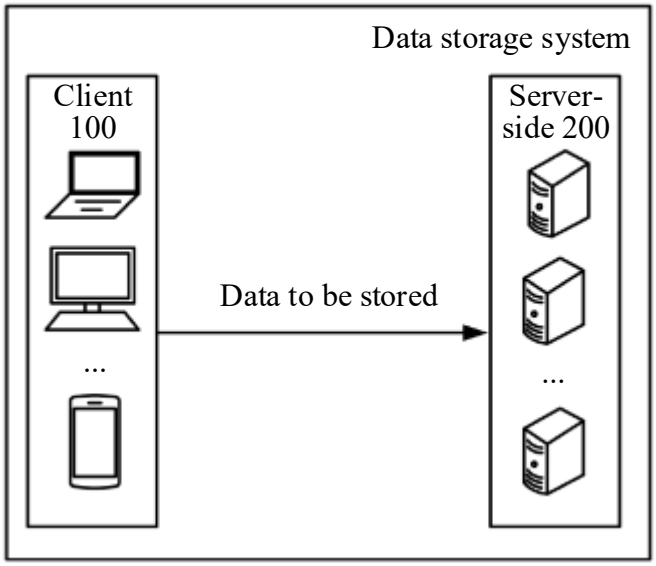


FIG. 1

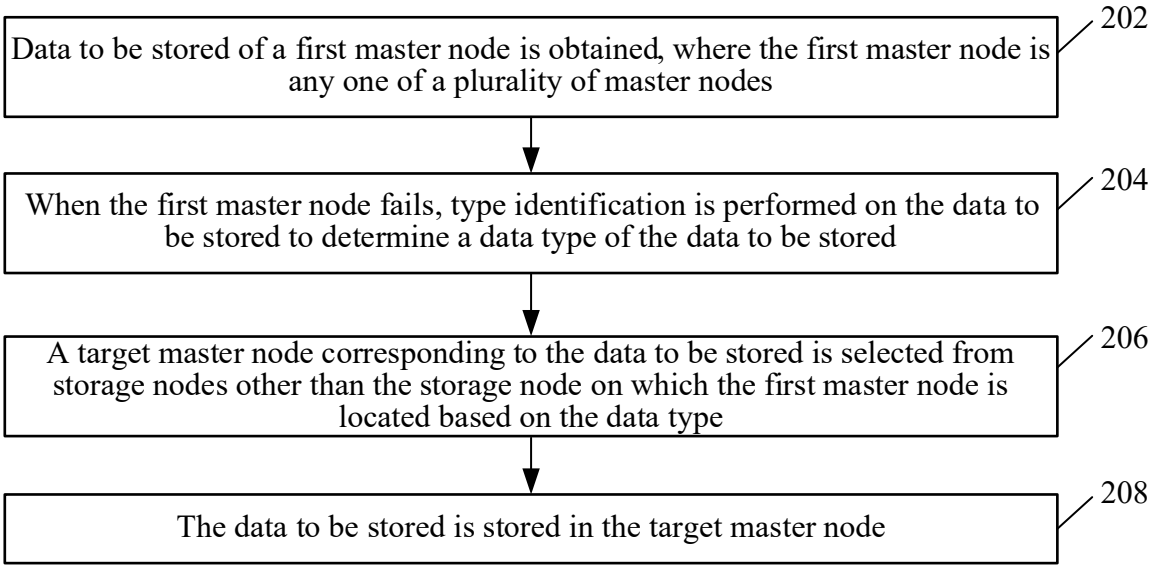


FIG. 2

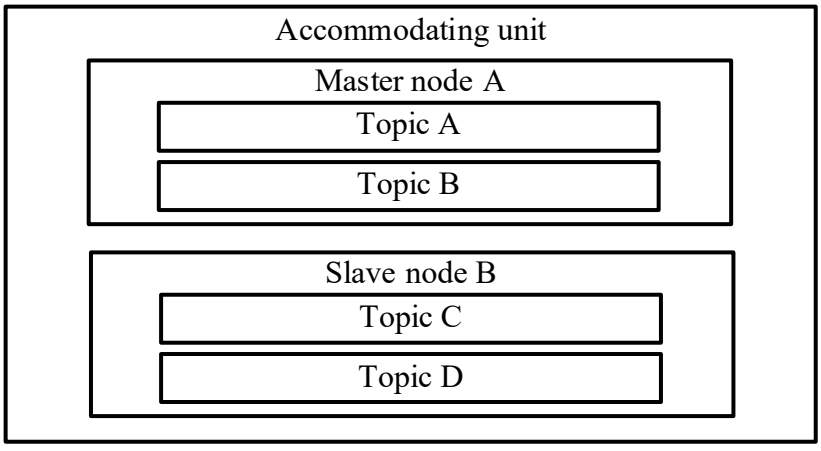


FIG. 3

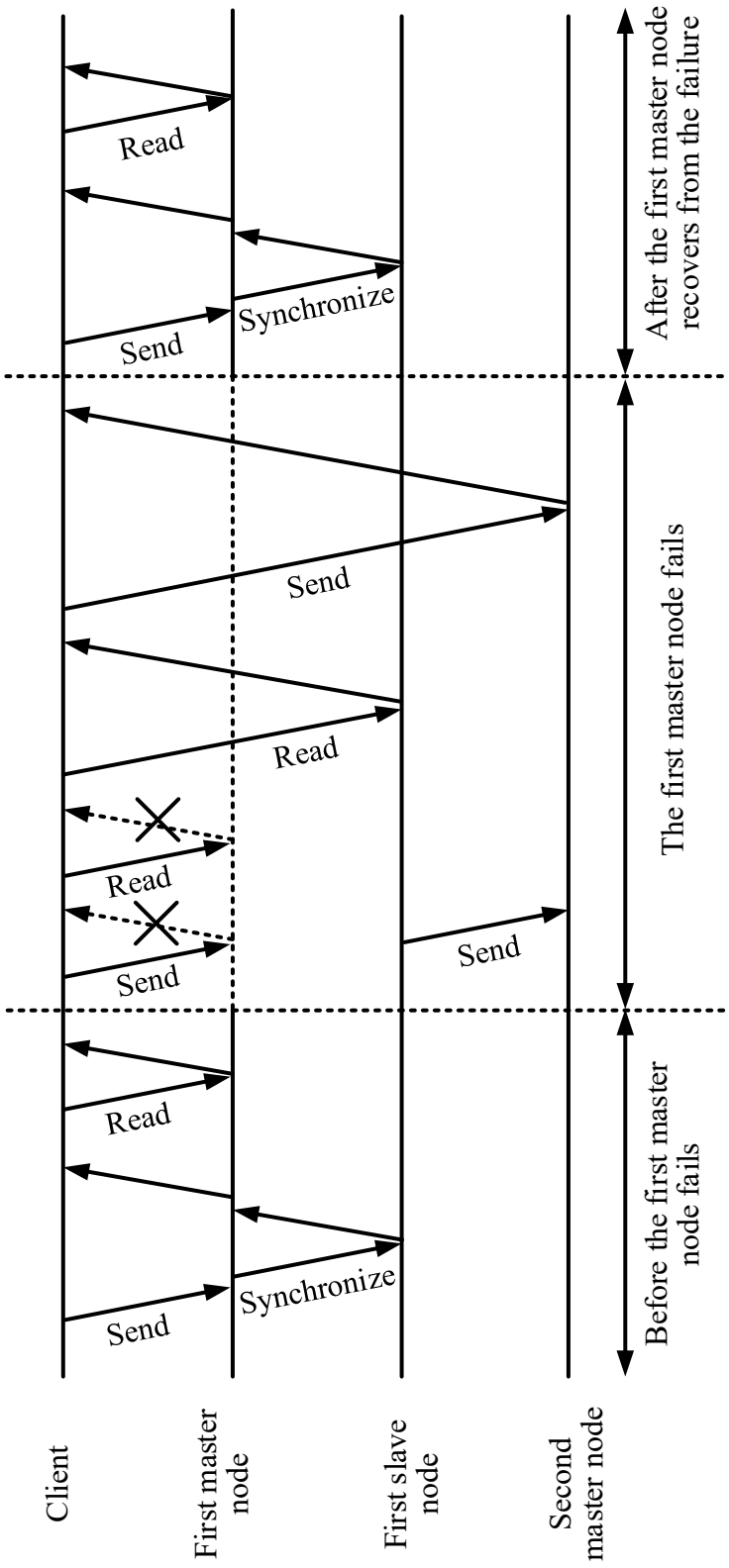

Client
First master node
First slave node
Second master node
Read
Synchronize
Send
Send
Read
Read
Send
Send
Read
Synchronize
Send
Before the first master node fails
The first master node fails
After the first master node recovers from the failure

