performance guarantee...	4
19. Detection and Mitigation of Security Threats in Cloud Computing.....	5
20. Softwarization of Mobile Network Functions towards Agile and Energy Efficient 5G Architectures: A Survey.....	5

Search Strategy

Databases: ABI/INFORM® Professional Advanced, Abstracts in New Technology & Engineering, AdisInsight: Drugs, AdisInsight: Trials, Adis Pharmacoeconomics & Outcomes News, AGRICOLA, AGRIS, Allied & Complementary Medicine™, Analytical Abstracts, APA PsycInfo®, Aqualine, Aquatic Science & Fisheries Abstracts (ASFA), Australian Education Index, BIOSIS® Toxicology, BIOSIS Previews®, British Library Inside Conferences, British Nursing Index, Business & Industry, CAB ABSTRACTS, Chemical Business Newsbase, Chemical Engineering & Biotechnology Abstracts, Chemical Safety Newsbase, Civil Engineering Abstracts, ClinicalTrials.gov, Current Contents® Search, Derwent Drug File, Derwent Drug Registry, DH-DATA: Health Administration, Medical Toxicology & Environmental Health, DIOGENES® FDA Regulatory Updates, Drug Information Fulltext, Earthquake Engineering Abstracts, EconLit, Ei Compendex®, Embase®, Embase® French Local Literature, Embase Preprints, EMCare®, ERIC, ESPICOM Pharmaceutical & Medical Device News, FDAnews, FLUIDEX (Fluid Engineering Abstracts), Foodline®: MARKET, Foodline®: PRODUCT, Foodline®: SCIENCE, FSTA®, Gale Group Computer Database™, Gale Group Health Periodicals Database, Gale Group New Product Announcements / Plus®, Gale Group Newsletter Database™, Gale Group PharmaBiomed Business Journals, Gale Group PROMT®, Gale Group Trade & Industry Database™, GEOBASE, GeoRef, Global Health, HSELINE: Health and Safety, ICONDA - International Construction Database, IMS Company Profiles, IMS New Product Focus, IMS Pharma Trademarks, IMS R&D Focus, IMS R&D Focus Drug News, Inspec®, International Pharmaceutical Abstracts, Jane's Defense & Aerospace News, King's Fund, KOSMET: Cosmetic Science, Lancet Titles, Mechanical & Transportation Engineering Abstracts, MEDLINE®, Meteorological & Geostrophysical Abstracts, Morressier Life Science Conference Abstracts and Posters, New England Journal of Medicine, Northern Light Life Sciences Conference Abstracts, NTIS: National Technical Information Service, Oceanic Abstracts, PAIS International, Paperbase, PAPERCHEM, ProQuest Advanced Tech & Aerospace Professional, ProQuest Biological & Health Science Professional, ProQuest Dissertations and Theses Professional, ProQuest Environmental Science Professional, ProQuest Materials Research Professional, ProQuest Newsstand Professional, ProQuest Technology Research Professional, Proux Science Daily Essentials, Proux Science Drug Data Report, Proux Science Drugs Of The Future™, Publicly Available Content, Registry of Toxic Effects of Chemical Substances (RTECS®), SciSearch®: a Cited Reference Science Database, Social SciSearch®, ToxFile®, Transport Research International Documentation, TULSA™ (Petroleum Abstracts), UBM Computer Full Text, Weldasearch®

Set#	Searched for	Results
S1	((manage[*4] near/15 virtual[*6]) near/15 environment) near/15 resource[*4]	9918*
S2	(((((virtual pre/0 machine) or VM) near/40 new) near/40 physical) near/40 host	1453°
S3	((real near/0 time) near/15 matrices) near/15 virtual	0°
S4	real near/0 time	13346529*
S5	S2 AND S1	122°
S6	S4 AND S2	378°
S7	S4 AND S1	2313°
S8	S4 AND S2	378°
S9	S7 AND S6 AND S5	55°
S10	(virtualization near/0 layer) near/0 resourc[*2]	62°
S11	S10 AND S9	1°
S12	S10 AND S8	1°

S13	S9 AND S8	55°
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* Duplicates are removed from the search, but included in the result count.

° Duplicates are removed from the search and from the result count.

An Improved Ant Colony Algorithm for Virtual Resource Scheduling in Cloud Computing

Author: Zhong, Chunlei; Yang, Gang

Publication info: International Journal of Advanced Computer Science and Applications 14.1 Science and Information (SAI) Organization Limited. (2023)

[ProQuest document link](#)

Databases: Publicly Available Content (1970 - current)

Research on virtual machine consolidation strategy based on combined prediction and energy-aware in cloud computing platform

Author: Wang, Jinjiang 1 ; Gu, Hangyu 1 ; Yu, Junyang 1 ; Song, Yixin 1 ; He, Xin 1 ; Song, Yalin 1 1 Henan University, Department of Software, Kaifeng, Henan, China (GRID:grid.256922.8) (ISNI:0000 0000 9139 560X)

Publication info: Journal of Cloud Computing 11.1 Springer Nature B.V. (Dec 2022)

[ProQuest document link](#)

Databases: ProQuest Advanced Tech & Aerospace Professional, Publicly Available Content, ProQuest Technology Research Professional

Prediction of resource contention in cloud using second order Markov model

Author: Surya, K 1 ; Rajam V Mary Anita 1 1 Anna University, Department of Computer Science and Engineering, Chennai, India (GRID:grid.252262.3) (ISNI:0000 0001 0613 6919)

Publication info: Computing. Archives for Informatics and Numerical Computation 103.10: 2339-2360. Springer Nature B.V. (Oct 2021)

[ProQuest document link](#)

Databases: ABI/INFORM® Professional Advanced, ProQuest Advanced Tech & Aerospace Professional, ProQuest Technology Research Professional

Next-Generation Blockchain-Enabled Virtualized Cloud Security Solutions: Review and Open Challenges

Author: Uddin, Mueen 1 ; Khaliq, Anjum 2 ; Awais Khan Jumani 3 ; Syed Sajid Ullah 4 ; Hussain, Saddam 5 1 Digital Science, Faculty of Science, Universiti Brunei Darussalam, Jln Tungku Link, Gadong BE1410, Negara Brunei Darussalam 2 Department of Computer Science, SZABIST Hyderabad, Sindh 71000, Pakistan; khaliq4u@gmail.com 3 Department of Computer Science, Shah Abdul Latif University, Khairpur 66020, Sindh, Pakistan; awaisjumani@yahoo.com 4 Department of Electrical and Computer Engineering, Villanova University, Villanova, PA 19085, USA; sullah1@villanova.edu 5 Department of Information Technology, Hazara

University Mansehra, Khyber Pakhtunkhwa 21120, Pakistan; saddamicup1993@gmail.com

Publication Info: Electronics 10.20: 2493. MDPI AG. (2021)

[ProQuest document link](#)

Databases: ProQuest Advanced Tech & Aerospace Professional, Publicly Available Content, ProQuest Technology Research Professional

Document 5 of 20

Cross-VM Network Attacks & Their Countermeasures Within Cloud Computing Environments

Author: Saeed, Atif

Publication Info: Lancaster University (United Kingdom), ProQuest Dissertations Publishing, 2020. 28277561.

[ProQuest document link](#)

Databases: ProQuest Dissertations and Theses Professional

Document 6 of 20

Virtual Machine Flow Analysis Using Host Kernel Tracing

Author: Nemati, Hani

Publication Info: Ecole Polytechnique, Montreal (Canada), ProQuest Dissertations Publishing, 2019. 28471055.

[ProQuest document link](#)

Databases: ProQuest Dissertations and Theses Professional

Document 7 of 20

A Novel Self-Adaptive VM Consolidation Strategy Using Dynamic Multi-Thresholds in IaaS Clouds

Author: Xie, Lei; Chen, Shengbo; Shen, Wenfeng; Miao, Huaikou

Publication Info: Future Internet 10.6 MDPI AG. (Jun 2018)

[ProQuest document link](#)

Databases: ABI/INFORM® Professional Advanced, ProQuest Advanced Tech & Aerospace Professional, Publicly Available Content, ProQuest Technology Research Professional

Document 8 of 20

International Business Machines (IBM) issued new U.S. patent [9,886,200]

Publication Info: News Bites - Computing & Information [Melbourne] 08 Feb 2018.

[ProQuest document link](#)

Databases: ABI/INFORM® Professional Advanced, ProQuest Newsstand Professional

Document 9 of 20

International Business Machines (IBM) issued new U.S. patent [9,886,198]

Publication info: News Bites - Computing & Information [Melbourne] 08 Feb 2018.

[ProQuest document link](#)

Databases: ABI/INFORM® Professional Advanced, ProQuest Newsstand Professional

Document 10 of 20

International Business Machines (IBM) issued new U.S. patent [9,886,176]

Publication info: News Bites - Computing & Information [Melbourne] 08 Feb 2018.

[ProQuest document link](#)

Databases: ABI/INFORM® Professional Advanced, ProQuest Newsstand Professional

Document 11 of 20

International Business Machines (IBM) issued new U.S. patent [9,886,188]

Publication info: News Bites - Computing & Information [Melbourne] 08 Feb 2018.

[ProQuest document link](#)

Databases: ABI/INFORM® Professional Advanced, ProQuest Newsstand Professional

Document 12 of 20

International Business Machines (IBM) issued new U.S. patent [9,886,203]

Publication info: News Bites - Computing & Information [Melbourne] 08 Feb 2018.

[ProQuest document link](#)

Databases: ABI/INFORM® Professional Advanced, ProQuest Newsstand Professional

Document 13 of 20

International Business Machines (IBM) issued new U.S. patent [9,886,193]

Publication info: News Bites - Computing & Information [Melbourne] 08 Feb 2018.

[ProQuest document link](#)

Databases: ABI/INFORM® Professional Advanced, ProQuest Newsstand Professional

Document 14 of 20

Reliable and Energy Efficient Resource Provisioning in Cloud Computing Systems

Author: Sharma, Yogesh

Publication info: Western Sydney University (Australia). ProQuest Dissertations Publishing, 2018. 13895032.

[ProQuest document link](#)

Databases: ProQuest Dissertations and Theses Professional

Document 15 of 20

Towards Protection Against Low-Rate Distributed Denial of Service Attacks in Platform-As-a-Service Cloud Services

Author: Silva, Bruno Carneiro da

Publication info: Universidade da Beira Interior (Portugal), ProQuest Dissertations Publishing, 2018. 28762582.

[ProQuest document link](#)

Databases: ProQuest Dissertations and Theses Professional

Document 16 of 20

Porting LTZVisor To i.MX 6Quad SD

Author: Lopes, Ailton Andersen Sanches Ferreira

Publication info: Universidade do Minho (Portugal), ProQuest Dissertations Publishing, 2018. 28787764.

[ProQuest document link](#)

Databases: ProQuest Dissertations and Theses Professional

Document 17 of 20

Efficient Resource Management techniques in Cloud Computing Environment: Review and discussion

Author: Nzanywayingoma, Frederic; Yang, Yang

Publication info: TELKOMNIKA 15.4: 1917-1933. Ahmad Dahlan University. (Dec 2017)

[ProQuest document link](#)

Databases: Publicly Available Content (1970 - current)

Document 18 of 20

Adaptive task scheduling strategy in cloud: when energy consumption meets performance guarantee

Author: Shen, Yao; Bao, Zhifeng; Qin, Xiaolin; Shen, Jian

Publication info: World Wide Web 20.2: 155-173. Springer Nature B.V. (Mar 2017)

[ProQuest document link](#)

Databases: ProQuest Advanced Tech & Aerospace Professional, ProQuest Technology Research Professional

Document 19 of 20

Detection and Mitigation of Security Threats in Cloud Computing

Author: Zhang, Tianwei

Publication Info: Princeton University. ProQuest Dissertations Publishing, 2017. 10622170.

[ProQuest document link](#)

Databases: ProQuest Dissertations and Theses Professional

Document 20 of 20

Softwarization of Mobile Network Functions towards Agile and Energy Efficient 5G Architectures: A Survey

Author: Dlamini Thembelihle 1 ; Rossi, Michele 2 ; Munaretto, Daniele 3 1 Department of Information Engineering, University of Padova, Padova, Italy; Athonet, Bolzano Vicentino, Vicenza, Italy 2 Department of Information Engineering, University of Padova, Padova, Italy 3 Athonet, Bolzano Vicentino, Vicenza, Italy

Publication Info: Wireless Communications & Mobile Computing (Online) 2017 Hindawi Limited. (2017)

[ProQuest document link](#)

Databases: ProQuest Advanced Tech & Aerospace Professional, ProQuest Technology Research Professional

Contact ProQuest

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Bibliographic Data

Application No: 18/135,007

Foreign Priority claimed: ☐ Yes ☒ No

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

Verified and Acknowledged: /ABDELNABI O MUSA/

Examiner's Signature

Initials

Title:

VIRTUAL SYSTEMS MANAGEMENT

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
04/14/2023	709	2472	367894-991103
RULE			

APPLICANTS

ToutVirtual, Inc.,

INVENTORS

Vipul Pabari, Carlsbad, CA, UNITED STATES

CONTINUING DATA

This application is a CON of 17074500 10/19/2020 PAT 11656915

17074500 is a CON of 15201087 07/01/2016 PAT 10810050

15201087 is a CON of 14450765 08/04/2014 PAT 9444762

14450765 is a CON of 11503090 08/10/2006 PAT 8799431

11503090 has PRO of 60708473 08/15/2005

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

04/28/2023

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PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	7	("20050138165" "20050155033" "20060294238" "20070067435" "20080086731" "7463648" "7512769").PN.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/29 11:51 AM
L2	19897	709/223.ccls. or 709/226.ccls. or 709/229.ccls.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/29 05:10 PM
L3	16	pabari.in.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/29 05:10 PM
L4	0	(manage\$4 virtual\$6 environment inventory resource\$4 prioritiz\$4 physical host).clm.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/29 05:12 PM
L5	1094	(manage\$4 virtual\$6 environment inventory resource\$4 prioritiz\$4 physical host)	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/29 05:12 PM
L6	1	L3 L5	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/29 05:12 PM
L7	1	(virtual\$ mange\$4).ti.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/29 05:13 PM
L8	82	(manage\$4 virtual\$6 environment resource\$4).ab.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/29 05:14 PM
L9	13	L2 L8	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/29 05:14 PM
L10	2	(manage\$4 virtual\$6 environment resource\$4 physical host).ab.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/29 05:17 PM
L11	17572	(manage\$4 virtual\$6 environment (resource\$4 or asset\$2) physical host allocat\$4)	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/30 02:10 PM
L12	19897	709/223.ccls. or 709/226.ccls. or 709/229.ccls.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/30 02:11 PM
L13	1084	L11 L12	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/30 02:11 PM
L14	468	L13 (load adj (shar\$4 or balanc\$4))	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/30 02:11 PM
L15	82	(manage\$4 virtual\$6 environment resource\$4).ab.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/30 02:13 PM
L16	4	L14 L15	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/30 02:13 PM

L17	143	((virtual adj machine) or VM) same new same physical same host	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/30 02:18 PM
L18	2	L15 L17	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/30 02:19 PM
L19	2	L17 L15	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/30 02:19 PM
L20	84	L17 L11	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/30 02:21 PM
L21	9	L20 L12	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/30 02:22 PM
L22	0	(knowledge near block re\$allocat\$4 (real\$time or real near time) virtual\$2 image application\$2 (inventory or resource\$2) prioritiz\$6 (peer\$2 or member\$2) physical).clm.	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2012/04/10 02:21 PM
L23	2	(knowledge near block re\$allocat\$4 (real\$time or real near time) virtual\$2 image application\$2 (inventory or resource\$2) prioritiz\$6 (peer\$2 or member\$2) physical)	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2012/04/10 02:21 PM
L24	156	(Automatic configuration management).ab.	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2012/04/10 02:29 PM
L25	41755	709/223.ccls. 224,226,229,220,221.ccls.	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2012/04/10 02:31 PM
L26	29	L24 L25	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2012/04/10 02:31 PM
L27	0	(10/460518).APP.	(USPAT; USOCR)	OR	OFF	OFF	2012/04/10 02:34 PM
L28	7	("20050138165" "20050155033" "20060294238" "20070067435" "20080086731" "7463648" "7512769").PN.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L29	25092	709/223.ccls. or 709/226.ccls. or 709/229.ccls.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L30	20	pabari.in.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L31	0	(manage\$4 virtual\$6 environment inventory resource\$4 prioritiz\$4 physical host).clm.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L32	1541	(manage\$4 virtual\$6 environment inventory resource\$4 prioritiz\$4	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM

L33	1	physical host) L30 L32	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L34	1	(virtual\$ mange\$4).ti.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L35	122	(manage\$4 virtual\$6 environment resource\$4).ab.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L36	26	L29 L35	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L37	3	(manage\$4 virtual\$6 environment resource\$4 physical host).ab.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L38	22641	(manage\$4 virtual\$6 environment (resource\$4 or asset\$2) physical host allocat\$4)	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L39	25092	709/223.ccls. or 709/226.ccls. or 709/229.ccls.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L40	1484	L38 L39	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L41	637	L40 (load adj (shar\$4 or balanc\$4))	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L42	122	(manage\$4 virtual\$6 environment resource\$4).ab.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L43	8	L41 L42	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L44	238	((virtual adj machine) or VM) same new same physical same host	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L45	7	L42 L44	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L46	7	L44 L42	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L47	141	L44 L38	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L48	18	L47 L39	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L49	166	(manage\$4 virtual\$6 resource\$4 physical).ab.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:39 PM
L50	118867	"709".clas.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:39 PM
L51	49	L50 L49	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:39 PM
L52	49	L51 not L26	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:39 PM
L53	0	real near time matrices	(US-PGPUB; USPAT;	SAME	OFF	OFF	2012/04/10

L54	27	virtual physical real near time metrics virtual physical	USOCR; IBM_TDB) (US-PGPUB; USPAT; USOCR; IBM_TDB)	SAME	OFF	OFF	02:43 PM 2012/04/10
L55	1	L39 and real near time metrics virtual physical	(US-PGPUB; USPAT; USOCR; IBM_TDB)	SAME	OFF	OFF	02:43 PM 2012/04/10
L56	3	L50 L54	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	02:44 PM 2012/04/10
L57	9	pabari.in.	(USPAT)	AND	OFF	OFF	02:46 PM 2012/04/10
L58	20	pabari.in.	(US-PGPUB; USPAT)	AND	OFF	OFF	02:50 PM 2012/04/10
L59	1	L23 L58	(US-PGPUB; USPAT)	AND	OFF	OFF	02:50 PM 2012/04/10
L60	0	L24 L58	(USPAT)	AND	OFF	OFF	02:50 PM 2012/04/10
L78	3	"11503090"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	OFF	OFF	02:51 PM 2012/04/10
L79	8	(US-20080086731-\$ or US-20050155033-\$ or US-20060149842-\$ or US-20050125537-\$ or US-20040015600- \$).did. or (US-7512769- \$ or US-7577722-\$ or US-6490620-\$).did.	(US-PGPUB; USPAT)	OR	OFF	OFF	03:19 PM 2013/03/12
L80	5	L79 and (virtual\$7 environment layer network (resourc\$2 or computer\$2 or printer\$2 or device\$2) (asset\$2 or software or program\$2 or instruction\$2))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	AND	OFF	OFF	03:52 PM 2013/03/12
L81	1	(11/031542).APP.	(USPAT; USOCR)	OR	OFF	OFF	03:54 PM 2013/03/12
L82	0	virtual\$8 environment virtual\$8 near2 laver\$1 network resource\$2d virtual asset\$2 (software or instantiation\$1) virtualization layer managing the virtual assets	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	04:04 PM 2013/07/24
L83	0	virtual\$8 environment virtual\$8 near2 laver\$1 network resource\$2d virtual asset\$2 (software or instantiation\$1)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	10:45 AM 2013/07/24
L84	0	virtual\$8 environment	(US-PGPUB; USPAT;	SAME	OFF	OFF	2013/07/24

		virtual\$8 near2 laver\$1 network resource\$2d virtual asset\$2	USOCR)				10:46 AM
L85	0	virtual\$8 environment virtual\$8 near2 laver\$1	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:46 AM
L86	1	virtual\$8 virtual\$8 near2 laver\$1	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:46 AM
L87	858	virtualization layer manag\$6 virtual (asset\$2 or resourc\$2)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:47 AM
L88	427	virtualization near layer manag\$6 virtual (asset\$2 or resourc\$2)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:47 AM
L89	31	virtualization near layer near5 manag\$6 near5 virtual (asset\$2 or resourc\$2)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:47 AM
L90	10	virtualization near layer near5 manag\$6 near5 virtual (asset\$2 or resourc\$2) and ("709"/\$.ccls.)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:48 AM
L91	3218	(virtual or virtualization) layer network (resourc\$2 or assets)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:49 AM
L92	444	L91 and L87	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:49 AM
L93	287	L91 and L88	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:50 AM
L94	522	(virtual or virtualization) near layer network (resourc\$2 or assets)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:50 AM
L95	259	L94 and L88	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:50 AM
L96	258	(virtual or virtualization) near layer near4 (resourc\$2 or assets)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:54 AM
L97	10	virtualization near layer near5 manag\$6 near5 virtual (asset\$2 or resourc\$2) and ("709"/\$.ccls.)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 02:22 PM
L98	37	(virtual or virtualization) near layer near3 manag\$6 near4 (resourc\$2 or assets)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 02:22 PM
L99	33	L98 not L97	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 02:22 PM
L100	15	(virtualization near layer resourc\$2).ab.	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 02:33 PM
L101	12	L100 not L99	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 02:33 PM

L102	29	virtualization near layer near2 manag\$6 near4 (asset\$1 or resourc\$2)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 02:36 PM
L103	2	L102 not L99	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 02:37 PM
L104	10	(US-20080086731-\$ or US-20050155033-\$ or US-20060149842-\$ or US-20050125537-\$ or US-20040015600-\$ or US-20060069761-\$ or US-20050044301- \$).did. or (US-7512769- \$ or US-7577722-\$ or US-6490620-\$).did.	(US-PGPUB; USPAT)	AND	OFF	OFF	2013/07/24 02:40 PM
L105	2	L104 and (virtual or virtualization) near layer	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 02:40 PM
L106	37	(virtual or virtualization) near layer near3 manag\$6 near4 (resourc\$2 or assets)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 02:40 PM
L107	0	(10/831973).APP.	(USPAT; USOCR)	AND	OFF	OFF	2013/07/24 02:41 PM
L108	10	(US-20080086731-\$ or US-20050155033-\$ or US-20060149842-\$ or US-20050125537-\$ or US-20040015600-\$ or US-20060069761-\$ or US-20050044301- \$).did. or (US-7512769- \$ or US-7577722-\$ or US-6490620-\$).did.	(US-PGPUB; USPAT)	AND	OFF	OFF	2013/08/28 09:06 PM
L109	0	L108 and (virtualization with layer) controller (resourc\$2 or inventory or assents) virtualization near4 environment\$1 (allocat\$4 or re\$allocat\$4)	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:09 PM
L110	403	(virtualization with layer) controller (resourc\$2 or inventory or assents) virtualization near4 environment\$1 (allocat\$4 or re\$allocat\$4)	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:10 PM
L111	32	(virtualization with layer) controller (resourc\$2 or inventory\$1 or assent\$2) virtualization near4 environment\$1 (allocat\$4 or re\$allocat\$4) (erorr\$1	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:12 PM

L112	0	or debug\$2 or degrad\$3 or corrupt\$4 or bad\$2) log\$2 near4 fil\$2 (virtualization with layer) controller (resourc\$2 or inventory\$1 or assent\$2) virtualization near4 environment\$1 (allocat\$4 or re\$allocat\$4) (erorr\$1 or debug\$2 or degrad\$3 or corrupt\$4 or bad\$2) log\$2 near4 fil\$2 @ad<="20061218" and ("370"/\$.ccls. or "455"/\$.ccls.)	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:13 PM
L113	1	(virtualization with layer) controller (resourc\$2 or inventory\$1 or assent\$2) virtualization near4 environment\$1 (allocat\$4 or re\$allocat\$4) (erorr\$1 or debug\$2 or degrad\$3 or corrupt\$4 or bad\$2) log\$2 near4 fil\$2 @ad<="20061218" and ("370"/\$.ccls. or "455"/\$.ccls. or "709".clas.)	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:13 PM
L114	1	(virtualization with layer) controller (resourc\$2 or inventory\$1 or assent\$2) virtualization near4 environment\$1 (allocat\$4 or re\$allocat\$4) (erorr\$1 or debug\$2 or degrad\$3 or corrupt\$4 or bad\$2) log\$2 near4 fil\$2 @ad<="20061218"	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:14 PM
L115	0	(virtualization with layer) controller (resourc\$2 or inventory\$1 or assent\$2) virtualization near4 environment\$1 (allocat\$4 or re\$allocat\$4) (erorr\$1 or debug\$2 or degrad\$3 or corrupt\$4 or bad\$2) log\$2 near4 fil\$2 @ad<="200508/15"	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:14 PM
L116	0	(virtualization with layer) controller (resourc\$2 or inventory\$1 or assent\$2) virtualization	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:14 PM

L117	7	near4 environment\$1 (allocat\$4 or re\$allocat\$4) (erorr\$1 or debug\$2 or degrad\$3 or corrupt\$4 or bad\$2) log\$2 near4 fil\$2 @ad<="20050815" ((virtualization layer) (resourc\$2 or inventory\$1 or assent\$2) (allocat\$4 or re\$allocat\$4)).ab.	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:18 PM
L118	2	L117 L110	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:18 PM
L119	11	((virtualiz\$5 layer) (resourc\$2 or inventory\$1 or assent\$2) (allocat\$4 or re\$allocat\$4)).ab.	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:19 PM
L120	4	L119 not L117	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:21 PM
L121	71	(virtualization near3 layer) (resourc\$2 or inventory\$1 or assent\$2) (allocat\$4 or re\$allocat\$4) (erorr\$1 or debug\$2 or degrad\$3 or corrupt\$4 or bad\$2) @ad<="20050815"	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:24 PM
L122	71	L121 not L119	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:24 PM
L123	16	(US-20080086731-\$ or US-20050155033-\$ or US-20060149842-\$ or US-20050125537-\$ or US-20040015600-\$ or US-20060069761-\$ or US-20050044301-\$ or US-20060184937-\$ or US-20050223221-\$ or US-20030236956-\$ or US-20020166117-\$ or US-20050198062- \$).did. or (US-7512769- \$ or US-7577722-\$ or US-6490620-\$ or US- 7330858-\$).did.	(US-PGPUB; USPAT)	AND	OFF	OFF	2013/08/28 09:50 PM
L124	0	L123 and (virtualization with layer) controller (resourc\$2 or inventory or assents) virtualization near4 environment\$1 (allocat\$4 or re\$allocat\$4)	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:52 PM

L125	3	L123 and (virtualization with layer) controller (resourc\$2 or inventory or asset\$2) virtualization (allocat\$4 or re\$allocat\$4)	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:53 PM
L126	16	(US-20080086731-\$ or US-20050155033-\$ or US-20060149842-\$ or US-20050125537-\$ or US-20040015600-\$ or US-20060069761-\$ or US-20050044301-\$ or US-20060184937-\$ or US-20050223221-\$ or US-20030236956-\$ or US-20020166117-\$ or US-20050198062-\$).did. or (US-7512769-\$ or US-7577722-\$ or US-6490620-\$ or US-7330858-\$).did.	(US-PGPUB; USPAT)	AND	OFF	OFF	2013/08/29 06:33 PM
L127	2748	"I13" and automatic\$5	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/29 06:33 PM
L128	9	I3and automatic\$5	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/29 06:34 PM
L129	12	L126 and automatic\$5	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/29 06:34 PM
L130	1	L126 and automatic\$5 same (allocat\$4 or re\$allocat\$4)	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/29 06:34 PM
L131	259	automatic\$5 same (allocat\$4 or re\$allocat\$4) and debug\$4 and forecast\$4	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/29 06:36 PM
L132	69	automatic\$5 same (allocat\$4 or re\$allocat\$4) and debug\$4 same (inventory or resourc\$2) and forecast\$4 virtual\$4	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/29 06:37 PM
L133	62	automatic\$5 same (allocat\$4 or re\$allocat\$4) and debug\$4 same (inventory or resourc\$2) and forecast\$4 virtual\$4 and @ad<="20050815"	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/29 06:38 PM
L134	3	automatic\$5 near4 (allocat\$4 or re\$allocat\$4) and debug\$4 same (inventory or resourc\$2) and forecast\$4 virtual\$4	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/29 06:41 PM

L135	128	and @ad<="20050815" automatic\$5 near4 (allocat\$4 or re\$allocat\$4) and forecast\$4 virtual\$4 and @ad<="20050815"	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/29 06:42 PM
L136	0	automatic\$4 (allocat\$4 or reallocation) virtual (asset\$2 or resourc\$2 or inventory) (fore\$cast\$3 or futur\$3) Capacity Planning Manager and @ad<="20050815"	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:44 PM
L137	1	automatic\$4 (allocat\$4 or reallocation) virtual (asset\$2 or resourc\$2 or inventory) (fore\$cast\$3 or futur\$3) Capacity Planning Manager and @ad<="20050815"	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:44 PM
L138	15	automatic\$4 (allocat\$4 or reallocation) virtual (asset\$2 or resourc\$2 or inventory) (fore\$cast\$3 or futur\$3) and @ad<="20050815"	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:45 PM
L139	3	automatic\$4 (allocat\$4 or reallocation) virtual (asset\$2 or resourc\$2 or inventory) (fore\$cast\$3) and @ad<="20050815"	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:46 PM
L140	613	automatic\$4 near4 (allocat\$4 or reallocation) near4 (asset\$2 or resourc\$2 or inventory) and @ad<="20050815"	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:51 PM
L141	30	automatic\$4 near4 (reallocation) near4 (asset\$2 or resourc\$2 or inventory) and @ad<="20050815"	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:51 PM
L142	0	automatic\$4 near4 (reallocation) near4 (asset\$2 or resourc\$2 or inventory) and @ad<="20050815" and forecasting	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:51 PM
L143	1	automatic\$4 near4 (reallocation) near4 (asset\$2 or resourc\$2 or inventory) and @ad<="20050815" and	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:51 PM

L144	27	forecasting automatic\$4 near4 (reallocation) near4 (asset\$2 or resourc\$2 or inventory) and @ad<="20050815" and (forecast\$4 or predict\$4 or estimat\$4 or project\$4 or anticipat\$4 or guess\$4)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:54 PM
L145	3	automatic\$4 near4 (reallocation) near4 (asset\$2 or resourc\$2 or inventory) and @ad<="20050815" and (forecast\$4 or predict\$4 or estimat\$4 or project\$4 or anticipat\$4 or guess\$4) virtual\$4	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:55 PM
L146	0	L126 and (forecast\$4 or predict\$4 or estimat\$4 or project\$4 or anticipat\$4 or guess\$4) virtual\$4	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:56 PM
L147	7	L126 and (forecast\$4 or predict\$4 or estimat\$4 or project\$4 or anticipat\$4 or guess\$4)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:57 PM
L148	2	L126 and (forecast\$4 or predict\$4 or estimat\$4 or project\$4 or anticipat\$4 or guess\$4) automatic\$6	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:58 PM
L149	7	L126 and (forecast\$4 or predict\$4 or estimat\$4 or project\$4 or anticipat\$4 or guess\$4) and automatic\$6	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:58 PM
L150	16	(US-20080086731-\$ or US-20050155033-\$ or US-20060149842-\$ or US-20050125537-\$ or US-20040015600-\$ or US-20060069761-\$ or US-20050044301-\$ or US-20060184937-\$ or US-20050223221-\$ or US-20030236956-\$ or US-20020166117-\$ or US-20050198062-\$ or US-20030236882-\$.did. or (US-7512769-\$ or US-7577722-\$ or US-6490620-\$).did.	(US-PGPUB; USPAT)	AND	OFF	OFF	2015/04/30 01:43 PM
L151	0	L150 and day same	(US-PGPUB; USPAT;	AND	OFF	OFF	2015/04/30

