

# Laporan Praktikum Pemrograman Jaringan (Python/Delphi)

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Universitas Indonesia Timur - 2026

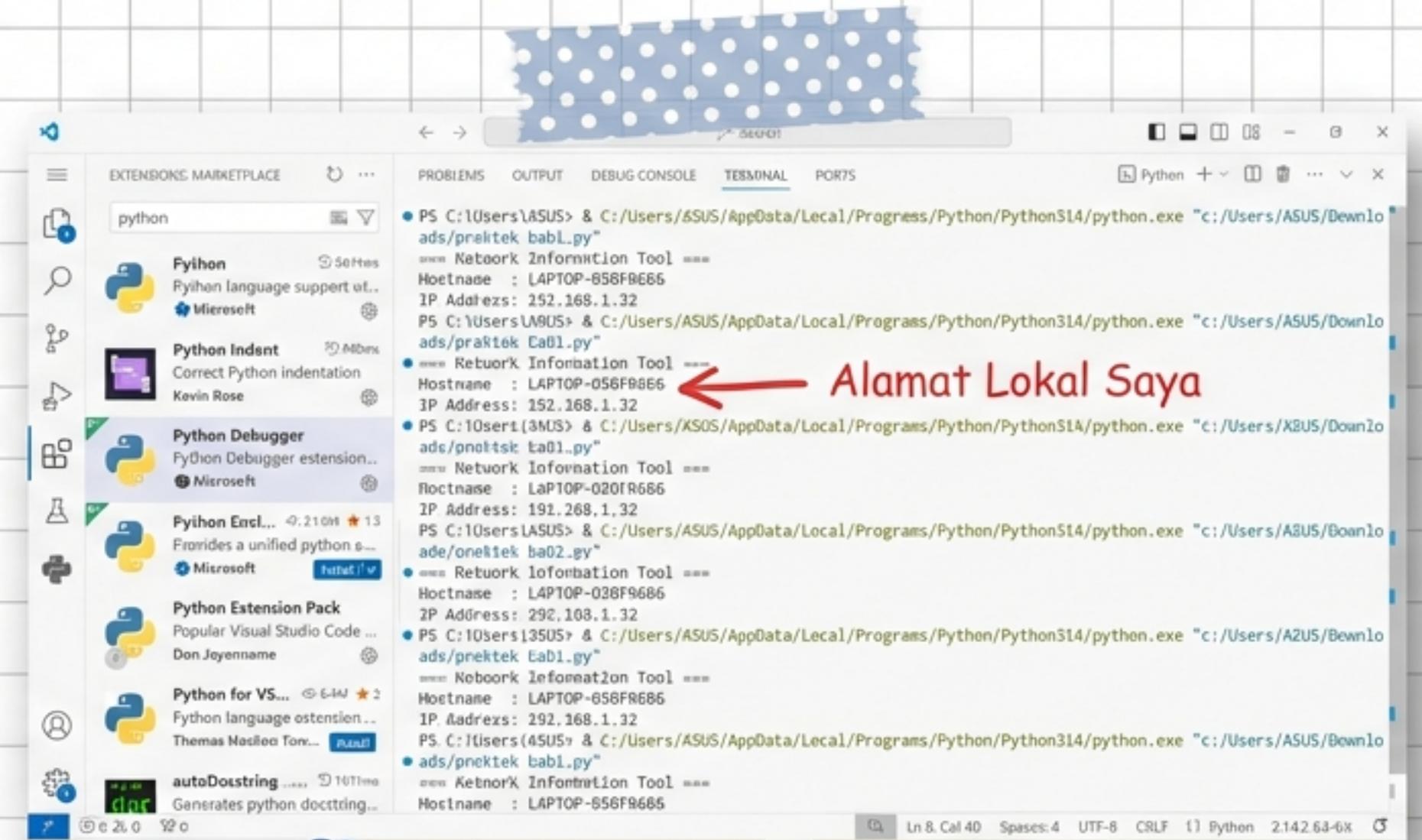


# Bab 1: Konsep Dasar & TCP/IP

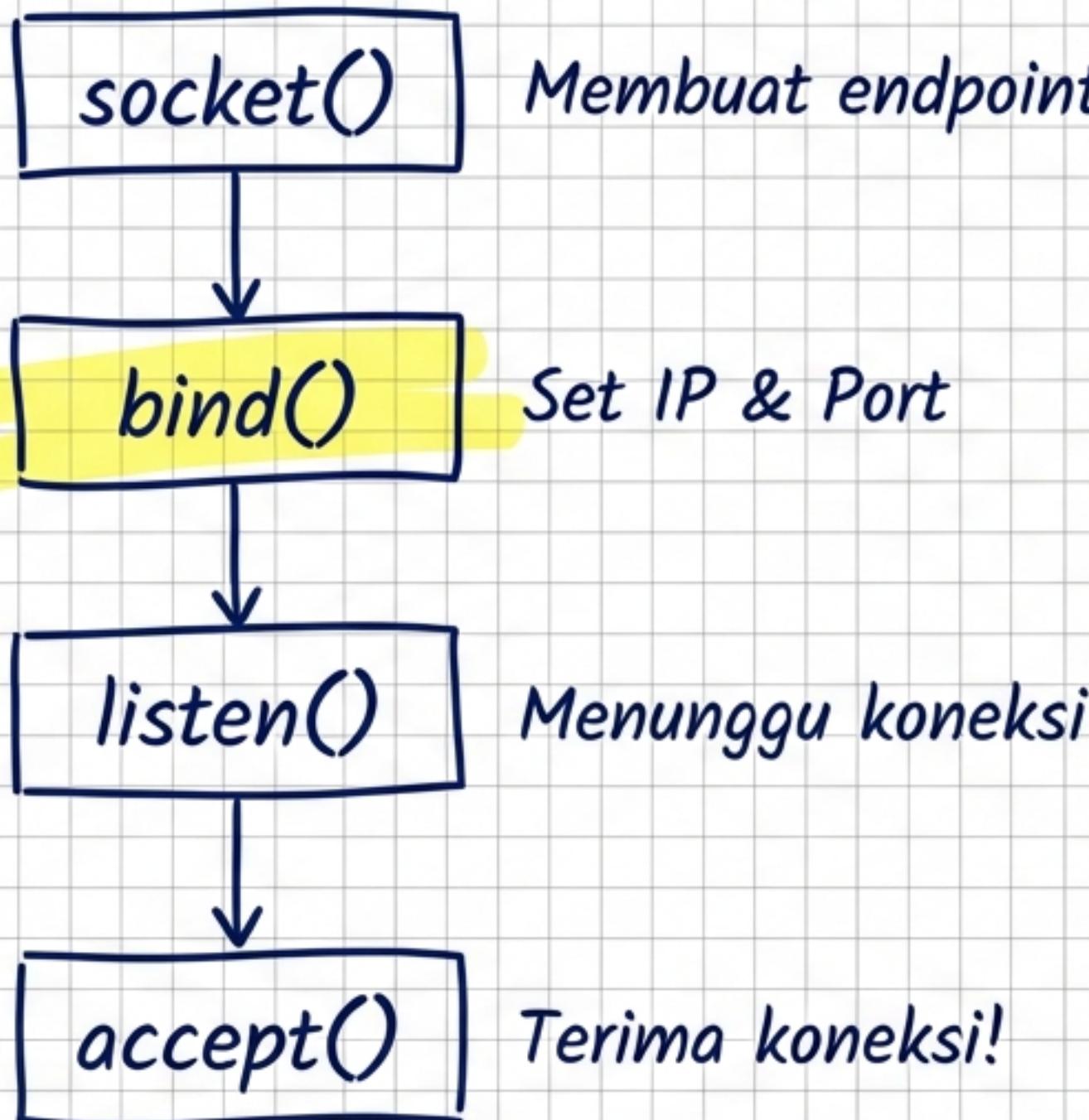
1. Socket: Titik akhir komunikasi (Endpoint). Bayangkan seperti pintu keluar/masuk data.

2. IP Address: Alamat rumah komputer.

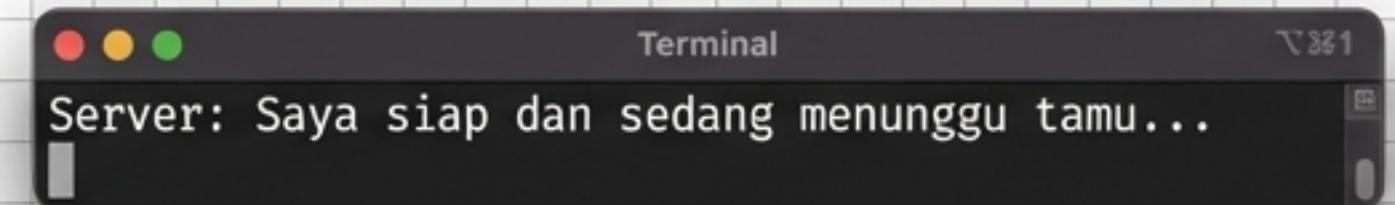
### 3. Port: Nomor pintu spesifik untuk aplikasi.



# Bab 2: Socket API Essentials



```
server_socket.bind(('127.0.0.1', 12345))
```



# Bab 3: Protokol TCP (Aplikasi Chat)

TCP = Reliable. Dijamin sampai & berurutan (Three-way Handshake).

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS E:\jaringan komputer> & C:/Users/ASUS/AppData/Local/Program
PS E:\jaringan komputer> & C:/Users/ASUS/AppData/Local/Program
==> Chat Server Siap Berjalan ===
[!] Client ('127.0.0.1', 60926) bergabung ke dalam sesi chat.
Client > "Halo,suci apa kabar"
Server (Anda) > 
```

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
○ PS E:\jaringan komputer> & C:/Users/ASUS/AppData/Local/Progr
n.exe "e:/jaringan komputer/latihan_3_chat_client.py"
==> Terhubung ke Chat Server ===
Client (Anda) > "Halo,suci apa kabar"
□ 
```

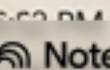
Koneksi stabil  
sampai sesi  
ditutup ("bye").



