Dissertation Title:
Cloud File Mover with Encryption

Course No.: CC ZG628T

Course Title: Dissertation

Dissertation Done by:

Student Name: Vijay Kumar D

BITS ID: 2023mt03648

Degree Program: M.Tech Cloud Computing

Research Area: Cloud Computing

Dissertation carried out at:

Optum Global solutions, Hyderabad

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Contents

1. Broad Area of Work

My project combines principles from Cloud Computing, Cybersecurity, and Applied Cryptography. The central goal is to develop a practical solution for secure data migration that puts control back into the user's hands, ensuring their files remain private as they are moved to and stored on cloud platforms.

2. Background

As data volumes continue to grow exponentially, moving to the cloud has become a standard practice for many organizations. However, this shift introduces significant security risks. Standard protocols don't always protect data from end to end, leaving files vulnerable to interception during transfer or unauthorized access on a remote server. My work addresses this problem directly by focusing on a system where security is handled at the source—files are encrypted on the user's local machine before they are ever uploaded, ensuring they remain unreadable to anyone without authorization.

3. Objectives

I have set out the following primary objectives for this project:

1. To design and build a complete web application in Python that securely manages the entire file migration process.
2. To implement robust AES encryption to guarantee file confidentiality before any data is transmitted over the network.
3. To integrate a secure authentication system, ensuring only authorized users can upload, download, or decrypt files.
4. To use an HMAC (Hash-based Message Authentication Code) to verify file integrity and prevent tampering.
5. To architect the system in a modular way, allowing it to easily connect with different cloud providers like AWS S3 or Azure Blob Storage.

4. Scope of Work

Scope of this dissertation involves designing and developing a Flask-based application, Cloud File mover with encryption, with secure file encryption, user authentication, cloud storage integration, and a user-friendly frontend. Comprehensive testing will be conducted to ensure functionality and security.

The development process is broken down into following key phases:

1. **Architecture & Setup**:
   The core structure of the Flask application will be laid out, and the primary modules for handling users, files, and cryptographic keys will be designed.
2. **Cryptography Module**:
   Functions for secure encryption and decryption will be developed, ensuring efficient handling of files.
3. **Backend API**:
   API endpoints for user login, file uploads, and download requests will be built once the core logic is in place.
4. **Frontend Interface**:
   An intuitive user interface will be developed to allow users to interact with the backend services.
5. **Cloud Integration**:
   A connector will be written to interface with a cloud storage provider's API.
6. **Testing**:
   Thorough testing will be conducted on all components, with close attention paid to the security workflows to ensure the absence of vulnerabilities.

5. Plan of Work

Phases	Start Date-End Date	Work to be done
Dissertation Outline	26th July 2025 – 30th July 2025	Literature Review and prepare Dissertation Outline
Design & Development	31st July– 30th August 2025	Design & Development Activity
Testing	31st August – 1st October 2025	Software Testing, User Evaluation & Conclusion
Dissertation Review	3rd October - 15th October 2025	Submit Dissertation to Supervisor & Additional Examiner for review and feedback
Submission	7th Nov 2025 - 11th Nov 2025	Final Review and submission of Dissertation

6. Literature References

The following are referred Books and journals from the preliminary literature review.

[1] ***Foundational Texts on Cryptography:*** *Foundational books covering the principles of symmetric-key algorithms, block cipher modes, and message authentication.*

Cryptography and Network Security by William Stallings.

[2] ***Official Technical Standards:*** *The formal publications that define the cryptographic methods being used. NIST FIPS 197, which is the official standard for the Advanced Encryption Standard (AES).*

[3] ***Cloud Security Research & Whitepapers:*** *Academic papers and industry publications detailing cloud architecture, threat models, and security best practices.*

Articles from IEEE/ACM journals and security whitepapers from providers like AWS and Microsoft Azure.

[4] ***Software and Library Documentation:*** *The official guides and API references for the specific tools used in the project's implementation.*

[5] ***The official documentation for Python****, the Flask framework, Flask-Login, and the cryptography library.*

7. Particulars of the Supervisor and Examiner

	Supervisor	Additional Examiner
Name	**Dilip Reddy Parakala**	**Dilip Reddy Parakala**
Qualification	**M.Tech**	**M.Tech**
Designation	**Director – Data Engineering**	**Director – Data Engineering**
Employing Organization and Location	**Optum Global Solutions, Hyderabad**	**Optum Global Solutions, Hyderabad**
Phone No.(with STD Code)	**917386958645**	**917386958645**
Email Address	**dilip.parakala@optum.com**	**dilip.parakala@optum.com**

8. Remarks of the Supervisor

"The **Cloud File Mover with Encryption** project will develop a centralized, in-house solution to manage and secure all electronic file transfers, addressing critical organizational security needs. The proposed system will be built using Python and Flask to ensure flexibility for custom integrations and long-term maintainability. The project plan is well-considered, including a clear business justification, robust validation standards for performance and security, and a roadmap for integration with existing corporate systems. I approve the following project as the supervisor."

Information about the Supervisor:

Dilip Reddy Parakala,
Director – Data Engineering,
Optum Global solutions.

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
WORK INTEGRATED LEARNING PROGRAMMES (WILP) DIVISION
SECOND SEMESTER OF ACADEMIC YEAR 2025-2026

CC ZG628T**:** Dissertation OUTLINE

STUDENT ID No.	2023mt03648
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STUDENT'S EMPLOYING ORGANIZATION & LOCATION	Optum Global Solutions, Hyderabad.
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DISSERTATION TITLE	Cloud File Mover with Encryption

Please prepare the outline as a separate document with the following sections along with the above identification information.

1. Cover Page with Student ID No., Name, Course Number, Course Title and Dissertation / Project / Project Work Title, Broad Academic Area of Work.
2. Background (Relevance of the Project to the current work environment in the employing organization)
3. Objectives
4. Scope of Work (To be done by the student independently)
5. Plan of Work (Work to be done during the semester)
6. Literature References
7. Particulars of the Supervisor and Additional Examiner
8. Remarks of the Supervisor

D. Vijay Kumar	Dilip Reddy Parakala	Dilip Reddy Parakala
Signature of Student	**Signature of Supervisor**	**Signature of Additional Examiner**
Name: Vijay Kumar D	**Name: Dilip Reddy Parakala**	**Name: Dilip Reddy Parakala**