



**TRIBHUVAN UNIVERSITY  
INSTITUTE OF SCIENCE AND TECHNOLOGY  
CENTRAL DEPARTMENT OF COMPUTER SCIENCE AND  
INFORMATION TECHNOLOGY  
KIRTIPUR, KATHMANDU  
NEPAL**

**ENHANCED SECURITY ENCRYPTION FOR  
DATA STORAGE USING MULTIPLE KEYS**

**BY:**

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A thesis submitted to the Central Department of Computer Science and Information Technology in partial fulfillment of the requirement for the Master's Degree in Computer Science and Information Technology

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**CERTIFICATION**

Mr. Sushil Nepal has carried out this thesis entitled **“Enhanced Security Encryption for Data Storage using Multiple Keys”** under my supervision and guidance. In the best of my knowledge this is an original work done by him in computer science. I, therefore, recommend for further evaluation.

.....

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## **ABSTRACT**

Encryption of data has been a key issue in the global market as the technology advancement has brought high risk through unauthorized access, alteration, degradation, destruction, and other threats to the information that is being shared. For the solution to these problems, many algorithms have been designed to overcome the potential threats.

My research also focuses on encrypting the data through efficient use of algorithm to make it secure. For this the use of multiple keys is an essential part. Key1 is a high entropy source where as key2 is a pass phrase. Key1 is seeded with PRNG to generate 32 byte block which is then added to the beginning of the message.

Encryption algorithm is designed to provide some protection for the user who re-uses the same pass phrase when encrypting various files. The algorithm will generate different cipher text even if it is invoked on the exact same plain text with the same pass phrase. This is accomplished by cascading a stream cipher with a block cipher. The block cipher is not cryptographically secure. Its purpose is to avalanche changes throughout the file. The first block is XORed with the hash of the pass phrase, the hash of the subsequent blocks are calculated from the plain text of the previous block concatenated with the hash used in the previous block. The stream cipher is a simple XOR against the next PRNG return and an XOR against the sum of all previous plain text modulo 256. Before starting encryption, the PRNG is seeded with high entropy data and used to generate a first block.

# TABLE OF CONTENTS

## CHAPTER 1

### INTRODUCTION

1.1 Storage Security	2
1.2 The need of Storage Security	2
1.3 Security Control for storage	3
1.4 Secrecy System	4
1.5 Valuation of Secrecy System	5
1.6 Motivation	6
1.7 Approach	7

## CHAPTER 2

### LITERATURE SURVEY

2.1 Cryptography	8
2.2 Cipher Model	8
2.2.1 Symmetric Model	9
2.2.1.1 Substitution Technique	9
2.2.1.2 Transposition Technique	10
2.2.2 Asymmetric Model	11
2.2.3 Hash Function	12
2.2.3.1 MD5	12
2.2.3.2 Secure Hash Algorithm-1(SHA-1)	14
2.2.4 Quantum Encryption	15
2.2.5 Noise Addition	15
2.2.6 Steganography	15
2.2.7 The Needham-Schroeder Public Key Protocol	15

## CHAPTER 3

PROBLEM DEFINITION	
3.1 Problem Definition	17
3.2 Proposed Solution	17
<b>CHAPTER 4</b>	
STUDY OF ALGORITHMS	
4.1 Secure Hash Standard	19
4.2 SHA-256	20
4.2.1 SHA-256 Function	21
4.2.2 SHA-256 Constants	21
4.2.3 SHA-256 Preprocessing	22
4.2.3.1 Padding the message	22
4.2.3.2 Parsing the padded message	22
4.2.3.3 Setting the initial hash value $H(0)$	22
4.2.4 SHA-256 Initial Operation	23
4.2.5 SHA-256 Hash Computation	23
<b>CHAPTER 5</b>	
DESIGN AND IMPLEMENTATION	
5.1 Pseudo Random Number Generation of Key	26
5.2 Generation of Hash elements using SHA-256	27
5.3 Generation of Plaintext modulo 256	29
5.4 Encryption Process	30
5.5 Algorithm	31
5.6 Implementation of Algorithm	32
<b>CHAPTER 6</b>	
TESTING AND ANALYSIS	
6.1 Execution of Program	33

6.2 Testing	33
6.3 Analysis	35
<b>CHAPTER 7</b>	
<b>CONCLUSION AND FUTURE WORK</b>	
7.1 Conclusion	36
7.2 Future Works	36
<b>APPENDIX</b>	37
<b>REFERENCES</b>	51
<b>BIBLIOGRAPHY</b>	53

## LIST OF FIGURES

1. Schematic diagram of simple secrecy system	4
2. Asymmetric Cryptogram	11
3. MD5 operation with one operation within a round	13
4. Secure hash algorithm properties	20
5. Generation of $k(i)$	26
6. Generation of $h(i)$	28
7. Bit variation Analysis	35