Examining Energy Consumption of Data Transmission for TCP Download/Uploads

M.Manikandan
P.G Scholar, CSE,
K.S.Rangasamy College Of Technology,
Tamil Nadu, India
mani10061993@gmail.com

Dr.E.Mohanraj
Assistant Professor, CSE,
K.S.Rangasamy College Of Technology,
Tamil Nadu, India

Abstract - **Energy consumption through wireless data transmission on Smartphones is growing rapidly with the growing popularity of applications that require a network connection. This results in shrinking battery life, such as the development of battery technology is not in a position to comply with the energy requirements of applications. During the waiting time for the breakthrough in battery technology, we can try that the networked applications more energy-efficient. This project investigates the energy consumption characteristics of data transmission via WLAN , the Internet is the effect of the flow properties and the network environment. We present deterministic models that describe the energy consumption of wi-fi data transfer with traffic burstiness, network performance metrics such as throughput and proliferation rate and parameters in the use of energy-saving mechanisms. These models are very useful because their inputs are easily on mobile platforms without changing the low-level software or hardware components.**

Keywords - Mobile node, Smartphones, Retransmission Rate, Radio signals.

I. INTRODUCTION

This manual is intended for embedded systems engineers and support professionals who are not familiar with wireless networks from a theoretical point of view and implementation. The components that the organization and operation of wireless networks will be presented. There is a focus on issues of security and the security of available protocols. Wi-Fi is the transmission of radio signals. Wireless rabbit offer many advantages for the embedded systems engineer a wide range of applications. Wireless Ethernet: Wi-Fi is an Ethernet replacement . Wi-Fi and Ethernet, IEEE 802 Networks, some of the most important elements.

Advanced Access is the lack of wires and cables extends access to the places where cables and wires, or where it is too expensive for you. Cost reduction: As mentioned above, the absence of wires and cables lowers costs. This is achieved by a combination of factors that the relatively low cost of wireless router, and there is no need for trenching, drilling and other methods that are necessary to ensure the physical connections. Mobility: Cable ties for a site. The switch to Wireless means you have the freedom to change your location without the Connection.

II. RELATED WORK

Feng Qian, Zhaoguang Wang describes that Despite the popularity of mobile applications, their performance and energy shortages remain hidden due to a lack of transparency in resource-constrained mobile execution environment with potentially complex interaction with the application behavior. In this work they design and implement ARO, the mobile application resource optimizer and the first tool that efficiently and accurately represents the cross-layer interaction between the different levels, including[11], Radio Resource Channel Status, transport layer, application layer and the user interaction layer to enable the discovery of the inefficient use of resources for smart-phone applications.

Roy Friedman, Alex Kogan et.al., describes a combined power and throughput performance study of WiFi and Bluetooth use in smartphones.[13]. The study shows some interesting phenomena and compromises. The conclusions of this study indicate preferred usage patterns and operational proposals for researchers and developers smartphone. Smartphones are quickly to the most important computing and (data) communication platform.

Mohammad A. Hoque, Matti Siekkinen et.al[12]., the authors Examining how much energy can be saved by forming streaming audio traffic before the reception on the mobile devices. The reason for this is the following: Mobile network interface (WLAN and 3G) are in the active mode when you send or receive data, otherwise you are in hibernation/standby mode. To save energy, the minimum possible time should be spent in the active mode and maximum idle/Sleep mode. It is known that the reorganization of the rule Constant Bit Rate multimedia traffic in bursts, it is possible to spend more time in the idle/Sleep mode will lead to impressive energy savings.

Aki Saarinen, Matti Siekkinen et.al., presents that Outsourcing of tasks to cloud is one of the proposed solutions for extending battery life of mobile devices[14]. Most of the research focuses on the outsourcing of the calculation so that communication related tasks out of range. But the most popular applications today intensive communication, it requires a significant part of the total energy. It is therefore currently not know how to use it is possible to discharge for

the saving of energy in such applications.Use an open source Twitter client and tweet, as a case study.

Shivajit Mohapatra, Nikil Dutt presents the design and implementation of a cross-layer framework for the evaluation of the performance and performance trade-offs for streaming video to mobile handheld systems.The knowledge of these adjustments are then used to drive "onde vice" adjustments[15], including CPU voltage scaling by OS-based soft real time planning, LCD-background lighting adjustment and Network Card Power Management.

