Friendly Online Learning Service for Students based on Education as a Service (EaaS) using Education Cloud

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*Abstract***:** *The cloud computing is combination of all well-developed techniques in the world. It contain web service, virtualization, ubiquitous computing, high security, on-demand computing, Utility Computing, grid computing, cluster computing, distributed system and High performance Computing. Education is an important factor for all country's growth. In education field very limited cloud services are available for student development. The Proposed learning cloud service is providing a details and clear direction of learning for the students using Education Cloud. It is a unique and novel service to combine the many of services in common place to share for students. Using this cloud service the student's skills are improved and time saved. The proposed learning service utilize many advance techniques to achieve higher throughput. The proposed research work developed as design, algorithm and implementation. The proposed learning cloud service use the following novel techniques such as, Education Cloud (E-Cloud), Education as a Service (EaaS), live migration and agent based Resource Management Technique.*

*Index Terms***:** *Agent based Resource Management Technique, Cloud Computing, Education Cloud, Education as a Service, learning cloud service.*

I. INTRODUCTION

 Highlight a section that you want to designate with a certain style, and then select the appropriate name on the style menu. The style will adjust your fonts and line spacing. **Do not change the font sizes or line spacing to squeeze more text into a limited number of pages.** Use italics for emphasis; do not underline. The cloud computing is belongs to multi-disciplinary areas like business, Information Technology and Engineering. The important difference based on payment as the cloud service is free or paid and based on publish as the cloud as public and private. The definition of Cloud computing is ability of sharing via virtualization techniques, fault tolerance techniques, scheduling techniques and load balancing techniques with high security [16]. It is use to reduce power consumption, reduce energy consumption, reduced cost, reduce space, save the time and

protected with Proactive fault tolerance [12].

The computers are used for three main purpose such as Storage, Computation and Application. The same three main purpose cloud computing also used in the market. The main difference is cloud computing provide high level Storage, Computation and Application. The cloud computing is working through internet anywhere anytime access the data and computing nodes. It is fit for higher level jobs as well as low level jobs. The cloud users no need to carry the data and computing nodes use mobile and internet for access.

A. Statement of the Problem

The major components of the proposed learning cloud service in the Cloud architecture is cloud user and cloud responders. Here Education as a Service (EaaS) is a smart agent between cloud user and cloud responders [6]. The Education as a Service (EaaS) manage one share cloud database for maintain all log details. The cloud user are submitting the request in the cloud portal to the Education as a Service (EaaS) agent. The EaaS agent collects the request from the cloud portal. It suggests the optimal solution for every request based on advanced Resource Management Techniques. It gets the information from the E-Cloud server. The Online learning E-Cloud server maintain entire data such as cloud user request, E-Cloud server response, EaaS agent suggestion as expert's multimedia data, service sponsor information and computing nodes details [7]. Live Migration is available between cloud user and cloud responders. This Cloud architecture has a more number of cloud responders such as, Local education Institutes, Foreign education Institutes, local publisher and Foreign publisher. M number of cloud responders may utilized for elastic cloud service. Hypothesis This online cloud service is very useful for students and educator.

B. Significance of the Study

The proposed research work is to implement a novel Cloud portal for Friendly Online learning cloud Service for Students based on Education as a Service (EaaS) using E-Cloud to provide an extraordinary power for students. The proposed learning service executed with help of Agent based Resource Management Techniques. This service provide an optimal solution for the students request exclusive of cloud computing skills [8].

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The Agent based Resource Management Techniques are

- Optimal computing nodes prediction
- Best match making idea [17]
- Proper scheduling on cloud network
- Advance agent suggestion

In the cloud computing area many techniques are already available to achieve Resource Management Technique, can utilize the best methods to achieve the task. The Cloud Network topological arrangement is simulated in the Local Area Network. This Local Area Network is setup as cloud network in this research work. The cloud network is resented as network graph. The Computing nodes are vertex and connecting portion called as edge of network graph. The experimental execution will be done in the NetBeans IDE, Programming Language as JAVA, Cloud network setup will be a CloudSim and Database as MySQL. This simulation work is trying to focus more number of learning cloud service for the students in a single web service. Based on On-Demand Computing, the computing nodes are categories as high, medium and low level nodes [9]. If the student requests are high for the high level computing nodes, Cloud balancing will apply to the computing nodes. If the computing node highly loaded live migration will help to solve the problem. High priority elements are process first in this queue by the control of E-Cloud.

