

WHAT IS CLAIMED IS:

1. ~~—A computer implemented method for capturing a representation of a data set, comprising:~~

~~under the control of one or more computer systems configured with executable instructions,~~

~~receiving an instruction from a client device to capture the representation of the data set at a point in time, the point in time based at least in part on a capture policy received from the client device; and~~

~~responsive to at least the instruction to capture the representation of the data set:~~

~~instructing one or more applications to suspend at least acknowledgment of completion of data operations, the data operations including manipulation of the data set that is distributed among a plurality of partitions, each of the partitions being operated in accordance with operation of a corresponding server of a plurality of servers, the one or more applications being in communication with the servers for at least writing to the data set;~~

~~responsive to suspension by the applications of acknowledgment of completion of the data operations, instructing the servers to capture corresponding portions of the data set stored in corresponding partitions of the data set; and~~

~~at a time after instructing the servers to capture the corresponding portions of the data set, instructing the one or more applications to resume at least acknowledgment of completion of the data operations.~~

2. ~~—The computer implemented method of claim 1, wherein requests to perform the data operations originate on a computing device different from the one or more applications.~~

3. ~~—The computer implemented method of claim 1, wherein the plurality of partitions are stored on a plurality of physical storage devices.~~

4. ~~—The computer implemented method of claim 1, wherein instructing the servers to capture corresponding portions of the data set includes inserting a token into request streams to the servers.~~

5. ~~—The computer implemented method of claim 1, further comprising generating, independently of operation of a user application from which requests to perform the data operations originate, an instruction to capture the data set and wherein instructing~~

~~one or more clients of a plurality of servers to suspend at least acknowledgment to the user application of completion of data operations performed responsive to the instruction to capture the data set.~~

6. ~~—The computer implemented method of claim 1, wherein at least one of the one or more storage interfaces is configured to cause completion of one or more data operations while suspending acknowledgment of at least acknowledgement of performance of data operations.~~

7. ~~—The computer implemented method of claim 1, wherein instructing one or more applications to suspend at least acknowledgment of completion of data operations includes instructing the one or more applications to suspend issuing acknowledgments of completions of write operations.~~

8. ~~—The computer implemented method of claim 1, wherein instructing one or more applications to suspend at least acknowledgment of completion of data operations includes instructing the one or more applications to postpone issuance of write requests.~~

9. ~~—A system operable to direct capture of a representation of a data set, comprising:~~

~~one or more processors; and~~

~~memory including executable instructions that, when executed by the one or more processors, cause the system to:~~

~~receive an instruction from a client device to capture the representation of the data set at a point in time, the point in time based at least in part on a capture policy received from the client device; and~~

~~responsive to at least the instruction to capture the representation of the data set:~~

~~instruct one or more applications to suspend at least acknowledgment of completion of data operations, the data operations including manipulation of the data set that is distributed among a plurality of partitions, each of the partitions being operated in accordance with operation of a corresponding server of a plurality of servers, the one or more applications being in communication with the servers for at least writing to the data set;~~

~~responsive to suspension by the applications of completion of the data operations, instruct the servers to capture corresponding portions of the data set stored in corresponding partitions of the data set; and~~

at a time after instructing the servers to capture the corresponding portions of the data set, instruct the one or more applications to resume at least acknowledgment of completion of the data operations.

10. — The system of claim 9, wherein the plurality of partitions are stored on a plurality of physical storage devices.

11. — The system of claim 9, wherein instructing the servers to capture corresponding portions of the data set includes inserting a token into request streams to the servers.

12. — The system of claim 9, wherein requests to perform the data operations originate from a user application executing on a computing device different from the one or more applications.

13. — The system of claim 12, wherein the memory includes executable instructions that, when executed by the one or more processors, cause the system to generate, independently of operation of the user application, an instruction to capture the data set and wherein instructing one or more clients of a plurality of servers to suspend at least acknowledgment to the user application of completion of data operations performed responsive to the instruction to capture the data set.

