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AN ADVANCED SURVEY ON CLOUD STORAGE FOR ENTERPRISE

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ABSTRACT: Storage as a Service is a business model in which a large company rents space in their storage infrastructure to a smaller company, individual and up to large company. In the enterprise, SaaS vendors are targeting secondary storage applications by promoting SaaS as a convenient way to manage backups. Cloud storage is an enterprise-class file server securely located in multiple geographically diverse data centers designed to enhance performance, redundancy and data security for business customers. Zoolz is designed with enterprise level features to offer a comprehensive business solution for backing up, archiving, data management and collaboration. The enterprise level features are scalability, centralized management, reliability, data tiring and more at a very affordable price. By leveraging AWS technology and our powerful backend, we provide a solution that will allow all businesses, no matter how large, an easy move to the cloud. Unlike other services, Zoolz does not cap bandwidth upload/download speeds nor does it set upload/download file size limitations. It can be used for quality cloud backup feasible for all businesses. Zoolz is the world's first cloud backup to adopt Cold Storage Technology to securely backup, archive and safe keep huge amounts of data to the cloud for a lifetime. Cold storage leverages the secure and reliable Amazon AWS technology everything is stored with 256-AES military grade encryption and transferred over an encrypted connection.

KEYWORDS: AWS, CLOUD STORAGE, SAAS, ZOOLZ.

INTRODUCTION

Storage as a Service is generally seen as a good alternative for a business and personnel to implement and maintain their own storage infrastructure. Cloud storage means the storage of data online in the cloud. Cloud storage is simply a term that refers to online space that you can use to store your data. Cloud storage provides a secure way of remotely storing your important data. Online storage solutions are usually provided using a large network of virtual servers that also come with tools for managing files and organizing your virtual storage space. Cloud storage can provide the benefits of greater accessibility, reliability, rapid deployment, strong protection for data backup, archival and disaster recovery purposes.

TYPES OF CLOUD STORAGE

Personal Cloud Storage: Also known as mobile cloud storage, personal cloud storage is a subset of public cloud storage that applies to storing an individual's data in the cloud and providing the individual with access to the data from anywhere. It also provides data syncing and sharing capabilities across multiple devices.

Public Cloud Storage: Cloud storage where the enterprise and storage service provider are separate and there aren't any cloud resources stored in the enterprise's data centre. The cloud storage provider fully manages the enterprise's public cloud storage.

Private Cloud Storage: In private cloud storage, the storage provider has infrastructure in the enterprise's data centre that is typically managed by the storage provider. Private cloud storage helps resolve the potential for security and performance concerns while still offering the advantages of cloud storage.

Hybrid Cloud Storage: A combination of public and private cloud storage where some critical data resides in the enterprise's private cloud while other data is stored and accessible from a public cloud storage provider.

Community Cloud Storage: The cloud infrastructure is shared by several organizations and supports a specific community that has shared concerns (example: mission, security requirements, policies and compliance considerations). It may be managed by the organizations may exist on-premises and off-premises.

CLOUD SERVICE MODELS

A Cloud is a type of parallel and distributed system consisting of a collection of interconnected and virtualized computers that are dynamically provisioned and presented as one or more unified computing resources based on service-level agreements established through negotiation between the service provider and consumers. Cloud computing is a general term for anything that involves delivering hosted services over the Internet. These services are broadly divided into three categories: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS). Cloud services include the delivery of software, infrastructure and storage over the Internet based on user demand. Fig 1 shows that levels of Cloud Computing.

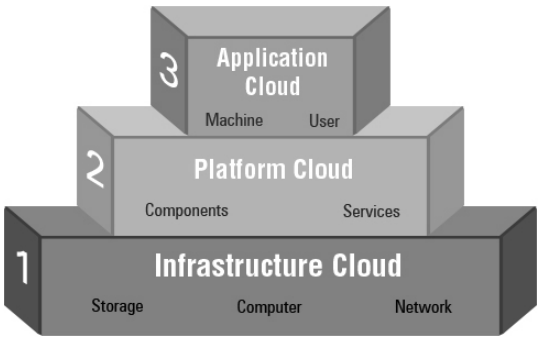

Fig 1: Cloud Computing Service Levels

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Infrastructure as a Service (IaaS): The capability provided to the consumer is to provision processing, storage, networks and other fundamental computing resources. 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.

