

IMPLEMENTATION OF RASPBERRY PI SERVER AND EXECUTING TWITTER BOT

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ABSTRACT

The world of Internet is growing rapidly and with a hike in the demand of internet usability, the ethernet connectivity is also growing. Various measures are being taken to make the design and data transfer processes much optimal in order to reduce cost and size of the products. This modern age is of internet and almost everything is done or processed now a days on internet so there is a need to overcome the design challenges. This paper introduces methodology for setting up a web server on an embedded systems. This project uses Raspberry Pi 3 and TCP/IP which provides high bandwidth, economy and compatibility. This project will further implement a Twitter Bot over the server made on Raspberry Pi and will post suitable tweets in a regular interval of assigned time. The project is using the BeautifulSoup (bs4) module in order to do web scraping and efficiently harness the data for the tweets from websites.

Keyword: - Raspberry Pi 3, TCP/IP, Twitter Bot, Web scrapping.

1. INTRODUCTION

No doubt internet has been a boon to us but as the demand is exceeding at high pace and there is a need for more and more complicated technology and infrastructure in order to sustain growth. We are reducing all those constraints in this paper, we are using a Raspberry Pi 3 to set up a web server through Apache. Apache is a popular web server application we can install on the Raspberry Pi to allow it to serve web pages. Network communications can make an embedded system more powerful and easier to monitor and control. In this paper embedded systems and Internet technology are combined to form a new technology the Embedded Internet Technology, which developed with the popularization of computer network technology in recent years. Initially the electronic devices were controlled and monitored from exact location or nearby location where the device is installed. The respective person has to operate the device in the device locality. Due to which human efforts were more and remote management and running field diagnostic is absent, due to which human error is more and is less secure and less user friendly.

1.1 RASPBERRY PI

The Raspberry Pi is a progression of little single-board PCs created in the United Kingdom by the Raspberry Pi Foundation to advance the educating of essential software engineering in schools and in creating countries. The first model ended up significantly more mainstream than anticipated, offering outside its objective market for utilizations, for example, mechanical technology. Be that as it may, a few extras have been incorporated into a few official and informal bundles. The first generation (Raspberry Pi 1 Model B) was released in February 2012, followed by the simpler and cheaper Model A. In 2014, the Foundation released a board with an improved design, Raspberry Pi 1 Model B+. These boards are approximately credit-card sized and represent the standard mainline form-factor. Improved A+ and B+ models were released a year later. A "Compute Module" was released in April 2014 for embedded applications. The Raspberry Pi 2 which added more RAM was released in February 2015. A Raspberry Pi Zero with smaller size and reduced input/output (I/O) and general-purpose input/output (GPIO) capabilities was released in November 2015 for US\$5. By 2017, it became the newest mainline

Raspberry Pi. On 28 February 2017, the Raspberry Pi Zero W was launched, a version of the Zero with Wi-Fi and Bluetooth capabilities, for US\$10. On 12 January 2018, the Raspberry Pi Zero WH was launched, the same version of the Zero W with pre-soldered GPIO headers. Raspberry Pi 3 Model B was released in February 2016 with a 64 bit quad core processor, and has on-board Wi-Fi, Bluetooth and USB boot capabilities.

1.2 TWITTER BOT

Just for experimentation if the server is working well and fine we are going to implement a Twitter Bot on it.

A Twitter bot is a type of bot software that controls a Twitter account via the Twitter API. The bot software may autonomously perform actions such as tweeting, re-tweeting, liking, following, un following, or direct messaging other accounts. The automation of Twitter accounts is governed by a set of automation rules that outline proper and improper uses of automation. Proper usage includes broadcasting helpful information, automatically generating interesting or creative content, and automatically replying to users via direct message. Improper usage includes circumventing API rate limits, violating user privacy, or spamming.

