Client server network project

By

Group C

Submitted to

The University of Liverpool

MASTER-OF-COMPUTER-SCIENCE

*Software Development in Practice*

Word Count: XXX

09/Oct/2023

REPORT TITLE

Submitted to

The University of Liverpool

Word Count: XXX

09/Oct/2023

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# Introduction

The objective of this project is create a Client Server Network which once established is capable of facilitating the transmission of encrypted and serialised files. Also the server must have the seamless mechanism for decrypting and processing these files on the server side.

**SCOPE OF PROJECT**

The code and software architecture report will explain how Group C developed our Client Server Network and deployed it on to the local network.

The project needs to have three key functions:

1. Capable of Secure Communication between client and server.
2. Using Pickle – Serialising the data/encryption before transmission from client.
3. Decrypting the data and demonstrating the information in required format by printing it.

Purpose of Report

This report and the related code created by Group C will demonstrate the following:

* Understanding of network communication, creation and manipulation of data structures,
* Transmission of data between client and server,
* Implementation of advanced features such as data serialisation in various formats and encryption of text files.

We decided to break this project into four roles of Project Manager, Architect, Developer and Testerto reflect how this project would be managed as a real time project in industry. This will enable Group C to acquire the essential skills for designing and managing networked systems in real-world scenarios whilst gaining an understanding of how data security works and the importance of privacy.via encryption

# Solution Overview

Solution overview

Figure 1 is a high-level solution of a simple client-server network to perform data serialisation, encryption, and transfer from a server to a client.

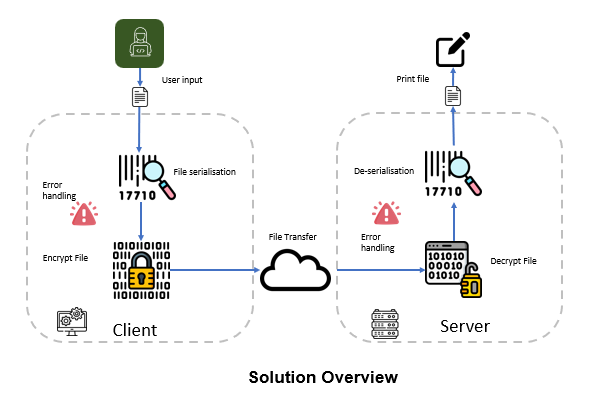


Figure 1. Solution overview

Technical Flow

The Technical Flow diagram (Figure 2) showcases the process flow of a Client-Server network that accomodates various data formats and encrypts the data to protect transmitted information. It also showcases server actions to accept the transmited data, de-seralise, unencrpt and print the received data.

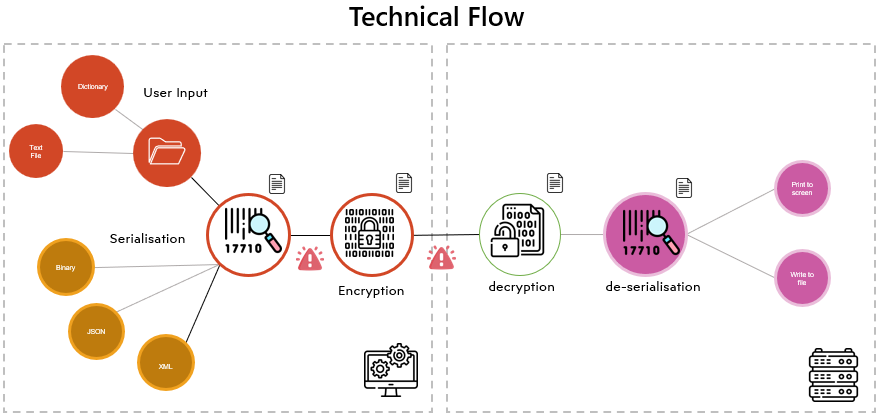
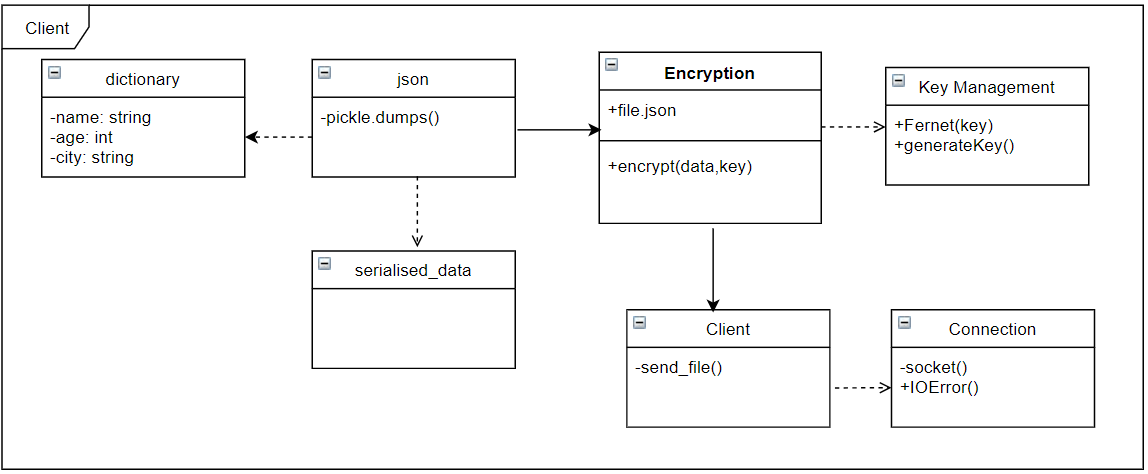