L152	0	metric L150 and day and metric	USOCR) (US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	01:43 PM 2015/04/30 01:44 PM
L153	2	L150 and time same day	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2015/04/30 01:44 PM
L154	0	"2008248817".did.	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2015/05/01 12:39 AM
L155	1	"20080248817".did.	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2015/05/01 12:39 AM
L156	1	"20040203828".did.	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2015/05/01 12:45 AM
L157	1	"13639190"	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2015/05/01 08:35 PM
L158	16	(US-20080086731-\$ or US-20050155033-\$ or US-20060149842-\$ or US-20050125537-\$ or US-20040015600-\$ or US-20060069761-\$ or US-20050044301-\$ or US-20060184937-\$ or US-20050223221-\$ or US-20030236956-\$ or US-20020166117-\$ or US-20050198062-\$ or US-20030236882- \$).did. or (US-7512769- \$ or US-7577722-\$ or US-6490620-\$).did.	(US-PGPUB; USPAT)	AND	OFF	OFF	2015/05/14 02:39 PM
L159	1	"14450765"	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2015/05/14 02:53 PM
L160	4	"11509030"	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2015/05/14 03:19 PM
L161	4	"11503090"	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2015/05/14 03:22 PM
L162	1	"10326552".pn.	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2021/10/14 01:31 PM
L163	17	(Vipul WITH Pabari).in.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2022/01/06 11:56 AM
L164	17683752	(virtualization system resources AND physical	(US-PGPUB; USPAT; USOCR; FIT (AU, AP,	OR	ON	ON	2022/01/06 11:57 AM

		resource AND virtual assets).clm.	AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))				
L165	8	L164 AND L163	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2022/01/06 11:57 AM
L166	7	L164 AND L163	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/01/06 11:57 AM
L167	17683752	(virtualization layer AND virtualization system resources AND physical resource AND virtual assets).clm.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2022/01/06 11:59 AM
L168	4549107	(virtualization layer AND virtualization system resources AND physical resource AND virtual assets).clm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/01/06 11:59 AM
L169	7	L168 AND L163	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/01/06 11:59 AM
L170	1	(15/201087).APP.	(USPAT; USOCR)	OR	ON	ON	2022/01/06 12:07 PM
L171	0	(17/074500).APP.	(USPAT; USOCR)	OR	ON	ON	2022/01/06 12:27 PM
L172	2	"17074500"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP,	OR	ON	ON	2022/04/12 12:56 PM

L173	16	((US-20080086731-A1 OR US-20050155033-A1 OR US-20060149842-A1 OR US-20050125537-A1 OR US-20040015600-A1 OR US-20060069761-A1 OR US-20050044301-A1 OR US-20060184937-A1 OR US-20050223221-A1 OR US-20030236956-A1 OR US-20020166117-A1 OR US-20050198062-A1 OR US-20030236882-A1 OR US-20210034432-A1).did. AND PGPB.dbnm.) OR ((US-7577722-B1 OR US-6490620-B1).did. AND USPT.dbnm.)	AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2022/05/12 09:50 AM
L174	281493	virtual ADJ asset\$2 physical ADJ resource\$2 virtualization ADJ layer	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/05/12 09:51 AM
L175	7	virtual ADJ asset\$2 physical ADJ resource\$2 virtualization ADJ layer	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB,	WITH	ON	ON	2022/05/12 09:51 AM

L176	1	L175 AND L173	HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/05/12 09:51 AM
L177	16	virtual asset\$2 physical resource\$2 virtualization layer	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	WITH	ON	ON	2022/05/12 09:52 AM
L178	1	L177 AND L173	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2022/05/12 09:53 AM

L179	59	virtual assets manage\$5 virtualization layer	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2022/05/12 10:00 AM
L180	49	L179 NOT L175	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2022/05/12 10:01 AM
L181	22	L179 NOT L175	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/05/12 10:01 AM
L182	2	"20080086731"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/05/12 10:06 AM
L183	43188	virtual manage\$5 virtualization	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2022/05/12 10:08 AM
L184	10484	virtual physical virtualization layer	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB,	WITH	ON	ON	2022/05/12 10:09 AM

L185	2824	virtual physical manage\$5 virtualization ADJ layer	HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2022/05/12 10:09 AM
L186	1632	virtual physical manage\$5 virtualization ADJ layer	(US-PGPUB; USPAT; USOCR)	WITH	ON	ON	2022/05/12 10:09 AM
L187	1	L186 AND L173	(US-PGPUB; USPAT; USOCR)	WITH	ON	ON	2022/05/12 10:09 AM
L188	2	"20060149842"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/05/12 10:14 AM
L189	15	((US-20080086731-A1 OR US-20050155033- A1 OR US- 20060149842-A1 OR US-20050125537-A1 OR US-20040015600- A1 OR US- 20060069761-A1 OR US-20050044301-A1 OR US-20060184937- A1 OR US- 20050223221-A1 OR US-20030236956-A1 OR US-20020166117- A1 OR US- 20050198062-A1 OR US-20030236882- A1).did. AND PGPB.dbnm.) OR ((US- 7577722-B1 OR US- 6490620-B1).did. AND USPT.dbnm.)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/30 11:44 AM
L190	45	physical resources	(US-PGPUB; USPAT;	WITH	ON	ON	2022/08/30

		execut\$4 virtual assets	USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				11:45 AM
L191	0	L189 AND L190	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2022/08/30 11:46 AM
L192	23	physical resources	(US-PGPUB; USPAT; USOCR)	WITH	ON	ON	2022/08/30 11:46 AM
L193	640	execut\$4 virtual assets physical resources virtual assets	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2022/08/30 11:50 AM
L194	0	L193 L189	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,	AND	ON	ON	2022/08/30 11:50 AM

L195	0	L189 AND physical virtual assets	IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2022/08/30 11:51 AM
L196	10	L189 AND physical virtual	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2022/08/30 11:51 AM
L197	3	"17074500"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2022/12/07 03:17 PM
L198	17	((("PABARI") near3	(US-PGPUB; USPAT;	OR	ON	ON	2022/12/08

		("Vipul"))).INV.	USOCR; EPO; JPO; DERWENT)				08:16 AM
L199	22	L44 L42	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2023/01/12 11:16 AM
L200	22	L42 L44	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2023/01/12 11:16 AM
L201	60	L47 L39	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2023/01/12 11:16 AM
L202	185222	"709".clas.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2023/01/12 11:16 AM
L203	117	L50 L49	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2023/01/12 11:16 AM
L204	117	L51 not L26	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2023/01/12 11:16 AM
L205	220	virtualization near layer near5 manag\$6 near5 virtual (asset\$2 or resourc\$2)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2023/01/12 11:17 AM
L206	4898	L91 and L87	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2023/01/12 11:17 AM
L207	3288	L91 and L88	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2023/01/12 11:17 AM
L208	47	(Artificial Intelligence) Similar to: 17/074,500 with 0 CPC Selections and 0 Text Selections Text: (US-11249816-B2 OR US-20210288793-A1 OR US-20210306142- A1 OR US-10728024- B2 OR US-10756886- B2 OR US-11025411- B2 OR US- 20220012105-A1 OR US-11050554-B2 OR US-20200389296-A1 OR CN-112732447-A OR US-7353418-B2 OR US-20030177287-A1 OR CN-109891831-A OR CN-113806260-A OR EP-3823245-A1 OR EP-3451635-B1 OR US-20210191750-A1 OR US-10389591-B2 OR US-20180123890- A1 OR US- 20190342171-A1 OR US-10924431-B2 OR EP-3533182-A1 OR WO-2018080941-A1 OR JP-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2023/01/12 11:17 AM

L209	49	<p>WO2011064811-A1 OR US-10949248-B2 OR US-10812413-B2 OR WO-2011064811-A1 OR JP-5447532-B2 OR EP-2748713-B1 OR US-20120297126-A1 OR US-9935829-B1 OR US-8793446-B2 OR US-20160127184-A1 OR US-20090031302- A1 OR JP- WO2014027416-A1 OR CN-114745263-A OR US-9251115-B2 OR WO-2014027416-A1 OR KR-20100025980-A OR US-20140258446- A1 OR EP-2965202-A1 OR WO-2014138206- A1 OR US-10931527- B2 OR US-10263842- B2 OR EP-2965202-B1 OR KR-101007356-B1 OR US-20210409270- A1 OR JP-5930046-B2 OR US-20190199590- A1 OR US-11200104- B2).did.</p> <p>(Artificial Intelligence) Similar to: 17/074,500 with 9 CPC Selections and 2 Text Selections</p> <p>Text: (US-11249816-B2 OR US-20210306142-A1 OR US-20210288793- A1 OR US-10728024- B2 OR US-11050554- B2 OR US-10756886- B2 OR EP-3823245-A1 OR CN-112732447-A OR US-11025411-B2 OR EP-3451635-B1 OR US-20200389296-A1 OR CN-113806260-A OR US-20220012105- A1 OR US-11200104- B2 OR US-10824360- B2 OR US- 20210255915-A1 OR US-20220107741-A1 OR US-10712963-B2 OR US-20200393986- A1 OR US-10389591- B2 OR EP-3533182-A1</p>	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2023/01/12 11:17 AM
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L210	39	<p>OR WO-2018080941-A1 OR US-20180123890-A1 OR US-20190342171-A1 OR US-11137922-B2 OR US-20210271403-A1 OR US-20210318823-A1 OR CN-104125149-A OR CN-104125149-B OR US-10963176-B2 OR US-20200356294-A1 OR US-10990309-B2 OR US-11029870-B2 OR US-20210365199-A1 OR CN-109891831-A OR US-10824358-B2 OR US-10768842-B2 OR US-20210141552-A1 OR US-10795595-B2 OR US-11093311-B2 OR EP-2797261-A1 OR US-10326654-B2 OR US-10732879-B2 OR EP-2797261-B1 OR US-20210191750-A1 OR US-10768841-B2 OR US-10922124-B2 OR US-20160127184-A1 OR US-11016832-B2 OR US-11307787-B2).did.</p> <p>(US-11249816-B2 OR US-20210306142-A1 OR US-20210288793-A1 OR US-10728024-B2 OR US-11050554-B2 OR US-10756886-B2 OR EP-3823245-A1 OR CN-112732447-A OR US-11025411-B2 OR EP-3451635-B1 OR US-20200389296-A1 OR CN-113806260-A OR US-20220012105-A1 OR US-11200104-B2 OR US-10824360-B2 OR US-20210255915-A1 OR US-20220107741-A1 OR US-10712963-B2 OR US-20200393986-A1 OR US-10389591-B2 OR EP-3533182-A1 OR WO-2018080941-A1 OR US-20180123890-A1 OR</p>	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/01/12 11:18 AM
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		US-20190342171-A1 OR US-11137922-B2 OR US-20210271403-A1 OR US-20210318823-A1 OR CN-104125149-A OR CN-104125149-B OR US-10963176-B2 OR US-20200356294-A1 OR US-10990309-B2 OR US-11029870-B2 OR US-20210365199-A1 OR CN-109891831-A OR US-10824358-B2 OR US-10768842-B2 OR US-20210141552-A1 OR US-10795595-B2 OR US-11093311-B2 OR EP-2797261-A1 OR US-10326654-B2 OR US-10732879-B2 OR EP-2797261-B1 OR US-20210191750-A1 OR US-10768841-B2 OR US-10922124-B2 OR US-20160127184-A1 OR US-11016832-B2 OR US-11307787-B2).did.					
L211	19	((("PABARI") near3 ("Vipul"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/12/21 12:39 PM
L212	26	((("PABARI") near3 ("Vipul"))).INV.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/21 12:39 PM
L213	4	(virtualization system AND center application AND physical resources AND virtual assets).clm.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO,	WITH	ON	ON	2023/12/21 12:40 PM

L214	2	L212 AND L213	MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2023/12/21 12:40 PM
L215	17	(virtualization system AND physical resources AND virtual assets).clm.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2023/12/21 12:42 PM
L216	6	L215 L212	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	AND	ON	ON	2023/12/21 12:42 PM
L217	15	((US-20080086731-A1	(US-PGPUB; USPAT;	AND	ON	ON	2023/12/21

		OR US-20050155033-A1 OR US-20060149842-A1 OR US-20050125537-A1 OR US-20040015600-A1 OR US-20060069761-A1 OR US-20050044301-A1 OR US-20060184937-A1 OR US-20050223221-A1 OR US-20030236956-A1 OR US-20020166117-A1 OR US-20050198062-A1 OR US-20030236882-A1).did. AND PGPB.dbnm.) OR ((US-7577722-B1 OR US-6490620-B1).did. AND USPT.dbnm.)	USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				01:43 PM
L218	3	request\$3 portion AND L217	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2023/12/21 01:43 PM
L219	4433	virtual assets storage	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	WITH	ON	ON	2024/04/29 12:44 PM
L220	6622	allocation data virtual storage	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB,	WITH	ON	ON	2024/04/29 12:44 PM

L221	7027	allocation data virtual storage	HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN)) (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2024/04/29 12:44 PM
L222	7027	L221 L220	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	AND	ON	ON	2024/04/29 12:44 PM
L223	2974	L221 L220	(US-PGPUB; USPAT; USOCR)	AND	ON	ON	2024/04/29 12:44 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N61	10106	(manage\$4 virtual\$6 environment (resource\$4 or asset\$2) physical host allocat\$4)	(USPAT)	AND	OFF	OFF	2012/04/10 02:47 PM
N62	76	((virtual adj machine) or VM) same new same physical same host	(USPAT)	AND	OFF	OFF	2012/04/10 02:47 PM
N63	206	"S13" (load adj (shar\$4	(USPAT)	AND	OFF	OFF	2012/04/10

N64	10106	or balanc\$4)) (manage\$4 virtual\$6 environment (resource\$4 or asset\$2) physical host allocat\$4)	(USPAT)	AND	OFF	OFF	02:47 PM 2012/04/10 02:47 PM
N65	45876	"S2" "S8"	(USPAT)	AND	OFF	OFF	2012/04/10 02:47 PM
N66	78	(manage\$4 virtual\$6 resource\$4 physical).ab.	(USPAT)	AND	OFF	OFF	2012/04/10 02:47 PM
N67	23872	709/223,224,226,229,2 20,221.ccls.	(USPAT)	AND	OFF	OFF	2012/04/10 02:47 PM
N68	21589	"I3" "I4"	(USPAT)	AND	OFF	OFF	2012/04/10 02:47 PM
N69	593	(manage\$4 virtual\$6 environment inventory resource\$4 prioritiz\$4 physical host)	(USPAT)	AND	OFF	OFF	2012/04/10 02:47 PM
N70	2	("20050138165" "20050 155033" "20060294238 " "20070067435" "2008 0086731" "7463648" "7 512769").PN.	(USPAT)	AND	OFF	OFF	2012/04/10 02:48 PM
N71	0	(manage\$4 virtual\$6 environment inventory resource\$4 prioritiz\$4 physical host).clm.	(USPAT)	AND	OFF	OFF	2012/04/10 02:48 PM
N72	593	(manage\$4 virtual\$6 environment inventory resource\$4 prioritiz\$4 physical host)	(USPAT)	AND	OFF	OFF	2012/04/10 02:48 PM
N73	497	"L26" "L18"	(USPAT)	AND	OFF	OFF	2012/04/10 02:48 PM
N74	0	N73 N72	(USPAT)	AND	OFF	OFF	2012/04/10 02:48 PM
N75	463	N69 N64	(USPAT)	AND	OFF	OFF	2012/04/10 02:49 PM
N76	0	N62 N72	(USPAT)	AND	OFF	OFF	2012/04/10 02:49 PM
N77	9	pabari.in.	(USPAT)	AND	OFF	OFF	2012/04/10 02:49 PM
N78	14	pabari.in.	(USPAT)	AND	OFF	OFF	2022/01/06 12:43 PM
N79	2	("20050138165" "20050 155033" "20060294238 " "20070067435" "2008 0086731" "7463648" "7 512769").PN.	(USPAT)	AND	OFF	OFF	2022/01/06 12:43 PM
N80	116	N66 AND ((H04L47/70 OR H04L41/0896 OR H04L67/10 OR H04L41/0806 OR	(USPAT)	AND	OFF	OFF	2022/01/06 12:44 PM

		H04L67/1097 OR H04L41/12 OR H04L67/1002 OR H04L41/0893 OR H04L12/4641 OR H04L41/22 OR H04L47/822 OR H04L41/5054 OR H04L67/1008 OR H04L41/0816 OR H04L41/5025 OR H04L41/5096 OR H04L43/0876 OR H04L63/08 OR H04L43/16 OR H04L47/783).cpc.)					
N81	17	N62 N72	(USPAT)	AND	OFF	OFF	2023/01/12 11:17 AM
N82	1896	N69 N64	(USPAT)	AND	OFF	OFF	2023/01/12 11:17 AM
N83	0	N73 N72	(USPAT)	AND	OFF	OFF	2023/01/12 11:17 AM
N84	937	"L26" "L18"	(USPAT)	AND	OFF	OFF	2023/01/12 11:17 AM
N85	988	"L26" "L18"	(USPAT)	AND	OFF	OFF	2024/04/29 12:45 PM
N86	0	N73 N72	(USPAT)	AND	OFF	OFF	2024/04/29 12:45 PM
N87	2325	N69 N64	(USPAT)	AND	OFF	OFF	2024/04/29 12:45 PM
N88	18	N62 N72	(USPAT)	AND	OFF	OFF	2024/04/29 12:45 PM



**UNITED STATES
PATENT AND TRADEMARK OFFICE**

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United States Patent and Trademark Office
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APPROVAL LETTER

APPLICATION #
18/135,007

FILING DATE
04/14/2023

APPLICANT/PATENT UNDER REEXAMINATION
Vipul Pabari

Title of Invention

VIRTUAL SYSTEMS MANAGEMENT

Electronic terminal disclaimer filed on 04/23/2024

☒ **Approved**

This patent is subject to a Terminal Disclaimer

Approved / Disapproved by: Electronic Terminal Disclaimer automatically approved



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TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A PRIOR PATENT

APPLICATION #
18135007

FILING DATE
04/14/2023

FIRST NAMED INVENTOR
Vipul Pabari

ATTORNEY DOCKET #
367894-991103

Title of Invention

VIRTUAL SYSTEMS MANAGEMENT



Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action



This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.

Owner	Percent interest
TOUTVIRTUAL, INC.	100%
Total	100%

The owner(s) of percent interest listed above 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 any patent granted on pending reference Application Number(s)

Application #	Filing Date
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as the term of any patent granted on said reference application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending reference application. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and any patent granted on the reference application 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 owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term of any patent granted on said reference application, "as the term of any patent granted on said reference application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending reference application," in the event that any such patent granted on the pending reference application: 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 shortened by any terminal disclaimer filed prior to its grant.

The owner(s) of percent interest listed above 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 number(s)

Patent #

9444762

as the term of said prior patent is presently shortened by any terminal disclaimer. The owner 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 owner 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.



Terminal disclaimer fee under 37 CFR 1.20(d) included with Electronic Terminal Disclaimer request.

Applicant claims the following entity status:

Small

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I certify, in accordance with 37 CFR 1.4(d)(4) that I am: An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application

Signature	Name	Registration #
/Thomas J. Fuller/	Thomas Fuller	74439

* Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner). Form PTO/SB/96 may be used for making this certification. See MPEP 324.



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ELECTRONIC PAYMENT RECEIPT

APPLICATION # 18/135,007	RECEIPT DATE / TIME 04/23/2024 02:40:17 PM Z ET	ATTORNEY DOCKET # 367894-991103
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Title of Invention

VIRTUAL SYSTEMS MANAGEMENT

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	8901	FILED BY	Nicole Brown
PATENT CENTER #	65209223	AUTHORIZED BY	Thomas Fuller
CUSTOMER #	26379	FILING DATE	04/14/2023
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Vipul Pabari

Payment Information

PAYMENT METHOD DA / 071896	PAYMENT TRANSACTION ID E20244ME40526627	PAYMENT AUTHORIZED BY Thomas Fuller
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FEE CODE	DESCRIPTION	ITEM PRICE(\$)	QUANTITY	ITEM TOTAL(\$)
2814	STATUTORY DISCLAIMER, INCLUDING TERMINAL DISCLAIMER	170.00	1	170.00
TOTAL AMOUNT:				\$170.00

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 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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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #
18/135,007

RECEIPT DATE / TIME
04/23/2024 02:40:17 PM Z ET

ATTORNEY DOCKET #
367894-991103

Title of Invention

VIRTUAL SYSTEMS MANAGEMENT

Application Information

APPLICATION TYPE Utility - Nonprovisional Application
under 35 USC 111(a)

PATENT # -

CONFIRMATION # 8901

FILED BY Nicole Brown

PATENT CENTER # 65209223

FILING DATE 04/14/2023

CUSTOMER # 26379

FIRST NAMED INVENTOR Vipul Pabari

CORRESPONDENCE ADDRESS -

AUTHORIZED BY Thomas Fuller

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
petition-requestL.pdf	3	Terminal Disclaimer-Filed (Electronic)	48 KB
grantLetter.pdf	1	Terminal Disclaimer-Electronic- Approved	19 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
petition-requestL.pdf	E8A6AD2B5D0A5A9FFEE7FBB30AF2A25162278B48A6DA831C F12F9D4657EE9A72712B9F629B02FD29AD5DFAF379FB10362

027B8874FF47C920C990E64FB70BE8A

grantLetter.pdf

7D26B54B03F91BA3A9E09330CD216D6CB7EAB9EA026AAEBC
CF14B444CE784D09388EE5969739BAA940BB3493A128ED633
4E93D7465C2DD11AEA403E16832FDB6

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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 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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New International Application Filed with the USPTO as a Receiving Office

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION # 18/135,007	RECEIPT DATE / TIME 03/25/2024 06:44:55 PM Z ET	ATTORNEY DOCKET # 367894-991103
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Title of Invention

VIRTUAL SYSTEMS MANAGEMENT

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	8901	FILED BY	Nicole Brown
PATENT CENTER #	64830026	FILING DATE	04/14/2023
CUSTOMER #	26379	FIRST NAMED INVENTOR	Vipul Pabari
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Fuller

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
367894_991103_Resp_NFO A.pdf	8	-	160 KB
367894_991103_Resp_NF OA-A....pdf (1-1)	1	Amendment/Request for Reconsideration-After Non- Final Rejection	141 KB
367894_991103_Resp_NF OA-CLM.pdf (2-5)	4	Claims	113 KB
367894_991103_Resp_NF OA-REM.pdf (6-8)	3	Applicant Arguments/Remarks Made in an Amendment	146 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
367894_991103_Resp_NFOA.pdf	99DF941009AB95881D45FA38C0CF4D7F33EF94119AEFFA6E9C835A9ED66A7104531D93EC1A3FB36A4BA3BE8AD7D071CD8B289C319DAAB65424350683E12422BF
367894_991103_Resp_NFOA-A....pdf	70E562FD4F793F1F1ECC4BE45583A94A4BB96D46D425F7E427BBB7B492CBB7A81FA61C22C7C4CF17CBDFB23DFA160DF3091D531A3FC24E7E33FAE2FFAB702AD9
367894_991103_Resp_NFOA-CLM.pdf	F201E43DF03278D2F635052B941449981A8EA1A4228BF3EC48A93241F8979DE6150666D5540F02A708AA7DBAB8F96683C5D49ED8DDDA42547C64202A56FB86D5
367894_991103_Resp_NFOA-REM.pdf	2A6E8EDE865E011B160E3152886F71AE7BA5598F5259FB84AC869595929906168CAE4DFECCFB75E76D2B14884CBBAAEE25CBF18492029B808804539A0D04FBBF07

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New International Application Filed with the USPTO as a Receiving Office

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Certificate of Transmission Under 37 CFR 1.8

I hereby certify that this correspondence is being transmitted via electronic submission, attention Mail Stop:
Amendment, Commissioner for Patents, Alexandria, VA 22313-1450 on:

March 25, 2024

/Nicole D. Brown/
Nicole D. Brown

Appl. No.	: 18/135,007	Confirmation No.	8901
Inventor	: Vipul Pabari		
Filed	: April 14, 2023		
TC/A.U.	: 2472		
Examiner	: Abdelnabi O. Musa		
Docket No.	: 367894-991103		
Customer No.	: 26379		
Title	: VIRTUAL SYSTEMS MANAGEMENT		

Via Patentcenter

Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

RESPONSE TO NON-FINAL OFFICE ACTION

Commissioner:

In response to the Office Action mailed December 29, 2023, 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/Arguments begin on page 6 of this paper.

AMENDMENTS TO THE CLAIMS

The following claim amendments will replace all prior claims.

Listing of the claims:

1. (Currently Amended) A method for data storage across one or more virtualization system resources over a network, the method comprising:

implementing a virtualization system that includes a control center application, one or more physical resources, and one or more virtual assets ~~running~~ on each of the physical resources, wherein the virtual assets are managed by virtualization layer instances running on each of the physical resources, and wherein at least ~~[[one]]~~ two of the virtual assets on one or more of the physical resources include ~~[[a]]~~ virtual storage assets;

obtaining a set of data to be stored the ~~at least one~~ virtual storage assets ~~running~~ on any of the physical resources;

selecting one or more of the virtual assets for storage of the set of data based on an allocation of data on the virtual storage assets; and

causing storage of the set of data at the ~~at least one~~ selected virtual storage assets ~~running~~ on any of the physical resources.

2. (Original) The method of claim 1, wherein the at least one virtual storage asset is virtualized via storage virtualization layers running on each of the physical resources

3. (Original) The method of claim 1, wherein at least two virtual assets each comprise software instantiations of computer systems.

4. (Original) The method of claim 2, wherein at least one of the virtual assets comprise middleware applications running on each of the physical resources to access the virtual storage assets via the storage virtualization layer.

5. (Original) The method of claim 1, wherein the control center application is configured to perform configuration management or forecasting services via the virtualization layer instances.

6. (Original) The method of claim 5, wherein the configuration management includes application routing for virtual assets or implementation of application rules.

7. (Original) The method of claim 1, wherein the at least one virtual storage asset is a logical unit with a logical unit number (LUN).

8. (Original) The method of claim 1, further comprising:
obtaining a request from a user device to obtain at least a portion of the set of stored data;
retrieving at least the portion of the set of stored data from the virtual storage asset; and
transmitting at least the portion of the set of stored data to the user device via a network.

9. (Currently Amended) A virtualization system comprising:
a control computer running a control center application; and
one or more physical resources, wherein one or more physical resources are configured to execute one or more virtual assets, the virtual assets managed by virtualization layer instances ~~running~~ on each of the physical resources, wherein ~~at least a portion~~ at least two of the virtual assets on the one or more of the physical resources include virtual storage assets,

wherein the control center application is configured to:

obtain a request from a user device for data stored at any of the virtual storage assets;

~~retrieve~~ retrieve the data from one or more virtual storage assets that are storing the data; and

transmit the retrieved data to the user device.

10. (Original) The virtualization system of claim 9, wherein the virtual storage assets are virtualized via a storage virtualization layer.

11. (Original) The virtualization system of claim 9, wherein the virtualization system is further configured to:

obtain the data to be stored at any of the virtual storage assets; and

store the data across any of the virtual storage assets running on the physical resources.

12. (Original) The virtualization system of claim 9, wherein each of the one or more physical resources execute at least two virtual assets that each comprise software instantiations of computer systems.

13. (Original) The virtualization system of claim 9, wherein at least one of the virtual assets comprise middleware applications accessing the virtual storage assets via the storage virtualization layer.

14. (Original) The virtualization system of claim 9, wherein the control center application is configured to perform configuration management or forecasting via the virtualization layer instances.

15. (Original) The virtualization system of claim 9, wherein the virtual storage assets comprise databases.

16. (Original) The virtualization system of claim 9, the virtual storage assets are logical units with a logical unit number (LUN).

17. (Original) The virtualization system of claim 9, wherein the virtualization system is further configured to receive, over a network by a user, one or more instructions to configure the virtual storage assets.

18. (Currently Amended) A method for data storage on virtualized resources, the method comprising:

receiving a request to store data, at a control center application in communication with one or more physical resources that are part of a virtualization system that includes the control

center application, the one or more physical resources, and one or more virtual assets on each of the physical resources, and wherein at least two of the virtual assets on one or more of the physical resources include virtual data storage assets;

selecting one or more of the virtual assets for storage of the set of data based on an allocation of data on the virtual data storage assets; and

causing storage of the data, by the control center application, at ~~one or more~~ the selected virtual data storage assets ~~running~~ on each of the one or more physical resources,

wherein the virtual data storage assets are managed by storage virtualization layer instances ~~running~~ on each of the physical resources.

19. (Original) The method of claim 18, wherein one or more virtual assets are configured to run on each of the physical resources, wherein the virtual assets are managed by virtualization layer instances running on each of the physical resources.

20. (Original) The method of claim 19, wherein at least two of the virtual assets comprise software instantiations of computer systems, and wherein the virtual storage assets comprise databases.

REMARKS

Claims 1-20 are pending in this application. Claims 1, 9, and 18 have been amended. No new matter has been added. Reconsideration of the present application is respectfully requested.

DOUBLE PATENTING REJECTION

Claims 1-20 are rejected on the ground of nonstatutory double patenting. Applicant respectfully requests this rejection be held in abeyance until allowable matter is identified.

35 USC 103 REJECTION

Claims 1-20 are rejected under 35 USC 103 as being unpatentable by Vasilevsky (US 2005/0044301). Applicant respectfully traverses.

Applicant respectfully submits that the cited reference does not teach or suggest each limitation of independent claim 1.

For instance, claim 1 recites:

1. A method for data storage across one or more virtualization system resources over a network, the method comprising:
 - implementing a virtualization system that includes a control center application, one or more physical resources, and one or more virtual assets on each of the physical resources, wherein the virtual assets are managed by virtualization layer instances running on each of the physical resources, ***and wherein two of the virtual assets on one or more of the physical resources include virtual storage assets;***
 - obtaining a set of data to be stored the virtual storage assets on any of the physical resources;
 - selecting one or more of the virtual assets for storage of the set of data based on an allocation of data on the virtual storage assets; and***
 - causing storage of the set of data at the selected virtual storage assets on any of the physical resources.

Vasilevsky generally relates to a grid computing system that combines resources of multiple servers to create a ***single*** compute system. Further, Vasilevsky describes a virtualization layer 104 that isolates applications on a guest operating system (GOS) operating in layers 102 and 103, respectively, from an underlying hardware layer 105. This virtualization layer 104 virtualizes resources on each individual system 107a-c system to implement a single computing system (e.g., system 101) that is independent of any individual system 107a-c.

Particularly, in the Office Action, the virtualization layer managing the execution of the operating system that controls access to physical resources. OA, p. 6-7. However, as noted

above, the grid computing system of Vasilevsky virtualizes resources on multiple servers to virtualize a *single* compute system. The grid computing system Vasilevsky relates to assigning processing tasks across multiple computing resources to act as a single compute system, not the selective storing of data across multiple virtual storage assets.

Accordingly, the single compute system of Vasilevsky fails to teach or suggest *two of the virtual assets on one or more of the physical resources include virtual storage assets*, as recited in claim 1 as amended. See Spec., paras. [0144], [0167]; FIGS. 6, 15. Further, the disclosure fails to teach or suggest *selecting one or more of the virtual assets for storage of the set of data based on an allocation of data on the virtual storage assets*, as recited in claim 1 as amended.

Further, Vasilevsky does not teach or suggest the limitations of independent claims 9 and 18 for at least reasons similar to that provided with respect to claim 1. Additionally, dependent claims 2-8, 10-17, and 19-20 are dependent on claims 1, 9, and 18, and therefore are allowable at least due to their dependence to independent claims 1, 9, and 18. Withdrawal of the present rejection is respectfully requested.

