

What is claimed is:

1. A computing system for managing stored data, the computing system including:
 - a memory module configured to store working data that includes a plurality of data units;
 - a storage system configured to store recovery data that includes a plurality of sets of one or more data units; and
 - at least one processor configured to manage transfer of data units between the memory module and the storage system, the managing including:
 - maintaining an order among the plurality of data units included in the working data, the order defining a first contiguous portion including one or more of the plurality of data units and a second contiguous portion including one or more of the plurality of data units; and
 - for each of multiple time intervals, identifying any data units accessed from the working data during the time interval, and adding to the recovery data a set of two or more data units including: one or more data units from the first contiguous portion including any accessed data units, and one or more data units from the second contiguous portion including at least one data unit that has been previously added to the recovery data.
2. The computing system of claim 1, wherein the managing further includes, for each of multiple intervals of time, removing from the recovery data at least one set of one or more data units for which any data units still included in the working data are stored in at least one other set of one or more data units.
3. The computing system of claim 1, wherein the managing further includes, for each of the multiple time intervals, identifying any data units removed from the working data during the time interval.
4. The computing system of claim 3, wherein the second contiguous portion excludes any removed data units.

5. The computing system of claim 3, wherein the managing further includes, for each of multiple intervals of time, adding to the recovery data information identifying any removed data units.

6. The computing system of claim 1, wherein identifying any data units accessed from the working data during the time interval includes moving any data units accessed from the working data during the time interval into the first contiguous portion.

7. The computing system of claim 1, wherein the order among the plurality of data units included in the working data is based on how recently the data units have been accessed.

8. The computing system of claim 7, wherein the first contiguous portion includes: a most-recently-accessed data unit of all of the plurality of data units included in the working data, and a least-recently-accessed data unit of a subset of the plurality of data units that have not been added to the recovery data since their most-

9. The computing system of claim 8, wherein the second contiguous portion does not overlap with the first contiguous portion.

10. The computing system of claim 9, wherein the second contiguous portion includes at least one data unit that has been added to the recovery data since its

11. The computing system of claim 10, wherein the one or more data units from second contiguous portion is limited to a number of data units that is between about half the number of data units in the one or more data units from the first contiguous portion and about twice the number of data units in the one or more data units from the first contiguous portion.

12. The computing system of claim 11, wherein the first contiguous portion includes data units that have been more recently accessed than any of the data units in the second contiguous portion.

13. The computing system of claim 1, wherein a time indicating how recently a data unit has been accessed corresponds to a time at which exclusive access to the data unit was initiated.

14. The computing system of claim 1, wherein a time indicating how recently a data unit has been accessed corresponds to a time at which exclusive access to the data unit was concluded.

15. The computing system of claim 1, wherein the managing further includes using the recovery data to restore a state of the working data in response to a failure.

16. The computing system of claim 1, wherein the plurality of data units included in the working data are each associated with a key value.

17. The computing system of claim 16, wherein at least one of the data units included in the working data includes one or more values accessible based on the key value associated with the data unit.

18. The computing system of claim 16, wherein the total number of different key values associated with different data units included in the working data is larger than about 1,000.

19. The computing system of claim 1, wherein the time intervals do not overlap with each other.

20. The computing system of claim 1, wherein identifying any data units accessed from the working data during the time interval includes identifying at least one of: any data units added to the working data during the time interval, any data units read from the working data during the time interval, or any data units updated within the working data during the time interval.

21. The computing system of claim 1, wherein the memory module includes a volatile memory device.

22. The computing system of claim 1, wherein the storage system includes a non-volatile storage device.

23. A computing system for managing stored data, the computing system including:

a memory module configured to store working data that includes a plurality of data units;

a storage system configured to store recovery data that includes a plurality of sets of one or more data units; and

means for managing transfer of data units between the memory module and the storage system, the managing including:

maintaining an order among the plurality of data units included in the working data, the order defining a first contiguous portion including one or more of the plurality of data units and a second contiguous portion including one or more of the plurality of data units; and

for each of multiple time intervals, identifying any data units accessed from the working data during the time interval, and adding to the recovery data a set of two or more data units including: one or more data units from the first contiguous portion including any accessed data units, and one or more data units from the second contiguous portion including at least one data unit that has been previously added to the recovery data.

24. A method for managing transfer of data units between a memory module of a computing system and a storage system of the computing system, the method including:

storing, in the memory module, working data that includes a plurality of data units;

storing, in the storage system, recovery data that includes a plurality of sets of one or more data units;

maintaining an order among the plurality of data units included in the working data, the order defining a first contiguous portion including one or more of the plurality of data units and a second contiguous portion including one or more of the plurality of data units; and

for each of multiple time intervals, identifying any data units accessed from the working data during the time interval, and adding to the recovery data a set of two or more data units including: one or more data units from the first contiguous portion including any accessed data units, and one or more data units from the second contiguous portion including at least one data unit that has been previously added to the recovery data.

25. Software stored in a non-transitory form on a computer-readable medium, for managing transfer of data units between a memory module of a computing system and a storage system of the computing system, the software including instructions for causing the computing system to:

store, in the memory module, working data that includes a plurality of data units;
store, in the storage system, recovery data that includes a plurality of sets of one or more data units;

maintain an order among the plurality of data units included in the working data, the order defining a first contiguous portion including one or more of the plurality of data units and a second contiguous portion including one or more of the plurality of data units; and

for each of multiple time intervals, identify any data units accessed from the working data during the time interval, and add to the recovery data a set of two or more data units including: one or more data units from the first contiguous portion including any accessed data units, and one or more data units from the second contiguous portion including at least one data unit that has been previously added to the recovery data.

