



MANET Test Bed for Rescue Operations in Disaster Management

C.Niranjan Kumar¹, R.Praveen Sam²

¹P.G Student, CSE Dept, G.Pulla Reddy Engineering College, Kurnool, Andhra Pradesh, India

²Professor, CSE Dept, G.Pulla Reddy Engineering College, Kurnool, Andhra Pradesh, India

neeru3janu@gmail.com; Praveen_sam75@yahoo.com

Abstract--- A post disaster situation demands an efficient communication and coordination among rescue teams. Exchange of real time information among responders and emergency management centers is crucial for saving lives. However, communication systems were usually down due to various reasons. The loss of communication systems made the rescue operation extremely difficult. In such scenario, MANETs are suitable for providing communication mechanism, as they are easy to deploy and do not require elaborate infrastructure. In this paper, we have considered that the relief and rescue operations in a post disaster situation are performed using a MANET test-bed setup. We have shared the files from one laptop to another laptop using Mobile Adhoc Network test-bed.

Keywords--- “post disaster”, “MANET”, “test-bed”, “rescue operations”, “emergency”.

I. INTRODUCTION

A Mobile Adhoc Network[1][4][5] is a collection of independent mobile nodes that can communicate to each other via radio waves. The mobile nodes that are in radio range of each other can directly communicate, whereas others need the aid of intermediate nodes to route their packets. Each of the nodes has a wireless interface[2] to communicate with each other. These networks are fully distributed, and can work at any place without the help

of any fixed infrastructure as access points or base stations. Figure 1 shows a simple adhoc network with 3 nodes. Node 1 and node 3 are not within range of each other; however the node 2 can be used to forward packets between node 1 and nodes 3. The following Figure 1 illustrates the MANET Structure.



Figure 1: Mobile Adhoc Network

II. RELATED WORK

Almost every year, the world is stricken by numerous catastrophic natural disasters[3], such as earthquake, hurricane, typhoon, tsunami, etc. When stricken by catastrophic natural disaster, such as Hud-Hud cyclone in Andhra Pradesh, Flash floods in Himachal Pradesh, Landslides in Himachal Pradesh, emergency rescue operation is very critical to numerous lives. Many people trapped in the disastrous areas under collapsed buildings or landslides may have a large chance to survive if they are rescued in 72 hours, referred as "*Golden 72Hours*". People evacuated from their home jammed in highways or dome shelters need to communicate teach other for various reasons such as allocation of rescue and relief resource as well as reunion of family members. However, communication systems, fixed or mobile, were usually down due to various reasons. Rescue teams in each stricken area consists of few trained professional squads, army, police, fire fighters, and hundreds of thousands of disorganized volunteers. The loss of communication systems made the rescue operation extremely difficult. Although establishing a temporary communication network to support emergency communications and networking is one of the most urgent tasks in disastrous rescue mission. We propose to use Wi-Fi-ready mobile devices owned by rescue volunteers themselves to construct a MANET to support such a need. Because the popularity of Wi-Fi-ready mobile devices is very high nowadays, this solution would be highly feasible in many countries.

III. EXISTING SYSTEM

In the previous performance evaluation primarily conducted through analytic (or) simulation based studies, which frequently fail to accurately predict real world performance and behavior. So we have gone for the proposed system.

IV. PROPOSED SYSTEM

When a disaster occurs it becomes difficult to provide services in the affected areas due to the lack of communication. All modes of communication system get damaged and it takes a lot of time to establish an infrastructure network. To overcome this infrastructure less Mobile Adhoc network is established using wi-fi enabled devices for effective and efficient rescue operations. In this paper we have transferred the files from one laptop to another laptop by using adhoc network.

V. MANET TEST-BED SETUP

A MANET Test-Bed is equipment used to show real time implementation of Wi-Fi enabled mobile devices which are in adhoc mode. This setup consists of Wi-Fi enabled mobile devices among which the information is shared. After the completion of Set up of MANET Test-Bed and the network is ready to share the information. The maximum range allowed for the exchange of information between the nodes is only 30 meters. If the distance is more then we use multi-hop communication for transfer.

- **Experimental Design:**

In the Real time Test bed We have used two laptops in which the configuration of one laptop is Windows7 32 bit operating system,2 GB RAM, Intel i3 processor, Hard disk is 500GB . Second one is Windows7 64 bit operating system , 4 GB RAM, Intel i5 ,Hard Disk 500GB.

- **Adhoc configuration:**

Before going to create the adhoc configuration, the wireless should be turned on computers between which you are about to create adhoc network

Step1: Creating adhoc wireless network

First open network and sharing center. Click on Setup a new connection or network. Then Select a 'Setup a wireless Adhoc network'. Then we have to click next button which will ask the network name, security type and security key. After entering the above Fields, we have to save the network and click next. Now the setup will create the network. When finished we will receive notification that the network has been created and it is ready to use.

