Smartfarmer-IoT Enabled Smartfarming Application

(***Category: Internet Of Things***)

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Team Member : Aswin Zen KS

Team Member : Vishnu SS

Team Member : Sharon Singh JA

Team Member : Jeyaresh D

Abstrtact

Smart agriculture is a farming system which uses IoT technology. This emerging system increases the quantity and quality of agricultural products. IoT devices provide information about nature of farming fields and then take action depending on the farmer input. The conventional methods in agricultural practices have become grossly inadequate to cater to the increasing needs.

This paper proposes a smart farming system in a limited, enclosed area wherein different sensors are strategically positioned to measure parameters such as moisture content, temperature, pressure, light intensity and pH of the soil. This is devised in such a way that it could be setup by any individual at minimum cost. Sensors using Arduino board and in case of any discrepancy send a SMS notification as well as a notification on the application developed for the same to the farmer's smartphone using Wi-Fi/3G/4G.

Various sensor nodes are deployed at different locations in the farm to automate the irrigation anytime anywhere. This project will be more helpful for the farmer's welfare .In this technology has more helpful in farmers daily life.

Literature Survey

IoT Enabled Smart Farming and Irrigation Systems
(M. Rohith; R Sainivedhana; N. Sabiyath Fatima)

The existing system only checks the soil water stress and automates the process of watering. The paper is about IOT based smart farming and irrigation system. The ultimate agenda of this paper is to automate the process of watering to plants. This work helps us to know the values of various parameters such as humidity, moisture and temperature of plants and water them accordingly.

IoT-based Low Cost Architecture For Smart Farming
(Amine Faid; Mohamed Sadik; Essaid Sabir)

The system is based on the in this paper, we present an IoT-based lowcost architecture for smart farming based implementation of the change point detection algorithm and leach protocol for network clustering. This solution supports near realtime monitoring, data processing, and aid to improve decision-making.

Internet of Things based Smart Farm Security Systems
(Gajula Siva Sai Preethi; Kommu Kavya)

After harvesting farmers gather the paddy stalks and dry them. At this time, they have to stay on farm to protect the crop from animals or intruders but it will increase workload on farmers. In these situations, they may use a security device to protect their farms. Meanwhile they can complete their other work. An Architecture model for Smart Farming (Anna Triantafyllou; Dimosthenis C. Tsouros) IoT based monitoring systems to guide the process of designing and implementing Smart farming monitoring systems, in this paper we propose a generic reference architecture model, taking also into consideration a very important non-functional requirement, the energy consumption restriction.

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An Architecture model for Smart Farming

(Anna Triantafyllou; Dimosthenis C. Tsouros)

IoT based monitoring systems to guide the process of designing and implementing Smart farming monitoring systems, in this paper we propose a generic reference architecture model, taking also into consideration a very important nonfunctional requirement, the energy consumption restriction.

Proposed Solution

1. Problem statement (problem to be solved) to make farming easier by choosing several Constraints in agriculture and to overcome those constraints, to increase production quality and quantity using IOT. Quality and quantity using IOT.

2. Idea / Solution description Using smart techniques like monitoring farms Climate, smart irrigation and soil analysis.

3. Novelty / Uniqueness Solar power smart irrigation system which helps you to monitor temperature, moisture, Humidity using smart sensors.

4. Social impact / Customer Satisfaction It is better than present modern irrigation System by using this method we can control Soil erosion. There will be better production yield.

5. Business Model (Revenue Model) as the productivity increases customer Satisfaction also increases and hence need for the application also increases, which increases the revenue of the business.

6. Scalability of the solution it is definitely scalable we can increase the Constraints when the problem arises.

Technical Architecture:

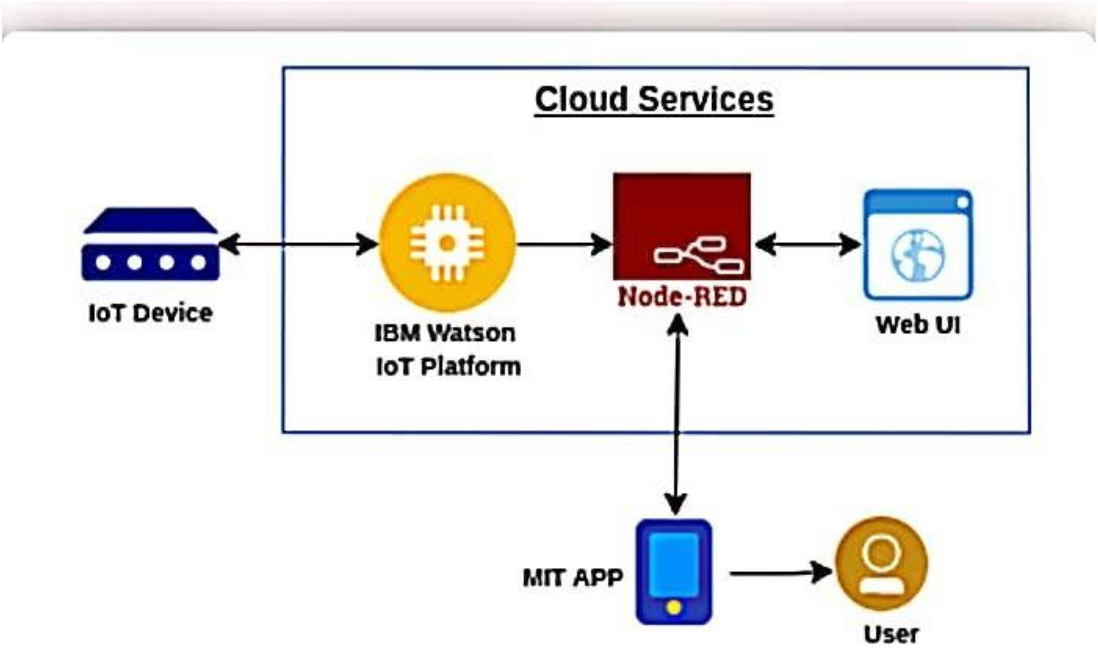


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	How user interacts with application e.g. Web UI, Mobile App, Chatbot etc.	MIT app
2.	Application Logic-1	Logic for a process in the application	Node red/IBM Watson/MIT app
3.	Application Logic-2	Logic for a process in the application	Node red/IBM Watson/MIT app
4.	Application Logic-3	Logic for a process in the application	Node red/IBM Watson/MIT app
5.	Database	Data Type, Configurations etc.	MySQL, NoSQL, etc.
6.	Cloud Database	Database Service on Cloud	IBM cloud.
7.	Temperature sensor	Monitors the temperature of the crop	
8.	Humidity sensor	Monitors the humidity	
9.	Soil moisture sensor (Tensiometers)	Monitors the soil temperature	
10.	Weather sensor	Monitors the weather	.
11.	Solar panel		.
12.	RTC module	Date and time configuration	
13.	Relay	To get the soil moisture data	

