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A SURVEY ON BACKUP RECOVERY ISSUES IN CLOUD COMPUTING

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Abstract: Cloud computing offers several kinds of services to the users. Storage-as-a-service is one of the services delivered by cloud infrastructure in which large volume of electronic data is stored in cloud data base. The most important data of an enterprises are stored in a cloud, so that they assured that data is safe and be available to access at any time from anywhere. In situations like Flood, Fire, Earthquakes or any hardware malfunction or any accidental deletion our data may no longer remain available. To maintain the data safety there must be some data backup techniques for cloud platform to recover most important data efficiently in such situations mentioned above. This paper provides a survey on several backup techniques used for cloud computing platform.

Keywords: Cloud computing, electronic data, cloud data base, security issues, backup, threats, risks.

I. INTRODUCTION

Cloud computing offers a new system to increase the current depletion and delivery model for IT environment, by providing scalable and virtualized resources as a service for computing through Internet [1] . Data stored in the cloud is being generated at an incredible speed, therefore speed is the key components in cloud computing. Server failure is a challenging issue which can be reduced by the primary technique of storing data redundantly among many storage disks using eraser code. Cloud computing is an enhancing technology which enhances the scaling, availability, and reliability and also provides the optimized and efficient computing [2].

Cloud computing technology is a model for enabling pervasive and on-demand network access to computing resources such as networks, storage and applications [3]. Robustness can be maintained in cloud infrastructure by applying eraser codes are in distributed storage systems against server failures by storing data redundancy among many storage servers. The cloud model pictures a world where components can be rapidly orchestrated, provisioned, implemented, and scaled up to provide an

on-demand utility-like model of distribution and depletion [19]. Systems use cloud computing with different services but the main challenge is to provide security to the users. The use of virtualization techniques in cloud environment brings unique concern in security for the users and gives high storage facilities. The resources in cloud computing are pervasive, that are available and accessible anytime with high security [20].

II. LITERATURE REVIEW

The following sections explain the survey of various techniques regarding this concern. Different methods that have been proposed for data backup for Cloud Computing are given bellows. Kruti Sharma has proposed a Seed Block Algorithm Architecture (SBA) and suggested a remote backup server. The remote Backup server is a replica of original cloud server which is physically situated at a remote location [3]. This method is based on the concept of Exclusive-OR (XOR) operation of digital computing. The whole mechanism consists of three main parts 1.The Main Cloud Server 2.Clients of the Cloud and 3.The Remote Server. The SBA uses a random number and a unique client id associated with each client. Remote Backup Server and its Architecture Whenever a new Client is get registered with the cloud its unique client id is get XOR with a random number. The result of this XOR operation is called as a Seed Block which will be used only for that particular client. Whenever a client stores any Data on to the Cloud it is saved in Cloud and at the same time it is XORed with its Seed Block and the resultant Data' is stored in the remote server [4]. If any accidental data loss occurs in the main Cloud then in such cases the original data is recovered by XORing the Data' with the Seed Block of that particular client to obtain Data'' i.e. the original Data file. Somesh P. Badhel All Rights Reserved this technique is fully capable of recovering the data files accurately in any data loss situation also at the same time it maintains data integrity. The disadvantage of this technique is that it is inefficient because the data files on the remote server uses the same space as in the main Cloud so in this way there is wastage of storage space. The storage space in the remote Server can be reduced by applying the compression techniques to achieve high efficiency [1].

Chi-won Song et. al [2], have proposed a novel data recovery service framework for cloud infrastructure, the Parity Cloud Service (PCS) provides a privacy-protected personal data recovery service. In this proposed framework user data is not required to be uploaded on to the server for data recovery. All the necessary server-side resources that provide the recovery services are within a reasonable bound. The advantages of Parity Cloud Service are that it provides a reliable data recovery at a low cost but the disadvantage is that its implementation complexity is higher.

Vijaykumar Javaraiah et. al [3], proposed a mechanism for online data backup technique for cloud along with disaster recovery. In this approach the cost of having the backup for Cloud platform has been reduced and also it protects data from disaster at the same time the process of migration from one cloud service provider to another becomes easier and much simpler. In this approach the consumers' are not dependent on the service provider and it also eliminates the associated data recovery cost. A simple hardware box is used to achieve all at little cost.

Yoichiro Ueno et. al [4], proposed the innovative file back-up concept HS-DRT, that makes use of an effective ultra-widely distributed data transfer mechanism and a high-speed encryption technology. This system consists of two sequences one is Backup sequence and other is Recovery sequence. The data to be backed-up is received in Backup sequence. The recovery sequence is used when there is a disaster or any data loss occurs the Supervisory Server (one of the components of the HSDRT) starts the recovery sequence. There are some limitations in this approach and due to which, this model cannot be declared as a perfect technique for Cloud back-up and recovery. Although this model can be used for movable clients such as laptops Smart phones etc. the data recovery cost is comparatively increased and also there is increased redundancy.