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.

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 web browser. The consumer does not manage individual application capabilities with the possible exception of limited user specific application configuration settings.

CLOUD STORAGE

Cloud storage is a model of networked online storage where data is stored on multiple virtual servers, generally hosted by third parties, rather than being hosted on dedicated servers. Hosting companies operate large data centers and people who require their data to be hosted buy or lease storage capacity from them and use it for their storage needs. The data center operators in the background virtualized the resources according to the requirements of the customer and expose them as storage pools, which the customers can themselves use to store files or data objects. Physically, the resource may span across multiple servers, through based uses a Web Cloud storage services may be accessed through a web service application programming interface (API) or interface. The use of the term cloud in describing these new models arose from architecture drawings that typically used a cloud as the dominant networking icon. The cloud conceptually represented any to any connectivity in a network, but also an abstraction of concerns such the actual connectivity and the services running in the network that accomplish that connectivity with little manual intervention.

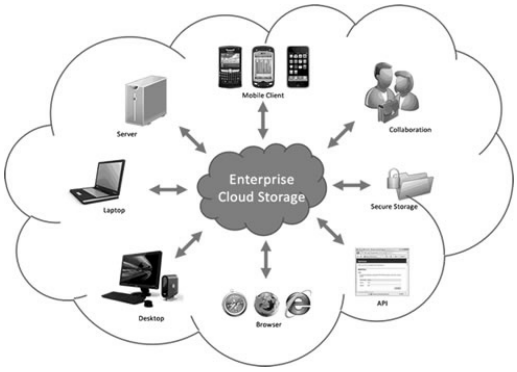

Fig 2: Enterprise Cloud Storage Architecture

Cloud storage is a cloud computing model in which data is stored on remote servers accessed from the Internet or "cloud". It is maintained, operated and managed by a cloud storage service provider on storage servers that are built on virtualization techniques. Cloud storage is also known as utility storage a term subject to differentiation based on actual implementation and service delivery. Fig 2 shows that, the Cloud Leverage storage platform scales to support business storage needs of any size. We use virtualization technology, which automatically increases capacity to support additional customers on the fly and ensures performance is always at its best.

CLOUD STORAGE REFERENCE MODEL

The appeal of cloud storage is due to some of the same attributes that define other cloud services: pay as you go, the illusion of infinite capacity (elasticity), and the simplicity of use/management. It is therefore important that any interface for cloud storage support these attributes, while allowing for a multitude of business cases and offerings, long into the future. The model created and published by the Storage Networking Industry Association™, shows multiple types of cloud data storage interfaces able to support both legacy and new applications. All of the interfaces allow storage to be provided on demand, drawn from a pool of resources. The capacity is drawn from a pool of storage capacity provided by storage services. Fig 3 shows the data services are applied to individual data elements as determined by the data system metadata. Metadata specifies the data requirements on the basis of individual data elements or on groups of data elements (containers).

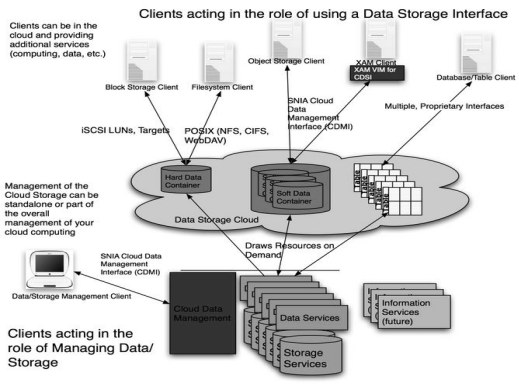

Fig 3: Cloud Computing Reference Model

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Cloud storage has the potential to truly disrupt the storage market due to its ability to provide "inherent" data protection and unlimited scalability, while imposing minimal infrastructure and management requirements on customers. This interface is also used by administrative and management applications to manage containers, accounts, security access and monitoring/billing information, even for storage that is accessible by other protocols. The capabilities of the underlying storage and data services are exposed so that clients can understand the offering. Conformant cloud offerings may offer a subset of either interface as long as they expose the limitations in the capabilities part of the interface.

