

(19)
(12)

(KR)
(B1)

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(45)
(11)
(24)

2001 09 26
10 - 0304319
2001 07 20

(21) 10 - 1999 - 0018120
(22) 1999 05 19

(65) 2000 - 0005689
(43) 2000 01 25

(30) 09/105,601 1998 06 26 (US)

(73)

10504

(72)

78731

7801

78759

#18121266

(74)

:

(54)

1 2

(OLT)

I/O

가

()

1 .

2 1 - .

3 , - 가 (OLTP; o
n - line transaction processor)

4 , I/O - .

5 2 .

6 3 .

7 6 .

8 .

9 2 .

(information processing system)

station) (mainframe) , 가 (availability)
(lock - step duplexing)
, 2
(mismatch)가
, 가 (downtime)
(outage) 가

(PC) (work
(data integrity) 가
(processing element)가

- 가 (retry) 가 , 가 , 2
가

(transient error)
 common - mode error) 가 (exposure) 가 (

) 2 - (non - batch) I/O

ing processor) I/O (private write buffer) (lead (lagging pr (pseudo)
 ocessor) 가 public write check buffer) 가 I/O (

IBM PowerPC™ (Reduced Instr
 uction Set Computing; RISC)

1 (fault - tolerant computer; FTC) , FT
 C 1 (101) 2 (103) (105)
 (107) (105) (105) (109)
 (113)
 (I/O) (111)가 (105) (115 117)
 (115 117) (online transaction; OLT)

가 (time interval) 가 (time - lag)
 1 FTC 2 (103), 'p2')가 1 (101),
 p1') '8'

(granularity) , (high level) 8 ()

p1 (checkpoint) , /
(check/wait buffer) p2가 /
가 가 가 가

(, I/O)
가 가

3 OLTP
(301, 307) , 1 2 OLT (301, 307)가 (303) . OLT
(connection; 319) (comparator device; 311) 가 .
(301) (305) 3 I/O (313) . OLT
, OLT (307) (309) . I/O (313) (315)
(network interface connection; 317) . I/O (313)
(321), (325) I/O (323)

I/O (313)가 I/O (301) (307)
I/O (application specific integrated c
ircuit; ASIC) . I/O (313) I/O (323)(,), (321)(
13) 가), (325) . I/O (3

3 (atomic macro instruction) , (i) , 'R
Record - Id' (325) Read(Record - Id); (ii) , 'Record - Id'
transform(Transform) Transform(Transform Record - Id); (iii) 'Recor
d - Id' (325) Write(Record - Id) 가 .

5

((321)) - (batch)가 Read - Transform - Write
Read - Transform - Write

(non - batch mode) I/O

(303)가

(301) I/O (313) - (315) (307)
 (309) (pseudo write)
 (, 100) 2 OLT (325) (flushing)
 OLT (309) I/O
 (315) (mismatch)가
 (corrupt) 가 가
 I/O 가 (313) (325)
 가 (buffered write solution) 가

OLT I/O (313) - (315)
 (315) (hardened) 가
 OLT (301) (307) 가
 , OLT (315) 가
 가 (315)가 (325)가

I/O 가 4 (401) (403)
 (405)
 (401) (401) (403, 405) 가 I/O

2 (301, 307) 3 가
 5 (time point) 4 가 5
 , I/O (recovery) 가
 2 가 (transient fault)

6 (601) , (60) (604)
 3) (315) (605) 가 가 (604), I/O (313)
 (606) (, OLT (305 309) (607),
 I/O (315) (609). 가 (611)
 (615), (613) '가, (613)
 (325) (617). 가
 (619). 가 (325)

7 6 (701) ,
 (309)) (703), I/O 가 (705). OLT (, (305)
 (709). (, ' - (corrupt - depend
 ent)' 가), , (reschedule) (709), ' '
 (flag)가 . (705), (709), 가 ,
 (711), (711), ,
 가 , 가 가 . 가 .
 , (corrective action) .

8 (dependency rescheduling) 8 ,
 10 , 가 ,
 1 5 6 ' ' ON 가 , 6
 가 , 7 가 7
 7 1 6 8 9 10
 9 , 7

9 2 가 (301, 307) 3 , I/O
 , (5) 6 . ,
 가 가 가 . 가 가
 가 , 'NO OP(no operation)'가 .

