US007831739B2

(12) **United States Patent**

Lambeth et al.

(10) Patent No.: **US 7,831,739 B2**
(45) Date of Patent: ***Nov. 9, 2010**

(54) **PARTIAL COPYING OF DATA TO TRANSMIT BUFFER FOR VIRTUAL NETWORK DEVICE**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **12/639,590**

(22) Filed: **Dec. 16, 2009**

(65) **Prior Publication Data**

US 2010/0095045 A1   Apr. 15, 2010

Related U.S. Application Data

(63) Continuation of application No. 11/565,029, filed on Nov. 30, 2006, now Pat. No. 7,657,659.

(51) **Int. Cl.**
G06F 15/173   (2006.01)

(52) **U.S. Cl.** **709/250**; 711/6; 718/1; 370/470; 370/471; 370/472; 370/473; 370/474

(58) **Field of Classification Search** 709/250; 711/6; 718/1; 370/470–474
See application file for complete search history.

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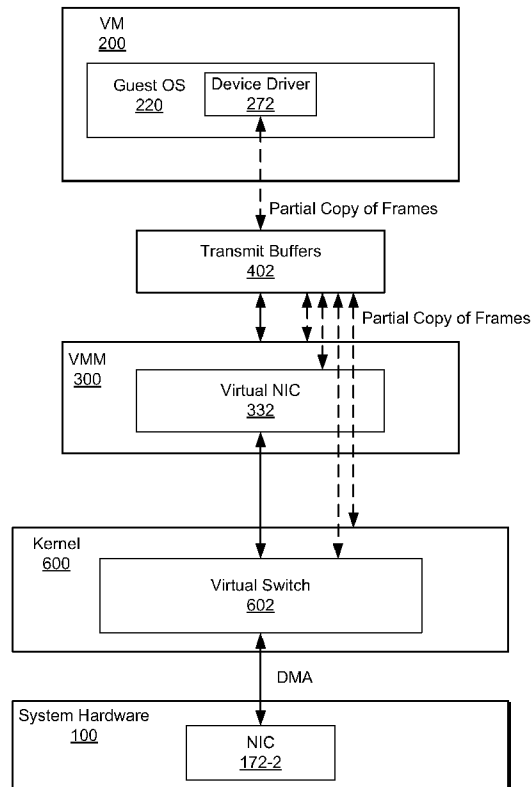*Primary Examiner*—Wing F Chan
Assistant Examiner—Hitesh Patel
(74) *Attorney, Agent, or Firm*—Terry McHugh

