PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	Igor Belianski	Confirmation No.	9698
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Title:	HOT GROWING A CLOUD HOSTED BLOCK DEVICE		

CERTIFICATE UNDER 37 CFR 1.8 I hereby certify that this correspondence is being transmitted via the United States Patent and Trademark Office electronic filing system on August 28, 2025.

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AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

In response to the Office Action mailed May 05, 2025, the period of response for which runs through September 05, 2025 upon a one-month extension of time, please amend the application.

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 7 of this paper.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

Claim 1. (Currently Amended): A ~~computer-implemented~~ method ~~that when executed on data processing hardware causes the data processing hardware to perform operations~~ comprising:

executing, by data processing hardware, an instance;

~~attached~~ attaching, by the data processing hardware, [[to]] a virtual storage device to the instance, wherein the virtual storage device includes a partition and a root persistent disk being associated with ~~exposing, to the instance,~~ a block storage volume ~~on memory hardware, the block storage volume comprising~~ having an initial storage capacity, wherein the root persistent disk stores an operating system that is actively executing on the instance ~~virtual storage device comprising a partition~~;

receiving, by the data processing hardware and from a user, a request to increase the initial storage capacity of the block storage volume to an increased storage capacity; and

while the operating system stored on the root persistent disk is actively executing on the instance ~~is executing~~:

increasing, by the data processing hardware, the block storage volume of the root persistent disk from the initial storage capacity to the increased storage capacity without attaching an additional virtual storage device to the instance; and

extending, by an operating system tool executing on the data processing hardware, the partition based on the increased storage capacity.

Claim 2. (Currently Amended): The ~~computer-implemented~~ method of claim 1, wherein the operations further comprise generating, by the data processing hardware, a directory structure logically mapping the block storage volume to the virtual storage device.

Claim 3. (Currently Amended): The ~~computer-implemented~~ method of claim 1, wherein the operations further comprise removing, by the data processing hardware, a subset of the block storage volume from the instance while the instance continues to execute.

Claim 4. (Currently Amended): The ~~computer-implemented~~ method of claim 1, wherein the virtual storage device comprises ~~one~~ two or more partitions.

Claim 5. (Currently Amended): The ~~computer-implemented~~ method of claim 1, wherein increasing the block storage volume from the initial storage capacity to the increased storage capacity occurs without mounting an additional block storage volume to the instance.

Claim 6. (Cancelled)

Claim 7. (Currently Amended): The ~~computer-implemented~~ method of claim 1, wherein the ~~received~~ request comprises an application programming interface (API) request.

Claim 8. (Currently Amended): The ~~computer-implemented~~ method of claim 1, wherein the ~~received~~ request comprises a service provider platform request.

Claim 9. (Currently Amended): The ~~computer-implemented~~ method of claim 1, wherein ~~the operations further comprise~~ attaching the virtual storage device to the instance [[by]] includes establishing, by the data processing hardware, a logical connection between the virtual storage device and [[a]] an instance monitor hosting the instance.

Claim 10. (Currently Amended): The ~~computer-implemented~~ method of claim 1, wherein the operations further comprise configuring, by the data processing hardware, user access of the block storage volume through the instance.

Claim 11. (Currently Amended): A system comprising:

data processing hardware; and

memory hardware in communication with the data processing hardware, the memory hardware storing instructions that when executed on the data processing hardware cause the data processing hardware to: ~~perform operations comprising:~~

~~executing~~ execute an instance;

~~attached~~ attach [[to]] a virtual storage device to the instance, wherein the virtual includes a partition and a root persistent disk being associated with ~~storage device exposing, to the instance,~~ a block storage volume ~~on memory hardware, the block storage volume comprising~~ configured with an initial storage capacity, wherein the root persistent disk stores an operating system that is actively executing on the instance ~~virtual storage device comprising a partition~~;

~~receiving~~ receive, from a user, a request to increase the initial storage capacity of the block storage volume to an increased storage capacity; and

while the operating system stored on the root persistent disk is actively executing on the instance ~~is executing~~:

~~increasing~~ increase the block storage volume of the root persistent disk from the initial storage capacity to the increased storage capacity, wherein ~~without attaching~~ an additional virtual storage device is not attached to the instance; and

~~extending~~ extend, by an operating system tool, the partition based on the increased storage capacity.

Claim 12. (Currently Amended): The system of claim 11, wherein the ~~operations further comprise~~ instructions further cause the data processing hardware to ~~generating~~ generate a directory structure logically mapping the block storage volume to the virtual storage device.