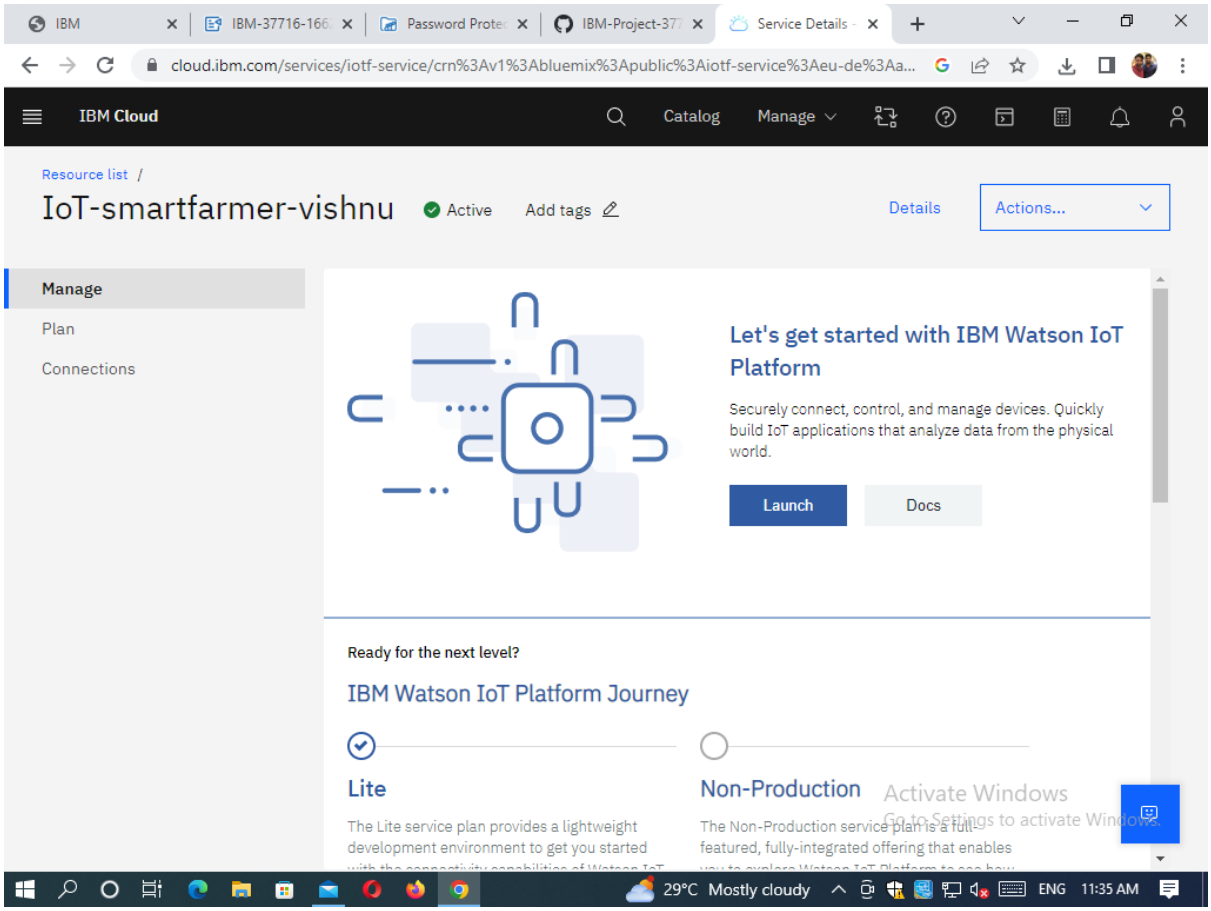
Table-2: Application Characteristics:

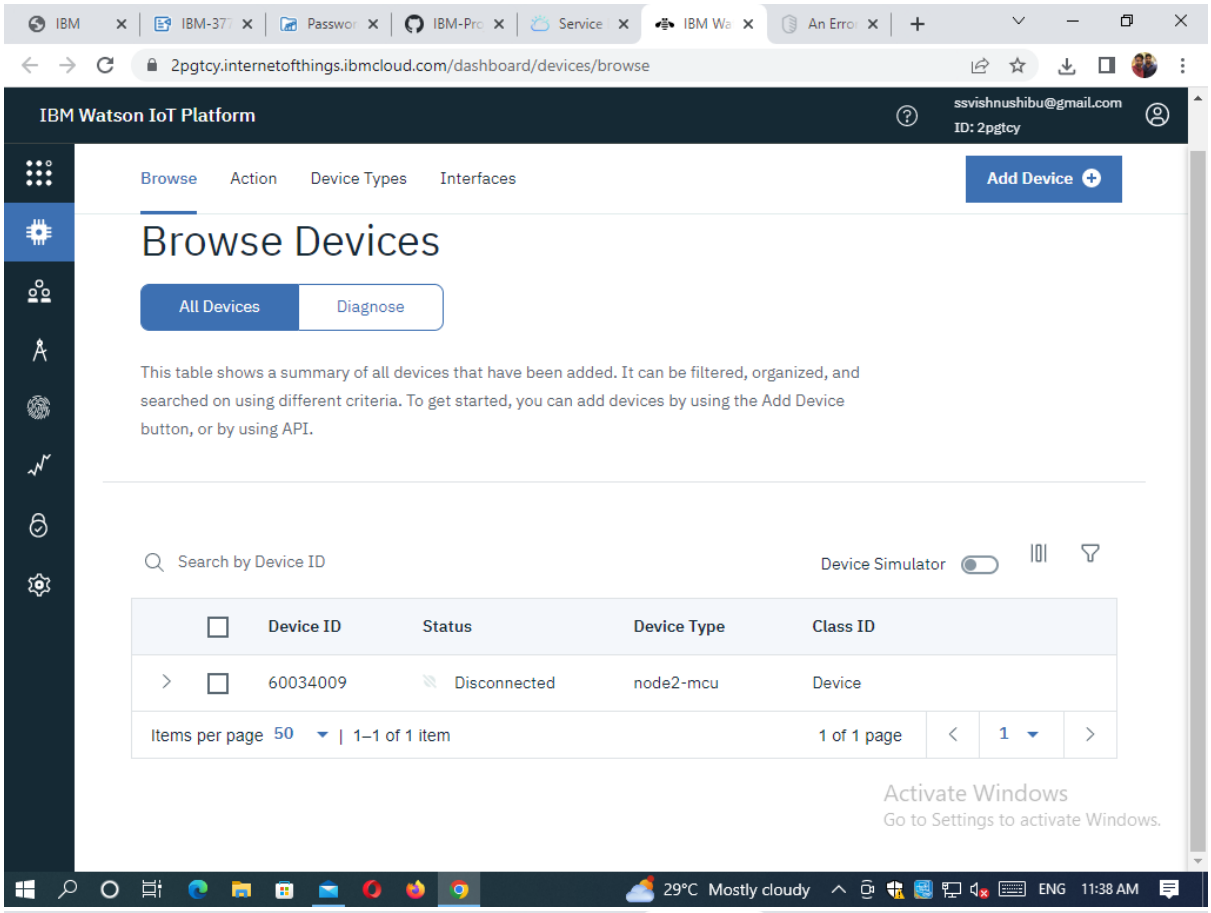
S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	MIT app,Node-Red	Software
2.	Scalable Architecture	Drone technology, pesticide monitoring ,Mineral identification in soil	Hardware

Software Required

Software Required:
Python IDLE

System Required:
RAM-Minimum 4GB Processor-Min. Configuration OS-Windows/Linux/MAC


IBM
IBM-37716-166
Password Prote
IBM-Project-37
Service Details
cloud.ibm.com/services/iotf-service/crn%3Av1%3Abluemix%3Apublic%3Aiotf-service%3Aeu-de%3Aa...
IBM Cloud
Catalog
Manage
Resource list /
IoT-smartfarmer-vishnu
Active
Add tags
Details
Actions...
Manage
Plan
Connections
Let's get started with IBM Watson IoT Platform
Securely connect, control, and manage devices. Quickly build IoT applications that analyze data from the physical world.
Launch
Docs
Ready for the next level?
IBM Watson IoT Platform Journey
Lite
The Lite service plan provides a lightweight development environment to get you started
Non-Production
The Non-Production service plan is a full-featured, fully-integrated offering that enables
Activate Windows
Go to Settings to activate Windows.
29°C Mostly cloudy
ENG
11:35 AM