1. A computer-implemented method for capturing a representation of a data set, the data set being distributed among a plurality of physical storage devices each accessible by at least one corresponding server operable to receive instructions from one or more storage interfaces to cause corresponding operations for data in the data set to be performed, the method comprising:

under the control of one or more computer systems configured with executable instructions,

receiving an instruction from a client device to capture the representation of the data set at a point in time, the point in time based at least in part on a capture policy specified by the client device; and

responsive to at least the instruction to capture the representation of the data set:

issuing, to the one or more storage interfaces, a first command to suspend at least acknowledgment of completion of write operations to an application of the client device;

for each of the one or more storage interfaces, receiving a first notification that the storage interface has suspended processing of at least acknowledgment of completion of the write operations;

at a time after receiving the first notification for each of the one or more storage interfaces, instructing each of the servers to enqueue an instruction to capture a representation of a portion of the data set stored in a corresponding physical storage device and subsequently resume acknowledging completion of the write operations, the captured representation of the portion of the data set associated with the point in time; and

storing the captured representation of the portion of the data set.

2. The computer-implemented method of claim 1, further comprising: receiving requests to perform the write operations, the request received from the application; and

for each of the requests, selecting a physical storage device in which to perform a corresponding operation and performing the corresponding operation in the selected physical storage device.

3. The computer-implemented method of claim 1, wherein the application executes on the client device, and wherein the client device includes a computer system different from the one or more storage interfaces, the servers, and the physical storage devices.

4. The computer-implemented method of claim 1, wherein instructing each of the servers to enqueue an instruction to capture a portion of the data set stored in a corresponding physical storage device and subsequently resume acknowledging completion of the write operations includes, for each server of the servers, inserting a token into a request stream from the one or more storage interfaces to the server.

5. The computer-implemented method of claim 1, wherein communicating the requests to perform the data operations includes:

receiving the requests from the application of the client device; and

for each request of the requests, selecting at least one storage interface of the one or more storage interfaces, wherein each of the one or more storage interfaces are configured to instruct a corresponding server to cause, in a corresponding physical storage device, completion of an operation corresponding to the request.

6. The computer-implemented method of claim 1, wherein at least one of the one or more storage interfaces is configured to cause completion of one or more data operations while suspending at least acknowledgement of performance of the one or more data operations.

7. A computer-implemented method for capturing a representation of a data set, comprising:
under the control of one or more computer systems configured with executable instructions,

receiving an instruction from a client device to capture the representation of the data set at a point in time, the point in time based at least in part on a capture policy received from the client device; and

responsive to at least the instruction to capture the representation of the data set:

instructing one or more applications to suspend at least acknowledgment of completion of data operations, the data operations including manipulation of the data set that is distributed among a plurality of partitions, each of the partitions being operated in accordance with operation of a corresponding server of a plurality of servers, the one or more applications being in communication with the servers for at least writing to the data set;

responsive to suspension by the applications of acknowledgment of completion of the data operations, instructing the servers to capture corresponding portions of the data set stored in corresponding partitions of the data set; and

at a time after instructing the servers to capture the corresponding portions of the data set, instructing the one or more applications to resume at least acknowledgment of completion of the data operations.

8. The computer-implemented method of claim 7, wherein requests to perform the data operations originate on a computing device different from the one or more applications.

9. The computer-implemented method of claim 7, wherein the plurality of partitions are stored on a plurality of physical storage devices.

10. The computer-implemented method of claim 7, wherein instructing the servers to capture corresponding portions of the data set includes inserting a token into request streams to the servers.

11. The computer-implemented method of claim 7, further comprising generating, independently of operation of a user application from which requests to perform the data operations originate, an instruction to capture the data set and wherein instructing one or more clients of a plurality of servers to suspend at least acknowledgment to the user application of completion of data operations performed responsive to the instruction to capture the data set.

12. The computer-implemented method of claim 7, wherein at least one of the one or more storage interfaces is configured to cause completion of one or more data operations while suspending acknowledgment of at least acknowledgement of performance of data operations.

13. The computer-implemented method of claim 7, wherein instructing one or more applications to suspend at least acknowledgment of completion of data operations includes instructing the one or more applications to suspend issuing acknowledgments of completions of write operations.

14. The computer-implemented method of claim 7, wherein instructing one or more applications to suspend at least acknowledgment of completion of data operations includes instructing the one or more applications to postpone issuance of write requests.

15. A system operable to direct capture of a representation of a data set, comprising:

one or more processors; and

memory including executable instructions that, when executed by the one or more processors, cause the system to:

receive an instruction from a client device to capture the representation of the data set at a point in time, the point in time based at least in part on a capture policy received from the client device; and

responsive to at least the instruction to capture the representation of the data set:

instruct one or more applications to suspend at least acknowledgment of completion of data operations, the data operations including manipulation of the data set that is distributed among a plurality of partitions, each of the partitions being operated in accordance with operation of a corresponding server of a plurality of servers, the one or more applications being in communication with the servers for at least writing to the data set;

responsive to suspension by the applications of completion of the data operations, instruct the servers to capture corresponding portions of the data set stored in corresponding partitions of the data set; and

at a time after instructing the servers to capture the corresponding portions of the data set, instruct the one or more applications to resume at least acknowledgment of completion of the data operations.

