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Cloud Based Video on Demand (VoD) Using DCRP Algorithm

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***Abstract* - The attempt to display media files through internet was started from mid-20th century. Several research works have been reported to provide Video on Demand model in distributed like RMI, SOA and Grid Computing. Internet-based cloud computing is a new computing paradigm aiming to provide agile and scalable resource access in a utility-like fashion. The fundamental question is how to configure the cloud utility to meet the highly dynamic demands of such applications at a modest cost. In this paper, a queueing network based model is used to characterize the viewing behaviors of users in a multichannel VoD application, and derive the server capacities needed to support smooth playback in the channels for two popular streaming models, client-server and P2P.Disk Scheduling is used to allocate separate disks to users. A dynamic cloud resource provisioning algorithm is used in which the derived capacities and instantaneous network statistics as inputs, can effectively support VoD streaming with low cloud utilization cost. Analysis and algorithm design are verified and extensively evaluated by applying large-scale experiments under dynamic realistic settings on a cloud platform.**

***Keywords* - Peer-to-Peer, Video on Demand (VoD), streaming, Caching, Prefetching, Disk Scheduling**

1. Introduction

Cloud computing is the delivery of computing as a service rather than a product, whereby shared resources, software, and information are provided to computers and other devices as a utility over a network. Cloud computing provides computation, software, data access, and storage services that do not require end-user knowledge of the physical location and configuration of the system that delivers the services [2].

Parallels to this concept can be drawn with the electricity grid, wherein end-users consume power without needing to understand the component devices or infrastructure required to provide the service. video-on-demand which are relevant to Telstra. The primary focus is on reducing the cost of providing efficient video-on-demand services [1][4].

Cloud offers to realize multi-screen experience and significantly expand the reach . It enables users to store, buy, manage, access and share user generated and commercial content on the go. Cloud brings flexibility for wide variety of data and content [3].

The cloud meets the dynamic demands of the VoD applications. A queueing network based model to characterize the viewing behaviors of users in a multichannel VoD application, and derive the server capacities needed to support smooth playback in the channels for two popular streaming models: client-server and P2P is introduced [1].

Resource provisioning is typically based on Service Level Agreements (SLAs) between the cloud provider and the cloud consumer. Different service models of a cloud infrastructure have been proposed [1], namely Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS), among which the IaaS model provides the most .exibility where a consumer can deploy and run any software on its allocated VMs. Dynamic cloud resource provisioning algorithm which, using the derived capacities and instantaneous network statistics as inputs, can effectively support VoD streaming with low cloud utilization cost [1].

Video on demand is a technology that provides entertainment on demand to all the subscribers of the service. Video on demand provides customers with informative and entertaining streams of multimedia and video information. Some of the services that can be offered by video on demand technology are: Movies-on-demand, TV shows, special interest programs and music videos can be watched by home users at their convenience [4].

II. Background Work

A. Broker

It is a communicating interface between the cloud provider and a cloud consumer, via which the consumer can submit requests to the cloud.

B. VM Scheduler

It is responsible for VM provisioning to meet the demands of the applications

C. VM Monitor

Keeps track of all the VM instances provisioned and monitors their activities and performance.

D. Streaming Rate

To offer high video quality, the service provider wants the system to deliver video content at a high rate, subject to the capacity of the server and the peers.

III. Related Work

Cloud computing has recently emerged as a new computing paradigm for organizing a shared pool of servers in datacenters into a cloud infrastructure that can provide on demand server utilities (CPU, storage, bandwidth, etc.) to users anywhere anytime [1].

Workflow applications are commonly represented as a directed acyclic graph. The mapping of jobs to the compute resources is an NP-complete problem in the general form . The problem is NP-complete even in two simple cases: (1) scheduling jobs with uniform weights to an arbitrary number of processors and (2) scheduling jobs with weights equal to one or two units to two processors [2].

There are only a few theoretical performance studies of P2P streaming systems was developed a simple probability model to compare different chunk selection and peer selection strategies. Small et al. investigated the scaling laws and tradeoffs in P2P streaming systems. The problem of efficient decentralized broadcasting in both edge-capacitated and node capacitated networks, and proposed completely decentralized algorithm was studied. Latest useful chunk algorithm can achieve dissemination at an optimal rate and within an optimal delay, up to an additive constant term [7].

P2P file sharing systems do not use servers to store actual file content, as all files are exchanged among users. As a result, they have no guarantees on file availability, and files being downloaded may become unavailable at any time when all “seeds” (peers with a complete copy of the file) leave the system [10].

In [10,14] the VoD has been considered as another potential application of P2P technology, there are few studies that present measurement results to examine P2P VoD systems in real world. Most of existing work about P2P VoD systems was concentrated on the protocol design of topology and the analysis of simulation results, including our previous work.

UUSee Inc., delivering thousands of on-demand video channels to millions of unique visitors each month.

To saturate available upload bandwidth from ordinary peers and to minimize server bandwidth usage [4].

