

Watson Internet of Things Platform – Analytics

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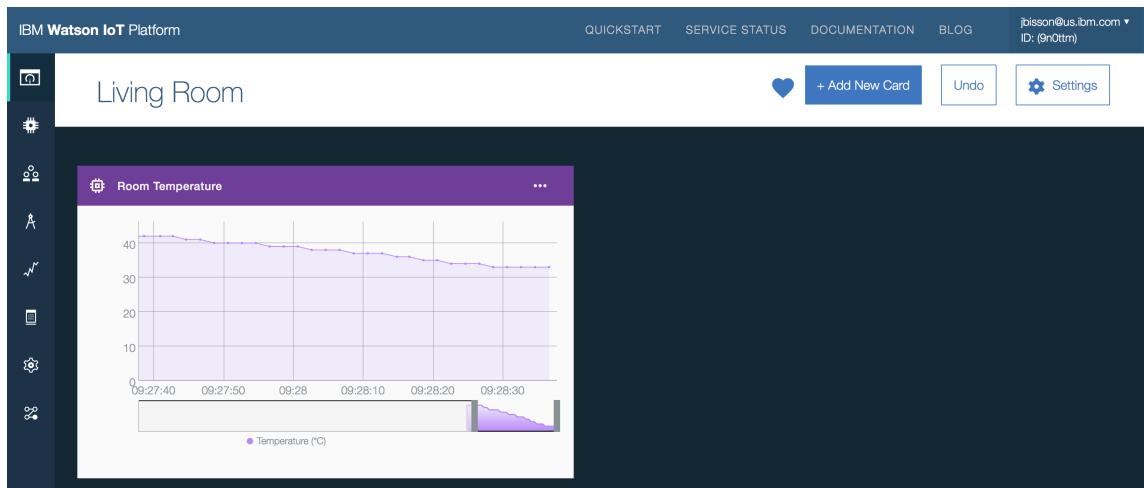
Rule: High Temperature
Device: 9n0ttm:simulator:environment
Date: 2016-10-06T16:10:28.583Z
Condition:
simulator.d.temp>40
Incoming Message:

```
{"d": {"name": "simulator", "temp": 42, "humidity": 77, "objectTemp": 24}, "ruleContent": {"jobID": "XFc1GM0w", "contextSchemas": [], "transforms": [{"parameters": "Rule, becomes, true, 0", "name": "High Temperature1475770186133", "type": "DeliverOnChange"}]}, "ruleDescription": "", "severity": 4, "messageSchema": {"name": "High Temperature", "actions": [{"J6vBpI03"}, {"id": "HUXoA0tz", "updated": "6 Oct 2016 16:10:27 GMT", "created": "6 Oct 2016 16:10:27 GMT", "version": 1}}}
```

This is an automatically generated email. Do not reply. For questions regarding this alert, contact your system administrator.

Send an email alert via the Watson IoT Platform when the temperature sensor reaches a specified threshold.

(see Create a Rule and Action, pg 5)



Visualize the temperature data using a dashboard and a line graph.

(see Create a [dash]Board, pg 9)



