Cost and Communication Efficient Framework for Privacy Assured Data Management Cloud

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Abstract: Now a days the data on cloud is one of the major concern for the researcher and enterpriser, in respect with cost maintenance, availability for the use with greater reliability over the transfer. Storing the data and hosting with the cheaper cost is one of the major task. Once user put data on cloud he fell confident on data. In this regard we have proposed a scheme where authenticity of data is protected while transfer. This scheme also work for the optimization of cost while transfer from one to other with secure channel for transfer. The optimization of image is very good with the fragmentation of pixel. Time required for the reconstruction of image is very less so that system is more efficient .The chunk of image is decide by the user with fix number so it's easy to avoid losses in fragmentation .The encryption technic used for the security aspect while transferring data or images .We have provided 2 level security first for chunk with encrypted format and the file where chunk sequence are stored is also in encrypted format We have found that our scheme shows greater performance with the existing system with the variety of aspects.

Keywords: Cloud, Authenticity, Optimization.

I. INTRODUCTION

Cloud is the place where major task deals with the security while transferring the files. Files on the cloud has a major aspect with the storage cost as well. The use of cloud services needs to payable in system. The logic of every type of cloud usage is different. The types of server has different service aspect as well number of users in it. The private cloud has a very limited users which are already predefined in a system .This type of cloud are more secure than any other type. The process of authentication is majorly use for the security .The storage of personal cloud has a limited files on it .The public and hybrid type of clouds deals with the major security challenges because of different type of users. In the Cloud major concern with the security storage and working of it. [1][4]Infrastructure as a service (IaaS) cloud is rapidly emerged as one of the best It model for the data delivery in cloud computing. This helps to reduce the cost and helps in more utilization of data at different centers. The cloud release the different resources after the complete use of it. The private cloud. [1] The data reliability is one of the most promising task in cloud enterprises. Customer need it with 24 hours working business model. The movement of data on cloud the user has no control to given on their own data set. This leads in to lose the control on self-data on cloud [1].

The major and important internet service or the content distributed with the application such as video streaming, file share between different users, large volume data with the highly dynamic data. In the substantial progress over the bandwidth usage the system will be highly benefited for the business. [2]

Adaptive bitrate streaming has been used for the video streaming while data on the cloud is operated. This support the growing media consumption in the environment of different parts such as heterogeneous. [3] Partial transcoding scheme is used to lower the cost with the segment values. [3] These is explosive growth in the data over the cloud storage with the images in last some decades. The major task over the local network and global network with replica store and work on it .This should shows the regular data work on it and avoid multiple replica and store one point [4]

The cloud services should work efficiently at the end user. If the number of users are more than the system should not get block this solution can be provided with a new framework so that every user will have easy in use. The connections between every individuals should be isolated. The security needs to provide in such a way that the end user should feel that the data on cloud is more secure and cost required for that should be very less. [8]

The task of sending files from one place to other through a proper channel .The security framework will deals while sending files. The intruder should not be there to damage the process. In a process that connections should happen only between the expected users .If a user want to have multiple users at other end he should be able so that he can work efficiently with less time . The batch processing helps to allocate a task at a same time so that the time require to do process will be less. Customer or user all the time deals with the data on cloud with some payable charge with the time period. If the customer users less time than the customer need not to pay more money. [2].The access of data given to every user should be specific. The process of authenticating can be done at a first time so that unauthorized user can be easily find out .In this process many a times we are unable to find the intruder so that we need to provide some extra security with some keys while accessing the data .[9]

Contribution of own work in brief:

In our approach we have mainly focus on achieving different goals as follows: we work on the advancement in storage overhead reduction while working on it we provide the secure image storage on cloud as well share the image for the same. The authorization is provided for the stored image acquisition. Objectives of our approach is to ensure the data security in cloud using following methods. Firstly we will split the image and generating data chunks of it using our own proposed approach.

IN the next process we have gather the file which stored the sequence of that chunks in the form of encrypted data .The encryption of file which holds the sequence of data chunks. It has also maintained the data access control. Finally we have achieved the minimum storage cost using our approach of data compression method. Our work shows the effective and flexible scheme for the distributed data which is dynamic .This will ensure the correctness of user's data on cloud environment. Our one of the major goal is to build up the repository for data integration across the data share on cloud with preservation of data authenticity as well confidential factor. .