FIG. 4

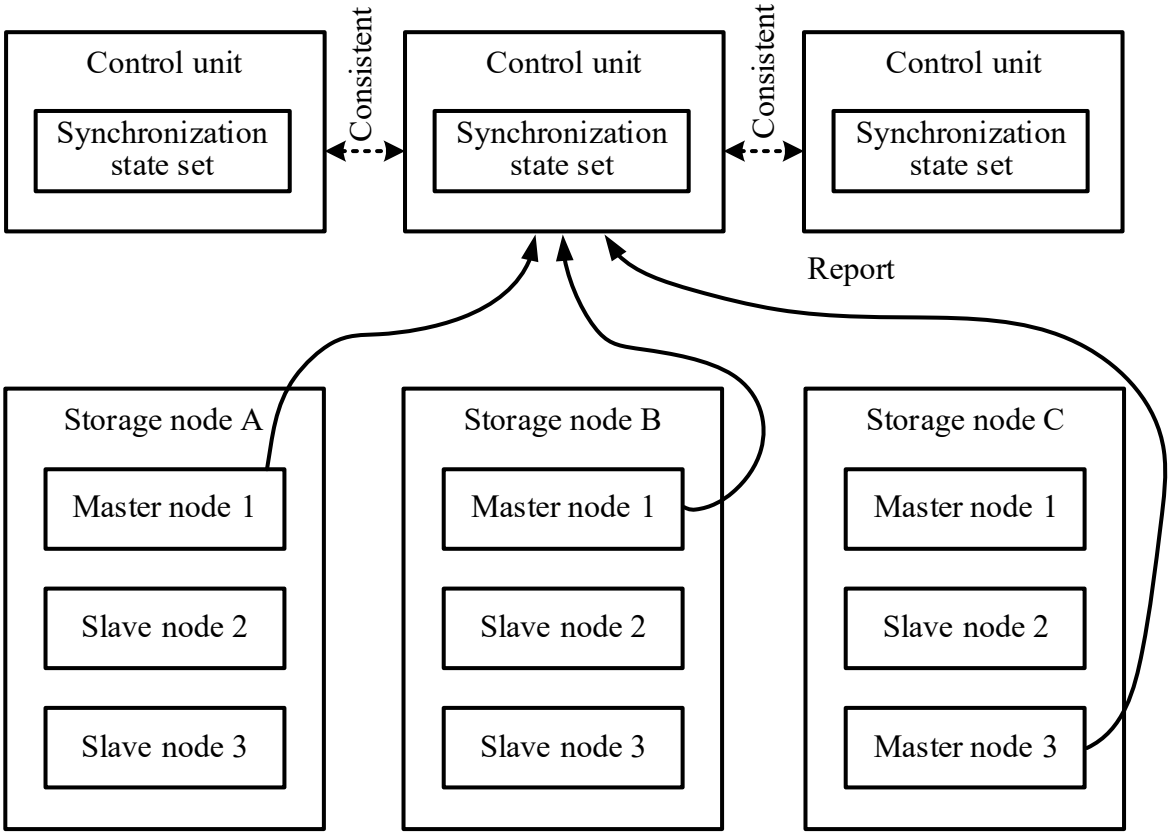

Control unit
Synchronization state set
Consistent
Control unit
Synchronization state set
Consistent
Control unit
Synchronization state set
Report
Storage node A
Master node 1
Slave node 2
Slave node 3
Storage node B
Master node 1
Slave node 2
Slave node 3
Storage node C
Master node 1
Slave node 2
Master node 3

