Laporan Praktikum WSE #3

Mata Kuliah : Web Service Engineering
Dosen Pengampu : Muhayat, M.IT
Praktikum : P3 – **Web Service Architecture**
Nama Mahasiswa : Febi Novia Putri
NIM : 230104040055
Kelas : TI23B
Tanggal Praktikum : 06-10-2025

A. Tujuan Praktikum

1. Memahami perbedaan arsitektur Client–Server, SOA, dan Microservices.
2. Membangun layanan sederhana yang sesuai setiap arsitektur.
3. Menguji komunikasi antar komponen dengan tools (Postman/Browser).
4. Menganalisis kelebihan & kekurangan tiap arsitektur melalui studi kasus.

B. Alat & Bahan

1. Laptop / PC
2. Software: Node.js (Express)
3. IDE: VS Code
4. Testing : Postman, Browser.
5. Tool Diagram Arsitektur: miro.com
6. Koneksi internet aktif.

C. Langkah Kerja

1. Persiapan (15 menit)

- Memahami konsep arsitektur Web Service.
- Membuat skenario praktikum.

2. Eksperimen Client–Server (25 menit)

- Membuat server sederhana (Node.js/Python) dengan endpoint GET /hello.
- Uji dengan browser/Postman untuk memahami pola dasar request–response.
- Mencatat dan menyimpan screenshot hasil pengujian

3. Simulasi SOA (30 menit)

- Membuat 2 layanan terpisah: Authentication Service & Data Service.
- Uji integrasi keduanya → Data Service hanya bisa diakses jika melewati Authentication.
- Mencatat dan menyimpan screenshot hasil pengujian

4. Microservices Mini Project (50 menit)

- Membuat aplikasi mini menjadi 4 service (Authentication, Product, Order, Notification).
- Uji akses setiap service melalui API terpisah.

- Mencatat dan menyimpan screenshot hasil pengujian

5. Membuat Laporan Praktikum

- Judul & Tujuan
- Langkah Kerja & Kode Program
- Hasil Uji (screenshot Postman/Browser)
- Diagram Arsitektur
- Tabel Perbandingan
- Analisis & Kesimpulan.

D. Hasil & Pembahasan

Port Terpakai:

No	Service	Port	Status
1	Client-Server (CS)	3001	OK
2	Auth Service (SOA)	4000	OK
3	Data Service (SOA)	5000	OK
4	API Gateway (MS)	3001	OK
5	Auth Service (MS)	4001	OK
6	Product Service (MS)	5001	OK
7	Order Service (MS)	5002	OK
8	Notification Service (MS)	5003	OK

Hasil Uji

1. ARSITEKTUR 1 – **CLIENT–SERVER**

1.1 Diagram Singkat

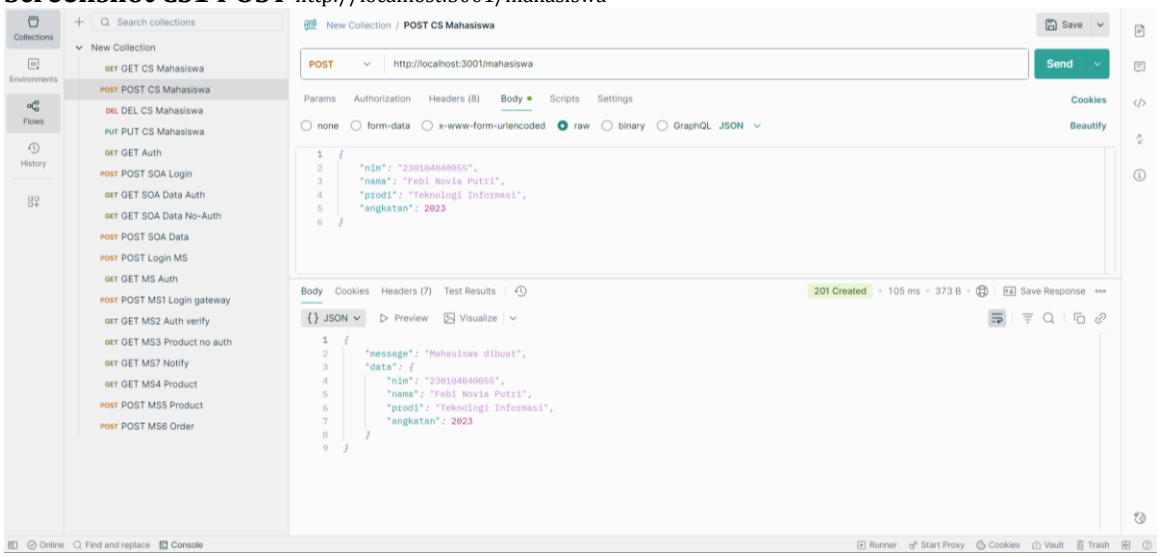
```
flowchart LR
  C[Client (Postman/Browser)] -->|HTTP| S[Server (Express)]
  S -->|Response| C
```