Ying Huang et al [1] describe the WLAN-based content distribution community infrastructure (CDCI), file servers are deployed in various places around the cities, caching popular files interesting to a community. The optimal caching strategy depends on many factors, such as Users' mobility patterns, access point topology, file, etc. because of the popularity of the NP-hard and a variable area this optimization problem, a heuristic algorithm is proposed moba sign, allocate blocks.

Joshua rich et al [2] explains emerging networking experiments and multimedia content distribution in mobile settings requires significant bandwidth. Centralized infrastructure are often either inadequate or excessively expensive to fill the demand. An alternative here P2P content dissemination plan for mobile devices (e.g. mobile phones), smart-examined which uses local dedicated caches on these devices to opportunistic user requests.

Vincent lenders et al.. [3] said that podcasting has become a very popular and successful internet service in a short period of time. Podcasting has become very popular for the distribution of audio and video content over the Internet. It is based on user subscriptions where software clients query server for updates from subscribed feeds using a Web content syndication protocol such as RSS or Atom. Podcasting is often used for the download of content to a mobile media player that people will play back on the motion.

Feng Li and Jie Wu et al.. [4] describe the content-based service that dynamically routes and offers events from sources to interested users, is extremely important to network services. A unique Publish/Subscribe rules it is proposed that uses the long-term social network properties, which for many DTNs easier, content-based services in DTNs.

Paolo Costa [5] et al. describe the aApplications with the dissemination of information directly relevant to the people (e.g. service of advertising, news spread, environmental alerts) often rely on publish-subscribe, in which the network provides a published message only to the nodes whose subscribed interests coincide. In principle, the publish-subscribe is particularly useful in mobile environments as the clutch under communication is minimized.

Chiara Boldrini [6] et al. Describe the data dissemination in resource constrained opportunistic networks, i.e. multi-hop ad-hoc networks in which the simultaneous paths between endpoints are not available, in general, for end-to-end communication. One of the biggest challenges is to make the content available in those regions of the network where interested users exist without the hard disk failure rates available resources (e.g. by avoiding floods). These regions should be identified through the use of dynamic, only local information exchanged from the nodes on the encounter with other peers. To this end, the evaluation of information on the social behavior of the user proves to be very efficient.

Augustin Chaintreau et al [8] describe the transfer of data between wireless devices carried out by man. The authors observed that the distribution of the inter-contact time (the time gap between two contacts between the same pair of devices) may well be approximated by a law on the track.

Adriana Iamnitchi et al [9] describe the Web cache, content distribution networks, peer-to-peer file sharing networks, distributed file systems and data light grids all have in common that a community of users, the use of shared data.proposed that a new structure - the interest of file-sharing graph and the common interests of the user in the data and justify its usefulness with studies on four data-sharing system: a high-energy physics collaboration, the network, the Kazaa Peer-to-peer network, and a BitTorrent file-sharing community.

Elizabeth Daly et al [7] describe the message delivery in sparse mobile ad hoc networks (MANETs is difficult due to the fact that the network graph is rarely (if ever). An important challenge is a route to find the good delivery performance and low end-to-end delay in a separate network graphics in which nodes can move freely.

Mirco Muso Lesi et al.. [10] describe the mobile ad-hoc network protocols is based almost exclusively on the simulation. The value of the validation is therefore heavily dependent on how realistic the movement in the simulations used models. Since there are only a very limited number of available real tracks in the public domain, synthetic models for motion pattern generation must be used.

Although there are many techniques for evaluating the applications such as pedestrian counting, trajectory path estimation; there is no standard protocol has been defined. So far in the discussion, it is obvious that the objective measure for evaluating the multi target tracking methods includes many significant factors which give a fair assessment of the performance.

III. OVERVIEW OF THE PROJECT

Energy consumption through wireless data transmission to smart phones is rapidly with the growing popularity of applications that require a network connection. This results in shrinking battery life, such as the development of battery technology is not in a position to comply with the energy requirements of applications. In the project to a deterministic models power modeling, where the basic idea is to estimate the energy consumption of hardware components with the help of predefined state machines. Building a state machine that models the default behavior of a 802.11 WNI.

