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ADAPTIVE IPTV SERVICE IMPLEMENTATION USING OPTIMIZING CLOUD RESOURCES

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ABSTRACT:
Virtualized cloud-based services can get advantage of statistical multiplexing across applications to give significant cost savings to the manipulator. Carrying out of IPTV service delivery through Virtualization is of practical involvement in many applications such as detecting an IPTV service delivery failure. In this report, we seek to lower a provider's cost of real-time IPTV services through a virtualized IPTV architecture and through intelligent time shifting of service delivery. The intrusion detection is defined as a mechanism for an IPTV service delivery through virtualization to detect the existence of inappropriate, wrong, or anomalous moving attackers. In this paper, we consider this issue according to heterogeneous IPTV service delivery models. We take advantage of the differences in the deadlines associated with Live TV versus Video-on-Demand (VoD) to effectively multiplex these services. Furthermore, we consider two sensing detection models: single-sensing detection and multiple-sensing detection... we seek to lower a provider's costs of real-time IPTV services through a virtualized IPTV architecture and through intelligent time shifting of service delivery, We provide a generalized framework for computing the amount of resources needed to support multiple services, without missing the deadline for any service. We implement a simple mechanism for time-shifting scheduled jobs in a simulator and study the reduction in server load using real traces from an operational IPTV network. We also show that there are interesting open problems in designing mechanisms that allow timeshifting of load in such environments. Our results show that we are able to reduce the load by 24% (compared to a possible 31%). We also show that there are interesting open problems in designing mechanisms that allow time-shifting of load in such environments. Keywords: Live TV, Set Top Box, Provable data possession (PDP) (or proofs of retrievability (POR)), Video On Demand, InteractiveTV

I. INTRODUCTION

As IP-based video delivery becomes more popular, the demands placed upon the service provider's resources have dramatically increased. IPTV means delivering enhanced video applications over a managed or dedicated network via Internet Protocol. Service providers typically provision for the peak demands of each service across the subscriber population. However, provisioning for peak demands leaves resources under utilized at all other periods. This is particularly evident with Instant Channel Change (ICC) requests in IPTV. ICC adds a demand that is proportional to the number of users concurrently initiating a channel change event . In IPTV service, this technology is used as that of Internet Services. In this service the TV channels are encoded in IP format and delivered to TV using a Smart Electrical Electronic Device. The IP TV Service also includes Video on Demand cloud services which is similar to watching Video CDs / DVDs using a VCD / DVD/CD player. Movies,different channels, Instructional Videos and other content shall be available to customers in the IP TV Services.This IPTV through a broadband connection. IPTV is not video over the public Internet. Our goal in this paper is to take advantage of the difference in workloads of the different IPTV services to better utilize the deployed servers.

Operational data show that there is a dramatic burst load placed on servers with correlated channel change requests from consumers.

This results in large peaks occurring on every half-hour and hour boundaries and is often significantion terms of both bandwidth and server I/O capacity.

Currently, this demand is served by a large number of servers grouped in a data center for serving individual channels, and are scaled up as the number of subscribers increases. However this demand is transient and typically only lasts several seconds, possibly up to a couple of minutes. As a result, majority of the servers dedicated to live TV sit idle outside the burst period. In a virtualized environment, ICC is managed by a set of VMs (typically, a few VMs will be used to serve a popula channel).

Other VMs would be created to handle VoD requests. With the ability to spawn VMs quickly [3], we believe we can shift servers (VMs) from VoD to handle the ICC demand in a atter of a few seconds. We identify the sever-capacity region formed by servers ateach time instant such that all the jobs arriving meet their deadlines, which is defined as: the region such that for any server tuple with integer entries inside this region, all deadlinescan be met and for any server tuple with integer entries outside this region, there will be at least one request that misses the deadline.

In this paper, we aim- a) to use a cloud computing infrastructure with virtualization to dynamically shift the resources in real time to handle the ICC workload, b) to be able to anticipate the change in the workload ahead of time and preload VoD content on STBs, thereby facilitate the shifting of resources from VoD to ICC during the bursts and c) solve ageneral cost optimization problem formulation without having to meticulously model each and every parameter setting in a data center to facilitate this resource shift.

