



US009881040B2

(12) **United States Patent**
Rawat et al.

(10) **Patent No.:** **US 9,881,040 B2**
(45) **Date of Patent:** **Jan. 30, 2018**

(54) **TRACKING DATA OF VIRTUAL DISK
SNAPSHOTS USING TREE DATA
STRUCTURES**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 336 days.

(21) Appl. No.: **14/831,808**

(22) Filed: **Aug. 20, 2015**

(65) **Prior Publication Data**

US 2017/0052717 A1 Feb. 23, 2017

(51) **Int. Cl.**
G06F 3/06 (2006.01)
G06F 17/30 (2006.01)

(52) **U.S. Cl.**
CPC **G06F 17/30327** (2013.01); **G06F 3/067** (2013.01); **G06F 3/0608** (2013.01); **G06F 3/0641** (2013.01); **G06F 17/30088** (2013.01)

(58) **Field of Classification Search**
CPC **G06F 17/30327**; **G06F 3/0608**; **G06F 3/0641**; **G06F 3/067**; **G06F 17/30088**
See application file for complete search history.

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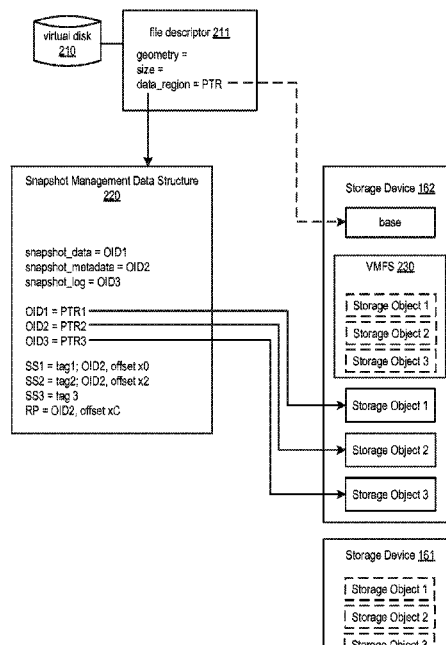
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(57) **ABSTRACT**

User data of different snapshots for the same virtual disk are stored in the same storage object. Similarly, metadata of different snapshots for the same virtual disk are stored in the same storage object, and log data of different snapshots for the same virtual disk are stored in the same storage object. As a result, the number of different storage objects that are managed for snapshots do not increase proportionally with the number of snapshots taken. In addition, any one of the multitude of persistent storage back-ends can be selected as the storage back-end for the storage objects according to user preference, system requirement, snapshot policy, or any other criteria. Another advantage is that the storage location of the read data can be obtained with a single read of the metadata storage object, instead of traversing metadata files of multiple snapshots.

