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A Review on Key Technologies Based on Cloud Storage Architecture

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Abstract: This paper proposes a general design of cloud storage system, analyses the functions of the parts, and discusses the key technologies, etc. Cloud storage could be a novel storage service mode which the service suppliers provide storage capacities and information storage services through the net to the clients; meantime, the clients needn't apprehend the main points and lowered structures and mechanisms. The planned design of cloud storage is layered and cooperative, and therefore the mentioned key technologies involve preparation, storage virtualization, information organization, migration, security, etc. The operation mechanism as well as ecology chain, scientific theory, hymenopter on colony optimisation, data life cycle management, maintenance and update, convergence and evolution mechanisms area unit analysed too. therefore, AN overall and new viewpoint to cloud storage system is illustrated.

Keywords: Cloud Storage Architecture, Key Technologies, Operation Mechanism, Ecology Chain, Game Theory, Ant Colony Optimization.

I. INTRODUCTION

Cloud computing is associate in nursing rising computing platform, and repair mode, that organise and schedule service supported the net. Cloud storage is one amongst the services which give storage resource and repair supported the remote storage servers supported cloud computing. Cloud storage are able to give storage service at a lower value and a lot of reliable Ness and security. Cloud storage system could be a cooperation storage service system with multiple devices, several application domains, and plenty of service forms. The event of cloud storage system is like the wi-fi network, web 2.0, storage enterprise-level, storage network, appeal storage included with servers and storage devices, cluster technology, grid computing, distributed file system, content delivery network, peer-to -peer, knowledge compression, data cryptography, etc. the ease of the paper is put in order as follows. Section a pair of introduces related work. Section three proposes a general design of cloud storage. Section four proposes policies of construction. Section 5 discusses the key technologies of cloud storage system. Section seven makes a conclusion. There area unit several cloud computing and cloud storage suppliers, such as EMC, NETAPP, HP, NIRVANIX, HDS, SYMANTEC, etc.

There are additional and additional cloud storage platforms, e.g., google drive, one drive, drop box, box and amazon s3, etc platform, file store, and kfs, etc. The storage network business association (snia) proposes cloud storage initiative (csi) to adopt cloud knowledge management interface (cdmi) normal as cloud service normal. Yunhong gu et. Al projected sector [1] that allows users to work with massive datasets hold on over multiple distributed nodes as if the files were on their native disk. Users don't ought to find data, manage knowledge across multiple nodes, keep a copy knowledge, and manage the addition of recent nodes or the deletion of existing nodes to the system. The paper [2] present metacdn, a system that put to used 'storage cloud' resources, making associate integrated overlay network personal or room use is granted while not fee only if copies area unit not created or distributed for profit or business advantage which copies bear this notice and also the full citation on the primary page.

To copy Otherwise, to republish, to post on servers or to spread to lists, requires previous specific permission and/or a fee. Icis 2009, November 24-26, 2009 seoul, korea copyright © 2009 acm 978-1-60558-710-3/09/11... $10.00" 1044 that provides a coffee value, high performance cdn for content creators. Metacdn removes the complexness of coping with multiple storage distributor, by showing information gathering coordinate with and putting customer satisfied onto one or a number of storage suppliers contribute to their aspect of good turn, content and allocate alternative. Metacdn makes

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it trivial for content creators and customers to harness the performance and coverage of various 'storage clouds' by providing one united namespace that creates it straightforward to integrate into origin websites, and is clear for end-users. The paper [3] projected a live storage migration mechanism over Wan, which may be referred in storage distributed migration.

The speedy development of cloud computing and cloud storage can produce cloud resource market and brought within the cloud services There exist many clouds storage style theme from altogether totally different cloud storage service platform. they are generally complexity and incompatible. we tend to tend to propose a stratified and generalized style of cloud storage. Cloud storage could also be a service kind supported cloud computing.

II. (1) DEMAND ANALYSIS

Cloud storage is occupation for pervasive storage desires and massive storage desires. The operation and perseverance are supported by the storage systems. Programs, data, texts, pictures, videos, etc. unit of measurement all needed to store at intervals the storage systems. Mobile terminals, PC, consume physics like cameras, smart phones; MP3/MP4, etc. unit of measurement all would love extra and extra storage resources.

