

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0016621 A1 Havewala et al.

Jan. 18, 2007 (43) **Pub. Date:**

(54) MOVING DATA FROM FILE ON STORAGE **VOLUME TO ALTERNATE LOCATION TO** FREE SPACE

(75) Inventors: Sarosh Cyrus Havewala, Redmond, WA (US); Guhan Suriyanarayanan, Redmond, WA (US); Christophe Franck Robert, Newcastle, WA (US); Shobana Balakrishnan, Redmond, WA (US); Dan Teodosiu, Bellevue, WA (US); Nikolaj S. Bjorner, Woodinville,

> Correspondence Address: WOODCOCK WASHBURN LLP (MICROSOFT CORPORATION) ONE LIBERTY PLACE - 46TH FLOOR PHILADELPHIA, PA 19103 (US)

WA (US)

(73) Assignee: Microsoft Corporation, Redmond, WA

(21) Appl. No.: 11/181,440

Jul. 14, 2005 (22) Filed:

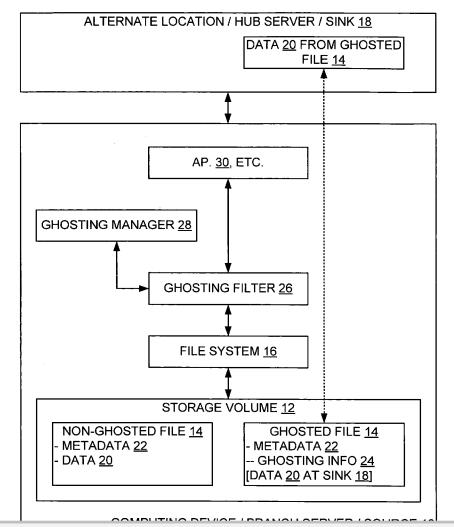
Publication Classification

(51) Int. Cl. G06F 17/30 (2006.01)

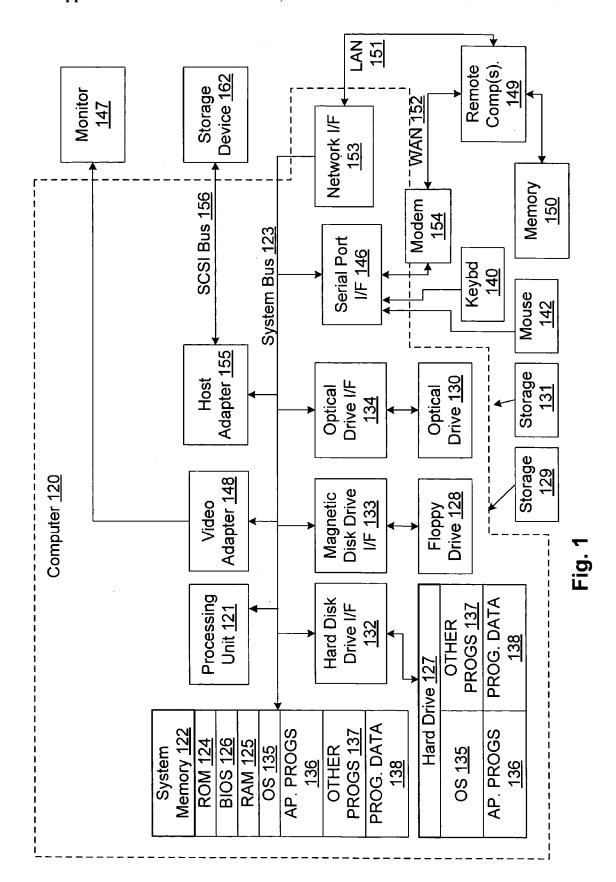
(52) U.S. Cl.707/200

ABSTRACT (57)

A computing device has a file stored on a storage volume by a file system and accessed through such file system. The file is defined to include data and metadata relating to the data, and at least a portion of the data of the file is removed from the file and stored at an alternate location such that the data does not occupy substantially any space on the volume and the file is in a reduced, ghosted form. The ghosted file is reconstituted for use by retrieving the data from the alternate location and associating such retrieved data with such ghosted file to form the reconstituted file.