IBM Watson IoT Platform
ssvishnushibu@gmail.com
ID: 2pgtcy
2pgtcy.internetofthings.ibmcloud.com/dashboard/devices/browse
Browse
Action
Device Types
Interfaces
Add Device
Browse Devices
All Devices
Diagnose
This table shows a summary of all devices that have been added. It can be filtered, organized, and searched on using different criteria. To get started, you can add devices by using the Add Device button, or by using API.
Search by Device ID
Device Simulator
Device ID
Status
Device Type
Class ID
60034009
Disconnected
node2-mcu
Device
Items per page 50
1–1 of 1 item
1 of 1 page
1
Activate Windows
Go to Settings to activate Windows.
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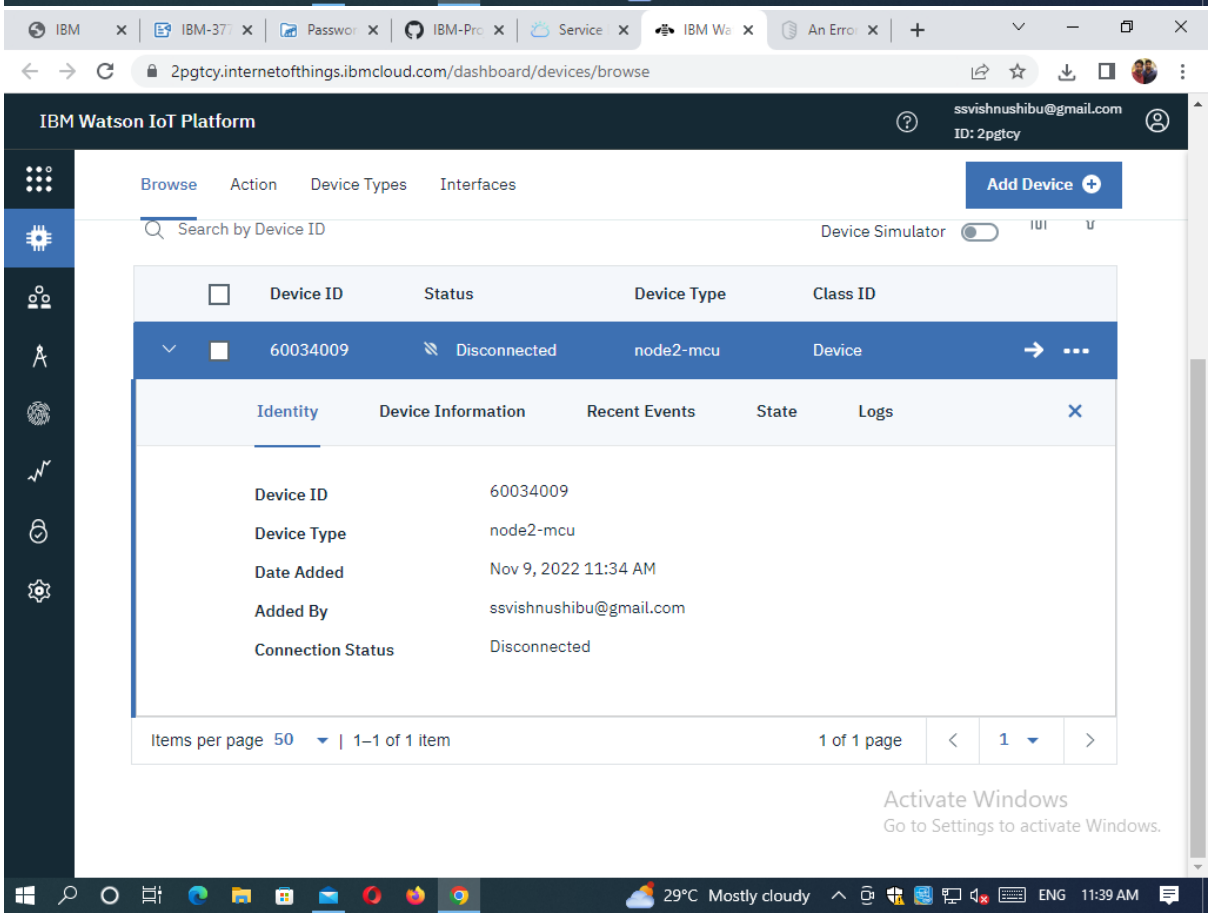
ENG
11:38 AM


