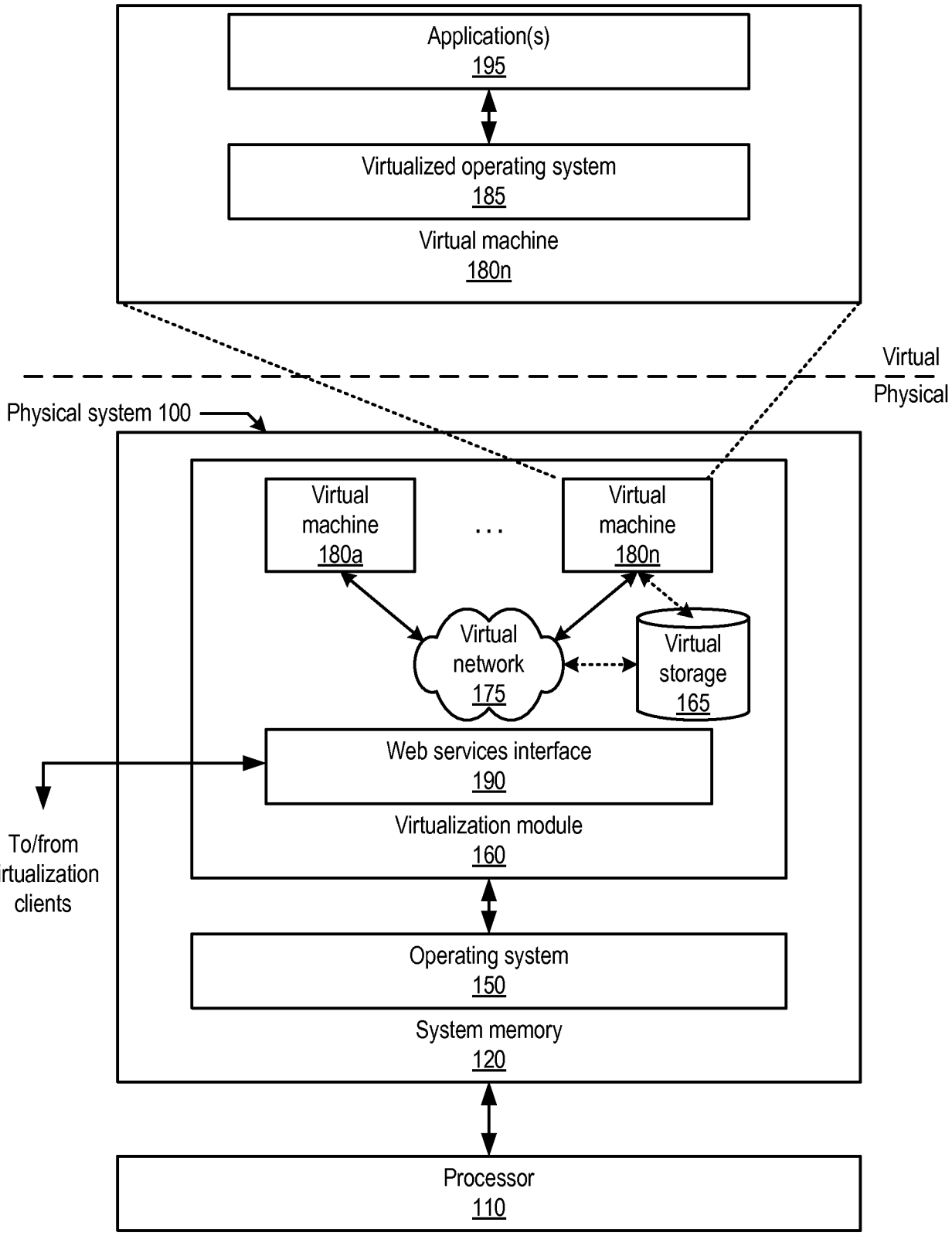
Application(s)
195
Virtualized operating system
185
Virtual machine
180n
Virtual
Physical
Physical system 100
Virtual machine
180a
. . .
Virtual machine
180n
Virtual network
175
Virtual storage
165
Web services interface
190
Virtualization module
160
To/from virtualization clients
Operating system
150
System memory
120
Processor
110

