

# **Reducing Cloud Bandwidth and Eliminate Redundant Network Traffic in Cloud Computing**

MaheSwari.G<sup>1</sup>, Revathi.E<sup>2</sup>

PG Scholar, Department of CSE, PSR Rengasamy College of Engineering for Women, Tamilnadu, India<sup>1</sup>

Assistant Professor, Department of CSE, PSR Rengasamy College of Engineering for Women, Tamilnadu, India<sup>2</sup>

**ABSTRACT:** Cloud computing is technology where the users can use high end services in form of software that exist in on different servers and access data from all over the world. The data can be transmitted between the cloud and its end user with low speed and high bandwidth so traffic can be occurred. Here, bandwidth reduction is an important issue. Existing system does not reduce cloud bandwidth and cost at sensible time. Proposed work presents a predictive acknowledgement and traffic redundancy elimination system and Redundancy aware routing algorithm. Traffic redundancy elimination technique used to eliminate the redundant content and therefore significantly to reduce the network cost and able to send the data in high speed and low bandwidth. On sender side traffic redundancy elimination technique proposed. On receiver side Predictive Acknowledgement algorithm is used by redundancy elimination applications. Redundancy aware routing algorithm has been used to remove the redundant content in cloud storage space so that the usage of cloud storage bandwidth has been saved. Finally Analyze the Predicative Acknowledgement benefits for cloud users using traffic traces from various sources.

**KEYWORDS:** Traffic Redundancy Elimination System, Predictive Acknowledgement, and Redundancy Aware Routing Algorithm.

## **I. INTRODUCTION**

Cloud Computing is a type of computing that relies on distribution computing assets like server storage to user's application such as email, security, back up all delivers over the internet. A cloud computing background can provide one or more of these necessities. Cloud like compensate as you go model of production. Cloud computing is an umbrella term used to refer to Internet based development and services. The Cloud delivers a hosting background like supple, scalable, dependable it savings institution moment in time, currency and assets. A Cloud is a type of parallel and distributed system it has the collection of interconnected and ritualized computers that are presented as one or more unified computing assets. Cloud utility model as follows, Software as a service (SaaS): Software-as-a-Service provides complete application to a cloud's end user. It is mainly right to use through a web gateway and service oriented architectures based on web review technologies. Platform as a service (Paas): The ability to provide to the customer is to install on the cloud infrastructure customer created or acquire applications created using programming languages and tools supported by the provider. Infrastructure as a service (IaaS): The ability to provide to the customer is to terms processing, storage, networks, and other essential computing resources. Physical assets are abstracted by virtualization, which means they can then joint by several operating systems and end user environment on the virtual assets – preferably, without any mutual obstruction. The proposed system comes under the cloud computing utility model as software as a service. The cloud set up model can be classified as Follows, Public Cloud: The cloud communications is made available to the common users or a huge production cluster and is owned by an institute selling cloud services. Private Cloud: The cloud infrastructure is operating exclusively for a particular institute. It may be managed by the institute or a third party, Community Cloud: The cloud communications is joint by several institutions and supports an exact

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group of people who has joint concern It may be managed by the institutions or a third party like mission, security necessities, rule, or acquiescence considerations. Hybrid Cloud: The cloud communications is a composition of two or more clouds (private, community, or public) that stay unique entities but are bounce mutually by identical or proprietary technology that enables data and application portability like cloud stuffed for load-balancing between clouds. The proposed system comes under the cloud deployment model as public cloud for cloud customers.

### II. RELATED WORK

In the Cloud Computing literature, there are various algorithms and techniques were used to reducing cloud bandwidth. The following section deals with most representative work that is related to proposed work.

*A Protocol Independent Technique for Eliminating Redundant Network Traffic [1]* presents a technique for identify the cyclical information shift and uses it to evaluate the redundancy of network traffic. The protocol independent techniques were applied to find the high level of redundancy and are able to identify the replication that web caches or not. Rabin finger printing algorithm was applied to find the replication content in the process of stream of packets or data while conversion it increase the web performance. The representative finger print packets are generating by compute finger print for each length substring of the packet.

