Conventional Art

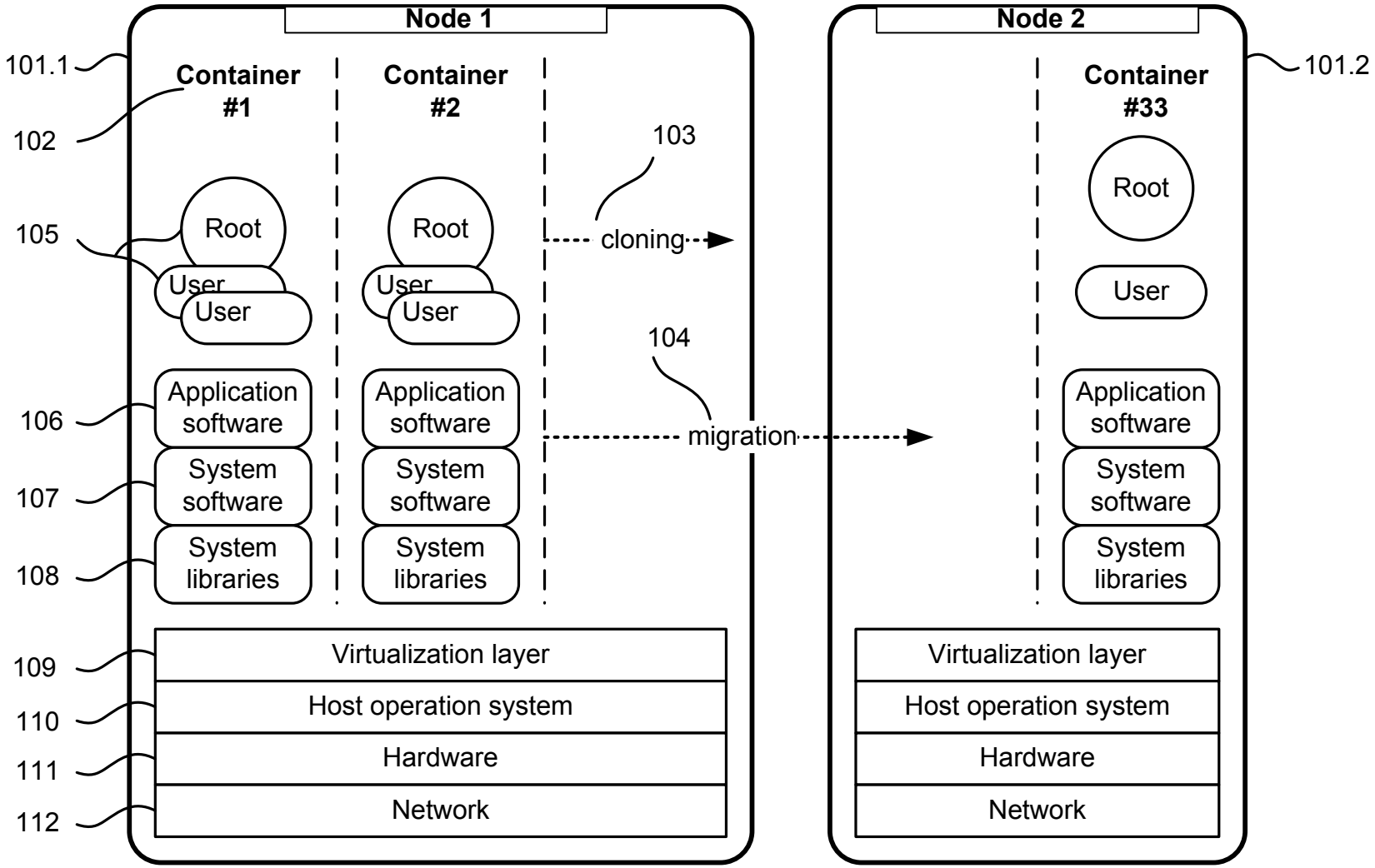

FIG. 1

Conventional Art

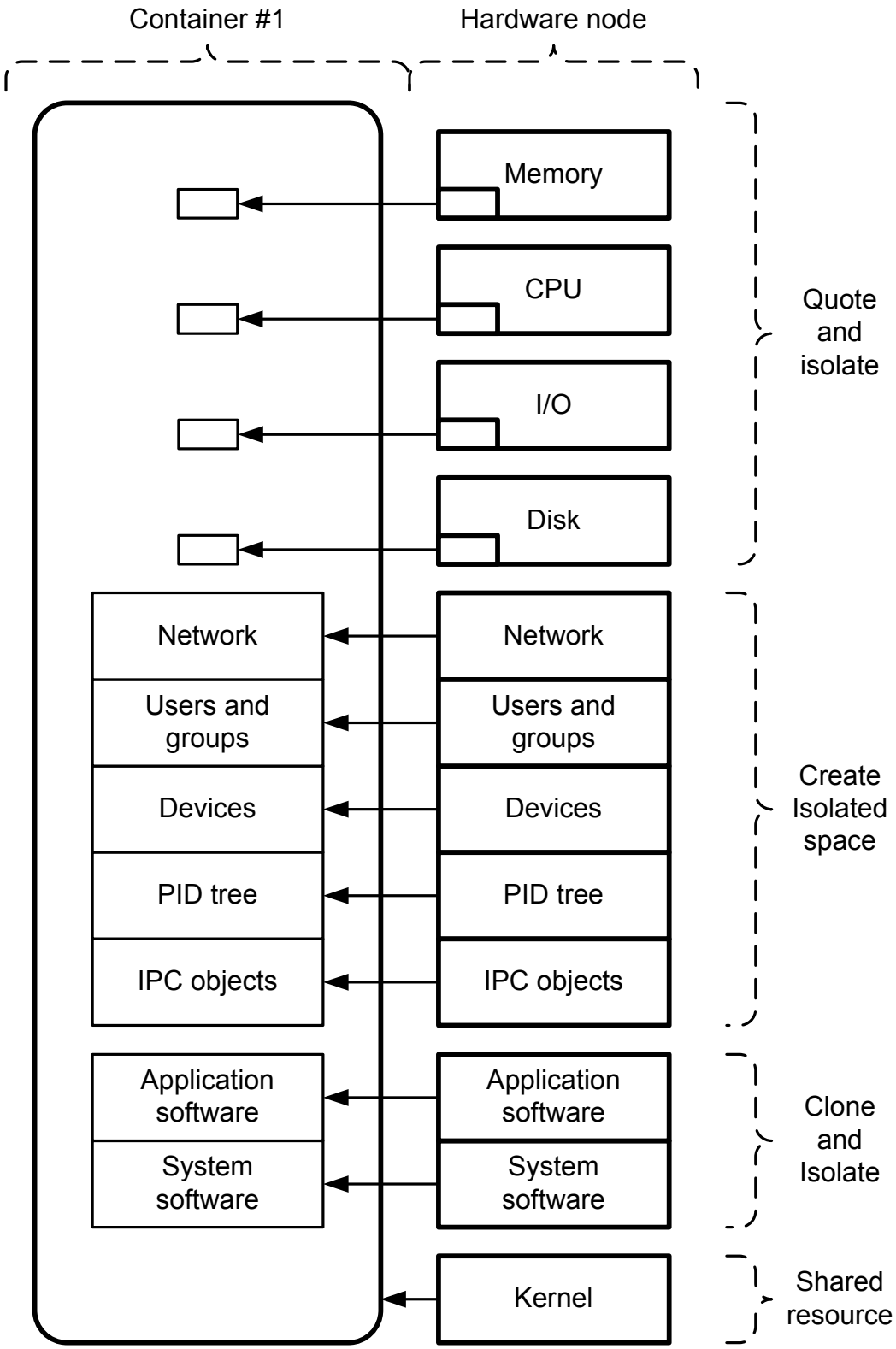

FIG. 2

