DATA SECURITY STRATEGY BASED ON ARTIFICIAL IMMUNE SYSTEM FOR CLOUD COMPUTING

Mr. ARUNMOZHI B, M.E., Assistant Professor,
Department of Computer Science and Engineering
Mrs. **SADHANAPAUL J**, **B.E** Student of Computer Science and Engineering,
Mrs. VISHNUPRIYA K, **B.E** Student of Computer Science and Engineering
St. Joseph College of Engineering, Sriperumbudur, Chennai.

Abstract:

The fast development of cloud computing and its wide application, data security plays an important role in cloud computing. This paper brought up a data security strategy based on artificial immune system on architecture of HDFS for cloud computing. we explained the main factors influence data security in cloud environment. Then we introduce HDFS architecture, data security model and put forward an improved security model for cloud computing. In the third section, artificial immune system related with negative selection algorithm and immune algorithm that adopted in our system and how they applied to cloud computing are depicted in detail. Simulations are taken by two steps. Former simulations are carried out to prove the performance of artificial immune system brought up in this paper, the latter simulation are running on Cloudsim platform to testify that data security strategy based on artificial immune system for cloud computing is efficient.

KEYWORDS – Data Security, Artificial immune, Cloud Computing, HDFS, Cloudsim.

Introduction:

Cloud computing is a new computing paradigm appeared in 2006, and the evolutionary offspring of parallel computing, distributed computing, utility computing and grid computing, and the developmental outcome of network storage, virtualization and load balance. The main idea of cloud computing is to build a virtualized computing resource pool by centralizing abundant computing resources connected with network and present the service of infrastructure, platform and software. This network that offers various computing resources is called cloud . As a supercomputing paradigm based on the Internet, cloud computing allows

customers to dynamically share a mass of hardware, software and data resource, and charges according to their actual usage. Therefore, computing power can be sold and purchased as merchandise easily by network in a low price, just like water, gas and electric power. Cloud computing is an innovatory thing similar to electric power changing from a single generator to a centralized electric power plant. Cloud computing has been encountered with security problems. In this paper we want to carry out security strategy for cloud computing.

Objectives:

The main objective of our project is the user will get double security by splitting the single file into many separate files that stored in different position and user can retrieve the files by giving personal details like user name , password , one time password through phone number.

Literature Survey:

Applying Artificial Immune System for Intrusion Detection,. AUTHOR: Xiaohong Yuan,Kaushik Roy, Albert Esterline,Joaquin Hernandez, YEAR: 2018

This paper investigates the approaches of using an analogy of the Human Immune System (HIS) to createan Artificial Immune System (AIS) based Intrusion Detection System (IDS). Noise can severely limit an intrusion detection system's effectiveness. Bad packets generated from software bugs, corrupt DNS data, and local packets thatescaped can create a significantly high false-alarm rate.

