

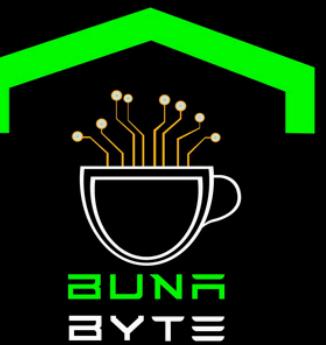
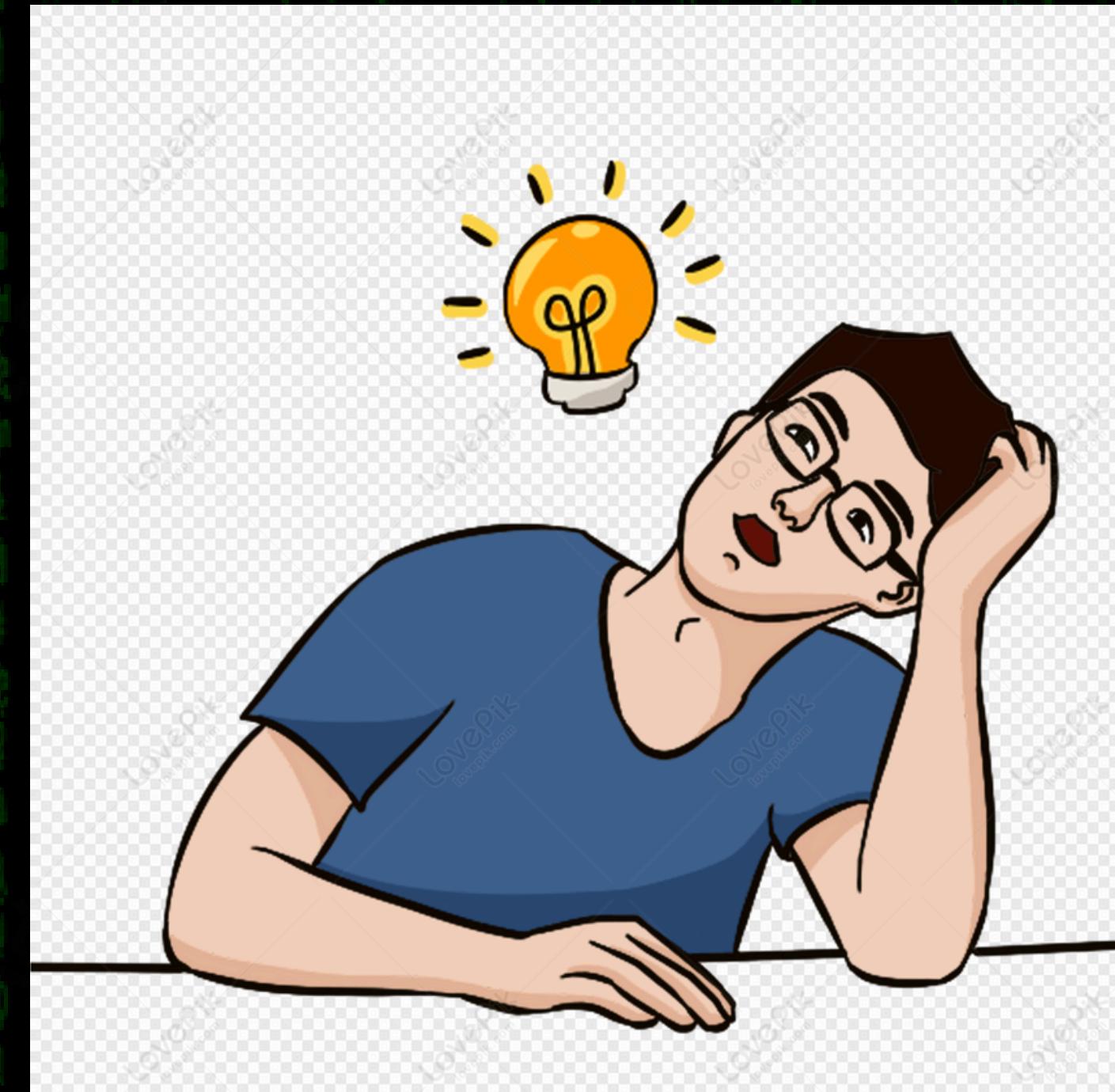
OSI MODEL



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Why Models Matter

- Models help us understand the complex process of how data moves between devices.
- The OSI model is a conceptual framework for how network communication happens, and TCP/IP is the real-world implementation used by the internet.
- Think of these models like blueprints for how information is sent and received.