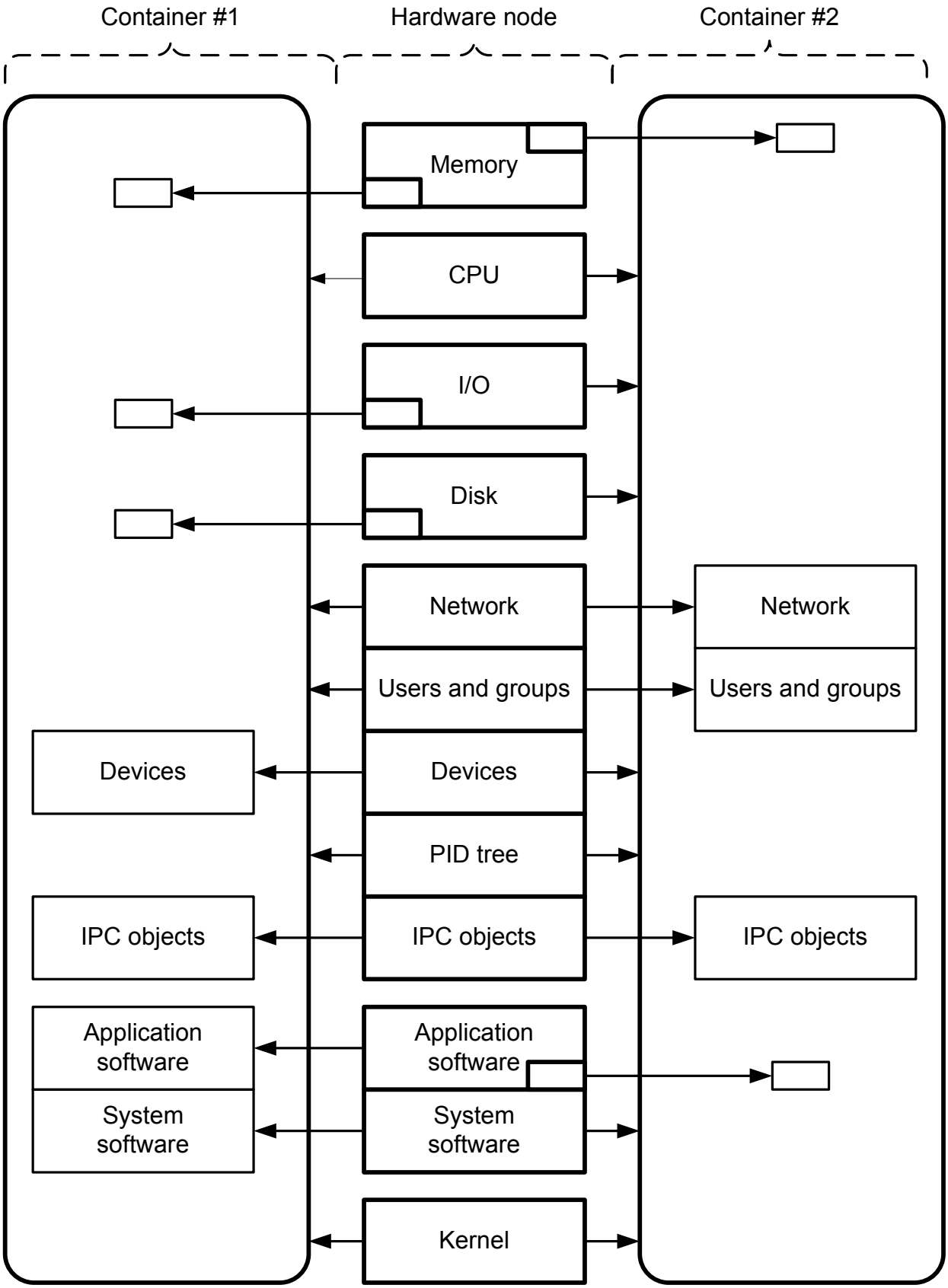
Container #1
Hardware node
Container #2
Memory
CPU
I/O
Disk
Network
Users and groups
Devices
PID tree
IPC objects
Application software
System software
Kernel
Network
Users and groups
IPC objects
Devices
IPC objects
Application software
System software