IBM Watson IoT Platform
ssvishnushibu@gmail.com
ID: 2pgtcy
2pgtcy.internetofthings.ibmcloud.com/dashboard/devices/browse
Browse
Action
Device Types
Interfaces
Add Device
Search by Device ID
Device Simulator
Device ID
Status
Device Type
Class ID
60034009
Disconnected
node2-mcu
Device
Identity
Device Information
Recent Events
State
Logs
Device ID
60034009
Device Type
node2-mcu
Date Added
Nov 9, 2022 11:34 AM
Added By
ssvishnushibu@gmail.com
Connection Status
Disconnected
Items per page 50
1–1 of 1 item
1 of 1 page
1
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ENG
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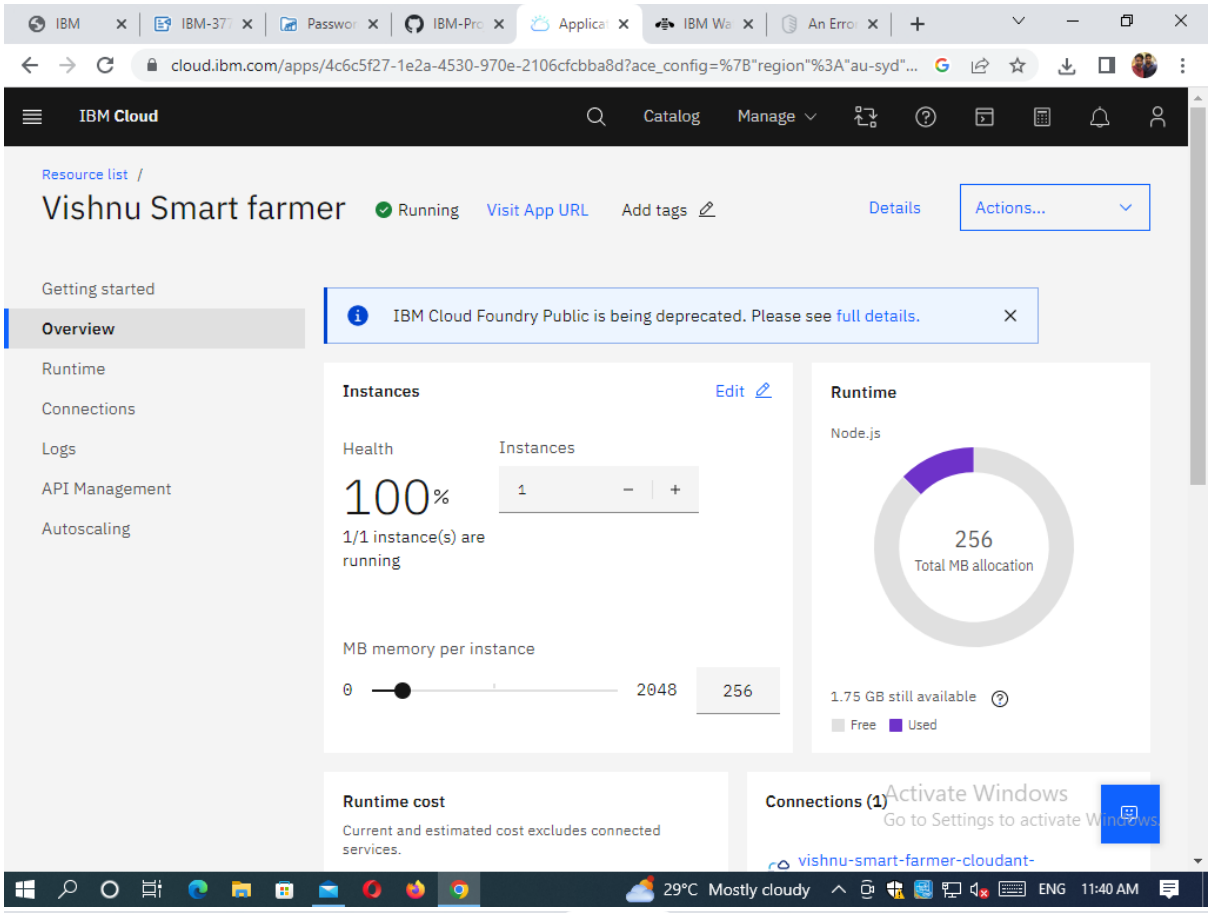
cloud.ibm.com/apps/4c6c5f27-1e2a-4530-970e-2106cfcbba8d?ace_config=%7B"region"%3A"au-syd"...
IBM Cloud
Catalog
Manage
Resource list /
Vishnu Smart farmer
Running
Visit App URL
Add tags
Details
Actions...
Getting started
Overview
Runtime
Connections
Logs
API Management
Autoscaling
IBM Cloud Foundry Public is being deprecated. Please see full details.
Instances
Edit
Health
100%
1/1 instance(s) are running
Instances
1
MB memory per instance
0
2048
256
Runtime
Node.js
256
Total MB allocation
1.75 GB still available
Free
Used
Runtime cost
Current and estimated cost excludes connected services.
Connections (1)
vishnu-smart-farmer-cloudant-
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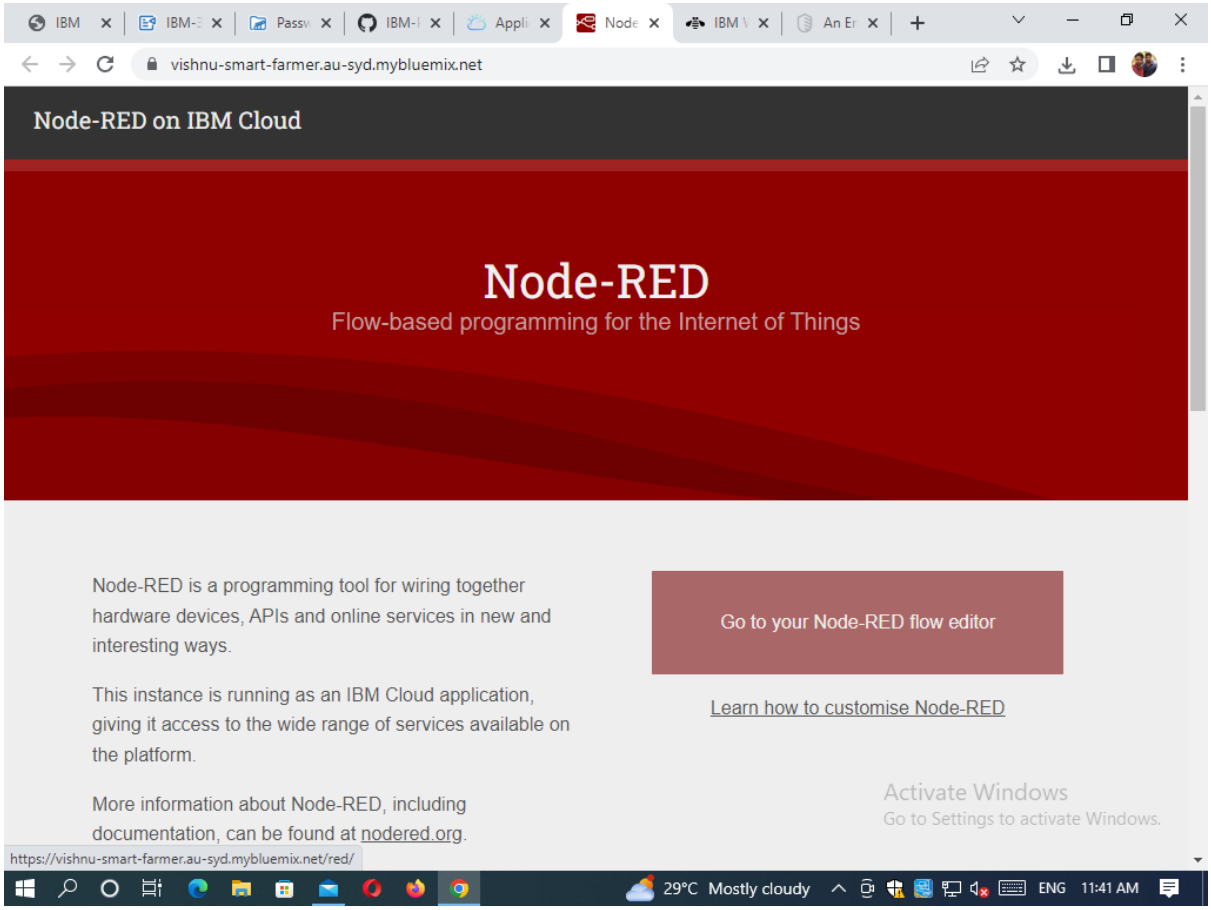
vishnu-smart-farmer.au-syd.mybluemix.net
Node-RED on IBM Cloud
Node-RED
Flow-based programming for the Internet of Things
Node-RED is a programming tool for wiring together hardware devices, APIs and online services in new and interesting ways.