1.2 Skenario Uji & Bukti

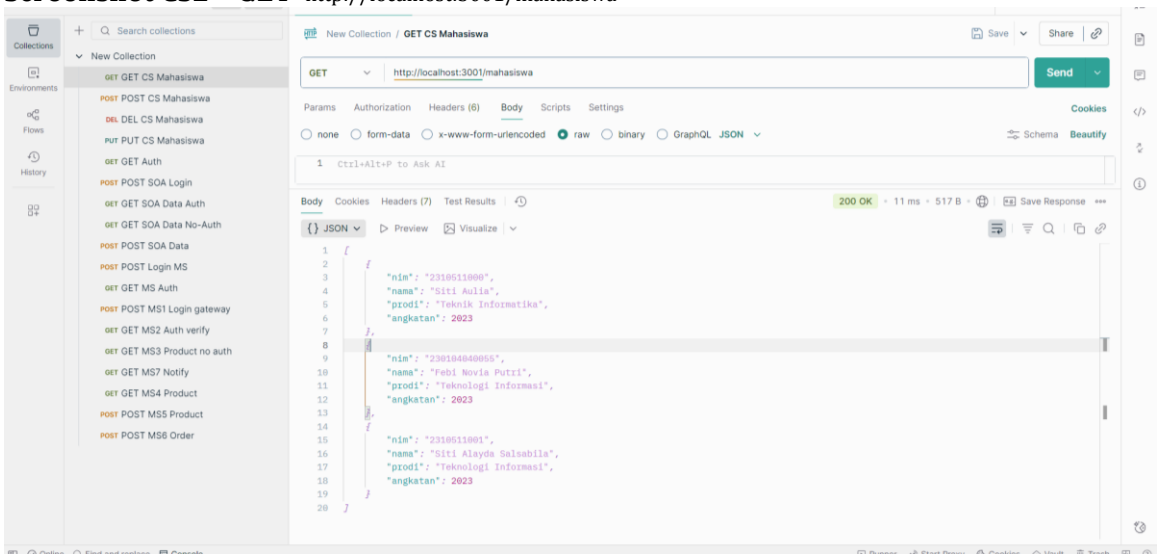
ID	Perintah / Endpoint	Input	Status	Message
CS1	POST http://localhost:3001/mahasiswa	Body/raw/json: { "nim": "2310511004", "nama": "Siti Alayda Salsabila", "prodi": "Teknologi Informasi", "angkatan": 2023 }	201 Created	"Mahasiswa dibuat"
CS2	GET http://localhost:3001/mahasiswa	—	200 OK	Daftar Mahasiswa

CS3	DELETE http://localhost:3001/mahasiswa/2310511001	—	200 OK	"Mahasiswa dihapus"
CS4	PUT http://localhost:3001/mahasiswa/2310511002	Body/raw/json: { "prodi": "Sistem Informasi", "angkatan": 2024 }	200 OK	"Mahasiswa diupdate"

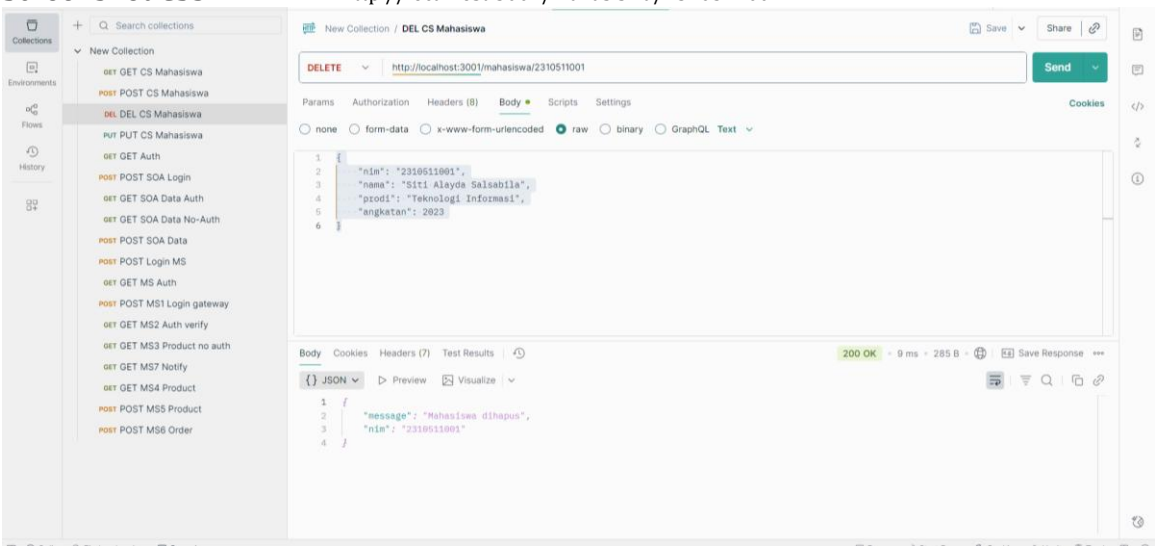
Screenshot CS1 POST http://localhost:3001/mahasiswa