FIG. 5

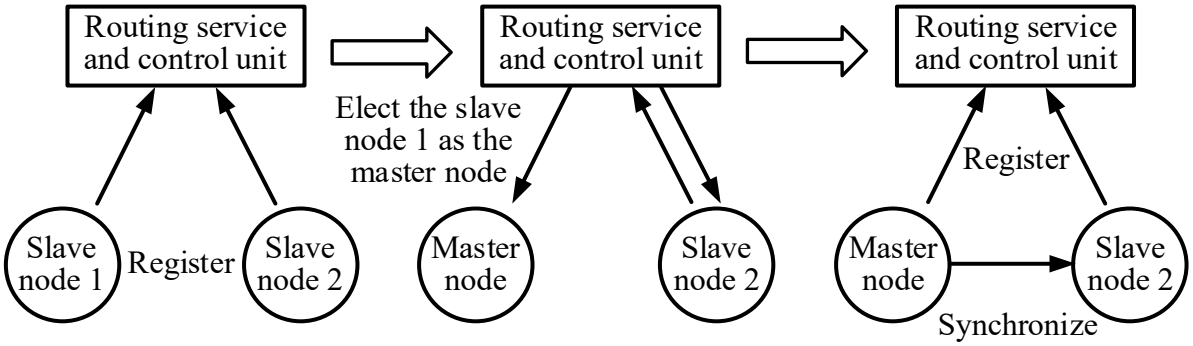

Routing service and control unit
Slave node 1
Register
Slave node 2
Routing service and control unit
Elect the slave node 1 as the master node
Master node
Slave node 2
Routing service and control unit
Register
Master node
Slave node 2
Synchronize

FIG. 6

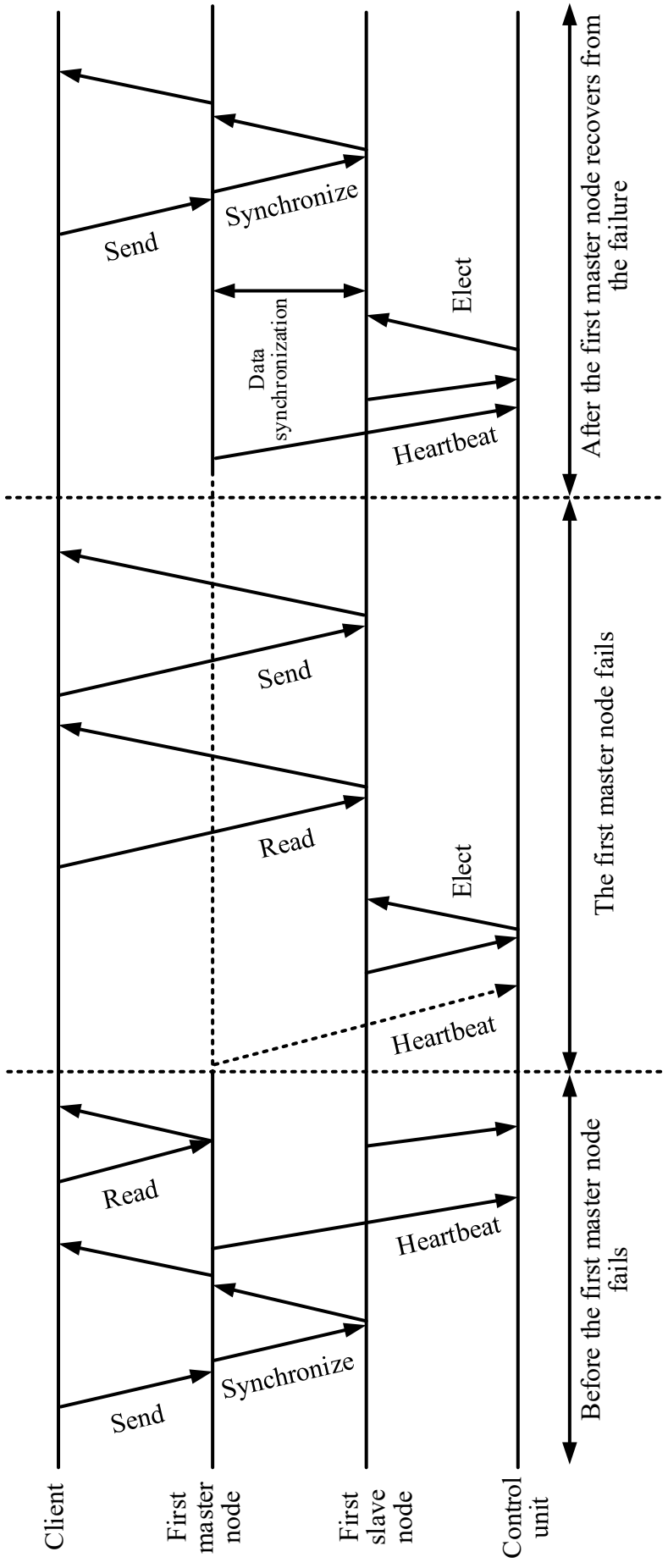

Client
First master node
First slave node
Control unit
Send
Synchronize
Data synchronization
Elect
Heartbeat
After the first master node recovers from the failure
Send
Read
Elect
Heartbeat
The first master node fails
Read
Heartbeat
Send
Synchronize
Before the first master node fails