C. Scope and Limitation

This service should be a single and centralized framework that provides more number of learning Service for students based on Education as a Service (EaaS) using E-Cloud [18]. The following learning Services are hosted in this single cloud portal,

- Online E-Books resource access and download
- Webinar services
- Online practical demonstration class
- Knowledge sharing camp
- Question and Answer service
- Question Bank
- Resource sharing service
- Suggestion for improvement service
- Project discussion

All above cloud services are present in the cloud portal for students with help of Education as a Service (EaaS).

The Future direction of the proposed learning cloud service as follows

- Employed as a real time service
- In future work, this service may be available as a mobile service for friendly learning cloud service for students

Cloud computing is an assets of internet users in the today world. It provides cost effective utilization of available nodes that are accomplished by different providers and distributed anywhere in the world, to solve complex problems in quick time using parallel computing. Cloud Computing shows an energetic part in sharing the cooperative resources and distributed services in a large-scale computing network.

- Cloud scheduling- The allocation of distributed computational resources to user applications
- Cloud resource co-allocation is an advanced technique used to execute multiple site jobs in large-scale computing environments.

II. REVIEW OF RELATED LITERATURE AND STUDIES

A. Related Literature

The Existing systems have an Imperfect novelty for resource management process in the cloud computing [10]. Computing node Selection and allocation for a given task is the main theme of the cloud computing. The agent is employed as a default element of a task requisition. In the previous research works cloud techniques not utilized efficiently for the education field. Education is an important area in the world. Education cloud have a more opening for the researchers. It doesn't bolster with different segments to accomplish superior, because not have enough computing node and services. Select the best cloud computing node and allocate to the task is the significant issue which the majority of the cloud foundation has in this day and age for education field. Very limited number of services are available in Education cloud (E-Cloud). The following drawbacks are noted and it need to improve in E-Cloud

- Select and allocate the computing node for a given task in E-Cloud.
- The agent is executed as a built-in component of a task requisition.
- Essential to optimize the quality of Customer Satisfaction on E-Cloud.
- Essential to improve cloud balancing with fault tolerances service on E-Cloud.

B. Related Studies

JaeChul Oh et al [1] designed the EaaS Cloud Service based on a Cloud computing. This work achieves a personalized and high-quality monitoring system by means of new technologies like Cloud Storage, Data Analysis and the process mining algorithm. The Benefits of this system is its multiple tenant access method, which is designed to protect data privacy. The disadvantage in this system is that it is not focused on Fault Tolerant and Cloud balancing techniques.

Constraints of this investigation integrated the Higher Education in Nigeria identified with Mobile Learning [2]. This work suggests that the trial is not likely to be an agent of the general population. It restricted the energy of the examination to recognize relationship between mobile utilization and Mobile Learning attitudes despite the fact that it is steady with different investigations led to assess the attainability, agreeableness or viability of cell phone interceded mediations for wellbeing. This is not shocking considering that the kind of people who would take an interest in this investigation since they would be unequivocally secure of Mobile Learning.

Rashidah F. Olanrewaju et al [3] examined how applications can offer the possibility to enhance Higher Learning Institutions, yet they likewise have a few constraints. Maybe premier are boundaries to utilize.

