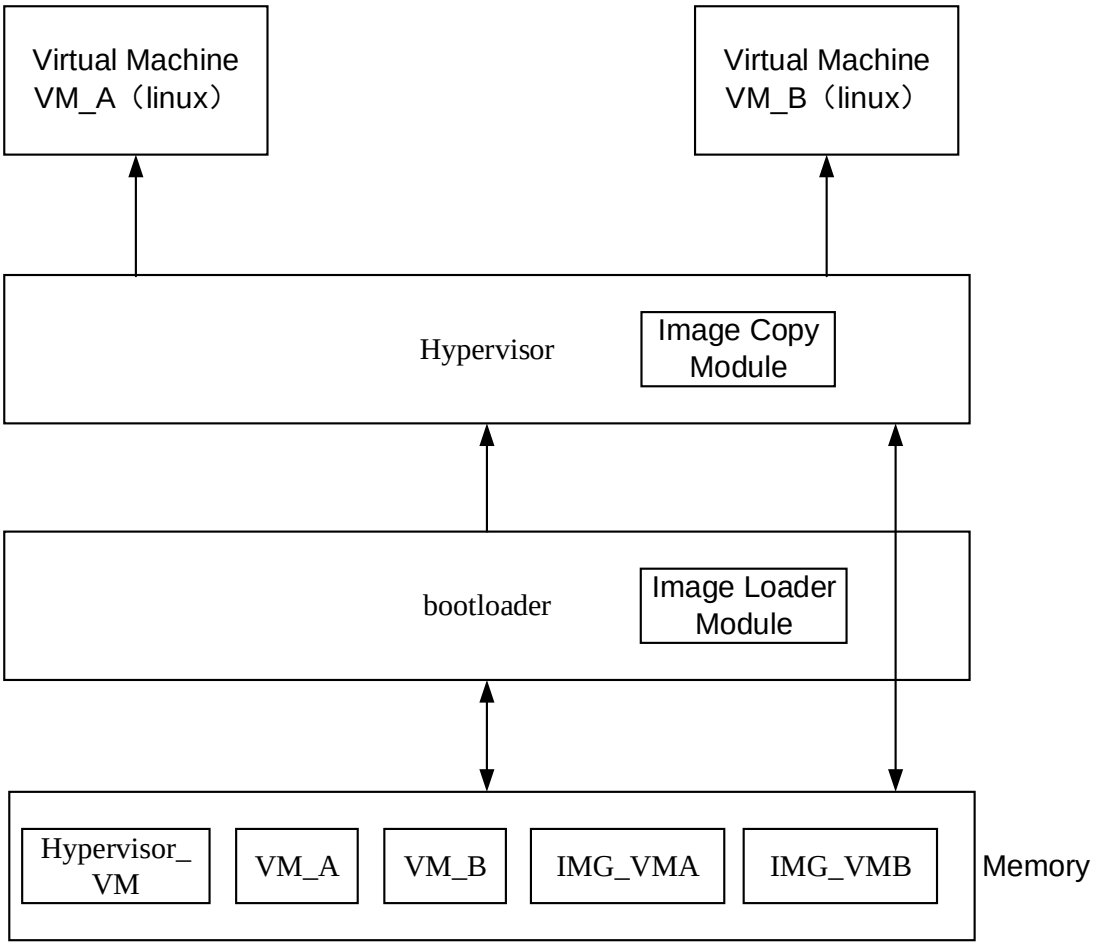
Virtual Machine
VM_A（linux）
Virtual Machine
VM_B（linux）
Hypervisor
Image Copy
Module
bootloader
Image Loader
Module
Hypervisor_
VM
VM_A
VM_B
IMG_VMA
IMG_VMB
Memory