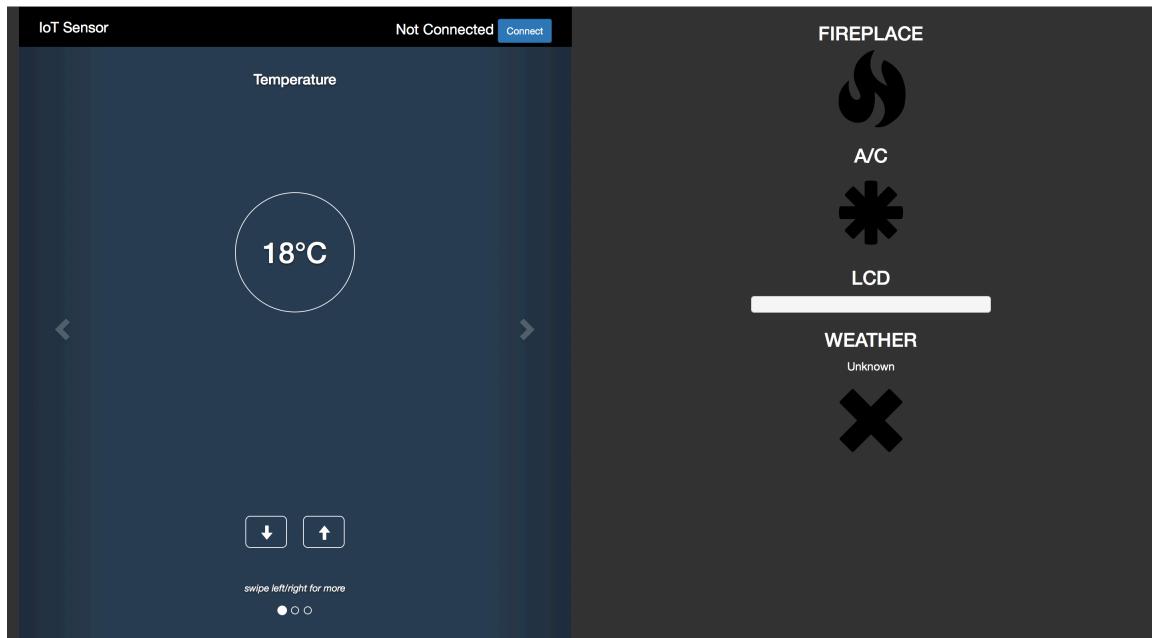
A digital copy of this lab can be found at:
<http://ibm.biz/home-iot-analytics>



Set up IoT simulator in IBM Bluemix

This lab uses an IoT simulator application and Watson Internet of Things Platform service that was created in another lab. Please visit ibm.biz/home-iot-simulator and follow the steps to deploy the simulator application and create the device profiles. These two parts are prerequisites to following along in this lab.

You can also choose to use your own IoT device and data. In this case, please make appropriate changes to reflect the device event properties your device emits to the IoT Platform.



(simulator application when deployed from ibm.biz/home-iot-simulator)

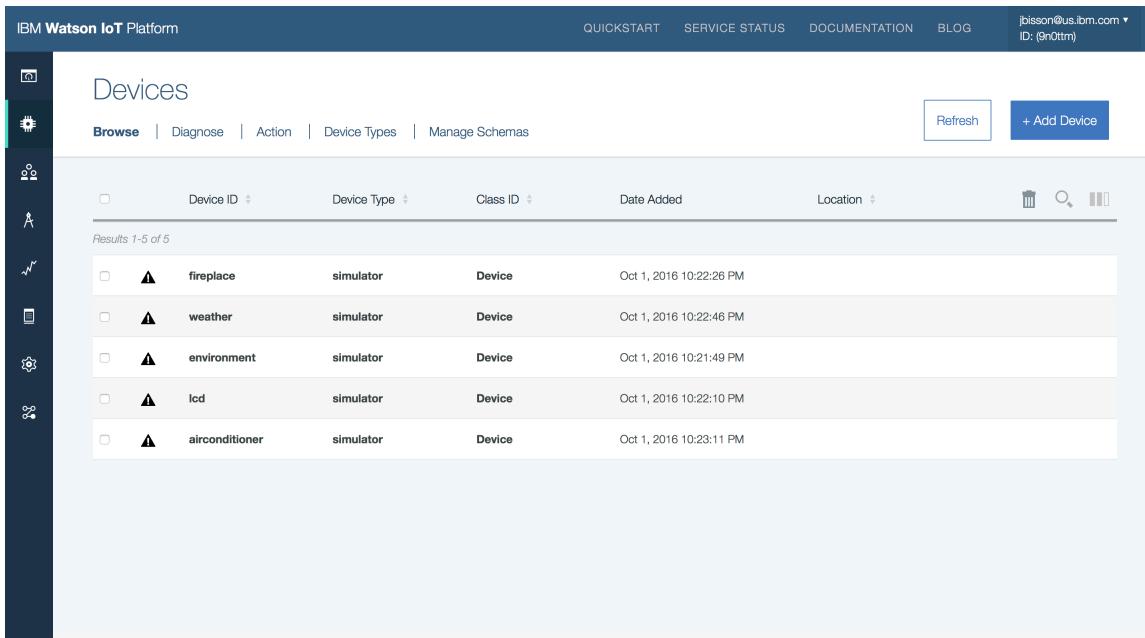
A screenshot of the "Devices" page in the IBM Watson IoT Platform. The page has a sidebar with various icons. The main area shows a table with columns: Device ID, Device Type, Class ID, Date Added, and Location. The table contains five rows, each representing a simulated device: "environment" (simulator, Device, Sep 30, 2016 4:43:33 PM), "fireplace" (simulator, Device, Sep 30, 2016 4:44:18 PM), "airconditioner" (simulator, Device, Sep 30, 2016 4:44:40 PM), "lcd" (simulator, Device, Sep 30, 2016 4:44:59 PM), and "weather" (simulator, Device, Sep 30, 2016 4:45:15 PM). The table includes sorting and filtering options at the top and a search bar at the bottom right.

