

## Spring Basics & SpringBoot & Microservices

### Introduction:

Course Introduction -Prerequisites of Spring & SpringBoot

Programming Language vs Technology Vs Framework

Spring & SpringBoot Modules and versions

Importance of Spring & SpringBoot Modules in Real Time Projects

What is Container

- Different Types of Containers
  - ➔ Servlet Container
  - ➔ Jsp Container
  - ➔ EJB Container
  - ➔ IOC container/Spring Container

### Core Module with Spring

Introduction and Importance of Core Module.

Inversion Of Control(IOC) principal

Dependency Management

- > Dependency Lookup
- > Dependency Injection

Two types of IOC Containers

>Bean Factory

> Application Context

Spring Beans Configuration

- >@Component
- >@Bean

Different ways of developing the spring application

- Xml driven configurations
- Xml + annotation driven configurations
- 100% code driven configurations/ Java Config approach

Developing the First Spring Application

- Composition/HAS –A property
- @Configuration
- @Autowired
- @ComponentScan
- Flow of the execution

Different Modes of Dependency Injection

- Setter Injection
- Constructor Injection
- Field Injection
- Arbitrary Method Injection

Solving the Ambiguity Problem

- Using @Qualifier
- Using Primary

- **By Matching the Dependent Spring Bean id with target class HAS-A property name**

### **Strategy Pattern**

- **3 principles of Strategy DP**
- **Strategy DP implementation in Spring**

### **Spring Bean Scopes**

- **Singleton**
- **Prototype**
- **Request**
- **Session**
- **Application**
- **Global Session ( only in 4.x/5.x)**
- **Websocket**
- **@Scope**
- **@Lazy**
- **Pre-instantiation of singleton scope spring beans**

### **Stereotype Annotations**

- **Why the set of annotations are called stereotype type annotations**
- **@Component**
- **@Service**
- **@Repository**
- **@Controller**
- **Configuration**
- **others**

### **Working with Properties file**

- **Configuring the properties file using @PropertySource Annotation**
- **Reading the values of properties file using @Value**
- **Environment object**

### **Bean Factory Container V/S Application**

#### **Context Container**

- **Where to use the BeanFactory IOC container and where to use ApplicationContext Container**

### **Spring Bean Life Cycle**

- **init life cycle method**
- **destroy life cycle method**
- **Working with @PostConstruct and @PreDestroy method**

