Developing the python code

```
import time
import sys
import ibmiotf.application
import ibmiotf.device

organization = "7oyue9"
deviceType = "ESP32_Controller"
deviceId = "BME280_Sensor"
authMethod = "use-token-auth"
authToken = "12345678"


def myCommandCallback(cmd):
print("Command received: %s" % cmd.data)
    if cmd.data['command'] == 'motoron':
print("Motor On IS RECEIVED")

    elif cmd.data['command'] == 'motoroff':
print("Motor Off IS RECEIVED")

    if cmd.command == "setInterval":

        if 'interval' not in cmd.data:
print("Error - command is missing required
information: 'interval'")
        else:
            interval = cmd.data['interval']
    elif cmd.command == "print":
        if 'message' not in cmd.data:
print("Error - command is missing required
information: 'message'")
        else:
            output = cmd.data['message']
            print(output)


try:
    deviceOptions = {"org": organization, "type":
deviceType,
                     "id": deviceId, "auth-method":
authMethod, "auth-token": authToken}
```

```
    deviceCli = ibmiotf.device.Client(deviceOptions)

except Exception as e:
print("Caught exception connecting device: %s" %
str(e))
sys.exit()

deviceCli.connect()

while True:

    deviceCli.commandCallback = myCommandCallback

deviceCli.disconnect()
```

Node Red Flow.json

```
[{
    "id": "6a097760.653918",
    "type": "tab",
    "label": "IBMIOT(smart Agriculture)",
    "disabled": false,
    "info": ""
}, {
    "id": "4fdd8d20.76a9b4",
    "type": "ibmiot in",
    "z": "6a097760.653918",
    "authentication": "apiKey",
    "apiKey": "233183d6.16ba7c",
    "inputType": "evt",
    "logicalInterface": "",
    "ruleId": "",
    "deviceId": "BME280_Sensor",
    "applicationId": "",
    "deviceType": "ESP32_Controller",
    "eventType": "+",
    "commandType": "",
    "format": "json",
    "name": "IBM IoT",
    "service": "registered",
    "allDevices": "",
    "allApplications": "",
```

```
    "allDeviceTypes": "",
    "allLogicalInterfaces": "",
    "allEvents": true,
    "allCommands": "",
    "allFormats": "",
    "qos": 0,
    "x": 130,
    "y": 440,
    "wires": [
        ["8d0c40d3.848cd", "6aa78b4a.da3eb4",
"5642999c.ed7868", "c396573b.e8d738"]
    ]
}, {
    "id": "c396573b.e8d738",
    "type": "debug",
    "z": "6a097760.653918",
    "name": "",
    "active": false,
    "tosidebar": true,
    "console": false,
    "tostatus": false,
    "complete": "payload",
    "targetType": "msg",
    "x": 770,
    "y": 360,
    "wires": []
}, {
    "id": "8a49f2d5.e9d07",
    "type": "ui_gauge",
    "z": "6a097760.653918",
    "name": "",
    "group": "28e6141.0c047ec",
    "order": 0,
    "width": "6",
    "height": "4",
    "gtype": "gage",
    "title": "Humidity",
    "label": "%Percentage",
    "format": "{{value}}",
    "min": 0,
    "max": "100",
    "colors": ["#00b500", "#e6e600", "#ca3838"],
    "seg1": "",
    "seg2": "",
```

```
    "x": 800,
    "y": 540,
    "wires": []
}, {
    "id": "9e820fb2.1ded5",
    "type": "ui_gauge",
    "z": "6a097760.653918",
    "name": "",
    "group": "28e6141.0c047ec",
    "order": 0,
    "width": "6",
    "height": "4",
    "gtype": "gage",
    "title": "Temperature",
    "label": "°C Celcius",
    "format": "{{value}}",
    "min": 0,
    "max": "100",
    "colors": ["#00b500", "#e6e600", "#ca3838"],
    "seg1": "",
    "seg2": "",
    "x": 770,
    "y": 660,
    "wires": []
}, {
