ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 6, June 2016

Collective Data Downloading Framework over Hybrid Network

Manali M Shimpi, Prof. Pankaj Agarkar

M.E Student, Dept. of Computer Engineering, Dr. D Y Patil School of Engineering, Lohegaon, Pune, India

Asst. Professor, Dept. of Computer Engineering, Dr. D Y Patil School of Engineering, Lohegaon, Pune, India

ABSTRACT: Due to the advancement in internet technology, it has paved a way to use cell phones, laptops and PCs Massively for downloading data. However, due to limited bandwidth access the speed is hampered and it takes more time to download the data especially when the resolution is high. The collaborative data downloading over mobile network will allow the members who are requested for the downloading task in the same group to download some portion of the file separately and independently. Thus, due to this multiple members involved in downloading the same task but independently and a particular member is focusing on a particular portion of the data; which facilitates in increased speed of download in less time. This paper effectively places the use of this technology in different conditions.

KEYWORDS: Segmentation, Group formation, Adhoc network, Sequencing, Indexing, Segment forwarding, merging

I. INTRODUCTION

This technology provides a deep insight into the efficient use of the bandwidth so that the task of downloading the data is successfully reached. This also makes the efficient use of the member's data plan because if a member is allotted 1 GB data plan and the speed is not enough to download the contents, so the data plan is more or less like wasted. But, if the task of collaborative downloading is applied, then the entire file is split in equal parts which depends on the number of members and downloading can be done. It means, if 1 GB file is to be downloaded and four members are there, then the file is split up into 250 Mb, each member. Thus, breaking the main task into sub task. Once the entire file is downloaded, then these four independent files are merged. The system can be used in VANET, LAN or mobile adhoc network for any kind of downloading. The concept of chain topology can be applied before coverage to keep it stable. This system can be best implemented by focusing on the parameter called "download time" The flow of this system is as under:

1) Scan for members.
2) Requesting the members in group.
3) File segmentation and sequencing.
4) Allocating file portion.
5) Data collection by using adhoc network.

II. RELATED WORK

In the survey carried out, the issue in the collaborative data downloading, most of researches have stated collaborative video streaming technique, which enables different user to cooperatively see the data. But, the system proposed here will explain the segmentation and sequencing technique for desired work. Here not only one but a group of members also called as parties are involved. The data to be downloaded is distributed equally amongst different parties and collaboratively the downloading is achieved. The main problem faced during the downloading of data is at the time of movement. In such cases there is continuous fluctuation in the range. This may lead the user to re-download the entire data. Use of the upcoming technology like 4G network still may not help to increase the downloading speed.[2][3][5]. Firstly, there may be other applications whichare utilizing the 4G network. This means the already existing/ running applications. Secondly, the movement of the vehicle in the cell i.e. the control tower of cell phones or the coverage boundary of control/ mobile tower. This will result in the weakening of the signal even though it is 4G signal. This

ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 6, June 2016

issue can be easily overcome by distributing the task amongst different parties i.e. allocating the part of file to other party thus utilizing the unused part of the bandwidth of the other party. The increase in cellular traffic is 16 percent by 2015. As per the survey carried out, the mobile towers are utilized to 85% during the peak times. Thus, there is increase in demand of the bandwidth even in the 4G network also. Also, there is huge fluctuation of the signal during the entire day. This utilization of the signal is also dependent on the area. Towers installed in cities can be busier than the towers in the villages [3]. Thus, by a collaborative technique, the entireproblem of downloading can be effectively solved.

III. SYSTEM ARCHITECHTURE

The system flow can be observed by the following flow chart:

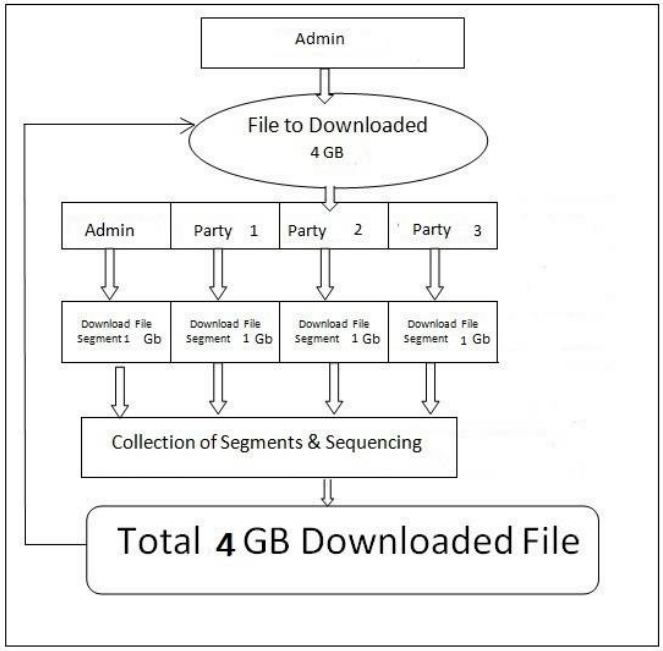

Fig. 1 Step by Step System Process

IV. SYSTEM WORKING

As seen from the above flow chart, the admin gives the file to the parties after scanning the parties in the nearby range. Here, the example is taken for 4 GB download and is done by breaking the data as 1 GB equally for each, including the group admin. It's always necessary that the breakage should be done equally. If party 1 is having more bandwidth, then 1 GB can be allotted and even if the bandwidth of the other party is low, still 1 GB will be alloted. So that the downloading can be done in collaborative way.

A. Scanning Members

The group admin or the user who wants to download the data will scan the members within his proximity who can help to download the data collectively or collaboratively. Once the admin find them through Wi-Fi or Bluetooth, then the request can be done to the parties to carry out the task of downloading the file. Once the request is done, it depends solely on the parties whether to accept it or not. If request is accepted by the party, then thedownloading task can be assigned to the party.Thus, the task is broken down among different parties, facilitating fast data download.

ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 6, June 2016

B. Requesting the members

As per the acknowledgement from the party which will decide whether the party is ready to have a collaborative download process so that the overhead on the admin is reduced. And if so it happens then the data or file is divided amongst parties and they can start downloading. The selection of parties is done such that the parties are in the vicinity of theadmin.

C. File segmentation and Sequencing

The downloading of file is done such that, it is break into number of segments and file is rank in particular order, so after receiving it can be sequentially placed. Here, the admin waits for the approval from the parties and once it is done, it performs segmentation and allocates the task which is to be downloaded. The respective party will carry out the task of downloading the allocated segment with its own available bandwidth. Here given file as per the flowchart is braked into four segments and further sequencing is done in numerical format like 1, 1, 1, and 1.

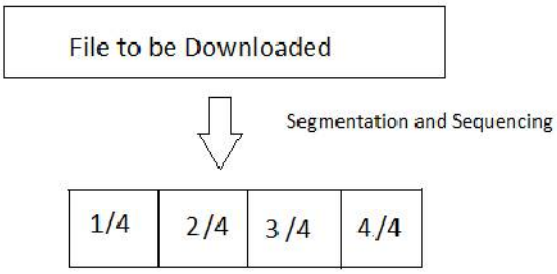

Fig. 2 Segmentation and Sequencing

D. Allocating task to parties

Task of downloading can be allotted after the breaking of the data. Once the file to be downloaded is split; the allocation can be done to the parties for downloading the data or the file.

E. Data acquiring using adhoc network

Once the data or file is downloaded, it is forwarded to the admin through the use of adhocnetwork without using the cellular network. The adhoc network can be anything like Bluetoothor Wi-Fi depending upon the facilitieswith the device. Then Admin will do the collection of segment from each party and put it in sequence and then the file will be ready to use or if the file is in video format it is ready to be played.

V. PROPOSED ALGORITHM

A. Segmentation of File

Input: Video file

1)Get file and calculate size in bytes.
2) Get total number of clients.
3) Each part can be calculated as part size = file size/number of clients.
4) Store bytes of part size into array.
5) Convert bytes to file and rename as sequentially.

ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 6, June 2016

Output: Parts of file

B. Algorithm to Send Files

Input: File at Client End

1) Server pc open sport and listens to all the incoming requests.
2) The video parts are converted to bytes.
3) Client machines send all the parts to server on that port.
4) The parts with particular IP address are arranged as per the index.
5) Later they are merged.

Output: Files at admin.

C. Merging

Input: Parts of files.

1) Get all parts of the video file.
2) Make a byte array of all total parts.
3) Add each part sequentially into that array.
4) Convert it to file and rename it.

Output: Complete video file.

VI. MATHEMATICAL MODELLING

A mathematical model is a process of describing a systems operation in equation format is termed mathematical modeling. Non functionality specifies the condition needed to analyse the operation of a system, rather than actually used in the implementation.

