An Environment for Supporting Collaboration of Distributed Team.

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ABSTRACT

To implement the project various services and platforms are used by the developer's team in order to interact with each other and to share the resources required for the project. The team needs to learn a new software tool to carry out each activity and learn each tool; it becomes too difficult to remember when the team uses more number of tools. In this project, we have integrated all the functionalities with some additional features. Using this tool will lead to increase in efficiency and productivity of the distributed team. All the data of the teams project is stored at a central database which is located on cloud, hence the data will be available anytime anywhere. All the functionalities in this tool are well organized and we are trying to implement the user friendly interface. The team will be connected consistently and will have real time interaction with each other. The focus of our project is to the support a small developer's team interaction while developing the software. The primary function is to share information about project-related activities. The information sharing enables members to make quick decisions about project actions and goals. The developer's team can participate in Real time and create software; also they can make constant changes to the code and release new versions of their software.

Keyword : - *Distributed teams, Database, Cloud Services*

1. INTRODUCTION

The Concept of distributed Team is a group of individuals who work across time, space and organizational boundaries connected by webs of communication technology. But practically, Distributed team is a group of People working on the same objective which are separated by geographical location whether that means working on different levels of the same building, or in a neighboring city, or in a totally different time zone. So, we have proposed this tool in which we are integrating all the functionalities required to work in the virtual environment.

2. MOTIVATION

In any organization, a project is distributed within a team and each member in a team is assigned a task with respect to his skills. But sometimes the tasks are limited to individual skill set, so organization has to hire another professional who has particular skills and expertise in that field, and he can perform the task without arriving at that particular location. Sometimes such task is assigned to a team, and co-ordination among such team is even more challenging for physically separated group members.

There are many existing platforms which support distributed groups but not all the factors are supported by these platforms. Media exchange, delay in communication, lack of focus in a team, expensive communication cost, lack of coordination among the groups are some obstacles that needs to be overcome. There is a need to coordinate the real

time interaction to overcome the scheduling problem in team. Also to conduct formal meetings, we need synchronised interaction to report the status of the project

3. OBJECTIVES

The proposed tool tends to store all the code and the resources required for the project implementation at single place. The communication between the user and the cloud will be reliable and the data will be easy to upload or download from the cloud. All the data will be well organised and maintained in the cloud for faster search results will request for the data. This all adds up to a single tool which will allow many software developers to work on a given project without requiring them to share a common network so that more time is spend on the actual coding rather than time and resource management.

4. TECHNOLOGIES TO BE USED

4.1 About C#
C# is a simple, modern, general-purpose, object-oriented programming language developed by Microsoft within its .NET initiative in 2000. When C# is compared with C++, it have advantages such as a *native* garbage-collection, It allows you to treat class-methods' signatures as free functions, It also has a huge standard library with so much useful stuff that's well-implemented and easy to use.
And when C# is compared with java, it has the following advantages like it doesn't have checked exceptions and also it's deeply integrated with Windows, It has dynamic variables.

4.2 About ASP.NET

ASP (Classic ASP) was introduced in 1998 as scripting language on Microsoft's first server side.ASP.NET was released in 2002 as a successor to Classic ASP (Active Server Pages). ASP is a framework used for building web pages. ASP.NET pages have the extension (.asp) and are written in C# .ASP and ASP.NET both are server side technologies. Both technologies help computer code to be executed by an Internet server. When a browser requests an ASP or ASP.NET file, the ASP engine reads the file, executes any code in the file, and returns the result back to the browser.

4.3 About .NET Framework
.NET is a programming framework developed by Microsoft which is used by developers to create applications more easily. A framework is just like a bunch of code that the programmer can call without having to write it explicitly. The main two components of .Net Framework are namely Common Language Runtime (CLR) and .Net Framework Class Library (FCL). Programs written for .NET Framework execute in a software environment (in contrast to a hardware environment) named Common Language Runtime (CLR), an application virtual machine that provides services such as memory management, security and exception handling.

4.4 About Web Technologies

The methods by which computers communicate with each other with the help of markup languages and multimedia packages are known as **web technology**. Web technology provides the ways to interact with hosted information such as websites. Using a variety of markup languages, like hypertext markup language (HTML) and cascading style sheets (CSS), delivering text to producing incredible graphics possible.

