

Design and Analysis of Handover between Two Wi-Fi Network||

Vrushali V. Shrpurkar

Dept of Electronics and Communication
Engineering Priyadarshini Institute of
Priyadarshini Institute of
Engineering and Technology, Nagpur
Vrushali.shirpurkar@gmail.com

Prof. Soni Chaturvedi

Dept of Electronics and Communication
Engineering Priyadarshini Institute of
Priyadarshini Institute of
Engineering and Technology, Nagpur
sonichaturvedi@rediffmail.com

Pravin S. Mawale

Dept of Electronics and Communication
Engineering Priyadarshini Institute of
Priyadarshini Institute of
Engineering and Technology, Nagpur
pravin.mawale@gmail.com

Prof. Abhijit Bijwe

Dept of Electronics and Communication
Engineering Priyadarshini Institute of
Priyadarshini Institute of
Engineering and Technology,
Nagpur***bijweabhijit@rediffmail.com***

Abstract: Mobile Operators see an unending growth of data traffic generated by their customers on their mobile data networks. As the operators start to have a hard time carrying all this traffic over 3G or 4G networks, offloading to Wi-Fi is being considered. Present study proposes method to handover between two Wi-Fi. To achieve aforesaid objectives, the make before break (MBB) technique has been used. Feasibility of using Wi-Fi handover in the current Internet has been proved experimentally by using Network simulator 2 (NS2).

Keywords: Handover, MBB, NS2, Wi-Fi

1. INTRODUCTION

Handoff is the transferring of data from one Wi-Fi network to another Wi-Fi network without disconnecting the previous one till second Wi-Fi network is being connected with device or mobile.

Handoffs are basically two types horizontal handoff and vertical handoff. This work is based on the horizontal handoff that transferring of data in same type of networks. Fig 1 shows the rough idea about the horizontal handoff

A mobile node should be able to adapt its protocol stack to its user's requirements. From the user's viewpoint, there are three important factors to be considered. The first factor is the performance of the data transfer. Some users will probably prefer the fastest possible data transfer. The second factor is the battery lifetime. Some users will probably trade performance for longer battery lifetime. The third factor is traffic pricing. Some networks, typically 3G networks are billed in function of the number of transmitted bits or packets. Some users will favour cheaper networks.

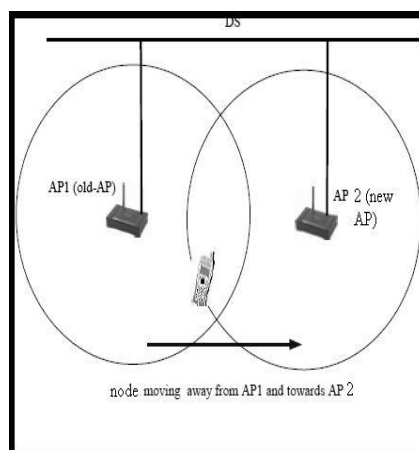


Fig 1 wifi network for handoff

2. WI-FI NETWORKS

Wi-Fi is a local area wireless technology that allows an electronic device to exchange data or connect to the internet using 2.4 GHz UHF and 5 GHz SHF radio waves. The name is a trademark name, and is a play on the audiophile term Hi-Fi. The Wi-Fi Alliance defines Wi-Fi as any "wireless local area network (WLAN) products that are based on the Institute of Electrical and Electronics Engineers (IEEE) 802.11 standards". However, since most modern WLANs are based on these standards, the term "Wi-Fi" is used in general English as a synonym for "WLAN".