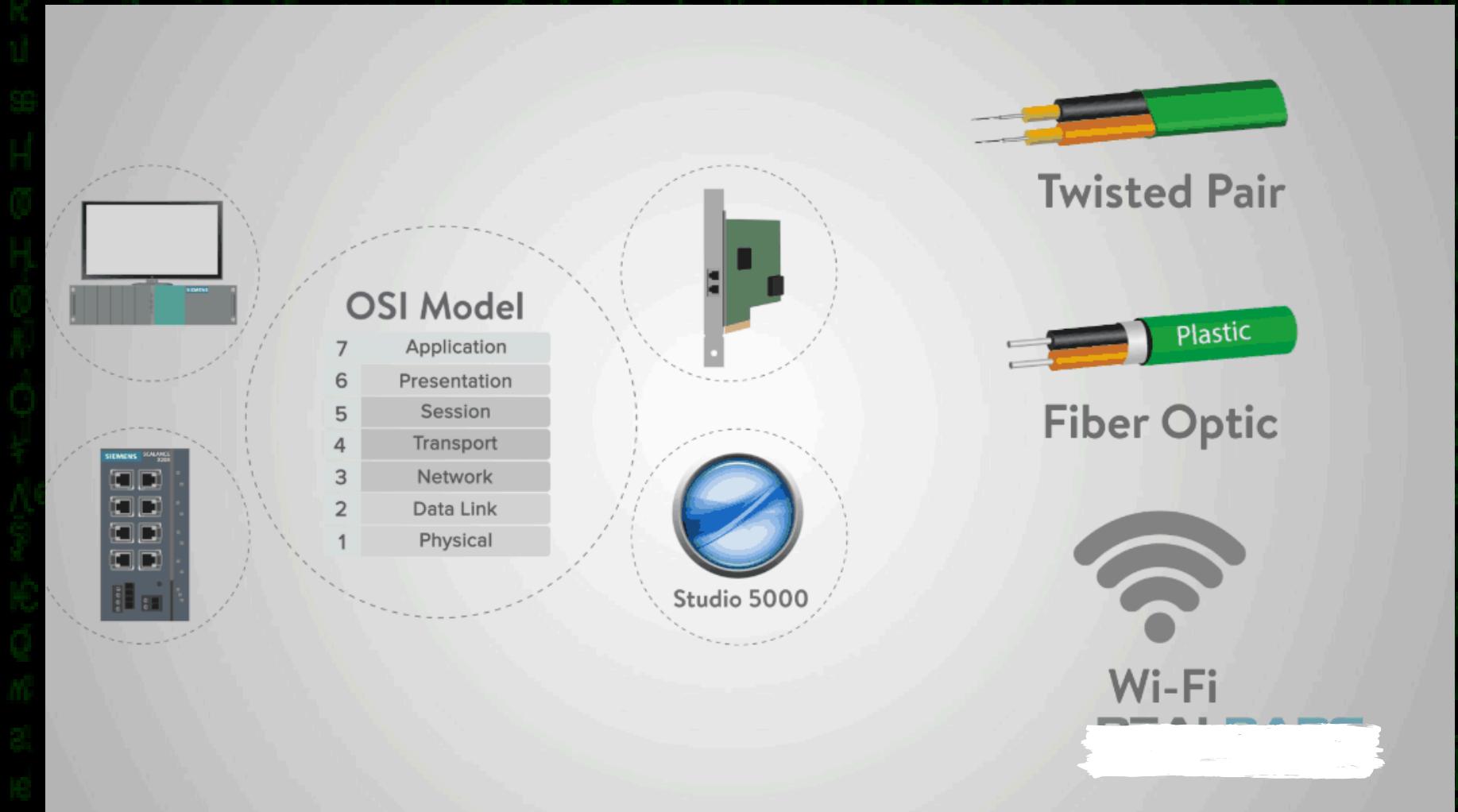
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The OSI Model

