**CHARM 2: AN EFFICIENT PRICING MODEL FOR MULTI-CLOUD DATA**

**HOSTING SCHEME WITH HIGH AVAILABILITY**

A PROJECT REPORT

*Submitted by*

**Mythele.B (111712104065)**

**Nandhini Kumari.J (111712104067)**

**Padmaja.S (111712104071)**

**Radhika.S.S (111712104081)**

*In partial fulfilment for the award of the degree*

*Of*

BACHELOR OF ENGINEERING

IN

**COMPUTER SCIENCE AND ENGINEERING**

 

RMK ENGINEERING COLLEGE, KAVARAIPETTAI

ANNA UNIVERSITY :: CHENNAI 600 025

APRIL 2016

**ANNA UNIVERSITY::CHENNAI – 600 025**

**BONAFIDE CERTIFICATE**

Certified that this project report “**CHARM2 AN EFFICIENT PRICING MODEL FOR MULTI-CLOUD DATA HOSTING SCHEME WITH HIGH AVAILABILITY**” is the bonafide work of **MYTHELE[111712104065],** **NANDHINI KUMARI[111712104067],** **PADMAJA[111712104071]** and **RADHIKA.S.S [11712104081]** who carried out the project under my supervision.

|  |  |
| --- | --- |
| **SIGNATURE**  **DR. K.L.SHANMUGANATHAN, M.E.,M.S.,Ph.D.,** HEAD OF THE DEPARTMENT  PROFESSOR  Department of Computer Science and  Engineering,  R.M.K Engineering College,  Kavaraipettai - 601 206. | **SIGNATURE**  **Mrs. K.ANITHA, M.E., (Ph. D)**  SUPERVISOR  ASSISTANT PROFESSOR  Department of Computer Science and Engineering,  R.M.K Engineering College,  Kavaraipettai - 601 206. |

Submitted to Project Viva Voce Examination held on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| **EXTERNAL EXAMINER** | **INTERNAL EXAMINER** |

**ABSTRACT**

More and more enterprises and organizations are hosting their data into the cloud, in order to reduce the IT maintenance cost and enhance the data reliability. However, facing the numerous cloud vendors as well as their heterogeneous pricing policies, customers may well be perplexed with which cloud(s) are suitable for storing their data and what hosting strategy is cheaper. The general status quo is that customers usually put their data into a single cloud (which is subject to the vendor lock-in risk) and then simply trust to luck. Based on comprehensive analysis of various state-of-the-art cloud vendors, this paper proposes a novel data hosting scheme (named CHARM) which integrates two key functions desired. The first is selecting several suitable clouds and an appropriate redundancy strategy to store data with minimized monetary cost and guaranteed availability. The second is triggering a transition process to re-distribute data according to the variations of data access pattern and pricing of clouds. We evaluate the performance of CHARM using both trace-driven simulations and prototype experiments. The results show that compared with the major existing schemes, CHARM not only saves around 20% of monetary cost but also exhibits sound adaptability to data and price adjustments.

**ACKNOWLEDGEMENT**

Support on demand, encouragement at the needed moment and guidance in the right direction are in dispensable for the success of any project. We have received these in excess from all corners from various people, we are glad to submit our gratitude to them.

We thank **Shri. R.S.Munirathinam, Chairman,** and **Shri. R.M.Kishore , Vice Chairman** of RMK group of Institutions for extending a generous hand in providing the best of resources to the college. Dr**. Elwin Chandra Monnie, the esteemed Head of our Institution** has been a source of motivation to all the staffs and students of our college. We are so much thankful to him. Our sincere thanks to **Dr. Mohammed Junaid, the Vice Principal** for giving the continuous support for the completion of our project.

Our sincere thanks to **Dr. K.L.Shanmuganathan, the Head of the Department** for his continuous support and motivation throughout our project.

We extend our profound gratitude to **Dr. K.Sethukarasi our Project Coordinator** and **Mrs. K.Anitha our Guide** for her guidance, who has indeed been a polestar throughout the course of the project, we thank him for giving us full support to complete the project successfully.

Last, but not the least, we take this opportunity to thank all the **staff members** of the Department of Computer Science and Engineering. Regards to **our family, classmates and friends** who offered an unflinching moral support for completion of this project.