II. RELATED WORK

There are mainly three threads of related work, namely cloud computing, scheduling with deadline constraints, and optimization.

Cloud computing has recently changed the landscape of Internet based computing, whereby a shared pool of configurable computing resources (networks, servers, storage) can be rapidly provisioned and released to support multiple services within the same infrastructure. There exist various tools and technologies for multi-cloud, such as PlatformVM Orchestrator, VMware Sphere, and Overt. These tools help cloud providers construct a distributed cloud storage platform for managing clients' data.

However, if such an important platform is vulnerable to security attacks, it would bring irretrievable losses to the clients. For example, the confidential data in an enterprise may be illegally accessed through a remote interface provided by a multi-cloud, or relevant data and archives may be lost or tampered with when they are stored into an· uncertain storage pool outside the enterprise.

Therefore, it is indispensable for cloud service providers provide security techniques for managing their storage services. Due to its

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nature of serving computationally intensive applications, cloud infrastructure is particularly suitable for content delivery applications. Optimization theory is a mathematical technique for determining the most profitable or least disadvantageous choice out of a set of alternatives.

Dynamic optimization is a subbranchof optimization theory that deals with optimizing the required control variables of a discrete time dynamic system. The IPTV provides the following ways to watch television through over air broadcasts and cable signals. The broadcast TV,an antenna picks up radio waves to transmit pictures and sound to your television set.The cable TV,wires connect to your TV & these wires run from your house to the nearest cable TV station and it acts as one big antenna.

- Set Top Box (STB)
- Delivery network - Which is MTNL's Broadband network and MTNL's telephone line. (Landline).

1) TV and Content Head End - Where the TV channels are received and encoded. Also other content (Video's) is stored at
Head End. MTNL has signed agreement for this with M/s Aksh Broadband.

In this paper, we consider finite-horizon optimization where the optimal control parameters with finite look-ahead are to be found.

More specifically, we will know the arrival pattern of the IPTV and VoD requests with their deadlines in the future. We wish to find
the number of servers to use at each time so as to minimize the cost function. In this paper, we consider different forms of cost functions. We derive closed form solutions where possible for various cost functions.

III. OVERVIEW

A. IPTV through Virtualization Strategy

In recent years, cloud storage service has become a faster profit growth point by providing a comparably low-cost, scalable, position-independent platform for clients' data.

In recent years, cloud storage service has become a faster profit growth point by providing a comparably low-cost, scalable, position-independent platform for clients' data.
Cloud (or hybrid cloud). Often, by using virtual infrastructure management (VIM) , a multi-cloud allows clients to easily access his/her resources remotely through interfaces such as Web services provided by Amazon EC2. There exist various tools and technologies for multicloud, such as Platform VM Orchestrator, Vmware spheres, and Ovirt. These tools help cloud providers construct a distributed cloud storage platform (DCSP) for managing clients' data.

However, if such an important platform is vulnerable to security attacks, it would bring irretrievable losses to the clients. Provable data possession (PDP) (or proofs of retrievability (POR)) is such a probabilistic proof technique for a storage provider to prove the integrity and ownership of clients' data without downloading data. Various PDP schemes have been recently proposed, such asScalable PDP and Dynamic PDP. However, these schemes mainly focus on PDP issues at untrusted servers in a single cloud storage provider and are not suitable for a multi-cloud environment.

IPTV Services: IPTV virtualization provides the following services

1. Live TV
2. Video On Demand (VOD)
3. Interactive TV

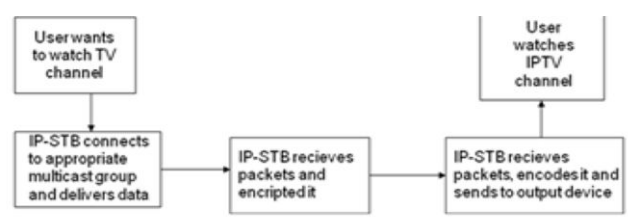

Fig.1. IPTV-STB Operation

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Interactive television is a form of media convergence, adding data services to traditional television technology.