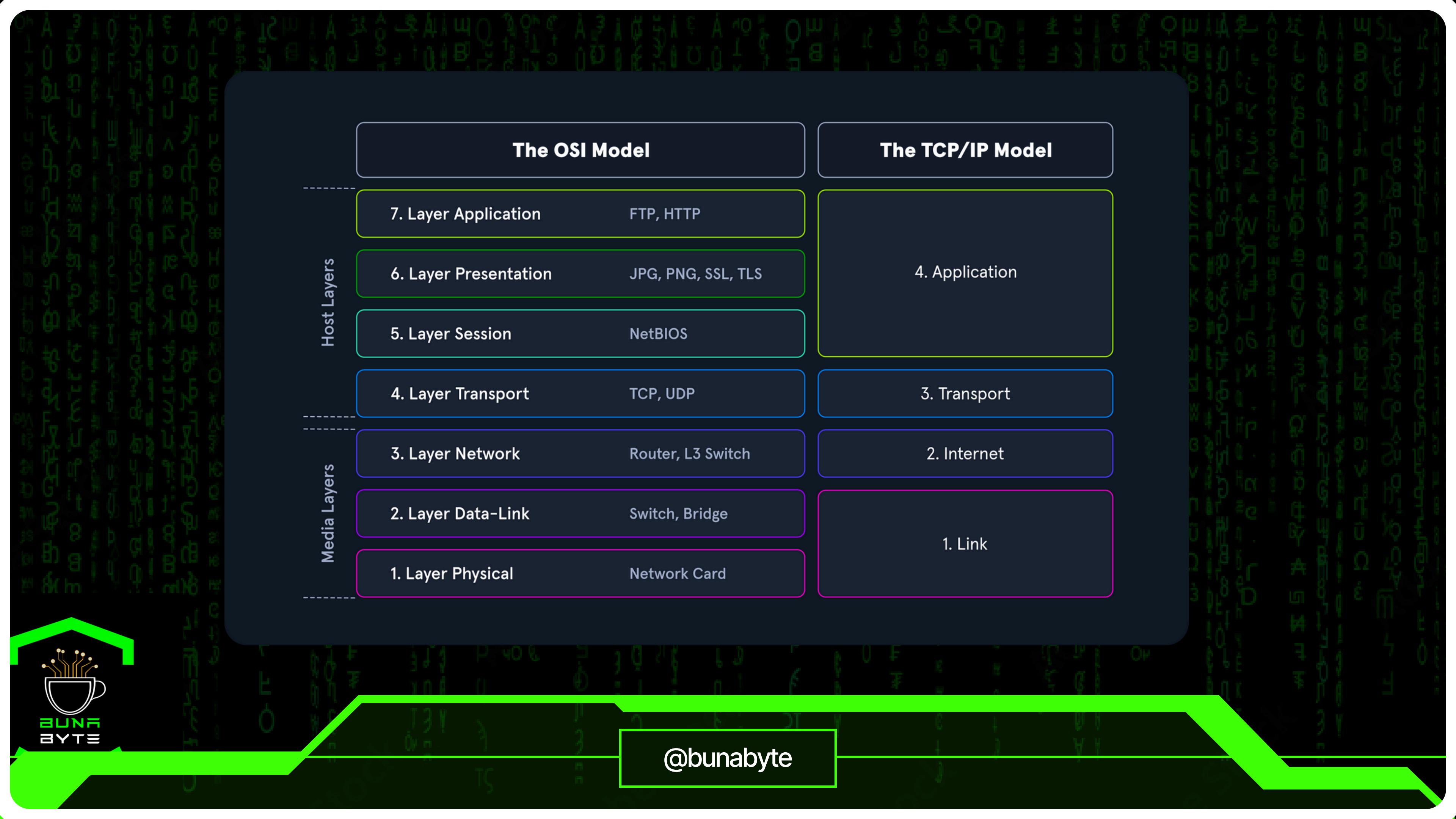
The term OSI stands for Open Systems Interconnection model

we use to demonstrate the theory behind computer networking.

In practice, it's actually the more compact TCP/IP model that real-world networking is based off; however the OSI model, in many ways, is easier to get an initial understanding from.



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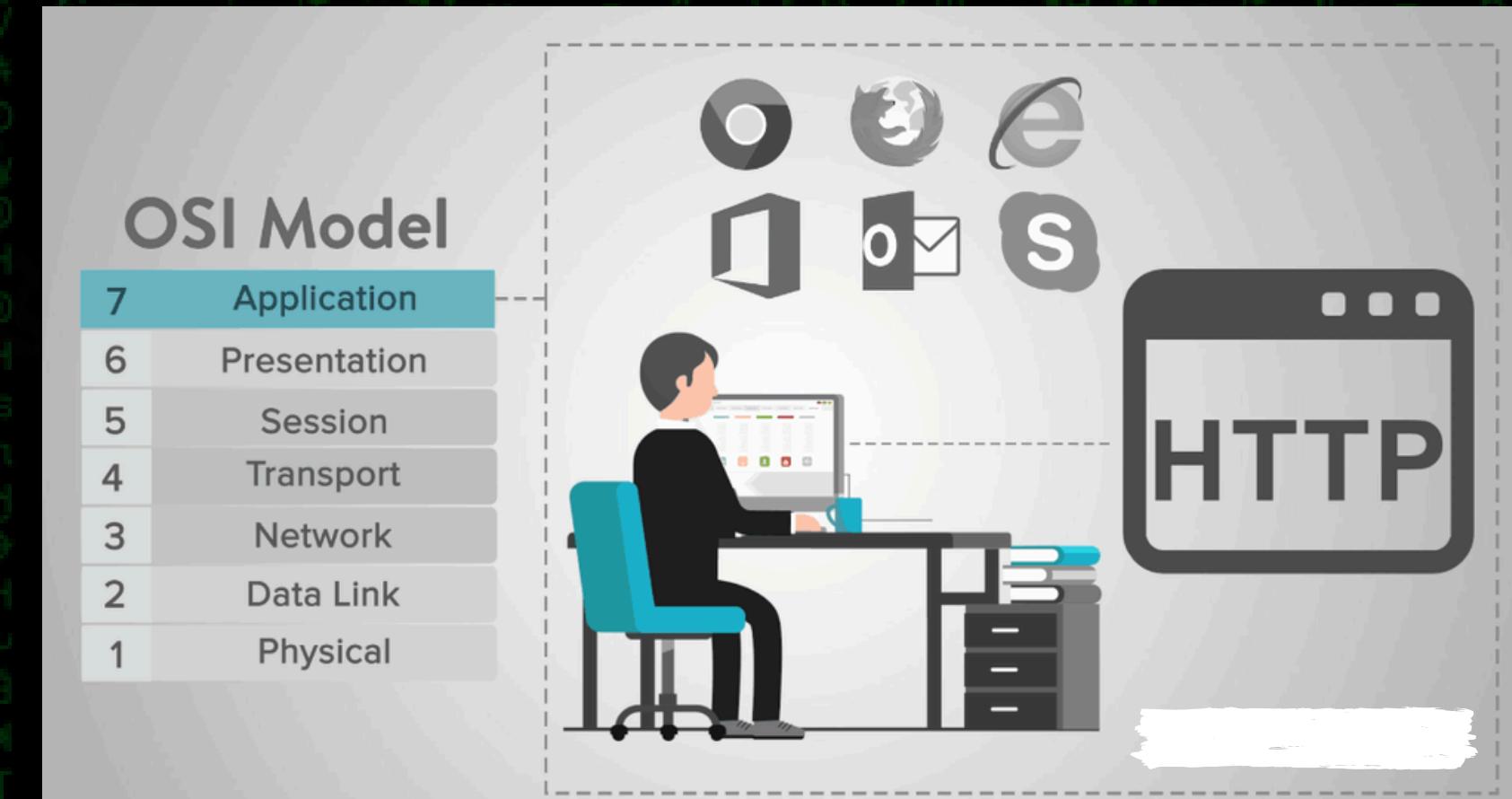


