

OSI vs TCP/IP Model Explained (CCNA-Friendly Guide)

If you are starting your journey into networking or preparing for the **CCNA**, one of the first concepts you must understand is:

- The **OSI Model**
- The **TCP/IP Model**

These models are not just theory.

They are the foundation of how real networks work, how data moves across the internet, and how engineers troubleshoot problems.

In this blog, we will break down both models in a simple, practical, and job-ready way.

Why Do We Even Need Network Models?

When you send a message, open YouTube, or connect to a website, a lot happens behind the scenes:

- Your device creates data
- That data is packaged
- It travels through routers and switches
- It reaches the destination
- The destination understands it correctly

Without a structured model, networking would be chaos.

That is why engineers use layered models.

A layered model helps us:

- Standardize communication
- Understand protocols clearly
- Troubleshoot network issues faster
- Design scalable networks

What is the OSI Model?

The **OSI Model** stands for:

Open Systems Interconnection Model

It was created as a **7-layer reference model** to describe how communication happens over a network.

Think of OSI as a learning framework.

It helps you visualize networking from:

- Physical cables
to
- Applications like browsers

The 7 Layers of the OSI Model

Here is the OSI model from top to bottom:

Layer	Name	Purpose
7	Application	User services (HTTP, DNS)
6	Presentation	Data formatting, encryption
5	Session	Connection management
4	Transport	Reliable delivery (TCP/UDP)
3	Network	Routing (IP)
2	Data Link	Switching, MAC addressing
1	Physical	Cables, bits, signals

Layer 1: Physical Layer

This is the hardware layer.

Examples:

- Ethernet cables
- Fiber optics
- Radio signals
- Bits traveling as electrical pulses

Layer 2: Data Link Layer

This is where switching happens.

Key concepts:

- MAC addresses
- Ethernet frames
- Switches

Protocols:

- Ethernet
- ARP

Layer 3: Network Layer

This layer handles routing between networks.

Key concepts:

- IP addressing
- Routers
- Packet forwarding

Protocols:

- IPv4 / IPv6
- ICMP

Layer 4: Transport Layer

This layer ensures end-to-end communication.

Two major protocols:

- **TCP** (Reliable, connection-based)
- **UDP** (Fast, connectionless)

Examples:

- Web browsing uses TCP
- Video streaming often uses UDP

Layers 5–7: Session, Presentation, Application

These top layers deal with:

- Managing sessions
- Formatting data
- User-level services

Examples:

- HTTPS encryption
- Web applications
- DNS name resolution

What is the TCP/IP Model?

The **TCP/IP Model** is the real-world networking model used on the internet today.

Unlike OSI, TCP/IP is not just theory.

It was built based on the protocols that actually run the internet.

It has **4 layers**, not 7.

The 4 Layers of the TCP/IP Model

TCP/IP Layer	Equivalent OSI Layers	Example Protocols
Application	Layers 5–7	HTTP, DNS, SSH
Transport	Layer 4	TCP, UDP
Internet	Layer 3	IP, ICMP
Network Access	Layers 1–2	Ethernet, Wi-Fi

OSI vs TCP/IP: Key Differences

Feature	OSI Model	TCP/IP Model
Layers	7 Layers	4 Layers
Purpose	Conceptual reference	Practical real-world use
Used in Internet?	No (mainly for learning)	Yes (internet standard)
Complexity	More detailed	More simplified

How They Work Together in Real Life

When you open a website like:

www.google.com

Here's what happens:

- 1. Application Layer**
Browser sends an HTTP request
- 2. Transport Layer**
TCP establishes connection
- 3. Internet Layer**
IP routes the packet across networks

4. Network Access Layer

Ethernet/Wi-Fi sends it physically

Even though the internet runs on TCP/IP, engineers still use OSI to troubleshoot.

Why This Matters for CCNA and Jobs

Understanding OSI vs TCP/IP helps you answer questions like:

- Why can I ping an IP but not open a website?
- Is this a Layer 2 issue or Layer 3 issue?
- Why is my DNS failing?
- Why is TCP handshake not completing?

In interviews, a strong candidate can say:

“This looks like a Layer 3 routing issue, not an application issue.”

That is the mindset of a real network engineer.

Quick Memory Trick

OSI Layers:

Please Do Not Throw Sausage Pizza Away

- Physical
- Data Link
- Network
- Transport
- Session
- Presentation
- Application

TCP/IP Layers:

ATIN

- Application
- Transport
- Internet
- Network Access

Final Thoughts

The OSI model teaches networking in depth.

The TCP/IP model powers the real internet.

Both are essential for:

- CCNA success
- Troubleshooting skills
- Strong networking fundamentals

If you master these models early, everything else in CCNA becomes easier.