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Homework 4

Explain TCP/IP layering as shown in the figure. Are the frames and datagrams identical on both sides of Router R? Why or why not? Explain the difference between End-To-End consistency and Machine-to-Machine consistency.

End-To-End consistency is when the frame or datagram received by the end recipient is the same frame or datagram that was sent by the original sender, with respect to particular layers. For example, the same message that was sent by application layer and transport layer of Host A, is the same message that the application layer and transport layer that Host B sees, respectively.

Machine-To-Machine consistency is when the frame or datagram received by a host or a router is the same message sent by the host or router immediately preceding it on the route. For example, the message sent to the router by the Internet and Network layer of Host A is identical to the message received on those same layers of Router R.

The Internet and Network Interface Layers are Machine-To-Machine consistent, but not End-to-End consistent. When Router R receives A’s message, what is sent by A is Identical to what is received by R. Thus, it is Machine-to-machine consistent. However, what it sends back out will be different. The TTL will be decremented, because of the extra hop, and the sender and receiver will be different in the frame header (it will change from sender\_A, recipient\_R to sender\_R, recipient\_b). Also, depending on the MTU of the new network, the datagrams may also have to be broken into smaller pieces.

The Application and Transport layers are always end to end consistent. The Internet layer pieces the datagrams together before it sends it up to the transport layer, so it receives the entire message, which was originally sent by A’s transport layer to its own IP layer. Also, The IP header and Network header are the only pieces of the datagram that would have held information that changes from jump to jump, but by this point, they have both been removed.