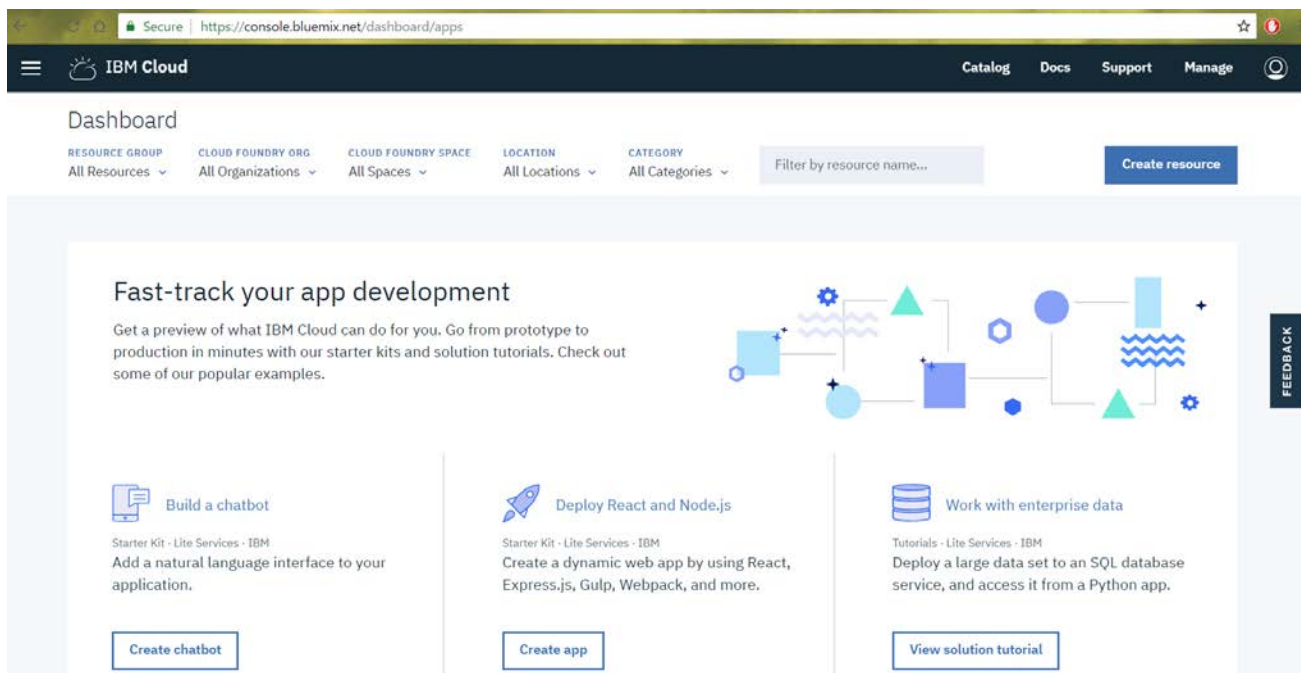


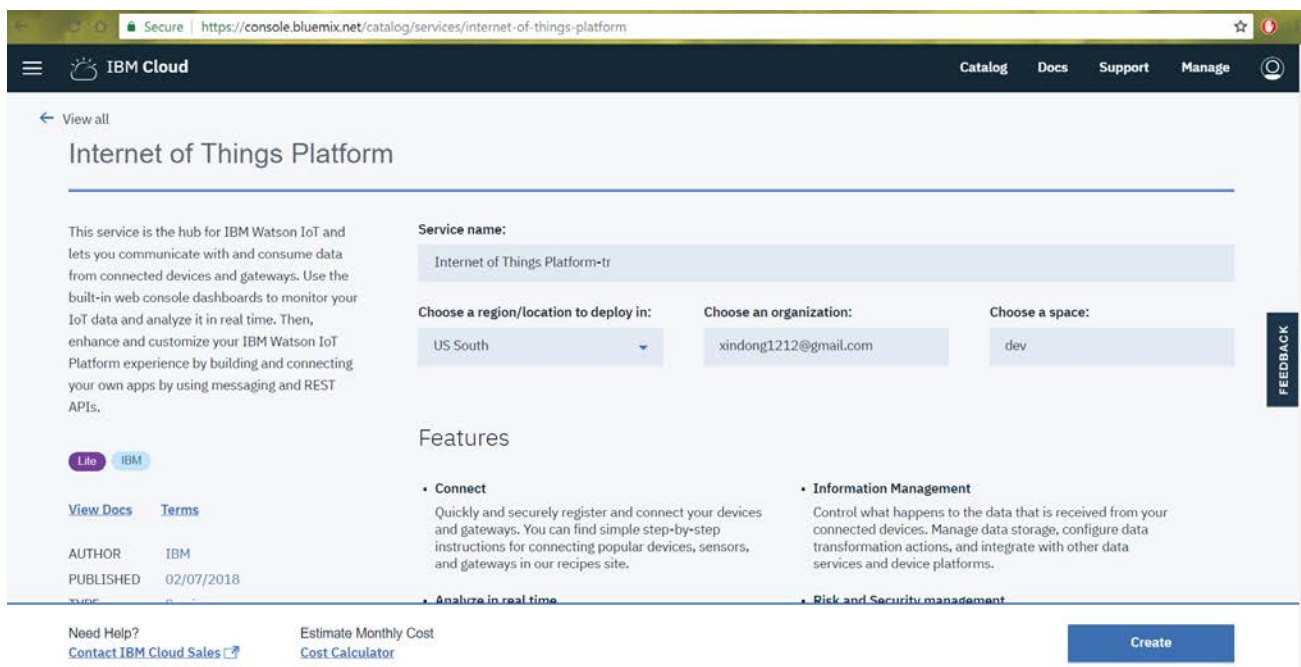
Go to <https://console.bluemix.net/> to “Create a free account”.



The screenshot shows the IBM Cloud Dashboard. At the top, there's a navigation bar with the IBM Cloud logo and links for Catalog, Docs, Support, and Manage. Below the navigation bar, the dashboard title "Dashboard" is followed by filters for Resource Group, Cloud Foundry Org, Cloud Foundry Space, Location, and Category. A "Filter by resource name..." input field and a "Create resource" button are also present. The main content area features a large section titled "Fast-track your app development" with a subtext: "Get a preview of what IBM Cloud can do for you. Go from prototype to production in minutes with our starter kits and solution tutorials. Check out some of our popular examples." To the right of this text is a diagram showing a flow from a prototype to production. Below the main text, there are three cards: "Build a chatbot" (with a subtext about Starter Kit - Lite Services - IBM and a "Create chatbot" button), "Deploy React and Node.js" (with a subtext about Starter Kit - Lite Services - IBM and a "Create app" button), and "Work with enterprise data" (with a subtext about Tutorials - Lite Services - IBM and a "View solution tutorial" button). A "FEEDBACK" button is visible on the right side of the dashboard.

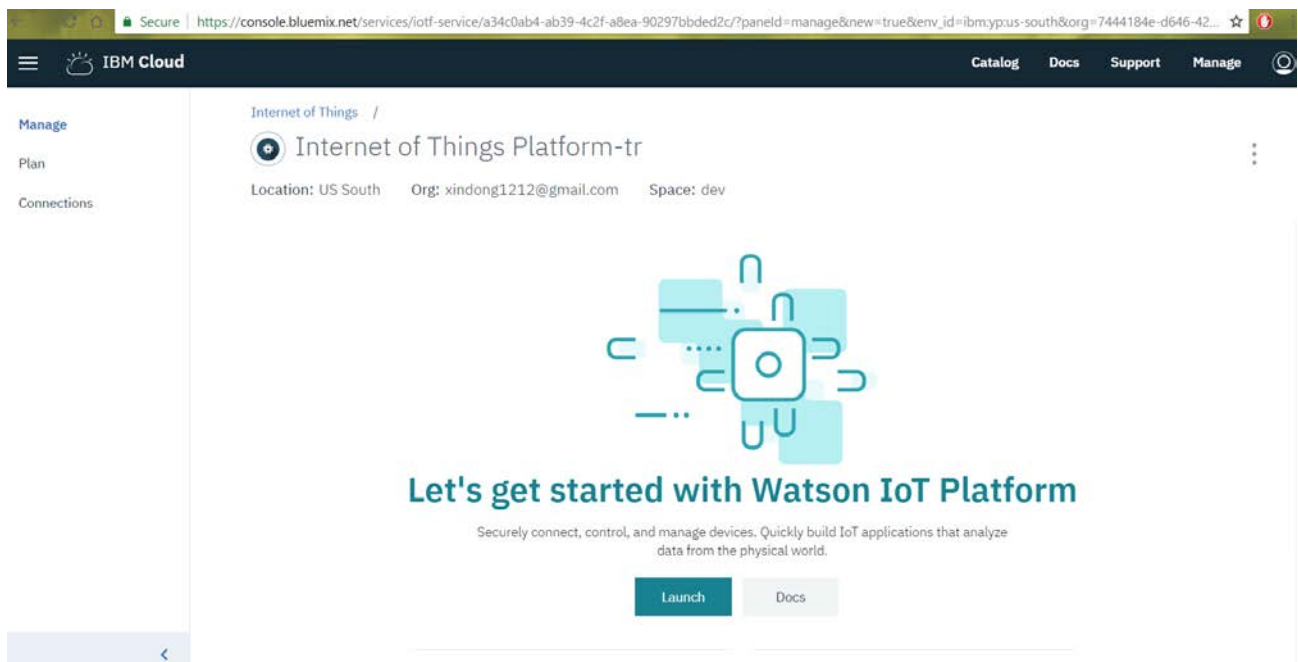
“Catalog” -> “Platform” -> “Internet of Things”

Create an “Internet of Things Platform”.