(devices that the simulator uses)

Create a Device Schema

To use Watson Internet of Things Platform features such as rules and actions, you must first create a schema to map device properties to user-friendly properties names, set the data units for the properties, and specify a message type to use with the schema. In this section, we will create a schema for the environment sensor with three properties: temperature, humidity, and object temperature.

1. Select **Devices** from the left toolbar of the IBM Watson IoT Platform dashboard. Select the **Manage Schemas** tab.

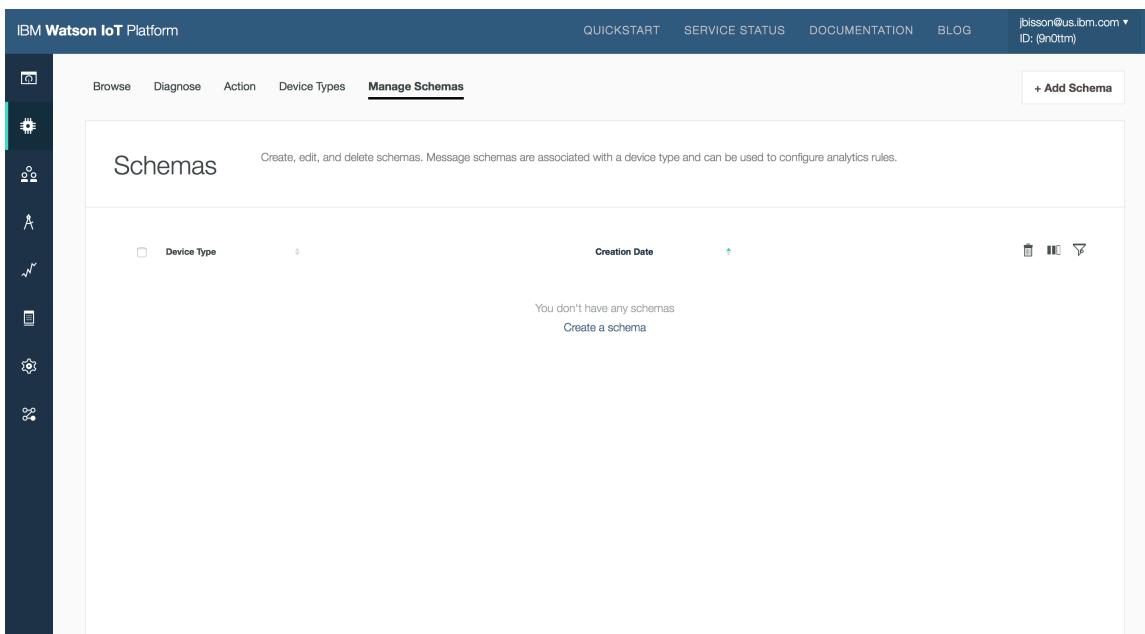


The screenshot shows the 'Devices' page of the IBM Watson IoT Platform. The top navigation bar includes links for QUICKSTART, SERVICE STATUS, DOCUMENTATION, and BLOG, along with a user account dropdown. On the left, a vertical toolbar contains icons for Device Overview, Diagnose, Action, Device Types, and Manage Schemas. The main content area is titled 'Devices' and shows a table with columns for Device ID, Device Type, Class ID, Date Added, and Location. The table lists five entries:

Device ID	Device Type	Class ID	Date Added	Location
fireplace	simulator	Device	Oct 1, 2016 10:22:26 PM	
weather	simulator	Device	Oct 1, 2016 10:22:46 PM	
environment	simulator	Device	Oct 1, 2016 10:21:49 PM	
lcd	simulator	Device	Oct 1, 2016 10:22:10 PM	
airconditioner	simulator	Device	Oct 1, 2016 10:23:11 PM	

Buttons for Refresh and + Add Device are located in the top right corner of the table area.

