Chapter 2.6
Healthcare Collaborative Framework Based on Web 2.0, Grid Computing and SOA

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ABSTRACT

Web 2.0 has been adopted by many as the best way for forming a collaborative framework e.g., sharing resources, experiences, information, knowledge and feedback. A collaborative framework for application to e-health is necessary to provide patients with the awareness that assists in improving their health. Moreover, collaborative framework can be used by physician to exchange experiences and discuss challenge cases. However, the use of Web 2.0 with healthcare applications is not simple as the use of Web 20 with other enterprise applications according to the privacy of healthcare applications, which requires high quality and security of data, availability of resources, maintainability of services, system security, and Quality of Services (QoS). To offer the required requirements, grid computing is proposed here. Grid computing supporting enterprise applications through offering massive resources through resources collaborative framework that is offering power computing, storage devices, and services. The use of grid computing by Web 2.0 requires robust model that is able to deploy, discover, invoke, and integrate resources in open standard format. Therefore, Service Oriented Architecture (SOA) is adopted as a model for managing the mixing between Web 2.0 and grid computing technologies. SOA for Web 2.0 and Grid Computing (SOAW2G) are used throughout this work to offer a fabric for e-health applications.

INTRODUCTION

Collaborative framework leverages the share of information, experiences, knowledge, resources and feedback among people in the field of interest. Like collaborative framework for distributed computing system, maintenance engineering, networking troubleshooting, entertainment, patients, physicians, and others. The collaborative framework is useful in decision making process, which is vital for many users like managers, physician, engineers and others. Healthcare collaborative

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framework is one of the frameworks, that requires high level of cooperation. The healthcare collaborative framework is important in improving the patients' awareness and responsibilities towards their health, like what type of food and exercise is useful for diabetes patients, what type of tests are required for pregnant women in different trimester. Moreover, the healthcare collaborative framework facilitates the share of experience and knowledge between physician through exchanging medical experience, discussing challenges cases, sharing clinical insights, and trying new medicine. Healthcare management users also get benefit from the collaborative framework through getting the required information and experience from other management team for better decision making.

Online healthcare collaborative framework is not something new, and many are aiming to develop such framework science the mid of 90's, when the Internet be available in reasonable price and many places around the world. Advanced Research TEstbed for Medical InformaticS (ARTEMIS) is one of these environments that is aiming to build collaborative framework between the patients and physician (R Reddy, 1993; V Jagannathan, 1995). ARTEMIS aims to provide healthcare services to patients in large community. ARTEMIS is consisting of number of subsystems that are intended to overcome the barriers that inhibit the collaborative process. The subsystems include MONET (Meeting On the Net)--to provide consultation over a computer network, ISS (Information Sharing Server)--to provide access to multi-media information, and PCB (Project Coordination Board)--to better coordinate focused activities. For such system to be viable, it needs update information and resources to be feed to the system, which was difficult in the med of 90's with absence of the digital awareness and lake of the open standard format. However, with Web 2.0 technology the proposed system can be applied.

On the other hand, healthcare collaborative framework assists in overcoming the shortage of specialists, the high patient load on hospitals, the cost of health services, and the difficulty in getting treatment in rural and remote places. Most of the countries around the world are suffering from these problems. The healthcare collaborative framework can be considered as advisory system that is offering advices to patients as well as physician. The advices are feed to the system through physician or patients who have same disease.

However, this dream of having healthcare collaborative framework requires a massive resources (Vincent Breton, 2005) and control according to the privacy of the framework, which deals with human live. The resources like supercomputing, storage system, backup system, communication, and health services such as remote monitoring and video conferencing. The control and management system is required to ensure the quality of deployed information, availability of the system, quality of health services, and security of information. In addition, the collaborative framework is deployed over heterogeneous system, which requires the adoption of open standard format in exchanging medical information.

The healthcare collaborative framework would follow new concepts of enterprise applications, which are based on having the system as a number of services (Software as Services (SaS)). SaS requires model for managing the integration of services. Therefore, this chapter would discuss the development of model that is supporting the integration of services for forming health care collaborative framework and use massive resources from grid computing.

The chapter covers current attempt of using Web 2.0 in forming healthcare collaborative framework, the need for grid computing and SOA, SOAW2G model, scenario for using SOAW2G, case study for remote health monitoring system, conclusion and future works.