
SiWG917 Wi-Fi HTTP Server

Martin Looker (Silicon Labs)

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v2.3

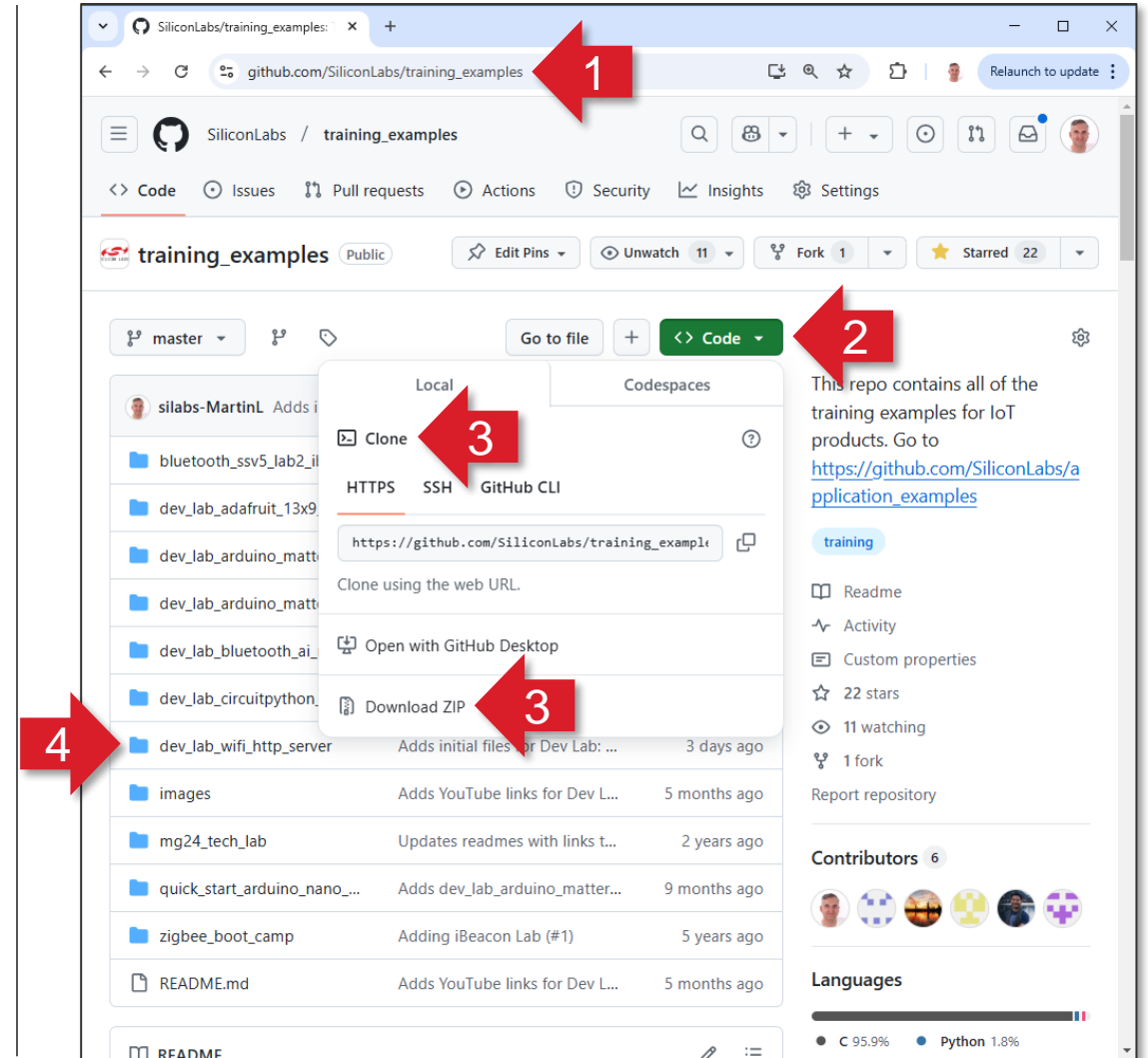


In this workshop:

- **Connect and setup SiWG917 boards in the Simplicity Studio v5 IDE**
- **Create, build and run the Wi-Fi HTTP Server example application**
- **Adapt the Wi-Fi HTTP Server application to display button states in a browser**
- **Make the joining and rejoining process robust**
- **How to use software APIs to construct Wi-Fi applications for the SiWG917**