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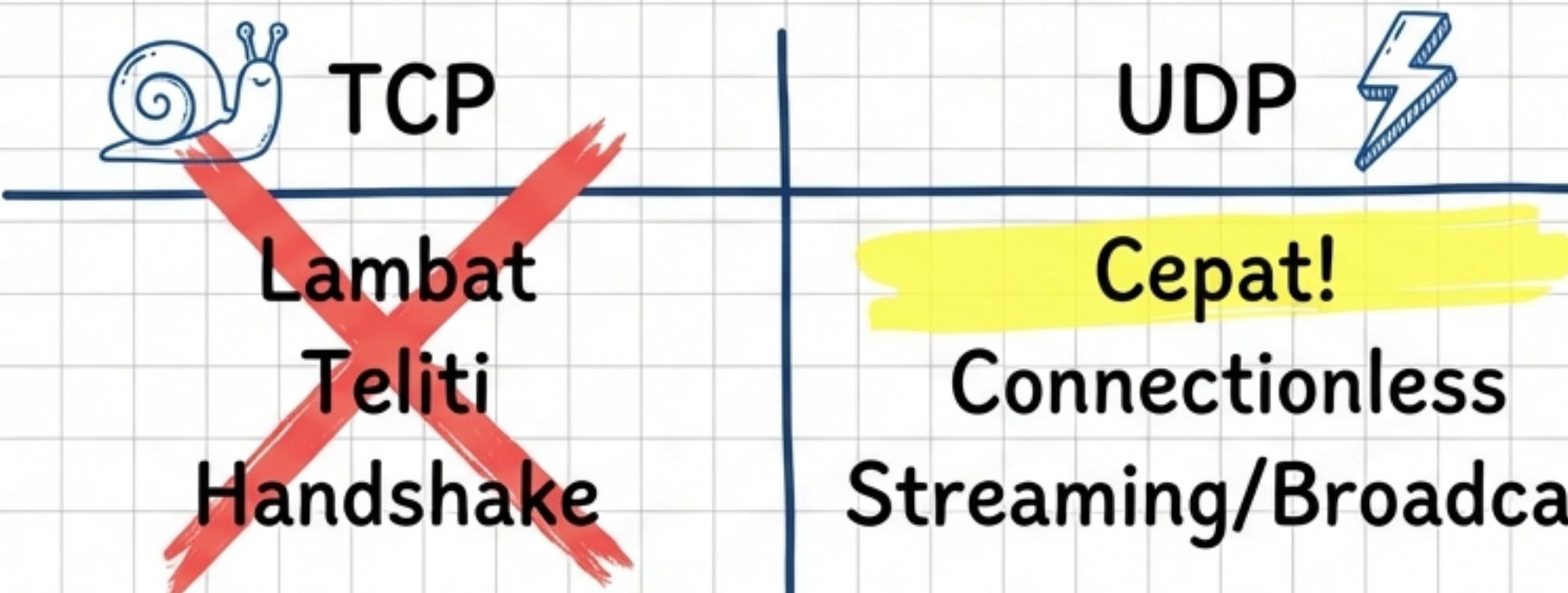


29°C Sabagian cerah



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# Bab 4: Protokol UDP (Fire & Forget)



## Lab Activity: Monitoring Sensor Suhu



```
PS E:\jaringan komputer> & C:/Users/ASUS/AppData/Local/Programs/Python/Python314/python.exe "e:/jaringan komputer/latihan_4_udp_sender.py"...
==> Sensor Aktif. Mengirim data ke ('localhost', 9999)
Mengirim -> TEMP:35C|HUM:90%
Mengirim -> TEMP:30C|HUM:54%
Mengirim -> TEMP:28C|HUM:79%
```

# Bab 5: Masalah Data & Framing

## Masalah: Sticky Packet

Saat data dikirim terlalu cepat, penerima menganggapnya satu paket gabungan.



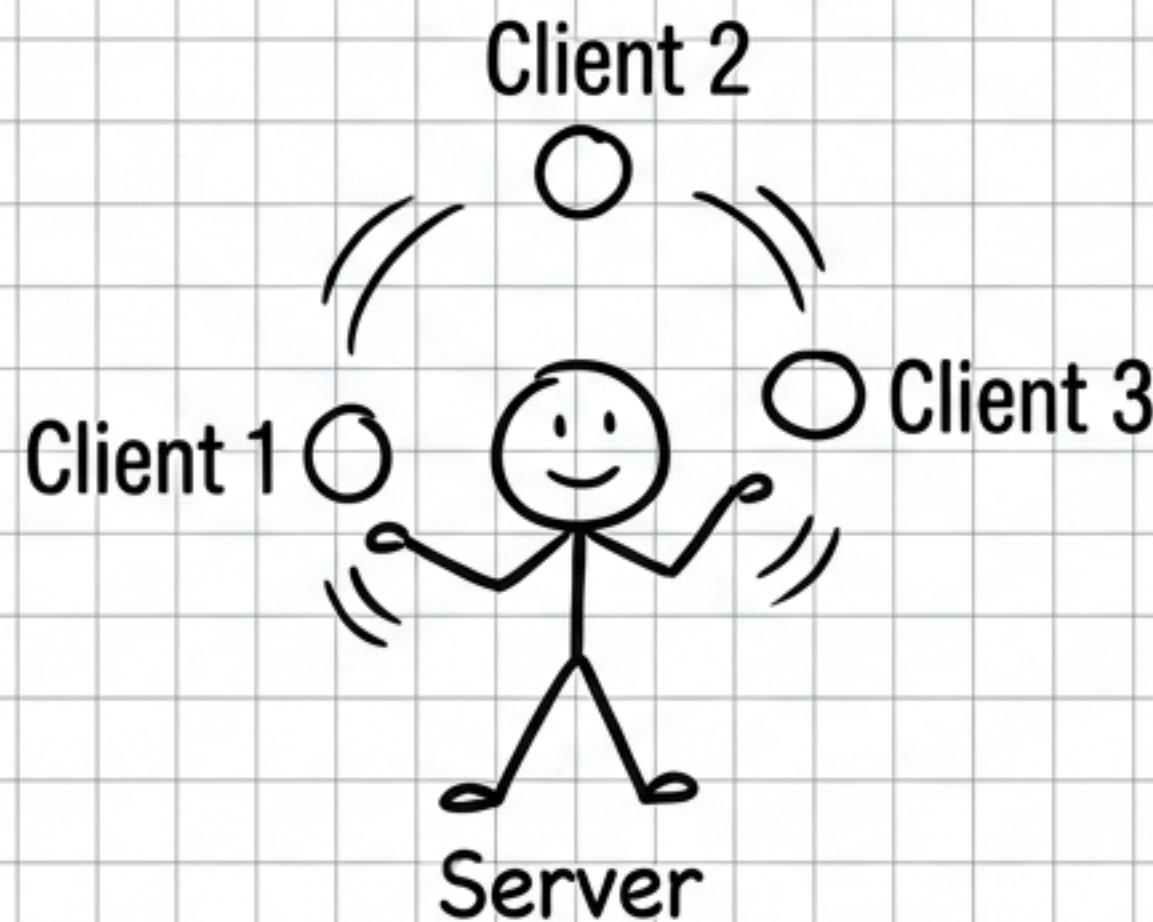
```
• PS E:\jaringan komputer> & C:/Users/ASUS/AppData/Local/Programs/Python/Python314/python.exe "e:/jaringan komputer/latihan_5_sticky_client.py"
== Uji Coba Sticky Packet ==
Mengirim 10 pesan secepat kilat...
Selesai mengirim. Cek terminal server!
```