ZOOLZ

Zoolz is a backup service that creates a continuous real time backup of your system and data providing your company with a scalable, reliable and a secure backup solution. Since data security is pivotal to the provider and user of backup software, Zoolz uses the highest security standards in transferring your data to and from our data centers. Using military-grade encryption, the user's data is protected from cyber-attacks, unauthorized access and theft. Zoolz is quick and simple to use. Once the app is downloaded, it rapidly scans folders for relevant files to add to the cloud. There is no need to make any configurations, and if a file has been changed, the updated versions will automatically upload. Zoolz is useful for people who have large volumes of media and documents and an interest in accessing them remotely and sharing them with others. It's a powerful means of securing important data, with download and uploads speeds up to five times quicker than its competition. Zoolz is new kid on the block among cloud-based backup service providers. In fact, both Zoolz and its parent company Genie9 are relative newcomers to this space.

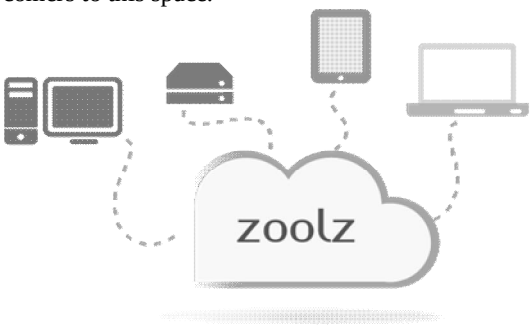

Fig 4: Zoolz for Everything

Fig 4 shows that with Zoolz, you can backup computers, laptops, netbooks, Windows Servers, Mac computers, and any external or network storage attached to your computers. Zoolz protects it all. In home computer or mobile device, open Zoolz web to access their backed up files and share securely with collaborators.

DEFINITION OF ZOOLZ

Zoolz is a long term storage unit for all data on your external, internal and network drives. Zoolz is designed for storing your data on the cloud for a lifetime. Fig 5 shows that Zoolz is the very first cloud backup to adopt Cold Storage Technology to securely backup, archive and safe keep huge amounts of data to the cloud for a lifetime. Zoolz is built entirely on Amazon AWS architecture.

