

SPRINT-2

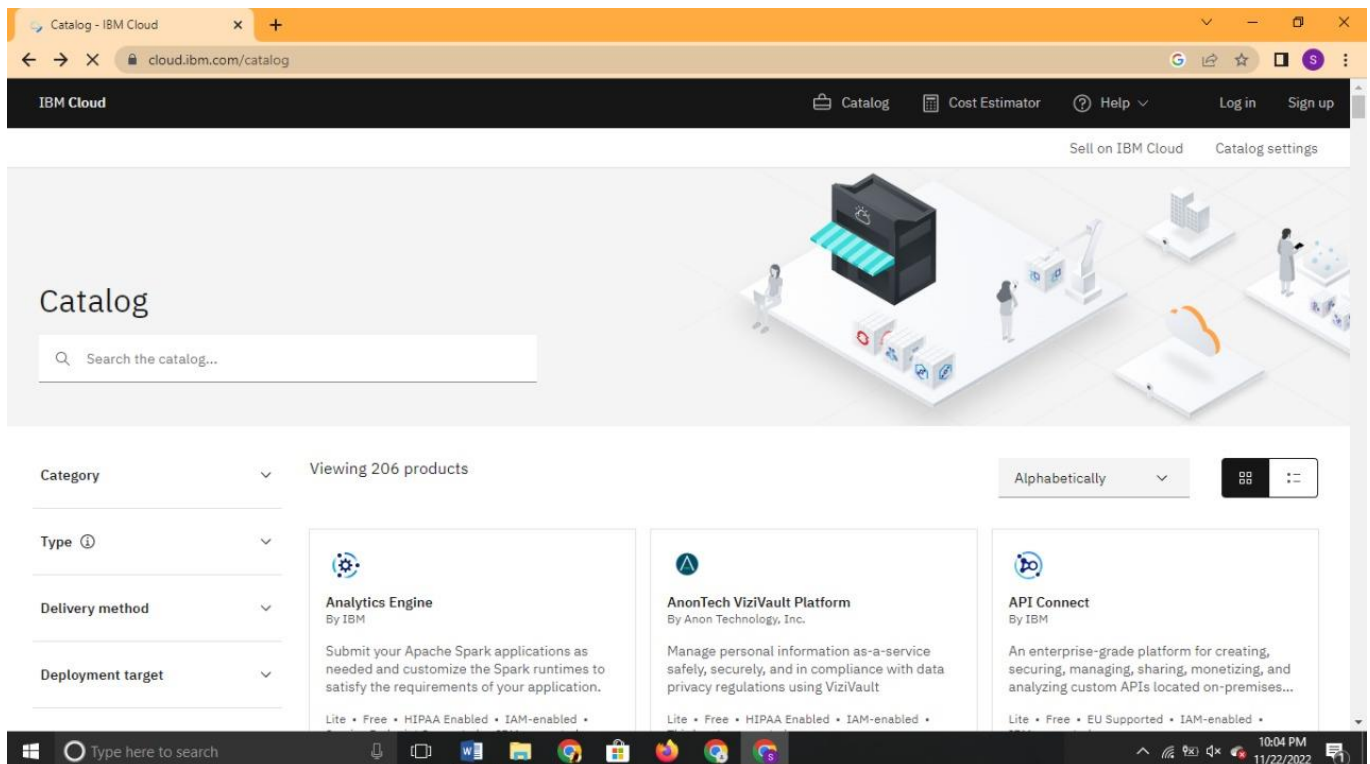
TEAM ID: PNT2022TMID14780

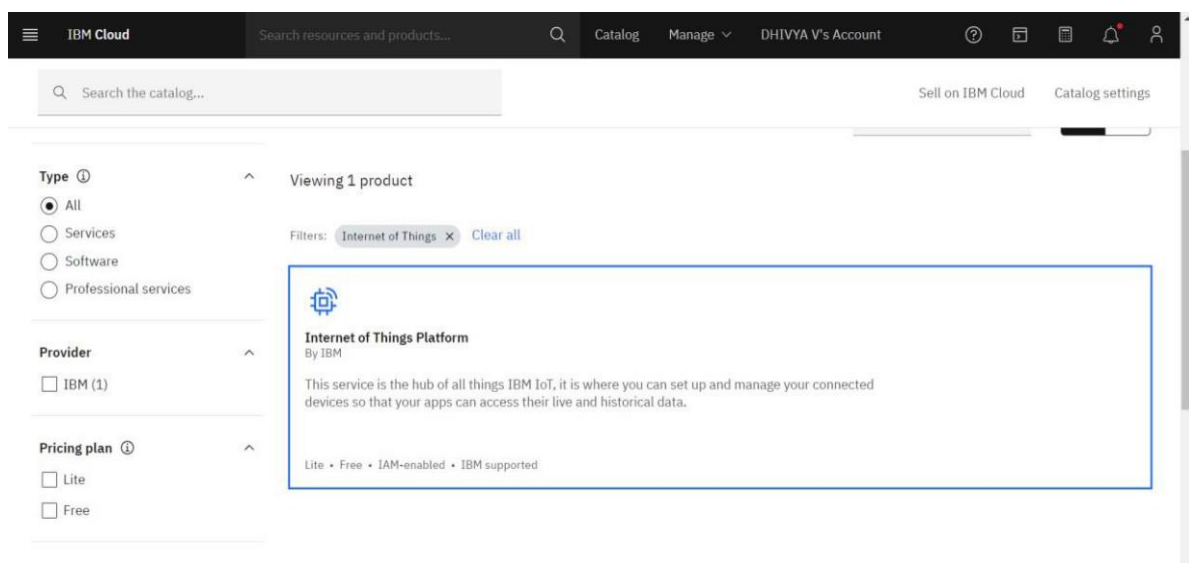
