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CPE 403-1001

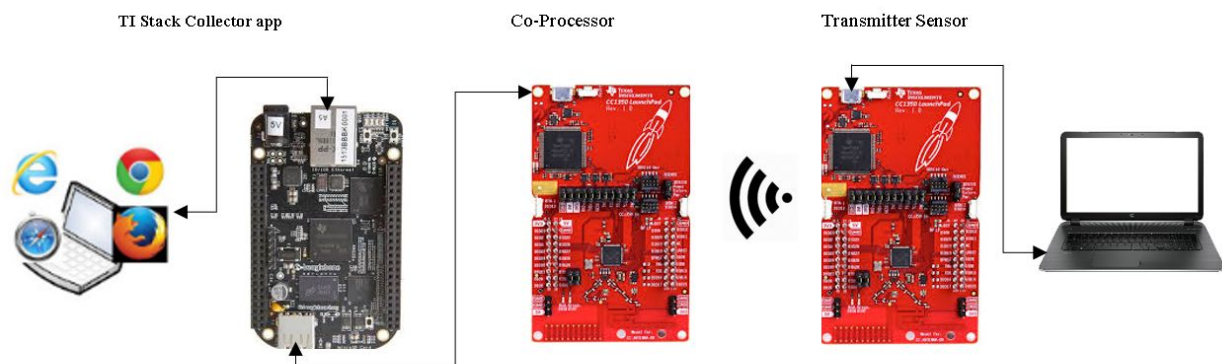
December 12th, 2018

CPE 403 FINAL PROJECT
BEAGLEBONE BLACK AND CC1350 COMMUNICATION

PROBLEM STATEMENT:

Goal/Objective: The main goal is to integrate a temperature sensor by running a “co-processor module” connected between BeagleBone(BBB) and one CC1350 and using a 2nd CC1350 as a transmitter. We also want to display data from the temperature sensor using the “TI 15.4-Stack Collector app”. Our goals have been achieved by programming C code on the CC1350 and interfacing the CC1350 launchpads to collect and transmit data. Another objective is to successfully setup the BeagleBone (BBB) and host system such as Linux for application development.

Project block diagram:



PRE-REQUISITES:

Components, tools, software used in the design, install steps etc.

Components:

- 2 x Wireless MCU LaunchPad Development kit (LAUNCHXL-CC1350)

<http://www.ti.com/tool/LAUNCHXL-CC1350>

- BeagleBone Black

<https://beagleboard.org/black>

- Temperature Sensor

Tools:

Software:

- Uniflash Standalone Flash Tool for TI Microcontrollers (MCU)