Since the operating systems on most commercial devices no exposure for the duration of the WNI spends in each operating mode, we propose with traffic tracks to estimate this duration. The inputs of our models, especially the traffic data as the burst duration and sizes, are accessible without changing the low-level hardware or software components. While exploring the trade-off between the accuracy of the model and the granularity of the inputs is that the burst-level traffic information is enough for power modeling purposes.
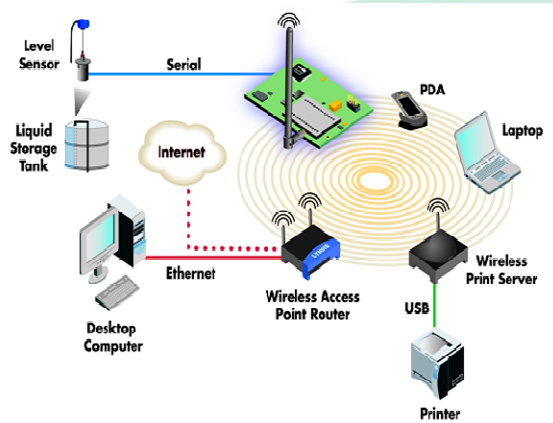

Fig 1. Architecture Diagram

In this proposed models are designed for both TCP and UDP transmission. Due to the limited space, we use the more complex TCP transmissions in the model evaluation. This selection can also be justified by the fact that more than 70% of all IP data traffic was measured by TCP-based. Assessment of the proposed models with TCP download/upload at the different transmission rates in both fairly and highly congested networks. The test cases cover the scenarios in which the data are periodically repeated sequence so often seen in streaming applications, as well as the scenarios in which the data is delivered in bursts with random sizes and distances such as surfing the Internet and instant messaging.

IV. TOOLS AND TECHNIQUES

In the proposed technology, on the basis of past transactions for a particular node node is the data quickly and reliably found and proposed for consecutive communication is also implemented. Also includes details on stable nodes are the requested data to other nodes are retained. In the proposed system, P2P-based approach in which a node is the viewing and downloading of media content, you can upload the content at the same time. With regard to the efficient sharing of media content, the project uses the segmented media content to avoid the possibility of downloading failure.
It allows users to share existing media segments, while others can download. The stable node function as a broker match content requestor and provider. Nodes are treated as stable

peers by a time threshold and nodes online up to this point in time is treated as a stable node. And also the colleagues are online and offline can be maintained. The total number of up time and downtime of each peer is also maintained.

V. EXPERIMENTS

A. MOBILE NODE CONFIGURATION

i. Configuration Mobile Server

In this form, the server machine IP address (the main application running node's IP address) is saved in to the 'ServerIPAddress' table.

ii. Configuration Mobile Peer

In this form, the node id and IP address (the client application running node's IP address) is saved in to the 'Peers' table.

iii. Configuration Stable Node

In this form, the stable node time settings threshold is saved in to the 'StableNodeThreshold' table. When a client application is started and runs up to this duration, then this node is said to be stable node.
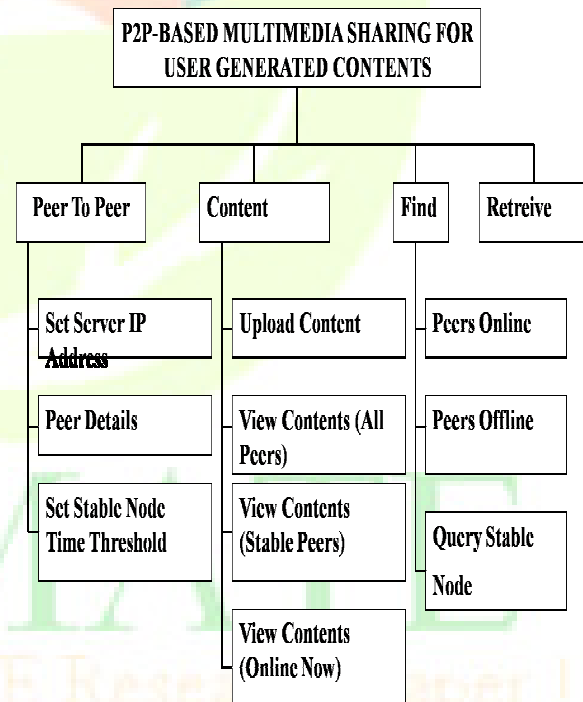

Fig 2. System Fllow Diagram

203

B. DATA SHARE CONFIGURATION

i. Configuration Upload

In this form, the date/time, title and description, the file path to be uploaded, and file type (extension such as .doc, .mp3, etc) are saved into 'Uploads' table.

ii. View Data Share Contents (All Mobile Peers)

In this form, using data grid view control, all the records in 'Peers' table are fetched from database and displayed.

iii. View Data Share Contents (Stable Mobile Peers)

In this form, using data grid view control, all the records in 'Peers' table with 'StableNode' column's value set to 1 are fetched from database and displayed. When the node is selected, the files kept in that node are displayed.

iv. View Data Share Contents (Online Now)

In this form, using data grid view control, all the records in 'Peers' table with 'OnlineNow' column's value set to 1 are fetched from database and displayed. When the node is selected, the files kept in that node are displayed.

