# Laporan Praktikum Pemrograman Jaringan


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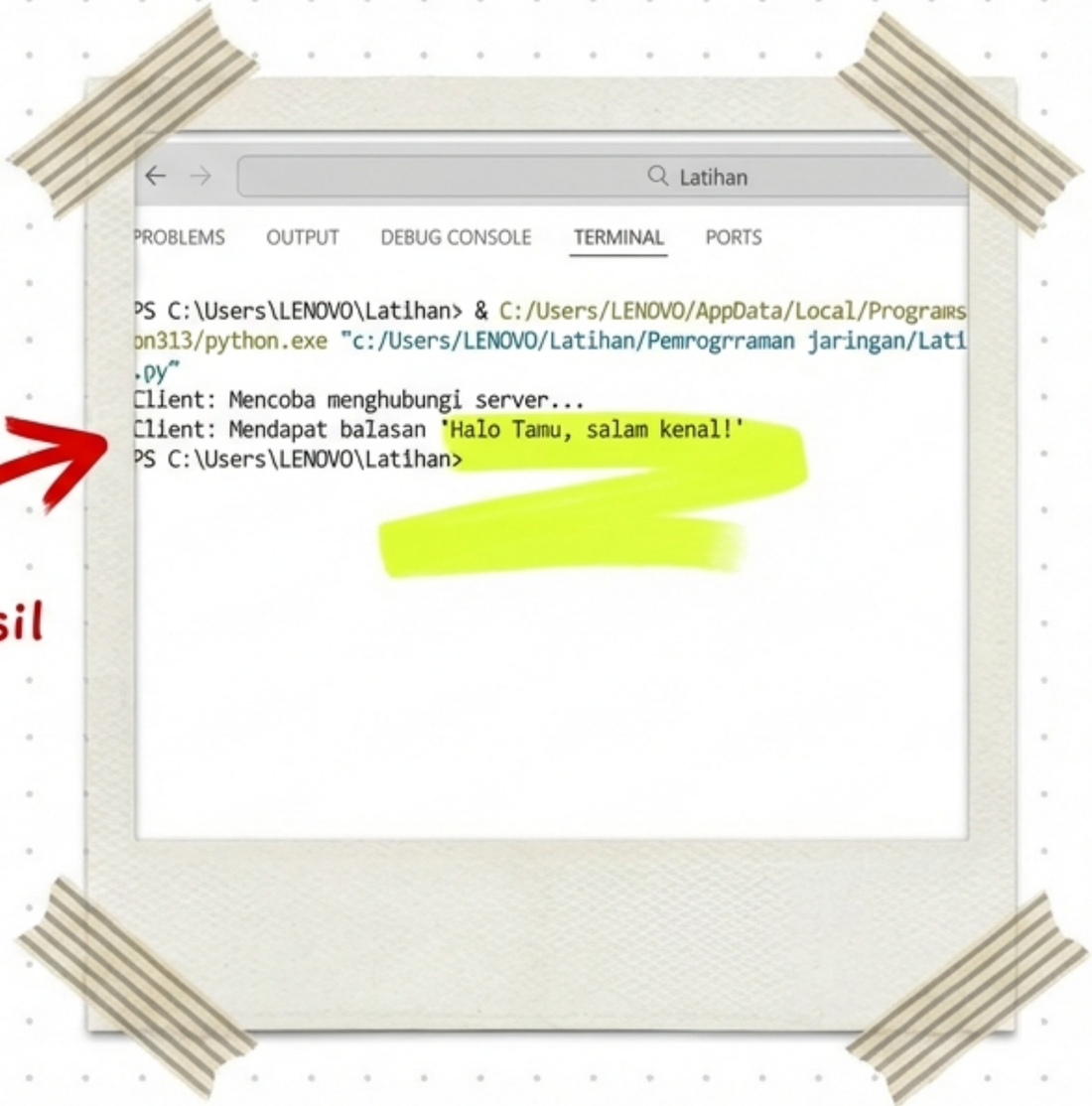
# Bab 1 & 2: Identitas & Koneksi Pertama

Konsep Dasar: Server itu tuan rumah yang 'mengundang', Client itu tamu yang 'berkunjung'.


