User Guide for an end-end demo of IoT Asset Monitoring Application

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Purpose

This user guide contains the installation and setup instructions for demonstrating IoT Asset Monitoring application using Bosch XDK or TI Sensor tag devices. If you plan to use TI Sensor tag device then there is no firmware setup needed and hence you could skip the sections pertaining to Bosch XDK setup in the document below.

Android Versions

The android app mentioned in this document works with both Bosch XDK as well as TI Sensortag devices. The app has been tested with android 7 (Nougat) and Android 6 (Marshmallow) versions.

Demo Setup Overview

With the android app installed on your phone and connected to the sensor device, your phone acts as a gateway for these devices to IoT Asset Monitoring Cloud. The app sends data messages to IoT Asset Monitoring Cloud which are used for generating various incidents and alerts.

Here is a summary of the demo steps. Please note that you would have to read and follow all the instructions in this document to be able to use these demo steps.

1. Before the demo, you should make sure that your phone is connected to the internet and/or VPN – depending upon the IoT cloud instance location.

2. Turn ON the location and Bluetooth settings on your mobile phone.

3. Launch the app and connect to the sensor device.

4. At this point, you can show the sensor data appearing live on the mobile phone app screen. You could blow into the device (to increase humidity) or hold the device in between your palms (to increase temperature). However the easiest is to cover the device (the side where sensors are located) with your hands or face it to the window/light source, to show the light values (Lux) changing.

5. Then flick the switch in the app to start sending the data to IoT Asset Monitoring Cloud app. You could show the map of assets and point out your device on the map. Drill in to show the live sensor data from the device on the Asset Details page.

6. Then you could turn ON the incident rules and manipulate the device e.g. tilt it or make it fall to trigger the related rule etc and show the audience the resultant incident/alert.

Install firmware on Bosch XDK

Note : The instructions in this section are applicable if you have a Bosch XDK device. If you have a TI Sensortag device, then you can skip this entire section.