Usually, native storage is not ample, and lost merely, and consistency assurance once data hold on across multiple storage devices, etc. Therefore, the desired and generality of storage requirements results to that the properties of cloud storage ought to be low cost, easy maintenance, reliable, security, retrievable, etc.

II. (2) STYLE OF CLOUD STORAGE

Cloud storage consists of thousands of storage devices clustered by network, distributed classification systems and different storage middleware to produce cloud storage service for users. the everyday building of cloud storage carries storage method pool, distributed classification system, service level agreements (SLA), and service interfaces, etc.

Globally, they'll be divided by physical and logical functions boundaries and relationships to produce more compatibilities and interactions. supported this idea, the architecture planned here unit of measurement as follows. it is a stratified model.

The design from bottom to higher is network and storage infrastructure, storage management, data management, storage overlay, service interface. The careful functions area unit discussed later.

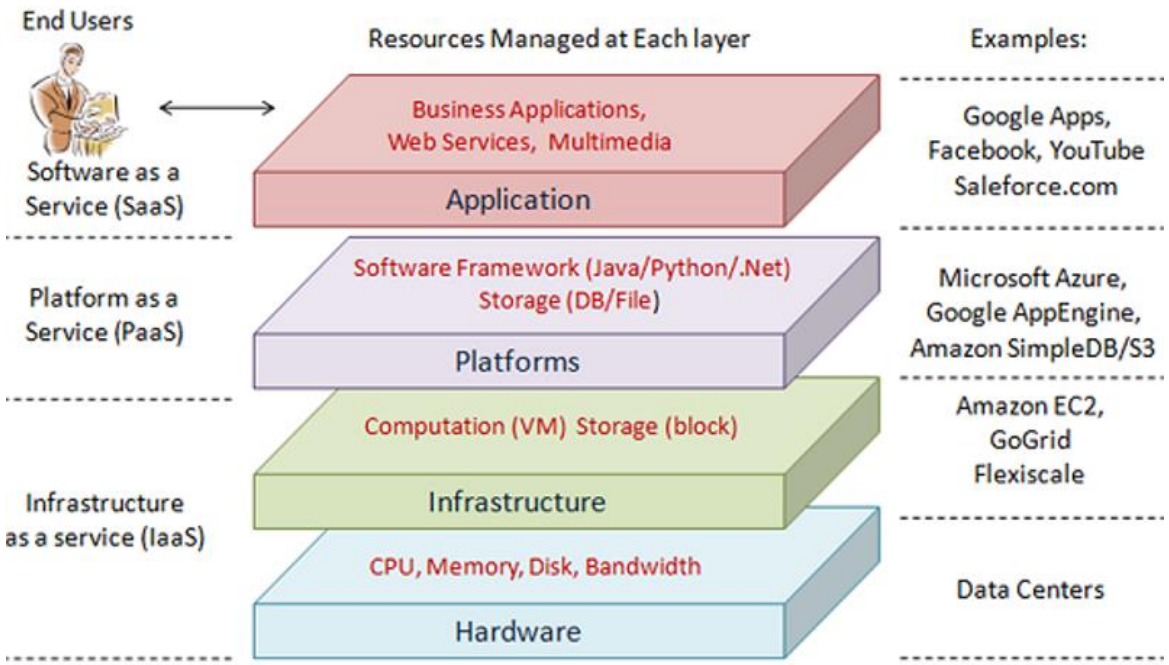

Fig.1

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In network and storage infrastructure, there area unit distributed wired and wireless networks, storage devices networks. In storage management, geographical distributed storage resources area unit organized by domains and logical entities, data can be kept by files or blocks in storage media. The information management clusters the worldwide domain knowledge storage metadata info and collaborate totally different domains to load balance.

II. (3) FUNCTIONS OF THE ELEMENTS

According to the planning of cloud storage, the infrastructure layer includes network, nodes hardware, and native operations and file systems. The storage management layer includes native storage organization and remote storage redirection. The data management implies that they're going to be centralized and distributed to multiple nodes to promote the performance of question services. The storage surface layer response for the description of the cloud storage system, virtualization storage resources and programming optimized. The service interface layer provides shoppers access interface and applications interface or API calls.

