

# Smart Weather Monitoring System

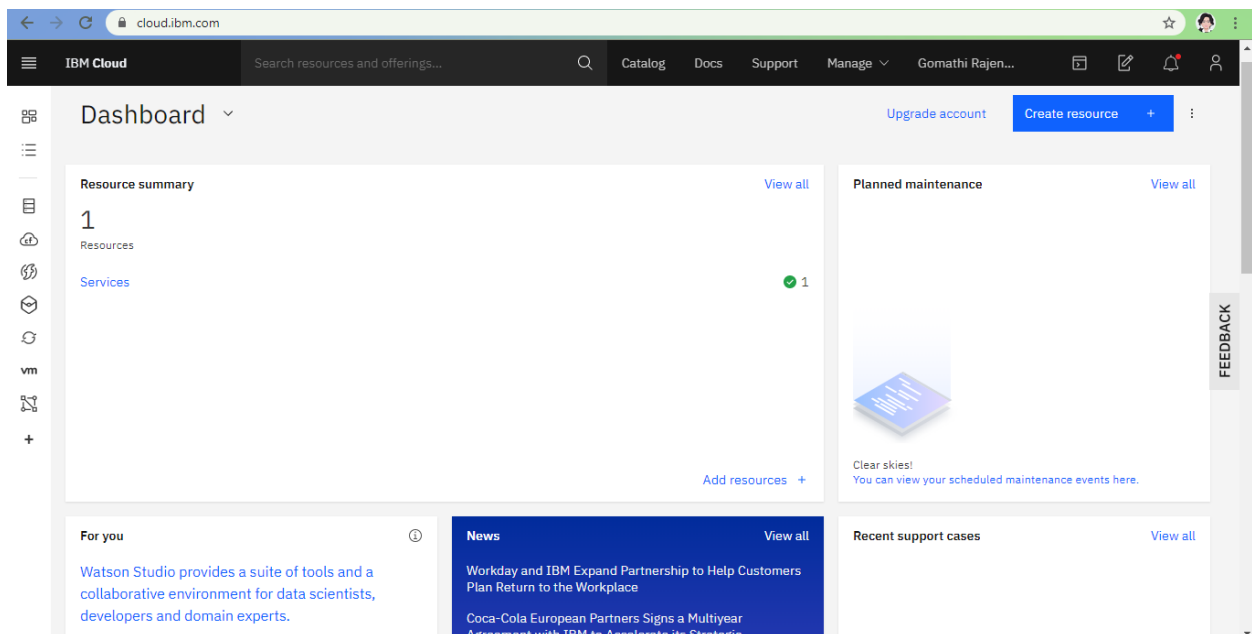
## INTRODUCTION:

Smart Weather Monitoring system provides users to have real-time access to weather data from different locations. Weather information like temperature, humidity, and object temperature are monitored by using an online simulator. The online simulator is connected to the device in the IBM IoT platform. The cards and boards are designed to visualize the data in the form of graphs.

## SETUP ENVIRONMENT:

### 1) Creating an IBM account:

An IBM account is created for using IBM Watson IoT Platform for the project. Upon successful registration and login to the cloud, the dashboard page appears as follows.



## 2) Create and Launch the IBM IoT Platform :

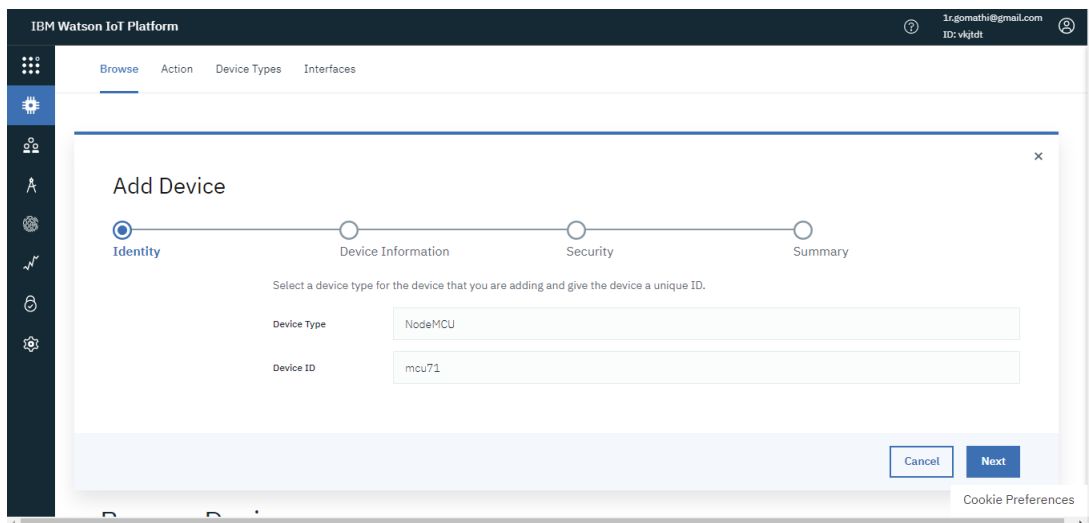
IBM Watson IoT Platform is a foundational cloud offering that can connect and control IoT sensors, appliances, homes, and industries. Built on IBM Cloud, Watson IoT Platform provides an extensive set of built-in and add-on tools. These tools can be used to process IoT data with real-time and historical analytics, extract key performance indicators (KPIs) from the data, add “smarts” in the cloud for non-smart products, and securely connect our own apps and existing tools to the Watson IoT Platform infrastructure. The Platform Service component provides IoT device connectivity, IoT data filtering and mapping, and device management tools. The IBM IoT Platform is created and launched through the following steps.