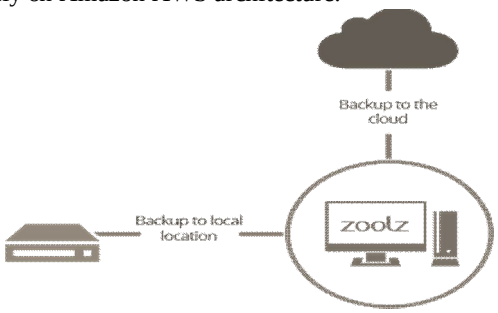

Fig 5: Zoolz Online Backup

FEATURES OF ZOOLZ

- **Continuous Backup:** Zoolz software will monitor file changes and backup your files as you update them.
- **Backup anything:** backup multiple computers, external hard drivers and even network drives onto Zoolz. There is no limit.
- **Multiple performance modes:** There are four backup performance modes: turbo, smart, battery saving and presentation.
- **Advanced file filtering:** It can filter by type, size, date and expression.
- **3 level data de-duplication.** Machine level, company level and global.
- **No limit on individual file size:** Whether you have 25GB MySQL database file or 10GB Light room files.
- **Several backup policies:** It can also set backup schedules and frequency.
- **Advanced user management:** Admins have the ability to configure the user data selection, privileges and settings all from one centralized location.
- **Mobile Apps:** get apps on both Android and iOS devices.
- **File retention rules:** Basically, can set file retention rules on your own.
- **Lightweight Client Software:** Most computation is done at the backend so the client software is very lightweight.
- **Share files:** easily share files via email and link generation and also protect your shared files with password.
- **Expiring Links:** This is the ability to expire links after one download.
- **Copy, Encrypt, Ship:** This is unique service Zoolz offers. Basically, can use utility software provided by Zoolz to copy and encrypt your data on an external hard drive and ship it to Zoolz and then they will process your files onto the cloud.
- **Cold Storage:** Built on top of Amazon Glacier storage infrastructure, it is meant for backing up rarely accessed files that don't need frequent updating. It is designed for archiving purpose and the cost is very low.

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- **Web console:** Apart from uploading and downloading files, all other functions can be done from the web interface.
- **Instant search:** A powerful search engine is built-in Zoolz web interface so that you can easily search among your files.
- **Easily switch between multiple computers:** If we are backing up multiple computers under the same account, we can easily switch between each computer under the same account.
- **Advanced reporting:** we can get all sorts of reports about your backups, including users across the globe and monitor each user's bandwidth usage.
- **Easy restoration:** we can do restoration via Web interface or using the client software. We can pause and resume your restores and it can restore to original file location or to different destination too.
- **Backup Windows servers:** Continuous data protection, backup while logged off, open file backup support and server level de-duplication that supports encrypted drives.

SECURITY & PROTECTION

Zoolz is actually built on top of Amazon AWS architecture, which is trusted by organizations like NASA, NASDAQ, National Institutes of Health and many others. There are 3 levels of encryption: 256 AES on machine, 128-bit SSL for data transfer, and 256-bit AES server side encryption. Data are stored on Amazon S3 and Glacier servers. According to Zoolz, this kind of security complies and surpasses with all laws and regulations required for data processing, transferring and storing such as Sarbanes-Oxley Act, HIPPA, PCI-DSS, GLBA, FISMA, and the Joint Commission. Zoolz protects your data with 256-AES encryption before it even leaves your network, 256-SSL encryption in transit and 256-AES encryption while at rest. Fig 6 shows that you can choose your own encryption key so that not even the Zoolz staff will ever be able to see any of your data. Also, files and folders you need to share are password-protected, and you can request a confirmation email that lets you know when files have reached the recipient. The administrative controls make it easy to deactivate users or passwords when needed for security purposes. It also unshared links to files and folders. Zoolz uses the Amazon Web Services infrastructure to store your data in any of Amazon's secure storage facilities around the world.

Fig 6: Remotely Access and Share with Zoolz

Users are able to provide others with access to their clouds by adding names via email and Facebook. The main app is used via Facebook, Zoolz also offers an app for mobile phones and iPads that allows film and music access while traveling.

COMPARISON

Table 1: Comparisons between Zoolz and Flickr

	Zoolz	Flickr
Files Supported	Everything	only photos
Upload Limitation	No Limitation	200 MB per photo
Privacy	Files are encrypted before leaving your machine using 256-AES. You can specify your own encryption password (optional)	Visible to everyone by default, no encryption
Image extensions supported	All including RAW image formats	JPEGs, non-animated GIFs, and PNGs. You can also upload TIFFs and some other file types, but they will automatically be converted to and stored in JPEG format.
File uploading	Automatic	Manual
Purpose of use	Backup and sharing	Photo sharing and streaming
Upload interruption	resumes where it left off	start the process from the beginning

Table 1 shows that difference in File storage, Uploading and usages.

DATA STORAGE

Zoolz is a pure-cloud solution. Multiple cloud storage providers are utilized to securely store the user's data. The list currently includes Amazon S3 and Amazon Glacier. This service provider is among the most trusted in the business as they provide the highest standards of data availability and service reliability. Data in storage is always present in an encrypted form using the AES 256 Encryption Standard SSE.

