Impact Factor (SJIF): 3.632

International Journal of Advance Research in Engineering, Science & Technology

e-ISSN: 2393-9877, p-ISSN: 2394-2444

Volume 3, Issue 6, June-2016

Efficient utilization of cloud resources in cloud environment using switching technique

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Abstract — The rapid increase in the field of IP-based video delivery had become very popular, so the demand for resources provided by the service provider is goes on increasing. The subscriber gains the resources of cloud on demand basis from the service providers. The Live TV and Video on Demand (VoD) is served by a more number of servers put together in a data center for serving each channel which has more waiting time and more switching latency. To compute these issues a resource provisioning framework has been proposed that allows switching of load among cloud servers. This will help us to better utilize the deployed servers which minimizes the delay, waiting time and allows for delivering the Internet Protocol Television (IPTV) services to the intended users instead of broadcasting while saving the overall bandwidth with optimum servers.

Keywords- IPTV; VoD; Live TV; switching technique; Resource provisioning method

I. INTRODUCTION

In 1950, the concept of cloud computing technology came into existence by implementing the mainframe computers that are accessible by thin and static clients. It refers to the manipulating, configuring and accessing the applications online through the Internet. It consists of data storage, infrastructure and applications. Cloud computing is defined as on-demand network access to a shared pool of configurable computing resources such as storage, networks, services and applications.

Cloud provides a storage space in which users can store their sensitive and confidential data, code, videos, audios, documents and images. User can move their data onto the server from anyplace over the world using Internet. The user will be unaware of the data storage, because data is stored in many storage locations around the world. Browser enabled devices are used to access these records. The infrastructure of the cloud is appropriate for the applications such as information delivery and retrieval. Information's will be available within the cloud 24/7, so that the user can access it anytime. In order to reduce the file size and to make those to have a less storage space several compression techniques were introduced.

1.1 Cloud computing characteristics

- **On demand services:** The services like Applications, E-mail, and Network or Server oriented services can be provided by the service provider that too without any human interaction. Cloud Service provider provides on demand services like Amazon Web Services (AWS), IBM, Google, Microsoft and Salesforce.com.
- **Broad network access:** Cloud provides the facilities that are accessed through the standard mechanisms, supported by different thin/thick client platforms such as Laptops, PDAs and Mobile phones.
- **Resource pooling:** Economies of scale will be building when pooling together of the resources such as storage, memory, processing, network bandwidth, email services, and virtual machines.

1.2 Cloud Service Models

- **Software as a Service [SaaS]:** It is also called as "on request software", the cloud provider provides a software to the customer for better utilization by means of web program. Cloud provider should look of the responsibilities such as management of server, operating system, internal cloud network, application configuration on middleware. Sales Force is one of the examples for SaaS.
- **Platform as a Service [PaaS]:** Cloud providers provide the platform by which user's can deploy their applications. Hidden equipment or infrastructure cannot alter (storage, network).
- **Infrastructure as a service [IaaS]:** Cloud infrastructure includes network, processing, storage and so on. User can send and execute their application by using this base (infrastructure); customer can also purchase virtual products, Data-center space, and network framework.

1.3 Internet protocol television (IPTV)

The rapid increase in the field of IP-based video delivery had become very popular, so the demand for resources provided by the service provider is goes on increasing. The subscriber gains the resources of cloud on demand basis from the service providers. Currently the Internet based application had become more familiar across the world, Internet protocol television (IPTV) has been turned out to be extremely popular. The recent advances in PC communication and innovation televisions are the outcome of numerous progressions throughout the years. Now a day's IP based featured television is progressing over worldwide.

In past decades, information is accessed from broadband internet and downstream data rates is Mbit/Sec. Increased the number of users are accessing the video streaming and downloading by use of IP and to retrieval of video content from the web. So this type of IP based television is known as WebTV. This WebTV doesn't provide a quality of service (QoS).Telecommunication companies had started their work across the drawbacks of the WebTV and after they had launched the IPTV. IPTV stands for Internet Protocol Television. IPTV is mainly categorized into three types:

- **Live Television**
- **Time Shifted programming and**
- **Video on demand (VoD).**

VoD and live TV require the bandwidth (transmission capacity). The basic concept of VoD is to allow viewers to watch any Video program at any instance. Technology has been developed and costs reduced and then Video on demand became more popular. The concept of VoD is based on Video programs which are stored in cloud or a device .And it delivered to the clients when they need video programs. Hundreds of viewer can watch same video simultaneously.