- From the Catalog section in the dashboard, 'Internet of Things Platform' is selected to launch the IoT Platform.
- 'Create' button is pressed to create an IoT Platform for the project leaving the default region provided.
- After creating the IoT platform, it is redirected to the IBM Watson IoT platform launch page. The IoT platform is launched by clicking on the 'Launch' button

## CONFIGURING IBM IOT PLATFORM:

### 1. Creating a Device in IBM Watson IoT Platform.

- Click on 'Create a device' on the IoT Platform dashboard to create a device.
- Click on 'Next' after giving proper device type and device name.



The screenshot shows the 'Add Device' dialog box in the IBM Watson IoT Platform. The dialog has a dark blue header with the text 'IBM Watson IoT Platform' and a user profile icon. Below the header, there are tabs: 'Browse', 'Action', 'Device Types', and 'Interfaces'. The 'Add Device' dialog is a light blue box with a close button (X) in the top right corner. It features a progress bar with four steps: 'Identity' (selected), 'Device Information', 'Security', and 'Summary'. Below the progress bar, there is a text prompt: 'Select a device type for the device that you are adding and give the device a unique ID.' There are two input fields: 'Device Type' with the value 'NodeMCU' and 'Device ID' with the value 'mcu71'. At the bottom right of the dialog, there are two buttons: 'Cancel' and 'Next'. A 'Cookie Preferences' link is visible at the bottom right of the page.

## 2. Generating Auth Token:

Provide Authentication Token in the security field and click 'Next'

IBM Watson IoT Platform

1r.gomathi@gmail.com  
ID: vkjtdt

Browse Action Device Types Interfaces

There are two options for selecting a device authentication token.

**Auto-generated authentication token (default)**

Allow the service to generate an authentication token for you. Tokens are 18 characters and contain a mix of alphanumeric characters and symbols. The token is returned to you at the end of the device registration process.

**Self-provided authentication token**

Provide your own authentication token for this device. The token must be between 8 and 36 characters and contain a mix of lowercase and uppercase letters, numbers, and symbols, which can include hyphens, underscores, and periods. Do not use repeated characters, dictionary words, user names, or other predefined sequences.

Authentication Token

Make a note of the generated token. Lost authentication tokens cannot be recovered. Tokens are encrypted before being stored.

Authentication tokens are encrypted before we store them.

Back Next

Cookie Preferences

## 3. Copy Device credentials in Notepad:

IBM Watson IoT Platform

1r.gomathi@gmail.com  
ID: vkjtdt

← Back

Device Drilldown - mcu71

**Device Credentials**

You registered your device to the organization. Add these credentials to the device to connect it to the platform. After the device is connected, you can navigate to view connection and event details.

Organization ID	vkjtdt
Device Type	NodeMCU
Device ID	mcu71
Authentication Method	use-token-auth
Authentication Token	helloworld

⚠ Authentication tokens are non-recoverable. If you misplace this token, you will need to re-register the device to generate a new authentication token.