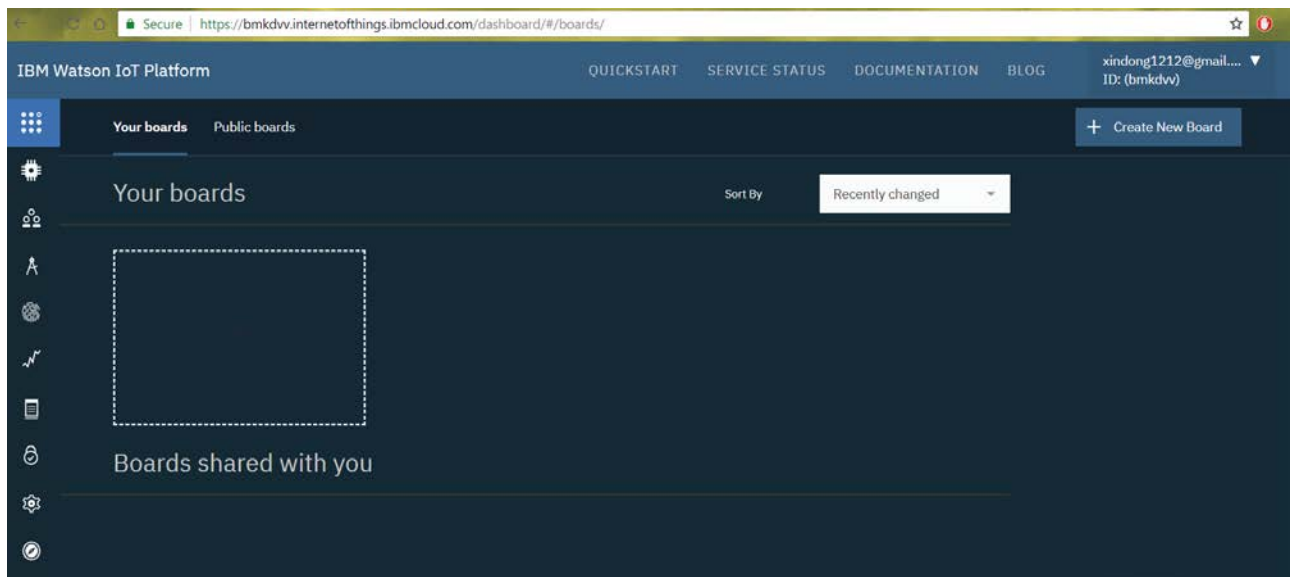
The screenshot shows the IBM Cloud Catalog page for the "Internet of Things Platform". The page has a navigation bar with the IBM Cloud logo and links for Catalog, Docs, Support, and Manage. Below the navigation bar, the page title "Internet of Things Platform" is followed by a description: "This service is the hub for IBM Watson IoT and lets you communicate with and consume data from connected devices and gateways. Use the built-in web console dashboards to monitor your IoT data and analyze it in real time. Then, enhance and customize your IBM Watson IoT Platform experience by building and connecting your own apps by using messaging and REST APIs." Below the description, there are three dropdown menus: "Service name:" (set to "Internet of Things Platform-tr"), "Choose a region/location to deploy in:" (set to "US South"), and "Choose an organization:" (set to "xindong1212@gmail.com"). There is also a "Choose a space:" dropdown set to "dev". Below these dropdowns, the "Features" section lists: "Connect" (Quickly and securely register and connect your devices and gateways. You can find simple step-by-step instructions for connecting popular devices, sensors, and gateways in our recipes site.), "Information Management" (Control what happens to the data that is received from your connected devices. Manage data storage, configure data transformation actions, and integrate with other data services and device platforms.), "Analyze in real time", and "Risk and Security management". At the bottom, there are links for "Need Help? Contact IBM Cloud Sales" and "Estimate Monthly Cost Cost Calculator", and a "Create" button.

Leave everything as default and “Create”.



“Launch”.

“IBM Watson IoT Platform” opens in a new tab.



“Apps” -> “Generate API Key”

The screenshot shows the 'Generate API Key' dialog box in the IBM Watson IoT Platform. The 'Information' tab is selected. The 'Description' field contains 'API Access for [Sigfox Backend](#)'. The 'API Key Expires' toggle is set to 'Off'. Below the toggle is a 'Choose date' button with a calendar icon. At the bottom right are 'Cancel' and 'Next' buttons.

IBM Watson IoT Platform QUICKSTART SERVICE STATUS DOCUMENTATION BLOG xindong1212@gmail.... ID: (bmkdvv)

Browse IBM Cloud Apps

Generate API Key Information Permissions

Description API Access for [Sigfox Backend](#)

API Key Expires OFF ON Choose date

Cancel Next

“Next”.

The screenshot shows the 'Generate API Key' dialog box in the IBM Watson IoT Platform, now on the 'Permissions' tab. The text 'The application will have access for the following role:' is displayed. Below it, the 'Role' dropdown menu is set to 'Standard Application'. A link for more information about roles is provided. At the bottom right are a back arrow and a 'Generate Key' button.

IBM Watson IoT Platform QUICKSTART SERVICE STATUS DOCUMENTATION BLOG xindong1212@gmail.... ID: (bmkdvv)

Browse IBM Cloud Apps

Generate API Key Information Permissions

The application will have access for the following role:

Role Standard Application

For more information about roles, see [User](#), [application](#), and [gateway](#) roles.

< Generate Key

“Generate Key”.

**IMPORTANT:** Take a screenshot of the “Authentication Token”.

IBM Watson IoT Platform

QUICKSTART SERVICE STATUS DOCUMENTATION BLOG xindong1212@gmail... ID: (bmkdvv)

Browse IBM Cloud Apps

### The API key has been added.

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

#### Generated Details

API Key a-bmkdvv-ihlxrkjc

Authentication Token i&cl\_WR\*+7x(c38\*@h)

**Warning:** Make a note of the generated authentication token. Lost authentication tokens cannot be recovered. If you lose the token, you must reregister the API to generate a new token.

#### API Key Information

Description API Access for Sigfox Backend

Role Standard Application

Expires Never

View API Key Add Another Close

Go to <https://backend.sigfox.com>.

“Device”.

Secure | <https://backend.sigfox.com/device/list>

sigfox

DEVICE DEVICE TYPE USER GROUP BILLING

### Device - List

New New series Edit series Transfer series Replace series Delete series

Id

Average SNR (all)  5 dB 50 dB

State

Last seen from date

Count: 8 / 8 page 1

Average Rssi	Average SNR	Communication status	Device type	Id	Last seen	Name	Token state
111.08	33.31	○	Xkit_Brisbane_City_Council	2BEB3	2018-07-05 15:01:14	Xkit_002BEB3	✓
110.80	32.69	○	Onesence Agriculture 01	2C2948	2018-05-21 17:44:58	EVVOS_002C2948	✓
108.32	21.84	○	Xkit_Brisbane_City_Council	2C5CA8	2018-07-05 15:49:26	Xkit_002C5CA8	✓
108.64	22.77	○	Onesence Agriculture 01	3E3B43	2018-06-27 09:39:50	EVVOS_003E3B43	✓
111.31	21.28	○	Onesence Agriculture 01	3E3FAF	2018-06-28 10:02:08	EVVOS_003E3FAF	✓
109.85	21.13	○	Xkit_4_Brisbane_City_Council	3E5AC8	2018-06-13 09:27:02	Xkit_003E5AC8	✓
93.71	49.80	○	Xkit 2 Brisbane City Council	3E808F	2018-05-31 12:58:22	Xkit_003E808F	✓

Click “Xkit\_Brisbane\_City\_Council” Device type for Id “2BEB3”.

The screenshot shows the Sigfox backend interface. The left sidebar contains a menu with options: INFORMATION, LOCATION, ASSOCIATED DEVICES, DEVICES BEING REGISTERED, STATISTICS, EVENT CONFIGURATION, and CALLBACKS. The main content area is titled "Device type 'Xkit\_Brisbane\_City\_Council' - Information". It displays the following details:

- Id: 59aa5fad500574337cb1303e
- Name: Xkit\_Brisbane\_City\_Council
- Description: Xkit\_Brisbane\_City\_Council
- Keep alive: N/A
- Subscription automatic renewal: ☒ ⓘ
- Group: Brisbane City Council (Pilot Test)
- Payload display: None
- Contract: Free 7 - replacement
- Alert Email:
- Creation date: 2017-09-02 17:37:17
- Created by: Guy Langlois
- Last edition date: 2017-09-02 17:37:17
- Last edited by: Guy Langlois

At the top right of the main content area, there are buttons for "Disengage sequence number" and "Edit".

“CALLBACKS” -> “New” -> “IBM Watson IoT Platform”

Enter “API Key” and “Auth Token” for the API Key “a-bmkdvv-ihllxrrkjc” created earlier in the Watson IBM Watson IoT Platform.

The screenshot shows the Sigfox backend interface for configuring a new callback. The left sidebar is the same as in the previous screenshot, with "CALLBACKS" highlighted. The main content area is titled "Device type Xkit\_Brisbane\_City\_Council - Callback new". It includes the following information:

You can find complete documentation about the IBM Watson IoT Platform following this [link](#). Click on ⓘ buttons to display help relative to a particular field.


**Watson specific**

Organization Id	bmkdvv	ⓘ
API Key	a-bmkdvv-ihllxrrkjc	ⓘ
Auth Token	i8cl_WR*+7x(c38*@h	ⓘ
Device type Id	59aa5fad500574337cb1303e	ⓘ
Device type description	Xkit_Brisbane_City_Council (automatically created from Sigfox backend)	ⓘ

**Callbacks**

Custom payload config	ⓘ
JSON body	

Define “JSON body”.



DEVICE

DEVICE TYPE

USER

GROUP

BILLING

INFORMATION

LOCATION

ASSOCIATED DEVICES

DEVICES BEING REGISTERED

STATISTICS

EVENT CONFIGURATION

CALLBACKS

Device type Xkit\_Brisbane\_City\_Council - Callback new

Device type id 59aa5fad500574337cb1303e

Device type description Xkit\_Brisbane\_City\_Council (automatically created from Sigfox backend)

Callbacks

Custom payload config

JSON body


```
{
  "deviceId": "{device}",
  "time": "{time}",
  "seqNumber": "{seqNumber}",
  "data": "{data}",
  "otherData": {"datadecoded": "0"}
}
```

Available variables: device, time, duplicate, snr, station, data, avgSnr, lat, lng, rssi, seqNumber  
Custom variables:

Ok

Cancel

“Ok”.



DEVICE

DEVICE TYPE

USER

GROUP

BILLING

INFORMATION

LOCATION

ASSOCIATED DEVICES

DEVICES BEING REGISTERED

STATISTICS

EVENT CONFIGURATION










CALLBACKS

Device type 'Xkit\_Brisbane\_City\_Council' - Callbacks

New

These callbacks transfer data received from the devices associated to this device type to your infrastructure. For more informations, please refer to the [Callback documentation](#)

DATA callbacks (no downlink callback available)

Downlink	Enable	Channel	Subtype	Duplicate	Batch	Information	Edit	Errors	Delete
<input type="checkbox"/>	<input checked="" type="checkbox"/>		UPLINK	<input type="checkbox"/>	<input type="checkbox"/>	{POST} https://api.thinger.io/v4/users/ScollioT/buckets/2BEB3/data			
<input type="checkbox"/>	<input checked="" type="checkbox"/>		UPLINK	<input type="checkbox"/>	<input type="checkbox"/>	{GET} http://siot.fsg.qld.gov.au/api/xkit?device={device}&time={time}&duration={data}			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		UPLINK	<input type="checkbox"/>	<input type="checkbox"/>	{POST} https://bmkdvv.messaging.internetofthings.ibmcloud.com/api/v0002/device/types/59aa5fad500...			

