Data Placement in Object Storage Based Multiple Containers in Cloud Environment

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Abstract—Cloud computing is an Internet based processing where virtual shared servers give programming and different resources. Cloud storage is only capacity of information on outsider cloud servers. The benefits are boundless capacity, backup and recovery. The bad marks are specialized issues, cost and absence of backing in security. In This paper, we made to build an application for cloud security in IBM bluemix cloud to partition the data and storing them into multiple containers of object storage. Object storage is a resource which is used in IBM bluemix cloud to store a data. Hence the data is retrieve when needed by merging it. An proposed efficient data placement algorithm is used. This will consider how to place the files efficiently to the containers in object storage. Beside, the files will merge when client needs it back. So some additional algorithms is also used for partitioning and merging of files. Our goal is to achieve good security for cloud storage system, through proposed algorithm by using multiple containers of object storage in cloud.

Keywords— Cloud, Object Storage, Security, server, Data, Container.

I. INTRODUCTION

Cloud computing conveys enormously versatile registering resources as an services with Internet based advancements. Resources are shared among an incomprehensible number of customers taking into account a lower expense of IT proprietorship. At present, cloud computing is broadly examined in the technology world and industry. Virtualization, circulated registering innovation etc, cloud computing incorporates the processing, storage, organizing and other figuring resources, and rents to clients. Such mode could decrease the expense of big business data development and quicken the information of big business. The Cloud storage is intended for virtualized PC environment. The cloud storage is actualized utilizing cloud computing that implies using the product and equipment resources of the cloud computing services supplier.

Cloud computing is developing at a high speed in the IT business around the globe. While there are numerous points of interest of cloud computing, the undertakings are as yet holding up to utilize cloud computing, on account of the information security issue of cloud computing is not illuminated totally. Cloud storage gives a virtual space to store mass information. Be that as it may, the information proprietors have no power over their information. The cloud supplier has full control on the client's information. This makes the client's psyche to thing about the information security in the cloud. To overcome this problem in this paper, we made to build an application for cloud security in IBM bluemix cloud to partition the data and storing them into multiple containers of object storage. Object storage is resource which is used in IBM bluemix cloud to store a data. Hence the data is retrieve when needed by merging it. An proposed efficient data placement algorithm is used. This will consider how to place the files efficiently to the containers in object storage. Beside, the files will merge when client needs it back. So some additional algorithms is also used for partitioning and merging of files.

IBM Bluemix is the IBM open cloud stage that gives mobile and web creators access to IBM programming for mix, security, exchange, and other key capacities, and programming from business accomplices. Bluemix likewise has cloud arrangements that fit your needs. Whether you are a little business that arrangements to scale, or a vast endeavor that requires extra disengagement, you can create in a cloud without fringes, where you can associate your committed services to people in general Bluemix services accessible from IBM and outsider suppliers. All services cases are overseen by IBM. Bluemix likewise gives middleware services to your applications to utilize. Bluemix follows up for the application's sake when it procurements new services cases, and after that ties those services to the application. Your application can perform its genuine occupation, leaving the services of the services to the infrastructure. As a rule, you don't need to stress over the working framework and infrastructure layers when running

applications on Bluemix. Layers, for example, root filesystems and middleware segments are dreamy with the goal that you can concentrate on your application code.

This paper is organized as follows; Section II describes literature survey, Section III provides descriptive details of IBM bluemix cloud and Section IV provides concept of IBM bluemix Devops services and Section V describes Data partition and merge techniques and Section VI demonstrates design and implementation results.

II. LITERATURE SURVEY

There are huge measure of researches in the outline of cloud storage. A considerable lot of these looks into are document framework based capacity framework, for example, GFS[1] and HDFS[2]. These structures are expert slave directing worldview. In those capacity frameworks, replication services is performed by utilizing default imitation number. Also, the capacity of information is accomplished by information movement in these frameworks. It can cost more data transfer capacity use to the entire framework.