Paolo Trunfio et. al [5], proposed Efficient Routing Grounded on Taxonomy (ERGOT) which is fully based on the semantic analysis and does not focus on time and implementation complexity. This system is based on the Semantics that provide support for Service Discovery in cloud computing. This model is built upon 3 components one A DHT (Distributed Hash Table) protocol second A SON (Semantic Overlay Network), and third A measure of semantic similarity among service description We makes a focus on this technique because it is not a simple back-up technique rather it provides retrieval of data in an efficient way that is totally based on the semantic similarity between service descriptions and service requests. ERGOT proposes a semantic-driven query answering in DHT-based systems by building a SON over a DHT but it does not go well with semantic similarity search models. The drawback of this model is an increased time complexity and implementation complexity.

Eleni Palkopoulouy et. al [6], proposed one technique that mainly focuses on the significant reduction of cost and router failure scenario i.e. (SBBR). It involves logical connectivity of IP that will be remain unchanged even after a router

failure. The most important factor of this model is that it provides the network management system via multi-layer signaling. Additionally this model shows how service imposed maximum outage requirements that have a direct effect on the setting of the SBRR architecture (e.g. imposing a minimum number of network-wide shared router resources locations).The problem with model is that it is unable to include optimization concept with cost reduction.

Sheheryar Malik et, al [7], proposed the lowest cost point of view a model "Rent out the Rented Resources". This technique focuses on reducing the cloud service's monetary cost. It proposed a model for cross cloud federation which consists of three phases that are 1) Discovery, 2) Matchmaking and 3) Authentication. This model is simply based on the concept of cloud vendors that rent the resources from different venture(s) and after virtualization, rents it to the clients as cloud services.

Lili Sun et. al [8], suggested a technique in which there is a gradual increase in cost with the increase in data i.e. The Cold and Hot back-up strategy that performs backup and recovery on trigger basis of failure detection. In CBSRS (i.e. Cold Backup Service Replacement Strategy) recovery process, it is triggered when a service failure is detected and it will not be triggered when there is no failure i.e. when the service is available. The HBSRS (i.e. Hot Backup Service Replacement Strategy), is a transcendental recovery strategy for service composition that is used for dynamic network. During the implementation of process, the backup services remains in the activated state and the first returned results of services will be used to ensure the successful implementation of service composition.

III. RESULTS AND DISCUSSIONS

The advantages and disadvantages of all the above discussed techniques are described in the Table 1. And due to the high applicability and need of backup process in many companies and enterprises, the role of a remote data back –up server with an efficient technique is very important and a hot research topic.

Table-1. Comparison between various techniques of Back-up and recovery

S. No.	Method	Advantages	Disadvantages
1.	HSDRT (High Speed Data Rate Transfer)	Used for mobile clients like laptop, tablet and cell phones.	-Expensive -Data Redundancy
2.	HSDRT (High Speed Data Rate Transfer)	- Reliable - Secured - Less Expensive	Difficult to implement due to high implementation complexity
3.	ERGOT (Efficient Rounding Grounded on Taxonomy	- Perform perfect retrieval of data. - Low cost for implementing	-Time complexity -Implementation - - Complexity
4.	ERGOT (Efficient Rounding Grounded on Taxonomy	- Simple - Low cost for implementation	-Requires a higher bandwidth -Not secure -Backs up the whole virtual machine every time.
5.	Cold/Hot Back-up Strategy	- Triggers only when failure is detected	-Cost increases as data increases gradually

The following sections explain the survey of various papers regarding this concern. Different methods that have been proposed for having data backup for Cloud Computing are given bellow.

a) Seed Block Algorithm Architecture (SBA)

The Seed Block Algorithm is time efficient technique to recover the file. It maintains the data integrity and solves the issues like cost, implementation complexity. SBA also focuses on the security concept for the back-up files stored at remote backup server, without using the existing encryption techniques[5]. The dis-advantage of this technique is that it is inefficient because the data files on the remote server uses the same space as in the main Cloud so in this way there is wastage of storage space.

b) Parity Cloud Service (PCS)

They proposed a novel data recovery service framework for cloud infrastructure, the Parity Cloud Service (PCS) provides a privacy-protected personal data recovery service. In this proposed framework user data is not required to be uploaded on to the server for data recovery [6]. All the necessary server-side resources that provide the recovery services are within a reasonable bound. The advantages of Parity Cloud Service are that it provides a reliable data recovery at a low cost but the disadvantage is that its implementation complexity is higher [7].

c) Online data backup technique

This is for cloud along with disaster recovery. In this approach the cost of having the backup for Cloud platform has been reduced and also it protects data from disaster at the same time the process of migration from one cloud service provider to another becomes easier and much simpler [8]. In this approach the consumers' are not dependent on the service provider and it also eliminates the associated data recovery cost. A simple hardware box is used that achieves all these at little cost [9].