FIG. 1

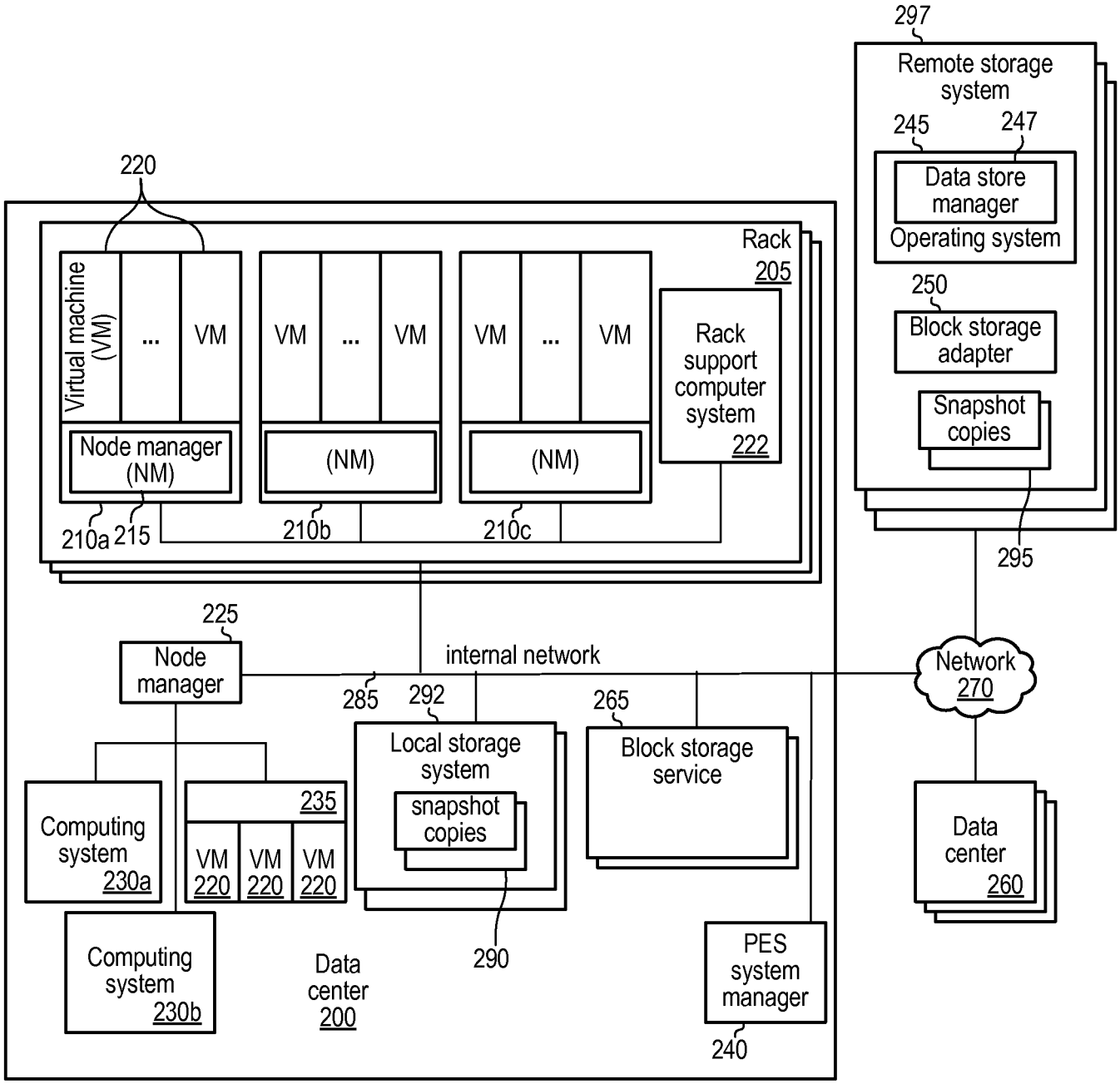
297
Remote storage system
245
247
Data store manager
Operating system
250
Block storage adapter
Snapshot copies
295
220
Rack 205
Virtual machine (VM)
VM
VM
VM
VM
VM
VM
Node manager (NM)
(NM)
(NM)
Rack support computer system 222
210a
215
210b
210c
225
Node manager
internal network
285
292
265
Network 270
Local storage system
snapshot copies
Block storage service
Computing system 230a
235
VM 220
VM 220
VM 220
Data center 260
Computing system 230b
Data center 200
290
PES system manager
240

FIG. 2A

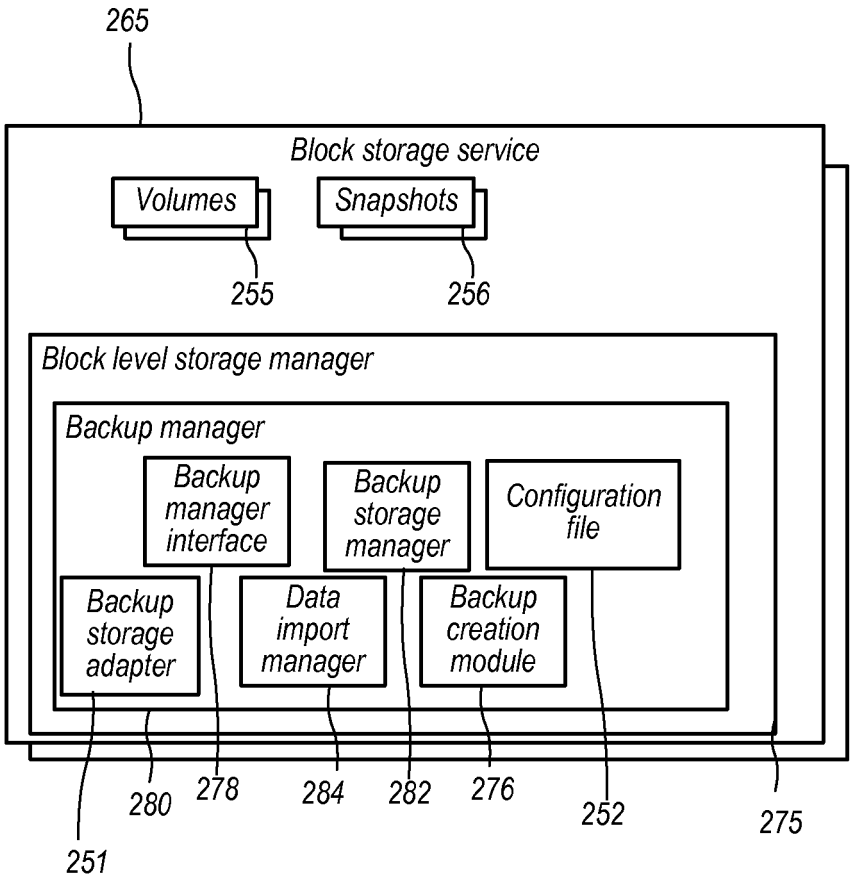
265
Block storage service
Volumes
Snapshots
255
256
Block level storage manager
Backup manager
Backup manager interface
Backup storage manager
Configuration file
Backup storage adapter
Data import manager
Backup creation module
251
280
278
284
282
276
252
275

