Journal of Computer Applications ISSN: 0974 – 1925,
Volume-5, Issue EICA2012-5, February 10, 2012

Organizational Security Through Cloud Privacy

Manikandan S
Dept of IT,
Anna University,
Vel Tech Multitech Dr.Rangarajan Dr.Sakunthala Engineering College, Chennai
E-mail: manik.bhuvan @gamil.com

Jenifer Sagaya A
Dept of IT,
Anna University,
Vel Tech Multitech Dr.Rangarajan Dr.Sakunthala Engineering College, Chennai
E-mail: jeni7chiffre @gamil.com

Ranjani B
Dept of IT,
Anna University,
Vel Tech Multitech Dr.Rangarajan Dr.Sakunthala Engineering College, Chennai
E-mail:baluranjani01@gamil.com

Abstract-Cloud computing has computational and sociological implications. In computational terms cloud computing is described as a subset of grid computing concerned with the use of special shared computing resources. The rare pitfalls of public cloud, issues regarding its security and necessity of pCloud are in urge. In this paper, we introduce pCloud that adapts the Striping technique in a distributed setting which enables the protocol retrieve large information without compromising computational cost at the server. In addition, pCloud organizes the peers in a network, partitions the database into disjoint data segments and disseminates the individual segments to the peers to allow efficient query execution in parallel.

Keywords: *Grid Computing, Cloud Computing, pCloud, Striping Technique, Query Processing.*

I. INTRODUCTION

Cloud computing is still a relatively recent technological trend, and it's certainly enjoying a ton of publicity and hype. Although each deployment option has its own benefits and drawbacks, in certain situations, the benefits can outweigh the risks. What you need to do is identify those situations in which you can apply the cloud to reap the maximum rewards with minimum risk. To choose which cloud computing solution option is appropriate for your company, you will need to consider and balance a number of factors. The factors that are to be considered are scalability, per-hour computing costs, and reliability and risk management. In computer data storage, data striping is the technique of segmenting logically sequential data, such as a file, in a way that accesses of sequential segments are made to different physical storage devices.

In summary our contributions are the following:

When large blocks of data have to be retrieved there results a challenge. Based on our study, we propose a striping technique, which enables the protocol to retrieve arbitrarily large information without compromising computational cost at the server. We introduce pCloud

that adapts the above technique in a distributed setting. We design an efficient data placement policy, a fast result retrieval method, and a query authentication mechanism. Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

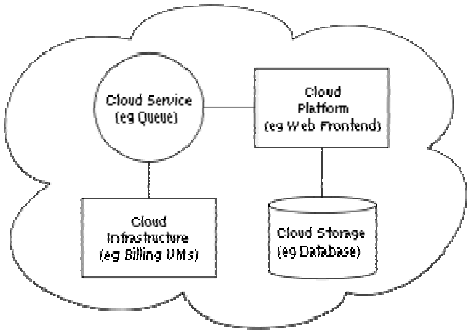

Figure 1: Cloud Sample Architecture

This cloud model promotes availability and is composed of five essential characteristics, three service models and four deployment models. By performing segment accesses on multiple devices, multiple segments can be accessed concurrently. This provides more data access throughput, which avoids causing the processor to idly wait for data accesses.

II. PRIVATE CLOUD

Private cloud (also called internal cloud or corporate cloud) is a marketing term for a proprietary computing architecture that provides hosted services to a limited number of people behind a firewall. Advances in virtualization and distributed computing have allowed corporate network and datacenter administrators to effectively become service providers that meet the needs of clients within the corporation.

Marketing media that uses the words "private cloud" is designed to appeal to an organization that needs or wants more control over their data than they can get by using a third-party hosted service such as Amazon's Elastic Compute Cloud (EC2) or Simple Storage Service (S3).

Private clouds offer many of the advantages of public cloud services but without the security concerns and compliance issues. Virtualization is a core feature of the infrastructure layer of a private cloud, but above this is an orchestration layer, and above this, a self-service portal. These layers of technology must all be loosely coupled and controlled through a service bus, enabling dynamic expansion and contraction of resources based on need. All these elements together make up a private cloud.

2.1 Service Models

a) Cloud Software as a Service (SaaS)

The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through a thin client interface such as a Web browser (e.g., Web-based email). The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings.

b) Cloud Platform as a Service (PaaS)

The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or -acquired applications created using programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly application hosting environment configurations.

c) Cloud Infrastructure as a Service (IaaS)

The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, deployed applications, and possibly limited control of select networking components (e.g., host firewalls).

III. SYSTEM ARCHITECTURE

In this section, we present pCloud environment and its interaction with the grid environment which enables the client to access the data from the grid end utilizing Private Information Retrieval. Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be given as rapidly provisioned and released with minimal management effort or service provider interaction.