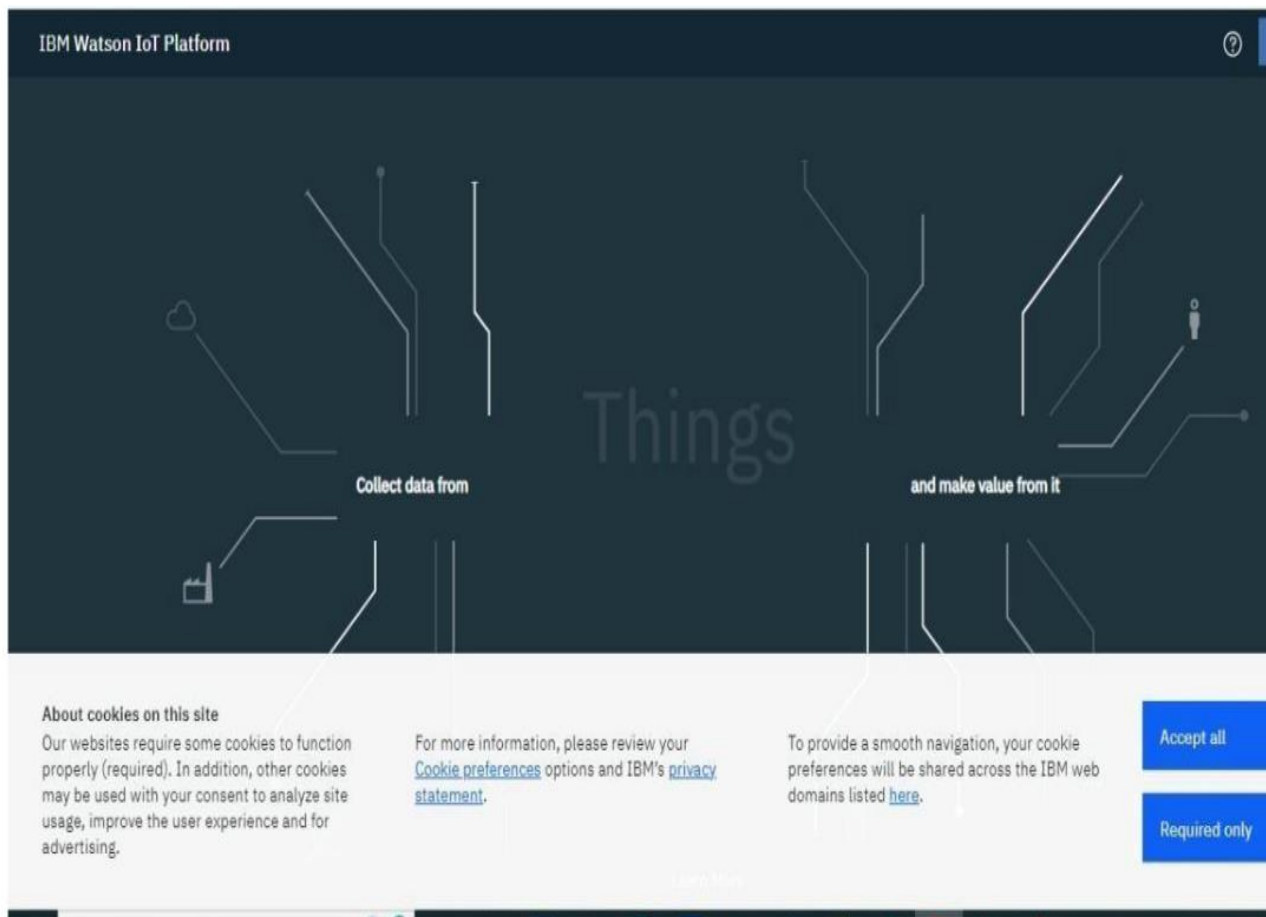
PROJECT NAME: IoT based smart crop protection system for Agriculture

