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Doctor et al.

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(54) **HYBRID CLOUD NETWORK MONITORING SYSTEM FOR TENANT USE**

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H04L 29/08 (2006.01)
H04L 12/46 (2006.01)
H04L 12/26 (2006.01)

(52) **U.S. Cl.**
CPC *H04L 67/10* (2013.01); *H04L 12/4633* (2013.01); *H04L 43/062* (2013.01); *H04L 43/12* (2013.01)

(58) **Field of Classification Search**
CPC ... H04L 67/10; H04L 12/4633; H04L 43/062; H04L 43/12
USPC 709/224
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

7,899,048	B1 *	3/2011	Walker	H04L 43/18 370/390
8,547,972	B2 *	10/2013	Mahdavi	G06F 9/455 370/389
8,645,952	B2 *	2/2014	Biswas	H04L 49/208 718/1
8,665,747	B2 *	3/2014	Elsen	H04L 45/18 370/254
8,879,554	B2 *	11/2014	Emmadi	H04L 49/30 370/389
8,996,691	B1 *	3/2015	Stickle	H04L 12/40071 709/224
9,397,960	B2 *	7/2016	Arad	H04L 49/355

(Continued)

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(57) **ABSTRACT**

Network traffic in a cloud computing system is monitored in response to a request to capture network traffic of a tenant port of a first virtual machine (VM) executing in the cloud computing system, wherein the first VM is associated with a first tenant organization different from a second organization managing the cloud computing system. A decapsulating VM having a first network interface and a second network interface is instantiated, wherein the decapsulating VM is inaccessible to the first tenant organization. An encapsulated port mirroring session from the tenant port of the first VM to the first network interface of the decapsulating VM is then established. A plurality of packets comprising captured network traffic received via the encapsulated port mirroring session are decapsulated, and the captured network traffic is forwarded via the second network interface of the decapsulating VM to a sniffer VM.

14 Claims, 4 Drawing Sheets
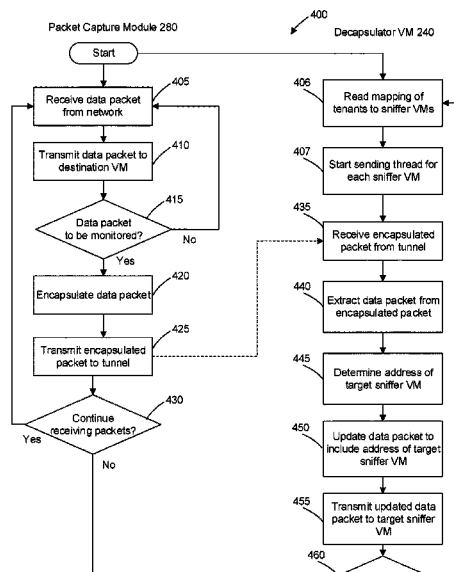
(56)   **References Cited**

U.S. PATENT DOCUMENTS

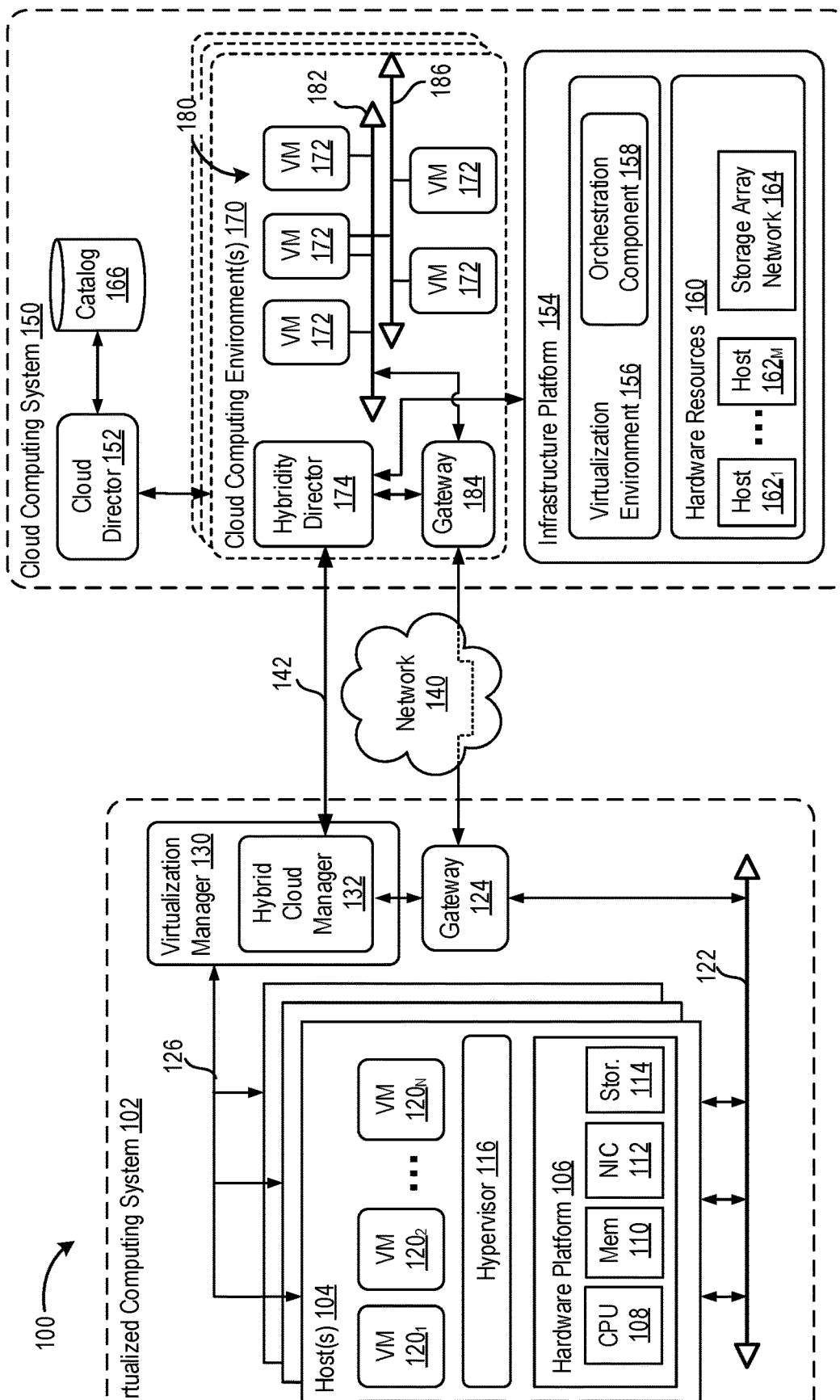|			
2014/0185616 A1*	7/2014	Bloch	H04L 12/4633
			370/392
2014/0279885 A1*	9/2014	Anantharam	H04L 5/0055
			707/622
2015/0139232 A1*	5/2015	Yalagandula	G06F 9/45558
			370/392