4.5 About Cloud
Cloud computing is the delivery of computing services like servers, storage, databases, networking, software, analytics and more over the Internet. Cloud storage is a cloud computing model in which data is stored on remote servers accessed from the internet or cloud. It is managed, operated and maintained by a cloud storage service

provider on storage servers that are built on non - physical that is on virtualization techniques. Google Drive allows users to store files in the cloud, synchronize files across devices, and also to share it.

5. OVERALL DESCRIPTION

5.1 Product Perspective
The main perspective of our project is to provide an online environment to work on a single project with the distributed teams.

5.2 Interface:
1. Hardware Requirements:
    i. Processor The minimum Pentium IV with 900 MHz
    ii. RAM - 1GB of RAM available
    iii. Hard disk - minimum 40GB
2. Software Requirements:
    i. Operating System : Windows XP, 7 ,8 and other operating systems like Linux, MacOS.
    ii. .NET is Platform independent.

3. Programming Languages:
    i. C Sharp.
    ii. Asp .NET
    iii. SQL Server

5.3 Product Function:
The goal is to provide an online environment to work on a single project with the distributed teams. For this, we need two interfaces like

   i.   *Admin Interface.*
       In Admin interface, we provide major services such as to create a project group. He can also add Users , Delete users, Can keep a watch on the database, or if the user is locked out of his account he can change the password. Users need to be validated by the admin by responding to the request send by the user. He can also use all the features of the user interfaces too.

   ii.   *User Interface*.
       In User interface, the interface will be divided into two parts such as the interaction part and the coding part. The interaction part will contain the functionalities of screen sharing, Upload the data, retrieve the data, send the mail or get on instant chat with the peer members. The coding part consists of features like create a coding project, compile the project and save the project for later presentation. This whole system acts as a version control System.
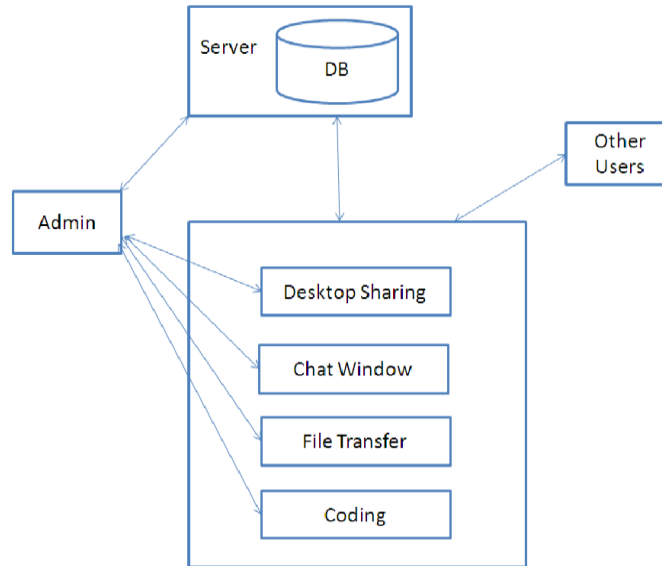
6. ARCHITECTURAL DIAGRAM

Fig. 1 : Basic Architecture

   The Basic architecture of the system is described in Fig.1, As the database will be accessible in every stage of operations, it must be well connected with all the functions of the tool. Admin will have all the right to manage the database and the user will be able to upload media and view or download the media resources. The code section will be separated from the common shared media as project which is being developed .

7. ALGORITHMS

   There are various functionalities used in this tool for the interaction between different user like chatting, video conferencing and media sharing. To implement these functions, we need various algorithms such as PEKS algorithm, AES encryption algorithm, RSA algorithm, BRA algorithm and STL algorithm.
   We have analyzed them and according to our requirement following algorithms are important such as BRA algorithm for Image/video/audio compression and PEKS for secure retrieval of data from the cloud.

7.1 Byte Rotation Algorithm (BRA) Algorithm
   The multiple encryption and multilevel encryption system provides sufficient security. But a security level is increased, the time for encryption and decryption along with the complexity of algorithm is also increased. Also speed and performance of these systems is low. This is the major cause of decreasing the speed and efficiency of the encryption system. In this work we will implement a new encryption algorithm Byte Rotation Algorithm which enhances the security as well as speed of the encryption scheme.
   We studied two algorithms for network security. One is Byte-Rotation algorithm (BRA) and second is Advanced Encryption Standard algorithm (AES). In BRA algorithm random key generation technique and symmetric key is used. Implementation of both algorithms is done by java programming language. File encryption and decryption time is also calculated by .net programming language. The Byte-Rotation algorithm gives higher quality result as compared to AES algorithm.
   1. It is a Symmetric Key Block Cipher Algorithm.
   2. Each block size is of 16 bytes.
   3. Size of Key matrix is 16 bytes.
   4. Values of Key matrix are randomly selected.