2. SETUP

To run our web server, we're using what's commonly called the LEMP stack: Linux, nginx, MySQL, and PHP. In short, LEMP uses Linux as the operating system on the device hosting the server, nginx as the server itself, MySQL as a database management system, and PHP for dynamic processing. We have to start with setting up of Raspberry Pi 3 by getting the raspian os and accessing the command shell of Raspberry Pi.

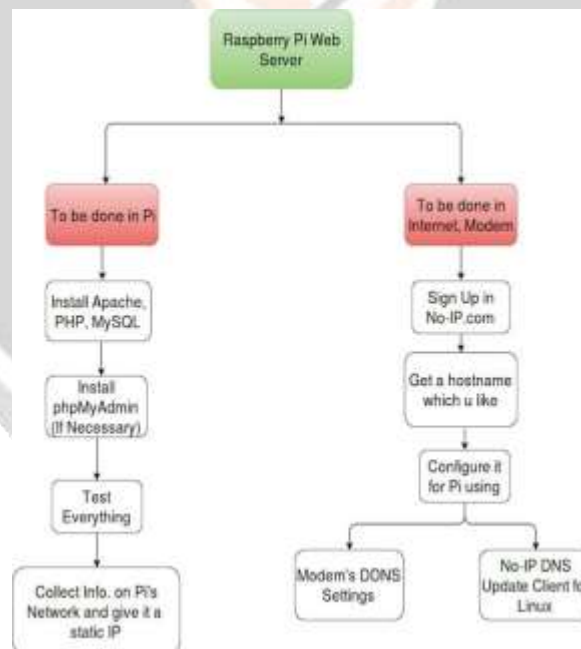


Figure -1: Flow Diagram of Setup

A Raspberry Pi is a small single board computer with the kind of processor that you'd normally find in a smart phone. It's just about powerful enough to run a desktop version of Linux. It can be used as a media server and you can also use its General Purpose Input Output (GPIO) pins to interact with your own circuits. I'm using my Raspberry Pi to find out how much traffic a miniature webserver can handle.



Fig -1: Raspberry Pi 3 (circuit)

2.1 GPIO

The Raspberry Pi's General Purpose IO Pins (GPIO) can be used to read data from sensors and send control signals to motors, lights or any circuit you can dream up. The PiFace interface board makes it much easier to connect things like motors to your Raspberry Pi without damaging it. You can write your own programs in Python or C to control devices connected to the PiFace board. The wiringPi software library makes it easy to control and debug the GPIO pins. The table below is generated using the 'gpio readall' command.