FIG. 1

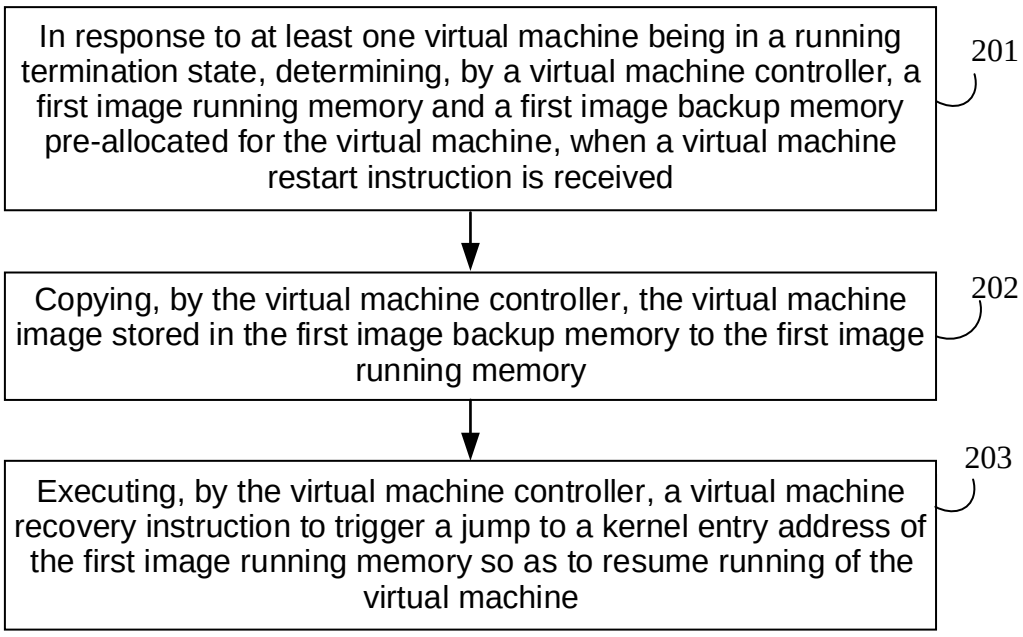
In response to at least one virtual machine being in a running termination state, determining, by a virtual machine controller, a first image running memory and a first image backup memory pre-allocated for the virtual machine, when a virtual machine restart instruction is received
201
Copying, by the virtual machine controller, the virtual machine image stored in the first image backup memory to the first image running memory
202
Executing, by the virtual machine controller, a virtual machine recovery instruction to trigger a jump to a kernel entry address of the first image running memory so as to resume running of the virtual machine
203

FIG. 2

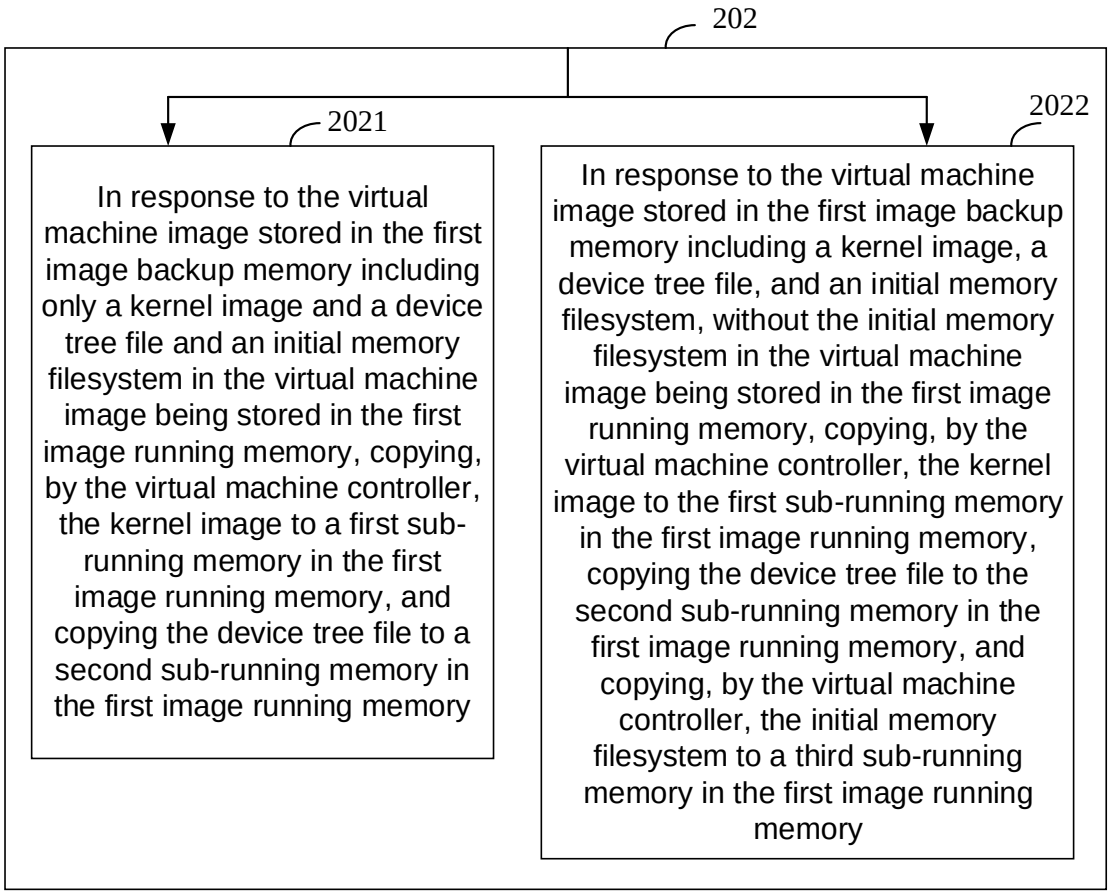
202
2021
In response to the virtual machine image stored in the first image backup memory including only a kernel image and a device tree file and an initial memory filesystem in the virtual machine image being stored in the first image running memory, copying, by the virtual machine controller, the kernel image to a first sub-running memory in the first image running memory, and copying the device tree file to a second sub-running memory in the first image running memory
2022
In response to the virtual machine image stored in the first image backup memory including a kernel image, a device tree file, and an initial memory filesystem, without the initial memory filesystem in the virtual machine image being stored in the first image running memory, copying, by the virtual machine controller, the kernel image to the first sub-running memory in the first image running memory, copying the device tree file to the second sub-running memory in the first image running memory, and copying, by the virtual machine controller, the initial memory filesystem to a third sub-running memory in the first image running memory

