

Lecture 2

OSI and TCP/IP Overview



The OSI Model

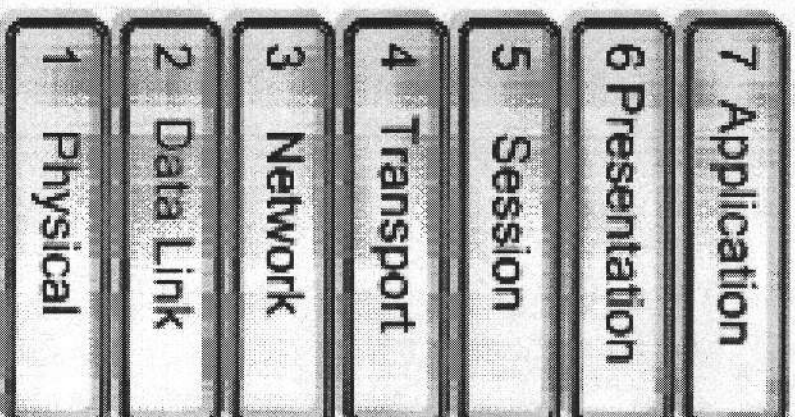
- Is a *theoretical* model of how any network is supposed to work
- Developed by the International Standards Organization
- The letters OSI don't actually stand for anything, due to fighting between the Americans and everybody else on noun/adverb placement. It doesn't actually stand for "Open Systems Interconnect"

●●● | OSI Model (cont'd)

- Designed so that companies (Xerox, IBM, Novell) would stop building their own proprietary networks from the ground up, and instead focus on creating compartmentalized components that would be interoperable within a larger networking schematic. Explained in just a moment...

OSI Model (cont'd)

- o Breaks networking down into 7 separate layers, each layer communicating with the layer above and below it.

