Release Notes : i-cube-octave_v1-0-0

Introduction

The i-cube-octave-wp77 is an endeavour of Sierra Wireless to bring together the capabilities of STM32L4 MCU and WP77 Programmable chipset offereing from Sierra Wireless to be knit into a all-in-one platform for connecting industrial assets to the cloud.

Pre Requisites

To be able to run the i-cube-octave-wp77, you would need following materials

1. MangOH Yellow with WP77 chipset along with the associated STMOD+ connectors procured through Sierra WIrelss FAE.
2. STM32 Board
   the STM32 board is composed of 2 boards;
   B-L4S5I-IOT01A / which is the main STM32 board equiped with a STM32L4S5VIT6 - https://www.st.com/en/evaluation-tools/b-l475e-iot01a.html
   X-NUCLEO-STMOD1 / which is a simple expanding board to allow the STMOD+ connector to be used with the STM32L4S5 processor. - https://www.st.com/en/ecosystems/x-nucleo-stmoda1.html
3. Pre provisioned SIM card from Sierra Wireless (Contact Sierra Wireless FAE for support)
4. An account in https://octave.sierrawireless.io/ (Contact Sierra Wireless FAE for support)
5. A STM32Cube IDE to be able to modify and recompile the code. A pre compiled binary already exist in the release directory path i-cube-octave-wp77\en.i-cube-octave_v1-0-0\STM32CubeExpansion_OCTAVE_V1.0.0\Projects\B-L4S5I-IOT01A\Demonstrations\Cellular\IDE\STM32CubeIDE\L4S5I_IOT01_WP77\Debug\L4S5I_IOT01_WP77.bin

Description

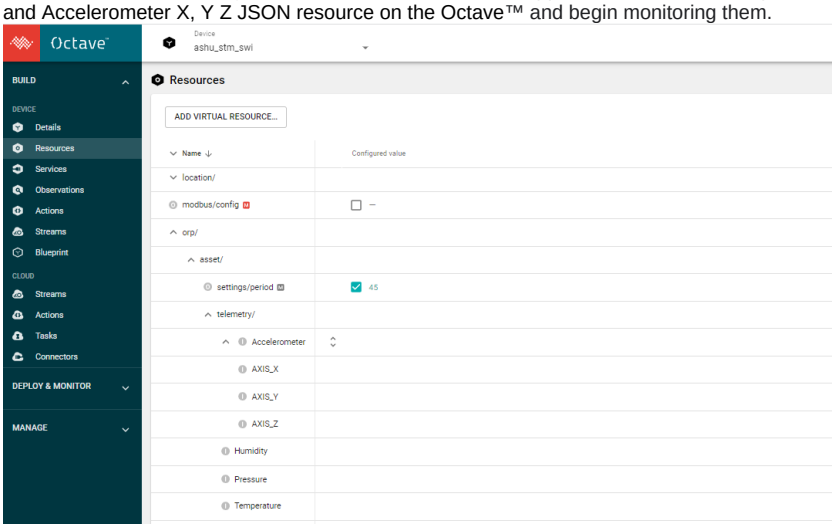
The i-cube-octave-wp77 ic composed of many small yet significant building blocks which provides a fully open source platform to augment and elevate the following exisiting functionalities

- Sensor Drivers
  1. Out of many sensors available on board the B-L4S5I-IOT01A devlepment board, current release uses Accelerometer, Temperature, Humididty, Pressure sensors.
  2. To ease the work of developpers and to be able to add more sensor capabilities quickly to the existing code , we have added into the delivery the drivers for all sensors supported on this development board.
  3. You will find the drivers being located at i-cube-octave-wp77\en.i-cube-octave_v1-0-0\STM32CubeExpansion_OCTAVE_V1.0.0 \Drivers\BSP\Components
- Sierra Wireless Modem Drivers
  1. This drivers are a powerful set of code that enables the communication between STM32L4 MCU and Sierra Wireless WP77 chipset thus making it possible to send a AT command to the modem and intrepret the responses recieved , including URC and be able to act smartly on it. Thereby maintaining the necessary encapsulation as required between the applicative part and lower layers.
  2. Driving the modem power and reset capabilities
  3. Among the category of AT commands supported in this release
     a. Set up the modem configuration like setting APN