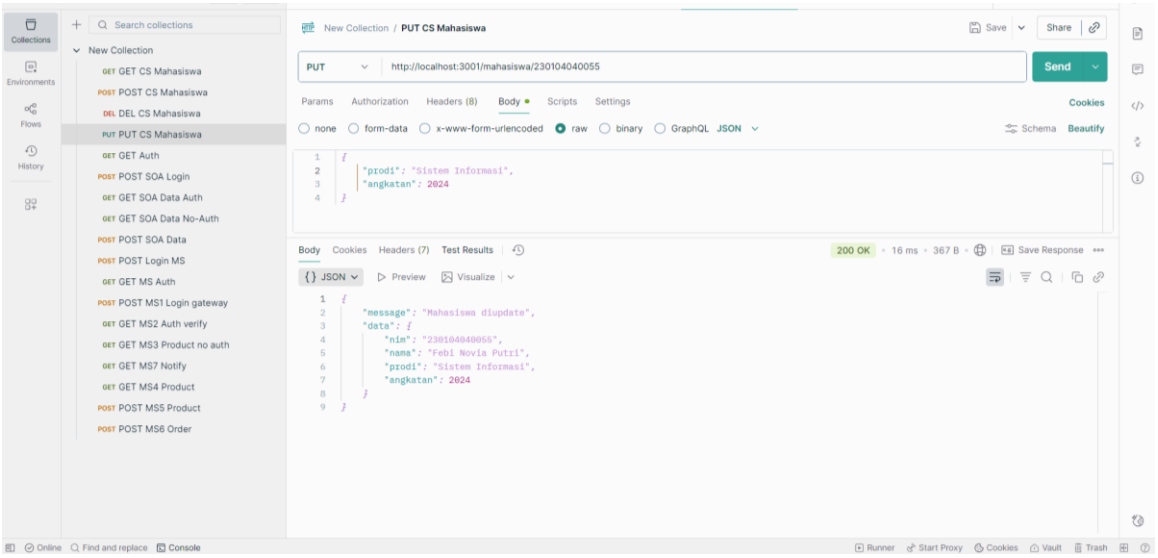
Screenshot CS2 – GET http://localhost:3001/mahasiswa



Screenshot CS3 : DELETE http://localhost:3001/mahasiswa/2310511001



Screenshot CS4 : PUT http://localhost:3001/mahasiswa/2310511002



2. ARSITEKTUR 2 **– SERVICE ORIENTED ARCHITECTURE (SOA)**

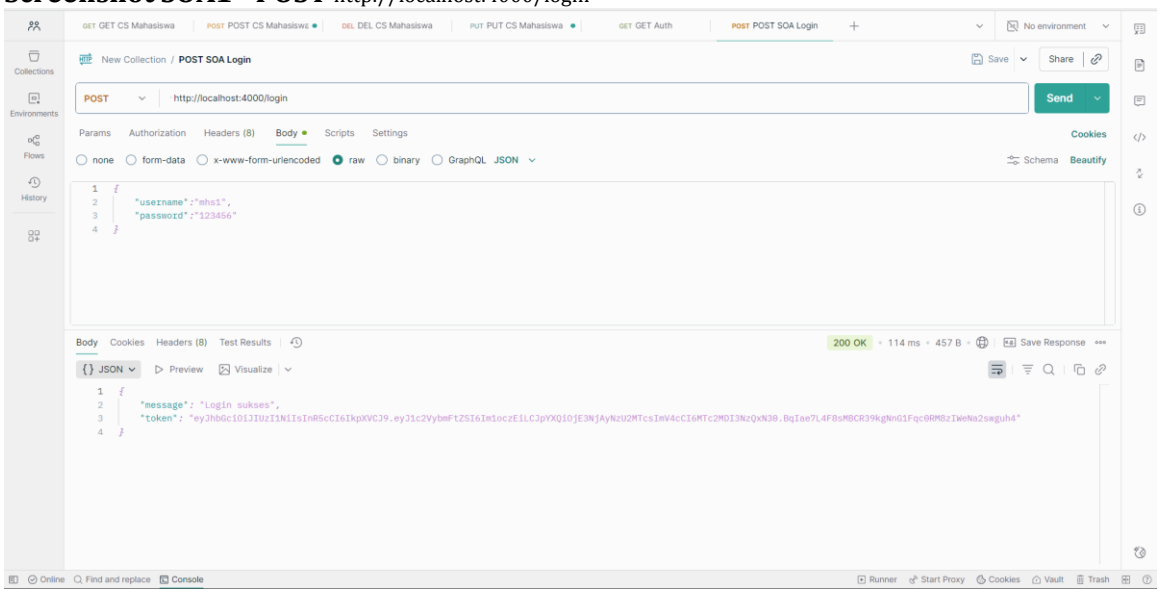
2.1 Diagram Singkat

```
flowchart LR
  Client -->|POST /login| Auth[(Auth Service :4000)]
  Client -->|GET /data \n Authorization: Bearer <JWT>| Data[(Data Service :5000)]
  Auth -->|JWT| Client
  Data -->|Data (200)| Client
```