CONCLUSION

The Examiner is invited to call Applicant's attorney at the number below in order to speed the prosecution of this application.

The Commissioner is authorized to charge any deficiencies in fees and credit any overpayment of fees to Deposit Account **No. 07-1896**.

Respectfully submitted,

DLA PIPER LLP (US)

Dated: March 25, 2024

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/135,007	04/14/2023	Vipul Pabari	367894-991103	8901
26379	7590	12/29/2023	EXAMINER	
DLA PIPER LLP (US) 3203 Hanover Street PALO ALTO, CA 94304			MUSA, ABDELNABI O	
			ART UNIT	PAPER NUMBER
			2472	
			NOTIFICATION DATE	DELIVERY MODE
			12/29/2023	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):

paloaltopatentdocket@us.dlapiper.com

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

2. This action is responsive to the application filed on 04/14/2023 has a total of 20 claims pending in the application; there are 3 independent claims and 17 dependent claims, all of which are ready for examination by the examiner.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper time-wise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly

owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(I)(1) - 706.02(I)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to:

www.uspto.gov/patents/process/file/efs/guidance/eTD-info-f.jsp.

4. **Claims 1-20** are rejected on the ground of nonstatutory double patenting as being unpatentable over **claims 1-16 of U.S. Patent No. 11,656,915 B2 [application No.17/074,500]**, Although the claims at issue are not identical, they are not patentably distinct from each other because the independent claims and their dependent claims of the instant application contain similar limitations of the independent and their dependent claims of the patented application, which lead to the same claimed invention, thus they are not patentably distinct from each other.

The independent claims and their dependent claims of the instant application contain similar limitations of the independent claims and their dependent claims of the co-pending application.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the language of the claims presented contain the same limitations claimed. It would have been obvious to one of ordinary skilled in the art to modify the patented application to create the instant application since both applications providing a virtualization system that includes physical resources and virtual assets managed by a virtualization layer running on the physical resources through a control computer or controller.

5. **Claims 1-20** are rejected on the ground of nonstatutory double patenting as being unpatentable over **claims 1-16 of U.S. Patent No. 10,810,050 B2 [application No.15/201,087]**, Although the claims at issue are not identical, they are not patentably distinct from each other because the independent claims and their dependent claims of the instant application contain similar limitations of the independent and their dependent claims of the patented application, which lead to the same claimed invention, thus they are not patentably distinct from each other.

The independent claims and their dependent claims of the instant application contain similar limitations of the independent claims and their dependent claims of the co-pending application.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the language of the claims presented contain the same

limitations claimed. It would have been obvious to one of ordinary skilled in the art to modify the patented application to create the instant application since both applications providing a virtualization system that includes physical resources and virtual assets managed by a virtualization layer running on the physical resources through a control computer or controller.

Claim Rejections - 35 USC § 103

6. 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 (i.e., changing from AIA to pre-AIA) 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.

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, 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 negated by the manner in which the invention was made.

The factual inquiries for establishing a background for determining obviousness under pre-AIA 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-20 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over **Vasilevsky et al. Publication No. (US 2005/0044301 A1)**.

Regarding **claim 1**, **Vasilevsky** teaches a method for data storage across one or more virtualization system resources over a network, the method comprising:

implementing a virtualization system (**virtualization environment 100 FIG.1 [0058]**) that includes a control center application (**Manager 212 FIG.2**), one or more physical resources (**data center provides network resources [0058] FIG.1**), and one or more virtual assets running on each of the physical resources (**a single copy of the operating system (OS) exists in the virtual machine architecture (VMA) that is run by any processor to virtualize resources through an abstraction layer (e.g., DVMM) to perform providing isolation between the operating system/application and the underlying hardware [0022-25] the virtual server presents a single system image while executing across one or more nodes [0038] each of the plurality of processors executes a respective instance of a microkernel program, and wherein each of the respective instances of the microkernel program are adapted communicate to cooperatively share the plurality of resources of the computer system [0043-44] FIG.7**), wherein the virtual assets are managed by virtualization layer instances running on each of the physical resources, and wherein at least one of the virtual assets include a virtual storage asset (**the virtualization layer managing the execution of the operating system, which includes a distributed virtual machine**

monitor that provides a single system abstraction based upon coordinated, cooperating systems and thereby controls access to physical resources underlying the virtual serves [0017] see examples of management of the application layer [0041-42] FIG.1);

obtaining a data to be stored the at least one virtual storage asset running on any of the physical resources **(the interface may provide an ability to map virtual servers to sets of physical resources, such as a virtual processor that is mapped to a physical processor. In one embodiment, a virtual server can span a collections of a physical nodes coupled by an interconnect. This capability allows, for example, an arbitrarily-sized virtual multiprocessor system (e.g., SMP, Numa, ASMP, etc.) to be created [0079-80] FIG.4); and**

causing storage of the data at the at least one virtual storage asset running on any of the physical resources **(the virtual resource is a virtual storage entity, and the actual resource includes an actual storage device. According to one embodiment, the manager is adapted to perform a reallocation of the virtual resource to another virtual server instance [0040-41] FIG.4).**

Vasilevsky does not specifically teach a set of data to be obtained and stored

Dawson teaches teach a set of data to be obtained and stored **(Dawson: Virtual resource 160 may include a virtual representation of the resources accessible from a single system or systems, wherein multiple systems may each be considered discrete sets of resources operating on independent platforms, but coordinated as a virtual resource by a grid manager [0029-30] FIG.2).**

Therefore, it would have been obvious to one of ordinary skilled in the art before the effective filling date of the claimed invention to have modified **Vasilevsky** by the teaching of **Dawson** to a call for a set of data to be obtained and stored in order to improve efficiency of the response times in a network (**Dawson: [0063] FIG.4**).

Regarding **claim 2**, **Vasilevsky** teaches the method of claim 1, wherein the at least one virtual storage asset is virtualized via storage virtualization layers running on each of the physical resources **(the virtualization layer managing the execution of the operating system, which includes a distributed virtual machine monitor that provides a single system abstraction based upon coordinated, cooperating systems and thereby controls access to physical resources underlying the virtual serves [0017] see examples of management of the application layer [0041-42] FIG.1)**

Regarding **claim 3**, **Vasilevsky** teaches the method of claim 1, wherein at least two virtual assets each comprise software instantiations of computer

systems **(a horizontally scalable software system that allows multiple processors coupled by one or more interconnects to be easily partitioned into smaller systems [0015-16] FIG.6).**

Regarding **claim 4**, **Vasilevsky** teaches the method of claim 2, wherein at least one of the virtual assets comprise middleware applications running on each of the physical resources to access the virtual storage assets via the storage virtualization layer

(a virtualization layer is provided that allows operating systems (OSs) and their applications to be executed on a virtual server that spans more than one physical node [0016-17] FIG.6).

Regarding **claim 5**, **Vasilevsky** teaches the method of claim 1, wherein the control center application is configured to perform configuration management or forecasting services via the virtualization layer instances **(the management agent 815 residing within the virtualization environment is responsible for handling dynamic reconfiguration functions by receiving commands from the administrator (the end user through manager 212) is used for accessing virtual assents for adding, deleting, and reallocating of resources from virtual servers [0150-0154] FIG.2).**

Regarding **claim 6**, **Vasilevsky** teaches the method of claim 5, wherein the configuration management includes application routing for virtual assets or implementation of application rules **(the management agent 815 residing within the virtualization environment is responsible for handling dynamic reconfiguration functions by receiving commands from the administrator (the end user through manager 212) is used for accessing virtual assents for adding, deleting, and reallocating of resources from virtual servers [0150-0154] FIG.2).**

Regarding **claim 7**, **Vasilevsky** teaches the method of claim 1, wherein the at least one virtual storage asset is a logical unit with a logical unit number (LUN) **(a logical**

memory defined by the distributed virtual machine monitor and makes available this memory to the operating system and its applications [0101] FIG.6).

Regarding **claim 8, the modified Vasilevsky** teaches the method of claim 1, further comprising: obtaining a request from a user device to obtain at least a portion of the set of stored data; retrieving at least the portion of the set of stored data from the virtual storage asset; and transmitting at least the portion of the set of stored data to the user device via a network **(Client system 200 may represent any computing system sending requests to grid management system 240. In particular, client system 200 may send virtual job requests (or requests for a quote (RFQs) and jobs to grid management system 240. Further, while in the present embodiment client system 200 is depicted as accessing grid environment 150 with a request, in alternate embodiments client system 200 may also operate within grid environment 150 [0037-38] FIG.2).**

Regarding **claims 9-17**, the independent claim and each dependent claim are related to the same limitation set for hereinabove in **claims 1-8**, where the difference used is the limitations were presented from a “**system**” side and the wordings of the claims were interchanged within the claim itself or some of the claims were presented as a combination of two or more previously presented limitations. **This change does not affect the limitation of the above treated claims.** Adding these phrases to the claims and interchanging the wording did not introduce new limitations to these claims. **Therefore, these claims were rejected for similar reasons as stated above.**

Regarding **claims 18-20**, the independent claim and each dependent claim are related to the same limitation set for hereinabove in **claims 1-8**, where the difference used is the limitations were presented from a “**method**” side and the wordings of the claims were interchanged within the claim itself or some of the claims were presented as a combination of two or more previously presented limitations. **This change does not affect the limitation of the above treated claims.** Adding these phrases to the claims and interchanging the wording did not introduce new limitations to these claims. **Therefore, these claims were rejected for similar reasons as stated above.**

Conclusion

7. When responding to this office action, Applicant is advised to clearly point out the patentable novelty which he or she thinks the claims present, in view of the state of the art disclosed by the references cited or the objections made. He or she must also show how the amendments avoid such references or objections See 37 CFR 1.111 (c).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ABDELNABI O MUSA whose telephone number is (571)270-1901, and email address is abdelnabi.musa@uspto.gov ‘preferred’. The examiner can normally be reached on M-F 9:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Kizou, Hassan, can be reached on 571-272.3088. 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.

/ABDELNABI O MUSA/
Primary Examiner, Art Unit 2472

Notice of References Cited	Application/Control No. 18/135,007		Applicant(s)/Patent Under Reexamination Pabari, Vipul	
	Examiner ABDELNABI O MUSA		Art Unit 2472	Page 1 of 2

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Name	CPC Classification	US Classification
*	A	US-20080086731-A1	2008-04-10	Trossman; Andrew	G06F9/50	718/100
*	B	US-20050155033-A1	2005-07-14	Luoffo, Vincent Valentino Di	G06F9/5088	718/104
*	C	US-20060149842-A1	2006-07-06	Dawson; Christopher James	G06F9/5072	709/226
*	D	US-20050125537-A1	2005-06-09	Martins, Fernando C. M.	G06F9/5083	709/216
*	E	US-7577722-B1	2009-08-18	Khandekar; Dilip	G06F9/45558	718/1
*	F	US-6490620-B1	2002-12-03	Ditmer; Christine M.	G06F11/3495	709/224
*	G	US-20040015600-A1	2004-01-22	Tiwary, Ashutosh	G06F11/3414	714/E11.193
*	H	US-20060069761-A1	2006-03-30	Singh; Sumankumar A.	H04L67/1008	709/222
*	I	US-20050044301-A1	2005-02-24	Vasilevsky, Alexander David	G06F9/45533	711/1
*	J	US-20060184937-A1	2006-08-17	Abels; Timothy	G06F9/455	718/1
*	K	US-20050223221-A1	2005-10-06	Proudlar, Graeme John	G06F21/62	713/194
*	L	US-20030236956-A1	2003-12-25	Grubbs, Mark Allen	G06F11/1458	711/159
*	M	US-20020166117-A1	2002-11-07	Abrams, Peter C.	H04L41/147	717/177

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

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	U	
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	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
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U.S. Patent and Trademark Office
PTO-892 (Rev. 01-2001)

Notice of References Cited

Part of Paper No. 20231221

<i>Notice of References Cited</i>	Application/Control No. 18/135,007		Applicant(s)/Patent Under Reexamination Pabari, Vipul	
	Examiner ABDELNABI O MUSA		Art Unit 2472	Page 2 of 2

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Name	CPC Classification	US Classification
*	A	US-20050198062-A1	2005-09-08	Shapiro, Richard B.	G06F16/2282	707/999.102
*	B	US-20030236882-A1	2003-12-25	Yan, Yong	G06F8/00	709/225
	C					
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	E					
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	G					
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Country	Name	CPC Classification
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	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in YYYY-MM-DD format are publication dates. Classifications may be US or foreign.

<i>Index of Claims</i> 	Application/Control No. 18/135,007	Applicant(s)/Patent Under Reexamination Pabari, Vipul
	Examiner ABDELNABI O MUSA	Art Unit 2472

✓	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	12/21/2023							
	1	✓							
	2	✓							
	3	✓							
	4	✓							
	5	✓							
	6	✓							
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	15	✓							
	16	✓							
	17	✓							
	18	✓							
	19	✓							
	20	✓							

<i>Search Notes</i> 	Application/Control No. 18/135,007	Applicant(s)/Patent Under Reexamination Pabari, Vipul
	Examiner ABDELNABI O MUSA	Art Unit 2472

CPC - Searched*		
Symbol	Date	Examiner
H04L 41/00, 41/147, 47/78, 41/046	12/21/2023	AM

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
H04L 41/00, 41/147, 47/78, 41/046 search is limited by text, see attached search history report.	12/21/2023	AM
PE2E SEARCH (USPAT, US-PGPUB, EPO, JPO, FIT, DERWENT, IBM_TDB), see attached; NPL: IEEE; Inventor Search/DP	12/21/2023	AM

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/ABDELNABI O MUSA/ Primary Examiner, Art Unit 2472	
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Report Information from Dialog

December 21 2023 14:22

Table of contents

Search Strategy.....	iii
1. CPS Security Testbed: Requirement Analysis, Prototype Design and Protection Framework.....	1
2. Experimental Evaluation of a CPU Live Migration on ARM Based Bare Metal Instances.....	1
3. Security Requirements and Challenges of 6G Technologies and Applications.....	1
4. Leveraging Computational Intelligence Techniques for Defensive Deception: A Review, Recent Advances, Open Problems and Future Directions.....	1
5. ToutVirtual Inc Seeks Patent for Virtual Systems Management.....	2
6. AI-assisted Distributed Applications at Edge for Industrial Field Autonomous Systems.....	2
7. An Interaction-Based Software-Defined Security Model and Platform to Secure Cloud Resources.....	2
8. IPCFA: A Methodology for Acquiring Forensically-Sound Digital Evidence in the Realm of IaaS Public Cloud Deployments.....	2
9. Virtualization and the Utilization in High-Performance Environments: A Mixed-Methods Study.....	3
10. Performance evaluation of windows virtual machines on a Linux host.....	3
11. Security Architecture for Cloud-Based Command and Control System in IoT Environment.....	3
12. Security Strategies to Prevent Data Breaches in Infrastructure as a Service Cloud Computing.....	3
13. Solving Key Design Issues for a New Virtual World Architecture.....	4
14. An Industrial Data Analysis and Supervision Framework for Predictive Manufacturing Systems.....	4
15. VMware Class A (VMW) issued new U.S. patent [9,934,067].....	4
16. VMware Class A (VMW) issued new U.S. patent [9,933,832].....	4
17. VMware Class A (VMW) issued new U.S. patent [9,934,060].....	4
18. VMware Class A (VMW) issued new U.S. patent [9,929,998].....	5
19. VMware Class A (VMW) issued new U.S. patent [9,928,010].....	5
20. VMware Class A (VMW) issued new U.S. patent [9,928,180].....	5

Search Strategy

Databases: ABI/INFORM® Professional Advanced, Abstracts in New Technology & Engineering, AdisInsight: Drugs, AdisInsight: Trials, Adis Pharmacoeconomics & Outcomes News, AGRICOLA, AGRIS, Allied & Complementary Medicine™, Analytical Abstracts, APA PsycInfo®, Aqualine, Aquatic Science & Fisheries Abstracts (ASFA), Australian Education Index, BIOSIS® Toxicology, BIOSIS Previews®, British Library Inside Conferences, British Nursing Index, Business & Industry, CAB ABSTRACTS, Chemical Business Newsbase, Chemical Engineering & Biotechnology Abstracts, Chemical Safety Newsbase, Civil Engineering Abstracts, ClinicalTrials.gov, Current Contents® Search, Derwent Drug File, Derwent Drug Registry, DH-DATA: Health Administration, Medical Toxicology & Environmental Health, DIOGENES® FDA Regulatory Updates, Drug Information Fulltext, Earthquake Engineering Abstracts, EconLit, Ei Compendex®, Ei EnCompassLIT, Embase®, Embase® French Local Literature, Embase Preprints, EMCare®, ERIC, ESPICOM Pharmaceutical & Medical Device News, FDAnews, FLUIDEX (Fluid Engineering Abstracts), Foodline®: MARKET, Foodline®: PRODUCT, Foodline®: SCIENCE, FSTA®, Gale Group Computer Database™, Gale Group Health Periodicals Database, Gale Group New Product Announcements / Plus®, Gale Group Newsletter Database™, Gale Group PharmaBiomed Business Journals, Gale Group PROMT®, Gale Group Trade & Industry Database™, GEOBASE, GeoRef, Global Health, HSELINE: Health and Safety, ICONDA - International Construction Database, IMS Company Profiles, IMS New Product Focus, IMS Pharma Trademarks, IMS R&D Focus, IMS R&D Focus Drug News, Inspec®, International Pharmaceutical Abstracts, Jane's Defense & Aerospace News, King's Fund, KOSMET: Cosmetic Science, Lancet Titles, Mechanical & Transportation Engineering Abstracts, MEDLINE®, Meteorological & Geostrophysical Abstracts, Morressier Life Science Conference Abstracts and Posters, New England Journal of Medicine, Northern Light Life Sciences Conference Abstracts, NTIS: National Technical Information Service, Oceanic Abstracts, PAIS International, Paperbase, PAPERCHEM, ProQuest Advanced Tech & Aerospace Professional, ProQuest Biological & Health Science Professional, ProQuest Dissertations and Theses Professional, ProQuest Environmental Science Professional, ProQuest Materials Research Professional, ProQuest Newsstand Professional, ProQuest Technology Research Professional, Proux Science Daily Essentials, Proux Science Drug Data Report, Proux Science Drugs Of The Future™, Publicly Available Content, Registry of Toxic Effects of Chemical Substances (RTECS®), SciSearch®: a Cited Reference Science Database, Social SciSearch®, ToxFile®, Transport Research International Documentation, TULSA™ (Petroleum Abstracts), UBM Computer Full Text, Weldasearch®

Set#	Searched for	Results
S1	virtualization near/15 system	138164*
S2	physical near/15 resources and virtual near/15 assets	1780°
S3	virtualization near/15 layer	16873*
S4	S2 AND S1	217°
S5	S3 AND S1	8945*
S6	S3 AND S2	81°
S7	S3 AND S2 AND S1	60°

* Duplicates are removed from the search, but included in the result count.

° Duplicates are removed from the search and from the result count.

Document 1 of 20

CPS Security Testbed: Requirement Analysis, Prototype Design and Protection Framework

Author: Talukder, Md. Rakibul Hasan

Publication info: Colorado State University, ProQuest Dissertations Publishing, 2023. 30527043.

[ProQuest document link](#)

Databases: ProQuest Dissertations and Theses Professional

Document 2 of 20

Experimental Evaluation of a CPU Live Migration on ARM Based Bare Metal Instances

Author: Avramidis, Ilias

Publication info: Liverpool John Moores University (United Kingdom), ProQuest Dissertations Publishing, 2022. 29360462.

[ProQuest document link](#)

Databases: ProQuest Dissertations and Theses Professional

Document 3 of 20

Security Requirements and Challenges of 6G Technologies and Applications

Author: Abdel Hakeem, Shima A 1 ; Hussein, Hanan H 2 ; Kim, HyungWon 3 1 School of Electronics Engineering, Chungbuk National University, Cheongju 28644, Korea; shimaakotb@cbnu.ac.kr ; Electronics Research Institute (ERI), El Nozha, Cairo 12622, Egypt; hananhussein@eri.sci.eg 2 Electronics Research Institute (ERI), El Nozha, Cairo 12622, Egypt; hananhussein@eri.sci.eg 3 School of Electronics Engineering, Chungbuk National University, Cheongju 28644, Korea; shimaakotb@cbnu.ac.kr

Publication info: Sensors 22.5: 1969. MDPI AG. (2022)

[ProQuest document link](#)

Databases: Publicly Available Content (1970 - current)

Document 4 of 20

Leveraging Computational Intelligence Techniques for Defensive Deception: A Review, Recent Advances, Open Problems and Future Directions

Author: Pilla, Vaishno Mohan 1 ; Dixit, Shriniket 1 ; Gyaneshwar, Amogh 1 ; Chadha, Utkarsh 2 ; Srinivasan, Kathiravan 1 ; Jung Taek Seo 3 1 School of Computer Science and Engineering, Vellore Institute of Technology (VIT), Vellore 632014, India; pillavaishno.mohan2019@vitstudent.ac.in (P.V.M.); shriniket.dixit2019@vitstudent.ac.in (S.D.); amogh.gyaneshwar2019@vitstudent.ac.in (A.G.); kathiravan.srinivasan@vit.ac.in (K.S.) 2 School of Mechanical Engineering, Vellore Institute of Technology (VIT), Vellore 632014, India; utkarsh.chadha2018@vitstudent.ac.in 3 Department of Computer Engineering, Gachon University, Seongnam 13120, Korea

Publication info: Sensors 22.6: 2194. MDPI AG. (2022)

[ProQuest document link](#)

Databases: Publicly Available Content (1970 - current)

Document 5 of 20

ToutVirtual Inc Seeks Patent for Virtual Systems Management

Publication info: Global IP News. Information Technology Patent News [New Delhi] 04 Feb 2021.

[ProQuest document link](#)

Databases: ProQuest Newsstand Professional

Document 6 of 20

AI-assisted Distributed Applications at Edge for Industrial Field Autonomous Systems

Author: Fourastier, Yannick 1 ; Baron, Claude 2 ; Chaouchi, Hakima 3 ; Thomas, Carsten 4 ; Bourgeau, Thomas 5 ; Smet, Jean-Paul; Yehorov, Viktor; Esteban, Philippe 1 CodEUrope SAS, 244 Route de Seysses, 3100 Toulouse, France 2 Université Toulouse, INSA, LAAS-CNRS, ISAE-Supaéro, 7 Av. Colonel Roche, 31200 France 3 Institut Polytechnique de Paris, Telecom SudParis, 9, rue Charles Fourier, 91011, Evry, France 4 HTW Berlin, Treskowallee 8, 10318, Berlin, Germany 5 KB Digital, 1291 Commugny, Switzerland

Publication info: Sensors & Transducers 249.2: 54-64. IFSA Publishing, S.L. (Feb 2021)

[ProQuest document link](#)

Databases: ProQuest Advanced Tech & Aerospace Professional, Abstracts in New Technology & Engineering, Publicly Available Content, ProQuest Technology Research Professional

Document 7 of 20

An Interaction-Based Software-Defined Security Model and Platform to Secure Cloud Resources

Author: Farahmandian, Sara

Publication info: University of Technology Sydney (Australia), ProQuest Dissertations Publishing, 2021. 30611807.

[ProQuest document link](#)

Databases: ProQuest Dissertations and Theses Professional

Document 8 of 20

IPCFA: A Methodology for Acquiring Forensically-Sound Digital Evidence in the Realm of IaaS Public Cloud Deployments

Author: Badreldin, Hosam

Publication info: Dakota State University, ProQuest Dissertations Publishing, 2021. 28494187.

[ProQuest document link](#)

Databases: ProQuest Dissertations and Theses Professional

Document 9 of 20

Virtualization and the Utilization in High-Performance Environments: A Mixed-Methods Study

Author: Marsh, Gilbert M.

Publication info: University of Phoenix, ProQuest Dissertations Publishing, 2021. 28321090.

[ProQuest document link](#)

Databases: ProQuest Dissertations and Theses Professional

Document 10 of 20

Performance evaluation of windows virtual machines on a Linux host

Author: Balen, Josip 1 ; Vdovjak, Krešimir 1 ; Martinović, Goran 1 1 Faculty of Electrical Engineering, Computer Science and Information Technology Osijek, Osijek, Croatia

Publication Info: Automatika 61.3: 435. Taylor & Francis Ltd. (Aug 2020)

[ProQuest document link](#)

Databases: ProQuest Advanced Tech & Aerospace Professional, ProQuest Technology Research Professional

Document 11 of 20

Security Architecture for Cloud-Based Command and Control System in IoT Environment

Author: Koo, Jahoon 1 ; Se-Ra Oh 1 ; Lee, Sang Hoon 2 ; Young-Gab, Kim 1 1 Department of Computer and Information Security, Security Engineering laboratory, Sejong University, Seoul 05006, Korea; sigmao91@sju.ac.kr (J.K.); terious551@sju.ac.kr (S.-R.O.) 2 Agency for Defense Development, Seoul 05006, Korea; shlee@add.re.kr

Publication info: Applied Sciences 10.3: 1035. MDPI AG. (2020)

[ProQuest document link](#)

Databases: Publicly Available Content (1970 - current)

Document 12 of 20

Security Strategies to Prevent Data Breaches in Infrastructure as a Service Cloud Computing

Author: Pratt-Sensie, Alberta

Publication info: Walden University, ProQuest Dissertations Publishing, 2020. 27833096.

[ProQuest document link](#)

Databases: ProQuest Dissertations and Theses Professional

Document 13 of 20

Solving Key Design Issues for a New Virtual World Architecture

Author: Shen, Bingqing

Publication info: University of Macau, ProQuest Dissertations Publishing, 2019. 22624803.

[ProQuest document link](#)

Databases: ProQuest Dissertations and Theses Professional

Document 14 of 20

An Industrial Data Analysis and Supervision Framework for Predictive Manufacturing Systems

Author: Peres, Ricardo Alexandre Fernandes da Silva

Publication info: Universidade NOVA de Lisboa (Portugal), ProQuest Dissertations Publishing, 2019. 27841679.

[ProQuest document link](#)

Databases: ProQuest Dissertations and Theses Professional

Document 15 of 20

VMware Class A (VMW) issued new U.S. patent [9,934,067]

Publication info: News Bites - Computing & Information [Melbourne] 05 Apr 2018.

[ProQuest document link](#)

Databases: ABI/INFORM® Professional Advanced, ProQuest Newsstand Professional

Document 16 of 20

VMware Class A (VMW) issued new U.S. patent [9,933,832]

Publication info: News Bites - Computing & Information [Melbourne] 05 Apr 2018.

[ProQuest document link](#)

Databases: ABI/INFORM® Professional Advanced, ProQuest Newsstand Professional

Document 17 of 20

VMware Class A (VMW) issued new U.S. patent [9,934,060]

Publication info: News Bites - Computing & Information [Melbourne] 05 Apr 2018.

[ProQuest document link](#)

Databases: ABI/INFORM® Professional Advanced, ProQuest Newsstand Professional

Document 18 of 20

VMware Class A (VMW) issued new U.S. patent [9,929,998]

Publication Info: News Bites - Computing & Information [Melbourne] 29 Mar 2018.

[ProQuest document link](#)

Databases: ABI/INFORM® Professional Advanced, ProQuest Newsstand Professional

Document 19 of 20

VMware Class A (VMW) issued new U.S. patent [9,928,010]

Publication Info: News Bites - Computing & Information [Melbourne] 29 Mar 2018.

[ProQuest document link](#)

Databases: ABI/INFORM® Professional Advanced, ProQuest Newsstand Professional

Document 20 of 20

VMware Class A (VMW) issued new U.S. patent [9,928,180]

Publication Info: News Bites - Computing & Information [Melbourne] 29 Mar 2018.