가
 , CPU
 CD, ()

(57)

1.

a)

1 1 ;

b)

1 2 , 2 2 가

1 ;

c)

3

1, 2 3 1, 2 3 , 가

2.

1 , 가 가

3.

1 , ;

3

가 ,

, 3 (flush)

가

4.

3 ,
(mark) 가 가 , (corrupt)

5.

4 ,
(schedule) 가 .

6.

5 ,
가 .

7.

6 ,
가 .

8.

(error) ,

a) ;

b) 가 ;

c) 가 (laggin
g buffer) ;

d) 가 I/O I/O ;

e) 가 I/O

9.

8 ,
가 (transactional basis)

10.

8 ,

가

(batch basis)

가

I/O

11.

10 ,

가

가

12.

11 ,

가

13.

12 ,

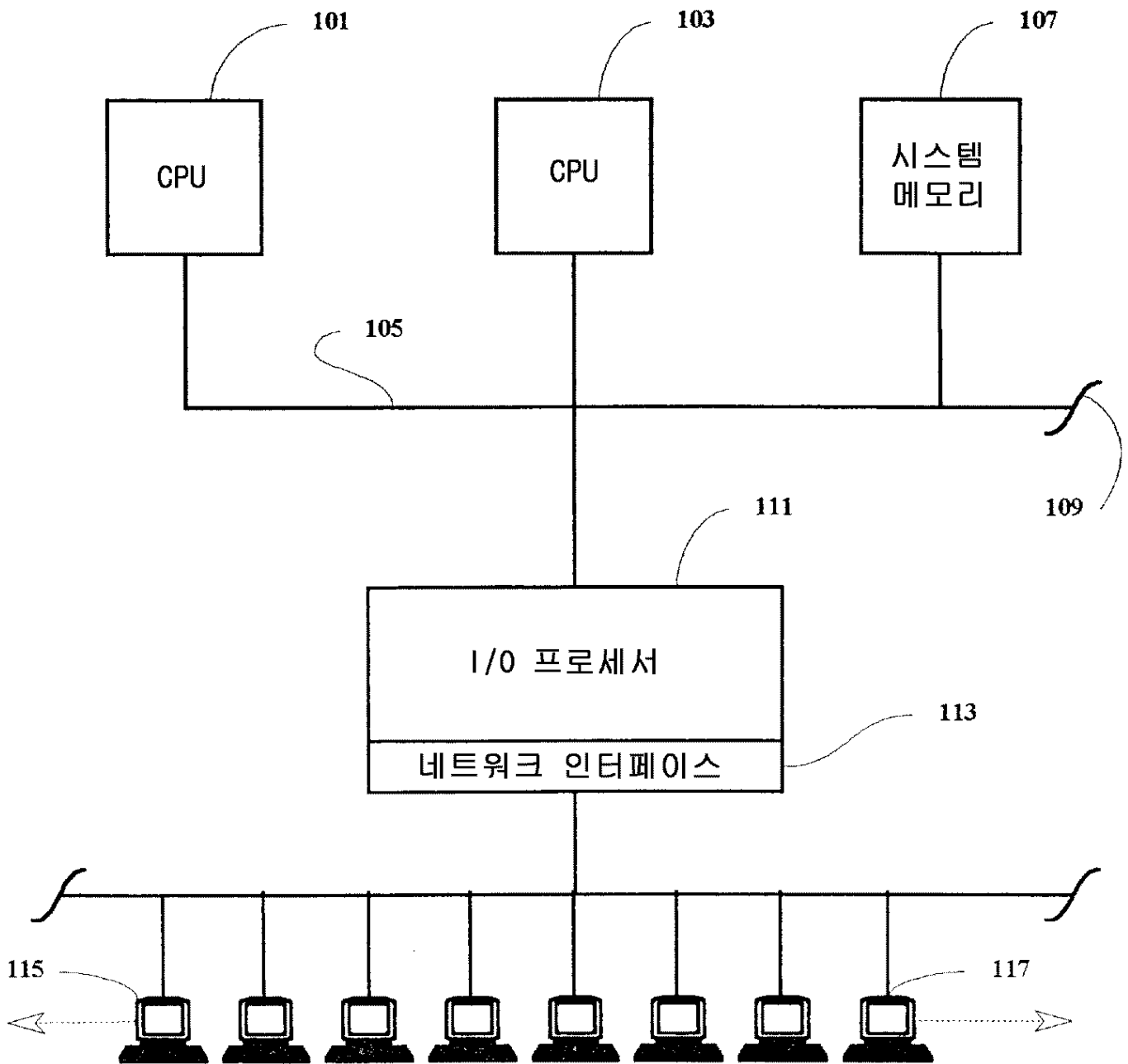
가

14.

