

Domoticz Plugin

TrafficLight

(using Tinkerforge Building Blocks)

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Objectives

- To set the color of a Tinkerforge RGB Bricklet to red, yellow or green using a Domoticz Selector Switch Device.
- To learn how to write a Python [Plugin](#) for the Domoticz Home Automation System.
- To learn how to interact with [Tinkerforge](#) Building Blocks.
- To use this sample plugin as a template for other Domoticz plugins interacting with Tinkerforge Building Blocks.

Solution

A Domoticz Python plugin hardware device "Traffic Light" controlling a Tinkerforge RGB LED Bricklet. Three Domoticz devices are part of the hardware device. Typename are Selector Switch, Alert, Text. The Tinkerforge RGB LED Bricklet is connected to a Tinkerforge Master Brick with WiFi extension.

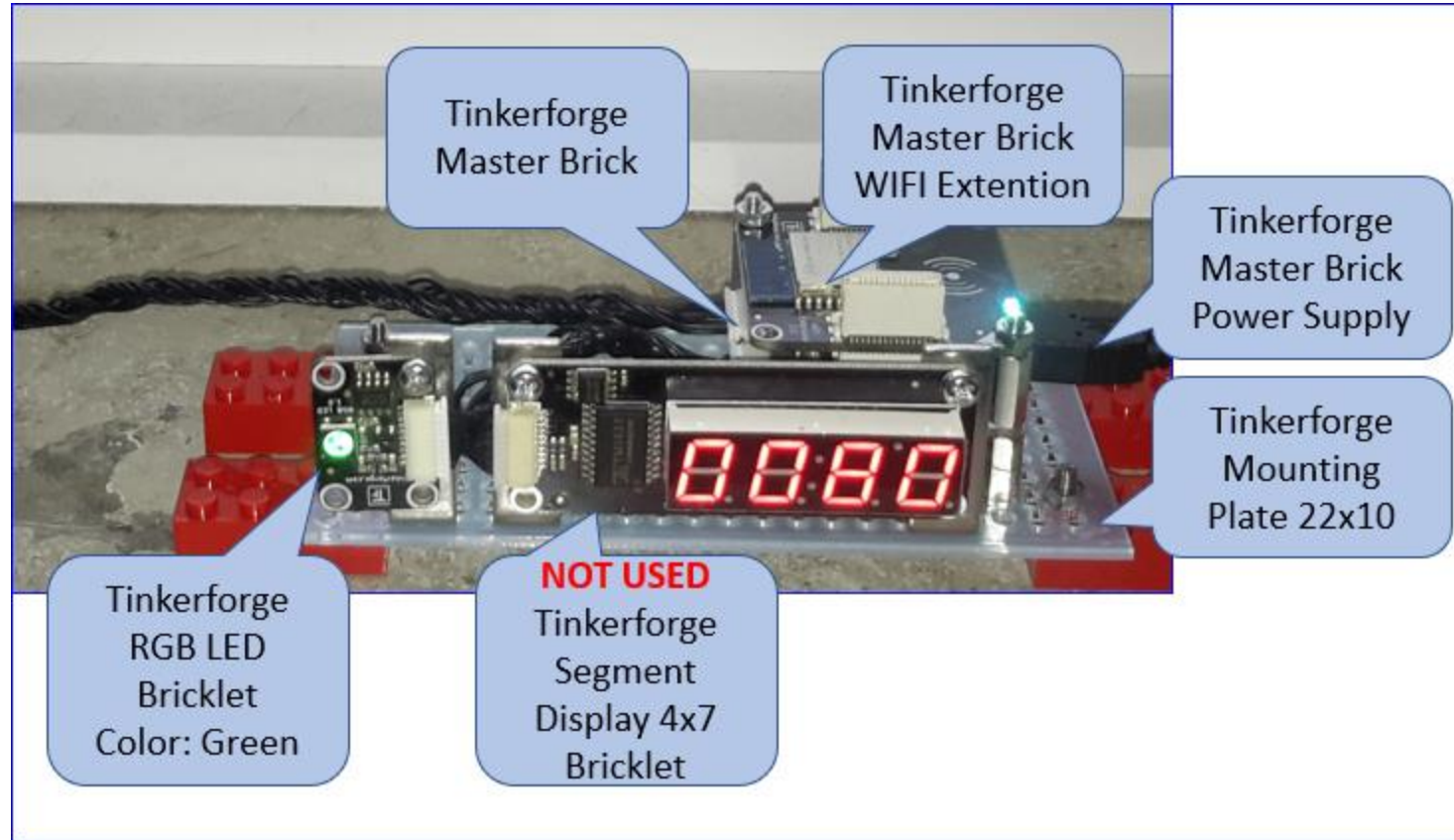
Hardware

- Raspberry Pi 3B+ ([Info](#))
- Tinkerforge Master Brick 1.1 ([Info](#))
- Tinkerforge WIFI Master Extension 2.0 ([Info](#))
- Tinkerforge RGB LED Bricklet ([Info](#))