     > **Note**
     >
     > The code at startup checks for the ICCID of the SIM to extract the Home MCC MNC and matches it with the a predefined table defined at i-cube-octave-wp77\en.i-cube-octave_v1-0-0\STM32CubeExpansion_OCTAVE_V1.0.0 \Middlewares\ST\STM32_Cellular\Core\Cellular_Service\Src\cellular_service_utils.c . If there is a SIM that does not match with the MCC MNC in the list, **default APN "iot.swir"** will be set up on the modem. Please verify your SIM type and and APN settings on the file before starting the tests).

     b. Manage the Activation and Deactivation of PDP context and Intelligent Network management(Registration loss/gain, Etc)
     c. ORP AT commands (Octave™ Resource Protocol (ORP) is a simple ASCII-based protocol that is built on top of HDLC-framed data sent via UART. Using ORP, a customer asset (asset) can interact with Octave™ by sending and receiving ASCII-based messages with an Octave™ edge device)
  4. Thanks to the RAW command featuture implmented in the middlewares , its possible at runtime, to send AT command directly from the STM32 USB console. You just need to append AT before the actual command you want to send like **AT AT+CPIN?**
  5. The drivers code is located at i-cube-octave-wp77\en.i-cube-octave_v1-0-0\STM32CubeExpansion_OCTAVE_V1.0.0 \Drivers\BSP\X_STMOD_PLUS_MODEMS\WP77\AT_modem_wp77
- ORP Middle ware
  1. The ORP Middleware defines and perfoms the encoding and decoding of the ORP protocole thus encompasing all intelligence required to handle the industrial assets data like sensors and be able to push it to the Octave™ and further to different Cloud platforms like IOT Central and Azure etc.
- Octave Lite Application Its the applicative part which is located at i-cube-octave-wp77\en.i-cube-octave_v1-0-0\STM32CubeExpansion_OCTAVE_V1.0.0\Projects\B-L4S5I-IOT01A\Demonstrations\Cellular\IDE\STM32CubeIDE\L4S5I_IOT01_WP77\Misc\Samples\Cellular_Sensors
  1. The current sample application which is a part of the release, monitors at device start up for Cloud(Octave™) connectivity.

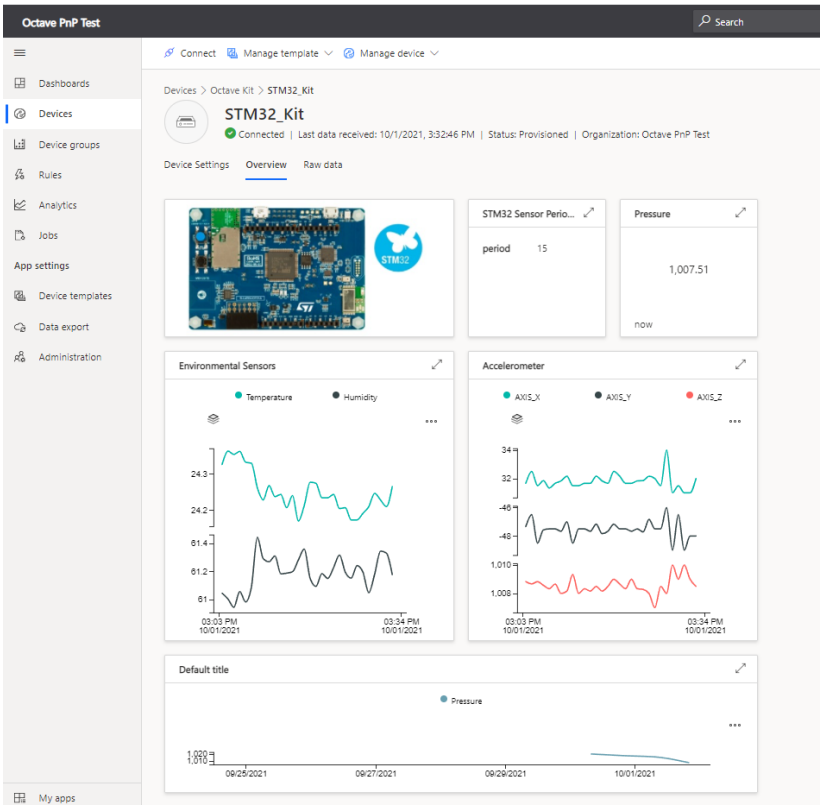
2. As soon as the connectivity with Octave™ is achieved, the application will create Temperature,Humidity,Pressure Numeric resources and Accelerometer X, Y Z JSON resource on the Octave™ and begin monitoring them.