FIG. 3

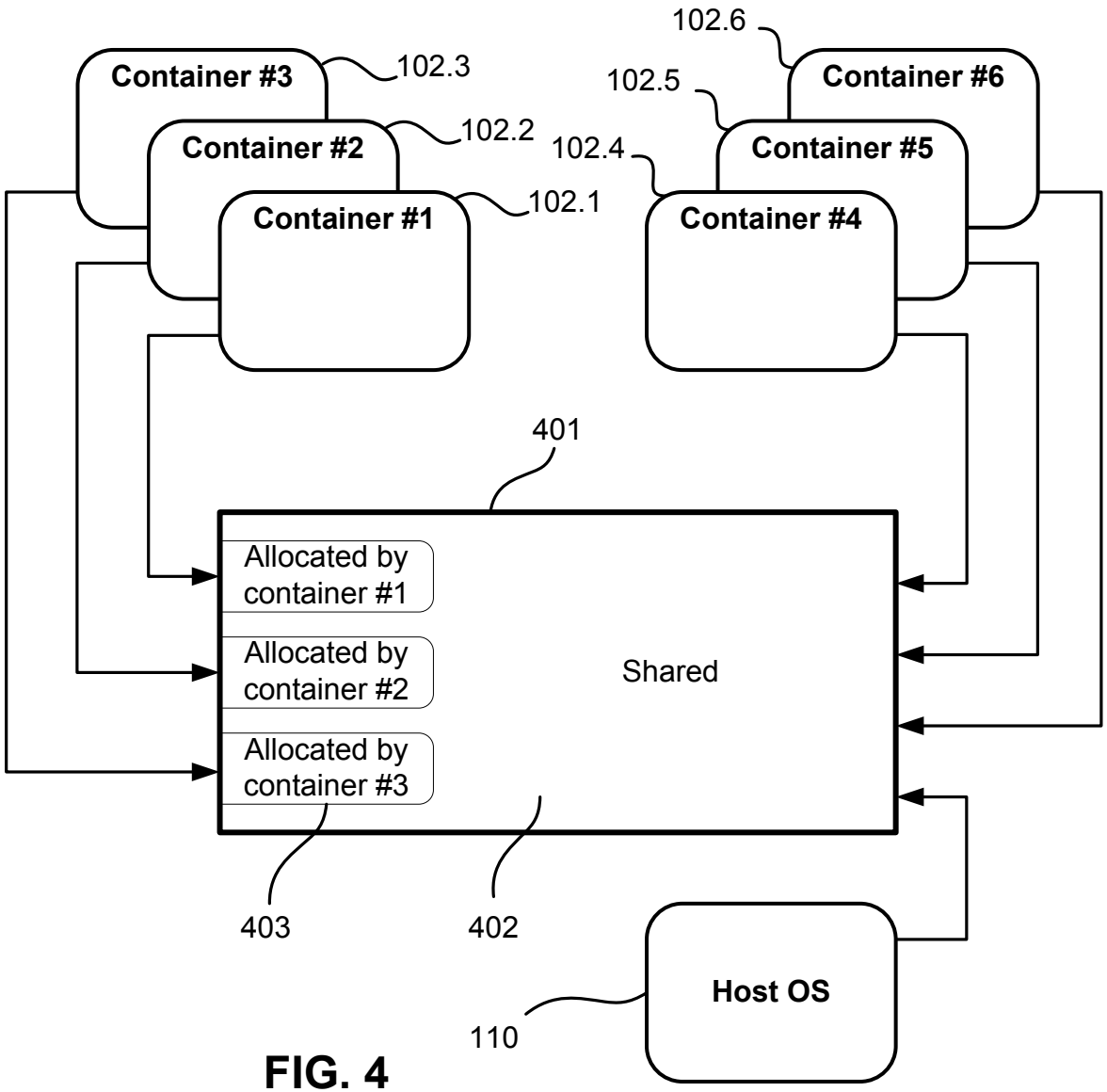
102.6
Container #3
102.3
102.5
Container #6
Container #2
102.2
102.4
Container #5
Container #1
102.1
Container #4
401
Allocated by container #1
Allocated by container #2
Allocated by container #3
Shared
403
402
Host OS
110

