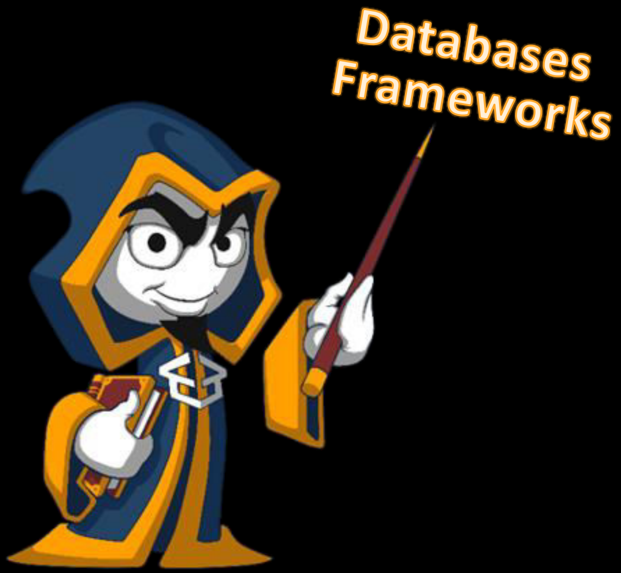
Spring Data Introduction

Spring Data, Repositories, Services



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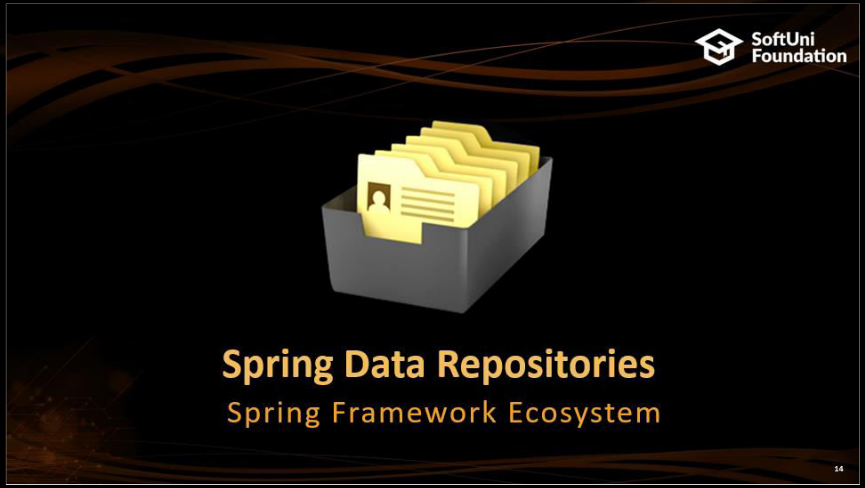
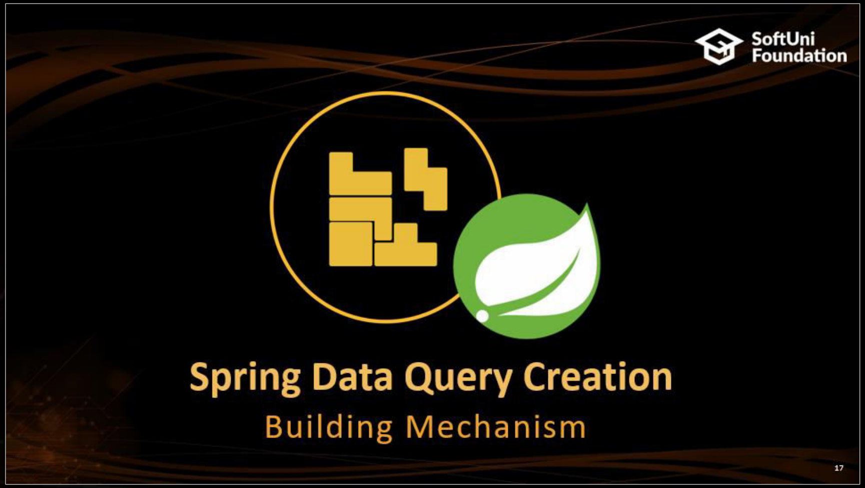




