Establishing Network connection and SSH connection

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June 1, 2015

Contents

1 Tutorial Name

Objective: In this tutorial we will learn how to establish a network connection in an R-Pi. We shall also learn how to connect a remote PC with a Raspberry Pi using SSH connection.

2 Prerequisites

One should be aware of :

- Various commands that are used in LXterminal.

- How to connect to Wireless network

3 Hardware Requirement

1. Raspberry Pi (I will be using Version 2 Model B)

2. Monitor

3. HDMI cable

4. Keyboard

5. Mouse

6. Wireless adapter

7. Power adapter

8. PC(either Windows or Linux)

4 Software Requirement

MobaXterm(for Windows user)

5 Theory and Description

Secure Shell, or SSH, is a cryptographic (encrypted) network protocol for initiating text-based shell sessions[clarification needed] on remote machines in a secure way.

This allows a user to run commands on a machine's command prompt without them being physically present near the machine. It also allows a user to establish a secure channel over an insecure network in a client-server architecture, connecting an SSH client application with an SSH server.Common applications include remote command-line login and remote command execution, but any network service can be secured with SSH. The protocol specification distinguishes between two major versions, referred to as SSH-1 and SSH-2.

SSH was designed as a replacement for Telnet and other insecure remote shell protocols such as the Berkeley rsh and rexec protocols, which send information, notably passwords, in plaintext, rendering them susceptible to interception and disclosure using packet analysis.


Applications of SSH or OpenSSH protocol

- For login to a shell on a remote host (replacing Telnet and rlogin)

- For executing a single command on a remote host (replacing rsh)

- For setting up automatic (passwordless) login to a remote server (for example, using OpenSSH)

- Secure file transfer

- In combination with rsync to back up, copy and mirror files efficiently and securely

- For forwarding or tunneling a port (not to be confused with a VPN, which routes packets between different networks, or bridges two broadcast domains into one).

- For using as a full-fledged encrypted VPN. Note that only OpenSSH server and client supports this feature.

- For forwarding X from a remote host (possible through multiple intermediate hosts)

- For browsing the web through an encrypted proxy connection with SSH clients that support the SOCKS protocol.

- For securely mounting a directory on a remote server as a filesystem on a local computer using SSHFS.

- For automated remote monitoring and management of servers through one or more of the mechanisms discussed above.

- For development on a mobile or embedded device that supports SSH.

6 Experiment

In order to use a Raspberry Pi remotely we need to configure its wireless settings as follows:

1. Insert the SD card (with Raspbian OS already written) into the micro SD slot in an R-Pi.

2. Connect the wireless adapter, keyboard , mouse and monitor (using a HDMI cable) to the Raspberry Pi.

3. Power on the board and monitor.You will notice a set of code running on the monitor.

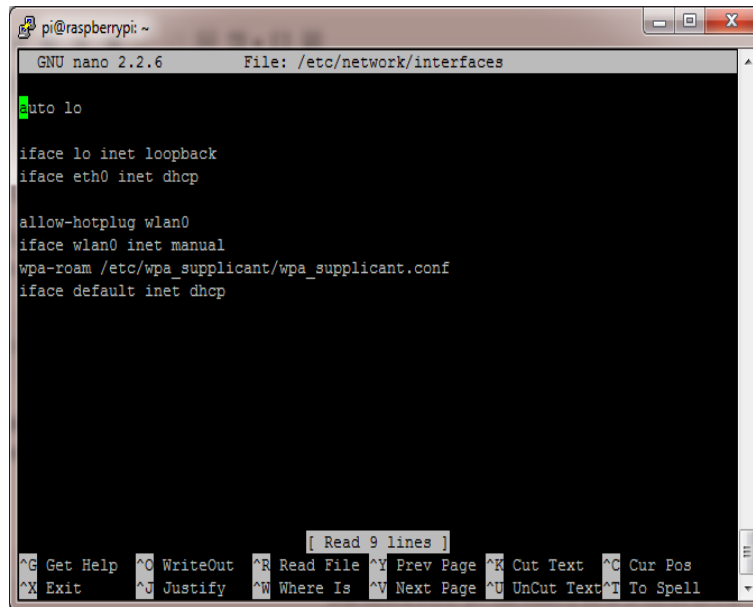4. Enter the set user name and password and then type 'startx' command to launch the GUI.
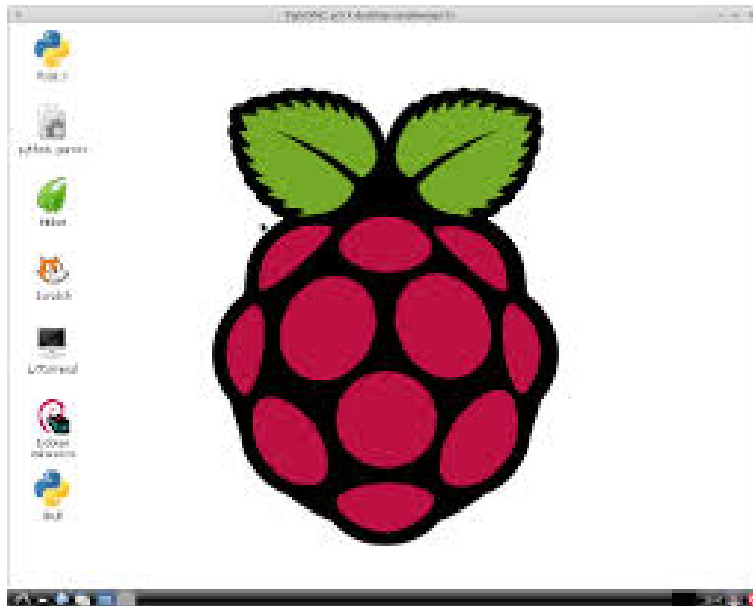
5. Click on the icon at the bottom-left on the screen. This is the start icon.