16. The system of claim 15, wherein the plurality of partitions are stored on a plurality of physical storage devices.

17. The system of claim 15, wherein instructing the servers to capture corresponding portions of the data set includes inserting a token into request streams to the servers.

18. The system of claim 15, wherein requests to perform the data operations originate from a user application executing on a computing device different from the one or more applications.

19. The system of claim 18, wherein the memory includes executable instructions that, when executed by the one or more processors, cause the system to generate, independently of operation of the user application, an instruction to capture the data set and wherein instructing one or more clients of a plurality of servers to suspend at least acknowledgment to the user application of completion of data operations performed responsive to the instruction to capture the data set.

20. One or more non-transitory computer-readable storage media having collectively stored thereon instructions that, when executed by one or more processors, cause the one or more processors to:

receive an instruction from a client device to capture a representation of a data set at a point in time, the point in time based at least in part on a capture policy received from the client device; and

responsive to at least the instruction to capture the representation of the data set:

instruct one or more storage interfaces to suspend processing of one or more activities in connection with the data set;

at a time after the one or more storage interfaces suspend processing of the one or more activities, insert a token into a plurality of request streams, each of the plurality of request streams from the one or more storage interfaces to a server of a plurality of servers, each of the plurality of servers being operable to cause completion of a data operation in a data set partition according to requests in a corresponding request stream, each token being an indication for performing a capture of a data set partition of the plurality of data set partitions; and

at a time after inserting the token into the one or more request streams, instruct the one or more storage interfaces to resume processing of the one or more activities.

21. The one or more non-transitory computer-readable storage media of claim 20, wherein the data set partitions are distributed among a plurality of physical storage devices.

22. The one or more non-transitory computer-readable storage media of claim 20, wherein each request stream comprises a collection of requests for performing data operations from a corresponding computing device of the one or more storage interfaces to a corresponding server of the plurality of servers.

23. The one or more non-transitory computer-readable storage media of claim 20, wherein, for each server, the request stream comprises a plurality of requests for performing a data operation from the one or more storage interfaces.

24. The one or more non-transitory computer-readable storage media of claim 20, further comprising instructions that, when executed by one or more processors, cause the one or more processors to:

receive requests for performing data operations from the application; and
for each of the requests from the application:

select an appropriate server for performing a requested operation; and
instruct the selected server to cause completion of the requested
operation.

25. A computer-implemented method for capturing a representation of a data set, comprising:

under the control of one or more computer systems configured with executable instructions,

receiving an instruction from a client device to capture the representation of the data set at a point in time, the point in time based at least in part on a capture policy received from the client device; and

responsive to at least the instruction to capture the representation of the data set:

using a plurality of servers to perform data set operations in a plurality of distributed data set partitions;

instructing one or more storage interfaces in communication with the plurality of servers to block acknowledgment of at least completion of one or more activities in connection with the data set; and

at a time after the one or more storage interfaces blocks acknowledgment of at least the one or more activities, inserting a token into one or more request streams from the one or more storage interfaces to the servers, each token being an indication to a server that receives the token for performing a capture of a data set partition of the plurality of data set partitions upon processing the token during processing of a corresponding request stream into which the token has been inserted.

26. The computer-implemented method of claim 25, wherein the data set partitions are distributed among a plurality of physical storage devices.

27. The computer-implemented method of claim 25, wherein each request stream comprises a collection of requests for performing data operations from a corresponding computing device of the one or more storage interfaces to a corresponding server of the plurality of servers.

28. The computer-implemented method of claim 25, wherein, for each server, the request stream comprises a plurality of requests from the one or more storage interfaces for performing a data operation.

29. The computer-implemented method of claim 25, further comprising: receiving requests for performing data operations from the application; and for each of the requests from the application:

selecting an appropriate storage interface that communicates with an appropriate server for causing completion of a requested operation; and

causing the selected storage interface to communicate with the appropriate server to complete the requested operation.

