Sending Alerts from BCM4343W IoT Starter Kit Alexa Voice-Controlled Smart Home Demo

By Bryan Chen

This application demonstrates an extended capability of the Alexa Smart Home Demo to issue email notifications under given sensor conditions.

Requirements:

- Avnet BCM4343W IoT Starter Kit
- Adafruit 8x8 LED Matrix board (more information in appendix)
- Seeed Studio Relay Shield v3.0 (more information in appendix)
- ZentriOS SDK
- A Serial console application (such as TeraTerm or Putty)
- IBM Bluemix Account
- Amazon AWS Account

Application Description

The main function of the application is to provide a push notification service in addition to the bridge between Amazon's Alexa voice interface and the Avnet BCM4343W IoT Starter Kit board through AV04. Thus, the general framework of the application remains the same with the two-part connection with the Amazon Alexa to Node RED to the Avnet board. The change that takes place for the email notification is within the Node RED application using Bluemix Services.

This application takes Node RED a step further, adding an email notification route within the existing flow. Therefore, when one asks Alexa to "start publishing", Node RED will periodically receive updates from the board, which will then be routed to its Bluemix Services for processing.

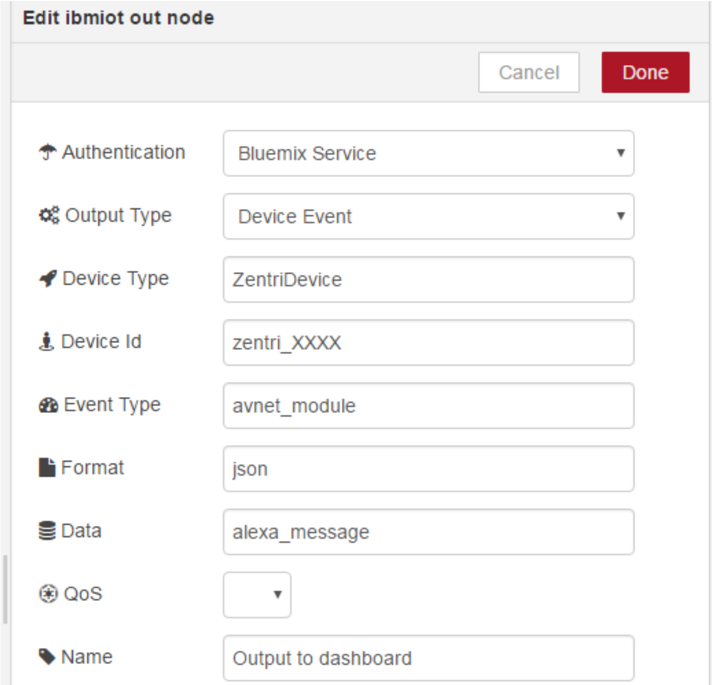
To utilize Bluemix Services, the Avnet board must first be registered as a device in the system. This is done by using the device's unique ID – zentri_XXXX, where "XXXX" represents the four digits of your individual device ID. Within Bluemix Services, a Device Schema is generated for your registered device to allow for Bluemix to identify which properties to work with. A "rule" is then created – an IF – THEN condition to trigger an email notification based on data thresholds. The user can then input certain email addresses for the push notifications to be sent to

Instructions

0. Please complete reference design AV04 first.
1. Reconfigure your Node-RED code

NOTICE OF DISCLAIMER: Avnet is providing this design, code, or information "as is." By providing the design, code, or information as one possible implementation of this feature, application, or standard, Avnet makes no representation that this implementation is free from any claims of infringement. You are responsible for obtaining any rights you may require for your implementation. Avnet expressly disclaims any warranty whatsoever with respect to the adequacy of the implementation, including but not limited to any warranties or representations that this implementation is free from claims of infringement and any implied warranties of merchantability or fitness for a particular purpose.

a. In Node RED, configure the node “*Output to dashboard*” like the following image if not done so already. Zentri_XXXX is replaced by your own device ID.