*Understanding and Exploiting Network Traffic Redundancy [2]*The Internet carry a huge amount of information and a wide range of content, Some of this information is more well-liked and accessed more regularly, than others. Make two contributions in this paper. First, study the basic properties of the redundancy in the information passed over the Internet, with a focus on network ends. Second, leverage measurement observations in the design of a family mechanism for eliminate redundancy in network transfer and improving the overall network performance. The mechanisms were proposed can improve the obtainable capacity of distinct network links as well as balance load across many network associations.

*Packet Caches on Routers: The Implications of Universal Redundant Traffic Elimination [3]*many past systems have explored how to eliminate redundant transfer from network links and improve network efficiency. An Investigate the benefits of deploy packet-level redundant content removal as a worldwide primitive on all Internet routers. Such a worldwide deployment would instantly reduce link loads all over the place. Then Develop “redundancy-aware” intra and inter domain routing algorithms and show that they permit better traffic engineering, reduce link convention costs, and enhance ISPs’ receptiveness to traffic variations. Consider the benefits of deploying of packet level redundant content elimination as a primitive IP-layer service crossway the entire Internet.

*SmartRE: Architecture for Coordinated Network-wide Redundancy Elimination [4]* Application-independent Redundancy Elimination (RE), or identifying and removing repeated content from net transfers, has been used with great achievement for humanizing net presentation on project admittance links. Recently, there is rising interest for sustaining RE as a network-broad service. Such a network-broad RE service benefit Internet service providers by falling link loads and growing the successful network power to improve. Present SmartRE, a sensible and well-organized architecture for network-wide RE. Show that SmartRE can facilitate more successful consumption of the available assets at network campaign, and thus can increase the overall benefits of network-wide RE. Prototype algorithms were using Click and test the framework broadly using a number of valid and artificial traces.

*EndRE: An End-System Redundancy Elimination Service for Enterprises [5]*Present the design and implementation of EndRE, an every other approach where redundancy elimination is provided as last part of the system service. Contrasting middle boxes, benefits in cooperationend-to-end encrypted traffic as well as traffic on final-hop wireless links to mobile campaign. EndRE requests to be quick, adaptive and saving in memory usage in order to opportunistically power assets on last part of the hosts. Design a new fingerprinting scheme called Sample Byte that is much quicker than traditional approaches of Rabin fingerprinting while deliver similar density gains. Contrasting Rabin fingerprinting, Sample Byte can also get a feel for its CPU usage depending on server stack. Then, introduce optimizations to reduce server memory.

*The Power of Prediction: Cloud Bandwidth and Cost Reduction [6]* present PACK (Predictive ACKs), a original end-to end transfer idleness Elimination system, designed for cloud computing customers. Cloud-based needs to apply a judicious use of cloud resources so that the bandwidth cost reduction combined with the additional cost of TRE computation and storage would be optimized. PACK's main advantage is its capability of offloading the cloud server TRE effort to end-clients, thus minimizing the processing costs induced by the TRE algorithm. Unlike previous solutions, PACK does not require the server to continuously maintain clients' status. This makes PACK very suitable for pervasive computation environments that combine client mobility and server migration to maintain cloud elasticity. We present a fully functional PACK implementation, transparent to all TCP-based applications and network devices.

### III. SYSTEM DESIGN

The system design represents the process of reducing the cloud bandwidth and cost. A new user enters into a cloud they need to register to get an account. Admin monitor the cloud database and chunk systems and user details. Admin monitor and verify the user details finally send the acknowledgement to user personal id. The user getting the acknowledgement from admin then enter its username and Password into a login form, and then entering into a cloud and start to do the processing of file as uploading and/or downloading.

