



# Cloud Computing as a Suitable Alternative to the Traditional On-Premise ERP and Massive Data Storage

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## ABSTRACT

This paper sought to aver Cloud Computing as a Suitable Alternative to the Traditional On-Premise ERP and Massive Data Storage based on the information from the institutions that implement ERP system, government and private organs that consider the adoption of cloud ERP and professionals comments from cloud technology media blogs. In this gamut, the genuine number of detriments of On-premise ERP deployment in today technology arena and subsidies of Cloud Based ERP adoption were sought;

The researcher, after getting the above information conducted as survey about this census to establish the potential of Cloud Computing based ERP as a suitable and alternative use of the On-Premise ERP and Massive Data Storage, The study had three objectives including examining the extent at which On-premise and Cloud ERP is being adopted and establishing whether people are likely to adopt Cloud based ERP, determine the factors affecting Cloud computing System adoption, indicating the factors

that are important for them to adopt or not adopt the Cloud computing Based ERP.

**Keywords :** *Cloud Computing, On-premises ERP, massive data storage, Cloud based ERP, Information Linking, Information Leakage, Trespassers, Service Outsourcing and Virtualization Framework, Cloud Computing Infrastructure and Data Allocation.*

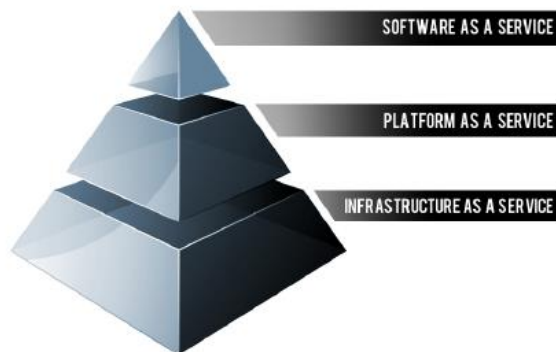


## I. INTRODUCTION

Cloud computing is one of the latest innovations of IT which claims to be all capable of driving the future world of IT within minimum costs. This concept of cloud computing being one side widely accepted by normal users while on the other hand majority of the Organizations have some serious standoff concerns before moving their Enterprise Resource Planning Systems to this form of IT evolution.

The idea leading to cloud computing paradigm is that the computing resources and software are available to the end user, whether an organization or an individual, in a virtualized environment (cloud) and the user can access it on demand and using a 'pay as you go' approach. These services to industry are respectively referred to as Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) (Hayes, 2009) as well as Data as a Service (DaaS) and Backup as a Service (BaaS).

Source: **Ontology of identified cloud services, 2009**



The diagram above depicts the Cloud Computing stack.

Enterprise resource planning system (ERP) is an enormous piece of software that integrates the entire organisation into one giant entity while capturing, changing and automating the organizational processes. ERP represents a company or organization's central nervous system.

One of the issues faced by the organisations in the world today is the need to make the organisational data globally accessible while taking into account the

intra organisational and extra-organisational data which are managed with Enterprise Resource planning Systems (ERPs) and a cloud based service can be a very enabling medium for achieving this.

The innermost Concerns today regarding a cloud based system include security, scalability, ease of migration and licensing issues. However there are some notable aspects that need to be addressed:

Whether a very pertinent issue is regarding the security of the organizational data since data is stored in the cloud and an organization does not have a direct control over it or the security of the organizational data is the responsibility of the service provider and this may create a lot of issues for an organization to consider before and after migrating to a cloud based Systems. Whether the possibility that vendors may lock in that it might disallow the organisation to migrate to another service provider when it is desired or if cloud service provider releases the organization's confidential data?

This research paper, would seek to argue that **Cloud Computing Based ERP Service** is a suitable alternative to the traditional on premise ERP and massive data storage. It will continue to argue that there is no more fears related to cloud based system service & it ensures the confidentiality to the legitimate users of the service. The research paper ends up with answer to the leading question: "Should we recommend organizations to acquire traditional on premise resource planning (ERP) OR to invest in emerging software-as-a-service (SaaS) based ERP solutions?"

## II. REVIEW OF RELATED LITERATURE

From the senses of literatures the following table highlight the advantage of Cloud based ERP over On-Premise ERP (NIST Tech Beat, 2010):



Cloud based ERPs
1. <b>Provide on-demand self-service.</b> This means that a cloud user can access the ERP System capabilities without human intervention from the service provider.
2. <b>Provide broad network access.</b> This means that a user can connect from anywhere, regardless the platform and/or device, at any time (provided there is internet access)
3. <b>Provide resource pooling.</b> This means that a group of users (or customers) share a core set of computing resources. This is what's meant by a "multi-tenant" model.
4. <b>Provide Rapid elasticity.</b> Capabilities can be elastically provisioned and released automatically to scale rapidly outward and inward commensurate with demand.
5. <b>Measured service.</b> Cloud based systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service.