III. POLICIES OF CONSTRUCION

Cloud storage is de facto the implementation of storage as a service. The policies of construction of cloud storage embrace that requirement analysis, capability prediction and performance planning, deployment, verification, distribution, maintenance, and updatability. The goal is to construct AN accessible, reliable, cooperative, scalable, secure, concurrency storage system at economic and wise mode. To construct cloud storage system, the divide storage piece of equipment with related management package needs to be combined with each other by virtualization, cluster and integration to reveal a unified infinite computer hardware resource pool to users. In the building of cloud storage, the QoS (Quality of Service) is one all told the mandatory factors of storage performances.

IV. KEY TECHNOLOGIES OF CLOUD STORAGE SERVERS

The key technologies of cloud storage embrace several sides from servers, networks, clients, and connected management measures, i.e., availability, dependability, virtualization, feedback, credits security, etc. Cloud storage system ought to support automatic management, distributed collaboration, knowledge integration, SLA matching, QoS, certification, access management, authority assignment, audit, etc. The following discussions primarily concentrate on the cloud storage servers and a few connected management measures.

(1) Readying of Cloud Storage

The readying phases of cloud storage embrace the subsequent items: needs analysis, storage resource redirection, optimization and evolution, etc.

(2) Virtualization and convenience of Cloud

Storage Virtualization is applied pervasively to several domains, such as operation system, servers, network, storage, etc. Storage virtualization is to map logical storage to physical storage in information access procedure. The cloud storage virtualization can facilitate to hide storage geographic positions and storage modes and alternative technology details to storage users and purchasers. The vacancy of cloud storage involves determined continuity and recovery. High convenience is required to make sure application QoS. Standard and customary file systems like NFS, CIFS, and GFS, etc. area unit adopted. Like UNIX operating system classification system VFS, a replacement cloud file system is also propelled at close to future.

(3) information Organization of Cloud Storage

The data organization of cloud storage may be info mode, file level, or block level. The info may be business info product, or gap supply info. info is organized as records to boost the retrieving speed. however, the info will solely manage some fixed varieties information. The file level may be versatile and changeable in step with the appliance process.

Block level is that the lower storing info, and also the databases or files are all supported the block level. Pure block level information ignores semantic, and it should be combined with alternative storage organization mode over it. Object homeward storage is associate degree rising storage mode and it may be intelligent if addition to some autonomous.

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(4) knowledge Migration and cargo Balance

Data migration of cloud storage suggests that moving knowledge in one storage system to alternative storage system in several places. It aims in cooperation and keeping load balance in cloud storage system. When the storage capability is employed over some threshold proportion values, the info ought to be migrated into alternative cloud storage units and keep pointers within the previous hold on positions, or modify and update the data at a similar time. Load balance is to stay accessible storage areas for later application in several storage devices in cloud storage system.

It can improve storage responsibility and convenience globally. Data migration is one in all the effective mechanisms for load balance, but it may bring overhead employment to network information measure and I/O activity, and it doesn't cure entry line of coincidence clients.

Data replication is that the specifical case of the info migration if the original knowledge is unbroken. knowledge replication could be a smart resolution to the single purpose fault in distributed cloud storage system, that keeps multiple copies of a similar content in several storage devices and places.

(5) knowledge Deduplication

Data deduplication [7] [8] could be a new technology in storage backup, recovery and archiving to scale back the occupied storage areas by compress the interior duplication knowledge. knowledge deduplication is that the best thanks to dramatically scale back knowledge volumes, slash storage requirements, and minimize knowledge protection costs and risks [7]. For the exponential growth enterprise and science knowledge, there'll want a massive cupboard space, knowledge deduplication can bring relevant massive storage space savings and also the price reductions.

For the massive scale of cloud storage, knowledge deduplication is an honest resolution to save storage volumes and build storage knowledge move secure and reliable. however there still a drag concerning wherever to try and do knowledge deduplication, e.g., whether or not in cloud servers or in purchasers.

