



- (51) International Patent Classification:
G06F 1/20 (2006.01) *G06F 1/32* (2006.01)
- (21) International Application Number:
PCT/US2011/054191
- (22) International Filing Date:
30 September 2011 (30.09.2011)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
61/389,616 4 October 2010 (04.10.2010) US
- (71) Applicant (for all designated States except US): **AVOCENT** [US/US]; 4991 Corporate Drive, Huntsville, Alabama 35805 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **KHUTI, Bharat A.** [GB/US]; 601 Madison Park Drive, Madison, Alabama 35758 (US). **GEFFIN, Steven** [US/US]; 19430 NE 21st Court, Miami, Florida 33179 (US). **WILLIAMS, Richard** [US/US]; 304 Westberg Avenue, Huntsville, Alabama 35801 (US). **KUTNER, Joe** [US/US]; 6718 Zach Lane, Owens Cross Roads, Alabama 35763 (US). **BASIAGO, Jack** [US/US]; 165 Crosswind Road, Toney, Alabama 35773 (US). **ALTMAN, Sheldon** [US/US]; 207 Colony Road, New Haven, Connecticut 06511 (US). **WILLIAMS, Brian** [US/US]; 26 Pine Hill Terrace, Stamford, Connecticut 06903 (US).

cut 06903 (US). **CARVALHO, Juarez** [BR/US]; 22613 Middletown Drive, Boca Raton, Florida 33428 (US). **BROWNER, Michael** [US/US]; 8511 NW 53rd Street, Lauderhill, Florida 33351 (US). **PATEL, Mitesh** [CA/US]; 11808 NW 2nd Street, Coral Springs, Florida 33071 (US). **HARPER, Kenneth L.** [US/US]; 4931 NW 116th Avenue, Coral Springs, Florida 33076 (US). **SHELTON, James H.** [US/US]; 5725 SW 118th Avenue, Cooper City, Florida 33330 (US). **CLARK, Steven** [US/US]; 7525 NW 61 Terrace, Unit 1601, Parkland, Florida 33067 (US). **STURGEON, Donald A.** [US/US]; 107 Gramercy Circle, Huntsville, Alabama 35806 (US). **COWEN, David John** [US/US]; 7461 SW 11 Street, Plantation, Florida 33317 (US). **KERSHNER, Mark** [US/US]; 1209 Deborah Drive, Huntsville, Alabama 35801 (US). **BLACKWELL, Steven R.** [US/US]; 5108 Highway 53, Harvest, Alabama 35749 (US). **MILLS, Karl** [US/US]; 17908 41st PL W, Lynnwood, Washington 98037 (US). **PU, Yang** [CN/CN]; 910A Jinhui Building, Shenzhen, Guangdong 518054 (CN). **JUN, Dai** [CN/CN]; 31-9B Wei Lan Hai An Deng Liang Road, Shenzhen, Guangdong 518057 (CN). **TOBIN, Richard M.** [US/US]; 19989 Pine Lane, Marysville, Ohio 43040 (US). **KHAN, Aman** [US/US]; 61 Apollo Road, Bethel, Connecticut 06801 (US). **PESTONE, Roy D.** [US/US]; 284 E. Prospect Avenue, Mount Vernon, New York 10553 (US). **LACHAPELLE, Jean-Maxime** [CA/US]; 11630 NW 56th Drive, Apt. 108, Coral Springs, Florida 33076 (US).

[Continued on next page]

(54) Title: SYSTEM AND METHOD FOR MONITORING AND MANAGING DATA CENTER RESOURCES IN REAL TIME

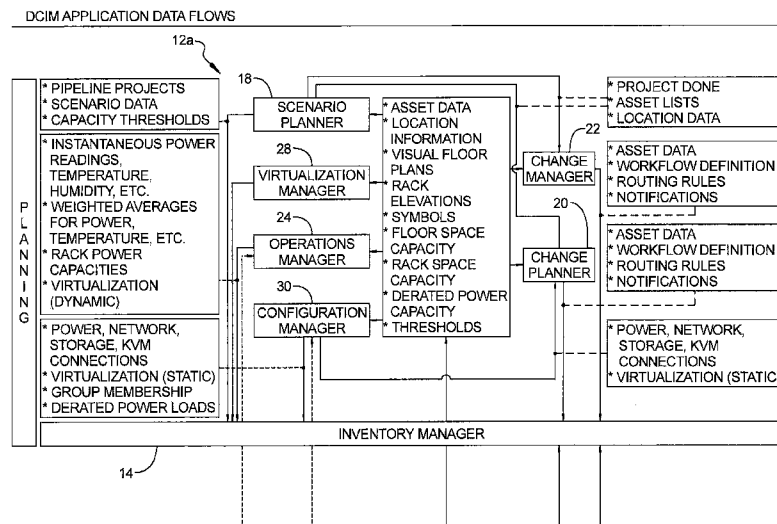


FIGURE 4A

(57) Abstract: A system for monitoring, controlling and optimizing power usage and cooling utilization within a data center infrastructure. The system may make use of a subsystem which is adapted to obtain real time information on both facility devices and information technology (IT) devices. The subsystem may be used to evaluate the real time information to provide an alert and diagnostic information with respect to at least one of the facility devices or at least one of the IT devices. The subsystem may also make use of a mechanism that provides real time control over at least one of the facility devices or at least one of the IT devices to optimize at least one of cooling utilization, power usage or performance of at least one of the facility devices or at least one of the IT devices.

WO 2012/047746 A3



(74) **Agents:** ELCHUK, Mark D. et al.; Harness, Dickey & Pierce, P.L.C., P.O. Box 828, Bloomfield Hills, Michigan 48303 (US).

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

(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH,

GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (*Art. 21(3)*)
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (*Rule 48.2(h)*)

(88) **Date of publication of the international search report:**
31 May 2012

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2011/054191

A. CLASSIFICATION OF SUBJECT MATTER
 INV. G06F1/20 G06F1/32
 ADD.
 According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
 G06F

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
 EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2006/248360 A1 (FUNG HENRY T [US]) 2 November 2006 (2006-11-02) paragraph [0037] - paragraph [0181] figures 1-23	1-23
X	----- US 2009/231152 A1 (TUNG TERESA S [US] ET AL) 17 September 2009 (2009-09-17) paragraph [0025] - paragraph [0119] figures 1-14	1-23
X	----- US 2010/010688 A1 (HUNTER ROBERT R [US]) 14 January 2010 (2010-01-14) paragraph [0065] - paragraph [0140] figures 1-7	1-23

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

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

Date of the actual completion of the international search 27 March 2012	Date of mailing of the international search report 04/04/2012
--	--

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Baldan, Marco
--	---

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2011/054191

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006248360	A1	02-11-2006	NONE

US 2009231152	A1	17-09-2009	NONE

US 2010010688	A1	14-01-2010	AU 2009268776 A1 14-01-2010
		CA 2730246 A1	14-01-2010
		EP 2313817 A2	27-04-2011
		US 2010010688 A1	14-01-2010
		WO 2010005912 A2	14-01-2010
