Blinking an LED using Node-RED

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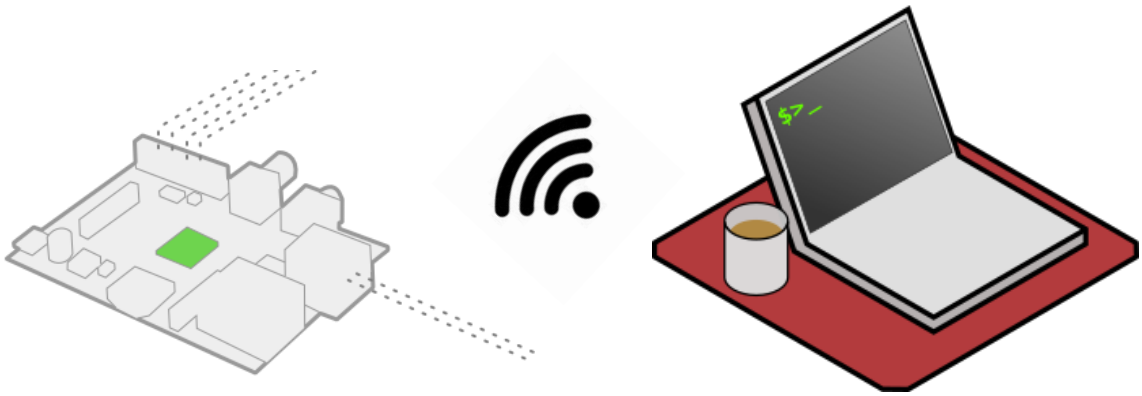
Introduction

Node red is a Java script-based block programming tool that aids the user in integrating several hardware devices, application program interfaces (APIs), and online services. Using the browser interface, the user can construct a program using inbuilt blocks or downloadable libraries to create a flow which can be deployed to all devices or services connected. Node red can be used locally, on a device, and on the cloud.

For this experiment, we will investigate using the basic form of Node-RED flow diagrams to control an LED.



Components

To create the node red circuit, we will be utilizing a few hardware components such as

- Red LED
- 230 Ohm Resistor
- Connecting wires
- Raspberry Pi
- Master PC

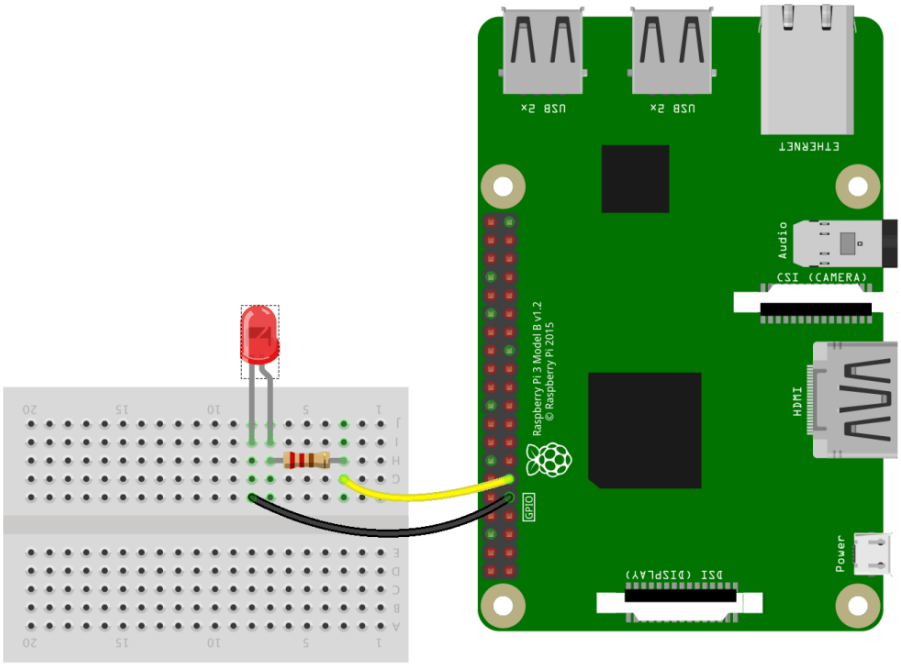


Figure 1: Connections of LED and Resistor on to the Raspberry Pi

Procedure

We begin the process by:

- Installing Node-RED on Raspberry Pi
- Host the Node-RED server on the Raspberry Pi
- Launch Node-RED on to the master PC
- Connect the Node-RED blocks
- Deploy the program

Installing Node-RED on Raspberry Pi

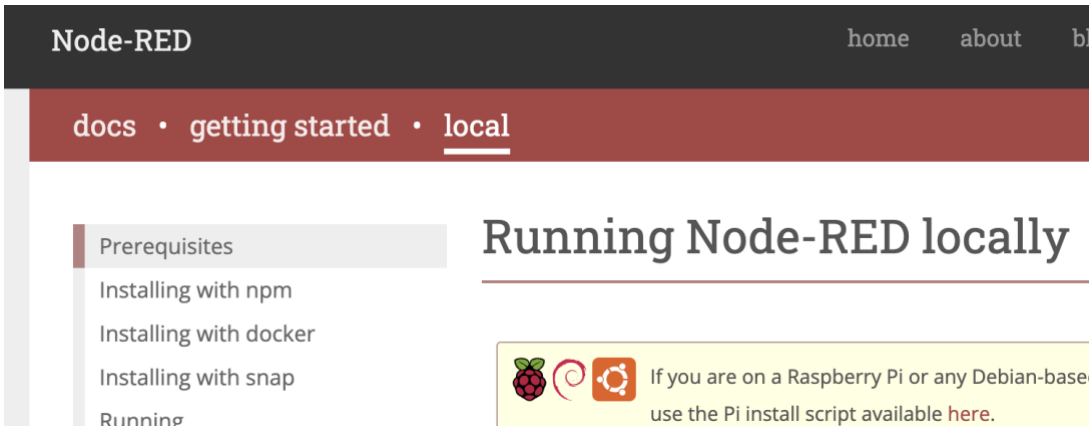


Figure 2: Window of Node-RED installation locally

To install node red on the Raspberry Pi, we need to go to: [Installation Link]. We are downloading the Node-red on Raspberry Pi Locally so that we can control the output pins of the Pi directly.

Host the Node-RED server on the Raspberry Pi

```
$ node-red

Welcome to Node-RED
===================

30 Jun 23:43:39 - [info] Node-RED version: v1.3.5
30 Jun 23:43:39 - [info] Node.js  version: v14.7.2
30 Jun 23:43:39 - [info] Darwin 19.6.0 x64 LE
30 Jun 23:43:39 - [info] Loading palette nodes
30 Jun 23:43:44 - [warn] rpi-gpio : Raspberry Pi specific node set inactive
30 Jun 23:43:44 - [info] Settings file  : /Users/nol/.node-red/settings.js
30 Jun 23:43:44 - [info] HTTP Static    : /Users/nol/node-red/web
30 Jun 23:43:44 - [info] Context store  : 'default' [module=localfilesystem]
30 Jun 23:43:44 - [info] User directory : /Users/nol/.node-red
30 Jun 23:43:44 - [warn] Projects disabled : set editorTheme.projects.enabled=true to enable
30 Jun 23:43:44 - [info] Creating new flows file : flows_noltop.json
30 Jun 23:43:44 - [info] Starting flows
30 Jun 23:43:44 - [info] Started flows
30 Jun 23:43:44 - [info] Server now running at http://127.0.0.1:1880/red/
```

Figure 3: Screenshot of terminal after launching Node-RED

After installing Node-RED, run the program using the command:

$ node-red

The terminal will show lines of text as observed above. At the bottom of the script is a link to the web interface of Nod-RED.