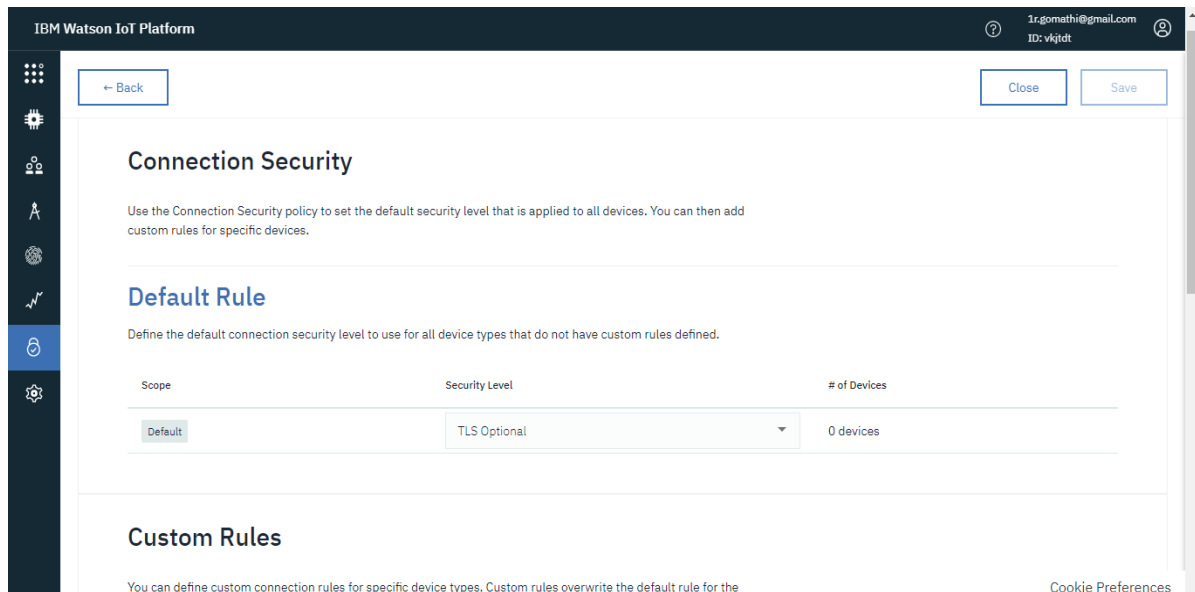
Find out how to add these credentials to your device ➔

Cookie Preferences

Device Credentials  
Connection Information  
Recent Events  
State  
Device Information  
Metadata  
Diagnostics  
Connection Logs  
Device Actions

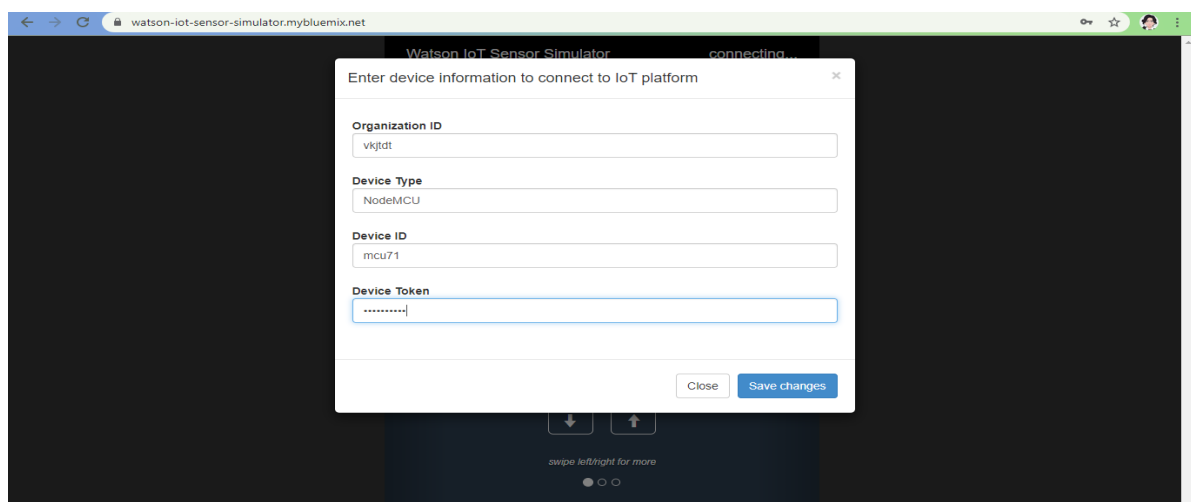
#### 4. Configure connection security:

- Hover the mouse towards the navigation pane and click on Security for configuring the connection security.
- In the Security tab, click on the edit icon for connection security
- In the connection security tab, select the default rule as TLS Optional
- After selecting the TLS optional rule it is prompted with a warning. Click on OK and then click on save for saving the rule created.

