

Optimized ERP System Deployment on Mobile Cloud Computing with AOM

Yvette E. Gelogo¹ and Haeng-Kon Kim^{1*}

¹School of Information Technology, Catholic University of Daegu, Korea
yvette@cu.ac.kr, *hangkon@cu.ac.kr

Abstract. Mobile devices are increasingly becoming an essential part of human life as the most effective and convenient communication tools not bounded by time and place. Cloud Computing emulate rich experience of various services from mobile applications which run on the devices and/or on remote servers via wireless networks. The contemplation of ERP to be mobilized is a challenging idea. This paper introduces a mobile ERP system with the concept of SaaS cloud. In this paper we proposed a development of mobile ERP based on the Adaptive object model. The evaluation shows that the proposed remodeling methodology is more efficient than the existing development model in terms of memory usage and standards of service.

Keywords: Cloud Computing, Mobile Cloud, AOM, ERP

1 Introduction

ERP provides an integrated real-time view of core business processes, using common databases maintained by a database management system. The applications that make up the system share data across the various departments that entered the data. ERP facilitates information flow between all business functions, and manages connections to outside stakeholders [1][2].

Mobile device use for ERP functions is an inevitable extension of our increasingly connected wireless society, and offers a wealth of advantages as employees meet customers on their own turf. [3].

Cloud based ERP benefits customers by providing application scalability and reduced hardware costs. In addition, Cloud computing technology made it easier to deliver our ERP software as a service (SaaS) for customers who want to acquire cloud ERP and not have to manage hardware, software, and upgrades while reducing up-front expenses. Cloud based ERP benefits customers by providing application scalability and reduced hardware costs. It is low cost, supports rapid development, flexible and scalable. It improved accessibility, mobility and usability; also it improved system availability and

disaster recovery. Moving into the cloud based system is very beneficial, it's always up to the company's readiness and capability to handle such transition.

2 Background of the Study

2.1 Cloud based ERP vs. On-premise ERP Surveys

According to data from the 2012 ERP Benchmark Survey as of October 2012, the majority of ERP solution is currently, deployed on-premise. This is unsurprising since SaaS and hosted solutions are only now coming to the forefront. Today, the gap between the SaaS and on-premise solutions is more pronounced in larger organization. On-premise got 79% over 4% of SaaS[5].

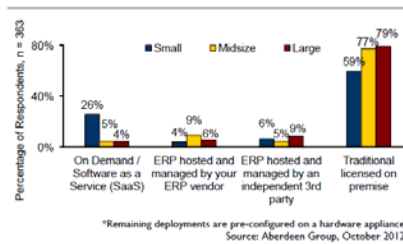


Fig. 1. Survey for ERP Deployment

The functions are often performed outside of the office walls or deal with moving parts outside of the organization. In the survey performed, 62% indicated that the sales can be improved through the cloud technology. This could be because sales professionals can be constantly connected to customer data in order to improve efficiency and customer service, or sales professionals can check inventory in real-time in order to guarantee delivery times [6].

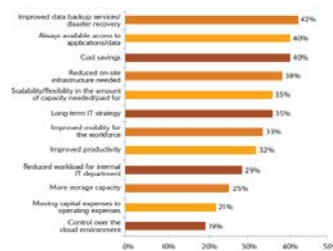


Fig. 2. Factors are driving interest in the cloud

Improved data backup services/ disaster recovery was the top factor driving interest in the cloud. However, among organizations with cloud-based services in place or working toward implementing one, cost savings was the top influencer (51%). Ref. -2013 Outlook on Technology Cloud Computing Survey Results, 2013 PC Connection [7].

3 Mobile Cloud-based ERP System

The advances in mobile industry also brought an idea to put the ERP system into to next level. The business owners are still hesitant to migrate from standard hardware support to mobile system. Mobile cloud applications move the computing power and data storage away from the mobile devices and into powerful and centralized computing platforms located in clouds, which are then accessed over the wireless connection based on a thin native client.

- Mobile devices are connected to the mobile networks via base stations that establish and control the connections and functional interfaces between the networks and mobile devices.
- Mobile users' requests and information are transmitted to the central processors that are connected to servers providing mobile network services.
- The subscribers' requests are delivered to a cloud through the Internet.

3.1 Mobility Platform

Enterprise mobility management (EMM) is the set of people, processes and technology focused on managing the increasing array of mobile devices, wireless networks, and related services to enable broad use of mobile computing in a business context. When we say mobility management it is refer to the management for mobility of the device. To perform a daily transaction, employees maybe move from one place to another, hence mobility is very important. This is an emerging discipline within the enterprise that has become increasingly important over the past few years as more workers have bought smartphone and tablet computing devices and have sought support for using these devices in the workplace [3][4].

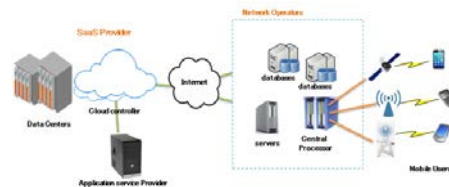


Fig. 3. Mobile cloud Mobility Architecture

Figure 3 illustrates the layer of mobility structure. Cloud deployment is flexible in mobile ERP application. The end user using the mobile devices can perform their day to day transactions using the combination of cloud computing, mobile web ERP and mobile devices. This shows the composition of the mobile enterprise application. These are the Enterprise connectors, Communication platform, mobile devices and storage or databases. Enterprise connectors are software, middleware and also components which are used to develop the applications. Communication platform, are the communication technology that support the mobility of the devices. Mobile devices are of course the devices; this can be smartphones, PDAs, tablets and etc.

