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PHR System of a Patient using Cloud Computing

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Abstract: Cloud computing system becomes more popular which allows users to access and extract the sensitive information whenever they require. This is mainly applicable in medical field, where the patients personal health information is often outsourced to be stored at a third party server, such as cloud providers. When the personal health information are stored and accessed through the proxy server, security becomes the main concerns. The main goal of this system is to protect patient's health information data confidentiality and then only the external entities such as doctors and nurses can gain access to the patient's data with the patient's consent. Hospitals are now benefitting from data sharing as this provides better, safe care of patients. There is no need to repeat medical history every time a new health professional is consulted which means no more unnecessary tests. The proposed scheme comes out with a novel encryption approach whereas the details of the patient's health information are encrypted and that encrypted text are stored in cloud database which shows security.

Keywords: Person Health Record, encryption, proxy server, cloud provider.

1. INTRODUCTION

1. CLOUD COMPUTING

Cloud computing is the delivery of computing as a service rather than a product, whereby shared resources, software , and information are provided to computers and other devices as a metered service over a network (typically the Internet).Cloud computing provides computation, software, data access, and storage resources without requiring cloud users to know the location and other details of the computing infrastructure. End users access cloud based applications through a web browser or a light weight desktop or mobile app while the business software and data are stored on servers at a remote location. Cloud application providers strive to give the same or better service and performance as if the software programs were installed locally on end-user computers.

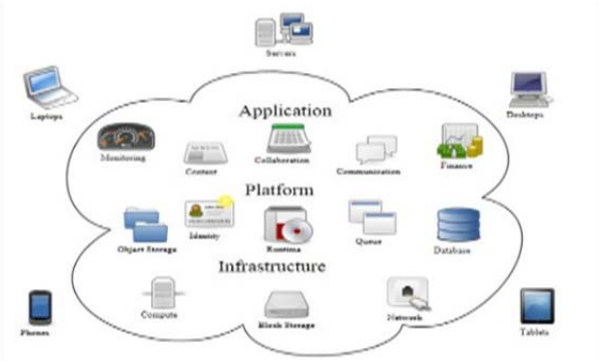

Fig 1.1 Cloud Architecture

1.1 Characteristics

Cloud computing exhibits the following key characteristics:

- Empowerment of end-users of computing resources by putting the provisioning of those resources in their own control, as opposed to the control of a centralized IT service.
- Agility improves with users ability to re-provision technological infrastructure resources.
- Application programming interface (API) accessibility to software that enables machines to interact with cloud software in the same way the user interface facilitates interaction between humans and computers. Cloud computing system typically use REST-based APIs.
- Pricing on a utility computing basis is fine-grained with usage-based options and fewer IT skills are required for implementation (in-house).
- Virtualization technology allows servers and storage devices to be shared and utilization be increased. Applications can be easily migrated from one physical server to another.
- Performance is monitored and consistent and loosely coupled architectures are constructed using web services as the system interface.
- Security is often as good as or better than other traditional systems, in part because providers are able to devote resources to solving security issues that many customers cannot afford.

1.2 Service Models

Cloud computing providers offer their services according to three fundamental models: Infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service (SaaS) where IaaS is the most basic and each higher model abstracts from the details of the lower models.

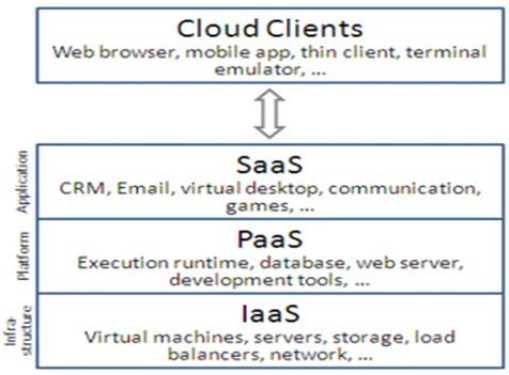

Fig 1.2 Cloud Service Model

1.2.1 Infrastructure as a Service (IaaS)

In this most basic cloud service model, cloud providers offer computers as physical or more often as virtual machines, raw (block) storage, firewalls, load balancers, and networks. IaaS providers supply these resources on demand from their large pools installed in data centers. Local area networks including IP addresses are part of the offer. For the wide area connectivity, the Internet can be used or – in carrier clouds – dedicated virtual private networks can be configured.