Figure 2. Technical Flow

# Solution Design

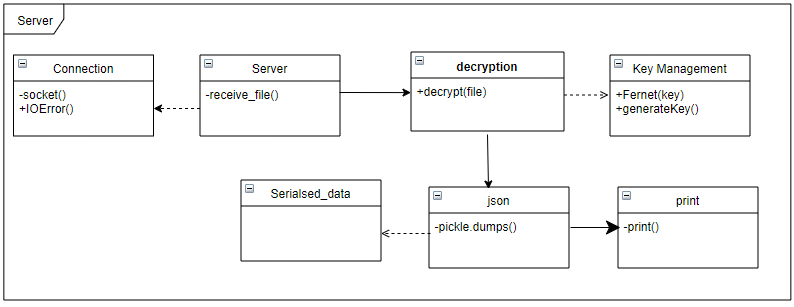
Solution Design (Client)



Key components within the Client design

* + Serialisation: Serialise the data into a structured format to maintain data integrity and interoperability.
  + Key Management: The key management component is responsible for generating and managing encryption keys.
  + Encryption: The encryption component is responsible for encrypting and decrypting data using the encryption keys provided by the key management component.
* Client: The client is responsible for sending encrypted data

Solution Design (Server)



Key components within the Server design

* **Server:** The server opens a socket to listen for incoming client connections. Once a connection is established, the server receives the file from the client. The server receives the file from the client. using a TCP Protocol.
* **Decryption:** The server decrypts the file using the same key used to encrypt it. This will be done via the Fernet Key generated by the client. This key will be supplied along with the file.
* **De-serialisation:** The server de-serialises the data in the file to a json format.
* **Print:** The server prints the contents of the dictionary.

Error Handling

Design Decisions

**Serialisation**: Pickle module is used to serialise the dictionary into JSON format for the following reasons –

* JSON is a text-based format that is easy to read and write.
* It is a language-agnostic format and interoperability between systems written in different languages.
* It is a lightweight format with minimal overhead.

**Encryption**: Fernet Cryptographic protocol will be used as our encryption tool of choice for the following reasons -

* Fernet uses symmetric key cryptography, which is simple and easy to use.
* Fernet is built on AES (Advance Encryption Standard) and ensures data encrypted is well-protected.

# Unit Testing

Serialization Unit Testing

Encryption Unit Testing

# Conclusion

REFERENCES

APPENDICES

|  | **Group Artifacts** |
| --- | --- |
| 1 | GitHub Repository |
| 2 | Client Server Network Project report |
| 3 | Requirement.txt |
| 4 | Readme.md |
| 5 | Screenshot of Github repo |
| 6 | Screenshot of Logs |