Project Report: Schema Binding and JSON Generation via JAXB in Spring Boot

# Overview

This Spring Boot project provides a framework to dynamically generate a pom.xml that binds XSD (XML Schema Definition) files to Java classes using JAXB. It also supports converting these JAXB-generated objects to JSON and exposing related utilities through REST endpoints.

# Server Configuration

- Port: 8098

- Base URL: http://localhost:8098

# XSD Handling

- Location: All .xsd files are placed under src/main/resources/xsd.

- Purpose: Used to generate Java classes via JAXB, which are then serialized to JSON.

# Dependencies

* spring-boot-starter-web: For building RESTful APIs using Spring MVC.
* spring-boot-starter-test: Provides testing support for Spring Boot applications.
* jakarta.xml.bind-api: JAXB API (Jakarta version) for XML/Java binding.
* jaxb-runtime: JAXB runtime needed for unmarshalling/marshalling XML.
* jaxb-api (javax version): Legacy JAXB API to support older tooling or compatibility.
* classgraph: Used to scan Java packages and discover classes.
* reflections: Classpath scanning and metadata analysis.
* jackson-module-jaxb-annotations: Allows Jackson to understand JAXB annotations.
* jmustache: Mustache templating engine for dynamic generation of pom.xml.

# Build Plugins

jaxb2-maven-plugin: Binds .xsd files to Java classes at compile-time.

build-helper-maven-plugin: Registers the generated JAXB source directories to the build path.

maven-compiler-plugin: Ensures Java 17 compatibility.

# Functionality

## pom.xml Generation

Static Method:

- Execute generate-sources-block.bat

Dynamic Method:

- Uses PomGenerationService and a static XML template, or call /api/pom/generate.

(Recommended):

- Call /generate/pom

- Uses PomGeneratorMustacheService with a Mustache template.

## JAXB Output

Generated classes placed under src/main/java/tn/bz/generated/... based on the .xsd name.

## JSON Generation

SchemaBindingUtils: Binds JAXB Java objects to JSON.

SchemaService: Lists available JAXB-generated classes.

SchemaController: REST interface for schema operations.

# REST Endpoints

* /api/classes: Lists available JAXB root classes
* /api/generate-json: Generates JSON from the selected class (param: key className Value tn.bz.schema. … based on the lists of available JAXB root classes)
* /api/pom/generate: Dynamic pom.xml generation
* /generate/pom: Dynamic pom.xml generation and Maven compile (Recommended)

# Output Directory

JSON files are saved under src/main/resources/json\_output.

# Additional Notes

XsdEntry Entity: Holds metadata about each .xsd file.

global.xjb: JAXB customization file to avoid type conflicts.