20 Claims, 4 Drawing Sheets



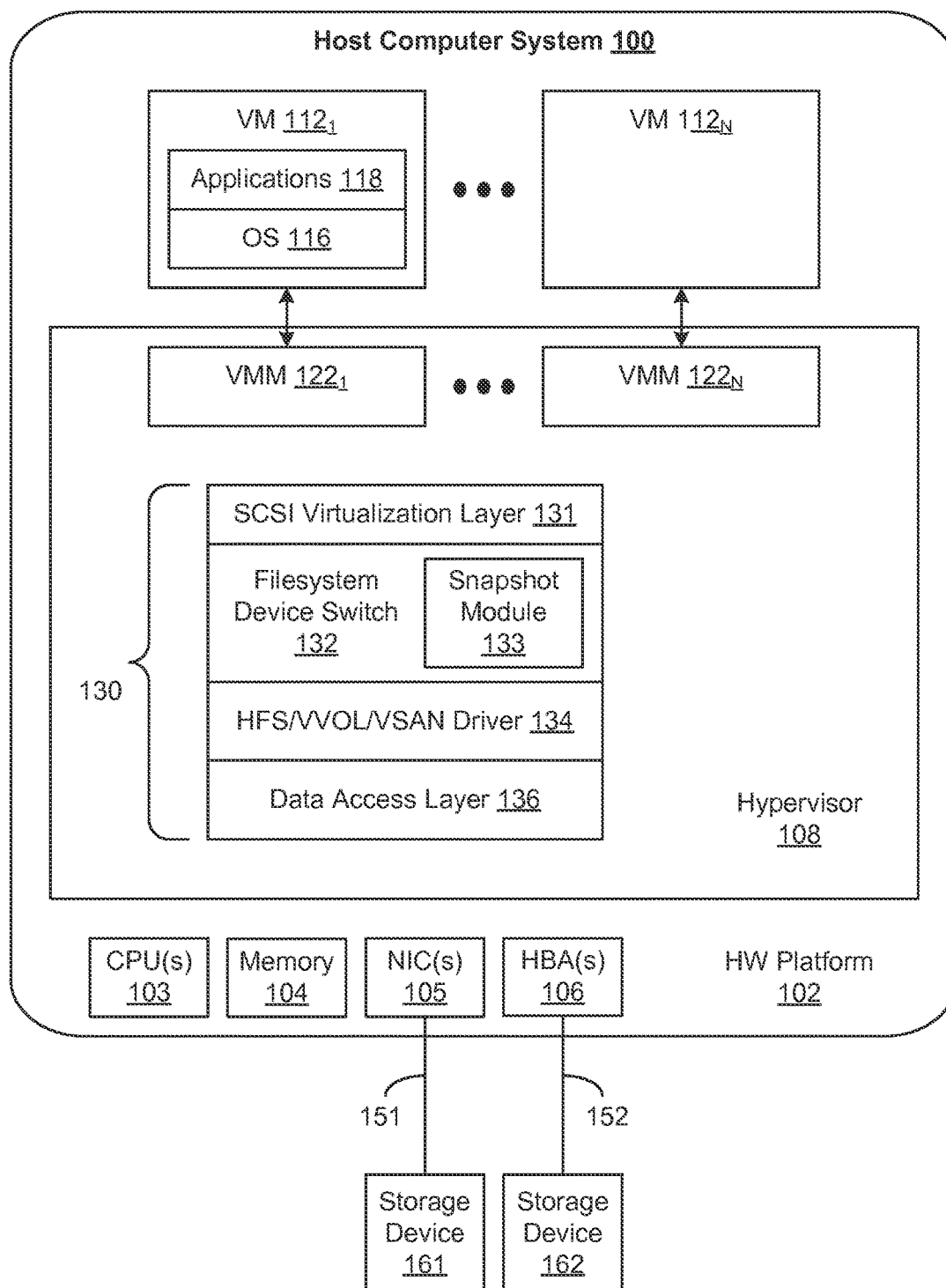


FIGURE 1

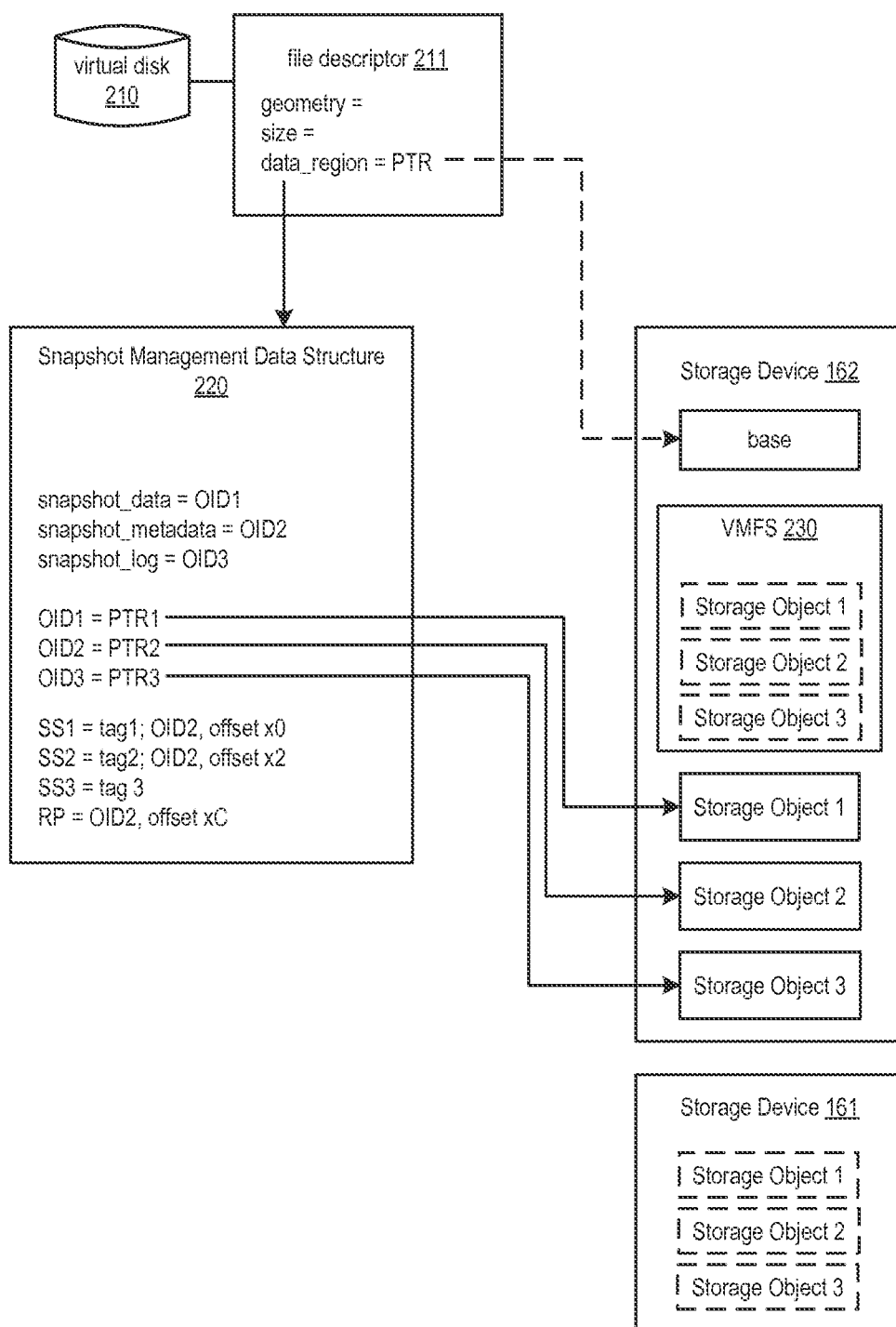


FIGURE 2