6. Select LXTerminal option. A terminal window opens.
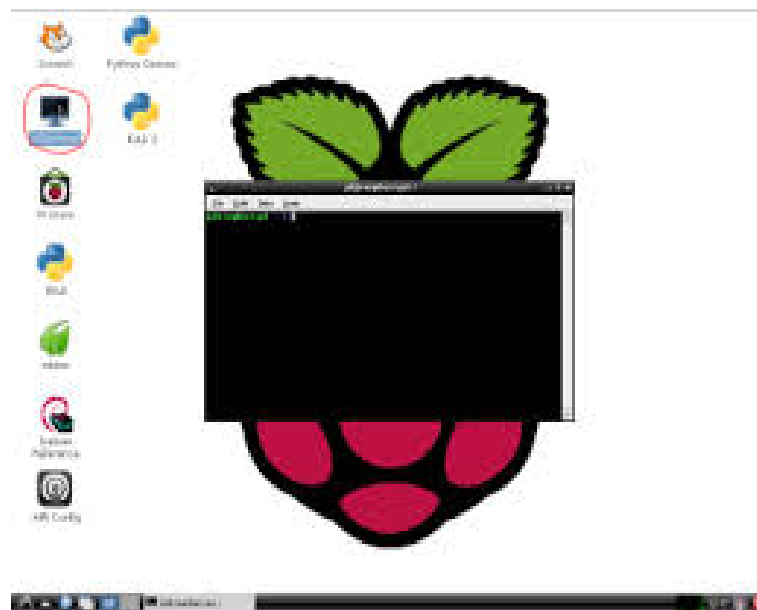
7. Some of the previous versions of Raspbian OS do not support wireless module. To know about the version you are using type "uname -a". To upgrade to the latest one type "sudo apt-get upgrade".

8. Connect your wireless adapter . To check if its connected type "lsusb"(We used D-link adapter which is highlighted in yellow)

9. Now type "sudo nano /etc/network/interfaces" and press enter. You will see the following window:

10. Change the code by adding the following lines:

11. Add in the SSID(username) and Password of your wifi. Then for changes to take effect type "sudo /etc/init.d/networking restart"
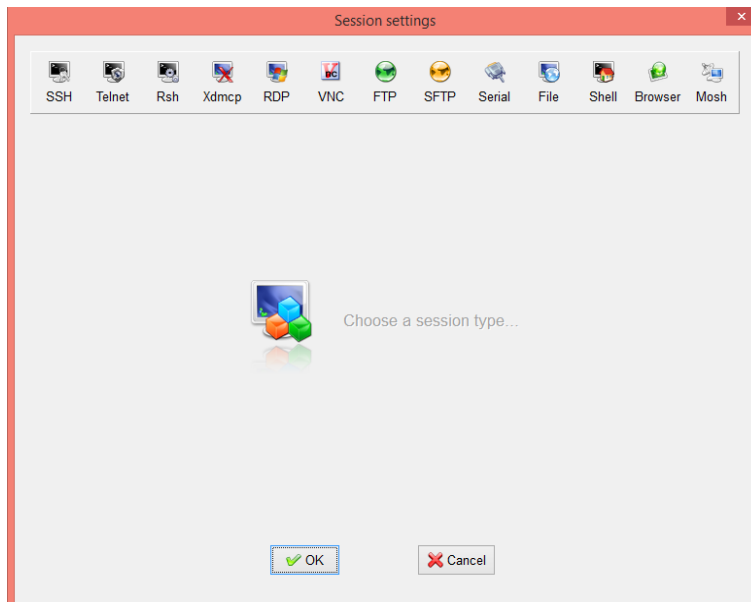
12. Type "ifconfig" to obtain the IP address of R-Pi etc. It will be under wlan0(written as inet address).