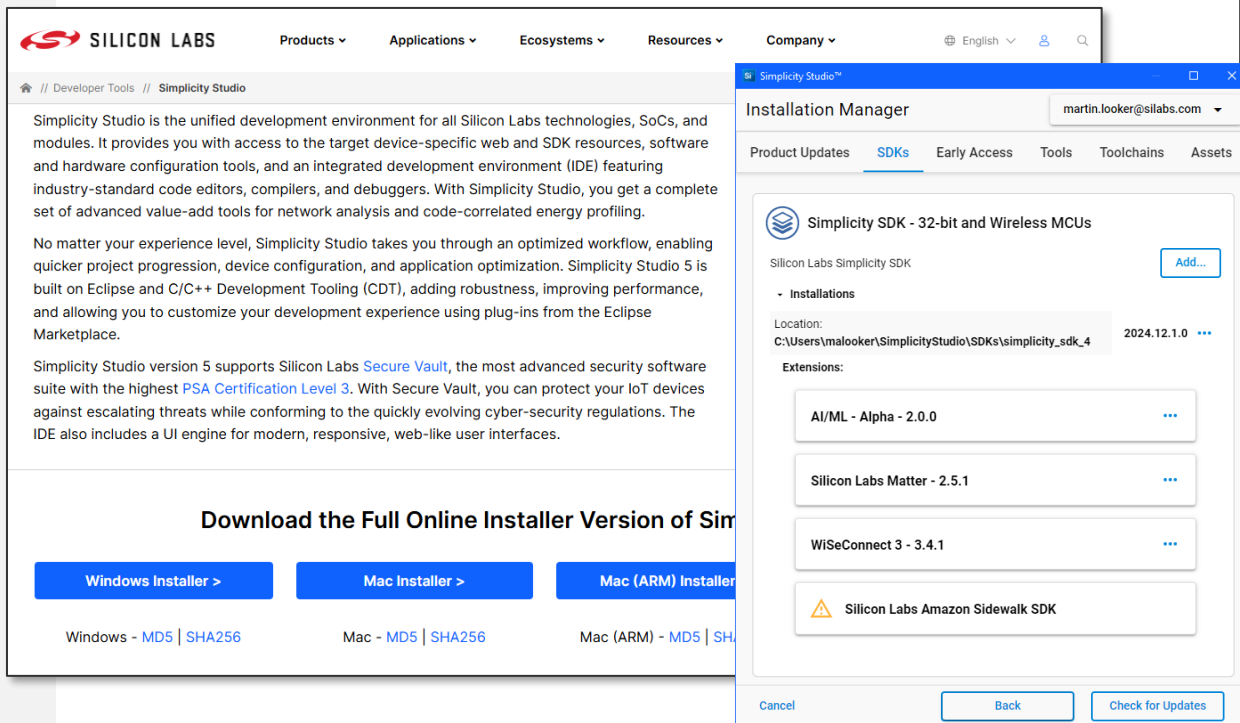
GitHub Silicon Labs Training Examples

- The Silicon Labs Training Examples repository on GitHub contains source files for training workshops and videos
- To download source files for this workshop:
 1. Visit the Silicon Labs Training Examples repository on GitHub
https://github.com/SiliconLabs/training_examples
 2. From the **Code** dropdown
 3. **Clone** the repository with your favorite Git client or
Click the **Download ZIP** option (unzip the files on the local PC)
 4. Source files for this workshop are located in the **dev_lab_wifi_http_server/source** folders
 5. A PDF version of this presentation is in the **dev_lab_wifi_http_server/presentation** folder



Prerequisites

- Simplicity Studio v5 installed:
 - Download from:
<https://www.silabs.com/developers/simplicity-studio>
 - Ensure the Simplicity SDK is installed including WiSeConnect 3.4.1 or later
- TeraTerm or similar serial terminal application



- SiWG917 Wi-Fi kits and boards
 - Silicon Labs Dev Kit
 - Silicon Labs Explorer Kit
 - Ezurio SL917 Veda Explorer Kit
 - Ezurio SL917 Click
 - Silicon Labs Pro Kit
 - More information at
<https://www.silabs.com/wireless/wi-fi?tab=kits>