C. MODELING FOR DATA CONTENT SHARE

i. Modeling For Mobile Peers Online

In this form, using data grid view control, all the records in 'Peers' table with 'OnlineNow' column's value set to 1 are fetched from database and displayed.

ii. Modeling For Mobile Peers Offline

In this form, using data grid view control, all the records in 'Peers' table with 'OnlineNow' column's value set to 0 are fetched from database and displayed.

iii. Modeling for Query Stable Node

In this form, using data grid view control, all the records in 'Peers' table with 'StableNow' column's value set to 1 are fetched from database and displayed.

D. RETRIEVE DATA CONTENT SHARE

i. Retrieve Multimedia Content

In this form, the search word is given and records having description matching with the search word are fetched and displayed. When the file is selected, the nodes having that record/file are displayed. When 'Download Content' button is clicked, the file's segments are retrieved from those systems.

ii. Report Broken Stable Node

In this form, the stable nodes if not connected to the given node, then it is displayed.

iii. Rate Stable Nodes Based On Capability

In this form, all stable nodes running for very long duration are displayed in the decreasing order of duration.

VI. EXPERIMENTAL AND RESULTS

The following **Table 1** describes experimental result for number of query search   process in existing and proposed average delay was compared.

Performances Analysis- Average Delay

The table contains number of search query, existing hit average delay and proposed average delay details are

Table 1 Performances Analysis- Average Delay

S.NO	Number of Query Search	Existing System AVG Delay	Proposing System AVG Delay
1	25	60.22	62.12
2	50	63.54	65.04
3	75	70.13	75.31
4	100	74.34	78.46
5	125	79.66	84.37
6	250	83.75	86.79
7	275	87.39	89.87
8	300	91.67	92.08

The **Fig. 2** describes experimental result for number of query search   process in existing and proposed average delay of query analysis.
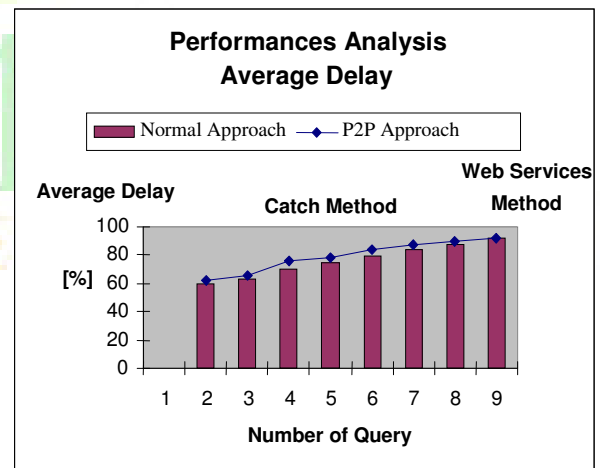
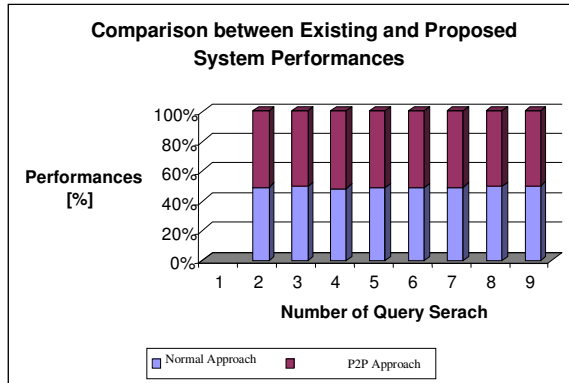**Fig 3. Performances Analysis- Average Delay**

Fig 4. Comparisons between Existing and Proposed

VII. CONCLUSIONS

The difficulty in distributing the content in the server is eliminated by using this application. It reduces the server bandwidth to consistent amount. The end users need not wait for server in downloading the content since the P2P application gets the content from available clients. The application works well for given tasks in network environment. Any node with .Net framework installed can execute the application and identifies the best site. The underlying mechanism can be extended to any / all kind of web servers and even in multi-platform like Linux, Solaris and more. The system eliminates the difficulties in the existing system. It is developed in a user-friendly manner. The system is very fast and any transaction can be viewed or retaken at any level. This software is very particular in reducing the work and achieving the accuracy.