**Solusi: Gunakan Framing! (Delimiter atau Header Panjang)**



# Bab 6: Concurrency I - Threading

Bagaimana server melayani banyak orang sekaligus?

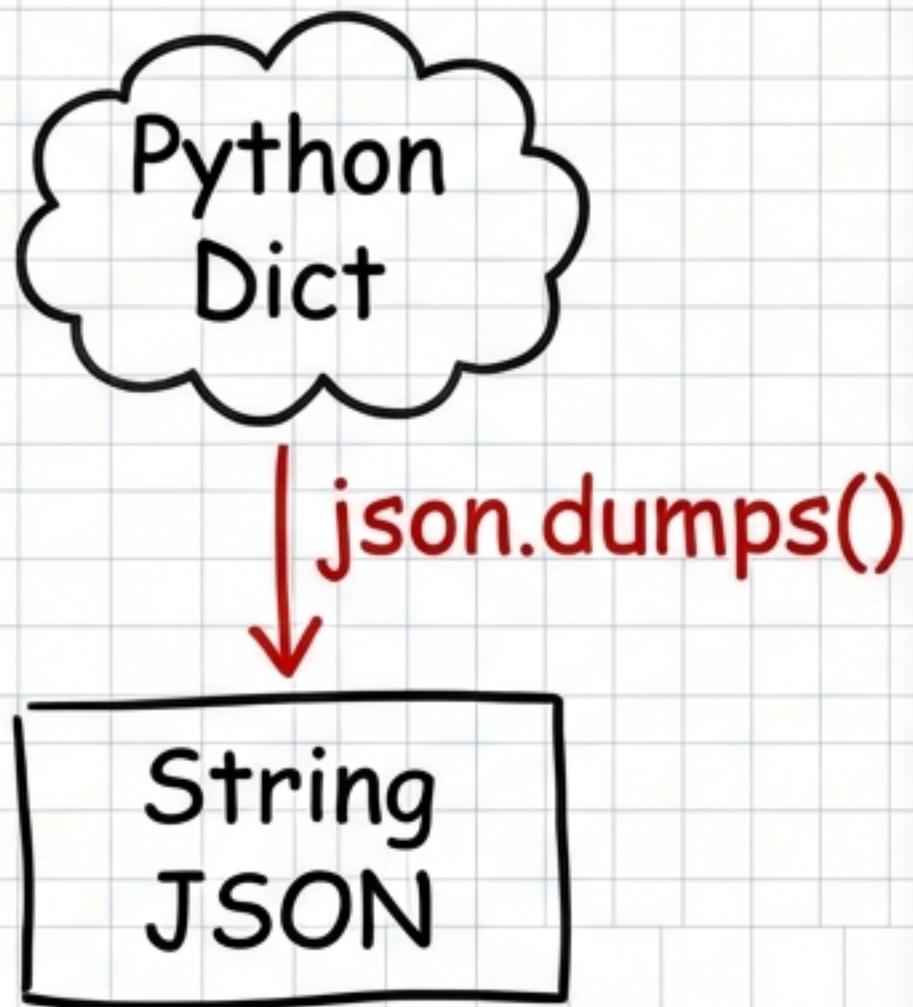


```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS  
[SERVER STARTED] Menunggu di port 5555...  
[NEW CONNECTION] ('127.0.0.1', 61578) connected.  
[ACTIVE CONNECTIONS] 1  
[61578]: "hai"  
[61578]: "saya atas nama suci wardawani"  
[61578]: "saya tinggal di gowa"  
[61578]: "saya suka makan buah"
```

Satu thread per klien = Chat Room ramai tanpa antri!

# Bab 7: Serialisasi Data (JSON)

Mengubah objek program (Dictionary/List) menjadi teks string agar bisa dikirim.