The utilization of cell phones is progressively boundless; be that as it may, the eagerness to utilize versatile applications for dealing with their wellbeing data stays indeterminate. While a more youthful age of advanced locals might be all the more ready to grasp portable innovation, more established clients may not be as open to utilizing versatile applications to oversee wellbeing data. Boundaries incorporate basic physical hindrances, for instance troubles perusing little screens and physically entering data. Nonetheless, there are additionally obstructions identified with innovation status mirroring a common distress and the utilization of innovation to achieve objectives in real life. These hindrances ought not to be belittled.Building up the best innovation is not of significant worth if people are not set up to download and utilize it. Strategies to beat "Advances in Computer Science and Information Technology" should concentrate on giving genuine incentive to the client [4]. Manual entry and self-reporting may not be viewed as substantial, especially in purview's that essentially depend on supplier entered information. Methods to beat this incorporate having a Computer Science and Information Technology services supplier approve the data presented by the person on the application. This service be empowered through a mark work, enabling the antibody supplier to sign beside the entered information straightforwardly on the gadget with a stylus. On the off chance that the information is entered utilizing the telephones camera to examine the scanner tag, it could likewise fill in as a strategy for confirming that the cloud service yield was gotten.

C. Synthesis

The main advantage of the previous works are grouping based job scheduling is first come first serve basis is used [5]. Based upon the availability of resources, the jobs are scheduled. Disadvantage is performance is slow. So the parallel scheduling is used to increase the performance and to increase Co-scheduling method can be used for simultaneous execution of a group of tasks. It is even though the service has more number of Qos parameters it won't completely satisfy the customer needs. So further more numbers of Qos attributes can be used and then meta-broker concept can be used. So during job migration this concept is very essential.

III. METHODOLOGY OF THE STUDY

Resource Management Technique is basically used to execute multiple site jobs in a large scale computing environments with secure, faultless and in transparent manner [11]. To be precise we are actually allocating multiple resources for different jobs taking into account the time parameter [15]. Here use of the Scheduling queue and Resource Co-Allocation to reduce the Turn-around time with an advanced concept of System Generated Prediction based on Priority [13]. The proposed work consider priorities like advanced reservation, system Generated Predictions, Negotiation, Co-scheduling, policy (SLA, Price, Trust). The resources in cloud Computing includes databases, workstations and many other clustered networks including storage networks.

The limitation of Existing System as follows,
- ❖ Inaccurate estimations provided by users for scheduling
- ❖ Lack of accuracy in scheduling queues
- ❖ Take more time for complete the task
- ❖ Lack a mechanism for advance reservation

The Advantages of Proposed System as follows
- ♦ Quick response for Resource Co-Allocation request
- ♦ High accuracy in scheduling.
- ♦ System generated predictions reduce the rescheduling time
- ♦ Cost Effective
- ♦ Reliable and can be extended to many systems in a shared environment

The algorithms used are as follows
- Resource Co-Allocation Algorithm
- System Generated Prediction Algorithm
- Priority Algorithm

The Statistical prediction or execution time estimation of a chosen machine calculates the execution time and it is measured & also keeps track of previously recorded observations [14]. This will help the Admin to take a wise decision as he now has the complete portfolio of the user and the resource execution time that was recorded earlier for prediction purpose.

The Cloud computing has all the earmarks of being a promising pattern for reasons in particular: Cost powerful use of accessible assets, Easy to team up with any associations, Solve complex issue in speedy time. The main goal of this research work is to design and implement an effective and reliable resource management application.

The following Procedure are available in the proposed algorithm

Step 1: Login - If the user is existing, he can login with User Name and Password with Cloud certification from cloud service provider. Otherwise he cans signup by clicking New User button.

Step 2: Resource List -After successful login, the user can choose the resources, from date to date needs. By clicking Get Availability button, the user can know the specific resources are available in the specified date. If it is available, the user has to choose the option to book and enter the comments in the command box then by clicking book button the user can book the resources.

Step 3: Resource Allocation- After the user booked the resources, the user has the allocation of resources table. It contains what are the resources he booked, start date and end date, status, comments he entered.

Step 4: Resource Scheduling- The resource is not available on the user specified date. If the user likes, he can reschedule the resources. The user has an option to Re-Schedule the selected resource to the next available or own preferred time slot

Step 5: Report Generation- After successful execution of the resource management application the user gets a success message and the system automatically generates a Consolidated Report. The Report contains the complete details of the allocated resource along with the time slot. This module is the admin process.