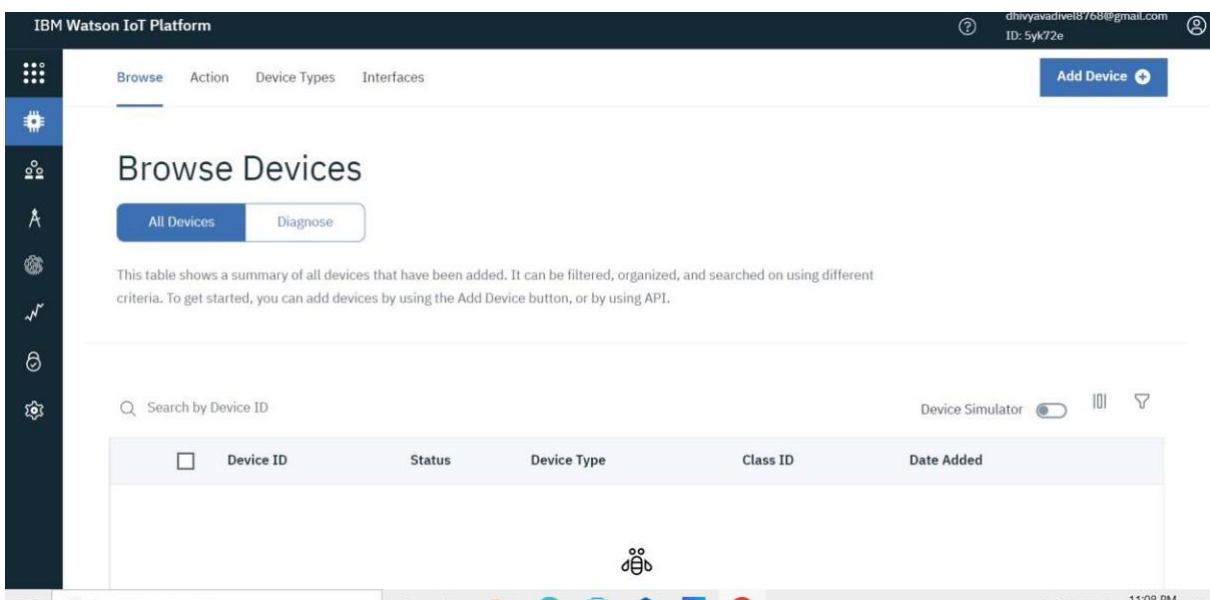
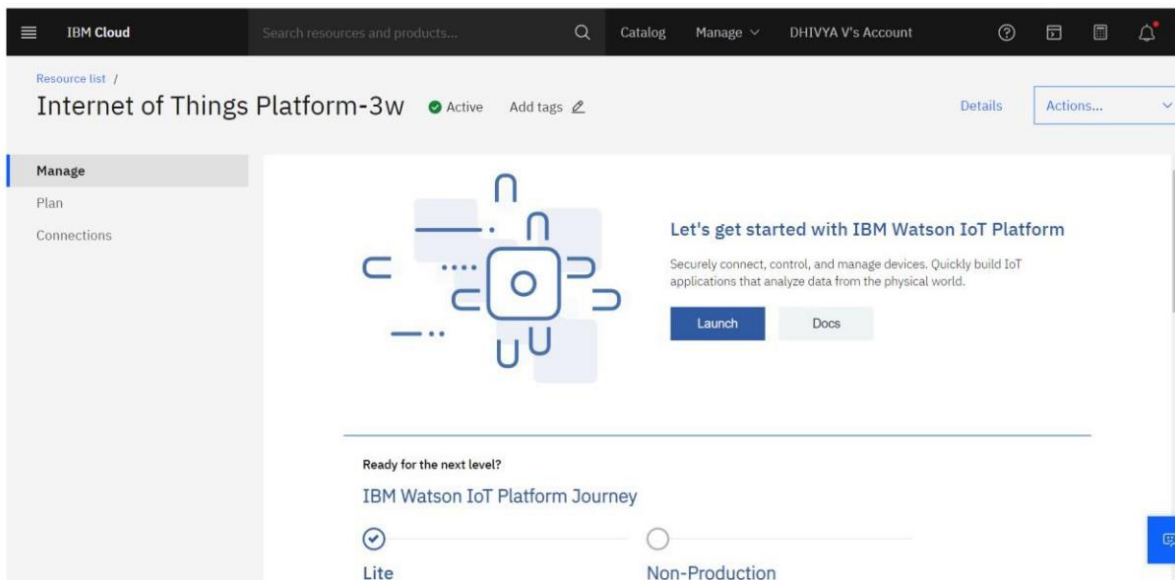
STEPS:

The random sensor data's are generated and automation has been implemented through the python code instead of using hardware to implement IOT based crop protection system. And the python code need to upload the data's in IBM cloud are written in this python script.