**Cloud ERP Compares to on- premise ERP**

Comparing ERP on-premises to the cloud ERP, Cloud ERP has been found to be trouble-free as it is based on the plus one offer ahead another. (*Burca, S., Fynes, B., et al., 2005*).

The basic difference between on-premise ERP and cloud ERP is clear: On-premise ERP solutions are installed locally on your company's hardware and servers and then managed by your IT staff while cloud ERP, also called SaaS, or Software-as-a-Service, is provided as a service. With this type of deployment, a company's ERP software and its associated data are managed centrally (in the Internet cloud") by the ERP vendor and are accessed by customers using a web browser.

What may not be so clear is that the type of ERP deployment model you choose can have a significant impact across your business. Here are some key

factors that most of the companies, organization and SMEs should consider when weighing whether to use on-premise or cloud-based ERP software:

**i. Ownership Costs**

On-premise ERP systems usually require large upfront and ongoing investments to purchase and manage the software and the related hardware, servers and facilities necessary to run it. If companies, organizations and SMEs don't have a large or experienced IT staff, may also have to invest more time and money in additional personnel and train them. Even more importantly, on-premise systems require that their IT team spend a significant amount of their time and budgets ensuring their system are up-and-running when they need it, including maintenance of hardware, server rooms, and more. When it's time for their ERP system to be upgraded, IT must then redeploy the system across the various users' computers and re-implement various customizations and integrations that their business installed on their previous software.

For cloud-based ERP, initial costs are typically much lower because they simply implement the software to their requirements and then access it through their computer's internet connection. The cloud ERP provider hosts and maintains all of the IT infrastructure for them, ensures the system is always running, that the data is secure, and that product enhancements are rolled out painlessly to their solution without breaking their previously implemented customizations. Ultimately, this allows their IT resources to focus on innovating and helping grow the business more effectively, rather than spending a disproportionate amount of their time on maintaining and managing their on-premise systems. Cloud ERP also offers a predictable, pay-as-you-go subscription model that can make cash flow management and planning much easier.

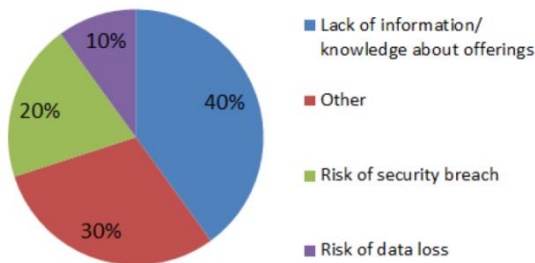
Over time, those IT savings add up. When comparing the total cost of ownership of on-premise ERP solutions relative to cloud systems, one industry analyst study found that cloud-based ERP can cost 50



percent less than on-site ERP for a 100-employee company over a four-year period.

**ii. System Upgrades and Enhancements**

On-premise ERP software can be customized, but those customizations are tied to your current software deployment and are not easy to re-implement with future versions. As your ERP provider releases new product updates and enhancements, your previously implemented customizations will be wiped out when you upgrade and your IT team will have to start customizing from scratch again. That's the main reason many companies simply avoid upgrading their on-site ERP software and just settle for running their business on out-of-date technology. In fact, two-thirds of mid-size businesses are running outdated versions of their ERP software. In contrast, cloud ERP solutions like Microsoft or IBM and so on, are continually upgraded by the provider so that you can always be sure of using the latest & most advanced version of your ERP software. Leading cloud applications today are built upon automatically. Your previously implemented customizations and integrations automatically carry forward when the solution is updated without additional investment (CloudApp 2010).



**Improved System Performance and Accessibility**

Cloud ERP often delivers better performance than on-premise solutions. Cloud software architecture is designed from the ground up for maximum network performance, which can mean better application availability than traditional on-site ERP systems. Cloud-based ERP also offers optimized performance that can adapt to your needs. If there is a spike in your business, cloud ERP automatically adjusts and

dynamically provisions additional resources to handle the surge. A local IT department is unlikely to be able to achieve these results, and may not even be able to regularly report their system uptime results to management.

It's also important to note that a cloud-based ERP solution provides real-time data that can be accessed via the Internet anywhere at any time. That means that staff at your company can see accurate information on laptops, smart phones, and tablet devices while they travel or telecommute all without extra setup fees or ongoing costs.

Not only can cloud-based ERP provide better performance and greater accessibility, but better security as well.