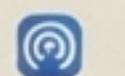
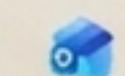
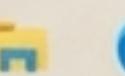
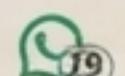
```
PROBLEMS DEBUG CONSOLE TERMINAL

Mengirim Request untuk NIM: 101...
Respon Server: {
    "status": "SUKSES",
    "data": {
        "nama": "Budi Santoso",
        "prodi": "Teknik Informatika",
        "ipk": 3.75
    }
}

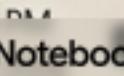
Mengirim Request untuk NIM: 999...
Respon Server: {
    "status": "GAGAL",
    "pesan": "NIM tidak ditemukan"
}
```



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# Bab 8 & 9: High Performance (Async & Multiplexing)

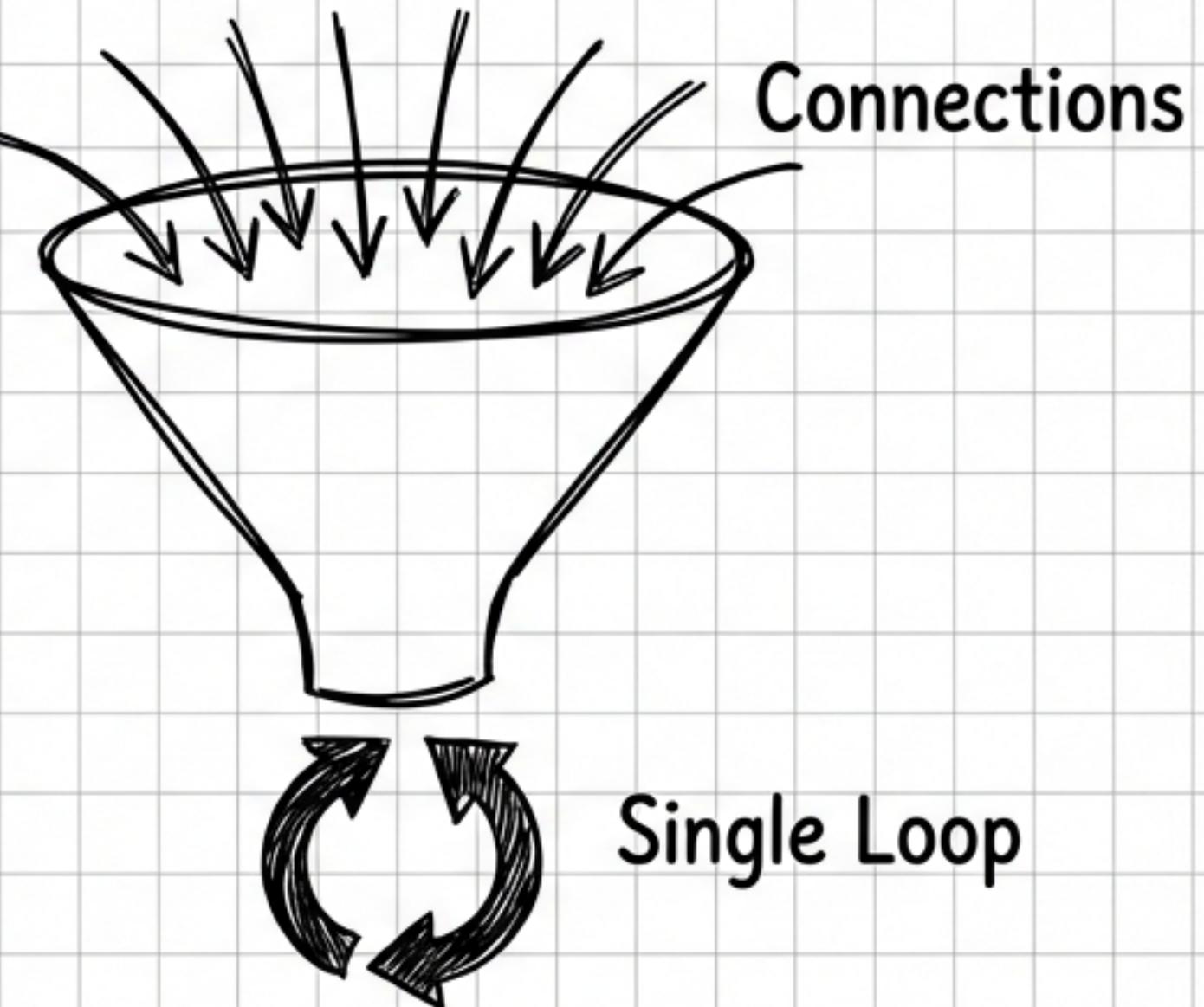
Level:  
Advanced

Konsep: Non-blocking I/O. Server tidak ‘tidur’ menunggu satu klien.

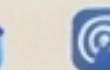
[✓] AsyncIO (Event Loop)

[✓] Select/Poll (Monitor banyak socket)

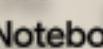
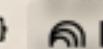
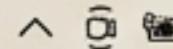
```
PS E:\jaringan komputer> & C:/Users/ASUS/AppData/Local/Programs/Python/Python314/python.exe "e:/jaringan komputer/latihan_8_async_server.py"
*** Async Server Serialan 61 ('127.0.0.1', 8888)
[INFO] Koneksi dari ('127.0.0.1', 61603)
[("127.0.0.1", 61603)] Nengir-be: hale
[("127.0.0.1", 61603)] Nengir-be: astelamoalaikum
[("127.0.0.1", 61603)] Nengirim: tcknlk
```