4 Optimized Mobile Cloud ERP

The figure 4, illustrates the flow of the processes for customizing the existing ERP system. It is difficult for the developer to reprogram again the existing ERP system. Considering that the ERP systems are structured similar to each other, here we proposed a development of mobile ERP based on the Adaptive object model. The business requirements should be analyze by the service provider, then they can remodel the existing system.

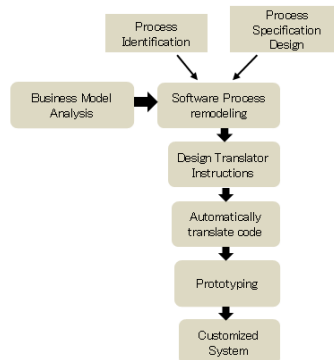


Fig. 4. Business process analysis, remodeling and integration of the new customized system

4.1 Application of Adaptive Object Model (AOM)

To provide customization support we proposed that the development of the mobile ERP application is based on the Adaptive Object Model (AOM). An Adaptive Object Model (AOM) is a common architectural style for systems in which classes, attributes, relationships and behaviors of applications are represented as metadata, allowing them to be changed at runtime not only by programmers, but also by end users. Metadata resources,

such as annotations (Java), custom attributes (.NET), XML files, naming conventions and interfaces, can be used to identify specific points where the application can be extended to add specialized behavior expressed using source code.



Fig. 5.Depicts the core design of an AOM

The figure 5depicts the core design of an AOM. This design can change the relationship, attribute and behavior of the existing system by integrating it with the analysis of the business requirements, like for example the accountability entity and accountabilityType, by analyzing the business rule, we can restructure the existing entity and adapt the new entity the new attributes and constraints.

4.2 Implementation of AOM

This section describes the implementation issues for proposed optimizedERP System Deployment on Mobile Cloud Computing Infrastructure. XML is used to describe the mappings to the organization data and generated the GUI and SQL queries.Documentation could be generated easily from XML mappings.Easy to change and release new versions for new tables through updates to the XML schema.

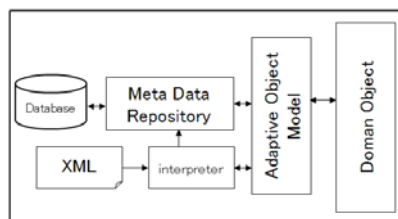


Fig. 6.XML mapping

The architecture and design of mobile applications built on the .NET Platform. It focuses on partitioning application functionality into layers, components, and services, and walks through their key design characteristics.

5 Evaluation

The evaluation was done to test whether the propose development methodology is efficient compared to the existing method.

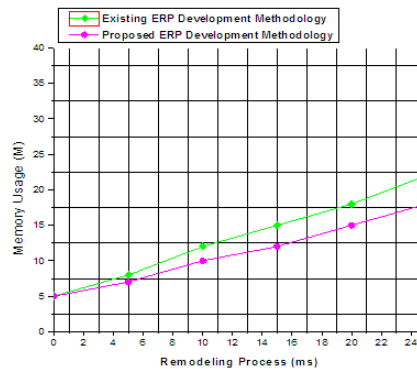


Fig. 7 Performance Evaluation between Existing ERP and Proposed ERP Development Methodology

This graph shows the performance between the existing ERP Development Methodology versus the proposed ERP development methodology. The proposed remodeling methodology is more efficient than the existing development model in terms of memory usage.

6 Conclusion and Future Works

The advances in mobile industry also brought an idea to put the ERP system into to next level. Cloud based ERP benefits customers by providing application scalability and reduced hardware costs. In addition, Cloud computing technology made it easier to deliver our ERP software as a service (SaaS) for customers who want to acquire cloud ERP and not have to manage hardware, software, and upgrades while reducing up-front expenses. Cloud based ERP benefits customers by providing application scalability and reduced hardware costs. In this paper we proposed a development of mobile ERP based on the Adaptive object model. An Adaptive Object Model (AOM) is a common architectural style for systems in which classes, attributes, relationships and behaviors of applications are represented as metadata, allowing them to be changed at runtime not only by programmers, but also by end users. This evaluation shows the performance between the

existing ERP Development Methodology versus the proposed ERP development methodology. The proposed remodeling methodology is more efficient than the existing development model in terms of memory usage.

In our future works, we will try to do more testing and implementation and enhancement of this work.

Acknowledgement. This research was Supported by the MSIP (Ministry of Science, ICT and Future Planning), Korea, under the CITRC (Convergence Information Technology Research Center) support program (NIPA-2014-H0401-14-1008) supervised by the NIPA (National IT Industry Promotion Agency).

This research was also supported by the International Research & Development Program of the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT & Future Planning (Grant number: K 2012057499).

References

1. Bidgoli, H.: (2004). The Internet Encyclopedia, Volume 1, John Wiley & Sons, Inc. p. 707.
2. Rouse, M.: ERP (enterprise resource planning), <http://searchsap.techtarget.com/definition/ERP>
3. Joel Schneide, "Fast-moving trends in mobile ERP, CRM technology", FierceCIO
4. <http://www.fiercecio.com/story/fast-moving-trends-mobile-erp-crm-technology/2013-09-11>
5. Is Your Business Ready for an ERP System?,
6. Workwise,<http://workwisellc.com/business-ready-erp-system/>
7. Castellina, N.: SaaS and Cloud ERP Observations, Is Cloud ERP Right for You?, December 2012
8. Castellina, N.: The Benefits of Cloud ERP: It's About Transforming Your Business. Aberdeen Group, A Harte Hanks Company, April 2014
9. 2013 Outlook on Technology Cloud Computing Survey Results, 2013 PC Connection.
10. J.D. Meier, Alex Homer, David Hill, Jason Taylor, Prashant Bansode, Lonnie Wall, Rob Boucher, AshayBogawat, "Mobile Application Architecture Guide", Microsoft Corporation, 2008