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Examine the latest developments in secure and scalable cloud computing infrastructure, focusing on its role in supporting modern applications and businesses.

1. Impact of Cloud Computing: Beyond a Technology Trend

[George Feuerlicht, Shyam Govardhan **2014]**

ABSTRACT

Cloud Computing is being widely promoted as the next enterprise computing paradigm and a solution to most current enterprise IT problems. IT experts are making bold predictions about Cloud Computing and IT vendors are making major investments to implement infrastructure for delivery of Cloud Computing services, while IT users' express concerns about various aspects of this new enterprise computing model. In this paper we consider Cloud Computing in a historical context of evolution of enterprise computing and briefly review the benefits and challenges of Cloud Computing. We then discuss the likely impact of wide adoption of Cloud Computing on both the providers and consumers of Cloud Computing services, and argue that Cloud Computing represents a continuation of existing trend towards centralization of IT resources resulting in increased specialization and ultimately leading to most end user organizations abandoning IT ownership.

SUMMARY

The paper "Impact of Cloud Computing: Beyond a Technology Trend" explores the concept of cloud computing and its potential impact on providers and consumers of cloud services. The authors discuss the convergence of technological trends that have paved the way for a major shift in enterprise IT. They highlight the investments made by leading IT companies in cloud infrastructure and the promotion of its benefits.

However, the authors acknowledge that user organizations have concerns about data security, service continuity, and provider lock-in. To address these concerns, they suggest that many large organizations may opt to implement their own private clouds, emulating the features of public clouds while mitigating risks. The paper also highlights the appeal of the cloud subscription model for small and medium enterprises (SMEs) due to its low upfront costs. However, SMEs may struggle with integrating services from different providers into their existing architecture. The authors have also mentioned about the three important services provided by cloud technology i.e., SaaS,

PaaS and IaaS. The authors argue that cloud computing represents a continuation of the trend towards centralization of IT resources. They predict that this will lead to increased specialization and efficiency, ultimately resulting in most organizations abandoning IT ownership. However, they caution that organizations must have the necessary architectural prerequisites to fully leverage cloud computing.

Overall, the paper emphasizes the potential benefits of cloud computing, such as cost reduction and scalability, while acknowledging the challenges and concerns associated with its adoption. It underscores the importance of addressing data security, service continuity, and provider lock-in concerns. The authors suggest that cloud computing will have a significant impact on both providers and consumers of cloud services, leading to a transformation in the IT landscape.

In conclusion, the paper provides insights into the current state of cloud computing and its potential impact. It highlights the benefits and challenges of cloud adoption and emphasizes the need to address concerns related to data security and service continuity. The authors predict a shift towards centralization and increased specialization, with organizations abandoning IT ownership. However, they stress the importance of having the necessary architectural prerequisites to fully leverage cloud computing.

CONCLUSIONS

Recent convergence of important technological trends that include commoditization of hardware, hardware and software virtualization, ubiquitous network connectivity and SOA has created pre conditions for a major shift in the way enterprise IT is implemented and delivered. Leading IT companies are facilitating this transition by making massive investments in infrastructure for delivery of Cloud Computing services and are actively promoting the benefits of this new model. It is also evident that IT user organizations have concerns about certain aspects of Cloud Computing, in particular data security, services continuity and provider lock-in. It is quite likely that many large organizations will take advantage of new data centre technologies and implement their own (private) clouds emulating the features of public clouds and deriving similar benefits without running the risks associated with external service providers. For example, the UK Government has announced a strategy to create a government cloud (G-Cloud) that will concentrate government computing power into a series of about a dozen highly secure data centres replacing more than 500 existing data centres with expected annual savings of £3.2bn [25]. Other large organizations with security concerns may follow a similar path towards Cloud Computing, consolidating their existing data centres and taking advantage of virtualization technologies to optimize hardware utilization and minimize costs. Cloud Computing adoption rates for individual application types and industry sectors are likely to vary significantly. Adoption rates for relatively simple and stable enterprise applications such as CRM and office productivity applications are relatively high, while more comprehensive ERP-style enterprise application are not easily adapted to service-based delivery because of the extensive customization required for