Identitas Perangkat:
Hostname: Lenovo
IP Address: 192.168.1.25

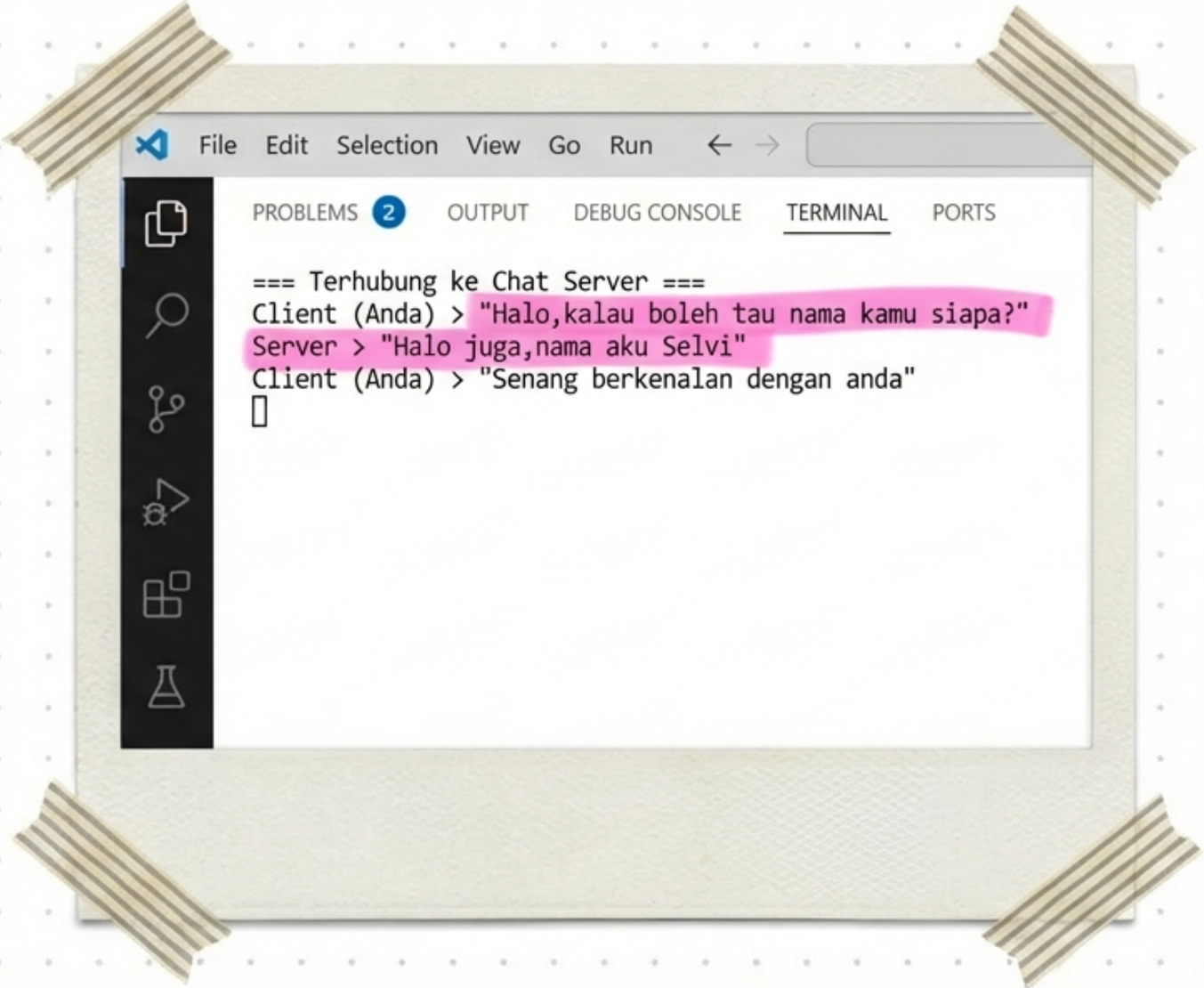
```
PS C:\Users\LENOVO\Latihan> & C:\Users\LENOVO\AppData\Local\Programs\Python\Python313\python.exe "c:\Users\LENOVO\Latihan\Pemrograman jaringan\latihan_1.py"
=== Network Information Tool ===
Hostname  : Lenovo
IP Address: 192.168.1.25
PS C:\Users\LENOVO\Latihan>
```

Socket berhasil terikat! (Bound)



# Bab 3: Protokol TCP (Si Paling Teratur)

- Percobaan: Aplikasi Chatting.
- Sifat TCP: Connection-oriented. Artinya, pastikan nyambung dulu, baru ngobrol.
- Keunggulan: Data dikirim berurutan (reliable). Tidak ada pesan yang hilang di jalan.

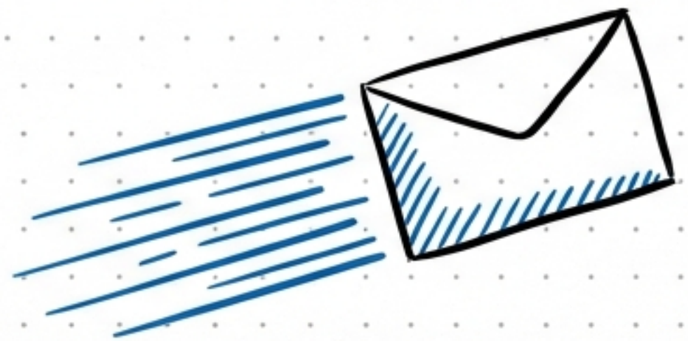


# Bab 4: Protokol UDP (Ngebut & Streaming)

Eksperimen: Kirim data sensor (Suhu & Kelembaban).