II. LITERATURE SURVEY

In a paper the researcher states about the economic use of cloud. They have verified with the different enterprises while finding results. Every .The main focus in this paper with the disaster recovery for storage on cloud. The enterprises have different data set on the cloud. Author has represented a resilient storage cloud map in this paper. This is a cost optimization framework while disaster recovery. The author also represented a new approach with an algorithm .The minimum cost DR plan is implemented. In a consideration of system different data set works differently while accessing the algorithm. One of the major feature is approximation bandwidth minimize and the parameters with constant approximation which are fixed. The author has implemented a comprehensive testing to find the result of implementation. [1]

In this paper the researcher uses recent advancement in cloud technology .The distribution with content application which is cloud based service. The system provides better scalability and the lowest budget in the cloud usage. This system has two major task one is migrate the content over the cloud and the distribution the load with web service over the cloud. The paper talks about both type of cloud private cloud of user and public cloud of provider. This helps to volatile request from users in the minimum cost with the operational value for every request. The author design a cost optimality design over the long run system. He has used Lyapunov technic for the optimization. The dynamic content dispatch for the hybrid cloud requests in a hybrid cloud with Geo distributed data at different places for the center. The author has verified with the result with rigorous system result. [2]

In this paper the author has studied Adaptive bitrate streaming system .The ABR support the video streaming to different devises and variable networks in a system. The author found of a problem that every user not using all data which is buffered so the wastage of data is more for this the user has proposed a Partial Transcoding scheme for the management purpose which is depend on content of it. Content is split into the different segment this helps in storing cost and computing cost .The author tried to work for the long term overall cost reduction .They design a online framework which shows the optimal solution within the optimal cost for the time period. The results shows that author is able to reduce the cost significantly over the period with catching all segment formulation in the system. [3]

In this paper author propose a novel approach for the photo album with the feature base. The compression of photo for the cloud with different compression scheme. This paper uses local features for the work rather than pixel of that image for analyze and explore for correlation between the images. He has adopt a content based feature matching system which is invariant with rotation, scale in both the places. The redundancy and correlation of image in environment. The author uses the images for the pseudo sequence with the predictive cost of every image with the sequence. The author also used three step method for the image prediction which is depend on local redundancy of it. They also use multimodal to avoid multiple deformation images in the cloud .At the last they have used a compensation technic with block-based motion results shows that the technic is more faster and better than other existing system .[4]

In this paper the author has defined that cost is depend on actual use of cloud resources .This can be bandwidth storage or computing data .The content placement strategy has investigate the cost optimal content problem .This works significantly for the optimization problem which has task to minimize cost with respect to resource capacity .They have used two step strategy   first which is mapped with k factor with single value. This is done using the graph heuristic approach .They have derive logarithmic model between optimal mean values from different point set. In a second step they analyze the cost estimation with simulations. At the end check with and compare replica with the system and state the two step verification of proposed system is powerful. [5]

III. EXISTING SYSTEM

In the present approach the different authors have worked on the frameworks. The OIRS is one of the framework which is used for outsourced image recovery service from the compress with sensing with the privacy. The major forces of the researcher on secure outsource of data with different domains. The proposed architecture contains different process to provide the complete security for the files. The major content on the private files when they are globally available over the cloud in system. Author has proposed the approach where it maintained the reconstructed method. [9]

The compression of local storage feature has explained in detail with a novel feature-based photo album compression technique. The cloud storage is used for the multiple user interact at a same time. The local features uses here rather than pixel of that image for the correlation. The adopt based feature uses here for scale, rotation, and robust to illumination changes.

The correlated images is used as pseudo sequence by minimizing the predictive cost over the cloud storage the author has used 3three different steps to execute the final steps. [10]

IV. PROPOSED SYSTEM
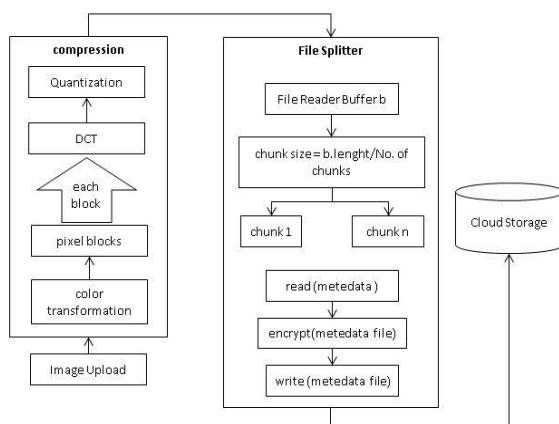
Fig 1. Architecture diagram image upload module

File Compressor: The module of file compressor contains different states which helps to execute the process faster. Input for this will contain the image as input file .It is compressed with DCT algorithm for further process which separates the image into different parts. The parts are depends on the frequencies of that image. The part of quantization where the actual compressed image occurs. The process where less frequency part get discarded and high frequency get preserved .This is nothing but a lossy part of that image .The discrete method used is cosine method which is widely used in this process for image compression .This process contains the information packing correctly as well the complexity is high with computation

