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Conference Paper · December 2012

DOI: 10.1109/ICCCTAM.2012.6488071

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ERP on Cloud: Implementation Strategies and Challenges

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Abstract - This paper aims to discuss about the ERP implementation strategies and challenges in a Cloud Environment. ERP is important business software used in all major enterprises and is a useful tool to coordinate the available resources, information and activities to complete the business process. Its importance in an enterprise has led to an increased demand of the ERP software. ERP in CLOUD environment, will help Medium and small enterprise to use it as per their requirements and will lead to more efficient business process.

Keywords: ERP, Cloud Computing, Web Services, Cloud Security, Latency, Distributed computing.

Acronyms: ERP-Enterprise Resource Planning, AJAX-Asynchronous Java, XSLT- Extensible Style sheet language, ICT- Information and Communication Technologies, CSS- Cascading Style sheet, DOM- Document Object Model, SLA- Service Level Agreement.

I. INTRODUCTION

Emergence of cloud computing is conceived as a revelation in the Computing industry. The success of Google and Amazon EC2 lead to many vendors adopting and providing cloud computing resources for the business applications such as CRM, ERP, Payroll, Sales Measures etc.

ERP systems are the Hardware and software systems that support the core processes in the Business process and is the reflection of the organizational structure of the company. So it comes in different sizes and specializations according to the Business needs and the size of the organization. Importantly customization is required to make it fit to

the needs of the particular organization [2]. With the development of Information and communication technologies (ICT), business process became increasingly complex and agile. The organization's functional units require more and more inter functional data flow for strategic decision making such as timely and efficient procurement of product parts, management of inventory, accounting, human resources and distribution of goods and services [8]. Only by following this concerned organization will be efficient and will stay ahead in the competition with optimized business process.

II. EMERGENCE OF CLOUD COMPUTING

The development of cloud computing in providing efficient and tenable service is stimulated by the development of three influential technologies in Web services viz. *AJAX technology, concept of multitenancy and Virtualization* [2].

AJAX makes rich clients possible and thus increases the capability of externally hosted application to run locally. AJAX itself is a collection of technologies for individual functions. For presentation it comprises XHTML & CSS. For the purpose of Display it uses DOM (Document object model) .XML and XSLT (Extensible style sheet language transformations) are used for the interchange and manipulation of data and JavaScript to bring these together [5].

Multitenancy is for the shared use of software and virtualization is for the efficient use of physical resources by many users. The concept of multitenancy is to isolate all tenants that share the

same physical environment and prove this to all customers by offering related reports and log files [3].

Virtualization is a key enabler of cloud computing due to its important feature of installing multiple OS on different virtual machines on the same physical machine. Virtualization is basically the abstraction of physical network, server and storage resources. It has the ability to hide the physical characteristics of the computing resources from the way in which the other systems, applications or end users interact with those resources makes it a key component of cloud computing [1].

III. CHALLENGES OF ERP ON CLOUD

To list out the challenges, the study of factors which drive the adoption of ERP systems needs to be understood. They are cost, flexibility and scalability.

The basic challenges of Cloud based ERP will be as follows [3]

- Bandwidth & Traffic management through Internet.
- Guarantee on the Average Network Latency.
- Resource Scalability on intermittent and or continuous increase in Demand.
- Risk of Open Access.
- Security (Encryption, Access & identity management, Network security, Industry Secrecy)

One important challenge is the Physical location of the ERP system Data. In a commercial & simple cloud computing, the service provided is transparent to the user, i.e the user has no technical need to be aware which server running on which host is delivering the service and where the host is located but that is not the case with ERP cloud. As the data handled by the ERP Software is more important for the company, the companies prefer service providers to be located within their geographical locations [2].

The next challenge is the Business model for ERP delivery which is mainly in the pricing scheme for the service being provided. Different pricing models available in the market are fixed/variable, SLA-related ones, Pay-as-you-go.

ERP is provided as a service and hence it falls in the category of SaaS. Because of the high cost of

dedicated & customized ERP software, ERP on the cloud will be commercially viable for the small and medium sized companies (SME). For the larger organizations, the customization level is more and hence the ERP on the cloud needs to be modified a lot to suit their requirement. This is an important deterrent for adopting Cloud ERP for large organizations.

Another challenge is that, as there is lack of industry standards in providing the SaaS, the user may find themselves reluctantly tied to the existing provider as the switching cost to the alternate provider will be high and additionally the format of storing the enterprise data may be proprietary and may not aid the process of switching to the new provider.

Compliance is a deciding factor when moving critical business process to the cloud because of regulatory and secrecy constraints. These constraints put more emphasis on the identity management issue. Cloud ERP provider needs to offer a 100% identification and mapping of all business users and their technical accounts. A global acting Cloud ERP provider needs to offer a centralized authorization system that will enable customers to individually customize security policies to the country specific regulations.

IV. FACTORS THAT INFLUENCE THE INSTALLATION OF CLOUD ERP

As per the survey by Aberdeen Group, [6], the most important factor that influences the enterprises to install cloud ERP is the lower cost of ownership as shown in the figure 1. This is followed by the perception of ease of implementation and lower upfront cost. Also larger organizations can also use cloud ERP for their new business units or starting subsidiaries which will give the advantage of “shorter time to Go Live” [6].