FIG. 4

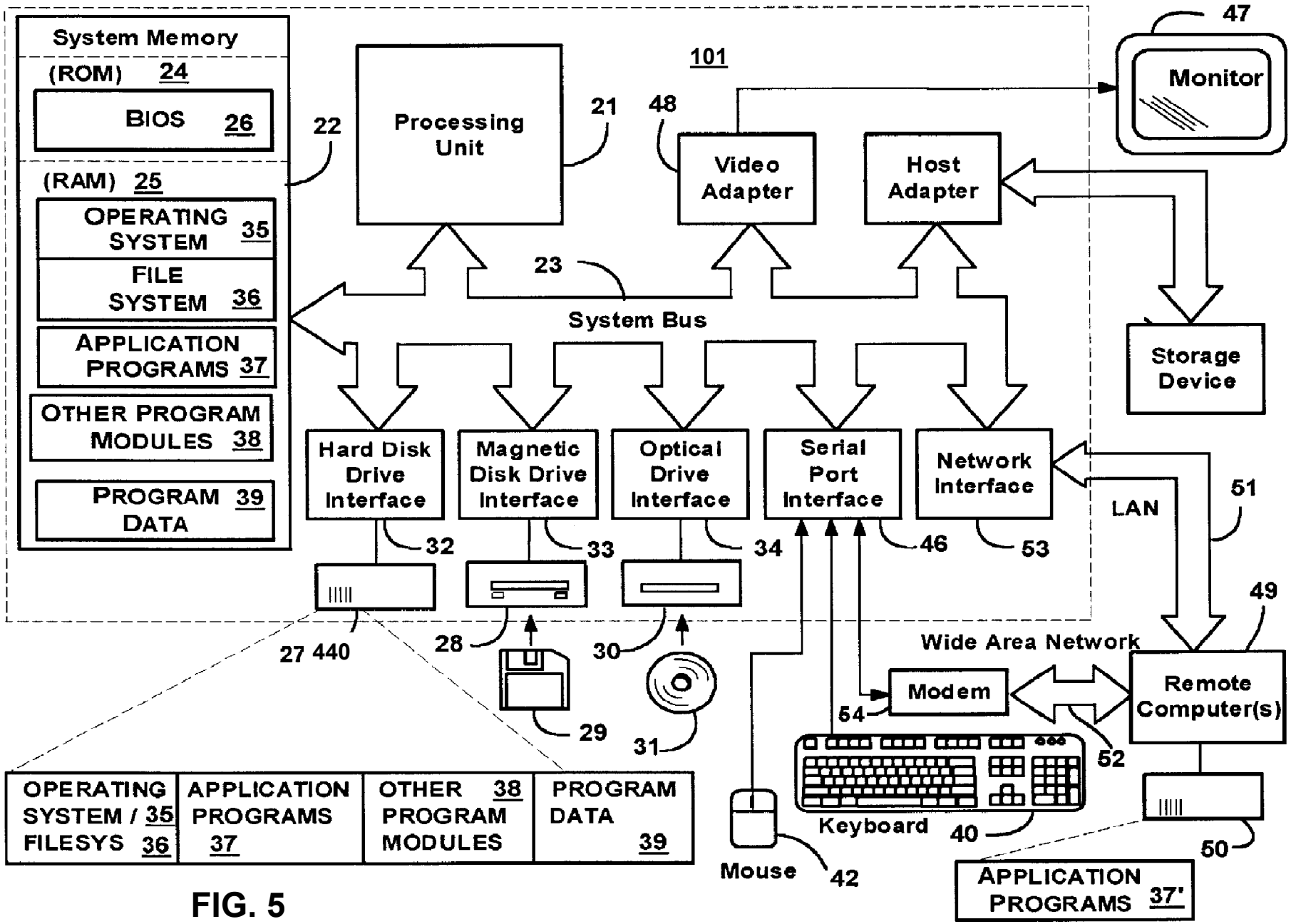
System Memory
(ROM) 24
BIOS 26
(RAM) 25
OPERATING SYSTEM 35
FILE SYSTEM 36
APPLICATION PROGRAMS 37
OTHER PROGRAM MODULES 38
PROGRAM DATA 39
22
Processing Unit
21
101
48
Video Adapter
Host Adapter
47
Monitor
23
System Bus
Storage Device
Hard Disk Drive Interface
Magnetic Disk Drive Interface
Optical Drive Interface
Serial Port Interface
Network Interface
LAN
51
32
33
34
46
53
49
27 440
28
30
Wide Area Network
Modem
Remote Computer(s)
54
52
29
31
Keyboard
40
50
Mouse
42
APPLICATION PROGRAMS 37'
OPERATING SYSTEM / 35 FILESYS 36
APPLICATION PROGRAMS 37
OTHER 38 PROGRAM MODULES
PROGRAM DATA 39

FIG. 5

```
~# cat /proc/user_beancounters
Version: 2.5
       uid  resource                     held              maxheld              barrier                limit              failcnt
      221:  kmemsize                 10480883             10523454   9223372036854775807   9223372036854775807            0
            lockedpages                    0                    0   9223372036854775807   9223372036854775807            0
            privvmpages               134181               134222   9223372036854775807   9223372036854775807            0
            shmpages                     671                  671   9223372036854775807   9223372036854775807            0
            dummy                          0                    0   9223372036854775807   9223372036854775807            0
            numproc                       37                   37                 32567                 32567            0
            physpages                  42347                42355   9223372036854775807   9223372036854775807            0
            vmguarpages                    0                    0   9223372036854775807   9223372036854775807            0
            oomguarpages               42347                42355   9223372036854775807   9223372036854775807            0
            numtcpsock                     7                    7   9223372036854775807   9223372036854775807            0
            numflock                       8                    8   9223372036854775807   9223372036854775807            0
            numpty                         1                    1                   255                   255            0
            numsiginfo                     0                    1                  1024                  1024            0
            tcpsndbuf                 124856               124856   9223372036854775807   9223372036854775807            0
            tcprcvbuf                 114688               114688   9223372036854775807   9223372036854775807            0
            othersockbuf               11640                11640   9223372036854775807   9223372036854775807            0
            dgramrcvbuf                    0                    0   9223372036854775807   9223372036854775807            0
            numothersock                  13                   14   9223372036854775807   9223372036854775807            0
            dcachesize                2160639              2164395   9223372036854775807   9223372036854775807            0
            numfile                      3043                 3044   9223372036854775807   9223372036854775807            0
            dummy                          0                    0                     0                     0            0
            dummy                          0                    0                     0                     0            0
            dummy                          0                    0                     0                     0            0
            numiptent                     10                   10   9223372036854775807   9223372036854775807            0
```