In IPTV, Live TV is generally multicast from servers efficiently utilizing Internet protocol (IP) Multicast, with each and every group per TV channel. VoD is supported by the service provider. When every request is served by a server utilize a unicast stream. While watching the live TV channels viewer may have to change their channel. We need to provide operations for changing TV channels within a time period. For all channel change, the user wants to join the multicast together connected with TV channel and sit tight for enough content to be buffered before the video content is watched. It takes minimum time. Analyzing this we get some drawbacks such as a more switching latency and more waiting time.

1.4 Objectives

The main objective of this paper is to provide the IPTV services on any network connected device. In this concept some amount of content remains in network and only the requested video channel is sent to the registered subscribers instead of broadcasting all the channels by making use of cloud resources efficiently, which saves the minimum amount of bandwidth. Registered users can also view the LIVE channels.

II. LITERATURE SURVEY

Author proposed an approach which brings down the services provided by real time IPTV with the support of virtualized IPTV and with support of services delivery by pro-efficient time shifting. The system supplied an isolated from work in order to estimate the amount of required resources of scope up multiple service. The proposed approach deployed an optimization and formulation which makes use of generic cost function. A detailed study which are done in server load reduction discussed and analysis which evaluate less number of servers required to accommodate, IPTV services are performed. a study have been done on the time shifting solution for the optimization which gives amount of servers required at multiple time of cope up with IPTV services. Proposed approach demonstrated that it. Blows down 24% of server load. The system provides the advantages like, live TV controller, Video on Demand, interactivity, economics, IPTV primary based coverage service, competitive pricing[1][2]. Author proposed an approach which is fully focused on presenting services of live TV, by making use of IPTV cloud based architecture and also by using statistical multiplexing. Here some of the methods are implemented to overcome the issues which are proposed in rescheduling VoD operation. The proposed approaches also ensure minimization of ICC delay. If exploits the scheduling algorithm in-order to perform VoD shifting jobs [3].

The cloud resource is optimized in-order to deliver IPTV service which makes use of virtualization techniques are discussed. The proposed approach employs scheduling algorithm like earliest deadline first (EDF) for rescheduling IPTV jobs. Comparative studies on server capacity region are performed. The system ensures that if can overcome issues like waiting time, higher switching latency and higher cost of IPTV services. The system met with expected fast delivery content of VoD, by buffering the set top box [4]. To deliver and to implement the service provided by IPTV in virtualized environment of cloud computing has been proposed. Here the proposed method achieved 24% reduction of server load. Paper provides two potential techniques in order to adapt VoD requests. The system ensures that it makes efficient utilization of deployed resources and meets accurate time deadlines. The system employs VoD as well as Live TV ICC to run IPTV accommodations in shared virtualized environment [5]. The proposed article details about how activity the IPTV services delivered by making use of virtualization technique in cloud computing. Here the two sensing identification models such as single sensing and multiple sensing are used. This approach to reduce the costs of IPTV services, here optimization formulations are constructed which makes an efficient use of generic cost functions. Simulation works are performed and results showed advantages of delivering WSN IPTV services. Here some of the problems present in designing mechanism which permits the load delivery time shifting operations are discussed. The proposed approach clearly introduces minimum number of computational as well as communication overloaded [6].

2.1 Issues identified

There exist many issues in cloud computing using switching technique. Following issues are:

- **More waiting time:** Send a video to the customer and it will take minimum amount of time to display on the screen.
- **More switching latency:** Choose a best server among the cloud environment and to get VoD.
- **Efficient utilization of cloud resource:** Within a given space data are to be stored in the cloud.

III. PROPOSED METHODOLOGY

Problem definition: When users change channels while watching live TV, we need to provide additional functionality so that the channel change takes effect quickly. For each channel change, the user has to join the multicast group associated with the channel, and wait for enough data to be buffered before the video is displayed; this can take some time. Currently Live TV and VoD is served by a large number of servers grouped in a data center for serving individual channels, so simply resources can be wasted here, More waiting time, and More switching latency.

Here initially admin is to login with his username and password. New user also login with the username and password. Admin upload the new channels. Admin check the user details, active user details, server status, comments and complains. A data flow diagram is diagrammatical process of the stream of information passes through following steps. It is demonstrated in a procedure angle. DFD is also called as a bubble chart. It sends an input data to the cloud and many user processing carries the output data. As shown in the figure 3.1 below.