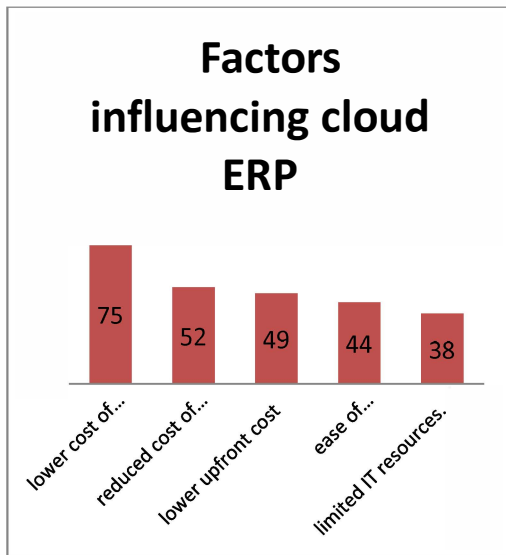


Figure.1 Factors positively influencing ERP implementation [6]

Alternatively, the factors which negatively impact the ERP implementation in organizations are as shown in the figure 2. Security concerns top the list of negative influence of implementing Cloud ERP with a higher percentage during the survey followed by the unpredictable performance during the phase of its deployment. The importance of ERP for the company is also acting as a barrier for the companies to enter to Cloud ERP.

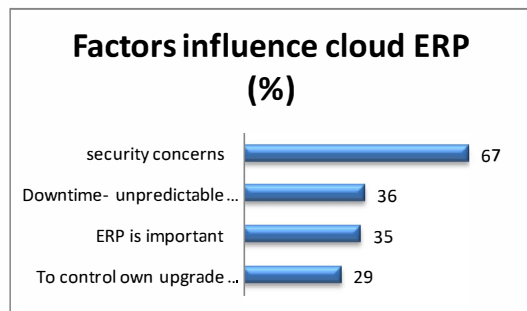


Figure.2 Factors negatively influencing ERP implementation [6].

V. Comparison Of Technologies

After studying the influential factors which contribute to the adaptation of cloud ERP, the reasons for implementing the Cloud model shall be

summarized as in the below table[4].The factors which are positive to the implementation of cloud ERP appeal well to the business objectives of Small and Medium enterprises which drive them to adapt this new technology.

TABLE 1: COMPARISON OF TECHNOLOGIES

| Conventional ERP | Cloud ERP |
|-------------------------------|------------------------------|
| High capital expenditure | No capital expenditure |
| Direct & Indirect investments | No investments |
| Ballooning costs | Low -cost subscription model |
| Long implementation time | Implementable in weeks |
| Rigid | Scalable |
| Limited access | Anytime, anywhere access |
| Upgrade at extra cost | Free upgrade |
| Limited licensing | Flexible licensing |

VI. SECURITY IN THE CLOUD

Security in the cloud is more of a trust issue between the provider and user in the Cloud than a real security issue. Web services are the ones which connect the customer and the provider over the internet and the well-known security practices such as data encryption, authentication, authorization and fraud detection to prevent all possible attacks.

The security issues in the cloud ERP shall be broadly classified as shown below: [9].

(i)Physical security: As the data and applications are stored in an external cloud, the physical security of the Datacenter is a concern but the modern day datacenters are well managed and secured to alleviate this concern to a greater extent

(ii)Transmission security: Applications running on Cloud require passing data between the Cloud over internet or wireless. Hence security & encryption algorithms such as Secure Socket Layer (SSL), Data Encryption Standard (DES) are commonly employed by the cloud vendors and which needs to be specified and tested during the initial design phase.

(iii)Storage security: As the data is stored in remote location, the cloud provided should ensure procedures that there is no snooping into client data. This is achieved specifically by proper selection of Access security, Data security and User authentication.

Also study carried out on the following parameters such as,

(i) Cloud ERP provide lower annual cost per user,

(ii) Cloud ERP is more adaptable than conventional systems

on 10 companies in India has substantially stated the advantages of the cloud ERP [10].

VII. CONCLUSION

This paper summarizes the importance of ERP in providing business solutions for the Small and Medium Enterprises. The implementation of cloud based ERP was studied in detail by analyzing the strategies for implementation and the main challenges which will be faced. With the clear understanding of the strategies and challenges, Organizations can successfully implement Cloud ERP for their business applications

REFERENCES

- [1] Cafore, Massimo, Aloisio Giovanni , “*Grids, Clouds and Virtualization*”, Springer-Verlag London limited 2011.
- [2] Petra Schubert, Femi Adisa, “Cloud Computing for Standard ERP Systems: Reference Framework and Research Agenda” University of Koblenz-Landau, Koblenz, Germany
- [3] Seitz Timm, “SAP ERP in the cloud”, Oracle White paper.
- [4] Ramco OnDemand ERP Whitepaper: *The planet's most powerful ERP on the cloud*
- [5] Velte.T.Anthony, Velte J.Toby, Elsenpeter Robert. “*Cloud computing – A practical approach*” McGrawHill, Newyork.
- [6] Castellina Nick, “*SaaS and Cloud ERP trends, observation and performance*”, Aberdeen Group, December 2011.
- [7] Epicor Manufacturing express edition. *SaaS ERP: A Viable Model for Job Shops and Small Manufacturers*:
- [8] Hossain Liaquat, Patrick, Jon David, Rashid M.A, “*Enterprise resource planning: Global opportunities and challenges*”, Idea group publishing, London.
- [9] John W.Rittinghouse, James F.Ransome, “*Cloud computing –implementation, Management and security*” CRC press.
- [10] Monika Sharma, Ashwani Mehra, Hareesh Jola, Anandkumar, “*Scope of cloud computing for SME's in India*”, Journal of computing, volume2, issue 5, May 2010.