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RESEARCH ARTICLE

AD-HOC TRANSFER OF LARGE FILES IN MINIMAL TIME (IMPROVED INSTANT FILE SHARING)

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ABSTRACT

In this paper, we attempt to propose a method to enhance ad-hoc file transfer. We employ the idea of using Wi Fi Peer to Peer MAC to establish connection with the desired peer. The Wi Fi Peer to Peer MAC is obtained by discovering the recipient peer through Bluetooth, and then employing an algorithm that computes the MAC using the recipient's Bluetooth MAC address. The advantage of establishing a peer- to-peer network lies in bypassing the need of connecting to AP (Access Point) and in better transfer rate and range over file transfer using Bluetooth. Further, test results show that our proposed implementation has the potential to achieve improved speed, wider range and better security when compared to existing peer-to-peer file transfer techniques, viz. NFC, Infrared and Bluetooth.

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INTRODUCTION

File transfer, - an act of exchanging files between devices is of growing importance currently, due to increased need for sharing images, text ,miscellaneous files including audio and most importantly videos, on the fly. The need for file transfer has increased with the invent of mobile devices with high end cameras capable of capturing images and motion pictures up to 40 mega pixels in size. (The most recent include Nokia Lumia 1020 with HD 41MPixel camera). Although several techniques currently exist to accomplish this task, each of them has their own pitfalls and fallacies. A Peer-to-peer (P2P) network is an architecture in which each node in a network (aka Peer) acts as both consumer and supplier of resources in contrast to a Client-Server architecture, where one peer supplies and the other consumes. The concept of P2P is predominantly suited for file sharing, since it establishes a direct one to one connection between two nodes. 802.11 is the widely used IEEE Protocol for implementing Wireless Local Area Network (WLAN) communication between devices. Maintained by the IEEE LAN/MAN Standards Committee, the 802.11 family consists of a series of amendments that use the same basic protocol. The initial version of this includes 802.11-1997, followed by 802.11a, b, g and n series. Table I shows the details of each of these amendments.

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The key advantage of using the 802.11 standard lies in its ability to establish a direct peer to peer connection on the fly. This is the reason why 802.11 promises ad-hoc connection establishment. In this project, the primary emphasis is on how the drawbacks of existing technologies can be converted to form a better and efficient technique for file sharing. Bluetooth, when combined with Wi-Fi forms a better way of transferring large amounts of file with a greater speed.

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Table I. Comparison of 802.11 Amendments

802.11 Amendment	Release	Transfer Rate (Approx.)	Range (Approx.)
1997	Jun-97	2 Mbps	20 m
a	Sep-99	11 Mbps	120 m
b	Sep-99	22 Mbps	140 m
g	Jun-03	54 Mbps	140 m
n	Oct-09	600 Mbps	250 m

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Related Work

Initial methods to achieve this include simple file *copy*, NFC, Infrared, Bluetooth and so on. This project attempts to point out the drawbacks of some such existing technologies and hence propose a new methodology to achieve an even better, yet efficient technique to achieve this critical task. Before getting into the details of the new proposal, the paper first brings into limelight the potential downfalls of the existing techniques and then introduces the proposed technique and its benefits over the latter. NFC or Near Field Communication is a set of standards that establishes radio communication between devices to exchange files by touching them together or bringing them to close proximity. Although interesting, this technique suffers from security issues and limitation in the communication distance. The communication range of NFC is limited to only a few centimeters. Also, the RF signal for wireless data transfer using NFC can be picked up by antennas, thus leading to eavesdropping.

IR or Infrared, - another technology, allows devices to transfer files and other digital data via short range wireless signals. However, IR communications span very short distances of not more than 5 meters. Also, IR signals cannot penetrate walls or other obstructions and work only in the direct *line of sight.*

Bluetooth, a wireless technology standard for exchanging data between devices by creating *Personal Area Networks* (PANs) offers high levels of security. It uses the principle of *device inquiry* and *inquiry scan*. Scanning devices listen to known frequencies for devices that are actively inquiring. When an inquiry is received, the scanning device sends a response with the information needed for the inquiring device to determine and display the nature of the device that has recognized its signal. However, connection between a Bluetooth device and its recipient device is not perfect. That is, if an object is placed between the devices, transmission could be easily cut off. Further, this technology is not designed for high speed data transfer (limited to max of 2.1 Mbps).

The proposed method

The main idea of the proposal lies in obtaining the P2P MAC of the recipient which is then used to establish a direct one on one connection. However, P2P MAC of recipient is not exposable to neighboring devices unlike the Bluetooth MAC. Accordingly, the proposal makes use of an algorithm in computing the P2P MAC using the Bluetooth MAC.