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Bibliographic Data

Application No: 18/135,007

Foreign Priority claimed: ☐ Yes ☒ No

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

Verified and Acknowledged: /ABDELNABI O MUSA/

Examiner's Signature

Initials

Title:

VIRTUAL SYSTEMS MANAGEMENT

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
04/14/2023	709	2472	367894-991103
RULE			

APPLICANTS

ToutVirtual, Inc.,

INVENTORS

Vipul Pabari, Carlsbad, CA, UNITED STATES

CONTINUING DATA

This application is a CON of 17074500 10/19/2020 PAT 11656915

17074500 is a CON of 15201087 07/01/2016 PAT 10810050

15201087 is a CON of 14450765 08/04/2014 PAT 9444762

14450765 is a CON of 11503090 08/10/2006 PAT 8799431

11503090 has PRO of 60708473 08/15/2005

FOREIGN APPLICATIONS

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PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	7	("20050138165" "20050155033" "20060294238" "20070067435" "20080086731" "7463648" "7512769").PN.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2010/10/29 11:51 AM
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L28	7	("20050138165" "20050155033" "20060294238" "20070067435" "20080086731" "7463648" "7512769").PN.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
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L31	0	(manage\$4 virtual\$6 environment inventory resource\$4 prioritiz\$4 physical host).clm.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L32	1541	(manage\$4 virtual\$6 environment inventory resource\$4 prioritiz\$4 physical host)	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM

L33	1	L30 L32	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L34	1	(virtual\$ mange\$4).ti.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L35	122	(manage\$4 virtual\$6 environment resource\$4).ab.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L36	26	L29 L35	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L37	3	(manage\$4 virtual\$6 environment resource\$4 physical host).ab.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L38	22641	(manage\$4 virtual\$6 environment (resource\$4 or asset\$2) physical host allocat\$4)	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L39	25092	709/223.ccls. or 709/226.ccls. or 709/229.ccls.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L40	1484	L38 L39	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L41	637	L40 (load adj (shar\$4 or balanc\$4))	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L42	122	(manage\$4 virtual\$6 environment resource\$4).ab.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L43	8	L41 L42	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L44	238	((virtual adj machine) or VM) same new same physical same host	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L45	7	L42 L44	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L46	7	L44 L42	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L47	141	L44 L38	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L48	18	L47 L39	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:36 PM
L49	166	(manage\$4 virtual\$6 resource\$4 physical).ab.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:39 PM
L50	118867	"709".clas.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:39 PM
L51	49	L50 L49	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:39 PM
L52	49	L51 not L26	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:39 PM
L53	0	real near time matrices virtual physical	(US-PGPUB; USPAT; USOCR; IBM_TDB)	SAME	OFF	OFF	2012/04/10 02:43 PM

L54	27	real near time metrics virtual physical	(US-PGPUB; USPAT; USOCR; IBM_TDB)	SAME	OFF	OFF	2012/04/10 02:43 PM
L55	1	L39 and real near time metrics virtual physical	(US-PGPUB; USPAT; USOCR; IBM_TDB)	SAME	OFF	OFF	2012/04/10 02:44 PM
L56	3	L50 L54	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2012/04/10 02:46 PM
L57	9	pabari.in.	(USPAT)	AND	OFF	OFF	2012/04/10 02:50 PM
L58	20	pabari.in.	(US-PGPUB; USPAT)	AND	OFF	OFF	2012/04/10 02:50 PM
L59	1	L23 L58	(US-PGPUB; USPAT)	AND	OFF	OFF	2012/04/10 02:50 PM
L60	0	L24 L58	(USPAT)	AND	OFF	OFF	2012/04/10 02:51 PM
L78	3	"11503090"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	OFF	OFF	2013/03/12 03:19 PM
L79	8	(US-20080086731-\$ or US-20050155033-\$ or US-20060149842-\$ or US-20050125537-\$ or US-20040015600- \$).did. or (US-7512769- \$ or US-7577722-\$ or US-6490620-\$).did.	(US-PGPUB; USPAT)	OR	OFF	OFF	2013/03/12 03:52 PM
L80	5	L79 and (virtual\$7 environment layer network (resourc\$2 or computer\$2 or printer\$2 or device\$2) (asset\$2 or software or program\$2 or instruction\$2))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	AND	OFF	OFF	2013/03/12 03:54 PM
L81	1	(11/031542).APP.	(USPAT; USOCR)	OR	OFF	OFF	2013/03/12 04:04 PM
L82	0	virtual\$8 environment virtual\$8 near2 laver\$1 network resource\$2d virtual asset\$2 (software or instantiation\$1) virtualization layer managing the virtual assets	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:45 AM
L83	0	virtual\$8 environment virtual\$8 near2 laver\$1 network resource\$2d virtual asset\$2 (software or instantiation\$1)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:45 AM
L84	0	virtual\$8 environment virtual\$8 near2 laver\$1 network resource\$2d	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:46 AM

L85	0	virtual asset\$2 virtual\$8 environment virtual\$8 near2 laver\$1	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:46 AM
L86	1	virtual\$8 virtual\$8 near2 laver\$1	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:46 AM
L87	858	virtualization layer manag\$6 virtual (asset\$2 or resourc\$2)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:47 AM
L88	427	virtualization near layer manag\$6 virtual (asset\$2 or resourc\$2)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:47 AM
L89	31	virtualization near layer near5 manag\$6 near5 virtual (asset\$2 or resourc\$2)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:47 AM
L90	10	virtualization near layer near5 manag\$6 near5 virtual (asset\$2 or resourc\$2) and ("709"/\$.ccls.)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:48 AM
L91	3218	(virtual or virtualization) layer network (resourc\$2 or assets)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:49 AM
L92	444	L91 and L87	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:49 AM
L93	287	L91 and L88	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:50 AM
L94	522	(virtual or virtualization) near layer network (resourc\$2 or assets)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:50 AM
L95	259	L94 and L88	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:50 AM
L96	258	(virtual or virtualization) near layer near4 (resourc\$2 or assets)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 10:54 AM
L97	10	virtualization near layer near5 manag\$6 near5 virtual (asset\$2 or resourc\$2) and ("709"/\$.ccls.)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 02:22 PM
L98	37	(virtual or virtualization) near layer near3 manag\$6 near4 (resourc\$2 or assets)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 02:22 PM
L99	33	L98 not L97	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 02:22 PM
L100	15	(virtualization near layer resourc\$2).ab.	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 02:33 PM
L101	12	L100 not L99	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 02:33 PM
L102	29	virtualization near layer near2 manag\$6 near4	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 02:36 PM

L103	2	(asset\$1 or resourc\$2) L102 not L99	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 02:37 PM
L104	10	(US-20080086731-\$ or US-20050155033-\$ or US-20060149842-\$ or US-20050125537-\$ or US-20040015600-\$ or US-20060069761-\$ or US-20050044301- \$).did. or (US-7512769- \$ or US-7577722-\$ or US-6490620-\$).did.	(US-PGPUB; USPAT)	AND	OFF	OFF	2013/07/24 02:40 PM
L105	2	L104 and (virtual or virtualization) near layer	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 02:40 PM
L106	37	(virtual or virtualization) near layer near3 manag\$6 near4 (resourc\$2 or assets)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/07/24 02:40 PM
L107	0	(10/831973).APP.	(USPAT; USOCR)	AND	OFF	OFF	2013/07/24 02:41 PM
L108	10	(US-20080086731-\$ or US-20050155033-\$ or US-20060149842-\$ or US-20050125537-\$ or US-20040015600-\$ or US-20060069761-\$ or US-20050044301- \$).did. or (US-7512769- \$ or US-7577722-\$ or US-6490620-\$).did.	(US-PGPUB; USPAT)	AND	OFF	OFF	2013/08/28 09:06 PM
L109	0	L108 and (virtualization with layer) controller (resourc\$2 or inventory or assents) virtualization near4 environment\$1 (allocat\$4 or re\$allocat\$4)	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:09 PM
L110	403	(virtualization with layer) controller (resourc\$2 or inventory or assents) virtualization near4 environment\$1 (allocat\$4 or re\$allocat\$4)	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:10 PM
L111	32	(virtualization with layer) controller (resourc\$2 or inventory\$1 or assent\$2) virtualization near4 environment\$1 (allocat\$4 or re\$allocat\$4) (erorr\$1 or debug\$2 or degrad\$3 or corrupt\$4 or bad\$2)	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:12 PM

L112	0	log\$2 near4 fil\$2 (virtualization with layer) controller (resourc\$2 or inventory\$1 or assent\$2) virtualization near4 environment\$1 (allocat\$4 or re\$allocat\$4) (erorr\$1 or debug\$2 or degrad\$3 or corrupt\$4 or bad\$2) log\$2 near4 fil\$2 @ad<="20061218" and ("370"/\$.ccls. or "455"/\$.ccls.)	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:13 PM
L113	1	(virtualization with layer) controller (resourc\$2 or inventory\$1 or assent\$2) virtualization near4 environment\$1 (allocat\$4 or re\$allocat\$4) (erorr\$1 or debug\$2 or degrad\$3 or corrupt\$4 or bad\$2) log\$2 near4 fil\$2 @ad<="20061218" and ("370"/\$.ccls. or "455"/\$.ccls. or "709".clas.)	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:13 PM
L114	1	(virtualization with layer) controller (resourc\$2 or inventory\$1 or assent\$2) virtualization near4 environment\$1 (allocat\$4 or re\$allocat\$4) (erorr\$1 or debug\$2 or degrad\$3 or corrupt\$4 or bad\$2) log\$2 near4 fil\$2 @ad<="20061218"	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:14 PM
L115	0	(virtualization with layer) controller (resourc\$2 or inventory\$1 or assent\$2) virtualization near4 environment\$1 (allocat\$4 or re\$allocat\$4) (erorr\$1 or debug\$2 or degrad\$3 or corrupt\$4 or bad\$2) log\$2 near4 fil\$2 @ad<="200508/15"	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:14 PM
L116	0	(virtualization with layer) controller (resourc\$2 or inventory\$1 or assent\$2) virtualization near4 environment\$1 (allocat\$4 or	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:14 PM

L117	7	re\$allocat\$4) (erorr\$1 or debug\$2 or degrad\$3 or corrupt\$4 or bad\$2) log\$2 near4 fil\$2 @ad<="20050815" ((virtualization layer) (resourc\$2 or inventory\$1 or assent\$2) (allocat\$4 or re\$allocat\$4)).ab.	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:18 PM
L118	2	L117 L110	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:18 PM
L119	11	((virtualiz\$5 layer) (resourc\$2 or inventory\$1 or assent\$2) (allocat\$4 or re\$allocat\$4)).ab.	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:19 PM
L120	4	L119 not L117	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:21 PM
L121	71	(virtualization near3 layer) (resourc\$2 or inventory\$1 or assent\$2) (allocat\$4 or re\$allocat\$4) (erorr\$1 or debug\$2 or degrad\$3 or corrupt\$4 or bad\$2) @ad<="20050815"	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:24 PM
L122	71	L121 not L119	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:24 PM
L123	16	(US-20080086731-\$ or US-20050155033-\$ or US-20060149842-\$ or US-20050125537-\$ or US-20040015600-\$ or US-20060069761-\$ or US-20050044301-\$ or US-20060184937-\$ or US-20050223221-\$ or US-20030236956-\$ or US-20020166117-\$ or US-20050198062-\$).did. or (US-7512769-\$ or US-7577722-\$ or US-6490620-\$ or US-7330858-\$).did.	(US-PGPUB; USPAT)	AND	OFF	OFF	2013/08/28 09:50 PM
L124	0	L123 and (virtualization with layer) controller (resourc\$2 or inventory or assents) virtualization near4 environment\$1 (allocat\$4 or re\$allocat\$4)	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:52 PM
L125	3	L123 and (virtualization with layer) controller	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/28 09:53 PM

L126	16	(resourc\$2 or inventory or asset\$2) virtualization (allocat\$4 or re\$allocat\$4) (US-20080086731-\$ or US-20050155033-\$ or US-20060149842-\$ or US-20050125537-\$ or US-20040015600-\$ or US-20060069761-\$ or US-20050044301-\$ or US-20060184937-\$ or US-20050223221-\$ or US-20030236956-\$ or US-20020166117-\$ or US-20050198062-\$).did. or (US-7512769-\$ or US-7577722-\$ or US-6490620-\$ or US-7330858-\$).did.	(US-PGPUB; USPAT)	AND	OFF	OFF	2013/08/29 06:33 PM
L127	2748	"I13" and automatic\$5	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/29 06:33 PM
L128	9	I3and automatic\$5	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/29 06:34 PM
L129	12	L126 and automatic\$5	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/29 06:34 PM
L130	1	L126 and automatic\$5 same (allocat\$4 or re\$allocat\$4)	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/29 06:34 PM
L131	259	automatic\$5 same (allocat\$4 or re\$allocat\$4) and debug\$4 and forecast\$4	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/29 06:36 PM
L132	69	automatic\$5 same (allocat\$4 or re\$allocat\$4) and debug\$4 same (inventory or resourc\$2) and forecast\$4 virtual\$4	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/29 06:37 PM
L133	62	automatic\$5 same (allocat\$4 or re\$allocat\$4) and debug\$4 same (inventory or resourc\$2) and forecast\$4 virtual\$4 and @ad<="20050815"	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/29 06:38 PM
L134	3	automatic\$5 near4 (allocat\$4 or re\$allocat\$4) and debug\$4 same (inventory or resourc\$2) and forecast\$4 virtual\$4 and @ad<="20050815"	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/29 06:41 PM
L135	128	automatic\$5 near4	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2013/08/29

L136	0	(allocat\$4 or re\$allocat\$4) and forecast\$4 virtual\$4 and @ad<="20050815"	USOCR)				06:42 PM
L137	1	automatic\$4 (allocat\$4 or reallocation) virtual (asset\$2 or resourc\$2 or inventory) (fore\$cast\$3 or futur\$3) Capacity Planning Manager and @ad<="20050815"	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:44 PM
L138	15	automatic\$4 (allocat\$4 or reallocation) virtual (asset\$2 or resourc\$2 or inventory) (fore\$cast\$3 or futur\$3) Capacity Planning and @ad<="20050815"	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:45 PM
L139	3	automatic\$4 (allocat\$4 or reallocation) virtual (asset\$2 or resourc\$2 or inventory) (fore\$cast\$3) and @ad<="20050815"	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:46 PM
L140	613	automatic\$4 near4 (allocat\$4 or reallocation) near4 (asset\$2 or resourc\$2 or inventory) and @ad<="20050815"	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:51 PM
L141	30	automatic\$4 near4 (reallocation) near4 (asset\$2 or resourc\$2 or inventory) and @ad<="20050815"	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:51 PM
L142	0	automatic\$4 near4 (reallocation) near4 (asset\$2 or resourc\$2 or inventory) and @ad<="20050815" and forecasting	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:51 PM
L143	1	automatic\$4 near4 (reallocation) near4 (asset\$2 or resourc\$2 or inventory) and @ad<="20050815" and forecasting	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:51 PM
L144	27	automatic\$4 near4	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29

		(reallocation) near4 (asset\$2 or resourc\$2 or inventory) and @ad<="20050815" and (forecast\$4 or predict\$4 or estimat\$4 or project\$4 or anticipat\$4 or guess\$4)	USOCR)				06:54 PM
L145	3	automatic\$4 near4 (reallocation) near4 (asset\$2 or resourc\$2 or inventory) and @ad<="20050815" and (forecast\$4 or predict\$4 or estimat\$4 or project\$4 or anticipat\$4 or guess\$4)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:55 PM
L146	0	L126 and (forecast\$4 or predict\$4 or estimat\$4 or project\$4 or anticipat\$4 or guess\$4) virtual\$4	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:56 PM
L147	7	L126 and (forecast\$4 or predict\$4 or estimat\$4 or project\$4 or anticipat\$4 or guess\$4)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:57 PM
L148	2	L126 and (forecast\$4 or predict\$4 or estimat\$4 or project\$4 or anticipat\$4 or guess\$4) automatic\$6	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:58 PM
L149	7	L126 and (forecast\$4 or predict\$4 or estimat\$4 or project\$4 or anticipat\$4 or guess\$4) and automatic\$6	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2013/08/29 06:58 PM
L150	16	(US-20080086731-\$ or US-20050155033-\$ or US-20060149842-\$ or US-20050125537-\$ or US-20040015600-\$ or US-20060069761-\$ or US-20050044301-\$ or US-20060184937-\$ or US-20050223221-\$ or US-20030236956-\$ or US-20020166117-\$ or US-20050198062-\$ or US-20030236882- \$).did. or (US-7512769- \$ or US-7577722-\$ or US-6490620-\$).did.	(US-PGPUB; USPAT)	AND	OFF	OFF	2015/04/30 01:43 PM
L151	0	L150 and day same metric	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2015/04/30 01:43 PM
L152	0	L150 and day and	(US-PGPUB; USPAT;	AND	OFF	OFF	2015/04/30

L153	2	metric L150 and time same day	USOCR) (US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	01:44 PM 2015/04/30 01:44 PM
L154	0	"2008248817".did.	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2015/05/01 12:39 AM
L155	1	"20080248817".did.	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2015/05/01 12:39 AM
L156	1	"20040203828".did.	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2015/05/01 12:45 AM
L157	1	"13639190"	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2015/05/01 08:35 PM
L158	16	(US-20080086731-\$ or US-20050155033-\$ or US-20060149842-\$ or US-20050125537-\$ or US-20040015600-\$ or US-20060069761-\$ or US-20050044301-\$ or US-20060184937-\$ or US-20050223221-\$ or US-20030236956-\$ or US-20020166117-\$ or US-20050198062-\$ or US-20030236882-\$).did. or (US-7512769-\$ or US-7577722-\$ or US-6490620-\$).did.	(US-PGPUB; USPAT)	AND	OFF	OFF	2015/05/14 02:39 PM
L159	1	"14450765"	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2015/05/14 02:53 PM
L160	4	"11509030"	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2015/05/14 03:19 PM
L161	4	"11503090"	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2015/05/14 03:22 PM
L162	1	"10326552".pn.	(US-PGPUB; USPAT; USOCR)	AND	OFF	OFF	2021/10/14 01:31 PM
L163	17	(Vipul WITH Pabari).in.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2022/01/06 11:56 AM
L164	17683752	(virtualization system resources AND physical resource AND virtual assets).clm.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2022/01/06 11:57 AM

L165	8	L164 AND L163	EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2022/01/06 11:57 AM
L166	7	L164 AND L163	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2022/01/06 11:57 AM
L167	17683752	(virtualization layer AND virtualization system resources AND physical resource AND virtual assets).clm.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2022/01/06 11:59 AM
L168	4549107	(virtualization layer AND virtualization system resources AND physical resource AND virtual assets).clm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/01/06 11:59 AM
L169	7	L168 AND L163	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/01/06 11:59 AM
L170	1	(15/201087).APP.	(USPAT; USOCR)	OR	ON	ON	2022/01/06 12:07 PM
L171	0	(17/074500).APP.	(USPAT; USOCR)	OR	ON	ON	2022/01/06 12:27 PM
L172	2	"17074500"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2022/04/12 12:56 PM

L173	16	((US-20080086731-A1 OR US-20050155033-A1 OR US-20060149842-A1 OR US-20050125537-A1 OR US-20040015600-A1 OR US-20060069761-A1 OR US-20050044301-A1 OR US-20060184937-A1 OR US-20050223221-A1 OR US-20030236956-A1 OR US-20020166117-A1 OR US-20050198062-A1 OR US-20030236882-A1 OR US-20210034432-A1).did. AND PGPB.dbnm.) OR ((US-7577722-B1 OR US-6490620-B1).did. AND USPT.dbnm.)	EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2022/05/12 09:50 AM
L174	281493	virtual ADJ asset\$2 physical ADJ resource\$2 virtualization ADJ layer	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/05/12 09:51 AM
L175	7	virtual ADJ asset\$2 physical ADJ resource\$2 virtualization ADJ layer	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO,	WITH	ON	ON	2022/05/12 09:51 AM

L176	1	L175 AND L173	MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/05/12 09:51 AM
L177	16	virtual asset\$2 physical resource\$2 virtualization layer	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	WITH	ON	ON	2022/05/12 09:52 AM
L178	1	L177 AND L173	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2022/05/12 09:53 AM
L179	59	virtual assets manage\$5 virtualization layer	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU,	WITH	ON	ON	2022/05/12 10:00 AM

			CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L180	49	L179 NOT L175	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2022/05/12 10:01 AM
L181	22	L179 NOT L175	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/05/12 10:01 AM
L182	2	"20080086731"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/05/12 10:06 AM
L183	43188	virtual manage\$5 virtualization	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2022/05/12 10:08 AM
L184	10484	virtual physical virtualization layer	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO,	WITH	ON	ON	2022/05/12 10:09 AM

L185	2824	virtual physical manage\$5 virtualization ADJ layer	NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2022/05/12 10:09 AM
L186	1632	virtual physical manage\$5 virtualization ADJ layer	(US-PGPUB; USPAT; USOCR)	WITH	ON	ON	2022/05/12 10:09 AM
L187	1	L186 AND L173	(US-PGPUB; USPAT; USOCR)	WITH	ON	ON	2022/05/12 10:09 AM
L188	2	"20060149842"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/05/12 10:14 AM
L189	15	((US-20080086731-A1 OR US-20050155033- A1 OR US- 20060149842-A1 OR US-20050125537-A1 OR US-20040015600- A1 OR US- 20060069761-A1 OR US-20050044301-A1 OR US-20060184937- A1 OR US- 20050223221-A1 OR US-20030236956-A1 OR US-20020166117- A1 OR US- 20050198062-A1 OR US-20030236882- A1).did. AND PGPB.dbnm.) OR ((US- 7577722-B1 OR US- 6490620-B1).did. AND USPT.dbnm.)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/30 11:44 AM
L190	45	physical resources execut\$4 virtual assets	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	WITH	ON	ON	2022/08/30 11:45 AM

L191	0	L189 AND L190	EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2022/08/30 11:46 AM
L192	23	physical resources	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2022/08/30 11:46 AM
L193	640	execut\$4 virtual assets physical resources virtual assets	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2022/08/30 11:50 AM
L194	0	L193 L189	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK,	AND	ON	ON	2022/08/30 11:50 AM

L195	0	L189 AND physical virtual assets	TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2022/08/30 11:51 AM
L196	10	L189 AND physical virtual	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2022/08/30 11:51 AM
L197	3	"17074500"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2022/12/07 03:17 PM
L198	17	((("PABARI") near3 ("Vipul"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/08 08:16 AM
L199	22	L44 L42	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2023/01/12 11:16 AM
L200	22	L42 L44	(US-PGPUB; USPAT;	AND	OFF	OFF	2023/01/12

L201	60	L47 L39	USOCR; IBM_TDB) (US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	11:16 AM 2023/01/12 11:16 AM
L202	185222	"709".clas.	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2023/01/12 11:16 AM
L203	117	L50 L49	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2023/01/12 11:16 AM
L204	117	L51 not L26	(US-PGPUB; USPAT; USOCR; IBM_TDB)	AND	OFF	OFF	2023/01/12 11:16 AM
L205	220	virtualization near layer near5 manag\$6 near5 virtual (asset\$2 or resourc\$2)	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2023/01/12 11:17 AM
L206	4898	L91 and L87	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2023/01/12 11:17 AM
L207	3288	L91 and L88	(US-PGPUB; USPAT; USOCR)	SAME	OFF	OFF	2023/01/12 11:17 AM
L208	47	(Artificial Intelligence) Similar to: 17/074,500 with 0 CPC Selections and 0 Text Selections Text: (US-11249816-B2 OR US-20210288793-A1 OR US-20210306142- A1 OR US-10728024- B2 OR US-10756886- B2 OR US-11025411- B2 OR US- 20220012105-A1 OR US-11050554-B2 OR US-20200389296-A1 OR CN-112732447-A OR US-7353418-B2 OR US-20030177287-A1 OR CN-109891831-A OR CN-113806260-A OR EP-3823245-A1 OR EP-3451635-B1 OR US-20210191750-A1 OR US-10389591-B2 OR US-20180123890- A1 OR US- 20190342171-A1 OR US-10924431-B2 OR EP-3533182-A1 OR WO-2018080941-A1 OR JP- WO2011064811-A1 OR US-10949248-B2 OR US-10812413-B2 OR WO-2011064811-A1 OR JP-5447532-B2 OR EP-2748713-B1 OR	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2023/01/12 11:17 AM

L209	49	<p>US-20120297126-A1 OR US-9935829-B1 OR US-8793446-B2 OR US-20160127184-A1 OR US-20090031302- A1 OR JP- WO2014027416-A1 OR CN-114745263-A OR US-9251115-B2 OR WO-2014027416-A1 OR KR-20100025980-A OR US-20140258446- A1 OR EP-2965202-A1 OR WO-2014138206- A1 OR US-10931527- B2 OR US-10263842- B2 OR EP-2965202-B1 OR KR-101007356-B1 OR US-20210409270- A1 OR JP-5930046-B2 OR US-20190199590- A1 OR US-11200104- B2).did.</p> <p>(Artificial Intelligence) Similar to: 17/074,500 with 9 CPC Selections and 2 Text Selections</p> <p>Text: (US-11249816-B2 OR US-20210306142-A1 OR US-20210288793- A1 OR US-10728024- B2 OR US-11050554- B2 OR US-10756886- B2 OR EP-3823245-A1 OR CN-112732447-A OR US-11025411-B2 OR EP-3451635-B1 OR US-20200389296-A1 OR CN-113806260-A OR US-20220012105- A1 OR US-11200104- B2 OR US-10824360- B2 OR US- 20210255915-A1 OR US-20220107741-A1 OR US-10712963-B2 OR US-20200393986- A1 OR US-10389591- B2 OR EP-3533182-A1 OR WO-2018080941- A1 OR US- 20180123890-A1 OR US-20190342171-A1 OR US-11137922-B2 OR US-20210271403-</p>	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2023/01/12 11:17 AM
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L210	39	<p>A1 OR US-20210318823-A1 OR CN-104125149-A OR CN-104125149-B OR US-10963176-B2 OR US-20200356294-A1 OR US-10990309-B2 OR US-11029870-B2 OR US-20210365199-A1 OR CN-109891831-A OR US-10824358-B2 OR US-10768842-B2 OR US-20210141552-A1 OR US-10795595-B2 OR US-11093311-B2 OR EP-2797261-A1 OR US-10326654-B2 OR US-10732879-B2 OR EP-2797261-B1 OR US-20210191750-A1 OR US-10768841-B2 OR US-10922124-B2 OR US-20160127184-A1 OR US-11016832-B2 OR US-11307787-B2).did.</p> <p>(US-11249816-B2 OR US-20210306142-A1 OR US-20210288793-A1 OR US-10728024-B2 OR US-11050554-B2 OR US-10756886-B2 OR EP-3823245-A1 OR CN-112732447-A OR US-11025411-B2 OR EP-3451635-B1 OR US-20200389296-A1 OR CN-113806260-A OR US-20220012105-A1 OR US-11200104-B2 OR US-10824360-B2 OR US-20210255915-A1 OR US-20220107741-A1 OR US-10712963-B2 OR US-20200393986-A1 OR US-10389591-B2 OR EP-3533182-A1 OR WO-2018080941-A1 OR US-20180123890-A1 OR US-20190342171-A1 OR US-11137922-B2 OR US-20210271403-A1 OR US-20210318823-A1 OR CN-104125149-A OR CN-104125149-B OR</p>	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/01/12 11:18 AM
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		US-10963176-B2 OR US-20200356294-A1 OR US-10990309-B2 OR US-11029870-B2 OR US-20210365199- A1 OR CN-109891831- A OR US-10824358-B2 OR US-10768842-B2 OR US-20210141552- A1 OR US-10795595- B2 OR US-11093311- B2 OR EP-2797261-A1 OR US-10326654-B2 OR US-10732879-B2 OR EP-2797261-B1 OR US-20210191750-A1 OR US-10768841-B2 OR US-10922124-B2 OR US-20160127184- A1 OR US-11016832- B2 OR US-11307787- B2).did.					
L211	19	((("PABARI") near3 ("Vipul"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/12/21 12:39 PM
L212	26	((("PABARI") near3 ("Vipul"))).INV.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/21 12:39 PM
L213	4	(virtualization system AND center application AND physical resources AND virtual assets).clm.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2023/12/21 12:40 PM

L214	2	L212 AND L213	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2023/12/21 12:40 PM
L215	17	(virtualization system AND physical resources AND virtual assets).clm.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2023/12/21 12:42 PM
L216	6	L215 L212	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	AND	ON	ON	2023/12/21 12:42 PM
L217	15	((US-20080086731-A1 OR US-20050155033-A1 OR US-20060149842-A1 OR US-20050125537-A1 OR US-20040015600-A1 OR US-20060069761-A1 OR US-20050044301-A1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO,	AND	ON	ON	2023/12/21 01:43 PM

		OR US-20060184937-A1 OR US-20050223221-A1 OR US-20030236956-A1 OR US-20020166117-A1 OR US-20050198062-A1 OR US-20030236882-A1).did. AND PGPB.dbnm.) OR ((US-7577722-B1 OR US-6490620-B1).did. AND USPT.dbnm.)	MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L218	3	request\$3 portion AND L217	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	WITH	ON	ON	2023/12/21 01:43 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N61	10106	(manage\$4 virtual\$6 environment (resource\$4 or asset\$2) physical host allocat\$4)	(USPAT)	AND	OFF	OFF	2012/04/10 02:47 PM
N62	76	((virtual adj machine) or VM) same new same physical same host	(USPAT)	AND	OFF	OFF	2012/04/10 02:47 PM
N63	206	"S13" (load adj (shar\$4 or balanc\$4))	(USPAT)	AND	OFF	OFF	2012/04/10 02:47 PM
N64	10106	(manage\$4 virtual\$6 environment (resource\$4 or asset\$2) physical host allocat\$4)	(USPAT)	AND	OFF	OFF	2012/04/10 02:47 PM
N65	45876	"S2" "S8"	(USPAT)	AND	OFF	OFF	2012/04/10 02:47 PM
N66	78	(manage\$4 virtual\$6 resource\$4 physical).ab.	(USPAT)	AND	OFF	OFF	2012/04/10 02:47 PM
N67	23872	709/223,224,226,229,220,221.ccls.	(USPAT)	AND	OFF	OFF	2012/04/10 02:47 PM
N68	21589	"I3" "I4"	(USPAT)	AND	OFF	OFF	2012/04/10

N69	593	(manage\$4 virtual\$6 environment inventory resource\$4 prioritiz\$4 physical host)	(USPAT)	AND	OFF	OFF	02:47 PM 2012/04/10 02:47 PM
N70	2	("20050138165" "20050155033" "20060294238" "20070067435" "20080086731" "7463648" "7512769").PN.	(USPAT)	AND	OFF	OFF	2012/04/10 02:48 PM
N71	0	(manage\$4 virtual\$6 environment inventory resource\$4 prioritiz\$4 physical host).clm.	(USPAT)	AND	OFF	OFF	2012/04/10 02:48 PM
N72	593	(manage\$4 virtual\$6 environment inventory resource\$4 prioritiz\$4 physical host)	(USPAT)	AND	OFF	OFF	2012/04/10 02:48 PM
N73	497	"L26" "L18"	(USPAT)	AND	OFF	OFF	2012/04/10 02:48 PM
N74	0	N73 N72	(USPAT)	AND	OFF	OFF	2012/04/10 02:48 PM
N75	463	N69 N64	(USPAT)	AND	OFF	OFF	2012/04/10 02:49 PM
N76	0	N62 N72	(USPAT)	AND	OFF	OFF	2012/04/10 02:49 PM
N77	9	pabari.in.	(USPAT)	AND	OFF	OFF	2012/04/10 02:49 PM
N78	14	pabari.in.	(USPAT)	AND	OFF	OFF	2022/01/06 12:43 PM
N79	2	("20050138165" "20050155033" "20060294238" "20070067435" "20080086731" "7463648" "7512769").PN.	(USPAT)	AND	OFF	OFF	2022/01/06 12:43 PM
N80	116	N66 AND ((H04L47/70 OR H04L41/0896 OR H04L67/10 OR H04L41/0806 OR H04L67/1097 OR H04L41/12 OR H04L67/1002 OR H04L41/0893 OR H04L12/4641 OR H04L41/22 OR H04L47/822 OR H04L41/5054 OR H04L67/1008 OR H04L41/0816 OR H04L41/5025 OR H04L41/5096 OR H04L43/0876 OR H04L63/08 OR H04L43/16 OR	(USPAT)	AND	OFF	OFF	2022/01/06 12:44 PM

N81	17	H04L47/783).cpc.) N62 N72	(USPAT)	AND	OFF	OFF	2023/01/12 11:17 AM
N82	1896	N69 N64	(USPAT)	AND	OFF	OFF	2023/01/12 11:17 AM
N83	0	N73 N72	(USPAT)	AND	OFF	OFF	2023/01/12 11:17 AM
N84	937	"L26" "L18"	(USPAT)	AND	OFF	OFF	2023/01/12 11:17 AM



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
18/135,007	04/14/2023	Vipul Pabari	367894-991103

CONFIRMATION NO. 8901

26379
DLA PIPER LLP (US)
2000 UNIVERSITY AVENUE
EAST PALO ALTO, CA 94303-2248

PUBLICATION NOTICE



OC000000060430619

Date Mailed: 08/11/2023

Title:VIRTUAL SYSTEMS MANAGEMENT

Publication No.US-2023-0251911-A1

Publication Date:08/10/2023

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 Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, 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 <https://portal.uspto.gov/pair/PublicPair>. 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 Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO.	TOT CLAIMS	IND CLAIMS
18/135,007	04/14/2023		664	367894-991103	20	3

CONFIRMATION NO. 8901

26379

DLA PIPER LLP (US)
2000 UNIVERSITY AVENUE
EAST PALO ALTO, CA 94303-2248

FILING RECEIPT



0000000056526732

Date Mailed: 05/01/2023

Receipt is acknowledged of this non-provisional utility 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 FIRST INVENTOR, 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 corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction 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 provided that the request is grantable.

Inventor(s)

Vipul Pabari, Carlsbad, CA;

Applicant(s)

ToutVirtual, Inc., Carlsbad, CA;

Power of Attorney: The patent practitioners associated with Customer Number 26379

Domestic Priority data as claimed by applicant

This application is a CON of 17/074,500 10/19/2020
which is a CON of 15/201,087 07/01/2016 PAT 10,810,050
which is a CON of 14/450,765 08/04/2014 PAT 9,444,762
which is a CON of 11/503,090 08/10/2006 PAT 8,799,431
which claims benefit of 60/708,473 08/15/2005

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: Yes

Permission to Access Search Results: Yes

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: 04/28/2023

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 18/135,007**

Projected Publication Date: 08/10/2023

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

VIRTUAL SYSTEMS MANAGEMENT

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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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.

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page 2 of 4

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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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 18/135,007			
APPLICATION AS FILED - PART I									
(Column 1)		(Column 2)		SMALL ENTITY		OTHER THAN SMALL ENTITY			
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)		
BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A	64		N/A			
SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A	280		N/A			
EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A	320		N/A			
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	20 minus 20 =	*	0	x = 0	OR				
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	3 minus 3 =	*		x = 0					
APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	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					
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0					
				TOTAL		TOTAL			
* If the difference in column 1 is less than zero, enter "0" in column 2.				664					
APPLICATION AS AMENDED - PART II									
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OTHER THAN SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total <small>(37 CFR 1.16(i))</small>	* Minus **	=	x =		OR	x =		
	Independent <small>(37 CFR 1.16(h))</small>	* Minus ***	=	x =		OR	x =		
	Application Size Fee (37 CFR 1.16(s))					OR			
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					OR			
				TOTAL ADD'L FEE		TOTAL ADD'L FEE			
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total <small>(37 CFR 1.16(i))</small>	* Minus **	=	x =		OR	x =		
	Independent <small>(37 CFR 1.16(h))</small>	* Minus ***	=	x =		OR	x =		
	Application Size Fee (37 CFR 1.16(s))					OR			
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					OR			
				TOTAL ADD'L FEE		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.									