7.2 Public Key Encryption with keyword Search (PEKS)
   A non-interactive searchable encryption scheme (PEAKS) that is much secure against an dynamic chosen keyword attack gives rise to a ciphertext guessing leading to leak the private key which is used to encrypt the file,

making it vulnerable to hackers. We define and construct a mechanism that enables Alice to provide a key to the gateway that enables the gateway to test whether the word urgent is a keyword in the email without learning anything else about the email. We refer to this mechanism as Public Key Encryption with keyword Search.

Consider an example, Suppose Bob wants to sends encrypted email to Alice using Alice's public key. Both the contents of the email and the keywords are encrypted. In this case the mail gateway cannot see the keywords and hence cannot make routing decisions. As a result, the mobile people project is unable to process secure email without violating user privacy. Our goal is to enable Alice to give the gateway the ability to test whether "urgent" is a keyword in the email, but the gateway should learn nothing else about the email. More generally, Alice should be able to specify a few keywords that the mail gateway can search for, but learn nothing else about incoming mail.
To do so, Bob encrypts his email using a standard public key system. He then appends to the resulting ciphertext a Public-Key Encryption with keyword Search (PEKS) of each keyword. To send a message M with keywords $W1, . . . , Wm$ Bob sends

$$Epub (M) \parallel PEKS(Apub, W1) \parallel \cdots \parallel PEKS(Apub, Wm)$$

Where Apub is Alice's public key. The point of this form of encryption is that Alice can give the gateway a certain trapdoor TW that enables the gateway to test whether one of the keywords associated with the message is equal to the word W of Alice's choice. Given $PEKS(Apub, W0)$ and TW the gateway can test whether $W = W0$. If $W \neq W0$ the gateway learns nothing more about $W0$. Note that Alice and Bob do not communicate in this entire process. Bob generates the searchable encryption for W0 just given Alice's public key

The problem is computationally difficult (NP-hard), however, there are efficient heuristic algorithms that are commonly employed and converge quickly to a local optimum.

7.3 NP-hard and NP-Complete Analysis

NP-hard means a lot of times you can solve a problem by reducing it to a different problem. I can reduce Problem B to Problem an if, given a solution to Problem A, I can easily construct a solution to Problem B. (In this case, "easily" means "in polynomial time.")
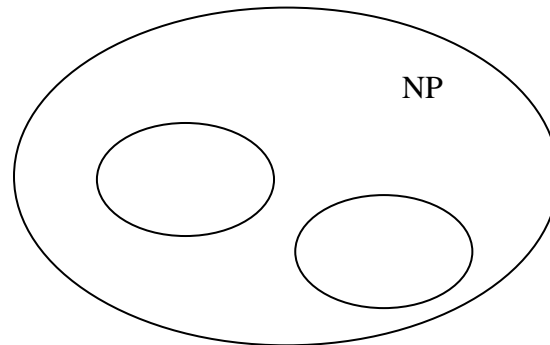

Fig. 2 : NP hard and complete NP-complete

A technical point: O (n) actually means the algorithm runs in asymptotically linear time, which means the time complexity approaches a line as n gets very large. Also, O (n) is technically an upper bound, so if the algorithm ran in sublinear time you could still say it's O(n), even if that's not the best description of it.

8. MATHEMATICAL MODEL

Let Assume S be the system which execute the tool
$S=\{s, e, X, Y, T, F_{main}, NDD, DD, Success, Failure\}$

S (System) = is our proposed system which includes following tuple.

s (initial state at time T) = GUI of the environment. The GUI provides space to enter Login details.

X (input to system) : Input Query. The user has to first enter the login details. The details may be valid or invalid, such that the process is repeated.

Y (output of system): The user will get the access to his personalized services and the project he's been working on, in his account.

T (No. of steps to be performed) : 5. These are the total number of steps required to process a query and generates results.

f_{main}**(main algorithm)** : It contains Process P. Process P contains Input ,Output and subordinates functions. It shows how the query will be processed into different modules and how the results are generated.

DD (deterministic data): It contains Database data which is located on the cloud. Here we have considered MySQL which contains number of queries. Such queries are user for showing results. Hence, MySQL is our DD.

NDD (non-deterministic data): The project will be compiled in users account and project result will generate some result in the form of data, which will be stored on the Database, that data will be Non-deterministic Data..