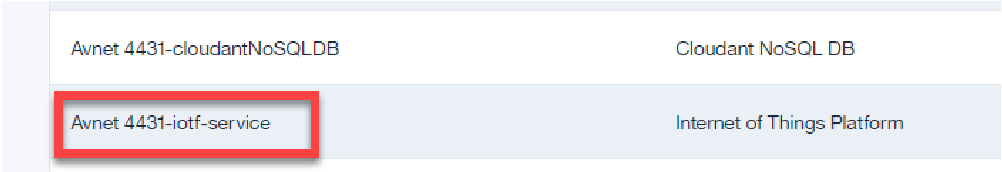
Edit ibmiot out node

Authentication	Bluemix Service
Output Type	Device Event
Device Type	ZentriDevice
Device Id	zentri_XXXX
Event Type	avnet_module
Format	json
Data	alexa_message
QoS	
Name	Output to dashboard

2. Register your Device in Bluemix Services

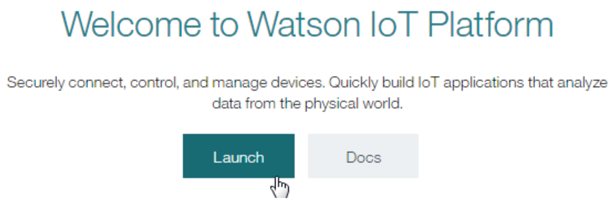
a. Go to the following link and scroll down to select the appropriate iotf service.

https://new-console.ng.bluemix.net/#all-items



Avnet 4431-cloudantNoSQLDB	Cloudant NoSQL DB
Avnet 4431-iotf-service	Internet of Things Platform

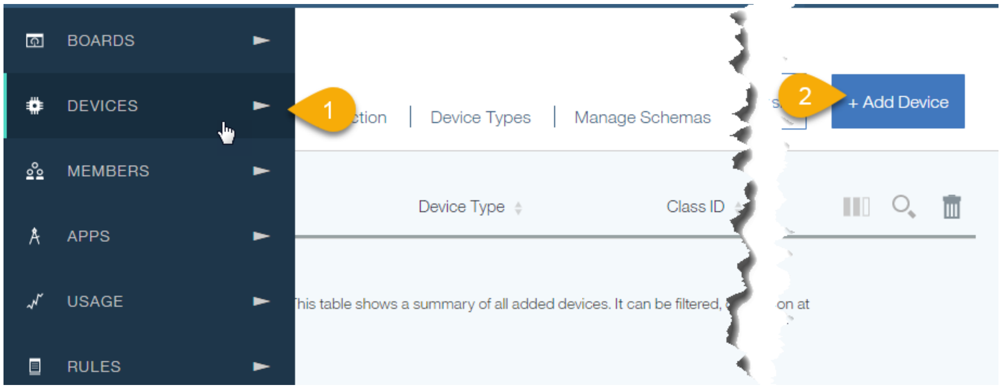
b. Click on “*Launch*” to access your Bluemix Services dashboard:



Welcome to Watson IoT Platform

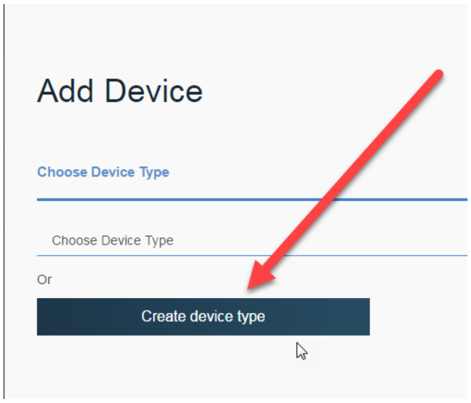
Securely connect, control, and manage devices. Quickly build IoT applications that analyze data from the physical world.

c. Hover your mouse over the icons to the left to open up the pop-out menu, then select “*Devices*”. Click “*Add Device*” in the top right corner of the screen.

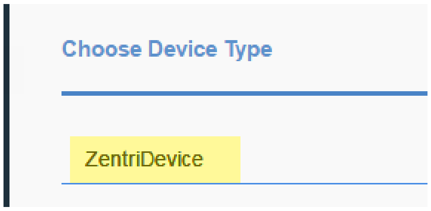


his table shows a summary of all added devices. It can be filtered, on at

d. Click on “*Create device type*”, then click “*Create device type*” again.



