

The background is a vibrant, detailed underwater scene of a coral reef. Sunlight rays penetrate the clear blue water from the top. The reef is covered in various colorful corals, including pink, orange, and green. Several small fish are visible, and a sea turtle is seen swimming in the middle ground. Overlaid on the right side of the image is a large, semi-transparent teal circle. To its right, there is a smaller, semi-transparent bar chart with four bars of increasing height. In the bottom right corner, there are three vertical, semi-transparent bars of increasing height.

OSI Layer 2

The Data Link Layer

Overview

OSI stands for Open Systems Interconnection. It is a **conceptual** framework that **standardizes** the functions of a telecommunication or networking system into seven **distinct** layers. [1]

Overview

Layer 2, also referred to as the **Data Link layer** is primarily concerned with six(6) procedures:

- Data Framing
- Addressing
- Error Detection & Correction
- Flow Control
- Media Access Control
- Logical Link Control

Data Framing

The Data Link Layer takes the **raw stream of bits** from the **physical layer (Layer 1)** and groups them into **data frames**. These frames include both **data** and **control information**, making it easier to transmit and manage data. [1]

Layer 1

Stream of Bits

Data Frames

Addressing

Each device on a network typically has a **unique** hardware address at this layer called a **MAC (Media Access Control)** address. The Data Link Layer uses MAC addresses to **identify** the **source** and **destination** of data frames within the **local network segment**. [1]

Error Detection & Correction

It ensures data **integrity** by adding **error-checking information** to the frames. If errors occur during transmission, the Data Link Layer can **detect** and, in some cases, **correct** them. [1]

Flow Control

The Data Link Layer manages the **flow** of data between devices to **prevent congestion** and ensure **efficient** data transmission. It can use techniques like **acknowledgments** and **windowing** to **regulate** data flow. [1]

Media Access Control (MAC)

This layer determines how devices on a shared network segment **access** and **transmit data**. It can use various methods, such as **CSMA/CD (Carrier Sense Multiple Access with Collision Detection)** in Ethernet networks, to **avoid collisions** when multiple devices try to transmit simultaneously. [1]

Logical Link Control (LLC)

The Data Link Layer can also include a **sub-layer** called the Logical Link Control (LLC), which handles network layer **protocol multiplexing, flow control, and error handling**. [1]

Conclusion

In summary, Layer 2, or the Data Link Layer, is responsible for creating a reliable link between two directly connected nodes on a network, addressing, error detection, and ensuring efficient and collision-free data transmission within a local network segment. [1]

References

[1] - Text generated by ChatGPT, September 22nd, 2023, OpenAI,
<https://chat.openai.com/chat>.

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