FIG. 3

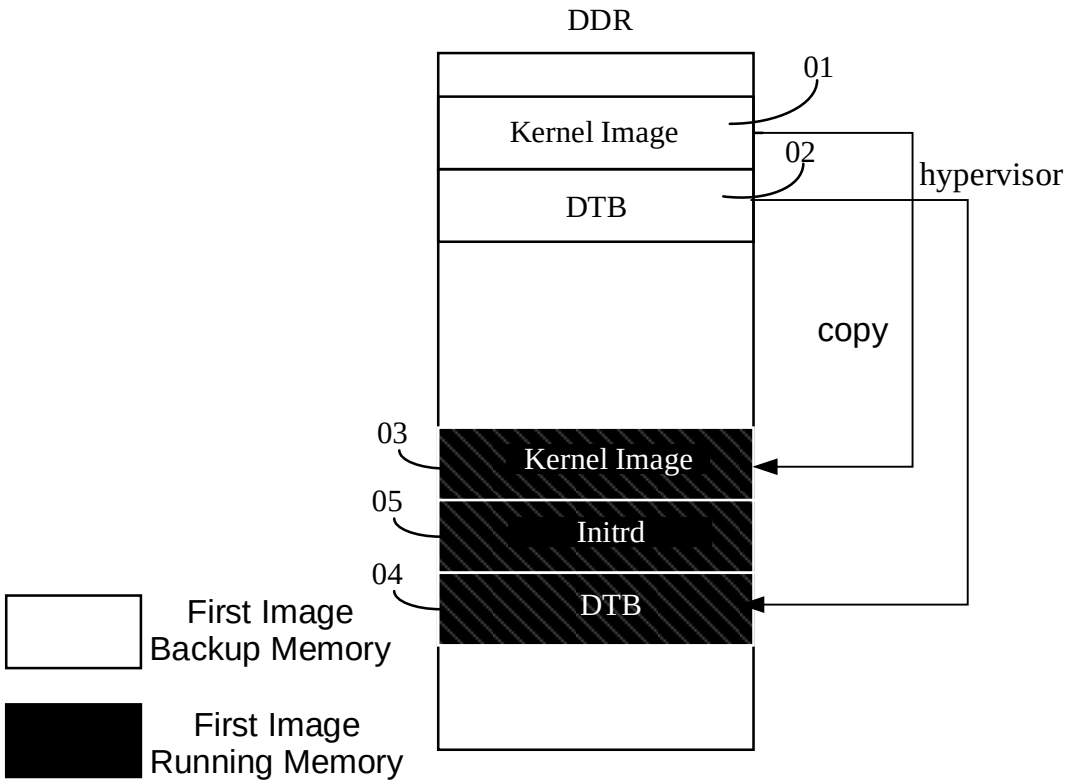
DDR
01
Kernel Image
02
hypervisor
DTB
copy
03
Kernel Image
05
Initrd
04
DTB
First Image
Backup Memory
First Image
Running Memory