Sifat UDP: Connectionless. Kirim terus tanpa basa-basi (Fire & Forget).

Kenapa UDP? Lebih cepat! Cocok untuk streaming data realtime.

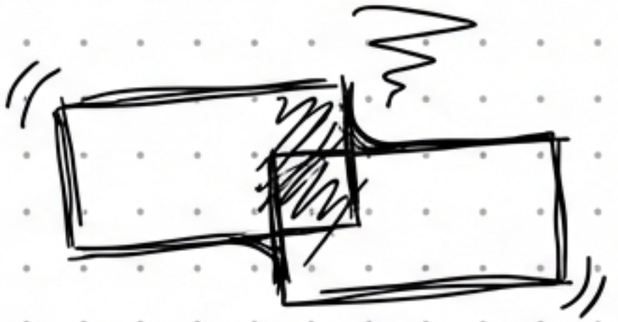


```
=== UDP Monitoring Server Berjalan ===
Menunggu data senser...
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:25C|HUM:52%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:25C|HUM:42%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:36C|HUM:33%
[Sensor ('127.0.0.1', 57136)] Melaporkan: TEMP:38C|HUM:50%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:38C|HUM:64%
[Sensor ('127.0.0.1', 57136)] Melaporkan: TEMP:33C|HUM:64%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:33C|HUM:62%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:33C|HUM:63%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:33C|HUM:44%
[Sensor ('127.0.0.1', 57136)] Melaporkan: TEMP:33C|HUM:50%
[Sensor ('127.0.0.1', 57136)] Melaporkan: TEMP:23C|HUM:38%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:26C|HUM:77%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:27C|HUM:84%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:27C|HUM:66%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:26C|HUM:51%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:22C|HUM:63%
[Sensor ('127.0.0.1', 57136)] Melaporkan: TEMP:23C|HUM:68%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:23C|HUM:78%
[Sensor ('127.0.0.1', 57136)] Melaporkan: TEMP:23C|HUM:27%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:23C|HUM:98%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:34C|HUM:59%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:29C|HUM:59%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:29C|HUM:88%
[Sensor ('127.0.0.1', 57136)] Melaporkan: TEMP:22C|HUM:64%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:22C|HUM:86%
[Sensor ('127.0.0.1', 57136)] Melaporkan: TEMP:32C|HUM:52%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:35C|HUM:63%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:35C|HUM:47%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:33C|HUM:48%
[Sensor ('127.0.0.1', 57136)] Melaporkan: TEMP:32C|HUM:54%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:22C|HUM:55%
[Sensor ('127.0.0.1', 57136)] Melaporkan: TEMP:31C|HUM:66%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:32C|HUM:67%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:32C|HUM:77%
[Sensor ('127.0.0.1', 57156)] Melaporkan: TEMP:25C|HUM:69%
```

# Bab 5 & 7: Merapikan Data (Framing & JSON)

## Masalah

Sticky Packet: Pesan nempel jadi satu.



## Solusi

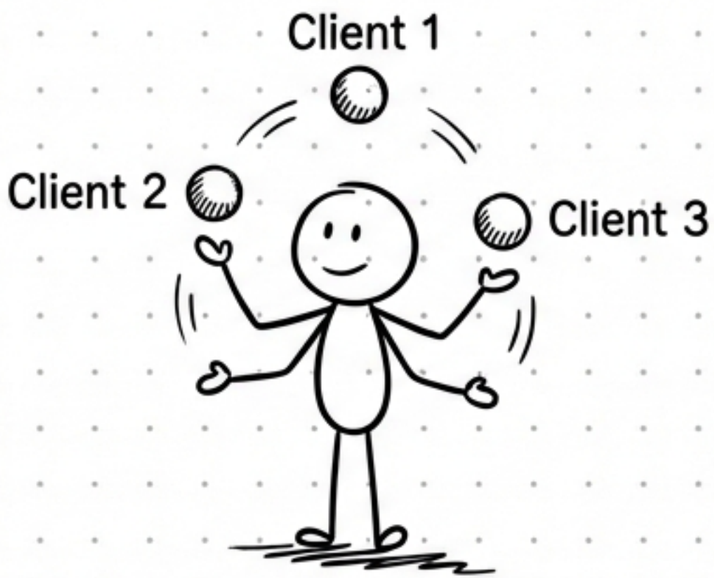
1. Framing: Memberi batas jelas.
2. Serialisasi (JSON): Membungkus objek Python jadi teks standar.