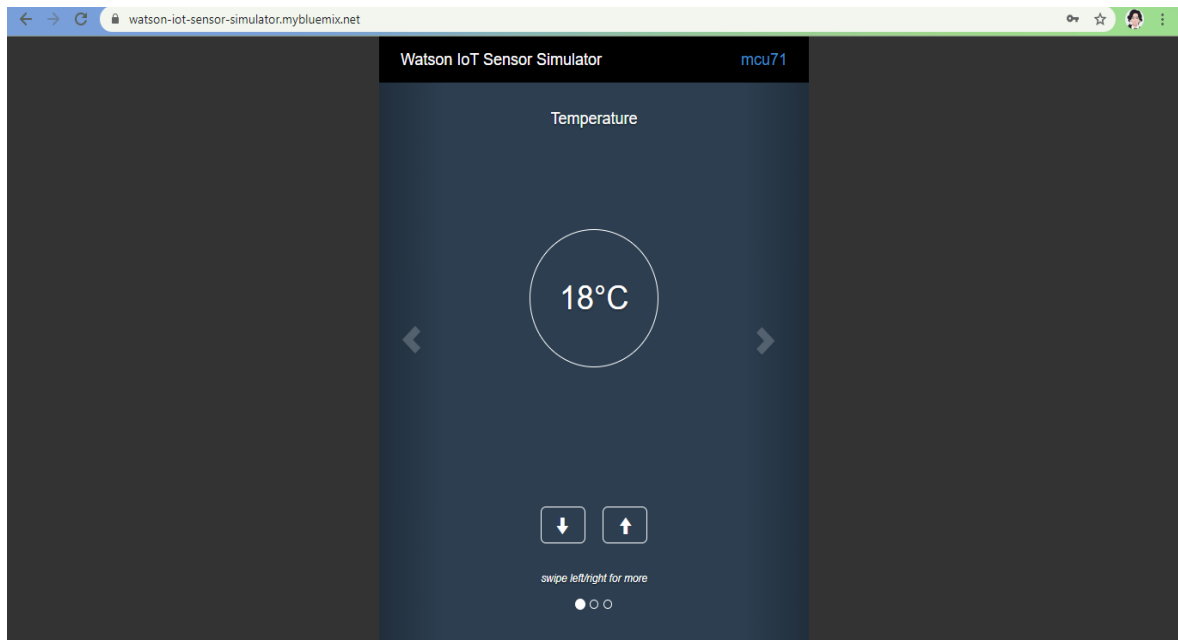


#### CONNECTING THE SENSOR TO THE DEVICE:

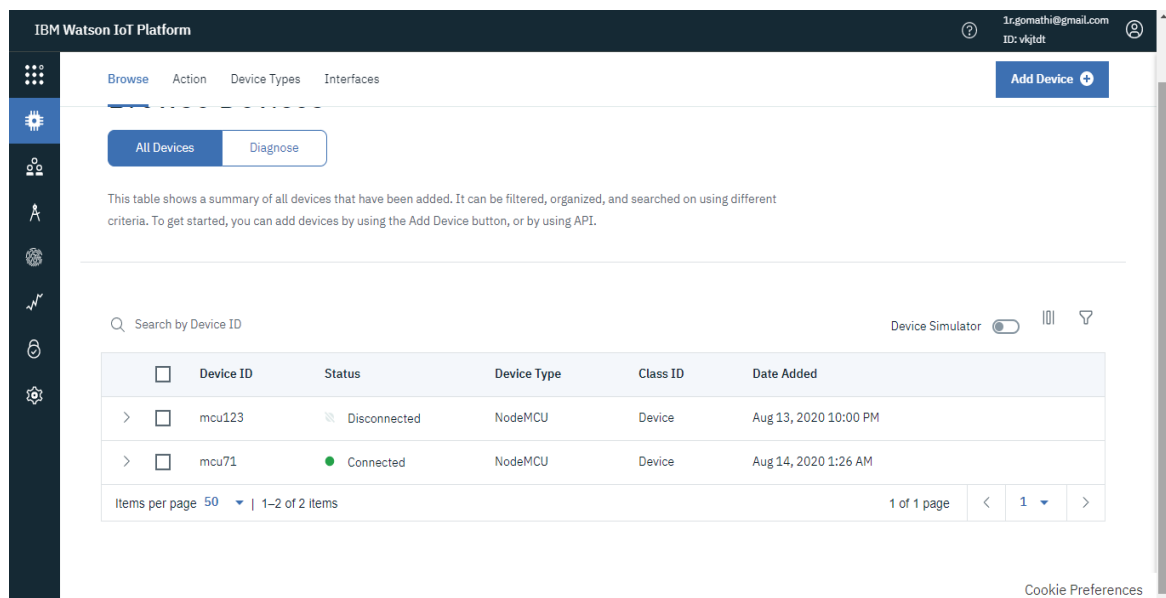
- Go to the Watson IoT simulator
- Connect to IoT Platform using device credentials