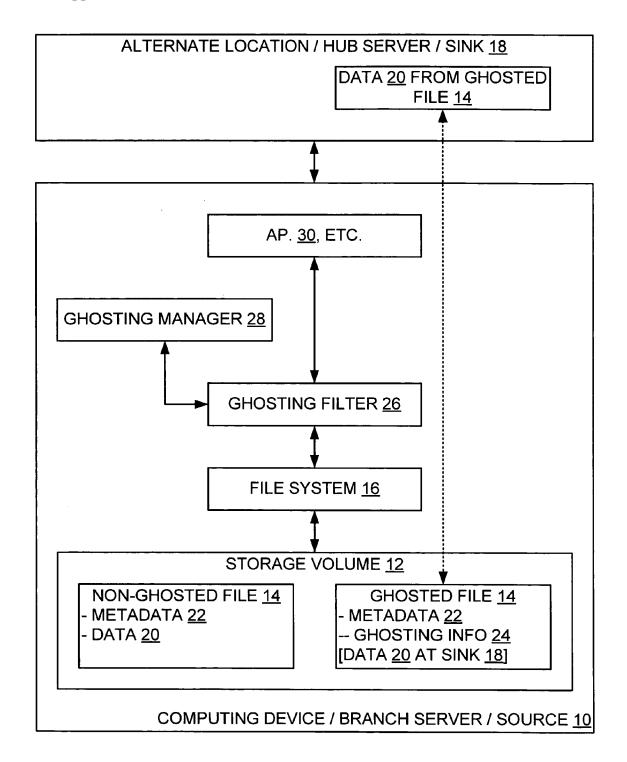


Fig. 2



NON-GHOSTED FILE 14

- METADATA <u>22</u>
- -- LOGICAL FILE SIZE
- -- SIZE ON VOLUME 12
- -- CREATE TIME
- -- MODIFY TIME
- -- ACCESS TIME
- -- ACCESS PERMISSIONS
- -- FILE ATTRIBUTES
- DATA <u>20</u>
- -- PRIMARY DATA 20
- -- ALTERNATE DATA 20



GHOSTED FILE 14

- METADATA <u>22</u>
- -- LOGICAL FILE SIZE [SAME]
- -- SIZE ON VOLUME 12 [LESS]
- -- CREATE TIME
- -- MODIFY TIME
- -- ACCESS TIME
- -- ACCESS PERMISSIONS
- -- FILE ATTRIBUTES
- --- GHOSTED ATTRIBUTE
- -- GHOSTING INFO 24
- --- ID
- --- STORAGE
- DATA <u>20</u>
- -- ALTERNATE DATA <u>20</u>

SINK <u>18</u>

- ID

-- PRIMARY DATA 20

FIG. 3A



NON-GHOSTED FILE 14

- METADATA 22
- -- LOGICAL FILE SIZE
- -- SIZE ON VOLUME 12
- -- CREATE TIME
- -- MODIFY TIME
- -- ACCESS TIME
- -- ACCESS PERMISSIONS
- -- FILE ATTRIBUTES
- DATA 20
- -- PRIMARY DATA 20
- -- ALTERNATE DATA <u>20</u>



GHOSTED FILE 14

- METADATA <u>22</u>
- -- LOGICAL FILE SIZE [SAME]
- -- SIZE ON VOLUME <u>12</u> [LESS]
- -- CREATE TIME
- -- MODIFY TIME
- -- ACCESS TIME
- -- ACCESS PERMISSIONS
- -- FILE ATTRIBUTES
- --- GHOSTED ATTRIBUTE
- -- GHOSTING INFO 24
- --- ID
- --- STORAGE
- DATA 20
- -- ALTERNATE DATA 20

SINK 18

- ID

-- NON-GHOSTED FILE 14

FIG. 3B



DOCKET A L A R M

Explore Litigation Insights



Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time** alerts and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.

