

The TCP/IP Model

Let's now have a look at the TCP/IP Model

WE'LL COVER THE FOLLOWING



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Introduction

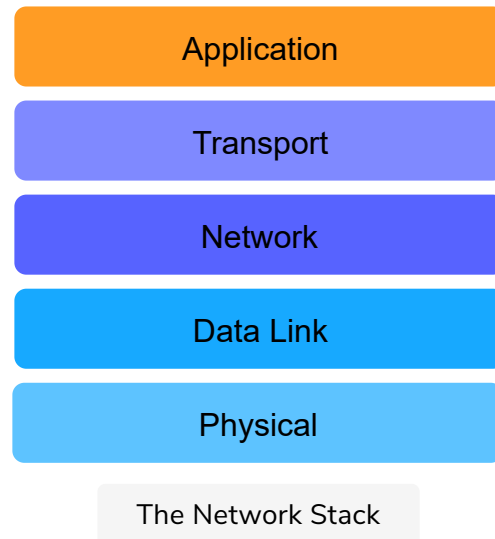
- The TCP/IP Model, also known as the **Internet protocol suite**, was **developed in 1989**.
- Its **development was funded by DARPA** (Advanced Research Projects Agency (ARPA) was renamed to the Defense Advanced Research Projects Agency (DARPA)!)
- Its technical specifications are detailed in [RFC 1122](#).
- This model is primarily based upon the most protocols of the Internet, namely the **Internet Protocol (IP)** and the **Transmission Control Protocol (TCP)**.
- The protocols in each layer are **clearly defined**, unlike in the OSI model. In this course, we'll largely adhere to the TCP/IP model and take a protocol oriented approach

protocol-oriented approach.

The Layers of The TCP/IP Stack

The TCP/IP model splits up a communication system into **5 abstract layers**, stacked upon each other. Each layer performs a particular service and communicates with the layers above and below itself.

Here are the five layers of the TCP/IP model:



TCP/IP vs OSI

Key Differences

Here are some main differences between TCP/IP and OSI.

TCP/IP	OSI
Is used practically	The OSI model is conceptual and is not practically used for communication.
Consists of five layers	Consists of seven layers

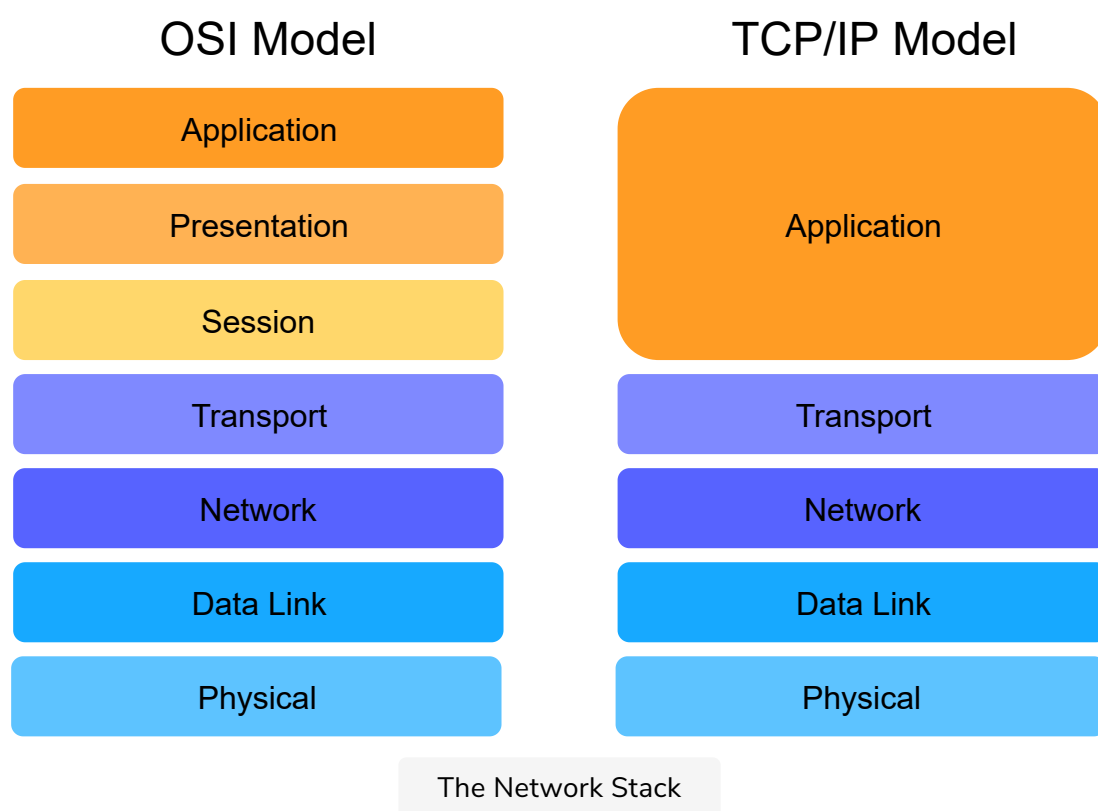
- Elaborating further on the first point, OSI is a **theoretical model** and works very well for teaching purposes, but it's far too complex for anyone to implement.

- TCP/IP, on the other hand, wasn't really a model. People just implemented it and got it to work. Then, people **reverse-engineered a reference model** out of it for theoretical and pedagogical purposes. So, something that “sounds like” a great idea might not be the eventual winner. It's de facto vs de jure standards.

Differences in Layer Functionality

The layers in the TCP/IP stack largely perform the same functions as their counterparts in the OSI model, except that the application layer in the TCP/IP model encompasses the functionalities of the top three layers of the OSI model.

Have a look at the following diagram for a more concrete view.



There is No Unanimous Stack

This is an example of where primary sources like RFCs clash with secondary sources like textbooks. There is, in fact, an entire [table on Wikipedia](#) dedicated to the prominent layer stacks! Regardless, we'll be sticking to the TCP/IP model described above.

The End-To-End Argument in System Design

The TCP/IP protocol suite is heavily influenced by the following design choice, also known as the **end-to-end argument**.

Implementing intelligence in the core was too expensive, therefore, intelligence was implemented at edge devices. So, the Internet's design was of **intelligent end devices** and a **dumb and fast core network**.

Packet Switched Core

Furthermore, the core was made **packet-switched**, which means that packets are routed **per-hop**, so they can circumvent failures because the requirement was for resilience.

With **circuit-switched networks**, however, torn connections have to be re-established, if there is still a path.

Quick Quiz!

1

The responsibilities of the presentation layer from the OSI model are handled by the _____ layer in the TCP/IP model.

COMPLETED 0%

1 of 2



Let's start on the application layer from the next chapter!