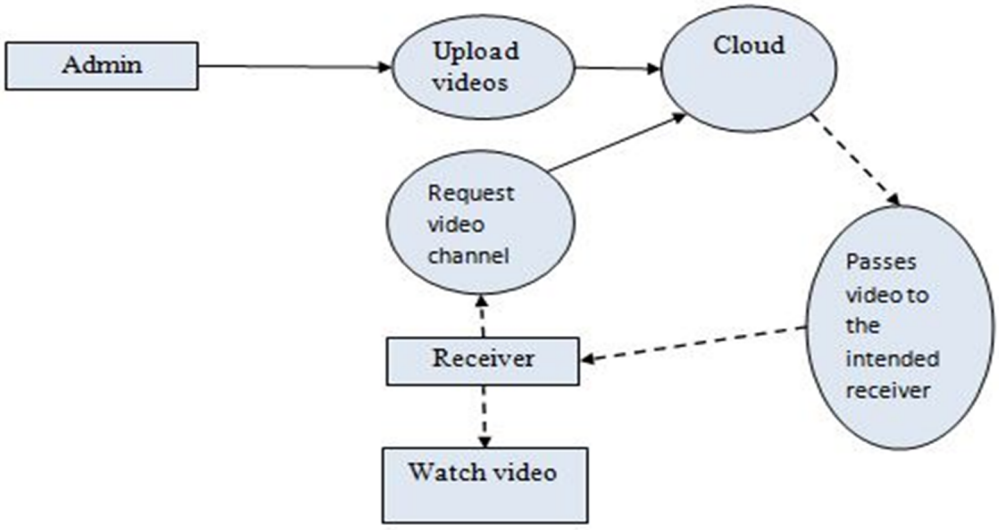

Figure 3.1 Data flow diagram- Level 0.

As shown in Figure 3.1 and figure 3.2 , an admin uploading video file into the cloud, before storing into the cloud. Subscriber will request for video channels. Requested video is plays on subscriber screen. But intended subscriber only watches the video instead of broadcasting. Cloud server will handled each request. Some time subscriber will increase. Load of subscriber will be shifted among server in the cloud. So it minimizes delay and waiting time. It takes minimum amount of time to shift. Single cloud environment embedded IPTV system. So this is used to share resources among the IPTV services, then resource is utilize efficiently. In which condition load will be shifted to another server. Shown below:

In cloud server some condition will check, only threshold number of subscriber access the video. Same video can watch one or more number of subscriber, and user need to change the channel at any time. Based on these conditions server will switch.

Advantages: User easily buys the channel using Internet, Live TV Controller, the IPTV subscribers have a full control over the functionalities such as pause, play, rewind, forward, etc in the services like Video-on-Demand, the requested video channel and program is only sent to the viewer instead of broadcasting all channels (which saves the overall bandwidth), Ease of installation and operation, Competitive pricing.

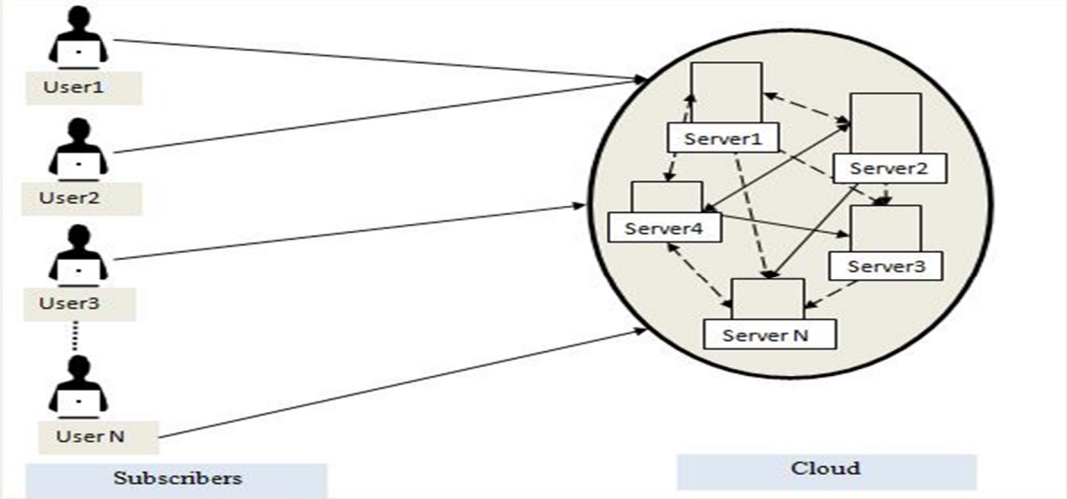

Figure 3.2 Data flow diagram-Level1.

IV. EXPERIMENT RESULT

As shown in below figure 4.1, admin and user login page, admin/user enter the valid username and password. New user register by using signup button and filled the required details.

Figure 4.1 Admin page.

Figure 4.2 shows the admin internal process, admin is to insert new channels, channel details, user details, subscription details, active user details, active server details, post complaints, and post comments. In server process it is to check the how many users are login, from which server they are accessing the video channels, active server work is to check the how many users are active mode.