Go back to IBM Watson IoT Platform, check “Devices”, a “Gateway” has been automatically created from Sigfox backend.

The screenshot shows the IBM Watson IoT Platform interface. The top navigation bar includes links for QUICKSTART, SERVICE STATUS, DOCUMENTATION, and BLOG. The user profile 'xindong1212@gmail...' is visible. The left sidebar contains various icons for navigation. The main content area is titled 'Browse' and shows a list of devices. A table displays one device: 'sigfox\_gw' of type 'sigfox\_gw' and class 'Gateway', added on '5 Jul 2018 16:40'. Below the table, a detailed view of the device is shown, including its identity, device information, permissions, recent events, state, and logs. The device information section shows: Device ID: sigfox\_gw, Device Type: sigfox\_gw, Date Added: 5 Jul 2018 16:40, Added By: a-bmkdvv-ihlbrkjc, and Connection Status: Disconnected.

Send a Sigfox message using device “2BEBC3”, “Callback - OK”.

The screenshot shows the Sigfox backend interface. The top navigation bar includes links for DEVICE, DEVICE TYPE, USER, GROUP, and BILLING. The left sidebar contains various icons for navigation. The main content area is titled 'Device 2BEBC3 - Messages'. It shows a table of messages with columns: Time, Data / Decoding, Location, Link quality, and Callbacks. The table displays five messages, all with a 'Callback - OK' status. The messages are as follows:

Time	Data / Decoding	Location	Link quality	Callbacks
2018-07-05 16:47:27	1101	✦	📶	🟢
2018-07-05 16:47:21	028302	✦	📶	🟢
2018-07-05 15:01:14	1101	✦	📶	🟢
2018-07-05 15:01:09	1001	✦	📶	🟢
2018-07-05 15:01:03	02d102	✦	📶	🟢



**sigfox** DEVICE DEVICE TYPE USER GROUP BILLING 👤 🔔 ? 🔗

**Device 2BEBC3 - Messages**

**Callback - OK**

[OK] - Base station SFA6 - 3 seconds

```

200 - - #1
POST
https://bmkdvv.messaging.internetofthings.ibmcloud.com/api/v0002/device/types/59aa5fad500574337cb1303e/devices/2BEBC3/events/message
HTTP/1.0
authorization : Basic Zy1ibHtkdnYtc2lnZm94X2d3LX0pZ2ZveF9ndzpcZjVVT3lqKzHjg4UUPwZk4=
accept-language : fr
accept-encoding : gzip,deflate
user-agent : SIGFOX
accept-charset : UTF-8;q=0.9,*;q=0.7

{
  "deviceId": "2BEBC3",
  "time": "1530773247",
  "sequenceNumber": "448",
  "data": "1101",
  "otherData": { "dataDecoded": "0" }
}

```

2018-07-05 15:01:09 1001

2018-07-05 15:01:03 02d102

**Callbacks**

**RESET** **FILTER**

Check that Device “2BEBC3” has been added by the “sigfox\_gw” Gateway.

**IBM Watson IoT Platform** QUICKSTART SERVICE STATUS DOCUMENTATION BLOG xindong1212@gmail.... ID: (bmkdvv)

**Browse** Action Device Types + Add Device

using different criteria. To get started, you can add devices by using the Add Device button, or by using API.

<input type="checkbox"/>	Device ID	Device Type	Class ID	Date Added				
2 results								
<input checked="" type="checkbox"/>	2BEBC3	59aa5fad500574337cb1303e	Device	5 Jul 2018 16:47				

**Identity** Device Information Recent Events State Logs +1 ×

Device ID	2BEBC3
Device Type	59aa5fad500574337cb1303e
Date Added	5 Jul 2018 16:47
Added By	g:bmkdvv:sigfox_gw:sigfox_gw
Connection Status	Disconnected



Go back to “IBM Cloud” “Dashboard”, go to “Catalog” and search for “Node-RED”.

Create a “Node-RED Starter” app, enter app name as “Xkit-2BEB3” and leave all other fields as default.

The screenshot shows the IBM Cloud console interface for creating a new Cloud Foundry application. The page title is "Create a Cloud Foundry App". The application being created is "Node-RED Starter". The form includes the following fields and values:

- App name:** Xkit-2BEB3
- Host name:** Xkit-2BEB3
- Domain:** mybluemix.net
- Choose a region/location to deploy in:** US South
- Choose an organization:** xindong1212@gmail.com
- Choose a space:** dev
- Selected Plan:** SDK for Node.js™
- Cloudant:** Lite

Additional information on the left side of the form includes:

- VERSION:** 0.8.1
- TYPE:** Boilerplate
- LOCATION:** Sydney, Germany, United Kingdom, US East, US South

At the bottom of the form, there are links for "Need Help? Contact IBM Cloud Sales" and "Estimate Monthly Cost Cost Calculator", and a large blue "Create" button.

“Create”.

Wait for the app to start.

The screenshot shows the IBM Cloud console interface for the "Xkit-2BEB3" application. The page title is "Xkit-2BEB3". The application status is "This app is awake." and the "Visit App URL" button is visible. The application details are:

- Org:** xindong1212@gmail.com
- Location:** US South
- Space:** dev

The main content area displays the application's description and instructions for using the command line interface (CLI) to manage the application. The instructions include:

- Download, modify, and redeploy your Cloud Foundry app with the command line interface
- Last Updated: 2018-05-24 | [Edit in GitHub](#)
- Use IBM Cloud command line interface to download, modify, and redeploy your Cloud Foundry applications and service instances.
- Before you begin, download and install the IBM Cloud CLI. [External link icon](#)
- Restriction:** The command line tool is not supported by Cygwin. Use the tool in a command line window other than the Cygwin command line window.
- After you install the command line interface, you can get started:

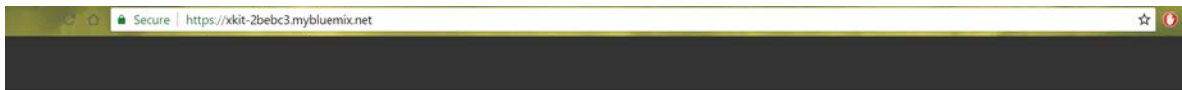
A numbered list of steps is provided:

- 1 Change to the directory where your code is located.

A code block shows the command to change to the directory:

```
$ cd your_new_directory
```

“Visit App URL”.



### Welcome to your new Node-RED instance on IBM Cloud

We know you're eager to start wiring up your flows, but first there are a couple of tasks you should do:

- Secure your Node-RED editor
- Browse available IBM Cloud nodes

“Allow anyone to view the editor, but not make any changes.”

## Secure your Node-RED editor

- ☒ Secure your editor so only authorised users can access it

Username

Password

strong

- ☒ Allow anyone to view the editor, but not make any changes

- ☐ *Not recommended:* Allow anyone to access the editor and make changes

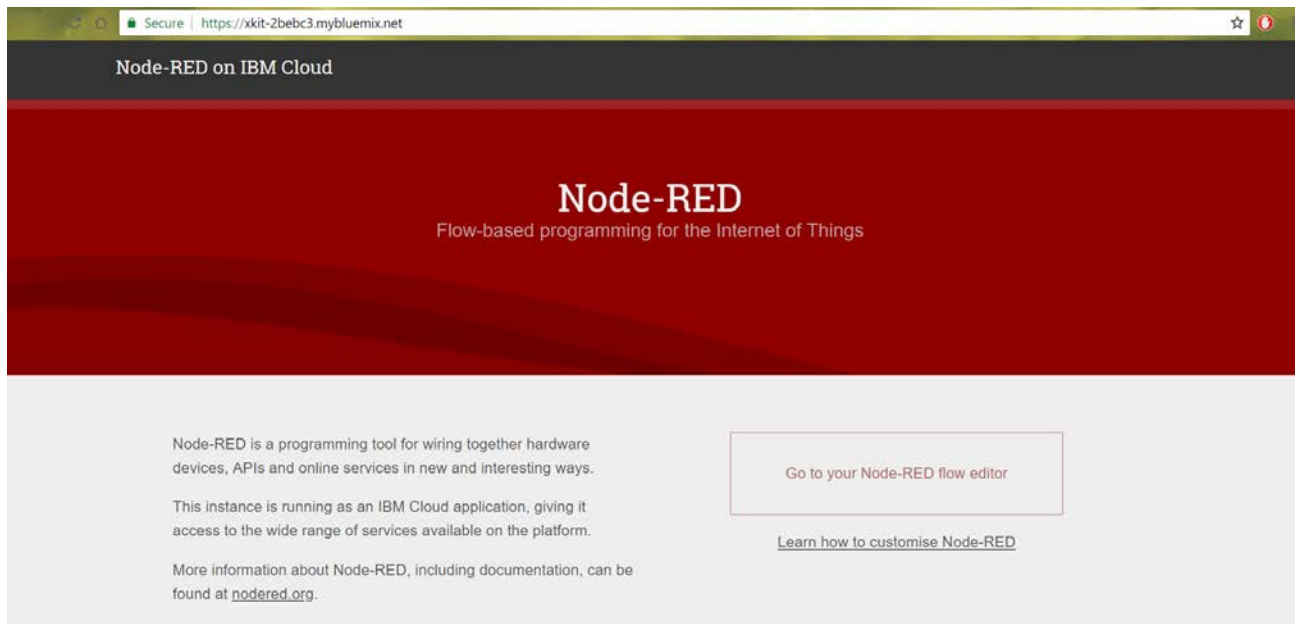
## Finish the install

You have made the following selections:

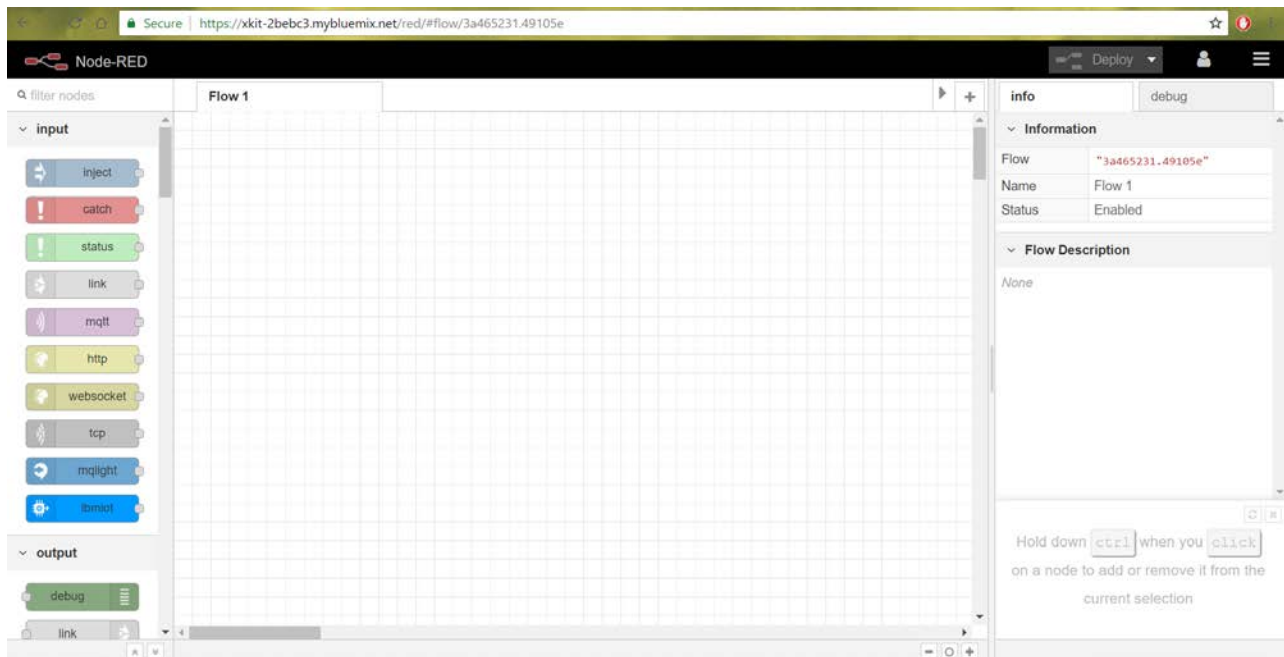
- Secure your editor so only authorised users can access it
- Allow anyone to view the editor, but not make any changes

You can change these settings at any time by setting the following environment variables via the IBM Cloud console:

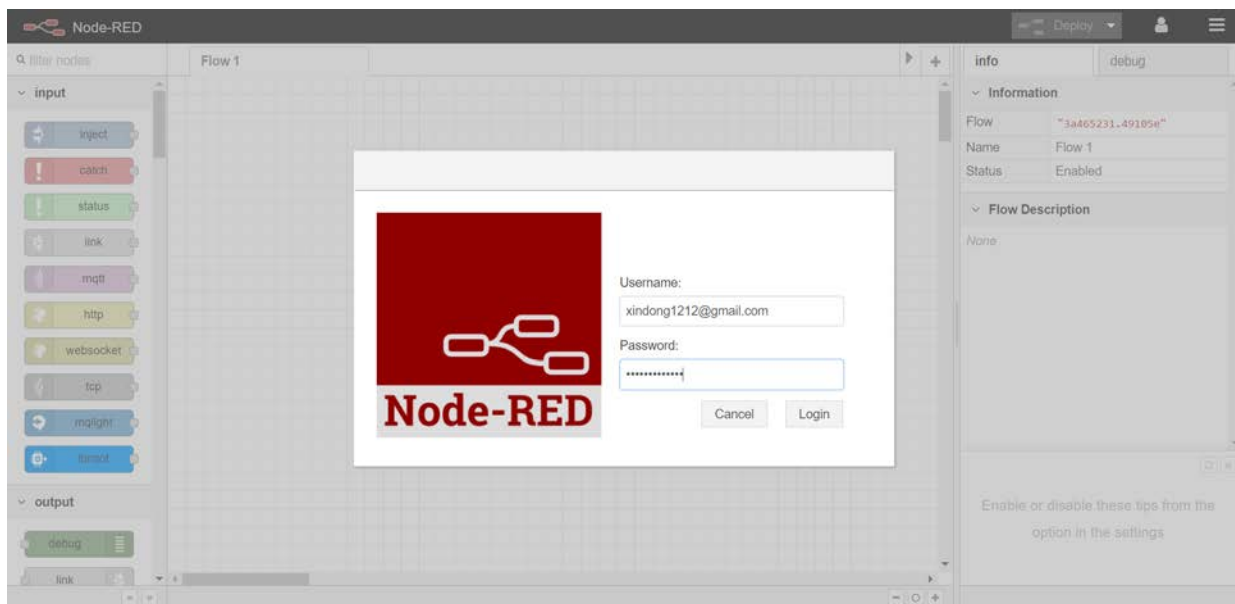
- NODE\_RED\_USERNAME - the username
- NODE\_RED\_PASSWORD - the password
- NODE\_RED\_GUEST\_ACCESS - if set to `true`, allows anyone read-only access to the editor



“Go to your Node-RED flow editor”.



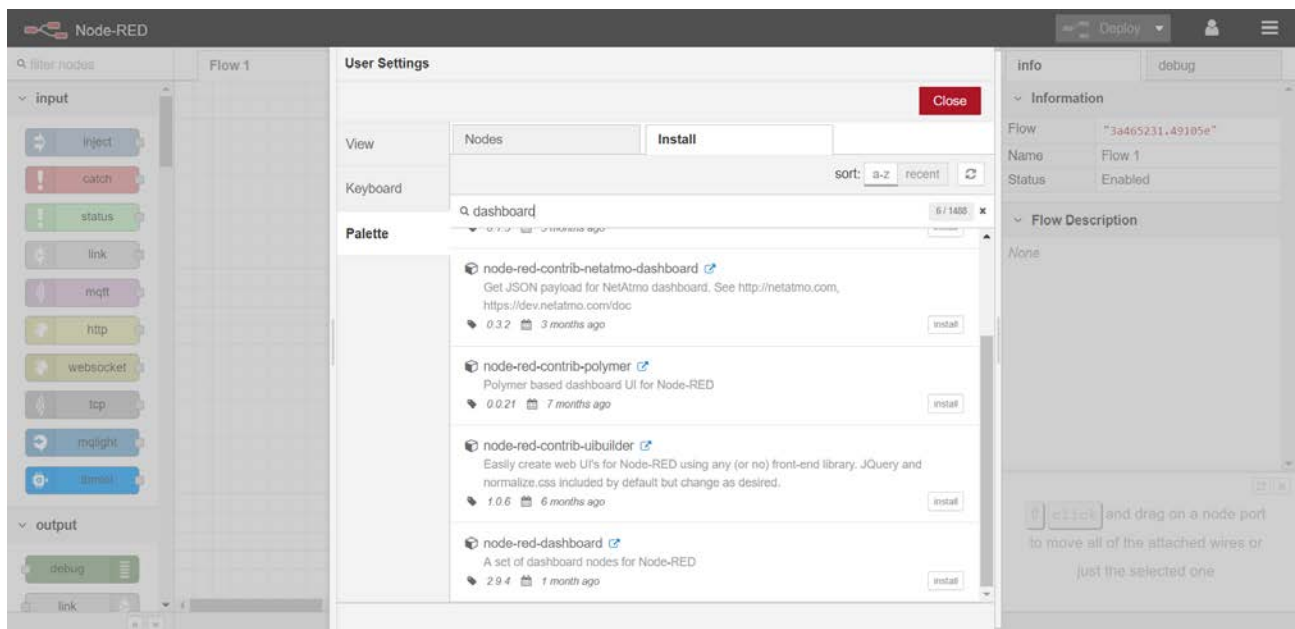
“Login”.



“Manage palette”.

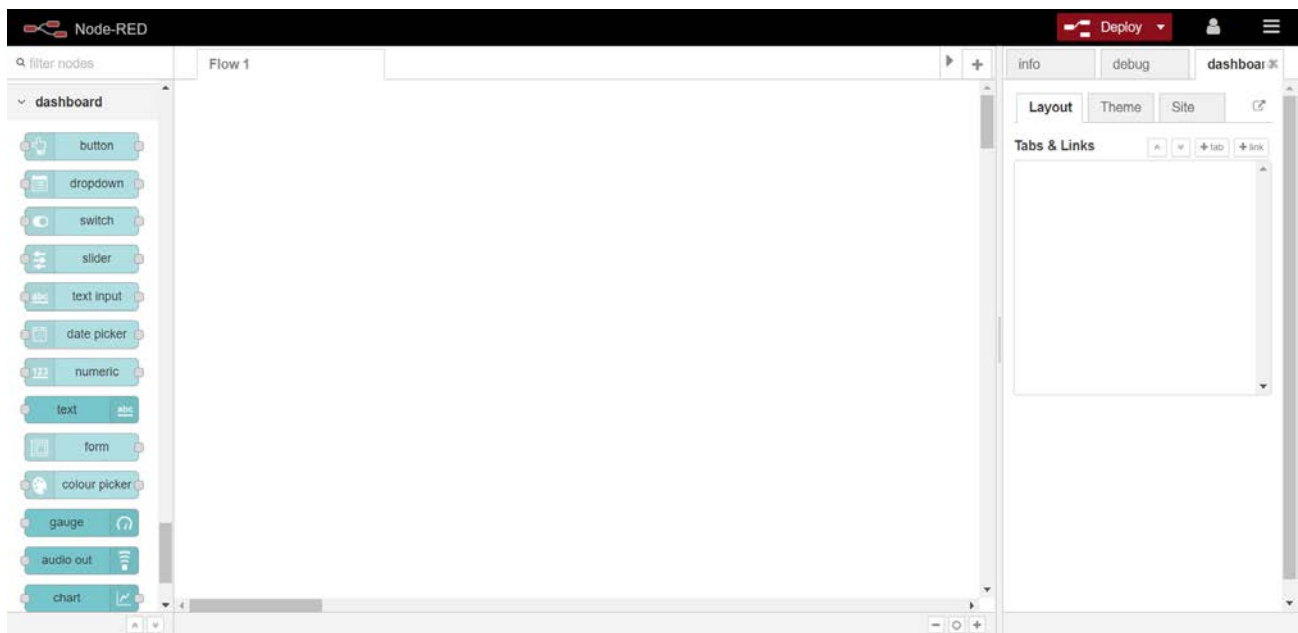
“Palette” -> “Install”, search for “dashboard”.