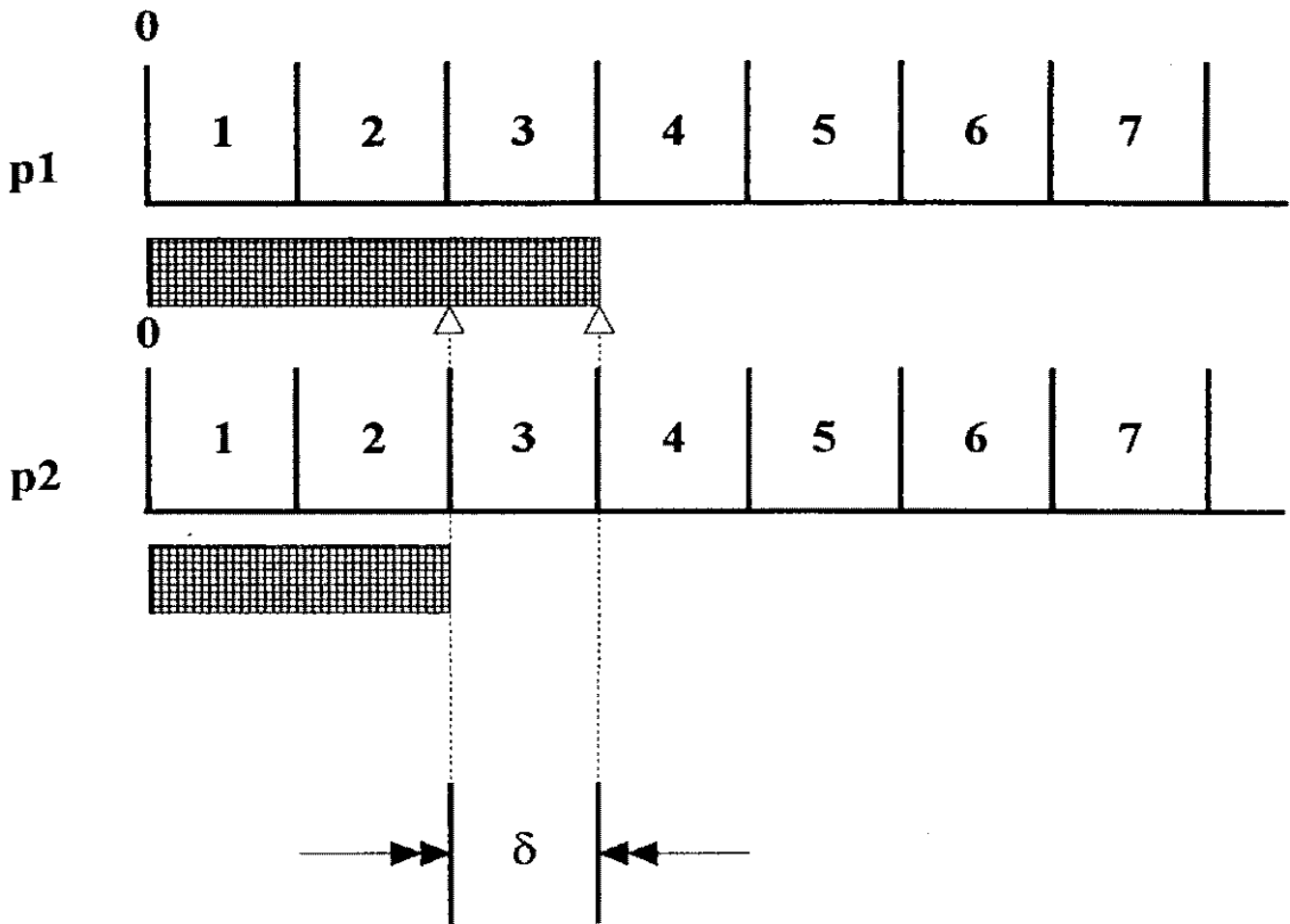
13 ,

가

1



2



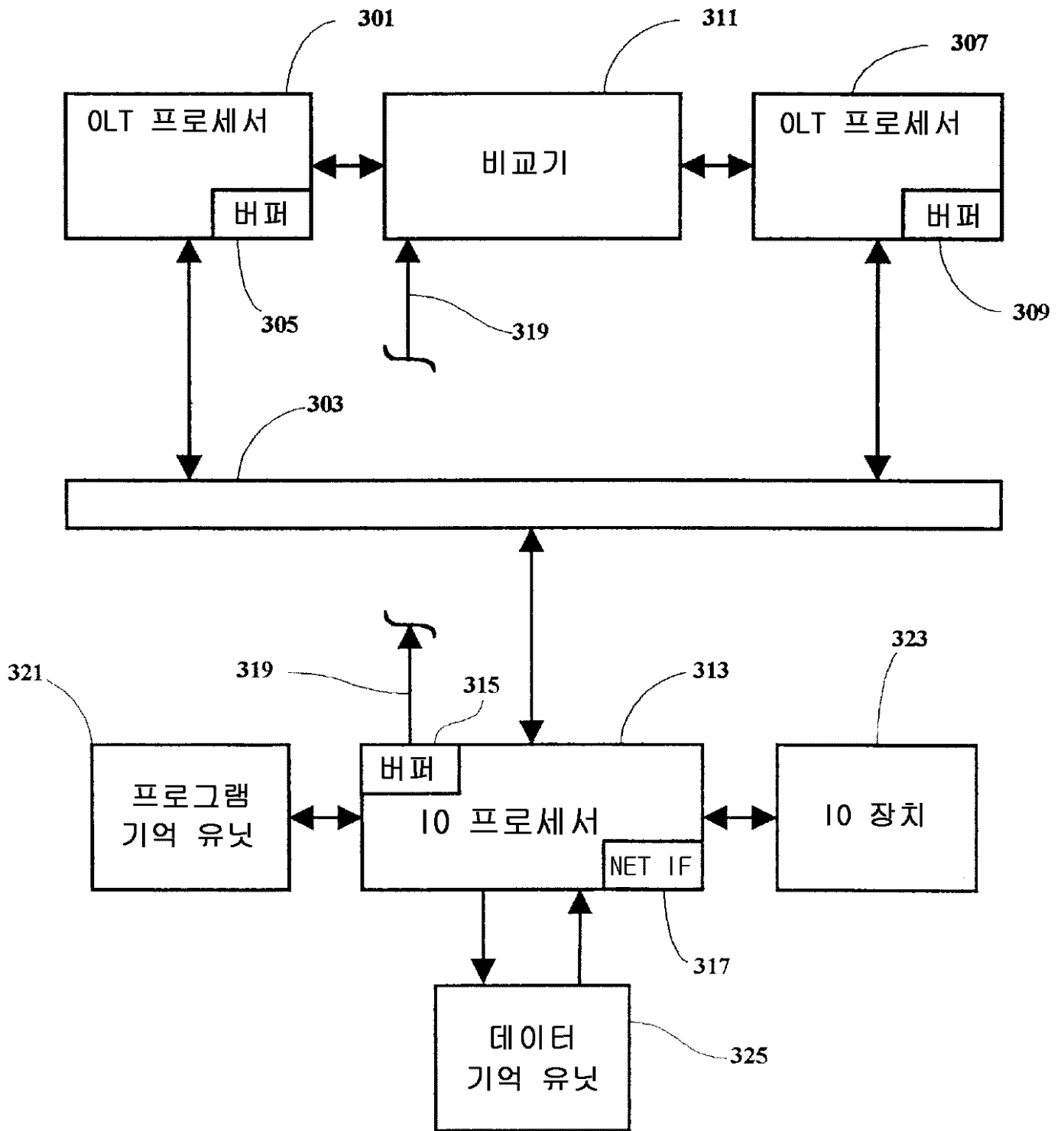
Time

↓

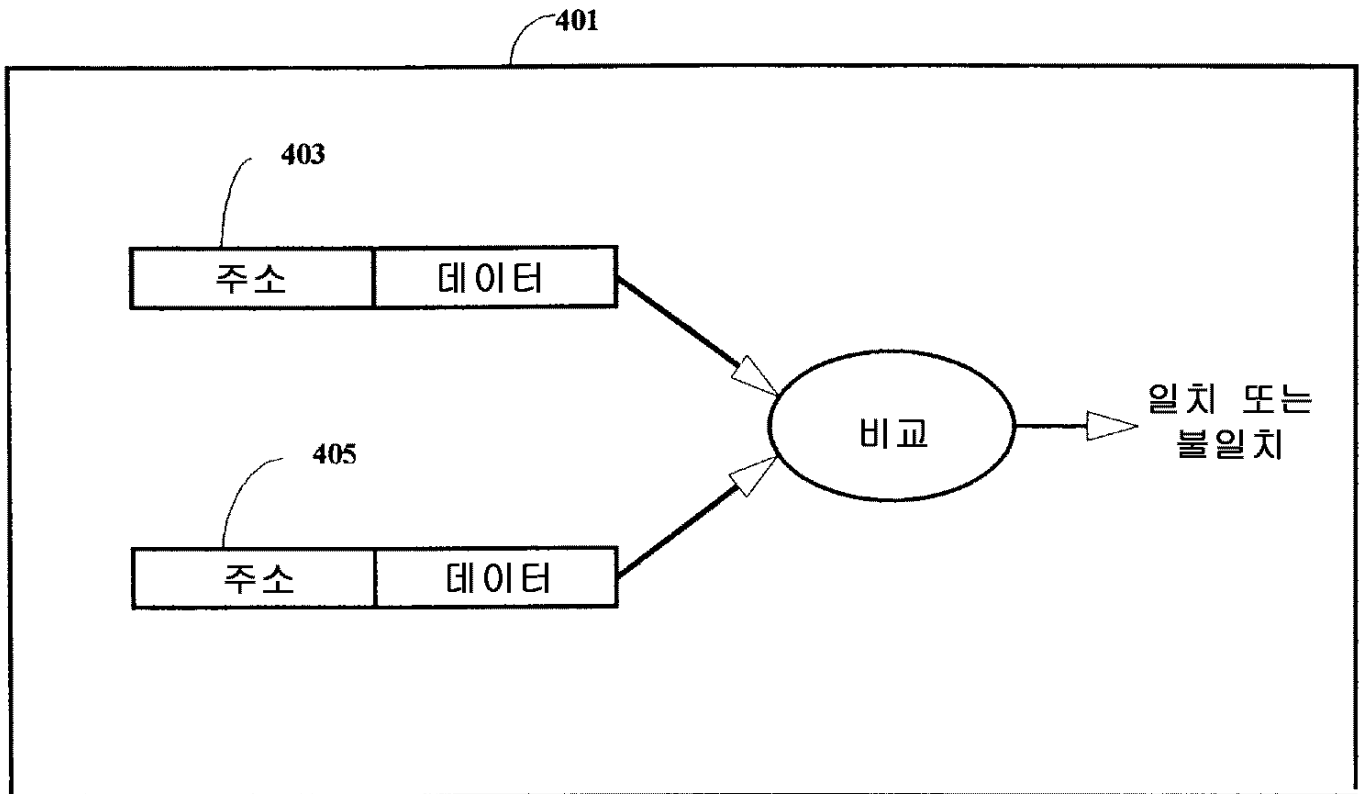
p2	p1
—	1
1	2
2	3
3	4
4	5
5	6
6	7

오류없음

3



4