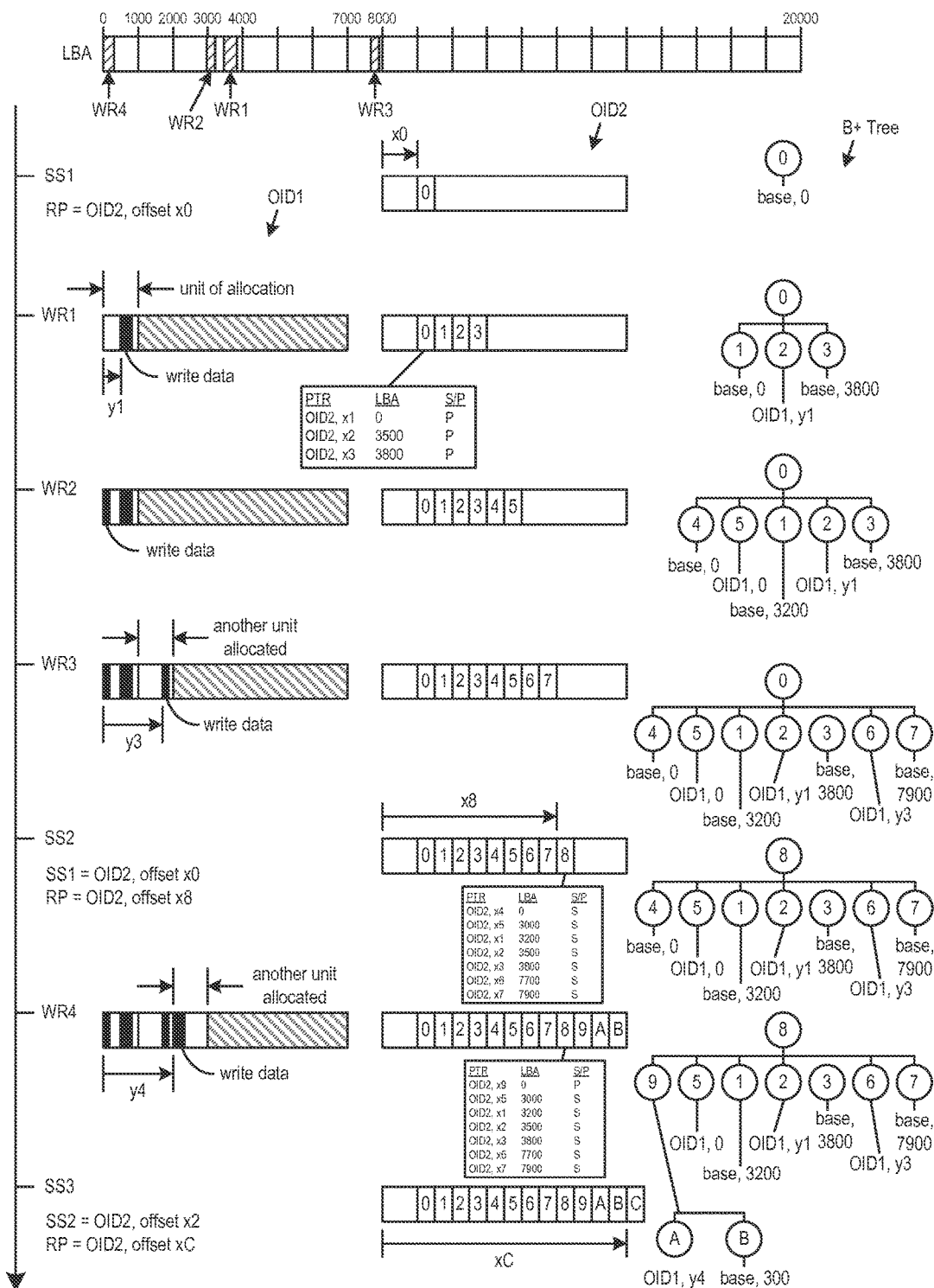


FIGURE 3

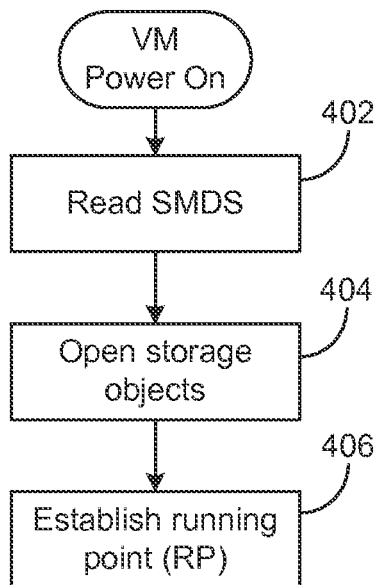


FIGURE 4A

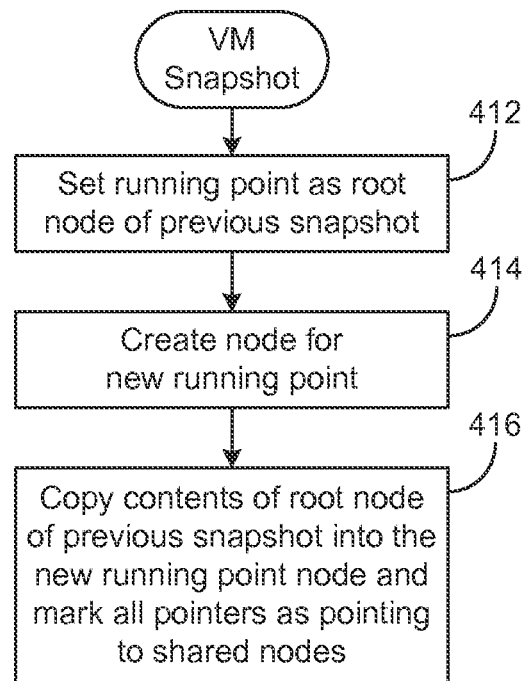


FIGURE 4B