Success = successfully recommended best tool as per user's demand

Failure = Failed to be recommended.

Subordinate functions:

Where

        s=Start State

        e=End State

        X={Set Of Inputs}

         = {x1,x2,x3,x4,x5}

        Where x1= Log in details

              x2=Register details.

              x3=interaction

              x4=code editor

              x5=input to code editor

        Y={Set of Outputs}

        = {y1,y2,y3,y4,y5}

        Where,

              y1= The user will get into his account.

              y2= The user account will be created.

              y3=interaction activity starts

              y4=code editing window will start

              y5=output according to the code

        F_{main} = {Set of procedure}

          = {f1,f2,f3,f4,f5,f6}

            Where

                  f1= Take x1 input

                  f2= Give y1 output

                  f3= Take x2 input

                  f4= Give y2 output

                  f5=interaction activities

                  f6=code editor
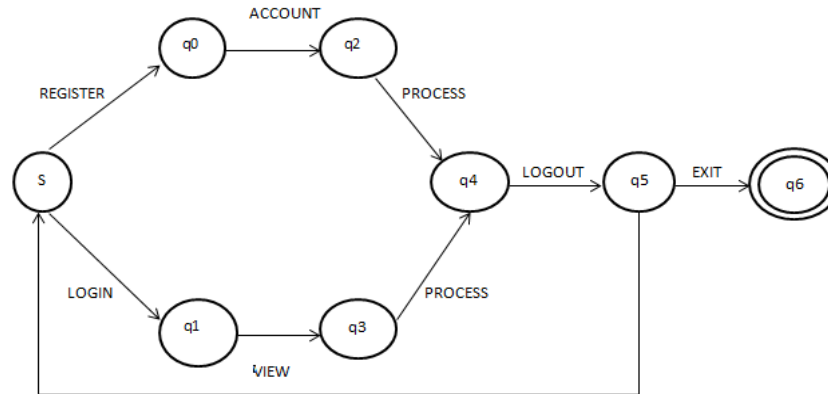
8.1 State Transition Diagram:

Fig 3: State Transition Diagram

Where,
s=input state
x=query
q0= Register a new user
q1= Login into your account
q3= Display the personalized environment
q2= create an account and setup the environment
q4= The main process
q5= Logout from the account
q6= exit

8.2 Explanation

The 'q1 'state is the login state where user either enter the username and password or create a new account.
The q1 follows the login state and opens the account at stage q3 and if he wants to develop a code he switches to state q4.
The q1 state creates a new account and setup it according to the user make state transition to view the environment and configures it, then it switches to the q4 state and do the basic operations. To logout, user jumps to the q5 state and he can repeat the states by logging on or to state q6 by terminating the program.

9. LITERATURE SURVEY

   Ali M. Sagheer, et.al 2011 [1], this paper provide us the Advanced encryption system, which is useful in secure transmission of file or messages. But we have observed that, if the mail-gateway wants to search a keyword "lunch" in the mail, it cannot search the contents of the file as it is encrypted so, it can't make routing decisions. The goal here is to give the gateway the ability to test whether "lunch" is keyword in mail, but the mail-gateway must not learn anything else about the mail. Fu-Kuo, et.al 2013 [3] enables us to search encrypted keywords without compromising the security of the original data. In this paper, we address three important issues of PEKS scheme such as refreshing keywords, removing secure channel and processing multiple keywords. So, in the paper we have removed the secured channel and constructed a new PEKS which is based on Identity Based Encryption (IBE). Punam V. Maitri, et.al 2014[9] using BRA algorithm secured file transmission is provided, where user sets time and frequency. The performance of file transmission is increased. It concludes that BRA algorithm is way better than AES algorithm as the data is transmitted with minimum delay. For increasing speed of encryption of data concept of multithreading is used. Tor Erlend Fgri, et.al 2016 [7] we addressed the problems faced by the virtual distributed team, to overcome the issues, a web based working environment which is the result of analysis of the problem faced by distributed users. So the proposed tool is an integrative framework where the distributed users can share a common workspace.

10. CONCLUSION

In this paper, we have studied existing software tools and observed the problems faced by the users who are trying to interact efficiently with their peer members In order to remove these obstacles, we can merge all the required services which are necessary for development of the project.

This will help the distributed team to come together and develop a project from a single tool. Various different algorithms are analysed and compared for our web tool and various data encryption techniques and compression algorithms are used to make the process fast and secure.

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