FIG. 2B

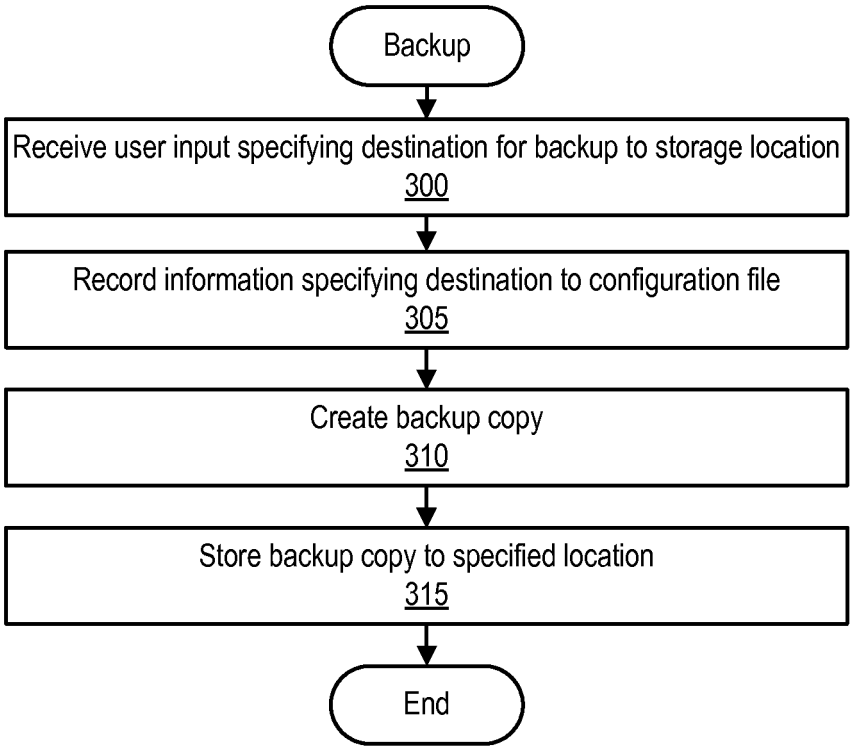
Backup
Receive user input specifying destination for backup to storage location
300
Record information specifying destination to configuration file
305
Create backup copy
310
Store backup copy to specified location
315
End

FIG. 3A

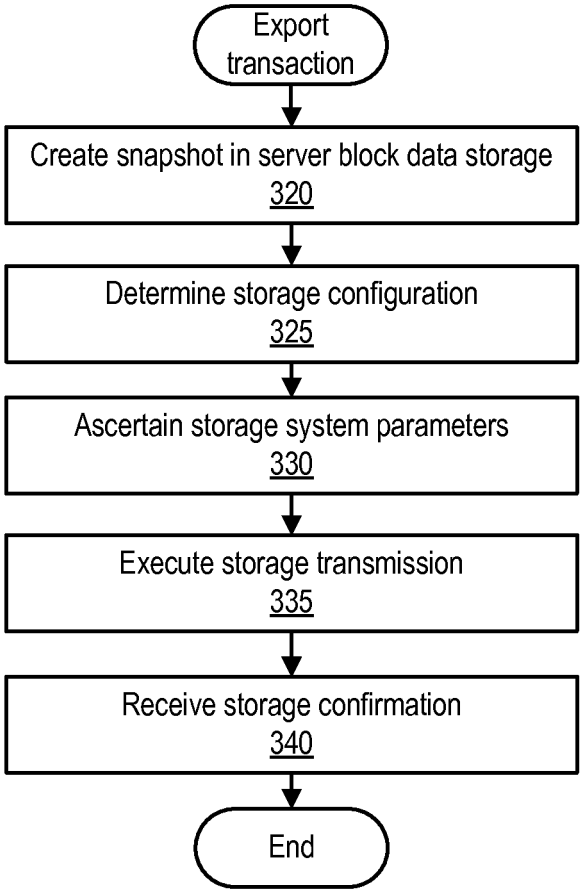
Export transaction
Create snapshot in server block data storage 320
Determine storage configuration 325
Ascertain storage system parameters 330
Execute storage transmission 335
Receive storage confirmation 340
End

