



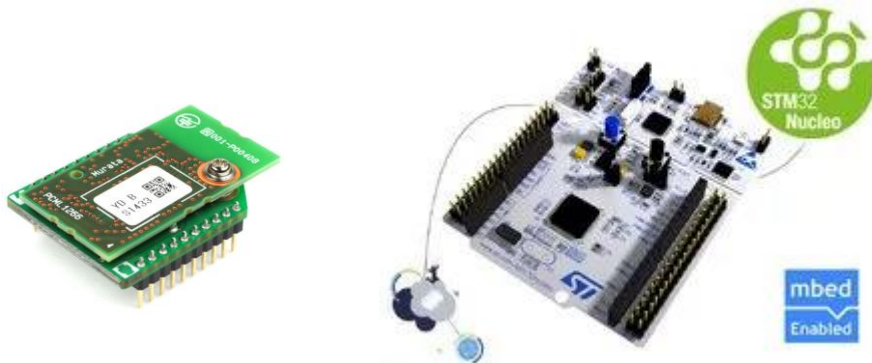
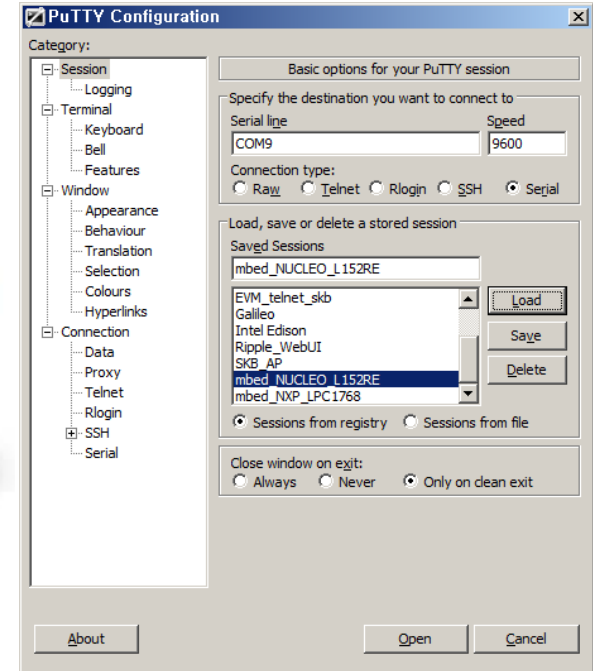
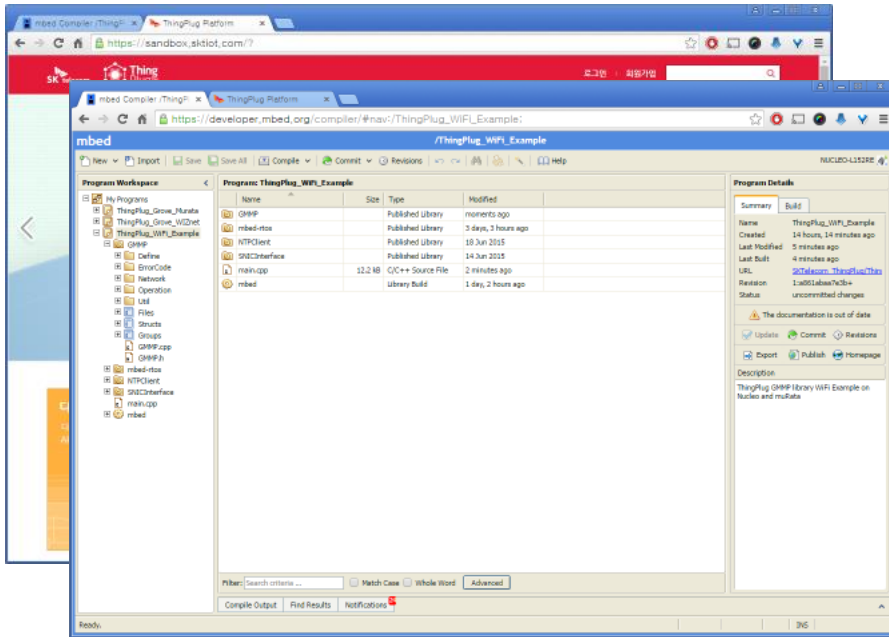
SKT 통합 IoT 플랫폼

ThingPlug 연동 가이드 for mbed

2015. 7. 25

종합기술원

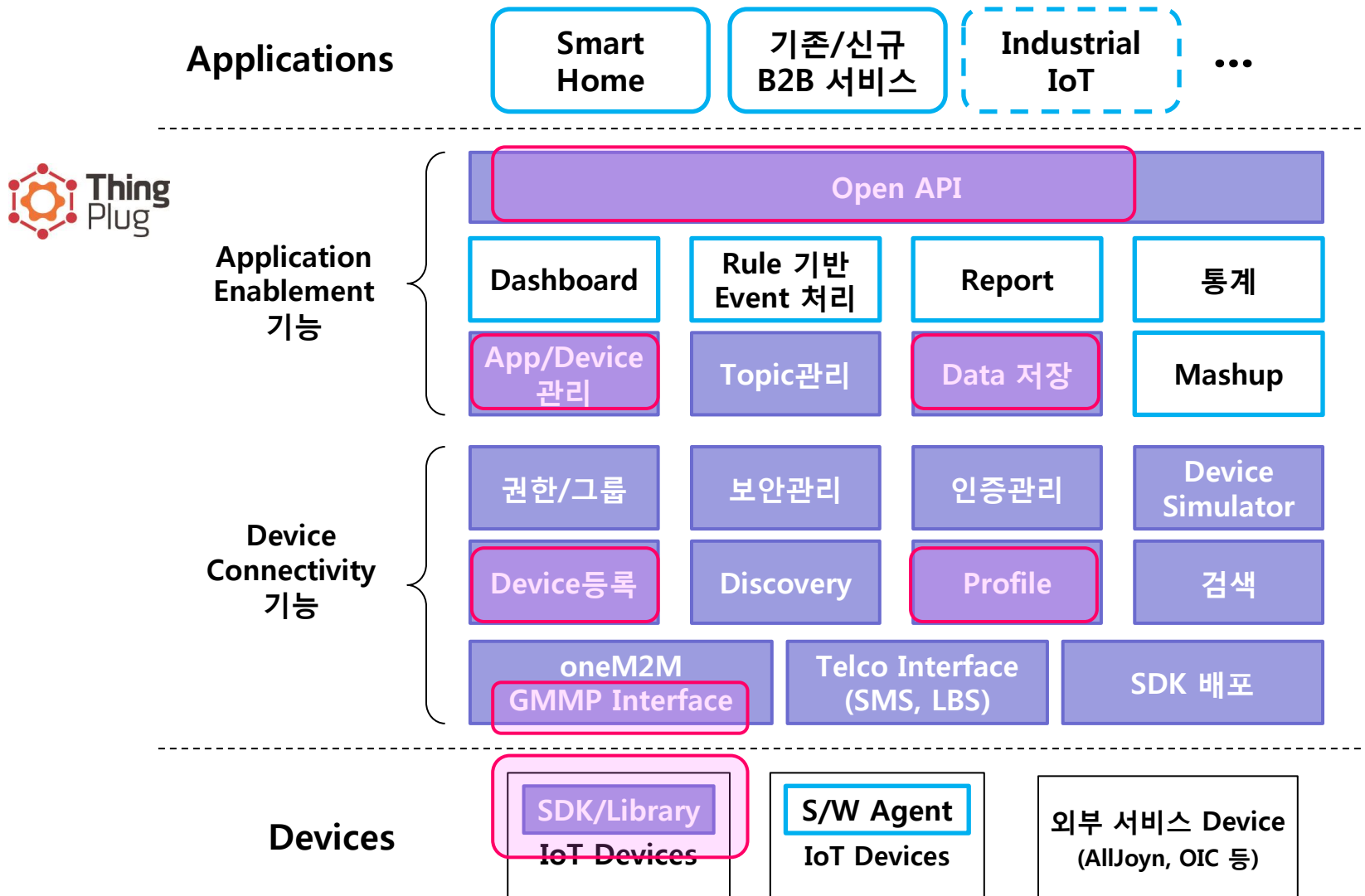
Are You Ready?