B. IPTV distributed cloud environment

In the paper , we address the problem of data possession in distributed cloud environment for the following aspects : high security, transparent verification ,and high performance. We then demonstrate that the possibility of construction a cooperative PDP(CPDP) scheme without compromising data privacy based on modern cryptography techniques, such as interactive proof system(IPS).We further introduce an effective construction of CPDP scheme using mentioned structure

.

IV. OPTIMIZATION FRAMEWORK

An IPTV service provider is typically involved in delivering multiple real time services, such as Live TV, VoD and in some cases, a network-based DVR service. Each service has a deadline for delivery, which may be slightly different, so that the playout buffer at the client does not under-run, resulting in a user-perceived impairment.

There have been multiple efforts in the past to analytically estimate the resource requirements for serving arriving requests which have a delay constraint. For example, this can be used to exploit the same server resources to deliver Live TV as well as VoD, where their deadlines can be different, and in the case of VoD we can prefetch content in the the STB buffer. Our analysis is applicable to the situation where 'cloud resources' (e.g., in the VHO) are dynamically allocated to a service by exploiting virtualization

.

V. IMPACT OF COST FUNCTIONS ON SERVER REQUIREMENTS

In this section, we consider various cost functions C(s1, s2, · · · , sT), evaluate the optimal server resources needed, and study the impact of each cost function on the optimal solution.

A. Cost functions

We investigate linear, convex and concave functions . With convex functions, the cost increases slowly initially and subsequently grows faster

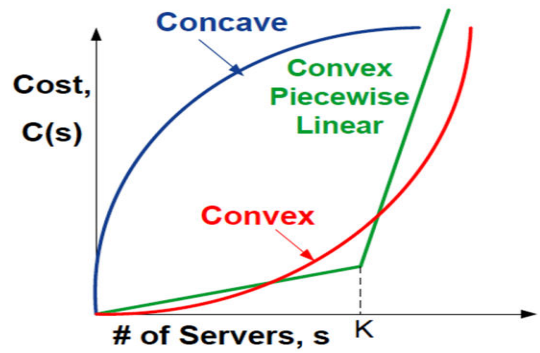

Fig.2. Cost functions

For concave functions the cost increases quickly initially and then flattens out, indicating a point of diminishing unit costs (e.g., slab or tiered pricing).

2) Minimizing a convex cost function results in averaging the number of servers (i.e., the tendency is to service requests equally throughout their deadlines so as to smooth out the requirements of the number of servers needed to serve all the requests).

3) minimizing a concave cost function results in finding the extremal points away from the maximum (as shown in the example below) to reduce cost.

B. We consider the following cost functions

1) Maximum Cost: C(s1,s2,··· ,sT) = maxT i=1 si. This cost function penalizes the peak capacity that will be needed to serve the incoming sequence of requests.

2) Convex Separable Cost: C(s1,s2,··· ,sT) = PT i=1 C(si), where C(si) is a convex function.

This models the case when a data center sees

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an increasing per unit cost as the number of servers required grows. We consider two examples of C(si), the component cost function. The first is the exponential function, C(si) = exp(si). The second is a piecewise linear function of the form C(si) = si+c(si−K)+ where c,K ≥ 0. This component cost function has per-server cost of unity when si ≤ K, and per-server cost of 1 + c thereafter.

3) Linear Cost: C(s1,s2,··· ,sT) =PT i=1 si. This mod- els the case where we incur a cost that is proportional to the total number of servers needed across all times.

4) Concave Separable Cost: C(s1,s2,...,sT) = PT i=1 C(si), with component cost C(si) a concave function. This may arise when the per-server cost diminishes as the number of servers grows.

C. Optimal Solutions

1) Piecewise Linear Convex Cost Function: Consider any scheduling of the incoming requests which uses yi server resources a time i.

2) Linear Cost Function: One strategy for meeting this cost is to set si = Pk j=1 rj(i), which means that we serve all requests as they arrive.