    "id": "6aa78b4a.da3eb4",
    "type": "function",
    "z": "6a097760.653918",
    "name": "Temperature",
    "func":
"msg.payload=msg.payload.d.temperature;\nreturn
msg;",
    "outputs": 1,
    "noerr": 0,
    "x": 410,
    "y": 560,
    "wires": [
        ["c396573b.e8d738", "9e820fb2.1ded5",
"687d6f13.98f7c"]
    ]
}, {
    "id": "8d0c40d3.848cd",
    "type": "function",
    "z": "6a097760.653918",
```

```
    "name": "Humidity",
    "func":
"msg.payload=msg.payload.d.humidity;\nreturn msg;",
    "outputs": 1,
    "noerr": 0,
    "x": 420,
    "y": 500,
    "wires": [
        ["c396573b.e8d738", "8a49f2d5.e9d07",
"a4f00796.520788"]
    ]
}, {
    "id": "5642999c.ed7868",
    "type": "function",
    "z": "6a097760.653918",
    "name": "SoilMoisture",
    "func":
"msg.payload=msg.payload.d.objectTemp;\nreturn msg;",
    "outputs": 1,
    "noerr": 0,
    "x": 430,
    "y": 440,
    "wires": [
        ["c396573b.e8d738", "dad1ab68.86f798",
"9888ac53.4a285"]
    ]
}, {
    "id": "dad1ab68.86f798",
    "type": "ui_gauge",
    "z": "6a097760.653918",
    "name": "",
    "group": "28e6141.0c047ec",
    "order": 2,
    "width": "6",
    "height": "4",
    "gtype": "gage",
    "title": "Soil Moisture",
    "label": "% Percentage",
    "format": "{{value}}",
    "min": 0,
    "max": "100",
    "colors": ["#00b500", "#e6e600", "#ca3838"],
    "seg1": "",
    "seg2": "",
```

```
    "x": 810,
    "y": 420,
    "wires": []
}, {
    "id": "9de2a117.06e1d",
    "type": "http request",
    "z": "6a097760.653918",
    "name": "",
    "method": "GET",
    "ret": "obj",
    "paytoqs": false,
    "url":
"http://api.openweathermap.org/data/2.5/weather?q=Pon
da,IN&appid=c17ea99bbf41216723c2071ce90c3633",
    "tls": "",
    "persist": false,
    "proxy": "",
    "authType": "",
    "x": 510,
    "y": 240,
    "wires": [
        ["c396573b.e8d738", "91b4e81a.972888",
"4bcf3c9.21fd4c4", "2c496973.5626d6",
"3552343c.1a23ac"]
    ]
}, {
    "id": "cbdf50d7.8bd57",
    "type": "inject",
    "z": "6a097760.653918",
    "name": "",
    "topic": "",
    "payload": "",
    "payloadType": "date",
    "repeat": "5",
    "crontab": "",
    "once": true,
    "onceDelay": "5",
    "x": 150,
    "y": 300,
    "wires": [
        ["9de2a117.06e1d"]
    ]
}, {
    "id": "f8fb8426.88b758",
```

```
    "type": "ibmiot out",
    "z": "6a097760.653918",
    "authentication": "apiKey",
    "apiKey": "233183d6.16ba7c",
    "outputType": "cmd",
    "deviceId": "BME280_Sensor",
    "deviceType": "ESP32_Controller",
    "eventCommandType": "command",
    "format": "json",
    "data": "Data",
    "qos": 0,
    "name": "IBM IoT",
    "service": "registered",
    "x": 560,
    "y": 100,
    "wires": []
}, {
    "id": "2deb666d.10728a",
    "type": "ui_button",
    "z": "6a097760.653918",
    "name": "",
    "group": "d251626d.10cec",
    "order": 2,
    "width": 0,
    "height": 0,
    "passthru": false,
    "label": "Motor on",
    "tooltip": "",
    "color": "",
    "bgcolor": "",
    "icon": "",
    "payload": "{\"command\":\"motoron\"}",
    "payloadType": "json",
    "topic": "",
    "x": 160,
    "y": 60,
    "wires": [
        ["f8fb8426.88b758", "c396573b.e8d738"]
    ]
}, {
    "id": "154a1e0e.e80672",
    "type": "ui_button",
    "z": "6a097760.653918",
    "name": "",
```

```
    "group": "d251626d.10cec",
    "order": 3,
    "width": 0,
    "height": 0,
    "passthru": false,
    "label": "Motoroff",