*준비물

- 노트북PC w/ Web Browser, PuTTY
- mbed Nucleo w/ Wi-Fi module
- USB cable

ThingPlug Architecture



ThingPlug Portal: <https://sandbox.sktiot.com>

SK telecom Thing Plug

로그인 | 회원가입

세상과 연결하는 IoT 그 중심에 ThingPlug가 함께 합니다.

인터넷을 기반으로 사람과 사물, 사물과 사물간 연결되어 상호 공유할 수 있는 지능형 기술을 만나 보세요

ThingPlug 소개

디바이스

디바이스를 등록하시면, API 및 앱을 통해 서비스가 가능합니다.

앱

다양한 IoT 앱을 개발하고, 그 가치를 창출할 수 있습니다.

개발자 커뮤니티

개발관련 문의사항이나 해결방안을 공유할 수 있습니다.

통계

통계 자료를 통해 IoT 현황을 분석/판단 할 수 있습니다.

ThingPlug Portal: Account Registration

- 회원
- 회원가입
- 아이디/암호 찾기
- 이용약관
- 개인정보 취급방침
- 이메일 주소 무단 수집 거부

회원가입

홈 > 회원 > 회원가입

▶ 사용자 정보

*은(는) 필수입력 항목입니다.

사용자 ID *

▶ 서비스 플랫폼

비밀번호 서비스 플랫폼 선택 사용 미사용
[다만, IoT 서비스 만들기]를 이용하기 위해서는 '서비스 플랫폼 선택'에서 '사용'을 체크해야 합니다.

▶ 서비스 정보

E-Mail 서비스 ID * 기본 서비스 사용

**기본 서비스 사용 체크 시,
ThingPlug 서비스 명 부여되면서
곧바로 가입승인 처리됨**

전화번호 *
가입 승인 완료 SMS를 받아 보실 수 있습니다.

디바이스 연동 프로토콜 * HTTP TCP * 등록 신청을 하시면 관리자 승인 후 이용하실 수 있습니다.

GMMP 연동을 위해 TCP 선택

ThingPlug Portal: Account Registration



lesm in2 님 환영합니다. | 로그아웃 | 정보수정 | 마이페이지



마이페이지

마이 IoT

회원정보수정

서비스 정보 수정

내 게시물 조회

홈 > 마이페이지 > 서비스 정보 수정

서비스 정보 수정

▶ 서비스 기본 정보

서비스 아이디 *	ThingPlug	서비스명 *	SKT
보고 주기 *	2 분	보고 주기 Offset *	20 초
Response Time out *	60 초	최근 정보 수정 일시	2015-06-24 10:20:50
CLOUD 저장 여부 *	<input type="radio"/> 저장 <input checked="" type="radio"/> 저장 안함	TCP Listen Port	31015
연동 URL	<input type="radio"/> 사용 <input checked="" type="radio"/> 사용 안함	연동 URL	<input type="text"/>

사용자별로 다른 port번호가 부여됨

▶ 암호화

암호화 사용 여부 *	<input checked="" type="radio"/> 미사용 <input type="radio"/> 사용	데이터 암호화 Key(m TCP) *	<input type="text"/> 자동생성
암호화 알고리즘 *	사용안함 ▼	관리용 암호화 Key(m TCP) *	<input type="text"/> 자동생성

ThingPlug on mbed site: team page

The screenshot shows the ARM mbed website navigation bar with links for Home, Platforms, Components, Handbook, Cookbook, Code, Questions, and Forum. Below the navigation is the ARM mbed logo and a search bar with the text "Search developer.mbed.org..." and a "Go" button. The main content area displays the breadcrumb "Teams » SKTelecom_ThingPlug" and the team name "SKTelecom_ThingPlug". A description reads "ThingPlug Team, responsible for SKT's IoT Platform". To the right is the Thing Plug logo. Below the description are four tabs: Summary, Code, Wiki, and Community. The main content area contains a link to the ThingPlug official site: <https://sandbox.sktiot.com>. Under the "Code" section, there are two entries: "GMMP" and "ThingPlug_WiFi_Example". Each entry includes a description, tags, and a "Last updated: about an hour ago" timestamp. The "GMMP" entry has 1 star and 0 forks, while the "ThingPlug_WiFi_Example" entry has 1 star and 0 forks.


ARM[®]mbed™

Search developer.mbed.org... Go

Teams » SKTelecom_ThingPlug

SKTelecom_ThingPlug






ThingPlug Team, responsible for SKT's IoT Platform








Summary Code Wiki Community

Refer the ThingPlug official site: <https://sandbox.sktiot.com>

Code

 **GMMP**  Last updated: about an hour ago
ThingPlug GMMP library for mbed  gmp, IOT, SKTelecom, TCP  1  0

 **ThingPlug_WiFi_Example**  Last updated: about an hour ago
ThingPlug GMMP library WiFi Example on Nucleo and muRata  gmp, SKTelecom, wifi  1  0

https://developer.mbed.org/teams/SKTelecom_ThingPlug/

ThingPlug on mbed site: GMMP SDK

The screenshot displays the ARM mbed developer website for the SKTelecom_ThingPlug / GMMP repository. At the top, there is a search bar and a 'Login or signup' button. The breadcrumb trail reads 'Teams » SKTelecom_ThingPlug » Code » GMMP'. The repository name 'SKTelecom_ThingPlug / GMMP' is prominently displayed, along with the description 'ThingPlug GMMP library for mbed'. Navigation links for 'Home', 'History', 'Graph', 'API Documentation', 'Wiki', and 'Pull Requests' are provided. The main content area shows 'Files at revision 0:32c20cfb2b30' with download options for 'zip' and 'gz'. A table lists the directory structure: [up], Define, ErrorCode, Network, Operation, and Util. On the right, a 'Repository toolbox' offers 'Import this library' and 'Export to desktop IDE' options. Below that, 'Repository details' show the library was created about 2 hours ago, has 0 imports, 0 forks, and 1 commit.

ARM[®]mbed™ Search developer.mbed.org... Go Login or signup

Teams » SKTelecom_ThingPlug » Code » GMMP

ThingPlug SKTelecom_ThingPlug / GMMP

ThingPlug GMMP library for mbed

Home History Graph API Documentation Wiki Pull Requests

Files at revision 0:32c20cfb2b30 Download repository: zip gz

/ default tip

Name	Size	Actions
↑ [up]		
Define		
ErrorCode		
Network		
Operation		
Util		

Repository toolbox

Import this library

Export to desktop IDE

Repository details

Type: Library

Created: about 2 hours ago

Imports: 0

Forks: 0

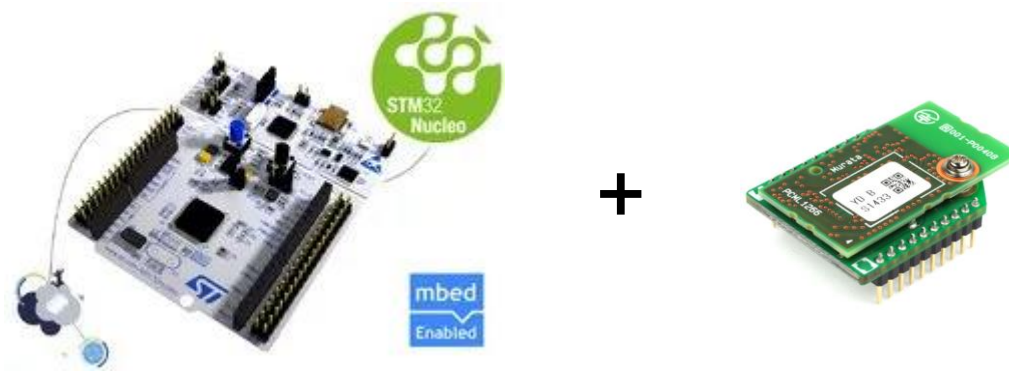
Commits: 1

https://developer.mbed.org/teams/SKTelecom_ThingPlug/code/GMMP/

ThingPlug Wi-Fi Example: Prepare Hardware



<https://developer.mbed.org/platforms/ST-Nucleo-L152RE/>



<https://developer.mbed.org/components/SNICInterface/>

ThingPlug Wi-Fi Example: Import Program

The screenshot shows the ARM mbed developer website interface. At the top, there is a search bar with the text "Search developer.mbed.org..." and a "Go" button. To the right is a green "Login or signup" button. Below the search bar, the breadcrumb trail reads "Teams » SKTelecom_ThingPlug » Code » ThingPlug_WiFi_Example". The main header shows "SKTelecom_ThingPlug / ThingPlug_WiFi_Example". Below this, it says "ThingPlug GMMP library WiFi Example on Nucleo and muRata". A "Dependencies" section lists "GMMP", "NTPClient", "SNICInterface", "mbed-rtos", and "mbed". There are navigation buttons for "Home", "History", "Graph", "API Documentation", "Wiki", and "Pull Requests". The main content area is titled "Files at revision 0:b111abbea470" and includes a "Download repository:" section with "zip" and "gz" options. Below this is a file list table with columns for "Name", "Size", and "Actions". The "Repository toolbox" on the right contains buttons for "Import this program" (circled in red), "Export to desktop IDE", and "Build repository". The "Repository details" section on the right shows "Type: Program", "Created: about an hour ago", "Imports: 0", and "Forks: 0".

