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Comparative Analysis for Cloud Based e-learning

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Abstract

Cloud computing is the delivery of computing as a service rather than a product, whereby shared resources, software, and information are provided to computers and other devices and utilities. IT projects in any learning organization at a strategic board level and not –as before - just. e Learning systems usually require hardware and software resources. Many educational institutions cannot afford such investments. This paper highlight the contribution of E-Learning standards with the Cloud standards and the impact on using cloud computing for e-learning solutions. An analysis for the prominent issues in current e Learning systems through a comprehensive comparison between e Learning systems before and after moving to Cloud Computing environment, using a generic framework for "Cloud-based e Learning systems.

Keywords: Cloud Computing, e Learning, Service Model Saas, IaaS, PaaS, ELaas.

1. Introduction

A search of the literature on cloud computing and e learning has been disappointing because no enough studies directly address effectiveness issues related of joining the cloud computing standards with the e-learning, especially when we consider cloud computing the extension of SOA out to cloud-delivered resources, of course so many papers and researches found , all goes around either the technical issues (hardware, software, networking) or the cloud computing as an effective tool to reduce the overall cost of e-learning in the long term and more cost-effective to the institution, very few papers go around cloud standards as a service model regardless the e-learning as one of the important service model.

Cloud computing mainly is a delivery of computing as a service rather than   acquiring IT products, whereby shared resources, software, and information are provided to computers and other devices as a utility (like the electricity grid) over a network (typically the Internet). [1] Cloud computing providers offer their services according to three fundamental models: Infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service (SaaS). In the main time the "Education and Learning as a Service" (ELaaS), emphasizing its possible benefits and offerings. It is essential for an educational and learning organization, with its budget restrictions and sustainability challenges, to use the cloud formation best suited for a particular IT activity [2].

Cloud computing is the mechanism of moving the processing effort from the local devices to the data center facilities. The software is commonly known   as a group of services, applications and data are stored on multiple servers that can be accessed from the Internet, same time most of the education organization do not have the resources and infrastructure needed to run top e-learning solution. This is why the random / haphazard teaching media became the biggest players in the field of e-learning software, although having now versions of the base applications that are cloud oriented. The base layer of e-learning cloud shares IT infrastructure resources and connects the huge system pool together to provide services. Cloud Computing allows the hardware layer to run more like the internet, to make the hardware resources shared and accessed as data resources in secure and scalable way. Virtualization technology separates the physical hardware from operating system, which on one hand can make computing and storage capacity of the existing server into smaller size and re-integration, to improve the utilization and flexibility of IT resource; on the other hand can provide a common interface for large-scale cloud computing integration that enables the publication of calculation

Hence, this paper introduces cloud computing into an e-Learning within the enterprise architecture standards not only as cost effective tools but for the integration of the standards of Service-Oriented Architecture (SOA) as a way of structuring and integrating IT services including the e-learning as a services , ELaaS.

2.   E learning standards

Recently there have been efforts to define standards for the e-learning contents and e-learning components like the IEEELOM, UKLOM, IMS, SCORM and OKI [3].   e-Learning, like almost every other technology, has a number of evolving standards which are relevant. The Dublin Core started in 1994 to develop a meta-data framework for web resources.[4] The Dublin Core is a metadata element set intended to facilitate discovery of electronic resources, some institutions of higher education and their vendor partners established an effort to develop open, market based standards for on-line learning, including specifications for learning content metadata. Also in 1997, NIST (National Institute for Standards and Technology) and the IEEE P.1484 study group (now the IEEE Learning Technology Standards Committee – LTSC)[5] began similar efforts. The NIST effort merged with the IMS effort, and the IMS began collaborating with the ARIADNE project, a European project with active meta-data definition effort. In 1998 IMS and ARIADNE submitted a joint proposal and specification to IEEE, which formed the basis for the current IEEE Learning Object Meta-data (LOM) base document.

3.   Cloud computing services [6]

IaaS

Infrastructure layer corresponds to IaaS infrastructure services, is the lowest layer of the network.Users can household to provide standard services, including computing power and storage resources. It turn the memory, storage and computing power into a virtual whole resource pool for the entire industry to provide the required of computing power and storage resources.

PaaS

Platform layer correspond to PaaS(Platform as a service) that made a higher level of abstraction on the base of Iaas layer.to Provides a development environment, test environment, server platforms and other services, users can develop applications based on Internet and other servers service providers infrastructure,then share it to other users.

SaaS

SaaS(Software as a service) is a software distribution model, designed for web delivery, user can deploy and access through the Internet hosting. SaaS providers need to build information for all network infrastructure,