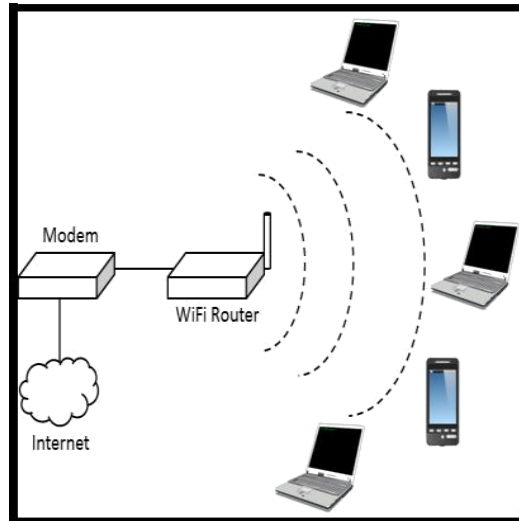


Fig 2 wifi network

3. HANDOVER EFFICIENCY

In wireless and mobile networks handovers are inevitable. As the Mobile Node (MN) may not be able to exchange data packets, when performing a handover, the handover delay becomes critical in guaranteeing real-time applications their QoS requirements. The International Telecom Union (ITU) has specified that this delay should not be more than 50 ms to avoid jitter in Voice over IP (VoIP) applications [1]. Thus there is a need to reduce the handover failure probability, by reducing the handover latency and packet loss to values that are tolerable by the MN's applications during handovers. If handover latency is too long, it might cause the existing Transmission Control Protocol (TCP) connections of the MN to break and result in poor voice quality for VoIP applications. Therefore the handover delay is an important metric in evaluating network performance for mobile users.

4. OBJECTIVES RESEARCH

In terms of objectives this work can be divided into two major branches.

1. Devising optimized handover solutions for mobile nodes.
2. The analysis of handover between two wifi using network simulator 2 (NS2)

5. ALGORITHM DESCRIPTION

For the efficient handover between two wi-fi network in this work we are dealing with make before break algorithm (MBB). This algorithm is distance oriented algorithm.

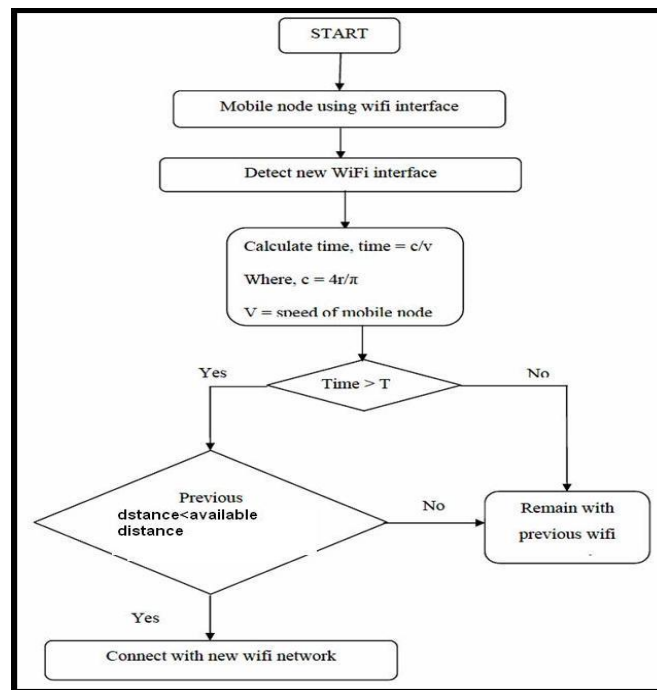


Fig 3 handoff algorithm

In our Proposed algorithm we are going to create the system that allow user to change the Wi-Fi network without losing any data because of delay in connectivity between two different Wi-Fi networks. In our Proposed method when users in any type of Wi-Fi connection and his moving towards another Wi-Fi network the connection is handover to the other Wi-Fi network by using Make Before Break concept. In the proposed method the node i.e. user is connected to Wi-Fi network by using following properties:

1. Distance From The Router
2. Range or Link Quality of the Wi-Fi Network.

Because we are using MBB concept in our proposed method the loss of data because of delay between handover from one Wi-Fi network to another Wi-Fi network is removed.

6. THE NETWORK SIMULATOR (NS-2)

Network Simulator, widely known as NS2, is simply an event driven simulation tool that has proved useful in studying the dynamic nature of communication networks. Simulation of wired as well as wireless network functions and protocols (e.g., routing algorithms, TCP, UDP) can be done using NS2. In general, NS2 provides users with a way of specifying such network protocols and simulating their corresponding behaviours. Due to its flexibility and modular nature, NS2 has gained constant popularity in the networking research community since its birth in 1989. [10]