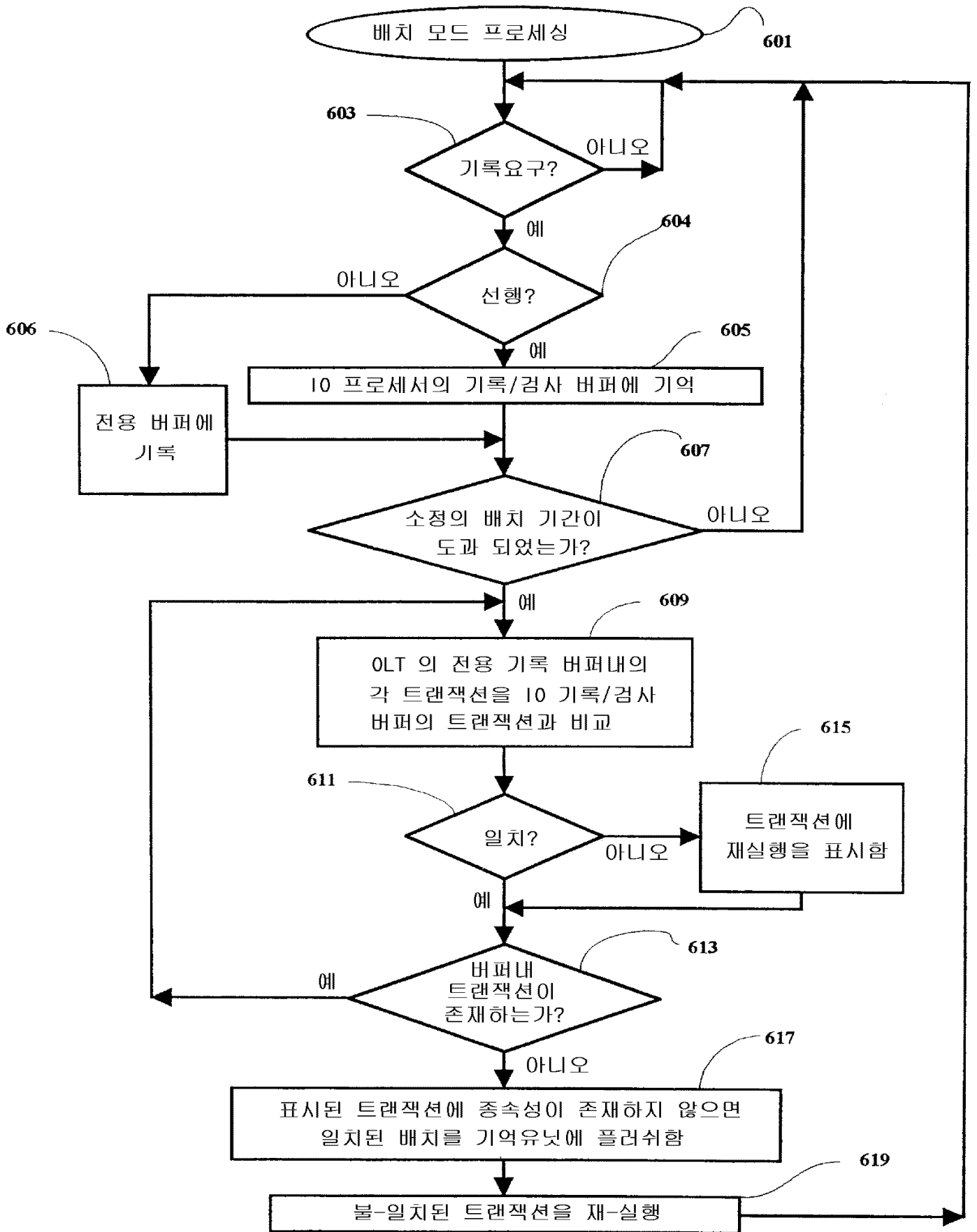


5

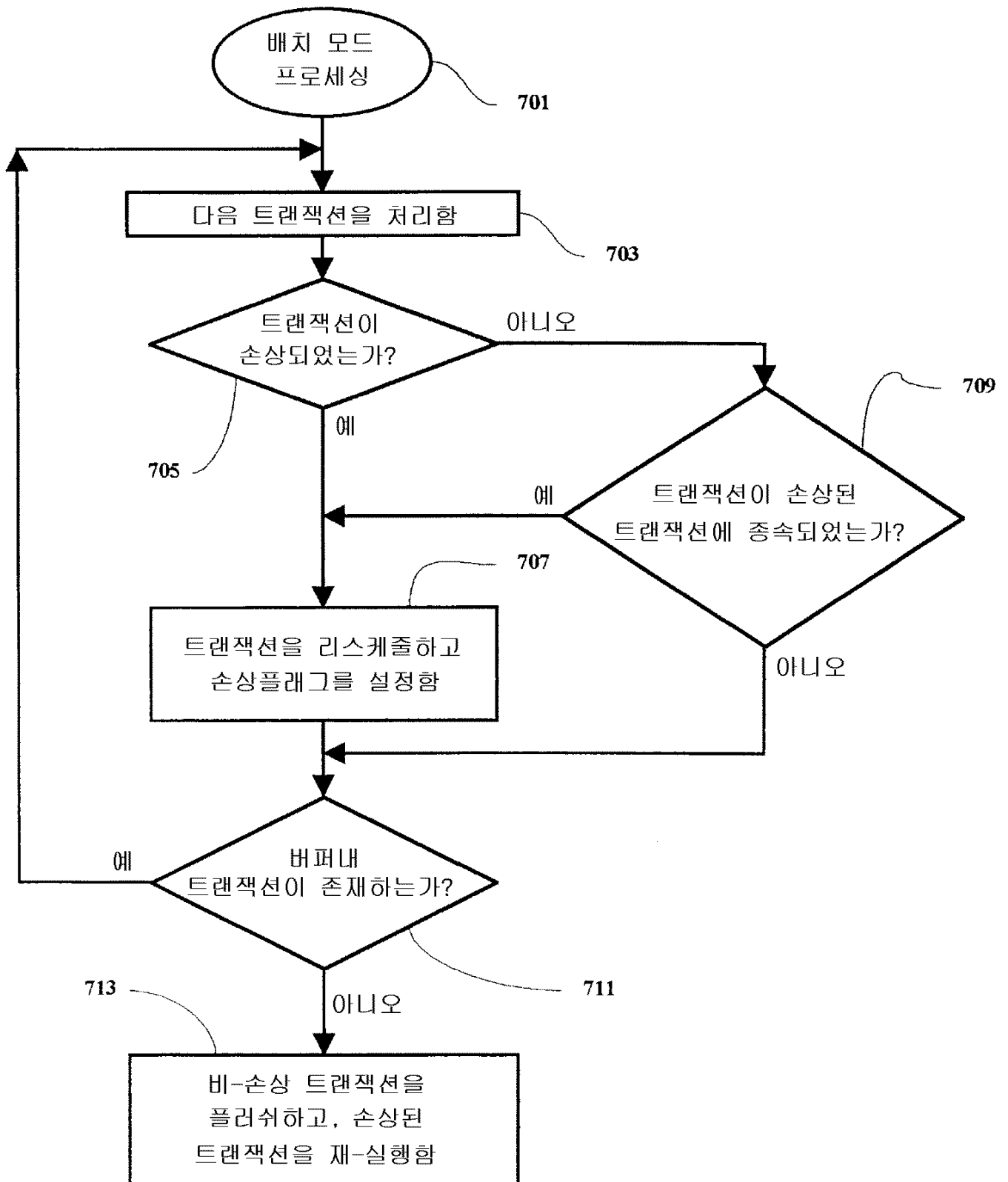
배치 트랜잭션

<u>TIME</u>	<u>프로그램 코드 1</u>	<u>프로그램 코드 2</u>
1	READ (A)	NO OP.
2	TRANSFORM (T,A)	READ (A)
3	WRITE (A)	TRANSFORM (T,A)
4	READ (B)**	WRITE (A)