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POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS	Application Number	11/503,090
	Filing Date	August 10, 2006
	First Named Inventor	Vipul PABARI
	Title	Virtual Systems Management
	Art Unit	2146
	Examiner Name	David S. Ampagoomian
	Attorney Docket Number	367894-000003

I hereby revoke all previous powers of attorney given in the above-identified application.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

26379

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified application to:

☒ The address associated with the above-mentioned Customer Number.

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the:

☒ Applicant/Inventor.

OR

☐ Assignee of record of the entire interest. See 37 CFR 3.71.

Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____.

SIGNATURE of Applicant or Assignee of Record

Signature

Date

Name

Telephone

Title and Company

ToutVirtual, Inc. - CTO - This person is authorized to act on behalf of the assignee.

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☒ *Total of 1 forms are submitted.

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.

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: TOUTVIRTUAL, INC.

Application No./Patent No.: _____ Filed/Issue Date: HEREWITH

Titled: VIRTUAL SYSTEMS MANAGEMENT

TOUTVIRTUAL, INC., 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 054187, Frame 0298, 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: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

2. 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.

[Page 1 of 2]

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.**

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STATEMENT UNDER 37 CFR 3.73(c)

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Reel _____, Frame _____, or for which a copy thereof is attached.

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The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, 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.

/Thomas J. Fuller/

Signature

Thomas J. Fuller

Printed or Typed Name

April 14, 2023

Date

74439

Title or Registration Number

A S S I G N M E N T

I, **VIPUL PABARI**, residing at 7349 Spinnaker Street, Carlsbad, California 92011 U.S.A., for good and valuable consideration, have assigned and do hereby assign to **TOUTVIRTUAL, INC.**, having a principal business address of 7033 Llama Street, Carlsbad, California 92009, U.S.A., its successors, assigns and legal representatives, the entire right, title and interest in and to all subject matter disclosed in the application for Letters Patent of the United States Patent Application No. 11/503,090 and PCT Patent Application No. PCT/US06/31193, both of which were filed on August 10, 2006 entitled:

VIRTUAL SYSTEMS MANAGEMENT

and in and to all Convention and Treaty rights of all kinds, in all countries throughout the world, for all such subject matter, including the right to claim for any such applications any priority rights to which such applications are entitled under international conventions, treaties or otherwise and, in and to, all Letters Patent to be obtained for said subject matter by the above application or any continuation, division, continuation-in-part, extension, conversion to 35 USC 111(b) or substitute thereof, and any reissue, reexamination or extension of said Letters Patent.

I agree to do all acts and sign all documents necessary to secure, defend and maintain all said Letters Patent and rights, including any continuations, divisionals, reissues, renewals and extensions, and request issuance of all said Letters Patent to the above Assignee in accordance with this assignment.

DATE: Oct 27th 2006

Vipul Pabari
VIPUL PABARI

WITNESSED:

DATE: 10-27-06

Jennifer Vail
[SIGNATURE OF WITNESS]
Jennifer Vail
[PRINTED NAME OF WITNESS]

WITNESSED:

DATE: _____

[SIGNATURE OF WITNESS]

[PRINTED NAME OF WITNESS]

SD 830487 v1 (41965.0003)

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:		VIRTUAL SYSTEMS MANAGEMENT		
First Named Inventor/Applicant Name:		Vipul Pabari		
Filer:		Thomas James Fuller/Nicole Brown		
Attorney Docket Number:		367894-991103		
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY FILING FEE (ELECTRONIC FILING)	4011	1	64	64
UTILITY SEARCH FEE	2111	1	280	280
UTILITY EXAMINATION FEE	2311	1	320	320
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 (\$)				664

Electronic Acknowledgement Receipt	
EFS ID:	47846187
Application Number:	18135007
International Application Number:	
Confirmation Number:	8901
Title of Invention:	VIRTUAL SYSTEMS MANAGEMENT
First Named Inventor/Applicant Name:	Vipul Pabari
Customer Number:	26379
Filer:	Thomas James Fuller/Nicole Brown
Filer Authorized By:	Thomas James Fuller
Attorney Docket Number:	367894-991103
Receipt Date:	14-APR-2023
Filing Date:	
Time Stamp:	18:05:28
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$ 664
RAM confirmation Number	E20234DI07315646
Deposit Account	071896
Authorized User	Nicole Brown
<p>The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:</p> <p>37 CFR 1.21 (Miscellaneous fees and charges)</p>	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	WebADS.pdf	191843	no	8
			cef5cb51055f1317ccf42767e1353d99b5fe3edb		
Warnings:					
Information:					
2		367894_991103_US_CON4_Application.pdf	255496	yes	40
			060ac604ee80bc945f2ea8a599cec118e3950b4a		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	35	
	Claims		36	39	
	Abstract		40	40	
Warnings:					
Information:					
3	Drawings-other than black and white line drawings	367894_991103_Drawings.pdf	561470	no	18
			85ff671a299cc3d4ec65d85409e1b24781b70f57		
Warnings:					
Information:					
4	Oath or Declaration filed	367894_991103_Oath.pdf	110603	no	2
			7c6d8b4fe7edae1397cd361e274df31837c64de2		
Warnings:					
Information:					
5	Power of Attorney	367894_991103_POA.pdf	99202	no	1
			f7b82d959a87657bc59e9d55df2e157286918391		

Warnings:					
Information:					
6	Assignee showing of ownership per 37 CFR 3.73	367894_991103_AIA0096.pdf	140680	no	5
			21be4b8513da6091236ff36383eb5cc7357f0ebd		
Warnings:					
Information:					
7	Fee Worksheet (SB06)	fee-info.pdf	44312	no	2
			a1118d5a3eb7794bb33025fdb408699a8268db59		
Warnings:					
Information:					
Total Files Size (in bytes):			1403606		
<p>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.</p> <p><u>New Applications Under 35 U.S.C. 111</u> 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.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> 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.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> 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.</p>					

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	367894-991103
		Application Number	
Title of Invention	VIRTUAL SYSTEMS MANAGEMENT		
<p>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.</p> <p>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.</p>			

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					
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Vipul		Pabari		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Carlsbad	State/Province	CA	Country of Residence ⁱ	US
Mailing Address of Inventor:					
Address 1	7033 Llama Street				
Address 2					
City	Carlsbad	State/Province	CA		
Postal Code	92009	Country ⁱ	US		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. <div style="text-align: right;"><input type="button" value="Add"/></div>					

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.			
Customer Number	26379		
Email Address	paloaltopatentdocket@us.dlapiper.com	<input type="button" value="Add Email"/>	<input type="button" value="Remove Email"/>

Application Information:

Title of the Invention	VIRTUAL SYSTEMS MANAGEMENT		
Attorney Docket Number	367894-991103	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	18	Suggested Figure for Publication (if any)	

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	367894-991103
		Application Number	
Title of Invention	VIRTUAL SYSTEMS MANAGEMENT		

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

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		26379			
Prefix	Given Name	Middle Name	Family Name	Suffix	Remove
Registration Number					
Prefix	Given Name	Middle Name	Family Name	Suffix	Remove
Registration Number					
Additional Representative Information blocks may be generated within this form by selecting the Add button.					

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	367894-991103
		Application Number	
Title of Invention	VIRTUAL SYSTEMS MANAGEMENT		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim 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.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status		Pending		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
	Continuation of	17074500	2020-10-19		
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
17074500	Continuation of	15201087	2016-07-01	10810050	2020-10-20
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15201087	Continuation of	14450765	2014-08-04	9444762	2016-09-13
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14450765	Continuation of	11503090	2006-08-10	8799431	2014-08-05
Prior Application Status		Expired		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
11503090	Claims benefit of provisional	60708473	2005-08-15		
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.					

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. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(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).

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	367894-991103
		Application Number	
Title of Invention	VIRTUAL SYSTEMS MANAGEMENT		
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.			

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

<p>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.</p> <p>☐ NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.</p>
--

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	367894-991103
		Application Number	
Title of Invention	VIRTUAL SYSTEMS MANAGEMENT		

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is 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 State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	367894-991103
		Application Number	
Title of Invention	VIRTUAL SYSTEMS MANAGEMENT		

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			
<p>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.</p>			
			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: <input type="text"/>			
If the Applicant is an Organization check here. ☒			
Organization Name	ToutVirtual, Inc.		
Mailing Address Information For Applicant:			
Address 1	7033 Llama Street		
Address 2			
City	Carlsbad	State/Province	CA
Country ¹	US	Postal Code	92009
Phone Number		Fax Number	
Email Address			
Additional Applicant Data may be generated within this form by selecting the Add button.			

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	367894-991103
		Application Number	
Title of Invention	VIRTUAL SYSTEMS MANAGEMENT		

Assignee Information including Non-Applicant Assignee 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.

Assignee 1				
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.				
If the Assignee or Non-Applicant Assignee is an Organization check here. ☐				
Prefix	Given Name	Middle Name	Family Name	Suffix
Mailing Address Information For Assignee including Non-Applicant Assignee:				
Address 1				
Address 2				
City		State/Province		
Country i		Postal Code		
Phone Number		Fax Number		
Email Address				
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.				

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	367894-991103
		Application Number	
Title of Invention	VIRTUAL SYSTEMS MANAGEMENT		

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Thomas J. Fuller/			Date (YYYY-MM-DD)	
First Name	Thomas J.	Last Name	Fuller	Registration Number	74439
Additional Signature may be generated within this form by selecting the Add button.					

VIRTUAL SYSTEMS MANAGEMENT**RELATED APPLICATIONS/PRIORITY CLAIMS**

This application is a continuation of and claims priority under 35 USC 120 to U.S. Patent Application Serial No. 17/074,500 filed October 19, 2020 and entitled “Virtual Systems Management” which in turn is a continuation of and claims priority under 35 USC 120 to U.S. Patent Application Serial No. 15/201,087 filed July 1, 2016 and entitled “Computer Network Systems to Manage Computer Network Virtualization Environments” which in turn is a continuation of and claims priority under 35 USC 120 to U.S. Patent Application Serial No. 14/450,765 filed on August 4, 2014 and entitled “Computer Network Systems to Manage Computer Network Virtualization Environments” which in turn is a continuation of and claims priority under 35 USC 120 to U.S. Patent Application Serial No. 11/503,090 filed on August 10, 2006 and entitled “Virtual Systems Management” which in turn claims priority under 35 USC 119(e) to U.S. Provisional Patent Application No. 60/708,473, filed on August 15, 2005, the contents of all of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION**1. Field of the Invention.**

The present invention relates generally to computer network systems and, more particularly, to management of computer network virtualization environments.

2. Description of the Related Art.

Information Technology (IT) management tasks can be characterized into two general areas, managing present day operations and forecasting capacity for future operations. Ensuring the well being of the current IT environment while using current trends to predict needs and trends for the future business needs is a fine balance and a highly refined skill. Management needs all the help and tools it can find to assist it in these tasks. Today, all major IT management platforms support the International Telecommunications Union (ITU) standard for Element Management Systems (EMS), wherein general functionality can be split into five key areas: Fault, Configuration, Accounting, Performance, and Security (FCAPS).

This conventional methodology has created an element-driven management system, with a focus on ensuring that each of the individual elements are running to their full potential. As the number of elements grew, the need for aggregated and correlated information increased. As the number of data-center locations grew, the need for global visibility and control increased.

5 Conventionally, IT capacity planning for day-to-day operations is typically carried out with a bottom-up data aggregation and with the use of forecasting methods such as trending, simulation, and custom analytics.

Capacity planning for resources is also typically completed when new business applications are rolled out or during an application upgrade cycle. In this capacity planning

10 scenario, the planning is typically carried out at the individual device level, which is then multiplied by the number of consumers and/or producers and further multiplied by the number of locations that need to be supported, giving a large number in the aggregate: (number of individual devices) x (number of consumers/producers) x (number of locations requiring support).

15 In order to estimate what resource capacity an enterprise will need to support the core business applications it provides, an enterprise will typically evaluate the worst case usage scenario, and bolster its capacity to ensure that a worst case scenario will be adequately supported. What is often overlooked is that this type of worst-case capacity planning typically is driven by the vendors who have built ROI calculators that are to their benefit.

20 By planning and bulking up resources to combat this evasive worst case scenario, enterprises typically end up with under-utilized IT resources. Applying the Pareto Principle, an estimate of how much under-utilized capacity can exist in a single enterprise would be as follows: only 20% of the available capacity ends up being used during 80% of the time during a given timeframe.

25 Many improvements have been made in the enterprise scenario for management of IT resources. At the macro-level, IT resources can be classified into 4 categories: (1) client resources (client resource examples include desktop machines, wireless, handheld devices, client grids (such as SETI@home and the like); (2) server resources (server resource examples include mainframe, File Server, Web server, peer-to-peer servers, blade servers, grid servers etc.); (3)

30 network resources (network resource example include routers, switches, bridges, infiniband,

wireless, radio, optical, fiber channel, link aggregation technologies (such as BitTorrent and the like); (4) storage resources (storage resource example include databases, network attached storage, storage area networks, data grids etc.). While one can describe a capacity planning scenario for each of the categories above, they all follow a very similar capacity planning process.

In the following example, we will describe a typical server resource capacity planning scenario. Servers in the enterprise have evolved with new application architecture. Application topologies have evolved from Mainframe-Green Screen interaction, to Client/Server, to Client/Web Server/Application Server/Database, Peer-to-Peer, and so forth. Server resource capacity planning is typically achieved by stress-testing the application with a certain predetermined workload and a set, acceptable application response time. A hardware specification is defined to support a user-defined worst-case scenario. The application is rolled out on the new hardware into a production environment.

Server resource and application utilization is monitored by a FCAPS-compliant management platform to provide complete visibility over operations. In order to provide an aggregated summary view, such management platforms typically roll-up element-level metrics into higher level metrics through data correlation techniques.

Conventionally, with the emergence of resource virtualization and the increase in use of Web services, combined with service-oriented architectures (SOAs), the number of moving pieces that need to be managed for the enterprise continues to rise. For example, imagine an enterprise running composite applications. That enterprise would include using a mixture of legacy, local, and external Web services, running on virtual infrastructure spread globally across the enterprise, and frustrated end users can't complete their mission critical business tasks. It is difficult to achieve sufficient visibility and control to manage such an environment, and knowing where to begin to manage such an environment can be difficult.

Traditional methods of resource planning at the individual physical resource level begin to show their age. For example, correlation and aggregation of element level data also becomes compute-intensive with the increase in the number of managed elements. It has been said that "The information technology industry is in a strange situation. We have enormously sophisticated engines that we're running--in the form of CPUs and communications equipment

and so forth, but the way we keep them running is through an outdated vision.” Doug Busch, Intel Vice President and CIO-Technology quoted in Intel Magazine, September/October 2004 (available at the URL of: www.intel.com/update/contents/it09041.htm as of June 2005). Management of virtual assets can be achieved conventionally with virtualization software tools, but such techniques are typically labor intensive and require manual selection and implementation of configurations and utilize relatively cumbersome configuration change management.

In network systems, with virtualization, it is possible to deploy physical resources in the form of virtual assets. The assets can thereby provide the functional equivalent of desktops (user interfaces), operating systems, applications, servers, data bases, and the like. Adding additional applications can be implemented by remotely executed software operations in virtual environments on one or more computers, rather than physical installations involving personnel with an installation CD media at each physical location (computer) of a network where the additional applications are desired.

The management of such virtual assets, however, is becoming increasingly complex and unwieldy. Many tools to assist in the management of virtualization environments are proprietary and work only with virtual environments from particular vendors. Similarly, some virtualization tools might only work with specific central processor units (CPUs) of machines that host the virtual environment, or might only work with specific operating systems or virtualization platforms of either the host machine or in the virtual environment. This characteristic can make it necessary to have multiple tools on hand for the various platforms and vendors that might be deployed throughout a network, as well as making it necessary to acquire and maintain the skill sets necessary to use such tools. The mere fact of requiring such diverse tools is, itself, inefficient. Thus, although virtualization trends show much promise for more efficient utilization of physical resources by optimal deployment of virtual assets, the virtualization environment management task is daunting.

It would be advantageous if more efficient means for managing virtual environments across computer networks were available. The present invention satisfies this need.

SUMMARY

The present invention provides methods and apparatus for management of one or more virtual environments regardless of any underlying central processing unit (CPU) specification and regardless of any underlying operating system (OS) or virtualization environment. In one
5 embodiment of the present invention the virtualization environment is managed through a Control Center application that provides an interface to virtualization environments in communication with the Control Center computer. The system, through the Control Center, provides active management of the virtualization environment by initiating automatic responses to operational situations that influence dynamic demands on the physical resources and virtual
10 assets. In this way, multiple virtual environments can be managed through a single user interface of a Control Center application even where the underlying CPU of the system physical resources are different from that of the Control Center, even where the operating systems of the Control Center, physical resources, and virtual assets are different, and even where the virtualization environments being managed are different from each other.

15 In one embodiment, the Control Center can comprise a collection of functional elements characterized as an Asset Manager, a Provisioning Manager, a Dynamic Application Router, an Optimizer, a Performance Manager, and a Capacity Planning Manager. With these functional elements, the process of managing the virtual environment comprises a sequence of building an inventory of available physical resources and virtual assets, provisioning the assets for a desired
20 network virtual configuration, optimizing the mix of physical resources and virtual assets, reporting on the system performance, and planning for future trends and forecasting for needed capacity.

In another embodiment, management of computer network virtualization environments is provided by performing one or more functions from among the set of functions including (1)
25 identification and management of network resources and virtual assets, (2) provisioning of virtual assets in response to network workflow demands, (3) dynamic deployment of virtual assets across the computer network, (4) performance measurement and reporting of resources and virtual assets, and (5) planning and forecasting of resource demands and asset utilization of the virtualization environment, such that the functions are carried out without regard to
30 processors, operating systems, virtualization platforms, and application software of the

virtualization environment. In this way, an inventory of resources and assets available at a network virtualization environment is determined, prioritization is assigned to an inventory of available resources and assets, and the inventory is utilized by allocating the virtual assets in the virtualization environment. The allocated virtualization environment is automatically managed
5 by determining real time performance metrics for the environment, and producing a reallocation of the inventory based on the real time performance metrics. In this way, automatic and efficient virtualization management of a computer network is provided.

Other features and advantages of the present invention should be apparent from the following description of the preferred embodiment, which illustrates, by way of example, the
10 principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Various embodiments of the present invention taught herein are illustrated by way of example, and not by way of limitation, in the FIG. s of the accompanying drawings, in which:

FIG. 1 is a schematic diagram that illustrates a virtualization system embodiment
15 constructed in accordance with the invention;

FIG. 2 is a schematic diagram that illustrates the Control Center components for the Control Center computers illustrated in FIG. 1;

FIG. 3 is a schematic diagram that illustrates the configuration of a virtualization platform network computer shown in FIG. 1;

20 FIG. 4 is a schematic diagram that shows the construction of the Control Agent in the computer of FIG. 3;

FIG. 5 is a flow diagram that illustrates the operation of the Control Center and Control Agent;

FIG. 6 is a representation of the virtualization configuration with which the present
25 invention can be deployed;

FIG. 7 is a screen shot of a display produced by the user interface of the Control Center computers of FIG. 1;

FIG. 8 is a screen shot of the Physical View display page of the user interface, accessed from the Control Center computers of FIG. 1;

FIG. 9 is a screen shot illustration of a Control Center display that shows a topology view of the virtual environment under management;

5 FIG. 10 is an expanded view screen shot of the topology view shown in FIG. 9;

FIG. 11 is a block diagram representation of a server virtualization configuration management that can be implemented from a computer such as illustrated in FIG. 1;

FIG. 12 is a block diagram representation of a storage virtualization configuration management that can be implemented from a computer such as illustrated in FIG. 1;

10 FIG. 13 is a block diagram representation of a network router virtualization configuration management that can be implemented from a computer such as illustrated in FIG. 1;

FIG. 14 is a block diagram representation of a desktop computer virtualization configuration management that can be implemented from a computer such as illustrated in FIG. 1;

15 FIG. 15 is a screen shot of the Physical View display page of the user interface for a storage virtualization, accessed from the Control Center computers of FIG. 1;

FIG. 16 is a flow diagram that illustrates operation of the computer such as illustrated in FIG. 1;

20 FIG. 17 is a flow diagram that illustrates operation of Knowledge Block processing so the computer such as illustrated in FIG. 1 can operate; and

FIG. 18 is a flow diagram that illustrates operation of the Control Center interface for the computers illustrated in FIG. 1.

25 In the drawings, like reference numerals refer to like structures. It will be recognized that some or all of the Figures are schematic representations for purposes of illustration and do not necessarily depict the actual relative sizes or locations of the elements shown. The Figures are provided for the purpose of illustrating one or more embodiments of the invention with the explicit understanding that they will not be used to limit the scope or the meaning of the claims.

DETAILED DESCRIPTION

In the following paragraphs, the present invention will be described in detail by way of example with reference to the attached drawings. While this invention is capable of embodiment in many different forms, there is shown in the drawings and will herein be described in detail specific embodiments, with the understanding that the present disclosure is to be considered as an example of the principles of the invention and not intended to limit the invention to the specific embodiments shown and described. That is, throughout this description, the embodiments and examples shown should be considered as exemplars, rather than as limitations on the present invention. Descriptions of well known components, methods and/or processing techniques are omitted so as to not unnecessarily obscure the invention. As used herein, the "present invention" refers to any one of the embodiments of the invention described herein, and any equivalents. Furthermore, reference to various feature(s) of the "present invention" throughout this document does not mean that all claimed embodiments or methods must include the referenced feature(s).

FIG. 1 is an illustration of a network implementation of a virtualization environment constructed in accordance with the invention for virtualization system management such that resource utilization is highly leveraged. Users at network computers 102, 104, 106 can communicate over a network 108 to gain access to system resources that are available through Control Center computers such as Control Center A 110 and Control Center B 112. Each of the Control Center computers 110, 112 executes application software and thereby manages one or more virtual environments regardless of any underlying central processing unit (CPU) and regardless of any underlying operating system (OS) or virtualization platform software. For example, a Control Center computer can manage resources and virtual assets that are powered by CPUs from Intel Corporation of Santa Clara, California USA or from Motorola, Inc. of Schaumburg, Illinois USA, or other vendors. The physical resources and virtual assets can be managed from the Control Center computers whether the underlying OS of the computers, resources, and assets is a Windows-based OS from Microsoft Corporation of Redmond, Washington USA or a Macintosh OS from Apple Computer Inc. of Cupertino, California USA or others, and whether the virtualization environment is a platform by VMWare, Inc. of Palo Alto, California USA or International Business Machines Corporation of Armonk, New York USA or

others. Operating parameters of the virtualization system management can be specified and changed at the Control Center computers 110, 112 through a user interface that is provided by the application software described herein executing at the respective Control Center computers 110, 112. The Control Center computers are represented in FIG. 1 as physical devices rather than virtual assets. Deployment of the Control Center on physical devices is typical, because otherwise a Control Center that is deployed on a virtual asset would leave the users with being dependent on their virtualization platform for configuration management and the like, in addition to the usual machine dependencies.

In this description, physical devices such as computers, printers, routers, and other "boxes" will be referred to as resources, whereas virtual devices that exist only as software instantiations of equipment objects in a virtual environment will be referred to as virtual assets. The resource-asset dichotomy will be maintained throughout this discussion.

The present invention provides automated management of network-based virtual environments through Control Center software that supports on-demand operation of one or more functions including (1) identification and management of enterprise resources and virtual assets, (2) provisioning of virtual assets in response to network workflow demands, (3) dynamic deployment (routing) of virtual assets across the network, (4) performance measurement and reporting of virtual assets and resources, and (5) planning and forecasting of resource demands and asset utilization. Such operations are carried out without regard to the mix of otherwise proprietary processors, operating systems, virtualization platforms, application software, and protocols. These features and functions are provided in a modular fashion so that desired functions can be included in the system, and functions not desired can be excluded from the system. In any implementation in accordance with the present invention, the virtualization management system is transparent to the virtual environment being managed, in that the system can support multiple virtual environments with different protocols and operating specifications. Thus, the disclosed system is platform-independent.

FIG. 1 shows that the users 102, 104, 106 can communicate with the Control Centers 110, 112 through a network 108, which can comprise a local area network, a wide area network, or through an extended network such as the Internet, or any other network for communication

among multiple computers. FIG. 1 also indicates that the users can be connected directly to a Control Center computer, if desired, such as for the user 106 indicated as User 3.

Each Control Center computer 110, 112 that is equipped with the virtualization management application described herein will have management of one or more physical assets within a domain or other subnet arrangement associated with the respective Control Center. FIG. 1 shows that Control Center A 110 manages multiple resources, two of which are shown: a first set of resources 120 and a second set of resources 122. For ease of illustration, each set 120, 122 may be considered in the context of a computer rack system containing multiple computer physical assets. It should be understood that additional physical resources can be managed by the Control Center A, but are not shown in FIG. 1 for simplicity of illustration.

The first set of resources 120 are illustrated as comprising two blade servers, indicated in FIG. 1 as Blade 1 and Blade 2. The second set of resources are illustrated as comprising two additional blade servers, Blade n and Blade n+1. Thus, a number of different resources can be accommodated. It should be understood that the resources could comprise other devices or equipment, such as memory devices, printers, routers, and the like. It should also be understood that the blade servers themselves (Blade 1, Blade 2, ..., Blade n, Blade n+1, ...) can be configured to support a variety of virtual assets, including desktop computer environments, data storage, application servers, routers, and the like. FIG. 1 shows that Control Center B 112 manages two sets of resources, illustrated as Rack B1 and Rack B2. As with the Control Center A, it should be understood that the actual physical resources that make up Rack B1 130 and Rack B2 132 can comprise a variety of network-based computer equipment.

FIG. 2 is a schematic diagram that illustrates the application components for the virtualization management application of the Control Center computers 110, 112 illustrated in FIG. 1. The components enable the Control Center computers to function according to the description herein to provide automatic, network-based virtualization management independently of underlying processors, operating systems, and virtual environments. FIG. 2 shows the Control Center computer as including an Asset Manager 204, a Provisioning Manager 206, a Dynamic Application Router 208, an Optimizer 210, a Performance Manager 212, and a Capacity Planning Manager 214. In addition, a Virtual Mapping engine 216 is included, for determining the physical resources and virtual assets with which the Control Center will communicate. The

Virtual Mapping engine is programmed to discover the physical resources, such as the physical devices with which the Control Center is in network communications, and also the virtual resources, such as virtual servers, storage, desktops, and the like with which the Control Center has access. The Virtual Mapping engine 216 can be self-starting, such as being launched at
5 Control Center start-up or at some other predetermined system event, or the Virtual Mapping engine can be initiated by a user via a command.

As described further below, the illustrated embodiment of the Control Center 202 is configured in a modular fashion, such that the installation of the Control Center of the computers 110, 112 in FIG. 1 need not include every one of the modular components 204-214 illustrated in
10 FIG. 2. Rather, system requirements and user needs may be such that less than all of the Control Center components are installed on any one Control Center machine of the system. Any installation of the Control Center, however, will include the Virtual Mapping engine 216, so that the Control Center will be suitably informed of its environment. A more detailed description of the functionality for each of the modular components 204-214 is provided below.

15 Asset Manager

The Asset Manager 204 provides visibility and management of all global virtual assets available to the Control Center. This component provides a global view of all the resources used in a virtualized infrastructure along with a physical and logical topology view. Thus, a user can view a global topology view and an inventory of virtual infrastructure from a central console. In
20 addition, the component will support discovery and configuration of virtual resources, allow topology views for physical and logical infrastructure, provide inventory reports at local, remote, and global context, and simplify management of applications, hardware resources, virtual assets, and operating systems.

Provisioning Manager

25 The Provisioning Manager 206 provides an on-demand solution for provisioning of virtual assets for an automated workflow management. This component provides an automated solution allowing users to request and schedule their individual virtual asset needs and IT management to prioritize and provision the required assets on demand. The component can be used to provide a portal for users' virtual asset requests showing available virtual assets, as well

as a supervisor portal to prioritize needs and approve asset needs by time and priority, and also provides an IT manager to provision the needed resources and keeping track of used and available assets, an automated workflow system for users and IT to track needs and resources, supports the ability to keep mission critical application and assets to put them on line on demand
5 for emergency and disaster recovery needs, and provides a repository of virtual machines supporting VMWare, Microsoft and Xen virtual assets and their needed hardware components. The Provisioning Manager provides central management of global virtual machine images, provides an enterprise workflow system for adds, moves and changes in virtual infrastructure, and can be used to standardize and optimize virtual infrastructure use from lab to production
10 environment, such as needed in different development testing scenarios.

Dynamic Application Router

The Dynamic Application Router 208 provides real time and dynamic routing of applications running on virtual infrastructure. With this component, users of the Control Center can move applications running on virtual assets by comparing application usage with business
15 policy and drivers, and scheduling appropriate routing actions. This component can be used to move applications to different virtual assets as global business need changes, provide dynamic allocation of global virtual assets for workload optimization, enable zero down time in upgrading virtual environments, provide an optimizer for balancing resource and asset inventory against needs, a scheduler to auto schedule actions and provide reports, and provide alarms and triggers
20 to notify users of out of balance inventory items. The component also provides an aggregated action library for all virtual infrastructure, performs zero downtime virtual asset maintenance and upgrades, ensures a high availability plan for mission critical applications running on virtual infrastructure, can compare business policy against real time asset usage and then make load balance changes, and can provide top 10 recommendations for solutions.

25 Optimizer

The Optimizer 210 component operates on the virtual assets of a physical resource to provide efficient configuration of the assets in accordance with a set of business rules. For example, the Optimizer component may operate on a user desktop or on a server that manages a virtual environment so as to configure an efficient combination of applications and assets, such
30 as virtual devices of the host machine. In this way, the Optimizer provides a user with control

over how virtual assets use the underlying physical resources. Users can set business policies based on application criticality and can let the Optimizer allocate appropriate physical resources in accordance with the business policies. The Optimizer can allocate resources such as CPU, network, memory, hard disk, and the like in accordance with the business policies that have been
5 set by the user. Configuration of the business policies lets the user have a high degree of control over the allocation of resources. For example, users can set a maximum limit on how much each virtual asset can use the underlying physical resource.

Performance Manager

The Performance Manager component 212 provides availability and performance
10 management for all virtual assets in the system. This component shows performance of virtual asset usage, provides key performance matrices and metrics, and identifies future potential bottlenecks. The component can be used to provide real time monitoring and viewing of all virtual assets usage, measure and trend performance and show it against plan, provide triggers, alerts, and alarms for key performance matrices and metrics, identify current and predicted
15 bottlenecks, and provides a cross-platform solution.

Capacity Planning Manager

The Capacity Planning Manager component 214 provides capacity planning, trending and forecasting based on usage and needs. This component provides capacity planning, trending and forecasting of virtual assets based on historical trends and future projected business needs. The
20 component can be used to show used versus available capacity of virtual assets, trends capacity usage and compares it with thresholds, provides historical trend reports, provides forecasting of future needs, and provides alarms and triggers based on capacity usage and thresholds.

FIG. 3 is a schematic diagram that illustrates the configuration of an embodiment of a network computer device 300 constructed in accordance with the present invention to provide a
25 virtualization environment that is managed by the Control Center described herein. The computer device is, therefore, a physical resource of the network 100. For example, the computer device 300 can comprise a blade server, such as one of the blade servers 120, 122 illustrated in FIG. 1. That is, the computer device 300 can comprise a desktop computer system, a laptop, a blade server, conventional server, or other computing machine that includes hardware

components 302. In FIG. 3, the hardware components are illustrated as including input/output facilities 304 (such as keyboard, display, mouse, and printer facilities), a central processor unit (CPU) 306, memory 308, mass storage 310 (such as disk drives), and a network interface card 312 for network communications. Those skilled in the art will understand that not all of the hardware components shown are necessary for successful operation of the computer device 300 in the network 100. The hardware components of the device 300 will depend on the system requirements and the function of the device within the network.

