Lesson 2 -> Http vs Https

1️⃣ What is HTTP?

📌 Definition

HTTP (HyperText Transfer Protocol) is a protocol used for communication between a client (browser/app) and a server.
Consider it as a language which is used for communication on web, just like communication language like Hindi, english it is for web related operations between a client and server.

🔁 How it works

- Client sends request
- Server responds with data
- Data is sent in **plain text**

⚠️ Key Problem

> Anyone on the network can read or modify the data.

🌍 Example

http://example.com/login

📉 Risks

- Passwords visible
- Data can be tampered
- Vulnerable to man-in-the-middle attacks

2️⃣ What is HTTPS?

📌 Definition

HTTPS (HTTP Secure) is HTTP **over TLS/SSL encryption**.

Why https when http is already there ?

https is secured compared to http, http exposes user's information. Following are the steps how https works.

🔐 How it works

- Client and server establish a secure connection
- Data is **encrypted**
- Identity of server is verified

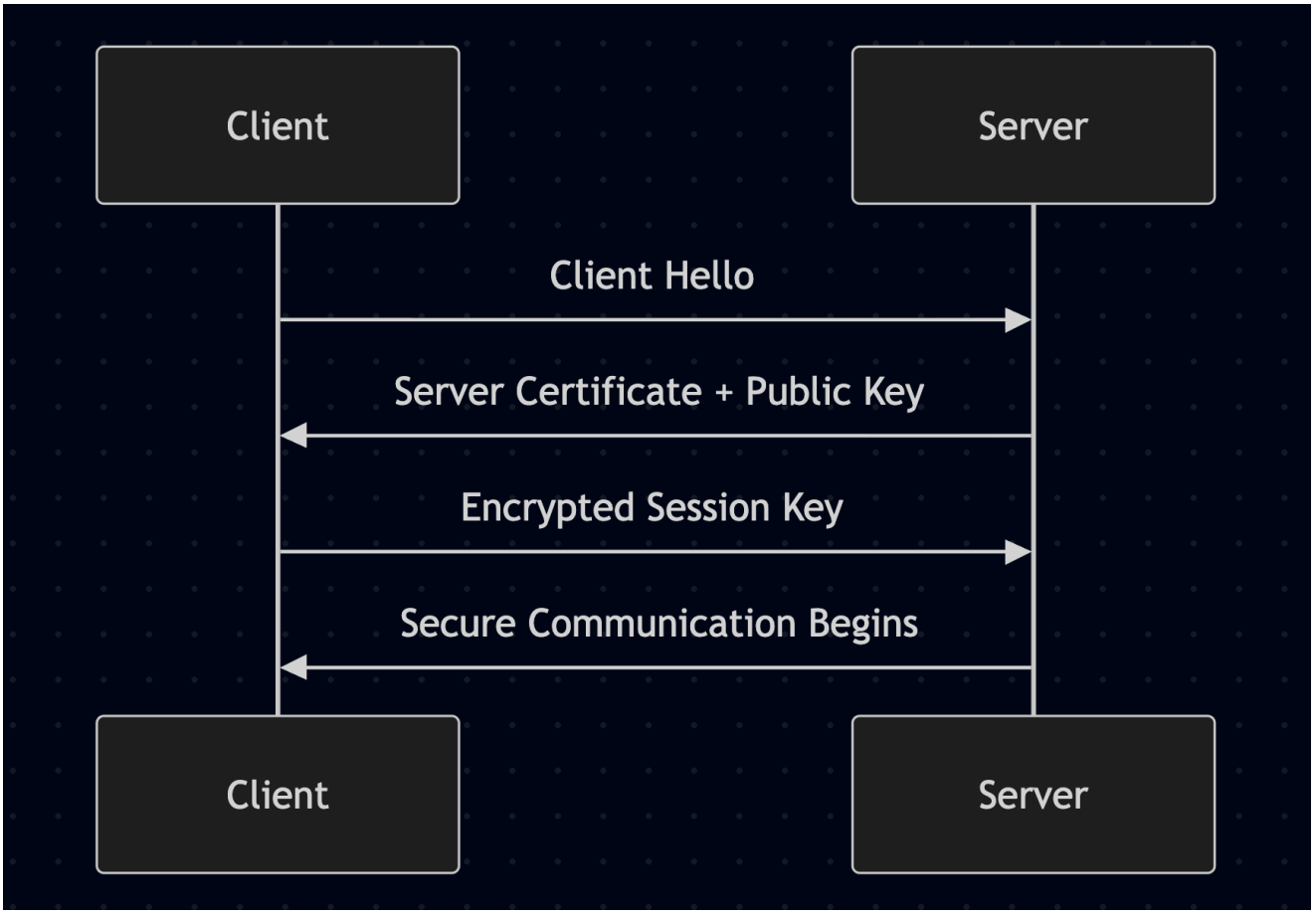
🌍 Example

https://example.com/login

3️⃣ Core Differences

Feature	HTTP	HTTPS
Encryption	❌ No	✅ Yes (TLS)
Data Safety	❌ Unsafe	✅ Secure
Authentication	❌ No	✅ Server identity verified
Port	80	443
Performance	Slightly faster	Slightly slower (negligible today)

HTTPS working between client and server



HTTPS is HTTP over TLS (Transport Layer Security).

It adds three critical guarantees:

1. Encryption
   Data is encrypted, so even if someone intercepts it, they cannot read it.
2. Authentication
   The server proves its identity using a certificate issued by a trusted Certificate Authority (CA).
3. Integrity
   Data cannot be modified in transit without detection.

To the application, it still looks like HTTP:

- Same methods (GET, POST)
- Same headers
- Same APIs

The difference is how data travels on the wire.