FIG. 6

Conventional Art

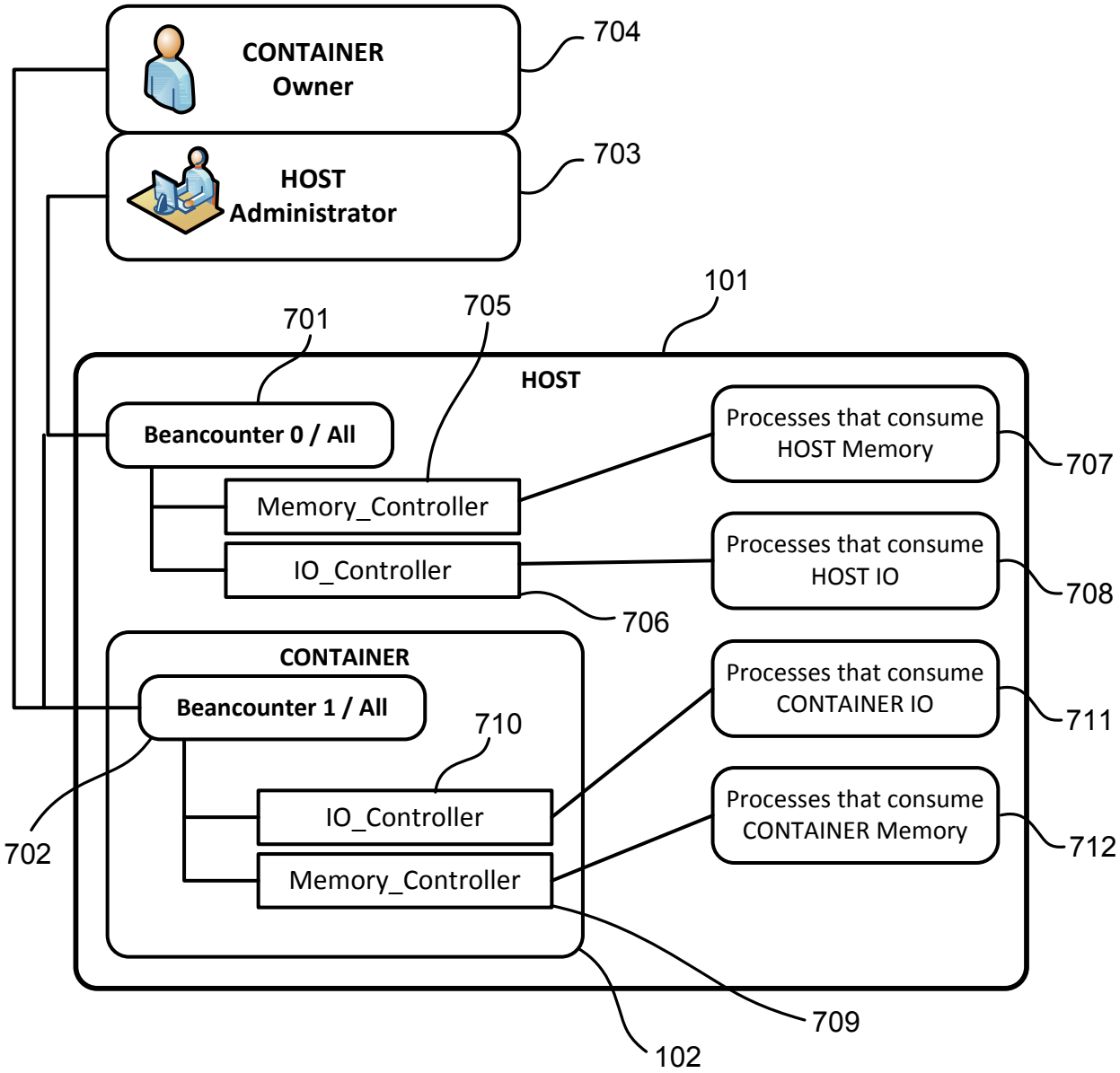

FIG. 7

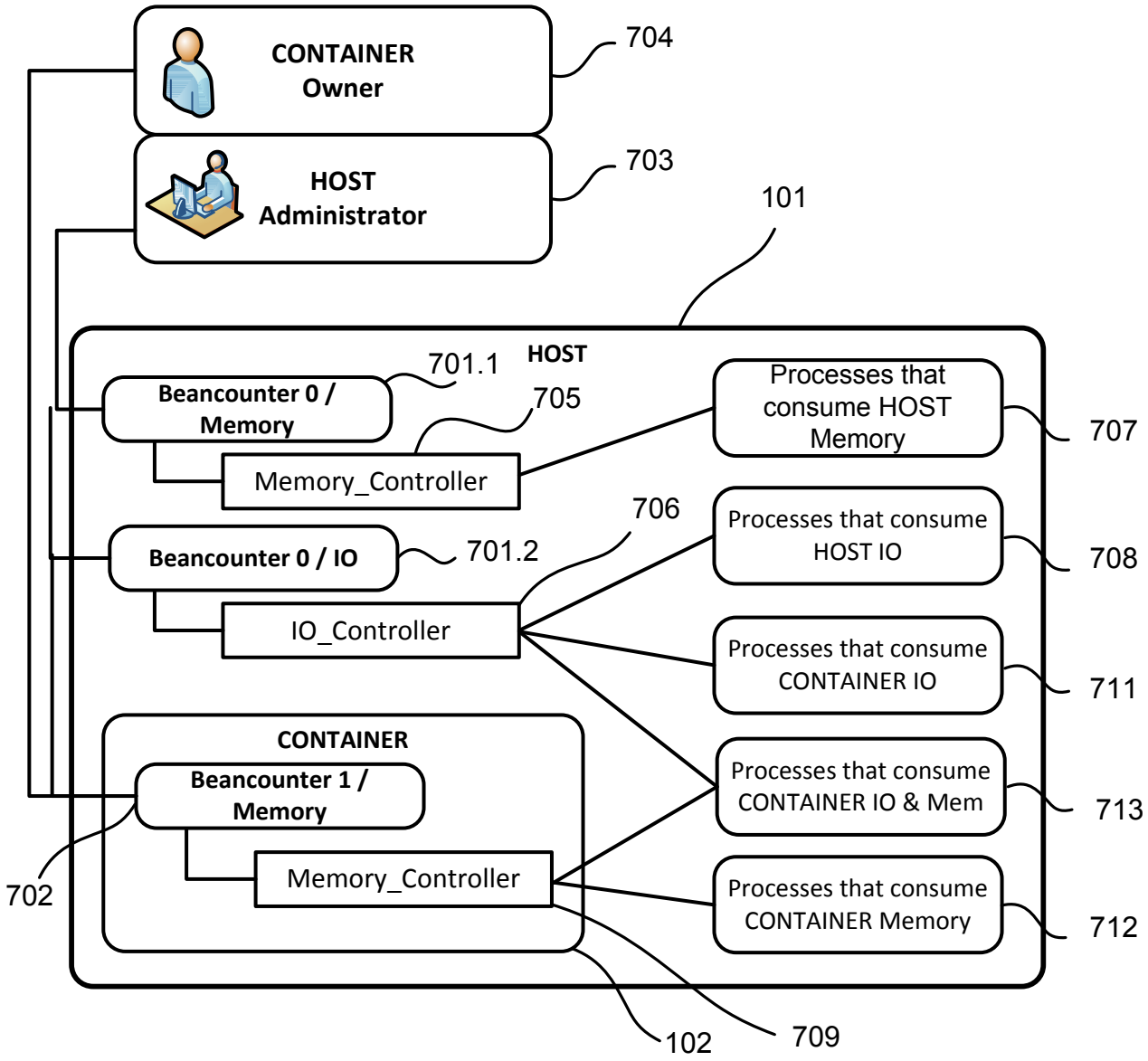
CONTAINER
Owner
704
HOST
Administrator
703
101
HOST
701.1
Beancounter 0 /
Memory
705
Memory_Controller
706
Beancounter 0 / IO
701.2
IO_Controller
CONTAINER
Beancounter 1 /
Memory
Memory_Controller
702
Processes that
consume HOST
Memory
707
Processes that consume
HOST IO
708
Processes that consume
CONTAINER IO
711
Processes that consume
CONTAINER IO & Mem
713
Processes that consume
CONTAINER Memory
712
102
709