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The admin can view what are resources booked, what the dates are booked, what is the status of that.

The overall diagram show the complete flow of the entire resource management application in Fig 1. The main application is well installed in the Head Node (Primary System) from which the sub node or the Secondary clustered systems access the application. As the Architecture diagram shows the first step is the User Authentication followed by the Resource Selected panel. The Resource Selection panel has the list of all the resources that are available to be shared by different users at different point of time.
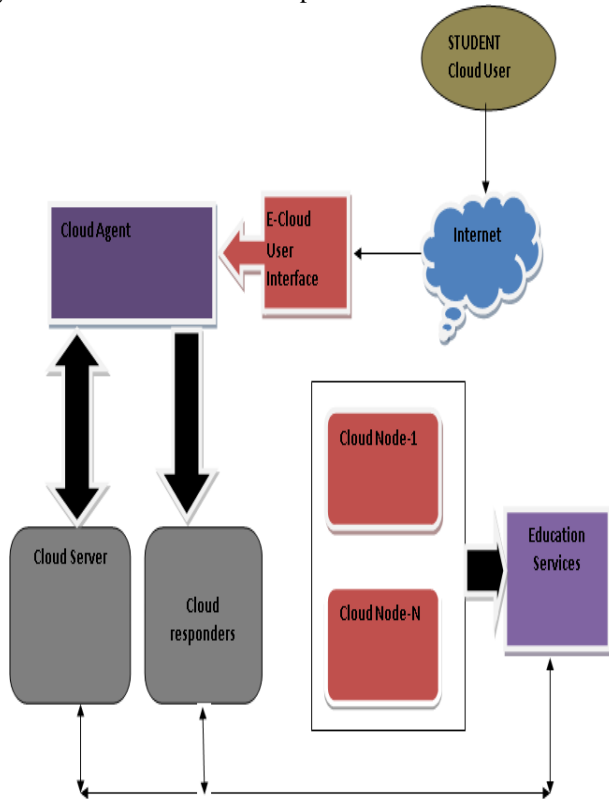

Fig 1: Cloud Computing Architecture for the Proposed System

Once the user selects the required resource and time, the System goes for an availability Check. If available it allocates the resource and generates a report for the user with complete specifications. If unavailable the system prompts the user to Re-Schedule the date and continue with the booking process. This can be implemented in a distributed environment. The Admin has been provided few striking features such as Add Resource, Delete Resource, View a consolidated report and each clustered reports. The application can also be shared on a distributed network via a link that can be generated at the primary system and sent to the user node where the application is not present.

IV. IMPLEMENTATION

An Elastic Scheduling dependent on Priority, System history, Cloud Network ability, number of occupations with size, framework produced forecast, Negotiation, and Co-planning. Customer server registering or organizing is a disseminated application design that parcels undertakings or remaining burdens between specialist co-ops (servers) and administration requesters, called customers. Frequently customers and servers work over a PC organize on independent equipment. A server machine is an elite host that is running at least one server programs which share its assets with customers. A customer additionally shares any of its assets; Clients in this manner start correspondence sessions with servers which anticipate (tune in to) approaching solicitations.
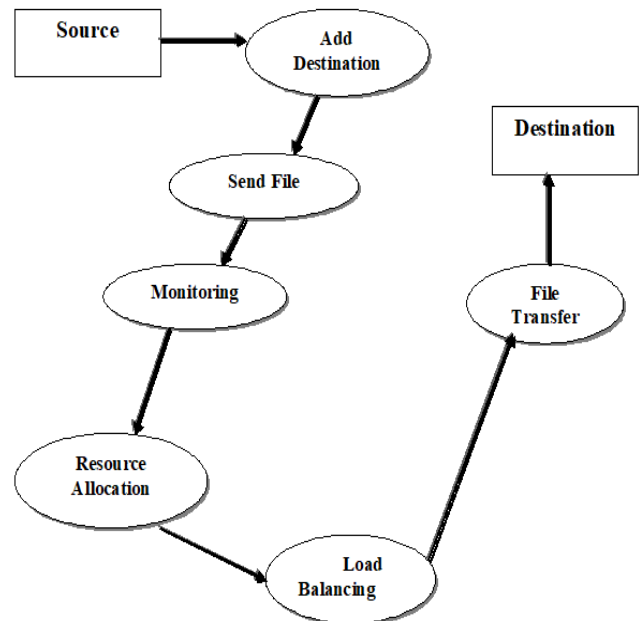