This instance is running as an IBM Cloud application, giving it access to the wide range of services available on the platform.
More information about Node-RED, including documentation, can be found at nodered.org.
Go to your Node-RED flow editor
Learn how to customise Node-RED
Activate Windows
Go to Settings to activate Windows.
https://vishnu-smart-farmer.au-syd.mybluemix.net/red/
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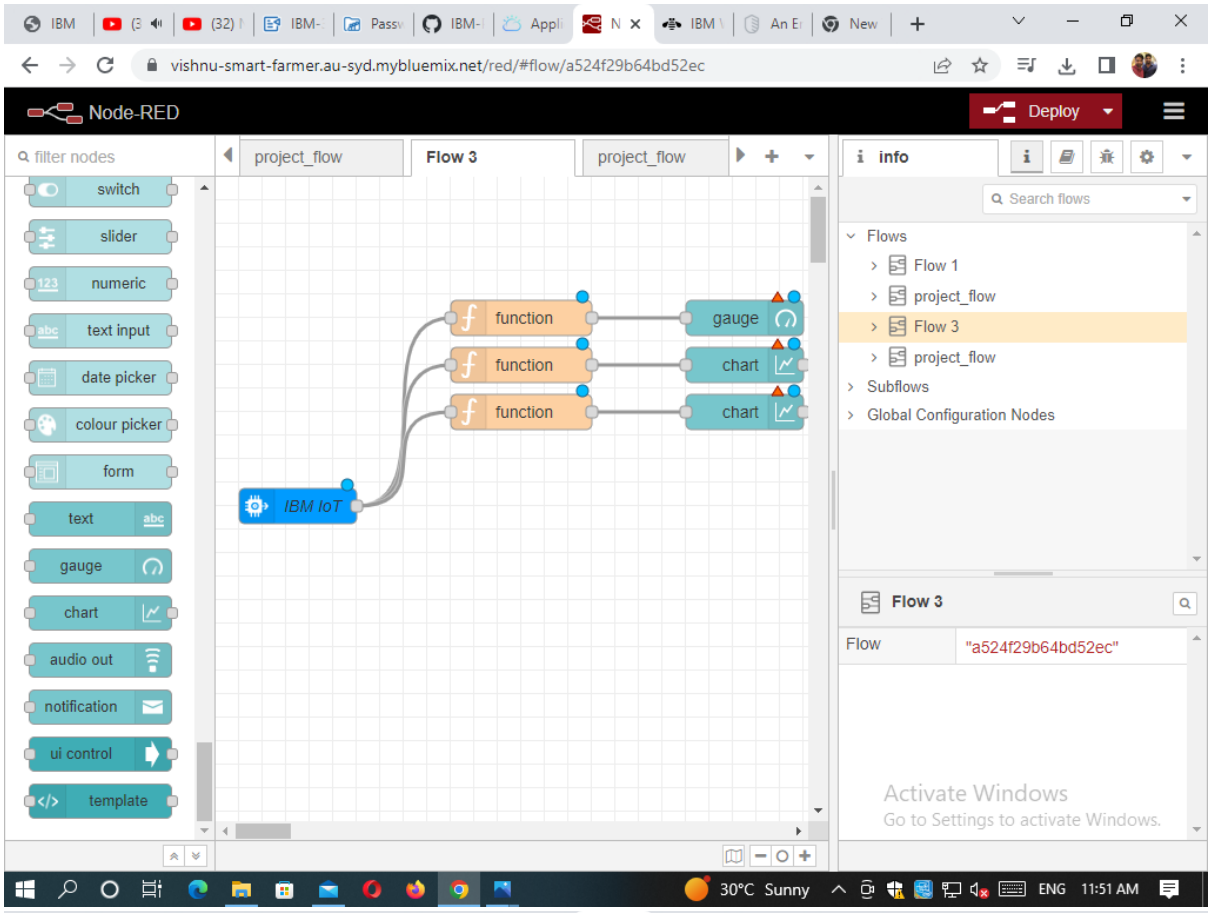
vishnu-smart-farmer.au-syd.mybluemix.net/red/#flow/a524f29b64bd52ec
Node-RED
Deploy
filter nodes
switch
slider
numeric
text input
date picker
colour picker
form
text
gauge
chart
audio out
notification
ui control
template
project_flow
Flow 3
project_flow
function
function
function
gauge
chart
chart
IBM IoT
info
Search flows
Flows
Flow 1
project_flow
Flow 3
project_flow
Subflows
Global Configuration Nodes
Flow 3
Flow
"a524f29b64bd52ec"
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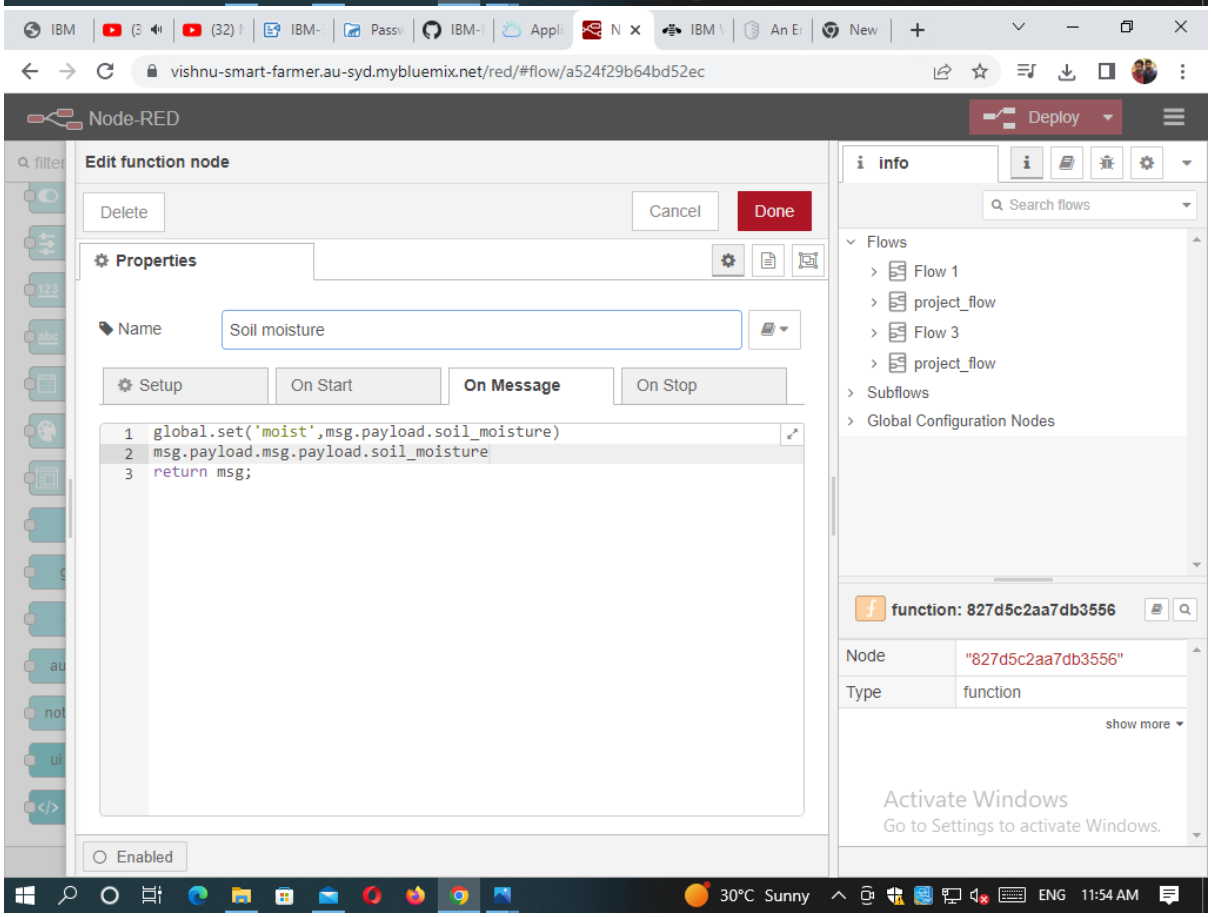
vishnu-smart-farmer.au-syd.mybluemix.net/red/#flow/a524f29b64bd52ec
Node-RED
Deploy
Edit function node
Delete
Cancel
Done
Properties
Name
Soil moisture
Setup
On Start
On Message
On Stop
1 global.set('moist',msg.payload.soil_moisture)
2 msg.payload.msg.payload.soil_moisture
3 return msg;
Enabled
info
Search flows
Flows
Flow 1
project_flow
Flow 3
project_flow
Subflows
Global Configuration Nodes
function: 827d5c2aa7db3556
Node
"827d5c2aa7db3556"
Type
function
show more
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Go to Settings to activate Windows.
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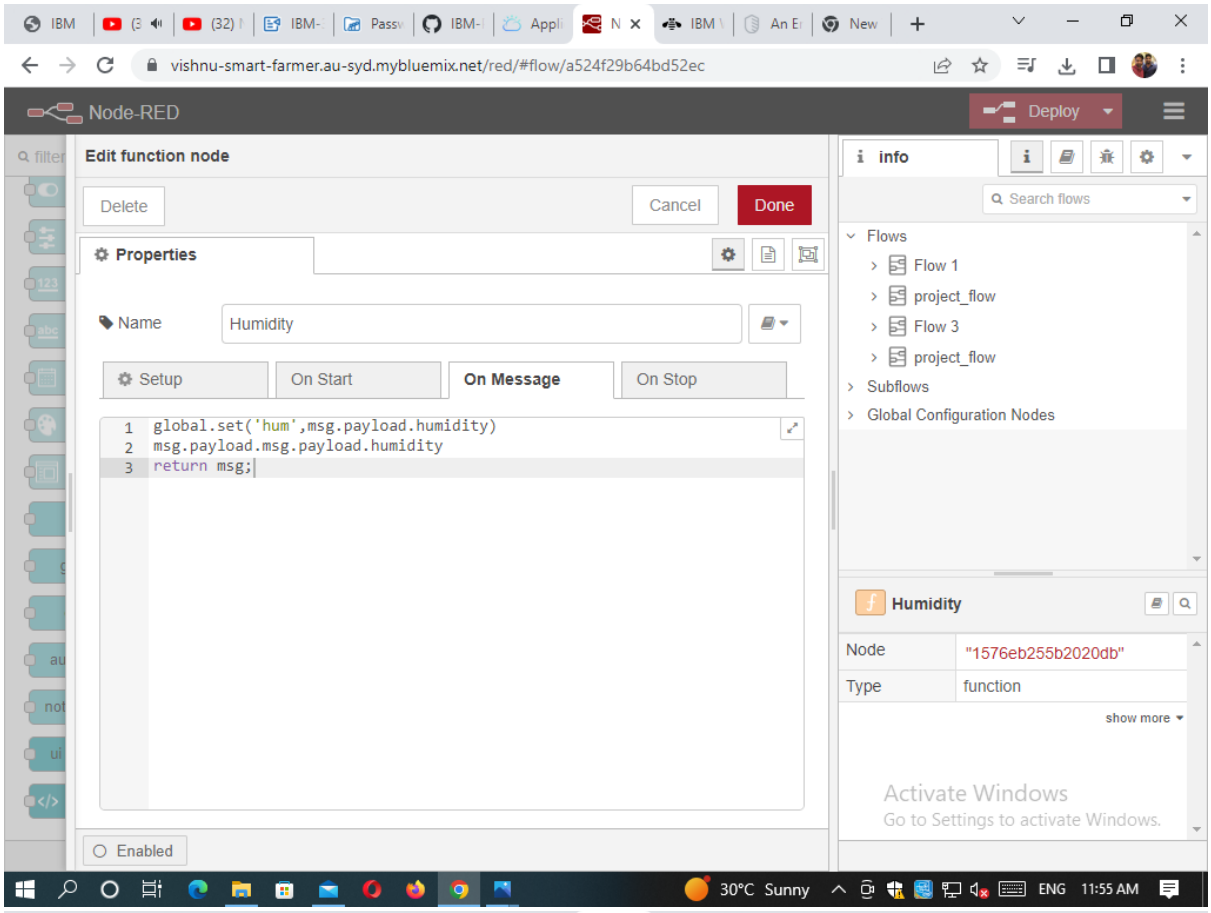
vishnu-smart-farmer.au-syd.mybluemix.net/red/#flow/a524f29b64bd52ec
Node-RED
Deploy
Edit function node