**TABLE OF CONTENTS**

|  |  |  |
| --- | --- | --- |
| **CHAPTER** | **TITLE** | **PAGE NO.** |
|  | **ABSTRACT** | **iii** |
|  | **LIST OF FIGURES** | **ix** |
|  | **LIST OF ABBREVIATIONS** | **x** |
| **1.** | **INTRODUCTION** | **1** |
|  | 1.1 Overview | 1 |
|  | 1.2 Objective | 2 |
|  | 1.3 Scope | 3 |
| **2.** | **LITERATURE SURVEY** | **4** |
| **3.** | **SYSTEM ANALYSIS** | **8** |
|  | 3.1 Overall Description | 8 |
|  | 3.1.1 Problem Definition | 8 |
|  | 3.1.2 Existing System | 9 |
|  | 3.1.2.1 Disadvantage | 10 |
|  | 3.1.3 Proposed System | 10 |
|  | 3.1.3.1 Advantage | 11 |
|  | 3.2 Feasibility Study | 11 |
|  | 3.2.1 Technical Feasibility | 11 |
|  | 3.2.2 Economic Feasibility | 12 |
|  | 3.2.3 Operational Feasibility | 12 |
|  | 3.3 System Configuration | 13 |
|  | 3.3.1 Hardware Requirements | 13 |
|  | 3.3.2 Software Requirements | 13 |
| **4.** | **SYSTEM DESIGN** | **14** |
|  | 4.1 Detailed System Design | 14 |
|  | 4.1.1 System Architecture | 15 |
|  | 4.1.2 Use Case Diagram | 16 |
|  | 4.1.3 Class Diagram | 17 |
|  | 4.1.4 Activity Diagram | 18 |
|  | 4.1.5 Sequence Diagram | 19 |
|  | 4.1.6 Collaboration Diagram | 19 |
|  | 4.1.7 Data Flow Diagram | 20 |
|  | 4.2 Requirements | 20 |
|  | 4.2.1 Functional Requirements | 20 |
|  | 4.2.2 Non - Functional Requirements | 20 |
|  | 4.2.3 Pseudo Requirements | 21 |
| **5.** | **IMPLEMENTATION** | **22** |
|  | 5.1 Module Description | 22 |
|  | 5.1.1 Multi-Cloud | 22 |
|  | 5.1.2 Data Hosting | 22 |
|  | 5.1.3 Cloud Storage | 23 |
|  | 5.1.4 Owner Module | 24 |
|  | 5.1.5 User Module | 24 |
|  | 5.2 Software Description | 24 |
|  | 5.3 Algorithm Description | 36 |
| **6.** | **TESTING** | **38** |
|  | 6.1 System Testing | 38 |
|  | 6.1.1 Introduction | 38 |
|  | 6.1.2 Source Code Testing | 38 |
|  | 6.1.3 Specification Testing | 38 |
|  | 6.1.4 Module Level Testing | 38 |
|  | 6.1.5 Unit Testing | 39 |
|  | 6.1.6 Integration Testing | 39 |
|  | 6.1.7 Validation Testing | 39 |
|  | 6.1.8 Recovery Testing | 39 |
|  | 6.1.9 Security Testing | 40 |
|  | 6.1.10 Performance Testing | 40 |
|  | 6.1.11 Black Box Testing | 40 |
|  | 6.1.12 Output Testing | 41 |
|  | 6.1.13 User Acceptance Testing | 41 |
|  | 6.2 Test Cases | 41 |
|  | 6.2.1 Login Credential Check | 41 |
|  | 6.2.2 File Upload | 42 |
|  | 6.2.3 File Download | 42 |
| **7.** | **CONCLUSION AND FUTURE ENHANCEMENT** | **43** |
|  | **APPENDIX 1 - SAMPLE CODE** | **44** |
|  | **APPENDIX 2 - SCREENSHOTS** | **62** |
|  | **REFERENCES** | **68** |

**LIST OF FIGURES**

|  |  |  |
| --- | --- | --- |
| **FIGURE NO.** | **TITLE** | **PAGE NO.** |
| 4.1 | Services Available | 14 |
| 4.2 | Charm Architecture | 14 |
| 4.1.1 | System Architecture | 15 |
| 4.1.2 | Use Case Diagram | 16 |
| 4.1.3 | Class Diagram | 17 |
| 4.1.4 | Activity Diagram | 18 |
| 4.1.5 | Sequence Diagram | 19 |
| 4.1.6 | Collaboration Diagram | 19 |
| 4.1.7 | Data Flow Diagram | 20 |
| 5.1 | Working of Java Program | 26 |
| 5.2 | Platform Independent | 26 |
| 5.3 | Execution of Java Program | 27 |
| 5.4 | Features of Java2 SDK | 30 |

**LIST OF ABBREVIATIONS**

|  |  |  |
| --- | --- | --- |
| 1. | UDS | Update batched Delayed Synchronization |
| 2. | SSD | Solid State Drive |
| 3. | DRAM | Dynamic Random Access Memory |
| 4. | SCC | Storage Configuration Compiler |
| 5. | SLA | Service Level Agreements |
| 6. | P2P | Peer-to-Peer |
| 7. | RAID | Redundant Array of Inexpensive/Independent Disk |
| 8. | RACS | Redundant Array of Cloud Storage |
| 9. | SDLC | Software Development Life Cycle |
| 10. | SVGA | Super Video Graphics Array |
| 11. | SDK | Software Development Kit |
| 12. | SMS | Storage Mode Switching |
| 13. | CGI | Computer Graphics Interface |
| 14. | API | Application Program Interface |
| 15. | JDBC | Java Database Connectivity |
| 16. | ODBC | Open Database Connectivity |
| 17. | RDBMS | Relational Database Management System |



