A Survey on Cloud Computing Based System Integration in Education

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Abstract - *In today's world, big organizations rely on several IT systems or software to manage various processes and data. And when you have multiple IT systems, it can bring a problem of getting them to work seamlessly. Companies use system integration to improve the performance and quality of their operations. Cloud System Integration can solve process and data sharing problems faced by large organizations. System integration is the process of linking sub-system software to act as one coordinated system. By joining databases and data sources together to provide a new system, valuable information and create new products, businesses avoid having to re-key the same data into their systems twice or more. System integration is done with help of some businesses goals, using the very latest technologies. The Higher Education sector in India is witnessing enormous and exponential growth in the number of students and institutions. The procedures associated with the academic processes have grown manifold. To reduce the manual work in handling all processes and to increase productivity Cloud System Integration can be used.*

Key Words: **Cloud Computing. System Integration, Education, Technologies, Cloud deployment models, Students.**

1. INTRODUCTION

The process of combining all of an organization's physical and virtual components is known as system integration. Data stored in databases, software, and apps make up the virtual components. The main advantages of Integration include speeding up the company's processes, increasing work efficiency, ensuring effective information exchanges and enabling basic system operations. Humans or improvised solutions may be used to bridge the gap between diverse systems and platforms, resulting in considerable (and costly) inefficiencies. The magnitude of the beneficial improvements that can result from a well-planned system integration project often amazes business leaders.

Cloud computing offers benefits not found in traditional IT environments. It achieves economies of scale by pooling computing resources and utilising virtualization. Cloud computing offers global access to information and services by utilising a computing environment that allows for on-demand scalability and inexpensive initial investment. It can also supply pre-built services and solutions, as well as the necessary skills for running and maintaining them, lowering the risk and requirement for the institution to maintain a highly skilled and hard-to-find group of employees.

The emerging information technology demands refreshing challenges in higher education to offer student services. With the increase in student population, it gets difficult to manage all the processes and data. The student management system, library management system and exam management system is integrated into one system to increase productivity, increase the data flow and reduce manual work. To satisfy the expectations of young millennial students, the university employs social, mobile, and cloud technology in addition to on-premise systems. As a result, the current invention must be suited for enterprise-wide integration among numerous modules, applications, platforms, locations and companies. The invention is further motivated by the growing amount of Government initiatives with the Digital India movement and technological implementation in higher education to serve students of the digital era.

As a result of the continuous financial crisis, learning institutions all over the world are under pressure to provide more quality services with relatively limited resources. However, if resources, including IT services, are shared among educational institutions, there is a larger likelihood that these institutions can focus more on research and core academic activities.

2. LITERATURE SURVEY

In paper [1], "Integration of Student System using iPaaS" authors Srimathi H and Krishnamoorthy A. focused on designing an academic and administrative interconnected systems which streamline data and functional integration automate process workflow, improve information access, secure data sharing, ease online submission, ensure seamless transaction and reduce the manual work, avoid errors and delayed process. They proposed a system to improve student experience and satisfaction. Features of their project include Digi Locker which will help an employer to do authenticate certificate verification, history card module so that students can access other interrelated applications/modules, CRM to qualify the leads for application conversion, LMS is used as an online learning platform and many more. The student of the institute will have a unique login id to do exam enrolment and view result publication. The integrated system has data flow

back and forth with consistent and updated information. And it will support synchronization among CRM, Bank / Institution / University ERP, LMS and MOOC which will help in the reduction of administrative tasks and improve data analysis and decision making. So, the institutions can take full advantage of the timely integration of real-time student data.

In paper [2], "Academic Research Integration System" authors Iulia Surugiu and Manole Velicanu worked on defining the software architecture for a coherent framework and methodology for enhancing existing web services into an integrated system. The tasks and activities will be recognized with help of Web Services, the existing ones or some new others wrapped around existing applications that have the permission to integrate with our system. Service recovery and integration will be accomplished by creating a web services repository that will serve client requests by wrapped web responses. The objectives set by them were to combine several Web Services additional standards and ad hoc data structures to ensure management of contextual information to provide Business Process Management (BPM) support, audit trail and error management, to provide location transparency of Web Services to provide redundancy and scalability and proposing new ways to present Web Services inside a service registry to make them easier to understand to business analysts. The main disadvantage of the integration solution might be that: Not all services fulfil framework requirements. And requires implementation effort to cope with unsupported standards. The fusion of information technologies and concepts such as Web Services, Business Process Management, in the way presented, leads to the integration of all those services to provide academies with easier and efficient access to a unified educational and research system, no matter the position from which they use system's services.