Launch Node-RED on to the master PC

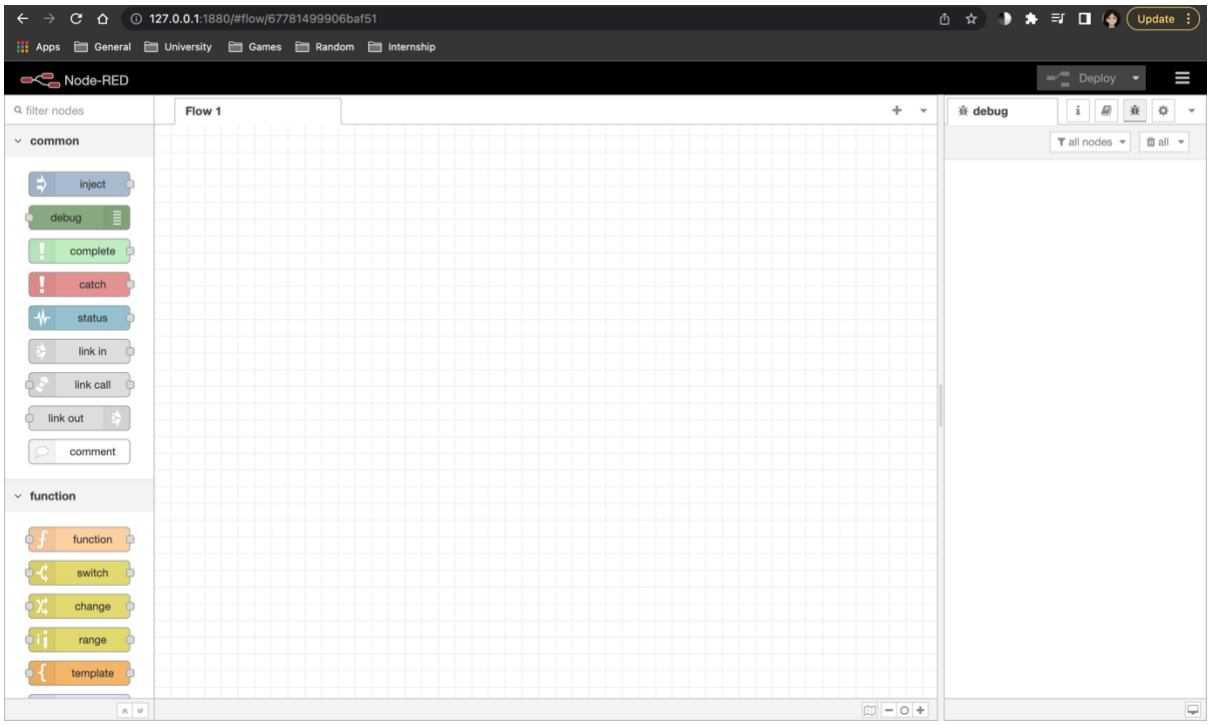


Figure 4: Web page of the Node-RED interface

Using the link at the bottom the terminal message, we launch the web interface of Node-RED on the master PC. The web interface should look like the image above.