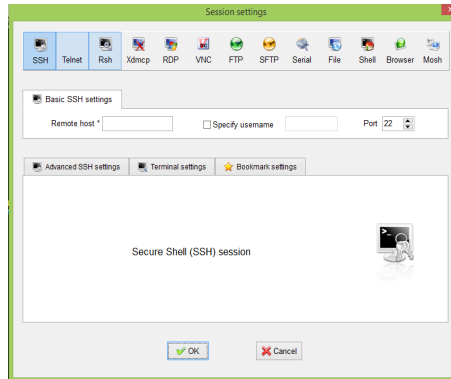To start using the Raspberry Pi remotely follow these steps:

1. A windows user should download MobaXterm (latest version) using the following link: `http://mobaxterm.mobatek.net/`

2. Run the .exe file and open the application.
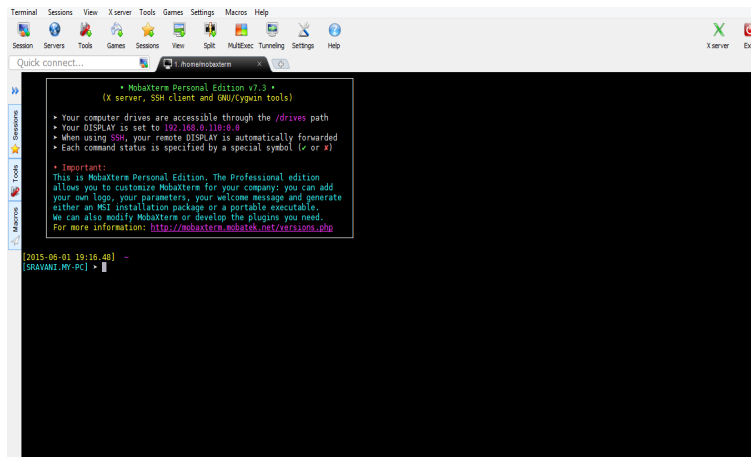
3. Then select the session option on the toolbar.

4. Click on the SSH option. A settings window opens as shown

5. Enter the IP address of the R-pi in the Remote host field and in the 'Advanced SSH settings' option configure the remote environment either as 'Interactive shell (terminal based)' or as an 'LXDE desktop(GUI based)'and click OK

6. If you are using the Interactive shell environment login to the R-Pi using the following command: ssh -X pi@192.168.0.4 (IP address of pi) and then enter the login id and password to start using the Pi remotely.

7. If you are using the LXDE desktop i.e. the GUI environment then use LX terminal icon to start programming the Pi.
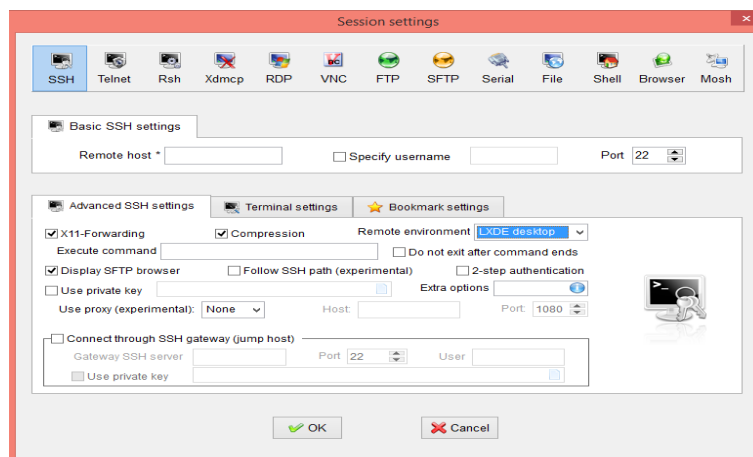
8. Also the established session is saved. So the next time you want to access directly click on the R-Pi's address mentioned in the saved session option to start using the Pi remotely.
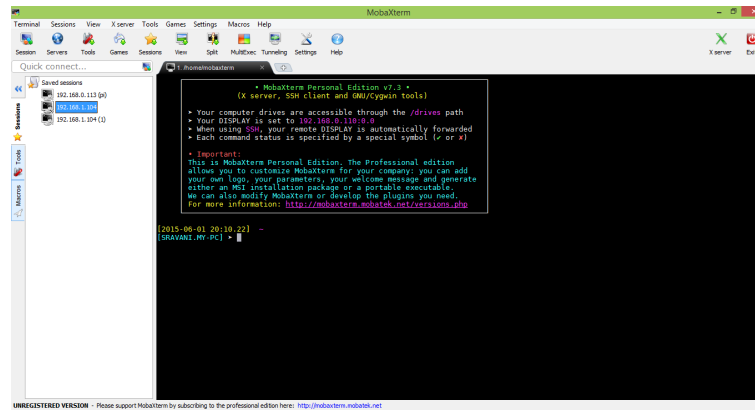
Note: A linux user needn't download any Xterm file. They can directly start accessing the R-Pi using the command: ssh -X pi@192.168.0.4 (IP address of pi) and then entering the login id and password for using the Pi remotely.

7 References

- http://en.wikipedia.org/wiki/Secure_Shell