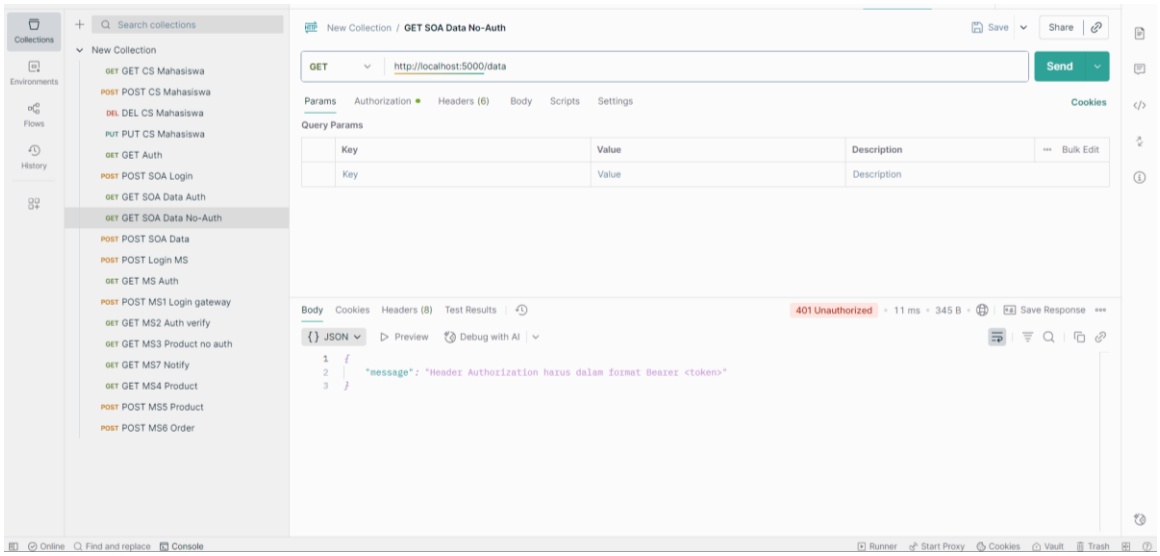
2.2 Skenario Uji & Bukti

ID	Endpoint	Header/Body	Ekspektasi	Status
SOA1	POST http://localhost:4000/login	{"username":"mhs1","password":"123456" }	200 + token	✔
SOA2	GET http://localhost:5000/data	(tanpa Authorization)	401 Anauthorized	✔
SOA3	GET http://localhost:5000/data	Authorization: Bearer <token>	200 + data milik user	✔
SOA4	POST http://localhost:5000/data	Header JSON + body {"name":"Data Rahasia C"} --> Ambil Token di POST Login	201 + item baru	✔

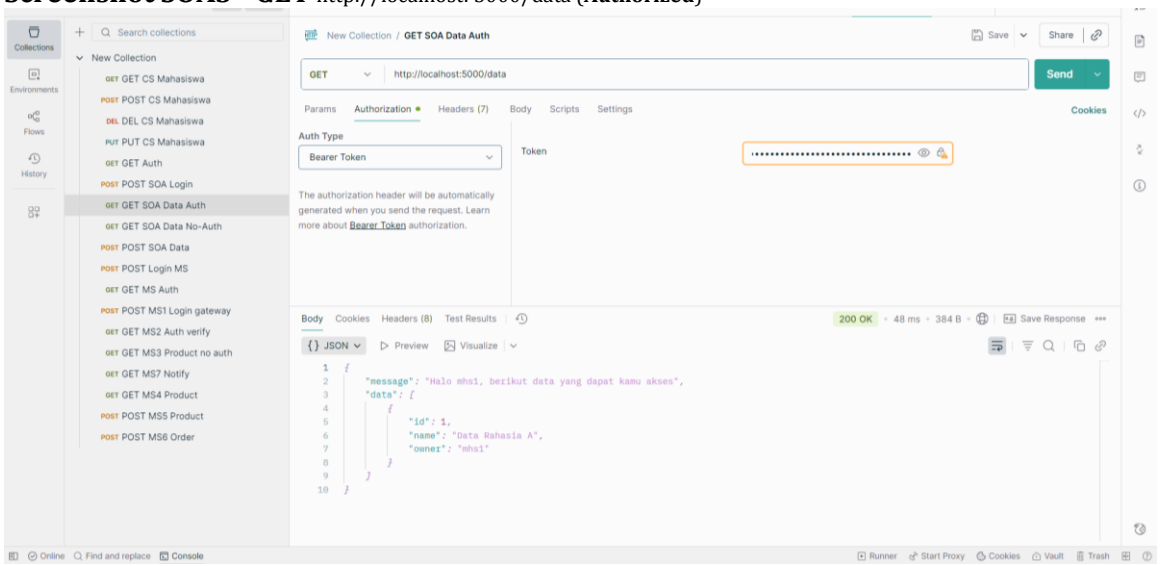
Screenshot SOA1 - POST http://localhost:4000/login



