Wi-Fi Setup on the Raspberry Pi

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Abstract − *Wifi is a wireless technology that allows devices to connect to each other without the use of wires. So it is easy to join additional devices to a wifi network without having to trail cables around your house, it is considered far more convenient than a wired connection. Furthermore, at an age when many devices are portable, wifi allows users to stay connected regardless of where they are on the network. This allows you to use the same gadget in different parts of your house. Nowadays, most devices connect to the internet via WiFi. In fact, wifi networks will be available in most hotels, cafes, restaurants, offices, school, colleges and many households. These networks, especially the ones observed in and across the home, are regularly constructed around a single router that hyperlinks to more than one computers.A Raspberry Pi is a general-purpose computer which connected with wifi that typically runs a Linux operating system and can run multiple programmes. Raspberry Pi serves as the brain. Its main advantage is higher level processing capability. It's a single-board computer. A single-board computer (SBC) is a complete computer built on a single circuit board, complete with microprocessor(s), memory, input/output (I/O), and other functional computer features.Single-board computers were created for use as demonstration or development systems, educational systems, or embedded computer controllers. Many home computers and portable computers combine all of their functions on a single printed circuit board.The Raspberry Pi includes an on-board 802.11n Wireless LAN adapter, eliminating the need to purchase a separate WiFidongle. It's also a lot easier to set up.*

Keywords: *Wifi, Raspberry Pi, SBC, Linux*

I.INTRODUCTION

A WiFi network is essentially a communication device that distributes an internet connection with various users in a home or business. The router connects to your internet modem directly and functions as a hub, broadcasting the internet signal to all of your Wi-Fi-enabled devices. As long as you're within your network's coverage area, you can stay connected to the internet.

Wi-Fi, often known as WiFi, WiFi, WI-fi, or Wifi, is commonly mistaken for Wireless Fidelity, however, this is not the case. A marketing agency coined the term in response to the wireless industry's need for a user-friendly name for the not-so-user-friendly IEEE 802.11 technology.

Wi-Fi sends data from the wireless networks to Wi-Fi-enabled devices such as TV, smartphone, tablet, and computers using radio waves. These devices and personal information may be subject to hackers, cyber-attacks, and other hazards since they communicate over airwaves. This is especially true while using a public Wi-Fi network in a coffee shop or airport. It is preferable to connect to a password-protected wireless network or a personal hotspot whenever available.

1.1. Types of Wi-Fi connections

Your options for connecting wirelessly at home are growing as mobile networks expand into the home internet realm. As with internet service, there are advantages and disadvantages to each type of wireless connection, suchas the speed and strength of a signal. We've outlined a few of them here.

Wireline/router

Most homes use a wireless router to access the internet these days. The pros include the convenience of setup, mobility within range of the Wifi access point (router), and the ability to connect multiple devices. The cons: limited bandwidth and reduced speed as more devices are connected to the same Wifi network and potential interference from other electromagnetic devices in the home.

Fig.1.Wireline/router

Mobile hotspot or jetpack

Mobile and dedicated hotspots are becoming an increasingly popular way to connect securely while on the go. Two, not unusual place hotspot gadgets are your cellphone and a jetpack. Almost any mobile phone or tablet these days can be used as a transient access point and is a great alternative in case you often wants it'ssimple to use and doesn't necessitate the purchase of additional devices, but it can quickly drain your batterylife and data., however, it is able to zap your battery existence and statistics quite fast. On the opposite hand,a jetpack acts as a devoted cell hotspot that alternatives up a sign from mobileular towers to your vicinity similar to your cellphone. It can connect to more devices and provides more Wi-Fi options. And because it'sa separate device, your cell phone's battery power isn't affected. The downfall is having to buy the jetpack and a separate plan through your mobile carrier.

Fig. 2. Mobile hotspot or jetpack

4G LTE Home Internet

If you live in a rural area where your internet options are limited, 4G LTE Home Internet is worth considering. Itprovides high-speed internet access via cell phone towers and mobile networks, with average download rates of roughly 25 Mbps and typically lower latency and more data than satellite. Better speeds and reliability, depending on your provider, are the benefits. A few of the downfalls of 4G LTE Home Internet can include limited availability and cost of service and setup.