Claim 13. (Currently Amended): The system of claim 11, wherein the ~~operations further comprise~~ instructions further cause the data processing hardware to ~~removing~~ remove a subset of the block storage volume from the instance while the instance continues to execute.

Claim 14. (Currently Amended): The system of claim 11, wherein the virtual storage device comprises ~~one~~ two or more partitions.

Claim 15. (Currently Amended): The system of claim 11, wherein the instructions that cause the data processing hardware to ~~increasing~~ increase the block storage volume from the initial storage capacity to the increased storage capacity ~~occurs~~ without mounting an additional block storage volume to the instance.

Claim 16. (Cancelled)

Claim 17. (Currently Amended): The system of claim 11, wherein the ~~received~~ request comprises an application programming interface (API) request.

Claim 18. (Currently Amended): The system of claim 11, wherein the ~~received~~ request comprises a service provider platform request.

Claim 19. (Currently Amended): The system of claim 11, wherein the instructions further cause the data processing hardware to ~~operations further comprise attaching~~ attach the virtual storage device to the instance by establishing a logical connection between the virtual storage device and [[a]] an instance monitor hosting the instance.

Claim 20. (Currently Amended): The system of claim 11, wherein the instructions further cause the data processing hardware to ~~operations further comprise configuring~~ configure user access of the block storage volume through the instance.

Claim 21. (New): The method of claim 1, wherein the virtual storage device spans one or more storage devices from a plurality of storage devices, and wherein increasing the block storage volume from the initial storage capacity to the increased storage capacity comprises allocating, by the data processing hardware, additional storage capacity from the plurality of storage devices to the block storage volume.

Claim 22. (New): The system of claim 11, wherein the virtual storage device spans one or more storage devices from a plurality of storage devices, and wherein the instructions that cause the data processing hardware to increase the block storage volume from the initial storage capacity to the increased storage capacity further includes instructions that cause the data processing hardware to allocate additional storage capacity from the plurality of storage devices to the block storage volume.

REMARKS

This Amendment is responsive to the Office Action dated May 5, 2025. Applicant has amended claims 1-5, 7-15, and 19-20, canceled claims 6 and 16, and added new claims 21 and 22. Support for the amendments may be found throughout Applicant's originally filed specification, including at least paragraphs [0036], [0038]-[0039], [0061], and [0067]-[0071]. Claims 1-5, 7-15, and 17-22 are pending upon entry of this Amendment.

Interview Summary

Applicant thanks the Examiner for the telephonic interview conducted on Wednesday, August 6, 2025. Participating in the interview were Examiner Phong Nguyen and Applicant's representatives, Hunter T. Berry (Reg. No. 82,969) and Benjamin R. Wutt (Reg. No. 66,975). During the interview, Applicant's representatives proposed amendments to, e.g., claim 1 and discussed the rejection of claim 1 under 35 U.S.C. § 103 in view of the proposed amendments. No agreements were reached during the interview. No exhibits were submitted, and no demonstrations were performed.

Claim Rejections Under 35 U.S.C. § 103

In the Office Action, the Examiner rejected claims 1-20 under 35 U.S.C. § 103 as follows:

- claims 1, 3-11, and 13-20 were rejected as allegedly being unpatentable over U.S. Publication No. 2016/0299695 by Chen et al. (hereinafter, "Chen") in view of U.S. Patent No. 9,128,745 to Crudele et al. (hereinafter, "Crudele"); and
- claims 2 and 12 were rejected as allegedly being unpatentable over Chen in view of Crudele and further in view of U.S. Publication No. 2016/0373821 by Nair et al. (hereinafter, "Nair").

Applicant respectfully traverses the rejections to the extent they may be considered applicable to the claims as amended. The applied references, alone or in any combination, fail to disclose or suggest all of the features defined by Applicant's amended claims, and there would have been no apparent reason that would have caused one of ordinary skill in the art, at the time of Applicant's invention, to modify the applied references to arrive at the claimed features.

Applicant has amended claim 1 to include, in part, subject matter of dependent claim 6. For example, amended claim 1 recites, in part, that the "virtual storage device includes… a root persistent disk… wherein the root persistent disk stores an operating system that is actively executing on the instance." Applicant has amended independent claim 11 in a similar manner. The cited references fail to disclose at least this combination of features.