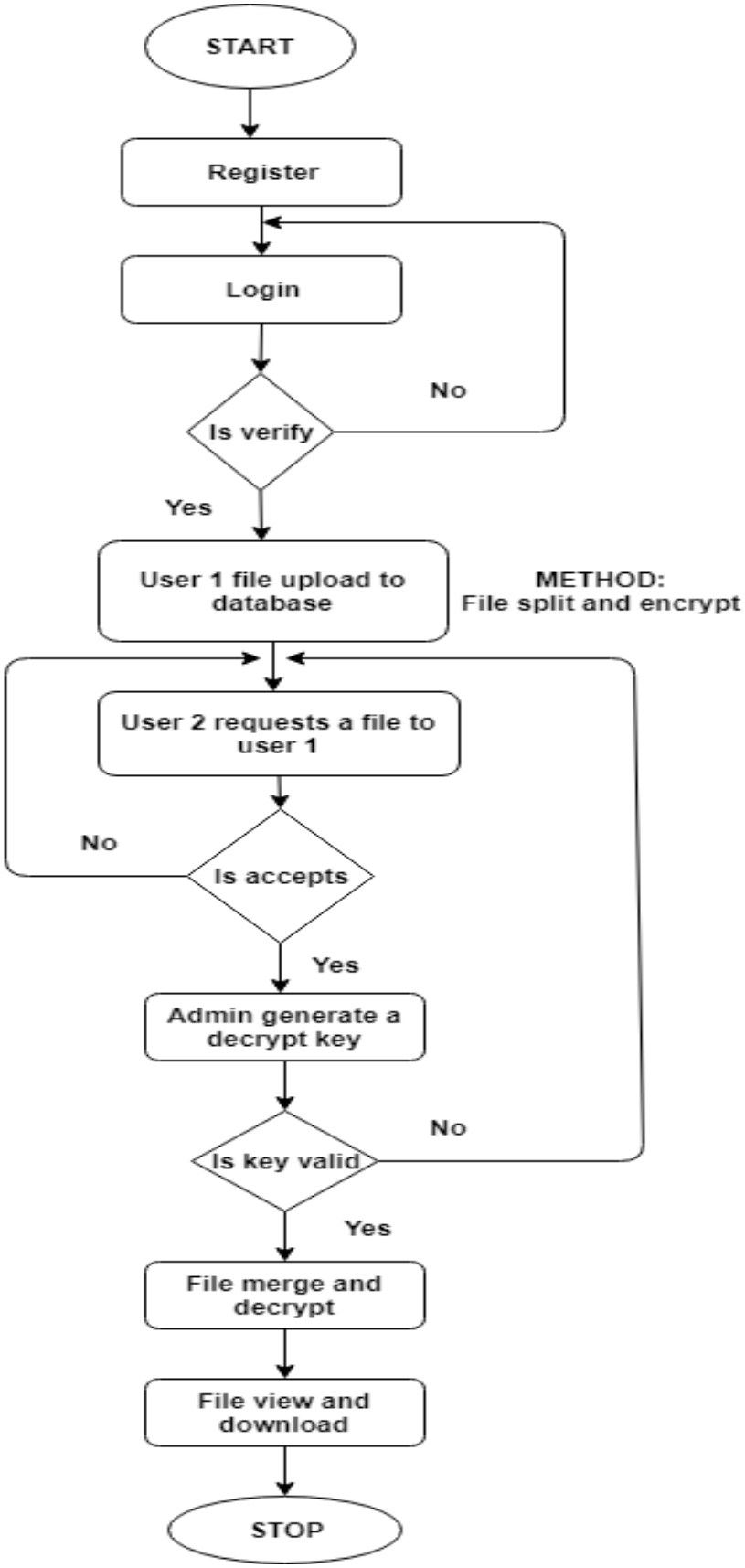
Towards a Hybrid Immune Algorithmbased on Danger Theory for Database Security, AUTHOR: Ayman Mohamed Mostafa, YEAR:2019

The most prevalent cause of data breachescomes from insiders who misuse their account privileges. Due to the difficulty of discovering such breaches, an adaptive,accurate, and statergy. Inability to respondor stop attacks upondetection

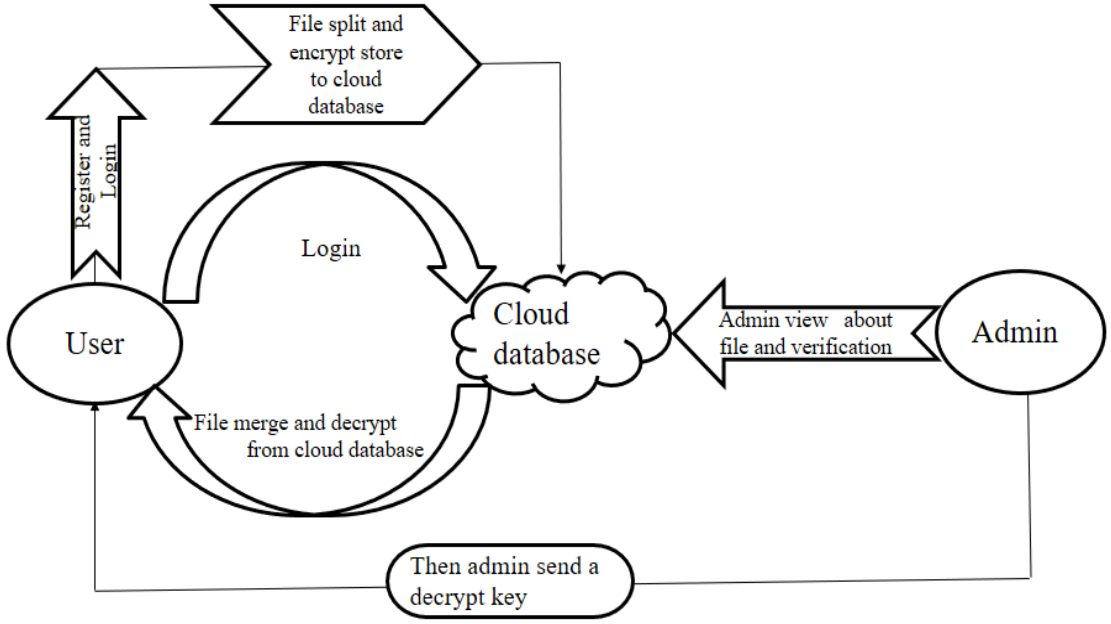
System Design:

DATA FLOW DIAGRAM:

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system, modeling its process aspects. A DFD is often used as a preliminary step to create an overview of the system without going into great detail, which can later be elaborated


START
Register
Login
Is verify
No
Yes
User 1 file upload to database
METHOD:
File split and encrypt
User 2 requests a file to user 1
Is accepts
No
Yes
Admin generate a decrypt key
Is key valid
No
Yes
File merge and decrypt
File view and download
STOP

ARCHITECTURE DIAGRAM:



Implementation:

Data security strategy based on artificial immune system

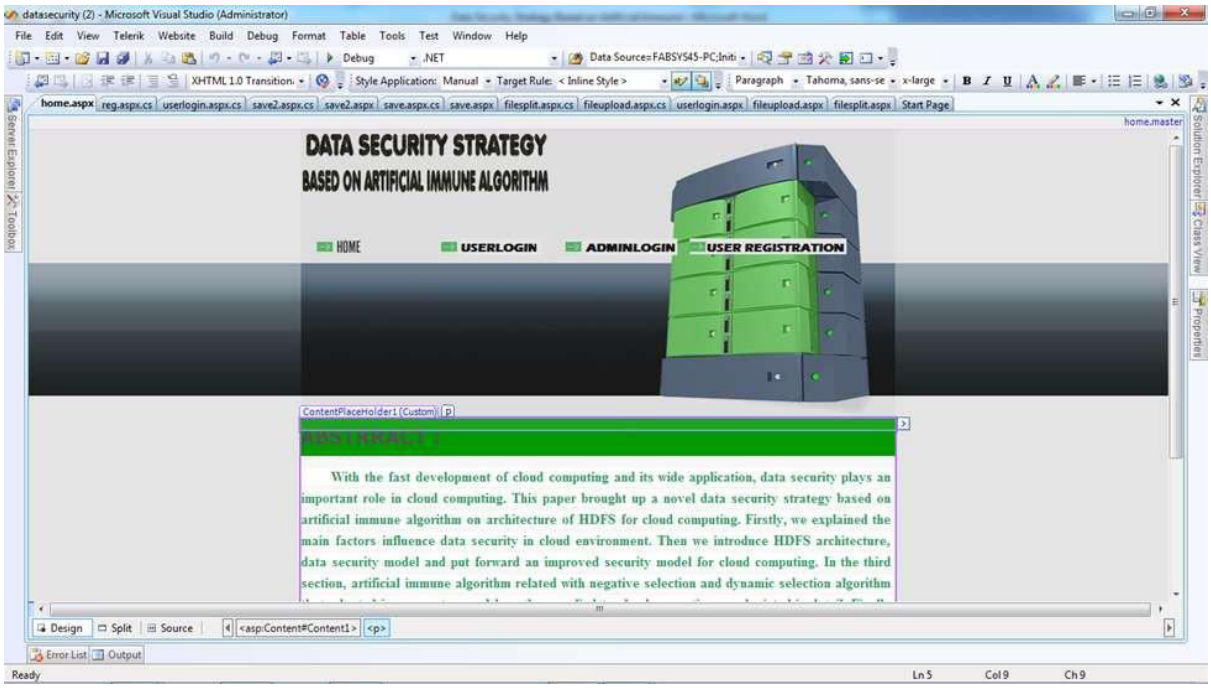
In cloud computing environment, several reasons could threat data security including uncertain cloud network, network node broken down, super-large user visits and data un consistency. One of the above situations would make data insecure. We maintain data consistency to keep data block on each node addressable. So maintain system consistency is to guarantee viewgraph consistency instead of data addressable on each online node. We suppose a user wants to visit current data task could be presented as f = f1, f2,., fn. While visiting file f , n task will be assigned on k data nodes. Each node runs task Ti , so the feasibility of f can be donated as follows. where Ci indicates the network connection between client and data node i. If and only if data node fi and Ci are both addressable, then file f could be obtained. So the feasibility of file f could be described as f = k ∏ i=1 Ci f.