Fig. 3. 4G LTE Home Internet

5G Home Internet

As 5G Home Internet (Fixed Wireless Access) becomes more widely available, It has the capacity to be one of the only and most cost-powerful net offerings available. It gives a large ability than 4G, a lot faster speeds (as very much as 1Gig), and decreases latency than what maximum humans experience at home, way to the usage ofa brand new spectrum of effective radio frequencies throughout a wi-fi network. Service reliability is frequentlygreat proper to the fact 5G wi-fi base stations are commonly located within 10 kilometers of households. The bestgreat drawback of 5G Home Internet proper now could be its limited availability, however, this is going to change.

Fig.4. 5G Home Internet

Raspberry Pi

      In 2006, Eben Upton, a software developer, and software engineers Pete Lomas and David Braden founded the Raspberry Pi foundation. The primary goal of this foundation was to create a computer that would inspire children. As a result, early Raspberry Pi prototypes were based on the 8-bit Atmel ATmega microcontroller to save money.On February 29th, 2012, the team began taking orders for Model B, and the following year, they began productionof around 10,000 units. The founders produced these models in China and Taiwan. On February 4th, 2013, they began taking orders for the lower-cost Model A. Similarly, on November 10th, 2014, the team announced the availability of even more low-cost Model ATmega. The Raspberry Pi is a small computer about the size of a credit card that has enough power to run games, word processors like Open Office, image editors like Gimp, and other programmes of similar magnitude. Pi was introduced as an educational tool for hobbyists and those interested in learning more about programming. It is not a replacement for our everyday Linux, Mac, or Windows PC. The Raspberry Pi is built around a Broadcom SoC (System on Chip) that includes an ARM processor [700 MHz], a GPU, and 256 to 512 MB RAM. The boot media is an SD card [which is not included], and the SD card can alsobe used to store data. Now that you know that the RAM and processing power are nowhere near that of the powerhouse machines you may have at home, these Pi's can be used as a cheap computer for some basic functions,particularly experiments and education. The Pi is available in three configurations, which we will go over in detailin the following sections. A Pi B Model costs around $35 and is available from a variety of online and physical stores.

Fig.5. Raspberry Pi

Different Types of Raspberry Pi Models

- Raspberry Pi 1 model B
- Raspberry Pi 1 model A
- Raspberry Pi 1 model B+
- Raspberry Pi 1model A+
- Raspberry Pi Zero
- Raspberry Pi 2
- Raspberry Pi 3 model B
- Raspberry Pi Zero W

II. METHODOLOGY

Installation of Raspberry pi

Making use of a computer with an SD card reader Download the image and unzip it to get the files.

Prepare your SD Card

a) Before copying the NOOBS documents onto the SD card, format it. To accomplish this: Download SDFormatter 4.0 for Windows or Mac from the SD Association's website.
b) Install the software program in keeping with the instructions.
c) Place your SD card in the SD card reader on your computer or laptop and write down the drive letterassigned to it, such as G:/.
d) In SD Formatter, format your SD card by selecting the drive letter.

Fig 6. GUI of Raspberry Pi

Initial boot

    a)   Connect your keyboard, mouse, and monitor.

    b)   Connect the USB strength cable to the

    c)   The Raspberry Pi will then boot, and a window will seem with a listing of various running structures from which you could choose. Raspbian is recommended; try the following field for Raspbian then clickinstall.

    d)   Raspbian will then start the setup process. Please hold in thought that this can take a little time.

    e)   The Raspberry Pi configuration menu (raspi-config) will seem as soon as the setup is complete. You canset the time and date on your region, permit a Raspberry Pi digital digicam board, or even create customers from this page. You can go out of this menu through the urgent Tab on your keyboard after which Finish.