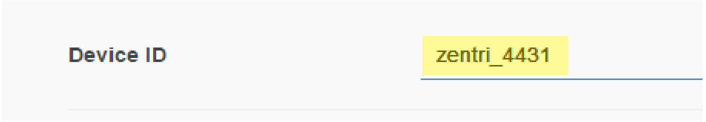
e. Enter “*ZentriDevice*” for the Name and add an optional description and click next to skip through rest of the windows until you reach the last page - Metadata. Click “Create” and you should now see a “*ZentriDevice*” device type.



Choose Device Type

ZentriDevice

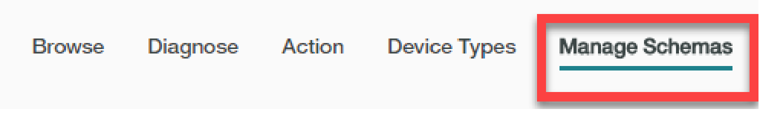
f. Click “*Next*” and enter in your “*zentri_XXXX*” device ID from earlier. Skip through the remaining windows and click the “*X*” when finished.



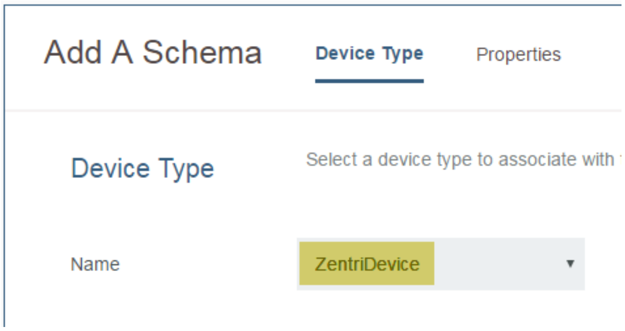
Device ID zentri_4431

3. Create a Device Schema

   a. Select the "*Manage Schemas*" tab on the top menu to create a device schema.

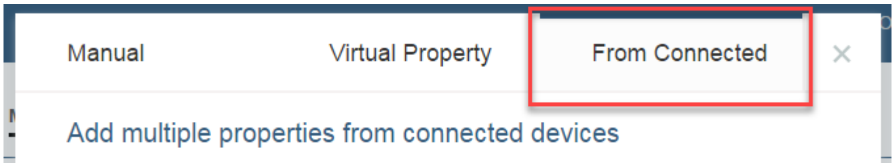


   b. Click "Add Schema" In the top right corner, select "*ZentriDevice*" for your device type and press "*next*".

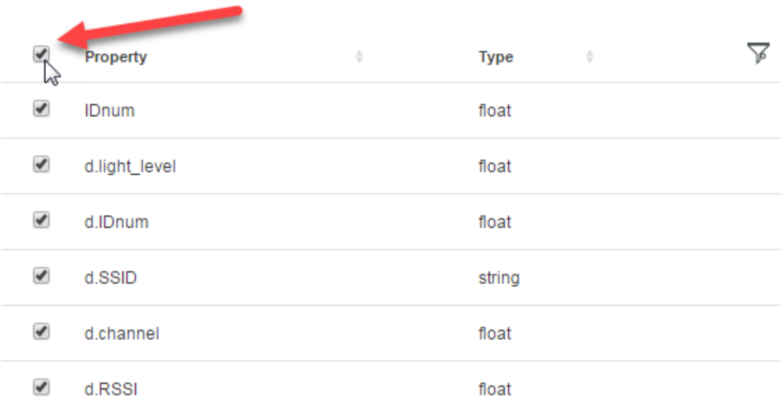


Name: ZentriDevice

   c. Click "*Add Property*" and select the "*From Connected Tab*", which will automatically import published properties.



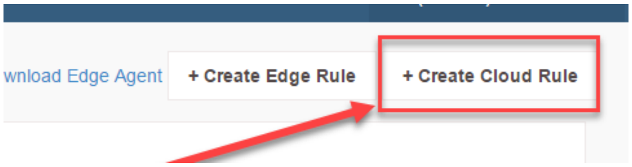
   d. Tell Alexa to "*start publishing*" to see properties appear on the menu. Select all by checking the box next to property.



