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## **A Review of Architecture for Providing Knowledge as a Service (KaaS), A New Paradigm on Academic Cloud**

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### **ABSTRACT**

Knowledge plays vital role in every stage of learning and research. The academic cloud providing education services to students, teachers and researchers can further be equipped to provide knowledge as a service to the users for their knowledge enhancement and problem solutions. This is feasible through development and embedding of knowledge database and extracting relevant knowledge from the academic cloud system. This paper proposes an architecture that uses a new paradigm KaaS on cloud environment. The architecture takes care of insertion of data, conversion of data into knowledge, knowledge extraction and providing various services. It also incorporates the requirement to pay policies for the knowledge services used. In this paper, we will review what the cloud computing infrastructure will provide in the educational arena, especially in the universities where the use of computers are more intensive and what can be done to increase the benefits of common applications for students and teachers.

**Keywords:** Knowledge As A Service (KaaS), Cloud Computing, Academic Cloud.

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### **INTRODUCTION**

Cloud Computing refers to both the applications delivered as services over the internet and the hardware and systems software in the datacenters that provide those services. The services themselves have long been referred to as Software as a Service (SaaS). The data center hardware and software is what we consider a Cloud. When a Cloud is made available in a pay-as-You-go manner to the general public, it is called a Public Cloud; the service being sold is utility Computing. Private Cloud is meant for internal datacenters of a business or other

organization, not made available to the general public. Thus, Cloud Computing is the sum of SaaS and Utility Computing, but does not include Private Clouds. People can be users or providers of SaaS, or users or providers of Utility Computing<sup>1</sup>.

The use of latest knowledge based system helps in many areas of teaching, research and collaboration of knowledge. The students, teachers, research and collaboration of knowledge. The students, teachers, researchers are taking the advantage of already developed and existing system which are developed with the help of expert system. We are aware that Software

As A Service (SaaS) is available in various cloud computing environments.

Similarly, it is possible to have the knowledge Cloud especially academic knowledge Cloud from which we can perform knowledge extraction and make it available to the users in an effective manner. This paper advocates architecture for providing knowledge As A Service (KaaS) paradigm, which constructs the knowledge with the help of expert system, and such knowledge can be provided to the end user as the knowledge as per the requirements. And pay as per the usage only.

The academic cloud aims to provide the various educational services to the direct end users of the teaching field including students. The knowledge extraction and collaboration from the existing system will benefit a lot with coeffectiveness. The cloud computing era is trying to provide the users everything as a service.

As the service-oriented architecture is producing meaningful information with the integration of all the services, we can consider the knowledge as a service to be used only when required and making the payment of usage only.

Further, this architecture of provides knowledge as integrated service from the modern knowledge based system collaborating with the cloud computing. The other facets are focusing on the aspects of using the knowledge-based system to improve the performance of academic cloud by collaborating expert system within the cloud.

Another relevant concept is "Software reuse", an important concept that is used to improve the productivity and quality of software development.

Since the consideration of this activity as an engineering process, different proposals about reuse have been made following different models. As new programming paradigms for application development were proposed (Eg, Structured programming, functional programming, Object-Oriented programming etc) new approaches for

reuse were also considered, giving rise to interesting contributions that have reduced considerably the effort required for building new applications. In particular, the scenario provided by internet a virtual platform with searching facilities that significantly increase the number of potential users of available reusable components<sup>2</sup>.

### **Knowledge as a service (KaaS) Paradigm**

The applications of the knowledge-based system are placed on the cloud, so every one can access it and users need to pay only for the usage only.

### **Software As A service (SaaS)**

A SaaS application runs entirely in the cloud (that is, on servers at an Internet-accessible service provider).

### **Attached Services**

Every on-premises application provides useful function on its own. An application can sometimes enhance these by accessing application-specific services provided in the cloud. Because these services are usable only by this particular application, they can be thought of as attached to it. Microsoft's Exchange Hosted Services provides an enterprise example, adding cloud-based spam filtering, archiving and other services to an on-premises Exchange Server.[3]

### **Knowledge As A Service (KaaS)**

A KaaS application runs to extract the knowledge from the modern knowledge based expert system inside the Cloud System and provides these directly to the end user. **Eg**. Students will get the immediate help on the assignments and practical, as they are performing those exercises by collecting knowledge from system, which converts the information into semantic format, that student can understand.