ARM[®]mbed™

Search developer.mbed.org... Go

Login or signup

Teams » SKTelecom_ThingPlug » Code » ThingPlug_WiFi_Example

SKTelecom_ThingPlug / ThingPlug_WiFi_Example

ThingPlug GMMP library WiFi Example on Nucleo and muRata

Dependencies: GMMP NTPClient SNICInterface mbed-rtos mbed

Home History Graph API Documentation Wiki Pull Requests

Files at revision 0:b111abbea470 Download repository: zip gz

/ default tip

Name	Size	Actions
↑ [up]		
GMMP.lib	77	Revisions Annotate
NTPClient.lib	71	Revisions Annotate
SNICInterface.lib	72	Revisions Annotate
main.cpp	12763	Revisions Annotate

Repository toolbox

Import this program

Export to desktop IDE

Build repository

Repository details

Type: Program

Created: about an hour ago

Imports: 0

Forks: 0

https://developer.mbed.org/teams/SKTelecom_ThingPlug/code/ThingPlug_WiFi_Example/

ThingPlug Wi-Fi Example: Select mbed platform

The screenshot shows the mbed IDE interface with the following elements:

- Header:** "mbed" logo and the path "/ThingPlug_WiFi_Example".
- Dialog Box:** "Select a Platform" with a close button (X).
- Platform Selection:** "NUCLEO-L152RE" is selected, indicated by a green checkmark and a "Select Platform" button. A red circle highlights this selection.
- Image:** A photograph of the NUCLEO-L152RE board with a green "STM32 Nucleo" logo.
- Description:** "Affordable and flexible platform to ease prototyping using a STM32L152RET6 microcontroller."
- Overview:** "The STM32 Nucleo board provides an affordable and flexible way for users to try out new ideas and build prototypes with any STM32 microcontroller line, choosing from the various combinations of performance, power consumption and features." It also mentions "The Arduino® connectivity support and ST Morpho headers make it easy to expand the functionality of the STM32 Nucleo open development platform with a wide choice of specialized shields." and "The STM32 Nucleo board does not require any separate probe as it integrates the ST-LINK/V2-1 debugger/programmer."
- Code Snippet:** A URL: `{{https://www.youtube.com/watch?v=7YDIG-oArdk&index=9&list=PLGyFKd2HIZlzhKhvngDGmsJxx0uLscnV}}`
- Your registered platforms:** A row of platform icons: "mbed LPC1768", "NUCLEO-F103RB", "NUCLEO-L152RE" (circled in red), "NUCLEO-F401RE", "NUCLEO-F334R8", and "Add Platform".
- Right Panel:** A sidebar showing a list of builds for "ThingPlug_WiFi_Example" with options like "Commit", "Revisions", "Publish", and "Homepage".

ThingPlug Wi-Fi Example: Test app with GMMP library

The image shows two screenshots of the mbed IDE. The top screenshot displays the main project view for `/ThingPlug_WiFi_Example`. The `Program Workspace` on the left shows a tree view where the `main.cpp` file is highlighted. The central table lists the project's components:

Name	Size	Type	Modified
GMMP		Published Library	7 minutes ago
mbed-rtos		Published Library	2 days, 2 hours ago
NTPClient		Published Library	18 Jun 2015
SNICInterface		Published Library	14 Jun 2015
main.cpp	12.5 kB	C/C++ Source File	20 hours, 20 minutes ago
mbed		Library Build	1 day, 1 hour ago

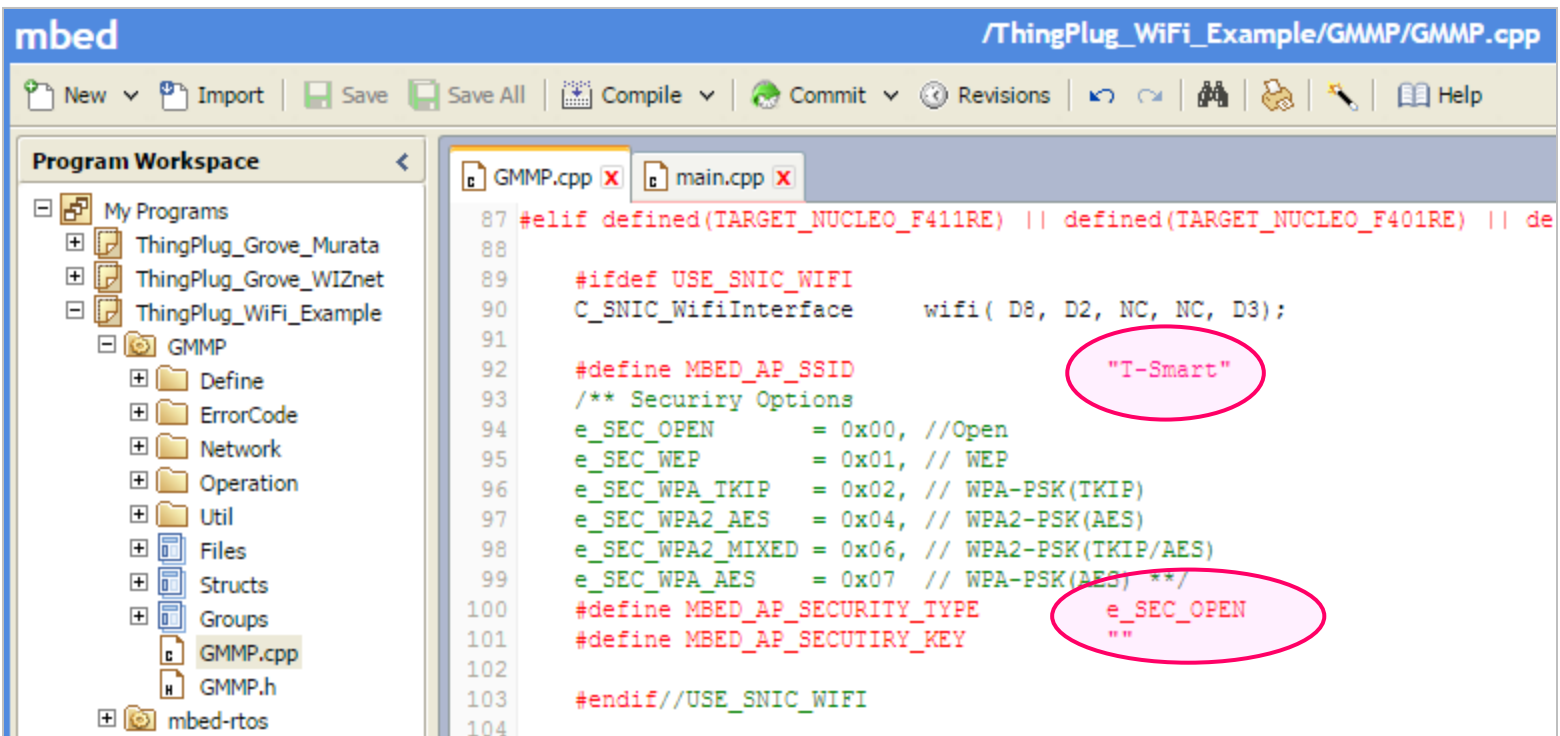
The `Program Details` panel on the right shows the following information:

- Name: ThingPlug_WiFi_Example
- Created: 1 hour, 1 minute ago
- Last Modified: moments ago
- Last Built: moments ago
- URL: [SKTelecom ThingPlug/ThingPlug](#)
- Revision: 0:b111abbea470
- Status: synced

The bottom screenshot shows the `Library: /ThingPlug_WiFi_Example/GMMP` view. The `Program Workspace` on the left highlights the `GMMP` folder. The central table lists the library's files:

Name	Size	Type	Modified
Define		Program Folder	1 day, 1 hour ago
ErrorCode		Program Folder	1 day, 1 hour ago
Network		Program Folder	1 day, 1 hour ago
Operation		Program Folder	1 day, 1 hour ago
Util		Program Folder	1 day, 1 hour ago
GMMP.cpp	11.5 kB	C/C++ Source File	9 minutes ago
GMMP.h	26.3 kB	C/C++ Header File	1 day, 1 hour ago

ThingPlug Wi-Fi Example: Setting Parameters - WiFi



```
87 #elif defined(TARGET_NUCLEO_F411RE) || defined(TARGET_NUCLEO_F401RE) || de
88
89 #ifdef USE_SNIC_WIFI
90 C_SNIC_WifiInterface    wifi( D8, D2, NC, NC, D3);
91
92 #define MBED_AP_SSID    "T-Smart"
93 /** Security Options
94 e_SEC_OPEN             = 0x00, //Open
95 e_SEC_WEP              = 0x01, // WEP
96 e_SEC_WPA_TKIP        = 0x02, // WPA-PSK(TKIP)
97 e_SEC_WPA2_AES        = 0x04, // WPA2-PSK(AES)
98 e_SEC_WPA2_MIXED     = 0x06, // WPA2-PSK(TKIP/AES)
99 e_SEC_WPA_AES         = 0x07 // WPA-PSK(AES) */
100 #define MBED_AP_SECURITY_TYPE    e_SEC_OPEN
101 #define MBED_AP_SECURITY_KEY    ""
102
103 #endif//USE_SNIC_WIFI
104
```

ThingPlug Wi-Fi Example: First Run!

Compile

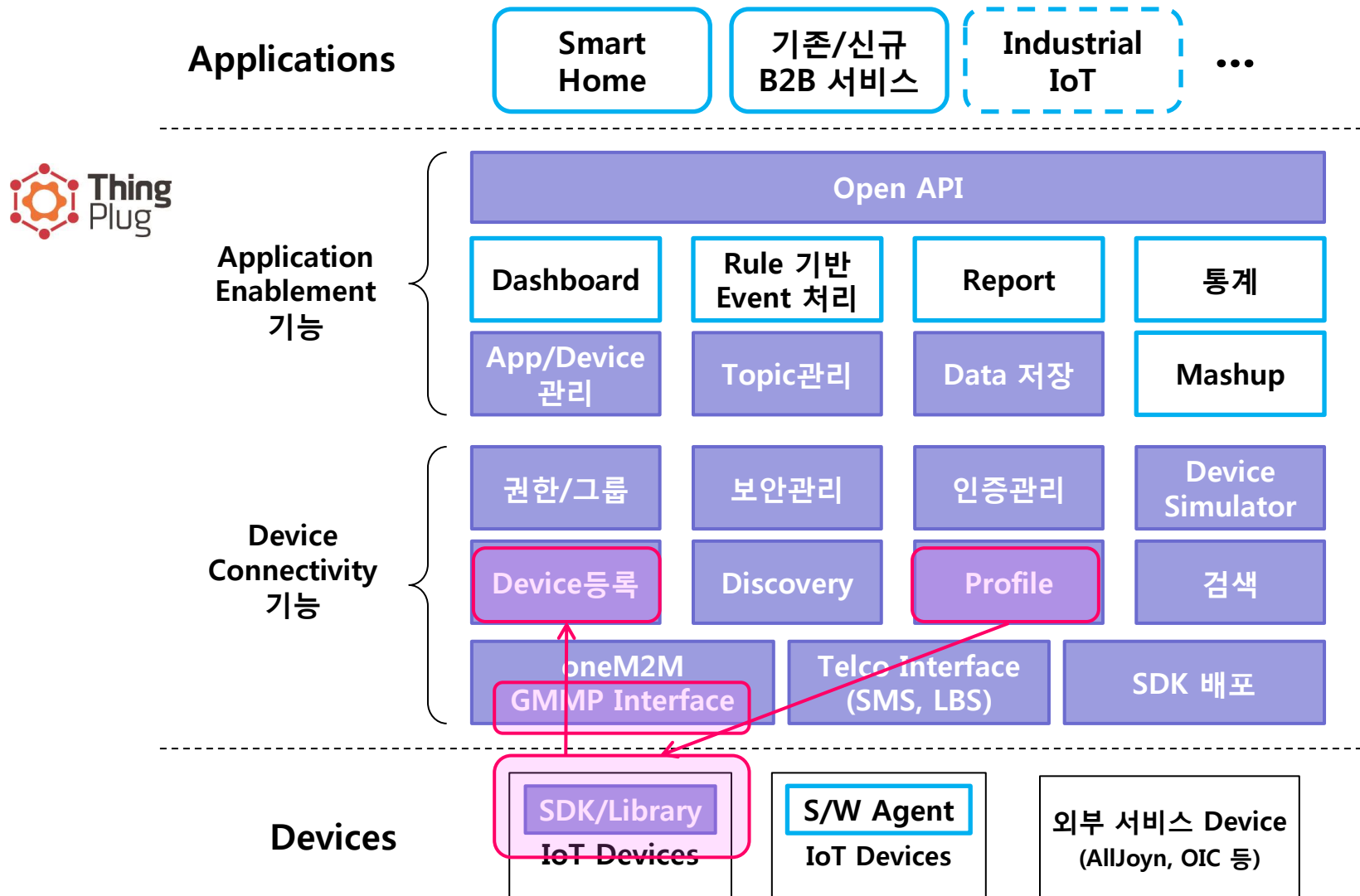
```
123 #ifdef USE_SNIC_WIFI
124 wifi.init();
125
126 wait(0.5);
127 int s = wifi.disconnect();
128 if( s != 0 ) {
129     return -1;
130 }
131
132 wait(0.3);
133 // Connect AP
134 wifi.connect( MBED_AP_SSID
135               , strlen(MBED_AP_SSID)
136               , MBED_AP_SECURITY_TYPE
137               , MBED_AP_SECURITY_KEY
138               , strlen(MBED_AP_SECURITY_KEY) );
139
140 wait(0.5);
141 wifi.setIPConfig( true ); //Use DHCP
142 wait(0.5);
```

Run Terminal

```
Start setup()
Sensor not detected!
MAC: 00:02:f7:f0:00:00
Getting IP...
MAC Address is 98:f1:70:67:4d:c3
IP Address is 192.168.1.51
Trying to update time...
Set time successfully
Time is set to (GMT+9): Fri Jul 24 00:21:22 2015
Connecting...
[INFO]server ip: 61.250.21.211:31015
Connected!!
GW RegReq has been sent.
Sent Data: 33.3
[INFO]Sent Data: 33.3
[INFO]MsgType: 12
[ERR]DeliverRes Err(0x24)!!
***** NOT E_WOULDBLOCK *****
[INFO]MsgType: 2
GWRegRes has been received:
SP10030374key
SC10006932
[INFO]GWRegRes has been received:
SP10030374key
SC10006932
%02x: ProfileReq has been sent.
.mac ***** NOT E_WOULDBLOCK *****
.mac Sent Data: 33.3
dress [INFO]Sent Data: 33.3
[INFO]MsgType: 12
DeliveryRes has been received.
***** NOT E_WOULDBLOCK *****
```