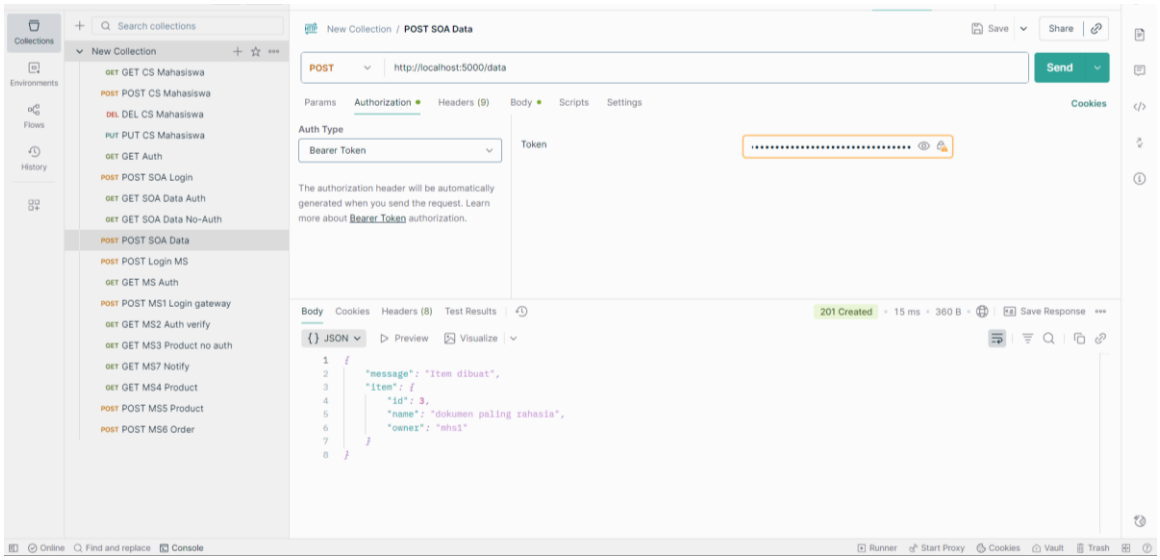
Screenshot SOA2 - GET http://localhost:5000/data (**UnAuthorized**)



Screenshot SOA3 - GET http://localhost: 5000/data (**Authorized**)



Screenshot SOA4 - POST http://localhost: 5000/data



3. ARSITEKTUR 3 – **MICROSERVICE (MS)** - (Gateway + Auth + Product + Order + Notification)

3.1 Diagram Singkat

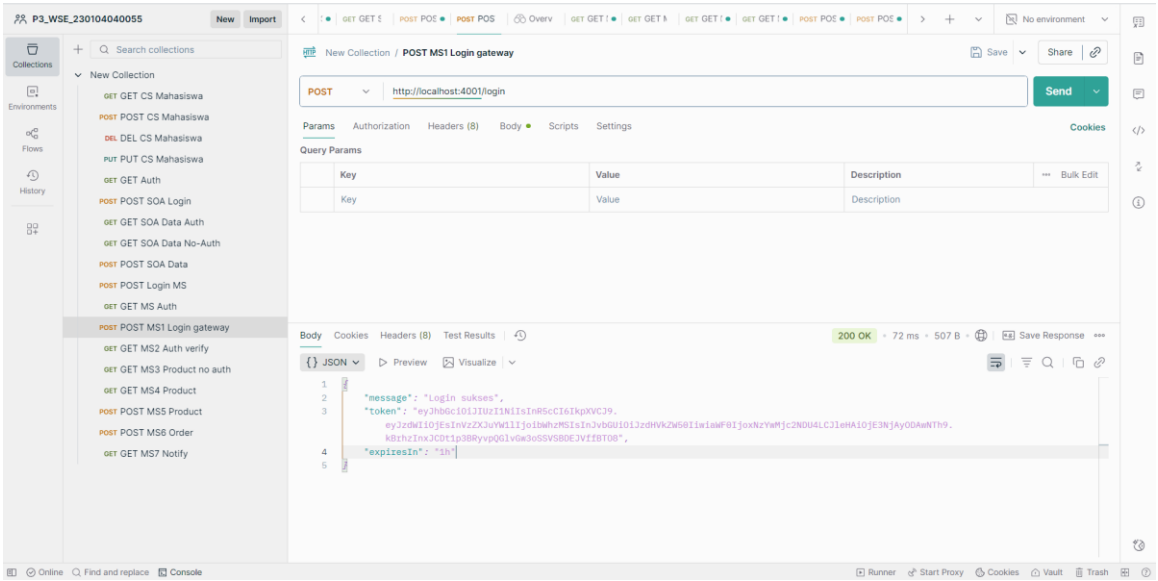
```
flowchart LR
  Client -.Bearer JWT .-> GW[API Gateway :3001]
  GW -->|/api/products| PS[Product :5001]
  GW -->|/api/orders| OS[Order :5002]
  GW -->|/api/notifications| NS[Notification :5003]
  OS -->|GET product/:id| PS
  OS -->|POST /notify| NS
  NS -->|/notifications/my| GW --> Client
```

