Cost-Minimizing Dynamic Migration of Content Distribution Services into Hybrid Clouds

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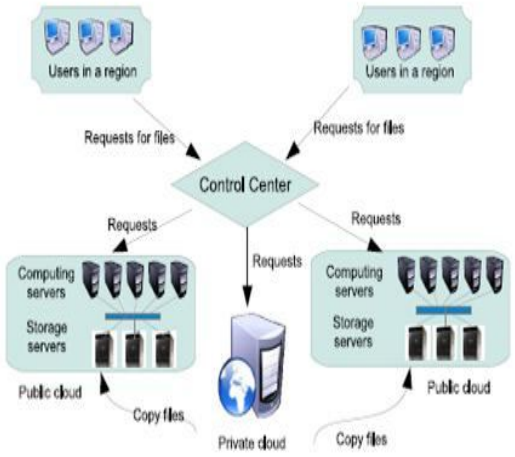
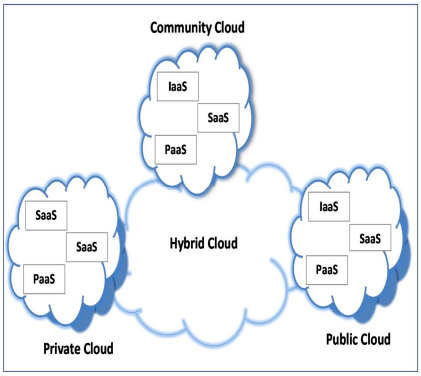
Abstract- *The recent advent of cloud computing technologies has enabled lithe and scalable resource access for a variety of applications. Content distribution services are a major category of popular Internet applications. A growing number of content providers are contemplating a switch to cloud-based services, for better scalability and lower cost. Two key tasks are occupied for such a move: to move around their contents to cloud storage, and to allocate their web service load to cloud-based web services. The main challenge is to make the best use of the cloud as well as their existing on-premise server infrastructure, to serve volatile content requests with service response time guarantee at all times, while incurring the minimum operational cost. Employing Lyapunov optimization techniques, we present an optimization framework for dynamic, cost-minimizing migration of content distribution services into a hybrid cloud infrastructure that spans geographically distributed data centres. A dynamic control algorithm is designed, which optimally places contents and dispatches requests in different data centres to minimize overall operational cost over time, subject to service response time constrictions. Rigorous analysis shows that the algorithm nicely bounds the response times with in the preset QoS target in cases of arbitrary request arrival patterns, and guarantees that the overall cost is within a small constant gap from the optimum achieved by a T-slot look ahead mechanism with known information into the future.*

Keywords- Content Multi homing, content distribution network.

I. INTRODUCTION

Cloud computing technologies have enabled rapid provisioning server utilities(CPU, storage, bandwidth) to users anywhere, anytime. To utilize the mixture of electricity costs and to provide service immediacy to users in different geographic regions, a cloud service often spans multiple data canters over the globe, e.g., Amazon Cloud Front, Microsoft Azure. The elastic and on demand nature of resource provisioning has made cloud computing attractive to providers of various applications. More and more new applications are being created on the cloud platform while many existing applications are also allowing for the cloud ward move including content distribution .As an important category of popular Internet services, content distribution applications, e.g., video streaming, web hosting and file sharing, feature large volumes of content and demands that are highly dynamic in the earthly domain.





II. COST-MINIMIZING SERVICE MIGRATION PROBLEM

We suppose that the system runs in a time-slotted fashion. Each time slot is a unit time which is enough for uploading any file m 2 M with size(m) (bytes) at the unit bandwidth. In time slot t, a(m)j (t) requests are generated for downloading file m 2 M, from users in region j. We assume that the request arrival is an arbitrary process over time, and

the number of requests arising from one region for a file in each time slot is upper-bounded by Amax. The cost of uploading a byte from the private cloud is h. The charge for storage at data center i is pi per byte per unit time. gi and oi per byte are charged for uploading from and downloading into data center i, respectively. The cost for renting a VM instance in data center i is fi per unit time. These charges follow the charging model of leading commercial cloud providers, such as Amazon EC2 [25] and S3[26]. We assume that the storage capacity in each data center is sufficient for storing contents from this content distribution application.

III. EXISTING SYSTEM

The existing system is used manual. Maintaining the data manually is a tedious job. All the calculations are done manually. The users are interested to speed up the calculations and to rectify the errors. Existing system is the manual one which has the following drawbacks.

IV. LIMITATIONS OF EXISTING SYSTEM

Time is wasted in entering the details. Lot of information's cannot be stored in the files. Sometimes the calculations done manually will prone to error. It requires more space& more time for maintaining the files. Required information cannot be retrieved easily. So they desire for the development of the proposed system has become essential.

V. PROPOSED SYSTEM

The proposed system is to computerize the orders and maintaining security of the data. The aim of the proposed system is to overcome the difficulties of the existing system.

VI. ADVANTAGES OF PROPOSED SYSTEM

- Very Easy in viewing all the records and details of the respected persons.
- No confutation in portion of the record.
- Easy to identify the respective record on time.
- The end user has to remember a lot of command to make efficient use of the system.
- The system does not have any descriptive reports and thus did not help management in decision-making.

VII. SERVICE QUALITY

The service quality qualified by users is evaluate by request response delay consisting of two major components: queuing delay in the request queue, and round-trip delay from when the request is dispatched from the queue to the time the first byte of there quested file is received. We ignore the processing delay inside a data centre, due to the high inter-connection band width and CPU capacity inside a data centre.

VIII. OPERATION COST

Our algorithm focuses on minimizing frequent operational cost of the content delivery system, not one-time costs such as the purchase of machinery in the private cloud and contents.

VIII. CONCLUSION

This paper investigates optimal migration of a content distribution service to a hybrid cloud consisting of a private cloud and public geo-distributed cloud services. We propose a generic optimization outline based on Lyapunov optimization theory, and design a dynamic joint content placement and request distribution algorithm, which minimizes the operational cost of the application with QoS guarantees. We notionally show that our algorithm approaches the optimality achieved by a tools with known information in the future T time slots by a small gap, no matter what the request coming pattern is. Our model based costing verifies our academic result. We intend to extend the framework to specific content distribution services with detailed requirements, such as video-on-demand services or social media applications, in our ongoing work.

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