FIG. 8

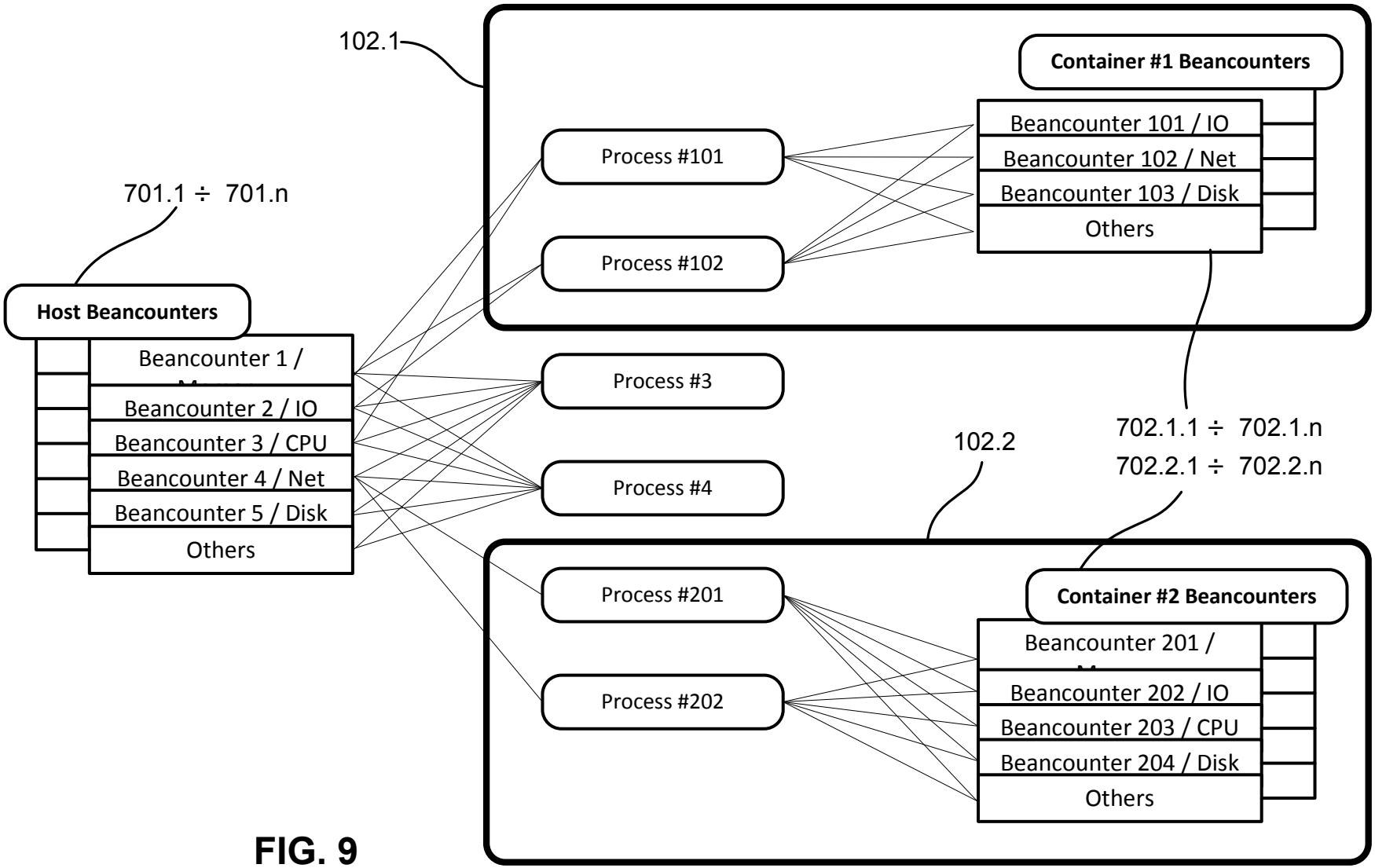
102.1
Container #1 Beancounters
Beancounter 101 / IO
Beancounter 102 / Net
Beancounter 103 / Disk
Others
Process #101
Process #102
701.1 ÷ 701.n
Host Beancounters
Beancounter 1 /
Beancounter 2 / IO
Beancounter 3 / CPU
Beancounter 4 / Net
Beancounter 5 / Disk
Others
Process #3
Process #4
102.2
702.1.1 ÷ 702.1.n
702.2.1 ÷ 702.2.n
Process #201
Process #202
Container #2 Beancounters
Beancounter 201 /
Beancounter 202 / IO
Beancounter 203 / CPU
Beancounter 204 / Disk
Others

FIG. 9