FIG. 7

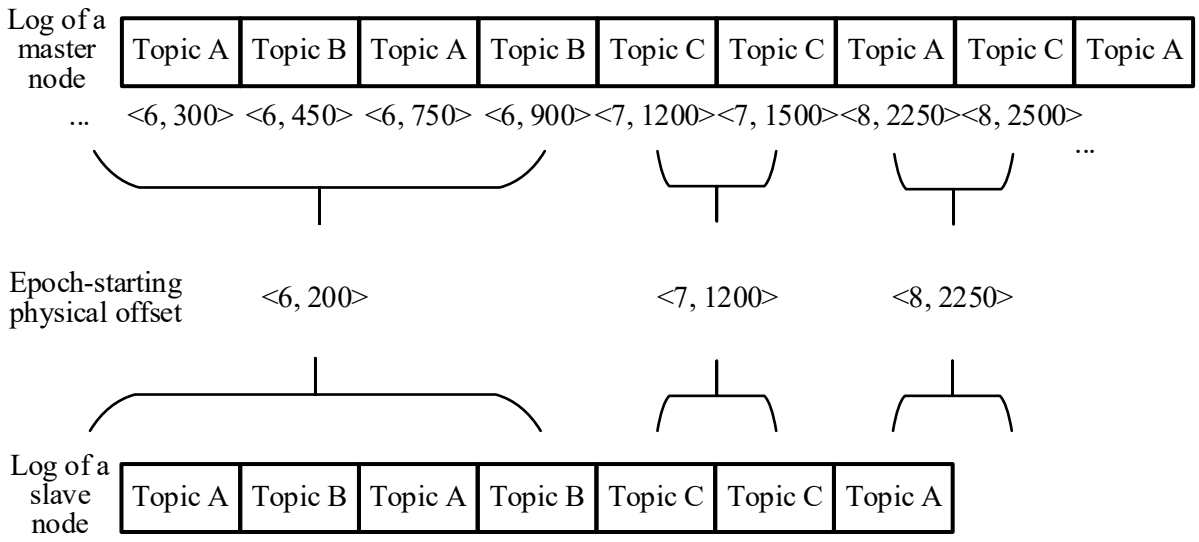

Log of a master node
Topic A
Topic B
Topic A
Topic B
Topic C
Topic C
Topic A
Topic C
Topic A
...
<6, 300>
<6, 450>
<6, 750>
<6, 900>
<7, 1200>
<7, 1500>
<8, 2250>
<8, 2500>
...
Epoch-starting physical offset
<6, 200>
<7, 1200>
<8, 2250>
Log of a slave node
Topic A
Topic B
Topic A
Topic B
Topic C
Topic C
Topic A