<http://www.ti.com/tool/UNIFLASH>

- SimpleLink™ Sub-1 GHz CC13x0 Software Development Kit

<http://www.ti.com/tool/simplelink-cc13x0-sdk>

- TI 15.4-Stack Gateway Linux Software Development Kit

<http://www.ti.com/tool/ti-15.4-stack-gateway-linux-sdk>

- PROCESSOR-SDK-LINUX-AM335X_05_01_00_11

http://software-dl.ti.com/processor-sdk-linux/esd/AM335X/latest/index_FDS.html

- balenaEtcher

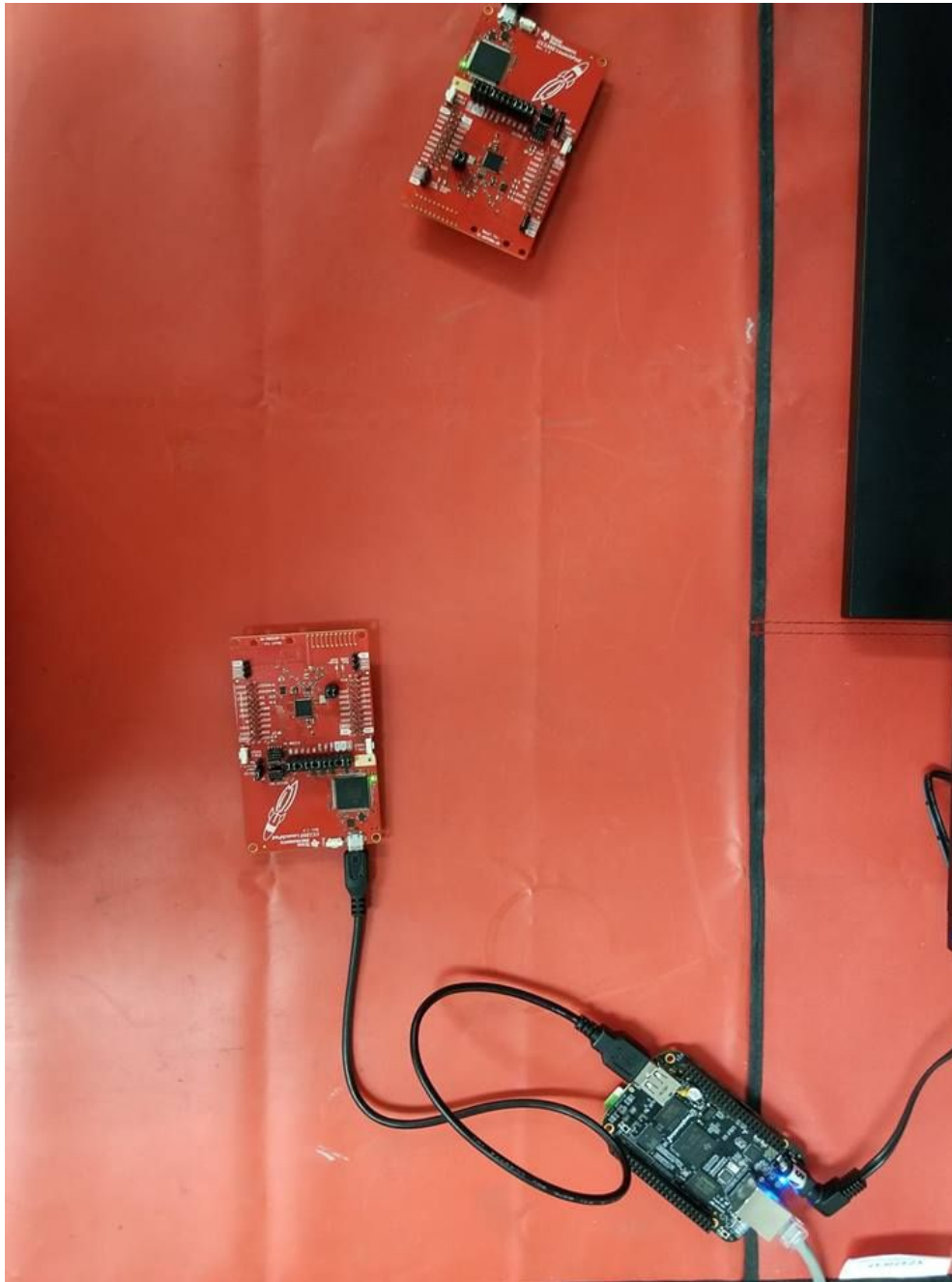
<https://www.balena.io/etcher/>

IMPLEMENTATION DETAILS:

- 1) Flash hex files to CC1350 and flash am335x linux image to the BBB
- 2) Untarred the tar folder in the Ubuntu Virtual Machine
- 3) Connected the coprocessor CC1350 to the BBB to create the coprocessor collector
- 4) Ran the “run_demo.sh” file to obtain url to Stack Collector App
- 5) Connected the sensor CC1350 to connect to coprocessor in Stack Collector App network

PHOTOS

a) Hardware Set-up



b) Untarring the tar folder

```

prebuilt/gateway/gateway/node_modules/better-assert/Readme.md
prebuilt/gateway/gateway/node_modules/better-assert/.npmignore
prebuilt/gateway/gateway/node_modules/better-assert/package.json
prebuilt/gateway/gateway/node_modules/content-disposition/
prebuilt/gateway/gateway/node_modules/content-disposition/index.js
prebuilt/gateway/gateway/node_modules/content-disposition/README.md
prebuilt/gateway/gateway/node_modules/content-disposition/LICENSE
prebuilt/gateway/gateway/node_modules/content-disposition/HISTORY.md
prebuilt/gateway/gateway/node_modules/content-disposition/package.json
prebuilt/gateway/gateway/public/
prebuilt/gateway/gateway/public/dist/
prebuilt/gateway/gateway/public/dist/fonts/
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prebuilt/gateway/gateway/public/dist/fonts/glyphicons-halflings-regular.svg
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prebuilt/gateway/gateway/public/dist/fonts/glyphicons-halflings-regular.woff2
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prebuilt/gateway/gateway/public/dist/images/Humidity.png
prebuilt/gateway/gateway/public/dist/images/Temperature.png
prebuilt/gateway/gateway/public/dist/images/Light.png
prebuilt/gateway/gateway/public/dist/css/
prebuilt/gateway/gateway/public/dist/css/bootstrap-theme.css.map
prebuilt/gateway/gateway/public/dist/css/bootstrap.min.css.map
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prebuilt/gateway/gateway/public/dist/css/bootstrap-theme.min.css.map
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prebuilt/gateway/gateway/public/dist/css/bootstrap-theme.css
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prebuilt/gateway/gateway/webserver/webserver.js
prebuilt/gateway/gateway/webserver/collectorApp.html
prebuilt/gateway/gateway/package.json
prebuilt/run_demo.sh
prebuilt/bin/
prebuilt/bin/host_collector_2_4g
prebuilt/bin/bbb_cc13xx-sbl
prebuilt/bin/bbb_collector
prebuilt/bin/npi_server2.cfg
prebuilt/bin/apimac-msgs.cfg
prebuilt/bin/run_collector.sh
prebuilt/bin/host_npi_server2
prebuilt/bin/collector.cfg
prebuilt/bin/host_cc13xx-sbl
prebuilt/bin/collector-2_4.cfg
prebuilt/bin/host_collector
prebuilt/bin/bbb_npi_server2
root@am335x-evm:~#