FIG. 3B

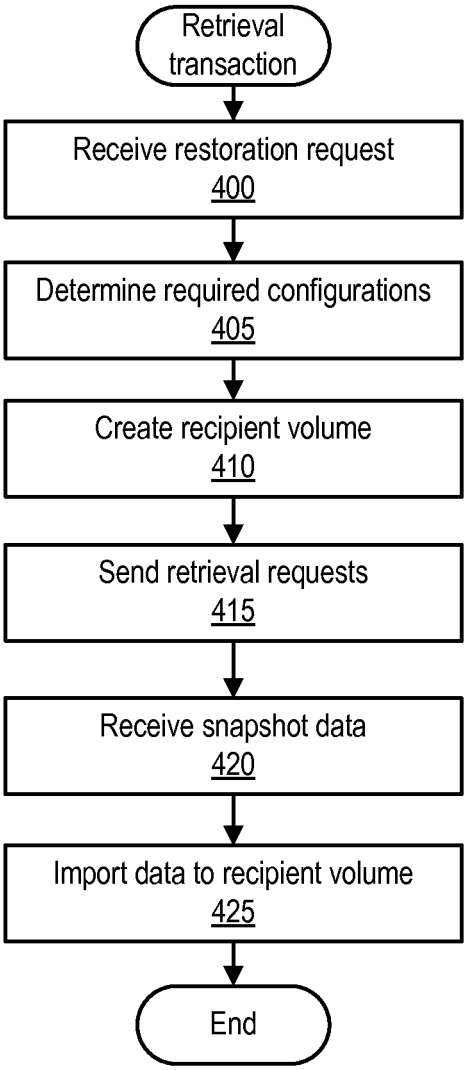
Retrieval transaction
Receive restoration request 400
Determine required configurations 405
Create recipient volume 410
Send retrieval requests 415
Receive snapshot data 420
Import data to recipient volume 425
End

FIG. 4

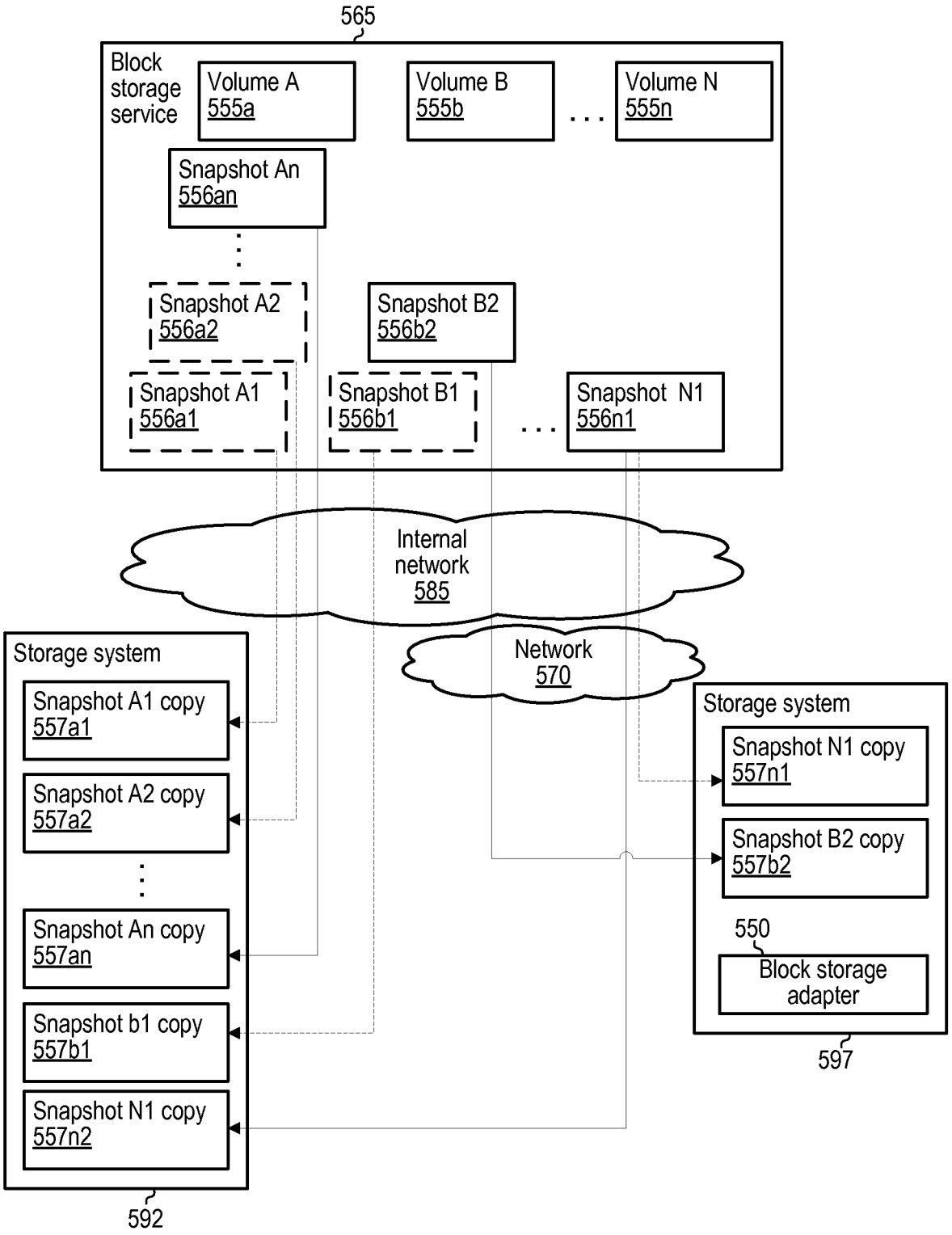
565
Block storage service
Volume A 555a
Volume B 555b
Volume N 555n
Snapshot An 556an
Snapshot A2 556a2
Snapshot B2 556b2
Snapshot A1 556a1
Snapshot B1 556b1
Snapshot N1 556n1
Internal network 585
Network 570
Storage system
Snapshot A1 copy 557a1
Snapshot A2 copy 557a2
Snapshot An copy 557an
Snapshot b1 copy 557b1
Snapshot N1 copy 557n2
592
Storage system
Snapshot N1 copy 557n1
Snapshot B2 copy 557b2
550
Block storage adapter
597