FIG. 8

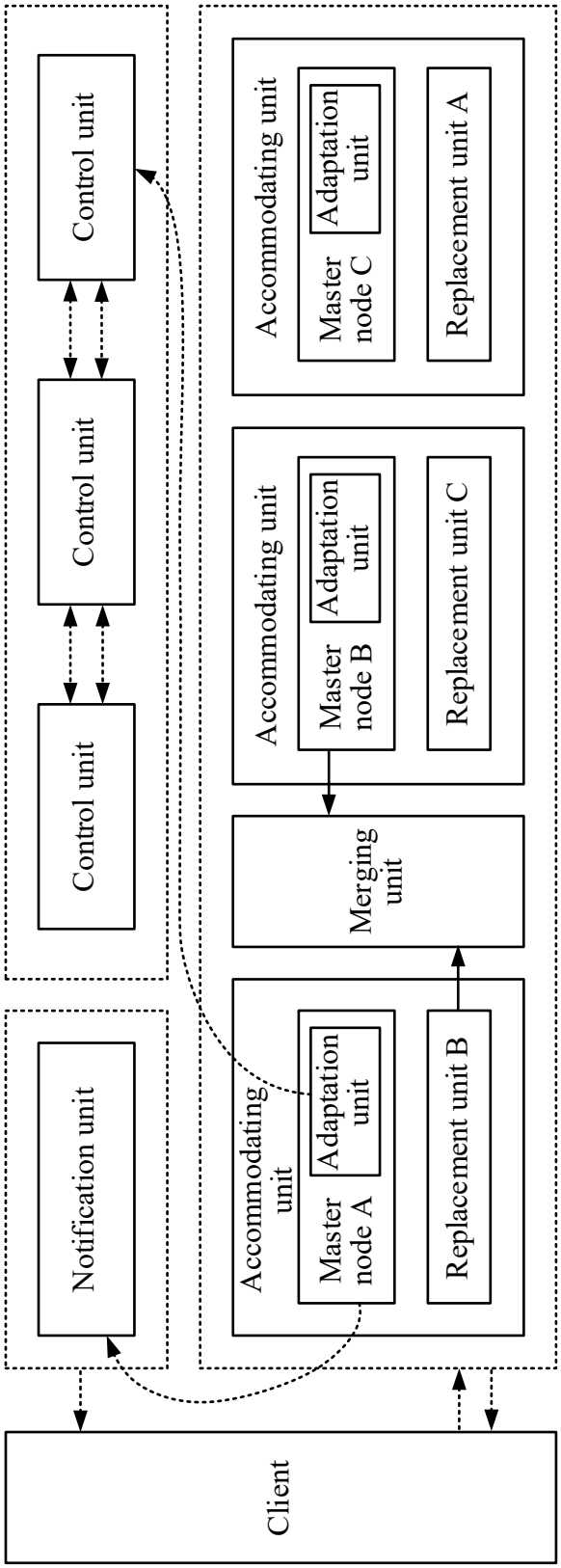

Client
Notification unit
Control unit
Control unit
Control unit
Accommodating unit
Master node A
Adaptation unit
Replacement unit B
Merging unit
Accommodating unit
Master node B
Adaptation unit
Replacement unit C
Accommodating unit
Master node C
Adaptation unit
Replacement unit A