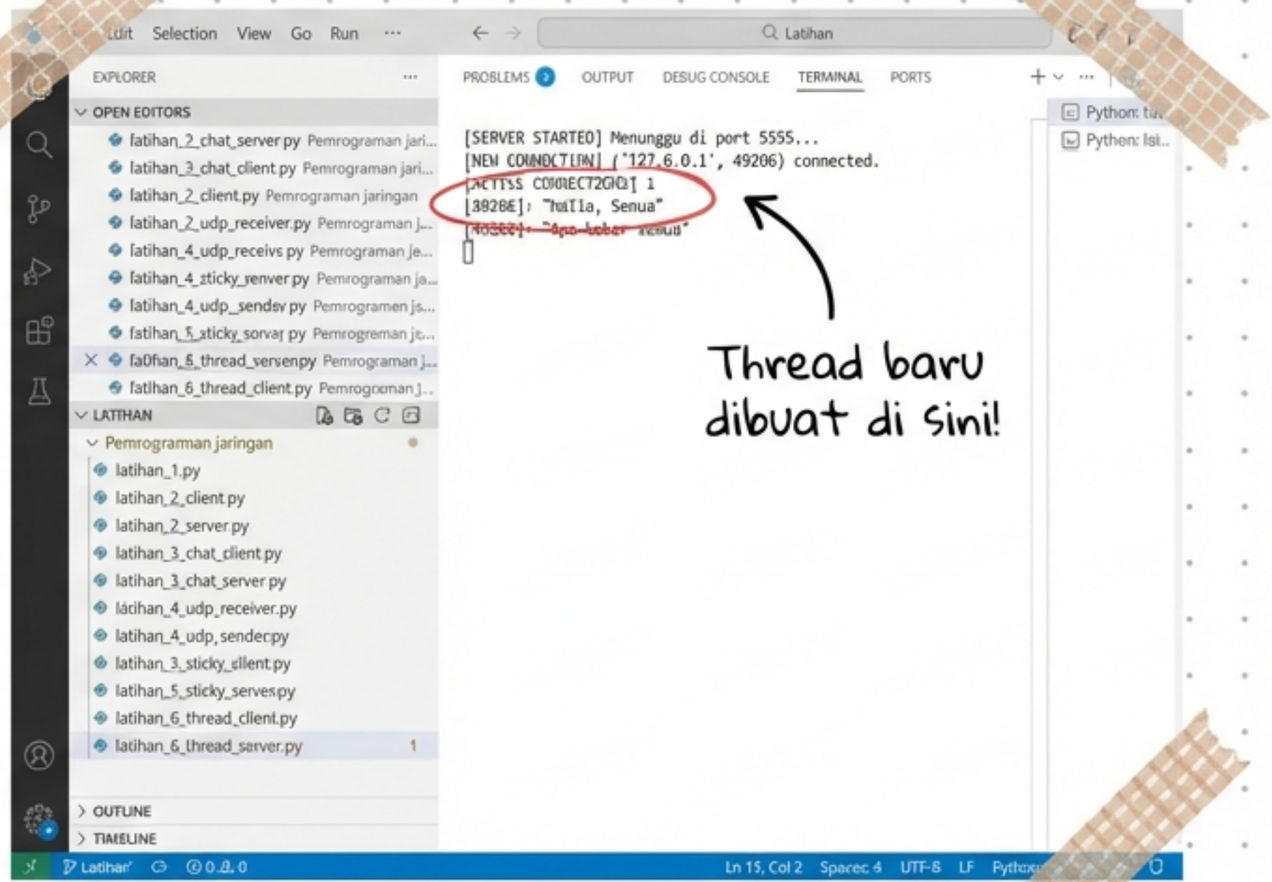
```
engirim Request untuk NIM: 101...
Respon Server: {
  "status": "SUKSES",
  "data": {
    "nama": "Budi Santoso",
    "prodi": "Teknik Informatika",
    "ipk": 3.75
  }
}
Mengirim Request untuk NIM: 999...
Respon Server: {
  "status": "GAGAL",
  "pesan": "NIM tidak ditemukan"
```

Data Rapih

# Bab 6: Threading (Multitasking Server)

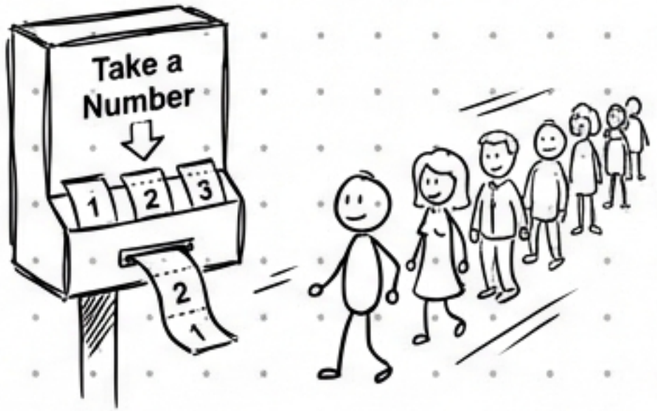
- **Tantangan:** Bagaimana jika banyak client datang bersamaan?
- **Solusi:** Threading. Setiap client dilayani oleh 'pekerja' (thread) terpisah.
- **Hasil:** Komunikasi lancar secara paralel. Server tidak bengong.