1. Download the firmware zip file (OracleIoTXDKDemoFirmware.zip) to your PC.
2. Extract the contents of this zip file to some folder on your PC. This folder will now contain a directory viz. OracleIoTXDKDemoFirmware.
3. Open XDK Workbench
4. Import the firmware into a XDK Workbench project.
   4.1. Select File -> Import. The following dialog box would be shown
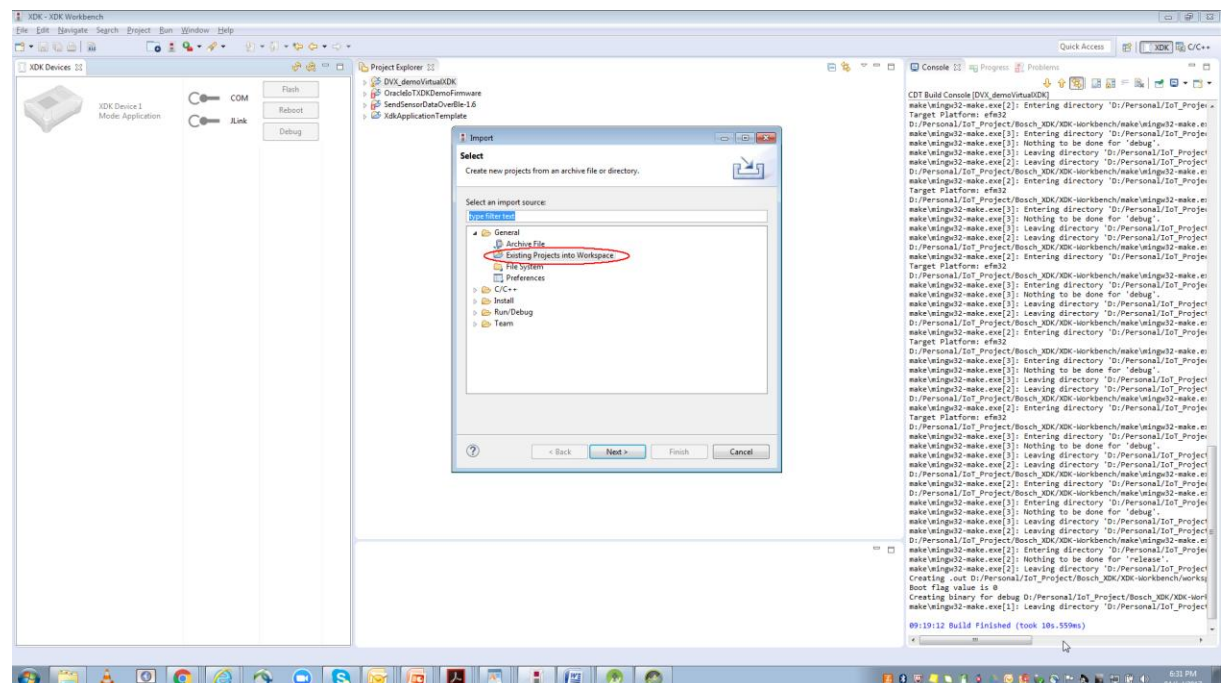
4.2. Select option General -> Existing Projects into Workspace. Click Next. Following dialog would be shown next
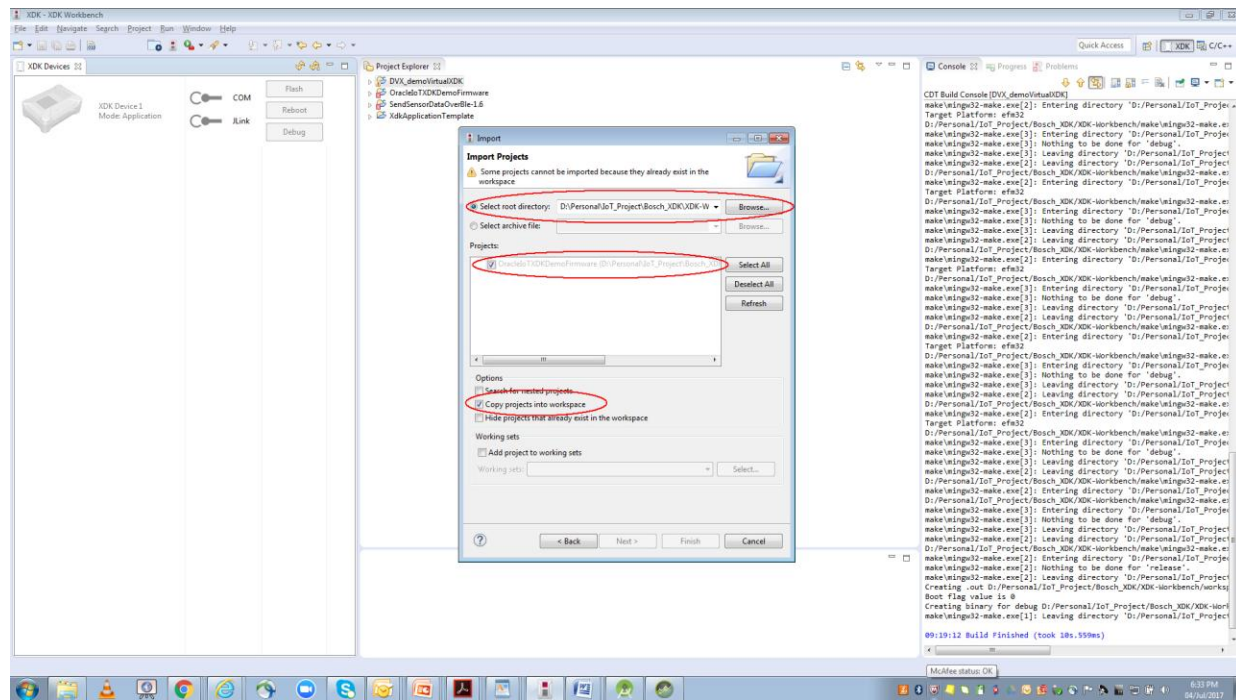
4.3. Set 'Select root directory' value to the OracleIoTXDKDemoFirmware folder location (extracted earlier – as per step 2 above)

4.4. Check the box in Projects section.

4.5. Check 'Copy projects into workspace' in Options section.

4.6. Click Finish.

5. A new project viz. OracleIoTXDKDemoFirmware would show up in the Project Explorer. Now you need to build this project.