The implementation is broadly divided into 3 major technical phases. The following sub-sections illustrate their details.

Computing P2P MAC

As pointed out, only the Bluetooth MAC of a device is exposable to the neighboring devices. As such, the implementation uses this to obtain the P2P MAC. The details of this computation is shown in Fig. I

Connection Establishment

The P2P MAC computed in the prior phase is then used to trigger a connection request with the corresponding recipient. This may be implemented using the popular Three Way Handshake protocol.

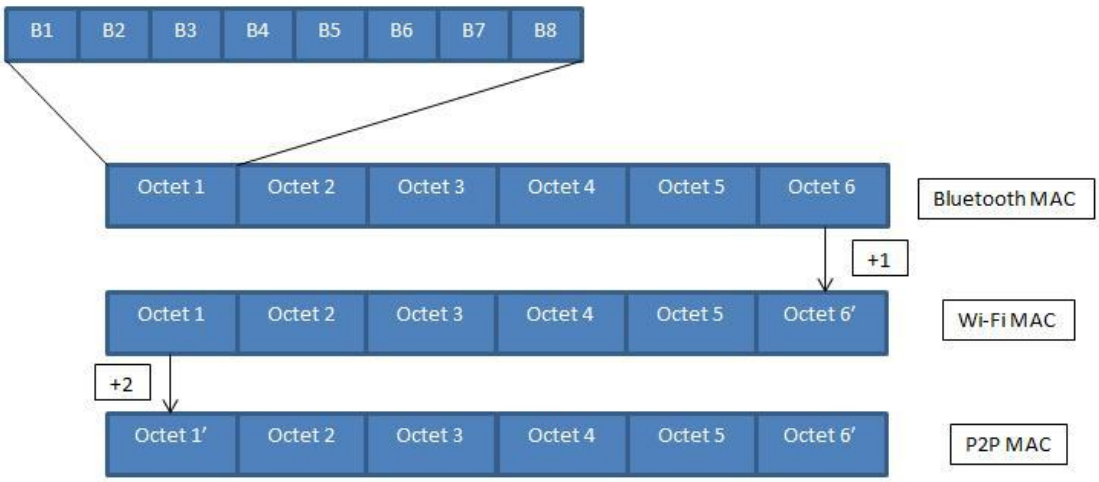

Fig. I. P2P MAC Computation

Table II. Experimental Results of File Transfer

File Type	File Size	Bluetooth	Our Implementation
Image	6.14 MB	38s	5s
Image	5.62 MB	36s	4s
Image	82.32 KB	2s	0s
Video	2.38 MB	16s	1s
Audio	9.09 MB	61s	7s
Audio	5.16 MB	39s	6s
Video	206 MB	21.1 min	6.3 min

The graph below gives a clear picture of the comparison made in Table II.

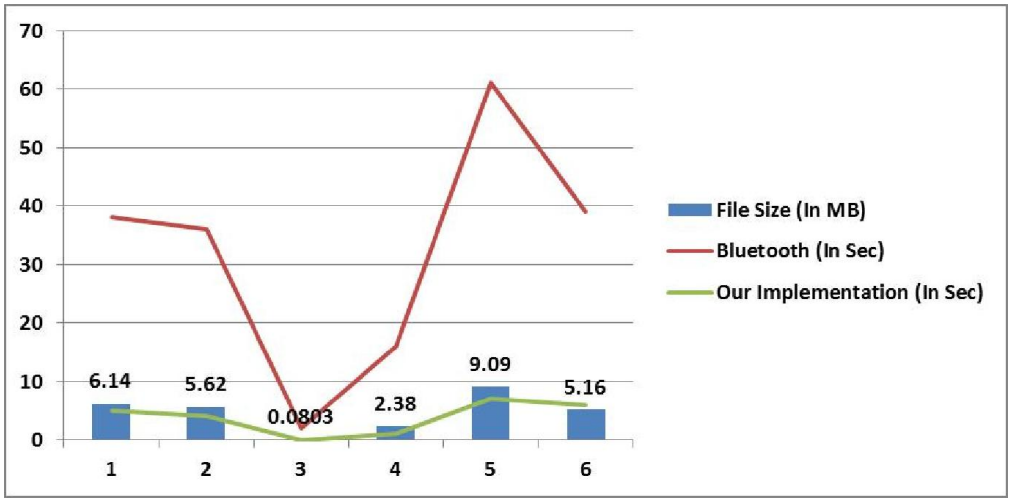

Fig. II. A sample line graph using colours which contrast well both Bluetooth and the new implementation

File Transfer

Once a direct P2P connection is established, the corresponding nodes (referred as peers) are free to exchange files of desired type depending upon the implementation. Since large files usually include audio and video, these MIME types are common files of interest in the transfer process. The peer that initiates a peer-to-peer connection would be referred as *Owner*. The *Owner's* IPaddress is of at most importance in helping the peers connect with it. Currently, our implementation connects the owner to a single peer. However, the owner might also be designed to connect with multiple peers, establishing a one-on-one connection with each of them. Further, our implementation, when compared with the current popular ad-hoc file transfer technique, Bluetooth, is efficient in terms of speed, range and distance. The results of this proof are shown in the following section.