Hybrid+: Fig 7 shows, at any stage of the backup can enable Zoolz Hybrid+ to back up a copy of all your files to a local server, network or external drive. It zeros recovery time by intelligently prioritizing restoration of files from your local Hybrid+ storage instead of the online storage.

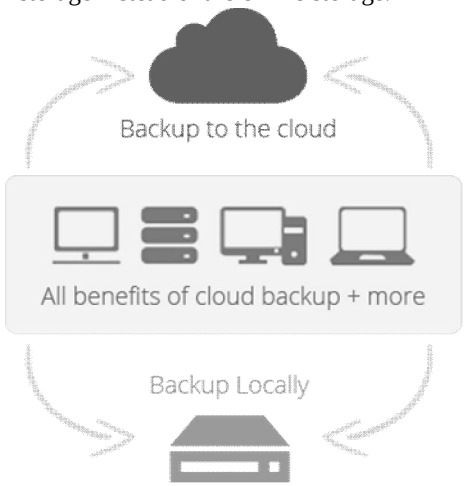

Fig 7: Zoolz Hybrid+ Storage

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CENTRALIZED MANAGEMENT

The Cloud Management Console allows controlling entire organization's backups. The management consoles also deploy Zoolz to client computers with simple email invites, whether it is one user up to thousands. This gives the administrator the ability to deploy policies, locally or globally and the control of managing and monitoring the entire process from a central location.

Enterprise level backend core: Zoolz uses the enterprise level, secure and reliable Amazon S3 Data centers. Your backups are duplicated and stored over multiple facilities across the globe ensuring on-demand data availability. All major computation is done on the back end cloud offering smooth backup and minimum performance impact on your side. Fig 8 shows, Zoolz is one of the cloud service providers for enterprise. It works more or same as the other cloud service provider. Zoolz also integrated with Facebook. It allows Facebook users to share their photos and videos. Zoolz user will face less complexity because this service supports both iOS and Android powered devices.

Fig 8: Zoolz Enterprise level backend core

COLD TECHNOLOGY

Cold Storage is an extremely low cost storage that provides an optimal, secure and reliable storage solution for data that is rarely accessed. It is designed to store your files for a lifetime as they are duplicated over multiple facilities across the Globe. Your hardware can fail, but your files will stay protected with Zoolz. Unlike other services, Zoolz is designed for safekeeping for retired and failed external drives or computers. There is no need to restore your rarely accessed data on your active computer or media, in order for your data to stay protected. Restoring cold storage files are delayed for 3-5 hours. However, recovery is extremely simple just go to My Computer from the web console and select your cold storage files, once they are ready you will receive an email with a secure link to download these files or folders. Cold storage leverages the secure and reliable Amazon AWS technology, everything is stored with 256-AES military grade encryption and transferred over an encrypted connection. It is a perfect solution to backup external drives, NASs, SANs and any big data stored for safekeeping, archiving or auditing purposes. To accelerate backing up big data, use Copy, Encrypt and Ship. Just copy and encrypt all your data to an external disk and ship the disk to us, backup will resume automatically taking new and changed files.

BIG DATA ARCHIVE WITH ZOOLZ

Zoolz is low cost cloud backup and archival system that leverages Amazon Glacier to give a complete and usable business solution and able to backup and archive data easily. Bypass internet by shipping your data to our data centers with Zero knowledge, Instant Search, Instant Browsing, 3-5 Hours Restore time, No hidden cost price includes, storage, transfer and recovery fee, Photo Previews (Big and small thumbnails) Perfect for photographs and media companies, Fast Recovery in case of large data recovery can accelerate the process by sending your files to an external hard disk. So, if 1 TB, 1 PB or even more can move them to the cloud easily with Zoolz. Fig 9 shows that the Zoolz is the most practical storage and archive solution which can replace tape backups and on premises storage, by providing easy retrieval and a cost effective solution.