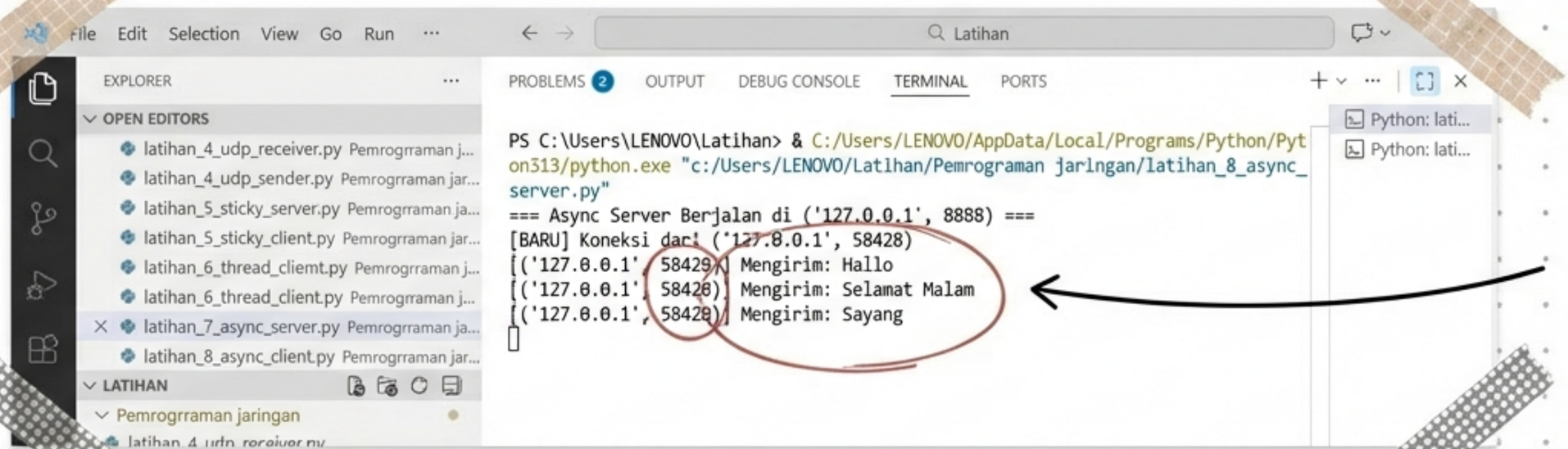


# Bab 8 & 9: Efisiensi Tinggi (Async & Multiplexing)

Upgrade Skill: Daripada pakai banyak thread (berat), lebih baik pakai Asynchronous I/O.
Metode: select atau poll.
Logika: Server memantau semua socket sekaligus. Siapa yang siap, dia yang diproses. Tanpa blocking!




Satu server, banyak tamu, nol lag.

# Bab 10: Masuk ke Web (Protokol HTTP)

**Eksperimen:** Bikin Web Server sendiri pakai Python Socket.
**Konsep:**
Browser (Request) <--> Server (Response).
**Target:**
http://localhost:8080


Rendering HTML dari kode kita!

# Bab 11: Mengambil Data Dunia (REST API)

Misi: Cek cuaca Jakarta & Makassar via API.

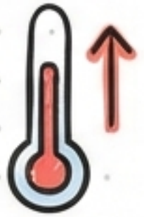
Format Pertukaran: JSON lagi!

Integrasi: Aplikasi kita request → Server API kasih data.