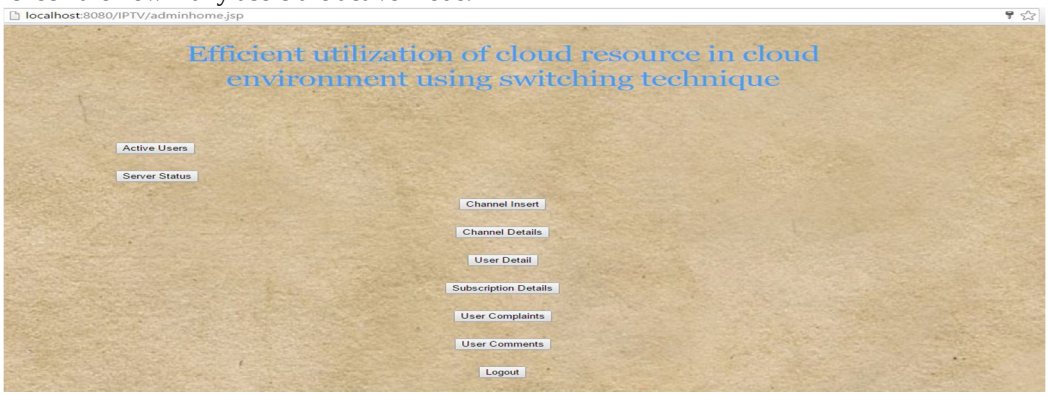

Figure 4.2 Admin activity page.

As shown in figure 4.3, this is user login page; it shows the username, valid date and time, channels subscription details. Channels subscribe, it consists of number of channels, user wants to subscribe the channel and watch it. Finally user end with a logout process.

Figure 4.3 User login page.

Below figure 4.4 and 4.5 shows the channel details, he/she want to subscribe the channels. User can easily change the channels; it takes fraction of second because here using the switching technique. After watching video channels user may have to post a comments or complaints. If video quality is not good, sound problem, video buffering etc, user can post the complaint. Admin will check the user comment details and complaint, and he/she will take the action for that.

Figure 4.4 subscribe details.

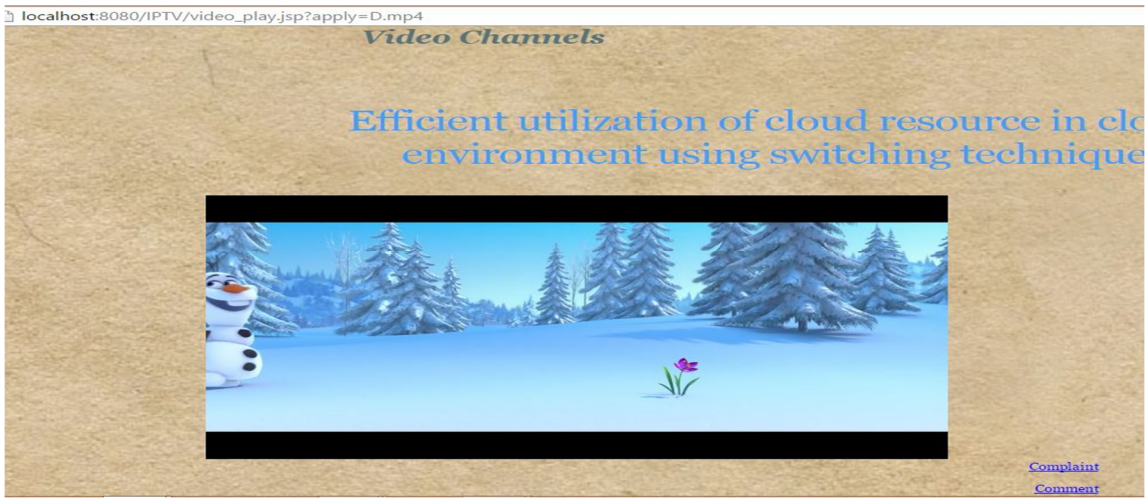

Figure 4.5 watch video.

V. CONCLUSION AND FUTURE WORK

There is a drastic increase in the population of users to access the VoD, cloud will provide the storage space within a given space video can be stored. So efficiently utilize the given space. IPTV administration suppliers can impact a virtualized cloud base and moving of load to better utilizes conveyed assets. Utilizing VoD conveyance as case, Resource Provisioning Framework to moving the collection among cloud servers is provided. The system design can fairly serve the user requests by using proposed switching technique. A single stored video can be accessed by threshold number of users without any delay. Users can also watch the live TV channels with acceptable buffering time. The proposed approach access that if can mate an efficient utilization of cloud resources.

5.1 Future Work

In future work, we concentrate on scaling up the servers progressively as and when it is required to increase various administrations and giving the IPTV administrations through long range interpersonal communication to enhance security and execution.

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