FIG. 4

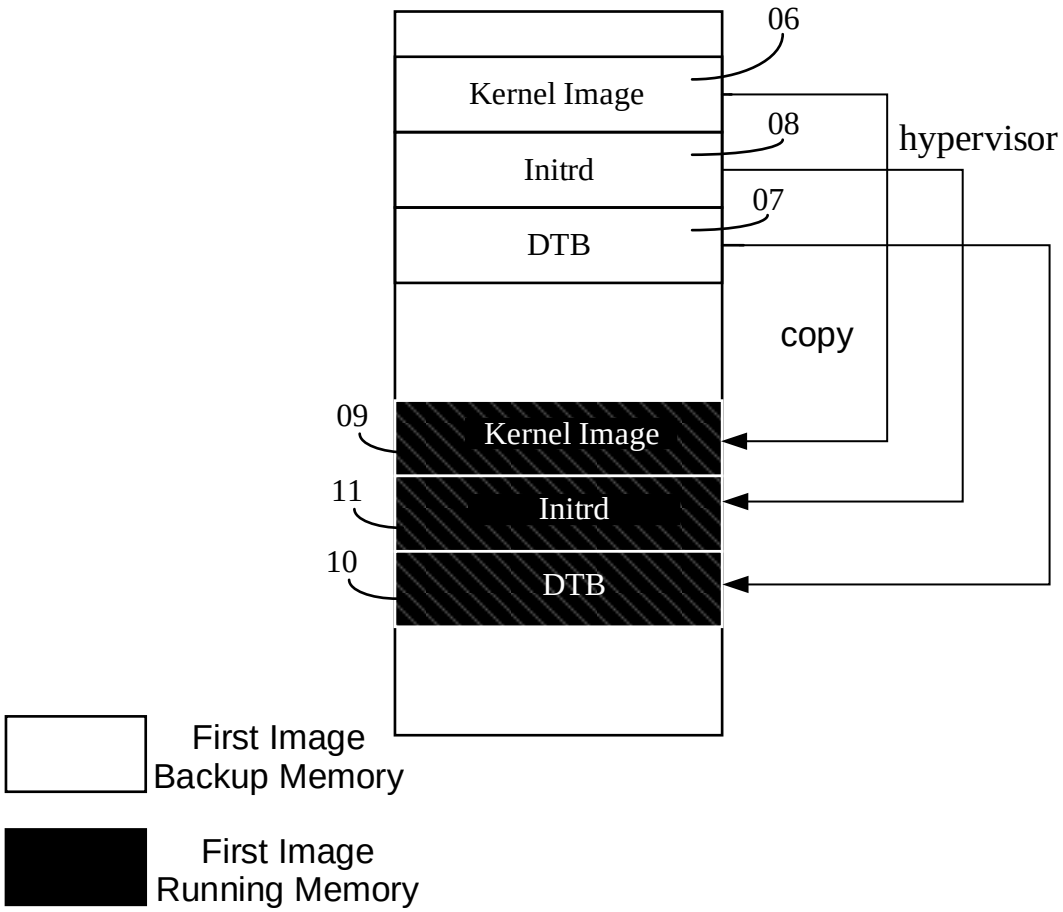
06
Kernel Image
08
Initrd
07
DTB
hypervisor
copy
09
Kernel Image
11
Initrd
10
DTB
First Image
Backup Memory
First Image
Running Memory