Unit	Functional Purpose	Size
Video	Unit for cache storage	> 100 MB
Group	Unit for content search in neighbor discovery	> 10 MB
Segment	Unit for fine-grained content exchange and playback	500 KB
Block	Unit for coding and transmission	1 KB

In [8] Dynamic resource allocation in virtualized data centers has been studied extensively in recent years. The work formulates this as a feedback control problem and uses tools from adaptive control theory to design online control algorithms. Such techniques use a closed-loop control model where the objective is to converge to a target performance level by taking control actions that try to minimize the error between the measured output and the reference input. While this technique is useful as a tracking problem, it cannot be used for utility maximization problems where the target optimal value is unknown. This approach requires building estimates of the future workloads.

The cloud computing for video on demand already use the queueing network model, a Jackson queueing network based model to characterize the viewing behaviors of VoD users inside each channel in the VoD system. The model facilitates our study of the server capacity needed to support smooth playback in the channels. A Jackson Network is a network of queues where the arrivals at each queue form a Poisson process, and the job service times are exponentially distributed. In this model small process will wait until the large one to complete [1].

A Metascheduler not directly access the resources of an organization, existing Metaschedulers are not prepared to find and to control the services in execution with the Grid as infrastructure. General Metaschedulers may not fit so well for the case of Cloud computing as happened with Grid Computing [13].

IV. Proposed Scheme

In proposed system queueing network based model disk scheduling is used. Disk Schedule Real-time constraints makes traditional disk scheduling algorithm, such as first come first serve, short seek time first, and scan, inappropriate for IVOD. Here are two suggested scheduling algorithms: Non-Round-Based the best known algorithm for real-time scheduling of tasks with deadlines is the earliest deadline first algorithm (EDF). The media block with the earliest deadline is fetched first. The disadvantage of this algorithm is excessive seeks and poor utilization of the server’s resource.

Since MPEG-2 results in variable-bit-rate compressed streams, the number of blocks that must be retrieved for each client in each round will vary according to the compression ratio achieved for each block. To ensure continuous playback of media streams, the server must retrieve a sufficient number of blocks for each client in each round to prevent starvation for the round’s duration.

Thus, the server has to know the maximum duration of a round as round length depends on the number of blocks retrieved for each stream. A simple scheme that retrieves the same number of blocks for each stream (generally referred to as a round robin algorithm) is inefficient since the maximum playback rate among all streams will dictate the number of blocks to read.

This results in streams with smaller playback rates retrieving more data blocks than needed in each round. This may overflow some clients’ buffer as well as decrease the capacity of the server. Consequently, more clients can be accommodated by reducing the number of data blocks retrieved per service round for streams with lower playback rate.

A. Queuing Algorithm

```
Start server {
        Set parameters and values of server as enabled
Start client
        {
        Get values (name, ip, mac, time)
        Set send.Button=true
          }
        Do Increment list
        {
        While view.button=true
        SelectValues=All from server
        Set Parameter and values from client
        Return list
        }
   }
End
```

Thus when the client starts sending requests to the server the clients are served based on the queuing model. Queuing model arrange the incoming clients based on their ip address and time. once they are arranged, individual users get their separate disks for their usage. Hence users get their videos.

V. Sytem Design

A. Cloud Server

Cloud Servers are the easiest way to get services on to the Cloud. Many clouds are deployed at the data centres and operate both in the UK and around the world. These are clouds designed for public consumption. Use this service if you want full administrative access to a server in the cloud, with backup, firewalls, OS reloads and console access included at no additional charge.

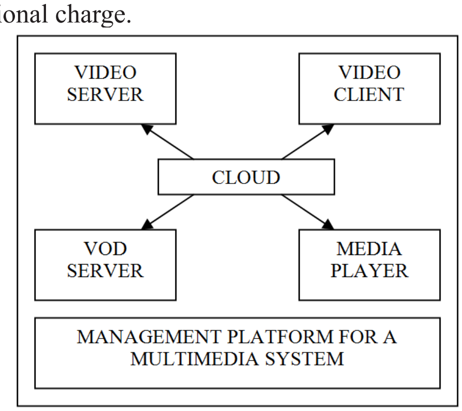

Fig. 1 Cloud Server

B. Video Server

A video server is a computer based device (also called a 'host') dedicated to delivering video. It is designed for one purpose; provisioning video, often for broadcasters. A professional grade video server records, stores, and playout of multiple video streams without any degradation of the video signal. Broadcast quality video servers often store hundreds of hours of compressed audio and video (in different codecs), play out multiple and synchronised simultaneous streams of video by, and offer quality interfaces such as SDI for digital video and XLR for balanced analog audio, AES/EBU digital audio and also Time Code.

C. Video Client

View live video, access video recordings, maps and more in CompleteView's Video Client. Access cameras across any number of CompleteView servers seamlessly. Unlimited clients can be open simultaneously to populate a video wall or multi-monitor display. Video Clients can be shown full screen, or with menu options and the navigation bar.