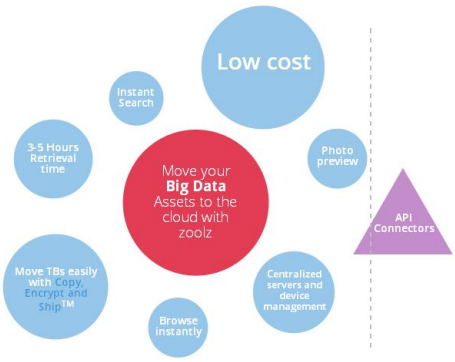

Fig 9: Big Data archive with Zoolz

CONCLUSION

This paper described the principal security measures offered by Zoolz to ensure the safety of the user's data. A Secure deployment of the software, transfer security, data encryption, and storage security all prove Zoolz to be a safe and a reliable cloud backup solution designed and constructed with security in mind. Cold storage leverages the secure and reliable Amazon AWS technology, everything is stored with 256-AES military grade encryption and transferred over an encrypted connection. Furthermore, Zoolz 2.0 is a complete comprehensive storage solution where you can backup desktops, laptop, external storage, network locations and even servers. Zoolz 2.0 leverages Amazon Glacier very beautifully by adding encryption, de-duplication, web viewing as well as browsing. With simply installing Zoolz you will instantly make your life easier, especially if you take a look at its many enticing features such as the introduction of Cold Storage which is the future of all backup solutions. All in all, Zoolz is the perfect business solution for both corporate and home users and with its compelling prices,

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REFERENCES

[1] Jiyi WU1,2, Lingdi PING1, Xiaoping GE3,Ya Wang4, Jianqing FU1, 2010 International Conference on Intelligent Computing and Cognitive Informatics, - Cloud Storage as the Infrastructure of Cloud Computing.
[2] http://searchsmbstorage.techtarget.com / feature / Understanding-cloud -storage -services-A-guide-for-beginners.
[3] http://www.Zoolz.com
[4] GurudattKulkarni, Ramesh Sutar, JayantGambhir / International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622 www.ijera.com Vol. 2, Issue 1,Jan-Feb 2012, pp.945-950 945 | P a g e - "Cloud Computing-Storage as Service".
[5] http://online-backup-reviews.biz/zoolz-reviews/ [Book Style].
[6] Zoolz_Security_Whitepaper.pdf
[7] **Pravin O. Balbudhe** and **Pradip O. Balbudhe**, International Journal of IT, Engineering and Applied Sciences Research (IJIEASR) ISSN: 2319-4413 Volume 2, No. 3, March 2013-Cloud Storage Reference Model for Cloud Computing.
[8] Dalit Naor, IBM Haifa Rese arch "Advanced Topics on Storage Systems" - Spring 2013, Tel-Aviv University - Introduction to Cloud :Cloud and Cloud Storage.
[9] http://code.google.com/apis/storage
[10] http://www.enisa.europa.eu/activities / risk-management / files / deliverables /cloud-computing-risk-assessment
[11] https://www.zoolz.com/meet_zoolz?p=true
[12] http://www.iiste.org/Journals/
[13] http://www.ijccts.org
[14] http://theinstitute.ieee.org /technology-focus / technology –topic / a-view-inside-the-cloud
[15] www.clouddrive.com.au-WhitePaper.pdf
[16] Securing Your Data in the Cloud: An insider's perspective posted on July 6th 2011at 15.48
[17] A New Cloud Computing Journal: "IEEE Transactions on Cloud Computing". Editor-in-Chief: Rajkumar Buyya. Submissions are invited. Details at:http://bitly.com/WiKqtV
[18] IJCSI International Journal of Computer Science Issues, Vol. 9, Issue 1, No 1, January 2012, ISSN (Online): 1694-0814
[19] Storage Networking Industry Association. Cloud Storage Reference Model, Jun.2009.
[20] http://www.business.att.com/enterprise/Service/hosting-services/cloud/storage/