FIG. 5

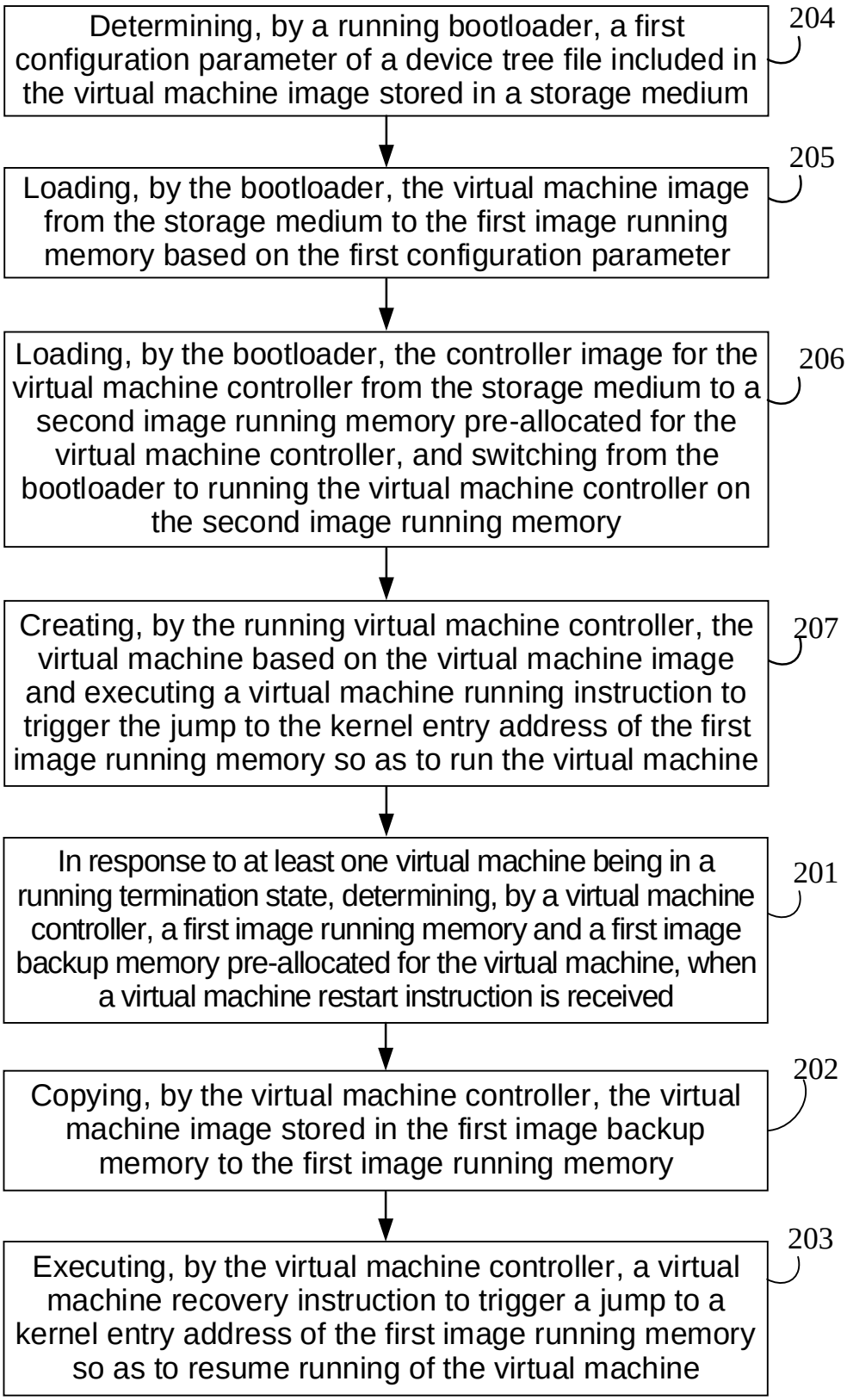
Determining, by a running bootloader, a first configuration parameter of a device tree file included in the virtual machine image stored in a storage medium
204
Loading, by the bootloader, the virtual machine image from the storage medium to the first image running memory based on the first configuration parameter
205
Loading, by the bootloader, the controller image for the virtual machine controller from the storage medium to a second image running memory pre-allocated for the virtual machine controller, and switching from the bootloader to running the virtual machine controller on the second image running memory
206
Creating, by the running virtual machine controller, the virtual machine based on the virtual machine image and executing a virtual machine running instruction to trigger the jump to the kernel entry address of the first image running memory so as to run the virtual machine
207
In response to at least one virtual machine being in a running termination state, determining, by a virtual machine controller, a first image running memory and a first image backup memory pre-allocated for the virtual machine, when a virtual machine restart instruction is received
201
Copying, by the virtual machine controller, the virtual machine image stored in the first image backup memory to the first image running memory
202
Executing, by the virtual machine controller, a virtual machine recovery instruction to trigger a jump to a kernel entry address of the first image running memory so as to resume running of the virtual machine
203