D. VoD Server

Video On Demand (VoD) are systems which allow users to select and watch/listen to video or audio content on demand. Television VOD systems either stream content through a set-top box, a computer or other device, allowing viewing in real time, or download it to a device such as a computer, digital video recorder (also called a personal video recorder) or portable media player for viewing at any time. The majority of cable and telco based television providers offer both VOD streaming, including pay-per-view and free content, whereby a user buys or selects a movie or television program and it begins to play on the television set almost instantaneously, or downloading to a DVR rented from the provider, or downloaded onto a pc, for viewing in the future. Internet television, using the Internet, is an increasingly popular form of video on demand.

E. Media Player

Media player is a computer software for playing back multimedia files. Most software media players support an array of media formats, including both audio and video files.

VI. Conclusion

Several research works have been reported to provide Video on Demand model in distributed like RMI, SOA and Grid Computing. Using the example of video-on-demand applications, we demonstrate how on-demand cloud resource provisioning can desirably meet the dynamic and intensive resource demands of VoD over the Internet. Our main contributions are: First, we propose a novel queueing network model to characterize users' viewing behaviors'. Second, disk scheduling is designed to allocate separate disks to users. Third, a practical dynamic cloud provisioning algorithm is designed and implemented, by which a VoD provider can effectively configure the cloud services to meet its demands.

Thus but implementing the above methods low cost, low execution time and memory consumption, faster computation will be achieved.

References

[1] Yu Wu, Chuan Wu, Bo Li, Xuanjia Qiu, Francis C.M. Lau" Cloud Media: When Cloud on Demand Meets Video on Demand ,“ *International Conference on Distributed Computing Systems*, 2011.

[2] S. Pandey, L. Wu, S. Guru, and R. Buyya, "A Particle Swarm Optimization (PSO)-based Heuristic for Scheduling Workflow Applications in Cloud Computing Environment," in *Proc. of IEEE AINA,* 2010.

[3] Y. Xiao, C. Lin, Y. Jiang, X. Chu, and S. Shen, "Reputation-based QoS Provisioning in Cloud Computing via Dirichlet Multinomial Model," in *Proc. of IEEE ICC,* 2010.

[4] Z. Liu, C.Wu, B. Li, and S. Zhao, "UUSee: Large-Scale Operational On- Demand Streaming with Random Network Coding," in *Proc. of IEEE INFOCOM,* March 2010.

[5] S. Liu, M. Chen, S. Sengupta, M. Chiang, J. Li, and P. A. Chou, "P2P Streaming Capacity under Node Degree Bound," in *Proc. of IEEE INFOCOM,* March 2010.

[6] S. Yu, C. Wang, K. Ren, and W. Lou, "Achieving Secure, Scalable, and Fine-grained Data Access Control in Cloud Computing," in *Proc. Of IEEE INFOCOM,* 2010.

[7] R. Urgaonkar, U. C. Kozat, K. Igarashi, and M. J. Neely, "Dynamic Resource Allocation and Power Management in Virtualized Data Centers," in *Proc. of IEEE/IFIP NOMS,* 2010.

[8] Peixoto, M. Santana, M. Estrella, J. Tavares, T. Kuehne, B. Santana, and R.H.C., "A Metascheduler Architecture to Provide QoS on the Cloud Computing", in *Proc. of IEEE ICT,* 2010.

[9] C. Wang, Q. Wang, K. Ren, and W. Lou, "Privacy-Preserving Public Auditing for Data Storage Security in Cloud Computing," in *Proc. of IEEE INFOCOM,* 2010.

[10] F. Liu, Y. Sun, B. Li, and B. Li, "Quota: Rationing Server Resources in Peer-Assisted Online Hosting Systems," in *Proc. of IEEE ICNP,* 2009.

[11] B. Cheng, X. Liu, Z. Zhang, H. Jin, L. Stein, and X. Liao, "Evaluation and Optimization of a Peer-to-Peer Video-on-Demand System," *J. Syst. Archit.,* vol. 54, no. 7, pp. 651–663, Jul. 2008.

[12] S. Liu, R. Zhang-Shen, W. Jiang, J. Rexford, and M. Chiang, "Performance Bounds for Peer-Assisted Live Streaming," in *Proc. of ACMSIGMETRICS,* June 2008.

[13] R. Kumar, Y. Liu, and K. Ross, "Stochastic Fluid Theory for P2P Streaming Systems," in *Proc. of IEEE INFOCOM,* 2007.

[14] R. Buyya, C. S. Yeo, S. Venugopal, J. Broberg, and I. Brandic, "Cloud Computing and Emerging IT Platforms: Vision, Hype, and Reality for Delivering Computing as the 5th Utility," *Future Generation Computer Systems, Elsevier Science,* vol. 25, no. 6, pp. 599–616, June 2006.