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

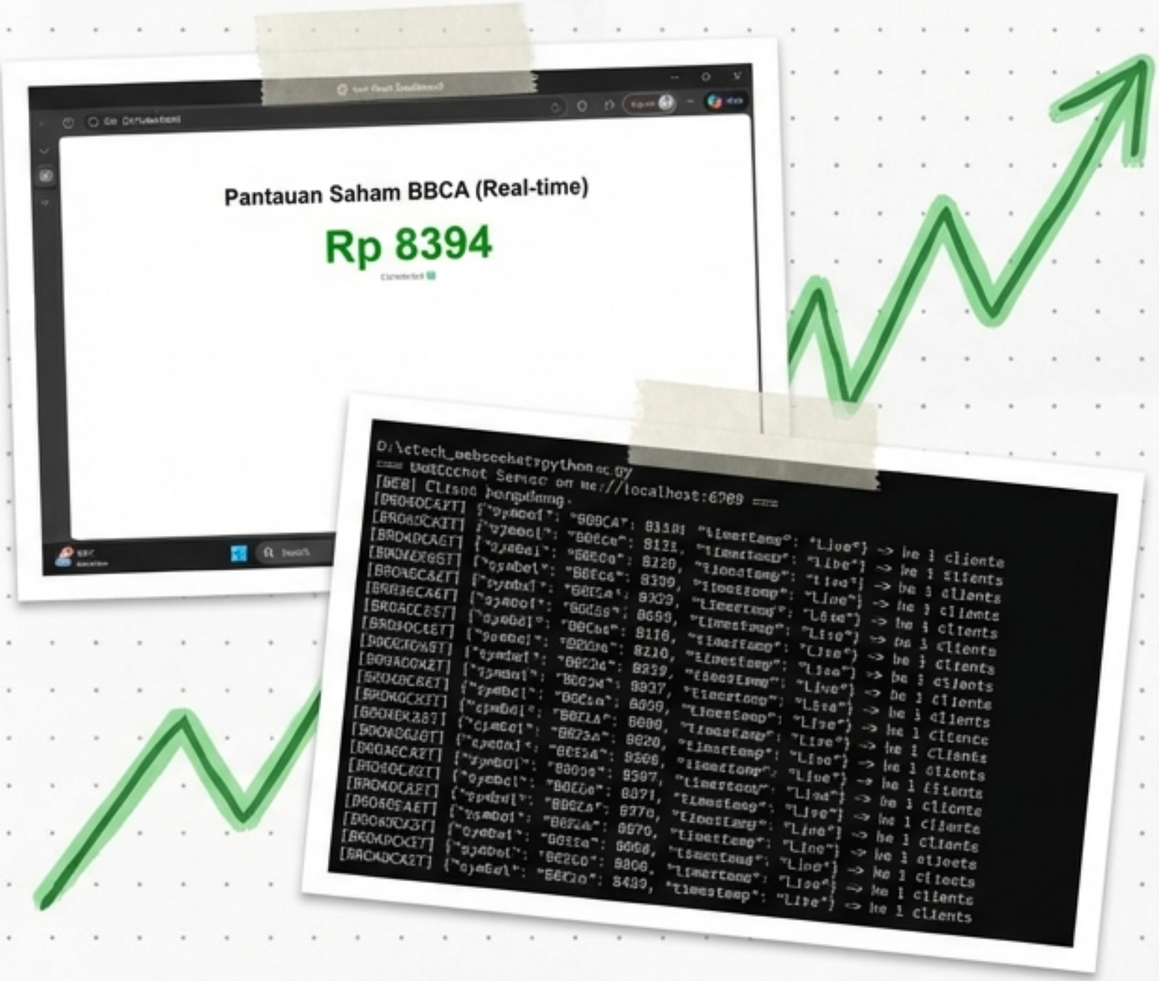
```
--- Mengambil Data Cuaca untuk Jakarta ---
🌡️ Suhu Saat Ini: 24.9°C
💨 Kecepatan Angin: 5.4 km/h
🌍 Koordinat: -6.2088, 106.8456

--- Mengambil Data Cuaca untuk Makassar ---
🌡️ Suhu Saat Ini: 28.9°C
💨 Kecepatan Angin: 27.2 km/h
🌍 Koordinat: -5.1477, 119.4327
PS C:\Users\LENOVO\Latihan>
```

Real Data



# Bab 12: Real-Time Communication (WebSocket)

- **Kasus:** Pantauan Saham BBCA.
- Bedanya sama HTTP? WebSocket salurannya terbuka terus. Tidak perlu refresh.
- **Hasil:** Angka saham berubah sendiri di layar secara live. Real-time.