In paper [3], "Cloud Computing In School Education: A study Enlightening Benefits and Challenges" authors Kishan Mali and Dr Snehlata Kothari proposed that advanced learning and teaching methods in the present education system can be adopted and implemented using Cloud computing technology. Rural Educational Institutions vary from their urban peer in the way that urban offers quality education with essential infrastructure and abundant resources which lies most of the time wasted. Providing the same standard of education to the rural as that of urban is not possible due to the constraints such as cost, distance and expertise unwilling to travel to the rural. Hence, a system to overcome the above problem by deploying some new techniques in the field of education becomes vital. The latest cloud technology can be used in rural educational institutions at a reduced cost. The objectives were carried out by studying students and teacher activities and their performance in schools, by observing the current status of learning and teaching in education up to Secondary and Senior Secondary level also measuring the level of education with or without adopting cloud technology. Advantages of cloud computing are cost-saving, ubiquities, scalability, storage, ease in use,

paperless environment, multi-user can access, reliability and security. The study found that teachers and students already using cloud computing-based services. Learning content can be accessed from a particular central point and can be retrieved anywhere at anytime.

In paper [4], "Private Cloud in Educational Institutions: An Implementation using UEC" authors D. Sudha Devi, L. Yamuna Devi, K. Thilagavathy, P. Aruna, N. Priya and S. Vasantha emphasized on advantages of moving to Private Cloud ad also challenges towards Public Cloud. The paper additionally portrayed how to get to an information base server put away in a cloud hub to help the end clients inside the Institution. The service models of cloud computing include Platform as a Service (PaaS), Software as a Service (SaaS) and Infrastructure as a Service (IaaS). The Deployment models include Public Cloud, Private Cloud, Hybrid Cloud and Community Cloud. In public clouds, resources and expenses are shared by users over the internet on pay per utilize the model. Even though the public cloud gives a few advantages, there are many difficulties like Security, Reliability, Availability and Performance which prevents the adoption of public clouds. Associations that are identified with Education can positively pick Private cloud instead of Public cloud for many reasons. A private cloud is a cloud computing infrastructure created by an association for its internal use which can give better security, than utilizing someone else's infrastructure. Institutions owning Blade servers can proceed with private cloud implementation because a Blade server is more than enough to have a good private cloud setup within their fulfilling all the requirements of the organization. In their system, they utilized four systems, three dedicated systems for server and one system for client node. Setting up an appropriate private cloud climate will unquestionably give more noteworthy adaptability and comfort. The setup can be extended on the requirement to be merged with the public cloud, forming a hybrid cloud if necessary.

In paper [5], "Information System Integration: A Review of Literature and a Case Analysis" authors Norshidah Mohamed, Batiah Mahadi , Suraya Miskon, Hanif Haghshenas, Hafizuddin Muhd Adnan provided an explanation on information system integration. Their main aim was to gain insights into the present characteristics and difficulties of information systems integration in meeting organizational effectiveness while simultaneously assuring governance. They defined Integration as the degree to which different systems of an organization are interconnected and are capable of communicating with each other. Different forms of integration in the information systems are strategic integration, horizontal integration, vertical integration, electronic integration, communication network integration, physical integration, data integration, temporal integration, semantic integration, context integration, presentation integration, process integration, electronic data integration, cognitive integration, ergonomic integration, compatibility integration and specific integration. The levels of integration can be divided into 6 which are system-

specification integration, system-user integration, islands of technology integration, organization integration, socio-organizational and global integration. Their contribution has added theoretical understanding to the contexts and perspectives of information system integration.

In paper [6], "Investigating the Barriers of Application of Cloud Computing in the Smart Schools of Iran" authors Fardin Amirian, Sanaz Nikghadam Hojjati and Fatemeh Soleimani Roozbahani identified the barriers against the implementation of Cloud Computing in smart schools. The ambiguous but also useful definition of the so-called word is that cloud computing is data, processes or experiments that are in some part of the cloud which is called the Internet. The types of cloud are public cloud, private cloud, hybrid cloud and community cloud. Saving data in the cloud has considerable advantages in access based on the client. The power of cloud processing is employed to complete tasks that traditional utility applications are incapable of completing. Allowance of using traditional servers and personal computers is more easily from the viewpoint of infrastructures, maintenance and recovery and cost-saving. It also has better scalability, making it easy to add the required calculative sources and occupational servers on occasion. It needs less maintenance and repair regardless of the tool that is used. Users are not forced to be concerned about the saving capacity, scalability or other subjects.

In paper [7], "A Survey on the Adoption of Cloud Computing in Education Sector" author Rania Mohammedameen Almajalid focused on benefits associated with the use of cloud computing in learning institutions. The solution provided by cloud computing ensures that the research and development, as well as teaching, is more sustainable and efficient, thus positively influencing the quality of learning and teaching within educational institutions. They explained different service types offered by cloud computing which are IaaS, SaaS and PaaS. They also discussed four cloud deployment models: Public Cloud, Private Cloud, Community Cloud and Hybrid Cloud. In the education sector, cloud computing is used to host learning management systems. Cloud applications make it possible for both teachers and students to access their data using a web browser from a computer or mobile phone at school, library, home or from any other place, thus ensuring efficient collaboration, communication and exchange of shared notes, documents, etc. Cloud computing will ensure that learning and teaching become more interactive. The current generation of students likes to use technology and its numerous applications. Cloud computing connects students and gives them quick access to important course content.