Delete
Cancel
Done
Properties
Name
Humidity
Setup
On Start
On Message
On Stop
1 global.set('hum',msg.payload.humidity)
2 msg.payload.msg.payload.humidity
3 return msg;
Enabled
info
Search flows
Flows
Flow 1
project_flow
Flow 3
project_flow
Subflows
Global Configuration Nodes
Humidity
Node
"1576eb255b2020db"
Type
function
show more
Activate Windows
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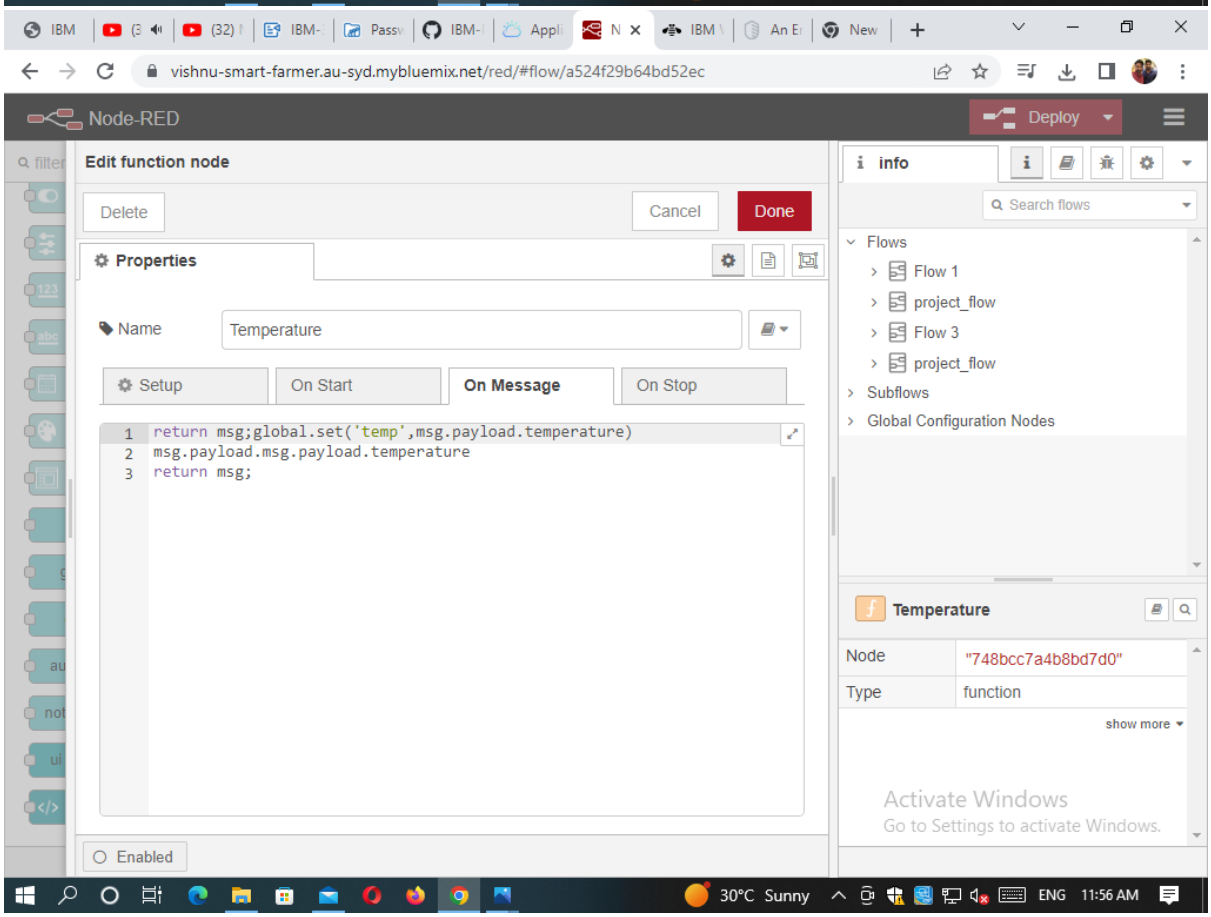
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Node-RED
Deploy
Edit function node
Delete
Cancel
Done
Properties
Name
Temperature
Setup
On Start
On Message
On Stop
1 return msg;global.set('temp',msg.payload.temperature)
2 msg.payload.msg.payload.temperature
3 return msg;
Enabled
info
Search flows
Flows
Flow 1
project_flow
Flow 3
project_flow
Subflows
Global Configuration Nodes
Temperature
Node
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Type
function
show more
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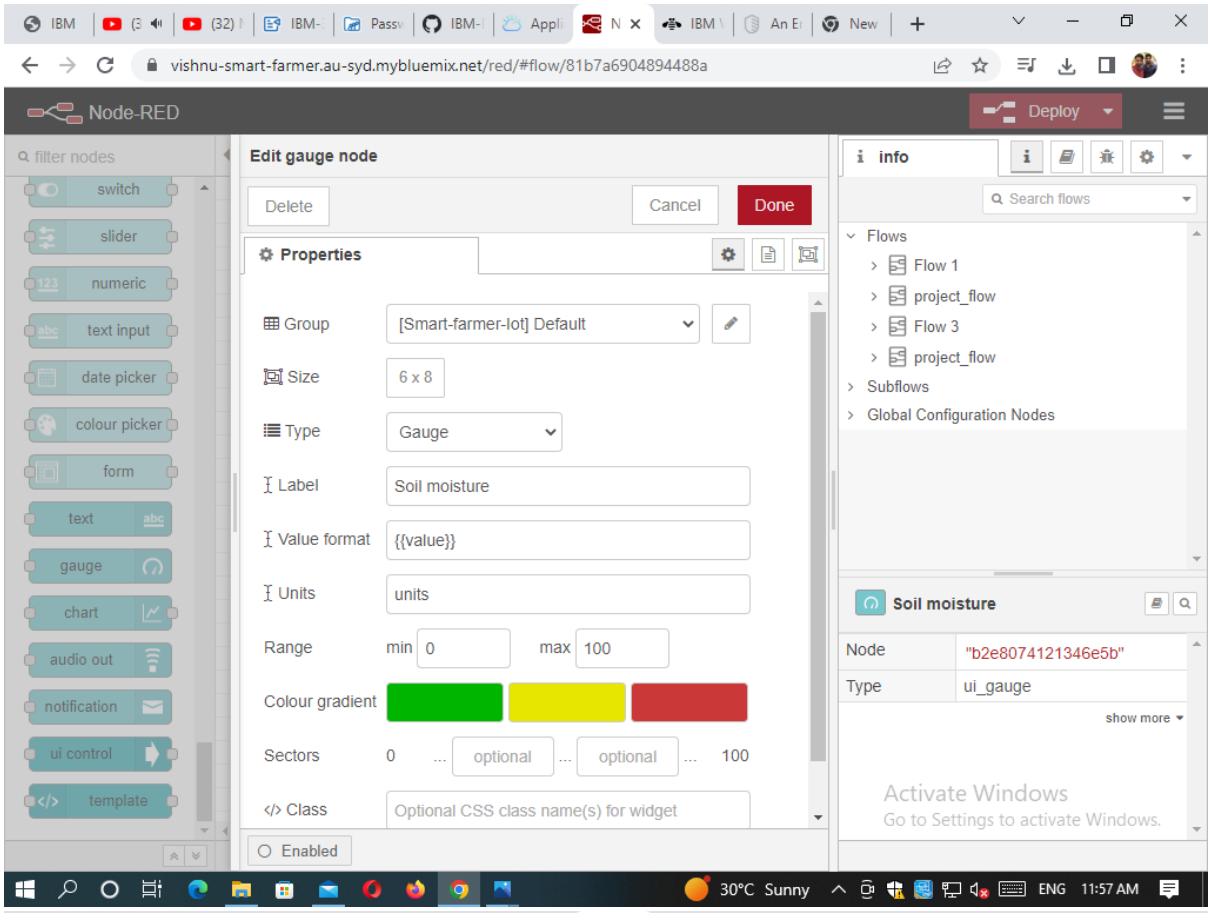
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Node-RED
Deploy
Edit gauge node
Delete
Cancel
Done
Properties
Group
[Smart-farmer-lot] Default
Size
6 x 8
Type
Gauge
Label
Soil moisture
Value format
{{value}}
Units
units
Range
min 0
max 100
Colour gradient
Sectors
0 ... optional ... optional ... 100
Class
Optional CSS class name(s) for widget
Enabled
info
Search flows
Flows
Flow 1
project_flow
Flow 3
project_flow
Subflows
Global Configuration Nodes
Soil moisture
Node
"b2e8074121346e5b"
Type
ui_gauge
show more
Activate Windows
Go to Settings to activate Windows.
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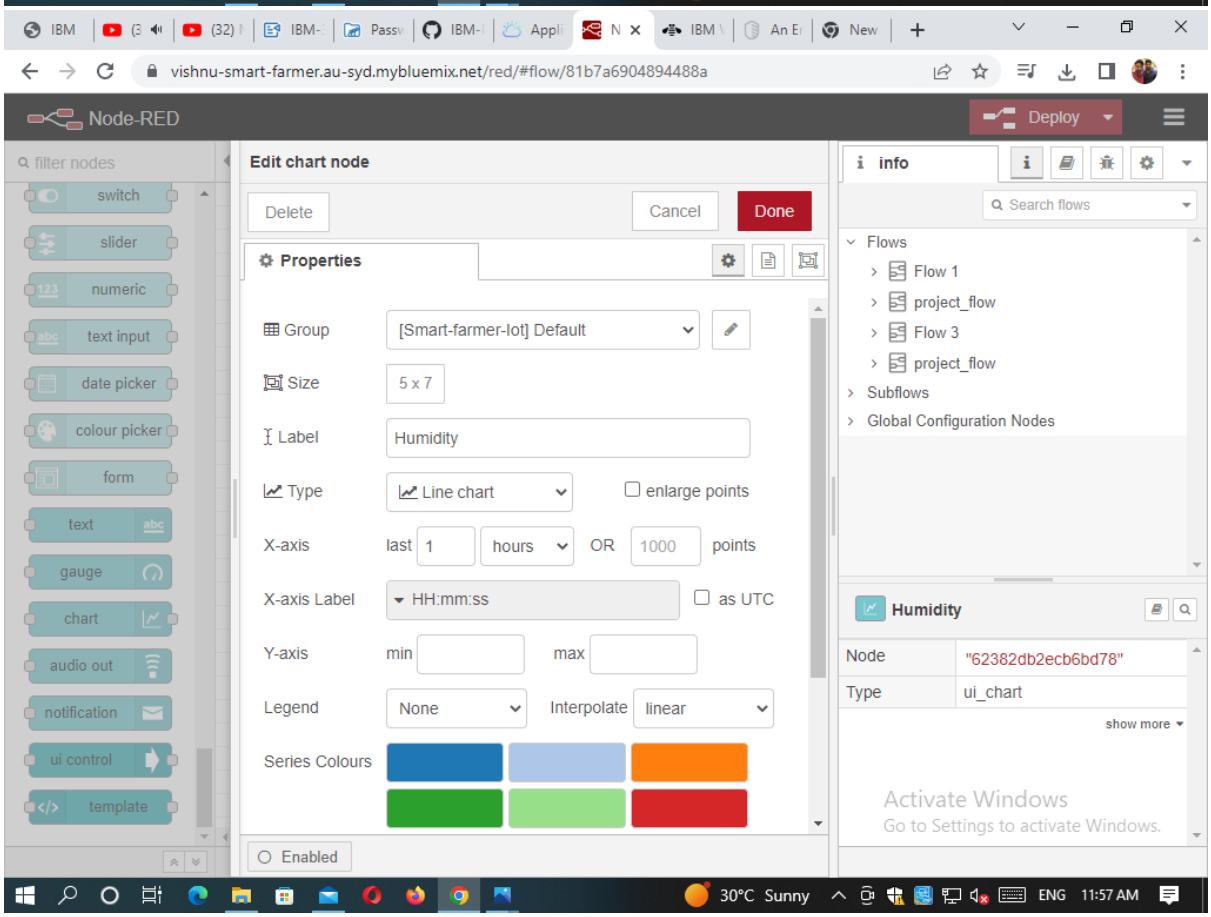
ENG
11:57 AM