Questions

sli.do

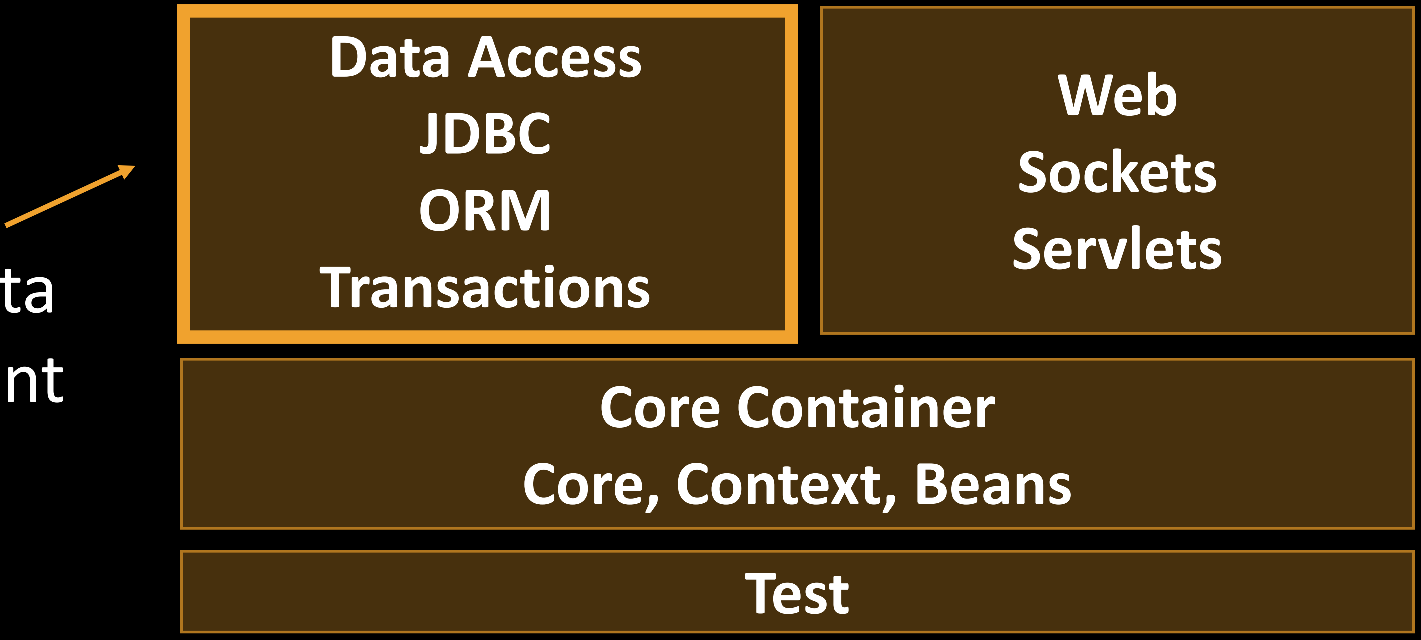
#db-advanced

Spring Data Framework

Spring Framework Ecosystem

What is Spring Framework

- Application framework for the Java Platform
  - Technology stack - includes several modules that provide a range of services