1.2.2 Platform as a Service (PaaS)

In the PaaS model, cloud providers deliver a computing platform and/or solution stack typically including operating system, programming language execution environment, database, and web server. Application developers can develop and run their software solutions on a cloud platform without the cost and complexity of buying and managing the underlying hardware and software layers.With some PaaS offers, the underlying compute and storage resources scale automatically to match application demand such that the cloud user does not have to allocate resources manually.

1.2.3 Software as a Service (SaaS)

In this model, cloud providers install and operate application software in the cloud and cloud users access the software from cloud clients. The cloud users do not manage the cloud infrastructure and platform on which the application on the cloud user's own computers simplifying maintenance and support. To accommodate a large number of cloud users, cloud applications can be multitenant, that is, any machine serves more than one cloud user organization. It is common to refer to special types of cloud based application software with a similar naming convention: desktop as a service, business process as a service, Test Environment as a Service, Communication as a Service.

1.3 Cloud Clients

Users access cloud computing using networked client devices, such as desktop computers, laptops, tablets, and smartphones. Some of these devices- cloud clients – rely on cloud computing for all or a majority of their applications so as to be essentially useless without it. Examples are thin clients and the browser –based chrome book. Many cloud applications do not require specific software on the client and instead use a web browser to interact with the cloud application. With AJAX and HTML5 these web user interfaces can achieve a similar or even better look and feel as native applications.

1.4 Deployment Models

Public cloud are offered over the Internet and are owned and operated by a cloud provider. Some examples include services aimed at the general public, such as online photo storage services, e-mail services, or social networking sites. However, services for enterprises can also be offered in a public cloud.

In a **private cloud**, the cloud infrastructure is operated solely for a specific organization, and is managed by the organization or a third party.

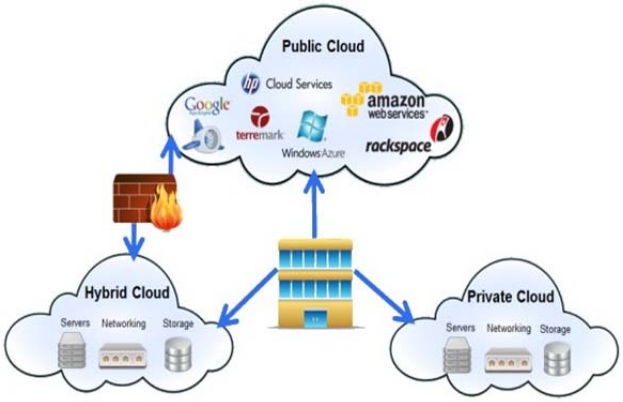

Fig 1.3 Cloud Deployment Model

In a **community cloud**, the service is shared by several organizations and made available only to those groups. The infrastructure may be owned and operated by the organizations or by a cloud service provider.

A **hybrid cloud** is a combination of different methods of resource pooling (for example, combining public and community clouds).

2. OBJECTIVE

The main goal of the project is to provide secure sharing of personal health records in cloud. Hospitals are now benefitting from data sharing as this provides better, safe care of patients. There is no need to repeat medical history every time a new health professional is consulted which means no more unnecessary tests. The proposed scheme comes out with a novel encryption approach whereas the details of the patient's health information are encrypted and that encrypted text are stored in cloud database which shows security.

3. EXISTING SYSTEM

Due to the high cost of building and maintaining specialized data centers, many Personal healthcare Record services are outsourced to or provided by third-party service providers, for example, Microsoft Health Vault. While it is exciting to have convenient PHR services for everyone, there are many security and privacy risks.

The main concern is about whether the patients could actually control the sharing of their sensitive personal health information (PHI), especially when they are stored on a third-party server which people may not fully trust.