2. Click on the **Add Schema** button in the top-right corner of the page.



The screenshot shows the 'Manage Schemas' page of the IBM Watson IoT Platform. The top navigation bar includes links for QUICKSTART, SERVICE STATUS, DOCUMENTATION, and BLOG, along with a user account dropdown. On the left, a vertical toolbar contains icons for Device Overview, Diagnose, Action, Device Types, and Manage Schemas. The main content area is titled 'Schemas' and displays a message: 'Create, edit, and delete schemas. Message schemas are associated with a device type and can be used to configure analytics rules.' Below this, there is a table header with columns for Device Type and Creation Date. A message states 'You don't have any schemas' and includes a 'Create a schema' button.

3. Select the device type **simulator** from the dropdown menu. Click **Next**.

4. You can enter properties manually, or you can have the platform use the properties from a device event. Click **Add property**. Select the **From Connected** tab.
5. When a device event is sent from the simulator, the list updates to include the properties of the event. Select the three properties: `d.temp`, `d.humidity`, `d.objectTemp`. Click **OK**.

Property	Type
<input type="checkbox"/> d.name	string
<input checked="" type="checkbox"/> d.temp	float
<input checked="" type="checkbox"/> d.humidity	float
<input checked="" type="checkbox"/> d.objectTemp	float

6. The message schema displays three properties with the type float. Click **Finish**.

Property	Name	Type
d	d	Parent
temp	temp	float
humidity	humidity	float
objectTemp	objectTemp	float

Schemas

Create, edit, and delete schemas. Message schemas are associated with a device type and can be used to configure analytics rules.

Create a Rule and Action

Rules are condition-based decision points that match real-time device data with predefined threshold values or other property data to trigger an alert if a condition is met. In this section, we'll monitor the room temperature and take action when the temperature increases above. Since the air conditioner is supposed to turn on at 27°C, and the temperature happens to continue to increase, we can suspect the air conditioner isn't working correctly and that we might need the system checked. In this section, we'll send an email to maintenance with the device information.

1. Click on **Rules** in the left toolbar. Click on the **Create Cloud Rule** button in the top-right corner of the page.

The screenshot shows the IBM Watson IoT Platform interface. At the top, there's a navigation bar with links for QUICKSTART, SERVICE STATUS, DOCUMENTATION, and BLOG, along with a user profile for jbisson@us.ibm.com. Below the navigation bar is a toolbar with various icons. The main area is titled 'Browse Rules' and contains a sub-header 'Actions'. There are buttons for 'Download Edge Agent', '+ Create Edge Rule', and '+ Create Cloud Rule'. A message says 'Create, edit, and delete rules for your devices. Use rules to create alerts or trigger actions when trigger conditions are met for a device.' Below this is a table header with columns: Name, Description, Applies To, State, Rule Type, and actions. The table body displays the message 'You don't have any rules'.

2. Give the rule a name of `High Temperature`. Choose `simulator` from the drop-down menu. Click **Next**.

The dialog box is titled 'Add New Cloud Rule'. It has three input fields: '*** Name:**' with the value 'High Temperature', '**Description:**' with the placeholder 'Provide a short description of the rule.', and '*** Applies to:**' with the value 'simulator' selected from a dropdown menu. At the bottom right are 'Cancel' and 'Next' buttons.

3. You can create complex logic matching rules with AND and OR conditions, which if matched, will then trigger an action to be performed. Click on the grey box labeled **New condition**.

The screenshot shows the IBM Watson IoT Platform Actions interface. A new condition is being created for a "High Temperature" alert. The alert has a description "Enter a description" and applies to a "simulator". The alert priority is set to "Low". The condition is defined as "IF: Add one or more conditions." and "THEN: Add or select one or more actions." A "New condition" box is open under the IF section, and a "New action" box is open under the THEN section. The interface includes a sidebar with various icons and a top navigation bar with links like QUICKSTART, SERVICE STATUS, DOCUMENTATION, and BLOG.

