1. Introduction

The URL Shortener Service is a backend-based web application that allows users to convert long URLs into compact, shareable short links. These shortened URLs redirect users to the original URLs and also track the number of accesses (click counts). The application is developed using Java, Spring Boot, and H2 Database.

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2. Abstract

In today's web environment, long URLs are difficult to manage and share. This project addresses that by implementing a URL shortening system that:

Generates a short Base62-encoded version of any URL.

Stores mappings in an in-memory H2 database.

Tracks each time a short URL is accessed.

Supports redirection and basic analytics.

Provides a REST API for interaction and testing using tools like Postman and Swagger UI.

This project improves understanding of backend development, API creation, and database operations.

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3. Tools Used

Programming Language: Java 17

Frameworks: Spring Boot, Spring Data JPA

Database: H2 (in-memory)

Testing Tools: Postman, Swagger UI

Version Control: Git & GitHub

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4. Steps Involved in Building the Project

1. Project Setup:
Created a Spring Boot project with dependencies (Spring Web, Spring Data JPA, H2 Database).

2. Model Creation:
Designed an entity class to store mappings between short and long URLs.

3. Service Layer:
Implemented logic for generating short URLs, handling redirects, and counting clicks.

4. Controller & REST API:
Built REST endpoints for:

Creating short URLs

Redirecting to long URLs

Fetching analytics (click count)

5. Configuration:
Application properties were configured, and the H2 console was enabled for debugging.

6. Testing & Documentation:

Endpoints were tested in Postman.

Swagger UI was used for interactive API documentation.

7. Deployment:
Uploaded and maintained source code on GitHub with a detailed README.

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5. Conclusion

The URL Shortener Service is a practical backend project that showcases skills in:

REST API design

Spring Boot development

In-memory database integration

URL redirection and analytics