WHAT IS CLAIMED IS:

1. A computer-implemented method for capturing a representation of a data set, the data set being distributed among a plurality of physical storage devices each accessible by at least one corresponding server operable to receive instructions from one or more storage interfaces to cause corresponding operations for data in the data set to be performed, the method comprising:

under the control of one or more computer systems configured with executable instructions,

receiving an instruction from a client device to capture the representation of the data set at a point in time, the point in time based at least in part on a capture policy specified by the client device; and

responsive to at least the instruction to capture the representation of the data set:

issuing, to the one or more storage interfaces, a first command to suspend at least acknowledgment of completion of write operations to an application of the client device;

for each of the one or more storage interfaces, receiving a first notification that the storage interface has suspended processing of at least acknowledgment of completion of the write operations;

at a time after receiving the first notification for each of the one or more storage interfaces, instructing each of the servers to enqueue an instruction to capture a representation of a portion of the data set stored in a corresponding physical storage device and subsequently resume acknowledging completion of the write operations, the captured representation of the portion of the data set associated with the point in time; and

storing the captured representation of the portion of the data set.

2. The computer-implemented method of claim 1, further comprising:

receiving requests to perform the write operations, the request received from the application; and

for each of the requests, selecting a physical storage device in which to perform a corresponding operation and performing the corresponding operation in the selected physical storage device.

3. The computer-implemented method of claim 1, wherein the application executes on the client device, and wherein the client device includes a computer system different from the one or more storage interfaces, the servers, and the physical storage devices.

4. The computer-implemented method of claim 1, wherein instructing each of the servers to enqueue an instruction to capture a portion of the data set stored in a corresponding physical storage device and subsequently resume acknowledging completion of the write operations includes, for each server of the servers, inserting a token into a request stream from the one or more storage interfaces to the server.

5. The computer-implemented method of claim 1, wherein communicating the requests to perform the data operations includes:

receiving the requests from the application of the client device; and

for each request of the requests, selecting at least one storage interface of the one or more storage interfaces, wherein each of the one or more storage interfaces are configured to instruct a corresponding server to cause, in a corresponding physical storage device, completion of an operation corresponding to the request.

6. The computer-implemented method of claim 1, wherein at least one of the one or more storage interfaces is configured to cause completion of one or more data operations while suspending at least acknowledgement of performance of the one or more data operations.

7. A computer-implemented method for capturing a representation of a data set, comprising:

under the control of one or more computer systems configured with executable instructions,

receiving an instruction from a client device to capture the representation of the data set at a point in time, the point in time based at least in part on a capture policy received from the client device; and

responsive to at least the instruction to capture the representation of the data set:

instructing one or more applications to suspend at least acknowledgment of completion of data operations, the data operations including manipulation of the data set that is distributed among a plurality of partitions, each of the partitions being operated in accordance with operation of a corresponding server of a plurality of servers, the one or more applications being in communication with the servers for at least writing to the data set;

responsive to suspension by the applications of acknowledgment of completion of the data operations, instructing the servers to capture corresponding portions of the data set stored in corresponding partitions of the data set; and

at a time after instructing the servers to capture the corresponding portions of the data set, instructing the one or more applications to resume at least acknowledgment of completion of the data operations.

8. The computer-implemented method of claim 7, wherein requests to perform the data operations originate on a computing device different from the one or more applications.

9. The computer-implemented method of claim 7, wherein the plurality of partitions are stored on a plurality of physical storage devices.

10. The computer-implemented method of claim 7, wherein instructing the servers to capture corresponding portions of the data set includes inserting a token into request streams to the servers.

11. The computer-implemented method of claim 7, further comprising generating, independently of operation of a user application from which requests to perform the data operations originate, an instruction to capture the data set and wherein instructing one or more clients of a plurality of servers to suspend at least acknowledgment to the user

application of completion of data operations performed responsive to the instruction to capture the data set.

12. The computer-implemented method of claim 7, wherein at least one of the one or more storage interfaces is configured to cause completion of one or more data operations while suspending acknowledgment of at least acknowledgement of performance of data operations.

13. The computer-implemented method of claim 7, wherein instructing one or more applications to suspend at least acknowledgment of completion of data operations includes instructing the one or more applications to suspend issuing acknowledgments of completions of write operations.

14. The computer-implemented method of claim 7, wherein instructing one or more applications to suspend at least acknowledgment of completion of data operations includes instructing the one or more applications to postpone issuance of write requests.