COPY&PASTE

ThingPlug Wi-Fi Example: Device Registration



ThingPlug Wi-Fi Example: Getting Parameters - MAC

The screenshot displays the mbed IDE interface for the file `/ThingPlug_WiFi_Example/GMMP/GMMP.cpp`. The left sidebar shows the project structure under "My Programs" > "ThingPlug_WiFi_Example" > "GMMP". The main editor shows the following C++ code:

```
123 #ifdef USE_SNIC_WIFI
124 wifi.init();
125
126 wait(0.5);
127 int s = wifi.disconnect();
128 if( s != 0 ) {
129     return -1;
130 }
131
132 wait(0.3);
133 // Connect AP
134 wifi.connect( MBED_AP_SSID
135              , strlen(MBED_AP_SSID)
136              , MBED_AP_SECURITY_TYPE
137              , MBED_AP_SECURITY_KEY
138              , strlen(MBED_AP_SECURITY_KEY) );
139
140 wifi.setIPConfig( true ); //Use DHCP
141 wait(0.5);
142
143 tagWIFI_STATUS_T wifi_status;
144 if( wifi.getWifiStatus(&wifi_status) ) printf("W
145
146 printf("MAC Address is %02x:%02x:%02x:%02x:%02x:
147         wifi_status.mac_address[0], wifi_status.mac_
148         wifi_status.mac_address[3], wifi_status.mac_
149 printf("IP Address is %s\r\n", wifi.getIPAddress
150 #endif//USE_SNIC_WIFI
151
```

The execution output on the right shows the following sequence of events:

```
Start setup()
Sensor not detected!
MAC: 00:02:f7:f0:00:00
Getting IP ..
MAC Address is 98:f1:70:67:4d:c3
IP Address is 192.168.1.51
Trying to update time...
Set time successfully
Time is set to (GMT+9): Fri Jul 24 00:21:22 2015

Connecting...
[INFO]server ip: 61.250.21.211:31015
Connected!!
GW RegReq has been sent.
Sent Data: 33.3
[INFO]Sent Data: 33.3

[INFO]MsgType: 12
[ERR]DeliverRes Err(0x24)!!
***** NOT E_WOULDBLOCK *****

[INFO]MsgType: 2
GWRegRes has been received:
SP10030374key
SC10006932
[INFO]GWRegRes has been received:
SP10030374key
SC10006932
ProfileReq has been sent.
***** NOT E_WOULDBLOCK *****
Sent Data: 33.3
[INFO]Sent Data: 33.3

[INFO]MsgType: 12
DeliveryRes has been received.
***** NOT E_WOULDBLOCK *****
```

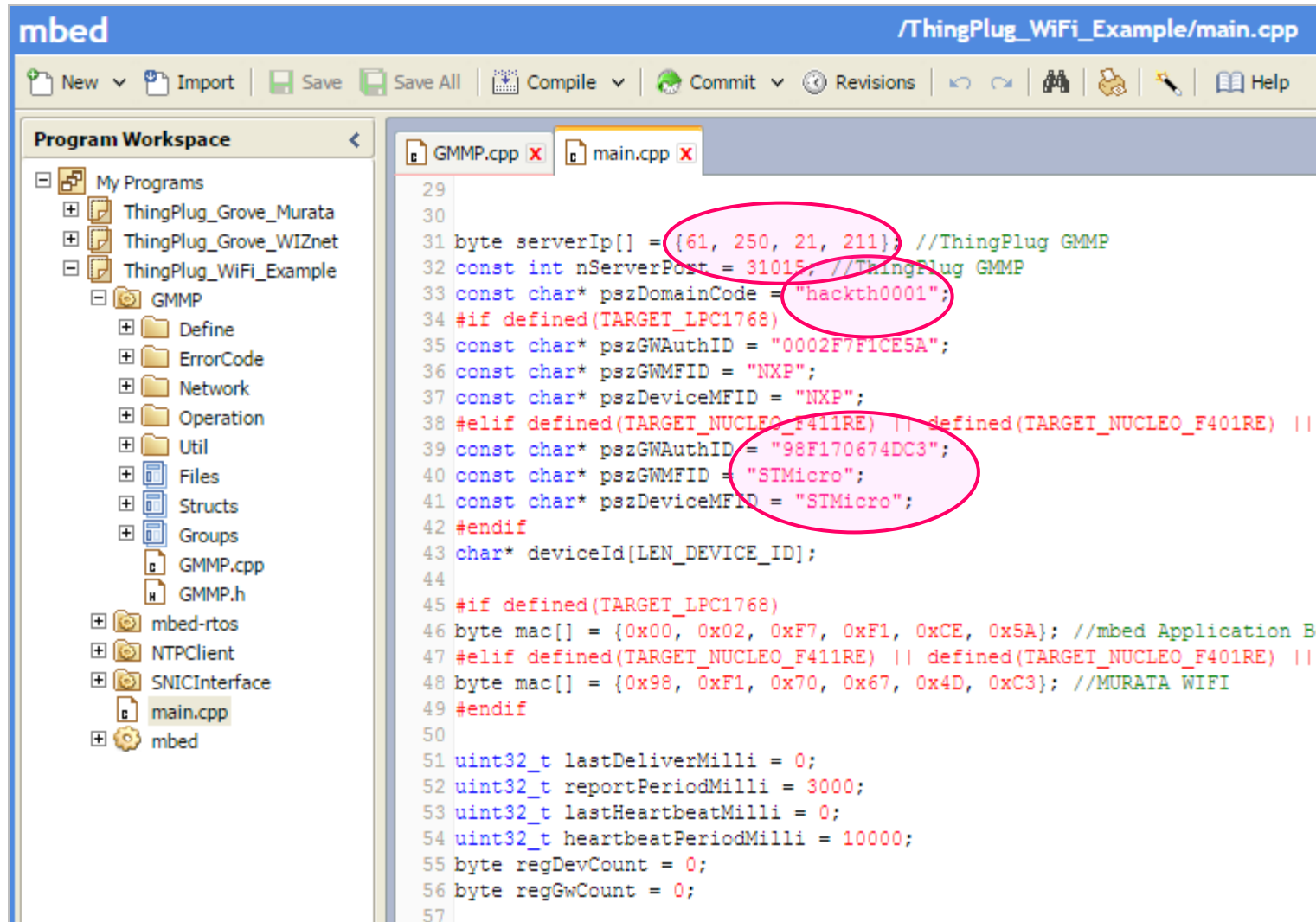

ThingPlug Wi-Fi Example: Setting Parameters - service

서비스 정보 수정

▶ 서비스 기본 정보

서비스 아이디 *	hackth0001	서비스명 *	SKT
보고 주기 *	2 분	보고 주기 Offset *	20 초
Response Time out *	60 초	최근 정보 수정 일시	2015-06-24 10:20:50
CLOUD 저장 여부 *	<input type="radio"/> 저장 <input checked="" type="radio"/> 저장 안함	TCP Listen Port	31015
연동 URL	<input type="radio"/> 사용 <input checked="" type="radio"/> 사용 안함	연동 URL	<input type="text"/> 연동 확인

ThingPlug Wi-Fi Example: Setting Parameters - service



The screenshot shows the mbed IDE interface. The left sidebar displays the 'Program Workspace' with a tree view of the project structure. The main editor window shows the code for 'main.cpp'. Several lines of code are circled in red, highlighting specific parameter values:

```
29
30
31 byte serverIp[] = {61, 250, 21, 211}; //ThingPlug GMP
32 const int nServerPort = 31015; //ThingPlug GMP
33 const char* pszDomainCode = "hackth0001";
34 #if defined(TARGET_LPC1768)
35 const char* pszGWAauthID = "0002F7F1CE5A";
36 const char* pszGWMFID = "NXP";
37 const char* pszDeviceMFID = "NXP";
38 #elif defined(TARGET_NUCLEO_F411RE) || defined(TARGET_NUCLEO_F401RE) ||
39 const char* pszGWAauthID = "98F170674DC3";
40 const char* pszGWMFID = "STMicro";
41 const char* pszDeviceMFID = "STMicro";
42 #endif
43 char* deviceId[LEN_DEVICE_ID];
44
45 #if defined(TARGET_LPC1768)
46 byte mac[] = {0x00, 0x02, 0xF7, 0xF1, 0xCE, 0x5A}; //mbed Application B
47 #elif defined(TARGET_NUCLEO_F411RE) || defined(TARGET_NUCLEO_F401RE) ||
48 byte mac[] = {0x98, 0xF1, 0x70, 0x67, 0x4D, 0xC3}; //MURATA WIFI
49 #endif
50
51 uint32_t lastDeliverMilli = 0;
52 uint32_t reportPeriodMilli = 3000;
53 uint32_t lastHeartbeatMilli = 0;
54 uint32_t heartbeatPeriodMilli = 10000;
55 byte regDevCount = 0;
56 byte regGwCount = 0;
57
```

ThingPlug Portal: Device Registration

디바이스

디바이스 정보

- 디바이스 조회
- 디바이스 등록

디바이스 진단

펌웨어

디바이스 그룹

🏠 > 디바이스 > 디바이스 정보 > 디바이스 등록

디바이스 등록

디바이스를 하나씩 개별 등록하실 수 있습니다.
등록하던 디바이스 정보가 있을 경우, 아래에 마지막으로 등록된 정보가 표시됩니다.