3.2 Skenario Uji & Bukti

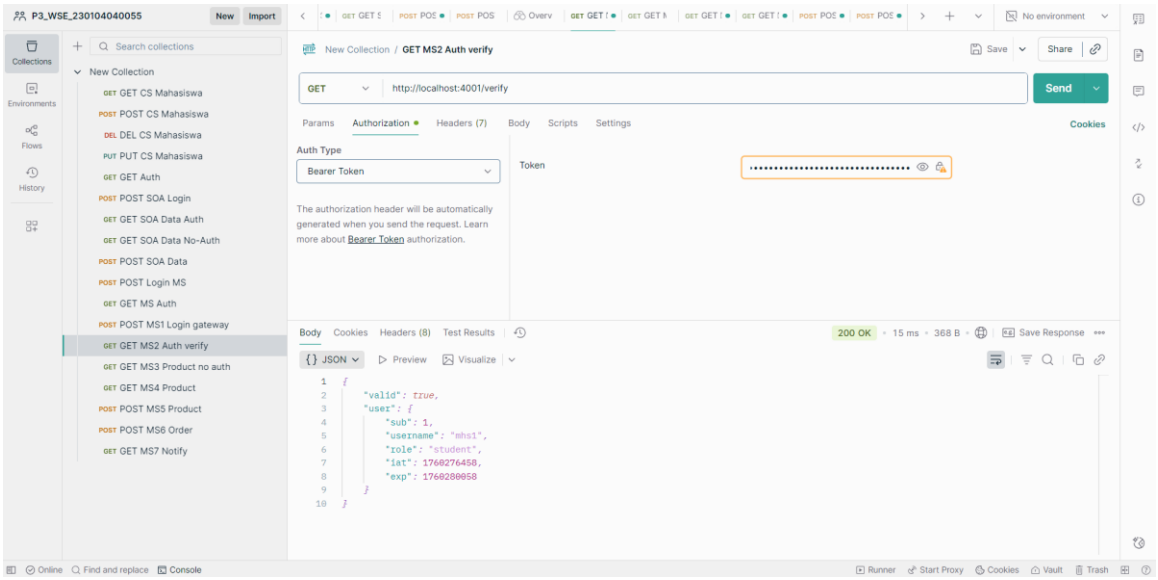
ID	Tujuan	Method / Endpoint	Header/Body	Ekspektasi	Catatan
MS1	Ambil token (Login) via Gateway (jika proxy /auth sudah ada)	POST http://localhost:3001/auth/login	Headers: Content-Type: application/json Body: { "username":"mhs1","password":"123456" }	200 → { "message":"Login sukses", "token":"<JWT>", "expiresIn":"1h" } (token dari Auth-Service)	Login via satu pintu (gateway)
MS2	Verifikasi token via Gateway (opsional, jika diproxy)	GET http://localhost:3001/auth/verify	Headers: Content-Type: application/json Body Authorization: Bearer <JWT> • Token di ambil dari MS1	200 → { "valid": true, "decoded": { "sub":..., "username":"mhs1", "role":"student", "exp":... } }	Cek cepat masa berlaku token.
MS3	Akses resource terproteksi tanpa token	GET http://localhost:3001/api/products	(Tanpa header Authorization)	401 → { "message":"Authorization Bearer <token> wajib" }	Menguji gatekeeper gateway.

	→ harus ditolak				
MS4	Akses resource terproteksi dengan token → diizinkan	GET http://localhost:3001/api/products	Headers: Authorization: Bearer <JWT>	200 → daftar produk (sesuai implementasi Product-Service).	Verifikasi alur Client → Gateway → Product.
MS5	Buat data di service terproteksi (contoh: tambah produk)	POST http://localhost:3001/api/products	Headers: Authorization: Bearer <JWT>, Content-Type: application/json Body: { "name":"Pensil 2B","price":5000 }	201 Created → detail produk baru / konfirmasi sukses (dari Product-Service).	Uji metode POST + propagate header user.
MS6	Buat order (uji lintas service)	POST http://localhost:3001/api/orders	Headers: Authorization: Bearer <JWT>, Content-Type: application/json Body: { "productId":1,"qty":2 }	201 Created → detail order (mis. total, status). Bisa memicu notifikasi async bila diimplementasi.	Uji orkestrasi lintas domain.
MS7	Akses notif terproteksi (cek header dari gateway diteruskan)	GET http://localhost:3000/api/notifications	Headers: Authorization: Bearer <JWT>	200 OK { "data": [], "total": 0 }	Menguji forwarding header user dari Gateway ke Notification Service (Axios + onProxyReq)

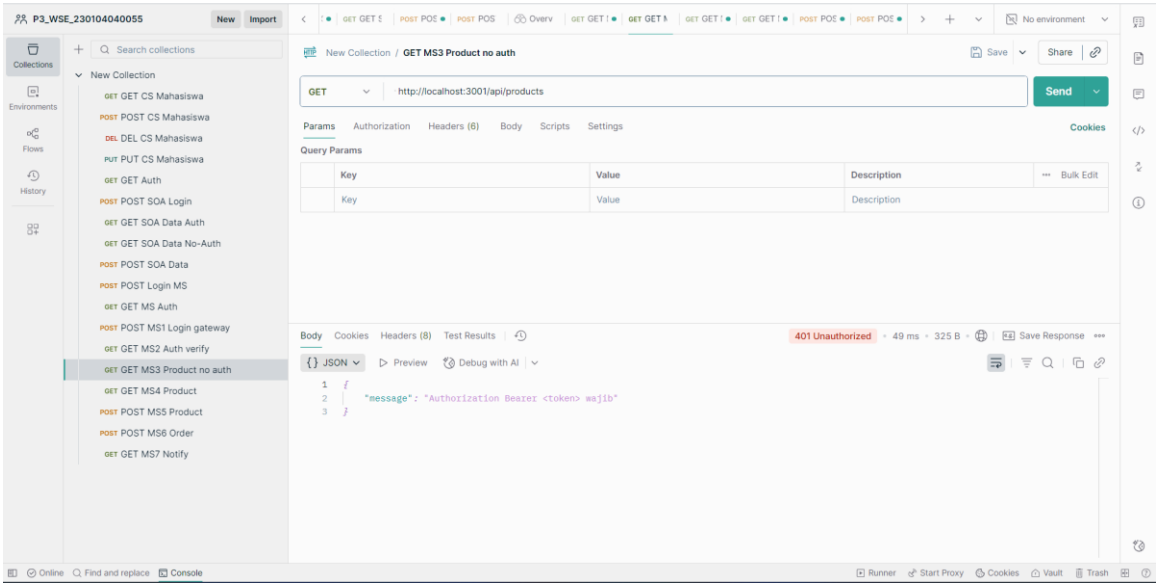
Screenshot MS1 - POST http://localhost:3001/auth/login