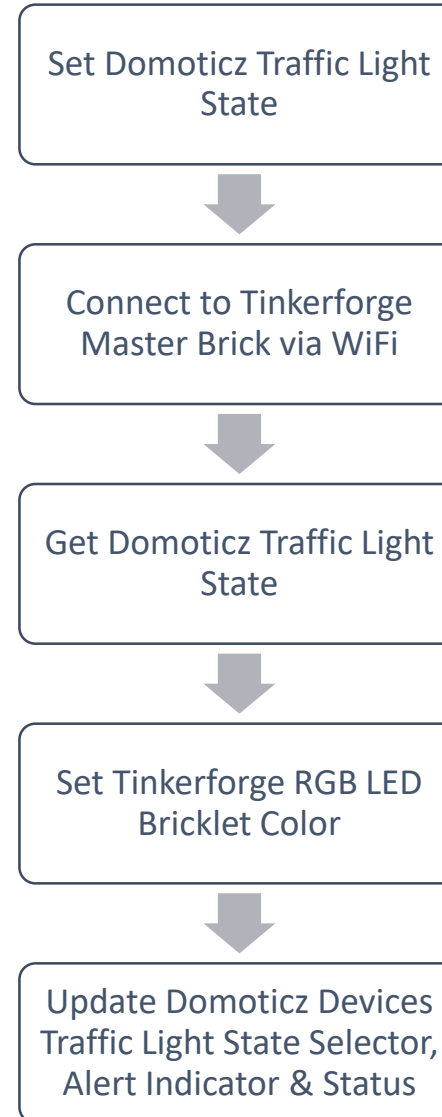
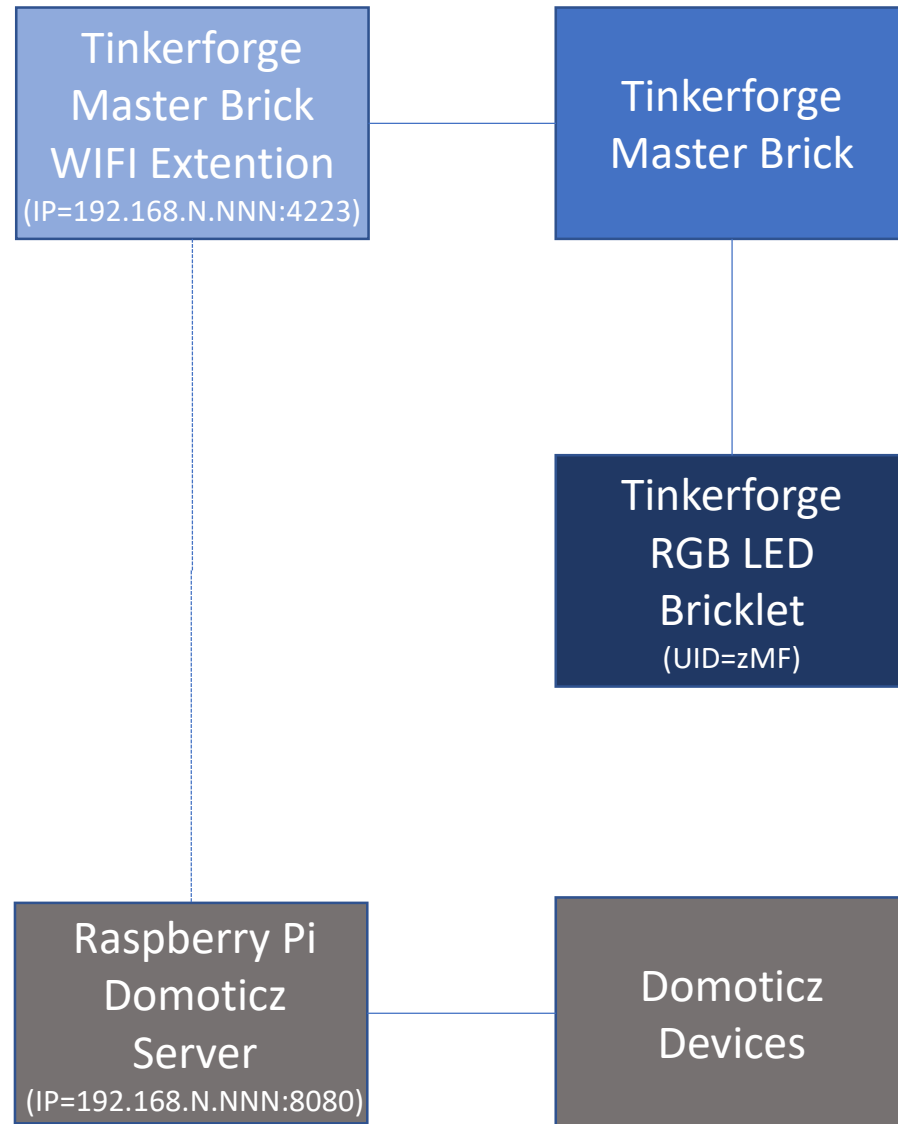
Software – with versions for developing this plugin.