▶ 기본 정보

서비스명 *	hackth0001
서비스 프로토콜 *	<input checked="" type="radio"/> GMMP <input type="radio"/> ETSI
이동전화 번호 / MAC Address *	<input type="text" value="0002F7F1CE5A"/> <small>무선 디바이스인 경우 이동전화번호 (예, 01012345678), 유선 디바이스인 경우 Mac Address (예, 1A2B3C4D5E6F)를 입력 해 주십시오.</small>
디바이스 이름 *	<input type="text" value="NXP"/>
디바이스 시리얼 번호 *	<input type="text" value="0002F7F1CE5A"/> <small>단말 인증에 사용되는 시리얼 번호입니다. <input checked="" type="checkbox"/> 이동전화 번호 / MAC Address로 단말 시리얼 번호로 대체합니다.</small>

ThingPlug Portal: Device Registration



lesm in2 님 환영합니다. | 로그아웃 | 정보수정 | 마이페이지



디바이스

디바이스 정보

- 디바이스 조회
- 디바이스 등록

디바이스 진단

펌웨어

디바이스 그룹

홈 > 디바이스 > 디바이스 정보 > 디바이스 등록

보고 주기	2 분 (서비스 등록 시 설정 된 값)
보고주기 Offset	20 초 (서비스 등록 시 설정 된 값)
Always On 여부	<input checked="" type="radio"/> 사용 <input type="radio"/> 사용안함
Heart Beat 주기	5 분 (서비스 등록 시 설정 된 값)
▶ 통신 규격	
1년 플랫폼 제어 방식	
플랫폼 제어메시지 수신망 *	IP_WIRELESS ▼
플랫폼 제어메시지 수신 방법 *	TCP Always On
주소 체계 *	IPv4
수신 Address *	1.1.1.1

해 주십시오.

다.

ThingPlug Portal: Device Registration

마이페이지

마이 IoT

회원정보수정

서비스 정보 수정

내 게시물 조회

홈 > 마이페이지 > 마이 IoT

마이 IoT

	서비스 가능 디바이스	2 건		디바이스 등록 요청	0 건
	디바이스 등록 패킷 전송 대기	0 건		어플리케이션 등록 요청	0 건

▶ 최신 등록 디바이스

더보기 >

이동전화 번호/ MAC Address	디바이스 시리얼 번호	접속 프로토콜	제조사 아이디	디바이스 아이디	상태	등록자	등록 일시
98F170674DC3	98F170674DC3	GMMP	STMicro	SC10006932	등록완료	lesmin2 (이상민)	2015-06-16 20:51:57
0002F7F1CE5A	0002F7F1CE5A	GMMP	NXP	SC10006921	등록완료	lesmin2 (이상민)	2015-06-16 20:50:41

ThingPlug Portal: Device Registration

Re-run mbed

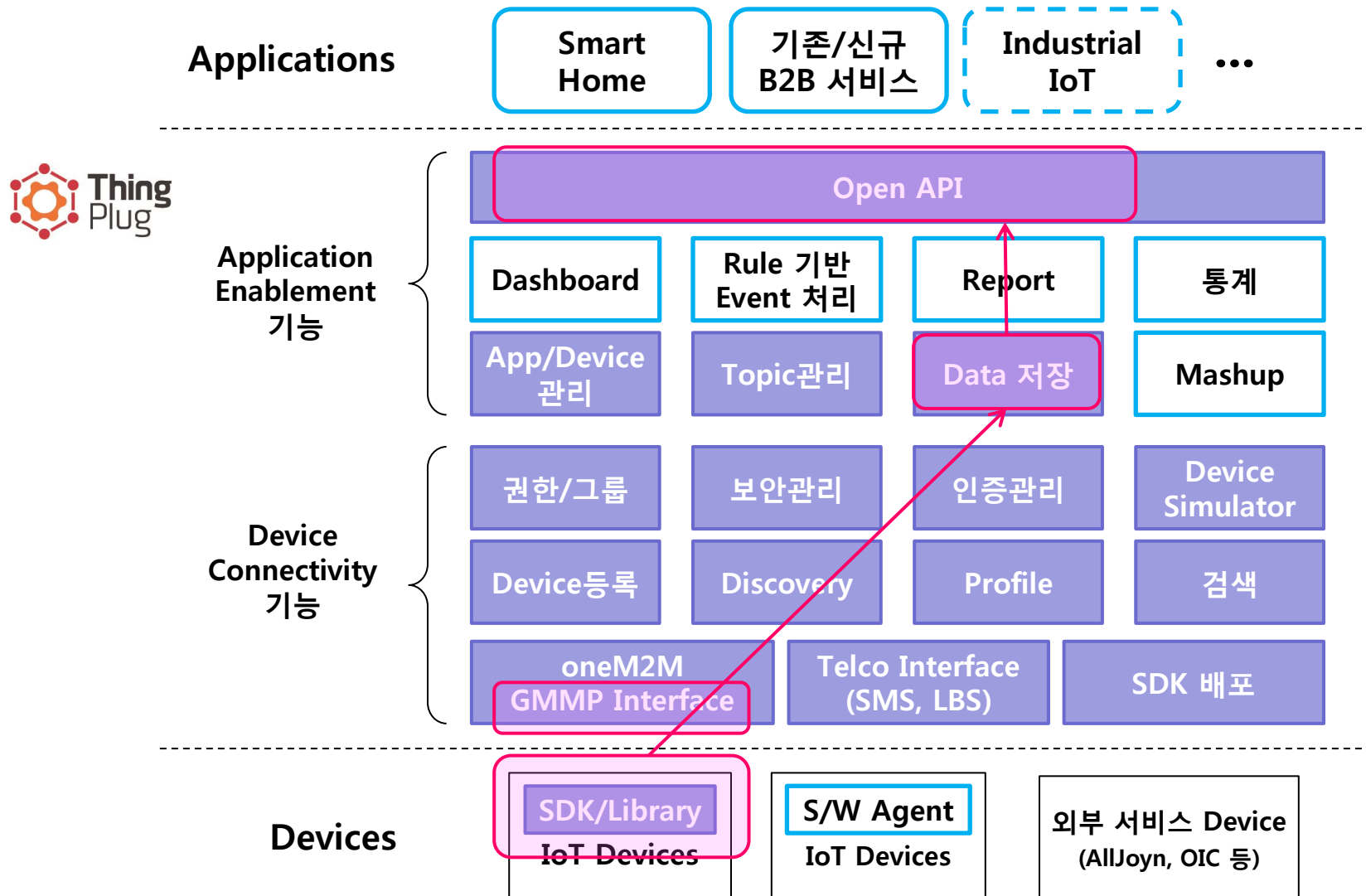


```
Start setup()
Sensor not detected!
MAC: 00:02:f7:f0:00:00
           Getting IP...
MAC Address is 98:f1:70:67:4d:c3
IP Address is 192.168.1.51
Trying to update time...
Set time successfully
Time is set to (GMT+9): Fri Jul 24 00:56:41 2015

Connecting...
[INFO]server ip: 61.250.21.211:31015
Connected!!
GW RegReq has been sent.
Sent Data: 33.3
[INFO]Sent Data: 33.3

[INFO]MsgType: 12
[ERR]DeliverRes Err(0x24)!!
***** NOT E_WOULDBLOCK *****
[INFO]MsgType: 2
GWRegRes has been received:
SP10030374key
SC10006932
[INFO]GWRegRes has been received:
SP10030374key
SC10006932
ProfileReq has been sent.
***** NOT E_WOULDBLOCK *****
[INFO]MsgType: 6
[INFO]ProfileRes has been received:
5
20
2
60
DevRegReq has been sent.
***** NOT E_WOULDBLOCK *****
[INFO]MsgType: 8
DevRegRes has been received:
AD10014516
```

ThingPlug Portal: Monitor



ThingPlug Portal: Monitor

The screenshot displays the ThingPlug Portal interface. At the top, there is a navigation bar with the SK Telecom logo, the text 'lesm in2 님 환영합니다.', and links for '로그아웃', '정보수정', and '마이페이지'. A search bar is also present.