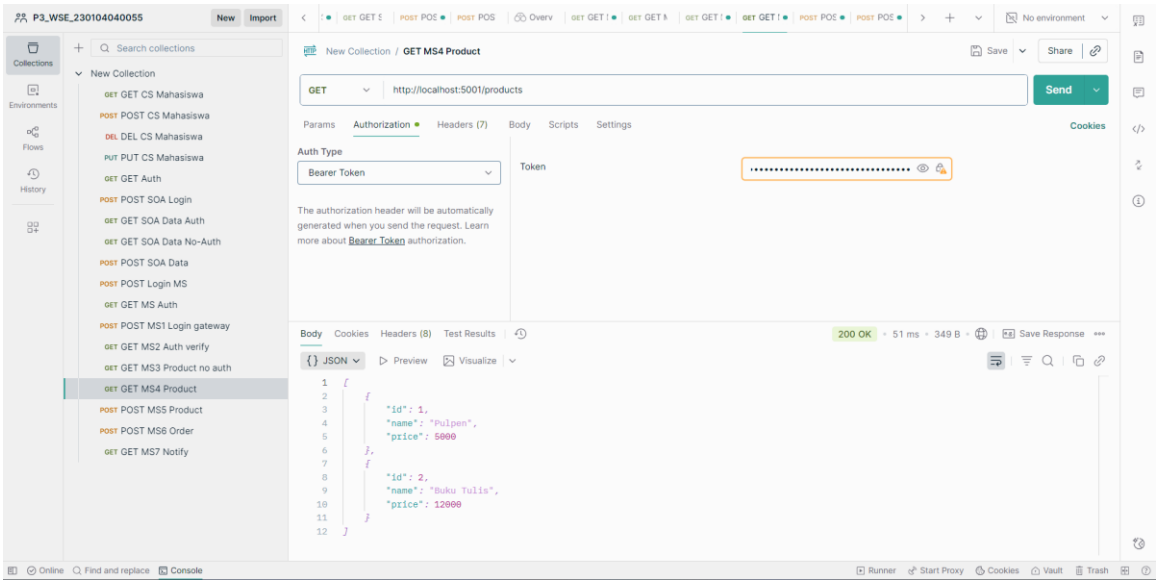
Screenshot MS2 - GET http://localhost:3001/auth/verify



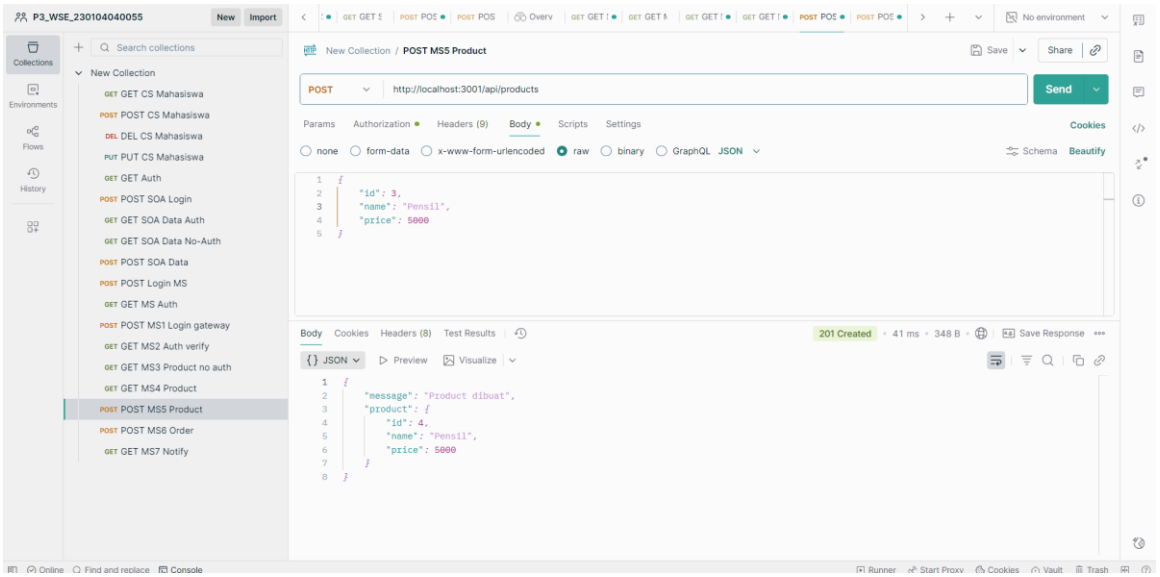
Screenshot MS3 - GET http://localhost:3001/api/products (Tanpa Token)