    "tooltip": "",
    "color": "",
    "bgcolor": "",
    "icon": "",
    "payload": "{\"command\":\"motoroff\"}",
    "payloadType": "json",
    "topic": "",
    "x": 160,
    "y": 160,
    "wires": [
        ["f8fb8426.88b758", "c396573b.e8d738"]
    ]
}, {
    "id": "6329ceb0.9a74",
    "type": "ui_text",
    "z": "6a097760.653918",
    "group": "a9434212.30379",
    "order": 0,
    "width": 0,
    "height": 0,
    "name": "",
    "label": "Temperature",
    "format": "{{msg.payload}}",
    "layout": "row-spread",
    "x": 970,
    "y": 140,
    "wires": []
}, {
    "id": "5d4cb33b.861edc",
    "type": "ui_text",
    "z": "6a097760.653918",
    "group": "a9434212.30379",
    "order": 1,
    "width": 0,
    "height": 0,
    "name": "",
    "label": "Humidity",
    "format": "{{msg.payload}}",
```

```
        "layout": "row-spread",
        "x": 980,
        "y": 200,
        "wires": []
    }, {
        "id": "d85fe3cc.9ca31",
        "type": "ui_text",
        "z": "6a097760.653918",
        "group": "a9434212.30379",
        "order": 0,
        "width": 0,
        "height": 0,
        "name": "",
        "label": "Region",
        "format": "{{msg.payload}}",
        "layout": "row-spread",
        "x": 980,
        "y": 260,
        "wires": []
    }, {
        "id": "e00de3f6.29978",
        "type": "ui_text",
        "z": "6a097760.653918",
        "group": "a9434212.30379",
        "order": 3,
        "width": 0,
        "height": 0,
        "name": "",
        "label": "Weather Description",
        "format": "{{msg.payload}}",
        "layout": "row-spread",
        "x": 1020,
        "y": 320,
        "wires": []
    }, {
        "id": "9888ac53.4a285",
        "type": "ui_chart",
        "z": "6a097760.653918",
        "name": "",
        "group": "309c8230.4f9bde",
        "order": 3,
        "width": 0,
        "height": 0,
        "label": "Soil moisture",
```

```
    "chartType": "line",
    "legend": "false",
    "xformat": "HH:mm:ss",
    "interpolate": "linear",
    "nodata": "",
    "dot": false,
    "ymin": "",
    "ymax": "",
    "removeOlder": 1,
    "removeOlderPoints": "",
    "removeOlderUnit": "3600",
    "cutout": 0,
    "useOneColor": false,
    "useUTC": false,
    "colors": ["#1f77b4", "#aec7e8", "#ff7f0e",
"#2ca02c", "#98df8a", "#d62728", "#ff9896",
"#9467bd", "#c5b0d5"],
    "useOldStyle": false,
    "outputs": 1,
    "x": 820,
    "y": 460,
    "wires": [
        []
    ]
}, {
    "id": "a4f00796.520788",
    "type": "ui_chart",
    "z": "6a097760.653918",
    "name": "",
    "group": "309c8230.4f9bde",
    "order": 4,
    "width": 0,
    "height": 0,
    "label": "Humidity",
    "chartType": "line",
    "legend": "false",
    "xformat": "HH:mm:ss",
    "interpolate": "linear",
    "nodata": "",
    "dot": false,
    "ymin": "",
    "ymax": "",
    "removeOlder": 1,
    "removeOlderPoints": "",
```

```
    "removeOlderUnit": "3600",
    "cutout": 0,
    "useOneColor": false,
    "useUTC": false,
    "colors": ["#1f77b4", "#aec7e8", "#ff7f0e",
"#2ca02c", "#98df8a", "#d62728", "#ff9896",
"#9467bd", "#c5b0d5"],
    "useOldStyle": false,
    "outputs": 1,
    "x": 800,
    "y": 580,
    "wires": [
        []
    ]
}, {
    "id": "687d6f13.98f7c",
    "type": "ui_chart",
    "z": "6a097760.653918",
    "name": "",
    "group": "309c8230.4f9bde",
    "order": 5,
    "width": 0,
    "height": 0,
    "label": "Temperature",
    "chartType": "line",