CREATION OF IBM WATSON CLOUD PLATFROM:







CODE:

```
import random
import ibmiotf.application
import ibmiotf.device
from time import sleep
```

```
import sys

#IBM Watson Device Credentials.
organization = "3xaptt"
deviceType = "NodeMCU"
deviceId = "12345" authMethod =
"use-token-auth" authToken =
"12345678"

def myCommandCallback(cmd):
    print("Command received: %s" % cmd.data['command'])
    status=cmd.data['command'] if status=="sprinkler_on":

        print ("sprinkler is ON")
    else :
        print ("sprinkler is OFF")
#print(cmd)

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()

#Connecting to IBM watson.
deviceCli.connect()

while True:

#Getting values from sensors.

    temp_sensor = round( random.uniform(0,80),2)
    PH_sensor = round(random.uniform(1,14),3)

    camera = ["Detected","Not Detected","Not
Detected","Not Detected","Not Detected","Not Detected",]
    camera_reading = random.choice(camera)

    flame = ["Detected","Not Detected","Not Detected","Not
Detected","Not Detected","Not Detected",]
    flame_reading = random.choice(flame)

    moist_level = round(random.uniform(0,100),2)
    water_level = round(random.uniform(0,30),2)


#storing the sensor data to send in json format to cloud.

    temp_data = { 'Temperature' : temp_sensor }
    PH_data = { 'PH Level' : PH_sensor }
    camera_data = { 'Animal attack' : camera_reading}
    flame_data = { 'Flame' : flame_reading }
```

```
moist_data = { 'Moisture Level' : moist_level }
```

```
water_data = { 'Water Level' : water_level }
```

```
# publishing Sensor data to IBM Watson for every 5-10  
seconds.
```

```
success = deviceCli.publishEvent("Temperature  
sensor", "json", temp_data, qos=0)
```

```
sleep(1)
```

```
if success:
```

```
    print (" .....publish ok. .... ")
```

```
    print ("Published Temperature = %s C" % temp_sensor,  
"to IBM Watson")
```

```
success = deviceCli.publishEvent("PH sensor", "json",  
PH_data, qos=0)
```

```
sleep(1)
```

```
if success:
```

```
    print ("Published PH Level = %s" % PH_sensor, "to  
IBM Watson")
```

```
success = deviceCli.publishEvent("camera", "json",  
camera_data, qos=0)
```

```
sleep(1)
```

```
if success:
```

```
    print ("Published Animal attack %s " % camera_reading,  
"to IBM Watson")
```

```
    success = deviceCli.publishEvent("Flame sensor",  
"json", flame_data, qos=0)
```

```
    sleep(1)
```

```
    if success:
```

```
        print ("Published Flame %s " % flame_reading, "to  
IBM Watson")
```

```
    success = deviceCli.publishEvent("Moisture sensor",  
"json", moist_data, qos=0)
```

```
    sleep(1)
```

```
    if success:
```

```
        print ("Published Moisture Level = %s " % moist_level,  
"to IBM Watson")
```

```
    success = deviceCli.publishEvent("Water sensor",  
"json", water_data, qos=0)
```

```
    sleep(1)
```

```
    if success:
```

```
        print ("Published Water Level = %s cm" % water_level,  
"to IBM Watson")
```

```
        print ("")
```

```
#Automation to control sprinklers by present temperature  
an to send alert message to IBM Watson.
```

```

if (temp_sensor > 35):
    print("sprinkler-1 is ON")
    success = deviceCli.publishEvent("Alert1", "json",{ 'alert1' :
"Temperature(%s) is high, sprinklerlers are turned ON"
%temp_sensor }
, qos=0)
    sleep(1)
    if success:
        print( 'Published alert1 : ', "Temperature(%s) is high,
sprinklerlers are turned ON" %temp_sensor,"to IBM Watson")
        print("")
    else:
        print("sprinkler-1 is OFF")
        print("")