The ecStore, an exceptionally versatile conveyed storage framework with extent inquiry and exchange support. The outline of ecStore depends on appropriated record structure called BATON (Balanced Tree Overlay Network)[3]. Regardless of the impact of single expert hub disappointment, it is sorted out into shared virtual system structure on capacity nodes[4]. The ecStore additionally connected information relocation strategy to store information in hubs and it needs to rebuild the BATON at whatever point issue happens in framework.

Another procedure for protection moderating information distributed subtle element review in[5] demonstrates that the creator considers delivering mark methods for giving security and protection in information storage. Dynamic operations are conveyed utilizing the RSA based capacity security technique. This strategy utilizes open inspecting of the remote information by improving existing RSA based mark generation. This open key cryptography system is generally utilized for giving security and information accuracy in cloud storage.

Data placement based on cloud storage has been proposed method in storage system. The proposed Idea of effective storage management scheme used in multiple containers of object storage service in IBM bluemix[6]. Many cloud storage systems applied different strategies for effective storage, but they do not consider available storage and has some other issues. In this paper, therefore an efficient data placement algorithm is proposed with some additional algorithm for data partition and merge. The cloud storage application is designed based on data partitioning[7] and

widely distributed, to multiple containers of object storage in IBM bluemix cloud.

III. IBM BLUEMIX CLOUD

A. Regions

A Bluemix area is a characterized topographical region that you can convey your applications. You can make applications and services occasions in various areas with the same Bluemix infrastructure for application services and the same use details elements view for charging. You can choose the area that is closest to your clients and convey your applications to this area to get low application inertness. You can likewise choose the area where you need to keep the application information to address security issues. When you assemble applications in numerous areas, in the event that one locale goes down, the applications that are in alternate areas keep on running. Your asset stipend is the same for every area that you utilize. On the off chance that you are utilizing the Bluemix client interface, you can change to an alternate area to work with the spaces in that area.

B. Infrastructure

Bluemix offers three courses for you to run your code: Cloud Foundry, IBM Containers, and Virtual Machines. The IBM Containers and Virtual Machines are accessible in just the US South and Europe United Kingdom area. You can pick the right base for sending your applications.

Cloud Foundry :- Apps running in the Cloud Foundry infrastructure work with existing Cloud Foundry applications and can tie to any of the services accessible in the Bluemix Catalog. With this framework, you create and deal with your application code and Bluemix deals with the services and upkeep of the base that powers those applications.

IBM Containers :- With the IBM Containers base, you can run your web application anyplace that backings compartment sending. A compartment is an article that holds everything that is required for an application to run. This infrastructure incorporates a private registry for your trusted pictures, with the goal that you can transfer, store, and recover them. You can then make those pictures accessible in Bluemix and deal with your compartments in the stage.

IBM Virtual Servers (BETA) :- IBM Virtual Servers is a facilitated cloud environment, some portion of IBM Bluemix, that you can use to fabricate, run, oversee, and screen your applications, while keeping up the most control over your applications and the middleware on which they run. Use Virtual Servers to separate your business

arrangements, particularly when you convey your applications in an open cloud.

C. Applications

In Bluemix, an application, speaks to the ancient rarity that an engineer is building. The application lifecycle in Bluemix and Cloud Foundry are indistinguishable, paying little respect to how you push the application to the Bluemix.

Mobile apps :- Mobile applications keep running outside of the Bluemix environment and use benefits that the mobile applications are presented to. These services regularly act in show, and speak to the back-end projection of that application. Bluemix can likewise have application code that the designer would rather keep running on a back-end server in a compartment based environment.

Web apps :- Web applications comprise of all the code that is required to be run or referenced at run time. Web applications are transferred to Bluemix to have the application. For dialects, for example, Java, where the source code is aggregated into runtime parallel records, just the twofold documents are required to be transferred.

