“Capstone Project”

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LMS Id :
Program : HDFC API Development
Date: 27/04/2023

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Introduction

Employee Management System

- It is a distributed application, developed to maintain the details of employees working in any organization.
- This project aims to simplify the task of maintaining records of the employees.
- We implemented the get Employee By ID features in this project.

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Project Overview

- This Employee System is an open source project built using Java, Spring boot, SQL and JPA.
- The primary goal is to query a single record based on EmployeeID.
- Project is checked into a GIT repository.
- Jenkins is used to build and deploy modifications to the application server's code..
- Project is then exposed as a HTTP web service.
- The project also provides a log file and the CURL commands for accessing web services.
- DateOfBirth is AES-256 encrypted and decrypted so that only the intended receiver may read it with key.
- Deployed the containerized web application as a Docker image to a Kubernetes using Jenkins.

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Tools and technologies used:

- Java 8+
- Spring Boot
- Spring Data JPA (Hibernate)
- MySQL
- Gradle
- Tomcat
- Jenkins
- Docker

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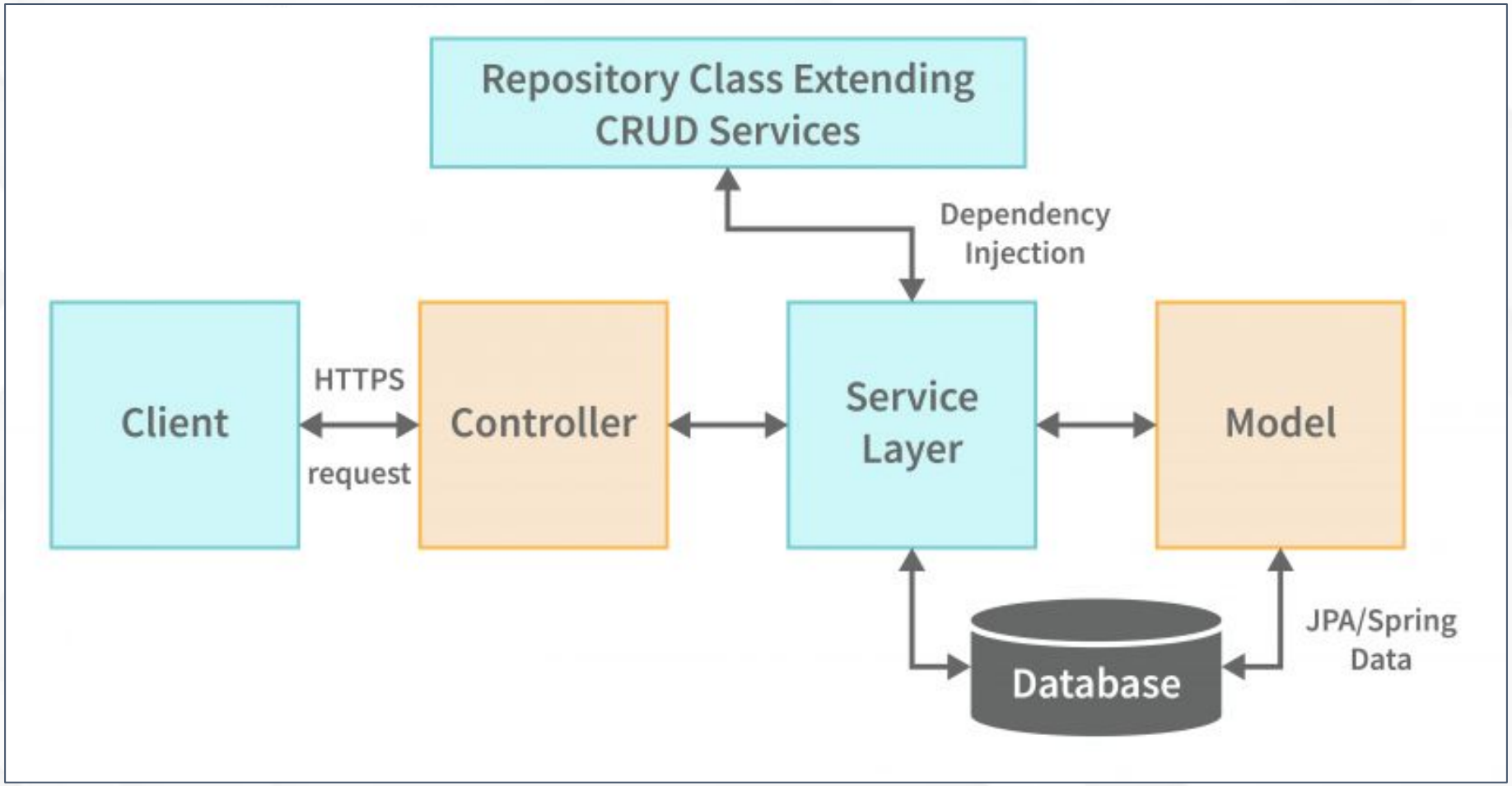
Architecture Design