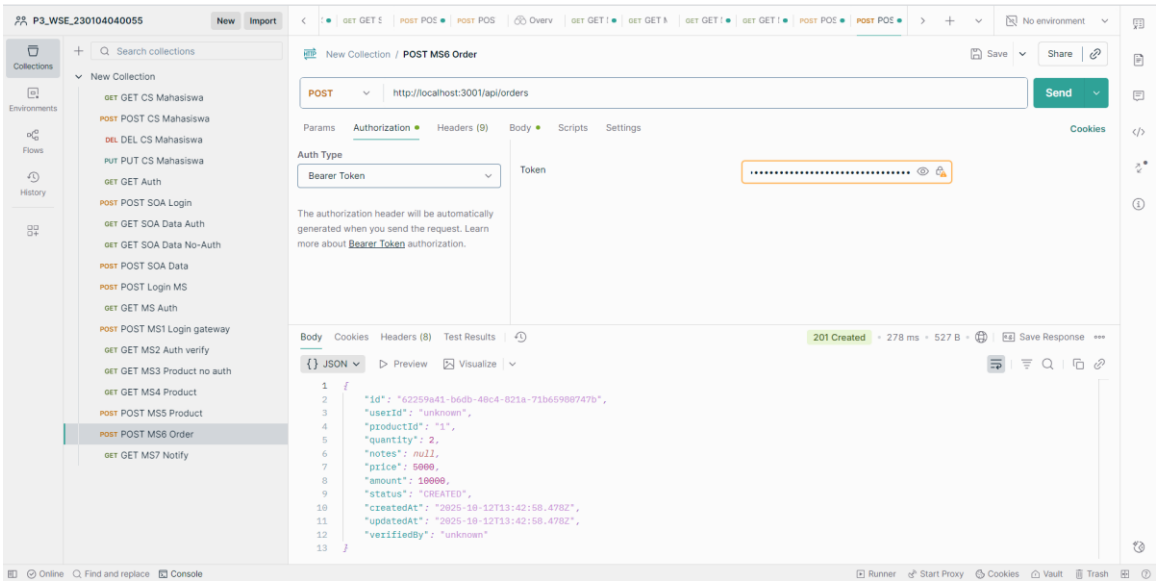
Screenshot MS4 - GET http://localhost:3001/api/products (dengan Token)



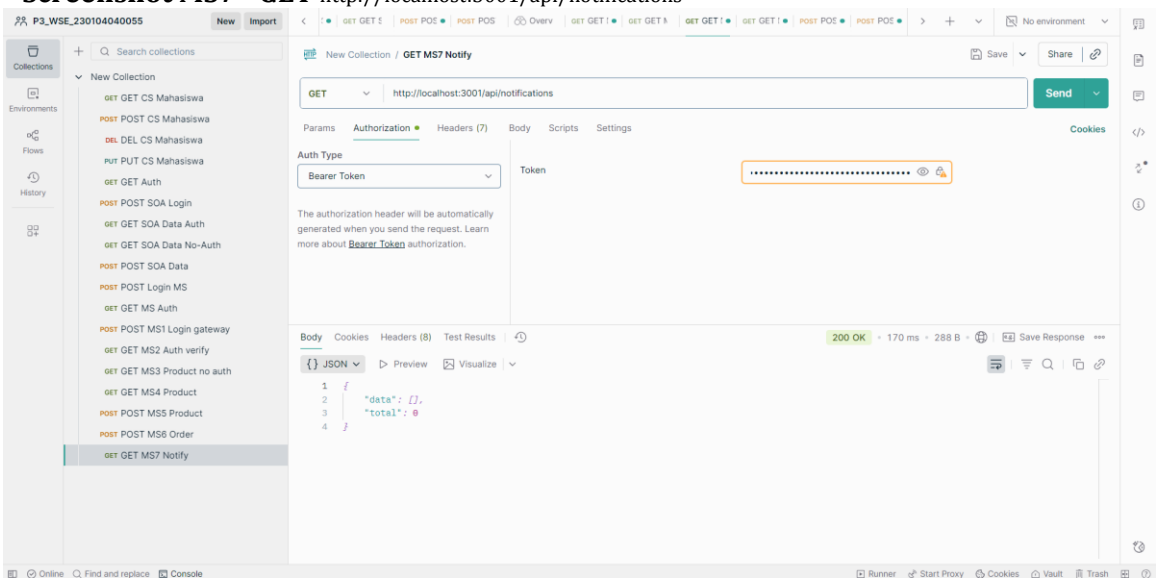
Screenshot MS5 - POST http://localhost:3001/api/products (dengan Token + Tambah Product)



Screenshot MS6 - POST http://localhost:3001/api/orders



Screenshot MS7 - GET http://localhost:3001/api/notifications



4. KESIMPULAN UMUM & REKOMENDASI

a) Client–Server: [ringkas temuan utama]

b) SOA: [ringkas temuan utama]

c) Microservices: [ringkas temuan utama]

d) Rekomendasi: [Jika Ada]