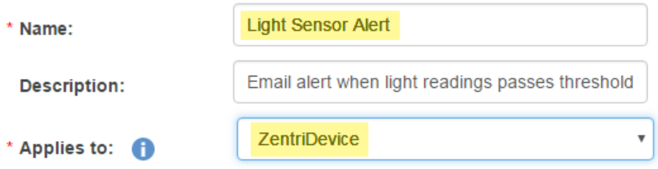
☑	Property	Type
☑	IDnum	float
☑	d.light_level	float
☑	d.IDnum	float
☑	d.SSID	string
☑	d.channel	float
☑	d.RSSI	float

   e. Click "*Finish*". You should now see a schema listed as "*ZentriDevice*" back in the Schemas menu.

4. Create a Device Rule
    a. Hover your cursor over the icons to the left of the page to open the pop-up menu again. Select "*Rules*" and then click on "*Create Cloud Rule*".

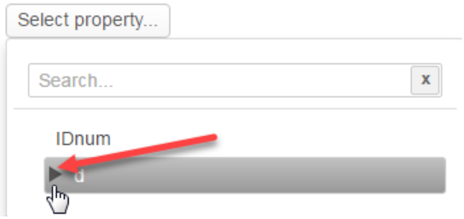


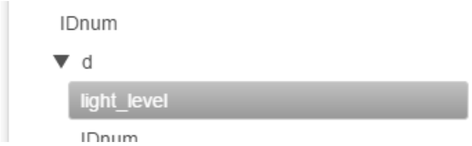
    b. Enter a name for your rule, an optional description and select the "*ZentriDevice*" schema in the "*Applies to:*" box.



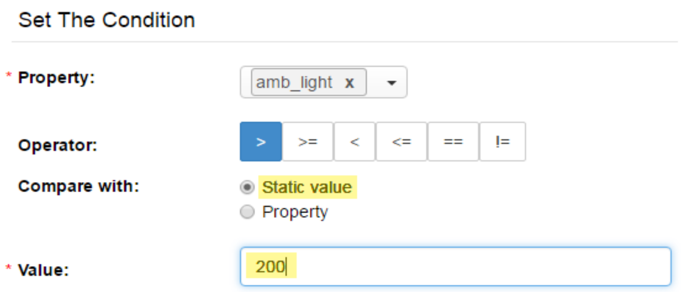
* Name:	Light Sensor Alert
Description:	Email alert when light readings passes threshold
* Applies to:	ZentriDevice

    c. Click next when complete and you should see an "IF/THEN" Diagram. Under the IF condition, click on the "*New Condition*" box to edit it. Click "*Select Property*" to choose the property for the IF condition, then click on the *triangle icon* next to "d" to open up a drop-down list of additional nested properties – select the "*light_level*" property.





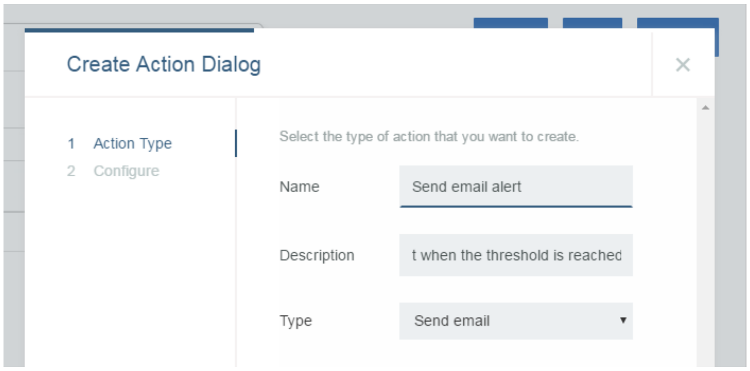
    d. Leave the operator as ">" and enter a reasonable value for the "*Value:*" box to compare whether the light is on or off. For this example, the value *200* is used. Click "*OK*".