5	TRANSFORM (S,B)	READ (B)
6	READ (B)	TRANSFORM (S,B)
7	TRANSFORM (S,B)	WRITE (B)
8	WRITE (B)	READ (C)
9	READ (C)	TRANSFORM (U,C)
10	TRANSFORM (U,C)	WRITE (C)
11	WRITE (C)	

6



7



8

배치 사이즈=10 트랜잭션

트랜잭션	증속성 태그	손상태그
1		
2		
3		
4		
5		
6	ON	
7		ON
8	ON	
9	ON	
10		

비-배치 트랜잭션

<u>TIME</u>	<u>프로그램 코드 1</u>	<u>프로그램 코드 2</u>
1	READ (A)	NO OP.
2	TRANSFORM (T,A)	READ (A)
3	WRITE (A)	TRANSFORM (T,A)
4	NO OP	WRITE (A)
5	READ (B)**	NO OP.
6	TRANSFORM (T,B)	READ (B)
7	READ (B)	TRANSFORM (T,B)
8	TRANSFORM (T,B)	WRITE (B)
9	WRITE (B)	NO OP.
10	NO OP	READ (C)
11	READ (C)	TRANSFORM (T,C)
12	TRANSFORM (T,C)	WRITE (C)
13	WRITE (C)	NO OP.