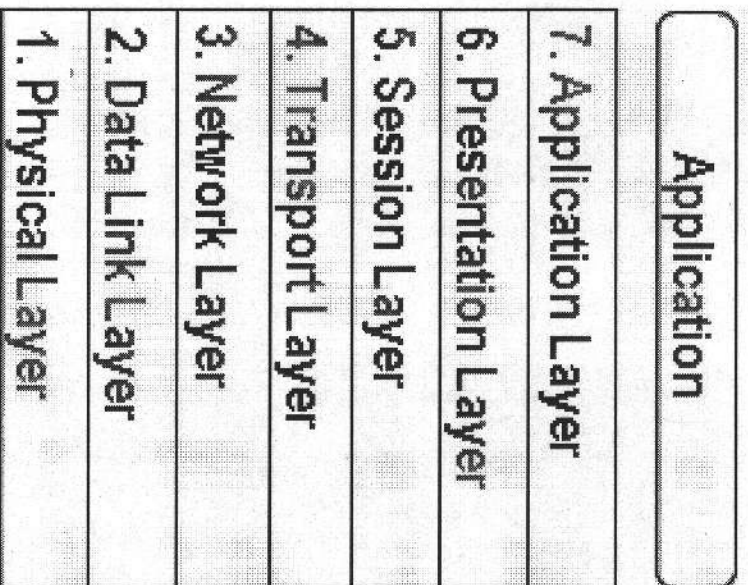




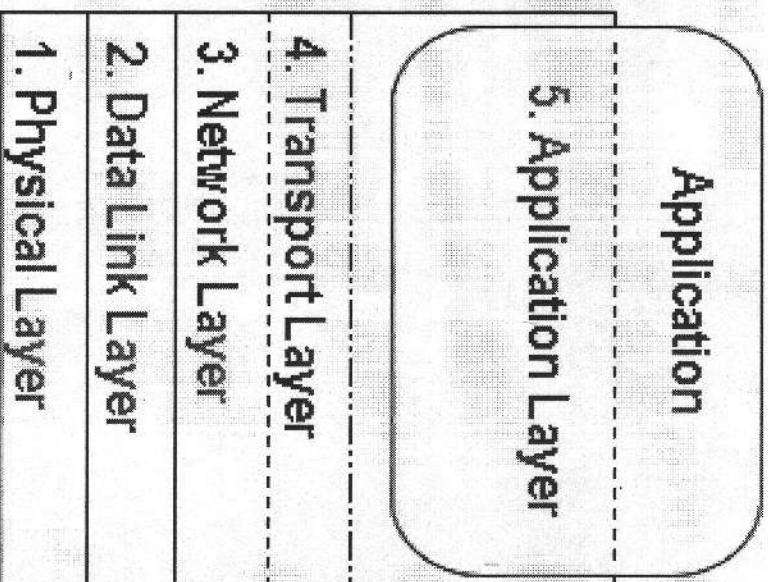
TCP/IP networking model

- Is an actual working networking model
- Designed by the DOD before the OSI model, and developed with it in mind.
- Designed to keep traffic moving across the network even if large parts of the network were destroyed.
- Gained popularity because:
 - It was an open standard (free for anybody to use)
 - Intelligently designed to accomplish the survivability goal (above)

OSI vs. TCP/IP



(a) OSI 7-Layer Model



(b) TCP/IP (Current)

●●● | Why bother with OSI

- It seems like it would be a good idea to describe networking in terms of TCP/IP:

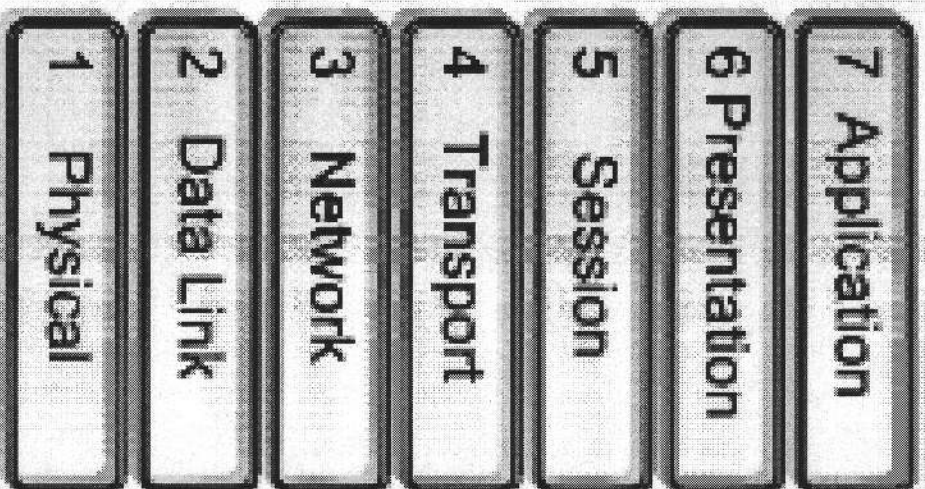
- It is a nice way to break networking down into layers
- Less layers than OSI
- Everybody uses it now, because:
 - The internet is built on it
- But...

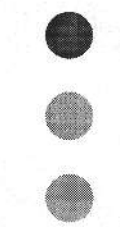


But...

- o The OSI model is so vague and general that it will never go out of date or be questioned.
- o It is generic enough that you can describe any component or process of networking within its framework.
- o We shall see that peer-to-peer networking with Windows 95/98, for example, does NOT involve TCP/IP

•••
| What Does OSI do for *us* in the
real world (layer by layer)?





Physical Layer

This describes anything having to do with the actual media your network is running on. The vast majority of the time, this is Cat 5 cable **HOWEVER** as we shall see, your network may not necessarily be running over it.



Data Link Layer

- o This is where computers communicate on a local area network. This is the level at which switches operate. This is where the computer's MAC address comes into play.
- o This is where computers on a local area network identify themselves



Network layer

- This layer starts to handle traffic when it goes beyond your local area network.
- Because everything operating at this level nowadays is based on the TCP/IP model, we can say that this layer is responsible for how your data gets from your computer to a computer in a remote place...and back.
 - Example, by requesting a Google web page, your request has to travel to Mountain View and back. The network layer is responsible for telling it how to get there.