VIII. FUTURE ENHANCEMENT

The new system become useful if the below enhancements are made in future. The statistical analysis of download data if prepared, can be used for further development. The P2P application if developed as web site can be used from anywhere. The user portal if developed can assist in maintaining download history for end users. The new system is designed such that those enhancements can be integrated with current modules easily with less integration work.

REFERENCES

[1] Y. Huang, Y. Gao, K. Nahrstedt, and W. He, ―Optimizing File Retrieval in Delay-Tolerant Content Distribution Community, Proc. IEEE 29th Int'l Conf. Distributed Computing Systems (ICDCS '09), 2009.

[2] J. Reich and A. Chaintreau, ―The Age of Impatience: Optimal Replication Schemes for Opportunistic Networks, Proc. Fifth Int'l Conf. Emerging Networking Experiments and Technologies (CoNEXT '09), 2009.

[3] V. Lenders, M. May, G. Karlsson, and C. Wacha, ―Wireless Ad Hoc Podcasting, ACM SIGMOBILE Mobile Computing and Comm. Rev., vol. 12, pp. 65-67, 2008.

[4] F. Li and J. Wu, ―MOPS: Providing Content-Based Service in Disruption-Tolerant Networks, Proc. IEEE 29th Int'l Conf. Distributed Computing Systems (ICDCS '09), 2009.

[5] C. Boldrini, M. Conti, and A. Passarella, ―ContentPlace: Social-Aware Data Dissemination in Opportunistic Networks, Proc. 11th Int'l Symp. Modeling, Analysis and Simulation Wireless and Mobile Systems (MSWiM '08), 2008.

[6] M. Papadopouli and H. Schulzrinne, ―A Performance Analysis of 7DS: A Peer-to-Peer Data Dissemination and Prefetching Tool for Mobile Users, Proc. IEEE Sarnoff Symp. Digest Advances in Wired and Wireless Comm., 2001.

[7] J.B. Tchakarov and N.H. Vaidya, ―Efficient Content Location in Wireless Ad Hoc Networks, Proc. IEEE Int'l Conf. Mobile Data Management (MDM '04), 2004.

[8] A. Fast, D. Jensen, and B.N. Levine, ―Creating Social Networks to Improve Peer-to-Peer Networking, Proc. 11th ACM SIGKDD Int'l Conf. Knowledge Discovery in Data Mining (KDD '05), 2005. 53

[9] A. Iamnitchi, M. Ripeanu, and I.T. Foster, ―Small-World File-Sharing Communities, Proc. IEEE INFOCOM, 2004.

[10] M. Mcpherson, ―Birds of a Feather: Homophily in Social Networks, Ann. Rev. Sociology, vol. 27, no. 1, pp. 415-444 , 2001.

[11] F. Qian et al., "Profiling resource usage for mobile applications:A cross-layer approach," in Proc. MobiSys, Bethesda, MD, USA,Jun. 2011, pp. 321–334.

[12] M. Hoque, M. Siekkinen, and J. K. Nurminen, "On the energyefficiency of proxy-based traffic shaping for mobile audiostreaming," in Proc. CCNC, Las Vegas, NV, USA, Jan. 2011,pp. 891–895.

[13] R. Friedman, A. Kogan, and K. Yevgeny, "On power and through-put tradeoffs of WiFi and bluetooth in smartphones," in Proc.INFOCOM, Shanghai, China, Apr. 2011.

[14] A. Saarinen et al, "Can offloading save energy for popular apps?"in Proc. MobiArch, Istanbul, Turkey, Aug. 2012, pp. 3–10.

[15] S. Mohapatra, N. Dutt, A. Nicolau, and N. Venkatasubramanian,"Dynamo: A cross-layer framework for end-to-end QoS andenergy optimization in mobile handheld devices," IEEE J. Select.Areas Commun., vol. 25, no. 4, pp. 722–737, May 2007.