d) HS-DRT

It makes use of an effective ultra-widely distributed data transfer mechanism and a high-speed encryption technology. This system consists of two sequences one is Backup sequence and other is Recovery sequence. The data to be backed-up is received In Backup sequence. The recovery sequence is used when there is a disaster or any data loss occurs the Supervisory Server (one of the components of the HSDRT) starts the recovery sequence [10]. There are some limitations in this approach and due to which, this model cannot be declared as a perfect technique for Cloud back-up and recovery. Although this model can be used for movable clients such as laptops Smart phones etc. the data recovery cost is comparatively increased and also there is increased redundancy [11] [12] .

e) Efficient Routing Grounded on Taxonomy (ERGOT)

This is fully based on the semantic analysis and does not focus on time and implementation complexity. This system is based on the Semantics that provide support for Service Discovery in cloud computing [13] . This model is built upon 3 components one A DHT (Distributed Hash Table) protocol second A SON (Semantic Overlay Network), and third A measure of semantic similarity among service description [14]. We makes a focus on this technique because it is not a simple back-up technique rather it provides retrieval of data in an efficient way that is totally based on the semantic similarity between service descriptions and service requests [15] . ERGOT proposes a semantic-driven query answering in DHT-based systems by building a SON over a DHT but it does not go well with semantic similarity search models. The drawback of this model is an increased time complexity and implementation complexity [16].

f) SBBR Technique

It involves logical connectivity of IP that will be remain unchanged even after a router failure. The most important factor of this model is that it provides the network management system via multi-layer signaling. Additionally this model shows how service imposed maximum outage requirements that have a direct effect on the setting of the SBRR architecture (e.g. imposing a minimum number= of network-wide shared router resources locations)[17].The problem with model is that it is unable to include optimization concept with cost reduction. g) CBSRS: Cold Backup Service Replacement Strategy technique in which there is a gradual increase in cost with the increase in data i.e. The Cold and Hot back-up strategy that performs backup and recovery on trigger basis of failure detection. In CBSRS (i.e. Cold Backup Service Replacement Strategy) recovery process, it is triggered when a service failure is detected and it will not be triggered when there is no failure i.e. when the service is available [19]. The HBSRS (i.e. Hot Backup Service Replacement Strategy), is a transcendental recovery strategy for service composition that is used for dynamic network. During the implementation of process, the backup services remains in the activated state and the first returned results of services will be used to ensure the successful implementation of service composition. Figure 1 depicts the disasters faced in a 5 year period [18].

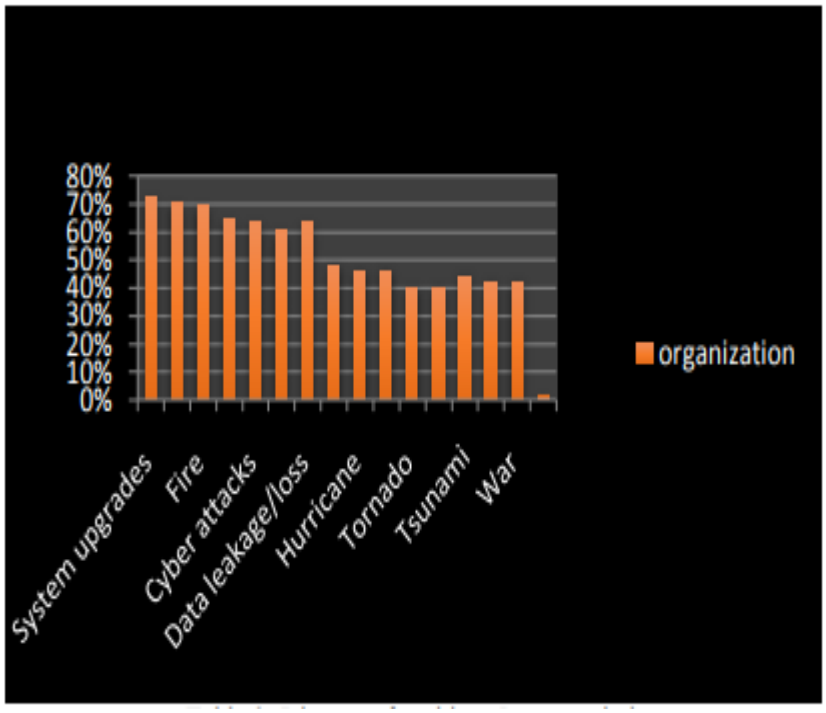

Figure 1: Disasters faced in a 5 year period

IV. CONCLUSION

All the above methods tried to find various issues of data backup and recovery for cloud computing such as maintaining the cost of implementation and implementation complexities as low as possible. This paper present design of proposed SBA algorithm. SBA is used for collecting the information from remote location and for recover that file in case of file deletion from the remote cloud if the main cloud is destroyed. However each one of the backup solution for cloud computing is unable to attain all the issues of remote data back-up server with less storage space.

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