BLE to WIFI IOT gateway
v1.0 Release Notes

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1 Introduction

This document contains the release notification details of "BLE to WIfi IOT Gateway" (BleFI) (Version 1.0) Software. There are two parts of the software, Wifi and BLE.
This release contains the source for the BleFi application that executes on CC3200. The BLE part is provided as a binary in the form of cc26xx.bin. Please refer the "BLE to WiFi IoT Gateway User Guide" for more information about changing and building either of the code.

2 Getting Started

2.1 *Using the Prebuilt Binaries*

User may flash the prebuilt binaries present in the "bin". Apart from the BleFi package, please download and install these

1. CC3200SDK-SERVICEPACK (v1.0.0.10.0) – download from http://www.ti.com/tool/CC3200SDK
2. CCS Uniflash tool (v3.2.0.00123)

2.2 *Building the blefi source code (CC3200)*

Developers may build the Blefi source code. Apart from the BleFi package, please download and install these

1. CCS 6.0.1 – download from http://processors.wiki.ti.com/index.php/Download_CCS)
2. In the CCS App center, install
    a. CC3200 Add-On
    b. TI-RTOS for SimpleLink

2.3 *Building the CC26xx.bin (CC2650)*

1. BLE Stack (v2.1) - download from http://www.ti.com/tool/ble-stack.

3 Release Information

Item	Version	Type
Wireless MCU (WIFI CC3200)	1.33 R1M2	Production device
Base CC3200 SDK	1.1.0	BleFi 1.0 version contains the libraries from CC3200 SDK 1.1.0
Wireless MCU (BLE CC2650)	2.1 (5X5 Package)	Production device
BLE SDK	2.1	Not part of this package. The cc26xx.bin is built using the BLE SDK v2.1
Hardware	BLE-to-Wifi (BleFi) board	Reference hardware. Download from the TI-Design directory
BleFi patch Software version	Version 1.0	Source code and Binary.
Supported IDE	CCS version 6.0.1.00040	Accessible separately. Not a part of this package
User guides	BLE-to-WIFI IOT Gateway user guide v1.0.	Not part of this package, download from TI-design directory.

Table 1 : Release information

4 Directory structure

The BleFi installer installs the software (and binaries) in user defined path. By default, the contents will be installed in "C:\ti" directory. The BleFi package is standalone, and does not need CC3200SDK to be installed.

4.1 *Binary*

All the binaries are present in '**bin**' folder.

File Name	Content
html/*	• All the files that are required for html server (BLE configurations)
blefi.bin	• The main blefi application,
blefi.ucf	• Uniflash file, required for flashing the binaries. This file contains the information about the binaries that needs to be flashed in CC3200 sflash.
blefi_session/*	• Session information for blefi.ucf
cc26xx.bin	• BLE application and stack binary, that executes on CC2650.
CC2650 SensorTag.sch	• Schema file for CC2650 Sensor Tag

Table 2 : Binary contents

Please refer the "BLE-To-WIFI IOT Gateway" user guide for steps to download the binaries to sflash.

4.2 *Source*

All the source files are present in **'src'** folder. The 'src' folder contains

a. Blefi application source
b. Library source files that are taken from to CC3200 SDK (v 1.1.0), copied in the package for ease of use.

4.2.1 BleFi application source

Folder Name	Content
src/example/blefi/cli	• Command Line Interface files.
src/example/blefi/gateway	• Gateway module files
src/example/blefi/include	• Contains the common include files
src/example/blefi/*mqtt_app*	• Mqtt Application files
src/example/blefi/*npi*	• Network Process Interface (for BLE) files
src/example/blefi/*schema*	• Schema file logic, JSON parser.
src/example/blefi/w*ifi*	• Wifi related files.

Table 3 : BleFi application source folders

4.2.2 CC3200 SDK Library source

Folder Name	Content
src/driverlib	• Driverlib source.
src/inc	• Common include files
src/netapps	• Network application (MQTT)
src/oslib	• OS Abstraction Layer
src/simplelink	• SimpleLink Host
src/simplelink_extlib	• OTA
src/ti_rtos	• Ti RTOS configuration file

Table 4 : Library source

Please refer the "BLE-To-WIFI IOT Gateway" userguide for steps to build the source file.

5 BLE-to-WIFI IoT gateway features

5.1 *Cloud connectivity*

- Mqtt Messaging, connects to these IBM Internet-Of-Things foundation service - https://internetofthings.ibmcloud.com/
  - Demo server
  - Quickstart server
- Seamlessly sends the CC2650 sensor tag characteristics to quickstart-ibm server.
- Link establishment, termination can be controlled from a remote MQTT client.
- BLE Device characteristics can be read/written from a remote MQTT client

5.2 *Wifi Connectivity*

- Smart config feature enabled
- Auto connect to the wifi access point enabled

5.3 *BLE provisioning*

- BLE device connection using HTML pages or MQTT or CLI
- Auto scan feature available.
- Auto connect feature available.

5.4 *Over The Air download*

- The CC3200 application and the cc26xx binaries can be downloaded from a remote server.

6 Limitations

6.1 *Software*

- If the BLE device stops advertising after the “scan” and before “Link Establish“, then the software freezes.
    - Workaround – Make sure the device is always advertising before the link establish is triggered (either from CLI or HTTP or MQTT)
- OTA – OTA might fail if the blefi binary is more than 145 KB. Reason for this is due to the limitation of SFLASH space, which is 1MB on the BleFi board.
- OTA – The OTA demo works only with ‘drop-box’. Sometimes the dropbox server may refuse the connection.
- MQTT – MQTT client of BleFi connects to IBM server. Sometimes the IBM server may be down or may refuse the connection. At this time MQTT will not work.
    - Workaround – Disconnect and reconnect the AP connection (use wlan_disconnect) from CLI.
- The software source has some warnings, related to “Redefinition of DBG_PRINT”.
- Some of the source lines on some of the software files do not end before 80th Column.

6.2 *Hardware*

- The buttons (BTN-1 and BTN-2) are carbon contact buttons. To activate them, one needs an metal dome button.
- The board does not have a “JTAG Emulator” on board. One needs to connect either to CC3200 Launchpad or SmartRF06 emulation board to debug/develop on CC3200 or CC2650 respectively. There are no external wires/cables for connection, one needs to use a “Tag-Connector” or solder the wires on the board. Please refer the schematics for more information.

7 Important notes

- The gateway takes approximately 15 seconds when a suitable wlan profile is not present in the gateway.
- The gateway is UP when the “BLE Stack Initialized” appears on CLI. From this point onwards, user may press “enter” and feed commands on CLI.

8 Test Data

Sl No	Tests	Result	Comments
1	Endurance Test	PASS	48 hours, 3 Sensor tags connected. MQTT Enabled
2	MQTT	PASS	Gateway Context - Demo mode Device Context - Quickstart mode
3	CLI	PASS	All commands
4	HTML	PASS	BLE configuration pages.
5	Gateway	PASS	Data bridging between WLAN and BLE
6	BLE Central	PASS	GAP and GATT commands
7	Wifi Configuration	PASS	Connecting and disconnecting from AP
8	BLE Connections	PASS	Up to three 2650 Sensor Tags.
9	OTA Update	PASS	Update Blefi Binary and CC26xx Binary
10	OS Functionality	PASS	TI-RTOS

Table 5 : Test Data

9 Collateral for application developers

- Visit www.ti.com/ble for BLE Products
- For BLE SDK download, please visit www.ti.com/ble-stack
- For CC3200 SDK, please visit http://www.ti.com/tool/CC3200SDK
- For technical support on BLE, please visit the Texas Instruments Bluetooth Low Energy E2E Forum
- For technical support on CC3200, please visit the Texas Instruments CC3200 Forum
- For additional sample applications, guides, and documentation, visit the Texas Instruments Bluetooth Low Energy wiki page. There is also a software quick start guide available here.