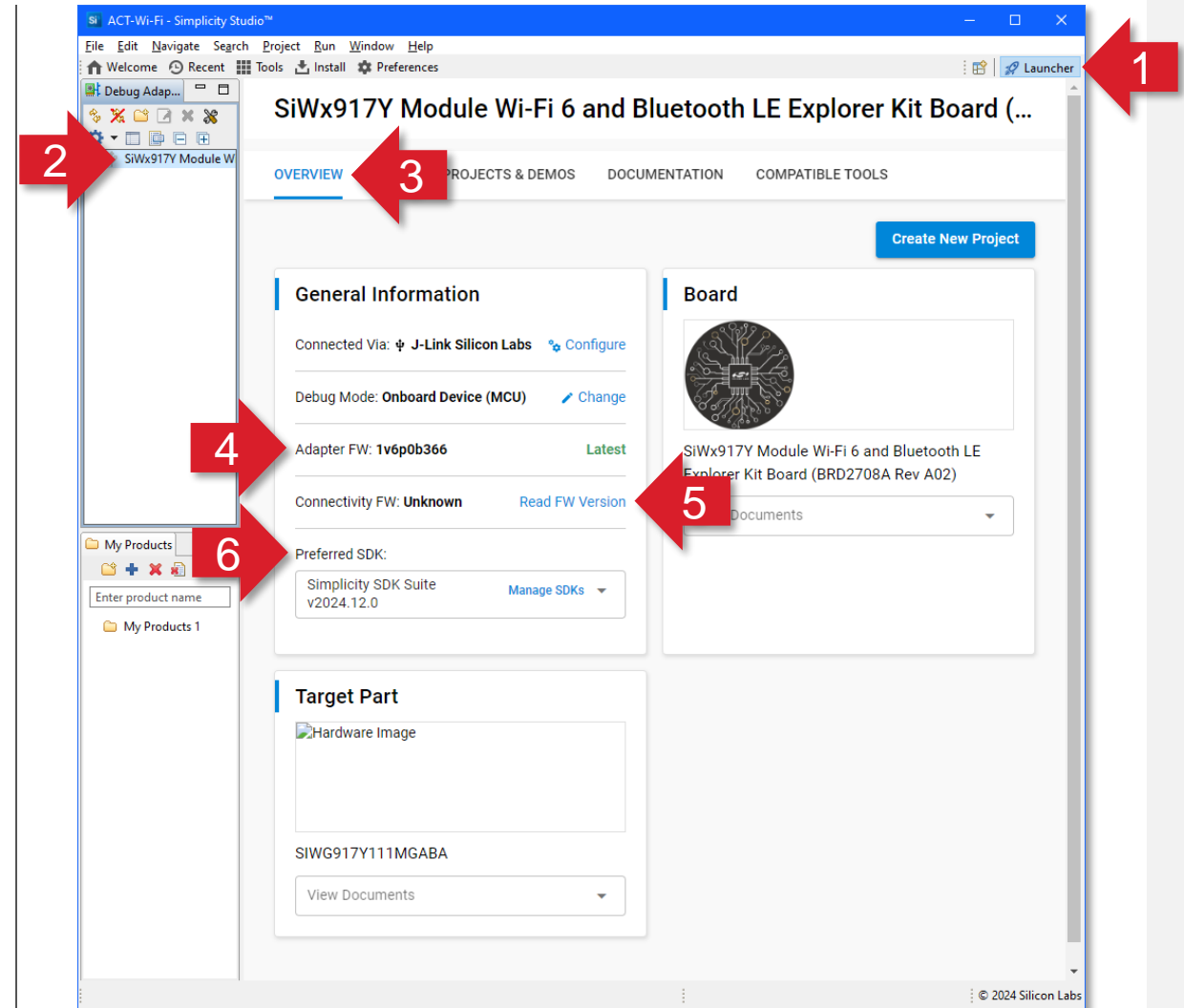


HTTP Server Project



Connect and Update Board

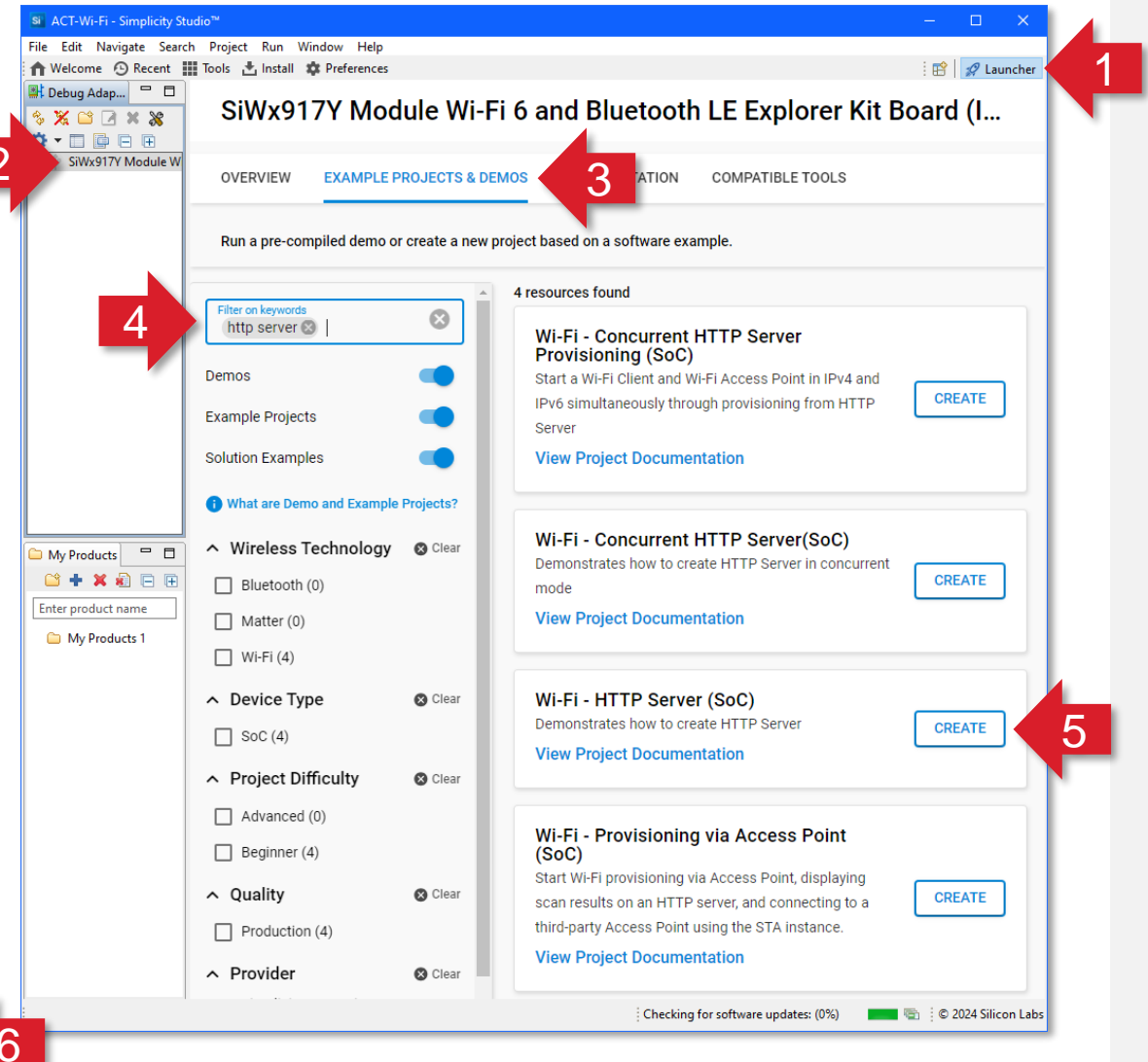
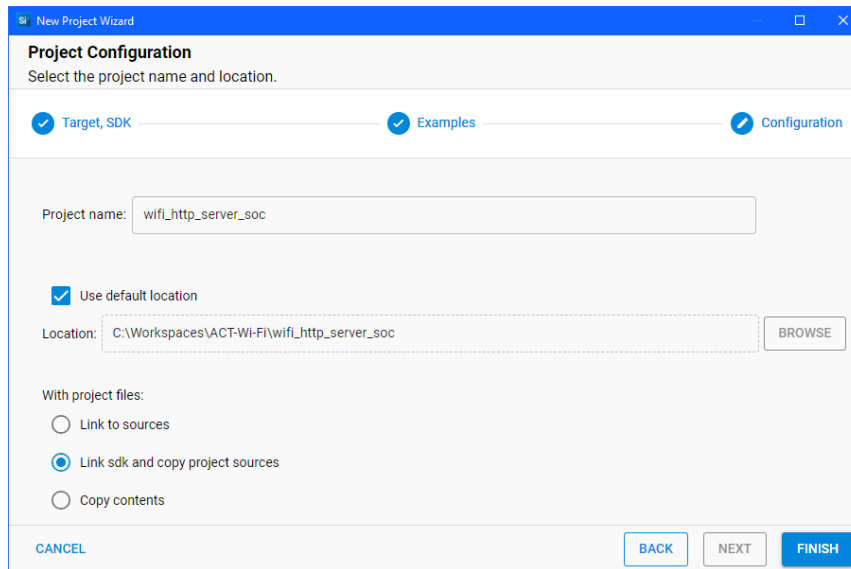
- To connect and update board firmware:
 1. Go to the **Launcher** perspective
 2. Connect the board using USB and select in the **Debug Adapters** panel
 3. Make sure the **Overview** page is selected
 4. In the **General Information** box, update **Adapter FW** if the latest is not installed
 5. Read the **Connectivity FW** version and update if the latest is not installed
 6. Check the **Preferred SDK** is set to **Simplicity SDK Suite**