Transform: In this phase the data get changed from the input image to intermix data image. The image get divided into the blocks of smaller sizes like eight multiplies with eight. Every block data converted in effectively array data .The top left most corner consider the most in formation data which is quantize and encode. The image is stored with little distortion in environment.

Quantization: IN this process the range of values get involve into a single value output .The output is more comprehensible data. The matrix is used with DCT coefficient matrix for the transformation. In this process most of the compression is the place in the detailed with all data values. This is almost the lossless quantization. The image factor for the quality purpose is different. The quality level stand for the lowest level but the readable data should be present. Scalar multiplication is used to optimize the data quality while processing for the transformation. In aspect with human eye it is more sensitive with lower frequency data and higher frequency get discard

File Splitter: This is unique module check helps to split the image into 10 chunks .The chunks get stored on the cloud with the Meta data file. All are in the encrypted form where two layer security is provided for the same .

Pseudo code:

Input: Image file in byte[] fileByteArray

```
long fileSize=fileByteArray.length;

if(!splitBySize)

{

  chunkSize=fileSize/chunkNumber;
```

```
}
```

// loop for each full chunk

```
int subfile;

File metadata=new File(this.directoryPath+"/metadata.txt");

String fileNames="";

int bytesRead=0;

for (subfile = 0; subfile < fileSize / chunkSize; subfile++)

{

// open the output file

Stringrandom=FileDirectoryUtil.getRandomFileName();

fileNames=fileNames+","+random;

BufferedOutputStream out = new BufferedOutputStream (new FileOutputStream (this.directoryPath +"/"+random));

// write the right amount of bytes

for (int currentByte = 0; currentByte < chunkSize; currentByte++)

{

   // load one byte from the input file and write it to the output file

   out.write(fileByteArray[bytesRead]);

   bytesRead++;

}
```

// close the file

```
out.close();
```

In this phase the data get converted into encrypted format. Every file of that chunk get encrypted and other file where all files stored .i.e. metadata file that is also get encrypted .In this process we have used the encryption method . Our works provide the better security with greater authentic data in encrypt file.

Pseudo code:

Input: String text, String secretKey

```
Public static String Encrypt (String text, String secretKey) {

     byte [] raw;

     String encryptedString;

     SecretKeySpec skeySpec;

     byte[] encryptText = text.getBytes();

     Cipher cipher;

     try {

        raw = Base64.decodeBase64(secretKey);

        skeySpec = new SecretKeySpec(raw, "AES");

        cipher =
```

```
Cipher.getInstance("AES");
        cipher.init(Cipher.ENCRYPT_MODE, skeySpec);
        encryptedString =
Base64.encodeBase64String(cipher.doFinal(encryptText));
    }
    catch (Exception e) {
      e.printStackTrace();
      return "Error";
    }
    return encryptedString;
                }
```

Download modules:

The module contains the process for other end where other user or the other viewer can do the process. The system provide the different layer of security for the same the approach is as follows User request validate: It uses data access control protocol to ensure that the user has rights to access the requested data. File Joiner: While downloading any image file joiner get the location of image that is location of splitted file with the help of metadata file
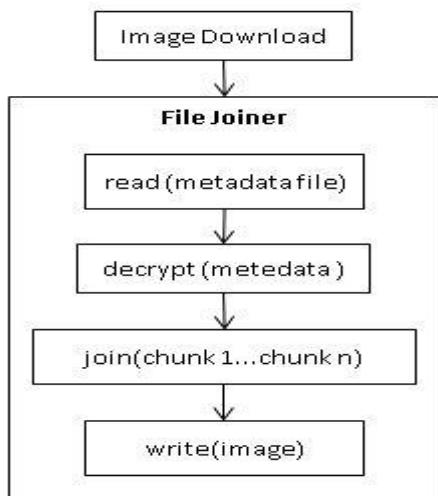
Fig2: Image download module

Pseudo code:

Input fileparts in string array String[] fileParts

```
public  byte[] join(String [] fileParts)
        {
                byte[] fileContent=null;
                byte [] contentToSend=null;
                byte[][] byteArrays= new
byte[fileParts.length][];
                int filepartCount=0;
        for (String filePart : fileParts) {
                if(FilenameUtils.isExtension(filePart,
Utils.split("is",",")))
                {
```

```
        if(FileDirectoryUtil.isExist(this.directoryPath+"/"+
filePart))
                {
        fileContent=FileDirectoryUtil.read(new
File(this.directoryPath+"/"+filePart));

        byteArrays[filepartCount]=fileContent;
                        filepartCount++;
                }
            }
        }
        contentToSend=Utils.append(byteArrays);
        return contentToSend;
    }
```

Decryption: This module is sub module of File joiner, file joiner module passes the encrypted metadata file to decryption module and this module decrypt the file and pass the file to file joiner and then file joiner get the information about chunks and joins the chunks and then joined file is a image that user requested to download.

Pseudo code:

Input: String cipherText, String secretKey

```
public static String Decrypt(String text, String secretKey) {
        Cipher cipher;
        String encryptedString;
        byte[] encryptText = null;
        byte[] raw;
        SecretKeySpec skeySpec;
        try {
            raw = Base64.decodeBase64(secretKey);
            skeySpec = new SecretKeySpec(raw, "AES");
            encryptText = Base64.decodeBase64(text);
            cipher = Cipher.getInstance("AES");
            cipher.init(Cipher.DECRYPT_MODE, skeySpec);
            encryptedString = new
String(cipher.doFinal(encryptText));
        } catch (Exception e) {
            e.printStackTrace();
            return "Error";
        }
        return encryptedString;
```

Proposed System Security Approach:

UPuKeyGen is the symmetric keys generated in to the server, which is used to encrypt and decrypt owner's data ImgRec is the recovery algorithm running on the server side, which recover encrypted image upon getting input of the secret key UpuKeyGen.

Given the problem formation for image stack management and reconstruction our main problem is how to let the cloud efficiently solve the problem,

ImgUpload = U(C(Img;decomRate) , E(Img; UPuKeyGen))

For image uploading there are two main functions first is C(Img;decomRate) in which C signifies compression which requires two parameters first is image and second is decomposition rate while compressing image. Second function is E (Img; UPuKeyGen) where E signifies encryption which comprises of two parameters that is image and server key.

ImgDownload = D(Dr(Img; UPuKeyGen))

For image downloading there the encrypted image should be

Image Name	Original Size	Compressed Size	Quality Factor	Time to compress
sunset.jpg	3.67 MB	147 KB	0.1f	781 ms
sunset.jpg	3.67 MB	177 KB	0.2f	671 ms
sunset.jpg	3.67 MB	208 KB	0.3f	656 ms
sunset.jpg	3.67 MB	236 KB	0.4f	640 ms

decrypted and which is done by decryption function which comprises of two parameters that is encrypted image, image and server key. Definition : A transformation scheme ImgUpload=U(C(Img;decomRate), E(Img; UPuKeyGen)) is efficient if (Decom(Size(Cimg),Size(Oimg)))=40% .

Storage allocation approach:

The mathematical procedure is explained in detail for our allocation of data in system. This deals with the request cost of data, storage cost of data, data transfer cost from one to other and the average cost of data allocation on the cloud computing system.

ST=ADS - database storage cost during allocation in
TR =NDT – The data transfer in number which is transfer from data set to storage site on cloud.
DBSIZE= DBS – The size of data on cloud while performing operation on cloud. This size calculated in GB.
DBUsage =DBU – This is calculated in usage of per user while accessing the data in percentage format.

DBReq=DBR - This is the monthly request for storing data in database per user.

PerReqCost =PRQU – This is the cost required for accessing data with each request by user.

Formulas calculating as follows: Average cost calculated as AvgADS

$$AvgADS = \frac{ADScost+NDTCost+PRQU}{Total\ GB\ stored} \quad \ldots EQ\ no\ 1$$

Storage cost of the system calculated ADS cost

$$ADS\ Cost = \sum DBS \times Cst \times ADS \quad \ldots EQ\ no\ 2$$

$$NDTCost = \sum NDT \times DBS \times DBU \ldots EQ\ no\ 3$$

Every request on system is calculated depend on the system users and request of every one on the cloud it will be calculated in request cost.

$$RequestCost = \sum ADS \times DBR \times PRQU \ldots$$

EQ no 4.

