**VIRTUAL WI-FI**

**Introduction:**

The need for sharing internet with other devices in a home group network or in corporate office has become essential. Internet can be shared in two ways: Share through LAN cables or by wireless routers.

**Existing system:**

To setup a wireless network in any environment, it requires resources such as wireless router and domain knowledge to setup such a system. In such a system, incorrect router settings will be tedious to correct and will take time to get it up and running

**Designed system:**

A new system which would not need a physical router and can share internet is designed. The new system is implemented through Internet Connection Sharing (ICS), i.e the use of a device with Internet access such as 3G cellular service, broadband via Ethernet, or other Internet gateway as an access point for other devices. It was implemented by Microsoft as a feature of its Windows Operating system through command line (command prompt).

**Objective and Aim:**

**Virtual Wi-Fi** provides network services to the client. It acts as a network administrator to its client to provide wireless network access, manage connected devices and control the network traffic.

A wireless network can be setup using already existing wireless network card to act as a router virtually. This system provides an easy to understand and use, GUI Windows application using which we can easily setup wireless network in any system with already existing wireless network card.

This application uses the available internet connection in the host computer (which could be LAN or any other source) and shares it among connected devices. The administrator can use it to monitor all the connected devices

Scope of the Application:

This type of system can be implemented in domestic households, small scale office, net centres etc.

**Functions provided:**

* **For Administrator:**
  + To Share internet with the devices in network.
  + To secure the network with WPA2 PSK encrypted security key.
  + To choose the type of internet connection to be shared.
  + To Identify connected devices by their MAC addresses.
  + To monitor number of devices connected.
  + Display number of devices connected to the network.
* **For User/Client**
  + - Secured access to internet.

**Implementation:**

Virtual Wi-Fi is basically written in C#. It’s been constructed with a few C# Projects as building blocks from many sources. It basically uses Win32 API and other API's to execute a command (Windows command) which creates hotspot. Windows ICS (Internet Connection Sharing) API is used to provide a user interface in selecting type of connection to be shared. Also blocks of code from various sources like Stackoverflow etc. have been used. If an API or piece of code used in this application belongs to a programmer or developer, all copyrights and stuff belongs to those developers and programmers...

To Run the application browse to “\Virtual-Wifi\Virtual wifi\bin\Debug“ and double click the Virtual wifi.exe file.

**Before Starting/Running the program.**

* Set it to "*Run as Administrator*". By opening properties of the application Virtual wifi.exe Switch to Compatibility tab under privilege Level, check to “*Run this program as Administrator*”

**To share internet through Virtual Wifi while connected to a WiFi source (This Feature is tested only on Win 10)**

* Open Control panel->Network and sharing->Change Adapter settings->Wireless network connection
* In sharing tab check "*Allow other network users to connect through the computer connection*"
* Then select Virtual Wi-Fi in Home network connection

**To share internet through Virtual Wifi while connected to internet through Wired cables (Local Area Connection i.e. LAN)**

* Control panel->Network and sharing->Change Adapter settings->Local Area ConnectionIn sharing tab check "*Allow other network users to connect through the computer connection*"
* select Virtual Wi-Fi in Home network connection

**To develop or view the source code**

* Download the repo and open it as a project in Microsoft Visual Studio. Preferably in Microsoft visual studio 2012 to avoid any package conflict since this application is developed in Visual studio 2012.

**Testing:**

Software testing is a process of executing a program or application with the intent of finding the software bugs. It can also be stated as the process of validating and verifying that a software program or application or product meets the business and technical requirements that guided its design and development works as expected.

**Unit testing:**

|  |  |  |  |
| --- | --- | --- | --- |
| Sl. No | Test Case | Expected Result | Test Result |
| 1. | Run the server  (Internet host) | Establish connection to client and service it | Successful |
| 2. | Run the client | Wait for server to service it | Successful |

**System testing:**

|  |  |  |  |
| --- | --- | --- | --- |
| Sl. No | Test Case | Expected Result | Test Result |
| 1. | Establish connection between client and server | A connection facilitating the client to access internet | Connection Established  (Successful) |
| 2. | Invalid SSID(network name) | Display invalid SSID | Successful |
| 3. | Invalid Password (Password lesser than 8 characters) | Display invalid Password | Successful |
| 4. | Run as without Admin privileges | Display run as Administrator | Successful |

**Conclusion:**

By implementing this application the problems in the existing system would be overcome. Virtual Wi-Fi makes it convenient to reduce human efforts in setting-up a separate router, by utilizing existing resource and thereby increases efficiency.

System can easily be enhanced. The application needn’t be installed to use the service. It can run on any device satisfying requirements without installation memory. So Virtual Wi-Fi application is 100% portable. Convenient user interface is provided with standard entry, information format and analysis to ease operation

The main focus of this application is to lessen human efforts and share internet among other devices by establishing secured connection. And it is expected that this application will go a long way in satisfying user’s requirements. Virtual Wi-Fi will not only give a secured connection but improves the efficiency by using very less memory space.

**Future Enhancements:**

The development phase of application includes many features as below:

* + - Give privilege to administrator over managing connected clients through MAC address filtering.
    - Provide alias names to connected devices.
    - Attach suitable icons to devices.
    - Displays IPv4 and IPv6 addresses of the connected network.

Since the application is written in C# an Object oriented language, the Development and other enhancements will be easier.