

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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SANDVINE CORPORATION and SANDVINE INCORPORATED ULC,

PETITIONERS,

V.

PACKET INTELLIGENCE, LLC,

PATENT OWNER.

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Case No. IPR2017-00769  
U.S. Patent No. 6,651,099

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**DECLARATION OF KEVIN C. ALMEROOTH, PH.D.**

**PACKET INTELLIGENCE LLC 2001 - 00001**

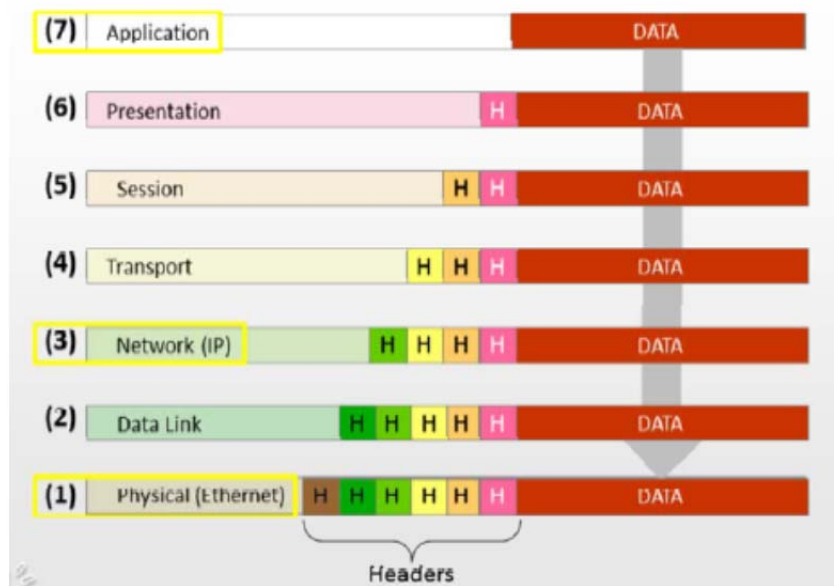
54. The Network layer (layer 3) includes protocols such as the Internet Protocol, also known as IP, used to support network routing decisions that guide traffic through the Internet. The Physical layer (layer 1) includes protocols such as Ethernet, which control the transmission of raw data onto the wire.

55. The OSI model provides a basic framework for understanding (1) high level networking, (2) how certain hardware and software elements interact, and (3) the relationship of specific information contained within a packet. It serves a generic means to separate computer networking functions into discrete functional groups.

## **B. Data Encapsulation**

56. Encapsulation enables protocol layering, which is taking a higher-level protocol message and packaging it into one or more lower-level protocol messages. Several layers, or protocols, may be involved in a single network communication. At the beginning of a network transmission, an application writes a message/data in an application layer protocol, for example, HTTP or the Skype protocol—this is OSI layer 7. In the image below (which was prepared to illustrate the encapsulation concept), the message is represented by the red block called “DATA” at the top right:

## Encapsulating Data



57. In order to send the actual message to another computer across a network, the application data (*i.e.*, the “DATA” block in the image above) is encapsulated. Encapsulation appends additional headers for other lower level layers in the OSI model to the application layer data. The image above illustrates this by the addition of “H” blocks (*i.e.*, headers) to the left of the application message at each lower OSI level. Each header contains information that help components in the network (switches, routers, gateways, etc.) route the data packet to its destination.

58. Before transmission, and after possible encapsulation in layers 6, 5, and 4, a message may be broken into one or more IP messages (or packets) that are constructed in conformance with the IP protocol. The IP protocol layer is layer 3. Each of these IP packets includes a header with information specific to the IP

Executed this 26<sup>th</sup> day of April, 2017, in Santa Barbara, California.

Respectfully submitted,

*Kevin C. Almeroth*

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