Logging in and gaining access

       The username pi is the default Raspbian login. Connect the Raspberry Pi to the WiFi LAN switch / get the right to access the point. After booting the pi, use the pc pc to locate the ARM11 system's IP cope. Since ARM11 is nolonger tied to the screen, we will connect to it using SSH, a remote access provider. To achieve this, we want to decide the IP address of the system. So, withinside the command terminal (DOS) at the pc PC, this is related to the LAN with the pi, kind C:/> ping raspbx. Where raspbx is the call of the pi, that's pre-programmed withinsidethe photo we keep to the pi's SD card. When it's acquiring the response, we can have an IP cope with for our pi. To log in to the pi, use the far-flung login software program "putty.

III. RESULTS

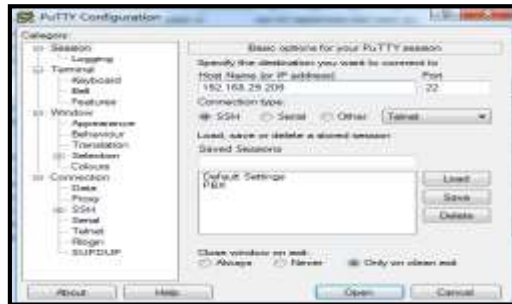- **3.1 Putty Configuration**

Fig .7. Putty Configuration

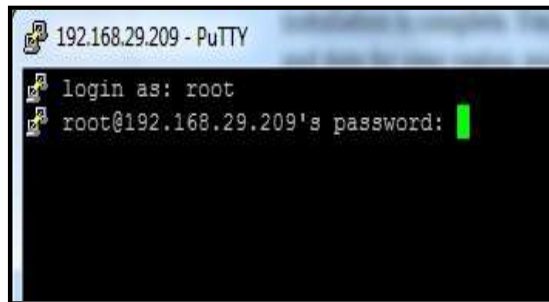Login as a root and Password as a raspberry into it and the following screen will appear.
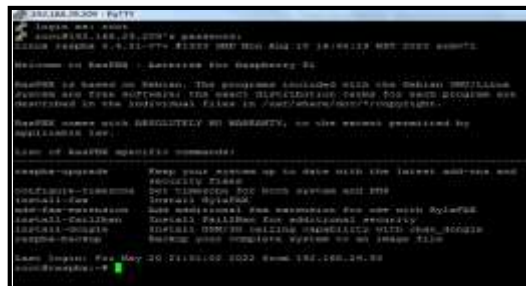

Fig.8.Login screen

Fig.9.Installation of Raspberry Pi

Fig.10. Installation of dongle

3.2 Wifi setup on raspberry pi

Raspi-Config is a console-based application that allows you to configure various Raspberry Pi settings. It is used for network configuration, remote access setup, boot options, and so on.

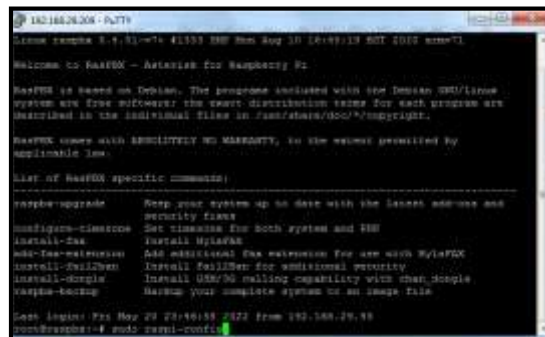To launch Raspi-Config from the command line, type: **sudo raspi-config**
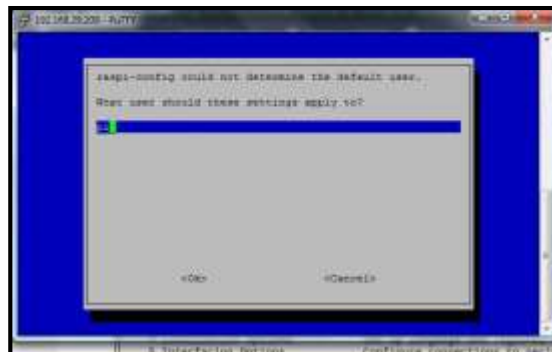

Fig. 11. Launch Raspi-Config

Fig. 12. Name of the network

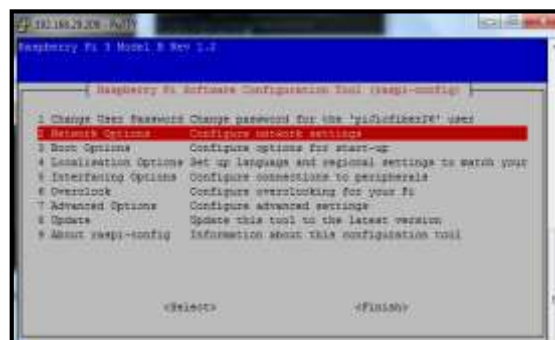Enter the name of the network so that the following window appears.