FIG. 6

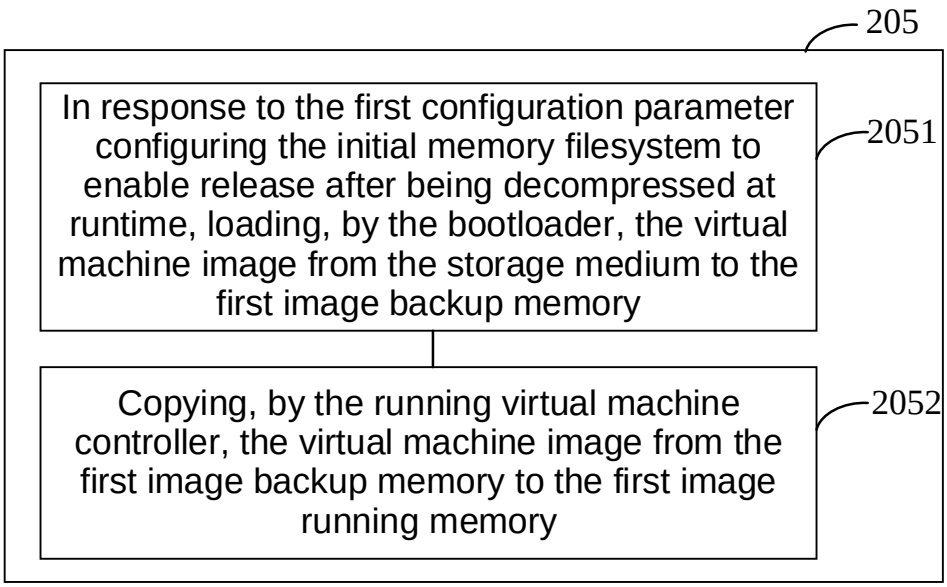
205
In response to the first configuration parameter configuring the initial memory filesystem to enable release after being decompressed at runtime, loading, by the bootloader, the virtual machine image from the storage medium to the first image backup memory
2051
Copying, by the running virtual machine controller, the virtual machine image from the first image backup memory to the first image running memory
2052