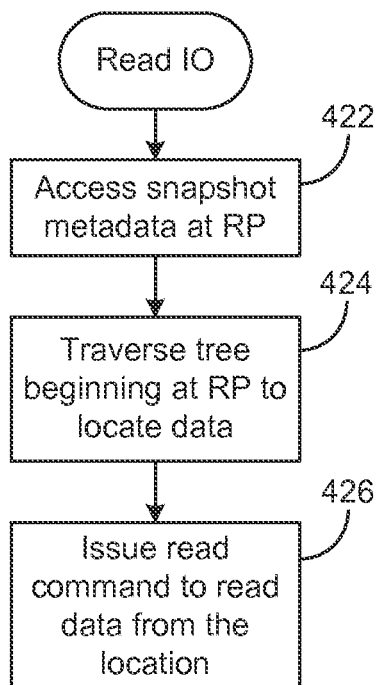


FIGURE 4C

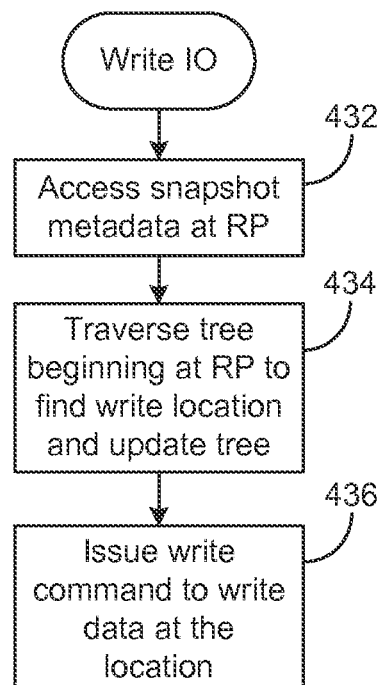


FIGURE 4D

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