Set	Description
S	Set of Whole System
GH	Set of Group Head
DF	Set of Desired File
FS	Set of File Segments
GM	Set of Group Members
F	Set of File

Table 1: Parameters used for System Description

S = {GH, DF, FS, GM, F}
Where,

FS={FS1, FS2, FSn}
Where FS is File Segment.

GM={GM1, GM2, GMn}
Where GM is Group member.

F={F1, F2, Fn}
Where F is the File to be download.
Segmentation is done by using followingformula:

ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 6, June 2016

SS= FS/NM.....(1)

Where,
SS = Segment Size
FS = File Size
NM = Number of Members

VII. IMPLEMENTATION AND RESULTS

A.Segmentation of File

The file on server which is segmented as per parties in the group is based on the following formula.

Number of Segments = File Size/No. of parties…..(2).

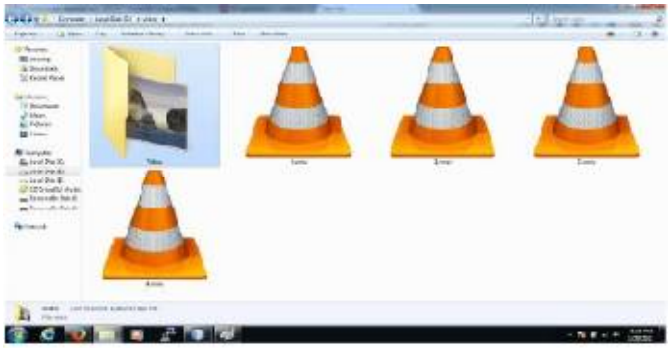

Fig. 3 Segmentation of File

Here, in fig. 3 according to file size, the number of segments and the size of each segments is to be downloaded and calculated by using above formula. Larger the size of the file an admin wants to download; larger the workload will be distributed among the parties. So, that the process can be accomplished faster.

B. Merging

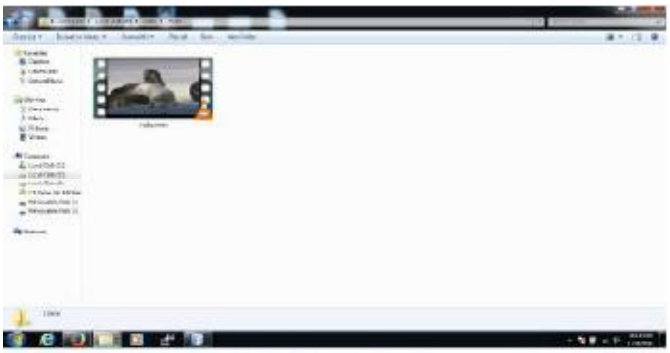

Fig. 4 Merging of File

ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 6, June 2016

Fig. 4 shows the merged file. Here, the merging is done at the admin side. This indicates the separately downloaded files by different parties are merged so as to form one complete file.

A. EXPECTED RESULTS

Following analysis is to be observed while performing the task of downloading a file.

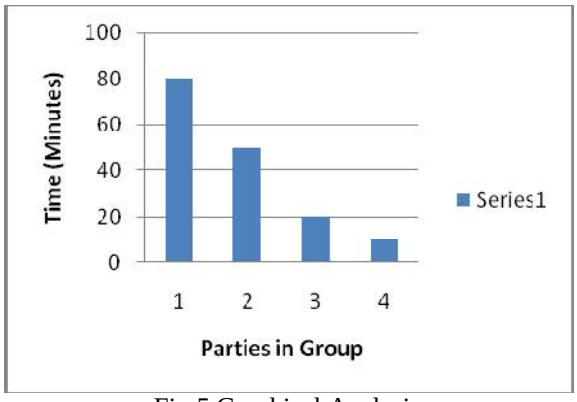

Fig.5 Graphical Analysis

Fig. 5 describes if one party requires 80 minutes to download a file, the same file can be downloaded within 10 minutes by group of four parties. The graph shows that as number of member increases, time required to download certain file decreases. This focuses on the collaborative activity carried out by the parties along with the admin.