FIG. 5

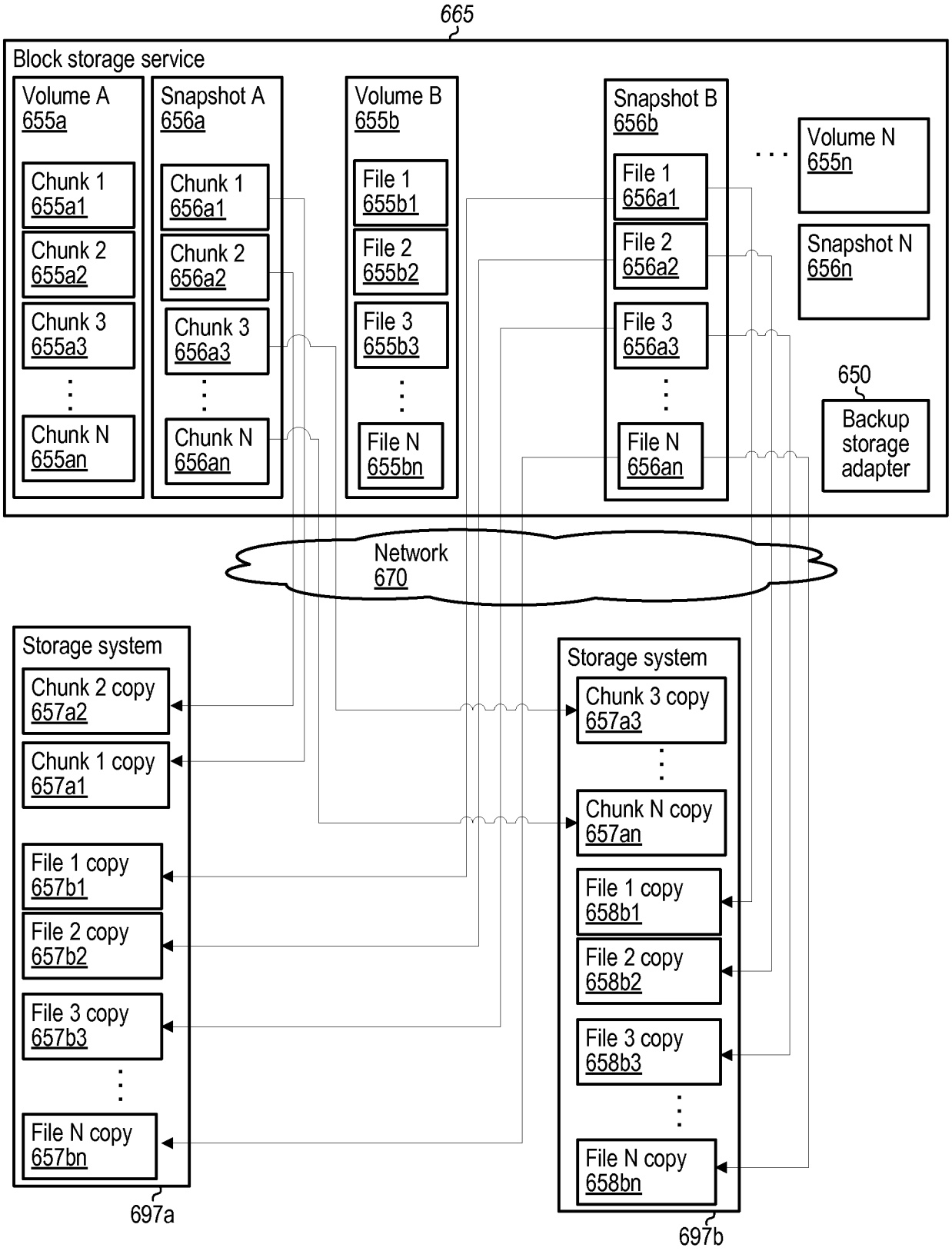
665
Block storage service
Volume A
655a
Chunk 1
655a1
Chunk 2
655a2
Chunk 3
655a3
Chunk N
655an
Snapshot A
656a
Chunk 1
656a1
Chunk 2
656a2
Chunk 3
656a3
Chunk N
656an
Volume B
655b
File 1
655b1
File 2
655b2
File 3
655b3
File N
655bn
Snapshot B
656b
File 1
656a1
File 2
656a2
File 3
656a3
File N
656an
Volume N
655n
Snapshot N
656n
650
Backup storage adapter
Network
670
Storage system
Chunk 2 copy
657a2
Chunk 1 copy
657a1
File 1 copy
657b1
File 2 copy
657b2
File 3 copy
657b3
File N copy
657bn
697a
Storage system
Chunk 3 copy
657a3
Chunk N copy
657an
File 1 copy
658b1
File 2 copy
658b2
File 3 copy
658b3
File N copy
658bn
697b