7. Application Layer

Application: Where users interact (web browsers, email, etc.).

The application layer provides networking services to programs on a computer, acting as an **interface** for data transmission.

It directly interacts with applications, passing data to the presentation layer for further processing.



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6. Presentation Layer

The presentation layer translates data from the application layer into a standardized format for the receiving computer.

It also handles encryption, compression, and other **transformations**. Once the data is formatted, it is passed to the session layer for further processing.



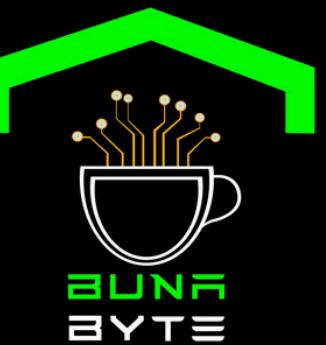
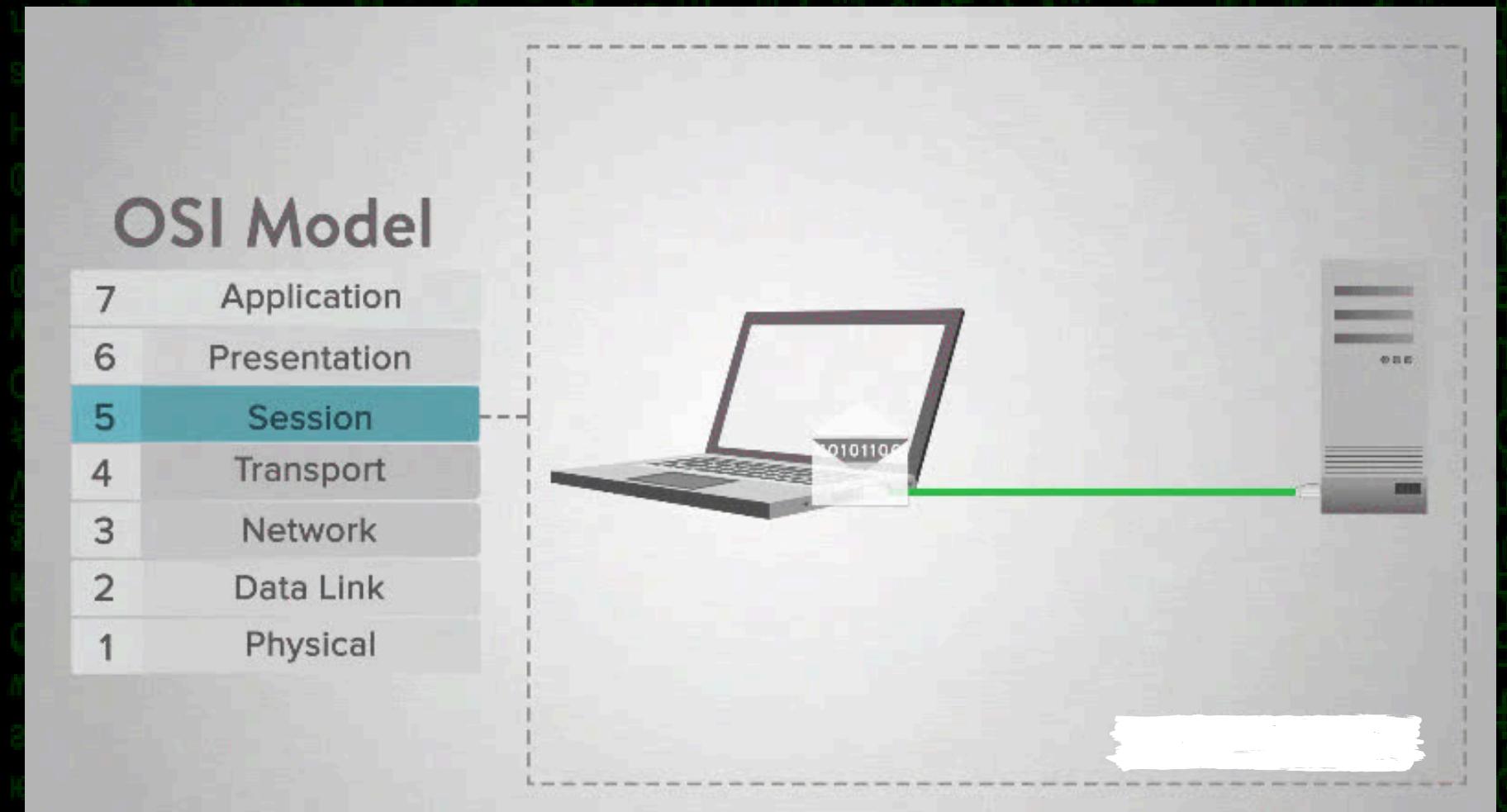
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5. Session Layer