    "legend": "false",
    "xformat": "HH:mm:ss",
    "interpolate": "linear",
    "nodata": "",
    "dot": false,
    "ymin": "",
    "ymax": "",
    "removeOlder": 1,
    "removeOlderPoints": "",
    "removeOlderUnit": "3600",
    "cutout": 0,
    "useOneColor": false,
    "useUTC": false,
    "colors": ["#1f77b4", "#aec7e8", "#ff7f0e",
"#2ca02c", "#98df8a", "#d62728", "#ff9896",
"#9467bd", "#c5b0d5"],
    "useOldStyle": false,
    "outputs": 1,
    "x": 810,
```

```
    "y": 700,
    "wires": [
        []
    ]
}, {
    "id": "91b4e81a.972888",
    "type": "change",
    "z": "6a097760.653918",
    "name": "Temperature",
    "rules": [{
        "t": "set",
        "p": "payload",
        "pt": "msg",
        "to": "payload.main.temp",
        "tot": "msg"
    }],
    "action": "",
    "property": "",
    "from": "",
    "to": "",
    "reg": false,
    "x": 750,
    "y": 120,
    "wires": [
        ["6329ceb0.9a74"]
    ]
}, {
    "id": "4bcf3c9.21fd4c4",
    "type": "change",
    "z": "6a097760.653918",
    "name": "Humidity",
    "rules": [{
        "t": "set",
        "p": "payload",
        "pt": "msg",
        "to": "payload.main.humidity",
        "tot": "msg"
    }],
    "action": "",
    "property": "",
    "from": "",
    "to": "",
    "reg": false,
    "x": 740,
```

```
    "y": 180,
    "wires": [
        ["5d4cb33b.861edc"]
    ]
}, {
    "id": "2c496973.5626d6",
    "type": "change",
    "z": "6a097760.653918",
    "name": "Region",
    "rules": [{
        "t": "set",
        "p": "payload",
        "pt": "msg",
        "to": "payload.name",
        "tot": "msg"
    }],
    "action": "",
    "property": "",
    "from": "",
    "to": "",
    "reg": false,
    "x": 740,
    "y": 240,
    "wires": [
        ["d85fe3cc.9ca31"]
    ]
}, {
    "id": "3552343c.1a23ac",
    "type": "change",
    "z": "6a097760.653918",
    "name": "Weather Description",
    "rules": [{
        "t": "set",
        "p": "payload",
        "pt": "msg",
        "to": "payload.weather.0.description",
        "tot": "msg"
    }],
    "action": "",
    "property": "",
    "from": "",
    "to": "",
    "reg": false,
    "x": 780,
```

```
    "y": 300,
    "wires": [
        ["e00de3f6.29978"]
    ]
}, {
    "id": "233183d6.16ba7c",
    "type": "ibmiot",
    "z": "",
    "name": "",
    "keepalive": "60",
    "serverName": "",
    "cleansession": true,
    "appId": "",
    "shared": false
}, {
    "id": "28e6141.0c047ec",
    "type": "ui_group",
    "z": "",
    "name": "Smart Agriculture",
    "tab": "d669ffca.1402d",
    "order": 6,
    "disp": true,
    "width": "6",
    "collapse": false
}, {
    "id": "d251626d.10cec",
    "type": "ui_group",
    "z": "",
    "name": "Motor Commands",
    "tab": "d669ffca.1402d",
    "order": 1,
    "disp": true,
    "width": "6",
    "collapse": false
}, {
    "id": "a9434212.30379",
    "type": "ui_group",
    "z": "",
    "name": "Weather Forecast",
    "tab": "d669ffca.1402d",
    "order": 3,
    "disp": true,
    "width": "6",
    "collapse": false
```

```
}, {
    "id": "309c8230.4f9bde",
    "type": "ui_group",
    "z": "",
    "name": "Graphical Representation",
    "tab": "d669ffca.1402d",
    "order": 5,
    "disp": true,
    "width": "6",
    "collapse": false
}, {
    "id": "d669ffca.1402d",
    "type": "ui_tab",
    "z": "",
    "name": "Smart Agriculture",
    "icon": "dashboard",
    "disabled": false,
    "hidden": false
}]
```