In paper [8], "Cloud Computing in Education and Student's Needs" authors Elena Krelja Kurelovic, Sabina Rako and Jasminka Tomljanovic aims to study if students show a need for cloud services and applications. They have also investigated the preconditions for the implementation of cloud applications in higher education. The study is focused mainly on the use of cloud service (SaaS) for the

students. For the purpose of research, a questionnaire was created in Google Docs. The questionnaire consisted of 3 sections. The first section collected general data about the respondent and data on the use of computers. The second section consisted of eight statements in which respondents were asked about the estimated frequency of situations indicating the need for cloud computing. The final segment of the survey asked ten questions about how often people used cloud applications and services. The results indicated that students expressed the greatest need for communication software to the cloud, then cloud multimedia sharing, cloud docs/office software and the smallest need for cloud storage and file synchronization software. The reasons for the worldwide introduction of cloud computing for educational establishments are mainly because of its financial nature. But it is also necessary to educate and motivate students about cloud applications and services to make them aware of the benefits.

3. DISCUSSION

Education in the Cloud Computing Environment has a significant impact not just in schools, but also across the entire educational industry, including colleges, universities, and other educational institutions, with promising outcomes for future generations. Cloud technology includes capabilities that can help government and private schools in both rural and urban locations improve their learning and teaching practices. Cloud computing is defined as the provision of information technology resources over the Internet when they are needed. The advantage of cloud computing in education is that it is the "key" to modernizing education. With the implementation of cloud computing in education, teachers and students have had a positive experience. Learning content can be retrieved at any time and from any location by using a single central point. Centralized learning content guarantees that trainers are completely focused on providing a high-quality learning experience rather than struggling with an ineffective method.

One of the key challenges raised by the rapid digital development of higher education institutions is system integrity. Although iPaaS for generic applications has been around for a while, its use in higher education is only getting started. The unified iPaaS provides integrated student information system apps that decrease manual processes, improve decision-making, simplify data analysis, reduce administrative paperwork, and save time. Institutions can improve their overall capacity by incorporating cloud computing into their IT strategy. Trainers, staff, and students can access any type of information from anywhere, using any type of device, with help of cloud computing. So, the use of cloud computing has proven to be beneficial to academics.

In a cloud environment, cloud computing can be used with multiple groups of learners to work on various projects and assignments. Quick sharing allows files and information to be easily transferred or transmitted through the cloud. The cost of document duplication has been

decreased dramatically thanks to cloud computing technology. When it comes to buying, leasing, and maintaining Xerox machines and printers, ink cartridges, and stationery, cloud computing can help you save money. There is no longer a need to save files both digitally and on paper because of cloud computing redundancy. Cloud computing systems are regularly backed up with scheduled backups, reducing the risk of data loss.

Despite the numerous advantages of cloud computing, it also has a number of drawbacks emanating from the fact that all apps and data are stored on the internet. Some of the hindrances to the adoption of cloud computing in education systems include difficultly maintaining privacy and security, lack of adequate network responsiveness and insufficient service quality. New and better policies and approaches can address the few issues that are expected to arise.

4. CONCLUSION

Education, in terms of quality and level, usually maintains and enhances a country's economic prosperity. In today's educational system, cloud computing is an interesting development. Cloud computing creates a common platform that is easier to scale. The flexible aspect of cloud computing relieves IT, staff of maintenance costs and duties, thus eliminating high operational costs and disaster recovery risks and costs. As a result, it will be essential for schools and individuals to migrate to the cloud, to take advantage of the low-cost and convenient access to information and technological services, particularly the benefits and capabilities, such as access to complex applications, low-cost cloud data storage, and the scalability and flexibility of a cloud-based e-learning platform. Cloud computing will explore and modernize the traditional learning system. Cloud computing should also be an essential part of school education just like student and teacher. Learning-teaching can be improved up to a standard impressively in students and teachers by adopting the benefits of cloud computing and its other features in school education.

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REFERENCES

[1] Integration of Student System Using iPaaS By Srimathi H, Krishnamoorthy A.

[2] Academic Research Integration System By Iulia Surugiu, Manole Velicanu.

[3] Cloud Computing In School Education: A study Enlightening Benefits and Challenges By Kishan Mali and Dr. Snehlata Kothari.

[4] Private Cloud in Educational Institutions: An Implementation using UEC By D. Sudha Devi, L. Yamuna Devi, K. Thilagavathy, P. Aruna, N. Priya and S. Vasantha.

[5] Information System Integration: A Review of Literature and a Case Analysis By: Norshidah Mohamed , Batiah Mahadi , Suraya Miskon , Hanif Haghshenas , Hafizuddin Muhd Adnan.

[6] Investigating the Barriers of Application of Cloud Computing in the Smart Schools of Iran By Fardin Amirian, Sanaz Nikghadam Hojjati and Fatemeh Soleimani Roozbahani.

[7] A Survey on the Adoption of Cloud Computing in Education Sector By Rania Mohammedameen Almajalid.

[8] Cloud Computing in Education and Student's Needs By Elena Krelja Kurelovic, Sabina Rako and Jasminka Tomljanovic.