Install “node-red-dashboard”.



“Close”.

Observe that dashboard nodes and a dashboard tab have been added.



Go to <https://console.bluemix.net> and login as [u1094132@umail.usq.edu.au](mailto:u1094132@umail.usq.edu.au).

Name	Region	CF Org	CF Space	Memory (MB)	Status
Xkit-2C5CA8	US South	u1094132@umai	dev	256	Running

Name	Region	CF Org	CF Space	Plan	Service Offering
Internet of Things Platform-sample	US South	u1094132@umai	dev	Lite	Internet of Things
Xkit-2C5CA8-cloudantNoSQLDB	US South	u1094132@umai	dev	Lite	Cloudant

Open “Xkit-2C5CA8-cloudantNoSQLDB” Cloud Foundry Service.

Manage

Service credentials

Plan

Connections

Data & Analytics /

**Xkit-2C5CA8-cloudantNoSQLDB**

Location: US South Org: u1094132@umail.usq.edu.au Space: dev

**Cloudant NoSQL DB** [LAUNCH](#)

Cloudant NoSQL DB is a fully managed data layer designed for modern web and mobile applications that leverages a flexible JSON schema. Cloudant is built upon and compatible with Apache CouchDB and accessible through a secure HTTPS API, which scales as your application grows. Cloudant is ISO27001 and SOC2 Type 1 certified, and all data is stored in triplicate across separate physical nodes in a cluster for HA/DR within a data center.

**Fully managed DBaaS**

Work with self-describing JSON documents through a RESTful API that makes every document in your Cloudant database accessible as JSON via a URL. Documents can be retrieved, stored, or deleted individually or in bulk and can also have files attached. IBM takes care of the provisioning, management, and scalability of the data store, freeing up your time to focus on your application.

**Powerful query, analytics, replication, and sync**

Cloudant indexing is flexible and powerful, and includes real-time MapReduce, Apache Lucene-based full-text search, advanced Geospatial, and declarative Cloudant Query. Cloudant makes it easy to conduct advanced analytics on JSON data with dashDB Warehousing and Apache Spark integrations. Replication enables cross-geo deployments and Cloudant Sync provides data access for mobile devices to run connected or off-line.

“LAUNCH” in a new tab.













Databases

Database name

Create Database

{ } JSON

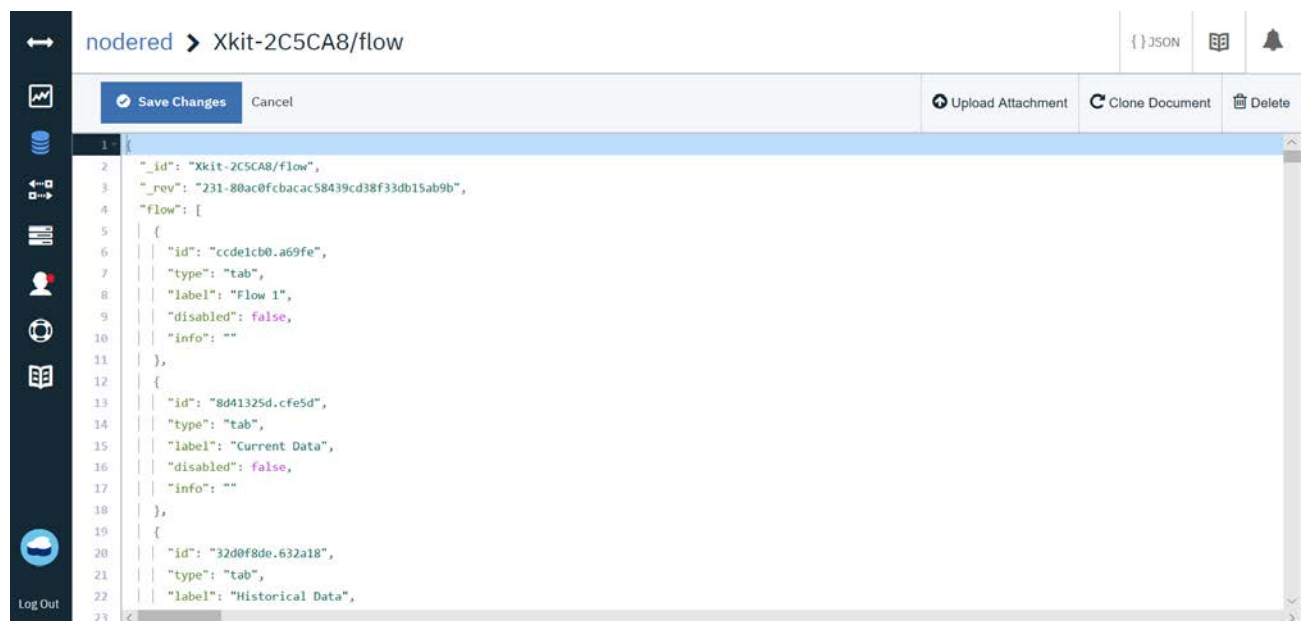
Your Databases

Name	Size	# of Docs	Actions
nodered	157.5 KB	4	  
otherdata	66.4 KB	0	  
soilmoisturedata	96.0 KB	231	  
temperaturedata	87.8 KB	199	  

Log Out

Showing 1-4 of 4 databases.

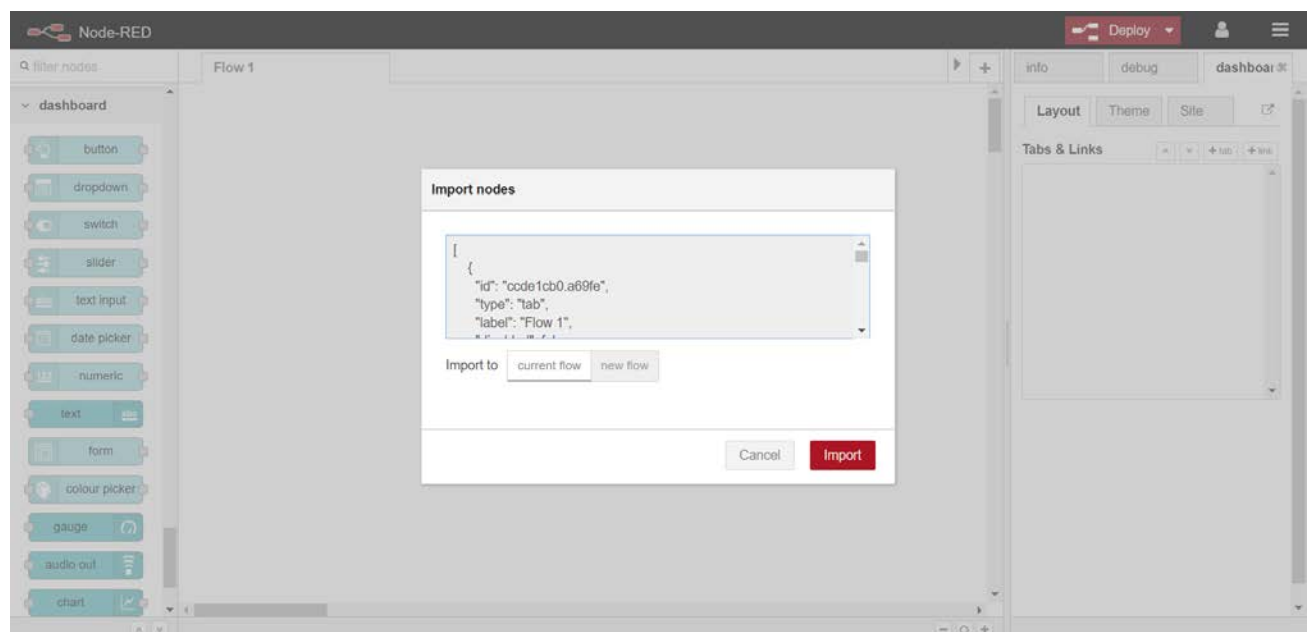
Open “nodered” database and the save the contents of “Xkit-2C5CA8/flow” to a JSON file.



Go back to <https://xkit-2bebc3.mybluemix.net/red>

“Import” -> “Clipboard”

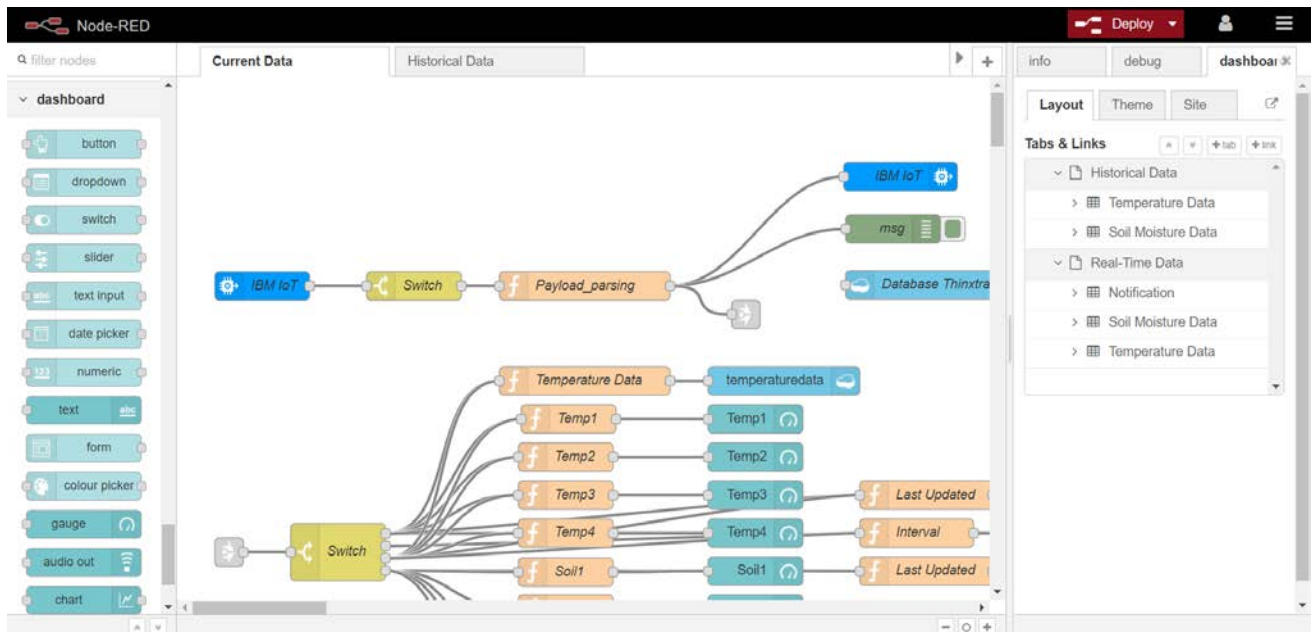
Import the copied “Xkit-2C5CA8/flow” to the “current flow”.