The computer device 300 includes an application that provides a virtualization layer 322 that manages virtual assets 326. Thus, the computer comprises a host machine for the virtualization environment. In FIG. 3, the virtual assets are illustrated as two virtual computers, or machines, a first Virtual Machine 328 and a second Virtual Machine 330. Each virtual machine can include an operating system (OS) for the virtual machine, computer applications programs executing on the virtual machine OS, and virtual hardware assets for the virtual machine. In FIG. 3, the first Virtual Machine 328 is shown as including an application program "App 1", an application program "App 2", and two instances or copies of an application program "App 3". The second Virtual Machine 330 is shown with one instance of App 1, one instance of App 3, and single instances of applications App 4 and App 5. As noted above, any one of the computer host machines, or boxes, of the network 100 can include a greater or lesser number of virtual machines. Two virtual machines are shown in FIG. 3 for purposes of illustration. Likewise, a greater or lesser number of applications running on the virtual OS can be provided. There is similar flexibility in the configuration (type and number) of OS and hardware assets of each virtual machine.

In accordance with the invention, a Control Center (such as illustrated in FIG. 2) manages the virtual assets of each computer host machine 300 for which the Control Center is responsible.

To accomplish such functionality, the Control Center must communicate with the virtualization layer of the host machine. FIG. 3 shows that a Control Agent 324 can be installed on the host machine 300 to facilitate such communication. The Control Agent 324 provides an interface between the hardware resources 302 of the host and the Virtualization Layer software 322. The Control Agent 324 facilitates communication between the external Control Center components 204-214 (FIG. 2) and the Virtualization Layer 322 of the host machine, and provides a common

interface to the variety of virtualization software that might be available on the host machine. For example, the Virtualization Layer may be provided by products from VMWare, or Xen, or Microsoft, or IBM Corporation, or other visualization platforms or emulation interfaces. In this way, the Control Agent acts as a universal adapter between the Control Center and the virtualization layer platforms of the host machines in the network. In some cases, it might be possible for the Control Center components (FIG. 2) to communicate directly with the Virtualization Layer 322 without need for a Control Agent 324, in which case there will be no Control Agent 324 installed at the host machine.

For example, if the Asset Manager component 204 can communicate directly with the Virtualization Layer using native interfaces of the virtualization layer, then the Control Agent 324 is not needed. This would likely be the case if, for example, the virtualization layer is provided by VMWare, which includes controls needed for external communications. Other virtualization software, such as provided by Xen and Microsoft, does not typically include such native controls and therefore a Control Agent 324 would be necessary. Those skilled in the art will appreciate that such controls typically include actions such as "Move VM", "Migrate VM", "Clone VM", and the like, which support movement, migration, and cloning of virtual machines and which usually can be invoked programmatically by all virtualization platforms. It is these controls that may be implemented by the Control Agent 324, in the absence of a native control in the virtualization platform. If the host machine does include a Control Agent 324, then the Control Agent 324 will have components to facilitate communication between the Control Center and the Virtualization Layer 322. In an alternative embodiment, the Control Agent 324 can be integrated into the Control Center itself, such that the Control Center can communicate directly with the Virtualization Layer 322 of the host machine, regardless of the virtualization middleware that is actually installed at the host machine. Those skilled in the art will understand how to integrate the functionality of the Control Agent 324 described herein into the Control Center, without further explanation, in view of the description provided.

FIG. 4 is a schematic diagram that shows the construction of the Control Agent 324 with components for virtualization communication and management. These are the components that enable the Control Agent 324 of a host machine (that is, the machine on which the Control Agent 324 is installed) to communicate with the Control Center of an external network machine. FIG.

4 shows that the Control Agent 324 includes a Communication Abstraction Layer/Adapter 402. This component ensures that the Control Agent 324 can communicate with the hardware resources of the host machine, such as network communications devices, through which the Control Agent 324 can send and receive data with one of the external Control Centers 110, 112.

5 In the Control Agent 324, an Action Event Receiver 404 receives notifications about incoming events for which a response or action is required. Such notifications will typically involve, for example, changes in status of a virtual machine or requests for action or service. The Control Agent 324 also includes a Server Monitor 404 that checks for status of the virtual applications of the host machine, and also checks the status of the external Control Center with
10 which it is communicating. As noted above, each host machine is associated, or managed, by a designated Control Center. The Control Agent 324 also includes an Event Dispatcher 408, which initiates actions by the host machine in response to the incoming events received by the Action Event Receiver 404. A Control Center Interface Layer 414 provides a monitoring interface function, a management interface function, and a statistics interface function for data
15 exchange between the Control Agent 324 and the associated Control Center. A Virtual Platform Abstraction Layer 416 permits communications between the host machine 302 resources and a set of multiple middleware adapters 418, as described further below.

 In the server virtualization of the illustrated embodiment, the Control Agent 324 acts as a proxy between the Control Center 110, 112 and server instances. The Control Agent manages
20 the messaging between the Control Center and the actual VMs. The Control Agent 324 will be created per host and per VM, as required. The Control Agent communicates with the Control Center through a communications protocol, such as the WS Management Catalog Protocol specification, wherein the Control Agent 324 is implemented as a service and will have the set of virtual assets that it manages. Other communications schemes can be used, as will be known to
25 those skilled in the art. The VM's and Hosts are the available resources, as specified by the protocol. The Control Agent 324 is assigned a unique URI and will provide a selector to select a VM instance running within the server.

 The Control Agent 324 can create a VM using a Resource configuration feature. The Control Agent 324 is responsible for a variety of tasks, including:

30 collecting Statistics from the VM's and hosts;

monitoring the health of the VM's and hosts;
generating Alarms when the VM's are out of balance;
monitoring the various events generated by the VM's and sending an appropriate alert to the Server;
5 communicating the VM / host status to the server;
performing management actions such as Create a VM, Suspend VM, Stop VM, and Move VM.

The Control Agent 324 also supports communication between the Abstraction Layer 416 and different Virtualization servers (virtualization platforms). The Abstraction Layer supports
10 interfaces for monitoring, managing, and collecting statistics from the VMs and hosts.

The Control Center 110, 112 can start the Control Agent 324. The Control Agent 324 has its lifecycle independent of the Control Center and can handle reconnection with the Control Center, when it starts.

The Control Agent 324 also controls and monitors the health of the host machine. The
15 Control Agent 324 is responsible for mining the system performance statistics such as the network performance, memory usage, and the disk usage of the host and passing these statistics on to the Control Center.

If a particular VM fails, the Control Agent 324 tries to restart the VM, or if that fails, sends out an alarm message to the virtual server.

20 Data constructs, such as Communication Objects, implement the communication protocols between the Control Agent 324 and the Control Center 110, 112. The communication protocol can be based on the WS Catalog protocol, in use by VMWare. Other suitable protocols will occur to those skilled in the art, in view of this description.

The Control Center has virtualization management responsibilities that include:

25 managing / monitoring Control Agents 324 ;
triggering Business Rules in the case of Alarm messages;

launching / moving applications to different virtual machines based on the VM work load (the Server makes the decisions and the request is sent to the Control Agent 324 to perform the operation;

balancing workload across different hosts /VM's;

5 performing Scheduled events;

re-initiating a Control Agent 324 in case of a failure;

aggregating the performance statistics across all the Control Agents 324 ;

providing management API's for the Control Center console (user interface) with which an administrator can monitor / manage individual host machines (physical devices) and VMs.

10

The Control Center includes the following functional components to perform the above-mentioned responsibilities:

an Event Receiver that receives messages from the Control Agent 324 and passes them on to an Action Manager. The Event Receiver is also responsible for generating a timeout event that will be triggered if no Ping/Alarm/Report Status messages are received after a configured period of time;

15

a Host Monitor that sends out heartbeat messages s to the Control Agent 324 (similar to a ping) to ensure that the host is available. When a Host Monitor detects that a host is not available, it will provide the Host Manager with that information;

20

Host States, which include two distinct states, from the point view of other machines managed by the server: either Offline, in which the host is not a fully active member of the virtualization infrastructure, wherein the host and VMs deployed may or may not be running; and Online, in which the host is a fully active member of the virtualization infrastructure, wherein the host maintains heartbeats, mines system performance statistical data, and can own and run Control Agents 324;

25

a Host Manager that is responsible for controlling host machines with Control Agents 324. For each Host, the Host Manager will launch one Control Agent 324. When a Host Monitor detects that a host is not available, the Host Manager tries to send a double-check ping message to the suspected unavailable host. If that host does not respond, the Host Manager will first try to launch a new Control Agent 324 process over that host before changing the Host State to indicate it as 'Offline' and implementing fail-over of its VM's to other Hosts;

a Scheduler that is responsible for scheduling applications based on a business policy. The Scheduler generates a set of actions to be performed based on certain business rules and the business policy. The actions are passed on to an Action Manager. The Action Manager is responsible for executing the actions;

an Action Manager that receives actions from the Event Receiver, Host Manager, and the Scheduler. The choice of host for performing actions such as CreateVM, MoveVM is made by a Load Balancer process. The Action Manager submits a list of hosts and VM actions to the Load Balancer process. The Load Balancer, based on certain business rules and also the load on the hosts, maps the VMs to the host machines.

The operation of the components described above can be better understood with reference to FIG. 5, which illustrates the operation of the Control Center and Control Agent 324. The operation of FIG. 5 begins with a halt condition of a VM, for example "VM1", which generates an event message that is sent to an Event Receiver of the Control Center. This condition is represented by the diagram box numbered 502. Next, at box 504, the Control Agent attempts to restart VM1. In this example, the restart fails, and therefore the Control Agent 324 sends a message to the corresponding Server Monitor (box 506). That is, a condition is detected by the Control Agent 324 and, once detected, the Control Agent 324 will attempt to rectify the condition. If that attempt fails, then the Control Agent 324 informs the Control Center with an event message and the Control Center processes the event with the Event Receiver.

At box 508, the Control Agent 324 message is received at an Event Receiver, and Business Rules are executed to determine the available hosts for supporting the type of virtual machine that has failed. At box 510, the Load Balancing procedure identifies a host machine

from the list of available hosts. Next, at box 512, the Event Dispatcher sends the failure event message to the Control Agent 324 of the selected host machine. Lastly, the Action Event Receiver of the selected host machine receives the event message and performs the action (startup VM) to restore the failed virtual machine.

5 Returning to the description of FIG. 4, the Control Center Interface Layer 414 enables the Control Agent 324 to communicate with the associated Control Center to provide the Control Center with information about the status of the host machine (monitoring function), receive instructions and commands from the Control Center (management), and report on operational information (statistics). Thus, the Interface Layer extends these three functional areas involving
10 administration, monitoring, and performance statistics.

The Administration aspect of the Control Agent 324 provides all the methods that are required for managing a virtual server, such as the GSX / ESX server platform from VMWare, and the virtual machines under its supervision. All methods related to starting, stopping, cloning, and moving a virtual machine are managed through the Administration interface.

15 The Monitoring aspect of the Control Agent 324 provides methods to check virtual machine status and review heartbeat information for a virtual machine. The monitoring interface includes methods to get the statistical information and compare it with specified thresholds and generate Action Events. The Control Agent 324 operation includes a "getAllEvents" method that validates each threshold value and generates the necessary Action Events.

20 The Statistical aspect of the Control Agent 324 collects the statistical information. The methods used by the Control Agent in these duties are responsible for obtaining performance statistics for CPU performance, disk performance, memory performance, and network performance. Those skilled in the art will understand the various performance metrics by which such performance is typically judged. The Control Agent 324 operation therefore includes
25 methods such as getCPUperfStats, getDiskPerfStats, getMemoryPerfStats and getNetworkPerfStats, which are responsible for returning corresponding specific statistical objects such as CPUStats, DiskStats, MemoryStats, and NetworkStats. These methods are supported for a variety of servers, such as ESX servers, and some servers will require the Control Agent 324 to make system calls to obtain the information, such as for GSX servers.

As noted above, the Virtual Platform Abstraction Layer 416 of the Control Agent 324 includes a set of multiple middleware adapters 418. The middleware adapters communicate with the virtualization environments of the host machine 302. These virtualization environments are shown in FIG. 4 as including platforms by VMWare 420, Xen 422, Microsoft 424, IBM 426, and also emulation solutions 428. It should be understood that these depicted platforms are for purpose of illustration only; additional or alternative virtualization platforms can also be accommodated.

To provide an abstraction layer over a variety of virtualization servers such as from VMWare, Xen, and Microsoft, the Abstraction Layer 416 of the Control Agent 324 provides a common API access for the virtualization servers. To do so, the Control Agent 324 includes components in accordance with the virtualization platform and communication management protocol, components such as:

a Communication Object Layer that manages services management events and translates to corresponding method calls, in accordance with the communication management protocol in use for the virtualization platform, such as JMS Events and in the case of the VMWare virtualization platform;

an Agent Interface comprising a generic interface that supports at least three interfaces including Administration, Monitoring, and Statistics, and uses a factory pattern to create an Agent Object specific to VMWare, Xen or Microsoft, or whatever the virtualization platform as desired;

a Virtualization Platform Agent, such as a VMWare Agent as an implementation class for an Agent Interface that is specific to VMWare platforms, and which uses JNI to call the COM layer on MS platform and uses JPL on Linux and Solaris;

a JNI DLL comprising an ATL dll that wraps the VMCOM object, wherein the COM functionality is exposed as method calls that can be accessed through JNI;

VMCOM interfaces, such as VMserverCtl, VMCtl, IConnectParams;

a VMIQAgent that is designed to be a web service with certain exposed methods, which for applicable communication management protocols may comprise a JMS Client application that produces / subscribes to certain sets of events for the required communication protocols. On startup, the VMIQAgent will use the Agent Factory class to create the VMWare Agent object. The information about the Virtualization server can be maintained as a part of the Agent Configuration file, which will only maintain the Virtualization server name, such that the details of the server, such as whether it is a GSX Server or ESX Server, will be obtained by querying the server itself.

For example, the Control Agent 324 may include a "VMWareAgentImpl" class for implementation of a Control Agent 324 interface to VMWare systems. This implementation class makes calls to classes called "VMServerCtl" and "VMCtl", wherein the VMServerCtl class includes methods related to the GSX and ESX servers. The VMServerCtl class is implemented as a singleton class. There would be only one instance of the Server object. This discussion assumes that there will be only one server per host (GSX server or ESX server). A host will not have the virtual machines of multiple virtualization servers (such as VmWare, Xen, and Microsoft). The server object will maintain a map of the VMName-to-VMCtl objects. The lookup will be on VMNames. The user can give the same name to multiple virtual machines on a server. Currently, VMWare does support duplicate names. The VMCtl and VMServerCTL classes invoke the com / perl interfaces of VMWare using JNI wrapper and JPL, respectively. The JNIWrapper is a DLL file which exposes methods from the VMCOM object.

The operations of the Control Center and Control Agent 324 to manage the virtual environment will support various use cases, or operating scenarios, including creation and startup of virtual machines (VMs). Such operations are described as follows for a VMWare environment (corresponding operations for other virtualization environments will be known to those skilled in the art, in view of this description):

Create VM

1. In order to create a VM on a particular host, the VM Manager first copies the "vmdk" file and the "vmx" file to the host machine using ssh and then send an event to the host.

2. The event message contains the following information

VM Name--Name of the VM to be created

VMTemplateInfo--Template details include type of server, location of the vmx and .vmdk files.

5 3. The event is received by the Control Agent 324.

4. createVM method is invoked by passing the VMName and the template info

5. VMWareAgentImpl class then modifies the display name to the VMName and the vmdk file reference in the vmx file.

10 6. VMWareAgentImpl class then checks for an existing VM with the same name and checks to see if the configuration file is the same. If not, then registers the VM with the GSX / ESX server.

StartVM

15 1. VM Manager sends an event to the VMIQAgent on a particular host to start a VM. The message contains the VMName.

2. The VMIQAgent receives the message and then calls the VMWareAgentImpl 's StartVM Method.

3. VMWareAgentImpl looks up the VMCtl object corresponding to the VMName in the VMMap

20 4. Calls a StartVM method of the VMCtl object by passing the vmx file name.

5. The StartVM method returns a task handle.

6. The task status is monitored by the VMWareAgentImpl

25 7. The VMCOM object returns a task handle. If the task state is completed then the Completed status is returned to the Manager.

8. The VMWareAgentImpl class monitors the task status.

9. If the task status is VM_QUESTION, then a new event is raised to the VM Manager with the QuestionInfo as the message.

10. The event is received by the VMManager - Either through an autoresponse or a manual process an answer is sent back to the VMIQAgent

5 11. Control Agent 324 receives the message – Message has a reference to the VMName, task id and the answer.

12. VMWareAgentImpl then calls answerVM method of the VMCOM object to set the answer.

13. Procedure is repeated till the task status is set to completed.

10 Other actions can be supported by suitable methods, as desired:

1. CreateVirtualDisk

2. ChangePermissions

3. Consolidate_VM

4. Snapshot_VM

15 5. Revert_VM

6. Enable / Disable host

7. Configure CPU, Configure disk, Configure memory, configure Host, Configure Network.

FIG. 6 is a representation of the virtualization environment that can be managed using a computer with the Control Center application described herein, such as the Control Center A 110 and the Control Center B 112 illustrated in FIG. 1. FIG. 6 is a schematic diagram that illustrates the various levels of virtualization that can be reached and managed with the Control Centers. In FIG. 6, multiple end users 602, 604, 606 can access physical resources and virtual assets of the host computer 300. FIG. 6 shows a conceptualized depiction of the access as the multiple users being accommodated through multiple virtual desktops, or user interfaces, through a desktop virtualization layer 608. The desktop virtualization layer presents the users with a collection of virtual assets available to the users as they communicate over the network (see the system

20

25

configuration illustrated in FIG. 1). The assets can include multiple applications of the host machine, depicted as "App 1" 610, "App 2" 612, and "App 3" 614 for purposes of illustration. The applications may include word processing, email, Web browsers, servers, and the like. The applications can be supported by middleware software through an application virtualization layer 5 616. The middleware applications are represented by "MW 1" 618, "MW 2" 620, "MW 3" 622. The middleware applications 618, 620, 622 can access data stores through a storage virtualization layer 624. The data stores are represented in FIG. 6 by databases 626, 628, 630 indicated as DB 1, DB 2, and DB 3, respectively. In accordance with the invention, the Control Center application can perform configuration management and forecasting services for the host 10 computer and the available virtual assets through each of the various virtualization layers 608, 616, 624.

FIG. 7 is a screen shot of a Control Center display produced by the user interface of the Control Center computers 110, 112 of FIG. 1. That is, the Control Center virtualization management application provides a user interface that includes a display such as illustrated in 15 FIG. 7. The "Virtual Manager" program window shows a list of applications in a left window pane corresponding to a virtual environment for the specified host machine, which is illustrated as "XPRO2005" in the left window pane. The Control Center display shows that the XPRO2005 computer includes three applications, which are operating systems, as shown in the detail pane on the right side of the display. The three operating systems are illustrated in FIG. 7 as 20 "Windows XP Professional", "SuSE Linux Enterprise Server", and "Windows 2000 Advanced Server". Other operating systems can be supported by the Control Center.

The setting pane on the right side, below the OS listing pane, shows the user interface feature for setting operating parameters of the Control Center. The priority of the virtual machine under management (VM Priority) can be set with a display slider from low priority to 25 high priority. A high priority setting means that the VM will have a high probability of being instantiated on the host machine under management. A low priority setting means that the VM is a likely candidate for deletion from the virtualization of the host machine if resource utilization is great and if other VMs have a higher priority setting. The virtualization parameters that can be set for the virtualization environment through the user interface of FIG. 7 include settings for 30 operation of CPU, memory, hard disk, and network.

The installed Control Center application provides a network-based, intelligent orchestration engine for automatic management of virtual assets across multiple computer virtualization platforms around a network. The exact management functions that can be performed by the Control Center will depend on the number of components selected for installation on the Control Center computer. The full complement of components are illustrated in FIG. 2 and were described above. The illustrated embodiment described herein is constructed with a modular approach, so that users can select desired components and can leave out the rest. The following description of operating feature details assumes a full installation of all the FIG. 2 Control Center components, except where noted, and the full installation will be referred to as the "application" except where a particular component is singled out for description or mention. It should be understood that installing any one of the FIG. 2 components will provide a user interface that includes the Control Center, albeit with functionality in accordance with the installed components.

The Control Center application provides a centralized repository for virtual infrastructure configuration change management with an audit trail for IT compliance requirements. In accordance with the application, macro-level policies are defined based on business needs. These are implemented as Application Criticality Rules (ACRs), described further below. The Control Center operates as a virtual controller that can mediate between physical server, network, applications, and storage resources. Such mediation can occur based on a combination of portable, application-provided as well as user-defined, Knowledge Blocks (KBs). The Control Center can also provide Adaptive Application Routing (AAR) for virtual assets based on the ACRs. With the Knowledge Blocks, the Control Center can take intelligent actions based on the KBs when any of the ACRs are violated.

The ACRs allow a user to specify business rules for controlling priority settings for applications. For example, in a system with a set of five application App1, App2, App3, App4, and App5, one of the rules could specify that, each morning from 6:00 am to 10:00 am, the five applications will have priorities set as follows: App1 has high priority, App2 has low priority, App3 has medium priority, App4 has low priority, and App5 has high priority. If preferred, the Control Center can provide a priority setting that is numerical, such as a range of integral numbers between 0 (zero) and 10 (ten). Other priority range indicators can be used as desired,

such as colors or other indexes. If traffic to an application is detected as being above a threshold level, another business rule could specify a dynamic response, that the priority for the corresponding application can be adjusted higher. Conversely, action could be specified to reduce priority if traffic is detected as abnormally low. Another business rule could be set for prospective action, for example, such that a particular application is given an increased priority according to time of day.

Control Center management of virtual assets and mediation between physical resources in conjunction with the ACRs provides a robust load balancing functionality with the ability to distribute server load among potential host machines, and determine when and how to increase or decrease the number of VM's to improve overall system throughput.

For purposes of the load balancing function, load can be calculated on a server by following several alternative criteria, or parameters. One parameter can be CPU run queue length, which returns the load as the average number of processes in the operating system (OS) run queue over a specific time period in seconds, normalized over the number of processors. Another parameter is CPU utilization, which returns the load as the CPU usage percentage. Other suitable parameters can include Network Performance (traffic throughput), Disk Performance, which can be measured by the number of bytes read and/or written in a specific time period in seconds, and Memory Performance, mainly by the ratio of the active memory used as compared with total managed memory. If desired, a weighted formula can be used for computing the load on a particular host based on these parameters.

With such parameters available, the load balancing strategy can be implemented with two different strategies: Static load balancing and dynamic load balancing. Static load balancing is similar to having a pre-defined set of minimum and maximum number of VM's that can run on a given host. The Dynamic load balancing approach suggests that, based on the current and the future load on a host, a decision is made as to which VM should run on which host. Once a set of hosts are identified, then the load balancer processing can pick a particular host, by a round-robin or a weighted round-robin method. The load balancer processing would first try to assign the high priority VM's to hosts with minimum load.

The Control Center also provides an interface to the installed configuration management application, which operates in conjunction with observed real-time events on the network. This

is achieved through a four-step process that includes (1) monitor, discover and alert tasks, (2) applying user-guided fix automation tasks, (3) automatically applying basic KBs, and automatically applying more complex KBs and user-defined KBs. In addition, the Control Center provides a mechanism to centrally schedule resource re-allocation in response to defined business events.

FIG. 8 and the following drawing FIG. 9 illustrate the automatic virtualization management in accordance with an embodiment of the invention in the context of managing a collection of virtual assets comprising application servers, but it should be understood that the Control Center virtualization management application being described can also be used to manage other virtual assets, such as user desktops (user interfaces), data storage such as database arrays and attached storage, and network traffic devices such as routers and switches.

FIG. 8 is a screen shot of the Physical View display page of the user interface, accessed from the Control Center computers 110, 112 of FIG. 1. FIG. 8 shows that the Physical View display enables a user to visualize resource utilization relationships. For example, FIG. 8 graphically illustrates two subnets attached to the Control Center computer, indicated as Net 1 and Net 2. This illustrated arrangement is analogous to Control Center B of FIG. 1, which shows Rack B1 and Rack B2 under management of Control Center B. Thus, Rack B1 could correspond to Net 1 and Rack B2 could correspond to Net 2. Alternatively, Net 1 and Net 2 could correspond to other types of network subdivisions. For example, Net 1 and Net 2 could relate to geographical divisions of the network, or could correspond to departmental groupings or subnet groupings.

In FIG. 8, Net 1 is shown as a virtual environment that includes Server 1 and Server 2, each of which manages a VNet 1 and a VNet 2, respectively. Operating on VNet 1 are an instance of App 1, an instance of App 2, and an instance of App 3. Under Server 2, the operating applications include one instance of App 1, an instance of App 4, and an instance of App 5. Thus, VNet 1 and VNet 2 are virtual networks that are deployed within Server 1 and Server 2. This view shows the application topology within the virtual infrastructure, and shows which virtual asset is running on what physical resource (dependency) and how they are interconnected via virtual networks and physical networks.

Knowledge Block

The Knowledge Block feature can be used to specify analysis rules that can detect application performance degradation. In response to such detection, an alert can be sent over the network, such as an alert message being sent to a network administrator. After an alert message has been sent, the configuration management application can wait for an administrative action, or
5 the application can be set up so as to execute an automatic action. For example, in response to a "crash" of a virtual machine, the application can find the last known "good" VM image from a repository and can deploy that image to the affected machine. In response to overtaxed applications, the application can deploy a new application instance, and can add new application instance information into a network load balancer to indicate the new instance is available and
10 should be considered as part of the "available application pool". In addition, the application can remove a degrading application from the available application pool, or can move a degrading application VM from a group of production servers to a debug server pool. Other functions that can be performed by the application in accordance with Knowledge Blocks include the capture of log files from the degrading application VM, the capture of archive logs and sending of email
15 alert messages to an administrator with the archive log location, and the halting of a degrading application VM and removal of it from the debug server pool.

FIG. 9 is an illustration of a Control Center display that shows a topology view of the virtual environment under management. FIG. 9 shows physical resources and virtual assets such as depicted in FIG. 8, but illustrates particular user interface features of the Control Center
20 software. Thus, FIG. 9 shows three physical servers, representing networks, indicated by network addresses 255.101.0.0, 255.102.0.0, and 255.103.0.0. Machine 1 and Machine 2, which are physical resources, are shown connected to the 255.101.0.0 server, and Machine 3, another physical resource device, is shown connected to the 255.102.0.0 server. Various network management operations can be carried out with a drag-and-drop user interface, represented by
25 the icons arrayed along the left side of the display window. For the objects in the large window pane, these operations represent moving display objects, connecting objects, and creating instances of objects such as networks, storage, routers, hubs, and the like.

FIG. 10 is an illustration of the FIG. 9 topology view showing Machine 3 expanded. The expanded (Level 1) view shows that Machine 3 is installed with virtual server applications that
30 include "SSB Server", "Oracle with mail", and "SS2000 with mail". These virtual assets are

connected so as to comprise a virtual network connected to the 255.101.0.0 server. The menu choices CPU, MEM, NET, and I/O in the Level 1 window for Machine 3 indicate that additional configuration details for these respective characteristics of Machine 3 are available in a Level 2 display (not illustrated) by selection of the corresponding display icons.

5 FIG. 11 is a block diagram representation of a server virtualization configuration management scheme that can be implemented from a computer such as the Control Center computers 110, 112 illustrated in FIG. 1. FIG. 11 depicts the virtualization management 1102 of the network computer system 100 (FIG. 1) as comprising an association or mapping between the actual Physical Resources, such as a collection of computer hardware machines 1104, to a
10 collection of Virtual Machine Assets 1106, or applications, in accordance with a set of application critical Rules 1108. In a typical system, for example, two physical machines might be sufficient to deploy forty virtual machines, each of which can be assigned a different application to operate and thereby provide services to network users. The configuration of the Virtual Machines 1106 and their corresponding operational applications will be governed by the
15 set of Rules 1108. Thus, if a rule specifies that a particular application has a high priority at a particular time of day, then a respective one of the Control Center computers 110, 112 (FIG. 1) will adjust the deployment of applications among the Virtual Machines 1106 under its management at the appropriate times.

 The server virtualization implementation described thus far can be used to control and
20 manage a complete virtualization environment, including assets such as storage assets, virtual routers, and virtual desktops. Such configurations are depicted in FIG. 12, FIG. 13, and FIG. 14.

 FIG. 12 is a block diagram representation of how storage in physical servers can be allocated by the virtual server using the system management of the present invention. FIG. 12 depicts the configuration management 1202 of the network computer system 100 (FIG. 1) as
25 comprising an association or mapping between actual Physical Resources comprising a collection of disk drives or storage devices 1204 to a collection of Logical Units 1206, such as network virtual storage drives, in accordance with a set of application critical Rules 1208. That is, the storage servers (physical resources comprising disks) are mapped to virtual assets (logical units). In a typical system, for example, two physical machines (CPUs with attached data
30 devices) might be sufficient to implement forty logical units, each of which can be assigned a

different network drive assignment, such as drive c:, or d:, or e:, and so forth, to operate and thereby provide data storage for network users. The configuration of the Logical Units 1206 and their corresponding virtual drives will be governed by the set of Rules 1208. Thus, if a rule specifies that a particular network drive should have a capacity of 50 GB while a particular application is running, to act as temporary storage for the application, then the configuration management application 110, 112 will adjust the data capacity configuration of the logical unit 1206 to provide the desired capacity, and will load the desired data, for the appropriate operational conditions.

FIG. 13 is a block diagram representation a network router virtualization configuration that can be managed through a virtual server that is managed from a Control Center computer 110, 112 such as illustrated in FIG. 1. FIG. 13 depicts the configuration management 1302 of the network computer system 100 (FIG. 1) for a collection of actual Physical Resources comprising a collection of processing devices for network path control, such as programmable machines or computers otherwise configurable through a virtualization layer to provide control of network paths, such as devices that can operate as routers 1304. The devices 1304 are associated with or mapped to assigned network paths 1306, such as virtual private network (VPN) devices, or secure routers. The mapping is in accordance with a set of application critical Rules 1308. In a typical system, for example, two physical machines (CPUs with attached network communications abilities) might be sufficient to implement a set of forty VPN servers, each of which can be assigned to different network paths or addresses. The configuration of the Network Path devices 1306 and their corresponding routing operations will be governed by the set of Rules 1308. Thus, if a rule specifies that a particular VPN router 1306 should handle traffic for a particular address, then the Control Center virtualization management application will adjust the network path assignment of the VPN router 1306 to provide the desired assignment.

FIG. 14 is a block diagram representation of a desktop computer virtualization configuration that can be managed through a virtual server that is managed from a Control Center such as illustrated in FIG. 1. FIG. 14 depicts the configuration management scheme 1402 of the network computer system 100 (FIG. 1) as comprising an association or mapping between actual Physical Resources comprising a collection of computers or other processing devices 1404

to a collection of Installed virtual asset Applications 1406, such as virtual machine applications including word processing, email, spreadsheet, and Web browser, in accordance with a set of application critical Rules 1408. In a typical system, for example, a collection of physical computing machines 1404 (processing devices such as desktops, laptops, and PDAs) might be sufficient to implement forty virtual user interfaces, each of which can provide a collection of installed applications 1406. The configuration of the Installed Applications 1406 will be governed by the set of Rules 1408. Thus, if a rule specifies that a particular user interface should include word processing and a Web browser during specified times of day, but then delete the browser application at other times of day, then the Control Center virtualization management application will adjust the deployed applications of the logical unit 1406 to provide the desired user interface, for the appropriate operational (time-of-day) conditions.