4. Choose the property `temp` and set the other options as shown below. Click **OK** when finished.

The screenshot shows the "Set The Condition" dialog box. It allows setting a condition based on a property ("temp"), operator (">"), and value (40). The "Static value" option is selected under "Compare with". The "OK" button is visible at the bottom right.

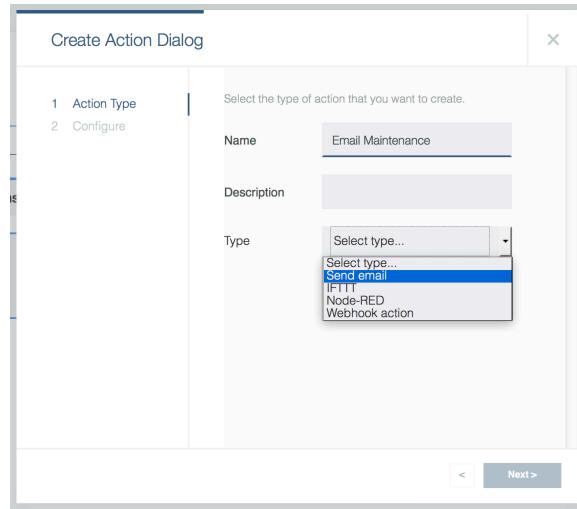
Property:	<code>temp</code>
Operator:	>
Compare with:	<input checked="" type="radio"/> Static value <input type="radio"/> Property
Value:	40

5. Next, we'll create an action to send an email when the high temperature condition occurs. Click on the grey box labeled **New action**. Click on **Add action**.

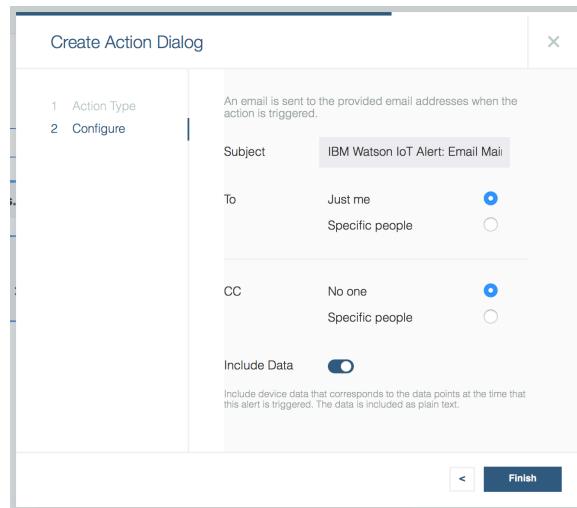
The screenshot shows the "Set The Action" dialog box. It includes an "Add action" button and a table for managing actions. The table columns are Name, Type, and Description. There are currently no actions listed.

Name	Type	Description

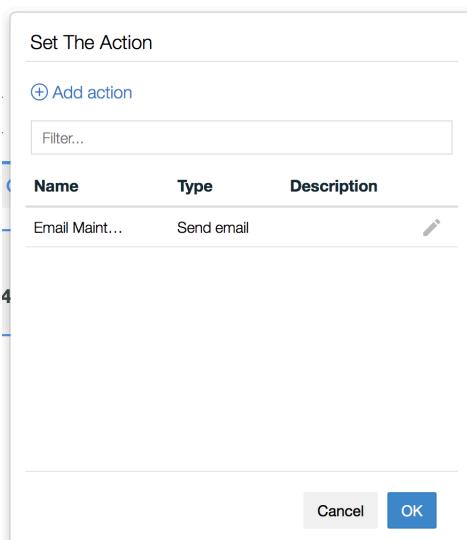
6. Enter the name of the action, **Email Maintenance**. Choose the action type **Send email**. You can choose other types of action, like communicating the service IFTT, interacting with a Node-RED application, or calling a webhook. Click **Next**.