- Raspberry Pi Raspian Linux 4.19.42-v7+ #1219
- Domoticz Home Automation System V4.1nnnn (BETA)
- Tinkerforge Python Binding v2.1.22
- Python 3.5.3
- [Thonny](#) 3.1.2 (Python IDE)

Prototype

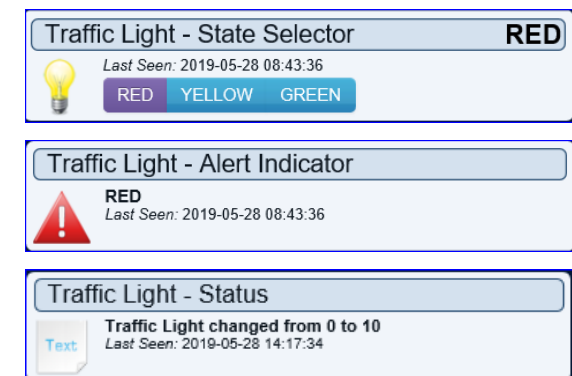


Hardware & Communication



Domoticz Hardware Traffic Light
(see next page)

Domoticz Devices



Domoticz – Add New Hardware Traffic Light

Idx	Name	Enabled	Type	Address
7	Traffic Light	Yes	Traffic Light	192.168.1.112

Showing 1 to 1 of 1 entries (filtered from 4 total entries)

Update Delete

Enabled: ☒

Name:

Type:

Data Timeout:
Specifying a Data Timeout will restart the hardware device if no data is received for the specified time.
Do not enable this option for devices that do not receive data!

Traffic Light

Set the color of a Tinkerforge RGB LED Bricklet to RED,YELLOW or GREEN via Domoticz Selector Switch device.

Features

- Traffic Light Color (R-G-B): RED=255-0-0; YELLOW=255-255-0; GREEN=0-255-0
- Traffic Light Brightness

Traffic Light Devices

- Traffic Light State Selector - Set the traffic light color RED,YELLOW or GREEN Selector Switch
- Traffic Light Alert Indicator - Reflects the traffic light state
- Traffic Light Status - Shows latest change or any error condition

Configuration

Requires the Tinkerforge Master Brick WiFi Extension HTTP address and Port and the Tinkerforge RGB LED Bricklet UID.
Use the Tinkerforge Brick Viewer to determine these parameter.

Version
20190528

Host:

Port:

UID:

Brightness:

Debug:

Notes

Read the code „plugin.py” for more information.

```
"""
<plugin key="TrafficLight" name="Traffic Light" author="rwbl" version="1.0.0">
  <description>
    <h2>Traffic Light</h2><br/>
    Set the color of a Tinkerforge RGB LED Bricklet to RED,YELLOW or GREEN via Domoticz Selector
    Switch device.
    <h3>Features</h3>
    <ul style="list-style-type:square">
      <li>Traffic Light Color (R-G-B): RED=255-0-0; YELLOW=255-255-0; GREEN=0-255-0</li>
      <li>Traffic Light Brightness</li>
    </ul>
    <h3>Traffic Light Devices</h3>
    <ul style="list-style-type:square">
      <li>Traffic Light State Selector - Set the traffic light color RED,YELLOW or GREEN
        Selector Switch</li>
      <li>Traffic Light Alert Indicator - Reflects the traffic light state</li>
      <li>Traffic Light Status - Shows latest change or any error condition</li>
    </ul>
    <h3>Configuration</h3>
    Requires the Tinkerforge Master Brick WiFi Extension HTTP address and Port and the
    Tinkerforge RGB LED Bricklet UID.<br/>
    Use the Tinkerforge Brick Viewer to determine these parameter.
    <br/>
    <h4>Version</h4>
    20190528
  </description>
  <params>
    <param field="Address" label="Host" width="200px" required="true" default="192.168.1.112"/>
    <param field="Port" label="Port" width="75px" required="true" default="4223"/>
    <param field="Mode1" label="UID" width="75px" required="true" default="zMF"/>
    <param field="Mode4" label="Brightness" width="75px" required="true" default="100"/>
    <param field="Mode6" label="Debug" width="75px">
      <options>
        <option label="True" value="Debug" default="true"/>
        <option label="False" value="Normal"/>
      </options>
    </param>
  </params>
</plugin>
"""
```

Domoticz – Add new Hardware Traffic Light - Domoticz Log

There are 3 new devices created and set to used. Note that the screenshot already shows a change in state to RED.

	Idx ^	Hardware ^	ID ^	Unit ^	Name ^	Type ^	SubType ^	
	13	Traffic Light	00070001	1	Traffic Light - State Selector	Light/Switch	Selector Switch	Set Level: 10 %
	14	Traffic Light	00070002	2	Traffic Light - Alert Indicator	General	Alert	RED
	15	Traffic Light	00070003	3	Traffic Light - Status	General	Text	Traffic Light changed from 0 to 10

```
2019-05-28 14:12:22.842 (Traffic Light) Debug logging mask set to: PYTHON PLUGIN QUEUE IMAGE DEVICE CONNECTION MESSAGE ALL
2019-05-28 14:12:22.842 (Traffic Light) 'UserDataFolder': '/home/pi/domoticz/'
2019-05-28 14:12:22.842 (Traffic Light) 'DomoticzVersion': '4.10840'
2019-05-28 14:12:22.842 (Traffic Light) 'Database': '/home/pi/domoticz/domoticz.db'
2019-05-28 14:12:22.842 (Traffic Light) 'HomeFolder': '/home/pi/domoticz/plugins/TrafficLight/'
2019-05-28 14:12:22.842 (Traffic Light) 'Mode4': '100'
2019-05-28 14:12:22.842 (Traffic Light) 'HardwareID': '7'
2019-05-28 14:12:22.842 (Traffic Light) 'Mode6': 'Debug'
2019-05-28 14:12:22.842 (Traffic Light) 'DomoticzBuildTime': '2019-05-28 08:12:58'
2019-05-28 14:12:22.842 (Traffic Light) 'Version': '1.0.0'
2019-05-28 14:12:22.842 (Traffic Light) 'Key': 'TrafficLight'
2019-05-28 14:12:22.842 (Traffic Light) 'Address': '192.168.1.112'
2019-05-28 14:12:22.842 (Traffic Light) 'Language': 'en'
2019-05-28 14:12:22.842 (Traffic Light) 'Author': 'rwbl'
2019-05-28 14:12:22.842 (Traffic Light) 'DomoticzHash': '9497b1f73'
2019-05-28 14:12:22.842 (Traffic Light) 'Mode1': 'zMF'
2019-05-28 14:12:22.842 (Traffic Light) 'StartupFolder': '/home/pi/domoticz/'
2019-05-28 14:12:22.842 (Traffic Light) 'Port': '4223'
2019-05-28 14:12:22.842 (Traffic Light) 'Name': 'Traffic Light'
2019-05-28 14:12:22.842 (Traffic Light) Device count: 0
2019-05-28 14:12:22.842 (Traffic Light) Creating new Devices
2019-05-28 14:12:22.842 (Traffic Light) Creating device 'State Selector'.
2019-05-28 14:12:22.844 (Traffic Light) Device created: Traffic Light - State Selector
2019-05-28 14:12:22.844 (Traffic Light) Creating device 'Alert Indicator'.
2019-05-28 14:12:22.845 (Traffic Light) Device created: Traffic Light - Alert Indicator
2019-05-28 14:12:22.845 (Traffic Light) Creating device Status'.
2019-05-28 14:12:22.846 (Traffic Light) Device created: Traffic Light - Change Info
2019-05-28 14:12:22.846 (Traffic Light) Pushing 'PollIntervalDirective' on to queue
2019-05-28 14:12:22.846 (Traffic Light) Processing 'PollIntervalDirective' message
2019-05-28 14:12:22.846 (Traffic Light) Heartbeat interval set to: 60.
2019-05-28 14:12:22.348 Status: (Traffic Light) Started.
2019-05-28 14:12:22.839 Status: (Traffic Light) Entering work loop.
2019-05-28 14:12:22.840 Status: (Traffic Light) Initialized version 1.0.0, author 'rwbl'
```