Our laptop will now broadcast this newly created network and it will wait for other computers to connect.

Step 2: Destination side connection

The other side network notification area will show the already created adhoc network. If we click 'connect', it automatically identifies the connection and it will ask the password. If we enter the password the adhoc network gets connected.

Step 3: Sharing files & folders on the network

Now we can easily share the files from one laptop to another laptop.

Illustration of File Sharing:

The following Figure 2 illustrate the File transfer at source node and Figure3 illustrates File at the Destination node.

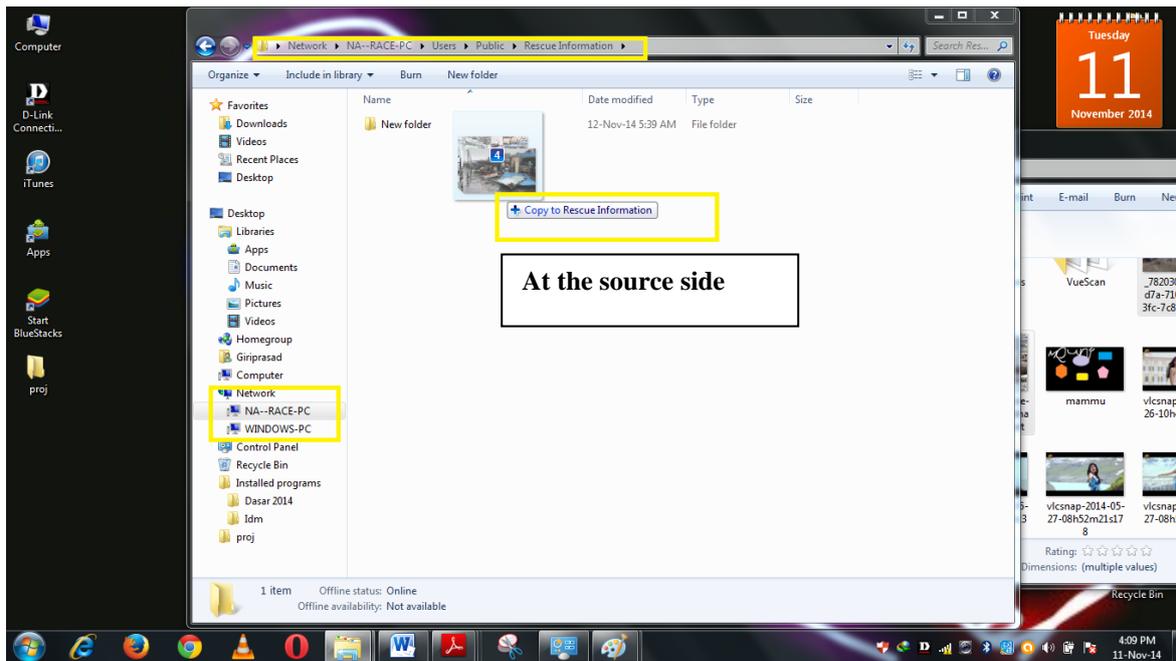


Figure 2: File Transfer at Source node

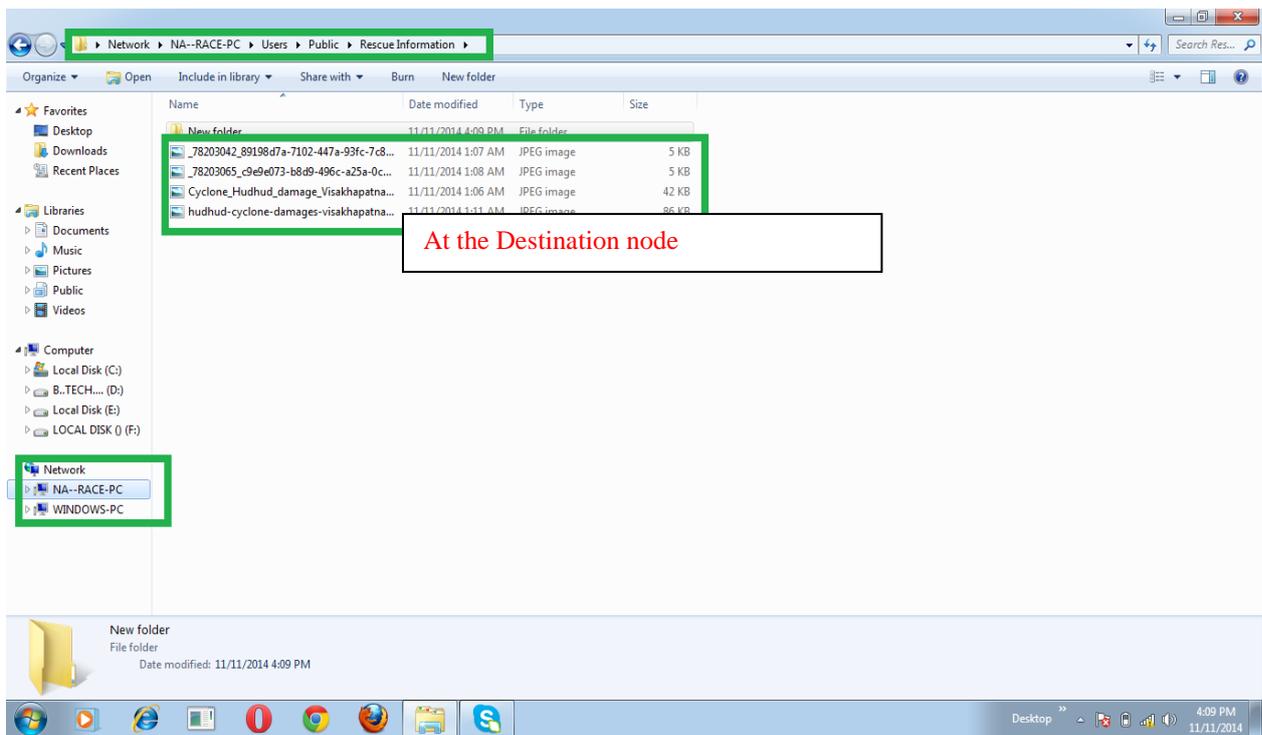


Figure 3: File receiving at the other node

Any change in the shared information at source automatically shows at the other nodes.

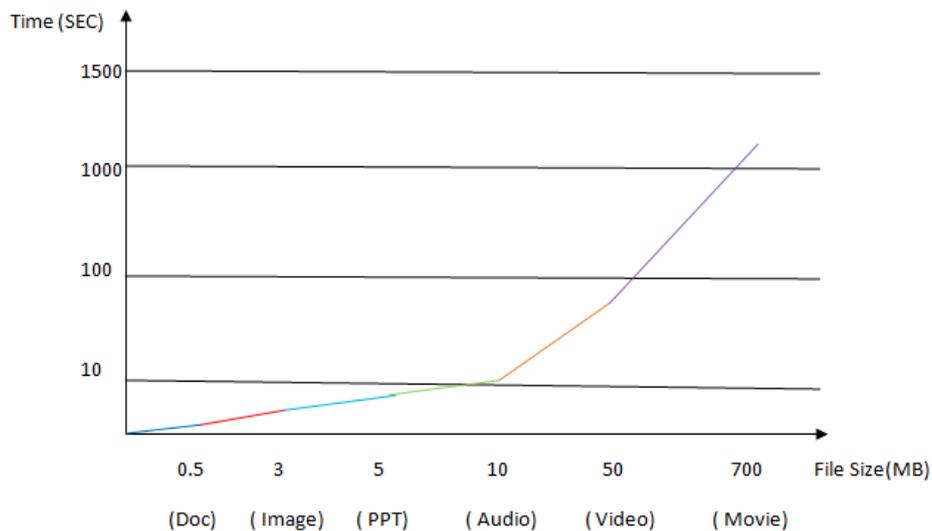
- **Experimental Results:**

All these results were taken when the network is good i.e. if the size of the file increases automatically the time taken to reach the destination also increases. In the below Table Representation and Graphical Representation the time is measured in seconds and file size is measured in MB's.

• **Table Representation:**

File Size(MBs)	Time(Seconds)
Document(doc) :0.5	Millie seconds(Fraction of seconds)
Image (img) :3	6 sec
Paper Presentation (ppt):5	9 sec
Audio :10	17 sec
Video :50	87 sec
Movie :700	1180 sec

• **Graphical Representation:**



VI. CONCLUSION AND FUTURE ENHANCEMENT

Finally a low cost test-bed of MANET is used to provide emergency services at the disaster areas which don't require much infrastructure. Using this MANET the information is exchanged between the rescue teams and services are provided according to that information. We can setup this temporary network anywhere because it is flexible and also reliable. In future we are planning to do multi hop communication by using routing protocol AODV(Adhoc On demand Distance vector routing).

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ABOUT THE AUTHORS



C.Niranjan Kumar completed his B. Tech in Santhiram Engineering college Nandyal, India in 2012 and now he is pursuing M. Tech in CSE Branch from G. Pulla Reddy Engineering College of Kurnool. His area of research includes Mobile Adhoc Network.



R.Praveen Sam working as Professor of Computer Science and Engineering Department at G. Pulla Reddy Engineering College, Kurnool. His area of research is Computer Networks.