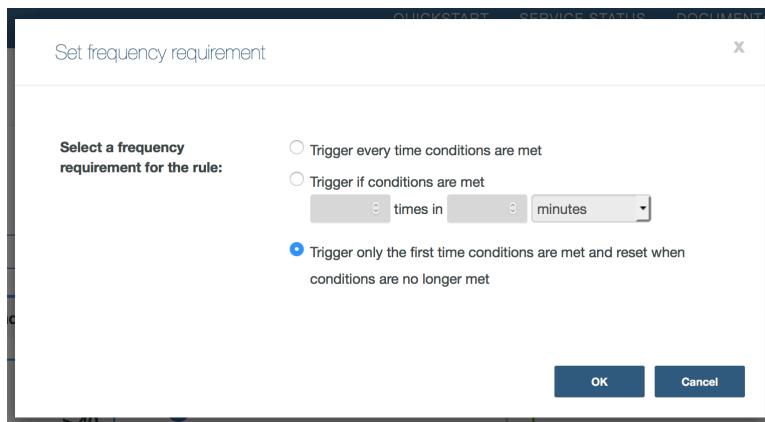
7. You can customize the email subject and the recipients. Switch on the **Include Data** option.



8. The new action is added to the list of available actions. Select the action from the list and click **OK**.



9. Lastly, let's set the frequency at which these emails should be sent. Click on Trigger every time conditions are met in the left column. Select the last option, to Trigger only the first time conditions are met and reset when conditions are no longer met. Click **OK**.



10. Click on the **Activate** button to activate this rule.

11. Return to the simulator and increase the temperature above 40°C. Check your email for the alert of a high temperature. The email automatically includes the device event for maintenance to use in diagnosing the potential failure.

IBM Watson IoT Alert: Email Maintenance

IoT Real-Time Insights to me

9:10 AM

[Show more](#)

Rule: High Temperature
Device: 9n0ttm:simulator:environment
Date: 2016-10-06T16:10:28.583Z
Condition:
`simulator.d.temp>40`
Incoming Message:

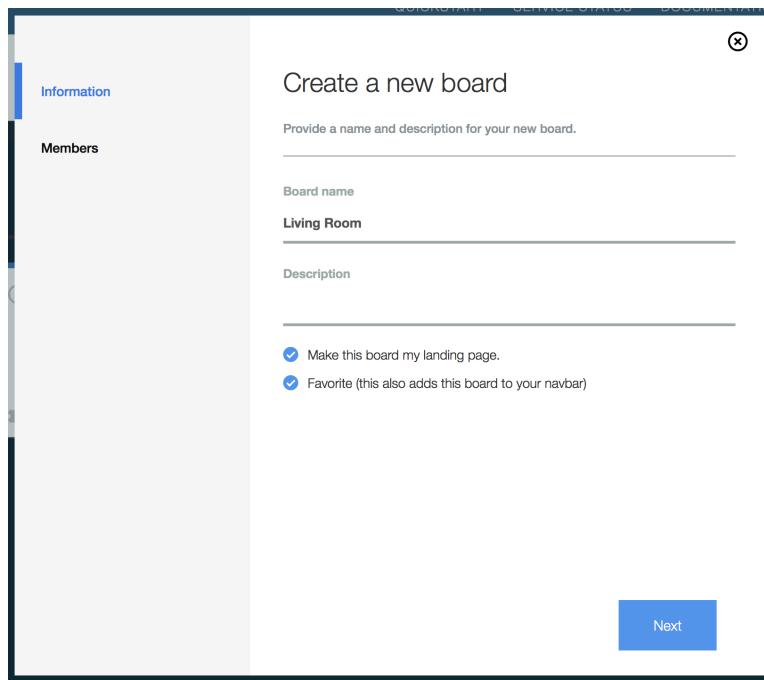
```
{
  "d": {
    "name": "simulator",
    "temp": 42,
    "humidity": 77,
    "objectTemp": 24,
    "ruleContent": {
      "jobID": "XFc1GM0w",
      "contextSchemas": [],
      "transforms": [
        {
          "parameters": "Rule, becomes, true, 0",
          "name": "High Temperature1475770186133"
        }
      ],
      "type": "DeliverOnChange"
    },
    "ruleDescription": "",
    "severity": 4,
    "messageScenarios": [
      {
        "simulator": []
      }
    ],
    "disabled": false,
    "ruleCondition": "simulator.d.temp>40",
    "name": "High Temperature1475770186133"
  }
}
```

Create a [dash]Board

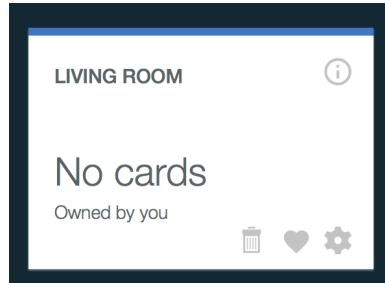
The Watson Internet of Things Platform offers an interface that you can create and share your own dashboards that visualize device data in real time. By using boards and cards, you can graphically visualize data set values from one or more devices to provide a quick overview and enhance understanding of the data. You can create boards and add cards that display the data as raw numbers, real-time graphs, gauges, and more.