5.1. Select this project in the Project Explorer.

5.2. Click on 'Project' menu and click on 'Build Project'.

6. Once the project is built, you are now ready to flash the firmware to your XDK device

6.1. Connect your XDK device to your PC using an USB cable.

6.2. Ensure that the device is switched ON by flicking the switch on the device.

6.3. Make sure that the device is recognized and listed in the XDK Devices section in the XDK workbench. See screenshot below.

6.4. Select project OracleIoTXDKDemoFirmware in the Project Explorer and Click on the 'Flash' button. The firmware would now be flashed to the XDK device.
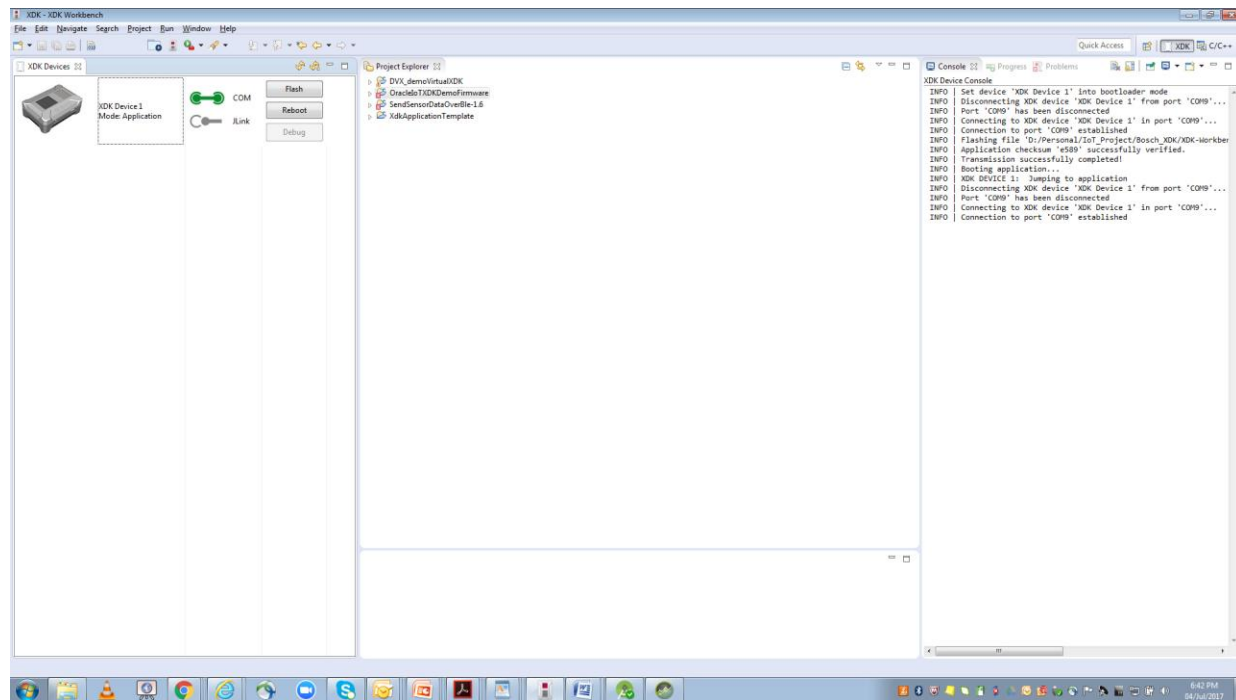
6.5. Your XDK device is now ready with the required firmware. You may disconnect it from your laptop now.

Install Android application

1. Download the OracleIoTAssetGateway.apk file to your mobile phone. You could do this in multiple ways – by sending this file by email and then accessing it on your phone OR by connecting your phone to your laptop using an USB cable and then copying the file over to the phone etc.