Set The Condition

* Property:	amb_light x
Operator:	**>** >= < <= == !=
Compare with:	● Static value ○ Property
* Value:	200

e. Now select the “*New action*” box to create a response to the IF condition. Click on “*Add Action*” and give your action a unique name and description, then select “*send email*” for “*Type*”. Press “*Next*” when complete.



Create Action Dialog

1 Action Type
2 Configure

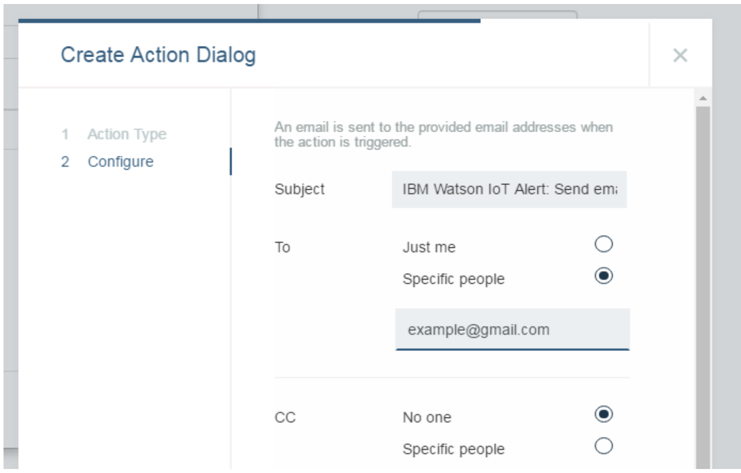
Select the type of action that you want to create.

Name: Send email alert

Description: t when the threshold is reached

Type: Send email

f. Edit the subject line if you wish, and select “*Specific People*” under the “*To*” header. Enter the email address(es) you wish the notification to be sent to. You can also include emails for CC.



Create Action Dialog

1 Action Type
2 Configure

An email is sent to the provided email addresses when the action is triggered.

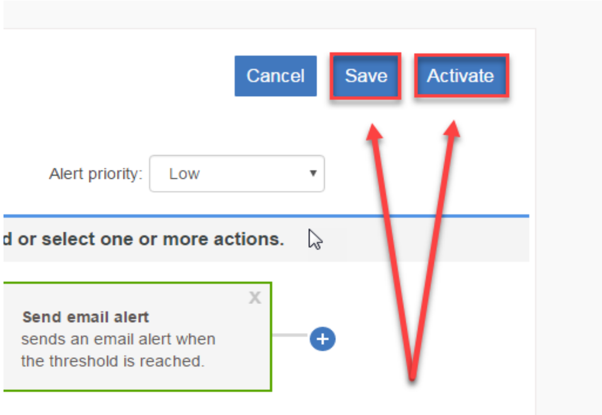
Subject: IBM Watson IoT Alert: Send emi

To: Just me ○ Specific people ●

example@gmail.com

CC: No one ● Specific people ○

g. Press finish and click on “*save*” and “*activate*” on the top right corner of the main rule menu to start your email notification application. Make sure the ‘*then*’ box has your rule.

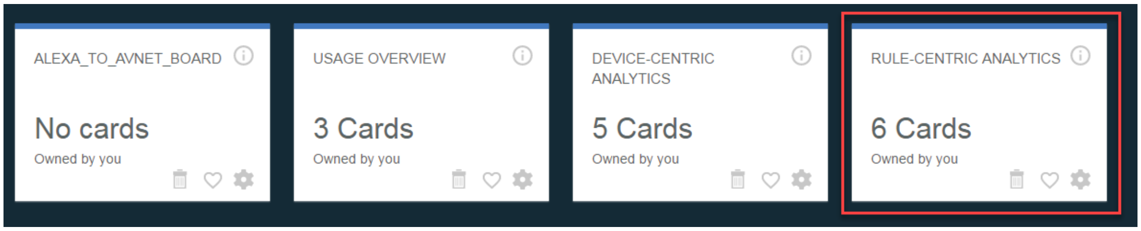


Alert priority: Low

d or select one or more actions.