3.1. DRAWBACKS OF EXISTING SYSTEM

1. The healthcare organization faces increased pressure in maintaining the personal health record services.
2. The personal information can be accessed by anyone at any time without the knowledge of the patient's consent.
3. The existing protocols do not consider the restrictions of underlying devices such as computing power and memory limitations.

4. PROPOSEDSYSTEM

To assure the patient's control over access to their own PHRs, it is a promising method to encrypt the PHRs before outsourcing. The main goal of this system is to protect patient's health information data confidentiality and then only the external entities such as doctors and nurses can gain access to the patient's data with the patient's consent. Hospitals are now benefitting from data sharing as this provides better, safe care of patients. There is no need to repeat medical history every time a new health professional is consulted which means no more unnecessary tests.

In order to protect the personal health data stored on a semi-trusted server, we adopt attribute-based encryption (ABE) as the main encryption primitive. Using ABE, access policies are expressed based on the attributes of users or data, which enables a patient to selectively share her PHR among a set of users by encrypting the file under a set of attributes, without the need to know a complete list of users.

4.1 ADVANTAGES OF THE PROPOSED SYSTEM

1. There is no need to repeat medical history every time a new health professional is consulted which means no more unnecessary tests.
2. Data kept confidential and secure.

5.ARCHITECTURE DIAGRAM

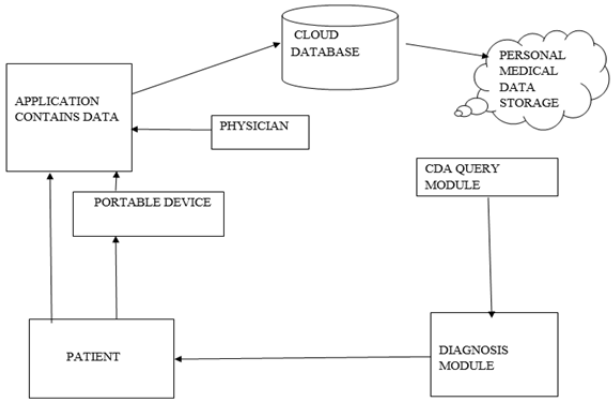

Fig. 5.1 Architecture of Personal Health Record System

6. MODULE DESCRIPTION

6.1 PATIENT PROFILE CREATION

A patient profile (user profile, or simply profile when used in-context) is a collection of personal data associated to a specific user[6]. A profile can be used to store the description of the characteristics of person. The user personal data store in PHR database that details contain informs like name, username, password, email Id, dob and mobile number etc.

6.2 DOCTOR PROFILE CREATION

Doctor profile is a visual display of personal data associated with a secure data[6]. A profile can be used to store the characteristics of the concern doctor. This consists of the following details namely name,dob,address, specialist and experience etc.

6.3 ADMIN MODULE

This module is used to control all the process, Admin is a super user who creates the PHR[4] data owner user and maintains the cloud server's configuration. Admin has the rights to add, edit or delete any type of data owners.

7. IMPLEMENTATION RESULTS

7.1 HOME PAGE

Fig 7.1 shows the home page. In home page it consists of Registration for new users, login for existing users, the details of the organization and its contact details.

Fig 7.1 Home Page

7.2 PATIENT REGISTRATION FORM

Fig 7.2 shows the patient registration form. In patient registration page it consists of Registration for new patients with full biodata.

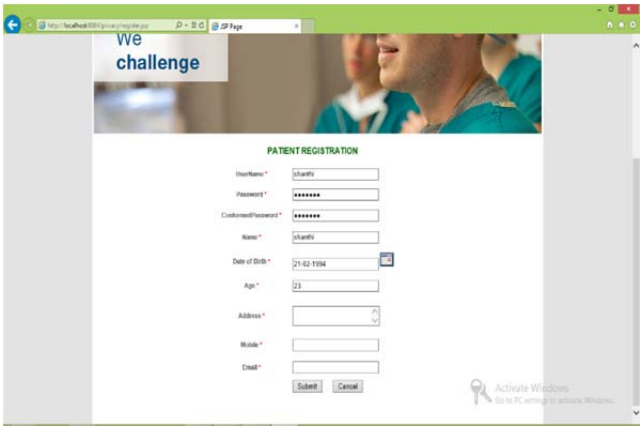

Fig 7.2 Patient Registration Form

7.3 ADMIN LOGIN PAGE

Fig 7.3 shows the admin login page. In admin login page it consists of login for existing users, by using correct username and password the admin can able to logon into the system.