Although FIG. 11 describes the virtualization management of virtual assets in the context of virtual machines or servers, as noted above, the Control Center application 202 (FIG. 2) described herein also can be used for management of other network virtual assets, such as virtual storage devices, network path devices, and user interfaces (desktops).

FIG. 15 is an illustration of a storage virtualization configuration that can be managed in accordance with the present invention. Those skilled in the art will recognize that FIG. 15 is similar to the illustration of FIG. 8 except for depicting storage devices and virtual storage assets (logical units, or LUNs) in place of servers and virtual applications, respectively. Thus, corresponding details of the discussion above for the server virtualization may be applied to the storage virtualization depicted in FIG. 15, which those skilled in the art will understand in view of this description. Similarly, the present invention can be used in conjunction with other corresponding virtualizations, such as routers and desktops.

FIG. 16 is a flow diagram that illustrates operation of the computer installed with the Control Center application 110, 112 such as illustrated in FIG. 1. When the application is launched, generally on boot up of the computer, the application will first perform a monitor and inventory operation 1602 that will determine the collection of virtual assets available to the computer. The monitor and inventory operation involves the Control Center application communicating with the virtualization platform software to determine a pool of available resource and asset inventory, including user interface inventory (such as installed applications),

network servers, network storage devices, network routers and switches, and the like, all accessible from the host machine. As noted above, such communications are facilitated in appropriate situations by the presence of a Control Agent in each host machine. The Control Agent can provide the necessary communications facilities for communications between the host
5 machine and the associated Control Center computer.

After the Control Center determines the collection of available virtualization assets, the next operation is for the application to apply the application rules 1604. These include the Application Critical Rules such as illustrated above in FIG. s 11-14 and any rules defined by the user in Knowledge Blocks or imported as Knowledge Blocks. The next operation is for the
10 Control Center application to enforce the rules 1606. For example, the rules may specify the number of application servers of a particular type that are deployed at given times of the day, or in response to detected network traffic conditions. Other discretionary operations may then continue.

FIG. 17 is a flow diagram that illustrates operation of Knowledge Block processing for
15 the Control Center computer such as illustrated in FIG. 1. In the first operation, the group of rules can be created 1702. These rules can include rules that are default rules common to all implementations of the application, and can also include rules that the user has fashioned for particular purposes using the rule editor. In the next operation, Knowledge Block rules can optionally be imported or exported 1704. In the last Knowledge Block processing operation, the
20 rules are applied 1706. As noted above, application of the rules can result in automatic configuration changes that the Control Center application implements through an interface with the virtualization layer software. Other processing can then take place.

FIG. 18 is a flow diagram that illustrates operation of the Control Center computers 110, 112 illustrated in FIG. 1. In the first operation, real-time performance metrics are obtained 1802.
25 Such metrics include utilization rate for each of the virtual assets, such as virtual network servers, virtual routers, virtual storage, and the like. Such metrics are also used in the load balancing function, as described above. Next, the Control Center application checks for any automatic configuration changes that are called for 1804. For example, one of the rules might specify a specific mix of virtual servers at a given time of day. Depending on the time of day,

then, the application might instantiate more or fewer virtual servers, as specified by the rule (KB).

If configuration changes are called for, an affirmative outcome at the decision box 1804, then the Control Center issues commands to the virtualization layer software to implement the
5 desired configuration changes 1806. Those skilled in the art will understand how to implement such configuration changes without further explanation, given the description herein. If no configuration changes are called for, a negative outcome at the decision box 1804, then the Control Center next checks to determine if any of the ACRs or Knowledge Block rules have been violated by any system configuration settings or performance metrics, as indicated by the
10 decision box 1808. If there has been a rules violation, an affirmative outcome at the decision box, then the application reports the violation 1810. The report can take the form of an alert email message generated by the Control Center application that is sent to a network administrator or other predetermined email mailing address. After the alert email message has been sent 1810, the Control Center issues commands to the virtualization layer software to implement the desired
15 configuration changes 1812. Those skilled in the art will understand how to implement such configuration changes without further explanation, given the description herein. Operation then returns to determining real-time system performance metrics 1802 and the loop repeats for as long as the Control Center application is executing. If there was no rules violation, a negative outcome at the decision box 1808, then no configuration change is carried out and, instead,
20 operation returns to determining the performance metrics and the loop repeats itself.

In this way, the Control Center provides automatic virtualization management for computer network systems that include network virtual assets. A wide range of installation enhancements can be implemented, including business (application critical) rules, import and export of rules, and administrator alert messages.

25 The present invention has been described above in terms of presently preferred embodiments so that an understanding of the present invention can be conveyed. One skilled in the art will appreciate that the present invention can be practiced by other than the above-described embodiments, which are presented in this description for purposes of illustration and not of limitation. The specification and drawings are not intended to limit the exclusionary scope
30 of this patent document. It is noted that various equivalents for the particular embodiments

discussed in this description may practice the invention as well. That is, while the present invention has been described in conjunction with specific embodiments, it is evident that many alternatives, modifications, permutations and variations will become apparent to those of ordinary skill in the art in light of the foregoing description. Accordingly, it is intended that the
5 present invention embrace all such alternatives, modifications and variations as fall within the scope of the appended claims. The fact that a product, process or method exhibits differences from one or more of the above-described exemplary embodiments does not mean that the product or process is outside the scope (literal scope and/or other legally-recognized scope) of the following claims.

CLAIMS:

What is claimed is:

1. A method for data storage across one or more virtualization system resources over a network, the method comprising:

5 implementing a virtualization system that includes a control center application, one or more physical resources, and one or more virtual assets running on each of the physical resources, wherein the virtual assets are managed by virtualization layer instances running on each of the physical resources, and wherein at least one of the virtual assets include a virtual storage asset;

10 obtaining a set of data to be stored the at least one virtual storage asset running on any of the physical resources; and

causing storage of the set of data at the at least one virtual storage asset running on any of the physical resources.

15 2. The method of claim 1, wherein the at least one virtual storage asset is virtualized via storage virtualization layers running on each of the physical resources

3. The method of claim 1, wherein at least two virtual assets each comprise software instantiations of computer systems.

20 4. The method of claim 2, wherein at least one of the virtual assets comprise middleware applications running on each of the physical resources to access the virtual storage assets via the storage virtualization layer.

25 5. The method of claim 1, wherein the control center application is configured to perform configuration management or forecasting services via the virtualization layer instances.

6. The method of claim 5, wherein the configuration management includes application routing for virtual assets or implementation of application rules.

7. The method of claim 1, wherein the at least one virtual storage asset is a logical unit with a logical unit number (LUN).

8. The method of claim 1, further comprising:
5 obtaining a request from a user device to obtain at least a portion of the set of stored data;
retrieving at least the portion of the set of stored data from the virtual storage asset;
and
transmitting at least the portion of the set of stored data to the user device via a
10 network.

9. A virtualization system comprising:
a control computer running a control center application; and
one or more physical resources, wherein one or more physical resources are
15 configured to execute one or more virtual assets, the virtual assets managed by virtualization layer instances running on each of the physical resources, wherein at least a portion of the virtual assets include virtual storage assets,
wherein the control center application is configured to:
obtain a request from a user device for data stored at any of the virtual
20 storage assets;
retrieve the data from one or more virtual storage assets that are storing the data; and
transmit the retrieved data to the user device.

25 10. The virtualization system of claim 9, wherein the virtual storage assets are virtualized via a storage virtualization layer.

11. The virtualization system of claim 9, wherein the virtualization system is further configured to:
30 obtain the data to be stored at any of the virtual storage assets; and

store the data across any of the virtual storage assets running on the physical resources.

12. The virtualization system of claim 9, wherein each of the one or more physical
5 resources execute at least two virtual assets that each comprise software instantiations of computer systems.

13. The virtualization system of claim 9, wherein at least one of the virtual assets
comprise middleware applications accessing the virtual storage assets via the storage
10 virtualization layer.

14. The virtualization system of claim 9, wherein the control center application is
configured to perform configuration management or forecasting via the virtualization layer
instances.

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15. The virtualization system of claim 9, wherein the virtual storage assets comprise
databases.

16. The virtualization system of claim 9, the virtual storage assets are logical units
20 with a logical unit number (LUN).

17. The virtualization system of claim 9, wherein the virtualization system is
further configured to receive, over a network by a user, one or more instructions to configure
the virtual storage assets.

25

18. A method for data storage on virtualized resources, the method comprising:
receiving a request to store data, at a control center application in communication
with one or more physical resources; and

causing storage of the data, by the control center application, at one or more virtual data storage assets running on each of the one or more physical resources,

wherein the virtual data storage assets are managed by storage virtualization layer instances running on each of the physical resources.

5

19. The method of claim 18, wherein one or more virtual assets are configured to run on each of the physical resources, wherein the virtual assets are managed by virtualization layer instances running on each of the physical resources.

10

20. The method of claim 19, wherein at least two of the virtual assets comprise software instantiations of computer systems, and wherein the virtual storage assets comprise databases.

ABSTRACT

An apparatus and method for automatic configuration management of a network are provided. The apparatus and method may provide a virtualization system that has an inventory
5 that includes physical resources and virtual assets managed by a virtualization layer running on the physical resources; wherein virtual assets are software instantiations of computer systems, receive a virtual asset provisioning request that specifies parameters to be considered for the virtual asset provisioning request and receive data on inventory available in the virtualization system. The apparatus and method may automatically provision a particular virtual asset to a
10 particular physical resource in the virtualization system that matches the parameters in the virtual asset provisioning request, assign the provisioned virtual asset to the virtual asset provisioning request and provide user access to the provisioned virtual asset.

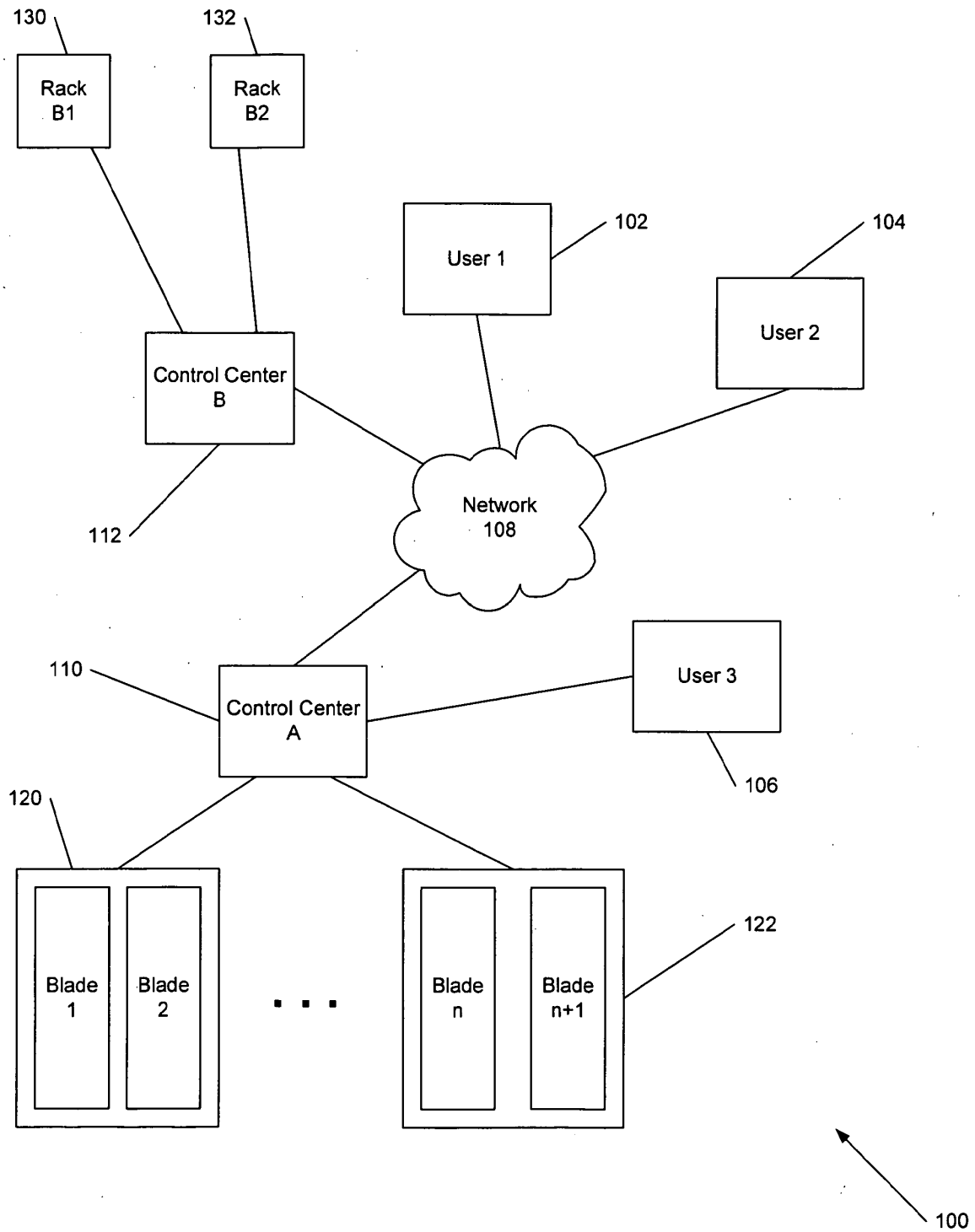


FIG. 1

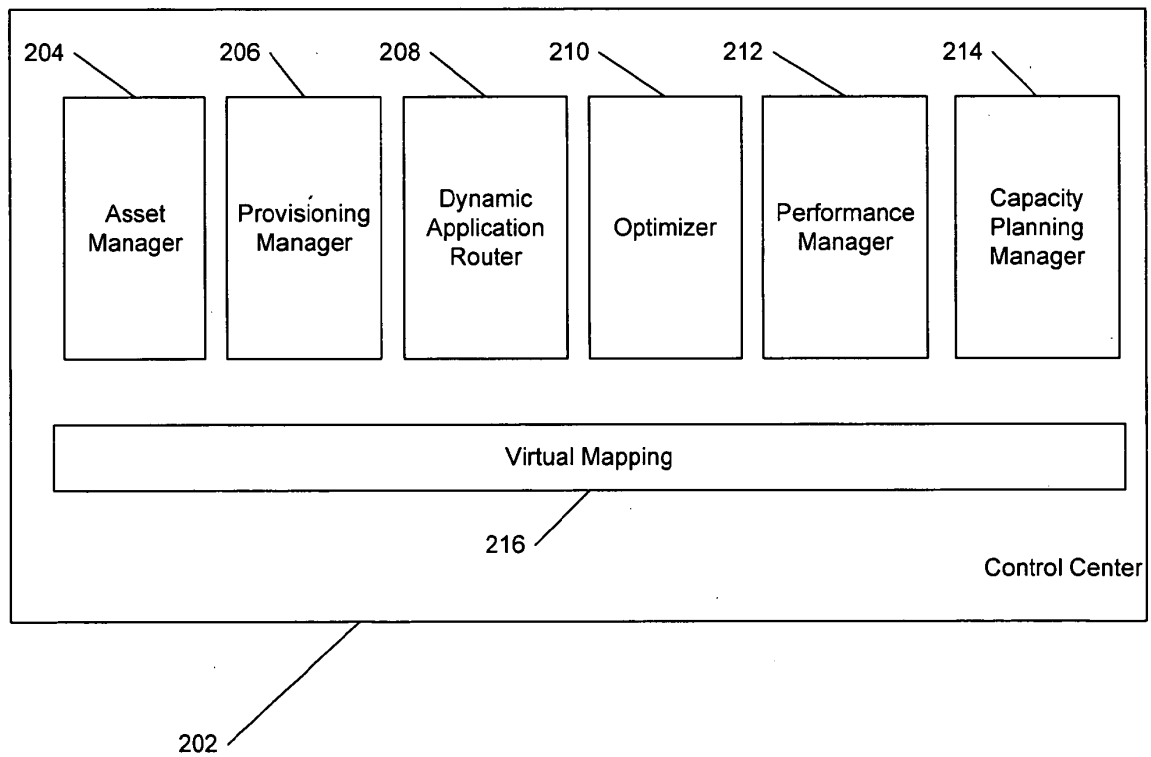
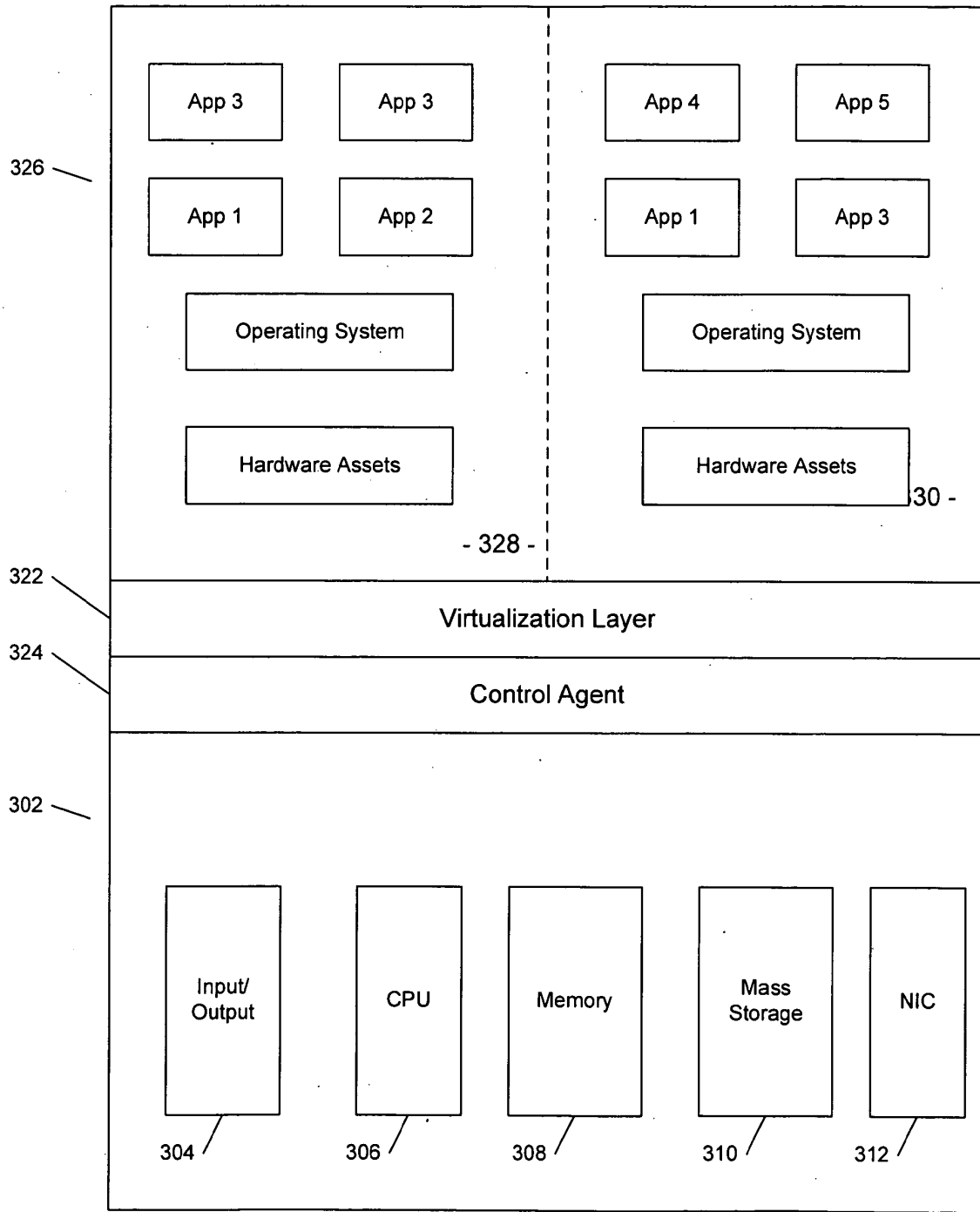