2. Install the mobile application on your phone by clicking/tapping on the apk file. The installed application is called "Oracle IoT Asset Gateway". See below a screenshot showing the installed app (circled in red)
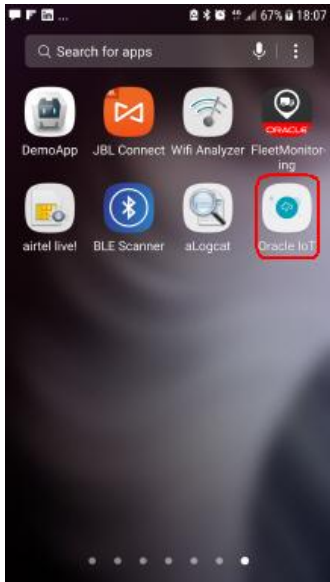
3. Make sure that your phone is connected to Internet. If your IoT server is on Oracle network then ensure that your phone is connected to VPN as well.
4. Turn on the Bluetooth and Location settings on your phone.
5. Launch the application by clicking on the application icon.
6. Grant the permissions that the application would ask for. This is important. If you deny the permissions sought by the app, then it will not work properly.
7. If the app goes in the background (this may happen sometimes), click on the app icon again.
8. Make sure that you set the screen timeout (Settings -> Display) of your phone to a large value – I use 10 minutes. This is required because the app would behave inconsistently during a demo if your phone screen locks/switches off etc. (Remember, I built this for my daughter and hence it has some quirks that our other production quality apps do not have ☺)
9. The application home screen looks as shown below

10. Have your XDK device nearby. Make sure that it is switched on.

11. Click on the Bluetooth scan icon in the mobile app home page (circled in red in the screenshot above)
12. Your Bosch XDK device would be discovered by the android app and it would be listed in the app home page screen. See screen shot below.

13. Click on the device name (circled in red in the screenshot above)
14. The android app will now connect to the XDK device using bluetooth LE. After it's connected, you should see the sensor values appear on the app home page. See below.
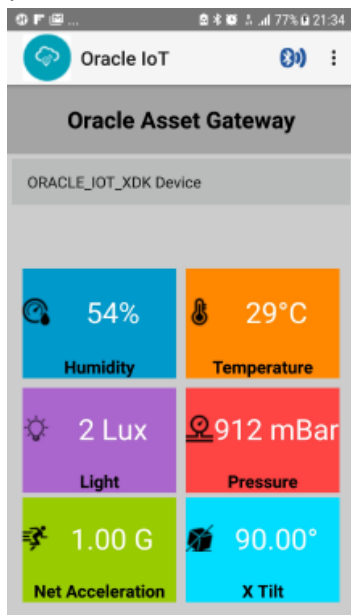
15. You now have successfully connected your android phone to the Bosch XDK device.
16. If the mobile screen times out then it's quite possible that the Bluetooth connection between the mobile phone and Bosch XDK device is severed and sensor values are not updated on the mobile app UI. In that case, after turning on the mobile screen, please repeat the scan and connect to device steps as mentioned above.

Configure IoT Cloud Service – Part 1

1. Log into IoTCS Platform Console on your PC.
2. Register a device (use single device registration) and download the provisioning file. Don't forget to note down the password you entered while creating this file. Also note down the device name.
3. Rename the file extension to .conf (i.e. a dot followed by conf). Make sure that the file name does not have any spaces. (e.g you could use _ to replace the space in the file name). Keep this provisioning file at a known location on your PC.
4. Create a device model with the following values. Ensure that the device model is created with the exact values below without any differences. If there are any discrepancies then the end-end demo would not work correctly or the mobile app may not connect to Oracle IoT Cloud successfully.
    4.1. Please ensure to specify the URN as shown below.
    4.2. Please ensure to select the following System Attributes in the device model