The session layer establishes and manages connections between computers over a network.

If it successfully sets up a **session**, it maintains and synchronizes communications with the remote computer, ensuring unique sessions for each communication.

This prevents data from different requests (e.g., multiple browser tabs) from getting mixed up.



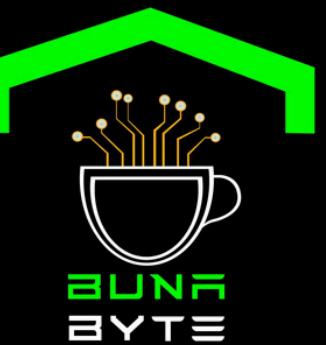
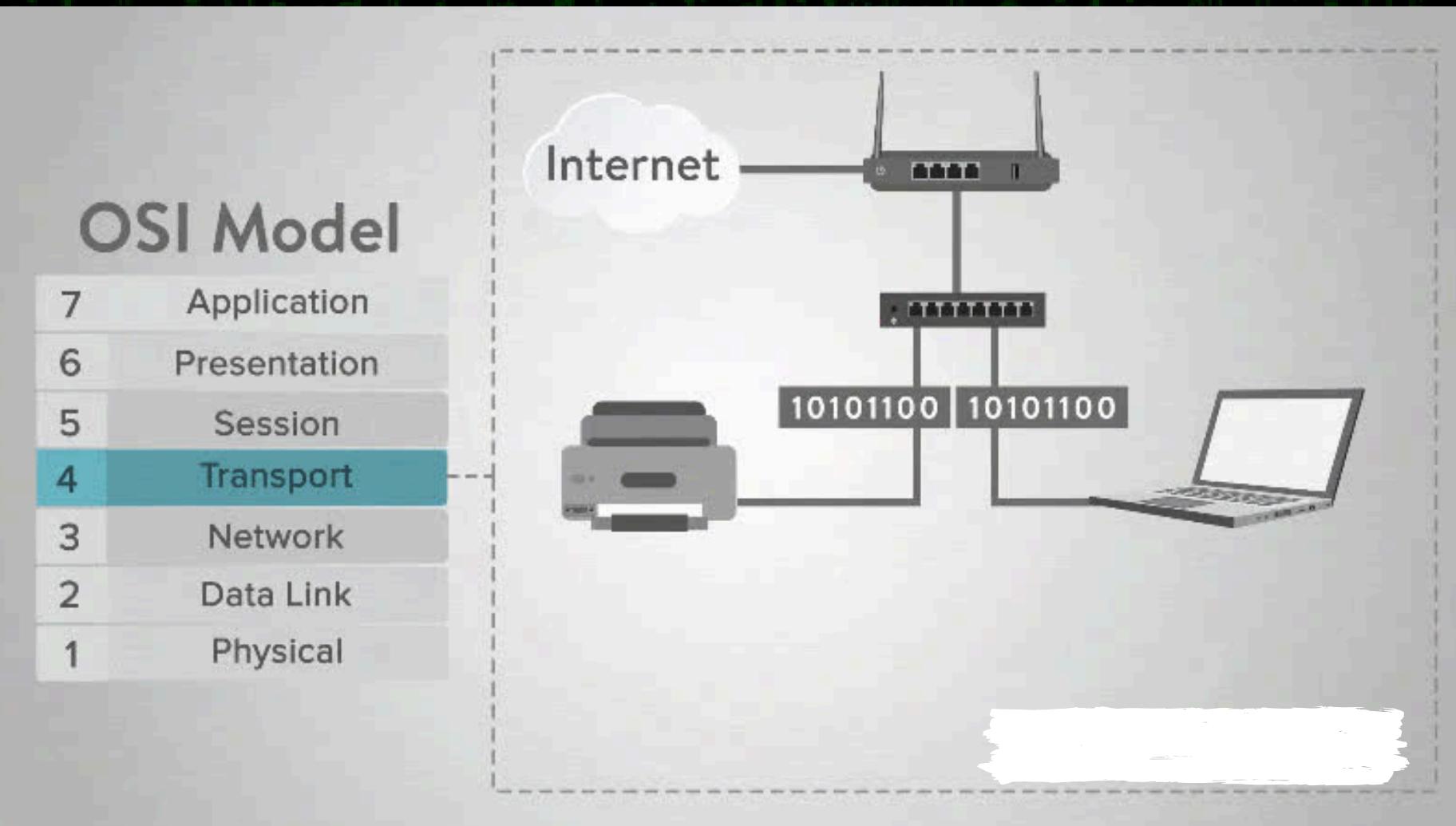
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4. Transport Layer