FIG. 7

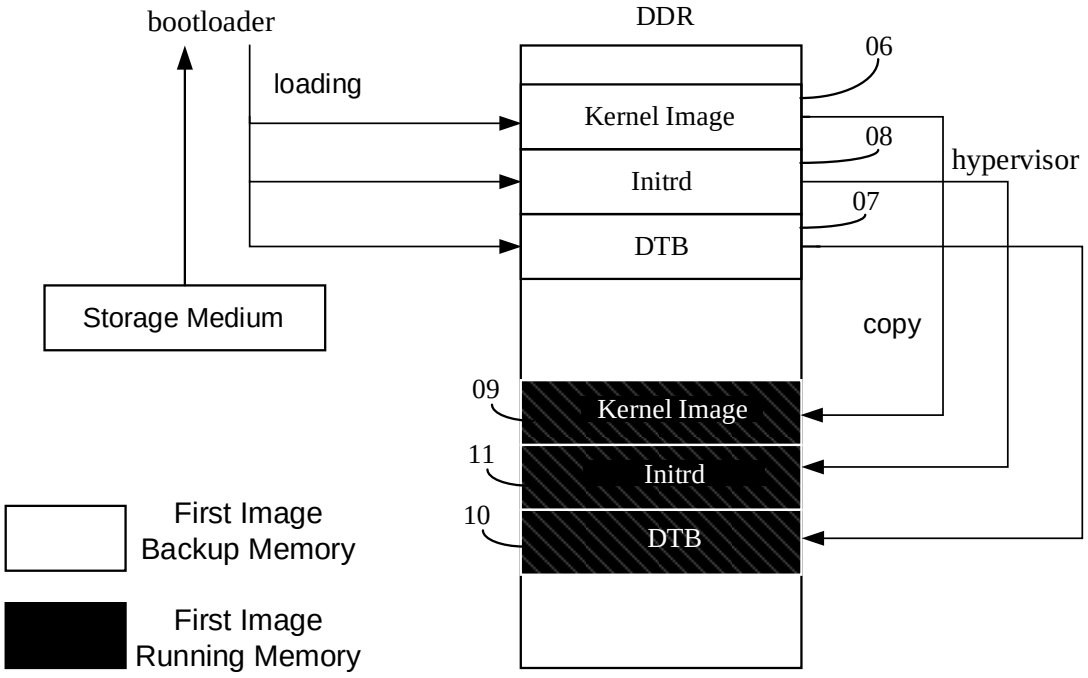
bootloader
DDR
06
loading
Kernel Image
08
hypervisor
Initrd
07
DTB
Storage Medium
copy
09
Kernel Image
11
Initrd
10
DTB
First Image Backup Memory
First Image Running Memory

FIG. 8

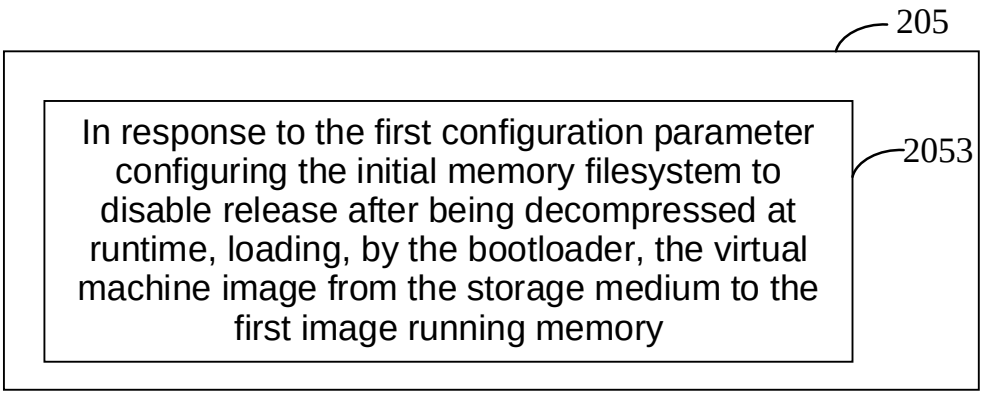
205
In response to the first configuration parameter configuring the initial memory filesystem to disable release after being decompressed at runtime, loading, by the bootloader, the virtual machine image from the storage medium to the first image running memory
2053