Domoticz Traffic Light - Devices

If the plugin starts first time, 3 new devices are created, with an initial state & info, set to used and manually added to the dashboard.

	13	Traffic Light	00070001	1	Traffic Light - State Selector	Light/Switch	Selector Switch	Off
	14	Traffic Light	00070002	2	Traffic Light - Alert Indicator	General	Alert	No Alert!
	15	Traffic Light	00070003	3	Traffic Light - Change Info	General	Text	

Example of the Domoticz Web-UI Dashboard after setting the Traffic Light to RED via the State Selector Device.

Light/Switch Devices:

Traffic Light - State Selector

RED

 Last Seen: 2019-05-28 14:17:34

RED YELLOW GREEN

Utility Sensors:

Traffic Light - Alert Indicator

RED

 Last Seen: 2019-05-28 14:17:34

Traffic Light - Status

 Traffic Light changed from 0 to 10

Last Seen: 2019-05-28 14:17:34

Domoticz Traffic Light – State Changed from Off to RED

The initial state is Off.


The log shows changing the state to RED by pressing RED button on the State Selector Switch.

```
2019-05-27 09:51:50.997 Status: User: Admin initiated a switch command (13/Traffic Light - State Selector/Set Level)
2019-05-27 09:51:51.002 (Traffic Light) Processing 'onCommandCallback' message
2019-05-27 09:51:51.002 (Traffic Light) Calling message handler 'onCommand'.
2019-05-27 09:51:51.003 (Traffic Light) onCommand called for Unit 1: Parameter 'Set Level', Level: 10
2019-05-27 09:51:51.012 (Traffic Light) IP Connection - OK
2019-05-27 09:51:51.012 (Traffic Light) Traffic Light - State Selector-Traffic Light State New=10
2019-05-27 09:51:51.012 (Traffic Light) Traffic Light - State Selector-nValue=0,sValue=
2019-05-27 09:51:51.017 (Traffic Light) Traffic Light - State Selector-RGB LED Colors R-G-B:0-100-0
2019-05-27 09:51:51.018 (Traffic Light) RGB LED Brightness updated:100
2019-05-27 09:51:51.018 (Traffic Light - State Selector) Updating device from 0:'' to have values 2:'10'.
2019-05-27 09:51:51.030 (Traffic Light) Traffic Light - State Selector-nValue=2,sValue=10
2019-05-27 09:51:51.030 (Traffic Light - Alert Indicator) Updating device from 0:'No Alert!' to have values 4:'RED'.
2019-05-27 09:51:51.038 (Traffic Light) Traffic Light - Alert Indicator-nValue=4,sValue=RED
2019-05-27 09:51:51.038 (Traffic Light - Change Info) Updating device from 0:'' to have values 0:'Traffic Light changed from 0 to 10'.
2019-05-27 09:51:51.045 (Traffic Light) Traffic Light - Status-nValue=0,sValue=Traffic Light changed from 0 to 10
2019-05-27 09:51:51.148 (Traffic Light) TrafficLight Update: OK
```


Domoticz Traffic Light – State Change Error

Example Error Message triggered by changing a color by the Selector Switch.
Caused by the Master Brick not powered up. This results in a IP Connection failed error.

