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ModusToolbox® AnyCloud 1.3 Release Notes

Production Release

Overview

With the ModusToolbox AnyCloud collection of software libraries, you can rapidly develop Wi-Fi and Bluetooth applications on PSoC 6 MCU devices. AnyCloud is based on the industry-standard lwIP TCP/IP stack and Mbed TLS network security. It provides the ideal solution for applications that do not use commercial cloud management systems such as Arm Pelion or Amazon AWS IoT Core. AnyCloud enables development with custom or alternative third-party cloud management approaches with a fully open, customizable, and extensible source code distribution.

This document describes all the libraries and versions included with AnyCloud 1.3.

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What's New/Changed

The following features have been added since the previous release of AnyCloud:

- mqtt 3.0 with support for QoS-2 and a simplified API
- http-client 1.0 with support for HTTP and HTTPS clients
- Command Console nased Wi-Fi/BT Tester 2.0 with Wi-Fi diagnostic commands
- Smart CoEx 1.0 with quick configuration for Wi-Fi/BLE coexistence parameters
- OTA v2.2.0 adds support for the SWAP and REVERT features, integrates with the updated mqtt and http-client libraries
- WLAN MfgTest 3.0 brings Wi-Fi manufacturing support to AnyCloud
- WLAN certification test 3.0 brings pre-cert test capabilities to AnyCloud
- BT Stack 1.7 with support for BLE Mesh

In addition, several libraries have been updated to new versions to address issues and provide additional features.

What's Included

This release of AnyCloud includes the following libraries. Those without changes are noted as such.

Wi-Fi Middleware Core (wifi-mw-core 3.0.0)

This is the core set of libraries for Wi-Fi applications. It bundles the FreeRTOS kernel (plus the abstraction-rtos), lwIP TCP/IP stack, Mbed TLS for security, Cypress Wi-Fi Host Driver (WHD), configuration files and associated code into a single unit that provides the essential Wi-Fi functionality.

ModusToolbox supports updating individual library versions within the wifi-mw-core bundle.

Light-Weight TCP/IP Stack (lwIP Stable 2.1.2) Unchanged

lwIP is a small independent open source implementation of the TCP/IP protocol suite. The focus of the lwIP TCP/IP implementation is to reduce resource usage while still having a full-scale TCP. See https://savannah.nongnu.org/projects/lwip/ for details.

The lwIP library is hosted on an external GitHub repository. Using this library in a project will cause lwIP to be downloaded onto your computer. It is your responsibility to understand and accept the lwIP license.

WHD (wifi-host-driver 1.93.0)

WHD is an independent, embedded Wi-Fi Host Driver that provides a set of APIs to interact with Cypress WLAN chips.

Arm Mbed TLS (mbedTLS Stable 2.16.7) Unchanged

Arm mbedTLS is an implementation of the TLS and SSL protocols and the respective cryptographic algorithms. mbedTLS is an open source TLS/SSL library which has cryptographic capabilities. Using this

library in a project will cause mbedTLS to be downloaded on your computer. It is your responsibility to understand and accept the mbedTLS license and regional use restrictions (including abiding by all applicable export control laws). See https://tls.mbed.org/ for details.

FreeRTOS (freertos 10.0.1) Unchanged

This is a FreeRTOS kernel, which is distributed as standard C source files with configuration header file, for use with the PSoC 6 MCU.

RTOS Abstraction Library (abstraction-rtos 1.2.2)

The RTOS Abstraction Library provides a generic API that allows Cypress middleware to be written in an RTOS agnostic manner. It contains implementations of the Abstraction Layer for FreeRTOS, CMSIS RTOS, and ThreadX.

MQTT (3.0.0)

The MQTT client library that can work with the family of Cypress connectivity chips. This library uses the AWS IoT Device SDK MQTT client library and implements the glue layer that is required for that library to work with Cypress connectivity platforms.

Over-the-Air (anycloud-ota 2.2.0)

OTA is simple mechanism for updating your device's firmware over Wi-Fi. The library uses MQTT and TLS to securely connect to an MQTT Broker and download a new application. Upon device reset, the MCUBOOT bootloader copies the new version of the application over to the Primary slot (slot 0) and runs the application. This release supports OTA via the MQTT protocol.

Secure Sockets (secure-sockets 2.1.0)

Secure sockets library provides network abstraction APIs for underlying network and security library. Secure sockets library eases application development by exposing a socket like interface for both non-secure (LwIP) and secure (mbedTLS) TCP connections. The APIs are thread safe and enable both client and server mode operations. Secure sockets provide both synchronous and asynchronous APIs for data transfer. Additionally, socket options are supported to configure send/receive timeout, callback for asynchronous mode, TCP keep-alive parameters, certificates/key and TLS extensions.

Wi-Fi Connection Manager (wifi-connection-manager 2.0.1)

Wi-Fi Connection manager (WCM) provides a set of APIs that are useful to establish and monitor Wi-Fi connection on Cypress platforms that support Wi-Fi connectivity. WCM library APIs are easy to use, and the library also provides additional features such Wi-Fi Protected Setup (WPS) and connection monitoring. WCM supports the following - STA, softAP and concurrent STA+softAP modes

Low Power Assistant Middleware (LPA 3.0.0) Unchanged

The LPA middleware provides an easy way to make the low-power features of Cypress devices available to developers in the form of a portable configuration layer.

Bluetooth FreeRTOS (bluetooth-freertos 1.4.0)

Cypress WICED BT/BLE host stack solution includes Bluetooth stack library, Bluetooth controller firmware and platform/OS porting layer.

Bluetooth Stack (btstack 1.7.0)

The BTSTACK is Cypress's Bluetooth Host Protocol Stack implementation. The stack is optimized to work on Cypress Bluetooth controllers.

HTTP Server (http-server 1.1.1) Unchanged

This library provides communication functions for HTTP (Hypertext Transfer Protocol) Server.

HTTP client (1.0.0) New

The HTTP client library can work with the family of Cypress connectivity chips. This library uses the AWS IoT Device SDK HTTP client library and implements the glue layer that is required for that library to work with Cypress connectivity platforms. This library supports RESTful methods such as GET, PUT, POST, and HEAD to communicate with any HTTP Server.

Smart CoEX (smart-coex 1.0.0)

Bluetooth Low Energy (BLE) and Wi-Fi operate in the same band, and in some devices, share a single radio. This can cause data transmission on one interface to interfere with the other. Such interference can impact the performance of both Wi-Fi and BLE. In order to avoid such interference, coexistence (coex) configurations and algorithms are introduced in the underlying WLAN and BT stacks. These configurations can be tuned from the application via the configurator to test and improve the performance of underlying Wi-Fi and BLE traffic when they are operated simultaneously.

This library provides an API that enables the application to configure the WLAN and BLE stack with the parameters that were set through the configurator..

mDNS (mdns 1.2.0) Unchanged

multicast DNS (mDNS) protocol resolves hostnames to IP addresses within small networks that do not include a local name server. It is a zero-configuration service, using essentially the same programming interfaces, packet formats and operating semantics as the unicast Domain Name System (DNS).

This library provides APIs to advertise mDNS service on the network and also to discover existing mDNS services running on the same IPv4/IPv6 network.

Note The mDNS library is only available to Apple MFi licensees.

HomeKit ADK 4.1 (homekit-adk 2.0.0) Unchanged

The Apple HomeKit ADK library is the middleware library for building Apple HomeKit BLE and IP accessories on Cypress platforms. It supports both MFi Hardware and SW Token Authentication, including MFi 3.0.

This library is developed for AnyCloud, and it implements all required Platform Abstraction Layer (PAL) APIs using the AnyCloud connectivity middleware libraries.

Note The HomeKit ADK is only available to Apple MFi licensees.

Command Console Framework (command-console 2.0.0)

This library provides a framework to add command console support to your application (or) product use cases. It supports Wi-Fi iPerf and Bluetooth BLE command support, and it includes a Bluetooth test application (mtb-anycloud-wifi-bluetooth-tester 2.0.0).

Known Issues/Limitations

This section lists the known issues/limitations of this release:

GCC newlib Memory Leaks

Problem	Workaround
[ModusToolbox 2.1 ONLY] The implementation of newlib from GCC will leak ~1.4 kb of Heap memory per task/thread that uses stdio functions (such as, printf, snprintf, etc.).	Does not apply when you are using ModusToolbox 2.2. By default, no AnyCloud libraries suffer this issue unless they report an error. If you turn on information or warning messages in our libraries, then you can be exposed to this issue. This is only recommended for debugging purposes. For your own libraries, avoid using stdio functions in your tasks/threads. Especially avoid this when you have a design for a task type that is continually created and destroyed.

More Information

Refer to the following links for more information about AnyCloud:

- AnyCloud Community Webpage
- AnyCloud Code Examples on GitHub

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