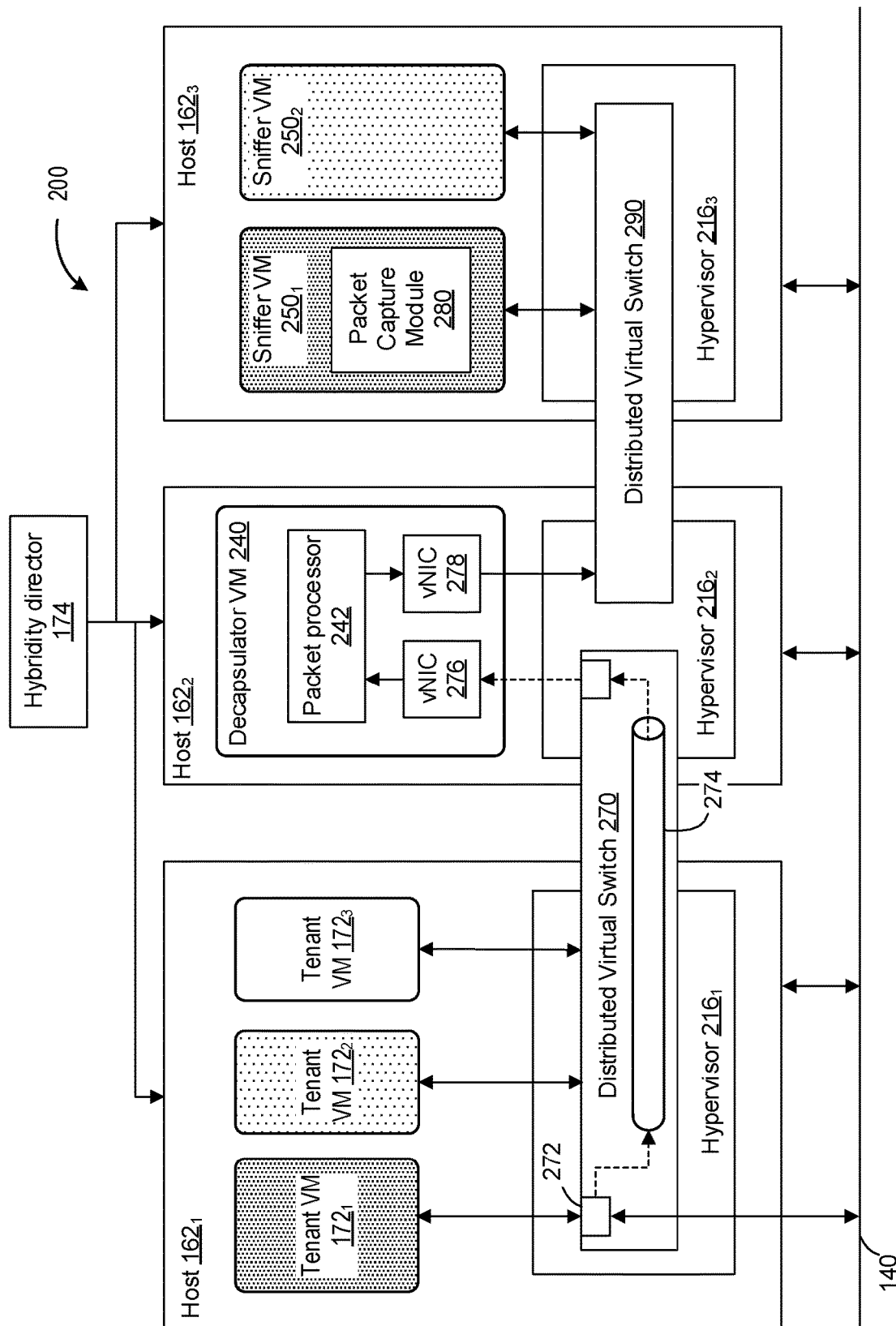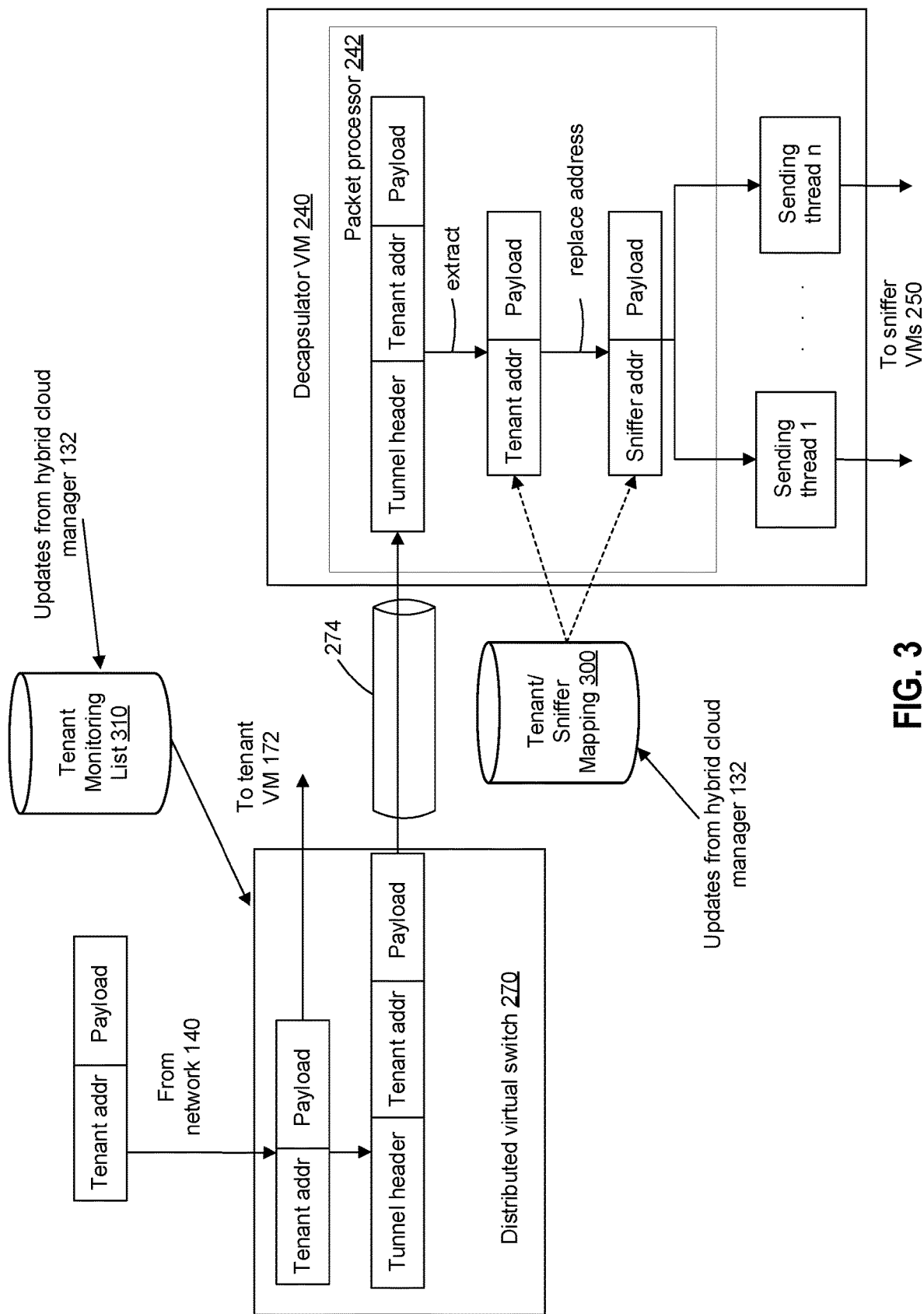* cited by examiner

FIG. 1

FIG. 2

FIG. 3

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