Traffic Light - Alert Indicator




[ERROR] Device Connection!
Last Seen: 2019-05-27 14:39:49

```
2019-05-27 14:48:37.140 (Traffic Light) onCommand called for Unit 1: Parameter 'Set Level', Level: 20
2019-05-27 14:48:37.101 Status: User: Admin initiated a switch command (13/Traffic Light - State Selector/Set Level)
2019-05-27 14:48:40.298 (Traffic Light) [ERROR] IP Connection failed
2019-05-27 14:48:40.299 (Traffic Light - Alert Indicator) Updating device from 3:'-[ERROR] Device Connection!' to have values 3:'[ERROR] Device Connection!'.
2019-05-27 14:48:40.307 (Traffic Light) Traffic Light - Alert Indicator-nValue=3,sValue=[ERROR] Device Connection!
2019-05-27 14:48:40.307 (Traffic Light) [ERROR] Device Connection!
```


Example Error Message triggered by changing a color by the Selector Switch.
caused by a wrong Tinkerforge RGB LED Bricklet UID.

Traffic Light - Alert Indicator



ERROR
Last Seen: 2019-05-28 14:23:18

Traffic Light - Status



[ERROR] Check settings, correct and restart Domoticz.
Last Seen: 2019-05-28 14:23:18

Domoticz Traffic Light – Plugin Code Snippet onCommand

```
def onCommand(self, Unit, Command, Level, Hue):
    self.ipConnected = 0
    try:
        ipcon = IPConnection()
        brickletUIDParam = Parameters["Mode1"]
        brickletUIDList = brickletUIDParam.split(',')
        if len(brickletUIDList) == 1:
            lb = BrickletRGBLED(brickletUIDList[0], ipcon)
        try:
            ipcon.connect(Parameters["Address"], int(Parameters["Port"]))
            self.ipConnected = 1
        except:
            Domoticz.Debug("[ERROR] IP Connection failed")

        if self.ipConnected == 0:
            Devices[3].Update( nValue=0, sValue="[ERROR] Can not connect to Master Brick.")
            Domoticz.Log(Devices[3].sValue)
            return

        oldtrafficlightstate = 0
        if Devices[1].sValue != "":
            oldtrafficlightstate = int(Devices[1].sValue)
        newtrafficlightstate = Level
        rgbvalue = lb.get_rgb_value()
        lbbrightness = int(Parameters["Mode4"])
        trafficlightcolor = "UNKNOWN"; trafficlightalert = 0
        if newtrafficlightstate == 10:lb.set_rgb_value(lbbrightness, 0, 0);trafficlightcolor = "RED";trafficlightalert = 4
        if newtrafficlightstate == 20:lb.set_rgb_value(lbbrightness, lbbrightness, 0);trafficlightcolor = "YELLOW";trafficlightalert = 2
        if newtrafficlightstate == 30:lb.set_rgb_value(0, lbbrightness, 0);trafficlightcolor = "GREEN";trafficlightalert = 1
        Devices[1].Update( nValue=2, sValue=str(newtrafficlightstate) )
        Devices[2].Update( nValue=trafficlightalert, sValue=trafficlightcolor )
        Devices[3].Update( nValue=0, sValue="Traffic Light changed from " + str(oldtrafficlightstate) + " to " + str(newtrafficlightstate) )
        ipcon.disconnect()
        Domoticz.Log(Devices[3].sValue)
    except:
        if self.ipConnected == 1:
            ipcon.disconnect()

        Devices[3].Update( nValue=0, sValue="[ERROR] Check settings, correct and restart Domoticz." )
        Domoticz.Log(Devices[3].sValue)
```

This is just a snippet
and not the latest
code.
See „plugin.py“.

Domoticz Traffic Light – Plugin Code Error Handling

Solution used to handle errors Master Brick Connection (ipconnection) or bricklet wrong UID.

```
class BasePlugin:
    def __init__(self):
        # Flag to check if connected to the master brick
        self.ipConnected = 0
        return

    def onCommand(self, Unit, Command, Level, Hue):
        Domoticz.Debug("onCommand called for Unit " + str(Unit) + ": Parameter '" + str(Command) + "', Level: " + str(Level))
        # Flag to check if connected to the master brick
        self.ipConnected = 0
        try:
            # Create IP connection
            ipcon = IPConnection()

            # Create device objects using the UID as defined in the parameters
            # <ADD>

            # Connect to brickd using Host and Port
            try:
                ipcon.connect(Parameters["Address"], int(Parameters["Port"]))
                self.ipConnected = 1
                Domoticz.Debug("IP Connection - OK")
            except:
                Domoticz.Debug("[ERROR] IP Connection failed")

            # Don't use device before ipcon is connected
            if self.ipConnected == 0:
                Domoticz.Log("[ERROR] Can not connect to Master Brick. Check settings, correct and restart Domoticz." )
                return
        except:
            # Error - Important to close the connection - if not, the plugin can not be disabled
            if self.ipConnected == 1:
                ipcon.disconnect()

            Domoticz.Log("[ERROR] Check settings, correct and restart Domoticz.")
```