FIG. 6

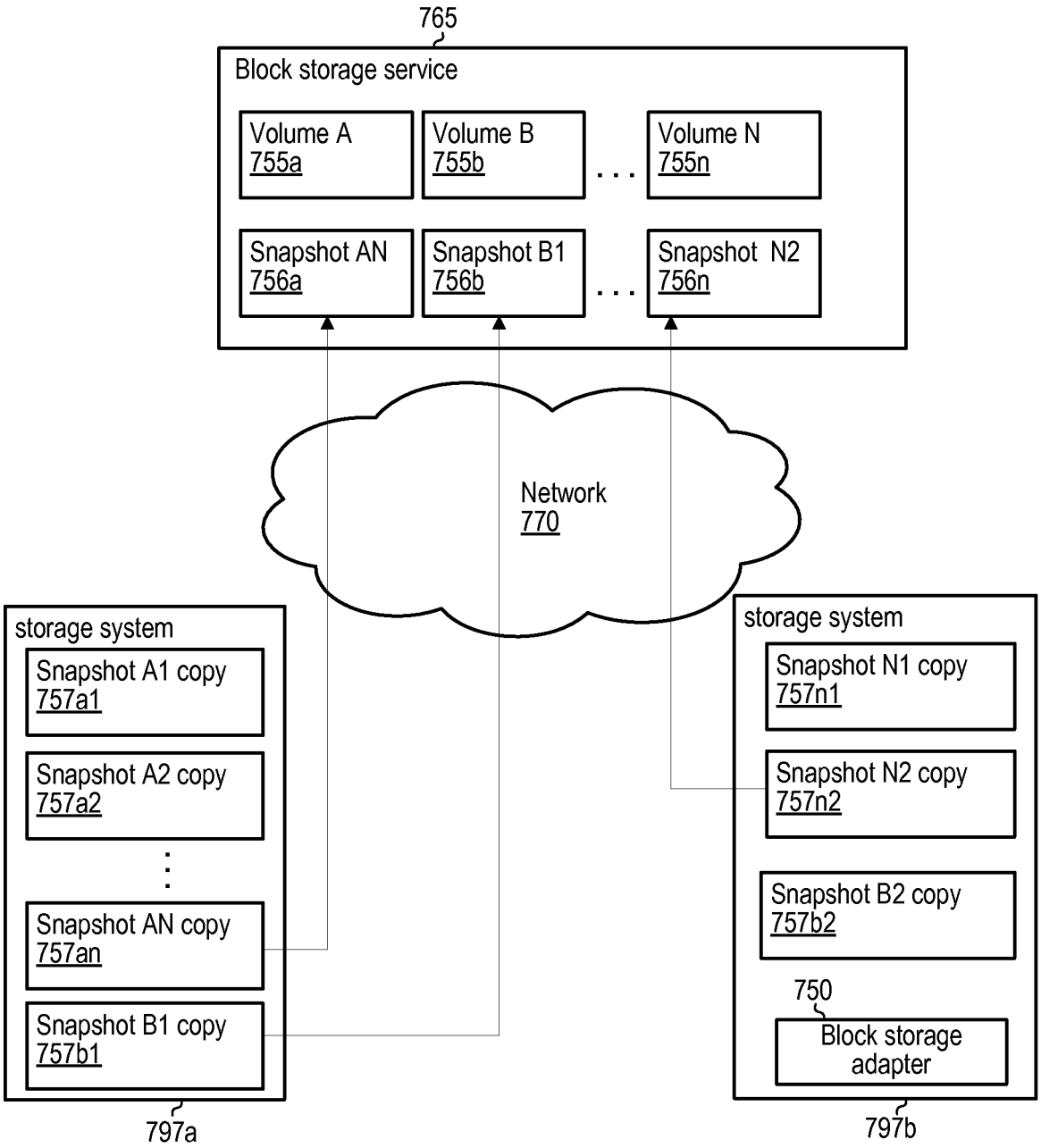
765
Block storage service
Volume A
755a
Volume B
755b
Volume N
755n
Snapshot AN
756a
Snapshot B1
756b
Snapshot N2
756n
Network
770
storage system
Snapshot A1 copy
757a1
Snapshot A2 copy
757a2
Snapshot AN copy
757an
Snapshot B1 copy
757b1
797a
storage system
Snapshot N1 copy
757n1
Snapshot N2 copy
757n2
Snapshot B2 copy
757b2
750
Block storage adapter
797b

