# ATMOSPHERIC TEMPERATURE DETECTION SYSTEM USING IBM BLUEMIX

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#### **Abstract**

To control electronic devices using networks, IoT plays an important role in our daily life. Controlling is done by observing information concerning the functioning of these electronic devices. For this project LM35 temperature sensor will sense the atmospheric temperature and pass that data to the microcontroller, the sensor device streams data over Ethernet, which is further published on the cloud using programming and IBM platforms. For this project ESP8266 WiFi module is used for storing the data.

Keywords - IoT, Arduino UNO, sensors.

#### I Introduction

This proposed system aims to detect the temperature of the atmosphere and send that data to the IBM cloud platform using programming. This project also uses Message Queuing Telemetry Transport (MQTT) protocol to update/publish sensor data to the IoT cloud. IBM Bluemix cloud platform is developed by IBM supports services as well as integrated DevOps to build, run, deploy and manage applications on the cloud. IBM has a series of platforms namely IBM Bluemix, IBM Watson and Node RED. These platforms are used to connect devices, collect data, and publish the readings on cloud and also to create applications on the web.

## **II Hardware Components**

Following are the hardware used for this project:

- 1. LM35 temperature sensor
- 2. Esp8266 WiFi module
- 3. Arduino UNO

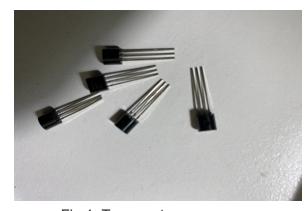


Fig 1. Temperature sensors

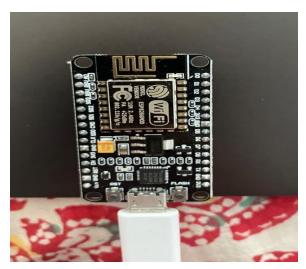


Fig 2. ESP8266 WiFi Module

# III Implementation

Once the hardware is connected to the system through USB cable it is ready to send data. Below picture is the connectivity of the WiFi module to the computer network in order to send the data to IBM cloud platform after compiling and uploading the code. The following result is visible in the serial monitor.

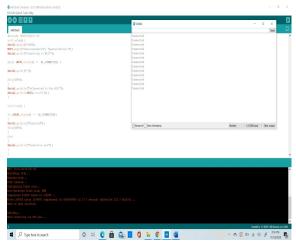


Fig 3. WiFi module connection check

# <u>Steps for configuring IBM Bluemix cloud</u> <u>platform:</u>

- Create a free IBM cloud free account.
- Enter the required valid details.
- 3. After that login to IBM cloud and select catalog.
- 4. For this project I created 2 services which are watson iot platform service and node-red service. After clicking on the watson lot service we created a device with device id and authenticated that device using user-auth-token method on watson iot platform. We then created an API key to authorize node-red service with Watson lot platform. In node-red UI logical flows are drawn to visualise data remotely.

- 5. Click on the internet of things and a window will show up.
- Clicking on manage in the next screen and launch button will show up. Click on it and an Add device button on the right top corner will show up.

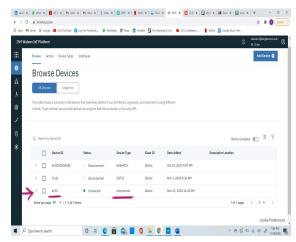


Fig 4. Device ID & Device type created

- 7. Click Next after creating the device type and device ID.
- 8. A token will be generated. Note it down. The connection status will be visible as follows:

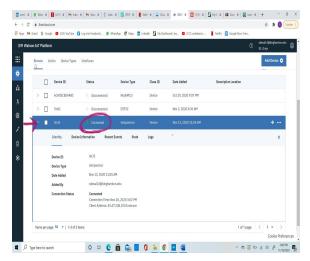


Fig 5.

Add the Device ID and Device type in the Arduino code. And run the code.

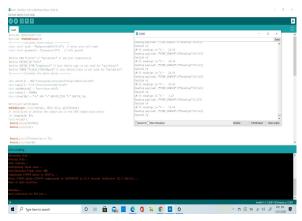


Fig 6.

 In the IBM cloud platform the temperature reading will be displayed.

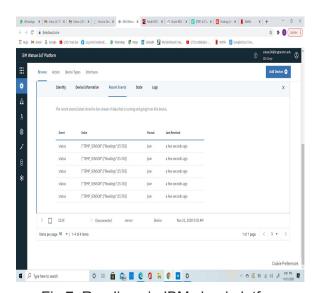


Fig 7. Readings in IBM cloud platform

11. The below figure shows the dashboard representation of the temperature readings and I have made it a UI design for that.



Fig 8.

### IV Conclusion

In This project IBM Bluemix platform is used. The system will sense the data and send it to the cloud and a dashboard will display the data.

# V Acknowledgement

I would like to thank Prof. Mo Sha and TA Junyang Shi for their continuous support and suggestions for this project.

### VI References

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