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Application of wireless networks-peer–to-peer information sharing

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Abstract.   Peer to Peer communications and its applications have gotten to be ordinary construction modelling in the wired network environment. But then, they have not been successfully adjusted with the wireless environment. Unlike the traditional client-server framework, in a P2P framework, each node can play the role of client as well as server simultaneously and exchange data or information with others. We aim to design an application which can adapt to the wireless ad-hoc networks. Peer to Peer communication can help people to share their files (information, image, audio, video and so on) and communicate with each other without relying on a particular network infrastructure or limited data usage. Here there is a central server with the help of which, the peers will have the capability to get the information about the other peers in the network. Indeed, even without the Internet, devices have the potential to allow users to connect and communicate in a special way through short range remote protocols such Wi-Fi.

1. Introduction
In the recent years peer-to-peer communications in the wired network environment had become conventional architecture. But in wireless environment they yet have to make a mark. Although P2P is a very controversial topic but there is a lot of confusion in understanding the concepts of P2P. This is a class of systems and applications that is to be deployed in decentralized manner. The peer-to-peer uses ad-hoc network concepts which allows user to access maximum bandwidth and performance with good data transfer rate. This conceptual model can be depicted to be distributed computing, data or content sharing as well as communication or platform services. While Peer-2-Peer systems previously had been used in many domains, and the design was known by the file sharing system Napster. The inspired concepts new in many areas of human interaction.

2. Problem Statement
Here we take into consideration the Wi-Fi network that is provided by the university and extend its usage for our purpose of designing the application. The Wi-Fi technology is a wireless medium to connect two or more devices for information sharing such as files, audio, video etc. But the Wi-Fi data that is provided to the students is limited for which a charge also has to be paid. Once the maximum limit is reached the services become inaccessible. In order to overcome this problem and continue the

information sharing process without any hassles of limited data bandwidth and charges which need to be paid for the data that is consumed, we come up with a solution.

3. Solution

We propose to deploy a central server in the Wi-Fi network which will process through the authentication of the connected users in the existing domain/workgroup. The users can share their data by sharing the folder or files from their devices. They need to provide permission to other users whoever wishes to access those files. Also the users can search the required data or files from the domain and download it to their own device without paying any cost. This would help them to save their limited data and charges applicable on that data. Each user's device will act as a client as well as server because it can request information from other devices in the network and also provide the requested information to other devices simultaneously.

4. Architectural Design

The central server that is deployed will do the entire management work. It will keep the information of all the devices like which device has which specific file that it wants to share or access, which device is in a working state and whether the file or folder is available for public or private access. It will only keep information of the devices that is connected in the peer to peer ad hoc network. When a particular device which request for a resource it will first look into the central server to check which particular device on the network has the requested resource and then it will connect with that particular device to retrieve the resource it wants.

On the client side there would be a component called Network Discovery Manager that would handle the different connections by identifying Wi-Fi access points and deciding when the peers on the network would be disconnected from the network. Another component would manage sending requests to the server and the managing a list of peers who are searching for some specific information. Another component would handle read or write operations. It permits client to make content accessible to different devices on the network. On the server side there would be three components where one would keep track of different exchange done by clients, second would handle client requests and provide response, the last one would handle admin interaction.

5. Working Methodology

The entire architecture that has been described above would work in the following way. Client will place their files a folder that would be shared among peers in that network. A file will be searched by its name and the central server will help in the searching activity as it knows in advance which device on the network has which file. The server will give the logical address of the peer having the file to the requesting peer so that it can now connect directly to the peer having the required file. Then after getting to know which particular device in the network has the particular file which is being requested, a connection will be established (between two peers) using handshaking activity. Once the connection is established the two systems can exchange files.
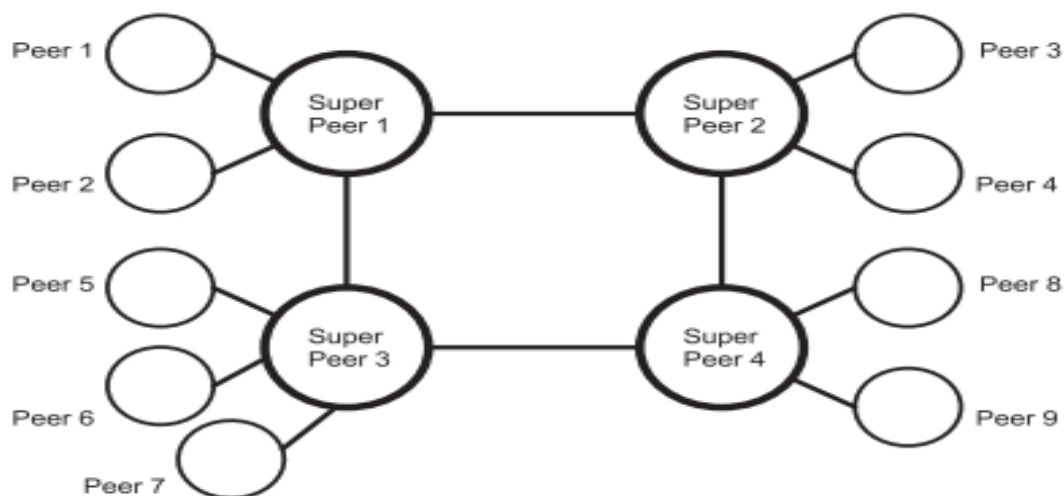
Figure 1. Basic Architecture Model for Work Plan

6. Conclusion

The proposed model is a peer-to-peer model that allows the file sharing model between two or more devices at very low cost with high speed data transfer. The deployment of P2P protocols and apps in the model of the collective wireless environment facilitates a solution with a wide range of users to share their own contents (data, audio, video, etc.), which they will have better transfer rate with the data transfer and no data consumption is charged for the limited quota. The content is just shared from one peer and can be downloaded from the other peer regardless the number of peers connected to the network area or domain. This is provided for efficient content distribution using lower cost data links that do not impose a charge on the data carrier which is subscribed for internet usage.

This model is expected to be a protocol which would allow the Wi-Fi users to communicate through each other and share their data and access other data without any charges to be paid. This paper can be considered for future improvements keeping in mind the end result to maintain quality of an application during transmission of data for the purpose of reliability and efficiency.

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