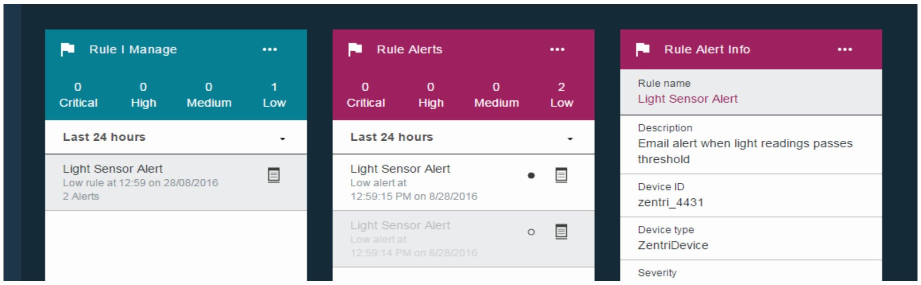
Send email alert
sends an email alert when the threshold is reached.

5. Test your Email Notification Alerts!
    a. Hover your cursor over the left pop-out bar and select “*Boards*”. Then click on the “*Rule-Centric Analytics*” board.



ALEXA_TO_AVNET_BOARD	USAGE OVERVIEW	DEVICE-CENTRIC ANALYTICS	RULE-CENTRIC ANALYTICS
No cards	3 Cards	5 Cards	6 Cards
Owned by you	Owned by you	Owned by you	Owned by you

    b. You will now see several “*cards*” that display rule-related information. Make sure that the board is currently publishing and shine a light on the light sensor to trigger the email rule.



Rule I Manage

0	0	0	1
Critical	High	Medium	Low

Last 24 hours

Light Sensor Alert
Low rule at 12:59 on 28/08/2016
2 Alerts

Rule Alerts

0	0	0	2
Critical	High	Medium	Low

Last 24 hours

Light Sensor Alert
Low alert at
12:59:15 PM on 8/28/2016

Light Sensor Alert
Low alert at
12:59:14 PM on 8/28/2016

Rule Alert Info

Rule name
Light Sensor Alert

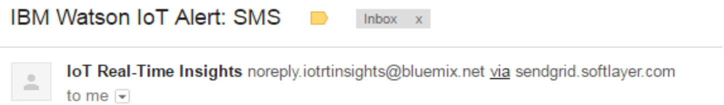
Description
Email alert when light readings passes threshold

Device ID
zentri_4431

Device type
ZentriDevice

Severity

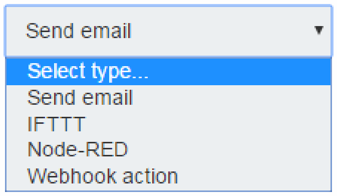
    c. Check your *email* to see the notification. If you don’t see it, try checking your spam folder.



IBM Watson IoT Alert: SMS   Inbox x

IoT Real-Time Insights noreply.iotrtinsights@bluemix.net via sendgrid.softlayer.com
to me

6. Extend this Application!
    Once you have successfully built this application, feel free to experiment with different IF conditions and THEN actions. There are many other actions that can be implemented with rules, such as triggering a Node-RED flow, IFTTT, etc.



LINKS:

Avnet BCM4343W IoT Starter Kit:
http://cloudconnectkits.org

Adafruit 8x8 LED Matrix Board:
https://www.adafruit.com/products/870

Seeed Studio Relay Shield:
http://www.seeedstudio.com/depot/Relay-Shield-v30-p-2440.html

ZentriOS SDK:
https://docs.zentri.com/wifi/sdk/latest/user-guide/getting-started

IBM Bluemix Console Page
https://new-console.ng.bluemix.net/

Author: Bryan Chen

With a passion for robotics and home automation, Bryan is a part-time EE/CS intern within Avnet's engineering team, while busy with full-time final year UCLA Electrical Engineering studies, focused on signals and systems.

He is a key contributor of reference designs, having published multiple applications using Avnet's versatile BCM4343W Wi-Fi & BT/BLE SoC module, taking-on challenging connectivity designs with BLE, cloud platforms and Alexa voice interfacing.

Revision History

Date	Version	Revision
20 June 17	01	Initial Release