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Back-end Development

- The Employee Get Data Project's back-end development includes three main tasks: creating the database, setting up the RESTful endpoint, and ensuring the application's security.

- To begin, the database should be designed and implemented with the "EmployeeID" column as the primary key. Next, a RESTful endpoint must be created to accept an EmployeeID parameter and retrieve the corresponding employee data from the database.

- Ensuring the application's security is crucial, so HTTPS support must be implemented using a self-signed certificate. This step guarantees that sensitive employee data is not transmitted in plain text over the internet. Additionally, the "DateOfBirth" field must be encrypted using AES-256 to protect it from unauthorized access. Only authorized users with the decryption key will be able to access this data.

- To track and record all requests made to the server, a logging framework such as Log4j should be configured. This step ensures that all interactions with the server are recorded and can be reviewed later.

Unit Testing

- Unit tests help to detect early in development process.
- Unit Testing is a one of the testing done by the developers to make sure individual unit or component functionalities are working fine.
- Unit tests help prevent regression issues by providing a suite of tests that can be run after changes are made to code.

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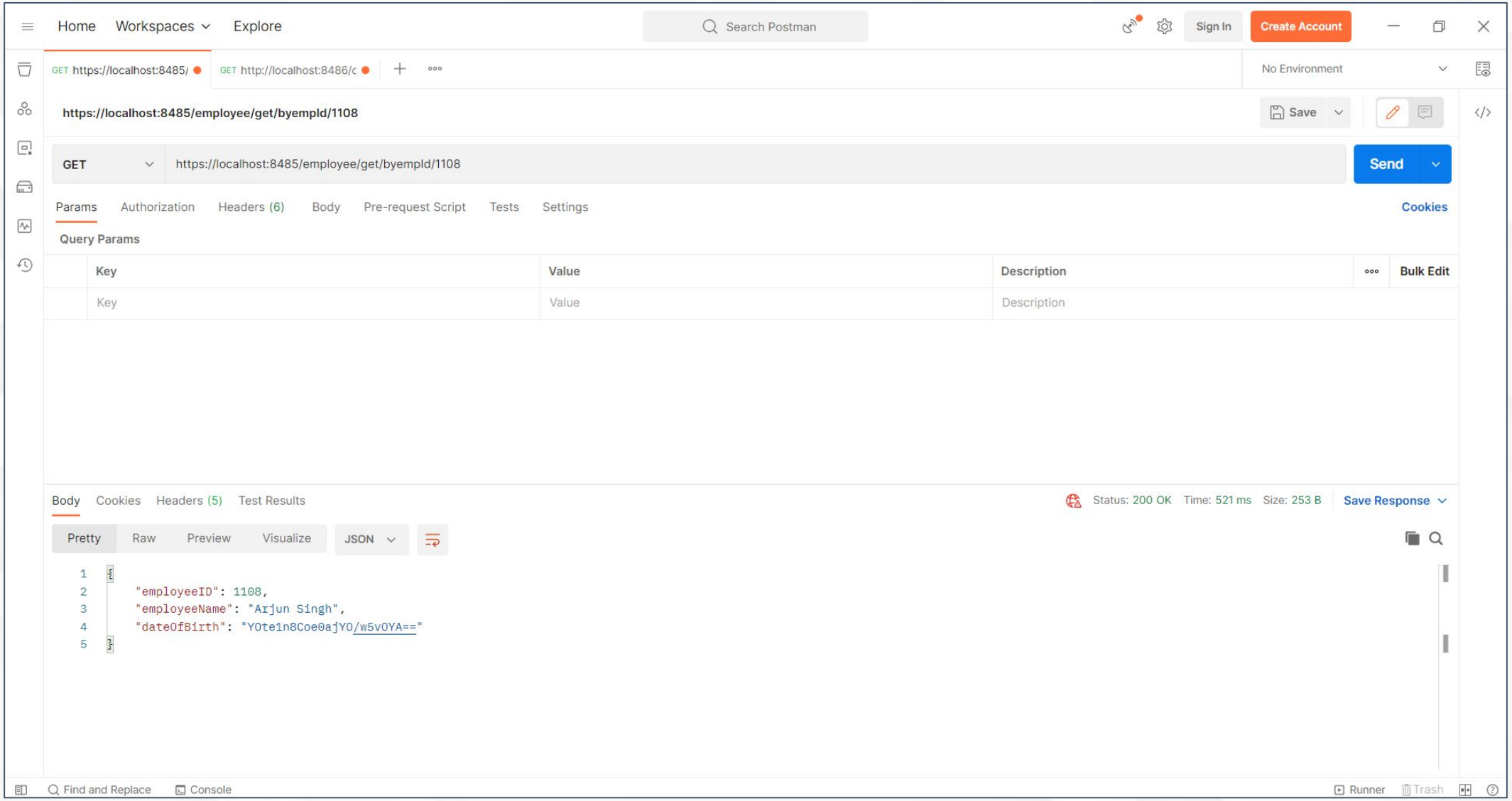
Deployment