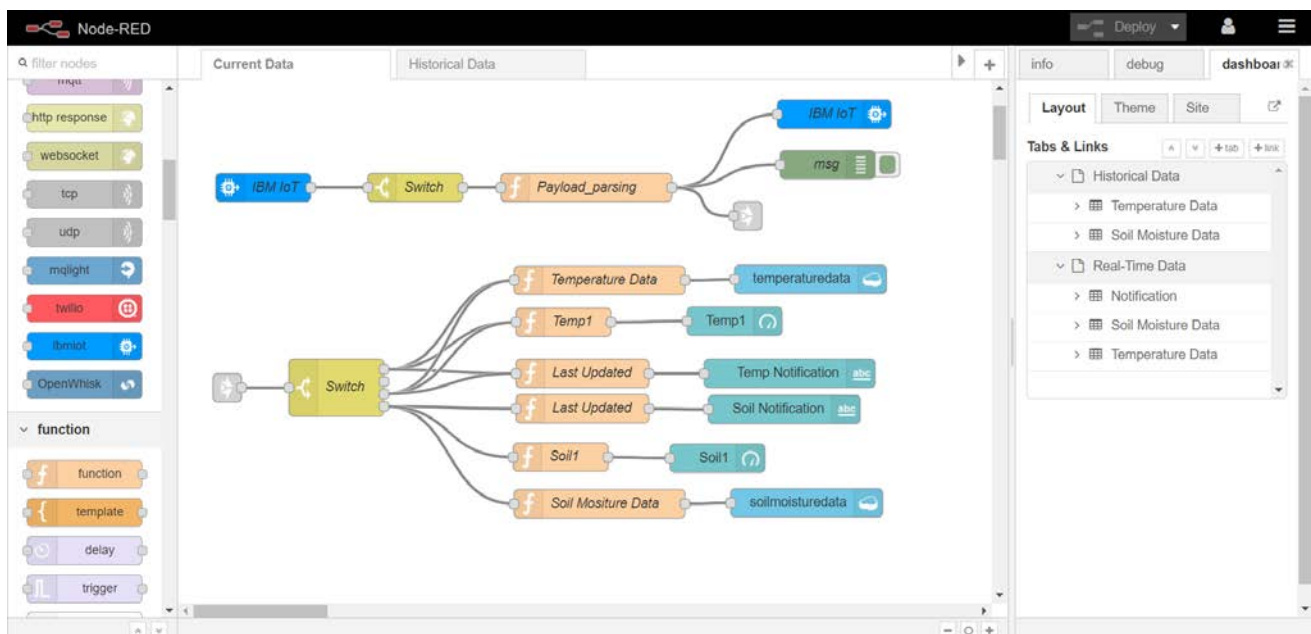
Select “Flow 1” tab, “Flows” -> “Delete”.

Do this for the other “Flow 1” tab as well.



Delete these unused nodes in the “Current Data” flow tab:

“Database Thinxtra”, “Temp2 ” function, “Temp2” gauge , “Temp3 ” function, “Temp3” gauge , “Temp4 ” function, “Temp4” gauge , “Soil2 ” function, “Soil2” gauge , “Soil3” function, “Soil3” gauge , “Soil4” function, “Soil4” gauge , “Interval” function, “Interval Notification”.



Go to IBM Watson IoT Platform and create another API Key.

The screenshot shows the 'Generate API Key' dialog box in the IBM Watson IoT Platform. The dialog has three tabs: 'Generate API Key' (active), 'Information', and 'Permissions'. The 'Generate API Key' tab contains a 'Description' field with the text 'Sigfox Access Key'. Below this is a toggle for 'API Key Expires' set to 'Off'. A 'Choose date' button is visible. At the bottom right are 'Cancel' and 'Next' buttons.

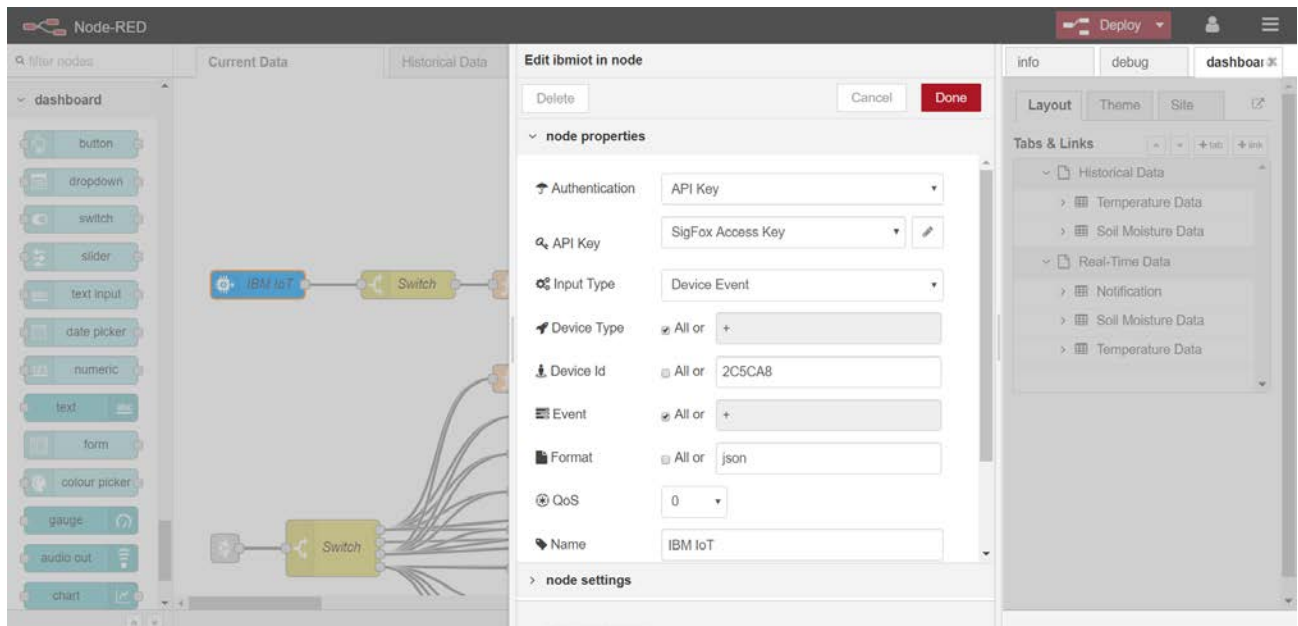
“Next”.

**IMPORTANT:** Take a screenshot of the “Authentication Token”.

The screenshot shows the confirmation screen after an API key has been added. The title is 'The API key has been added.' Below this is a warning: 'Authentication tokens are non-recoverable. If you misplace this token, you will need to re-register the API key to generate a new authentication token.' The screen is divided into two sections: 'Generated Details' and 'API Key Information'.  
**Generated Details:**  
API Key: a-bmkdvv-jdzdnv82ue  
Authentication Token: wc8PwH1xCeR\*L&L+PH  
**API Key Information:**  
Description: Sigfox Access Key  
Role: Standard Application  
Expires: Never  
A warning icon and text are present: 'Make a note of the generated authentication token. Lost authentication tokens cannot be recovered. If you lose the token, you must reregister the API to generate a new token.' At the bottom right are 'View API Key', 'Add Another', and 'Close' buttons.

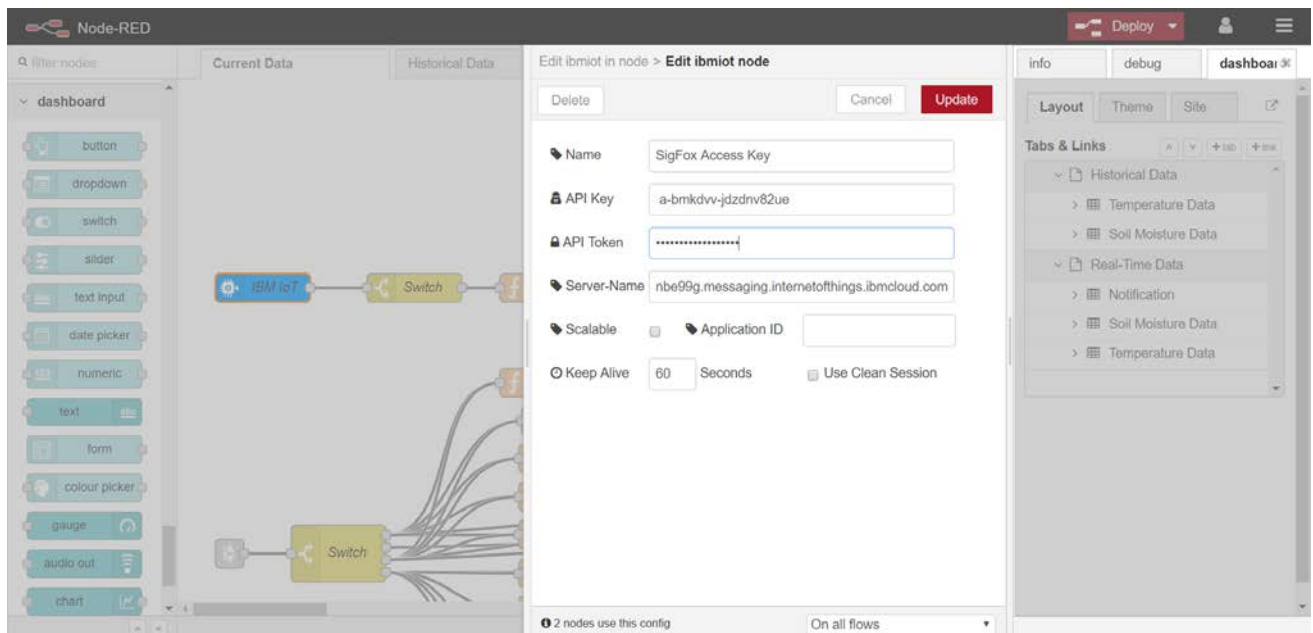
Go back to <https://xkit-2bebc3.mybluemix.net/red>

Edit “IBM IoT” input node.