    4.3. Create the following Custom Attributes and Alerts.

Configure Mobile App

1. Copy the provisioning file from your PC to the 'Download' folder on your android mobile phone. You could do this in multiple ways – by sending this file by email and then accessing it on your phone OR by connecting your phone to your laptop by USB and then copying the file over to the phone etc.
2. Open Oracle IoT Asset Gateway mobile app on your phone.
3. Click on the menu icon in top right corner (3 dots icon). A 'Cloud Settings' menu item would pop up.
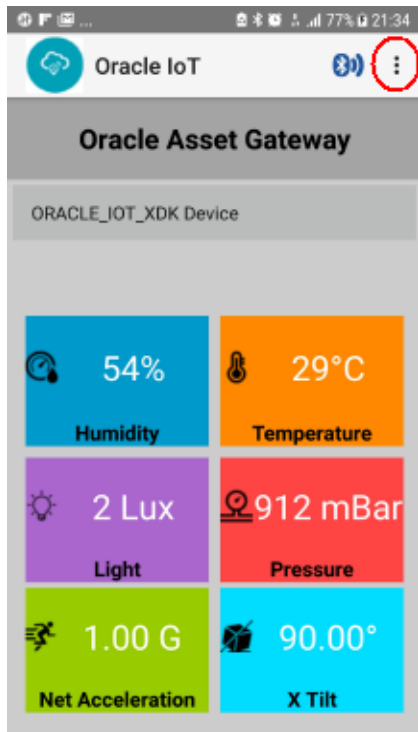
4. Click on the 'Cloud Settings' menu to navigate the Provisioning Information Page as shown below.
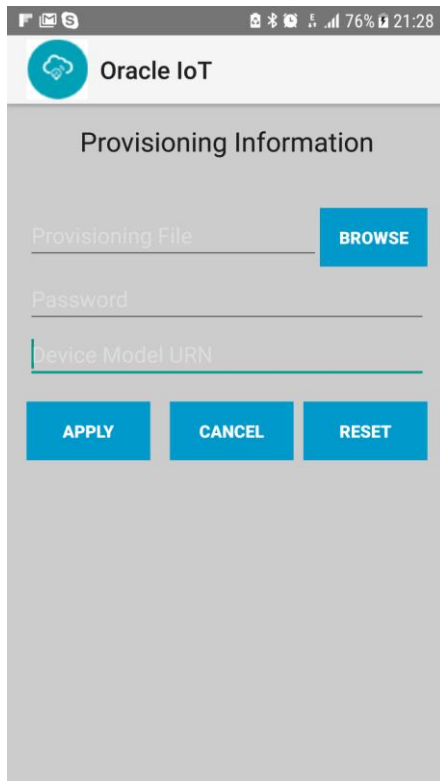
5. Click 'Browse' button and select the appropriate provisioning file from the Download folder on your mobile phone.
6. Enter the provisioning file password.

7. Enter the following in the Device Model URN field urn:oracle:asset:ti:sensortag:cc2650:data
8. Click Apply.
9. You will be navigated to the home page of the mobile app. You would now see a button viz. 'Connect to Cloud' on the home page. See below a screenshot
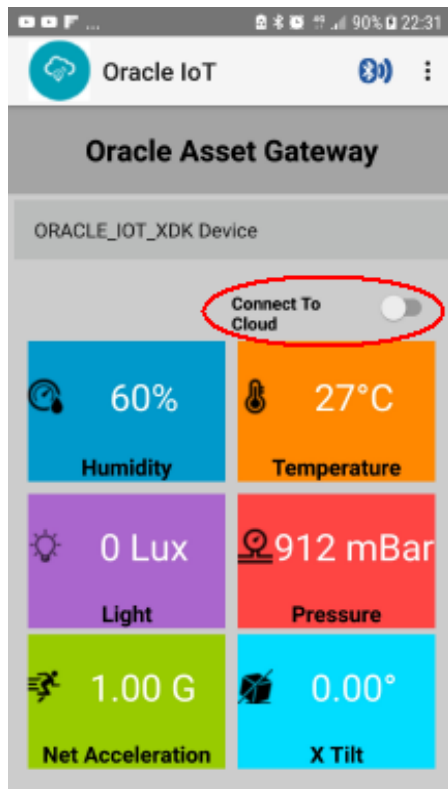
10. Flick that switch to connect to cloud.
11. If the app shows any errors at this point then ensure that your mobile phone is connected to internet/VPN. Another reason for these errors could be the incorrect device model, in which case, you need to re-verify the correctness of the device model.

Configure IoT Cloud Service – Part 2

1. Log into Oracle IoT Asset Monitoring Console.
2. Create a new Asset Type. Specify the device model created earlier as the device model for this Asset Type. Save the Asset Type.
3. Create a new Asset and select the Asset Type (created in step above).
4. In the Sensor Devices Section, click on Find Device button and then select the device (which you had registered earlier).
5. Now navigate to the Map on Asset Monitoring application and you would see your new asset show up on the map.
6. Create a couple of new rules as shown below.