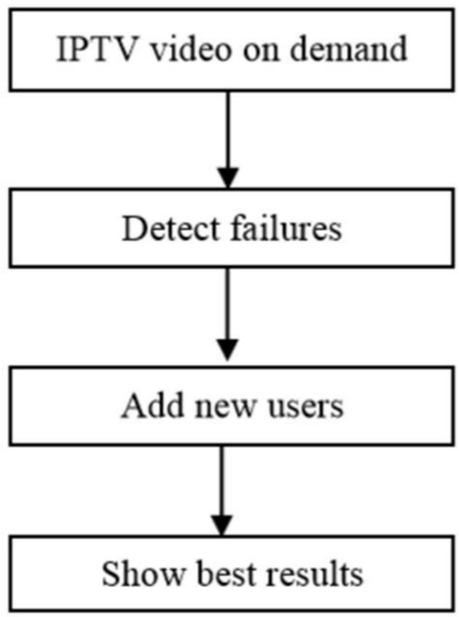
3) Concave Cost Function: This is a concave programming with linear and integer constraints

4) Exponential Cost Function: This is a convex optimiza- tion problem with integer constraints, and is thus NP hard problem in general.

VI. IMPLEMENTATION OF IPTV

To check the availability and integrity of outsourced data in cloud storages, researchers have proposed two basic approaches called Provable Data Possession and Proofs of Irretrievability. Ateniese et al. first proposed the PDP model for ensuring possession of files on un-trusted storages and provided an RSA-based scheme for a static case that achieves the communication cost. They also proposed a publicly verifiable version, which allows anyone, not just the owner, to challenge the server for data possession. Theyproposed a lightweight PDP scheme based on cryptographic hash function and symmetric key encryption, but the servers can deceive the owners by using previous metadata or responses due to the lack of randomness in the challenges.

The numbers of updates and challenges are limited and fixed in advance and users cannot perform block insertions anywhere.



A. Advantages of IPTV

1) Provable data possession is a technique for a storage provider to prove the integrity and ownership of clients' data without downloading data.

2) It mainly focuses on PDP issues at un-trusted servers for a multi cloud storage provider and is suitable for a multi-cloud environment.

3) Scalable to support storage of data across several CSP's

4) Provides multi-prove zero-knowledge proof system

5) Introduces lower computation and communication overheads in comparison with non-cooperative approaches.

B. Results Summary

In this section we presented results from a simple adjust- ment mechanism we implemented. Our results show that even our simple mechanism is able to give significant reductions in load. However, there is still room for improvement. We showed that the load reduction is dependent on the duration of the adjustment (burst window), the number of jobs moved and the period over which they are averaged (the smoothing window). Our results show that a particular value for each of these parameters is not the best across the board; instead the value chosen depends on the relative load of each of the services being adjusted. We believe that mechanisms to predict this relative load of each service and dynamically choose values for the parameters based on this prediction can yield further improvements. Designing such mechanisms is an opportunity for interesting future work

.

VII. CONCLUSION

We presented the construction of an efficient PDP scheme for distributed cloud storage. Based on homomorphism verifiable response and hash index hierarchy, we have proposed a cooperative PDP scheme to support dynamic scalability on multiple storage servers. We also showed that our scheme provided all security properties required by zero knowledge interactive proof system, so that it can resist various attacks even if it is deployed as a public audit service in clouds. Furthermore, we optimized the probabilistic query and periodic verification to improve the audit performance. Our experiments clearly demonstrated that our approaches only introduce a small amount of computation and communication overheads. Therefore, our solution can be treated as a new candidate for data integrity verification in outsourcing data storage systems. We implemented a simple time-shifting strategy and eval- uated it using traces from an operational system.

Our results show that anticipating ICC bursts and time-shifting VoD load gives significant resource savings (as much as 24%). We also studied the different parameters that affect the result and show that their ideal values vary over time and depend on the relative load of each service. mechanisms as part of our future work

VIII. ACKNOWLEDGEMENT

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REFERENCES

[1] D. Banodkar, K. K. Ramakrishnan, S. Kalyanaraman, A. Gerber, and O. Spatscheck, “Multicast instant channel change in IPTV system,” in Proceedings of IEEE COMSWARE, January 2008.