At the end of the complete calculation with mathematical approach our goal of minimizing data storage which affect the optimization value for the complete cost .This will help to minimize the cost and maximize the storage value on cloud. For the formation and proven the strategy we came up with storage efficiency approach which stated earlie

V. RESULT

In this section we have shown the output of our implemented project. In this regards we have taken compressed image size and quality factor as parameter for the result generation. The various images were considered with different sizes and for each image of different size the total compression time were calculated for images of different sizes. As the table shows various images with original storage size, compressed size and respective execution time for different quality factor

Result 1: Table
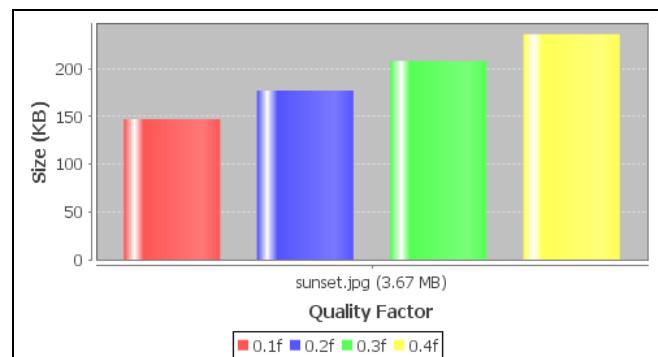
Result 1: Graph

Image Name	Original Size	Compressed Size	Quality Factor	Time to compress
butterfly.jpg	6.34 MB	196 KB	0.1f	975 ms
butterfly.jpg	6.34 MB	306 KB	0.2f	881 ms
butterfly.jpg	6.34 MB	434 KB	0.3f	797 ms
butterfly.jpg	6.34 MB	551 KB	0.4f	791 ms

Result 2: Table
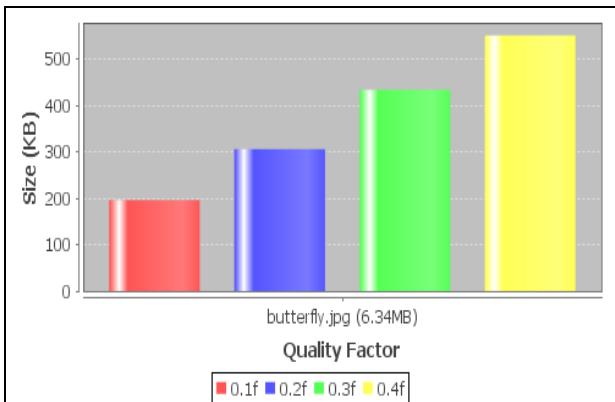
Result 2: Graph

Image Name	Original Size	Compressed Size	Quality Factor	Time to compress
city.jpg	8.58 MB	404 KB	0.1f	1230 ms
city.jpg	8.58 MB	651 KB	0.2f	998 ms
city.jpg	8.58 MB	857 KB	0.3f	969 ms
city.jpg	8.58 MB	1033 KB	0.4f	859 ms

Result 3: Table
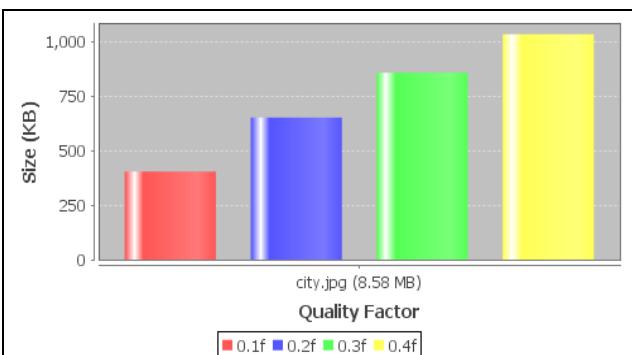
Result 3: Graph

PSNR Result Analysis:

The results of our approach in theoretical framework used in this paper to relate compression and accuracy is based on the least squares approach of area based image matching method in cloud computing transfer approach. The procedure of formulating the model that allows to predict the accuracy. The point of transfer of the given image with image compression technic .The method measures a compression noise for the images. In the lossy mage as well lossy video compression ideally values nearly 25 and 50 dB. The part of measuring technic is Peak signal to Noise ratio i.e. PSNR and other Mean square error i.e. MSR these two have been user for comparing the squared error between the original image and compressed image in procedure. The inverse methods states in between these two factor. The high quality images have always better PSNR ratio value.

$$PSNR = 10 \cdot \log_{10}\left(\frac{MAX_I^2}{MSE}\right)$$

$$= 20 \cdot \log_{10}\left(\frac{MAX_I}{\sqrt{MSE}}\right)$$

$$= 20 \cdot \log_{10}(MAX_I) - 10 \cdot \log_{10}(MSE)$$

In the procedure of analysis of results we have taken compressed image size and quality factor and PSNR value parameter for result. The various images used for the performance and considered with different sizes. In the each image of different size the PSNR value is calculated for images of different sizes. The result is shown in following tables and graphs in detail with different aspects like various images with original storage size, compressed size and respective PSNR value for different quality factor is shown here.The result shows that approach gives better performance.