```


c) Connecting to the Stack Collector App

```
TI Collector
Nwk: Started

Info: Channel 0
Collector Running as Process id: 1093
Launching Node-JS gateway application in background
Gateway is running as Process id: 1109

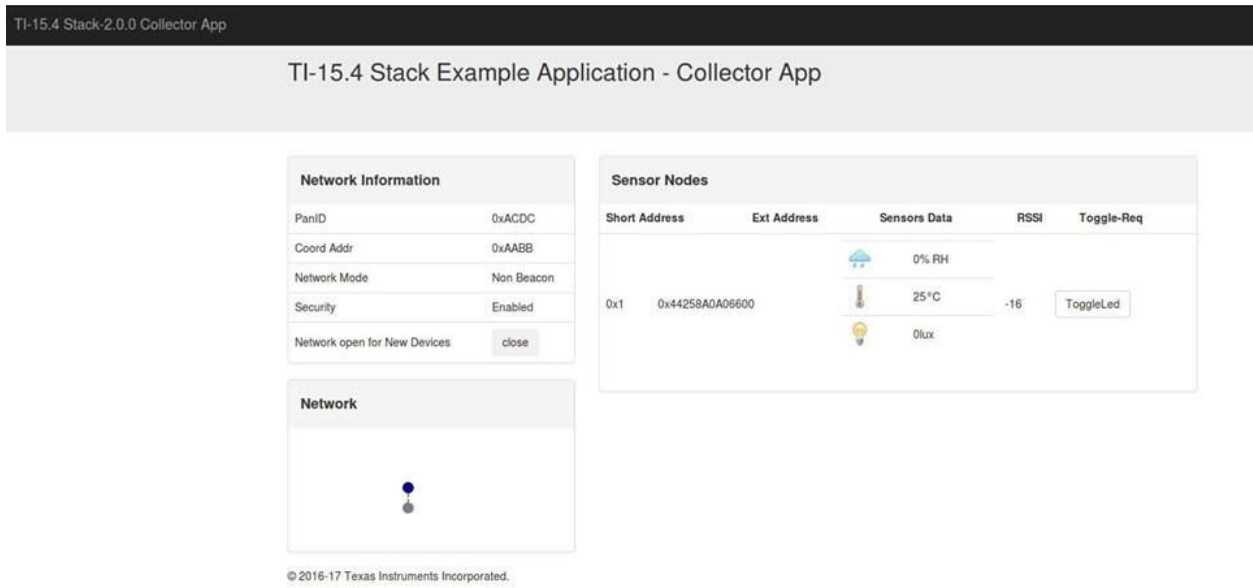
On your host, launch your browser using:

    http://10.40.36.18:1310

    http://192.168.7.2:1310

root@am335x-evm:~/prebuilt# Connected to App Server
```

d) Screenshot of working Collector App



OUTCOMES, RESULTS AND CONCLUSIONS:

Youtube Link: https://youtu.be/PKAdnBtK_Zg

We have successfully interfaced our temperature sensor. The outcome of our project demonstrates the result of the transmission of the CC1350 launchpad in charge of sending data towards our receiving CC1350 launchpad. The receiving CC1350 launchpad interacts with the BeagleBone Black(BBB) in order for the (BBB) to upload data to the “TI 15.4-Stack Collector app”.

REFERENCE:

- Official TI Tutorials
- Previous assignments (BBB, CC1350)
- CCS Resource Explorer
- TI Q&A forums
- Stack Overflow