Domoticz Traffic Light – Set State via HTTP

Set the Traffic Light (idx=13) State to GREEN by setting the level parameter to 30:

<http://ip-address:8080/json.htm?type=command¶m=switchlight&idx=13&switchcmd=Set%20Level&level=30>

Resulting in HTTP response

```
{ "status" : "OK", "title" : "SwitchLight" }
```

The plugin **onCommand** function is triggered and the devices are updated.

Check the Domoticz Web-UI:

- <http://ip:8080/#/Dashboard>
- <http://ip:8080/#/Log>

The Traffic Light Levels can be set to:

10=RED,20=YELLOW,30=GREEN

Domoticz Traffic Light – Development Screenshots

```
Thonny - C:\Users\Robert\AppData\Local\Temp\scp34709\home\pi\domoticz\plugins...
File Edit View Run Device Tools Help

plugin.py
1 # Domoticz Home Automation - TrafficLight
2 # Set the color of a Tinkerforge RGB LED Bricklet to RED,YELLOW or GR
3 # @author Robert W.B. Linn
4 # @version 1.0.0 (Build 20190528)
5 #
6 # NOTE:
7 # after every change run: sudo service domoticz.sh restart
8 # Check the Domoticz log: http://IP-ADDRESS:8080/#/Log
9 #
10 # Domoticz Python Plugin Development Documentation:
11 # https://www.domoticz.com/wiki/Developing_a_Python_plugin
12 # https://www.tinkerforge.com/de/doc/Hardware/Bricklets/Air_Quality.h
13 #
14 #
15 #
16 #
17 <plugin key="TrafficLight" name="Traffic Light" author="rwbl" version
18 <description>
19 <h2>Traffic Light</h2><br/>
20 Set the color of a Tinkerforge RGB LED Bricklet to RED,YELLOW
21 <h3>Features</h3>
22 <ul style="list-style-type:square">
23 <li>Traffic Light Color (R-G-B): RED=255-0-0; YELLOW=255-
24 <li>Traffic Light Brightness</li>
25 </ul>
26 <h3>Traffic Light Devices</h3>
27 #
```

```
pi@dodev: ~
Using username "pi".
password:
Linux dodev 4.19.42-v7+ #1219 SMP Tue May 14 21:20:58 BST 2019 armv7l

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: Mon May 27 19:03:06 2019 from [redacted]
pi@dodev:~$ sudo service domoticz.sh restart
pi@dodev:~$ sudo service domoticz.sh restart
pi@dodev:~$ sudo service domoticz.sh restart
pi@dodev:~$
```

TrafficLight - domoticz development - WinSCP

Local Mark Files Commands Session Options Remote Help

Synchronize Queue Transfer Settings Default

domoticz development X New Session

C: Acer

Upload Edit Properties New

C:\...domoticz-home-automation-workbook\documentation\plugins\Tinkerforge\TrafficLight\

Name	Size	Type	Changed
..		Parent direct	27.05.2019 19:20:55
Python Samples		Dateiordner	26.05.2019 11:31:56
Zip		Dateiordner	27.05.2019 19:21:08
~\$domoticz-plugin-trafficlight.pptx	1 KB	Microsoft Po...	28.05.2019 09:22:31
CHANGELOG.md	1 KB	MD-Datei	27.05.2019 10:19:50
domoticz-plugin-trafficlight.pdf	511 KB	Adobe Acrob...	28.05.2019 09:20:45
domoticz-plugin-trafficlight.pptx	503 KB	Microsoft Po...	28.05.2019 09:20:31
LICENSE	35 KB	Datei	27.05.2019 10:19:50
plugin.py	12 KB	Python file	27.05.2019 10:19:50
README.md	15 KB	MD-Datei	27.05.2019 10:19:50
TODO.md	1 KB	MD-Datei	27.05.2019 10:19:50