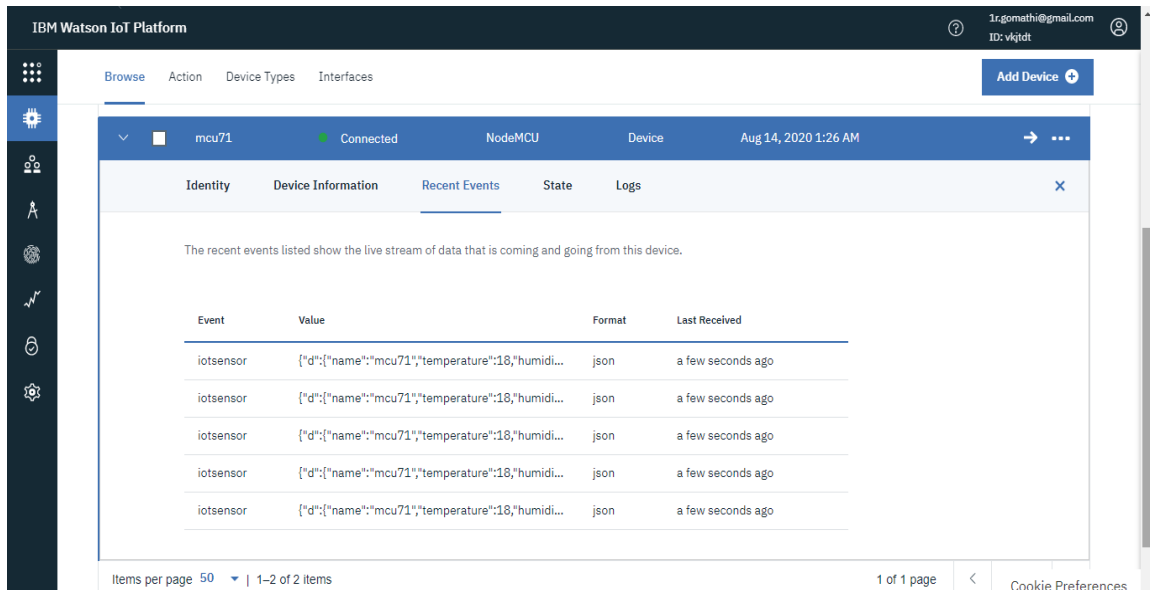
➤ The sensor simulator looks as follows



➤ Now, the device status in the IBM IoT platform changes to connected.

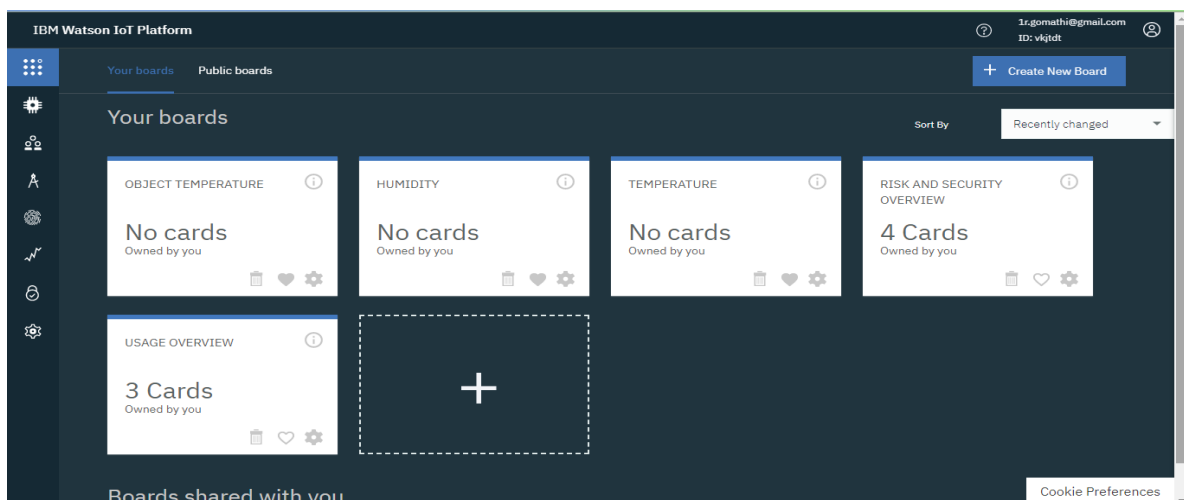


- The json data which is received by that device from the online simulator is seen by clicking on 'Recent events' on the connected device