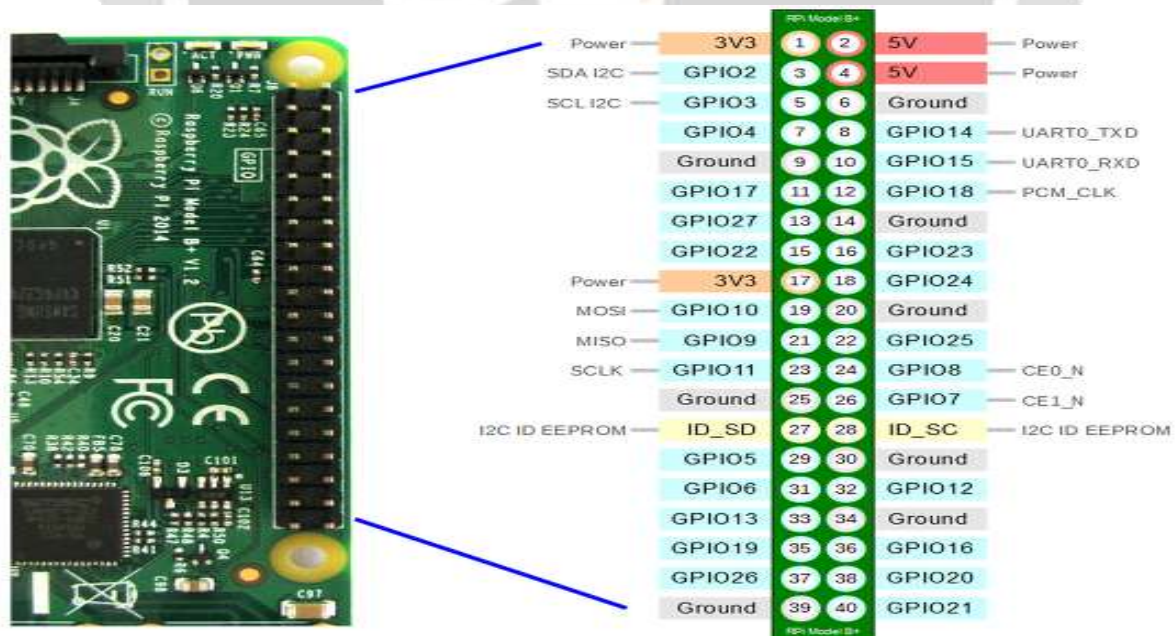


Figure -2: Raspberry Pi GPIO

2.2 IMPLEMENTING BEAUTIFUL SOUP

Beautiful Soup is a Python library for pulling data out of HTML and XML files. It works with your favorite parser to provide idiomatic ways of navigating, searching, and modifying the parse tree. It commonly saves programmers hours or days of work. These instructions illustrate all major features of Beautiful Soup 4, with examples. I show you what the library is good for, how it works, how to use it, how to make it do what you want, and what to do when it violates your expectations. First we need to install below modules on Raspberry Pi 3.

- Install bs4 python library (\$ apt-get install python3-bs4)
- Install lxml parser

3. TWITTER BOT SETUP

First the “Twython” library is being installed, “Twython” is the premier Python library providing an easy (and up-to-date) way to access Twitter data. In the text editor that appears, copy and paste the details of the twitter developer credentials, placing the consumer key with the relevant key from the Twitter application page. Each key is surrounded by single quotes, so be sure not to miss those. Note that **ACCESS_KEY** is referred to as **Access token** on the Twitter app page.

```
#!/usr/bin/env python
import sys
from twython import Twython
CONSUMER_KEY = '*****YOUR DATA*****'
CONSUMER_SECRET = '*****YOUR DATA*****'
ACCESS_KEY = '*****YOUR DATA*****'
ACCESS_SECRET = '*****YOUR DATA*****'

api = Twython(CONSUMER_KEY, CONSUMER_SECRET, ACCESS_KEY, ACCESS_SECRET)

api.update_status(status=sys.argv[1])
```

Web scraping is a computer software technique of extracting information from websites. This technique mostly focuses on the transformation of unstructured data (HTML format) on the web into structured data (database or spreadsheet). You can perform web scrapping in various ways, including use of Google Docs to almost every programming language. I would resort to Python because of its ease and rich ecosystem. It has a library known as ‘BeautifulSoup’ which assists this task. In this article, I’ll show you the easiest way to learn web scraping using python programming. We are scrapping datas (basically img files from websites) and posting it on twitter via a twitter bot.

3.1 WHY RASPBERRY PI AS A SERVER

Power consumption - The Pi draws about five to seven watts of electricity. This is about one tenth of what a comparable full-size box can use. Since servers are running constantly night and day, the electrical savings can really add up. The basic Pi kit (Pi board, case, and power supply) will pay for itself with about one year's worth of

electricity savings if it's left to run 24x7x365. I ended up with the CanaKit Basic Kit which is very affordable and good quality.

No moving parts - The Pi uses an SD card for storage, which is fast and has no moving parts. There are also no fans and other things to worry about. A Class 10 SD card is usually the best performing compared to lower class cards, but this will mainly only affect boot time where there is the most I/O.

Small form factor - The Pi (with a case) can be held in your hand. A comparable full-size box cannot. This means the Pi can be integrated inside of devices, too.

No noise - The Pi is completely silent.