The main content area is titled '개발자 지원' (Developer Support) and 'Open API 테스트' (Open API Test). A sidebar on the left contains links for '개발자 지원', 'FAQ', and '문의하기'. The 'Open API 테스트' section includes a sub-menu with 'Open API 테스트' and 'Open API 테스트 이력'.

Two modal windows are overlaid on the page:

- 디바이스 선택 (Device Selection):** This modal has a search bar with a dropdown for '접속 프로토콜' (Access Protocol) set to '전체' (All). The search criteria are set to '디바이스 이름' (Device Name). A search button labeled '조회' (Search) is visible.
- Open API 선택 (Open API Selection):** This modal has a search bar with a dropdown for 'Method' set to 'GET'. The search criteria are set to '주기' (Period). A search button labeled '조회' (Search) is visible. Below the search bar is a table of Open APIs.

The table in the 'Open API 선택' modal is as follows:

번호	Open API Name	Method	URI
10	Device 주기보고 데이터 조회	GET	<SB-ID>/scs/<SCL-ID>/applications/<DEVICE-ID>/containers/contCollection/contentInstances/<CONTENTINSTANCE-ID>
9	Device 주기보고 목록 조회	GET	<SB-ID>/scs/<SCL-ID>/applications/<DEVICE-ID>/containers/contCollection/contentInstances
8	Device 주기보고 목록 조회(결과 포함)	GET	<SB-ID>/scs/<SCL-ID>/applications/<DEVICE-ID>/containers/contCollection/contentInstances/detailed
7	Device 주기보고 목록 조회(조건설정)	GET	<SB-ID>/scs/<SCL-ID>/applications/<DEVICE-ID>/containers/contCollection/contentInstances
6	Device 주기보고 최신 데이터 조회	GET	<SB-ID>/scs/<SCL-ID>/applications/<DEVICE-ID>/containers/contCollection/contentInstances/latestOne
5	GW 주기보고 데이터 조회	GET	<SB-ID>/scs/<SCL-ID>/containers/contCollection/contentInstances/<CONTENTINSTANCE-ID>
4	GW 주기보고 목록 조회	GET	<SB-ID>/scs/<SCL-ID>/containers/contCollection/contentInstances
3	GW 주기보고 목록 조회(결과 포함)	GET	<SB-ID>/scs/<SCL-ID>/containers/contCollection/contentInstances/detailed
2	GW 주기보고 목록 조회(조건설정)	GET	<SB-ID>/scs/<SCL-ID>/containers/contCollection/contentInstances
1	GW 주기보고 최신 데이터 조회	GET	<SB-ID>/scs/<SCL-ID>/containers/contCollection/contentInstances/latestOne

최근 주기보고 값 얻어오기

ThingPlug Portal: Monitor

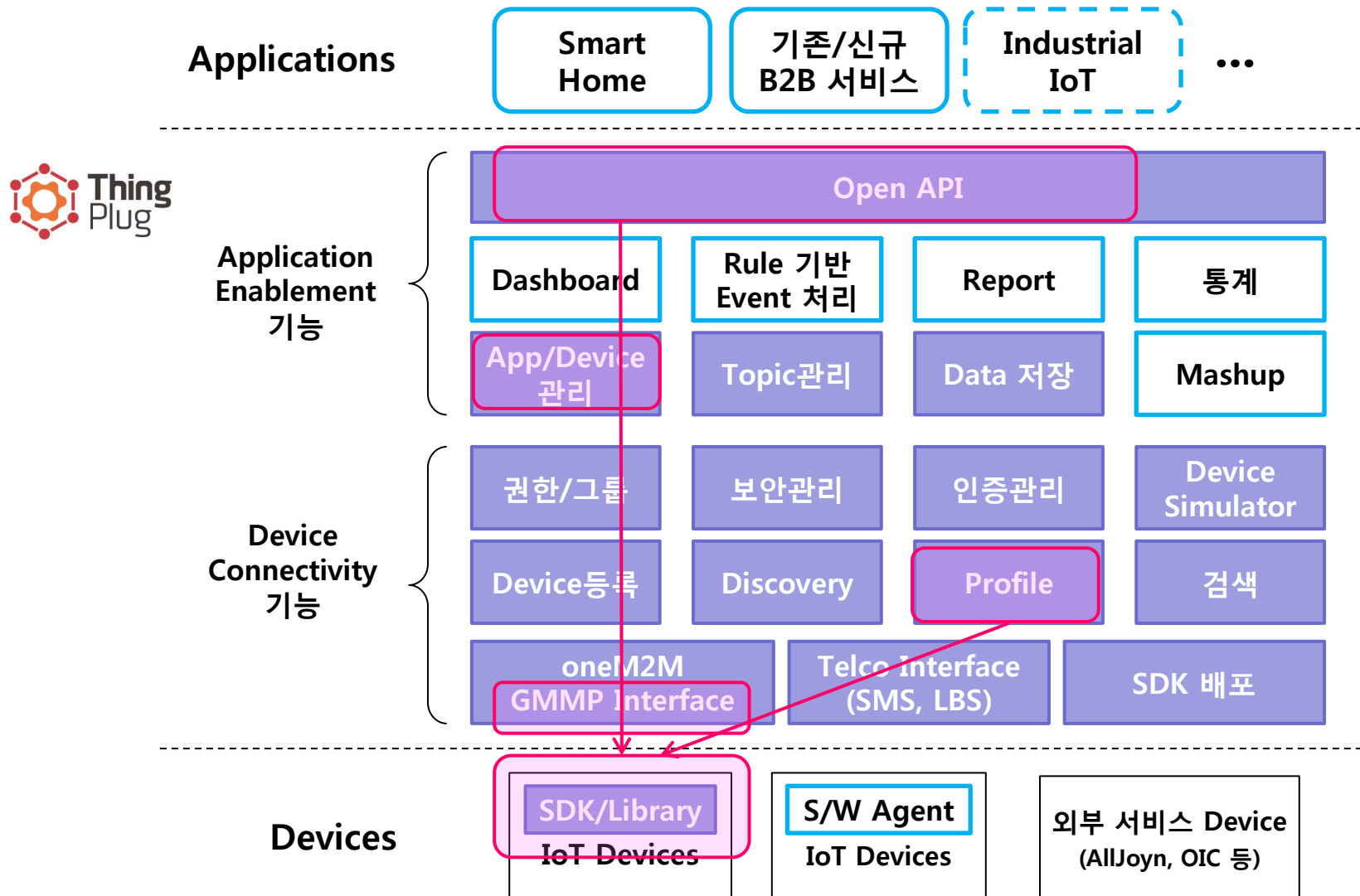
The screenshot shows the 'Open API 테스트' (Open API Test) page in the ThingPlug Portal. The page is in Korean and includes a sidebar with navigation links like '개발자 지원' (Developer Support), 'Open API 테스트' (Open API Test), '개발지원' (Developer Support), 'FAQ', and '문의하기' (Contact Us). The main content area is titled 'Open API 테스트' and contains a dark blue banner with the text 'Step3 Open API 테스트 결과를 확인합니다.' (Check the Open API test results in Step 3). Below the banner, there are sections for '설정 URL' (Setting URL) with the value 'http://61.250.21.211:10005', '선택한 어플리케이션' (Selected Application) with details for 'Service Default App' (Application ID: AP10005134, Instance ID: AP10005134, Access Key: AP10005134), and 'Open API' details (Method: GET, Test URL: scls/SC10006932/containers/contCollection/contentInstance, Device ID: <DEVICE-ID>). The '실행 결과' (Execution Result) section shows the raw XML response from the API, with the value '33.3' circled in red. The XML response is:

```
http://61.250.21.211:10005/hackth0001/scls/SC10006932/containers/contCollection/contentInstance/200 (OK)
<?xml version="1.0" encoding="UTF-8"?>
<contentInstance id="C188568087">
  <creationTime>2015-07-17T09:52:22</creationTime>
  <lastModifiedTime>2015-07-17T09:52:22</lastModifiedTime>
  <scID>SC10006932</scID>
  <content>MzMuMw==</content>
  <countIndex>11</countIndex>
  <totalCount>1</totalCount>
  <currentCount>1</currentCount>
  <containerType>contCollection</containerType>
</contentInstance>
```

The screenshot shows a 'Decode from Base64 format' web tool. The input field contains 'MzMuMw=='. Below the input field, there is a green button labeled '< DECODE >' and a dropdown menu set to 'UTF-8'. The output field shows the decoded result '33.3', which is circled in red. The tool also includes a note: '(You may also select input charset.)'

