International Journal of Information Management 36 (2016) 635–644

Contents lists available at ScienceDirect

International Journal of Information Management

journal homepage: www.elsevier.com/locate/ijinfomgt

A fad or future of IT?: A comprehensive literature review on the cloud computing research

Merve Bayramusta [a], V. Aslihan Nasir [b,*]

[a] Siemens AS, Corporate Technology, Development Center, 41480 Kocaeli, Turkey
[b] Department of Management Information Systems, Bogazici University, Hisar Campus B Block, R. Hisarustu Bebek, 34342 Istanbul, Turkey

ARTICLE INFO

Article history:
Received 28 January 2015
Received in revised form 31 January 2016
Accepted 3 April 2016
Available online 14 April 2016

Keywords:
Cloud computing
Content analysis
Trend analysis

ABSTRACT

Cloud computing is now a global trend and during the past decade, has drawn attention from both academic and business communities. Although the evolution of cloud computing has not reached the maturity level, there is still adequate research about the topic. The main purpose of this paper is to examine the development and evolution of cloud computing over time. A content analysis was conducted for 236 scholarly journal articles, which were published between 2009 and 2014 in order to (i) identify the possible trends and changes in cloud computing over the six years, (ii) compare publishing productivity of journals about the cloud computing subject, and (iii) guide future research about cloud computing. The results show that the majority of the cloud computing research is about "cloud computing adoption" (19%), and it was followed by the "legal and ethical issues" of cloud computing (15%). It is also found that "cloud computing for mobile applications" (6%), "benefits & challenges of cloud computing" (5%) and "energy consumption dimension of cloud computing" (4%) are the least attention-grabbing themes in the literature. However, "cloud computing for mobile applications" and "energy consumption dimension of cloud computing" themes have become popular in the last two years, so they are expected to be trendy topics of the near future. Finally, another finding of this study is that the majority of the articles were published by engineering, information systems or technical journals such as "*IT Professional Magazine*", "*International Journal of Information Management*" and "*Mobile Networks and Applications*". It seems as if this topic is generally ignored by the managerial and organizational journals even though the impact of cloud computing on organizations and institutions is immense and is in need of investigation.
© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

The development of the Internet and subsequently the WWW has placed pressure on organizations to review their business functions (CRM, Sales, BPM etc.). IT infrastructure models themselves have also evolved, most recently from Enterprise to Cloud Computing. There are five stages in this evolution representing different infrastructure elements; namely, Stage 1: General-Purpose Mainframe and Minicomputer Era, Stage 2: Personal Computer Era, Stage 3: Client/Server Era, Stage 4: Enterprise Computing Era and Stage 5: Cloud and Mobile Computing Era (Laudon & Laudon, 2014, p. 197–200). Cloud Computing started in the 2000s as the last stage of IT infrastructure evolution which refers to a computing model where organizations or individuals obtain computing power and software solutions over the Internet or other networks (Laudon & Laudon, 2014, p. 200).

Although cloud storage sounds like something related to weather fronts, it actually refers to saving data to a remote database, which is maintained by third parties, instead of hard drive or local storage device (Wu, Zhang, Lin, & Ju, 2010). Cloud computing was first introduced with the creation of the ARPANET to allow people to benefit from resources in different time zones (Leiner et al., 1997). Sultan (2013, p. 810) stated that "Cloud Computing is a model of delivering a range of IT services remotely through the Internet and/or a networked IT environment". Depending on the National Institute of Standards and Technology, Wu et al. (2010, p. 151) defined cloud computing as "a model for enabling convenient, on demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction". In an earlier study, Vouk (2008) stated that cloud computing embraces cyberinfrastructure, and builds upon decades of research in virtual-

* Corresponding author.
E-mail addresses: bayramustamerve@hotmail.com (M. Bayramusta), aslihan.nasir@boun.edu.tr (V.A. Nasir).

http://dx.doi.org/10.1016/j.ijinfomgt.2016.04.006
0268-4012/© 2016 Elsevier Ltd. All rights reserved.

ization, distributed computing, grid computing, utility computing, and, more recently, networking, web and software services. In a report from Gartner Inc. (2012), it is forecasted that, cloud services revenue will reach nearly $207 billion by the end of 2016. In today's global cloud computing market Amazon is the largest player, but it is challenged by Microsoft Azure and Google Cloud Storage, also Microsoft offers Hotmail and OneDrive and Google offers Gmail and Google Drive as free cloud services for consumers (Euromonitor International, 2012, p. 68).