FIG. 7

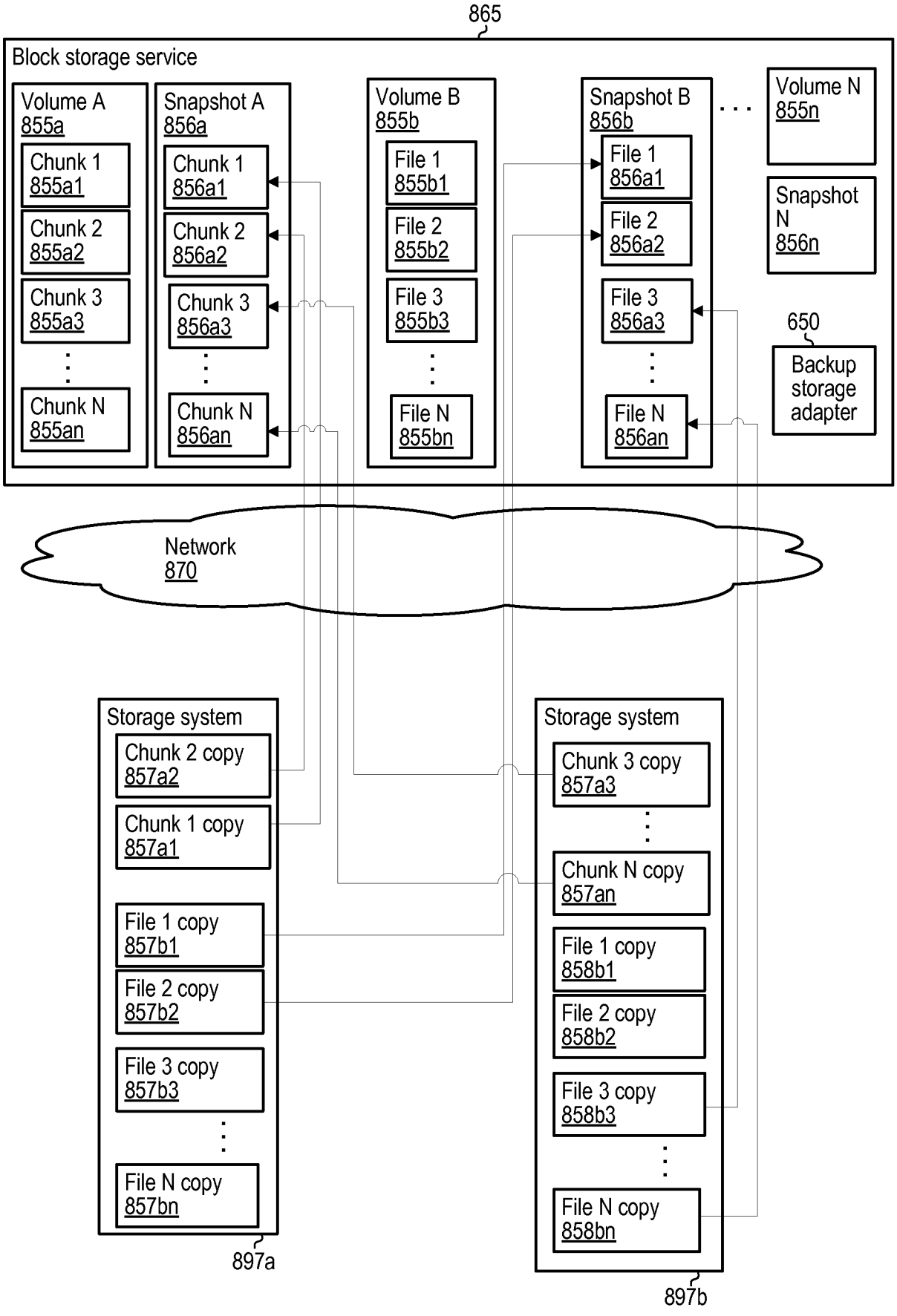
865
Block storage service
Volume A
855a
Chunk 1
855a1
Chunk 2
855a2
Chunk 3
855a3
Chunk N
855an
Snapshot A
856a
Chunk 1
856a1
Chunk 2
856a2
Chunk 3
856a3
Chunk N
856an
Volume B
855b
File 1
855b1
File 2
855b2
File 3
855b3
File N
855bn
Snapshot B
856b
File 1
856a1
File 2
856a2
File 3
856a3
File N
856an
Volume N
855n
Snapshot N
856n
650
Backup storage adapter
Network
870
Storage system
Chunk 2 copy
857a2
Chunk 1 copy
857a1
File 1 copy
857b1
File 2 copy
857b2
File 3 copy
857b3
File N copy
857bn
897a
Storage system
Chunk 3 copy
857a3
Chunk N copy
857an
File 1 copy
858b1
File 2 copy
858b2
File 3 copy
858b3
File N copy
858bn
897b