6.1. A rule that mimics the 'Door Open' event by setting a threshold on the Light sensor values. The premise here is that the Light sensor values go up when the door of the cold storage is opened. This rule creates an alert for this condition.

6.2. Another rule to create an incident when the asset tilts or falls down.

7. You are all set now.
8. You can now show the data coming in from the devices in real time on the device details page. Click on the asset pin in the map to go to the asset details page. Click on SENSORS tab to see the live sensor data. See screenshot below.
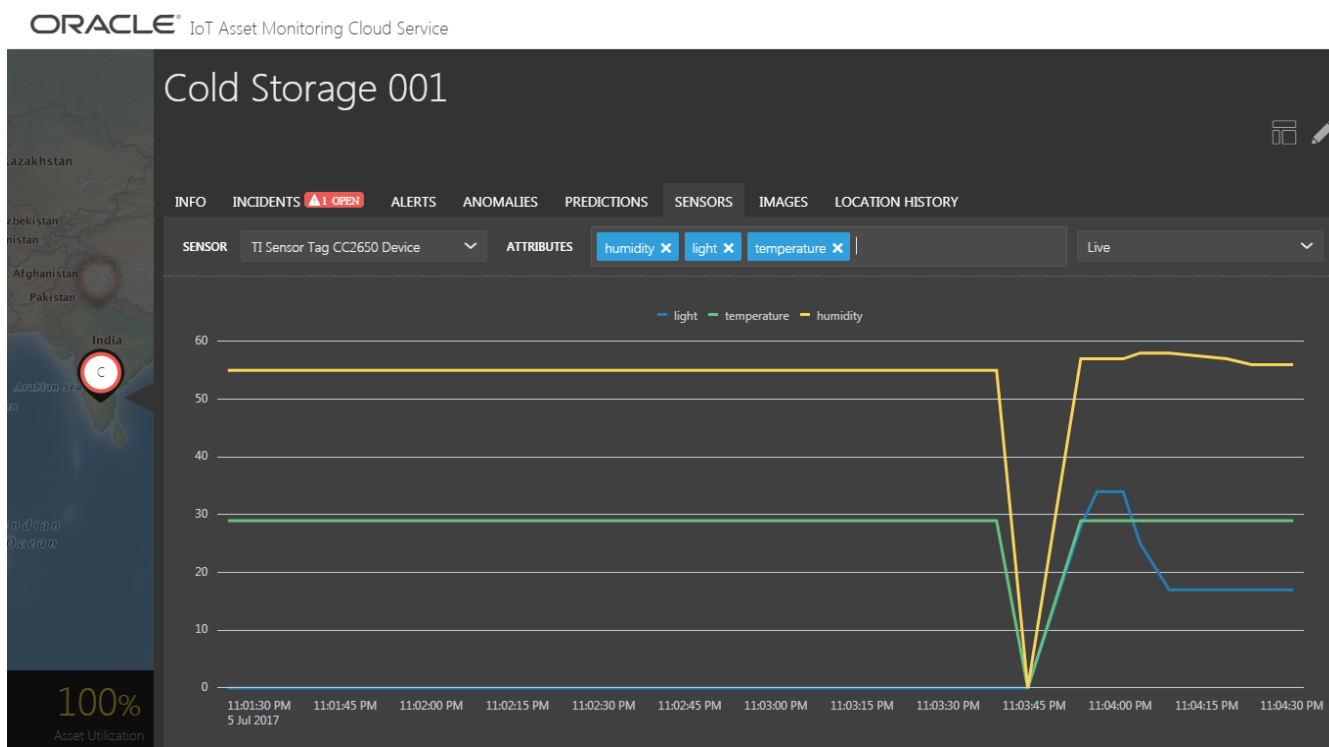
9. You can enable the rules by checking box against it in the Rule Listing UI page.

10. Then you may manipulate the light condition of the XDK device or tilt it or make it fall down to show the corresponding alert or incident getting generated.