[2] H. A. Lagar-Cavilla, J. A. Whitney, A. Scannell, R. B. P. Patchin, S. M. Rumble, E. de Lara, M. Brudno, and M. Satyanarayanan, “SnowFlock: Virtual Machine Cloning as a First Class Cloud Primitive,” ACM Transactions on Computer Systems (TOCS), 2011.

[3] D. Boneh and M. Franklin (2001), Identity-based encryption from the weil pairing, in Advances in Cryptology (CRYPTO’2001), vol. 2139 of LNCS, , pp. 213–229.. O. Goldreich (2001), Foundations of Cryptography: Basic Tools. Cambridge University Press

[4] V. Aggarwal, V. Gopalakrishnan, R. Jana, K. K. Ramakrishnan, and V. Vaishampayan, “Exploiting Virtualization for Delivering Cloud-based IPTV Services,” in Proc. of IEEE INFOCOM (mini-conference), Shang- hai, April 2011.

[5] Y. Dodis, S. P. Vadhan, and D. Wichs (2009), Proofs of retrievability via hardness amplification, in TCC, ser. Lecture Notes in Computer Science, vol. 5444. Springer, pp. 109–127.

[6] J. A. Stankovic, M. Spuri, K. Ramamritham, and G. C. Buttazzo, Dead- line Scheduling for Real-Time Systems: Edf and

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A Peer Revieved Open Access International Journal
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Related Algorithms. Norwell, MA, USA: Kluwer Academic Publishers, 1998.
[7] N. V. Thoai and H. Tuy, "Convergent algorithms for minimizing a concave function," in Mathematics of operations Research, vol. 5, 1980.
[8] H. Hu, G.-J. Ahn, Y. Han, and S. Chen (Oct 2011), Collaborative integrity verification in hybrid clouds, in IEEE Conference on the 7th International Conference on Collaborative Computing: Networking, Applications and Worksharing, CollaborateCom, Orlando, Florida, USA, 15-18, pp. 197–206. M. Armbrust, A. Fox, R. Griffith,
[9] R. Urgaonkar, U. Kozat, K. Igarashi, and M. J. Neely, "Dynamic resource allocation and power management in virtualized data centers," in Proceedings of IEEE IFIP NOMS, March 2010.
[10] A. J. Stankovic, M. Spuri, K. Ramamritham, and G. Buttazzo, "Deadline Scheduling for Real-Time Systems EDF and Related Algorithms," 1998, the Springer International Series in Engineering and Computer Science.
[11] L. I. Sennott, Stochastic Dynamic Programming and the Control of Queueing Systems. Wiley-Interscience, 1998.
[12] D. P. Bertsekas, "Dynamic Programming and Optimal Control," in Athena Scientific, Blemont, Massachusetts, 2007.
[13] G. Ramamurthy and B. Sengupta, "Delay analysis of a packet voice mul- tiplexer by the ΣDi/D/1 Queue," in Proceedings of IEEE Transactions on Communications, July 1991.
[14] C. L. Liu and J. W. Layland, "Scheduling Algorithms for Multiprogram- ming in a Hard Real Time Environment," Journal of the ACM, vol. 20, no. 1, pp. 46–61, 197
[15] A. Dan, D. Sitaram, and P. Shahabuddin, "Scheduling Policies for an On-Demand Video Server with Batching," in Proc. of ACM Multimedia, San Francisco, CA, October 1994, pp. 15–23.
[16] D. Bowers, A. Juels, and A. Oprea (2009), Hail: a high- availability and integrity layer for cloud storage, in ACM Conference on Computer and Communications Security, pp. 187–198.
[17] L. Fortnow, J. Rompel, and M. Sipser (1988), On the power of multiprover interactive protocols, in Theoretical Computer Science, pp. 156–161. Y. Zhu,
[18] A. D. Joseph, R. H. Katz, A. Konwinski, G. Lee, D. A. Patterson, A. Rabkin, I. Stoica, and M. Zaharia (2009), Above the clouds: A berkeley view of cloud computing, EECS Department, University of California, Berkeley, Tech. Rep.

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