```

#To send alert message if farmer uses the unsafe fertilizer to crops.

```

if (PH_sensor > 7.5 or PH_sensor < 5.5):
    success = deviceCli.publishEvent("Alert2", "json",{ 'alert2'
: "Fertilizer PH level(%s) is not safe,use other
fertilizer" %PH_sensor } ,
qos=0)

```



```
sleep(1)
```

```
if success:
```

```
    print('Published alert2 : ', "Fertilizer PH level(%s) is not  
safe,use other fertilizer" %PH_sensor,"to IBM Watson")
```

```
    print ("")
```

```
# To send alert message to farmer that animal attack on crops.
```

```
if (camera_reading == "Detected"):
```

```
    success = deviceCli.publishEvent("Alert3", "json", {  
'alert3' : "Animal attack on crops detected" }, qos=0)
```

```
    sleep(1)
```

```
if success:
```

```
    print('Published alert3 : ', "Animal attack on  
crops detected","to IBM Watson","to IBM Watson")
```

```
    print("")
```

```
#To send alert message if flame detected on crop land  
and turn ON the splinkers to take immediate action.
```

```
if (flame_reading == "Detected"):
```

```
    print("sprinkler-2 is ON")
```

```
    success = deviceCli.publishEvent("Alert4", "json", { 'alert4'  
: "Flame is detected crops are in danger,sprinklers turned  
ON" }, qos=0)
```

```

    sleep(1)
    if success:
        print( 'Published alert4 : ' , "Flame is detected crops are
in danger,sprinklers turned ON","to IBM Watson")
        print("")
    else:
        print("sprinkler-2 is OFF")
        print("")

#To send alert message if Moisture level is LOW and to Turn
ON Motor-1 for irrigation.
if (moist_level < 20):
    print("Motor-1 is ON")
    success = deviceCli.publishEvent("Alert5", "json", { 'alert5'
: "Moisture level(%s) is low, Irrigation started"
%moist_level }, qos=0)
    sleep(1)
    if success:
        print('Published alert5 : ' , "Moisture level(%s) is
low, Irrigation started" %moist_level,"to IBM Watson" )
        print("")
    else:
        print("Motor-1 is OFF")
        print("")

```

#To send alert message if Water level is HIGH and to Turn ON Motor-2 to take water out.

if (water_level > 20):

 print("Motor-2 is ON")

 success = deviceCli.publishEvent("Alert6", "json", { 'alert6' : "Water level(%s) is high, so motor is ON to take water out " % water_level }, qos=0)

 sleep(1)

 if success:

 print('Published alert6 : ' , "water level(%s) is high, so motor is ON to take water out " % water_level,"to IBM Watson")

 print("")

 else:

 print("Motor-2 of OFF")

 print("")

#command recived by farmer

deviceCli.commandCallback = myCommandCallback

Disconnect the device and application from the

cloud deviceCli.disconnect()

OUTPUT

```
Python 3.7.0 Shell
File Edit Shell Debug Options Window Help
Python 3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:59:51) [MSC v.1914 64 bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
RESTART: C:\Users\my pc\Documents\nalaiyathiran ibm\project development phase\sprint 1\Python script (IOT based smart crop prtection s
ystem for agriculture).py
2022-10-30 15:23:08,539 ibmiotf.device.Client INFO Connected successfully: d:zf801i:bharathi:bharathi123
.....publish ok.....
Published Temperature = 41.7 C to IBM Watson
Published PH Level = 11.955 to IBM Watson
Published Animal attack Not Detected to IBM Watson
Published Flame Not Detected to IBM Watson
Published Moisture Level = 49.71 to IBM Watson
Published Water Level = 15.01 cm to IBM Watson

sprinkler-1 is ON
Published alert1 : Temperature(41.7) is high, sprinkerlers are turned ON to IBM Watson

Published alert2 : Fertilizer PH level(11.955) is not safe,use other fertilizer to IBM Watson

sprinkler-2 is OFF

Motor-1 is OFF

Motor-2 of OFF

Ln: 49 Col: 4
```

Motor-1 is OFF

Motor-2 of OFF

.....publish ok.....
Published Temperature = 24.92 C to IBM Watson
Published PH Level = 3.948 to IBM Watson
Published Animal attack Detected to IBM Watson
Published Flame Not Detected to IBM Watson
Published Moisture Level = 65.01 to IBM Watson
Published Water Level = 11.14 cm to IBM Watson

sprinkler-1 is OFF

Published alert2 : Fertilizer PH level(3.948) is not safe,use other fertilizer to IBM Watson

Published alert3 : Animal attack on crops detected to IBM Watson to IBM Watson

sprinkler-2 is OFF

Motor-1 is OFF

Motor-2 of OFF

publish ok