D. Services

An services is a cloud expansion that is facilitated by Bluemix. The services gives usefulness that is prepared to use by the application's running code. The predefined services that are given by Bluemix incorporate database, informing, push warnings for versatile applications, and flexible reserving for web applications. you can make your own particular services in Bluemix. These services can shift in multifaceted nature. They can be basic utilities, for example, the capacities you may find in a runtime library. Then again, they can be mind boggling business rationale that you may find in a business process displaying services or a database. Bluemix disentangles the utilization of services by provisioning new cases of the services, and tying those services occurrences to your application. The services of the services is taken care of naturally by Bluemix.

IV.   IBM BLUEMIX DEVOPS SERVICES

IBM Bluemix DevOps Services is programming as an services (SaaS) on the cloud that backings persistent conveyance. With DevOps Services, you can create, track, arrange, and convey programming in one spot. From our activities, we can get to everything that we have to assemble a wide range of applications. You can chip away at your own particular or utilize the coordinated effort apparatuses to work with a group. After you fabricate an application, you can send it to the IBM Bluemix cloud stage. In minutes, you can go from source code to a running application.

A. DevOps Services capabilities

Nimble arranging through the Track and Plan services. a Web IDE where you can alter and oversee source control. Source control services (SCM) through Git, Jazz SCM, or GitHub. Mechanized forms and organizations through the Delivery Pipeline services.

B. Bluemix and DevOps Services

Bluemix is the stage where you convey your application and include services. The Bluemix Catalog contains services for information services, versatile applications, cloud combination, web applications, and security. The DevOps services in the Catalog are Delivery Pipeline and Track and Plan. You can make an undertaking in DevOps Services or from your Bluemix application with a tick of the ADD GIT catch.

C. Development support

In DevOps Services,you can create programming for any dialect. You can likewise add Agile arranging components to your venture. The Web IDE gives content help, tooltips, reviews, approval, and sentence structure highlighting for JavaScript, HTML, CSS and so on. Likewise, DevOps Services underpins sending to Bluemix with predefined buildpacks for Java, Node.js, Go, PHP, Python, and Ruby applications.

V.   DATA PARTITION AND MERGE TECHNIQUES

A. Architecture

In Fig-1 shows an architecture of the proposed system, it includes a Client, application and cloud. The client can send a data to the application for partition and merge. The Cloud Storage provides the hardware and storage resources for large scale data storage. The application layer which provides interfaces for clients to do the operations. The main focus of our work consisting of data partitioning and merging method to support cloud storage and retrieval effectively. The proposed technique handles both text file and image file.
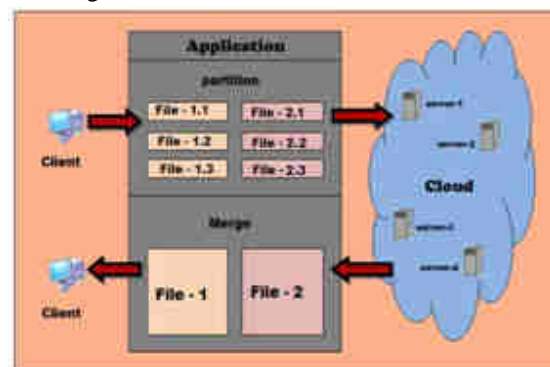

Fig.1: Cloud Storage Architecture.

B. Data Placement Technique

In this paper, an efficient data placement algorithm is proposed. The Application is designed based on data partitioning and merging. The partitioned data can widely cloud to multiple containers of object storage in IBM Bluemix. Data placement is efficient for storage system. After determining how many files partitioned, the technique is maintain a file to move on to containers. we will consider how to place these files efficiently to containers. so the data placement algorithm is used to place files among containers in object storage.

$$CN_{weight} = CN_{DiskSpace} + CN_{Avail}$$
$$CN_{Avail} = CN_{weight} - CN_{DiskSpace}$$

Where,

CN_{weight} --Container Weight

$CN_{DiskSpace}$ --Container disk space

CN_{Avail} --Container Available

Step 1   **: Select object storage.**
Step 2   **: Select container in object storage.**
Step 3   **: check availability in container.**
            $$CN_{Avail} = CN_{weight} - CN_{DiskSpace}$$
Step 4   **: check weight of container.**
            $$CN_{weight} = CN_{DiskSpace} + CN_{Avail}$$
Step 5   **: Store the files in container.**

