

Mastering Modern Spring : Microservices, Security & AI

1. **Security**
   * + - * Overview of Authentication &Authorization
         * Spring Security Integration
         * OAuth2 & OpenID Connect
         * JWT-Based Authentication
         * Role-Based Access Control (RBAC)
2. **Introduction to Microservices:**
   * + - * What are Microservices?
         * Monolithic vs Microservices Architecture
         * Advantages &Challenges
         * Key Components of Microservices
         * Setting up a Microservices Project (Assumes Spring Boot knowledge)
3. **Service Communication**
   * + - * What is Inter-Service Communication?
         * RestTemplate

Introduction & Use Case

Making Synchronous Calls

Marked Deprecated but still important in legacy code

* + - * + Feign Client

Declarative REST Client

Exception Handling

* + - * + WebClient (Reactive)

Asynchronous & Non-Blocking Calls

When to prefer WebClient over RestTemplate

1. **Service Discovery - Eureka**
   * + - * Why Service Discovery?
         * Setting up Eureka Server
         * Registering Microservices as Clients
         * Ribbon (Client-Side Load Balancing)
         * Deprecated in Spring Cloud, but used with Eureka
         * Spring Cloud LoadBalancer
         * Modern Replacement of Ribbon
2. **API Gateway - Spring Cloud Gateway**
   * + - * Role of API Gateway
         * Setting up Spring Cloud Gateway
         * Routing and Filters
         * Global Filters
         * Rate Limiting & Caching Headers
3. **Centralized Configuration - Spring Cloud Config**
   * + - * Need for Centralized Config
         * Creating Spring Cloud Config Server
         * Storing config in Git
         * Consuming config in Microservices
         * Refreshing config with Spring Actuator
         * Securing Config Server
4. **Resilience & Fault Tolerance**
   * + - * Why Resilience Matters in Microservices
         * Circuit Breaker Pattern
         * Resilience4j

Circuit Breaker

Retry

Rate Limiting

Bulkhead

Fallback Methods

1. **API Documentation with Swagger**
   * + - * What is Swagger/OpenAPI?
         * Adding Swagger to Each Microservice
         * Generating and Testing APIs from Docs
         * Customizing Swagger UI
2. **Introduction to Spring AI (Bonus / Trendy Topic)**
   * + - * Overview of Spring AI (Spring 6.1+)
         * Connecting to OpenAI or Hugging Face
         * Building AI-Powered Microservices

Chatbots

Text Summarizers

* + - * + Prompt Templates & Injection Protection

1. **Docker, Kubernetes & DevOps**
   * + - * Containerization with Docker
         * Writing Dockerfile for Each Service
         * Docker Compose for Local Setup
         * Introduction to Kubernetes
         * Managing Deployments with Helm
2. **Additional (Optional) Topics**
   * + - * Redis Caching in Microservices
         * ELK Stack (Optional for Logging)

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