Some scholars and practitioners in the ICT industry see similarities between cloud-base services and bureau computing. Wu et al. (2010) mentioned that the fundamental ideas for cloud storage are related to past service bureau computing paradigms and to those of application service providers and storage service providers of the late 90s. However, the authors believe that the economic situation and the advent of new technologies have triggered strong interest in the cloud storage provider model (Wu et al., 2010). Back in the 1970s, bureau computing providers ran enterprise software on their mainframe or minicomputers, and sold these applications to customers as a service. Nevertheless, according to Steve McCarthy from UXC Connect (2014), there are significant differences between cloud and bureau computing; and he continued that "with bureau you were tied into a single supplier and their applications. With cloud, you have a world of choice". Sharing resources is a similar concept between cloud computing and bureau computing, however the early-generation storage service providers ran into some problems like network costs and customers concerns over sharing the computing infrastructure with other similar businesses (Toigo, 2009). Today, cloud computing offers a better customer experience and unlike the old bureau services, applications and services can be obtained from multiple providers (Toigo, 2009).

As an advantage of better customer experience, the cloud computing adoption supports organizations to concentrate on their own businesses. All IT operations will be handled by experts in cloud service providers, and organizations do not need to deal with a redundant load of IT operations. Although deploying software out in the cloud has significant benefits like; cost reduction, mobility and collaboration; risks that will affect all levels of computational ecosystem should be considered additionally (Hayes, 2008 p. 9). Likewise, Rimal, Jukan, Katsaros, and Goeleven (2011) mention that there are several issues with the cloud such as security, availability, scalability, interoperability, service level agreement, data migration, data governance, trusty pyramid, user-centric privacy, transparency, political and legal issues, business service management etc. In their study, Wu et al. (2010) listed ten crucial common denominators which foster the value of cloud computing as follows: elasticity, automatic, scalability, data security, performance, reliability, ease of management, ease of data access, energy efficiency, and latency. In addition, Rimal et al. (2011) contended that the biggest challenge of cloud computing is the lack of a *de facto* standard or single architectural method, which can meet the requirements of an enterprise cloud approach. In their study, Rimal et al. (2011) stated that the architectural requirements of cloud computing are classified according to the requirements of *cloud providers*, the *enterprises* that use the cloud, and *end-users*. The authors proclaimed that from the *provider's* perspective, highly efficient service architecture to support infrastructure and services is needed in order to provide virtualized and dynamic services; whereas from the *enterprise's* perspective, a QoS-enabled, secure and scalable system is needed (Rimal et al., 2011). Furthermore, the authors pointed out that from the *user's* perspective, the fundamental requirement is a simplified interface with adaptability and self-learning capability that should focus transparent pricing and metering. Similarly, Singh et al. (2012), proposed an integrated co-innovation and co-production framework to get cloud vendors, cloud partners, and cloud clients to work together based on seven principles, namely: cloud ecosystem enablement, cloud infrastructure and its management, service-orientation, cloud core on provisioning and subscription, compostable cloud offerings, cloud information architecture and management, and cloud quality analytics. Furthermore, in a white paper prepared by Oracle (2012, p. 8), it is stated that there are some architectural principles and guidelines that should be followed in order to achieve success in cloud computing; these principles are listed as follows:

- Cloud interfaces and formats must conform to relevant industry standards.
- The system must present only the information (interfaces etc.) necessary to perform each specific function.
- The architecture should provide monitoring of all aspects of resource usage for the various dimensions required by both the Cloud consumer and provider.
- Any cloud provider's claims of reliability, availability, security, and performance must be verifiable.
- Availability should not be limited by inevitable hardware failures.
- Robust identity domain separation—consumers of the system have no exposure to the consequences of other consumers' use of the system.
- Transparent architecture and control—consumers have visibility into the design and operation of the system.
- Improved productivity—deliver an order of magnitude improvement over current levels of efficiency and productivity experienced in traditional IT environments.
- Assured data protection—consumers are assured of compliance with data privacy standards and regulations, have confidence that removal of data is absolute.
- Automate operations—consumers' runtime of business process services and platform services involves minimal manual operations.

According to Yoo (2011, p. 406), cloud computing has four key concepts which are; service oriented architecture/thin clients, delivery models for cloud computing, virtualization and deployment strategies.

1.1. Service oriented architecture/thin clients

In the early stages of the IT infrastructure evolution, consumers had to purchase software and computing power as products, but nowadays cloud computing reconceptualizes software and computing power which are purchased as services on an as-needed basis (Yoo, 2011, p. 407). The cloud computing is based on service-oriented architecture (SOA) and virtualization of hardware and software which enable the cloud's reusability and extensibility (Zhang, Zhang, Fiaidhi, & Chang, 2010). Unlike distributed computing such as grid computing, which connects remote computers geographically into a single network to combine processing power and create virtual supercomputers, cloud computing is easily configurable by end users. Google's Gmail and Microsoft's Hotmail, for example, host their email applications and data in datacenters. Therefore, consumers who access e-mail through these web-based services do not need to run an email program or store their messages locally (Yoo, 2011, p. 407).

1.2. Delivery models for cloud computing

Due to the change from enterprise computing to cloud computing, organizations and individuals need to develop new skills and competences. As the usage of cloud computing services increases, organizations start to investigate how to adapt their business structure to a cloud computing model. This model includes

Download English Version:

https://daneshyari.com/en/article/1025491

Download Persian Version:

https://daneshyari.com/article/1025491

Daneshyari.com