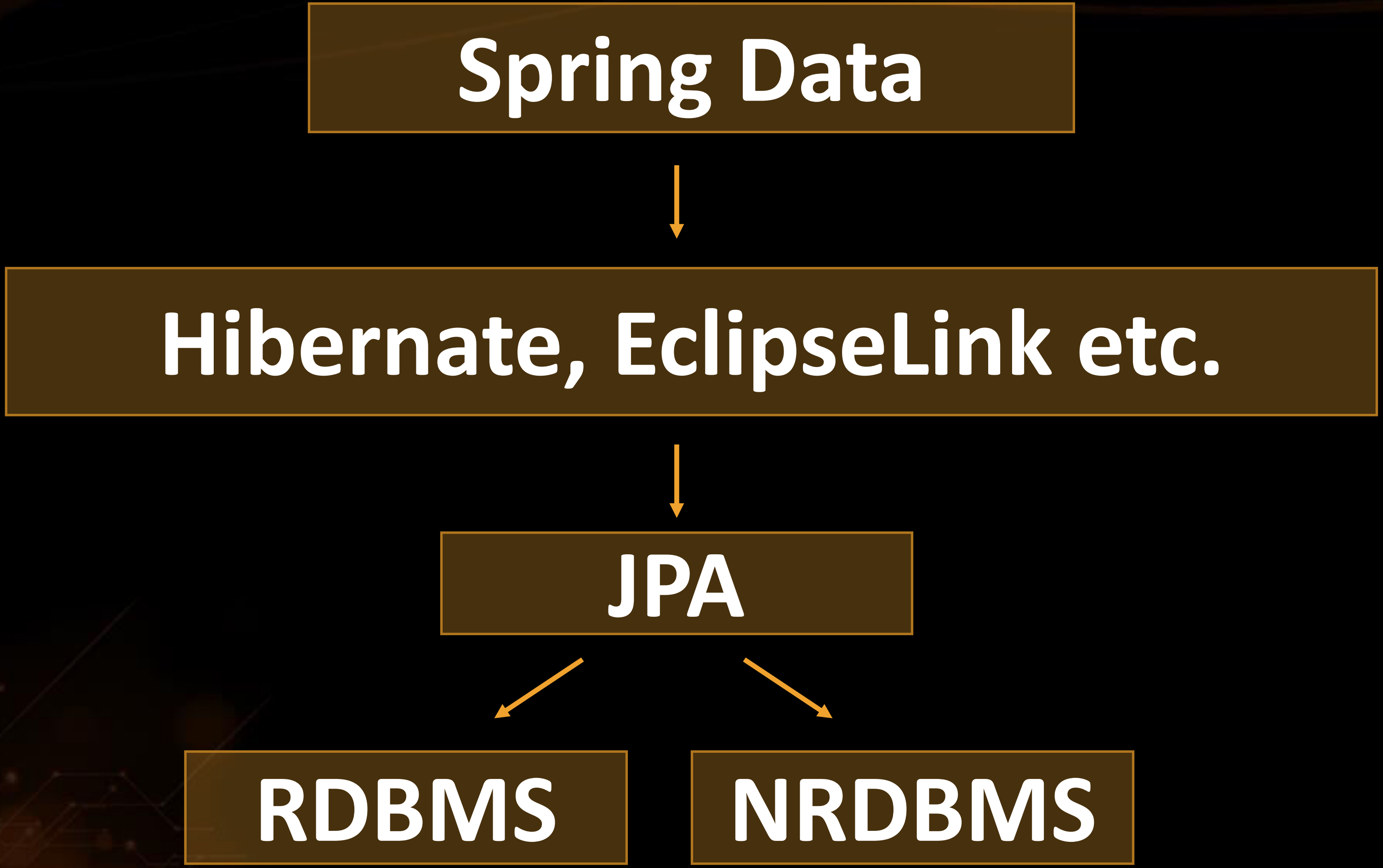


Spring Framework Overview

What is Spring Data

- Library that adds an extra layer of abstraction on the top of our JPA provider
- Provides:
  - Dynamic query derivation from repository method names
  - Possibility to integrate custom repositories and many more
- What Spring Data is not:
  - Spring Data JPA is not a JPA provider

Spring Data Role



Extra layer of abstraction over the used ORM

Spring Boot – Convention over configuration

- Creates stand-alone Spring applications
  - Provide opinionated 'starter' POMs to simplify your Maven configuration
- Automatically configure Spring whenever possible
- Absolutely no code generation and no requirement for XML configuration

Dependencies

pom.xml

```
<parent>
    <groupId>org.springframework.boot</groupId>
    <artifactId>spring-boot-starter-parent</artifactId>
    <version>1.4.1.RELEASE</version>
</parent>
```

Dependencies (2)

pom.xml

```
<dependencies>
       <dependency>
           <groupId>org.springframework.boot</groupId>
           <artifactId>spring-boot-starter-data-jpa</artifactId>
       </dependency>

       <dependency>
           <groupId>mysql</groupId>
           <artifactId>mysql-connector-java</artifactId>
       </dependency>
   </dependencies>
```

Spring Data

MySQL Connector

Build

pom.xml

```
<build>
       <plugins>
           <plugin>
               <groupId>org.apache.maven.plugins</groupId>
               <artifactId>maven-compiler-plugin</artifactId>
               <version>3.5.1</version>
               <configuration>
                   <source>1.8</source>
                   <target>1.8</target>
               </configuration>
           </plugin>
       </plugins>
   </build>
```