(57)   **ABSTRACT**

In a virtualized computer system, a network frame is transmitted from a virtual machine using a network interface device, possibly through a virtual switch, by copying only a part of the network frame to the transmit buffers that have pre-translated mappings from guest physical addresses to hypervisor virtual addresses and to machine addresses. The length of the part of the network frame that is copied to the transmit buffers may be variable.
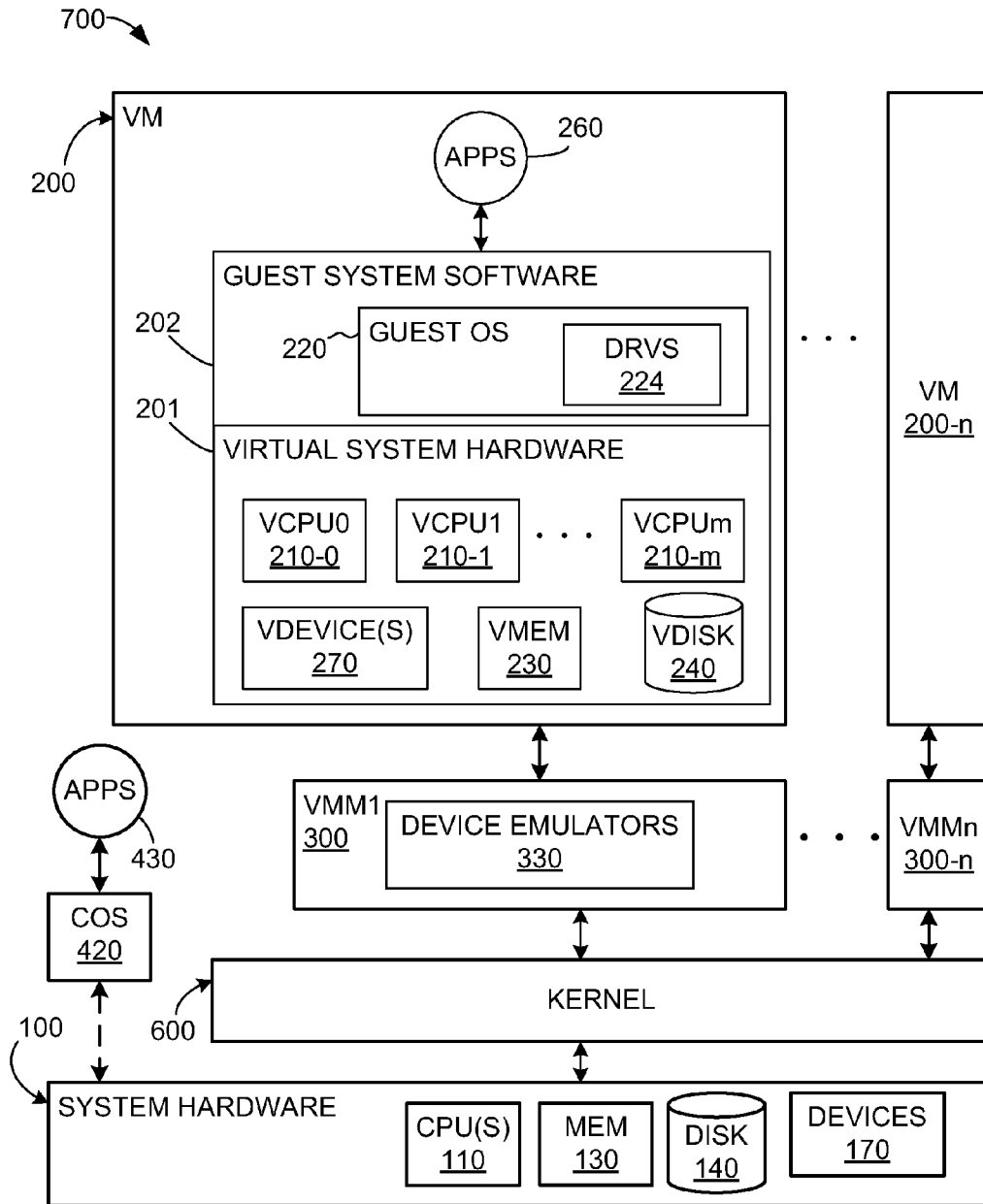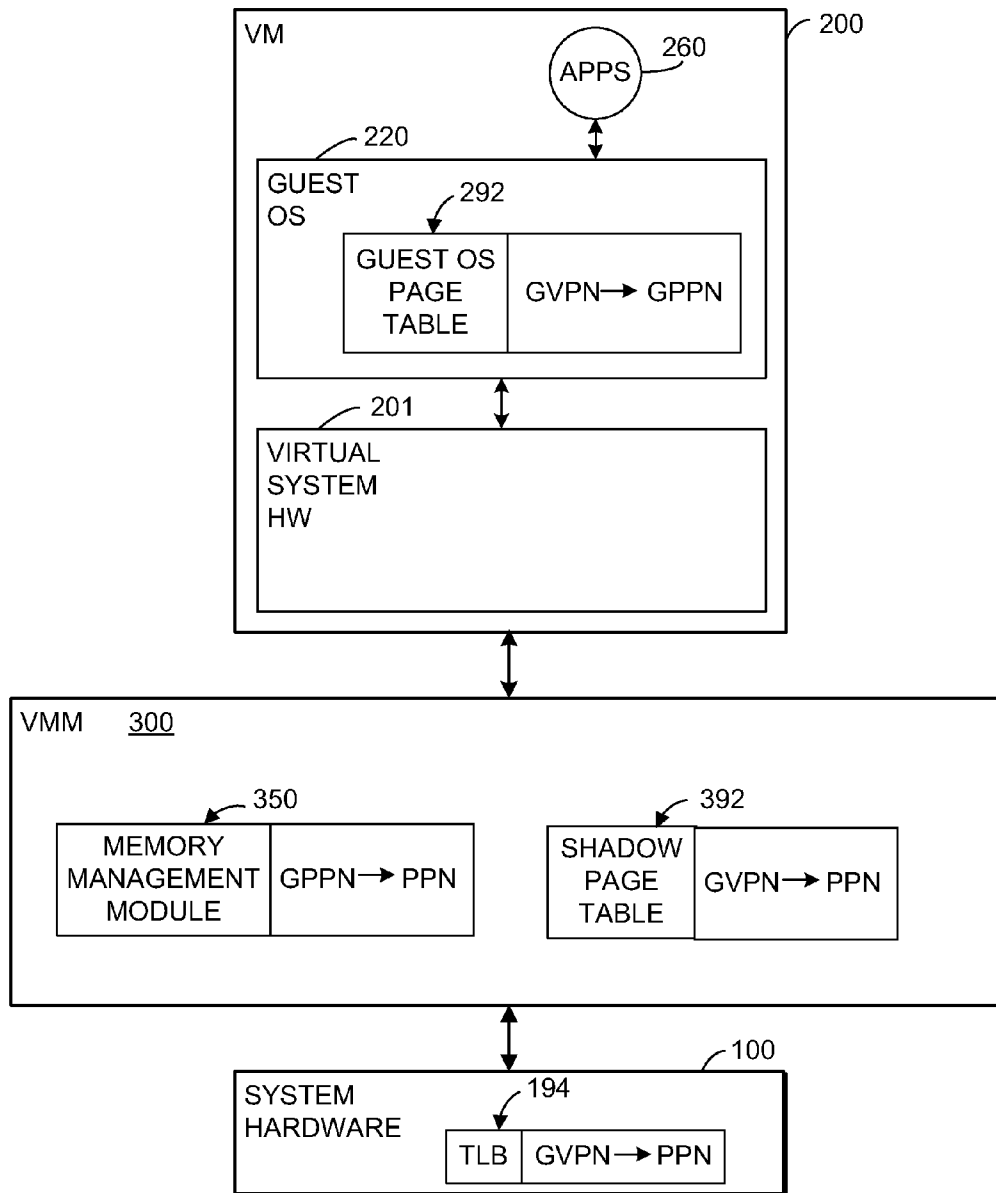
14 Claims, 7 Drawing Sheets