<https://www.base64decode.org/>

ThingPlug Portal: Control



ThingPlug Portal: Control

The screenshot displays the 'Open API 선택' (Open API Selection) interface. At the top, there is a search bar with 'Method' set to '전체' and '검색어' (Search) set to 'Control'. Below this is a table of APIs. The table has columns for '번호' (No.), 'Open API Name', and 'Method'. The 2nd row is circled in pink, showing 'GW User Defined Control' with a 'PUT' method. Below the table, there are three dropdown menus for 'Open API 선택' (PUT), '디바이스 선택' (<SCL-ID> : SC10006932), and '종속 디바이스 선택' (<DEVICE-ID> : AD10014516). The '사용자 정의 제어명령' (User Defined Control Command) section shows a text input field containing 'MQ==', which is circled in pink. To the right, there are two 'Encode to Base64 format' panels. The first panel shows the input 'MQ==' and the output 'MQ==', with both circled in pink. The second panel shows the input 'MDA=' and the output 'MDA=', also circled in pink. At the bottom left, the '입력 Body' (Input Body) section shows an XML snippet: <?xml version="1.0" encoding="UTF-8"?><mgmtObj><request>MQ==</request></mgmtObj>, with the 'MQ==' part circled in pink. At the bottom right, there are two buttons: '실행 코드 미리 보기' (Preview Execution Code) and '테스트 실행' (Execute Test). A URL is provided at the bottom right: <https://www.base64encode.org/>.

번호	Open API Name	Method
5	Device User Defined Control	PUT
4	Device User Defined Control 결과조회	GET
3	GW Multimedia Stream Control 결과조회	GET
2	GW User Defined Control	PUT
1	GW User Defined Control 결과조회	GET

사용자 정의 제어명령

```
<?xml version="1.0" encoding="UTF-8"?>
<mgmtObj>
<request>MQ==</request>
</mgmtObj>
```

<https://www.base64encode.org/>

ThingPlug Portal: Control

- Open API 테스트 이력

Open API 선택

Method 전체 검색어 Control 조회

번호	Open API Name	Method	URI
5	Device		
4	Device		
3	GW Mu		
2	GW Us		
1	GW Us		

▶ Open API

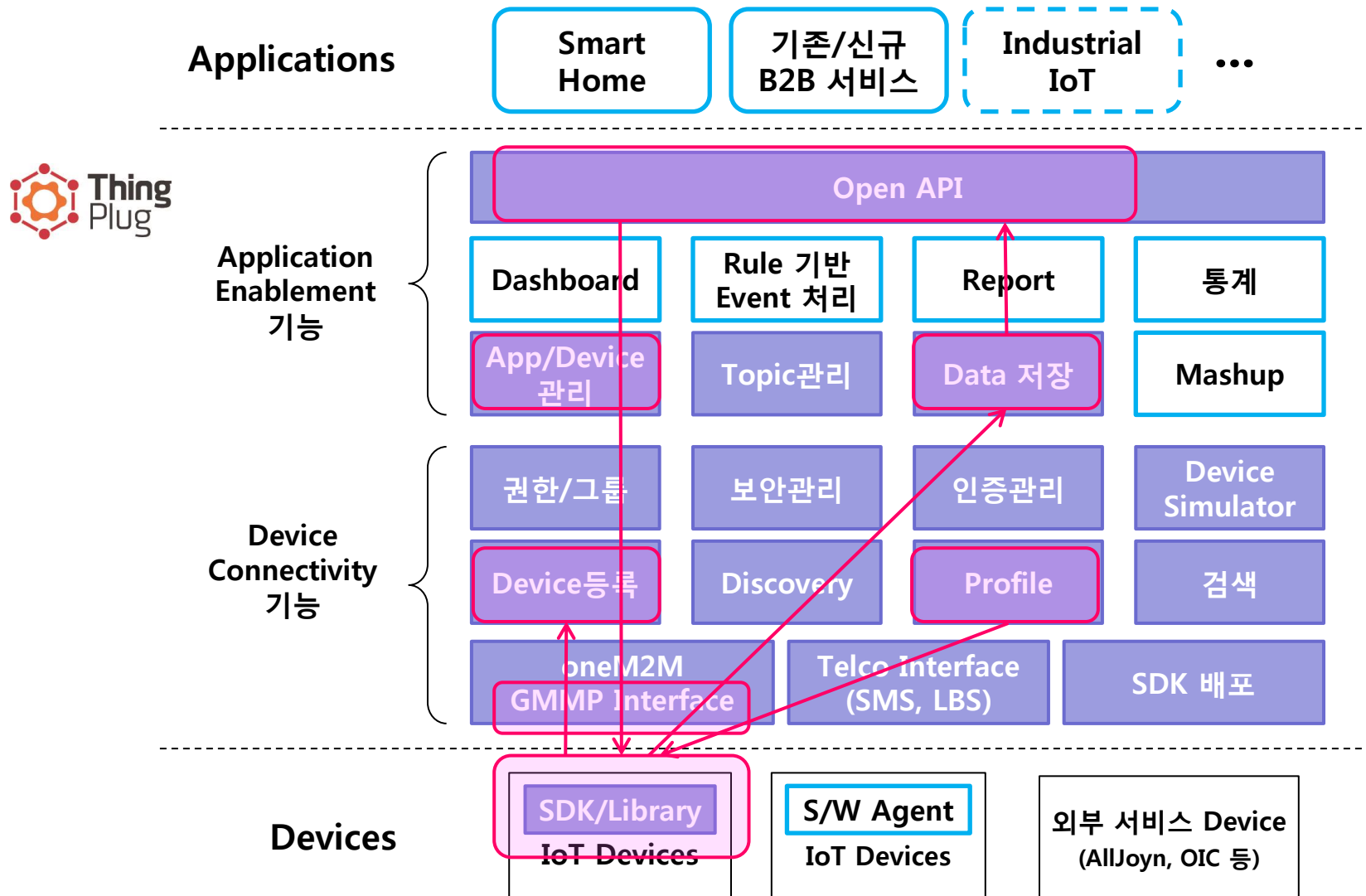
Method : PUT | 테스트 URL : scls/SC10006932/m gm tObjs/m gm tUser01
종속 디바이스 : <DEVICE-ID> : AD10014516

▶ 실행 결과

http://61.250.21.211:10005/hackth0001/scls/SC10006932/m gm tObjs/m gm tUser01
200 (OK)
<?xml version="1.0" encoding="UTF-8"?>
<m gm tObj id="m gm tUser01">
 <creationTim e>2015-06-18T20:30:49</creationTim e>
 <lastModifiedTim e>2015-07-22T12:05:04</lastModifiedTim e>
 <expirationTim e>9999-12-31T23:59:59</expirationTim e>
 <definedActionStatus>PROGRESS</definedActionStatus>
 <request>MQ==</request>
</m gm tObj>

```
[INFO]MsgType: 13
ControlReq has been received.
Control Msg Body: 00
ControlRes has been sent.
[INFO]128
LED OFF
Control NotiReq has been sent.
***** NOT E_WOULDBLOCK *****
[INFO]MsgType: 24
NotiRes has been received.
***** NOT E_WOULDBLOCK *****
[INFO]MsgType: 13
ControlReq has been received.
Control Msg Body: 1
ControlRes has been sent.
[INFO]128
LED ON
Control NotiReq has been sent.
***** NOT E_WOULDBLOCK *****
[INFO]MsgType: 24
NotiRes has been received.
***** NOT E_WOULDBLOCK *****
```

ThingPlug Wi-Fi Example: Monitor & Control



Thanks!