C. Algorithm
I. Partition for text file
Step 1   **: Browse the File for Partition.**
Step 2   **: Set no of lines to split.**
Step 3   **: Set count to find no of lines in the file.**
Step 4   **: Partitioning File:**
            Split = Count / No of lines.
Step 5   **: Set new files.**
            New files = Split.
Step 6   **: Create output path.**
Step 7   **: Show newly generated file in output path.**

II. Partition for Image file
Step 1   **: Browse the image for Partition.**
Step 2   **: Set rows and columns for split the image.**
Step 3   **: Give value to rows and columns.**
Step 4   **: Set chunks to calculate rows and columns.**
            Chunks = rows * columns.
Step 5   **: Set chunk Width and chunkHeight to determine the chunk size.**

Step 6   **: Set count to find no of chunks.**
            Count = Chunks.
Step 7   **: Create output path.**
Step 8   **: Show newly generated images in output path.**

III. Merge for text file
Step 1   **: Browse the File for merge.**
Step 2   **: Create output path.**
Step 3   **: Set files to find no of splitted files.**
Step 4   **: Set mergedfile to store output path.**
Step 5   **: Set aLine to find no of lines in each file.**
Step 6   **: Merging File:**
            Merge = files + aLine.
Step 7   **: Show newly generated file in output path.**

IV. Merge for Image file
Step 1   **: Browse the image for Partition.**
Step 2   **: Set rows and columns for merge the image.**
Step 3   **: Set chunks to calculate rows and columns.**
            Chunks = rows * columns.
Step 4   **: Set chunkWidth and chunkHeight to determine the chunk size.**
Step 5   **: Set finalImg to create output image.**
Step 6   **: finalImg = chunkWidth*columns + chunkHeight*rows.**
Step 7   **: Create output path.**
Step 8   **: Show newly generated images in output path.**

VI.   DESIGN AND IMPLEMENTATION
A. Application Design
User Interface :- In cloud innovation, User scan the application through skimming interfaces. Client associate with Application to perform the errand. At the point when an application peruses a data from the client then it can interface with cloud Environment.

Partition :- User collaborate with Application to segment the information and store on to various servers. At the point when record went into the application it will parcel. At the point when an application peruses a record, it can partition and afterward contacts a cloud storage. After that document give demands and exchange to the wanted asset in cloud.

Merge :- The application may included the procedure of union. At the point when document went into the

application it will do consolidate. The put away can get from were they put away and do the procedure of union.

Storage :- The outlined storage framework depends on various holders in cloud System. The item storage comprise of various compartments, which oversees information joined to it. The item storage are in charge of serving store demands from the customer. In the proposed framework, the single item storage deals with the entire holders.

Retrieval :- The application can include record recovery process. at the point when solicitations touch base from the customer side and if solicitations are information recovery demands, then application can do the procedure of recovery, the put away can get from where they put away.

B. Implementing The App In Bluemix Environment

I. Create an app in Bluemix

Sign into the Bluemix. In Fig-2 at that point Dashboard demonstrates an outline of the dynamic Bluemix space for your association. As a matter of course, the space is dev and the association is the client name of the individual who made the venture. Click CREATE AN APP. For the sort of application that you are making, click WEB. For your starter, click Liberty for java. Survey the docs and points of interest, and after that snap CONTINUE. Name your application and afterward click FINISH. The name is a remarkable URL where you get to your application. After a minute, the application begins. The application's Overview page opens and demonstrates that the application is running. you can see and adjust its code by utilizing DevOps Services.
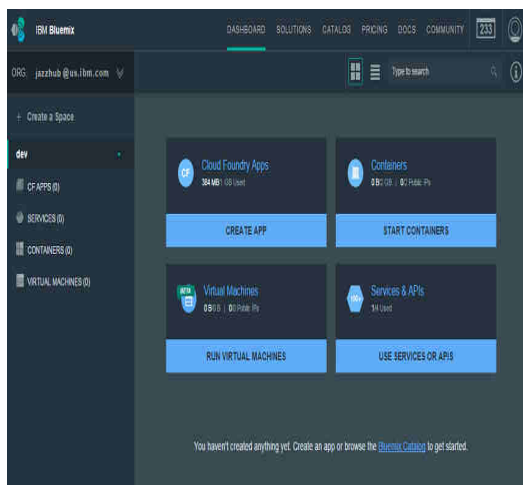