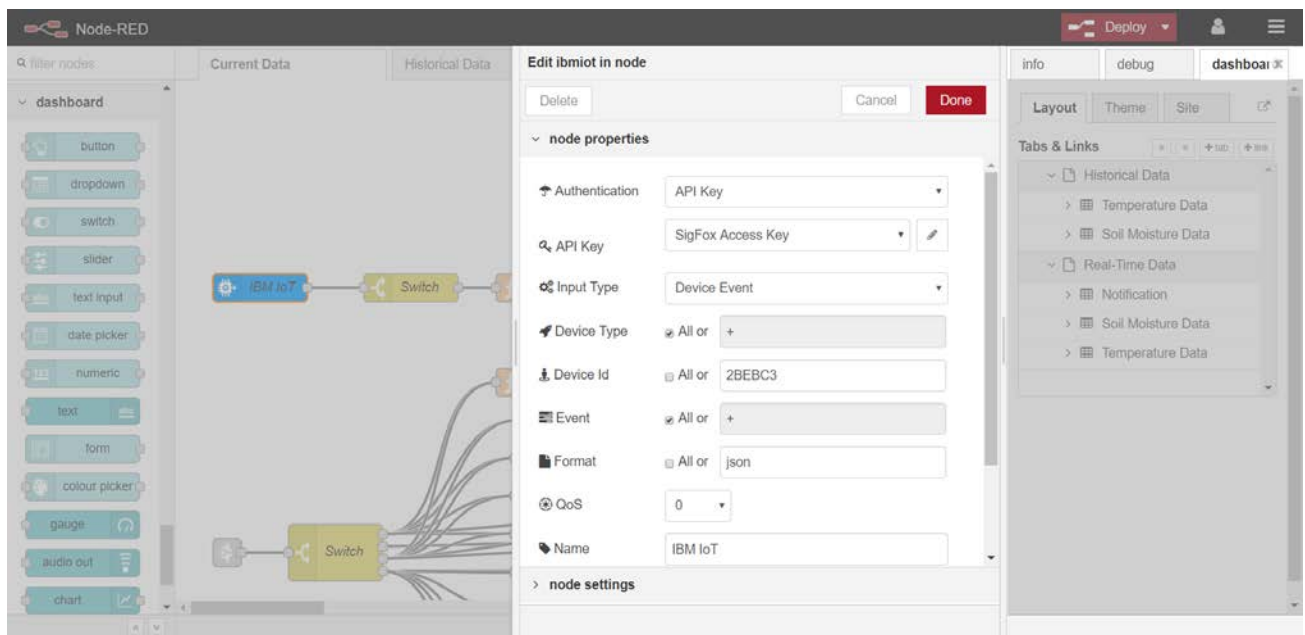
Edit “API Key”.

Enter “API Key” and “API Token” for API Key “a-bmkdvv-jdzdnv82ue”.



“Update”.

Change “Device Id” to “2BEBC3”.



“Done”.

Update “Device Id” for the “IBM IoT” output node as well.

“Deploy”.

Now edit “Payload\_parsing” function node.

Edit function node

Delete

Cancel

Done

node properties

Name

Payload\_parsing

Function

```

1 var Data = msg.payload.data;
2 var Dlength = Data.length;
3 msg.payload.otherData.Length = Dlength;
4 var type = Number('0x'+Data.slice(Dlength-2));
5 msg.payload.otherData.Type = type;
6 var T = msg.payload.time*1000;
7 msg.payload.otherData.Timestamp = T;
8
9 if(type==1)
10   msg.payload.otherData.Level = Number('0x'+Data
11 else if(type==2){
12

```

Outputs

1

See the Info tab for help writing functions.

node settings

info

debug

dashboard

Information

Node

"43c6332e.7117fc"

Name

Payload\_parsing

Type

function

show more

Node Help

A JavaScript function block to run against the messages being received by the node.

The messages are passed in as a JavaScript object called `msg`.

By convention it will have a `msg.payload` property containing the body of the message.

The function is expected to return a message object (or multiple message objects), but can choose to return nothing in order to halt a flow.

Details

See the [online documentation](#) for more information on writing functions.

Sending messages

The function can either return the messages

The two types of Sigfox messages are defined as follows.

Level	1
-------	---

Voltage													
						MSB							LSB
2													

20

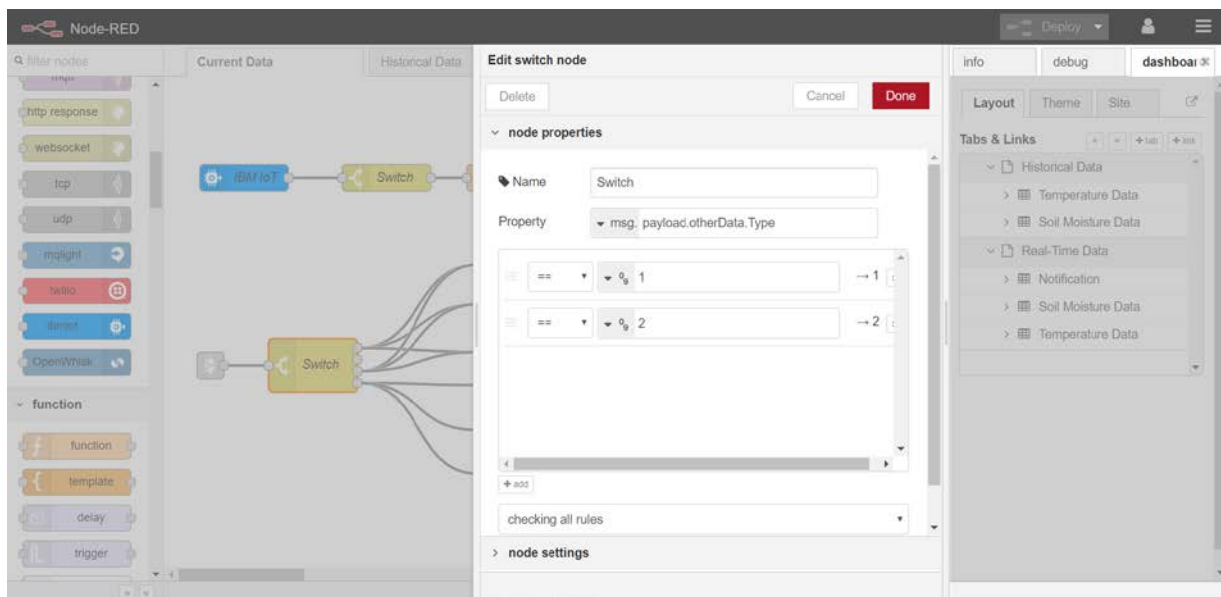
The JavaScript code below is the body of the function.

```
var Data = msg.payload.data;
var Dlength = Data.length;
msg.payload.otherData.Length = Dlength;
var type = Number('0x'+Data.slice(Dlength-2));
msg.payload.otherData.Type = type;
var T = msg.payload.time*1000;
msg.payload.otherData.Timestamp = T;

if(type==1)
    msg.payload.otherData.Level = Number('0x'+Data.slice(0,2));
else if(type==2){
    var voltage = Number('0x'+Data.slice(0,4));
    var height = 0;
    if(voltage!=0)
        height = 25.4 + (voltage+1)/1024*797.6;
    msg.payload.otherData.Height = height.toFixed(2);
}

msg.payload.otherData.datadecoded = '1';
return msg;
```

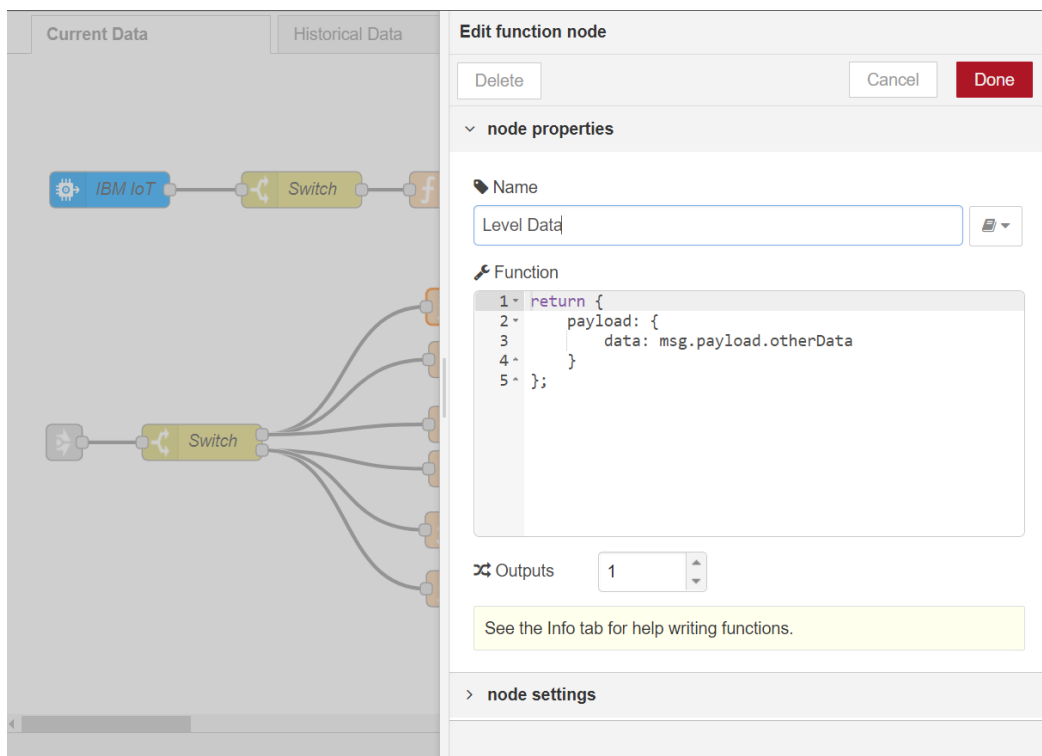
Edit “Switch” node.



“Done”.

“Deploy”.

Change the name of the “Temperature Data” function to “Level Data”.



Change the name of the “Soil Moisture Data” function to “Height Data”.



Edit the “temperaturedata” cloudant out node.