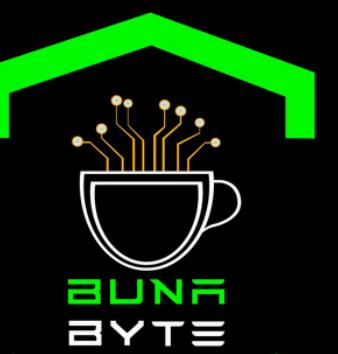
Layer 4 is used for end-to-end control of the transferred data. The Transport Layer can detect and avoid congestion situations and segment data streams.

The transport layer handles data transmission by selecting either **TCP** (reliable, connection-based) or **UDP** (fast, connectionless) protocols.

TCP is used when accuracy is prioritized, while UDP favors speed, such as in video streaming. It also breaks data into smaller segments (TCP) or datagrams (UDP) for efficient transmission.



4. Transport Layer



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3. Network Layer

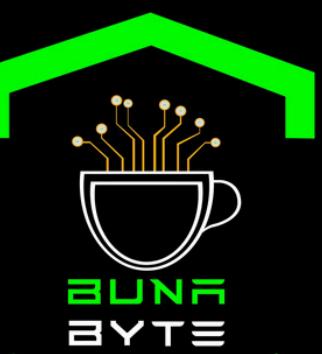
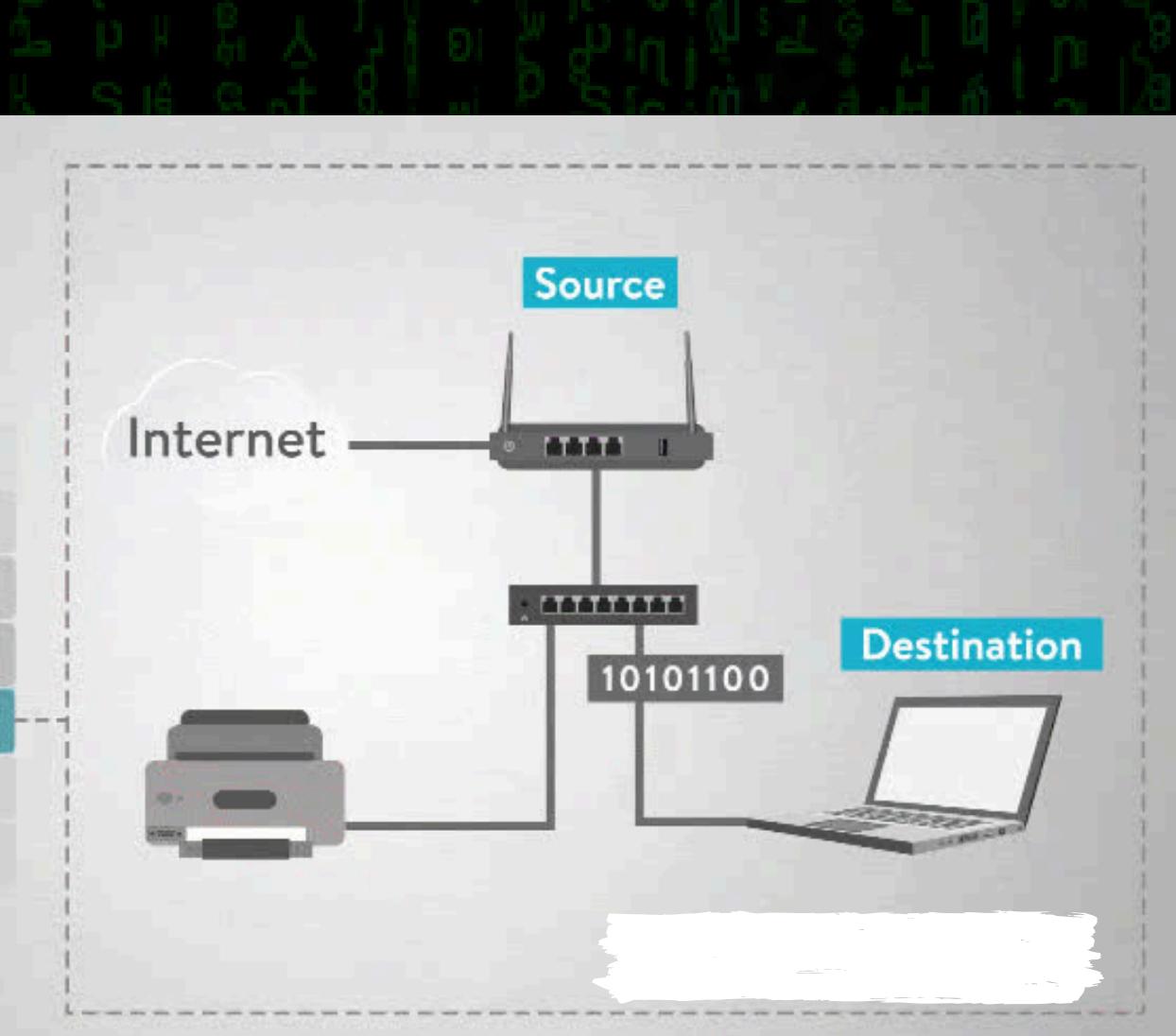
The network layer is responsible for determining the destination of a request by using logical addressing, such as IP addresses.