Create Example Application

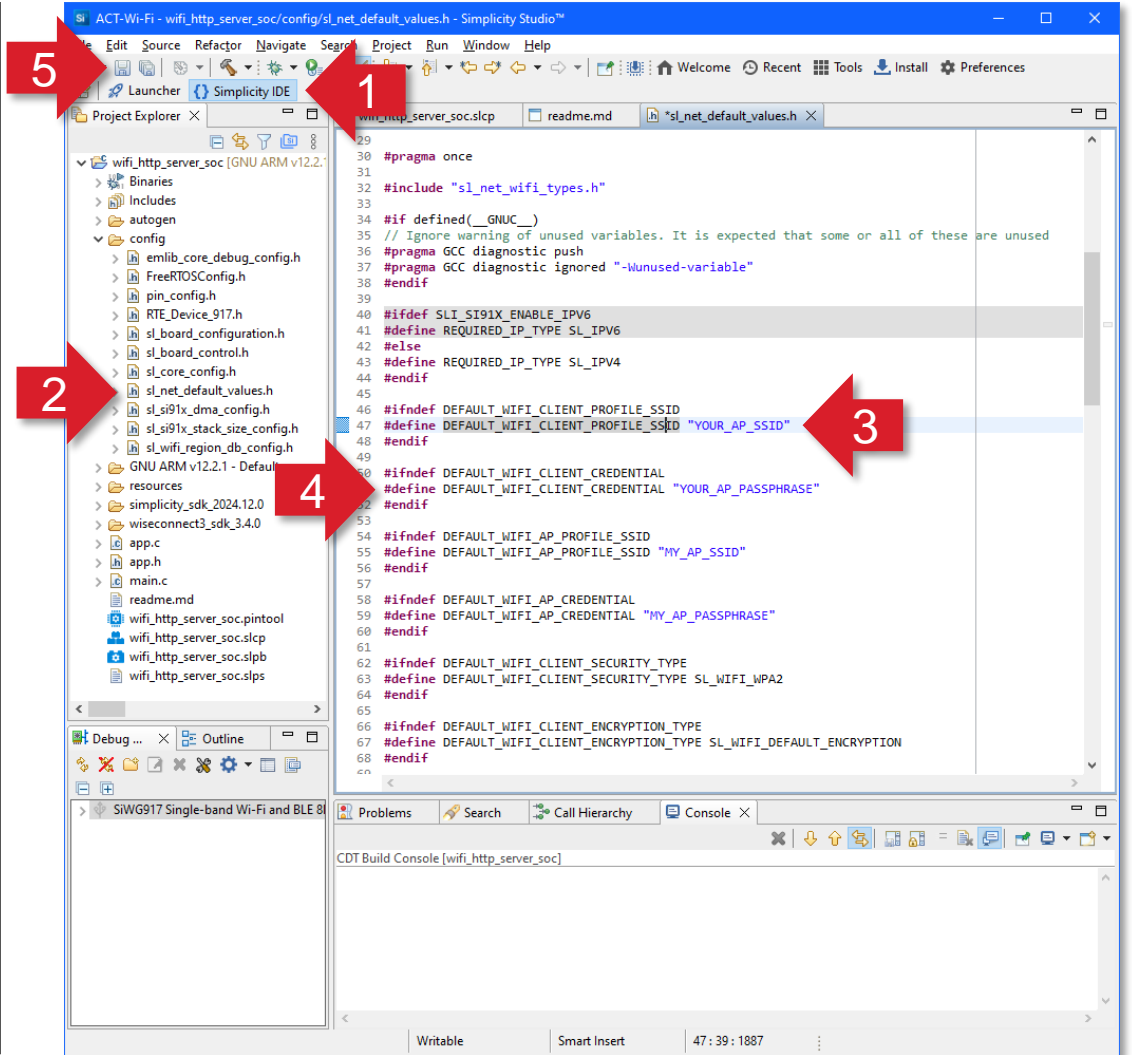
- To create the example application:

1. Go to the **Launcher** perspective
2. Make sure the board is selected in the **Debug Adapters** panel
3. Select the **Example Projects & Demos** page is selected
4. Enter **HTTP Server** into the filter editbox
5. In the **Wi-Fi – HTTP Server (SoC)** box, click the **Create** button
6. In the **New Project Wizard** window, click the **Finish** button



Configure Wi-Fi Access Point

- To configure the Wi-Fi access point credentials:
 1. Make sure the **Simplicity IDE** perspective is selected
 2. In the **Project Explorer** panel, open the **config/sl_net_default_values.h** file
 3. Update the **DEFAULT_WIFI_CLIENT_PROFILE_SSID** define with the SSID of the Wi-Fi network to join
 4. Update the **DEFAULT_WIFI_CLIENT_CREDENTIAL** define with the password of the Wi-Fi network to join
 5. **Save** the changes to the file



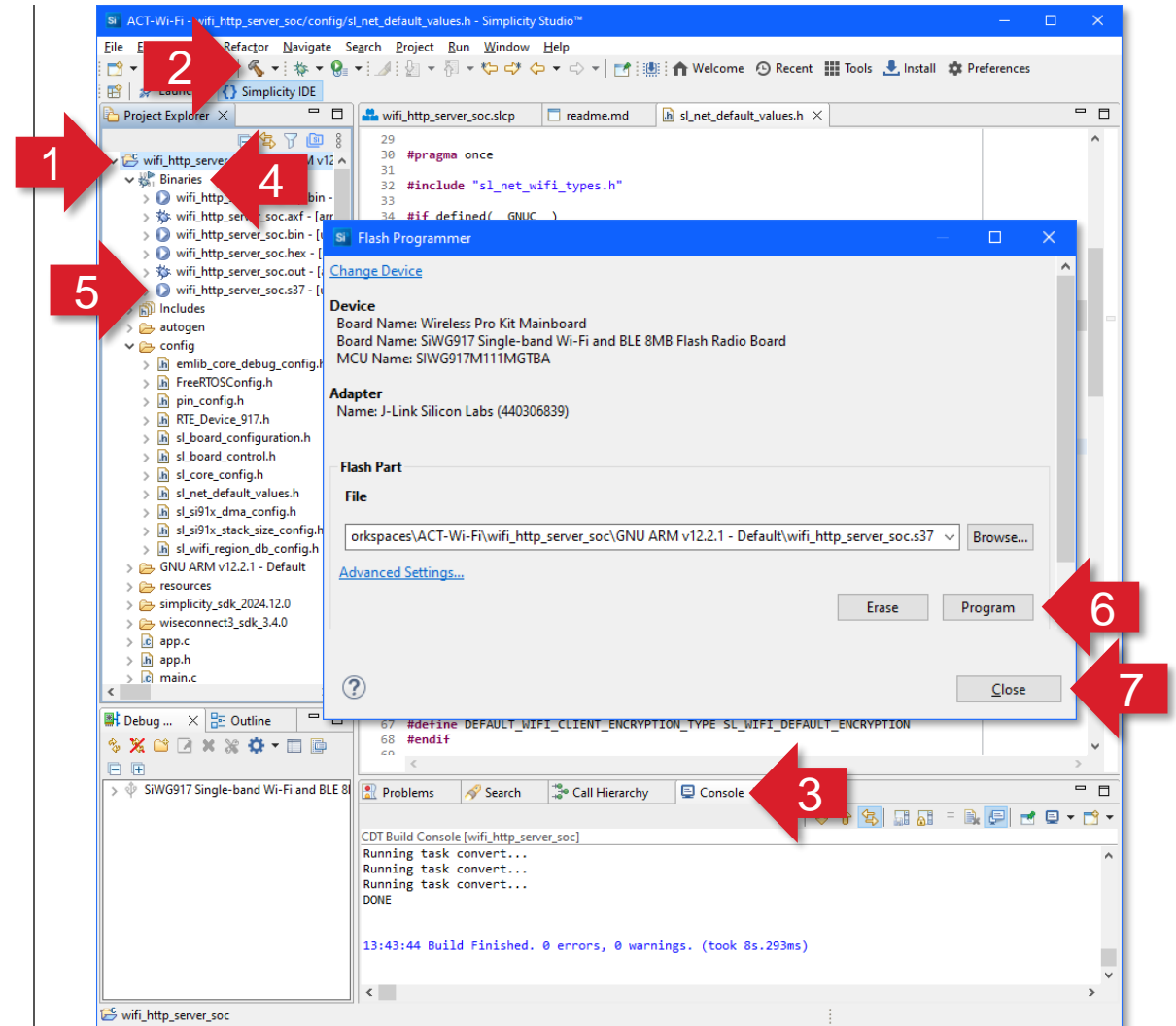
Compile and Flash

- To compile the software:

1. In the **Project Explorer** panel, select the top-level project
2. Click the **Build (hammer)** button on the toolbar
3. Compilation progress is shown in the **Console** panel

- To flash the software:

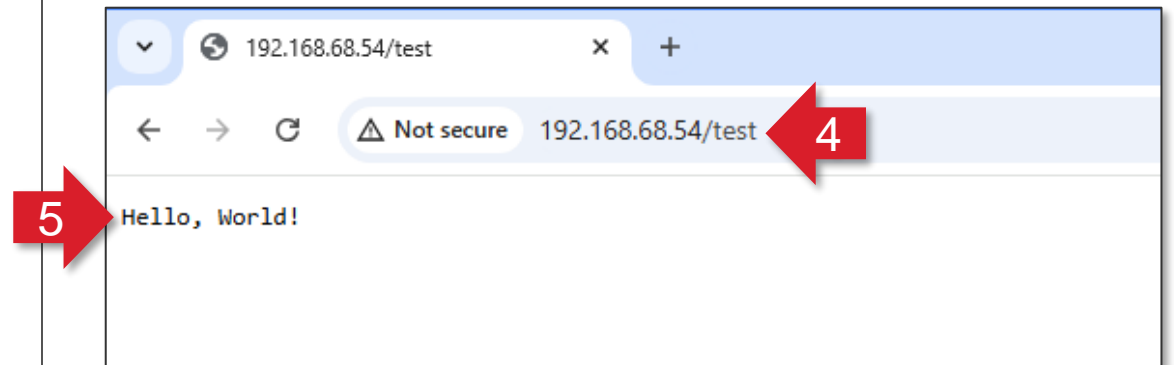
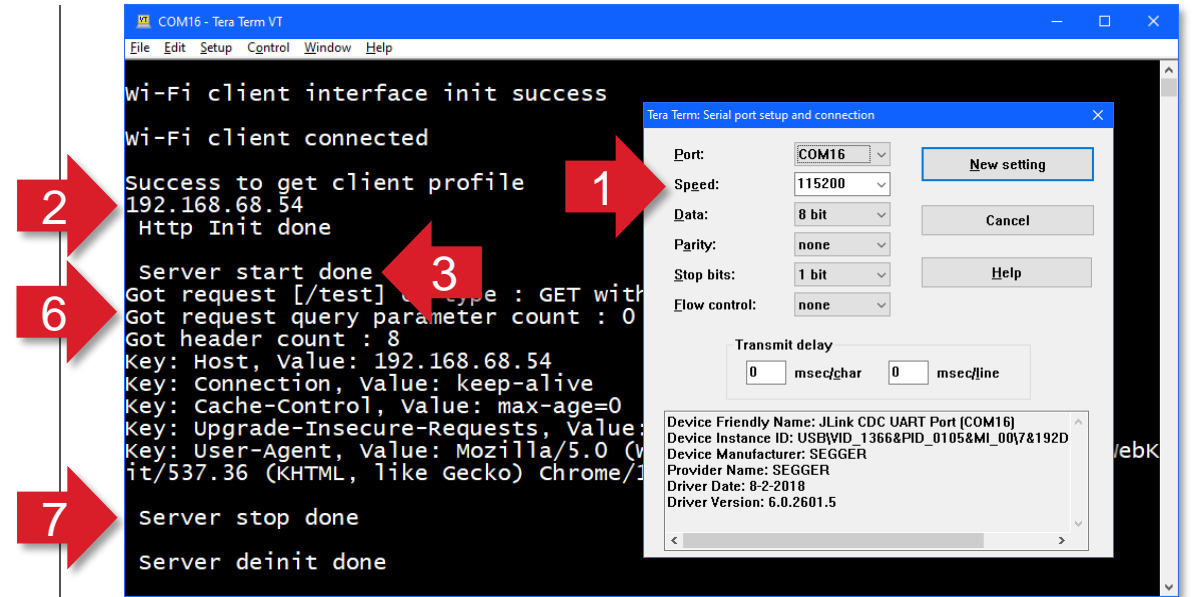
4. In the **Project Explorer** panel, open the **Binaries** folder
5. Locate the **.s37** file, right click and select **Flash to device...**
6. In the **Flash Programmer** window, click the **Program** button
7. When complete, click the **Close** button



Operation

- To operate the HTTP Server:

1. Connect a serial terminal to the board using: 115200 baud, 8 data bits, no parity, 1 stop bit, no flow control
2. Reset the board, when the device joins the network its IP address will be output to the terminal
3. **Server start done** will be output when the HTTP server is running
4. In a web browser enter the IP address followed by **/test**
5. **Hello, World!** Will be displayed in the browser window
6. Data on the HTTP request is displayed in the serial terminal
7. After serving the request, the HTTP server is stopped and deinitialised
8. If the browser is refreshed, connection refused will be returned as the server is no longer running (not shown)



HTTP Server Review



Application Startup

- The application code is structured around FreeRTOS with the application parts of the code in **app.c**:
- The **app_init()** function is called at startup from **main.c**
- The **app_init()** function creates a new thread that runs in the **application_start()** function

```
335 void app_init(const void *unused)
336 {
337     UNUSED_PARAMETER(unused);
338     osThreadNew((osThreadFunc_t)application_start, NULL, &thread_attributes);
339 }
340
341 static void application_start(void *argument)
342 {
```