(6) Storage Security

Storage security involves storage media physical security and knowledge security. As general network storage, the safety of cloud storage includes certification, authority, audit and encoding, etc. Through automatic redundant replications the info is straightforward recovery once failover.

The cloud storage security may expand to the hold procedure of storage service, as well as hardware, software, data, knowledge, data security and clients' privacy security, etc. Cloud storage is be liable to `join with cloud security, which will offer a lot of strong security.

V. OPERATION MECHANISM

The operation mechanism of cloud storage system suggests that dynamic and extensive live storage corporation, service delivery and charge and the price is allotted by the time and cupboard space. in several periods and totally different places, the applications might have totally different storage needs. the full cloud storage system will be thought as AN ecology system that storage resource is manufacturing and intense. we tend to propose that the sport theory and pismire colony optimization might improve the performance and potency.

(1) Ecology Chain of Cloud Storage

The cloud storage is also thought as AN ecology system of storage producing and intense, which incorporates cloud storage suppliers (hardware suppliers, package providers), storage integrators, storage brokers, knowledge centres, content suppliers, and shoppers.

The upper layer and also the lower layer will interaction with one another through dealings contract and additional price services. The ecology chain will be divided into 2 sub-cycles, i.e., storage resource producing chain and storage resource intense chain, as Figure.

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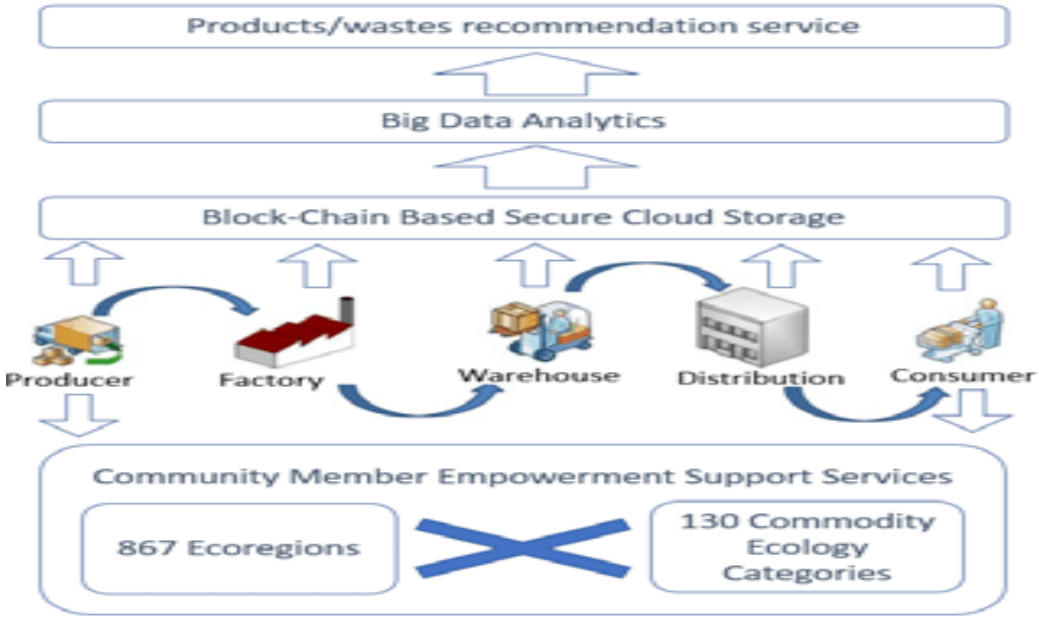

Fig.2

VI. CONCLUSION

The paper proposes the design of the cloud storage, and discusses the connected key technologies. though the applications of cloud storage are developed much and speedily, the synthesis and working process in business and trade should still want unified specifications and standards. The paper proposes layer design of cloud storage, discusses the deployment, virtualization and accessibility, information organization, datamigration and cargo balance, redundant information deletion, storage security, etc. within the operation mechanism, ecology chain, game theory, emmet colony improvement and storage resource convergence and evolution mechanisms square measure given that be future deep analysis.

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