15. A system operable to direct capture of a representation of a data set, comprising:

one or more processors; and

memory including executable instructions that, when executed by the one or more processors, cause the system to:

receive an instruction from a client device to capture the representation of the data set at a point in time, the point in time based at least in part on a capture policy received from the client device; and

responsive to at least the instruction to capture the representation of the data set:

instruct one or more applications to suspend at least acknowledgment of completion of data operations, the data operations including manipulation of the data set that is distributed among a plurality of partitions, each of the partitions being operated in accordance with operation of a corresponding server of a plurality of servers, the one or more

applications being in communication with the servers for at least writing to the data set;

responsive to suspension by the applications of completion of the data operations, instruct the servers to capture corresponding portions of the data set stored in corresponding partitions of the data set; and

at a time after instructing the servers to capture the corresponding portions of the data set, instruct the one or more applications to resume at least acknowledgment of completion of the data operations.

16. The system of claim 15, wherein the plurality of partitions are stored on a plurality of physical storage devices.

17. The system of claim 15, wherein instructing the servers to capture corresponding portions of the data set includes inserting a token into request streams to the servers.

18. The system of claim 15, wherein requests to perform the data operations originate from a user application executing on a computing device different from the one or more applications.

19. The system of claim 18, wherein the memory includes executable instructions that, when executed by the one or more processors, cause the system to generate, independently of operation of the user application, an instruction to capture the data set and wherein instructing one or more clients of a plurality of servers to suspend at least acknowledgment to the user application of completion of data operations performed responsive to the instruction to capture the data set.

20. One or more non-transitory computer-readable storage media having collectively stored thereon instructions that, when executed by one or more processors, cause the one or more processors to:

receive an instruction from a client device to capture a representation of a data set at a point in time, the point in time based at least in part on a capture policy received from the client device; and

responsive to at least the instruction to capture the representation of the data set:

instruct one or more storage interfaces to suspend processing of one or more activities in connection with the data set;

at a time after the one or more storage interfaces suspend processing of the one or more activities, insert a token into a plurality of request streams, each of the plurality of request streams from the one or more storage interfaces to a server of a plurality of servers, each of the plurality of servers being operable to cause completion of a data operation in a data set partition according to requests in a corresponding request stream, each token being an indication for performing a capture of a data set partition of the plurality of data set partitions; and

at a time after inserting the token into the one or more request streams, instruct the one or more storage interfaces to resume processing of the one or more activities.

21. The one or more non-transitory computer-readable storage media of claim 20, wherein the data set partitions are distributed among a plurality of physical storage devices.

22. The one or more non-transitory computer-readable storage media of claim 20, wherein each request stream comprises a collection of requests for performing data operations from a corresponding computing device of the one or more storage interfaces to a corresponding server of the plurality of servers.

23. The one or more non-transitory computer-readable storage media of claim 20, wherein, for each server, the request stream comprises a plurality of requests for performing a data operation from the one or more storage interfaces.

24. The one or more non-transitory computer-readable storage media of claim 20, further comprising instructions that, when executed by one or more processors, cause the one or more processors to:

receive requests for performing data operations from the application; and
for each of the requests from the application:

select an appropriate server for performing a requested operation; and
instruct the selected server to cause completion of the requested
operation.

25. A computer-implemented method for capturing a representation of a data set, comprising:

under the control of one or more computer systems configured with executable instructions,

receiving an instruction from a client device to capture the representation of the data set at a point in time, the point in time based at least in part on a capture policy received from the client device; and

responsive to at least the instruction to capture the representation of the data set:

using a plurality of servers to perform data set operations in a plurality of distributed data set partitions;

instructing one or more storage interfaces in communication with the plurality of servers to block acknowledgment of at least completion of one or more activities in connection with the data set; and

at a time after the one or more storage interfaces blocks acknowledgment of at least the one or more activities, inserting a token into one or more request streams from the one or more storage interfaces to the servers, each token being an indication to a server that receives the token for performing a capture of a data set partition of the plurality of data set partitions upon processing the token during processing of a corresponding request stream into which the token has been inserted.

26. The computer-implemented method of claim 25, wherein the data set partitions are distributed among a plurality of physical storage devices.

27. The computer-implemented method of claim 25, wherein each request stream comprises a collection of requests for performing data operations from a corresponding computing device of the one or more storage interfaces to a corresponding server of the plurality of servers.

28. The computer-implemented method of claim 25, wherein, for each server, the request stream comprises a plurality of requests from the one or more storage interfaces for performing a data operation.

29. The computer-implemented method of claim 25, further comprising:
receiving requests for performing data operations from the application; and
for each of the requests from the application:

selecting an appropriate storage interface that communicates with an
appropriate server for causing completion of a requested operation; and

causing the selected storage interface to communicate with the
appropriate server to complete the requested operation.