Image Name	Original Size	Compressed Size	Quality Factor	PSNR Value
sunset.jpg	3.67 MB	147 KB	0.1f	31.32 dB
sunset.jpg	3.67 MB	177 KB	0.2f	32.23 dB
sunset.jpg	3.67 MB	208 KB	0.3f	33.12 dB
sunset.jpg	3.67 MB	236 KB	0.4f	34.23 dB

Result 4: Table
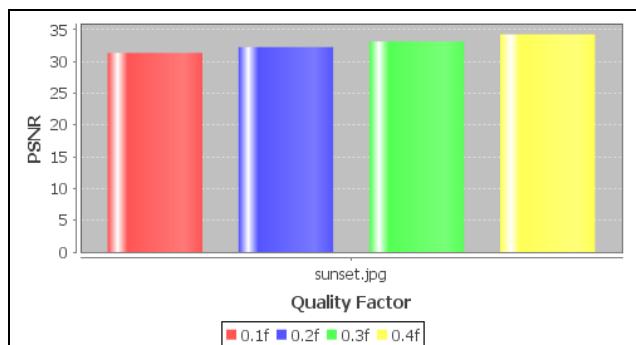
Result 4: Graph

Image Name	Original Size	Compressed Size	Quality Factor	PSNR Value
butterfly.jpg	6.34 MB	196 KB	0.1f	29.26 dB
butterfly.jpg	6.34 MB	306 KB	0.2f	31.59 dB
butterfly.jpg	6.34 MB	434 KB	0.3f	32.81 dB
butterfly.jpg	6.34 MB	551 KB	0.4f	33.65 dB

Result 5: Table
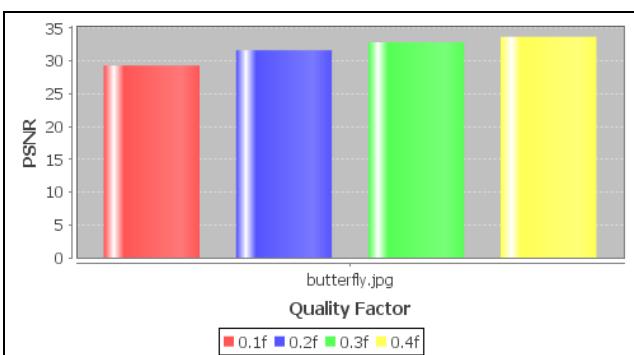
Result 5: Graph

Image Name	Original Size	Compressed Size	Quality Factor	PSNR Value
city.jpg	8.58 MB	404 KB	0.1f	29.12 dB
city.jpg	8.58 MB	651 KB	0.2f	29.78 dB
city.jpg	8.58 MB	857 KB	0.3f	30.45 dB
city.jpg	8.58 MB	1033 KB	0.4f	31.25 dB

Result 6: Table
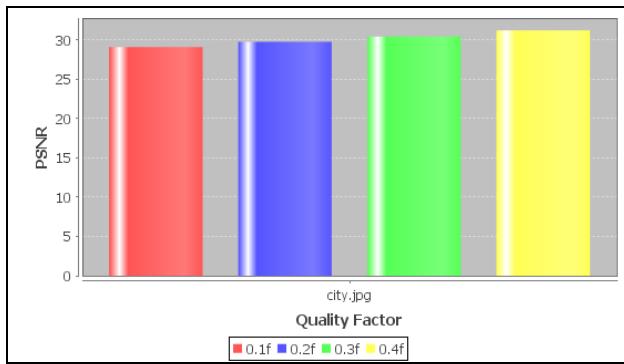
Result 6: Graph

VI. CONCLUSION

Our system shows that the efficiency of proposed system is more than the existing once. The approach gives minimum storage cost while accessing the data on cloud. The transfer of data during the cloud is more secure through the approach proposed here.Hence that the proposed method has great significance over the cloud framework.

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