It identifies the **best route** for data to reach its target, organizing networks using logical addresses like the common IPv4 format (e.g., 192.168.1.1).

This process helps maintain order in large networks like the Internet.

OSI Model

7	Application
6	Presentation
5	Session
4	Transport
3	Network
2	Data Link
1	Physical



2. Data-Link Layer

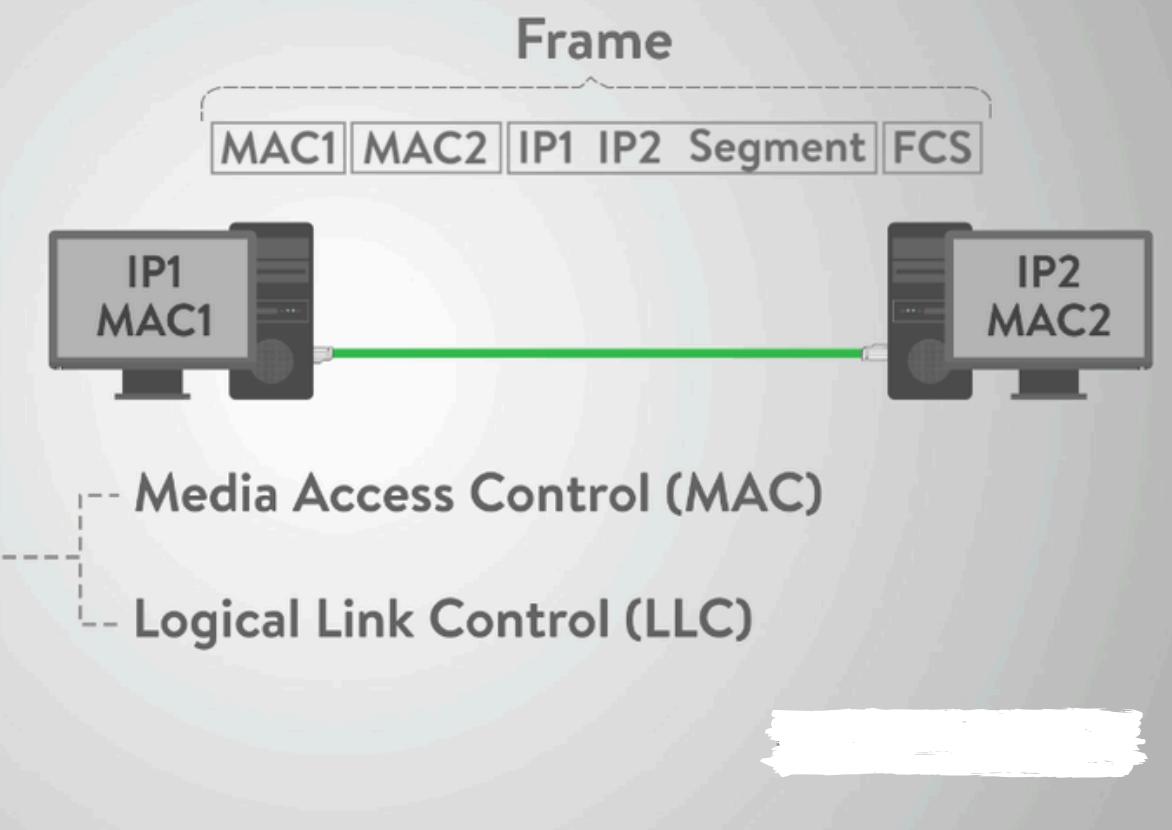
Error-free transmission between adjacent devices

The data link layer handles physical addressing by adding the MAC address of the receiving device to the packet.