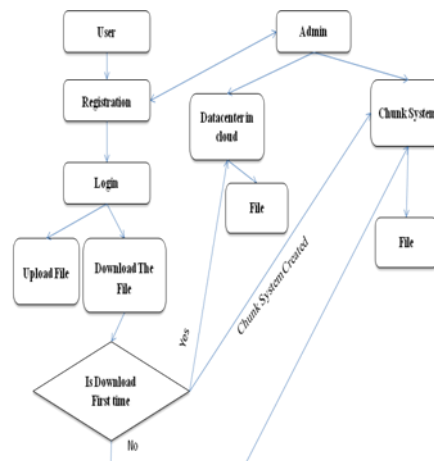
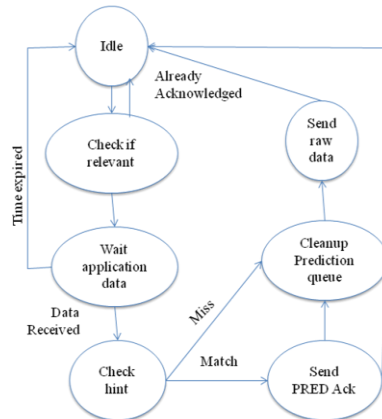


Fig 1. System Design

While user enters into the cloud, admin send the authentication key to the user personal mail id. Chunk system created at admin database which stores the replica copy of the previously download file, therefore it reduces server workload. While download the file from cloud database for the first time it will be download from the server and then for next subsequent time the same file will be download from the chunk system. Chunk system reduces the server workload and increases the transaction speed.

#### A. Traffic Redundancy Elimination System

The network redundant traffic, it intense more network bandwidth and reducing the effectiveness of the internet. The traffic redundancy elimination system can remove duplicate data from within random network flows; it has emerged as powerful technique to increases the effectiveness of network links. In Traffic redundancy elimination system, initially the binary-flow and content-length set as empty. If we are receiving file like audio or video means then set as Binary-flow and content length as 1 and pass the data. Then assign a content length as http content length, it used to checks whether the file is already presented or not in network link flows. If found a more copies of file in network flow means it remove from that and keep it original file then it pass to the cloud data storage to save file.



**Fig 2. Traffic Redundancy Elimination System**

*Traffic Redundancy Elimination pseudo code:*

```

while packet received do
  if HTTP GET Request then
    Set binary-flow 0
    Set content-length 0
  else if HTTP OK Response then
    if mime-type is in [video, audio, application] then
      Set binary-flow 1 for the flow
      Set content-length as HTTP Content-Length field
    end if
  Else
    Find the flow for the packet
    if content-length > 0 and binary-flow = 1 then
      Pass packet without chunking
    else
      if content-length = 0 and binary-flow = 1 then
        binary-flow 0
      end if
    Continue chunking and matching
  end if
end while
  
```

**B. Predictive Acknowledgement**

The predictive acknowledgement was used to create a chunk system, it is like database to store the data, and it used to reduce the server workload. Pack used to store the file as byte stream in cloud data storage. Byte stream means it store the file as 2 byte that is 16 bit as a sequence of file, because of these increasing the file download speed while transaction between the cloud and its end user's.

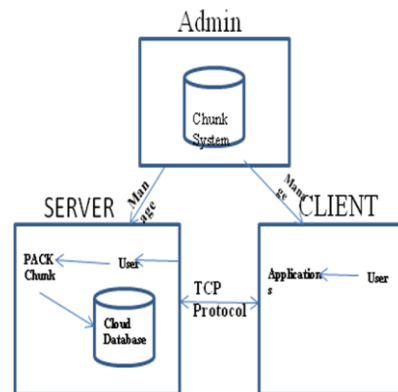


Fig 3.Pack Chunk

*Predictive Acknowledgement pseudo code:*

```

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. Redundancy Aware Routing Algorithm*

Redundancy aware routing algorithm (RARA) that reduces redundant data and delays and provides 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.

*Redundancy Aware Routing Pseudo code:*

```

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

```

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```
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
```

### IV. IMPLEMENTATION

The proposed system for reducing cloud bandwidth and cost on cloud computing is based on Traffic redundancy elimination technique and Predictive Acknowledgement and Redundancy aware routing algorithm is implemented in dot net on windows operating system.

#### A. Creating an Account

A new user enters into a web site creating an account for them. Admin monitor the user details and sends the acknowledgement to the user personal id. The user starts processing for data upload or download when it receives the acknowledgement message.