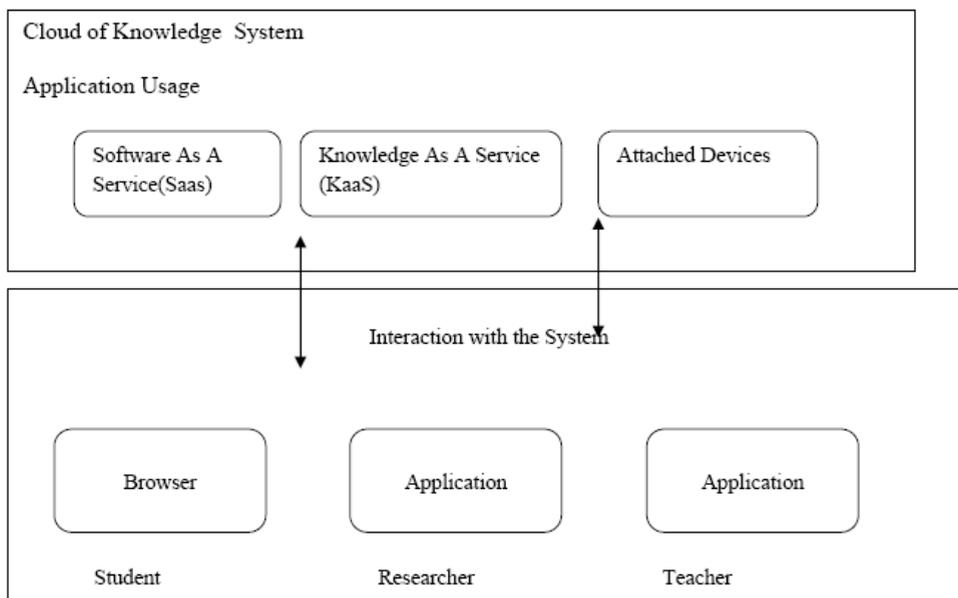
### **Cloud Platform**

A cloud platform provides cloud-based services for creating applications. Other than building their own custom foundation, for example, the creators of a new SaaS application could instead build on a cloud platform. As a Figure 1 shows, the direct users of a cloud platform are developers, not end users. Understanding cloud

platforms require some agreement on what the word “platform” means in this context. One broad way to think about it is to view a platform as any software that provides developer accessible services for creating applications<sup>4</sup>.

The Fig. 1 shows the architecture from where the user can get the service of knowledge

,if knowledge based system can be incorporated on to the Cloud. As indicated in the Fig. 1, Students, researchers as well as teachers get benefited from the knowledge-based cloud and they can get the immense knowledge which directly helps them to achieve the desired output on research or on practical with the available component.



**Fig. 1. The Architecture of Providing Knowledge As A Service on Academic Cloud**

Data in the cloud refers to the cloud storage idea where data is stored somewhere on the Web through abstract APIs with loose schemas and without any constraint of space, availability and Scalability. Clients can completely rely on the data cloud and count on loose coupling, as access is not tied to particular access patterns dependant on the use of specific schemas. This loose coupling is similar to the one provided by Triplespace Computing<sup>5,6</sup> an emerging coordination paradigm combining semantics, tuplespaces and Web Service Technology for the persistent publication of Knowledge and the coordination of services using that knowledge.

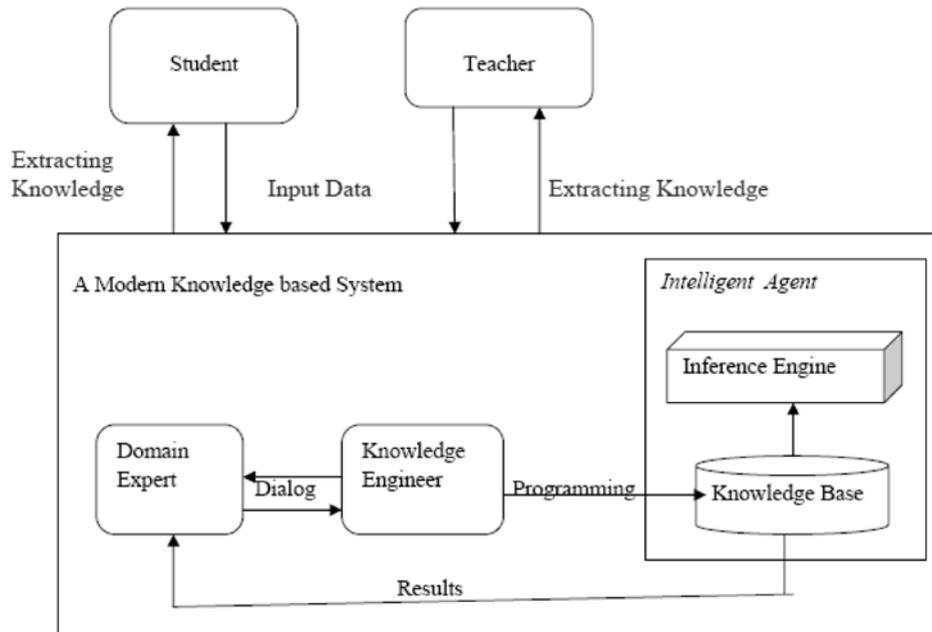
The Triplespace Computing paradigm with data in the Cloud forms the “Knowledge in the Cloud” vision, which incorporates support for

knowledge (Semantic data), Coordination (Collaboration) and self-organization (internal optimization)<sup>7</sup>.

**Collaboration of Modern Knowledge based System on Academic Cloud**

If we want to implement the knowledge-based system with cloud computing, it requires that within the cloud such knowledge-based System should exist...As the academic cloud requires interaction with knowledge database and getting knowledge from expert system, it is working behind the scene of cloud environment.

As indicated in the Fig. 2 Students can interact with knowledge-based system that is embedded in academic Cloud.



**Fig. 2: A modern Knowledge based System of Academic Cloud**

SQL –Tutor suggested in [8] is knowledge based expert system that helps the students to get the solution of the SQL statements very easily.

#### Issues and Challenges

Pay As Per You Use

Converting Data into Knowledge

Deploying the Academic Cloud from knowledge Perspective

Accessibility

#### CONCLUSION

As the Knowledge world is drastically changing ,it requires a system ,which can generate the knowledge and collaborate throughout the organization with the help of cloud computing .The Architecture for providing Knowl[edge As A Service (KaaS) paradigm specified here will take care of providing the knowledge required by academic users in efficient and cost effective way. However ,there are many issues and challenges regarding implementation and management of such of such Knowledge Systems. If the issues are resolved,KaaS paradigm for academic clouds will be proved as a revolution in the Knowledge society.

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