B. CONCLUSION AND FUTURE WORK

This paper comprises of a collaborative data downloading over the mobile network which is composed of cellular network and wired network. The merging of the files is shown and is oriented to the application layer. The technique can be used by many video hosting website, video sharing applications, E-Education purpose and end user which are widely using the cellular bandwidth for downloading purpose. The main issue for downloading large file was of time consumption. Here, an approach is shown to overcome the same. Also, the concept can be applied to PCs connected together and one amongst PC can be considered as admin and others as parties. Thus, with the reduced time, efficient use of the bandwidth is also done. The system can be further enhanced to a LAN network such that the server forms admin and remaining PC as parties.

REFERENCES

1. ManaliShimpi and PankajAgarkar,"Cooperative Content Downloading Framework over Cellular Network", International Journal of Science and Advanced Research in Technology, Vol.1, Issue 11, pp. 98-100, 2015.
2. Haibo Zhou, Student Member, IEEE, Bo Liu, Member, IEEE, Tom H. Luan, Member, "ChainCluster: Engineering a Cooperative Content Distribution Framework for Highway Vehicular Communications", IEEE transactions on intelligent transportation systems, 2014.J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol 2. Oxford: Clarendon, 1892, pp.68-73.
3. Chao-Hsien Lee, Chung-Ming Huang, Senior Member, IEEE, Chia- Ching Yang, and Hsiao-Yu Lin,, "The K-hop Cooperative Video Streaming Protocol Using H.264/SVC Over the Hybrid Vehicular Networks", IEEE transactions on Mobile Computing, Vol. 13, No. 6, June 2014.
4. J. Luo and D. Guo, "Neighbor discovery in wireless adhoc networks based on group testing", in Proc. 46th Annu. Allerton Conf. Communication, Control, Computing, Urbana Champaign, IL, USA Sep. 2008, pp. 791797.
5. R. Khalili, D. L. Goeckel, D. Towsley, and A. Swami, "Neighbor discovery with reception status feedback to transmitters", in Proc. 29th I EEE Conf. INFOCOM, San Diego, CA, USA, Mar. 2010, pp. I EEE Conf. INFOCOM, San Diego, CA, USA, Mar. 2010, pp. 23752383.
6. C. M. Huang, C.-C. Yang, and H.-Y. Lin, "A K-hop bandwidth aggregation scheme for member-based cooperative transmission over vehicular networks", in Proc. 17th IEEE ICPADS, Tainan, Taiwan, 2011, pp. 436443.
7. A. Nandan, S. Das, G. Pau, M. Gerla, and M. Y. Sanadidi," Cooperative downloading in vehicular ad-hoc wireless networks", in Proc. 2nd Annu. Conf. WONS, Washington, DC, USA, 2005 pp. 3241.

ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 6, June 2016

8. M. F. Tsai, N. Chilamkurti, J. H. Park, and C. K. Shieh,"Multi-path transmission control scheme combining bandwidth aggregation and packet scheduling for real-time streaming in multi-path environment", Instit. Eng. Technol.Commun., vol. 4, no. 8, pp. 937945, 2010.
9. M. Li, Z. Yang, and W. Lou, Codeon, "Cooperative popular content distribution for vehicular networks using symbol level network coding, IEEE J. Sel. Areas Commun", vol. 29,no. 1, pp. 223235, Jan. 2011.
10. Fan, V. Le, Z. Feng, Z. Hu, and X.Wang, "Adaptive joint session scheduling for multimedia services in heterogeneous wireless networks", in Proc. 70th IEEE VTC, Anchorage,AK, USA, Sep. 2009, pp. 15.
11. Lorenzo Keller,AnhLe,BlerimCici,"MicroCast: Cooperative Video Streaming on Smartphones",ACM 978-1-4503-1301, Uk,July 2012.
12. Ananthanarayanan, V. N. Padmanabhan, L. Ravindranath, and C. A. Thekkath."COMBINE:leveraging the power of wireless peers through collaborative downloading." InProceedings of the 5th International Conference on Mobile Systems, Applications andServices (MobiSys), pages 286298, 2009.

BIOGRAPHY

1. Manali Mohan Shimpiis a M.E student in the Computer Engineering Department, Dr. D Y Patil School of Engineering. She completed herBachelor of Engineering degree in 2013 from Pune University, Pune, India. Her research interests are Computer Networks (wireless Networks), Mobile Computing etc.

2. Prof. Mr. PankajAgarkaris Assistant Professor and P.G Coordinator in the Computer Engineering Department, Dr. D Y Patil School of Engineering, Lohegaon, Pune. He received Master of Engineering (Computer) degree from COEP, Pune, India. His research interests are Data Mining etc.