# Application Note
# AWS_IoT_HTTP
# Example

**Version 1.0.0**

For more information, visit our website at http://www.wiznet.io

# Contents

# Figures

# Tables

# 1 Introduction

This Application Note covers the implementation of AWS IoT HTTP on WIZnet's TOE Chip.

# 2 Github Link

https://github.com/WIZnet-ioNIC/WIZnet-PICO-AWS-C/tree/main/examples/aws_iot_http

# 3 Applicable products

Raspberry Pi Pico & WIZnet Ethernet HAT

W5100S-EVB-Pico

W5500-EVB-Pico

W55RP20-EVB-Pico

W5100S-EVB-Pico2

W5500-EVB-Pico2

# 4 How to Test AWS IoT HTTP Example

## 4.1 Step 1: Prepare software

The following serial terminal programs are required for AWS IoT HTTP example test, download and install from below links.

- **Tera Term**

## 4.2 Step 2: Prepare hardware

If you are using W5100S-EVB-Pico, W5500-EVB-Pico, W55RP20-EVB-Pico, W5100S-EVB-Pico2 or W5500-EVB-Pico2, you can skip '1. Combine...'

1. Combine WIZnet Ethernet HAT with Raspberry Pi Pico.
2. Connect ethernet cable to WIZnet Ethernet HAT, W5100S-EVB-Pico, W5500-EVB-Pico, W55RP20-EVB-Pico, W5100S-EVB-Pico2 or W5500-EVB-Pico2 ethernet port.
3. Connect Raspberry Pi Pico, W5100S-EVB-Pico or W5500-EVB-Pico to desktop or laptop using 5 pin micro USB cable. W55RP20-EVB-Pico, W5100S-EVB-Pico2 or W5500-EVB-Pico2 require a USB Type-C cable.

## 4.3 Step 3: Setup AWS IoT HTTP Example

To test the AWS IoT HTTP example, minor settings shall be done in code.

1. Setup SPI port and pin in 'w5x00_spi.h' in 'WIZnet-PICO-AWS-C/port/ioLibrary_Driver/' directory.

Setup the SPI interface you use.

- If you use the W5100S-EVB-Pico, W5500-EVB-Pico, W5100S-EVB-Pico2 or W5500-EVB-Pico2,

```
/* SPI */
#define SPI_PORT spi0

#define PIN_SCK 18
#define PIN_MOSI 19
#define PIN_MISO 16
#define PIN_CS 17
#define PIN_RST 20
```

- If you want to test with the AWS IoT HTTP example using SPI DMA, uncomment USE_SPI_DMA.

```
/* Use SPI DMA */
//#define USE_SPI_DMA // if you want to use SPI DMA, uncomment.
```

- If you use the W55RP20-EVB-Pico,

```
/* SPI */
#define USE_SPI_PIO

#define PIN_SCK 21
#define PIN_MOSI 23
#define PIN_MISO 22
#define PIN_CS 20
#define PIN_RST 25
```

2. Setup network configuration such as IP in ' aws_iot_http.c', which is the AWS IoT HTTP example in 'WIZnet-PICO-AWS-C/examples/aws_iot_http/' directory.

- We are going to use DHCP. However, If you want to use 'Static IP' set the IP and other network settings to suit your network environment.

```
/* Network */
static wiz_NetInfo g_net_info =
    {
        .mac = {0x00, 0x08, 0xDC, 0x12, 0x34, 0x56}, // MAC address
        .ip = {192, 168, 11, 2},                     // IP address
```

```
          .sn = {255, 255, 255, 0},                    // Subnet Mask
          .gw = {192, 168, 11, 1},                     // Gateway
          .dns = {8, 8, 8, 8},                         // DNS server
          .dhcp = NETINFO_DHCP                // DHCP enable/disable
};
```

3. Setup URL you want to connect to in 'aws_iot_http.c' located in the 'WIZnet-PICO-AWS-C/examples/aws_iot_http/' directory.

```
/* HTTP */
#define HTTP_GET_URL "URL"
```

## 4.4 Step 4: Build

1. After completing the AWS IoT HTTP example configuration, click 'build' in the status bar at the bottom of Visual Studio Code or press the 'F7' button on the keyboard to build.
2. When the build is completed, 'aws_iot_http.uf2' is generated in 'WIZnet-PICO-AWS-C/build/examples/aws_iot_http/' directory.

## 4.5 Step 5: Upload and Run

1. While pressing the BOOTSEL button of Raspberry Pi Pico, W5100S-EVB-Pico, W5500-EVB-Pico, W55RP20-EVB-Pico, W5100S-EVB-Pico2 or W5500-EVB-Pico2 power on the board, the USB mass storage 'RPI-RP2' is automatically mounted.

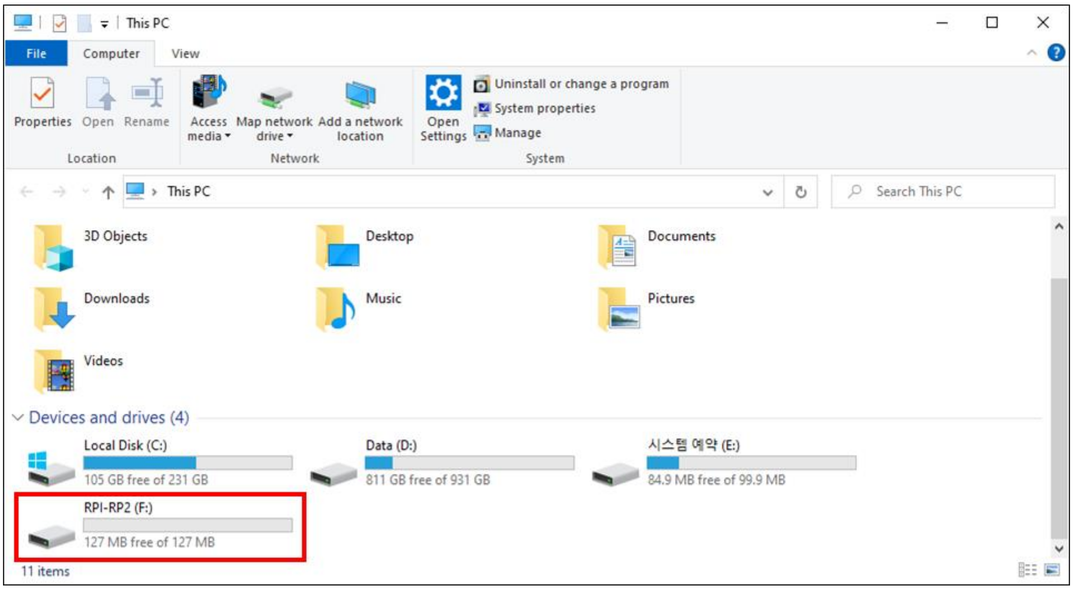
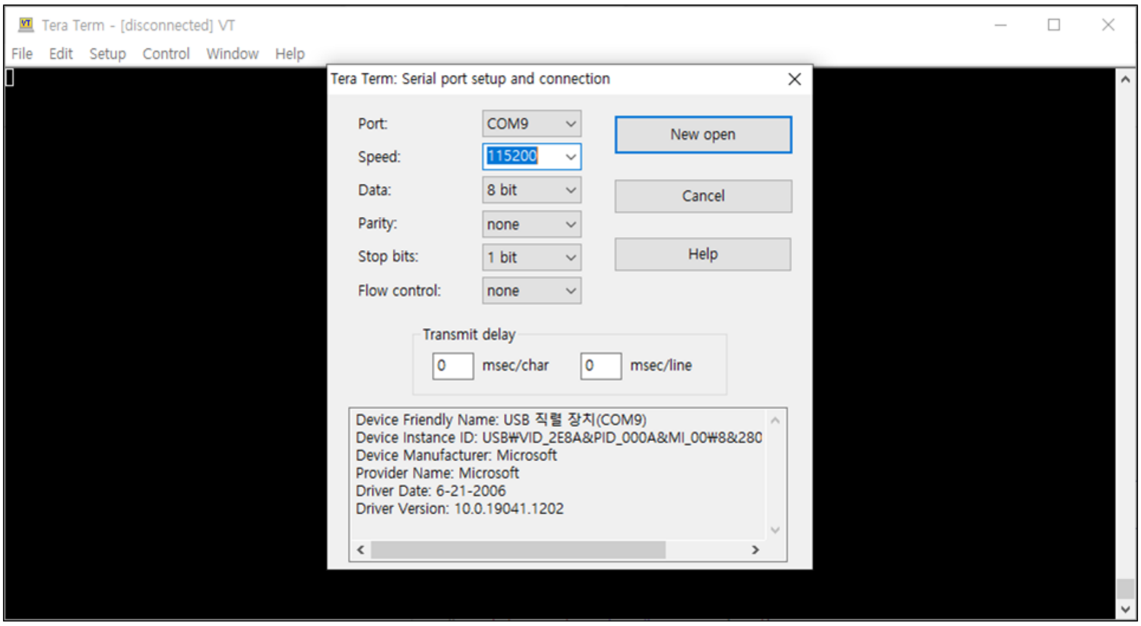


Figure 1. USB mass storage

2. Drag and drop ' aws_iot_http.uf2' onto the USB mass storage device 'RPI-RP2'.

3. Connect to the serial COM port of Raspberry Pi Pico, W5100S-EVB-Pico, W5500-EVB-Pico, W55RP20-EVB-Pico, W5100S-EVB-Pico2 or W5500-EVB-Pico2 with Tera Term.


Tera Term - [disconnected] VT
File Edit Setup Control Window Help
Tera Term: Serial port setup and connection
New open
Cancel
Help

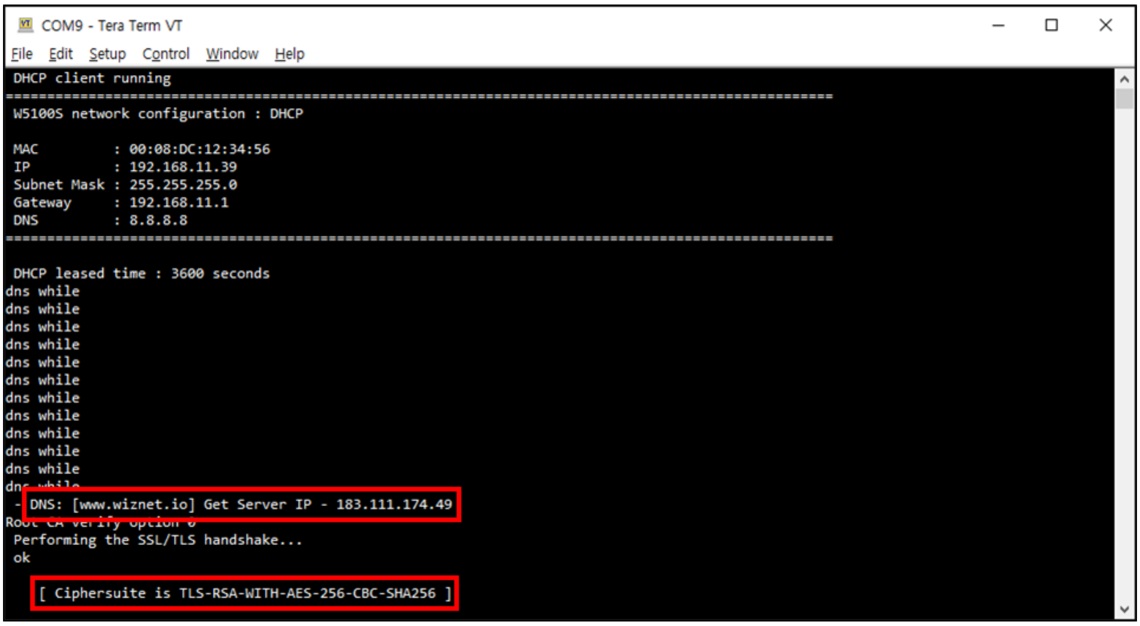
Port: COM9
Speed: 115200
Data: 8 bit
Parity: none
Stop bits: 1 bit
Flow control: none

Transmit delay
0 msec/char 0 msec/line

Device Friendly Name: USB 직렬 장치(COM9)
Device Instance ID: USB₩VID_2E8A&PID_000A&MI_00₩8&280
Device Manufacturer: Microsoft
Provider Name: Microsoft
Driver Date: 6-21-2006
Driver Version: 10.0.19041.1202

Figure 2. Tera Term

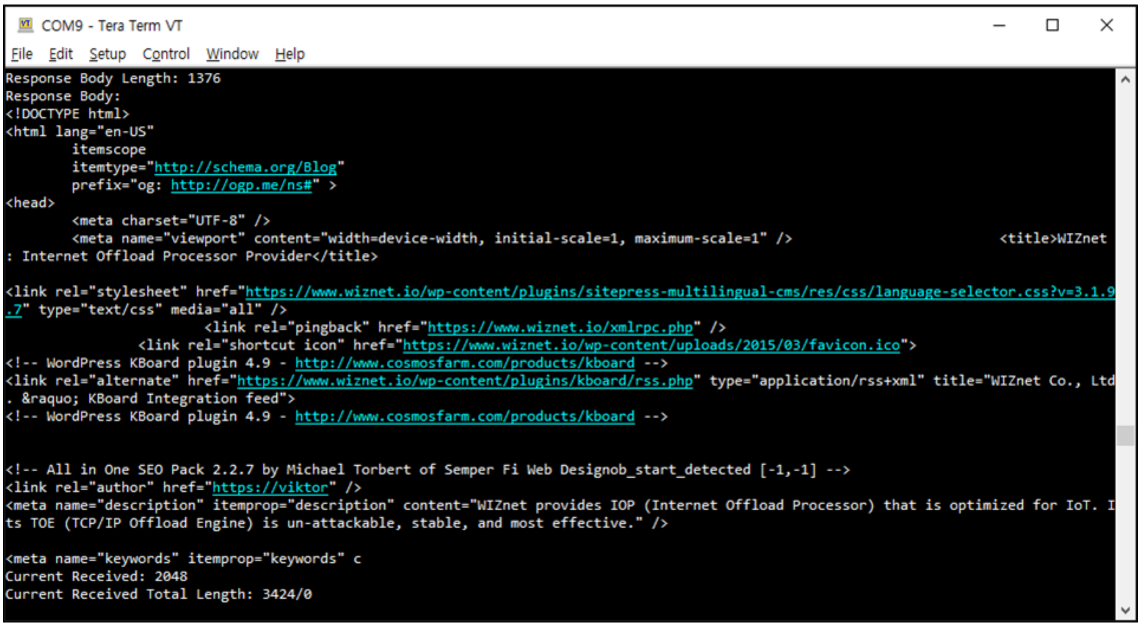
4. Reset your board.
5. If the AWS IoT HTTP example works normally on Raspberry Pi Pico, W5100S-EVB-Pico, W5500-EVB-Pico, W55RP20-EVB-Pico, W5100S-EVB-Pico2 or W5500-EVB-Pico2, You can see the IP got from the URL and the cipher suite applied when connecting.



```
 DHCP client running
=====================================================================================================
 W5100S network configuration : DHCP

 MAC         : 00:08:DC:12:34:56
 IP          : 192.168.11.39
 Subnet Mask : 255.255.255.0
 Gateway     : 192.168.11.1
 DNS         : 8.8.8.8
=====================================================================================================

 DHCP leased time : 3600 seconds
dns while
dns while
dns while
dns while
dns while
dns while
dns while
dns while
dns while
dns while
dns while
dns while
 - DNS: [www.wiznet.io] Get Server IP - 183.111.174.49
Root CA verify option 0
 Performing the SSL/TLS handshake...
 ok

   [ Ciphersuite is TLS-RSA-WITH-AES-256-CBC-SHA256 ]
```

Figure 3. DNS server IP and ciphersuite

6. Also, you can see HTTP body information.



```
Response Body Length: 1376
Response Body:
<!DOCTYPE html>
<html lang="en-US"
        itemscope
        itemtype="http://schema.org/Blog"
        prefix="og: http://ogp.me/ns#" >
<head>
        <meta charset="UTF-8" />
        <meta name="viewport" content="width=device-width, initial-scale=1, maximum-scale=1" />                    <title>WIZnet
: Internet Offload Processor Provider</title>

<link rel="stylesheet" href="https://www.wiznet.io/wp-content/plugins/sitepress-multilingual-cms/res/css/language-selector.css?v=3.1.9
.7" type="text/css" media="all" />
                        <link rel="pingback" href="https://www.wiznet.io/xmlrpc.php" />
                <link rel="shortcut icon" href="https://www.wiznet.io/wp-content/uploads/2015/03/favicon.ico">
<!-- WordPress KBoard plugin 4.9 - http://www.cosmosfarm.com/products/kboard -->
<link rel="alternate" href="https://www.wiznet.io/wp-content/plugins/kboard/rss.php" type="application/rss+xml" title="WIZnet Co., Ltd
. &raquo; KBoard Integration feed">
<!-- WordPress KBoard plugin 4.9 - http://www.cosmosfarm.com/products/kboard -->


<!-- All in One SEO Pack 2.2.7 by Michael Torbert of Semper Fi Web Designob_start_detected [-1,-1] -->
<link rel="author" href="https://viktor" />
<meta name="description" itemprop="description" content="WIZnet provides IOP (Internet Offload Processor) that is optimized for IoT. I
ts TOE (TCP/IP Offload Engine) is un-attackable, stable, and most effective." />

<meta name="keywords" itemprop="keywords" c
Current Received: 2048
Current Received Total Length: 3424/0
```

Figure 4. HTTP body information

# Revision history

| Version | Date | Descriptions |
|---|---|---|
| Ver. 1.0.0 | Dec, 2024 | Initial release. |

Table 1. Revision history

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