each use-user organization. Adoption of Cloud Computing is likely to be driven, at least initially, by SMEs and by new startups, with Cloud Computing acting as a catalyst for innovation. There is some evidence that new innovative startup companies are already taking advantage of Cloud Computing services to enable new business models. For example, the business intelligence and analytics company GoodData (www.gooddata.com) is using Amazon Web Services and Amazon CloudFront to deliver specialized BI (Business Intelligence) services. Finally, Cloud Computing while being driven by technological advances is not purely a technological trend. It is primarily a manifestation of increasing maturity of the IT industry resulting in increased specialization and re-distribution of responsibilities among IT vendors, end-user organizations and various types of third-parties (e.g., systems integrators, etc.). Most enterprise applications in use today have been architected for low performance/high-cost hardware platforms and low bandwidth networks. This type environment necessitates local deployment of applications and local storage of data, and consequently on-premise software and hardware. This results in poor hardware utilization and high TCO. A major component of this high TCO can be traced to inefficiencies associated with poor (diluted) IT expertise that needs to be transferred from the source (i.e., the IT vendor) to a large number of the end-user organizations. For example, a single new version release of an ERP system requires reskilling of thousands of local experts employed by end user organizations, and may also necessitate hardware upgrades and additional software customizations. Apart from the high cost associated with this re-skilling process, given the fast rate of change, enterprise applications in end user organizations are almost never up-to-date with latest software releases. Similar arguments can be made for onpremise hardware technology. Fast and ubiquitous network connectivity combined with almost infinitely scalable computing platforms makes this enterprise computing model obsolete. This will lead to concentration of IT resources with IT providers resulting in increased specialization and ultimately leading to most end user organizations abandoning IT ownership altogether.

2. Using Cloud Computing in Higher Education: A Strategy to Improve Agility in the Current Financial Crisis

[Marinela Mircea and Anca Ioana Andreescu **2011]**

ABSTRACT

In the current financial crisis and being challenged by growing needs, universities are facing problems in providing necessary information technology (IT) support for educational, research and development activities. The objective of this paper is to find alternatives to the use of IT, while leading universities to improve agility and obtain savings. The research methodology consisted in a rigorous analysis of the latest research on Cloud Computing as an alternative to IT provision, management and security. It also took into account the best practices for Cloud Computing usage within universities, plus the authors' experience in IT and higher education. The article begins

with a brief introduction to Cloud Computing in universities, referring to the most important results obtained so far. Further, a starting point for universities to use Cloud Computing is provided, by proposing an adoption strategy. The strategy includes five stages, with emphasis on the evaluation of data and processes/functions/applications from several major universities based on some key criteria, while creating a correspondence between these aspects and the models/services/applications that exist on the Cloud market. The results obtained are encouraging and support the use of Cloud solutions in universities by improving knowledge in this field and providing a practical guide adaptable to the university's structure. In order to be applicable in practice, the proposed model takes into account the university's architecture and criteria such as mission, availability and importance of applications and also the data's mission, sensitivity, confidentiality, integrity and availability.

SUMMARY

This document provides a comprehensive overview of a cloud adoption strategy tailored specifically for universities. It highlights the importance of evaluating data and processes/functions/applications based on key criteria to determine their suitability for migration to the cloud. The strategy consists of five stages, each designed to ensure a smooth and effective transition to cloud computing.

The first stage involves understanding the university's IT infrastructure, including its architecture and criteria such as mission, availability, and importance of applications. This step sets the foundation for the subsequent stages by providing a clear understanding of the university's specific needs and requirements.

The second stage focuses on evaluating the university's IT needs and usage. This evaluation takes into account factors such as the mission, sensitivity, confidentiality, integrity, and availability of data. By assessing these aspects, the university can identify the candidate elements that are suitable for migration to the cloud.

In the third stage, the document emphasizes the importance of choosing the appropriate cloud model for each function, process, and application identified. The options include private, public, community, and hybrid cloud models. The selection is based on the mission and importance of the business practices associated with each element.

The fourth stage involves measuring and improving processes, procedures, and services performed within the university. This step ensures that the cloud adoption strategy is not only implemented successfully but also continuously optimized to meet the evolving needs of the university.