Basic Architecture

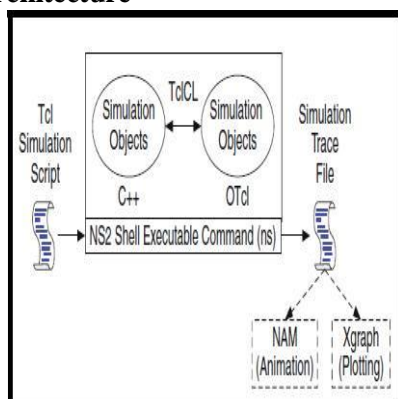


Fig 4 Basic Architecture

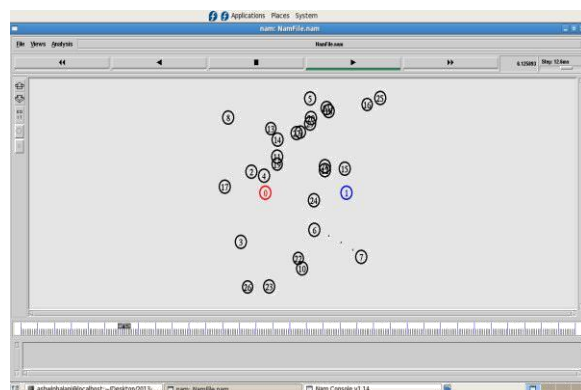


Fig 5 Node generation

7. HANDOVER PROCESSES

The type of operations and procedures that are carried out during a handover depends upon, the layer of the TCP/IP protocol stack which the handover belongs to, the mobility management protocol being used and the type of source and target networks. However these specific operations can be grouped into handover stages or phases that are common to all types of handovers. According to reference [15] the handover process is a three-stage process (i.e. handover initiation, connection generation and data-flow control). [16] [14] also divide the handover process into three phases namely network/system discovery, handoff decision, handoff implementation/execution

8. SIMULATION RESULTS

For simulation we are using network simulator 2. The simulation results are as follows :

1. Generation of nodes
2. Transfer of data
3. Handoff process
4. Delay graph

Simulation scenarios for Wi-Fi Networks

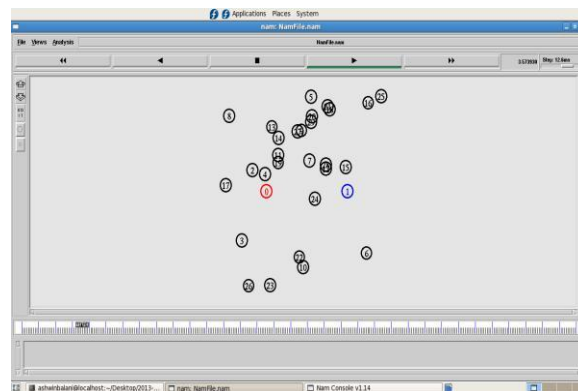


Fig 6 Transfer of data

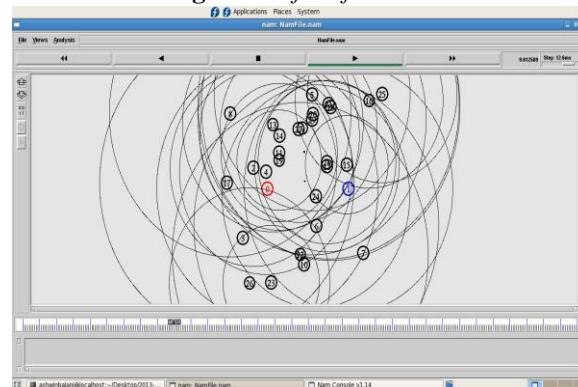


Fig 7 Handoff generation

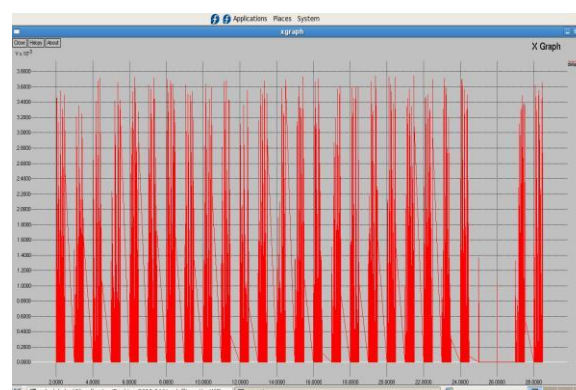


Fig 8 graph of delay

9. CONCLUSIONS

The Simulation results obtained from the presented model shows that the Handover between one Wi-Fi networks to another Wi-Fi network is successfully done by using make before break concept. The simulation results also show that's the delay for handover between different results is minimized or we can say that completely removed because we are able to connect the other network before disconnecting form first Wi-Fi network. We are also able to reduce the loss of data because of the network loss between handover times.

Thus, we conclude that our proposed method for handover between different Wi-Fi connection reduce the data loss and gives better flexibility and comfort to user of wireless network.

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