FIG. 9

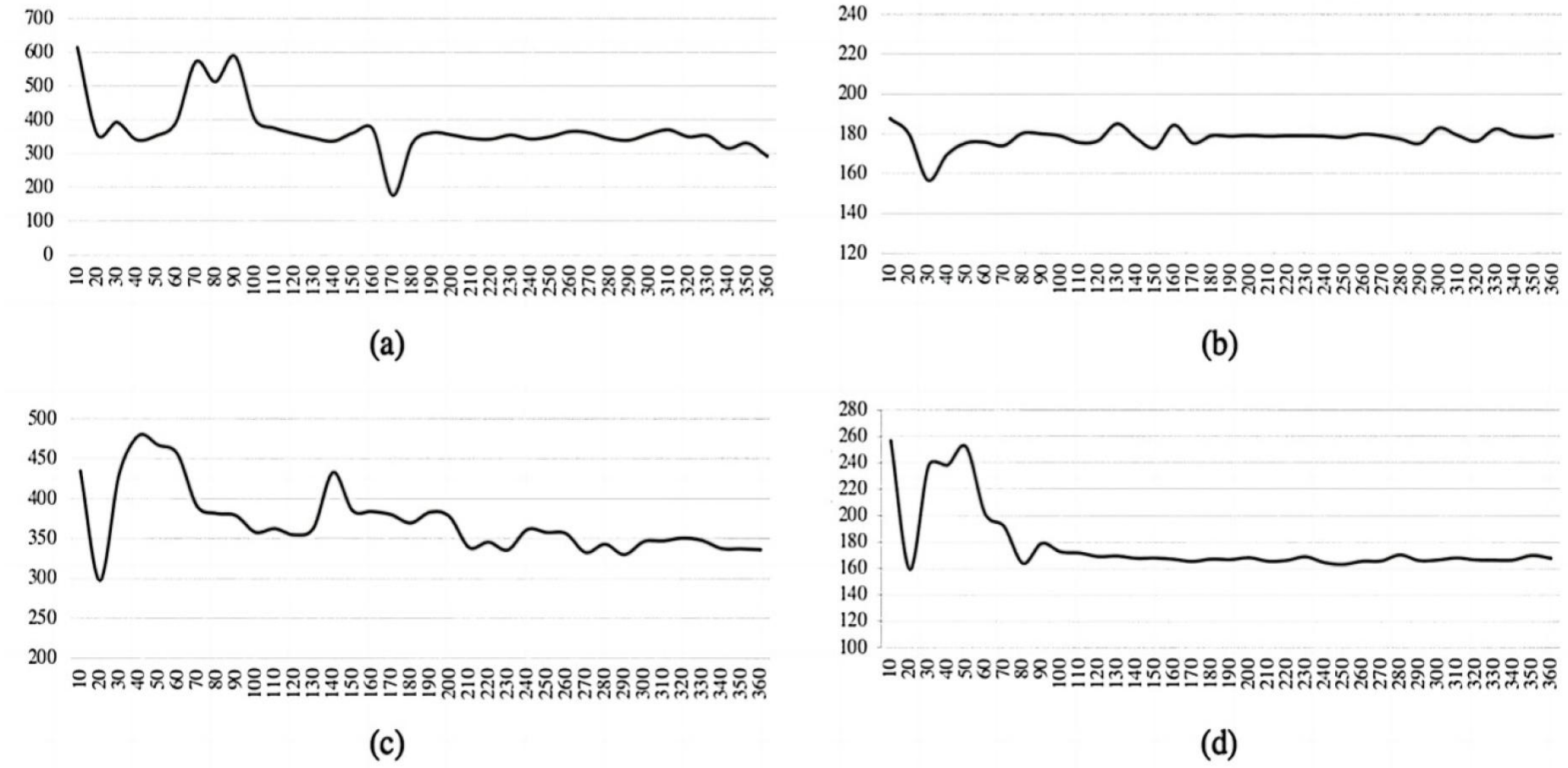


FIG. 10

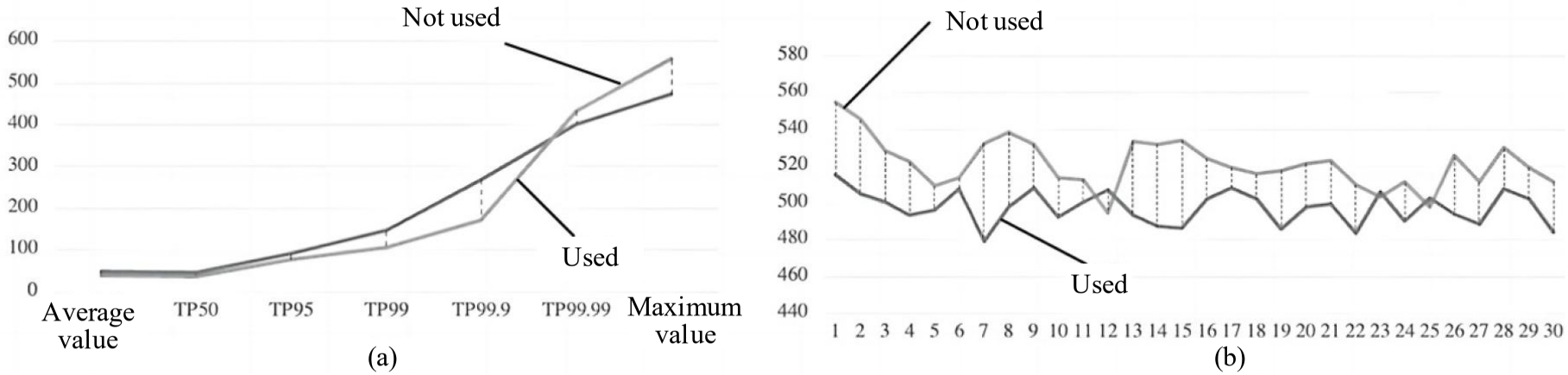

Not used
Used
600
500
400
300
200
100
0
Average value
TP50
TP95
TP99
TP99.9
TP99.99
Maximum value
(a)
Not used
Used
580
560
540
520
500
480
460
440
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
(b)