# Bab 13: Keamanan (Secure Socket Layer)

**Penting!** Data tidak boleh polos (plain text).

**Teknik:** SSL Handshake & Enkripsi.

**Bukti Aman:** Pesan didekripsi di server, tapi di jaringan "teracak".

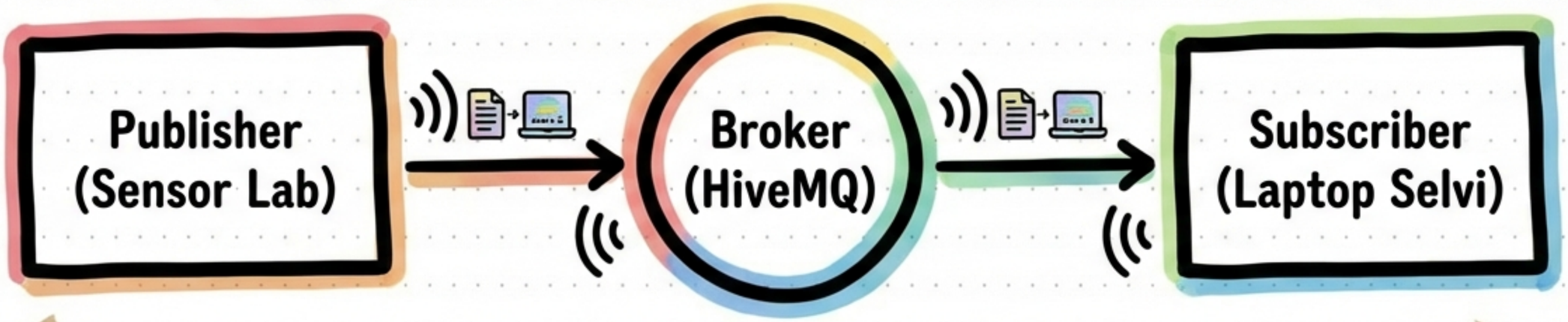
```
Secure Server
Secure Server listening on port 10023...
[SECURE] SSL Handshake sukses dengan ('127.0.0.1', 63623)
Pesan (Decrypted): Halo, ini pesan rahasia CIA.
[SECURE] SSL Handshake sukses dengan ('127.0.0.1', 62920)
Pesan (Decrypted): Halo, ini pesan rahasia CIA.
```

# Bab 14: Internet of Things (MQTT)

Arsitektur: Pub/Sub Model.

Protokol: Ringan, hemat bandwidth.

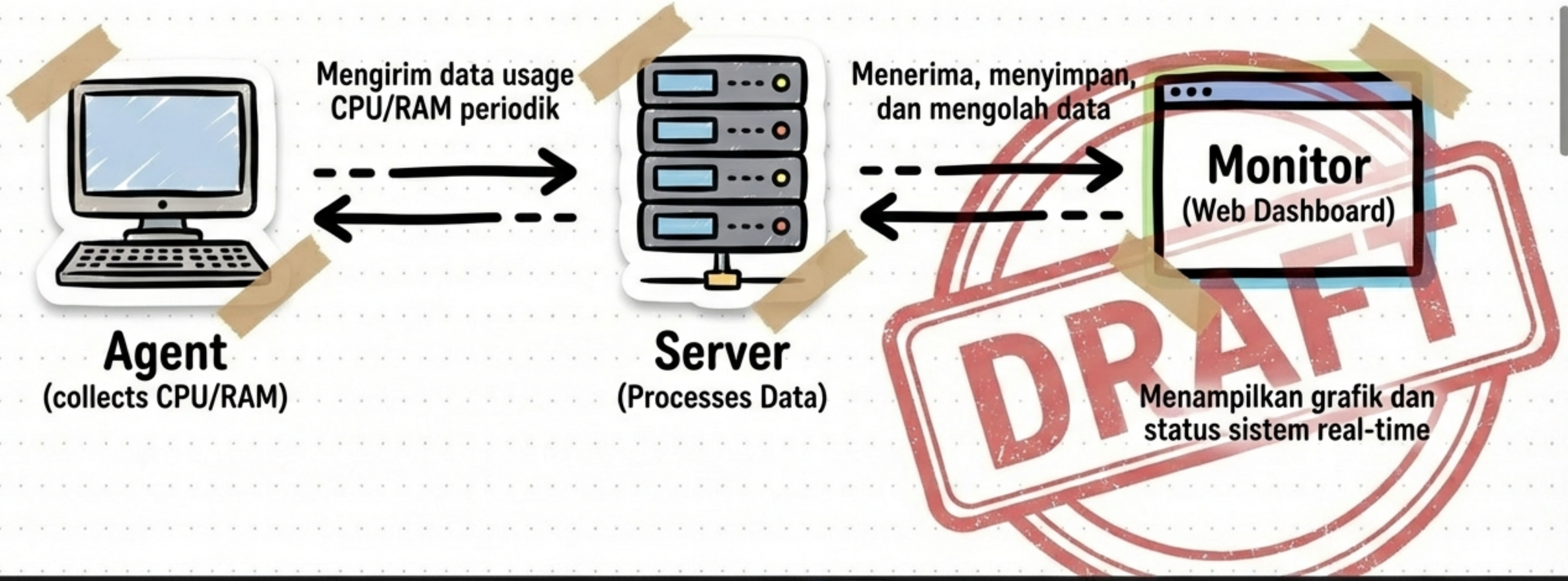
Lokasi Sensor: Lab Komputer & Kantin.




```
[SUKSES] Terhubung ke Broker!
Data Masuk dari [lab_komputer]: 20.72°C
Data Masuk dari [kantin]: 31.98°C
Data Masuk dari [kantin]: 23.74°C
Data Masuk dari [lab_komputer]: 22.41°C
Data Masuk dari [kantin]: 31.97°C
Data Masuk dari [lab_komputer]: 21.66°C
```