Fig 2: Data Flow Diagram for the Proposed System

Locate the Best Cloud Node dependent on CRP (Cloud Resource Prediction design) – PSO (Particle Swarm Optimization) Algorithm. Streamlining calculation introduced and named as CRP-PSO. In following applications, while choosing the subset of sensor hubs to add to the worldwide choice, we need to think about how educational the sensor hubs are about the condition of the objective. Impeccable blame tolerant Cloud asset choice for perform multiple tasks expectation depends on Hybrid CRP-PSO calculation.

Finding an ideal Node for the Task allotment is the serious issue which the vast majority of the Cloud Infrastructure has in this day and age. Molecule Swarm enhancement (PSO) calculation and Cloud Resource Prediction Pattern (CRP) from at least two Cloud systems, and undertaking execution is flawless regardless of whether a few disappointments happen. High client fulfillment and right asset usage dependent on powerful Energy-Efficient Cloud adjusting method.Upgraded Resources Co-Allocation are utilized to distribute the numerous assets for various applications effectively. Distinctive assets are not accessible in an each working spot that time co-Allocation help to get to the all assets from anyplace whenever. The framework created expectations are preferable parameters over client runtime gauges for Resource co-Allocation, Topological arranging strategy use to sort the vertex in the DAG (Directed Acyclic Graph).Using this topological arranging method we will speak to the need for the every asset requester.

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Planning, since System created expectations decrease the booking time through intermediary server and lessen number of scheduler and cost AP-driven strategy is predominant and gives hubs more information. In Existing Model, planning the asset co-designation ask for is finished utilizing client runtime estimation. This model gives wrong estimations given by clients to booking and absence of exactness in planning lines. As client runtime estimations are normally uncertain that isn't clear.

Fig 3: Available Resource List in E-Cloud

Usage is the phase of the work when the hypothetical plan is transformed out into a working framework. In this way it very well may be viewed as the most basic stage in accomplishing a fruitful new framework and in giving the client, certainty that the new framework will work and be successful. The usage organize includes watchful arranging, examination of the current framework and it's limitations on execution, planning of strategies to accomplish changeover and assessment of changeover techniques.In this research work designed an application to allocate and co-allocate resources taking into account the System Generated Predictions based on Priority. The proposed engineering is tending to the necessities of supporting remote work area sessions in developing Clouds. The architecture serves as a conceptual guide for building resource management services in a single system as well as a group of systems such as clusters. With the help of our Resource Management Application one can perform Resource Allocation, Resource Scheduling and Re-Scheduling at any time which implies the reliability and robustness of the project.

Fig 4: Resource Allocation in the E-Cloud

The Administrator will be given full rights to view all the details regarding the resources and their allotment to various users and its processing time can be determined. Administrator can also Add or Delete resource subject to the availability of resources. This application can be invoked by any outside end user regardless of the fact that the entire application may not be present in that user's system. With a simple authentic genuine link provided by the Administrator anyone can invoke this application in a distributed network.

V. CONCLUSION

The Cloud services are always ultimate to the people, here particularly for the student more useful application. The proposed work was implemented with design and developmental algorithm for the student. The proposed service was executed in local host as a simulation work using CloudSim tool. Evaluations are performed on the provided Cloud application to ensure reliability and its robustness. The research work promises to deliver a result which indicate that our application will meet the demand of Cloud system for allocation of multiple resource to multiple clients without overlapping. As an enhancement, continue more experimental evaluations as a future direction of this work.

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