API Gateway

1. without using **Eureka (Service Discovery)**
2. Using **Eureka (Service Discovery)**
3. Without using **Eureka (Service Discovery)**

**hardcode service URLs** in Feign clients and API Gateway

API Gateway Configuration (Without Eureka)

@Bean  
public RouteLocator gatewayRoutes(RouteLocatorBuilder builder) {  
 return builder.routes()  
 .route("student-service", r -> r.path("/student/\*\*").uri("http://localhost:8082"))  
 .route("faculty-service", r -> r.path("/faculty/\*\*").uri("http://localhost:8083"))  
 .route("course-service", r -> r.path("/course/\*\*").uri("http://localhost:8081"))  
 .build();  
}

This works, but if the service URL changes (e.g., deployed in a cloud environment), you must manually update it.

**Feign Client Without Eureka**

@FeignClient(name = "course-service", url = "http://localhost:8081")  
public interface CourseClient {  
 @GetMapping("/courses/{id}")  
 Course getCourseById(@PathVariable Long id);  
}

This is fine if your services have static IPs or hostnames. If hostnames dynamic then this approach is difficult

1. using **Eureka (Service Discovery)**

If you **use Eureka**, Feign clients and API Gateway automatically discover services **without hardcoding URLs**

**API Gateway with Eureka**

Instead of specifying full URLs, you use **service names**.

@Bean  
public RouteLocator gatewayRoutes(RouteLocatorBuilder builder) {  
 return builder.routes()  
 .route("student-service", r -> r.path("/student/\*\*").uri("lb://STUDENT-SERVICE"))  
 .route("faculty-service", r -> r.path("/faculty/\*\*").uri("lb://FACULTY-SERVICE"))  
 .route("course-service", r -> r.path("/course/\*\*").uri("lb://COURSE-SERVICE"))  
 .build();  
}

📌 **lb://COURSE-SERVICE** tells Spring Cloud to use **Load Balancer** + **Service Discovery**.

### ****Feign Client with Eureka****

Instead of hardcoding URLs, you only specify the service name.

@FeignClient(name = "course-service") // No need to specify URL  
public interface CourseClient {  
 @GetMapping("/courses/{id}")  
 Course getCourseById(@PathVariable Long id);  
}

With Eureka, Feign **automatically finds the correct service instance**.

## **Comparison: With vs. Without Eureka**

| **Feature** | **Without Eureka (Your Approach)** | **With Eureka** |
| --- | --- | --- |
| **Service URLs** | Hardcoded in Feign & Gateway | Dynamically discovered |
| **Works without Eureka?** | ✅ Yes | ❌ No (Eureka required) |
| **Supports Load Balancing?** | ❌ No | ✅ Yes |
| **Handles Service Failures?** | ❌ No (Needs manual fix) | ✅ Yes (Auto retries) |
| **Best for** | Small, fixed services | Scalable microservices |