vishnu-smart-farmer.au-syd.mybluemix.net/red/#flow/81b7a6904894488a
Node-RED
Deploy
Edit chart node
Delete
Cancel
Done
Properties
Group
[Smart-farmer-lot] Default
Size
5 x 7
Label
Humidity
Type
Line chart
enlarge points
X-axis
last 1 hours OR 1000 points
X-axis Label
HH:mm:ss
as UTC
Y-axis
min
max
Legend
None
Interpolate
linear
Series Colours
Enabled
info
Search flows
Flows
Flow 1
project_flow
Flow 3
project_flow
Subflows
Global Configuration Nodes
Humidity
Node
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Type
ui_chart
show more
Activate Windows
Go to Settings to activate Windows.
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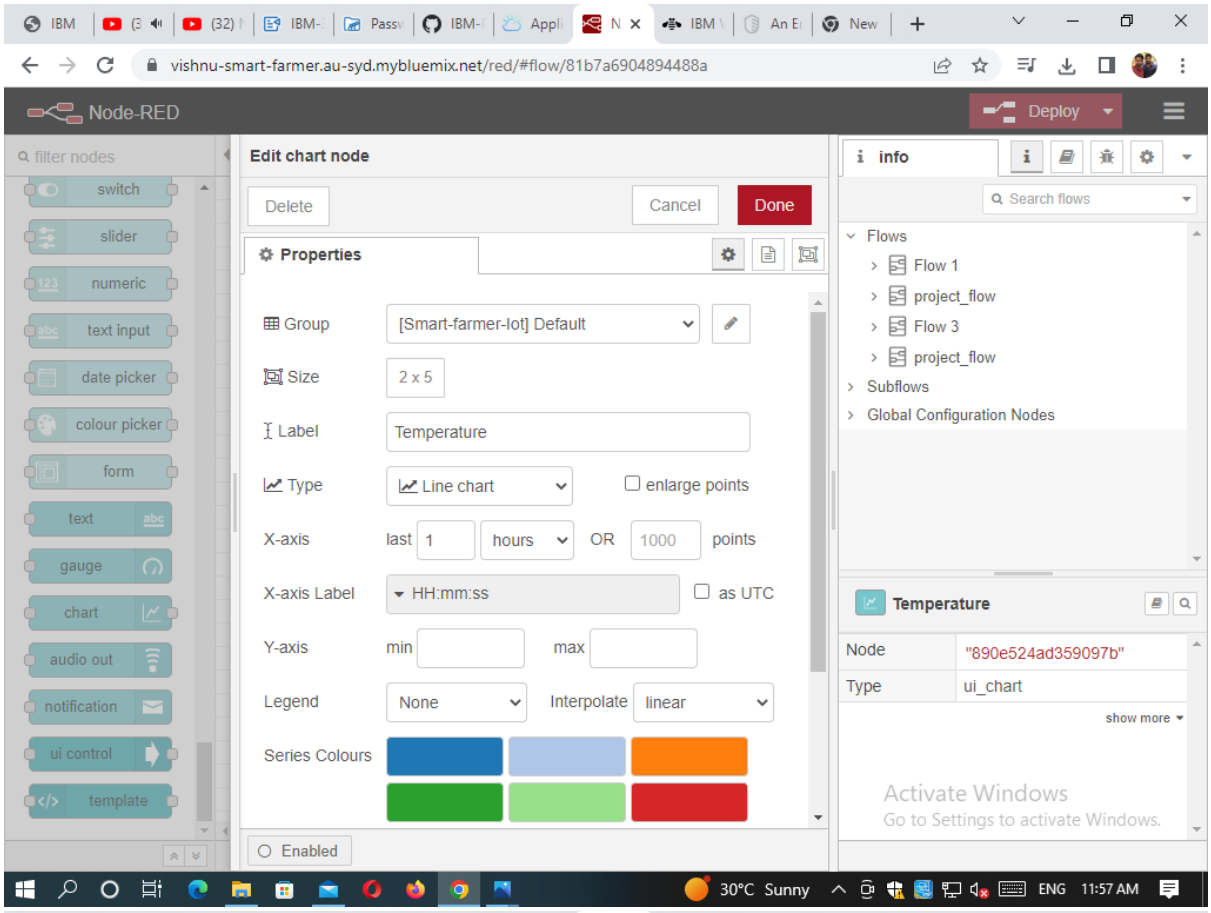
ENG
11:57 AM