Wi-Fi Startup

- The `application_start()` function handles the setup and joining of the Wi-Fi network:
- The `sl_net_init()` function initializes the network interface
 - The interface is initialized as a client device
 - The Wi-Fi configuration passed in using a `sl_wifi_device_configuration_t` structure
 - Note, despite the variable name this configures the Wi-Fi *not* the HTTP Server
- The `sl_net_up()` function brings up the network interface, for a client:
 - Uses the default profile which includes the SSID and password set in the `sl_net_default_values.h` file
 - Scans and connects to the network specified in the profile
- The `sl_net_get_profile()` function reads back the profile when it has joined the network
 - The IP address is extracted from this profile and output to the serial port

```
341 static void application_start(void *argument)
342 {
343     UNUSED_PARAMETER(argument);
344     sl_status_t status = 0;
345     sl_http_server_config_t server_config = { 0 };
346
347     status = sl_net_init(SL_NET_WIFI_CLIENT_INTERFACE, &http_server_configuration, NULL, NULL);
348     if (status != SL_STATUS_OK) {
349         printf("\r\nFailed to start Wi-Fi Client interface: 0x%x\r\n", status);
350         return;
351     }
352     printf("\r\nWi-Fi client interface init success\r\n");
353
354     status = sl_net_up(SL_NET_WIFI_CLIENT_INTERFACE, SL_NET_DEFAULT_WIFI_CLIENT_PROFILE_ID);
355     if (status != SL_STATUS_OK) {
356         printf("\r\nFailed to bring Wi-Fi client interface up: 0x%x\r\n", status);
357         return;
358     }
359     printf("\r\nWi-Fi client connected\r\n");
360
361     status = sl_net_get_profile(SL_NET_WIFI_CLIENT_INTERFACE, SL_NET_DEFAULT_WIFI_CLIENT_PROFILE_ID);
362     if (status != SL_STATUS_OK) {
363         printf("Failed to get client profile: 0x%x\r\n", status);
364         return;
365     }
366     printf("\r\nSuccess to get client profile\r\n");
367
368     ip_address.type = SL_IPV4;
369     memcpy(&ip_address.ip.v4.bytes, &profile.ip.ip.v4.ip_address.bytes, sizeof(sl_ipv4_address_t));
370     print_sl_ip_address(&ip_address);
```

HTTP Server Startup

- Near the start of `app.c`, an array of `sl_http_server_handler_t` structures are initialized:
 - Each element pairs a URI with a function to be called when the URI is requested
 - The `/test` URI causes the `buffered_request_handler()` function to be called
- The `application_start()` function also starts the HTTP Server:
 - A `sl_http_server_config_t` structure is initialized with settings for the HTTP Server, including the request handlers
 - The `sl_http_server_init()` function initializes the server using the configuration structure
 - The `sl_http_server_start()` function begins running the server
 - The thread is kept in a loop while the `is_server_running` variable is `true`

```
101 static sl_http_server_handler_t request_handlers[4] =
102     { { .uri = "/test",      .handler = buffered_request_handler },
103       { .uri = "/data",     .handler = large_data_handler },
104       { .uri = "/cert1.pem", .handler = large_response_handler },
105       { .uri = "/cert2.pem", .handler = chunked_large_response_handler } };
```

```
372 server_config.port           = HTTP_SERVER_PORT;
373 server_config.default_handler = NULL;
374 server_config.handlers_list   = request_handlers;
375 server_config.handlers_count  = 4;
376 server_config.client_idle_time = 1;
377
378 status = sl_http_server_init(&server_handle, &server_config);
379 if (status != SL_STATUS_OK) {
380     printf("\r\nHTTP server init failed:%lx\r\n", status);
381     return;
382 }
383 printf("\r\n Http Init done\r\n");
384
385 status = sl_http_server_start(&server_handle);
386 if (status != SL_STATUS_OK) {
387     printf("\r\n Server start fail:%lx\r\n", status);
388     return;
389 }
390 printf("\r\n Server start done\r\n");
391
392 is_server_running = true;
393 while (is_server_running) {
394     osDelay(100);
395 }
```

HTTP Request Handler (1)

- The `buffered_request_handler()` function is called when the `/test` URI is requested:
- Local variables are initialized including:
 - `http_response` for the response data
 - `header` for the response header
- The next part of the function outputs data in the HTTP request to the serial port

```
238 sl_status_t buffered_request_handler(sl_http_server_t *handle, sl_http_server_request_t *req)
239 {
240     sl_http_rcv_req_data_t rcvData      = { 0 };
241     sl_http_server_response_t http_response = { 0 };
242     sl_http_header_t request_headers[5] = { 0 };
243     sl_http_header_t header             = { .key = "Server", .value = "SI917-HTTPServer" };
244
245     printf("Got request [%s] of type : %s with data length : %lu\n",
246           req->uri.path,
247           request_type[req->type],
248           req->request_data_length);
249     if (req->request_data_length > 0) {
250         rcvData.request      = req;
251         rcvData.buffer       = (uint8_t *)response;
252         rcvData.buffer_length = 1024;
253
254         sl_http_server_read_request_data(handle, &rcvData);
255         response[rcvData.received_data_length] = 0;
256         printf("Got request data as : %s\n", response);
257     }
258
259     printf("Got request query parameter count : %u\n", req->uri.query_parameter_count);
260     if (req->uri.query_parameter_count > 0) {
261         for (int i = 0; i < req->uri.query_parameter_count; i++) {
262             printf("query: %s, value: %s\n", req->uri.query_parameters[i].query, req->uri.query_param
263         }
264     }
265
266     printf("Got header count : %u\n", req->request_header_count);
267     sl_http_server_get_request_headers(handle, req, request_headers, 5);
268
269     int length = (req->request_header_count > 5) ? 5 : req->request_header_count;
270     for (int i = 0; i < length; i++) {
271         printf("Key: %s, Value: %s\n", request_headers[i].key, request_headers[i].value);
272     }
```

HTTP Request Handler (2)

- The final part of the `buffered_request_handler()` function constructs and sends the response:
- The response code is set to **OK**
- The content type is set to **plain text**
- The **headers** are added
- The response data is set to **"Hello, World!"** and data lengths set appropriately
- The `sl_http_server_send_response()` function is then used to transmit the HTTP response
- Finally, the `is_server_running` variable is set to false
 - This allows the loop in the `application_start()` function to end

```
274 // Set the response code to 200 (OK)
275 http_response.response_code = SL_HTTP_RESPONSE_OK;
276
277 // Set the content type to plain text
278 http_response.content_type = SL_HTTP_CONTENT_TYPE_TEXT_PLAIN;
279 http_response.headers      = &header;
280 http_response.header_count = 1;
281
282 // Set the response data to "Hello, World!"
283 char *response_data      = "Hello, World!";
284 http_response.data        = (uint8_t *)response_data;
285 http_response.current_data_length = strlen(response_data);
286 http_response.expected_data_length = http_response.current_data_length;
287 sl_http_server_send_response(handle, &http_response);
288 is_server_running = false;
289 return SL_STATUS_OK;
290 }
```


HTTP Server Shutdown

- When the while loop exits in the `application_start()` function:
 - The `sl_http_server_stop()` function is called to stop the server
 - The `sl_http_server_deinit()` is called to deinitialize the server