In this section, we will create a dashboard with a line graph showing the temperature over time of the simulated living room. Please have the simulator connected and sending the environment sensors to the IoT Platform.

1. Click on **Boards** in the left toolbar. Click on **Create New Board**. Enter the board name **Living Room** as shown below. Click **Next**. Click **Create** on the next screen.



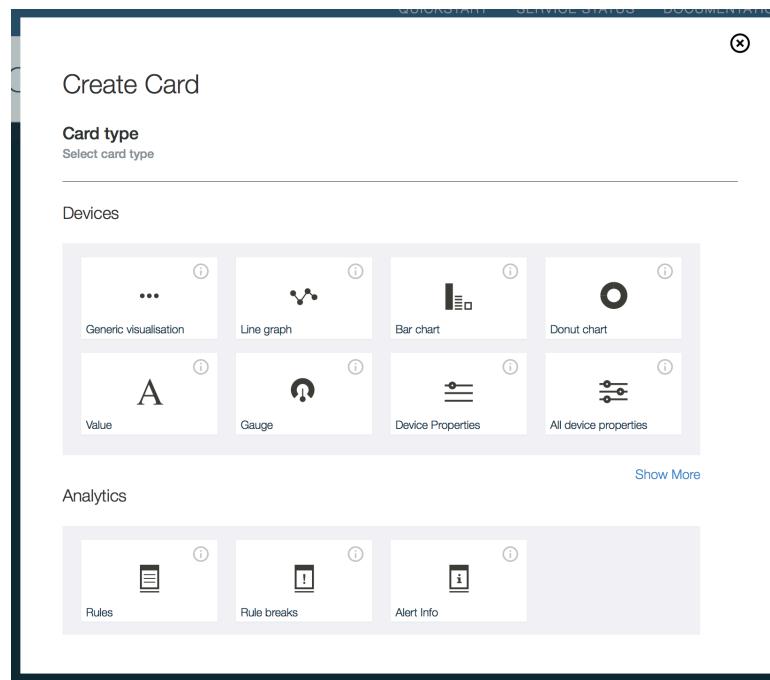
2. Select the board named **Living Room**.



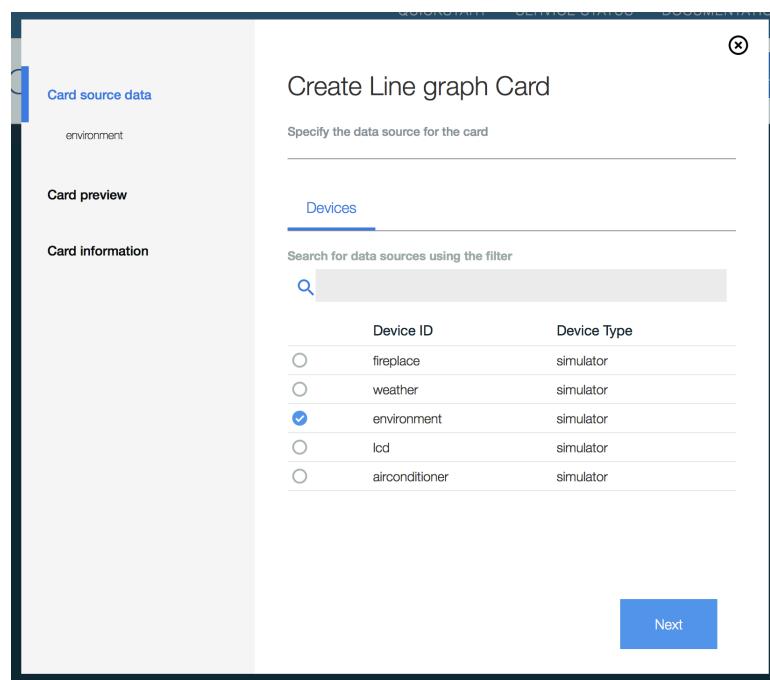
3. Click **Add New Card**.