Each device has a unique MAC address assigned by its manufacturer, used to identify the exact destination of the data. It also ensures the data is in the correct format for transmission and checks for corruption upon receiving data.

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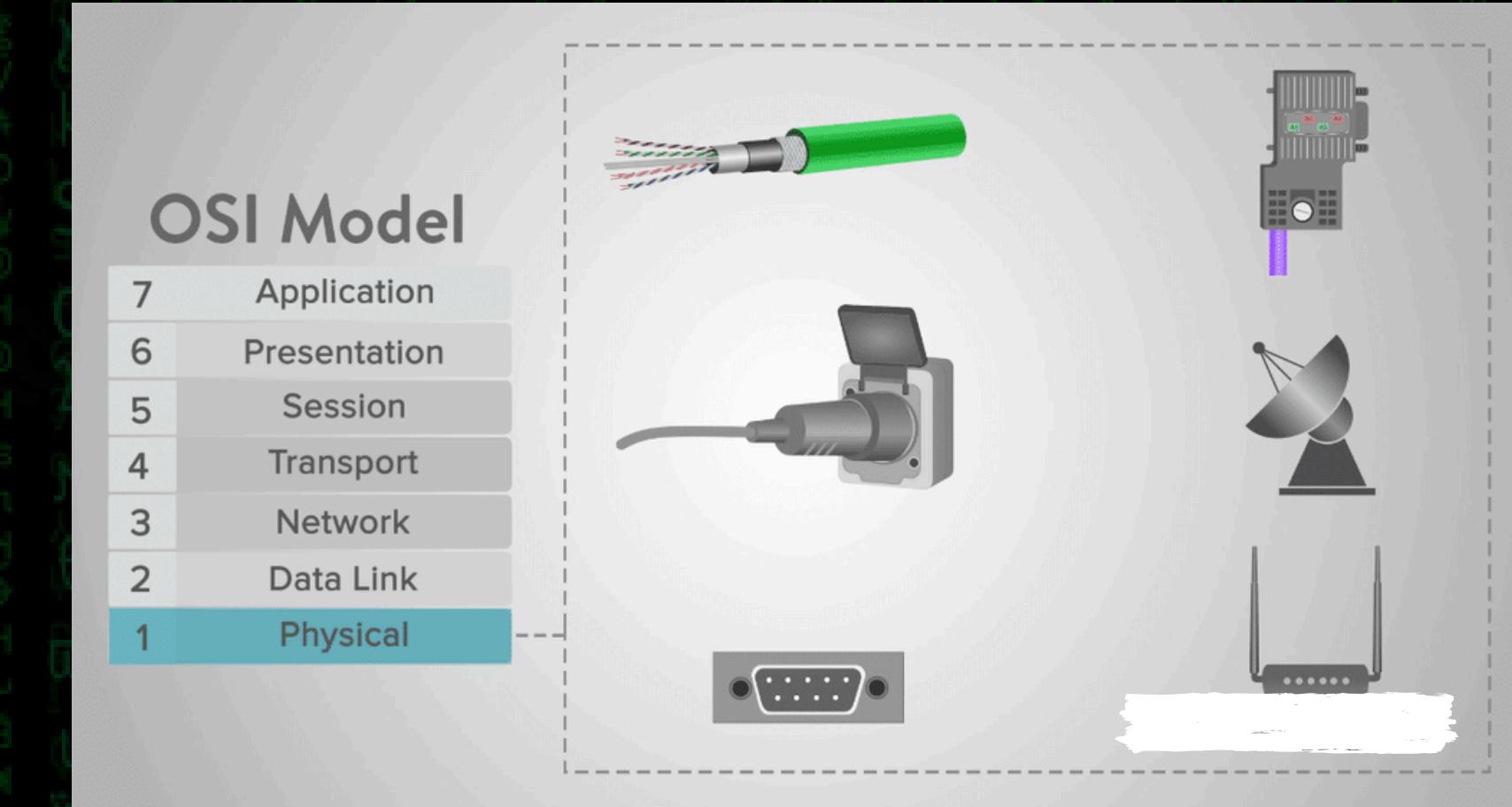


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1. Physical Layer

The physical layer handles the hardware aspect of data transmission, converting binary data into electrical signals for network transfer.

It transmits these signals across the network and converts incoming signals back into binary data for processing.



Recap of the 7 Layers

we start with the app you use, then translate the data, keep the connection alive, break the data into pieces, route it to the right place, package it, and send it physically!



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TCP/IP Model



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