Fig. 13. Network option

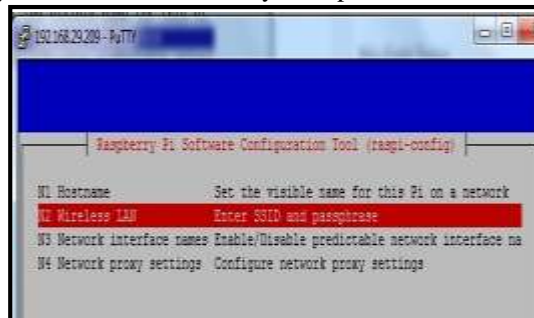Navigate to "Network Options" on the keyboard with the arrow keys and press Enter.

Fig. 14. Select Wifi

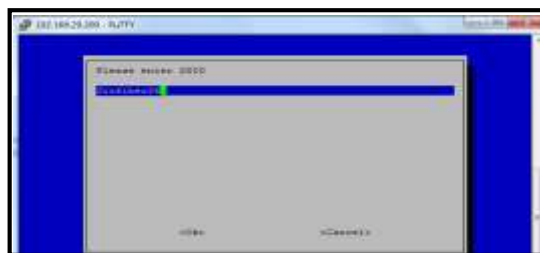Select Wi-Fi, then enter your network's SSID and password as directed on the screen.

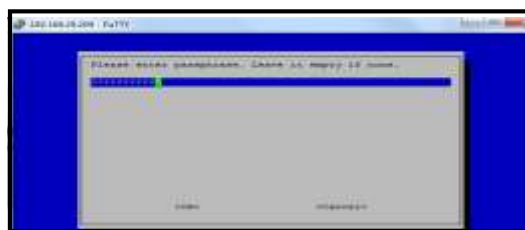
Fig. 15. Network's SSID

Fig.16. Network password

When you're finished, close Raspi-Config by selecting "Finish" from the main menu.

Finally, restart the Raspberry Pi to apply the new settings. Your WiFi connection should now be operational!

IV. CONCLUSION

Wi-Fi permits local area networks (LANs) to work while not cables and wiring, creating it a preferred selection of home and business networks. Wi-Fi may also want to offer wireless broadband network access to several fashionable devices, like laptops, smartphones, tablet computers, and electronic diversion consoles.

A wireless network has the advantage of allowing for better data communication. The transfer of data between users is much faster on a wireless network. Wireless networks are cost-effective because they are less expensive and easier to install.

Add WiFi to your Internet of Things device to eliminate the need for cables. Use the Raspberry Pi's USB port to create a low-cost, high-reliability wireless link. This wifi module is a small USB wireless adapter with a large antenna that allows for greater range and speed.

The Raspberry Pi 3 is the smallest and most affordable computer to date. This new model is still only $35 and comes with Wi-Fi and Bluetooth. "People have been requesting WiFi and Bluetooth for a long time," says Eben Upton, CEO of Raspberry Pi Trading, the charity's commercial arm.

One of the Raspberry Pi's most common applications has been in education, where the $35 price tag has enabledit to be used in many classrooms that would otherwise be unable to afford PCs. If schools wanted to connect theirPCs to the internet, they had to be connected via ethernet cables. With the Pi 3, they'll be able to connect over Wi-Fi, which can cover multiple classrooms at once.

For hobbyists and academics who are already using Pis to collect data from various sensors around their labs andhouses, the addition of Bluetooth will be much more crucial. The Pi can now collect data from sensors without being directly attached to them thanks to onboard Bluetooth. The ability to use a wireless keyboard and mouse isalso a plus.

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