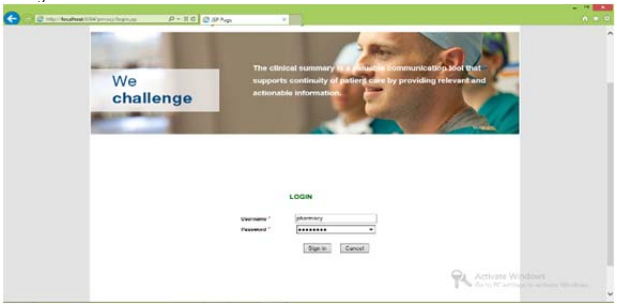

Fig 7.3 Admin Login Page

7.4 PATIENT DETAILS LIST

Fig 7.4 shows the patient details list. In patient details list page it consists of Registration for new users and login for existing users.

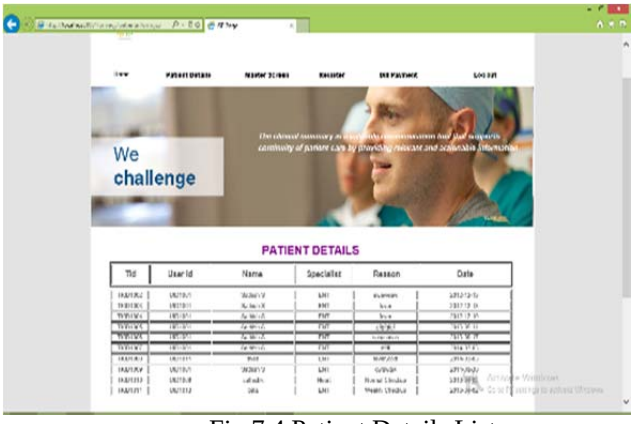

Fig 7.4 Patient Details List

7.5 DOCTOR REGISTRATION FORM

Fig 7.5 shows the doctor registration form page. In doctor registration page it consists of Registration for new physician with full biodata.

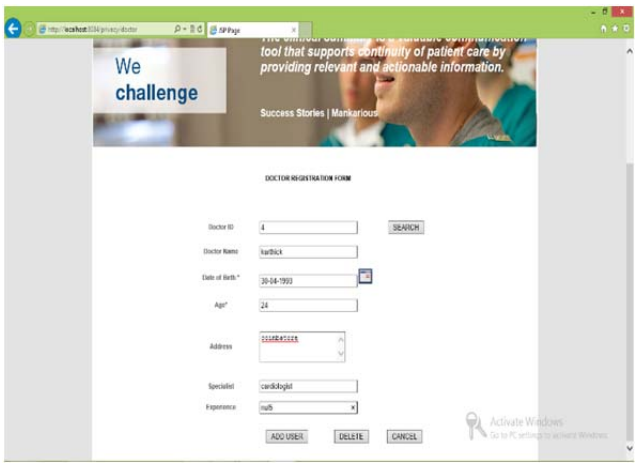

Fig 7.5 Doctor Registration Form

8.CONCLUSION AND FUTURE ENHANCEMENT

8.1 CONCLUSION

Cloud computing is changing our lives in many ways at a very quick space. Day by day utilization of cloud computing technologies is increasing in every part of the world. The cloud computing solutions in healthcare can help the physicians to stay in touch with their patients and examine their health condition effectively at a low cost. The system discusses only about the account creation for both physician and patient. Further, the admin will view the patient details list.

8.2 FUTURE ENHANCEMENT

The personal health records are now considered as the emerging trend where the security of data is the main privacy issue. In future work, the attribute based encryptions and its related techniques are applied in order to enforce for the security purpose and also it will be helpful in minimizing the key management problems and complexity.

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