Experimental results

Several tests have been performed in transferring files of different sizes and types (audio, video and image) between two devices that support Bluetooth V3.0 and Wi-Fi 802.11 g standards. The details of these tests are tabulated in Table II. The results are in comparison with Bluetooth.

Speed

Experimental results show that our proposal is superior in terms of transfer rate when compared to that using Bluetooth. Since, the P2P connection establishment is via the 802.11 wireless standard, the speed of transfer is directly proportional to the corresponding 802.11 amendment supported by the device that transfer the files. Today, however, since most devices are designed to support 802.11g and above amendments, the speed of transfer is theoretically 54 Mbps and above. Table II shows comparison in terms of Speed between Bluetooth and our implementation.

Range

Experimental results show that our proposal is superior in terms of transfer range when compared to that using Bluetooth. This is evident as 802.11 wireless standards support wider range in comparison to Bluetooth as pointed out in Table I.

Reliability

Since the connection is established using P2P MAC, which is unique to each device, the established connection is free from security threats such as eavesdropping and interception. No external peer would be able to interrupt connection between the *Owner* and its corresponding peer. This is because, an external peer would be possible to connect with another peer (referred here as *Owner*) only after the owner accepts the connection.

Conclusion

This paper attempts to highlight the importance of improved ad-hoc file transfer. The improvement is achieved in terms of

speed, range and reliability. Finally, we have analyzed the transfer rate and ranges between our implementation and Bluetooth. Regarding future research directions. First, the implementation can be improved to facilitate connection between the owner and multiple peers. This would help in multi-player games and other such application areas. Second, the proposal can be implemented across different platforms (cross-platform implementation) to facilitate ad-hoc file transfer between android-windows (and vice-versa), android-Symbian (and vice-versa) or between windows-Symbian (and vice-versa).

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REFERENCES

Android Developer Guide: http://developer.android.com/guide

D. Camps-Mur, X. Perez-Costa, S. Sallent-Ribes, Designing energy efficient Access Points with Wi-Fi Direct, Computer Networks, September 2011.

D. Camps-Mur, X. Perez-Costa, S. Sallent-Ribes, Designing en-ergy efficient Access Points with Wi-Fi Direct, Computer Networks, September 2011.

Device to device communications with Wi-Fi direct: Overview and Experimentation, Daniel Camps-Mur, Andres Garcia-Saavedra and Pablo Serrano.

http://www.tutorialspoint.com/java/java_networking.html

IEEE 802.11-2007 Standard, Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications, 2007.

IEEE 802.11z-2010 - Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications Amendment 7: Extensions to Direct-Link Setup (DLS).

Jin-Shyan Lee; Yu-Wei Su; Chung-Chou Shen, A Comparative Study of Wireless Protocols: Bluetooth, UWB, ZigBee, and Wi-Fi, Industrial Electronics Society, 2007. IECON 2007.

Lochan Verma and Scott Seongwook Lee, Proliferation of Wi-Fi: Opportunities in CE Ecosystem, in Proc. PerNets 2011, Las Vegas, USA, Jan 9 12, 2011.

On using peer-to-peer communication in cellular wireless data networks. Hung-Yun Hsieh ; Sch. of Electr. & Comput. Eng., Georgia Inst. of Technol., Atlanta, GA, USA ; Sivakumar, R

Peer-to-peer communication on android-based mobile devices: Middleware and protocols. Jabbar, W.A. ; Dept. of Electr., Electron. & Syst. Eng., Univ. Kebangsaan Malaysia, Bangi, Malaysia ; Ismail, M. ; Nordin, R.

Question and Answer Forum: http://stackoverflow.com/

TCP File Transfer (simple): http://www.coderpanda.com/java-socket- programming-file-transfer-through-socket-in-java/

Wi-Fi Alliance, P2P Technical Group, Wi-Fi Peer-to-Peer (P2P) Technical Specification v1.0, December 2009.

Wi-Fi Alliance, Wi-Fi Protected Setup Specification v1.0h, Dec. 2006.

****