26. The method of claim 24, wherein the managing further includes, for each of multiple intervals of time, removing from the recovery data at least one set of one or more data units for which any data units still included in the working data are stored in at least one other set of one or more data units.

27. The method of claim 24, wherein the managing further includes, for each of the multiple time intervals, identifying any data units removed from the working data during the time interval.

28. The method of claim 27, wherein the second contiguous portion excludes any removed data units.

29. The method of claim 27, wherein the managing further includes, for each of multiple intervals of time, adding to the recovery data information identifying any removed data units.

30. The method of claim 24, wherein identifying any data units accessed from the working data during the time interval includes moving any data units accessed from the working data during the time interval into the first contiguous portion.

31. The method of claim 24, wherein the order among the plurality of data units included in the working data is based on how recently the data units have been accessed.

32. The method of claim 31, wherein the first contiguous portion includes: a most-recently-accessed data unit of all of the plurality of data units included in the working data, and a least-recently-accessed data unit of a subset of the plurality of data units that have not been added to the recovery data since their most-recent access.

33. The method of claim 32, wherein the second contiguous portion does not overlap with the first contiguous portion.

34. The method of claim 33, wherein the second contiguous portion includes at least one data unit that has been added to the recovery data since its most-

35. The method of claim 34, wherein the one or more data units from second contiguous portion is limited to a number of data units that is between about half the number of data units in the one or more data units from the first contiguous portion and about twice the number of data units in the one or more data units from the first contiguous portion.

36. The method of claim 35, wherein the first contiguous portion includes data units that have been more recently accessed than any of the data units in the second contiguous portion.

37. The method of claim 24, wherein a time indicating how recently a data unit has been accessed corresponds to a time at which exclusive access to the data unit was initiated.

38. The method of claim 24, wherein a time indicating how recently a data unit has been accessed corresponds to a time at which exclusive access to the data unit was concluded.

39. The method of claim 24, wherein the managing further includes using the recovery data to restore a state of the working data in response to a failure.

40. The method of claim 24, wherein the plurality of data units included in the working data are each associated with a key value.

41. The method of claim 40, wherein at least one of the data units included in the working data includes one or more values accessible based on the key value associated with the data unit.

42. The method of claim 40, wherein the total number of different key values associated with different data units included in the working data is larger than about 1,000.

43. The method of claim 24, wherein the time intervals do not overlap with each other.

44. The method of claim 24, wherein identifying any data units accessed from the working data during the time interval includes identifying at least one of: any data units added to the working data during the time interval, any data units read from the working data during the time interval, or any data units updated within the working data during the time interval.

45. The method of claim 24, wherein the memory module includes a volatile memory device.

46. The method of claim 24, wherein the storage system includes a non-volatile storage device.

47. The software of claim 25, wherein the managing further includes, for each of multiple intervals of time, removing from the recovery data at least one set of one or more data units for which any data units still included in the working data are stored in at least one other set of one or more data units.

48. The software of claim 25, wherein the managing further includes, for each of the multiple time intervals, identifying any data units removed from the working data during the time interval.

49. The software of claim 48, wherein the second contiguous portion excludes any removed data units.

50. The software of claim 48, wherein the managing further includes, for each of multiple intervals of time, adding to the recovery data information identifying any removed data units.

51. The software of claim 25, wherein identifying any data units accessed from the working data during the time interval includes moving any data units accessed from the working data during the time interval into the first contiguous portion.

52. The software of claim 25, wherein the order among the plurality of data units included in the working data is based on how recently the data units have been accessed.

53. The software of claim 52, wherein the first contiguous portion includes: a most-recently-accessed data unit of all of the plurality of data units included in the working data, and a least-recently-accessed data unit of a subset of the plurality of data units that have not been added to the recovery data since their most-recent access.

54. The software of claim 53, wherein the second contiguous portion does not overlap with the first contiguous portion.

55. The software of claim 54, wherein the second contiguous portion includes at least one data unit that has been added to the recovery data since its most-

56. The software of claim 55, wherein the one or more data units from second contiguous portion is limited to a number of data units that is between about half the number of data units in the one or more data units from the first contiguous portion and about twice the number of data units in the one or more data units from the first contiguous portion.

57. The software of claim 56, wherein the first contiguous portion includes data units that have been more recently accessed than any of the data units in the second contiguous portion.

58. The software of claim 25, wherein a time indicating how recently a data unit has been accessed corresponds to a time at which exclusive access to the data unit was initiated.

59. The software of claim 25, wherein a time indicating how recently a data unit has been accessed corresponds to a time at which exclusive access to the data unit was concluded.

60. The software of claim 25, wherein the managing further includes using the recovery data to restore a state of the working data in response to a failure.

61. The software of claim 25, wherein the plurality of data units included in the working data are each associated with a key value.

62. The software of claim 61, wherein at least one of the data units included in the working data includes one or more values accessible based on the key value associated with the data unit.

63. The software of claim 61, wherein the total number of different key values associated with different data units included in the working data is larger than about 1,000.

64. The software of claim 25, wherein the time intervals do not overlap with each other.

65. The software of claim 25, wherein identifying any data units accessed from the working data during the time interval includes identifying at least one of: any data units added to the working data during the time interval, any data units read from the working data during the time interval, or any data units updated within the working data during the time interval.

66. The software of claim 25, wherein the memory module includes a volatile memory device.

67. The software of claim 25, wherein the storage system includes a non-volatile storage device.