700

VM

200

APPS — 260

GUEST SYSTEM SOFTWARE

202

220 — GUEST OS

DRVS
224

201

VIRTUAL SYSTEM HARDWARE

| VCPU0 210-0 | VCPU1 210-1 | . . . | VCPUm 210-m |

VDEVICE(S) 270   VMEM 230   VDISK 240

VM 200-n

. . .

APPS

430

COS 420

100

600

VMM1 300   DEVICE EMULATORS 330

. . .   VMMn 300-n

KERNEL

SYSTEM HARDWARE   CPU(S) 110   MEM 130   DISK 140   DEVICES 170

**FIG. 1
(PRIOR ART)**

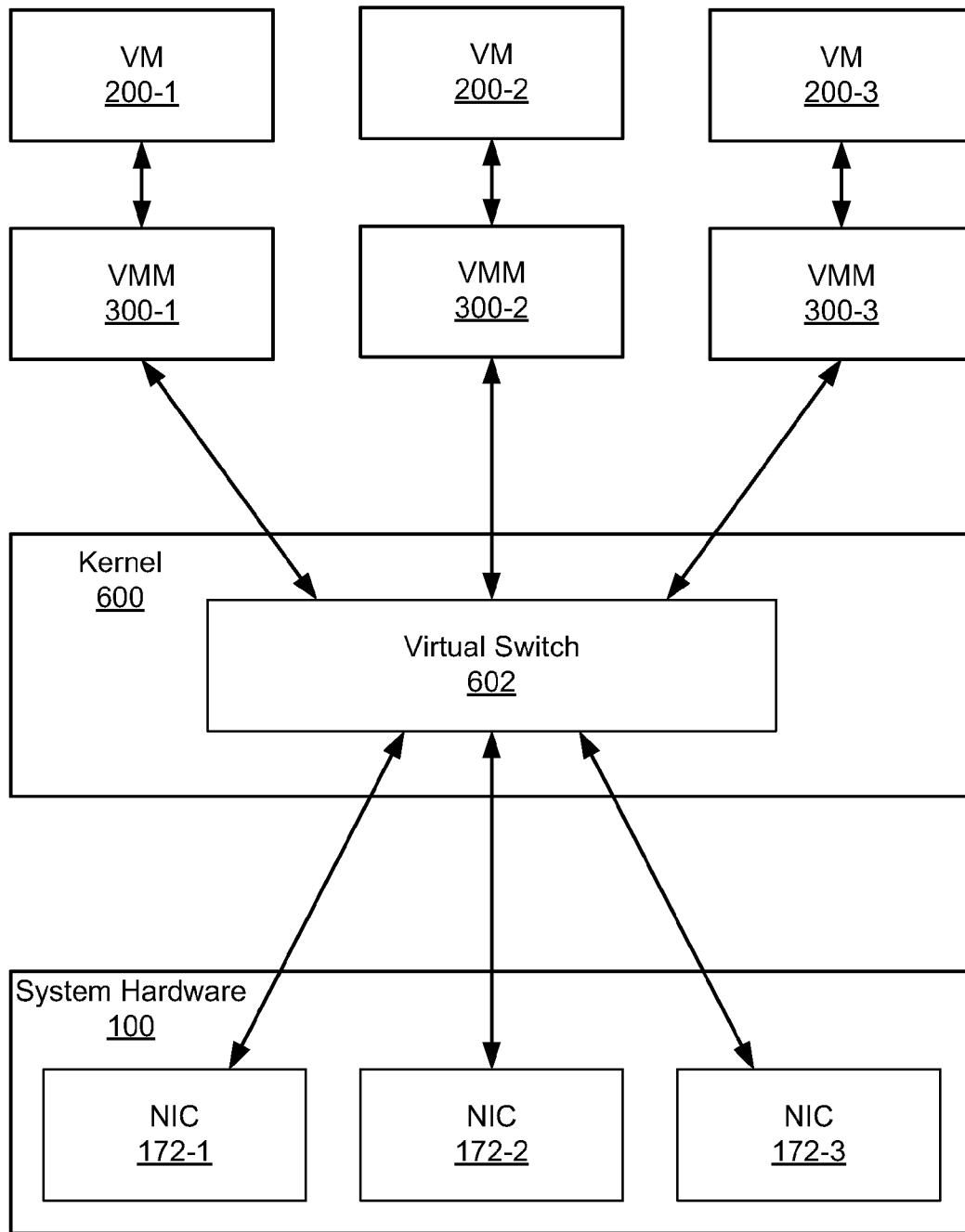**FIG. 2**
(PRIOR ART)
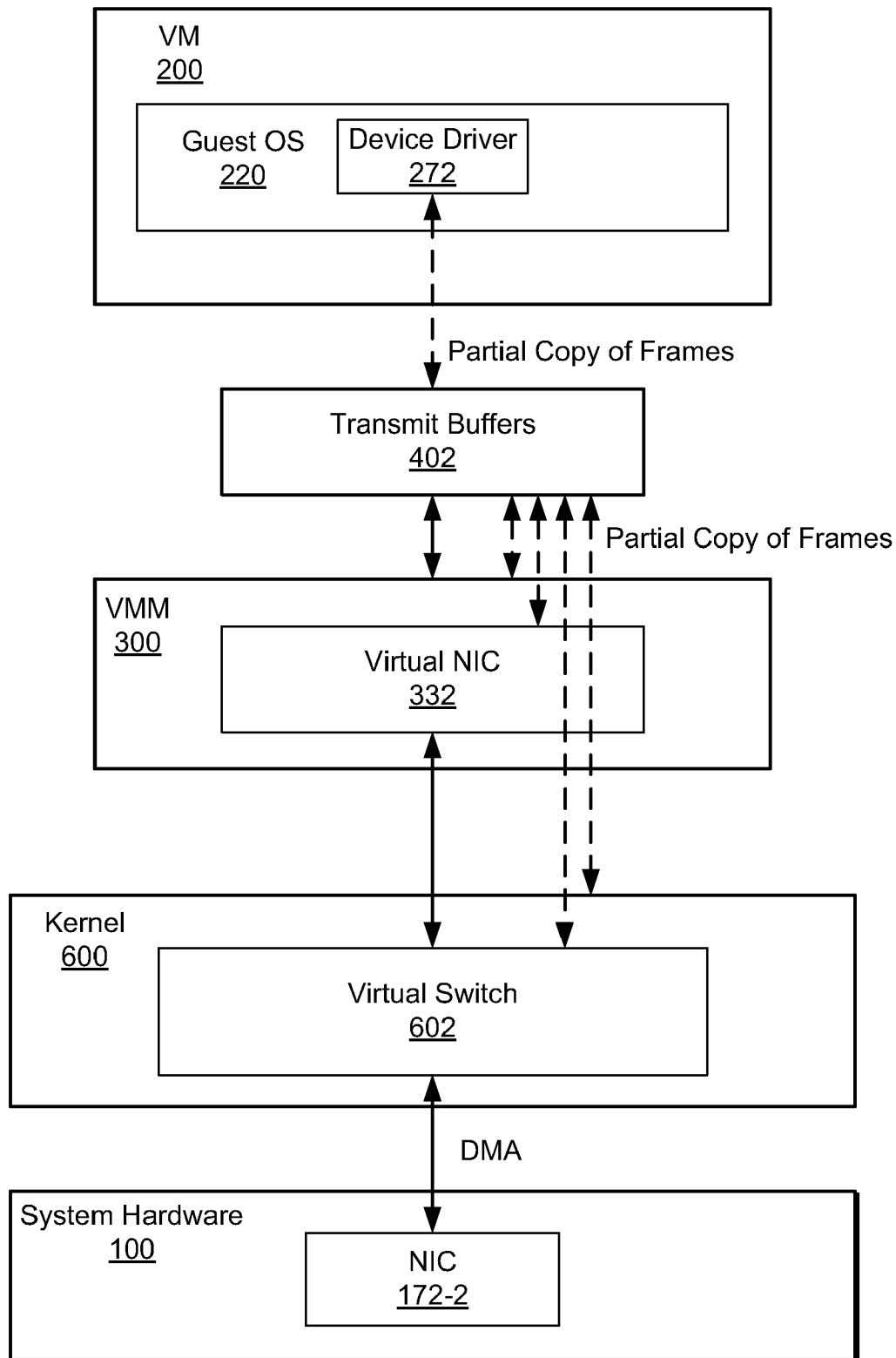
FIG. 3
(PRIOR ART)

FIG. 4

DOCKET ALARM

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