Java compile version

Configuration

- Spring boot configurations are held in a **application.properties** file

application.properties

```
#Data Source Properties
spring.datasource.driverClassName = com.mysql.jdbc.Driver
spring.datasource.url =
jdbc:mysql://localhost:3306/school?useSSL=false
spring.datasource.username = root
spring.datasource.password = 1234

#JPA Properties
spring.jpa.properties.hibernate.dialect =
org.hibernate.dialect.MySQL5InnoDBDialect
spring.jpa.properties.hibernate.format_sql = TRUE
spring.jpa.hibernate.ddl-auto = create-drop
```

Database Connection

JPA properties

Configuration (2)

application.properties

```
…
###Logging Levels
# Disable the default loggers
logging.level.org = WARN
logging.level.blog = WARN

#Show SQL executed with parameter bindings
logging.level.org.hibernate.SQL = DEBUG
logging.level.org.hibernate.type.descriptor = TRACE
```

Loggin settings

Spring Data Repositories

Spring Framework Ecosystem

Spring Repository

- Abstraction to significantly reduce the amount of boilerplate code required to implement data access layers
  - Perform CRUD Operations
  - Automatically generates JPQL/SQL code
  - Highly customizable

Built-in CRUD Operations

JPA REPOSITORY

```
- <S extends T> S save(S var1);
- <S extends T> Iterable<S>
save(Iterable<S> var1);
- T findOne(ID var1);
- boolean exists(ID var1);
- Iterable<T> findAll();
- long count();
- void delete(ID var1);
-  void deleteAll();
…
```

Spring Data Query Creation

Building Mechanism

Query Creation

- Queries are created via a query builder mechanism built into Spring Data
  - Strips the prefixes like `find…By`, `read…By`, `query…By` and starts parsing the rest of it
- Spring Data JPA will do a property check

  and traverse nested properties

Custom CRUD Operations

StudentRepository.java

```
@Repository
public interface StudentDao extends CrudRepository<Student,
Long> {
    List<Student> findByMajor(Major major);
}
```

Cutom method

SQL

```
SELECT s.*
  FROM students AS s
 INNER JOIN majors AS m
    ON s.major_id = m.id
 WHERE m.id = ?
```

Query Lookup Strategies

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Keyword	Sample	JPQL
And	findByLastnameAndFirstName	… where x.last_name = ?1 and x.firstname = ?2
Or	findByLastnameOrFistname	… where x.lastname = ?1 or x.firstname = ?2
Between	findByStartDateBetween	… where x.startDate between 1? and ?2
LessThan	findByAgeLessThan	… where x.age < ?1
Containing	findByFirstnameContaining	… where x.firstname like ?1 (parameter bound wrapped in %)
In	findByAgeIn(Collection<Age> ages)	… where x.age in ?1