Employee Management



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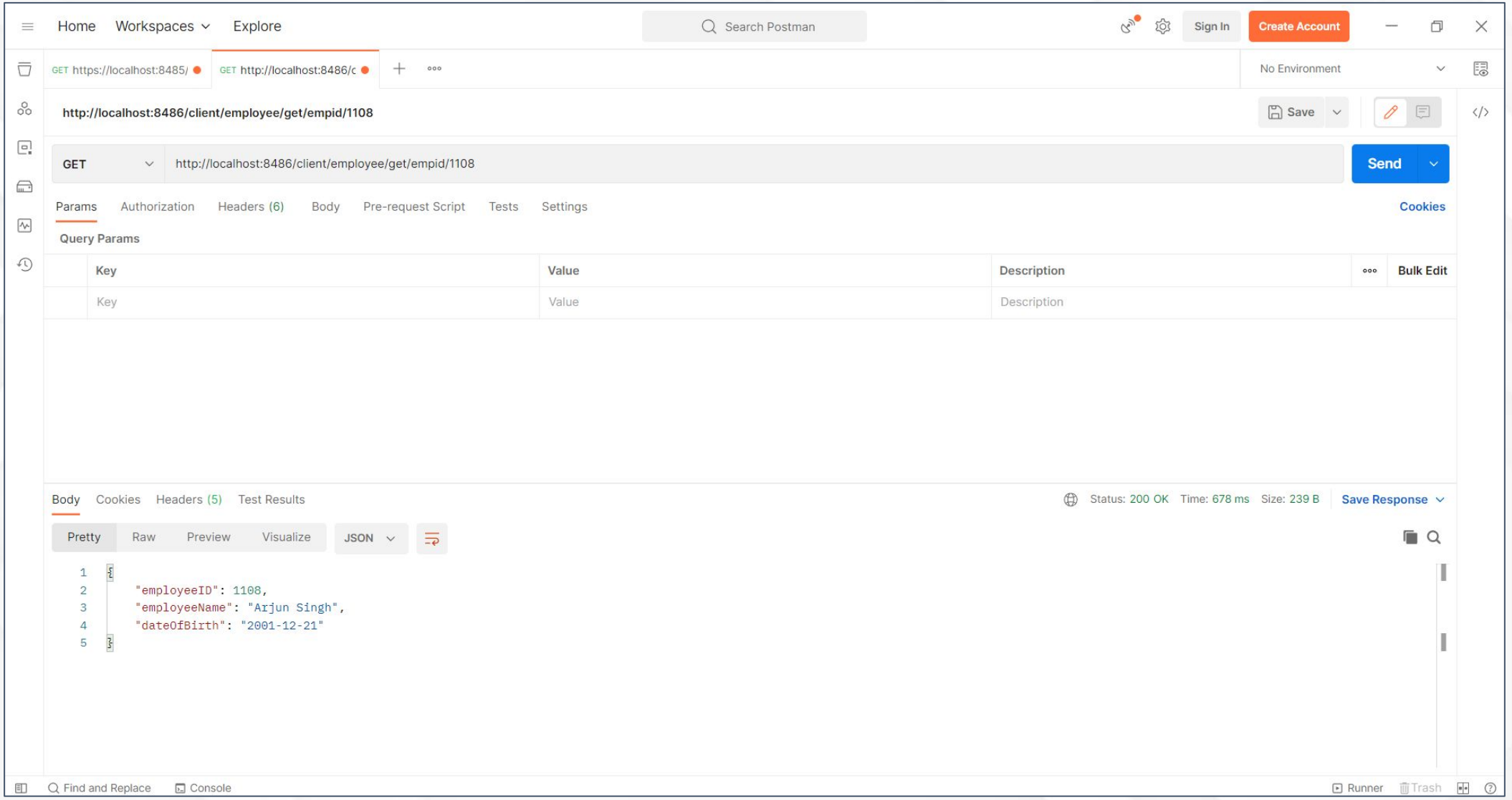
Deployment

Client



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Conclusion

The capstone project was successful in achieving its goal of developing a restful web service that can retrieve all the information about an employee from a single record in a database. Additionally, we used https with a self-signed certificate and aes-256 encryption to assure security. Jenkins was used for both the containerized web services deployment on Kubernetes as well as continuous integration and deployment.

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Future Work

- Adding additional features to the program, like the ability to retrieve all employee data, update and delete it, and search for employees based on particular criteria.
- Creating a user interface to provide better accessibility and usability for end users.
- Role based Access Control (RBAC) implementation will give the application precise access control, allowing different roles to access only the functionalities they need.
- The application can also be enhanced by integrating payroll management.

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References

1. https://www.codejava.net/frameworks/spring-boot/logback-rolling-files-example
2. https://www.codejava.net/frameworks/spring-boot/configure-https-with-self-signed-certificate
3. https://www.javatpoint.com/aes-256-encryption-in-java
4. https://www.javaguides.net/2021/07/spring-boot-tutorial-build-employee-management-project.html

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Appendices

Field	Type	Null	Key	Default	Extra
employee_id	int	NO	PRI	NULL	
employee_name	varchar(100)	YES		NULL	
date_of_birth	date	NO		NULL	

employee_id	employee_name	date_of_birth
1101	Pratiksha Patil	1997-11-21
1102	Pranay Singh	2000-11-28
1103	John Joe	2002-05-12
1104	Snehal Palve	1998-05-20
1105	Vaibhavi Patil	1997-08-30
1106	Ankita Mane	1997-08-25
1107	Mahan Nayak	1998-05-03
1108	Arjun Singh	2001-12-21
1109	Parth Kapoor	1995-12-12
1110	Kavya Chopra	2005-03-09

