



**Data Science  
Bootcamp**

Hyperiondev

# Introduction to the OSI Model

**Welcome**

**Your Lecturer for this session**



**Liano Naidoo**

# Lecture – Housekeeping

- ❑ The use of disrespectful language is prohibited in the questions, this is a supportive, learning environment - please engage accordingly.
- ❑ No question is daft or silly - **ask them!**
- ❑ There are Q/A sessions midway and at the end of the session, should you wish to ask any follow-up questions.
- ❑ You can also submit questions here:  
[hyperiondev.com/sbc4-cs-questions](https://hyperiondev.com/sbc4-cs-questions)
- ❑ For all non-academic questions, please submit a query:  
[www.hyperiondev.com/support](https://www.hyperiondev.com/support)
- ❑ Report a safeguarding incident:  
[hyperiondev.com/safeguardreporting](https://hyperiondev.com/safeguardreporting)
- ❑ We would love your feedback on lectures:  
<https://hyperiondev.wufoo.com/forms/zsgv4m40ui4i0g/>

# Objectives

- Be able to define what Networking and why it is important.
- Become familiar with the 7 Layers of the OSI model.
- Understand the why the OSI reference model is important.
- 

Take note of any foreign terminology to do some research on or refer in the questions form.

# What is networking?

Networking is the process of connecting different devices and systems together so they can communicate and share information.

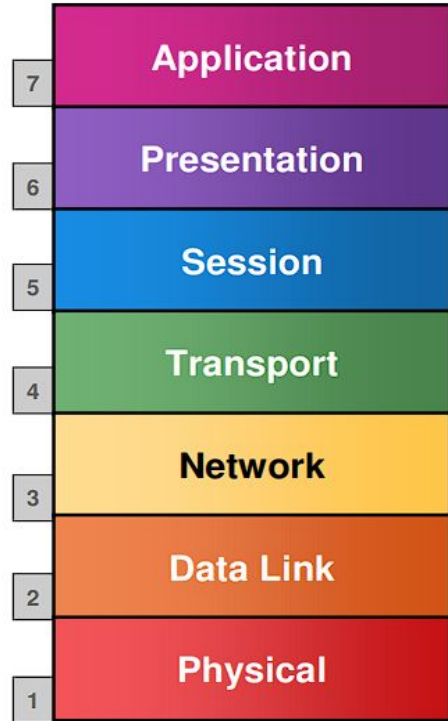
It's like connecting a phone to Wi-Fi so you can use the internet or sending a message to a friend on social media.

# What makes it important?

Networking is important because it makes it easier and faster to share information and resources between devices, even if they are far away from each other.

It's like being able to talk to someone on the other side of the world, or sharing pictures with friends without having to physically give them a photo album.

# Benefits of a layered model?



- Reduces complexity
- Standardizes interfaces
- Facilitates modular engineering
- Ensures interoperable technology
- Accelerates evolution
- Simplifies teaching and learning

# 7 – Application

- Which is where users interact directly with the network. This layer is responsible for receiving information from users and showing incoming data to the user.
- Important to note that applications themselves are not located in this layer. Instead, Layer 7 facilitates communication between lower layers to connect with applications on the other end.
- Examples of communications that depend on Layer 7 include web browsers like Chrome, Firefox, and Safari, as well as protocols like TelNet and FTP.



# 6 – Presentation

- Responsible for preparing data for transfer across the network by translating it from the format used by the application to a format that can be transmitted over the network.
- It also handles the reverse translation of data received from the network back into a format that can be understood by the application. An important function of the Presentation Layer is to ensure that the data is presented in a consistent and well-defined way
- This layer also handles data encryption and decryption to ensure secure transmission over the network.

# 5 – Session

- Responsible for creating and maintaining communication sessions between two network devices.
- It handles tasks like initiating, managing, and terminating these sessions, and decides how long the devices should wait for a response.
- This layer ensures that the data transmission between devices is accurate, reliable, and efficient.

