SMART E-LEARNING EDUCATION OVER CLOUD USING RASPBERRY PI

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Abstract— The usage of servers in a virtual environment like classroom is essential. Which emphasizes onto the fact that cost involved in this is more. As the number of users gets added up huge domain space is needed. Making space available on internet requires considerable cost, which are to be bored by college and staff. Having IoT based environment with virtual checking wherein teachers can access, and check paper online also post notifications. Using own web server not only reduce domain space but also provides authentication and privacy policy of the database.

Keywords--Raspberry Pi, Node, Cloud, E-learning

I. INTRODUCTION

Public or semi-public space on transmission lines that exists between the end points of a transmission referred as cloud [1]. There are some companies which are working on cloud Microsoft, Google, Yahoo, Apple, and IBM and others are providing high quality cloud computing services. Whereas Cloud computing is a computing-infrastructure and software model for enabling ubiquitous access to shared pools of configurable resources which can be rapidly provisioned with minimal management effort, often over the Internet[2][3]. Cloud cost high bitrate over the network as well as being cost efficient its new era comes into picture. The traditional instructor-led classroom learning is a proven and effective means of learning, with full opportunities for interaction between the instructor and students, the learning-inducing stress of exams and homework, and relationship forming among students, etc. However, the lack of equipment in the classroom may make it difficult for the instructor to teach certain topics effectively. For better e-learning teaching techniques, we need to design a classroom with smart infrastructure. Along with smart classroom to maintain the authentication and privacy of the firm we are associated with, we need to follow some protocols. "Smart E- learning Education over Cloud using R-pi" provides platform for an instructor as well as student for efficient outcome with proper privacy and authentication to the database. Here it provides computational stability and global access from any corner of world. Cloud involves various PCs hand held devices, Servers for processing client request and to provide services, Software tools and database. "Smart Elearning Education over Cloud using R-pi" provides online assessment, video lectures, notes, attendance system, online lab and simulation etc.

II. LITERATURE SURVEY

The methods used for the exploration of the topic on cloud computing and e-learning in the institutions of higher learning comprise a method of literature search of available sources found in the prestigious world's databases such as Web of Science, Scopus, Springer, or Science Direct. In addition, a method of comparison of examining the information found in the selected research studies on this topic was applied. Finally, the authors of this article present a case study illustrating the advantages and disadvantages of cloud computing in practice. In recent years, cloud computing as a new kind of advanced technology accelerates the innovation for the computer industry [4]. Cloud computing is a computing model based on networks, especially based on the Internet, whose task is to ensure that

users can simply use the computing resources on demand and pay money according to their usage by a metering pattern like water and electricity consumption. Therefore, it brings a new business model, where the services it provides are becoming computing resources. In Cloud computing, resources can be either externally owned (public Cloud – as provided by Google and Amazon) or internally owned (private Cloud). Public Clouds offer access to external users who are typically billed on a pay-as youuse basis. The private Cloud is built for the access within the enterprise where the users can utilize the facility without any charge. The methods of meeting challenges such as user interface; task distribution and coordination are explained and evaluated in. Praveena and Betsy have described the application of Cloud in universities. Delic and Riley assessed the current state of enterprise knowledge management and how it would turn into a more global, dependable and efficient infrastructure with Cloud computing. They have discussed architecture as well as applications. E-learning is an Internetbased learning process, using Internet technology to design, implement, select, manage, support and extend learning, which will not replace traditional education methods, but will greatly improve the efficiency of education. As e-learning has a lot of advantages like flexibility, diversity, measurement, opening and so on, it will become a primary way for learning in the new century [6]. In traditional web-based learning mode, system construction and maintenance are located inside the educational institutions or enterprises, which led to a lot of problems, such as significant investment needed but without capital gains for them, which leads to a lack of development potential. In contrast, cloud-based e-learning model introduces scale efficiency mechanism, i.e. construction of e-learning system is entrusted to cloud computing suppliers, which can make providers and users to achieve a win-win situation. The cloud-based environment supports the creation of new generation of e-learning systems, able to run on a wide range of hardware devices, while storing data inside the cloud.

III. METHODOLOGY

These technologies consist of various software such as educational Resource Planning (RP) learning AND management system (LS) and content management system (LCMS), Smart & intelligent Classroom are an advanced method of teaching using High performance computing [5]. Technology, digital equipment, software and many more. Nowadays the traditional Classroom teaching has changed more and more into a virtual environment where different issues about learning must be taken into account. Stepping the Smart and intelligent teaching environment we are giving following facilities Cloud computing.

