Achieve CPEL Criterion in Cloud with High Bandwidth and Cost Reduction

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Abstract— Cloud computing implementation is fast and simple with benefits like, Cost reduction by gaining a world-class IT infrastructure without the hardware, secure access to critical information 24/7 using only a Web browser, ability to stay mobile and many more. According to the survey 85 per cent of public sector organizations are using public cloud services, while on the other side data owner having concern about data confidentiality and query privacy due to the lost control of the infrastructure. To address these issues a criterion called CPEL is constructed; Data confidentiality, query privacy, efficient query processing, and low in-house processing cost. Satisfying these requirements will dramatically increase the complexity of constructing query services in the Cloud. Some related approaches have been developed to address some aspects of the problem. However, they do not satisfactorily address all of these aspects. We proposed the random space perturbation (RASP) approach with traffic redundancy elimination techniques, in which practical range query is constructed by using k-nearest neighbor (kNN) and range query algorithm, and to reduce redundancy in process predictive acknowledgement algorithm and redundancy aware routing algorithm is used by this way we can achieve CPEL criterion with high bandwidth of data processing with reduced cost.

Key words: CPEL, Cloud with High Bandwidth

I. INTRODUCTION

By using cloud storage, we don't have to store the information on our own hard drive. Instead, we can access it from any location and download it onto any device of our choice, including laptops, tablets or Smartphone's. Moreover, we can also edit files, such as Word documents or PowerPoint presentations, simultaneously with other users, making it easier to work away from the office .While accessing data from different server privacy and confidentiality has become major concern in public cloud. Data owner does not want to move to the cloud unless the data confidentiality and query privacy are guaranteed. By using RASP (Random space Perturbation) with traffic redundancy elimination algorithm, which mainly focus on optimizing secure and efficient query processing by using kNN-R (k-nearest-neighbor and range query) and various traffic redundancy elimination algorithm such as predictive acknowledgment and redundancy aware routing algorithm, we can achieve low in house workload, high bandwidth of data processing with secure and efficient query without affecting CPEL criterion. The Random space Perturbation (RASP) method used to construct the query, here separate the query as range query and kNN query [5] . The proposed RASP method will use the four concepts of the CPEL criteria and here the multidimensional data can be transformed with the combination of order preserving encryption, random projection and random noise injection. The RASP method and its combination provide confidentiality of data and this approach is mainly used to protect the multidimensional range of queries in secure way, with indexing and efficient query processing. It is also used to construct practical range query and kNN query services within the cloud system [1]. The range query is used in database for retrieving the stored data. It will retrieve the records from the database where it can denote some value between upper and lower boundary. The kNN query denotes k-Nearest Neighbor query. K denotes positive integer and this query are used to find the value of nearest neighbor to k. the predictive based approach used to eliminate repeated occurring traffic between the cloud and its end-users and Redundancy Aware Routing algorithm (RARA) reduces redundant data and delays to provide better performance characteristics for the cloud computing data centers. RARA is used in the cloud data centre to eliminate redundant data in cloud data storage so it increases the storage space [9] [1].

In this paper, we are presenting the RASP method which satisfies the CPEL criteria and predictive based approach as an end-to-end transfer idleness Elimination system with combination of RARA for traffic redundancy elimination to achieve high bandwidth of data processing.

II. KEYWORDS

kNN query, Range query, CPEL criterion, RARA,TRE.

III. PROPOSE WORK

The proposed approach will address all the four aspects of the CPEL criteria and aim to achieve a good balance on them with reduced redundant data .The basic idea is to randomly transform the multidimensional data sets with a combination of order preserving encryption, dimensionality expansion, random noise injection, and random project , so that the utility for processing range queries is preserved and to reduce redundancy we are using different redundancy elimination techniques. By using RASP we can upload, download and modify the similar information in cloud and by means of kNN and range query we can process query in secured and efficient manner but in the above process traffic redundancy arises from commonly use end-user's activities [8] ,such as repeatedly accessing, uploading, downloading, distributing and modifying the similar information. And this will affects the bandwidth and data processing cost .we can eliminate traffic redundancy by imposing different TRE techniques, here we are using predictive base approach which is a new lightweight chunking scheme on the receiver side which detects redundancy at the client side and there is no need of server to maintain client's status continuously. Here each receiver observes the incoming stream of chunk chain to match with a previously received chunk chain. The receiver sends server the predictions that include chunk's

signatures, chunk's hint of the sender's future data using the long-term chunks meta-data information kept locally. The sender examines the hint. Upon a hint match the sender triggers the TRE operation, saving the cloud's TRE computational effort. When redundancy is identified, the sender sends only the acknowledgements to the predictions instead of the actual data. The gist of this solution is to reduce the excessive high price TRE computation by eliminating traffic redundancy. The proposed solution is a new alternative for Rabin fingerprinting [8] used by redundancy elimination applications.

IV. WORKING OF PROPOSED SYSTEM

RASP is combination order preserving encryption, dimensionality expansion, random noise injection, and random project because of order preserving encryption confidentiality and indexing preserved by dimensionality expansion range query processing can be achieve , Random projection is mainly used to process the high dimensional data into low dimensional data representations which provides good scaling potential and performance , random noise injection used for adding noise which in result gives proper output [3].

