Communication as a Service based Cloud Computing

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ABSTRACT

Cloud Computing is the way of computing things over network. Cloud provides data independency and remote desktop applications. In the paper Infrastructure as a service (IAAS), Software as a Service (SAAS) and implementing the new concept of Communication as a Service (CAAS) in the cloud is explained. Paper contains the concept of client server architecture where the database of the client is stored on the server and the client would get the available software as a service. At the client side, the client can access the cloud server with browser via Internet with proper Authentication thereby performing different tasks In the new concept of Communication as a service the client can send email, chat with their friends, send texts and voice over internet protocol(VoIP).Also the overview and brief idea of "@cloud" project is explained.

General Terms

Infrastructure as a Service, Software as a Service, data independency, Communication as a service.

Keywords

Cloud Computing, Data Independency, Communication as a Service, Software as a Service, Infrastructure as a Service, "@Cloud" Project.

1. INTRODUCTION

Cloud Computing is the metaphor to describe the Internet. Cloud computing allows to create the data centres over network. Thus it is helpful in providing Infrastructure as a service. Cloud computing also provides data Independency through which people can manage their data online and use their remote desktop application from any place. Cloud computing also provides software as a service where the user can use the software as per the demand without installing them into the local machine. Cloud Computing is very helpful for the user who wants to use the software temporarily and doesn't want to buy the software. Cloud computing also provides the abstract concept of communication as a service which is the important of the user interactive cloud. User can communicate with other users by using services like e-mail, texts, voice calling and chat services. Cloud services associates to centralized data stored in large data centres, which can be accessed from anywhere and is much easier to manage and protect than massive decentralized data stores. For example, the use of data centres can minimize the risk of losing critical data that might otherwise be stored locally on a portable computer or device, which can easily be stolen or misplaced [2]. Cloud is the server (data center) where user can save their data and can use it whenever needed. The cloud server in the project "@cloud" is the LAMP server where Linux distribution server is used, Apache for server client communication, Mysql, Oracle for the database and PHP for client side scripting. Cloud computing is the technology which provides user with the facility of the data portability and the software usability. The main sections of the paper are: II) Communication as a Service III) Software as a Service IV) Infrastructure as a Service V) Overview of the project "@cloud".

2. COMMUNICATION AS A SERVICE

The heart of the project lies in the communication as a service, where the user on the cloud can directly communicate with the other user. The user can even communicate with other people from the cloud via E-mails, Texts, Voice and Video Calls, chat box etc. This facility is developed from the point of view of the user. It helps the user to share their thoughts with other people, without logging in the other website or service providers. Thus from the cloud website alone the user can have the multiple options to communicate with the other users. The communication mode would be anonymous and authenticated. The API of the email clients and chat rooms would be provided for the communication. This project is mainly built up for the educational use so according to the criteria, facilities would be provided. The API's are build on the java platform with the object oriented concepts and are the part of SAAS. The chat application is developed on the basis of the concept of Remote method invocation (RMI) and Ajax. While the E-mail facility can be provided by using SMTP (Simple Mail Transfer Protocol) where user can send their E-mail using their login from any providers (E.g. gmail, Yahoo Mail, Hotmail etc.).

3. SOFTWARE AS A SERVICE

Software as a service is an Integral part of cloud computing. It provides the software on demand and as a service. It is possessed, managed and delivered by the administrator remotely. It allows sharing of application processing and storage resources in one to many environments. The application data can even be migrated from one infrastructure to another. The application is not directly installed but it is loaded in the webpage whenever it is required. The API is used for this purpose. Software for the cloud website is developed on the java

platform and the concept of Perl and CGI (Common Gateway Interface) are also used. The software is also build using the JavaScript and runs entirely in the cloud. SAAS is built upon the IAAS and PAAS provides clients with integrated access to software applications. SAAS has become a common model for many business applications and enterprise including Accounting, Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Human Resource Management (HRM), Invoicing, Data Centre Management etc. Thus SAAS provides the user the needed software on demand. The points like flexibility, reliability, feasibility and software security are taken into consideration. .

4. INFRASTRUCTURE AS A SERVICE

Cloud computing cites to the myriad of Meta data, information and communications activities that are increasingly taking place in the network, broadly defined. Like the electricity migration in the early 1900s from generation to an electrical grid with metered and fluctuate free services, the cloud bespeak the movement of hard and soft functions such as storage, software applications and services to an off premises service industry [1]. Infrastructure as a service provides the user with virtualization as the service. It allows the User to store their data in the data centre (server) and retrieve it whenever it is needed. Also memory and bandwidth can be provided as the service to the user. The user can use the maximum computational power on demand with the help of the Infrastructure as a service . It allows user to upload and download the data from the cloud whenever it is needed. Thus it provides data independency to the authenticated user. User gets the Infrastructure like space and memory on demand. Also the bandwidth on demand in the network is possible using cloud computing.