FIG. 11

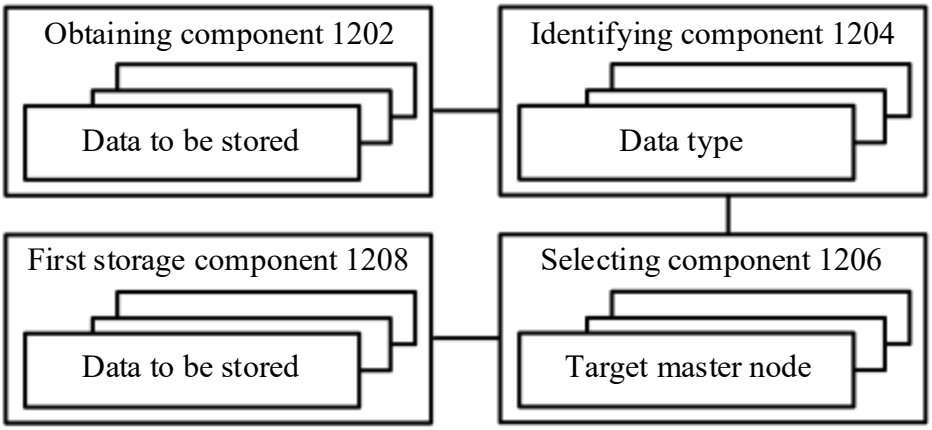

Obtaining component 1202
Data to be stored
Identifying component 1204
Data type
First storage component 1208
Data to be stored
Selecting component 1206
Target master node

FIG. 12

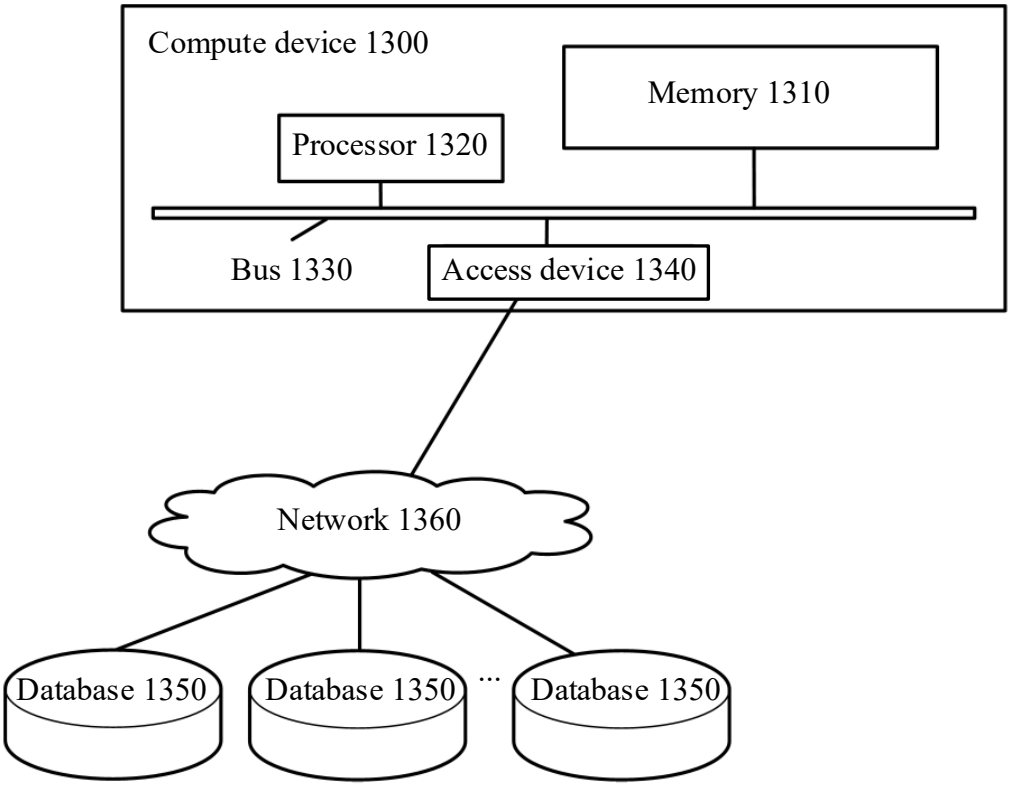

Compute device 1300
Memory 1310
Processor 1320
Bus 1330
Access device 1340
Network 1360
Database 1350
Database 1350
...
Database 1350

FIG. 13