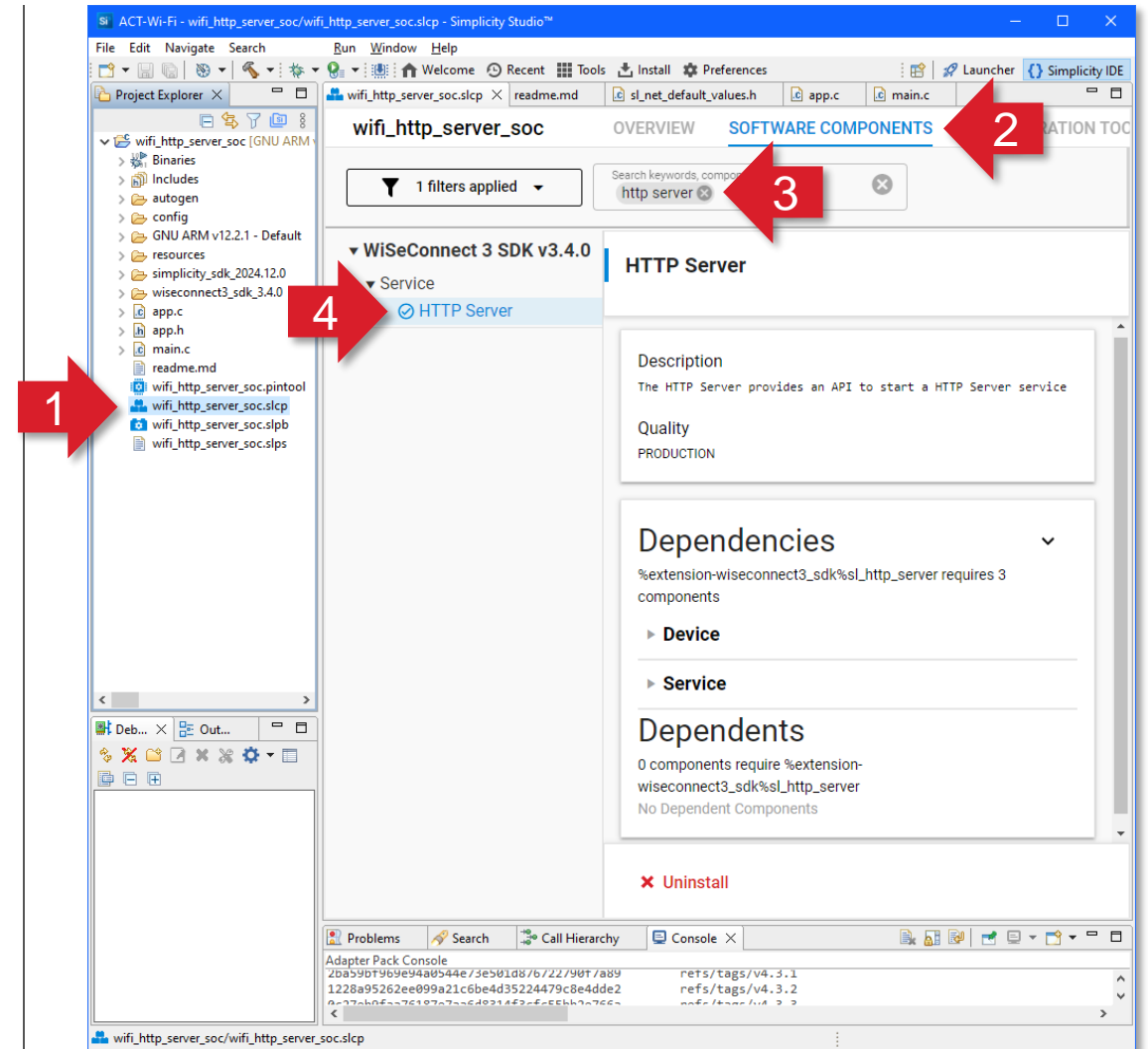
```
392 is_server_running = true;
393 while (is_server_running) {
394     osDelay(100);
395 }
396
397 status = sl_http_server_stop(&server_handle);
398 if (status != SL_STATUS_OK) {
399     printf("\r\n Server stop fail:%lx\r\n", status);
400     return;
401 }
402 printf("\r\n Server stop done\r\n");
403
404 status = sl_http_server_deinit(&server_handle);
405 if (status != SL_STATUS_OK) {
406     printf("\r\n Server deinit fail:%lx\r\n", status);
407     return;
408 }
409 printf("\r\n Server deinit done\r\n");
410 }
```