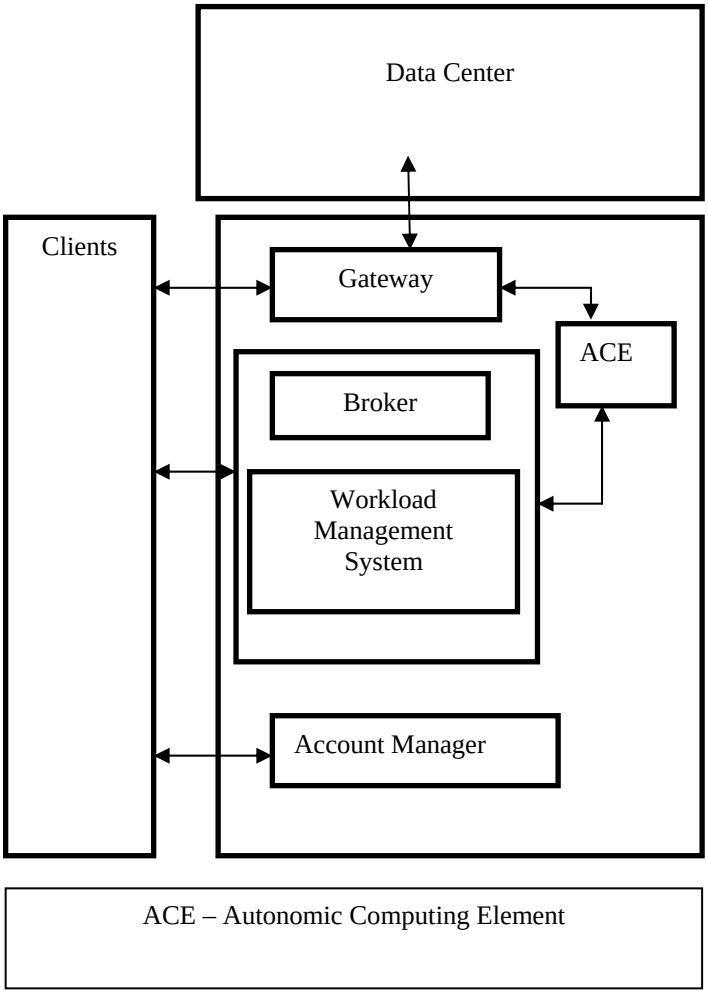

Figure 2: Architecture

3.1 Cloud Architecture Design

Cloud Architectures are designs of software applications that use Internet-accessible on-demand services. Applications built on Cloud Architectures are such that the underlying computing infrastructure is used only when it is needed (for example to process a user request).In this module, we build an ecosystem implementing the cloud environment which could process queries in parallel. The cloud server accepts the user's request at the client end and transmits the request to grid server for further computations.

3.2 Query Propagation and Computational Implications

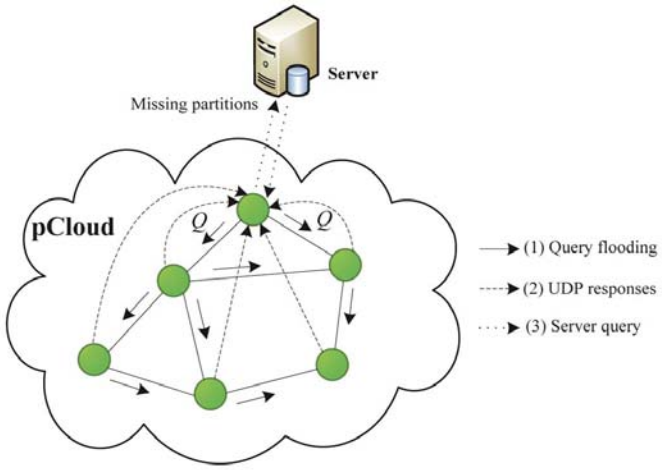

Figure 3: Query processing.

The query processing is capable of fully benefiting from all the distributed resources to minimize the query response time and maximize system throughput. The Gateway communicates to the Grid Data Centre to request/receive data and information. Broker receives the requests from the Gateway and analysis/forecast requests from clients for a particular financial query. When the system is not connected to a computational grid, Autonomic Computing Element enables to perform locally the analysis and forecast operations requested.

3.3 Reply Generation: PIR

Primary Server (PS) enables interoperability with other grid middleware without too many changes Clients are managed by the PS, so no client communicates directly with the grid. The analysed data and processed forecasts will be produced internally to the grid and returned to the clients, through the PS.The Cloud Server acts as the intermediate to the Cloud User and the Grid Environment.

3.4 Deployment Models

a) ***Private Cloud:*** The cloud infrastructure is operated solely for an organization. It may be managed by the organization or a third party and may exist on premise or off premise.

b) ***Community Cloud***: The cloud infrastructure is shared by several organizations and supports a specific community that has shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be managed by the organizations or a third party and may exist on premise or off premise.

c) ***Public Cloud:*** The cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services.

d) ***Hybrid Cloud:*** The cloud infrastructure is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load-balancing between clouds).