# Bab 15: Proyek Akhir (Capstone Project)

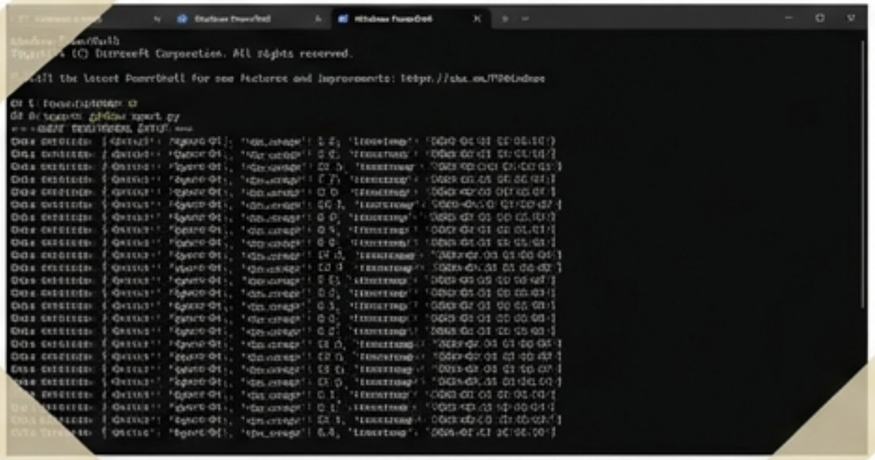
## Rancangan Sistem Monitoring Terdistribusi

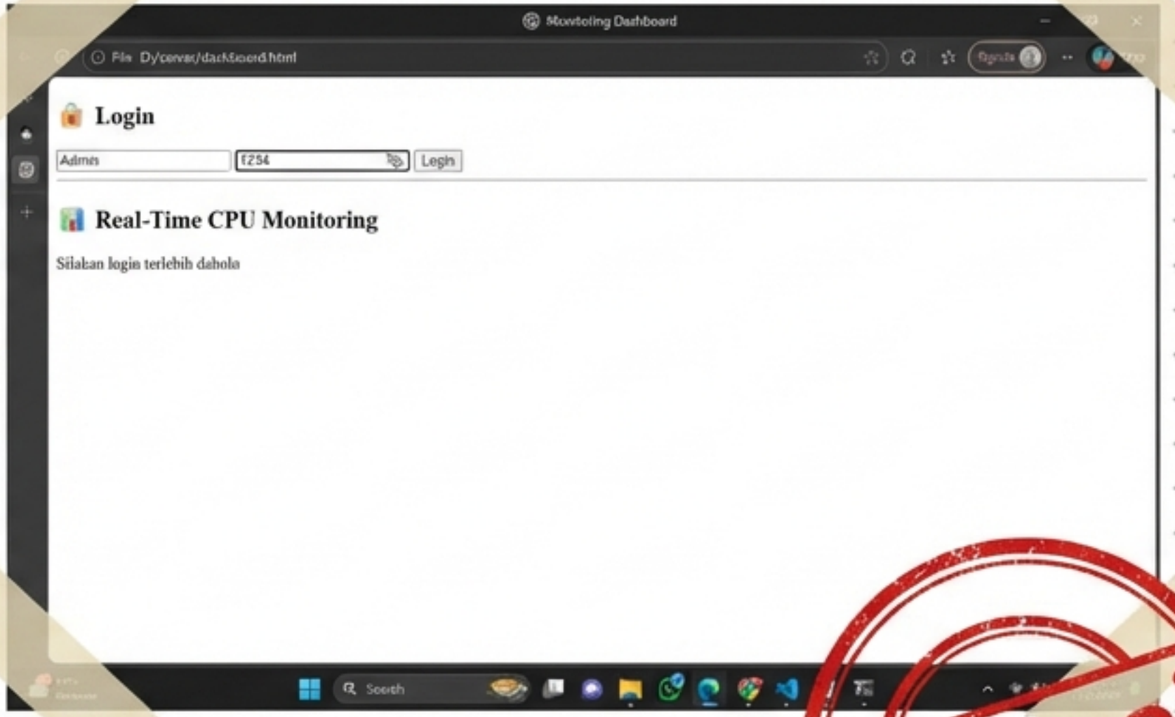


# Hasil Proyek: Real-Time CPU Monitor

Berhasil! Agent mengirim data, Server memproses, Dashboard menampilkan.

Status: Running on http://127.0.0.1:5000






# Rangkuman (Cheat Sheet)

| Protokol | Kegunaan | Sifat |
|---|---|---|
| TCP | Chat, File Transfer | Reliable, Connection-oriented |
| UDP | Streaming, Game | Cepat, Connectionless |
| HTTP | Web Browsing | Request-Response |
| WebSocket | Real-time Dashboard | Bi-directional, Live |
| MQTT | IoT Sensor | Ringan, Pub/Sub |

**Terima kasih! Sampai jumpa di semester depan. - Selvi**