# 4 – Transport

- Layer is responsible for managing the movement of data between different devices in a network. This includes deciding how much data to transfer, the rate of transfer, and the destination for the data.
- One well-known example of the Transport Layer is the Transmission Control Protocol (TCP), which is based on the Internet Protocol (IP) and often referred to as TCP/IP.
- This layer uses TCP and UDP port numbers to identify specific processes and services, while IP addresses are used to identify specific devices and locations at the Network Layer.

# 3 – Networking

- The Network Layer is responsible for the logical addressing and routing of data packets between different networks. It determines the best path for data transmission between different networks by examining the network addresses of the source and destination devices.
- This layer also ensures that data packets are delivered to the correct destination and can handle congestion control, packet sequencing, and error recovery.
- Routers are an essential component of this layer as they use logical addressing information to forward packets between different networks.

## 2 – Data Link

At the Data Link Layer, data is transferred between directly connected nodes in a network. This layer also manages error correction from the Physical Layer.

It is composed of two sublayers, the Media Access Control (MAC) layer and the Logical Link Control (LLC) layer.

Most switches in networking operate at Layer 2, but some also operate at Layer 3 to support virtual LANs that may span more than one switch subnet, requiring routing capabilities.

# 1 – Physical

- Responsible for transmitting raw data bits over a communication channel. This layer defines the physical characteristics of the communication medium such as voltage levels, cable types, connectors, and other physical attributes that are required to transmit data.
- In case of any network issues, troubleshooting at the physical layer is crucial, as issues like disconnected or faulty cables, hardware failure, and power outages can affect the entire network.

# Email Example

When you send an email, the message goes through different layers of communication protocols. The presentation layer compresses the data and sends it to the session layer, which opens a session for communication.

The transport layer breaks the data into segments, and the network layer breaks these segments into packets. These packets then move to the data link layer, where they are broken down into frames, and finally to the physical layer, where the data is converted into ones and zeros and sent through a medium.

When the recipient receives the message, the process is reversed. The message moves up through the layers of the OSI Model, from the physical layer to the application layer, where it is converted back into a readable format. If the recipient replies to the message, the process repeats, and the communication flows back up the OSI Model to the sender's device.

# Tip!

All People Seem To Need Data Processing



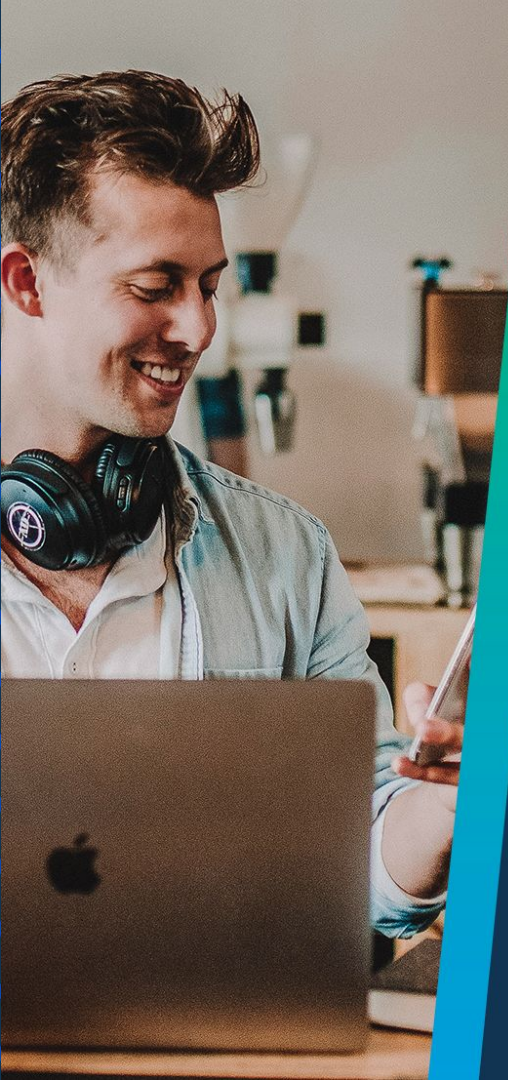
Please Do Not Throw Sausage Pizza Away



Hyperiondev

# Q & A Section

**Please use this time to ask any questions relating to the topic explained, should you have any**



Hyperiondev

**Thank you  
for joining us**