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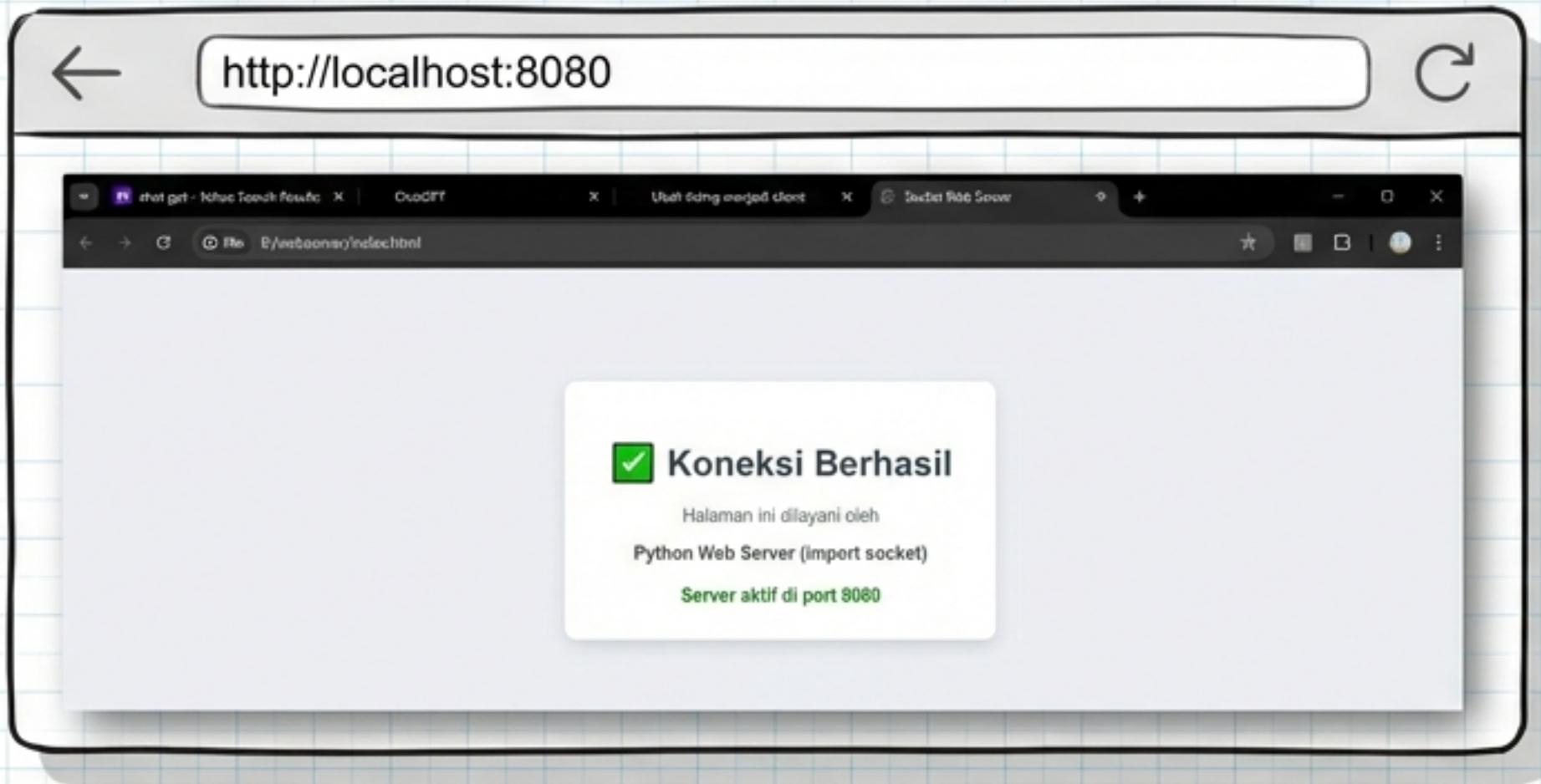
IDR/USD +0.42%



8:30 PM

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# Bab 10 & 11 : HTTP Server & REST API



Web Server yang  
kita buat sendiri!

## REST API Request

- PS E:\jaringan komputer>
  - Mengambil Data Cuaca untuk Jakarta ---
    - 🌡 Suhu Saat Ini: 26.0°C
    - 💨 Kecepatan Angin: 5.0 km/h
    - 📍 Koordinat: -6.2088, 106.8456
  - Mengambil Data Cuaca untuk Makassar ---
    - 🌡 Suhu Saat Ini: 26.7°C
    - 💨 Kecepatan Angin: 10.3 km/h
    - 📍 Koordinat: -5.1477, 119.4327
- PS E:\jaringan komputer> █