FIG. 2



300

FIG. 3

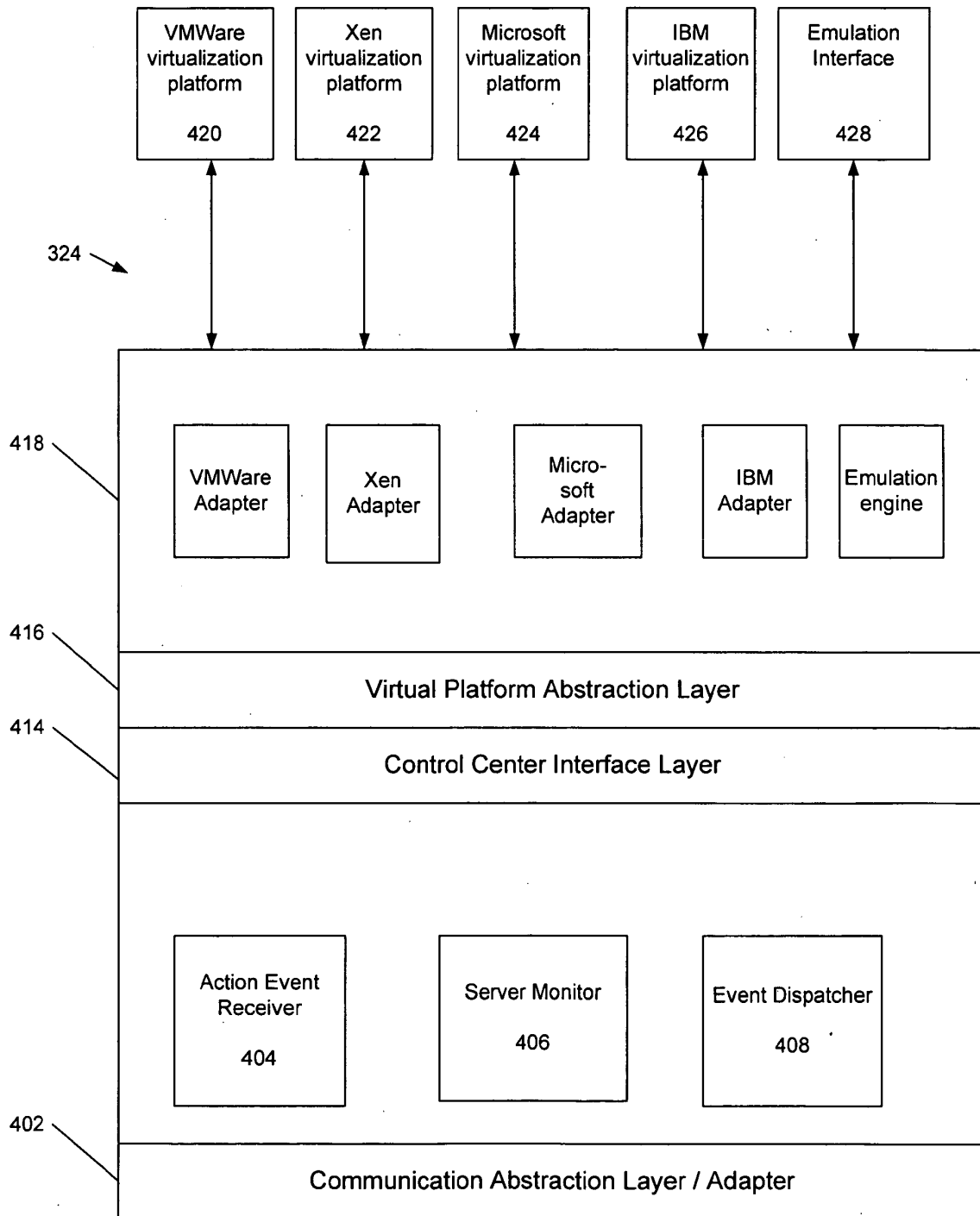


FIG. 4

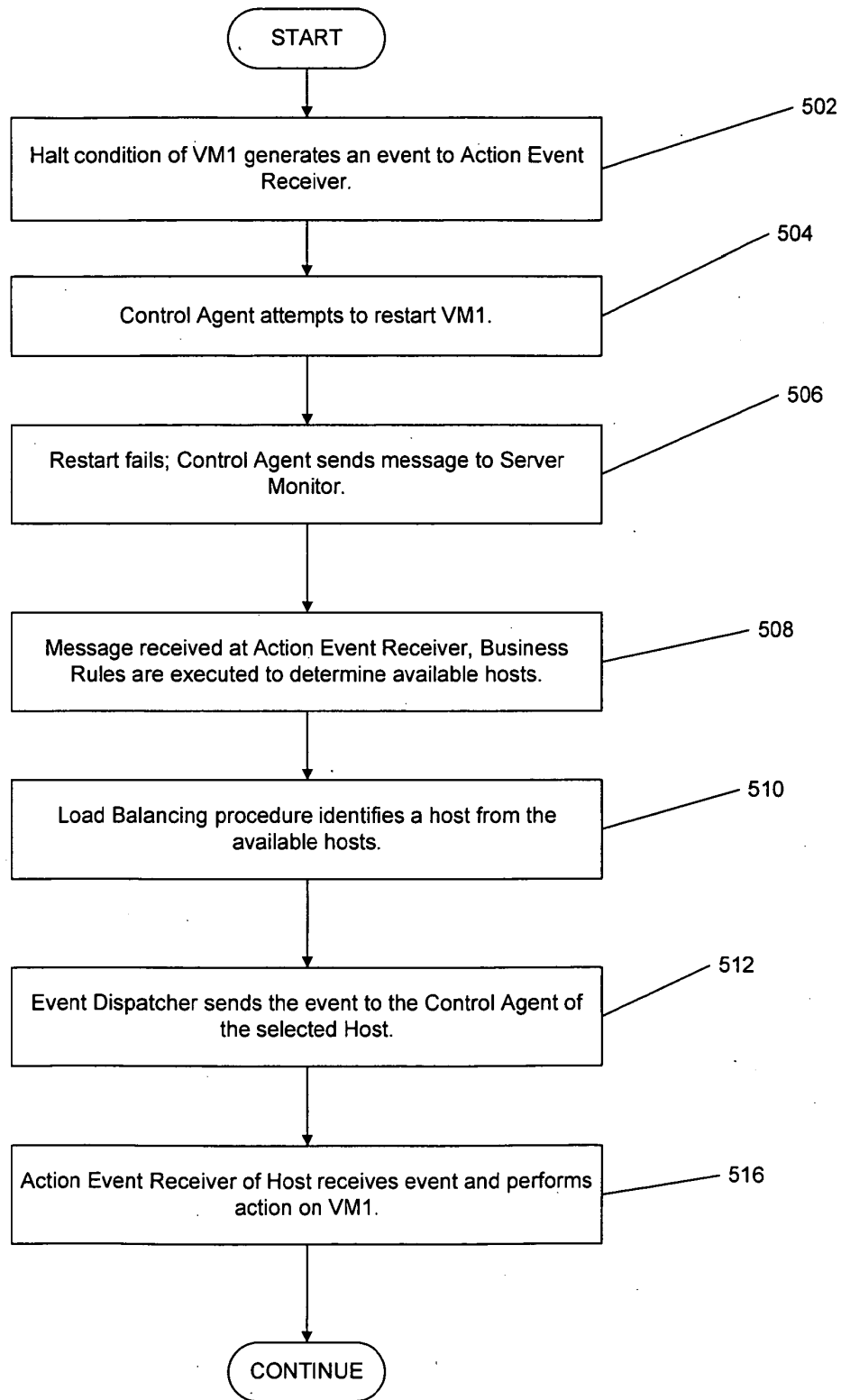


FIG. 5

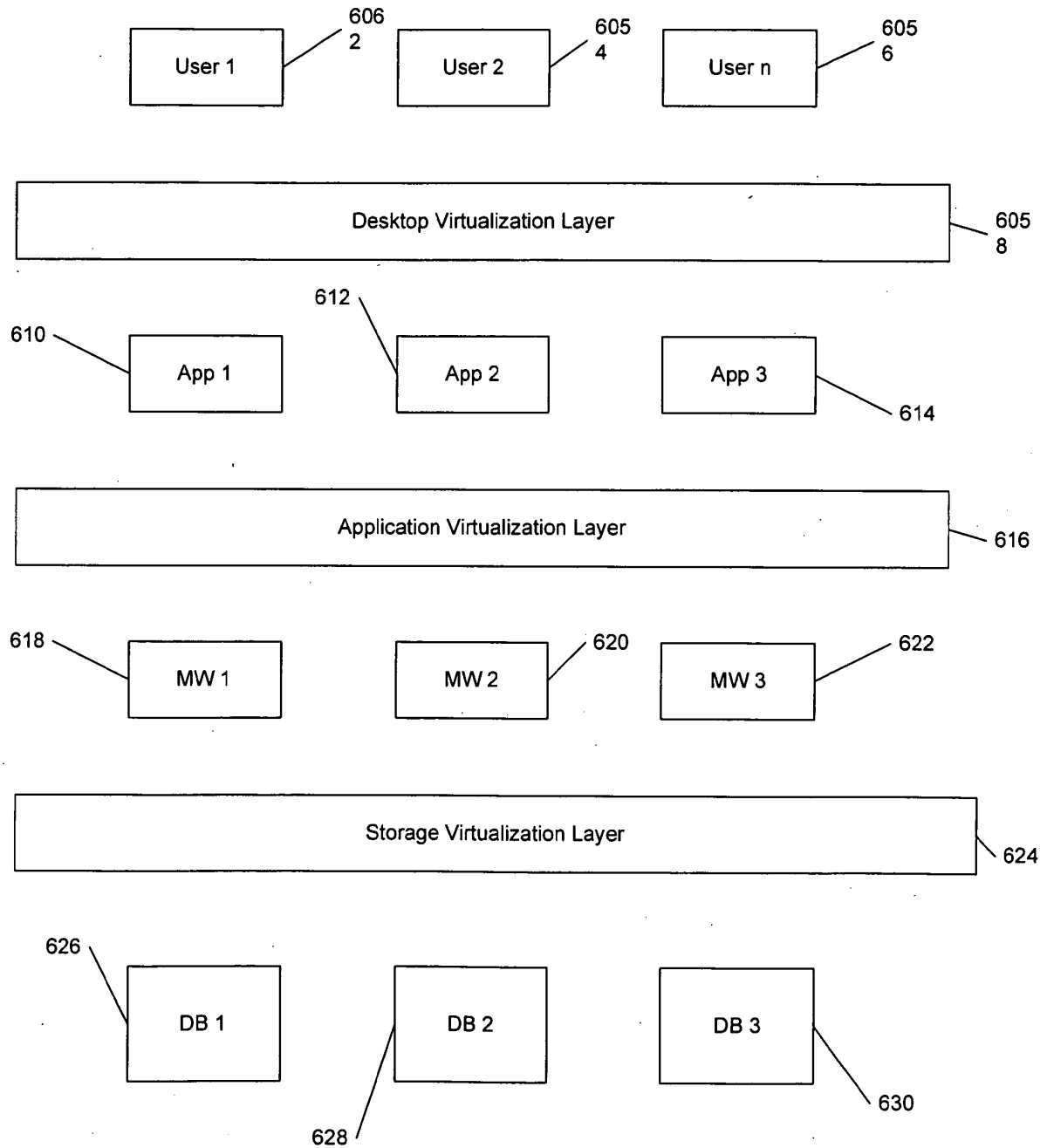


FIG. 6

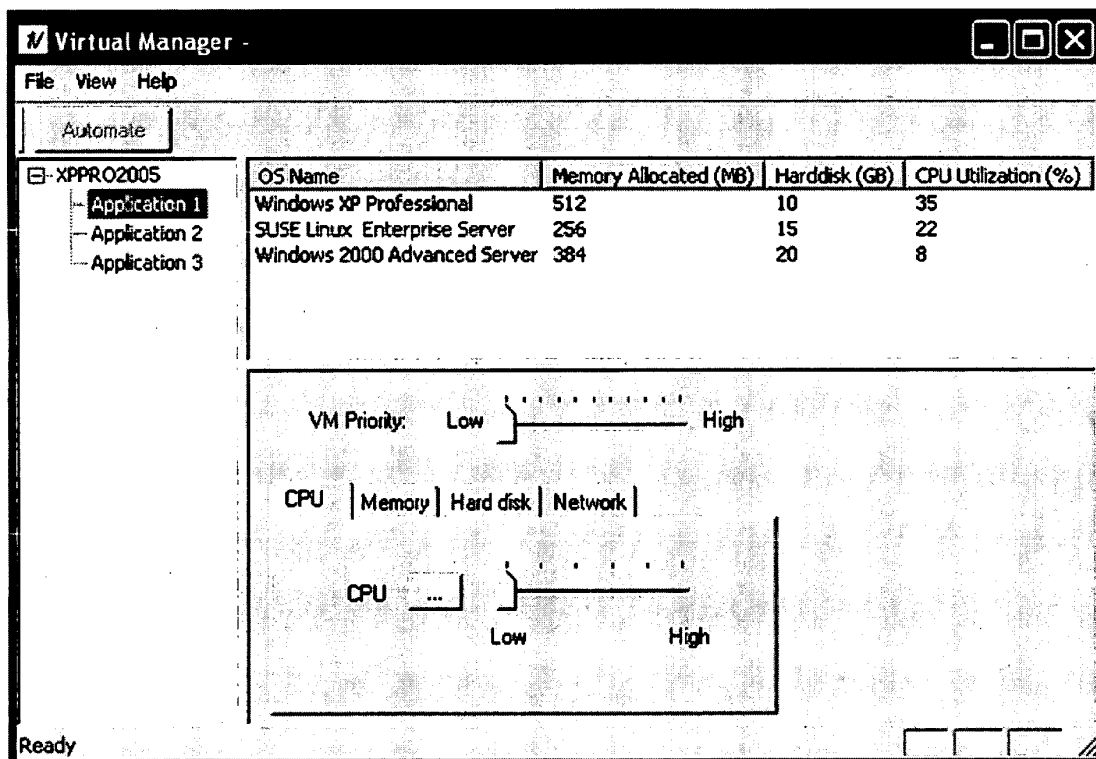


FIG. 7

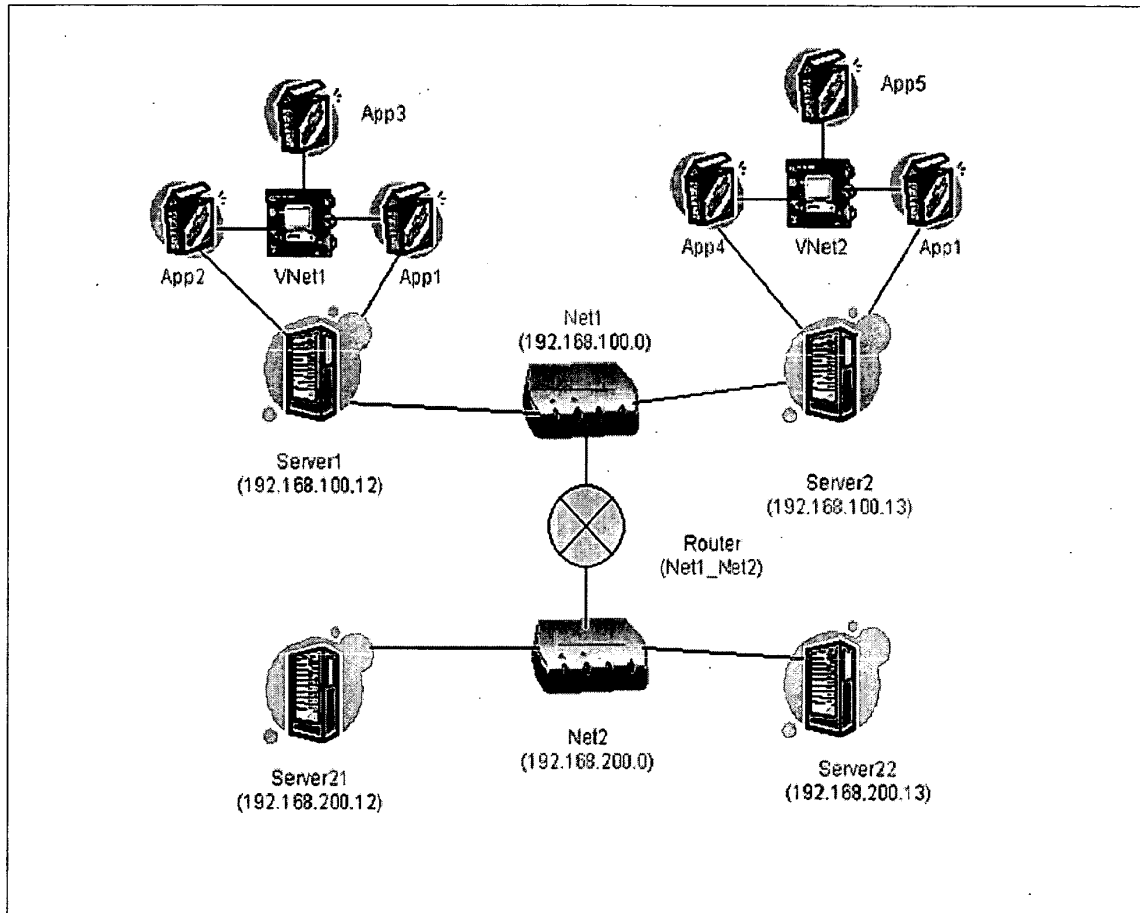


FIG. 8

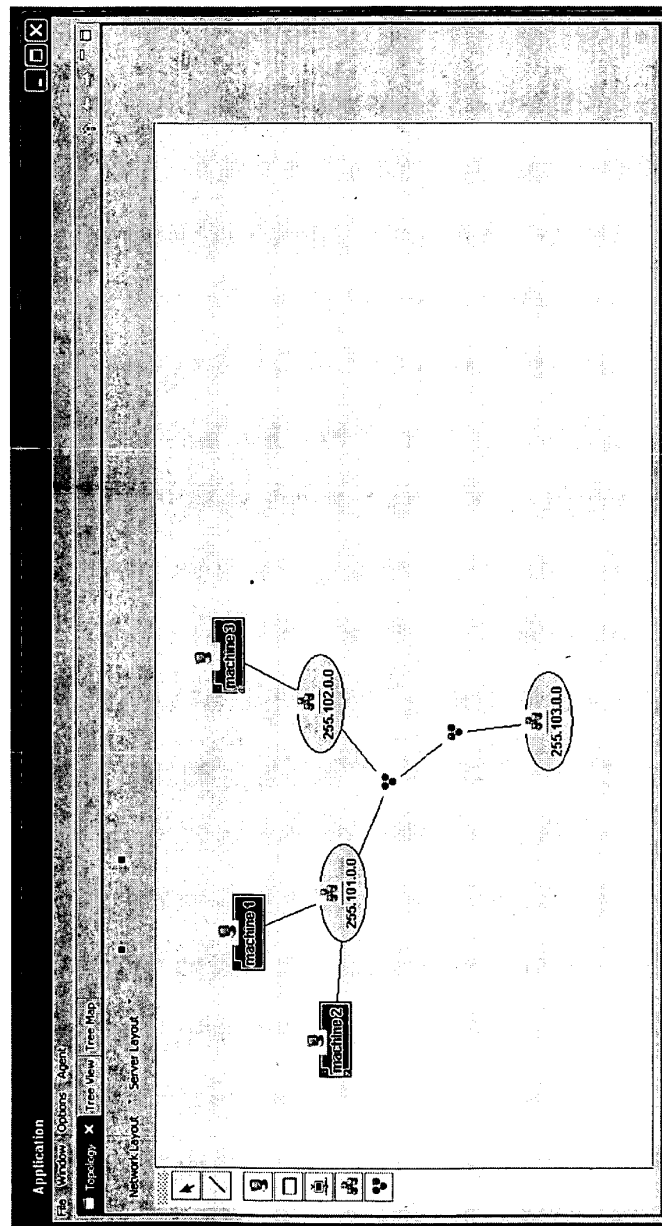


FIG. 9

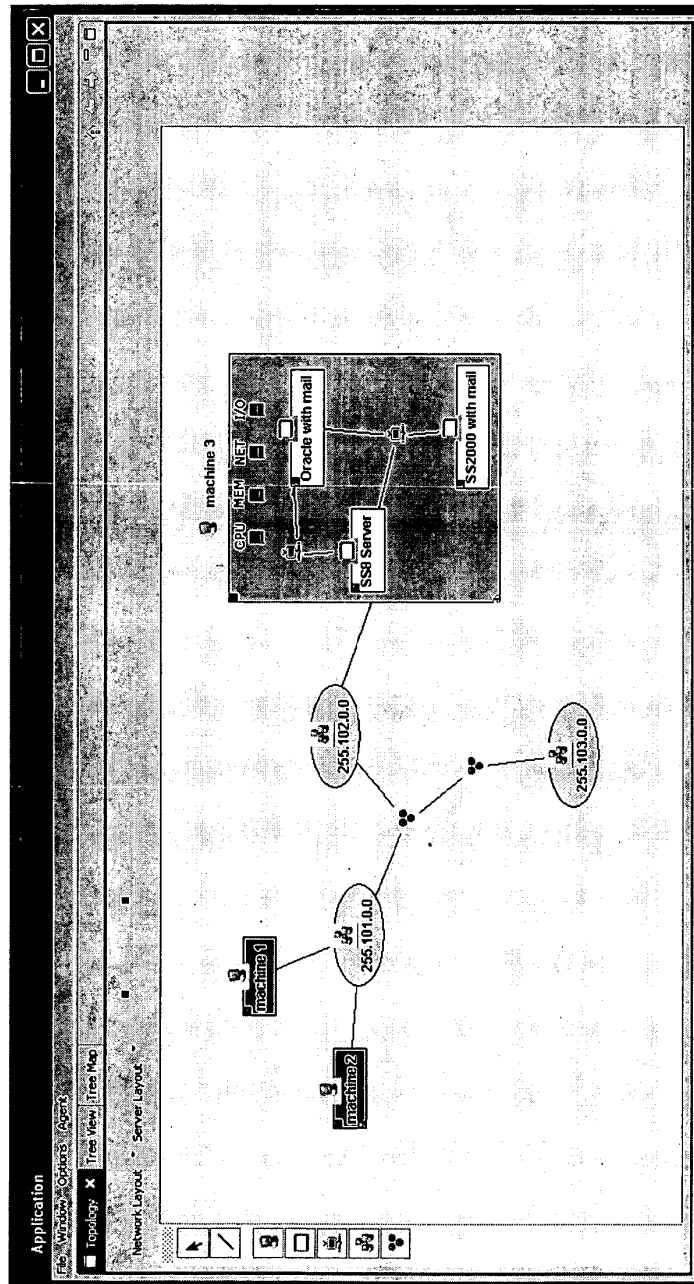


FIG. 10

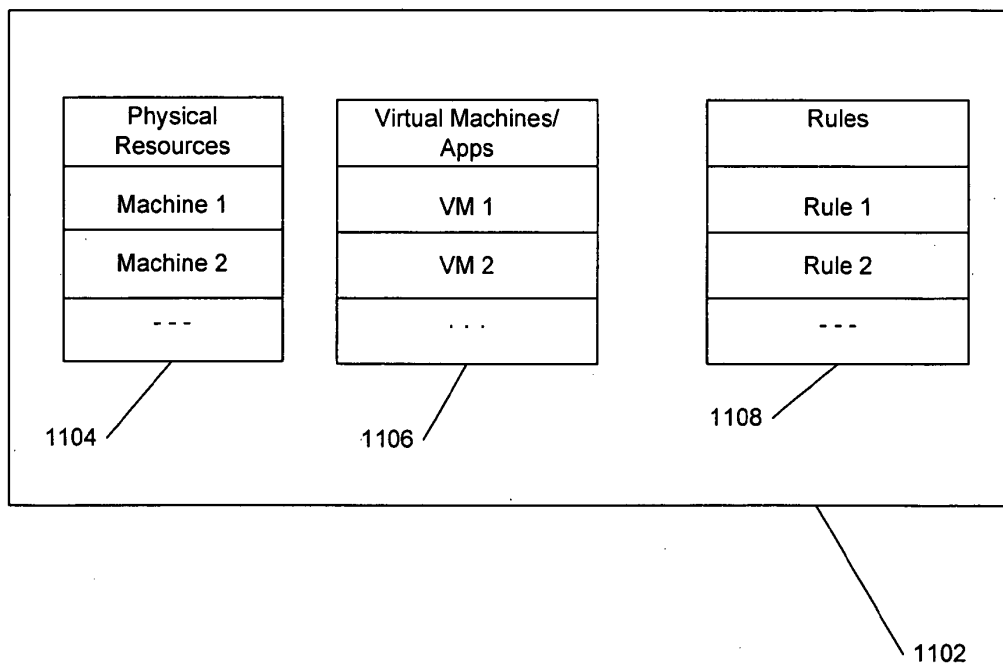


FIG. 11

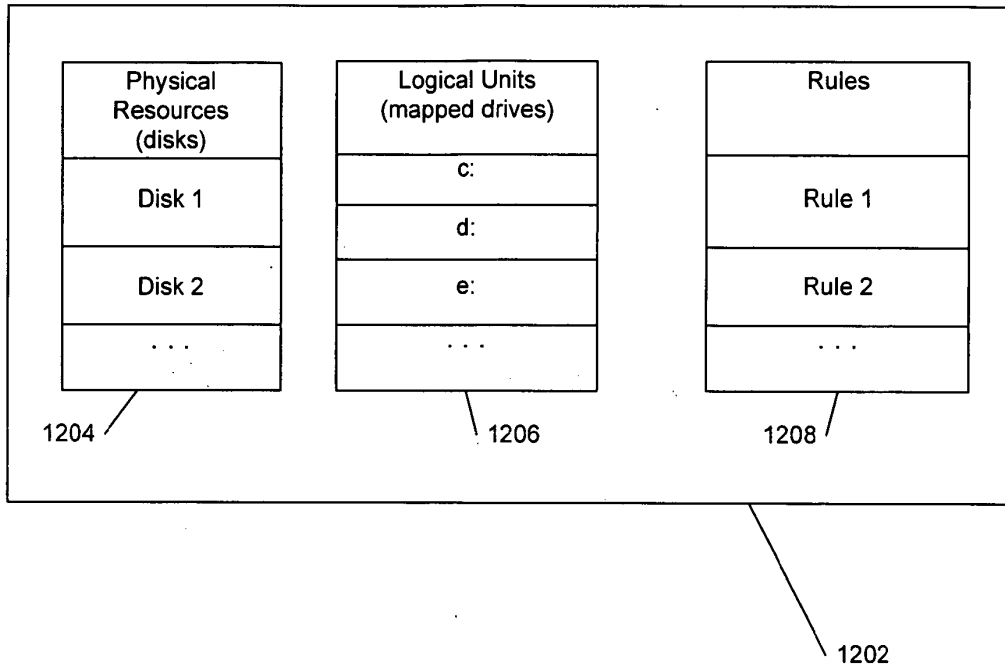


FIG. 12

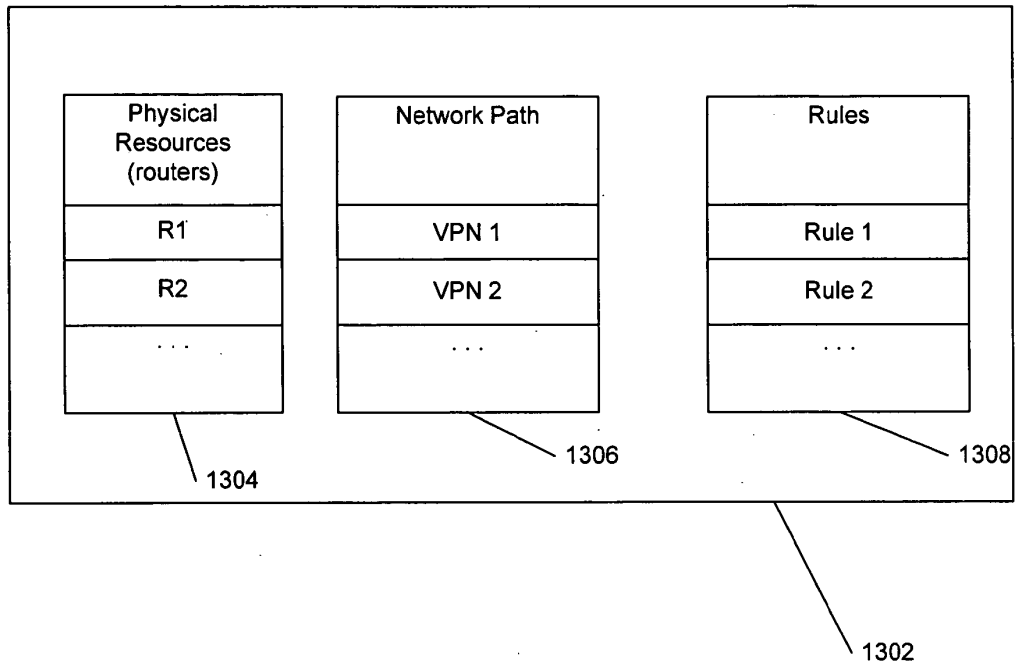


FIG. 13

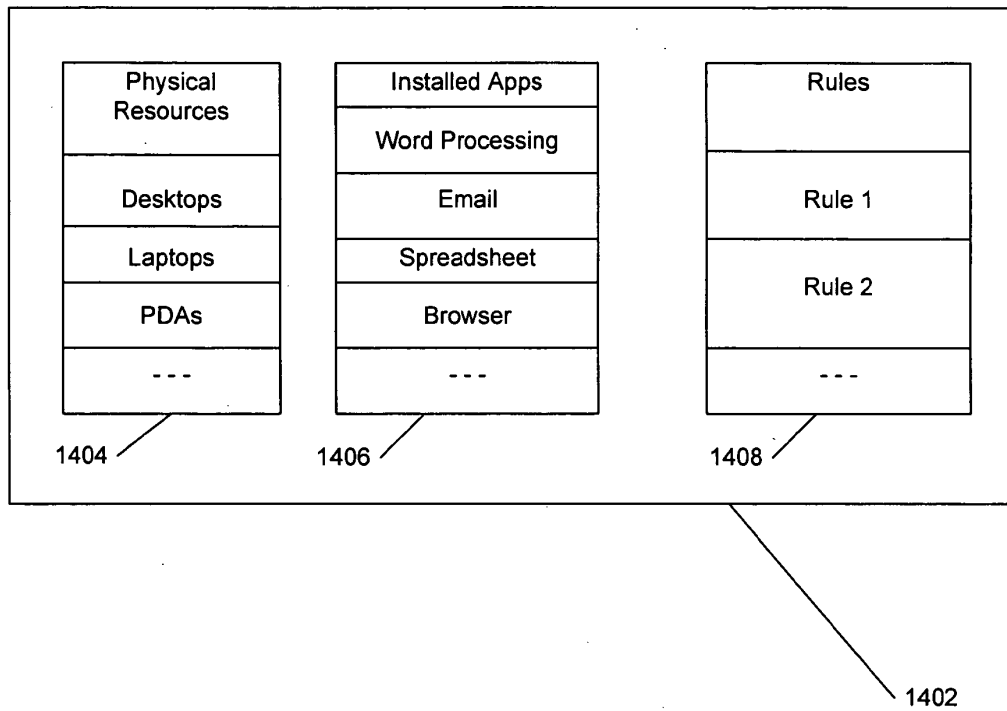


FIG. 14

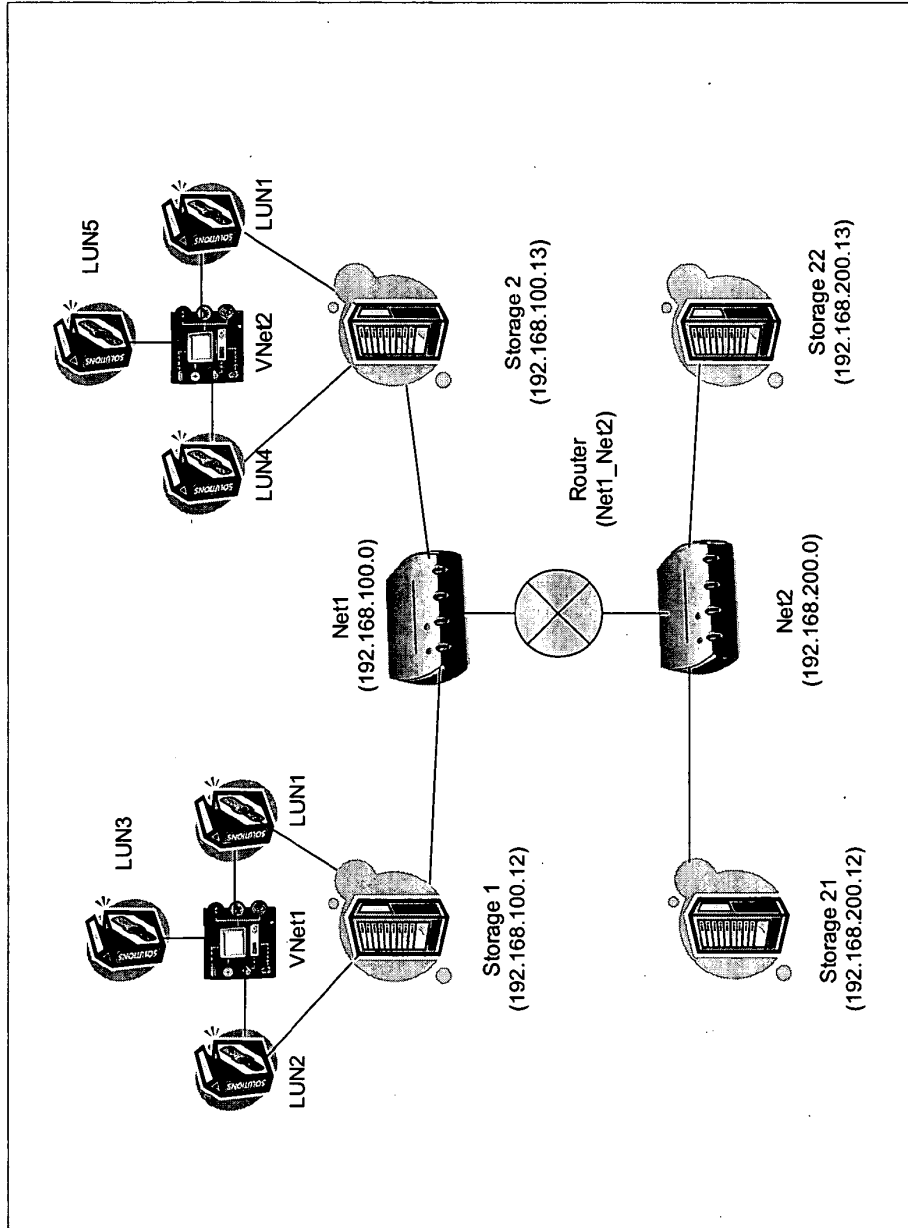


FIG. 15

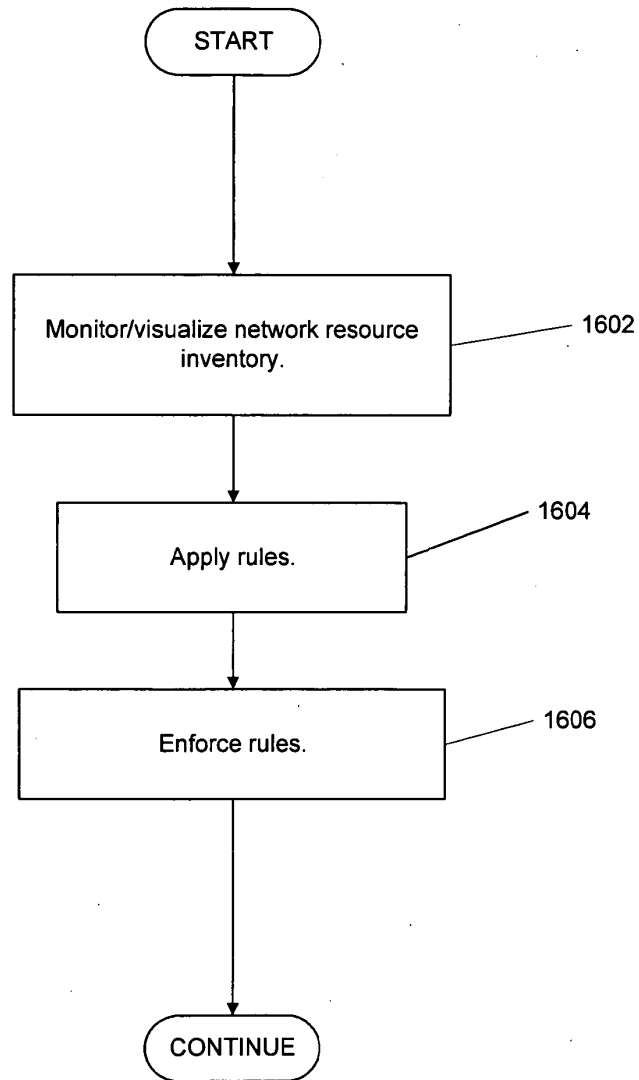


FIG. 16

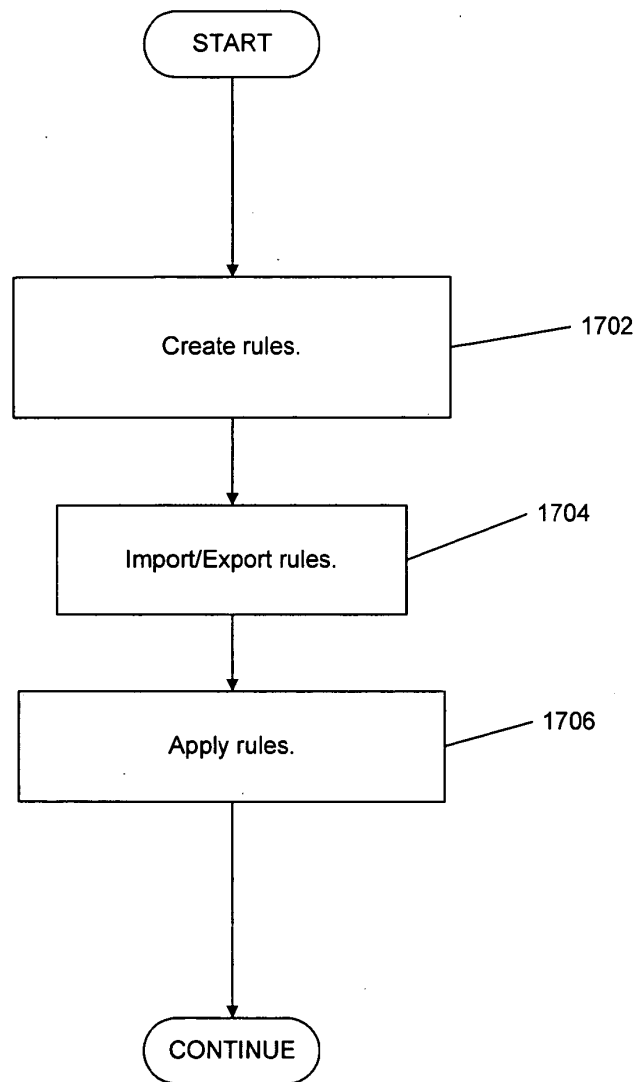


FIG. 17

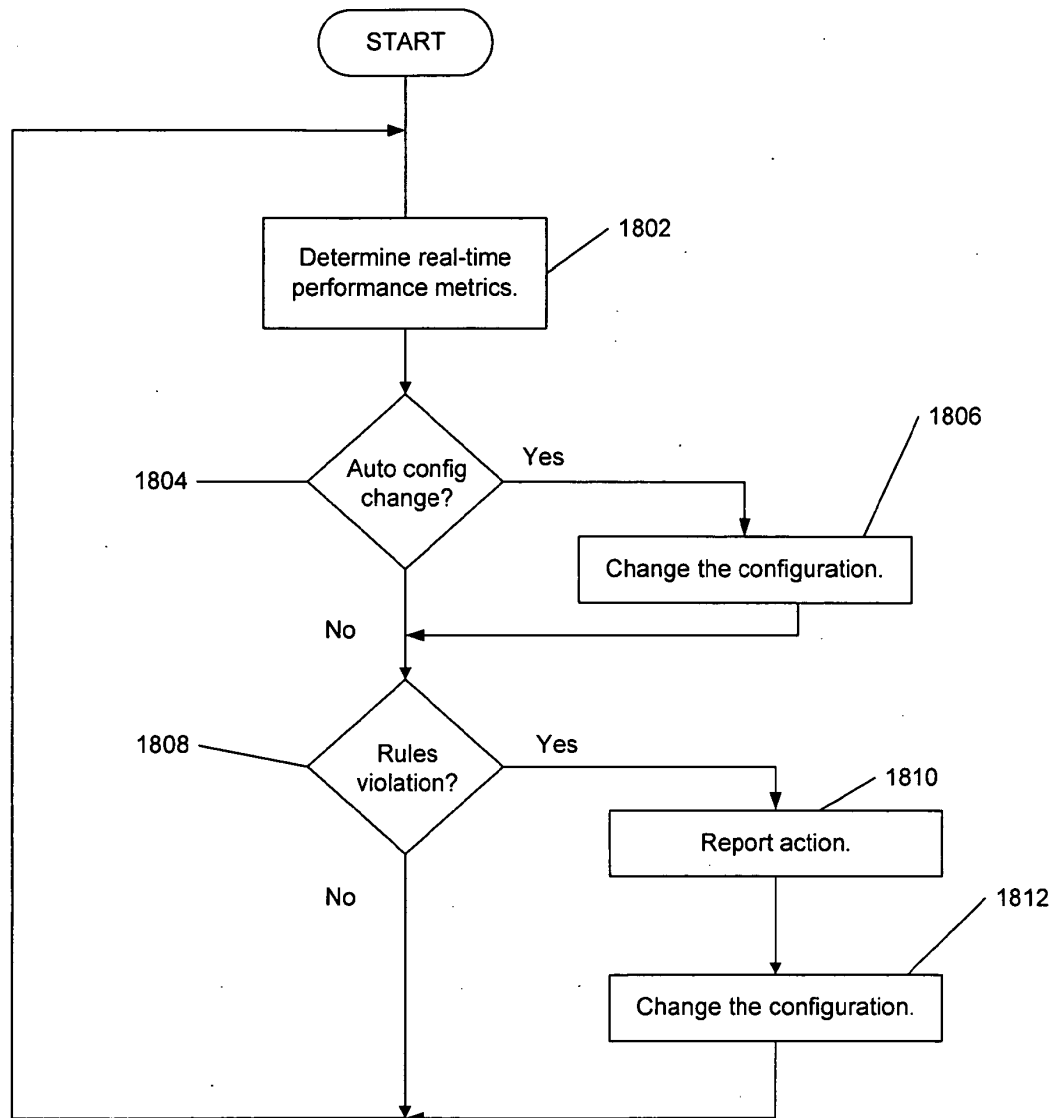


FIG. 18

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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63) ☐ Declaration Submitted With Initial Filing OR ☒ Declaration Submitted After Initial Filing (surcharge (37 CFR 1.16(f)) required)		Attorney Docket Number	367894-991100
		First Named Inventor	PABARI, Vipul
		COMPLETE IF KNOWN	
		Application Number	14/450,765
		Filing Date	August 4, 2014
		Art Unit	2447
		Examiner Name	Not Yet Assigned

VIRTUAL SYSTEMS MANAGEMENT

(Title of the Invention)

As a below named inventor, I hereby declare that:

This declaration is directed to:

☐ The attached application,

OR

☒ United States Application Number or PCT International application number 14/450,765
 filed on 08/04/2014.

The above-identified application was made or authorized to be made by me.

I believe 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.

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[Page 1 of 2]

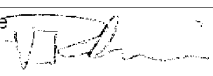
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