**iii. Deployment Speed**

Every ERP deployment takes time and requires careful planning, but cloud ERP offers clear advantages when you consider speed of deployment. Since cloud ERP requires no additional hardware, your business doesn't have to waste time procuring and installing IT infrastructure. With cloud ERP, you can easily roll it out across multiple regions, subsidiaries, and divisions, avoiding the cost associated with those rollouts. If you chose a cloud-based ERP system, these differences can add up to a significant time savings: Cloud ERP deployments usually take 3-6 months compared to the 12 months that it typically takes to implement an on-premise solution.

Cloud-based ERP systems are also easier to scale, giving you the flexibility to add more users as your business grows. On-site ERP solutions don't offer the same freedom to give more employees access to an on-site system, it's often necessary to provision additional hardware.

Every business is unique, so taking the time to consider how different ERP deployment options will affect your company is critical; to learn more about deploying a cloud-based ERP is a solution.



**III. METHOD OF INVESTIGATION AND SUMMARY OF FINDINGS**

Systematic and proactive methods have been adopted in collecting information from a population of interest. It tends to be quantitative in nature and aims to collect information from a sample of the population such that the results are representative of the population within a certain degree of error free.

The data collection procedure was an In-depth interviews based with IT partners of Cloud service provider companies in Rwanda, Universities and Business Companies, specific institution that implement ERP system, IT consultants and ERP users, government and private organs in Rwanda that considers the adoption of cloud ERP, professionals comments from social media blogs is another source of data to be used in this research.

The other data sources are to be collected from the scholar studies and recent articles that focus on cloud services outsourcing and cloud ERP.

The interviews based on open questions and built objectively without interfering or guiding the respondents to specific answers was conducted in various target whereabouts.

*Source: Researcher*

**IV. PRESENTATION AND SUMMARY OF FINDINGS**

The body of organization and industry knowledge about On-Premise ERP systems and Cloud based ERP have reached a certain maturity, public institutions recognise the advantages of migration to cloud bias Massive data Center because all government institutions have been clarified and several different private institutions are about to stir. Trust, while cloud ERP adoption is promising, the majority of respondents considered on-premise software. Reasons for this include not having sufficient information about cloud service (40%), doubting about risk of security breach (20%) and professed risk of data loss (10%) and others (30%).Based on Panorama’s understanding, we have

found that these are false impressions such as resistance to change.

The revealing size of rise results indicate that the majority of feedbacks (60%) indicated that they are willing to allow the switch and other are undefined and need to be identified in the further research. Among the factors that most people value when deciding to migrate include “a high cost to SME, Security trust, privacy, scalability, ease of migration and licensing issues, intellectual property and other sensitive information stored in the cloud could be stolen.”,

Despite this trend, the majority of entities continue to rely on ERP consultants in their ERP selection and implementation initiatives. As enterprise solutions continue to saturate the marketplace and the number of viable software options continues to increase, institutions are finding that ERP consultants with industry-specific expertise and experience are particularly helpful in guiding them through the selection process.

#	Class of Interviewed Entities	Respondents
1	ERP Consultants	10
2	Cloud Computing Consultants	5
3	Cloud Service provider	3
4	Public organ	12
5	Private entities	21

The data collected and analyzed also indicate that many institutions understand the importance of working with On-premise ERP throughout the entire business lifecycle than Cloud ERP implementation.

Interestingly, the percentage of respondents working with On-Premise ERP shows that deploying their business data with On-Premise ERP was because they do not find to be aware of any other alternative as they have to use ICT. On other hand, the percentages intricate that ERP failures appears to be having a direct positive impact on the way that institutions will be required to work for cost saving



systems as computerization is concerned with ERPs and data security.

Moreover, the overall results touched on the likelihood of not adopting the Cloud-ERP as suitable and advantageous are the factors such as of awareness, Trust, Cost and availability of High speed Internet Connection to working on virtualized environments and resistance to change.

## V. CONCLUSION AND RECOMMENDATIONS

This research paper suggests that there is a potential market for Cloud computing Services, and Smart IT delivery towards Sustainable Development through a cost saving with cloud ERP adoption instead of deploying On-premise ERP which incurs outsourcing equipment, experts who could be hired and software products to integrated organization's data and Additional tools such as security layer infrastructures and policies (Firewalls, Sockets, Antivirus, Genuine and Licensed softwares, Backup Server Systems, disaster-proof , disaster recovery and system reengineering) and other unavoidable expense such as vendor licenses and support; there is also a notable number of SMEs that prefer to make a switch without losing their existing infrastructure materials but allocation, further is only to recommend that a marketing strategy needs to be formulated to create awareness of this new buzzword "Cloud Computing" as most feedback indicated that they do not recognize about this technology. Finally, the pricing strategy should be formulated carefully not to discourage potential users at the beginning and Internet to all schemes.