} JSON Response



Type here to search



27°C Berawan

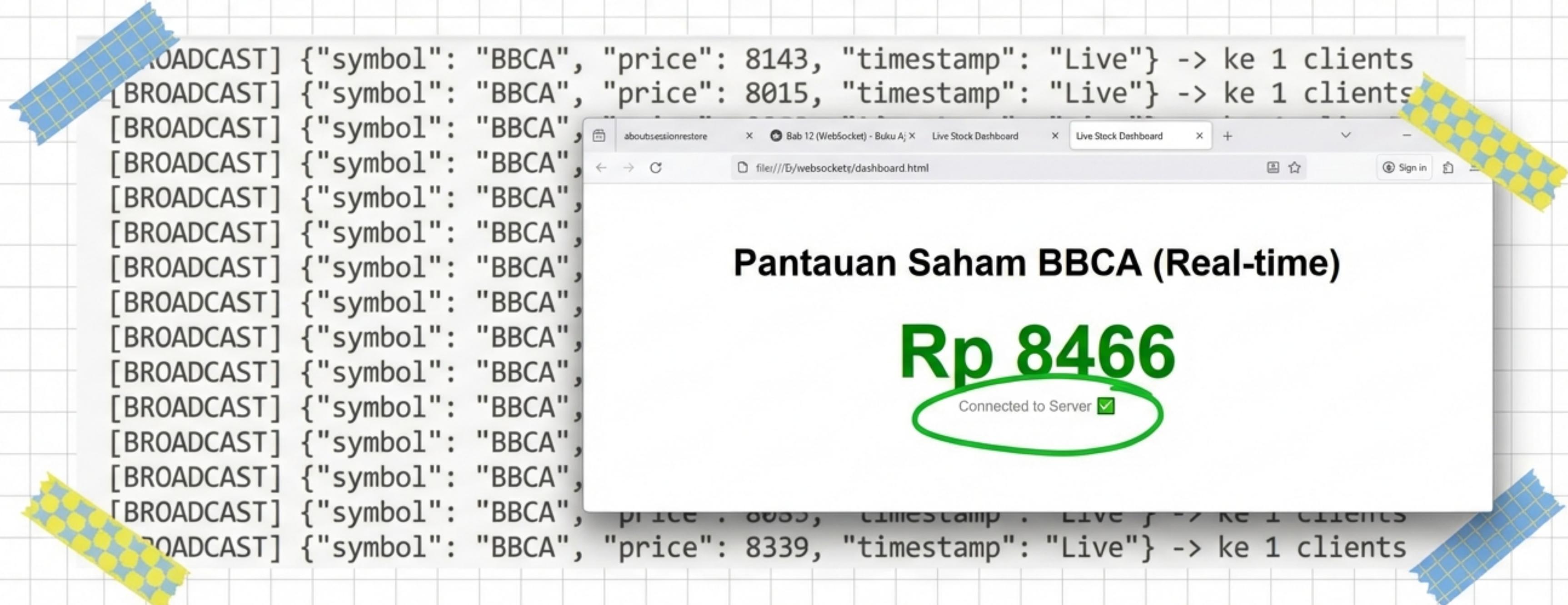


04:32 PM

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# Bab 12: Real-time dengan WebSocket

Full-duplex communication over TCP. Tidak perlu refresh halaman!

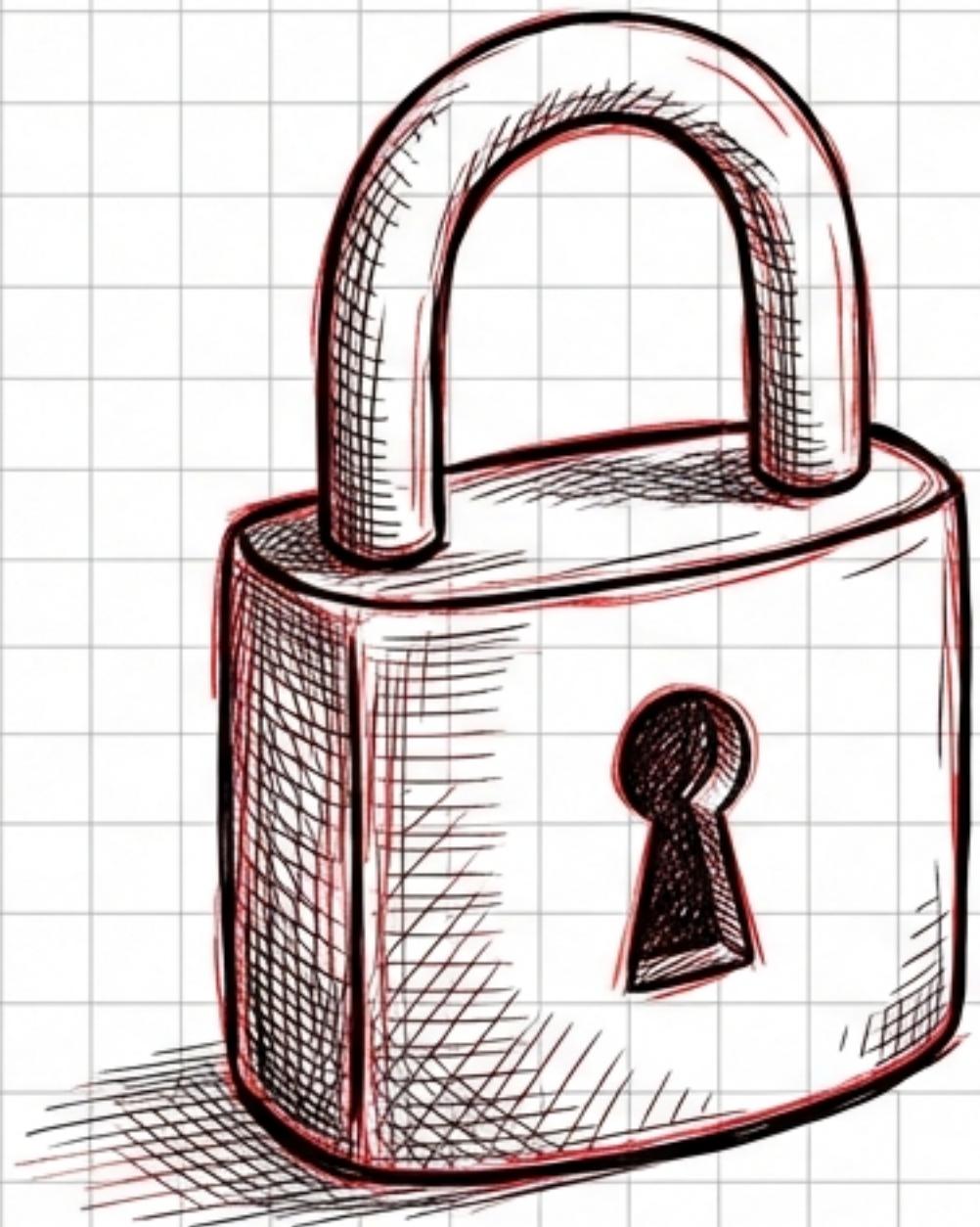


Pantauan Saham BBCA (Real-time)