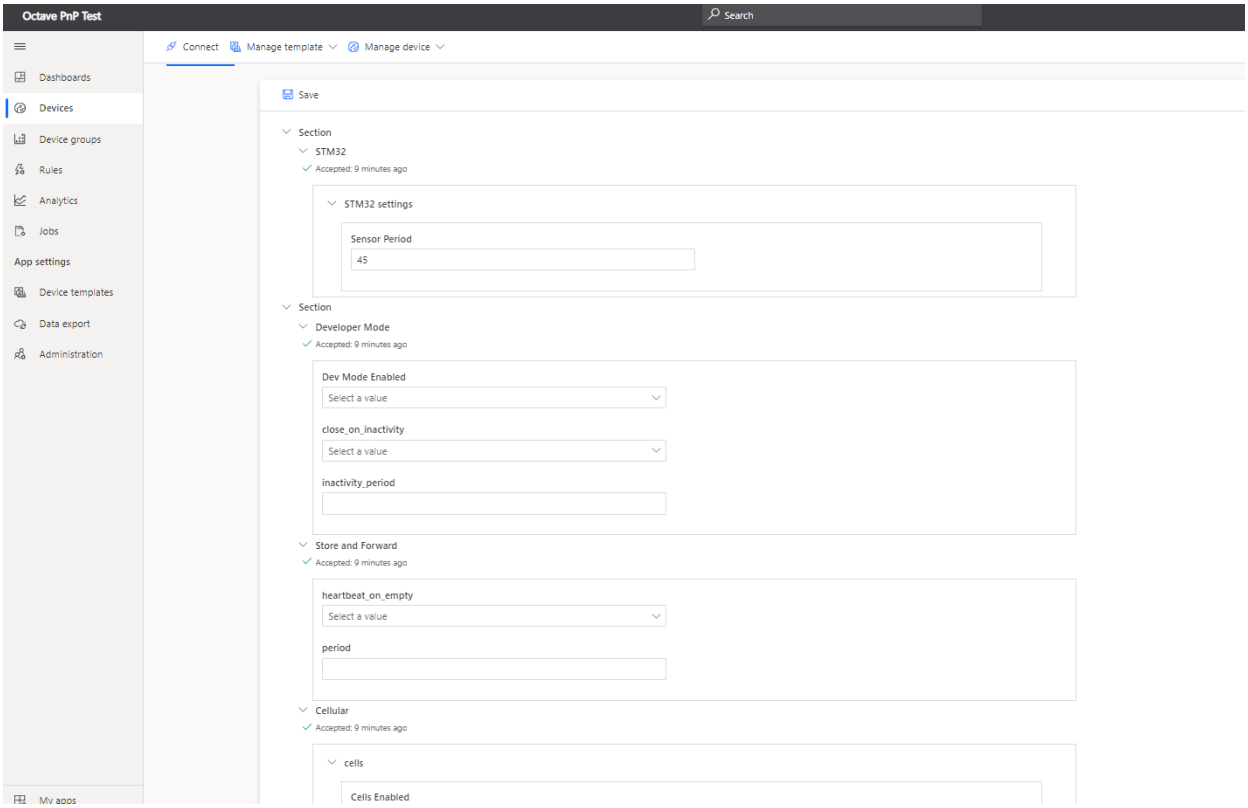
3. A predefined periodicity for fetching the sensor data is defined as 10 seconds. This parameter can be configured directly from within the code or through the Octave™ UI for your device (https://octave.sierrawireless.io/) by updating the value on the resource orp/asset /settings/period.

Observing the data through Azure Iot Central

To be able to direct the sensors data to the Azure IOT Central cloud we need to configure and map the device twin to populate the entire resource tree of the device under test to IoT Central and hence able to populate the dashboard with the incoming assets data on the cloud.



Furthermore thanks to the IoT Connector settings on Octave, it allows to control and update all the parameters of the module directly from the Azure IoT Central like sensor periodocity, Dev mode enable/disable and many more.



Donot hesitate to connect with the Sierra Wireless FAE to explore the Sierra Wireless Octave™ device pairing with Azure IoT central or with any other cloud.

> *Thanks for having intrest into the STM32L4 MCU and Sierra Wirless WP77 modems and we hope you will enjoy playing with this tiny yet powerful machines .*