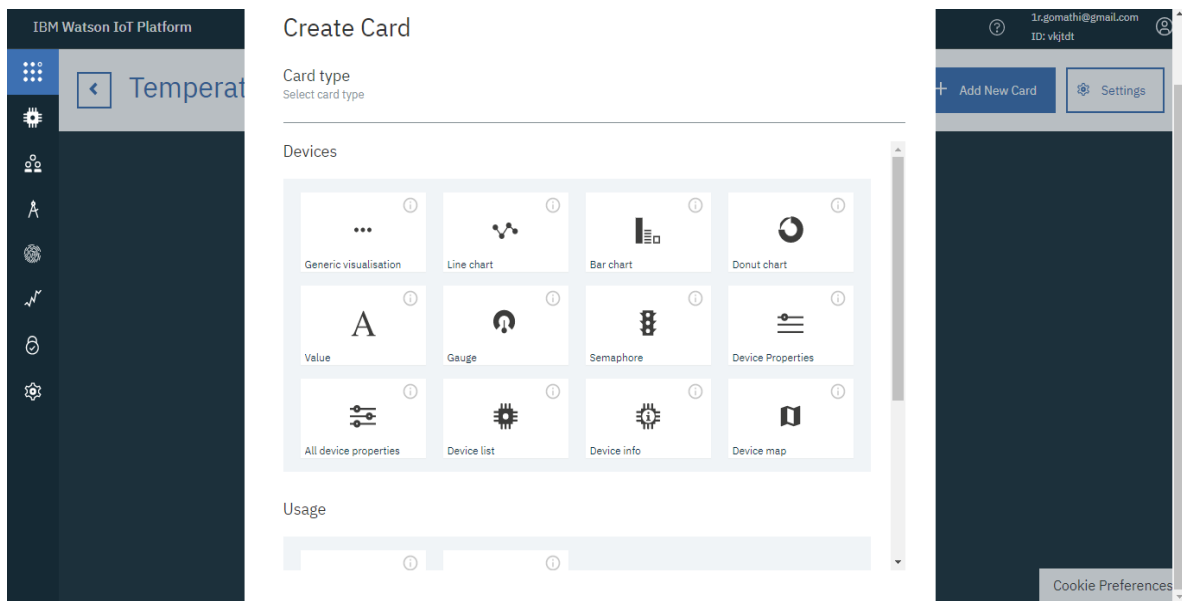


## VISUALISING DATA IN BOARDS AND CARDS:

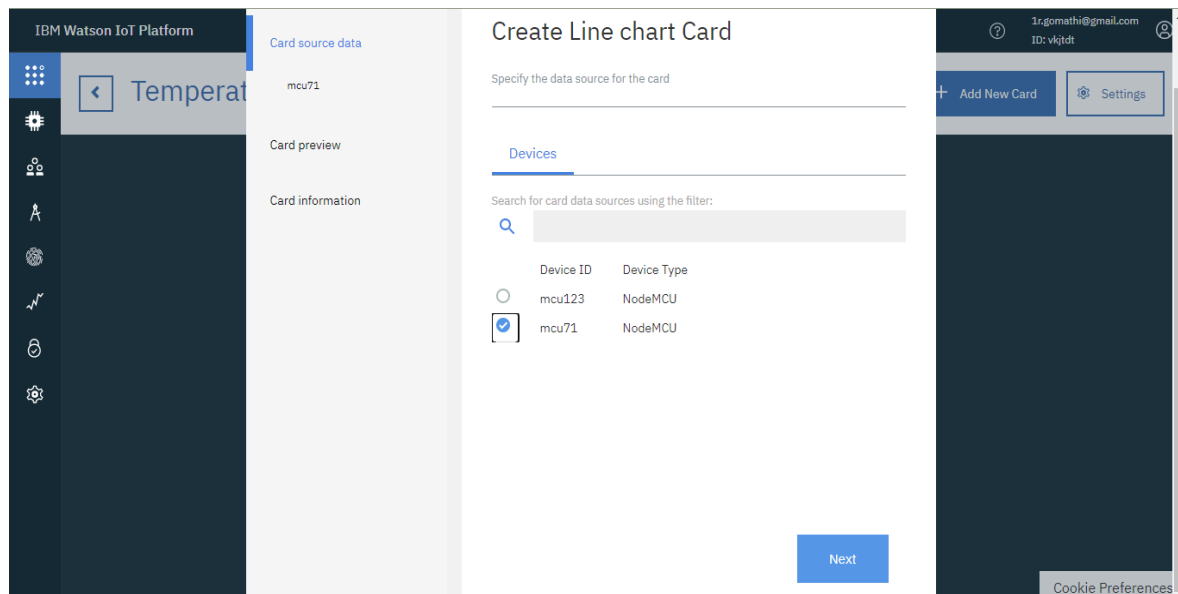
- To see json data in graphical format create board in the IoT platform To create boards, navigate to the menu in the left corner of screen and click on boards and click on “+” to create a new board in the boards section.
- In Create New board window, specify the board name and click on “NEXT”
- Create Boards for visualizing Temperature, Humidity and Object Temperature respectively



- In the Boards we need to create cards in order to visualize the individual sensor parameters. As we have three different parameters like temperature, humidity and object temperature we need to create 3 different cards to visualize each parameter.
- Click on the 'Temperature' board created in the board's menu.
- Now, Click on Add new card to create new cards to visualize data in the graphical format.
- Select the type of visualization in the card type while creating new card.



- Select the connected device from which we get the data in the platform and click on "NEXT"



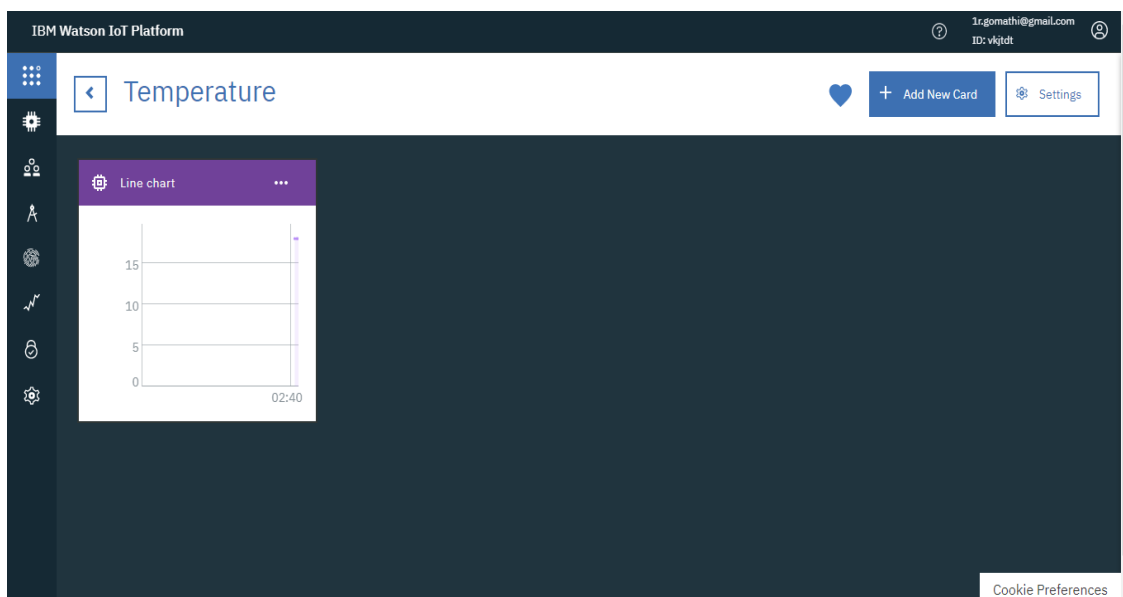
- In the next step, click on Create new data set to connect the device with the card and click on “NEXT”
- Choose event as “iotsensor” as we have connected our device to Watson simulator.
- In the property drop-down list, select property of the data set.

The screenshot shows the 'Create Line chart Card' configuration interface in the IBM Watson IoT Platform. On the left, a sidebar contains navigation icons and a 'Temperature' card preview. The main area is titled 'Create Line chart Card' and includes a 'Connect data set' section. The configuration fields are as follows:

- Event:** iotsensor
- Property:** temperature
- Name:** Temperature
- Type:** Number (selected from a dropdown)
- Unit:** (empty field)
- Min:** 0
- Max:** 100