Fig.2: Create App In bluemix

II. Set up Git integration and auto-deploy in DevOps Services

You can work with your application's code from multiple points of view. For instance, with auto-convey, you can adjust the code that keeps running in your application by pushing your progressions to a Git storehouse. You can auto-send your code on the off chance that you utilize the Build and Deploy abilities of DevOps Services. To empower auto-send, go to your application's Overview page on the Bluemix Dashboard and snap ADD GIT. A Git store is made and is populated with illustration code and a sent application. You may be incited to enter your secret key to confirm that DevOps Services can follow up for your sake. After you made a Git archive, Go to the application's Overview page and snap EDIT CODE. Your new venture opens in the web coordinated improvement environment (Web IDE).

III. Push changes to the Git repository by using the Web IDE

The incorporated Web IDE depends on the Eclipse Orion open-source venture. You can alter documents with linguistic structure shading support for numerous dialects, including HTML, CSS, JavaScript, Ruby, and Python. For a few dialects, for example, JavaScript, the Web IDE additionally underpins grammar checking and code finish, both for standard dialect builds and for the services that Bluemix gives. In the index, discover a document to change. In Fig-3 shows, alter the document in the editorial manager and Push the change by utilizing the incorporated Git support. From the furthest left menu, tap the Git Repository symbol. Select check box for the changed record. Sort a submit message, and afterward click Commit. In the Outgoing segment on the left, click Push.
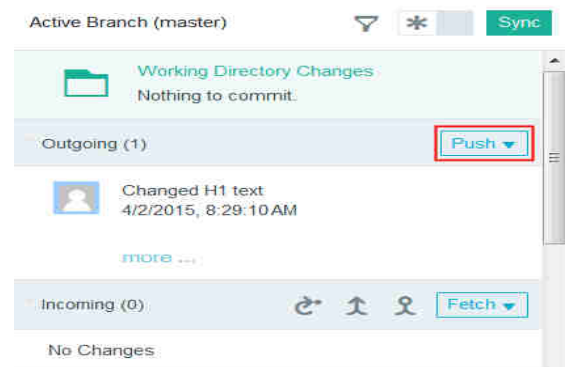

Fig.3: Push changes to GIT repository

To confirm that your code was sent, click BUILD and DEPLOY and hold up until you see a sign that the application was conveyed once more. In Fig-4 the Deploy

stage, in the LAST EXECUTION RESULT segment, tap the URL join under the application's name.

Fig.4: Deploy code to Devops

VII. CONCLUSION

Cloud computing is productive figuring services to an individual and venture clients. Because of some of security issue on it, individuals may think to utilize it. Once the issues are determined, cloud computing will be the trillion dollars business in the technology world. The Data storage on un-trusted cloud makes as a security issue. Data security in the cloud is guaranteed by the privacy of delicate information should be enforced on Cloud storage. In This paper, we created an application for cloud security to partition the file and putting away them into different containers of object storage in IBM Bluemix cloud and henceforth to recover the file when required by merging it. An proposed efficient data placement algorithm is used to place the files efficiently to the containers in object storage. Some additional algorithms is also used for partitioning and merging of files. IBM Bluemix is the IBM open cloud platform that consists of apps, services and other components. The app is created and deploy with object storage service to store the data on different containers. The main purpose of this app is to achieve the security in cloud environment.

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