FIG. 8

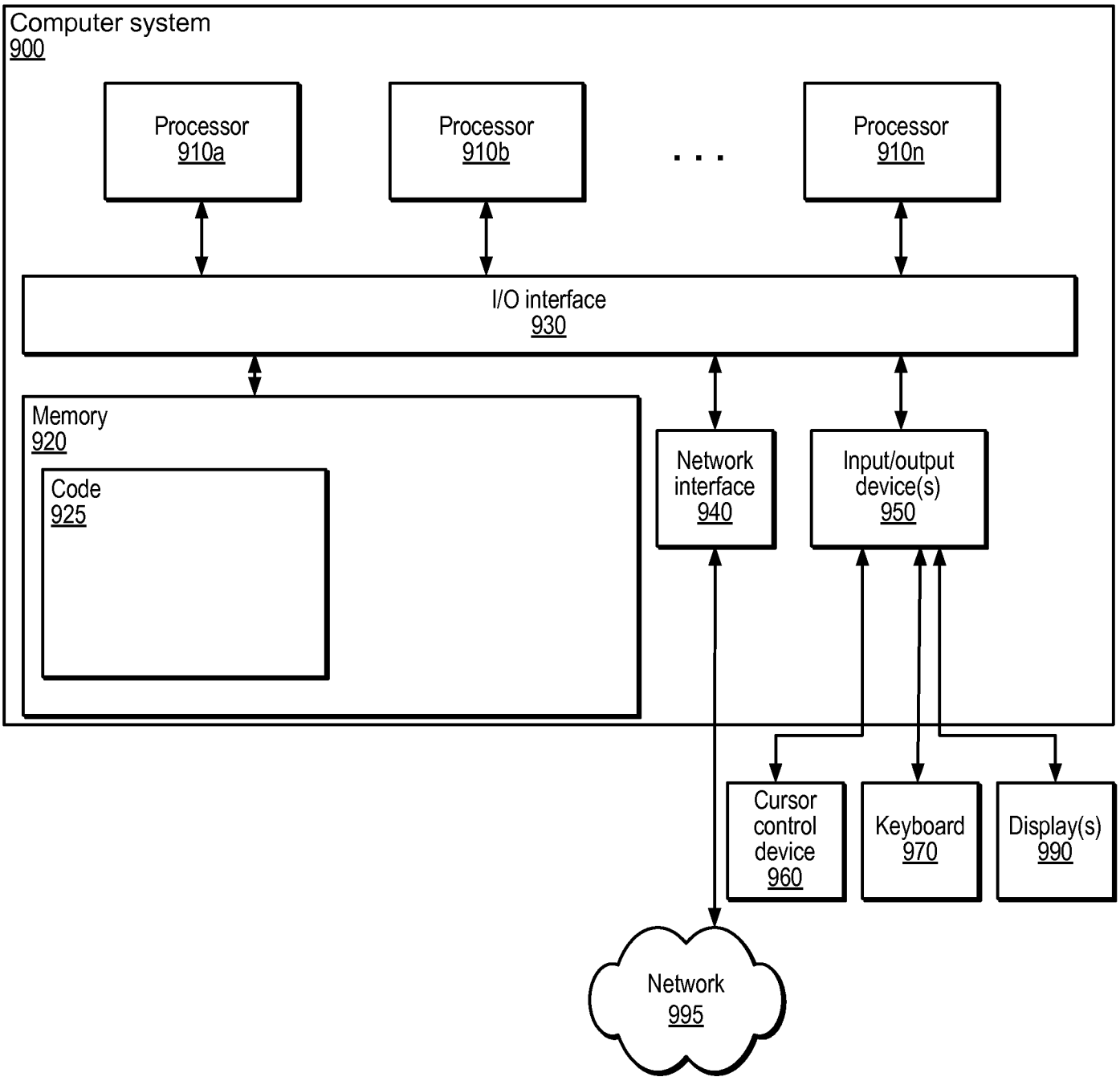
Computer system
900
Processor
910a
Processor
910b
. . .
Processor
910n
I/O interface
930
Memory
920
Code
925
Network
interface
940
Input/output
device(s)
950
Cursor
control
device
960
Keyboard
970
Display(s)
990
Network
995

FIG. 9