With respect to claim 1, the Examiner asserted that Chen describes "while the instance is executing: increasing the block storage volume from the initial storage capacity to the increased storage capacity without attaching an additional virtual storage device to the instance."[1] More specifically, the Examiner relied upon various elements of FIG. 4A of Chen.[2] According to Chen, "FIG. 4 illustrates an example process 400 by which operational parameters for a provisioned data volume can be modified for a given customer in accordance with various embodiments."[3] This process, as detailed in FIG. 4(a), includes:

1. "determin[ing] first server(s) having available resources to provision new volume copy having requested operational parameter(s),"[4] which includes determining servers that have "the desired storage capacity, storage type, processing resources, networking resources, etc."[5] According to Chen, "[i]f the current server(s) [being used by that customer] do not have capacity to provision the data volume… according to the request," the process determines "at least one server with resources available to satisfy the request."[6] Chen is clear that, "if the current server(s) have at least the requisite storage capacity," "the system can determine whether the current server(s) indeed have available storage capacity for the new mirror volume copy 424, and can then cause the current server(s) to allocate the storage capacity for the new mirror volume copy 426."[7]
2. Next, "[w]hen at least one server is located that is able to provide the data volume,"[8] resources are allocated "to provision new volume copy according to requested operational parameters."[9]

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[1] *See* Office Action dated May 5, 2025 at page 4.
[2] *See* Office Action dated May 5, 2025 at pages 4-5.
[3] Chen at paragraph [0056].
[4] Chen at FIG. 4(a), step 404. (Emphasis added.)
[5] Chen at paragraph [0059].
[6] Chen at paragraph [0060].
[7] Chen at paragraph [0062].
[8] Chen at paragraph [0061].
[9] Chen at FIG. 4(a), step 412. (Emphasis added.)

3. Then, a data migration step occurs to "[m]igrate data from original mirror volume copy to new volume copy."[10] Chen discloses that "[d]uring data migrations, the new volume copy is blocked from direct user read/write access" and that the system may "prohibit access to the original primary volume copy… during the migration process."[11]
4. Finally, the process is completed when the system must "[m]ap new volume copy to be active primary volume copy"[12] and "[e]nable user read/write access to new volume copy as active primary volume copy."[13] Chen discloses that the original primary volume copy may be "remapped to be the new mirror volume copy" or "blocked from user read/write requests," with the "[r]esources of the current server(s) allocated to provision the original primary volume copy" being "subsequently deallocated for other users."[14]

Chen further clarifies this is a migration, stating, "[d]ata from the currently active volume can be migrated to the new data volume 414."[15] Chen's described process does not teach or even suggest "while the operating system stored on the root persistent disk is actively executing on the instance: increasing, by the data processing hardware, the block storage volume of the root persistent disk from the initial storage capacity to the increased storage capacity without attaching an additional virtual storage device to the instance," as recited by amended claim 1 (emphasis added).

The cited portions of Crudele and Nair, considered alone or in any combination with Chen, fail to provide teachings sufficient to overcome these identified deficiencies of Chen, nor were they cited for such a purpose. Accordingly, amended independent claim 1 is patentable over the cited portions of the applied references.

Amended independent claim 11 is patentable for at least the reasons amended independent claim 1 is patentable. The dependent claims 2-5, 7-10, 12-15, and 17-19 are patentable over the cited references for at least the same reasons their respective base claims are patentable. Accordingly, the cited references fail to establish a *prima facie* case for the non-patentability of claims 1-5, 7-15, and 17-20, as amended, under 35 U.S.C. § 103. Applicant, therefore, respectfully requests reconsideration and withdrawal of these rejections.

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[10] Chen at FIG. 4(a), step 414. (Emphasis added.)
[11] Chen at paragraph [0061].
[12] Chen at FIG. 4(a), step 416.
[13] Chen at FIG. 4(a), step 418.
[14] Chen at paragraph [0061].
[15] Chen at paragraph [0061].

New Claims

Applicant has added claims 21-22 to the pending application. The applied references fail to disclose or suggest the features defined by Applicant's new claims, and would have provided no apparent reason for modification to arrive at the claimed features. No new matter has been added by the new claims.

CONCLUSION

All claims in this application are in condition for allowance. Applicant does not acquiesce as to any assertion in the Office Action with respect to the applied art or to Applicant's claims. Applicant's silence with respect to any assertion in the Office Action should not be interpreted as Applicant's acquiescence thereto. Applicant reserves the right to comment further with respect to the applied references and any pending claim in a future Amendment, Response, or on appeal. Applicant respectfully requests reconsideration and prompt allowance of all pending claims.

Please charge any additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed representative to discuss this application.

Date:	By:
August 28. 2025	/Hunter T. Berry/
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