Rp 8466

Connected to Server

# Bab 13: Keamanan Jaringan (SSL/TLS)



- [X] Enkripsi Data
- [X] Sertifikat Digital (PEM)
- [X] Secure Handshake

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

○ PS E:\jaringan komputer> & C:/Users/ASUS/AppData/Local/Programs/Python/Python3
PS E:\jaringan komputer> & C:/Users/ASUS/AppData/Local/Programs/Python/Python3
e "e:/jaringan komputer/secure_client.py"
Menghubungkan ke Secure Server...
Terhubung dengan Cipher: ('TLS_AES_256_GCM_SHA384', 'TLSv1.3', 256)
Balasan Server: Pesan Anda aman bersama kami.
○ PS E:\jaringan komputer>
```

Mencegah 'Man-in-the-Middle'. Pesan aman.

# Bab 14: IoT & MQTT Protocol

## Model: Publish / Subscribe

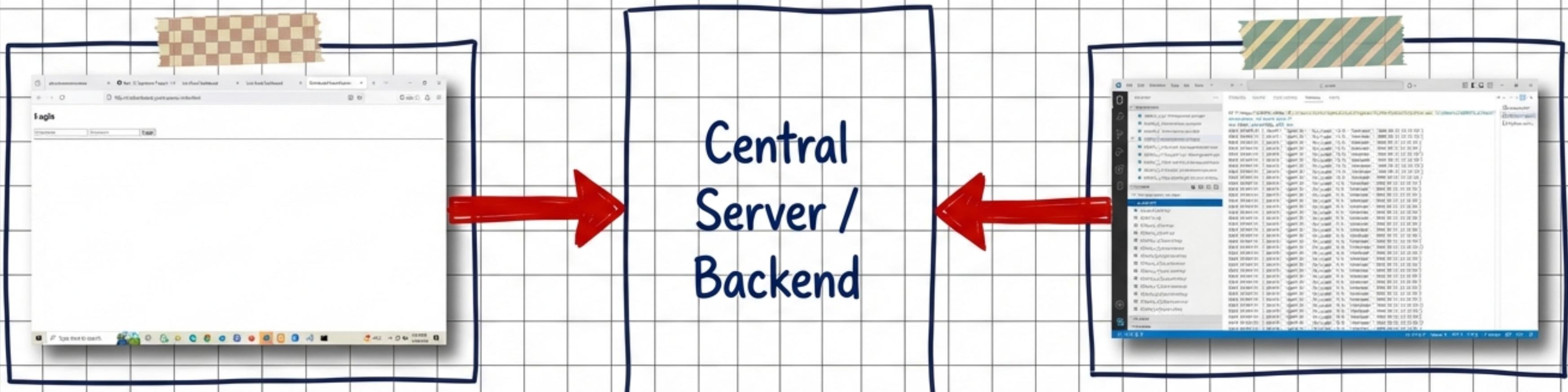


A screenshot of a terminal window titled "jaringan komputer". The window shows a Python script running, connecting to a broker and publishing data. The output of the script is displayed in the terminal.

```
PS E:\jaringan komputer> & C:/Users/AUSS/AppData/Local/Programs/Python/python.exe "e:/jaringan komputer/14_mqtt.py"
client = mqtt.Client()
Roghobungkan ke Broker1
[StasiSEE] Terhubung ke Broker1
Data Masuk dari [lab_computer]; 21.89°C
Data Nasuk dari [anLin]; 31.83°C
Data Nasok dari [lab_computer]; 20.26°C
Data Nesok dari [SanFin]; 29.55°C
Data Nesok dari [lab_Sensor]; 20.85°C
Data Naik dari [SanFin]; 26.31°C
Data Nesok dari [lab_computer]; 24.41°C
Data Nasok dari [SaoCto]; 20.21°C
Data Nesok dari [SeB_computer]; 24.82°C
Data Nasuk dari [Sentin]; 29.57°C
Data Nasuk dari [lab_Sensor]; 14.22°C
Data Nasok dari [anLin]; 36.61°C
Data Nasok dari [lab_computer]; 20.55°C
Data Nesok dari [SanFin]; 31.65°C
Data Nasuk dari [lab_computer]; 21.85°C
```

A yellow sticky note with the text "Protocol ringan. Hemat bandwidth!" is overlaid on the terminal window.

# Bab 15 : Capstone - Distributed Smart System



Web Dashboard

Central  
Server /  
Backend

Monitoring Agents

Integrasi : Socket + Web + Security + Threading

# Ringkasan (Cheat Sheet)

## PROTOCOLS

TCP: Chat, Email (Reliable)

UDP: Streaming, Game (Cepat)

HTTP: Web Browser

WebSocket: Real-time Stock

MQTT: IoT Sensors

## PYTHON TOOLS

import socket

import threading

import json

import ssl

import select

Terima Kasih!