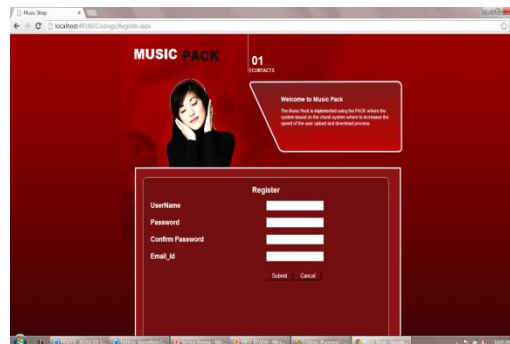


Fig 4.Home Page

#### B. Upload the Music File

A new user upload music file in the overall music file cloud. If it presented in cloud it will not allow you to upload the file. Else it will allow you to upload the file. If you Upload new file means it will show message your file uploaded successfully otherwise it will show your file already uploaded it achieved by compare byte streams to check whether the file is already presented or not.

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**Fig 5.Upload Music File**

*C. Predictive Acknowledgement*

We will find whether the file is presented in the chunk system or not. If it presented in the chunk system it will download from the chunk otherwise it will download from the server. The traffic of the server will be slow down and the chunk system will manage it. The Data is stored into a database as byte stream using Predictive Acknowledgement. The Pack algorithm used to split the data into a bite stream. Pack a framework which uses a carefully designed workload to incur significant delays on the targeted application.



**Fig 6.Search File**

*D. Download Music File*

The server will download the file into the chunk system while first request by the user. The chunk system is maintaining the files list in the admin module. If the admin allow user to access the file it can download from chunk. The files can be easily downloaded from the chunk system and it will reduce the workload of the server and increase the download speed .The file will be downloaded to the client system. Admin sends the Authentication key to the client system to download if the user does not receive any authentication key from admin they can't to download. Initially file will download from server otherwise it will download from chunk system. The chunk system reduces the server workload.



**Fig 7.Download Music File**

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### E. Admin Management

Admin manage the overall process and can be logged in by the admin only. The admin can allow the user and restrict the user. The data usage is monitored by the admin and list the active and idle user usage. The admin can have the rights to allow the user and restrict the user. Each and every stage checks Admin both Server and Client Side status. Admin is the Controller of Predictive acknowledgement and monitor the Data. Admin providing the authentication key to processing i.e. file upload and download.



User Name	Downloaded	Server	Downloaded	Chunk Type	File	Downloaded	File Name
admin	Yes	No	15:10:28.448:28	PK	015ANON-1.52P1		
admin	Yes	No	15:10:28.448:28	AK	160y part.jpg		
admin	No	Yes	15:10:28.448:28	AK	015ANON-1.52P1		
admin	Yes	No	15:10:28.448:28	PK	150y part.jpg		
admin	Yes	No	15:10:28.448:28	PK	2 Part Thumbnail.jpg		
admin	No	Yes	15:10:28.448:28	PK	150y part.jpg		

Fig 8.Chunk System.

## V. CONCLUSION

In cloud computing, the Cloud bandwidth, cost and redundant data in network have been reduced because of the algorithm Traffic redundancy elimination and Predictive acknowledgement. Redundancy aware routing algorithm. Traffic redundancy elimination was used to eliminate redundant data in network links so bandwidth and cloud cost reduced. Predictive acknowledgement was used to create a chunk system it reduce the server workload and increases the transaction speed. Redundancy aware routing algorithm has been used to remove the redundant content in cloud storage space so that the usage of cloud storage bandwidth has been saved. In the future, this work will extend to provide the security and file sharing while transmitting data between cloud and its end user's.

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### BIOGRAPHY

**G.Maheswari** has received B.E degree in Computer Science and Engineering from Anna University, Chennai 2010. She is currently pursuing Master of Engineering in Communication Systems in PSR Rengasamy College of Engineering for Women under Anna University, Chennai. Her areas of interest in research are Cloud Computing.

**E.Revathi** has received B.E degree in Computer Science and Engineering from Anna University, from PSR College of Engineering, Virudhunagar District in 2009 and M.E–Applied Computer Science and Engineering in Hindustan Institute of Technology and Science, Chennai in the year 2011. She is working as an Asst.Professor in the department of CSE, PSRR College of Engineering for Women, Sivakasi. She has published papers in various international and national journals. Her areas of interest are Networking, Cloud Computing.