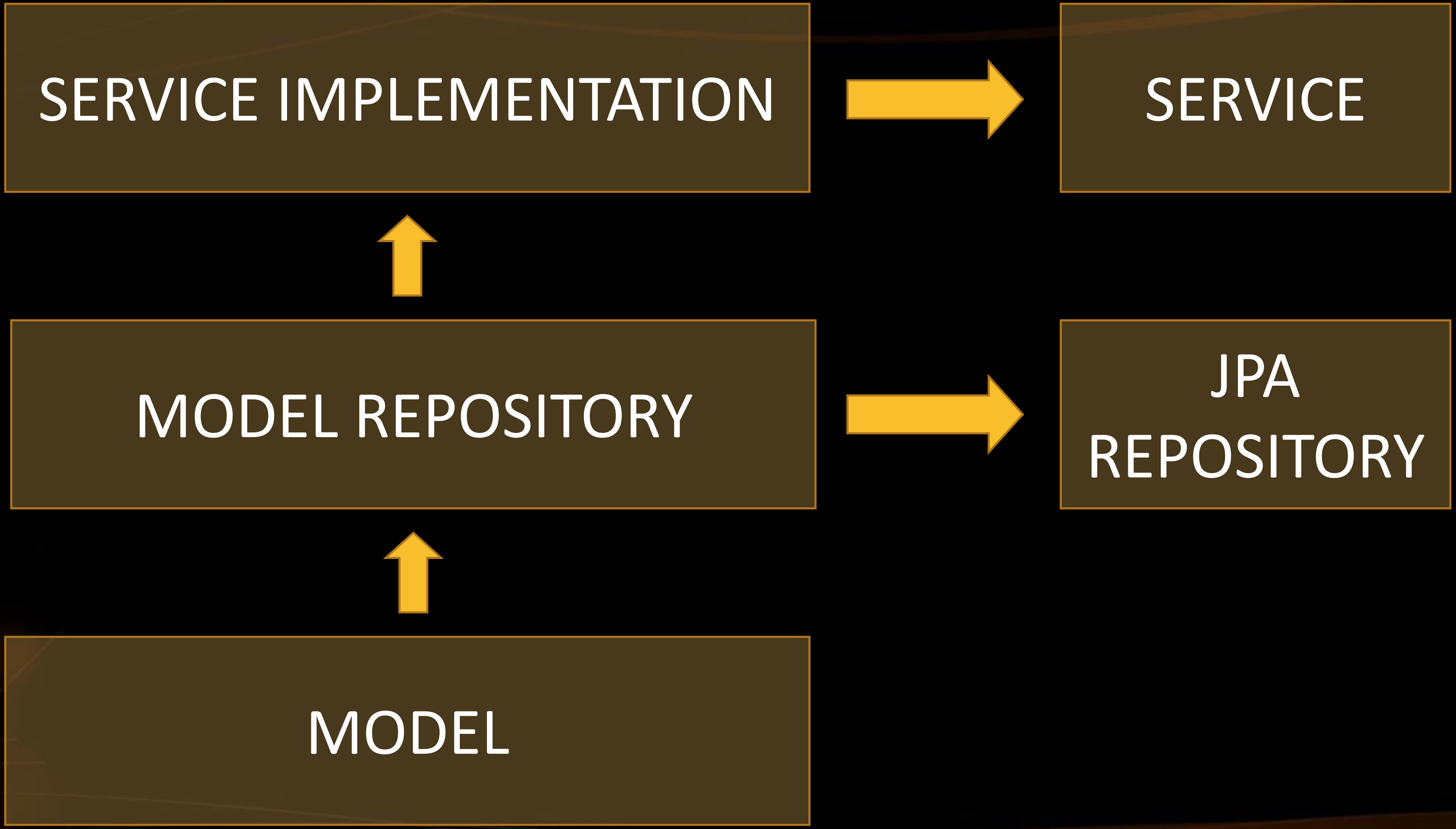
Spring Data Services

Encapsulating Business Logic

Service Pattern

- Service Layer is a design pattern of organizing business logic into layers
  - Service classes are categorized into a particular layer and share functionality
- Main concept is not exposing details of internal processes on entities
  - Services interact closely with Repositories

Spring Data Architecture



Services

StudentService.java

```
public interface StudentService {

    void register(Student student);

    void expel(Student student);

    void expel(long id);

    Student findStudent(long id);

    List<Student> findSampleByMajor(Major major);
}
```

Business Logic

Services

StudentServiceImpl.java

```
@Service
public class StudentServiceImpl implements StudentService {

    @Autowired
    private StudentRepository studentRepository;

    @Override
    public void register(Student student) {
        studentDao.save(student);
    }

    @Override
    public void expel(Student student) {
        studentDao.delete(student);
    }
}
```

Service Implementation

StudentRepository injection

Method implementation

Entry Point

MainApplication.java

```
@SpringBootApplication
public class MainApplication {
    public static void main(String[] args) {
        SpringApplication.run(MainApplication.class,args);
    }
}
```

Spring Boot Entry Point

Command Line Runner

CommandLineRunner.java

```
@Component
public class ConsoleRunner implements CommandLineRunner {

    @Autowired
    private StudentService studentService;

    @Autowired
    private MajorService majorService;

    @Override
    public void run(String... strings) throws Exception {
        Major major = new Major("Java DB Fundamentals");
        Student student = new Student("John",new Date(), major);
        majorService.create(major);
        studentService.register(student);
    }
}
```

Component

Student service

Major service

Persist data

Summary

- Spring Data is part of the Spring Framework
  - It is not a JPA Provider, just an abstraction over it
- Spring Data builds queries over conventions
- Main concept of Spring Data are Repositories and Services

Spring Data Introduction

Questions?

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