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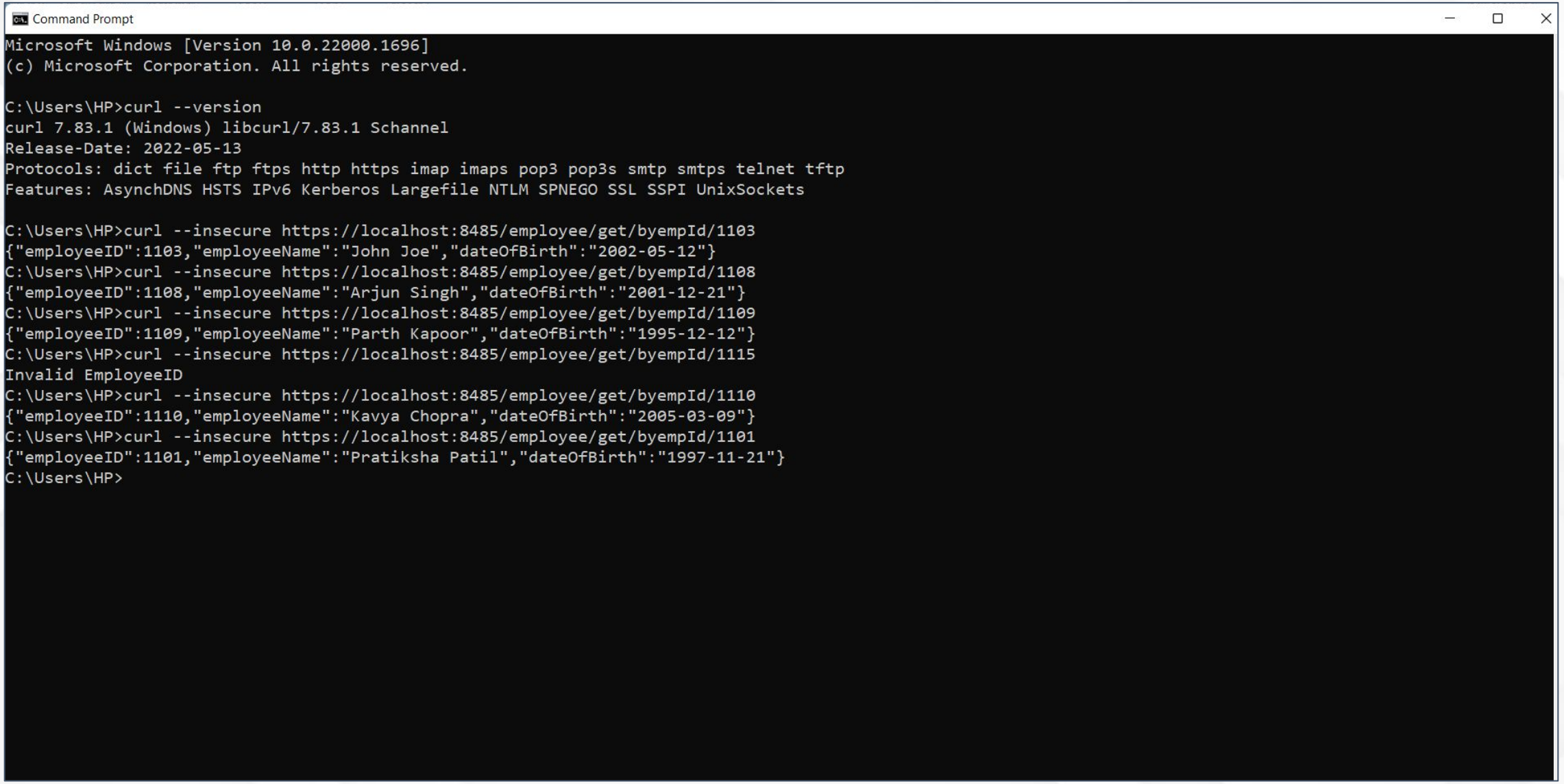
Appendices



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THANK YOU.