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(54) Title: NAME SPACE PROPAGATION IN A STORAGE SYSTEM

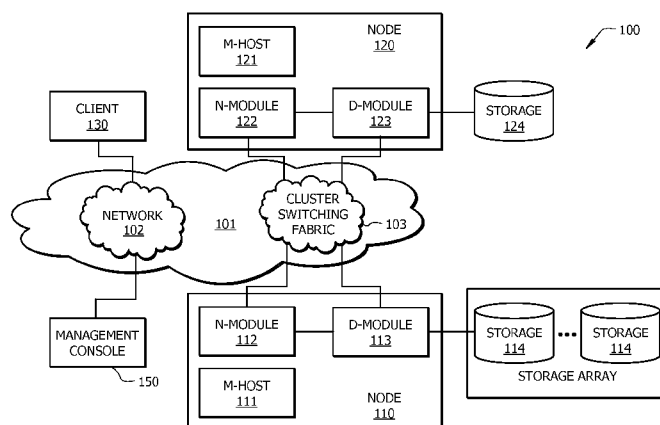


FIG. 1

(57) **Abstract:** Systems and methods efficiently distribute information, such as path name, attributes and object information, corresponding to changes in a content repository to remote nodes in a network using storage-layer/object-based protocols. A difference monitoring client monitors name space and object space changes by identifying inodes which have been modified on storage volumes between two or more snapshots. The monitoring client builds a list which may include name information, object space information and attributes such as file size and permissions for each of the changed inodes that is utilized to update the edge nodes. Systems and methods also provide for geo-scale content distribution from a central repository to edge nodes using a storage layer/object protocol. A caching mechanism is utilized to cache requested content at an edge node. Cached content may be maintained at the edge node during use and/or for an additional predetermined period.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US13/39258

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - G06F 15/16 (2013.01)

USPC - 709/217

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)

IPC(8): G06F 15/16, 15/167 (2013.01)

USPC: 709/217, 216, 214, 213

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 practicable, search terms used)

MicroPatent (US-G, US-A, EP-A, EP-B, WO, JP-bib, DE-C,B, DE-A, DE-T, DE-U, GB-A, FR-A); DialogPRO; IEEE; Google/Google Scholar; monitor*, detect*, chang*, update*, provid*, transmit*, send*, receiv*, content, data, file, distribut*, shar*, network

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2006/0161635 A1 (LAMKIN, A et al.) 20 July 2006; Abstract, paragraphs [0059], [0065], [0070], [0072], [0077], [0087], [0102], [0103], [0131], [0154], [0184]-[0186]	1-9 and 19-28
Y	US 2007/0233828 A1 (GILBERT, J) 04 October 2007; paragraphs [0007], [0086], [0186], [0187]	1-9 and 19-28
Y	US 2005/0198238 A1 (SIM, S et al.) 08 September 2005; paragraph [0039]	8
Y	US 2003/0204613 A1 (HUDSON, M et al.) 30 October 2003; paragraph [0011], [0047]	9
Y	US 2006/0107085 A1 (DANIELS, R et al.) 18 May 2006; paragraphs [0006], [0074]	21



Further documents are listed in the continuation of Box C.



* 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 application or patent 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)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search

30 October 2013 (30.10.2013)

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US13/39258

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:

Group I: Claims 1-9 and 19-28; Group II: Claims 10-14 and 29-34

-Please see Supplemental Page-

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying 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.:
1-9 and 19-28

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.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US13/39258

---Continued from Box No. III - Observations where unity of invention is lacking---

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fee must be paid.

Group I: Claims 1-9 and 19-28 are directed toward a method and system comprising: monitoring a content distribution network for changes in stored data on the network occurring between two points in time; providing a list of monitored changes; creating an object-based name space update file; providing the object-based name space update file to one or more nodes.

Group II: Claims 10-14 and 29-34 are directed toward a method and system comprising: receiving a request in an application-layer protocol to retrieve a file stored on the content distribution network to an external user device; determining at least one location of the file; determining which location to be used too provide the requested file to the user; requesting a transfer of the file; receiving the requested file.

Since none of the special technical features of the Groups I and II inventions are found in more than one of the inventions, unity is lacking.