## Implementation of Core Module with SpringBoot

**Spring Vs Spring boot framework**

**@SpringBootApplication annotation**

**@EnableAutoConfiguration**

**@ComponentScan**

**@SpringBootConfiguration/@Configuration**

**Creating Spring Boot Application**

**Spring Starter Wizard in Eclipse IDE**

**Installing STS plugin in Eclipse IDE**

**Introduction to Spring Boot Starters**

**>Spring Boot Parent Starter**

**> Spring-boot-starter**

**>Spring-boot-starter-web**

**>Spring-boot-starter-data-jpa**

**and etc...**

**SpringApplication.run(..) method**

**Spring Boot Application Boot strapping**

**AutoConfiguration in Spring Boot**

**Strategy DP implementation in Spring boot**

## Spring boot Data JPA Module

**Need of Spring boot data jpa**

**Data JPA Module with SpringBoot**

**> What is JPA**

**>Spring Data JPA Introduction**

**>What is ORM**

**>ORM Basics**

**>What is Persistence Layer**

**>Hibernate implementation with JPA**

**>What is an Entity Class**

**>JPA Annotations**

**>@Entity ,@Id ,@Colum , @Table , @Transient and etc...**

**>Repository Interfaces and their hierarchy in boot 2.x and 3.x**

**>CurdRepository introduction**

**>Database CRUD Operations**

**>CurdRepository methods for DB Operations**

**>Derived Query Methods in JPA**

**>Native Queries Execution in JPA**

**>PagingAndSortingRepository**

**>JpaRepository introduction**

**>JpaRepository methods for DB Operations**

**>CurdRepository vs JpaRepository**

**> Association Mapping**

## Spring boot Data MongoDB Module

**SQL Vs NoSQL DBs**

**Where to use SQL DBs and where to use NoSQL DBs**

**Installing MongoDB , Studio3T**

**Document class**

**@Document**

**@Id**

**Working with MongoRepository**

**>Performing Curd Operations with the support of MongoRepository**

**Special Types in MongoDB**

**->Collection Mapping**

**-> Association Mapping**

**Working with MongoTemplate**

**->Performing Curd Operations**

## **Spring Boot Mail Module**

**Need of Mail Server**

**Java Mail API Vs Spring Boot Mail**

**Mail Server Architecture**

**>Incoming Server (POP3/IMAP)**

**> Outgoing Server (SMTP)**

**Sending Mail with or with out attachment**

## **Spring boot MVC Module**

**MVC1 and MVC2 Models**

**Spring Web MVC Introduction**

**Spring Web MVC Advantages**

**Different Components of Spring boot MVC**

**? > DispatcherServlet**

**? > Handler Mapping**

**? > View Resolvers**

**? > Controllers/Handlers**

**? > View comps**

**Understanding Spring Web MVC Flow**

**What is Front Controller Servlet & Front Controller Design Pattern**

**What is DispatcherServlet ?**

**Handler Mappers / Mappings**

**Controller, Service, Repository Layers**

**Creation of SpringBoot Web MVC Application**

**MVC Module Annotations**

**@RestController**

**@RequestMapping**

**@PathVariable**

**@RequestParam**

**@GetMapping**

**@PostMapping**

**=> Different ways of Data Rendering**

**=> Different ways of Data Binding**

**=>Form Based application development**

**=>Spring Boot MVC CRUD Example Application**

**=>Web Application with Thymeleaf**

## **Spring boot Rest Module**

**Distributed Applications**

## **REST API/Services**

- =>SOAP vs REST
- =>RESTful Services Introduction
- =>XML vs JSON
- =>HTTP Protocol & Methods
- =>HTTP Status Codes
- =>Path Variables
- => XxxMapping Annotations
  - =>@GetMapping,@PostMapping,@DeleteMapping,
  - =>@PutMapping,@PatchMapping
- =>HTTP Headers
- =>POSTMAN tool based Testing
- => Mini Project using POSTMAN + Spring boot Rest + Spring Data JPA module
- =>Swagger3 documentation
- => Path Variables
- =>RestTemplate for Intra Communication

## **Spring Boot Batch**

- =>Need of Batch Processing
- => Comps in Batch Processing
  - >Job Launcher
  - >JobListener
  - >Job
  - >Step
  - >ItemWriter
  - >ItemReader
  - >ItemProcessor
- =>POC on Batch Processing
- => Converting the Csv file to DB table data
- => Converting the DB table data to CSV file data

## **Spring Boot Scheduling**

- => Need of Scheduling
- => Period of Time
- => Point of Time
- => Scheduling Using Cron Expressions
- => Different Tools to generate the Cron Expressions

## **Spring boot Security Module**

- => Need of Security
- => Need of Authorization and Authentication
- => Using Different Authentication Info Provider
  - > DB as Authentication Info Provider
- => Registering the user credentials having the encryption
- => Spring Boot Security with Spring data jpa

## **Spring boot oauth 2.x**

- => Need of oauth 2.0
- => Need of SSO(Single Sign On)
- => Different Phases of oauth 2.x implementation
  - => Authorization Server
  - => Resource Server

=> Client Application

=> Using the Facebook as Authorization and Resource Server

=> Using the Gmail as the Authorization and Resource Server

### Spring boot JWT (Json Web Tokens)

=> Need of JWT

=> Different Phases of JWT implementation

=> Example App on JWT

### Spring Boot Messaging

=> Synchronous Communication Vs Asynchronous Communication

=> Need of Messaging Based Communication

=> Different Styles of Communication

-> PTP model (Point To Point Communication)

-> Pub-Sub Model (Publisher and Subscriber Model)

=> Spring Boot JMS implementation using ActiveMQ/RabbitMQ as the MOM software

### Spring Boot Kafka

=> Introduction to apache kafka

=> kafka terminologies

>MOM

>kafka cluster

>producer

>consumer

> offset/index

> Bootstrap server

> replica -factor

=> kafka sender and Receiver App communication using kafka commands

=> kafka Messaging using Spring boot Programming

### Spring Cloud -Micro Services :

Monolith Architecture Introduction

Monolith Architecture case study

Monolith Application Deployment Process

Monolith Architecture Drawbacks

Micro services Introduction

Micro Services Advantages & DisAdvantages

Micro Services case study

Identifying Micro services boundaries

Micro services Architecture

Micro services Development

Eureka Server or R & D Server

Interservice communication

Using DiscoveryClient

LoadBalancerClient

FeignClient

RestTemplate

Config Server with ExternalConfig File and Native Config file

Spring boot actuators

>bean , info, threaddump , heapdump, loggers, metrics,mappings,scheduledtasks

and etc..

**Spring boot Admin server**

**Circuit Breaker implementation using resilience4j**

**API Gateway implantation using Spring Cloud API Gateway**

**Distributed Logging Using ELK stack**

**E--- ElasticSearch**

**L--- LogStash**

**K --- Kibana**

**Mini Project Using MicroServices Architecture**

**Design patterns in MicroServices**

### Miscellaneous

**DevTools In SpringBoot**

**Actuators in Spring Boot**

**Intergration with UI Technologies**

**Redis cache**

**Webflux programming**

### Development TOOLS

**Maven**

**Log4J/slf4j**

**POSTMAN**

**Swagger**

**Junit**

**Mockito**

**GITHUB**

**Debugging**

**Agile-JIRA**