- Online assessment
- e- Science labs
- Monitoring and Quality of education
- Security and authentication: Abbreviations and Acronyms
- i. BLOCK DIAG.



Fig: Block Diagram of communication with R-pi Cloud

fig1. Comprises Raspberry Pi, Router, storage space etc. basically raspberry pi and a storge space combines to form Server.

ii RASPBERRY-PI



Fig2: Raspberry Pi Circuit

It is credit card-sized single board computer is a fully programmable PC that runs in open-source operating system. The board consists of Video Core IV graphics processing unit (GPU), ARMv7-compatible quad-core one,512 MB of RAM. It has a MicroSD to boot media(Recommended 8GB) and for persistent storage(Recommended 1TB). One powerful feature of the Raspberry Pi is the row of GPIO -General Purpose Input/output pins along the edge of the board (refer Fig.1). These pins are a physical interface between the Pi and the outside world. At the simplest level, these are called as switches[8]. Seventeen of the 26 pins are GPIO pins; the others are power or ground pins. However R-pi act as server along with storage space as hard disk actually act as cloud or webserver for smart teaching learning technique.

A. ROUTER:

A router is a networking device that forwards data packets between computer networks. Routers perform the traffic directing functions on the Internet. A data packet is typically forwarded from one router to another router through the networks that constitute an internetwork until it reaches its destination node. Here Router Provides interface for students as well as teachers with our webserver/ cloud. Using an app Teacher and Students login through IP address, which directs user to the home page which act as user and server interface. Using this webpage all classroom facilities that we have mentioned can be achieved. Since We are available with 256 Ip connfigured login ids to make system more stable we can provide ip address as login id for students as well as teachers(Admin).



Fig 3: Router and Device communication

A router is connected to two or more data lines from different networks. When a data packet comes in on one of the lines, the router reads the network address information in the packet to determine the ultimate destination. Then, using information in its routing table or routing policy, it directs the packet to the next network on its journey. Similarly here The router act as rounting media as well as Set ups authentication for logging in. As shown external access Devices like android, Desktop which belonging to other networks can access the data by just providing IP address in search engine. Since our system is based on R-pi there are much benefits of using R-pi over cloud for leaning and teching. The following table shows the comparison between other E- learning process and Smart E-learning Education Over Cloud using R-pi. The Comparison between other e-learning process and smart elearning education over cloud using R-pi is shown below.

B. OTHER E- LEARNING PROCESS:

- Deals with technology works on cloud computing, mobile computing, projectors etc. over Domain by involvement of Third party.
- Teaching Methodology is completely digitized which Students and teachers does not prefer for all the time.
- In other E-learning processes works on the domain, hence the data is not enough secure and confidential.
- In other teaching and learning technique server are bulky requires more space as well as power.
- By considering power Requirement the server in other E- learning process needs very large power backup.

C. SMART E-LEARNING EDUCATION OVER CLOUD USING R-PI:

- Deals with technology cloud computing, mobile computing, projectors etc. over own Webserver.
- Teaching technique is Combination of Traditional and Advance digitized technique.
- Smart e-learning education works over own cloud provides security to our database.
- Since R-pi dimensions are in cm, the server's requirement regarding space as well as power is less.
- In case of R-pi it can run 4- times less power than that of bulky servers .

D. BENEFITS OF SMART E-LEARNING EDUCATION OVER CLOUD USING R-PI.

- Lower Setup Cost
- Enhance data Security
- Improve Accessibility
- Faster Deployment
- Cost Predictability
- Easier to maintain
- Less maintenance cost
- Unlimited Storage Space
- Fully Customize and Scalable

E. LIMITATIONS OF SMART E-LEARNING EDUCATION OVER CLOUD USING R-PI.

- User login ID Count is limited
- At a time no of user access to sever is limited

CONCLUSION

Smart and intelligent teaching environment, will make the life of student more easy and convenient, which would result in the transformation for the traditional form to next generation teaching methods. Students and teachers to provide quality of information more perfectly, effortless and by consuming less time. Such smart intelligent teaching technique will make teaching process easy and cost effective and more important ecofriendly.

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