Cloud software takes full advantage of the cloud paradigm by being service-oriented with a focus on statelessness, low coupling, modularity, and semantic interoperability. Throughout this document, any general use of the term “cloud” or “cloud system” should be assumed to apply to each of the four deployment models. Care is taken to specify a specific deployment model when a statement is not applicable to all four models."

To add clarity, this document uses the following terms consistently: cloud subscriber or subscriber: a person or organization that is a customer of a cloud; client: a machine or software application that accesses a cloud over a network connection, perhaps on behalf of a subscriber; and cloud provider or provider: an organization that provides cloud services.

IV. STRIPING TECHNIQUE

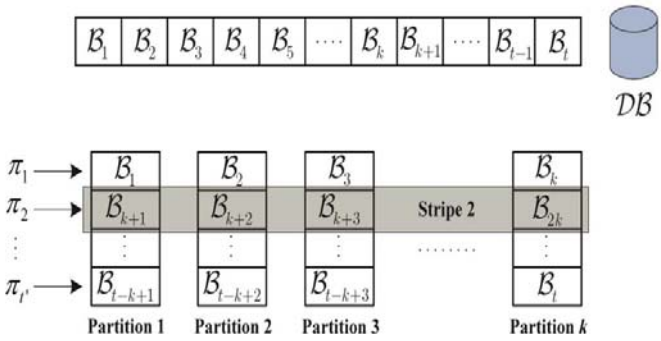

Figure 4 : Striping Technique

Applying striping technique into the database, the database is divided into successive strips each consisting of equally partitioned blocks. We apply a striping technique on the database, illustrated in figure. Assume that the page size is D. Initially, DB is divided into t0 successive stripes, each consisting of exactly k ¼ D=‘ blocks of size ‘ bytes. In this way, every stripe is exactly the size of one page and t0 ¼ t=k. Next, the blocks inside each stripe are assigned to the k partitions in a round robin manner. Following the striping process, each partition is considered as a separate database, consisting of memory blocks. Suppose that the client wishes to retrieve the ith page of DB. Initially, it forms a single query and transmits it to the server. The latter processes the query on every partition and returns replies to the client.

V. IMPLEMENTATION

In this context, a real time financial system, based on cloud computing technologies and paradigms, is being studied which will allow analysis and forecasts of the financial markets and their instruments. Several financial studies have demonstrated that it is possible to perform forecasts, using data and information collected as well as specialized graphs (i.e.: Candlestick). The system being developed will be thoroughly tested in large scale treatment of real time financial data by means of parallel and distributed computing techniques and the use of purposely created financial models for financial market analysis and forecasts. These models could also eventually be used, regardless of the existence of a computational grid. The system in fact is designed to work both as an internal grid service (more specifically as a collection of cloud services) and as a generic web-based application, and can be installed on one or more web server.

VI. CONCLUSION

pCloud will considerably reduce the query response time compared to client server model and minimize communication overhead. The network's performance improves linearly with the number of peers resilient to node failures and can handle updates. Security is ensured providing authentication to each user active in the cloud environment.

REFERENCES

1. Stavros Papadopoulos, Spiridon Bakiras, Member, IEEE, and Dimitris Papadias "pCloud: A Distributed System for Practical PIR," IEEE Transactions on Dependable and Secure Computing, Vol. 9, No. 1, January/February 2012.
2. A. Khoshgozaran, H. Shirani-Mehr, and C. Shahabi, "SPIRAL: A Scalable Private Information Retrieval Approach to Location Privacy," Proc. Workshop Privacy-Aware Location-Based Mobile Services (PALMS '08), 2008.
3. E. Kushilevitz and R. Ostrovsky, "Replication Is Not Needed: Single Database, Computationally - Private Information Retrieval,"Proc.Symp. Foundations of Computer Science (FOCS '07), 1997.
4. I. Stoica, R. Morris, D.R. Karger, M.F. Kaashoek, and H.Balakrishnan, "Chord: A Scalable Peer-to-Peer Lookup Service for Internet Applications," Proc. ACM SIGCOMM '01, 2001.
5. Developing Grid-based E-finance Portals for Intelligent Decision Making, the 20th Annual Conference of the Japanese Society for Artificial Intelligence, 2006.
6. Privacy in the Clouds: Risks to Privacy and Confidentiality from Cloud Computing, Prepared by Robert Gellman for the World Privacy Forum, February 23, 2009.
7. The Comparison between Cloud Computing and Grid Computing, 2010 International Conference on Computer Application and System Modeling (ICCASM 2010).
8. Jia Hu, Muneaki Ohshima, and Ning Zhong ,"Developing Grid-based E-finance Portals for Intelligent Decision Making", The 20th Annual Conference of the Japanese Society for Artificial Intelligence, 2006.
9. http://www.pcloud.com/CloudComputing.