The document concludes by highlighting the benefits of cloud computing in higher education, including cost reduction and improved agility. It acknowledges that the current economic situation necessitates the adoption of cloud solutions in universities.

However, it also emphasizes the need for careful consideration of the risks and challenges associated with cloud implementation.

CONCLUSIONS

Despite its critics and drawbacks, it seems that Cloud Computing is here to stay. Present economic situation will force more and more organizations at least to consider adopting a cloud solution. Universities have begun to adhere to this initiative and there are proofs that indicate significant decreasing of expenses due to the implementation of cloud solutions. The aim of our work was to identify the particularities of using Cloud Computing within higher education. Mainly, we have considered the risks and benefits of cloud architecture and proposed a cloud adoption strategy proper for universities. An analysis of the data and the main activities that exist within a university was the starting point for a cloud model that should take into account the special security requirements of higher education and the available cloud solutions as well. Future research will include a study regarding the level of acceptance and the implementation effects of Cloud Computing.

3. Benefits and challenges of cloud ERP systems e A systematic literature review

[Mohamed A. Abd Elmonem , Eman S. Nasr, Mervat H. Geith **2017]**

ABSTRACT

Enterprise Resource Planning (ERP) systems provide extensive benefits and facilities to the whole enterprise. ERP systems help the enterprise to share and transfer data and information across all functions units inside and outside the enterprise. Sharing data and information between enterprise departments helps in many aspects and aims to achieve different objectives. Cloud computing is a computing model which takes place over the internet and provides scalability, reliability, availability and low cost of computer reassures. Implementing and running ERP systems over the cloud offers great advantages and benefits, in spite of its many difficulties and challenges. In this paper, we follow the Systematic Literature Review (SLR) research method to explore the benefits and challenges of implementing ERP systems over a cloud environment.

SUMMARY

This systematic literature review explores the benefits and challenges of implementing cloud Enterprise Resource Planning (ERP) systems. The review protocol defined four research questions to guide the study. The search strategy involved searching five main scientific paper databases, including IEEE Xplore, ACM Digital Library, Science Direct, SpringerLink, and Google Scholar. A total of 45 publications were included in the review.

The review identified several key benefits of cloud ERP systems. These include lower cost, scalability, fast implementation, improved accessibility, high availability, and easier updates. Cloud ERP systems offer cost savings by reducing upfront and operating expenses. They also provide scalability, allowing organizations to easily adjust resources based on their needs. Rapid implementation and improved accessibility enable faster and more efficient deployment and usage of ERP systems. High availability ensures continuous access to data and services, while easier updates allow for seamless system maintenance and upgrades.

However, the review also highlighted various challenges associated with cloud ERP systems. Security risks, performance issues, customization and integration limitations, organizational challenges, and the selection process of cloud ERP systems were among the challenges reported. Security risks were a major concern, followed by performance issues and the need for customization and integration flexibility. Organizational challenges, such as change management and user adoption, were also identified. Additionally, the process of selecting the most suitable cloud ERP system posed challenges due to the wide range of options available.

CONCLUSIONS

We have introduced SLR of recent researches on benefits and challenges of cloud ERP; our SLR covers the published research during the interval from Jun 2011 to Jul 2016. The key identified benefits are lower cost, scalability, fast and rapid implementation, improved accessibility, high availability and easier update. The other benefits reported from different researches are using advanced technology, rapid updates & upgrades, improved accessibility, improved mobility, easier integration with cloud services, cost transparency, sales automation, using security standards and free trials. The key identified challenges are security risks, performance risks, customization and integration limitations, functionality limitations, SLA issues and data ownerships. Other challenges were reported from the investigated researches which are subscription expenses, strategic risks, compliance risks, loss of IT competencies, sensitivity of the information, control over cloud ERP, hidden costs in the contract, loss of technical knowledge, need for ERP as service standards and regulations, knowledge about the cloud, startup support, organizational challenges and choosing between cloud ERP systems. Before moving to the cloud ERP system, the cloud ERP clients should balance between the benefits and challenge. One benefit cloud led to many challenges and on another side, some challenges cloud be solved by some benefits. In the discussion section, we presented the relation between the studied benefits and challenges. The high rated challenges represent research points, which should be considered to improve the implementation and operation of cloud ERP systems.