Further recommendation, the interview findings demonstrated that cloud solutions can bring in a set of new

Features to overcome some of the technical deficiencies are inherent in on-premise ERP systems (e.g. high initial investment cost and complicated system upgrade, creation of awareness). However, cloud technology should then be simply perceived as very fruitful provided the discussed constraints are

addressed properly. Thus, Future studies on these ERP topics seem very promising.

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## VII. REFERENCES

- [1] Wang, L., Laszewski, G., Kunze, M., & Tao, J. (2008). Cloud Computing: A Perspective Study. *New Generation Computing- Advances of Distributed Information Processing*, 28(2), 137-146. doi: 10.1007/s00354-008-0081-5
- [2] Maggiani, R. (2009). Communication Consultant, Solari Communication, Cloud Computing is Changing How we Communicate. *IEEE International Professional Conference, IPCC*, 1-4,
- [3] Bhardwaj, S., Jain, L., & Jain, S. (2010). Cloud computing: A study of infrastructure as a service (IAAS). *International Journal of Engineering and Information Technology*, 2(1), 60-63.
- [4] Grossman, R. L., (2009). The Case for Cloud Computing. *IT Professional*, 11(2), 23-27. doi: 10.1109/MITP.2009.40.
- [5] Burca, S., & Fynes, B. (2005). Strategic technology adoption: extending ERP across the supply chain. *Journal of Enterprise Information Management*, 18(4), 427-440.
- [6] Cloud Security Alliance, "Security Guidance for Critical Areas of Focus in Cloud Computing V2.1," <http://www.cloudsecurityalliance.org/csaguide.pdf>.



[7] Catteddu, D., & Hogben, G. (2009). Cloud Computing: Benefits, Risks and Recommendations for Information Security. Retrieved from [www.enisa.europa.eu/act/rm/files/deliverables/cloud-computing-risk-assessment](http://www.enisa.europa.eu/act/rm/files/deliverables/cloud-computing-risk-assessment)

[8] Bruening, P. J., & Treacy, B.C. (2009). Cloud Computing: Privacy, Security Challenges. *Bureau of Nat'l Affairs*, retrieved from [www.hunton.com/files/tbl\\_s47Details/FileUpload265/2488CloudComputing\\_Bruening-Treacy.pdf](http://www.hunton.com/files/tbl_s47Details/FileUpload265/2488CloudComputing_Bruening-Treacy.pdf).

[9] How Cloud ERP Compares to On-premise ERP, Netsuite; <http://www.netsuite.com/portal/resource/articles/on-premise-cloud-erp.shtml>

[10] H. Takabi, J.B.D. Joshi, and G.-J. Ahn, (2010). SecureCloud: Towards a Comprehensive Security Framework for Cloud Computing Environments. *Proc. 1st IEEE Int'l Workshop Emerging Applications for Cloud Computing (CloudApp)*, IEEE CS Press, 393–398.

[11] Barki, H. & Pinsonneault, A. (2002). Explaining ERP implementation effort and benefits with organizational integration. *Cahiers du GreSI*, 2(1), 1-27.

[12] Willis, T. H., Willis-Brown, A. H., & McMillan, A. Cost containment strategies for ERP system implementations. *Production and Inventory Management Journal*, Vol. 42, No. 2, 2001, pp. 36-42.

[13] Parr, A. N. and Shanks, G. A Taxonomy of ERP implementation approaches. *Proceedings of the 33rd Hawaii International Conference on System Sciences*, Hawaii, 2000.

[14] Prosser, A., & Ossimitz, M. L. (2000). Data Warehouse Management. Department of Production Management, University of Economics and Business Administration, Vienna, Austria. Retrieved from [http://www.indi.wu-wien.ac.at/download/data\\_warehouse.pdf](http://www.indi.wu-wien.ac.at/download/data_warehouse.pdf)

[15] Rosemann, M., and Wiese, J. (1999). Measuring the performance of ERP software : a balanced scorecard approach. *Proceedings of the Australasian*

*Conference on Information Systems*, Wellington, 1-3 december, 1999.

[16] Smyth, R.W. (2001). Challenges to successful ERP use (research in progress). *Proceedings of the 9th European Conference on Information Systems*, Bled, Slovenia, 1227-1231.

[17] Soh, C., Kien, S. S., & Tay-Yap, J. (2000). Cultural Fits and Misfits :Is ERP A Universal Solution?. *Communications of the ACM*, 43(4), 47-51.

[19] Fini. (2009). The technological dimension of a massive open online course: The case of the CCK08 course tools. *International Review of Research in Open and Distance Learning*, 10(5), 1-26.

**"Information is the oil of the 21<sup>st</sup> century, and analytics is the combustion engine"**  
Gartner.

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