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[Continued on next page]

(54) Title: RESOURCE LEVEL ROLE BASED ACCESS CONTROL FOR STORAGE MANAGEMENT

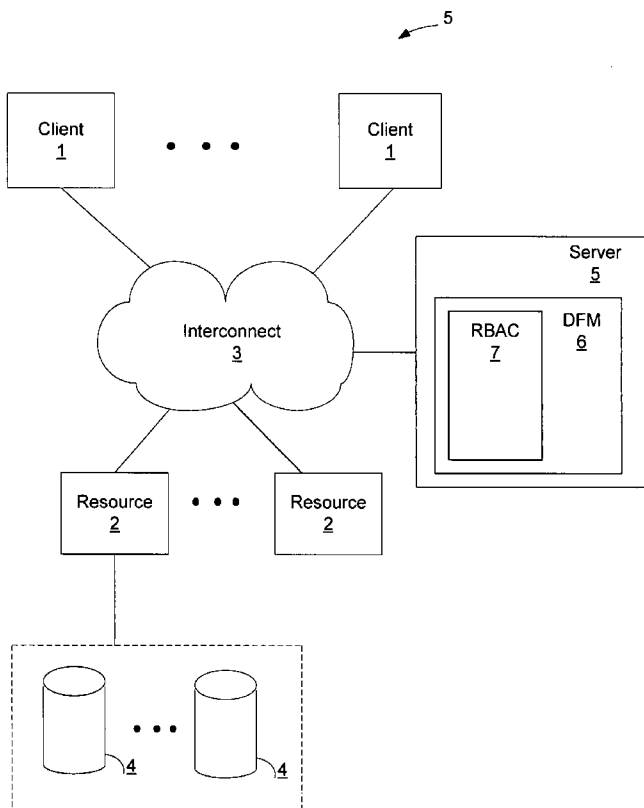


FIG. 4

(57) Abstract: A method, apparatus, and system for providing role-based access control (RBAC) for storage management are described herein. Resource-identifying information is stored in a role-based access database for a network storage system, in association with role-identifying information for each of a plurality of roles and operation-identifying information. The operation-identifying information indicates one or more authorized operations for each of the plurality of roles and the resource-identifying information identifies specific resources maintained by the network storage system. The role-identifying information, data indicating one or more authorized operations for at least one of the roles, and resource-specific identifying information in the role-based access database are used to determine whether to allow or deny a request from a network storage client to access a resource maintained by the network storage system.

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European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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**INTERNATIONAL SEARCH REPORT**

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**A. CLASSIFICATION OF SUBJECT MATTER**  
INV. H04L29/06 G06F21/00

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

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
H04L G06F

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

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

EPO-Internal, WPI Data, COMPENDEX, INSPEC, IBM-TDB

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/073436 A (ARCOT SYSTEMS INC [US]) 19 September 2002 (2002-09-19) paragraphs [0023] - [0039] figures 1,3-6	1-12
X	DE 199 54 358 A1 (HEWLETT PACKARD CO [US]) 20 July 2000 (2000-07-20) abstract column 6, line 57 - column 7, line 24 column 16, line 18 - column 17, line 23 figures 2,10,11	1-12
X	EP 1 124 172 A (EMC CORP [US]) 16 August 2001 (2001-08-16) abstract paragraphs [0053] - [0060] figures 1,3,5,8	1-12
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Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*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)
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Date of the actual completion of the international search

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International application No  
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2006/010483 A1 (BUEHLER DIETER [DE] ET AL) 12 January 2006 (2006-01-12) abstract paragraphs [0008], [0019] paragraphs [0025] - [0029] paragraph [0178] figures 1,2 -----	1-12
X	US 2005/193196 A1 (HUANG MING-YUH [US] ET AL) 1 September 2005 (2005-09-01) abstract paragraphs [0039], [0047] paragraphs [0051] - [0066] claims 33-50; figures 2-4,9 -----	13-16
A	WO 02/50691 A (MEDIAGATE INC [US]) 27 June 2002 (2002-06-27) paragraphs [0005], [0063], [0064] paragraphs [0113] - [0116] claims 16-18 -----	13-16

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2007/023418

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

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

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

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

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

1. claims: 1-12

Methods for performing role-based access control in a network storage system.

2. claims: 13-16

Method for specifying client-dependent role definitions in a role-based network storage system.

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No

PCT/US2007/023418

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
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