In order to keep data consistency during file visit, a novel data security strategy is brought up to manage data and file store. Two aspects need to consider for file store and management in cloud computing. 1. Data block numbers. Number of data block is used for count data block numbers stored in the same physical node site. The data creator needs to consider how many blocks should be created, the more blocks are, the more resources will be wasted which will cause more data consistency maintain cost. The less block number is, the

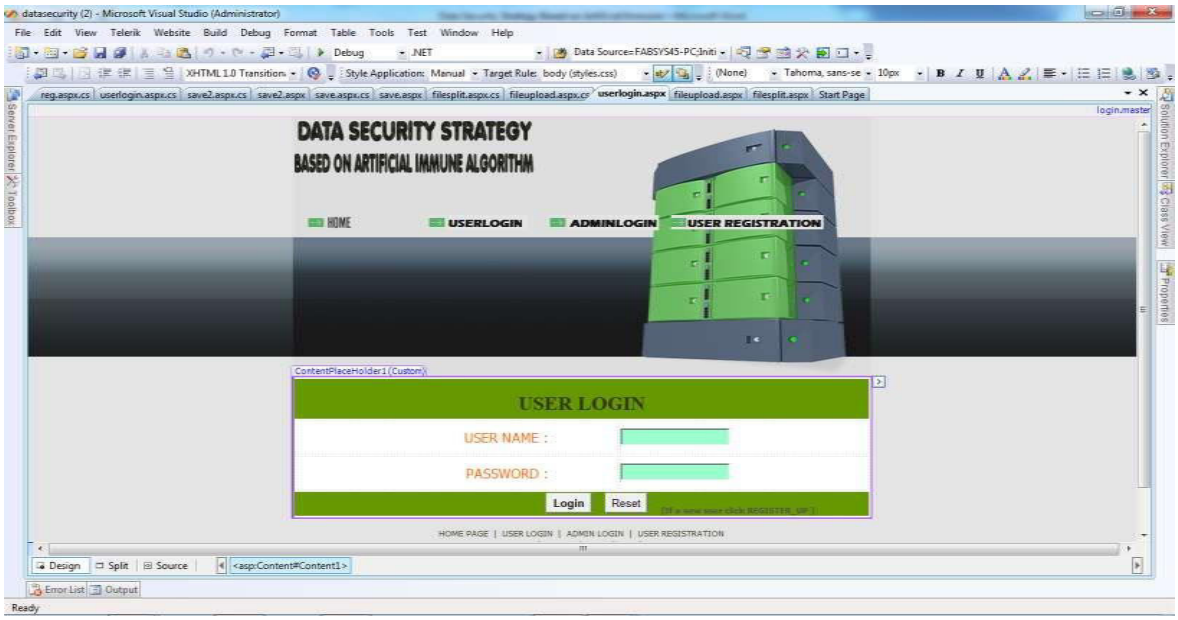
data block cannot meet the demand of user visit. So the data block number effect the data management and consistency maintain. Data block granularity. Data block granularity decides the file system efficiency by storing different files. Data block of HDFS is 64M, while other file may adopt different block granularity. File creation and management could be simulated as artificial immune system. Following table shows their common ground. File stored in cloud environment, they firstly be coded as antibody by using binary coding rules.

SNAPSHOTS:

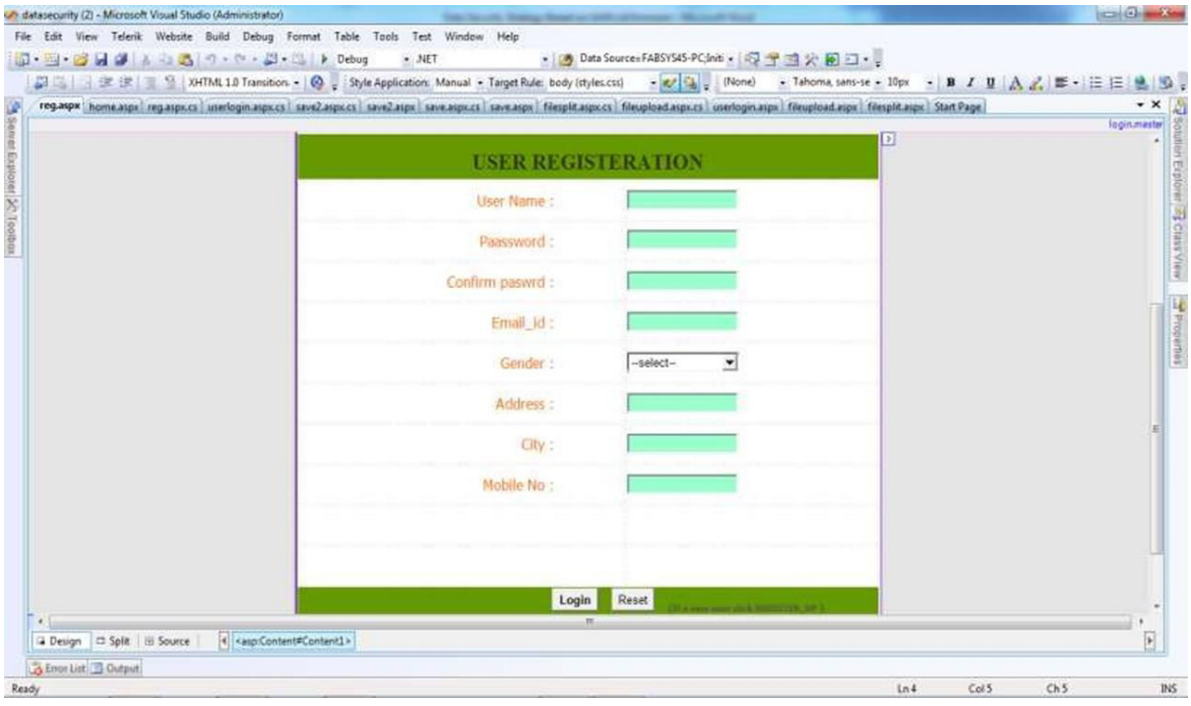
Home Page:



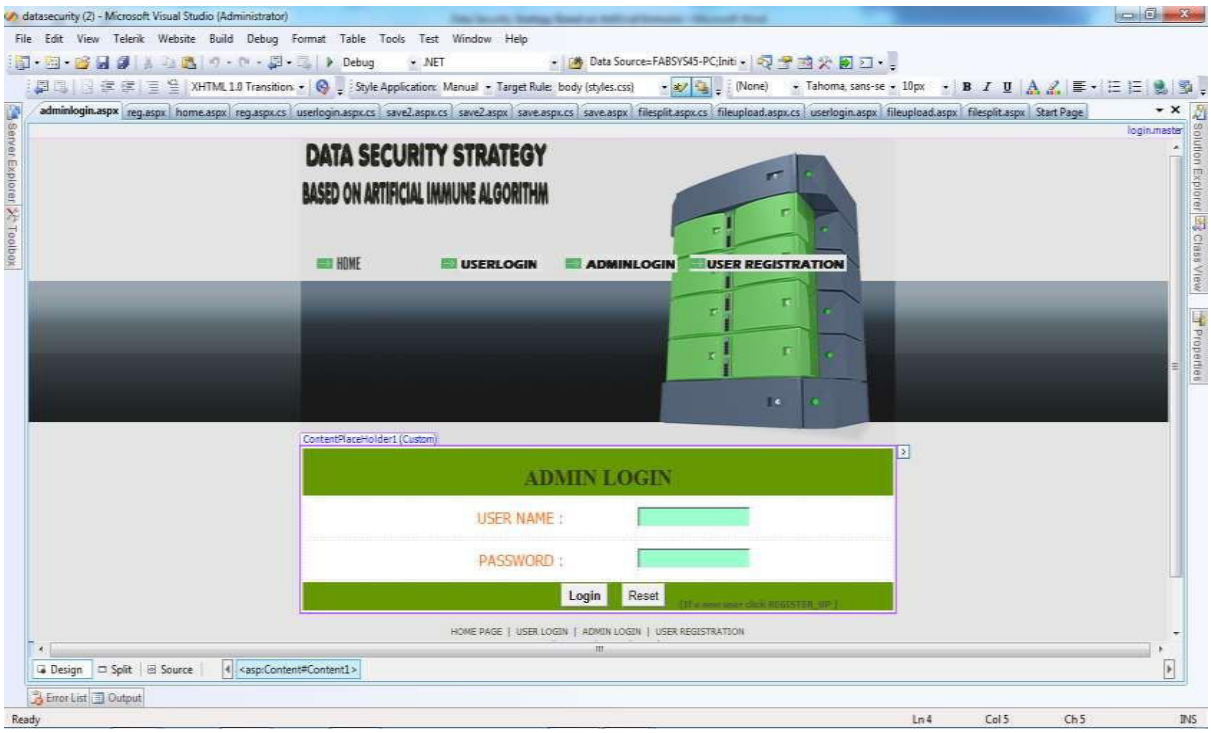
User Login:



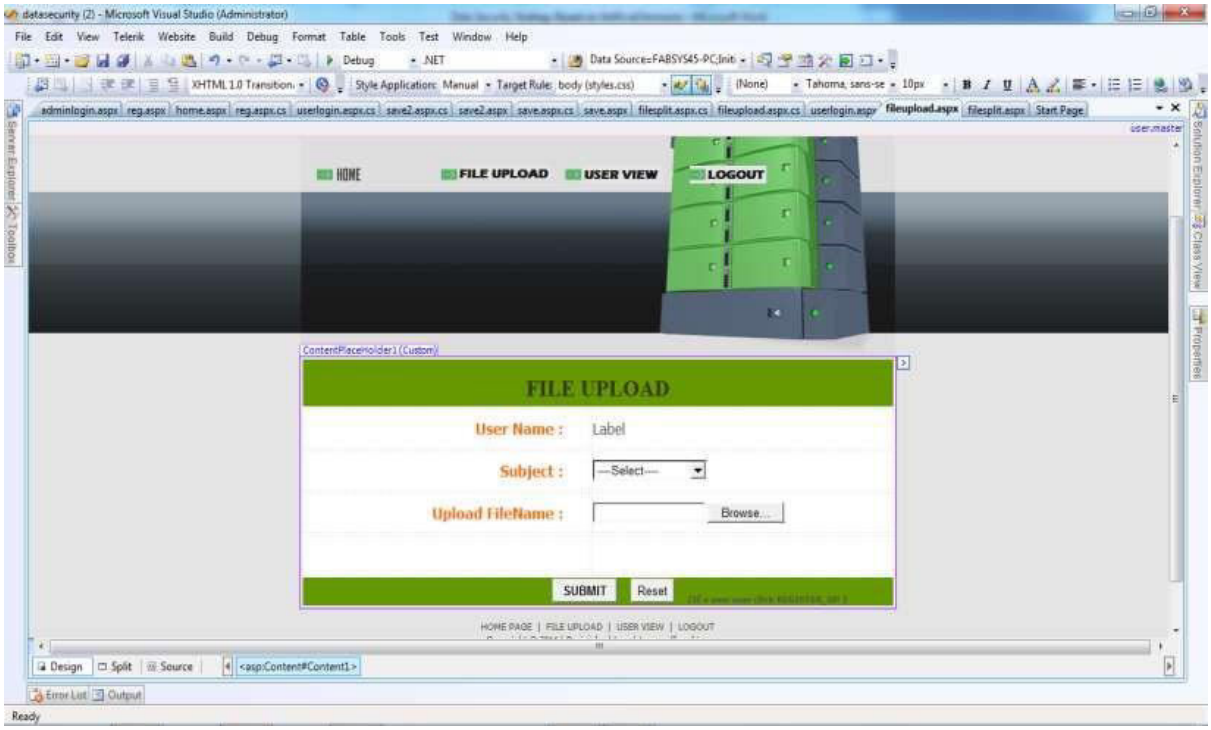
User Registration:



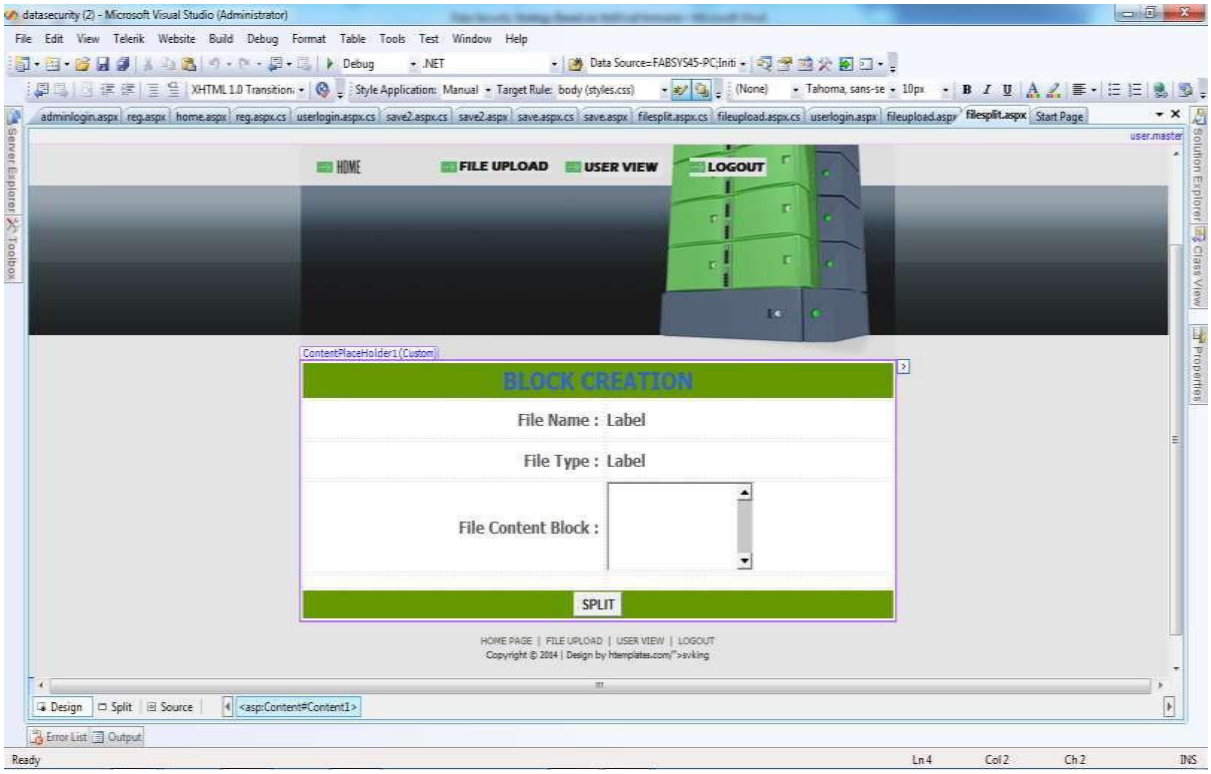
Admin Login:



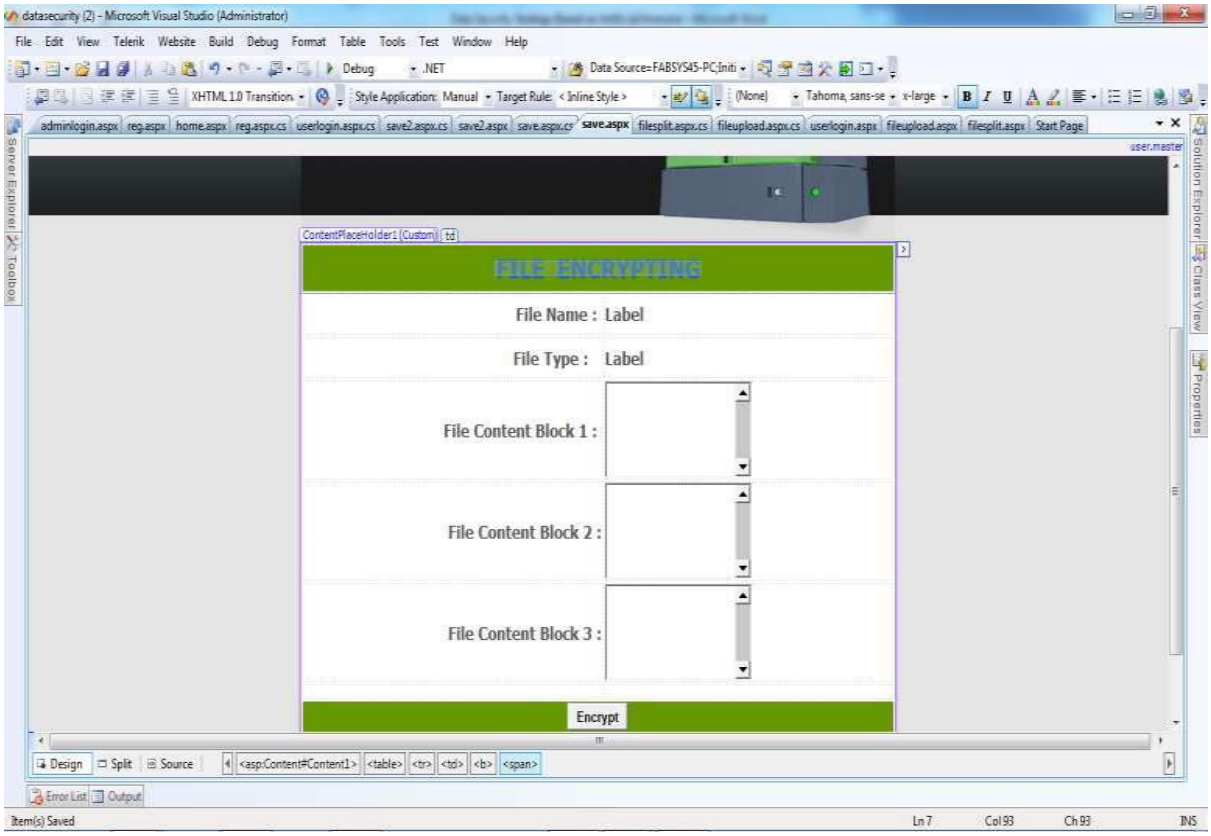
File Uploading:



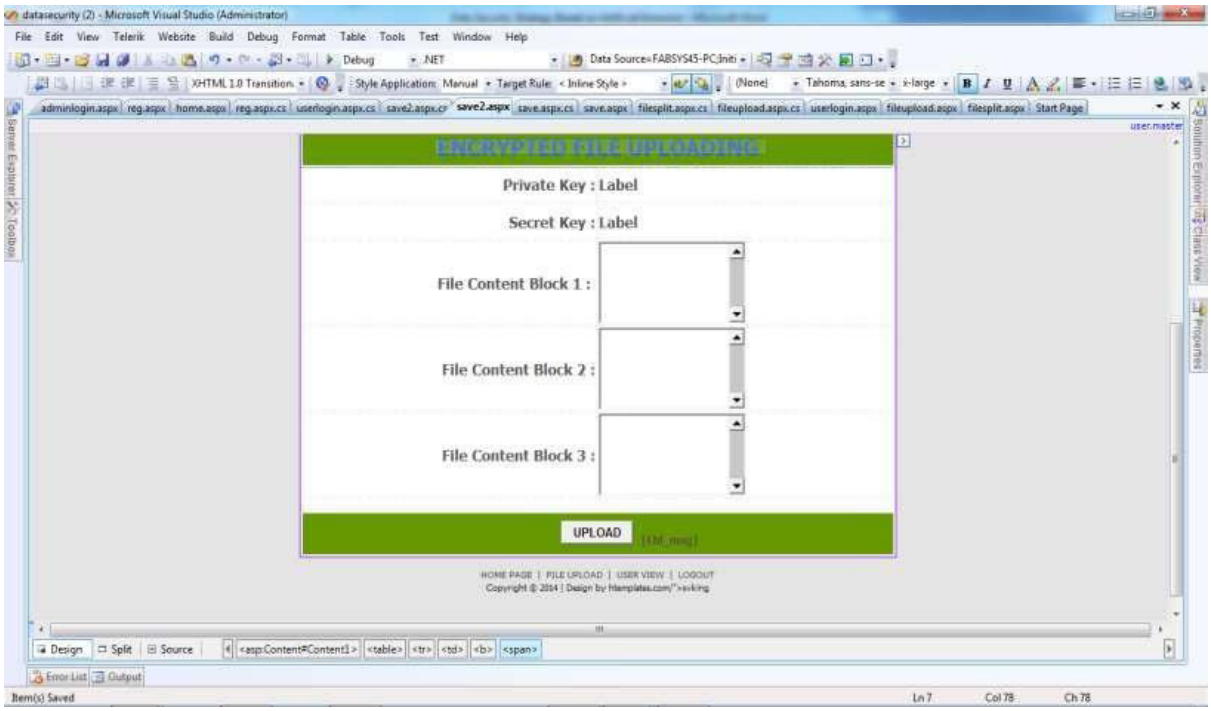
Block Creation:



FILE ENCRYPTING:



UPLOADING ENCRYPTED FILE:



Conclusion:

As the development of cloud computing, security issue has become a top priority. This paper discusses the cloud computing environment with the safety issues through analyzing a cloud computing framework–HDFS's security needs. Finally we conclude a cloud computing model for data security

Future Enhancement:

- This project helps to increase the security of data by splitting the file and upload it in cloud database.
- In future the same project can be extended to give the security for vedio and images.
- We can upload the file type like vedio, images, etc.

Author 1

Mr. B. ARUNMOZHI M.E., is an Assistant Professor in the Department of Computer Science and Engineering at St. Joseph College of Engineering, Sriperumbudur, Chennai, Tamil Nadu. He has completed his M.E, CSE under Anna University Affiliation College in the year 2011. He has done his B.E, CSE under Anna University Affiliation College in the year 2007. Mr. B. ARUNMOZHI has 11 years of teaching experience and has 12 publications in International Journals and Conferences. His area of interests includes Network Security, Computer Networks, Data Science and Machine Learning. He is an active member of CSI and IEANG. He has organized various International Conferences, workshops and Seminars in the area of Computer Networks,

Author 2

Ms. J. SADHANAPAUL B.E., Student of Computer Science and Engineering at St. Joseph College of Engineering, Sriperumbudur, Chennai, Tamil Nadu. I had attended many International Conference, Workshops, Hackathons and Seminars in the area of Search engine optimization specialist, cloud computing, IOT Respectively.

Author 3

Ms. K. VISHNUPRIYA B.E., Student of Computer Science and Engineering at St. Joseph College of Engineering, Sriperumbudur, Chennai, Tamil Nadu. I had attended many International Conference, Workshops, Hackathons and Seminars in the area of Search engine optimization specialist, cloud computing, IOT Respectively.

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