FIG. 9

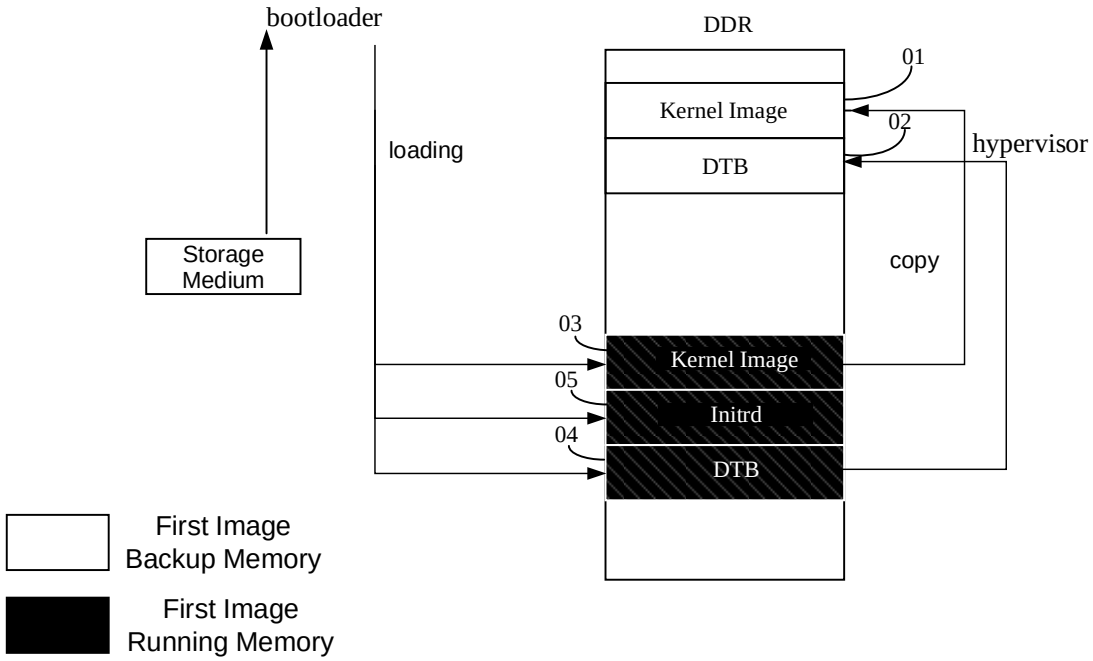
bootloader
DDR
01
Kernel Image
02
hypervisor
loading
DTB
Storage Medium
copy
03
Kernel Image
05
Initrd
04
DTB
First Image Backup Memory
First Image Running Memory

FIG. 10

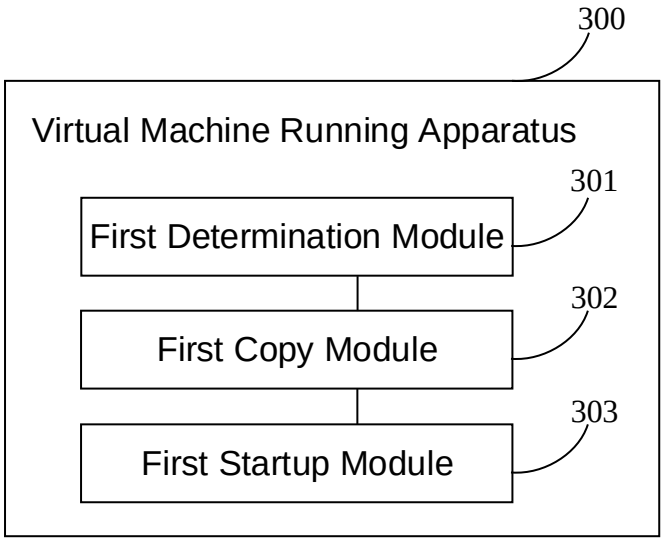
300
Virtual Machine Running Apparatus
301
First Determination Module
302
First Copy Module
303
First Startup Module

FIG. 11

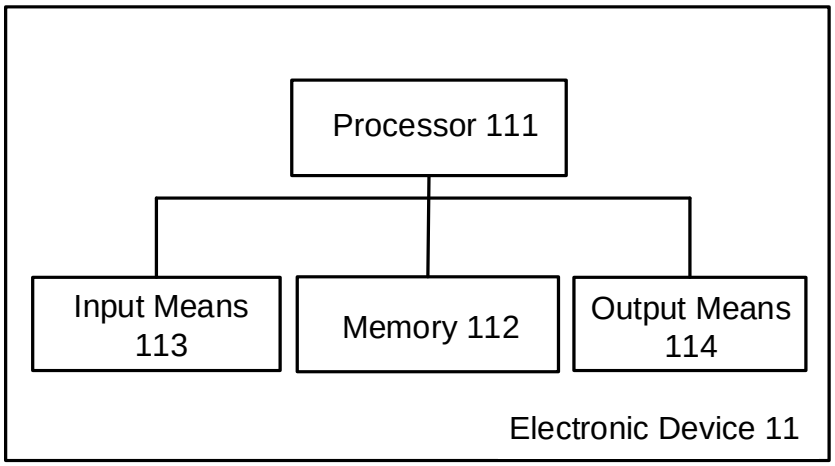
Processor 111
Input Means 113
Memory 112
Output Means 114
Electronic Device 11

FIG. 12