4. Select the card type of **Line graph**.



5. Select the radio button for the device with ID environment. Click **Next**.



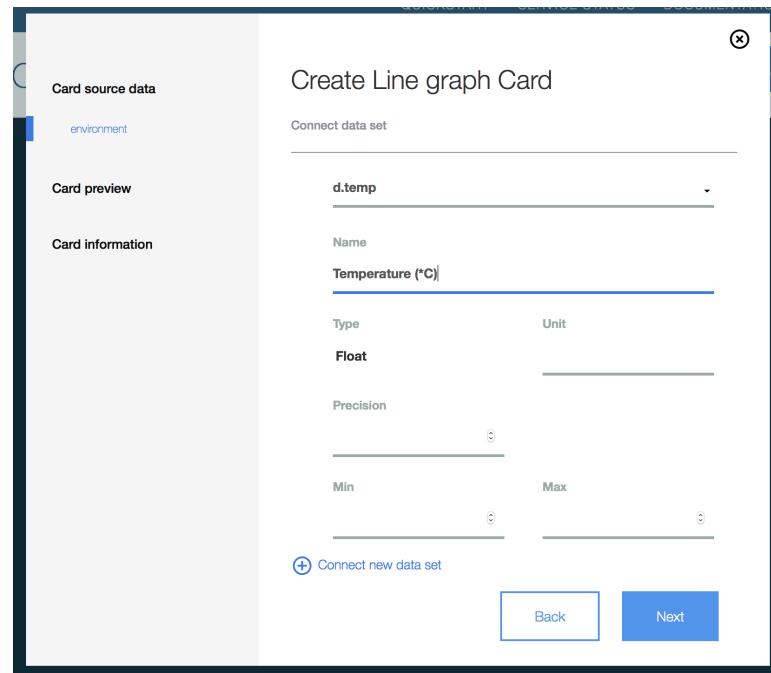
6. Click on **Connect new data set**.

Create Line graph Card

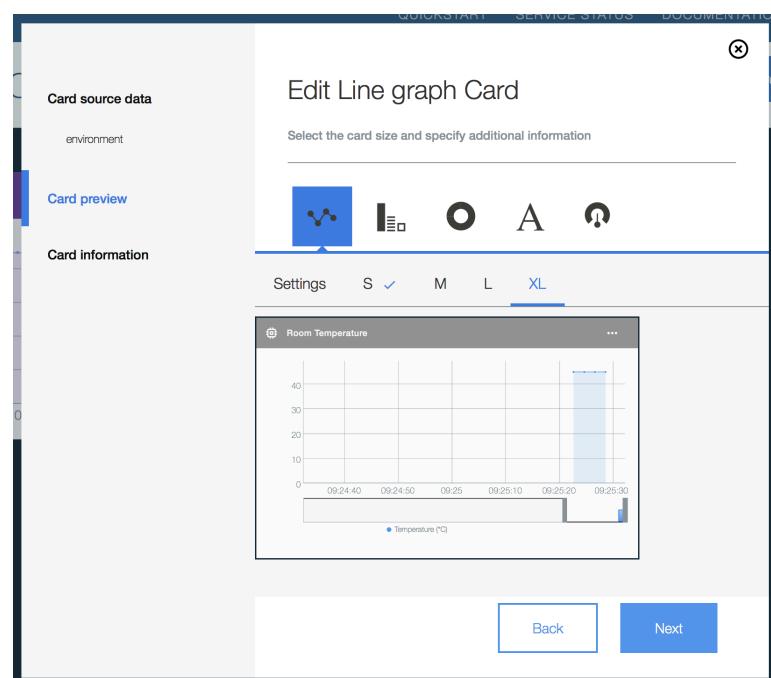
Connect data set

[Connect new data set](#)

7. Select the property `d.temp` from the **Property** dropdown menu. Enter the card name Temperature (*C). Click **Next**.



8. Select the chart size **XL**. Click **Next**.



9. Enter a Card Title Room Temperature. Click **Submit**.

Create Line graph Card

Title
Room Temperature

Description

Color scheme

Back Submit

10. As sensor event data comes in, the chart will display the temperature changes over time. Return to the simulator and adjust the temperature up and down to simulate fluctuating temperatures.