Connect the Node-RED blocks

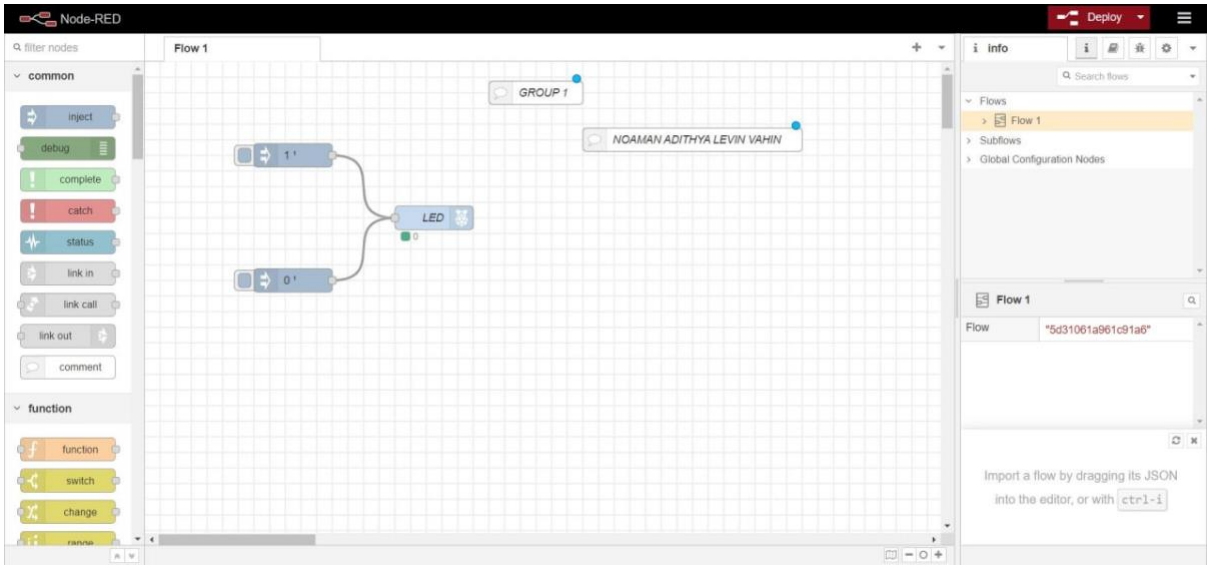


Figure 5: Web page of the Node-RED connections used to blink LED

Using 2 pushbuttons, we will switch the pin that is connected to the LED and resistor.

Deploy the program

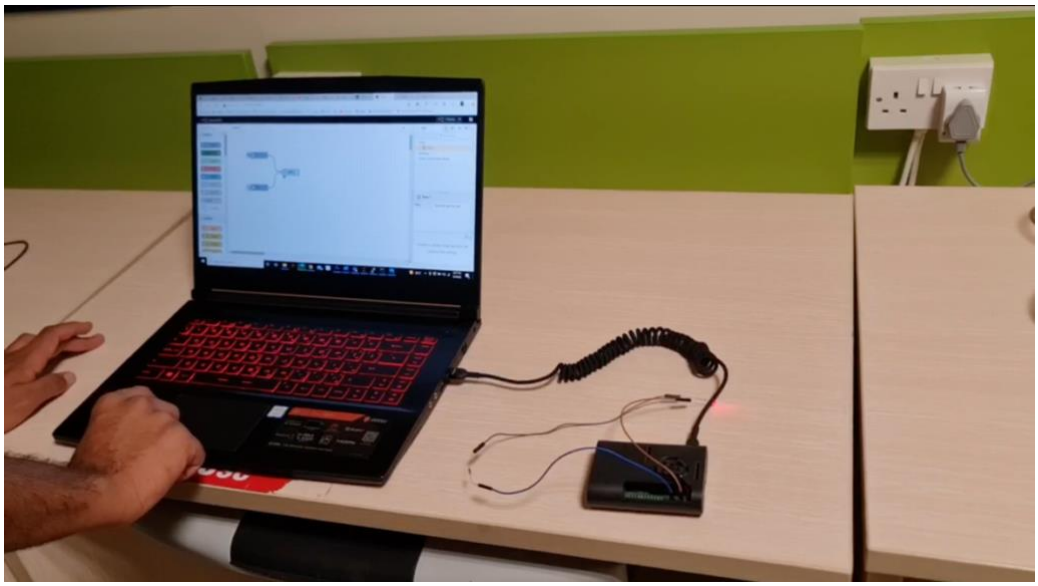


Figure 6: Blinking an LED using Node-RED on Master PC connected to Raspberry Pi

After deploying the program, the program will be shared over the server to the Raspberry Pi. The LED switched on when the pushbutton 1was pressed and the LED switched off when the pushbutton 0 was pressed.

Link for group video: iiot node red video

Observation

After constructing all the necessary connections to the Raspberry Pi, the LED blinked on and off at the push of a button. There was almost negligible latency between the input of the pushbutton and the LED switching on and off. The program was able to be deployed on to the server so that we could use the master PC to transfer signals over internet to the Raspberry Pi

Conclusion

Node-RED can be used in several IOT applications where multiple devices need to seamlessly communicate with each other without any direct connections. With this experiment, we were able to locally connect to the IOT device. However, using the vast array of libraries to aid applications, we can use Node-RED to communicate with devices over cloud and to use online services.

Reference

https://www.google.com/url?sa=i&url=https%3A%2F%2Felectropeak.com%2Flearn%2Fnode-red-raspberry-pi-tutorial-guide%2F&psig=AOvVaw3R5sUP1LkcOUoeZm4G_6GD&ust=1654152604620000&source=images&cd=vfe&ved=0CA0QjhxqFwoTCPjg4ubUi_gCFQAAAAAdAAAAABAb

https://nodered.org/docs/getting-started/local

https://www.youtube.com/watch?v=irT6ytAWnMg&ab_channel=techiesms

https://www.youtube.com/watch?v=qFVpnvWm0FI&ab_channel=LearnRobotics