Spring Microservices and Spring Cloud

**Introduction to Microservices**

* What is a microserivce?
* Monolithic vs Microserivce
* Characteristics of microservices
* 12-Factors app
* Microserivces patterns
  + Core microservices development pattern
  + Microservice routing patterns
  + Microservice client resiliency patterns
  + Microservice security patterns
  + Microservice logging and tracing patterns
  + Microservice build/deployment patterns

**Service Discovery**

* Why service discovery?
* Architecture of service discovery
* Service discovery in action using Spring and Netflix Eureka
* Building your Spring Eureka Service
* Registering services with Spring Eureka
* Using service discovery to look up a service
  + Looking up service instances with Spring DiscoveryClient
  + Invoking services with Ribbon-aware Spring RestTemplate
  + Invoking services with Netflix Feign clients
  + Invoking services with WebClient
* Setting up cluster of Eureka servers.

**Controlling your configuration with Spring Cloud configuration server**

* On managing configuration (and complexity)
  + Your configuration management architecture
  + Implementation choices
* Building our Spring Cloud configuration server
  + Setting up the Spring Cloud Config Bootstrap class
  + Using Spring Cloud configuration server with the filesystem
  + Using Spring Cloud configuration server with Git
  + Refreshing your properties using Spring Cloud configuration server.
    - @RefreshScope and /refresh actuator endpoint
    - Using spring cloud bus, /bus-refresh actuator endpoint, rabbitmq
* Protecting sensitive configuration information
  + Download and install Oracle JCE jars needed for encryption
  + Setting up an encryption key
  + Encrypting and decrypting a property
  + Configure microservices to use encryption on the client side.

**Client resiliency patterns with Spring Cloud and Netflix Hystrix**

* What are client-side resiliency patterns?
  + Client-side load balancing
  + Circuit breaker
  + Fallback processing
  + Bulkheads
* Implementing a circuit breaker using Hystrix
  + Timing out a call to the organization microservice
  + Customizing the timeout on a circuit breaker
* Fallback processing
* Implementing the bulkhead pattern
* Fine-tuning Hystrix

**Service routing with Spring Cloud and Zuul**

* What is a services gateway?
* Introducing Spring Cloud gateway
  + Setting up the api gateway Spring Boot project
  + Configuring api gateway to communicate with Eureka
* Configuring routes in api gateway
  + Automated mapping routes via service discovery
  + Mapping routes manually using service discovery
  + Manual mapping of routes using static URLs
  + Dynamically reload route configuration
* The real power of api gateway filters
* Implementing custom pre-filter
* Implementing a post filter
* Building a dynamic route filter

**Distributed tracing with Spring Cloud Sleuth and Zipkin**

* Introduction to Spring Cloud Sleuth
* Adding Spring Cloud sleuth
* Anatomy of a Spring Cloud Sleuth trace
* Log aggregation and Spring Cloud Sleuth
* A Spring Cloud Sleuth implementation
* Distributed tracing with Open Zipkin
* Setting up the Spring Cloud Sleuth and Zipkin dependencies
* Configuring the services to point to Zipkin
* Installing and configuring a Zipkin server
* Setting tracing levels