The screenshot shows the IBM IoT dashboard with two tabs: 'Current Data' and 'Historical Data'. In the 'Current Data' tab, a workflow is visible with an 'IBM IoT' node connected to a 'Switch' node, which then connects to a 'f' node. Below this, another 'Switch' node is connected to multiple output nodes. On the right, the 'Edit cloudant out node' panel is open. It features a 'Delete' button, 'Cancel' and 'Done' buttons, and a 'node properties' section. The 'Service' dropdown is set to 'Xkit-2BEBC3-cloudantNoSQLDB'. The 'Database' text field contains 'leveldata'. The 'Operation' dropdown is set to 'insert'. A checkbox labeled 'Only store msg.payload object?' is checked. The 'Name' text field contains 'Name'. Below the 'node properties' section is a 'node settings' section with a right-pointing arrow.

Current Data Historical Data

IBM IoT Switch f

Switch

Edit cloudant out node

Delete Cancel Done

node properties

Service Xkit-2BEBC3-cloudantNoSQLDB

Database leveldata

Operation insert

☒ Only store msg.payload object?

Name Name

node settings

Edit the “soilmoisturedata” cloudant out node.

The screenshot shows the 'Edit cloudant out node' panel. It features a 'Delete' button, 'Cancel' and 'Done' buttons, and a 'node properties' section. The 'Service' dropdown is set to 'Xkit-2BEBC3-cloudantNoSQLDB'. The 'Database' text field contains 'heightdata'. The 'Operation' dropdown is set to 'insert'. A checkbox labeled 'Only store msg.payload object?' is checked. The 'Name' text field contains 'Name'. Below the 'node properties' section is a 'node settings' section with a right-pointing arrow.

Edit cloudant out node

Delete Cancel Done

node properties

Service Xkit-2BEBC3-cloudantNoSQLDB

Database heightdata

Operation insert

☒ Only store msg.payload object?

Name Name

node settings

Edit the “Temp Notification” text node.

Edit text node

Delete

Cancel

Done

node properties

Group

Notification [Real-Time Data]

Size

auto

Label

Water Level Last Updated

Value format

{{msg.payload}}

Layout

label value

label value

label value

label value

label value

Name

Level Notification

node settings

info

debug

dashboard

Information

Node

"2eec9535.650cda"

Name

Temp Notification

Type

ui\_text

show more

Node Help

Will display a non-editable text field on the user interface.

Each received `msg.payload` will update the text based on the provided **Value Format**.

The **Value Format** field can be used to change the displayed format and can contain valid HTML and [Angular filters](#).

For example:  
`{{value | uppercase}} &deg;` will uppercase the payload text and add the degree symbol.

The label can also be set by a message property by setting the field to the name of the property, for example `{{msg.topic}}`.

Edit the “Soil Notification” text node.

Edit text node

Delete

Cancel

Done

node properties

Group

Notification [Real-Time Data]

Size

auto

Label

Water Height Last Updated

Value format

{{msg.payload}}

Layout

label value

label value

label value

label value

label value

Name

Height Notification

node settings

Edit “Temp1” function node.

The body of the function is:

```
msg = {payload:msg.payload.otherData.Level, timestamp:msg.payload.otherData.Timestamp};  
return msg;
```

**Edit function node**

Delete Cancel Done

▼ **node properties**

Name

Level

Function

```
1 msg = {payload:msg.payload.otherData.Level, timestamp:  
2 return msg;
```

Outputs 1

See the Info tab for help writing functions.

> **node settings**

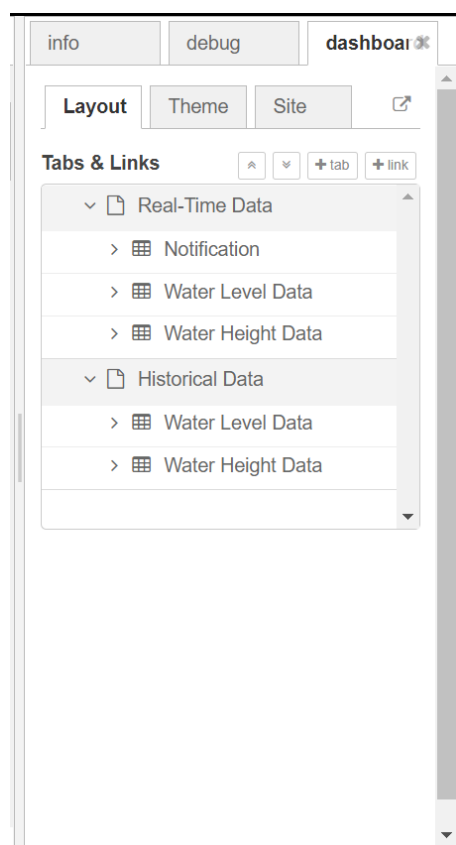
Rename “Soil1” function node to “Height”.

The body of the function is:

```
msg = {payload:msg.payload.otherData.Height, timestamp:msg.payload.otherData.Timestamp};  
return msg;
```

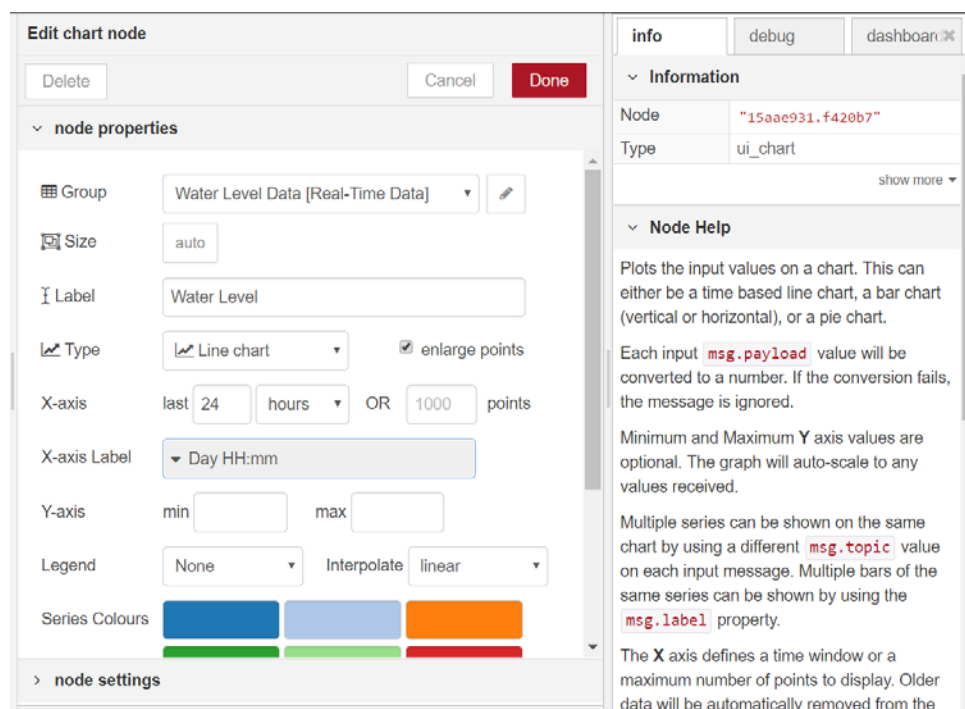
“Deploy”.

Go to “dashboard” “Layout”, rename the “Soil Moisture Data” and “Temperature Data” groups.



Replace “Temp1” gauge with a “Water Level” live chart.

Change “Group” to “Water Level Data [Real-Time Data]”.



Edit chart node

Delete

Cancel

Done

node properties

X-axis

last

24

hours

OR

1000

points

X-axis Label

Day HH:mm

Y-axis

min

max

Legend

None

Interpolate

linear

Series Colours

Blank label

Waiting for data to arrive.

☐ Use deprecated (pre 2.5.0) data format.

Name

Level Chart

node settings

Replace “Soil1” gauge with a “Water Height (mm)” live chart.

Edit chart node

Delete

Cancel

Done

node properties

Group

Water Height Data [Real-Time Data]

Size

auto

Label

Water Height (mm)

Type

Line chart

☒ enlarge points

X-axis

last

24

hours

OR

1000

points

X-axis Label

Day HH:mm

Y-axis

min

max

Legend

None

Interpolate

linear

Series Colours

node settings

Edit chart node

Delete

Cancel

Done

node properties

X-axis

last

24

hours

OR

1000

points

X-axis Label

Day HH:mm

Y-axis

min

max

Legend

None

Interpolate

linear

Series Colours

Blank label

Waiting for data to arrive.

☐ Use deprecated (pre 2.5.0) data format.

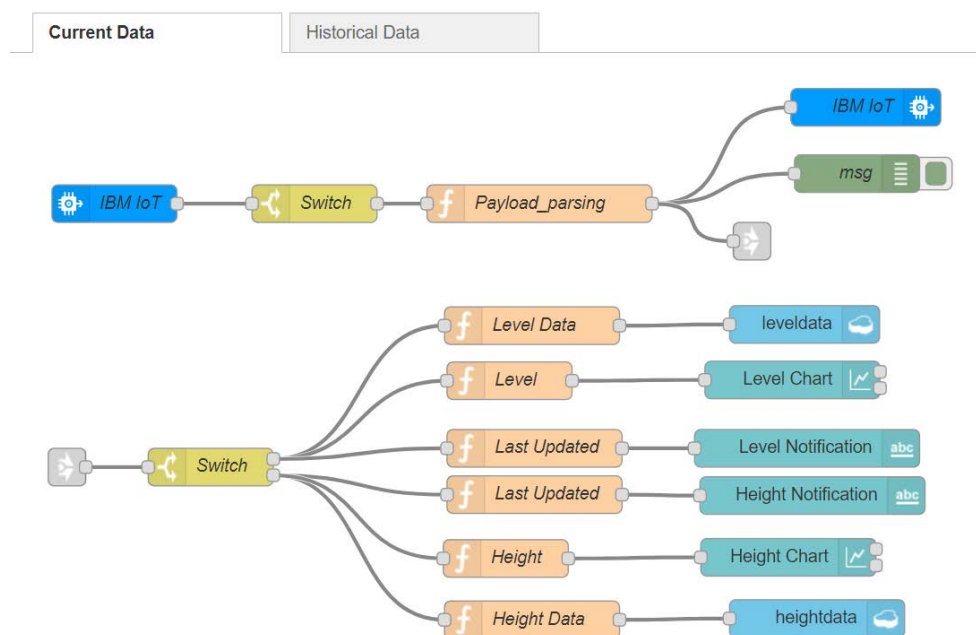
Name

Height Chart

node settings

“Deploy”.

The final “Current Data” flow:



The dashboards after initial set-up:

