Mbed Lab 10 Report WiFi and MQTT

109033130 唐振家

- Lab Description

1 . Connect B-L4S5I-IOT01A to WiFi

說明:

此部分旨在利用mbed上的接口·將mbed以及電腦連在同一個區域網路 之下·並確認是否有成功連接上。

先將電腦連上收機私人網路,利用終端輸入ipconfig找出IP位置,或 是直接利用電腦介面查詢,為[172.20.10.2]。之後進行apache2的下載在以 及測試連線是否可行。

tireless LAN adapter Wi-Fi: Connection-specific DNS Suffix . : Link-local IPv6 Address : fe80::690f:4272:6b25:1f8c%9 IPv4 Address. : 172.20.10.2 Subnet Mask : 255.255.255.240 Default Gateway : 172.20.10.1

說明:

此為將Apache server下載下來之後,設定好網路端口為80(Input、 Output需相同),最後將網頁裡index.html的code複製進去檔案中,執 行./httpd.exe檔案,再輸入本地網路的IP位址,即可確認是否輸入正確的網路 地址。

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EE2405 Lab			
Test web page for Apache			
You may modify this page and add additional contents.			
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1 . Connect B-L4S5I-IOT01A to WiFi

說明:

接下來將課程網頁上的URL引入Program中,將所有的HOST_IP部份改成 剛剛的本地網路的IP,且在mbed_app.json,將SSID以及PASSWORD改成私 人網路的名稱及密碼,如此一來mbed才能夠連上我們自己的私人網路。

利用Gitbash開啟Apache server · 執行mbed裡的program · 如果有成功 · 即會顯示以下資訊 · 我們可以看見 · 本地的HOST為剛剛設定的172.20.10.2 · 而port為80

💲 Lab_De	mo — Mbed Studio				
File Edit	Selection View Go Terminal	Help			
	Active program ⊗6 <u>∧</u> 0	led_test_client.py × G main.cpp ×			
S	mbed-os-example-s v	1 # led_test_client.py			
90	MINGW64:/d/Softwar	re/Apache24/Apache24/bin	— () X	
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ې ې ر	s cd D:				running
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Ì	\$./http.exe bash: ./http.exe: No	such file or directory			
Ľ)	tomkitty512@LAPTOP-N	7DHN3UH MINGW64 /d/Software/Apache24/Apache24	1/bin		
_	\$./httpd.exe AH00558: httpd.exe: 0	Could not reliably determine the server's ful	' lly qual	ified do	
\bigcirc	> main name, using fe80	0::690f:4272:6b25:1f8c. Set the 'ServerName' message	directi	ve globa	
	> •				<serial< td=""></serial<>
	>				
				-	
	> blink led	Starting socket demo			
	> BUILD				
	> 🌣 erpc_c	Connecting to the network IP address: 172.20.10.12			
	> 🌣 mbed-os	Netmask: 255.255.255.240			
	 .gitignore 	Opening connection to remote port 80			
	.mbed	Sanding maggaga.			
	⇔ blink_led_server C blink led server b	GET / HTTP/1.1			
	C blink_led.h	Host: 172.20.10.2 Connection: close			
	<pre>led_test_client.py</pre>				
	e _{te} main.cpp	sent 50 bytes Complete message sent			
	9_1_erpc_blinky	received 100 bytes:			
	> blink_led	111F71.1 200 0K			
		Demo concluded successfully			
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– Lab Description

1 · MQTT Broker and Client

說明:

此部分旨在·利用剛剛連接好的Wifi網路·將我們想要丟出去的message· 利用MQTT的方式丟出。

一樣需先下載MQTT broker service,然後設置1883 network port專門 每MQTT的通訊使用。

接著利用PowerShell,進到Program所在的資料夾,執行Mosquitto service。



說明:

我們可以先利用一些指令測試Mosquitto service是否可行,透過開啟其 預設的publish以及subscribe,如果可以將訊息文字傳遞成功,即表示 Mosquitto service是可以使用的。



- Lab Description

1 · MQTT Broker and Client

說明:

將Python的MQTT libraries下載下來並創建新的program,引入Wifi、 mqtt的 lbrary(因為我們要將其二做結合),同樣的將SSID以及PASSWORD 改成私人網路的名稱及密碼,IP也訂成自己的HOST IP,成功即顯示我的網路 名稱以及本地位址以及network port等資訊,並且測試五組數據是否穩定。

```
Connecting to jiajia...
Connecting to TCP network...
address is 172.20.10.2/1883
Successfully connected!
Message arrived: QoSO, retained 0, dup 0, packetID 816
Payload Message from Python!
Message arrived: QoSO, retained 0, dup 0, packetID 816
Payload Message from Python!
Message arrived: QoSO, retained 0, dup 0, packetID 816
Payload Message from Python!
Message arrived: QoSO, retained 0, dup 0, packetID 816
Payload Message from Python!
Message arrived: QoSO, retained 0, dup 0, packetID 816
Payload Message from Python!
Message arrived: QoSO, retained 0, dup 0, packetID 816
Payload Message from Python!
```

說明:

將Python MQTT Client設定完成,執行後,會出現以下結果,將收到連接成功的提示以及穩定接收五組資料。

```
d:\Embedded_system\Lab_Demo\10_2_MQTT>python3 mqtt_client.py
Connecting to 172.20.10.2/Mbed
Connected rc: 0
Subscribed OK
[Received] Topic: Mbed, Message: b'Message from Python!\n'
[Received PitelIsH from auto=BSC8BA12:193F-550F-5708-59200415B981
(d0, q0, r0, m0, 'Mbed', ... (21 bytes))
50977571: Sending PUELISH to Mbed (d0, q0, r0, m0, 'Mbed', ... (21 bytes))
50977572: Sending PUELISH to auto-BSC8BA12:193F-550F-5708-59200415B981 (d0, q0, r0, m0, 'Mbed', ... (21 bytes))
50977572: Sending PUELISH to auto-BSC8BA12:193F-550F-5708-59200415B981 (d0, q0, r0, m0, 'Mbed', ... (21 bytes))
50977573: Sending PUELISH to mato-BSC8BA12:193F-550F-5708-59200415B981 (d0, q0, r0, m0, 'Mbed', ... (21 bytes))
50977574: Sending PUELISH to auto-BSC8BA12:193F-550F-5708-59200415B981 (d0, q0, r0, m0, 'Mbed', ... (21 bytes))
50977575: Sending PUELISH to mato-BSC8BA12:193F-550F-5708-59200415B981 (d0, q0, r0, m0, 'Mbed', ... (21 bytes))
50977575: Sending PUELISH to mato-BSC8BA12:193F-550F-5708-59200415B981 (d0, q0, r0, m0, 'Mbed', ... (21 bytes))
50977575: Sending PUELISH to mato-BSC8BA12:193F-550F-5708-59200415B981 (d0, q0, r0, m0, 'Mbed', ... (21 bytes))
50977575: Sending PUELISH to mato-BSC8BA12:193F-550F-5708-59200415B981 (d0, q0, r0, m0, 'Mbed', ... (21 bytes))
50977575: Sendi
```

- Lab Description

1 · MQTT Broker and Client

說明:

按下按鍵時,mbed將message_num加一後pub給client(python端), client subscribe下來以後,印出結果。

> Payload Message from Python! Message arrived: QoSO, retained O, dup O, packetID 816 Payload Message from Python! Puslish message: QoSO Hello, Python! #1 Message arrived: QoSO, retained O, dup O, packetID 816 Payload QoSO Hello, Python! #1 Puslish message: QoSO Hello, Python! #2 Message arrived: QoSO, retained O, dup O, packetID 816 Puslish message: QoSO Hello, Python! #3 Payload QoSO Hello, Python! #2 Message arrived: QoSO, retained O, dup O, packetID 816 Puslish message: QoSO Hello, Python! #4 Payload QoSO Hello, Python! #3 Puslish message: QoSO Hello, Python! #5 Message arrived: QoSO, retained O, dup O, packetID 816 Puslish message: QoSO Hello, Python! #6 Payload QoSO Hello, Python! #4 Message arrived: QoSO, retained O, dup O, packetID 816 Payload QoSO Hello, Python! #5 Message arrived: QoSO, retained O, dup O, packetID 816 Payload QoSO Hello, Python! #6 Puslish message: QoSO Hello, Python! #7 Message arrived: QoSO, retained O, dup O, packetID 816 Payload QoSO Hello, Python! #7 u:\Embeaueu_system\tab_bemo\to_z_mQtt>pythons mqtt_titent.py Connecting to 172.20.10.2/Mbed Connected rc: 0 Subscribed OK [Received] Topic: Mbed, Message: b'Message from Python!\n' [Received] Topic: Mbed, Message: b'QoS0 Hello, Python! #1\x00' [Received] Topic: Mbed, Message: b'QoS0 Hello, Python! #2\x00' [Received] Topic: Mbed, Message: b'QoS0 Hello, Python! #3\x00' [Received] Topic: Mbed, Message: b'QoS0 Hello, Python! #4\x00' [Received] Topic: Mbed, Message: b'QoS0 Hello, Python! #5\x00' [Received] Topic: Mbed, Message: b'QoS0 Hello, Python! #6\x00'

\equiv \cdot Demo and Checkpoints

send the data of accelerometer

說明:

新增一個ticker,每0.5秒就call一次publish function,在每一次的 publish function 中,都取一次acceleromete的data,之後pub出去。

Ticker Ticker;

mqtt_thread.start(callback(&mqtt_queue, &EventQueue::dispatch_forever)); Ticker.attach(mqtt_queue.event(&publish_message, &client), 500ms);

void publish message(MQTT::Client<MQTTNetwork, Countdown>* client) {
 BSP_ACCELERO_AccGetXYZ(pDataXYZ);

ሌ	>_ C:\WINDOWS\SYSTEM32\cmd.exe - python3 mqtt_client.py \times
	<pre>Message: b'28 , 15 , 993\x00' Message: b'27 , 16 , 993\x00' Message: b'27 , 15 , 992\x00' Message: b'27 , 15 , 994\x00' Message: b'26 , 16 , 992\x00' Message: b'27 , 15 , 993\x00' </pre>

Error -3012

後來發現是如果Powershall沒有開啟好·就會出現這類問題

<pre>15 "nsapi.default-wifi-password: "\"OwO910809\"", 16 "platform.stdio-baud-rate": 9600, 17 "mbod-trace.enable": false, 18 "mbod-trace.enable": false, 19 "rtos.moin-thread-stack-size": 8192 20 }, 21 "B_L4S5I_IOT01A": { 22 "B_L4S5I_IOT01A": { 23 "Starget.network-default": true, 24 "target.network-default": true, 25 "target.network-default": true, 26 }, 27 "DISCO_E4132H": { 28 "target.network-default": ["MBEDILS_SHA1_C"] 29 "target.mecros_add": ["MBEDILS_SHA1_C"] 30 }, 31 "DISCO_L47SV6_IOT01A": { 30 Problems x >_ C:WINDOWS\SYSTEM32\cmdexe x @ Libraries x >_ DISCO-L4S5I(B-L4S5I-IOT01A) x Starting socket demo Connecting to the metrork 1P address: 172.20.10.1 0Penilg connection to remote port 80 Error!_socket.connect() returned: -3012</pre>
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<pre>17 "mbed-trace.enable": false, 18 "mbed-trace.maxlevel": "TRACE_LEVEL_DEBUG", 19 "rtos.main-thread.stack-size": 8192 20 } 21 "B_L4SSI_IOT01A": { 22 "B_u4SSI_IOT01A": { 23 "Ism43362.provide-default": true, 24 "target.network-default-interface-type": "WIFT", 25 "Istoc F4132H": { 26 "target.metros_add": ["WBEDILS_SHA1_C"] 26 "}, 27 "DISCO_F4132H": { 31 "DISCO_L475V6_IOT01A": { 31 "DISCO_L475V6_IOT01A": { 31 "DISCO_L475V6_IOT01A": { 31 "DISCO_L475V6_IOT01A": { 33 "DISCO_L475V6_IOT01A": { 34 "Starting socket demo Connecting to the aetork IP address: 172.20.10.1 Netask: 255.255.240 Gateway: 172.20.10.1 Depaing connection to remote port 80 Error! _socket.connect() returned: -3012</pre>
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<pre>19</pre>
<pre>20 21 22 23 24 25 25 26 27 26 27 26 27 27 28 29 29 29 20 20 20 20 20 20 20 20 20 20 20 20 20</pre>
21 "B_L4S5I_IOT01A": { 22 "target.components_add": ["ism43362"], 23 "target.network-default-interface-type": "WIFI", 24 "target.network-default-interface-type": "WIFI", 25 "target.network-default-interface-type": "WIFI", 26 }, 27 "DISCO_F4132H": { "target.macros_add": ["ism43362"], 29 "target.macros_add": ["MBEDILS_SHA1_C"] 30 }, 31 "DISCO_L475W6_IOT01A": { ① Problems x >_ C:WINDOWS\SYSTEM32\cmd.exe x @ Libraries x >_ DISCO-L455I(B-L455I-HOT01A) x Starting socket dewo Connecting to the network IP address: I72.20.10.12 Wetask: 252.352.352.400 G gateway: 172.30.10.1 Opening connecting to the network IF address: I72.30.10.1 Opening connecting to the network IF rof! _socket.connect() returned: -3012
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IP address: 172.20.10.12 Netnask: 255.255.255.2540 Gateway: 172.20.10.1 Opening connection to remote port 80 Error! _socket.connect() returned: -3012
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Opening contection to remote port 80 Error! _socket.connect() returned: -3012
Error! _socket.connect() returned: -3012

SSID問題

手機的wifi名稱可以是符號或是其他文字,但是如果是用符號,可能與電腦等不相容,進而導致連線失敗

四、討論

git remote repository

MQTT的publis跟subscribe只要在相同的topic下就可以使用,並且可以一次傳遞多種型別的message,感覺在很多的介面溝通能狗有很多應用。