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**Comparison of OSI and TCP/IP Models**

OSI Model is a 7-layer framework that explains how data moves between computers. While TCP/IP Model a 4-layer model that shows how the internet works in real life

**Overview**

| **Aspect** | **OSI Model** | **TCP/IP Model** |
| --- | --- | --- |
| **Full Form** | Open Systems Interconnection Model | Transmission Control Protocol/Internet Protocol Model |
| **Purpose** | Conceptual framework for networking standards and interoperability. | Practical framework for internet communication. |
| **Layers** | 7 Layers | 4 Layers |
| **Standardization** | Theoretical model defined by ISO. | Practical implementation model defined by ARPANET. |
| **Reliability** | Protocol-agnostic; designed to guide standard creation. | Protocol-dependent; designed for actual data transfer. |

**Layers and Mapping**

| **Layer** | **OSI Model** | **TCP/IP Model** | **Description** |
| --- | --- | --- | --- |
| Application | Application, Presentation, Session | Application | Handles user interaction and application data. |
| Transport | Transport | Transport | Manages end-to-end communication and reliability. |
| Network | Network | Internet | Determines routing and addressing. |
| Data Link/Physical | Data Link, Physical | Network Access | Deals with hardware transmission of raw data. |

**Key Differences**

| **Feature** | **OSI Model** | **TCP/IP Model** |
| --- | --- | --- |
| **Development** | Conceptual framework, not tied to a protocol suite. | Built around standard protocols like TCP and IP. |
| **Flexibility** | More general, not specific to the internet. | Focused on practical implementation of internet communication. |
| **Layer Interaction** | Strictly defined, each layer serves a unique function. | Layers are more flexible and interdependent. |

**Example Sending an Email in Both Model**

**Step-by-Step (OSI Model):**

1. **Application Layer:** User writes an email in a client like Gmail.
2. **Presentation Layer:** The email content is encoded and compressed.
3. **Session Layer:** A session is established between the sender and receiver.
4. **Transport Layer:** The email is broken into segments and assigned port numbers.
5. **Network Layer:** Each segment gets an IP address for routing.
6. **Data Link Layer:** Frames are created for transmission.
7. **Physical Layer:** The email travels as electrical or optical signals through wires or wireless media.

**Step-by-Step (TCP/IP Model):**

1. **Application Layer:** User writes an email in a client like Gmail.
2. **Transport Layer:** The email is segmented and assigned port numbers.
3. **Internet Layer:** Segments are assigned IP addresses and routed.
4. **Network Access Layer:** Frames are created and transmitted over the physical medium.