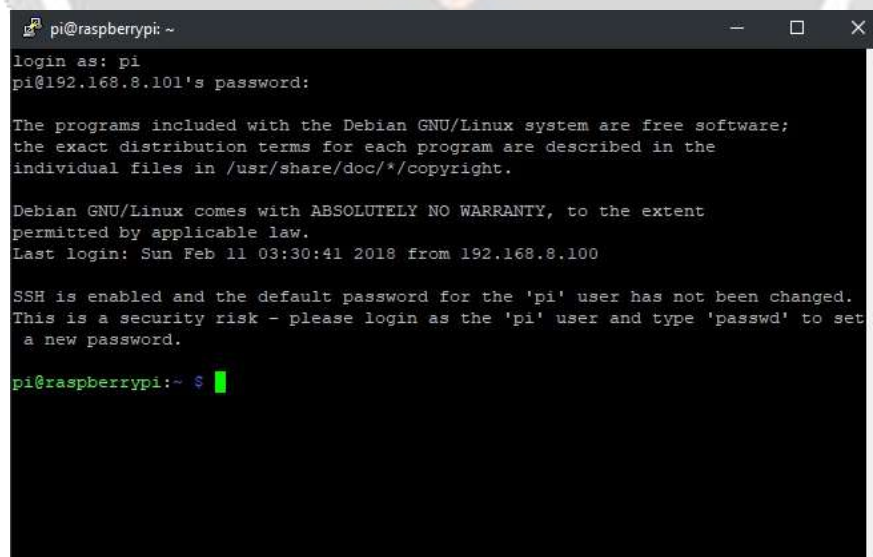
Status lights - There are several status lights on the Pi's motherboard. With a clear case you can see NIC activity, disk I/O, power status, etc.

Expansion capabilities - There are numerous devices available for the Pi, all at very affordable prices. Everything from an I/O board (GPIO) to a camera. The Pi has two USB ports, however by hooking up a powered USB hub, more devices can be added.

Built-in HDMI capable graphics - The display port on the Pi is HDMI and can handle resolutions up to 1920×1200, which is nice for making the Pi in to a video player box for example. There are some converters that can convert to VGA for backwards compatibility. A list of HDMI to VGA converters can be found [here](#).

Affordable - compared to other similar alternatives, the Pi (revision B) offers the best specs for the price, at least that I've found. It is one of the few devices in its class that offers 512 MB of RAM. The Pi has come down in price since it first arrived, and is finally affordable as a hobby, business use, or whatever need there is.

Huge community support - The Pi has phenomenal community support. Support can be obtained quite easily for the hardware and/or GNU/Linux software that runs on the Pi mainly in user forums, depending on the GNU/Linux distribution used.



```
pi@raspberrypi: ~  
login as: pi  
pi@192.168.8.101's password:  
  
The programs included with the Debian GNU/Linux system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/*/copyright.  
  
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent  
permitted by applicable law.  
Last login: Sun Feb 11 03:30:41 2018 from 192.168.8.100  
  
SSH is enabled and the default password for the 'pi' user has not been changed.  
This is a security risk - please login as the 'pi' user and type 'passwd' to set  
a new password.  
pi@raspberrypi:~ $
```

Fig -3: Command line of Raspberry Pi 3

Overclocking capability - The Pi can be overclocked if there are performance problems with the application used, but it is at the user's risk to do this.

Multiple uses - Having the storage on an SD card makes it easy to swap with other SD cards running other GNU/Linux distributions to quickly and easily change the functionality of the Pi. If you want to set up the Pi to run as a server to test it out, then later try something else, just swap the SD card and you're done. Using the "dd" command on a GNU/Linux computer, a backup of the SD card can be created and later restored if needed.

4. CONCLUSIONS

There are huge possibilities with this sort of cheap and efficient implementation of an embedded system in setting of a server and running your scripts. Starting from home automation to controlling unmanned vehicles, it can all be done by using this simple circuit. There is a huge potential in this mini and portable circuit. The future can be these small computers.

6. REFERENCES

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