5. OVERVIEW OF "@CLOUD" PROJECT

 The project "@CLOUD" is the educational purpose project and its abstract idea is presented. Project is based upon the client server architecture. A cloud Architecture consists of the LAMP (Linux Server x86_64, apache tomcat, oracle 9.i and php). At the client side the website of the cloud is provided with the proper authentication. The user can have there own cloud desktop (as a webpage) with database. The user can use the provided software without installing it on the local system. The users save the data in database and use from any location. This defines the data independency. User can easily upload and download the content from the cloud database. Initially all the programs are loaded. As per the use the programs or the API are loaded to the browser. This can be achieved through the use of Ajax technology. Only the required data is loaded on the page. Thus it will provide the user with a facility of infrastructure and software as a service.

As the project is developed for the educational purpose, the data like ebooks, education materials etc would be by default provided. The data can be updated and modified by the server administrator anytime.

At the client side the webpage is developed in c# with HTML and JavaScript is used for the validation. XML (eXtensible Mark-up Language) is used for data storage in the webpage while concept of Perl and XSL (eXtensible Style sheet Language) are used for the interactive and dynamic page design. At the server side, database is stored in the Oracle 9.i database and PHP is used for server side scripting. Linux distribution is

used as the operating system for the server. Individual directory is created in the server when the users sign up from the website. The data of the user gets stored into that directory and image of the user's desktop is loaded from the directory itself. The applications like word editor, calculator and many other important software applications are created in the java platform. For the communication as a service, the API's of the email clients and other protocols like SMTP, POP3 etc are used for the communication. Some of the application are planned to build in Microsoft visual studio 2010 and with .net Framework 4 in c# language. Hyper text transfer protocol (HTTP) will be used for client server communication. Every time only the required part is loaded and not whole page, these is possible using JavaScript and Ajax technology which reduces the load on the server and boost the speed. The entire database would be stored in the mysql and in oracle 9.i and when user logs in, the desktop image is loaded first. The queries used to access the database are the parameterized queries due to the security concert. The applications are then published to the cloud hosting website. This is how the project works as a cloud system for the educational purpose.

Constraints like high internet connectivity speed play an important role because all the user data and software files are at the server side and have to be transfer from server to the client. The cloud website cannot be loaded properly with low connectivity speed. The session will be maintained to enhance the security features of the project. The session would be dependent upon the login time constraint and user idle time. Other constraints like authentication, data redundancy, data privacy etc. are also taken into consideration. The logs would be maintained for the security purpose and the log file include the logs of the people who logged in the website or who try to do login attempt more then three times unsuccessfully. Also the record of the data access and data stored by the user are kept under watch. The rules and regulations are decided by the institute authority and system administrator. The administrator has the right to add user, delete the user and keep a watch on the user activities on the website.

The main advantage of the project is the data independency where the user can access the data from anywhere around the globe and can modify their private data with proper authentication. Another main advantage of the project is the remote desktop application where the user can work on the software provided by the website without installing it on the local system. The basic software application like calculator, word editor software, music player and games are provided by default. Other software as a service would be provided to the user on demand and availability. The users have their own control panel where they can modify their account details like username, password and other basic information.

Communication as a Service is an abstract idea where the user can communicate to the outside world. These will include facilities like E-mails, Texts, Voice and Video Calls, chat box etc. For E-mail services the simple mail transfer protocol (SMTP) is used where the user can send the E-mail to anyone. For the chat box and text services java technology and service provider's access rights.

The project is under construction and module of infrastructure as a service is under the testing purpose. The project is designed keeping in mind project's scalability, reliability, security issue and constraints.
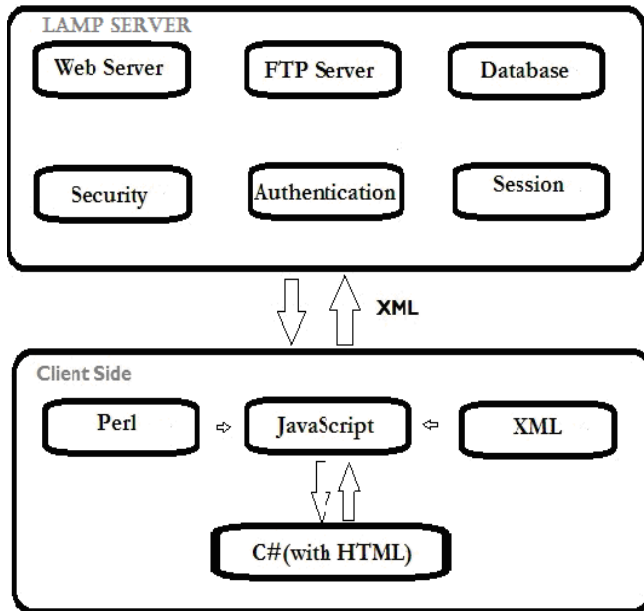
Figure 1 "@Cloud" Project Architecture – Server Client Design

3. ACKNOWLEDGMENTS

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