vishnu-smart-farmer.au-syd.mybluemix.net/red/#flow/81b7a6904894488a
Node-RED
Deploy
filter nodes
switch
slider
numeric
text input
date picker
colour picker
form
text
gauge
chart
audio out
notification
ui control
template
Edit chart node
Delete
Cancel
Done
Properties
Group
[Smart-farmer-Iot] Default
Size
2 x 5
Label
Temperature
Type
Line chart
enlarge points
X-axis
last
1
hours
OR
1000
points
X-axis Label
HH:mm:ss
as UTC
Y-axis
min
max
Legend
None
Interpolate
linear
Series Colours
Enabled
info
Search flows
Flows
Flow 1
project_flow
Flow 3
project_flow
Subflows
Global Configuration Nodes
Temperature
Node
"890e524ad359097b"
Type
ui_chart
show more
Activate Windows
Go to Settings to activate Windows.
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ENG
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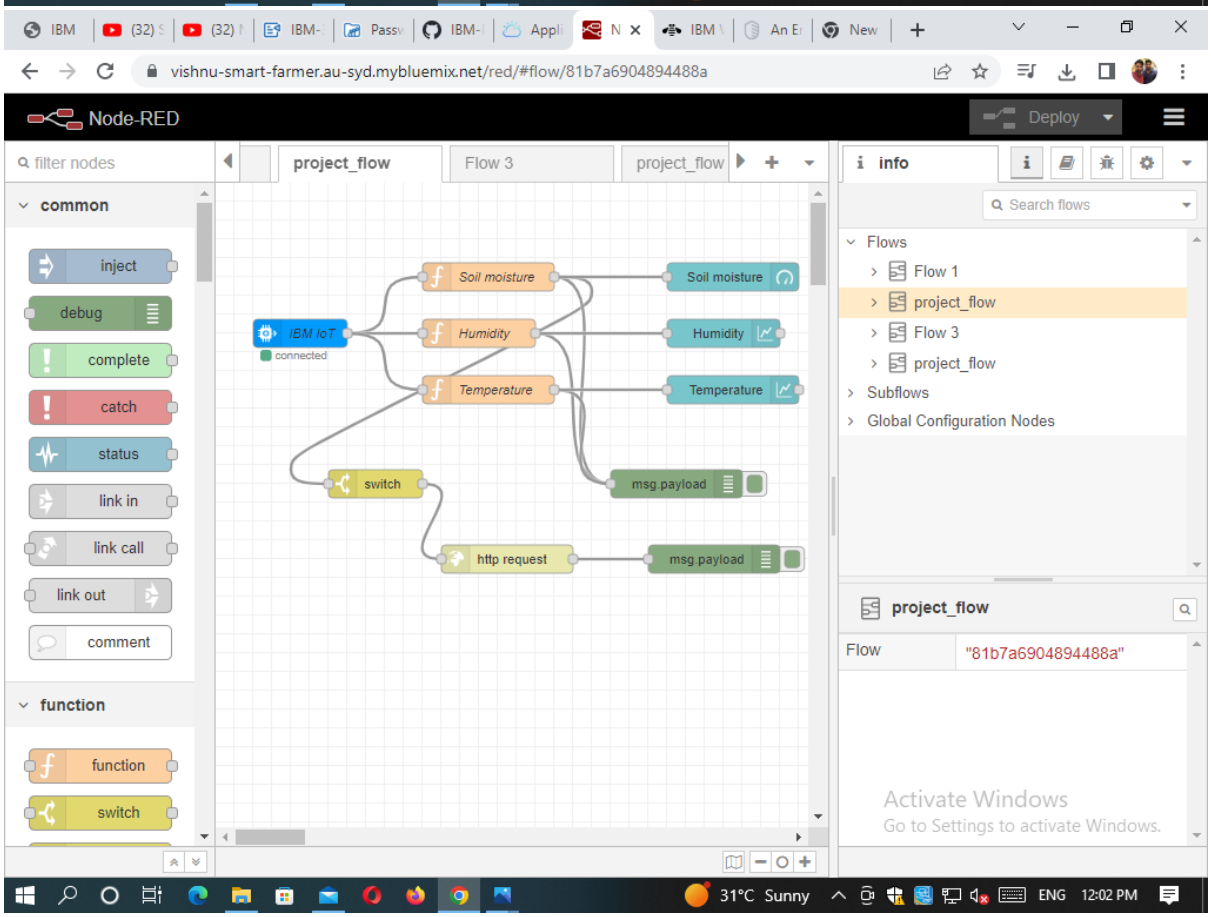
vishnu-smart-farmer.au-syd.mybluemix.net/red/#flow/81b7a6904894488a
Node-RED
Deploy
filter nodes
project_flow
Flow 3
project_flow
common
inject
debug
complete
catch
status
link in
link call
link out
comment
function
function
switch
IBM IoT
connected
Soil moisture
Humidity
Temperature
Soil moisture
Humidity
Temperature
switch
msg.payload
http request
msg.payload
info
Search flows
Flows
Flow 1
project_flow
Flow 3
project_flow
Subflows
Global Configuration Nodes
project_flow
Flow
"81b7a6904894488a"
Activate Windows
Go to Settings to activate Windows.
31°C Sunny
ENG
12:02 PM

Conclusion

In this application has more useful in farmers and the agricultural area and monitoring the environmental parameters like soil moisture, temperature, humidity, etc.