In random space perturbation, the word perturbation is used to do collapsing this process will happen according to the key value that is given by the owner. In this module the data owner have to register as owner and have to give owner name and key value. And then the user have register and get the key value and data owner name from the owner to do access in the cloud. Here user can submit their query as range query or kNN query and get their answer. We analyze and show the result with encrypted and also in decrypted format of the data for the query construct by the user. kNN query cannot be directly impose on RASP perturbated data, so we have designed a kNN query processing algorithm based on range queries .We use square ranges, instead of spherical ranges, to find the approximate kNN results, so that the RASP range query service can be used.

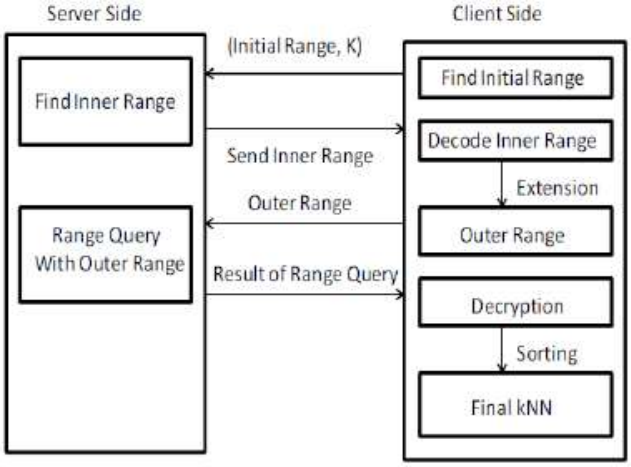

Fig. 1: working of RASP with kNN and Range query.

As shown in below fig.1, working of RASP with kNN and Range query service, but here authorized user can upload, download, updates the similar data which increases data processing cost, to address this problem we are using predictive acknowledgement approach which is based on byte stream processing, Byte stream means it store the file as 1 byte that is 8 bit as a sequence of file, because of these increases the file download speed while transaction between the cloud and its end user's [8],. As shown in below fig. 2.

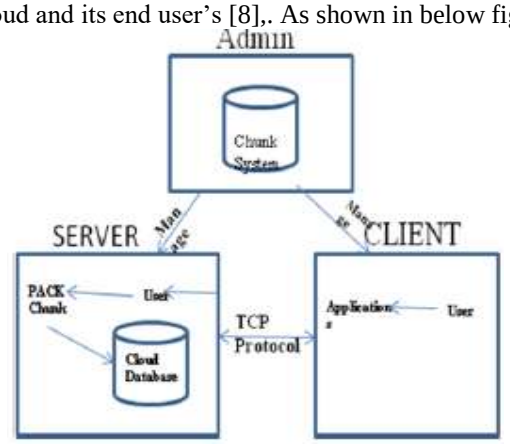

Fig. 2: Predictive Acknowledgment Approach.

V. ALGORITHMS OR PSEUDO CODE

A. Algorithm 1

kNN-R Algorithm
(K $-\delta$)-Range ($L1, Lm, k, \delta$)
High ← Lm, low ← $L1$;
While high-low ≥∈
Do
Mid ←(high+ low)/2;
Num←number of points in S^{mid} ;
If num≥ k &&num≤ k+ δ
Then
Break the loop
Else if num> k+ delta
Then
High← mid:
Else low← mid;
End if
End while
Return S^{mid} ;

B. Algorithm 2

Predictive Acknowledgment Algorithm
Input: R (copy of G) =R1 u R2 u……..Ri-1
Output: Ri, ith of sub topology
Begin
Init Ri is not empty
S→{Nodes in R that do not have strong interferers in R}
R→R/S; S→Max Feasible subset (S); Ri →R u S
Update weak interference budget
Refine R based on Ri
While R is not empty do
S→{Nodes in R that do not have strong interferers in R}
R→R/S
S→Max Feasible subset (S)
Ri→Ri u feasible weak interferers (R,S)
Update and refine(R,S,Ri)
End
Return Ri
End

C. Algorithm 3

Redundancy Aware Routing Algorithm
Px-Object, R-size of the file, X-Name of file,

Hx-Destinationfile
if (Ni is the source node) then
Px →[R, X,];
Send Px
Else
if ((R,X are correct) and verify as true)then
if (Ni is an intermediate node)then
Relay the packet
Store sigs(R, X,);
end if
If(Ni is the destination node)then
Send Hx
Else
Drop the packet
Send error packet to the source node
End if
End if
If (Px is the last packet) then
Evidence= {R, X,};
Report(R, X);
Store report and evidence
End if

By using above algorithm and pseudo code we can gain confidential and efficient query services with low data processing cost.

VI. CONCLUSION

The RASP approach provides a privacy guarantee practical to the setting of cloud based computing, while enabling much faster query processing compared to the encryption-based approach. As the amount of data exchanged between the cloud and its users is shooting up, there is a need of TRE solutions for cloud computing. Since most of the data redundancy exist at end-to-end exchange, a standard TRE is required. And for this we have proposed predictive based approach and Redundancy Aware Routing algorithm by using above approaches we can satisfy CPEL criterion with high bandwidth of data processing. The key vantage of this scheme is the ability to get confidential and efficient query services with high bandwidth and reduced cost.

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