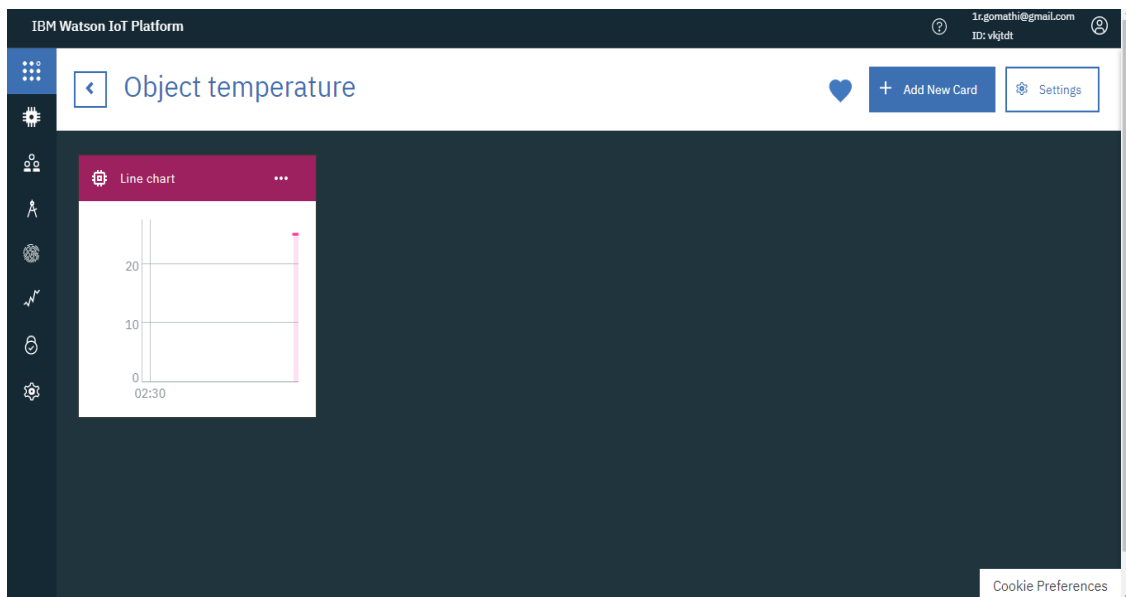
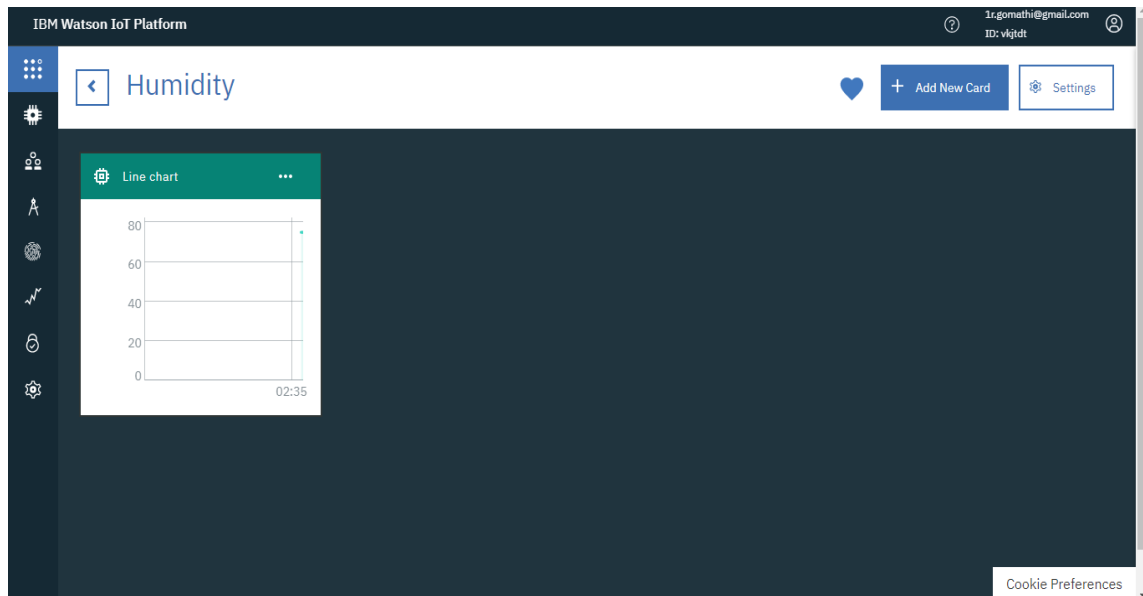
At the bottom of the configuration section are 'Back' and 'Next' buttons. On the right, a mobile device mockup displays the 'Temperature' card with a '+ Add New Card' and 'Settings' button. A 'Cookie Preferences' link is visible at the bottom right.

- The final card looks as follows





➤ Similarly cards are made for all the three parameters for visualizing as follows



## CONCLUSION:

Thus 'Smart Weather Monitoring System' is implemented using IBM Watson IoT Platform by connecting real time sensors with the device on the IoT platform and the data are visualized using Boards and Cards for the parameters considered. The final Event payload on the connected device during simulation is as follows.

The screenshot displays the IBM Watson IoT Platform interface. A modal window titled "Event Payload" is open, showing details for an event named "iotsensor" received on "Aug 14, 2020 2:59 AM". The payload is a JSON object: 

```
{
  "d": {
    "name": "mcu71",
    "temperature": 18,
    "humidity": 75,
    "objectTemp": 25
  }
}
```

. The background interface includes a sidebar with navigation icons, a top bar with the user profile "1r.gomathi@gmail.com", and a main area with a "Device ID" search bar and a table of recent events. A "Device Simulator" toggle is visible on the right, and a status bar at the bottom indicates "1 Simulation running".

Event	Value
iotsensor	{ "d": {
event1	{ "T
iotsensor	{ "d": { "name": "mcu71", "temperature": 18, "humidi...
iotsensor	{ "d": { "name": "mcu71", "temperature": 18, "humidi...