/home/pi/domoticz/plugins/TrafficLight/

Name	Size	Changed	Rights	Owner
..		10.05.2019 13:18:38	rw-r-xr-x	pi
__pycache__		28.05.2019 09:04:32	rw-r-xr-x	root
Python Samples		26.05.2019 10:36:12	rw-r-xr-x	pi
plugin.py	12 KB	28.05.2019 09:04:58	rw-r--r--	pi
README.md	20 KB	26.05.2019 10:13:09	rw-r--r--	pi

Thonny – Code Development
PuTTY – Terminal to restart Domoticz
WinSCP – Folder & File Management
Domoticz Web-UI Dashboard & Log

Domoticz V4.10826

Dashboard Switches Scenes

All Status

2019-05-28 09:04:32.431 Status: (Traffic Light) Entering work loop.
2019-05-28 09:04:32.432 Status: (Traffic Light) Initialized version 1.0.0, author 'rwbl'.
2019-05-28 09:04:32.591 Status: MQTT: Connecting to 192.168.1.179:1883
2019-05-28 09:04:32.691 Status: MQTT: connected to: 192.168.1.179:1883
2019-05-28 09:04:32.792 Status: MQTT: Subscribed
2019-05-28 09:04:42.453 (Traffic Light) onLineHeat called
2019-05-28 09:05:04.676 Sunrise: 05:02:00 Sunset: 21:34:00
2019-05-28 09:05:04.676 Day length: 16:33:00 Sun at south: 13:18:00
2019-05-28 09:05:04.676 Civil twilight start: 04:13:00 Civil twilight end: 22:23:00
2019-05-28 09:05:04.676 Nautical twilight start: 02:56:00 Nautical twilight end: 23:40:00
2019-05-28 09:05:04.676 There is no astronomical twilight in the space of 24 hours
2019-05-28 09:05:04.812 Active notification Subsystems: (0/13)
2019-05-28 09:05:04.821 Starting shared server on: ::6144
2019-05-28 09:05:04.636 Status: Domoticz V4.10840 (c)2012-2019 GizmoCuz
2019-05-28 09:05:04.636 Status: Build Hash: 9497b1f73, Date: 2019-05-28 08:12:58
2019-05-28 09:05:04.636 Status: Startup Path: /home/pi/domoticz/
2019-05-28 09:05:04.802 Status: PluginSystem: Started, Python version '3.5.3'.
2019-05-28 09:05:04.813 Status: WebServer(HTTP) started on address: :: with port 8080
2019-05-28 09:05:04.818 Status: WebServer(SSL) started on address: :: with port 443
2019-05-28 09:05:04.822 Status: RxQueue: queue worker started...
2019-05-28 09:05:04.822 Status: TCPServer: shared server started...
2019-05-28 09:05:06.823 Status: Hardware Monitor: Started
2019-05-28 09:05:06.840 Status: (Traffic Light) Started.
2019-05-28 09:05:06.841 Status: EventSystem: reset all device statuses...
2019-05-28 09:05:06.841 Status: EventSystem: reset all device statuses...
2019-05-28 09:05:07.014 Status: Python EventSystem: Initializing event module.
2019-05-28 09:05:07.015 Status: EventSystem: Started
2019-05-28 09:05:07.015 Status: EventSystem: Queue thread started...
2019-05-28 09:05:07.178 Status: PluginSystem: Entering work loop.
2019-05-28 09:05:07.694 Status: (Traffic Light) Entering work loop.
2019-05-28 09:05:07.694 Status: (Traffic Light) Initialized version 1.0.0, author 'rwbl'.
2019-05-28 09:05:07.840 Status: MQTT: Connecting to 192.168.1.179:1883
2019-05-28 09:05:07.941 Status: MQTT: connected to: 192.168.1.179:1883
2019-05-28 09:05:08.042 Status: MQTT: Subscribed
2019-05-28 09:05:32.251 (Traffic Light) Traffic Light changed from 30 to 10
2019-05-28 09:05:32.118 Status: User: Admin initiated a switch command (13/Traffic Light - State Selector/Set Level)

Domoticz V4.10840

Dashboard Switches Scenes

2019-05-28 14:31:57 🌞▲05:02 ▼21:34

Light/Switch Devices:

Traffic Light - State Selector **RED**

Last Seen: 2019-05-28 14:31:26

RED YELLOW GREEN

Utility Sensors:

Traffic Light - Alert Indicator **RED**

Last Seen: 2019-05-28 14:31:26

Traffic Light - Status

Text Traffic Light changed from 30 to 10

Last Seen: 2019-05-28 14:31:26