



OSI Model Ke Asan Notes

Cybersecurity Ki Nazar Se: Bilkul Shuruati Level Se Asan Urdu Mein

Taiyar Karda: Syed Ghous

| OSI Model Kya Hai?

Asan Tareen Tareef

Sochein jab aap WhatsApp par "Hi" bhejte hain, to woh raste mein kaise chalta hai? Internet ki duniya mein is poore raste ko samajhne ke liye ek nizam banaya gaya hai, jise hum **OSI Model** kehte hain.

Iske kul **7 Darje (Layers)** hain. Data raste mein inhi layers se guzarta hai.

real-Life Misaal: Khat Likhna

-  **Pehla Kaam:** Aap khat likhte hain (Application).
-  **Dusra Kaam:** Use lifafe mein band karte hain (Presentation).
-  **Tisra Kaam:** Address likh kar dakiya le jata hai (Physical).

| 7 Layers Ek Nazar Mein



L7: Application

Chrome ya WhatsApp
kholna



L6: Presentation

Data ka lock (Encryption)



L5: Session

Rabta jorna aur torna



L4: Transport

Saman sahi se pohanchana



L3: Network

Rasta aur IP Address



L2: Data Link

Switch aur MAC Address



L1: Physical

Asli Tarein aur Signals

| Layer 7: Application Layer (Sabar-e-Awal)

User Ka Seedha Rabta

Yeh woh layer hai jahan aap Chrome, WhatsApp, ya YouTube chalte hain. Yeh computer ko internet chalane ka seedha rasta deti hai.

- HTTP/HTTPS protocols yahan hote hain.
- User se computer ka rabta karwati hai.

Hacker Ka Attack:

Ghalat website codes (SQLi) ya fake login pages bana kar passwords churana.

Bachaao Ki Ghous Tip:

Web Application Firewall (WAF) lagaein aur Double login lock (MFA) lagaein.

| Layer 6: Presentation Layer (Sajawat aur Lock)

Data Ki Shakal aur Security

Is layer ka kaam data ko sahi shakal mein dikhana hai (Jaise text ko tasveer ya video banana). Sab se barh kar, yeh raste ke liye data ko lock lagati hai.

- Data ko **Encrypt (Lock)** aur Decrypt karti hai.
- JPEG, MP4 aur SSL/TLS yahan kaam karte hain.

Hacker Ka Attack:

SSL/TLS lock ko raste mein se todna (SSL Stripping attack).

Bachhao Ki Ghous Tip:

Hamesha naye aur mazboot algorithms (Jaise TLS 1.3) ka istemal karein.

| Layer 5: Session Layer (Rabta Jorna)

Connections Ko Chalana

Jab do computers aapas mein baat karte hain, to unke darmiyan ek rasta khul jata hai. Yeh layer us raste ko kholti hai, chalati hai, aur khatam karti hai.

- Do devices ke darmiyan sessions manage karti hai.
- Maslan, Zoom call par rabta rakhna.

Hacker Ka Attack:

Connection ke darmiyan mein ghus kar login session ko chorna (Session Hijacking).

Bachaao Ki Ghaus Tip:

Makhsoos waqt ke baad automatic logout setting (Session Timeout) lagaein.

| Layer 4: Transport Layer (Saman Pohunchana)

Data Ko Chhote Tukron Mein Bantna

Bade data ko chote chote packets (Segments) mein banta jata hai taake rasta aasani se tay ho sakay. Yahan 2 bade tareeqe hain:

- **TCP:** Guaranteed delivery (Thoda slow par zaroori).
- **UDP:** Boht tez delivery (Live calls ke liye behtareen).

Hacker Ka Attack:

Computer ko fuzool messages bhej kar jam karna (SYN Flood DDoS Attack).

Bachhao Ki Ghous Tip:

Firewall par rate-limiting lagaein taake koi limit se zyada message na bhej sakay.

| Layer 3: Network Layer (IP Address & Rasta)

Rasta Dikhane Ka Kaam

Duniya ke har computer ka ek makhsoos address hai jise hum **IP Address** kehte hain. Yeh layer sab se chota rasta dhoond kar data ko manzil tak bhejti hai.

- Data ke tukray ko **Packet** kaha jata hai.
- Routers yahan par kaam karte hain.

Hacker Ka Attack:

Nakli IP address bana kar system ko dhoka dena (IP Spoofing).

Bachhao Ki Ghaus Tip:

Routers par strict filtering rules (ACLs) lagaein jo nakli IP ko bahaar rok dein.

| Layer 2: Data Link Layer (Hardware Address)

Ghar Ka Asli Address

Ghar ke andar laga router har machine ko uske pakke hardware address se pehchanta hai, jise **MAC Address** kehte hain. Yeh local network ka rasta sambhalti hai.

- Data yahan **Frames** ki shakal mein hota hai.
- Switches aur MAC Addresses yahan aate hain.

Hacker Ka Attack:

Router ko galat MAC batana aur sara data chura lena (ARP Spoofing).

Bachhao Ki Ghaus Tip:

Switches ke andar "Dynamic ARP Inspection" aur port security lagaein.

| Layer 1: Physical Layer (Tarein aur Current)

Haqeeqi Hardware

Yeh bilkul aakhri zameeni layer hai. Is mein internet ki tarein (Cables), fiber optic aur Wi-Fi ke signals aate hain. Data yahan binary current ban kar dodta hai.

- Data ko **0 aur 1 (Bits)** mein bheja jata hai.
- Cables, Hubs, aur Wi-Fi physical waves yahan hoti hain.

Hacker Ka Attack:

Asli taar ko beech mein se kaat kar data nikalna (Wiretapping).

Bachhao Ki Ghous Tip:

Server room ko tala lagaein aur biometrics/cameras ka istemal karein.

| Syed Ghous Ki Sab Se Badi Tip



Defense-In-Depth Concept

Cybersecurity mein agar aap ne sirf Layer 7 par firewall lagaya par kisi ne aap ki asli internet ki taar (Layer 1) chura li, to poora network band ho jaye ga!

Nateeja: Aik kamyab cybersecurity expert banne ke liye aap ko har aik layer ki hifazat (Security) par kaam karna hota hai.



Sawal / Jawab?

Mere Notes Parhne Ka Boht Boht Shukriya!

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| Image Sources

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