HTTP Server Project Enhancements



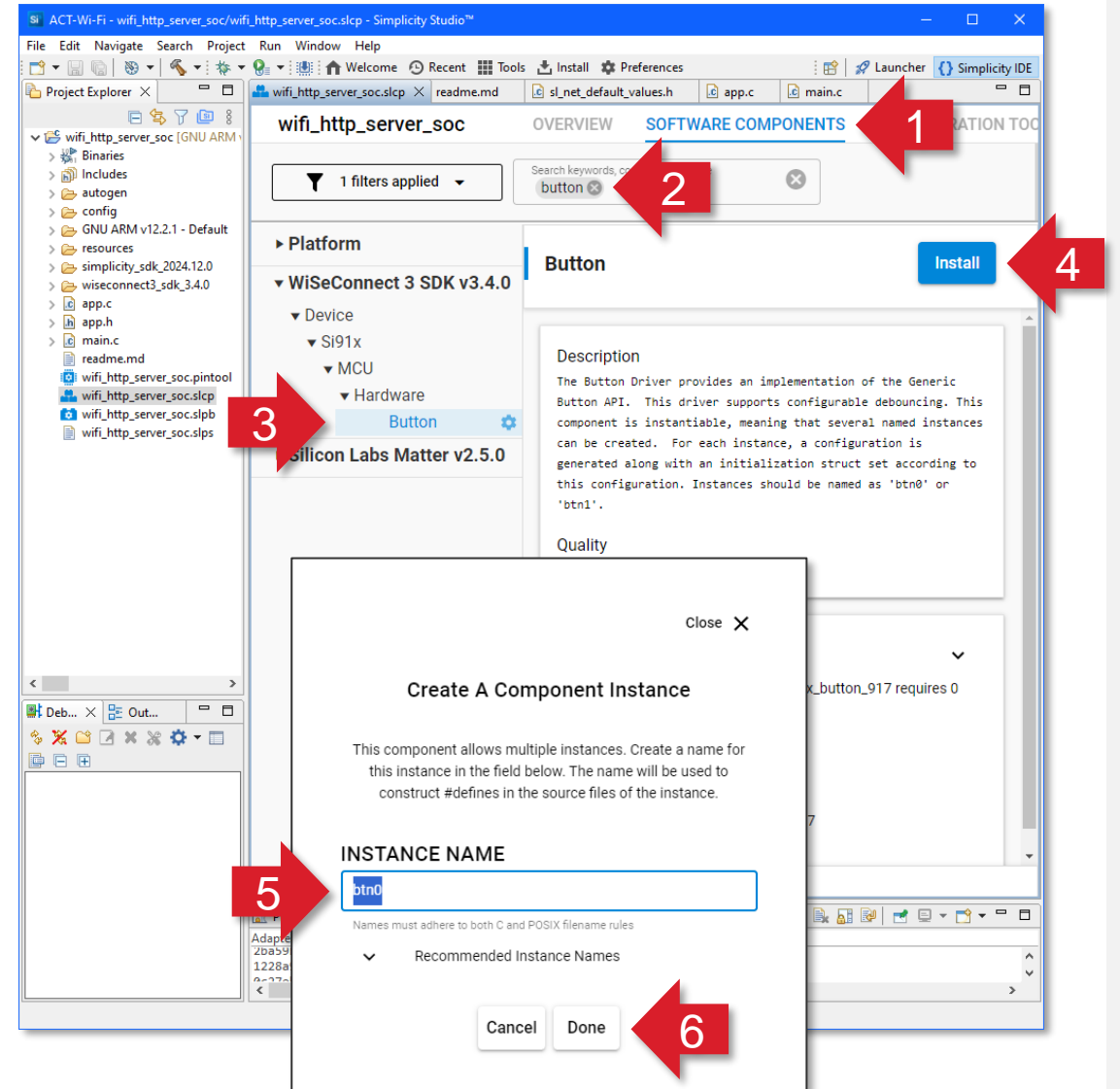
HTTP Server Software Component

- Software Components are a convenient way to add functionality to a project
- The HTTP Server Software Component is pre-installed in the example project
 - This provides the structures and functions used to operate the HTTP Server
- To view it:
 - Open the **.slcp** file in the main project
 - Go to the **Software Components** page
 - Search for **HTTP Server**
 - This component is already installed in the example project, as indicated by the tickbox
- The **.slcp** file also provides other options to manage the project and access relevant tools



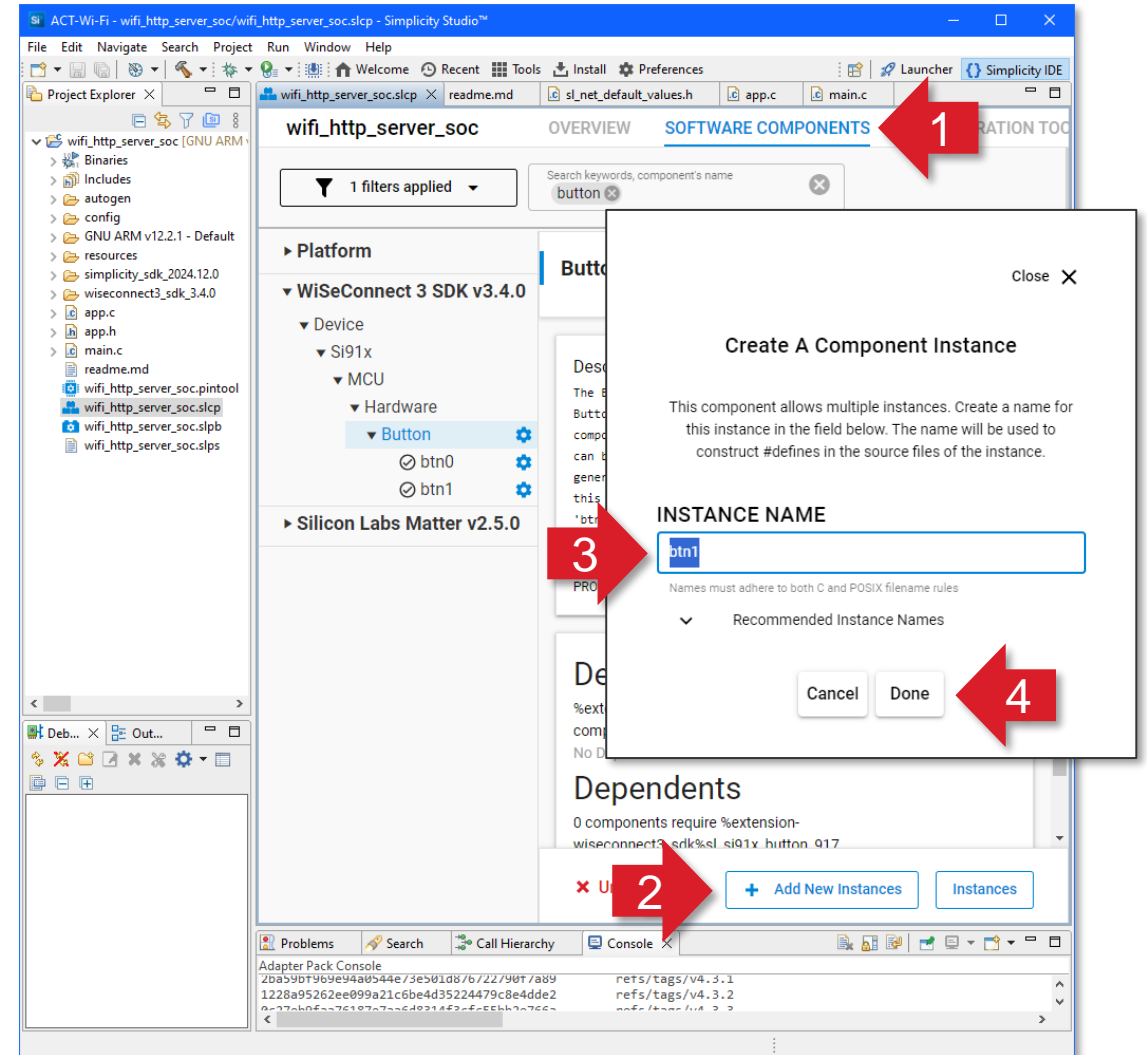
Button 0 Software Component

- We will add Software Components for the buttons we want to monitor:
 1. Make sure you are on the **Software Components** page
 2. Search for **Button**
 3. In the tree on the left, unfold: **WiSeConnect 3 SDK > Device > Si91x > MCU > Hardware > Button**
 4. Click the **Install** button
 5. In the **Create a Component Instance** window check the instance name is set to **btn0**
 6. Click the **Done** button
- This adds the button APIs to the project and also code to use it with Button 0 on the board with the correct pin configuration



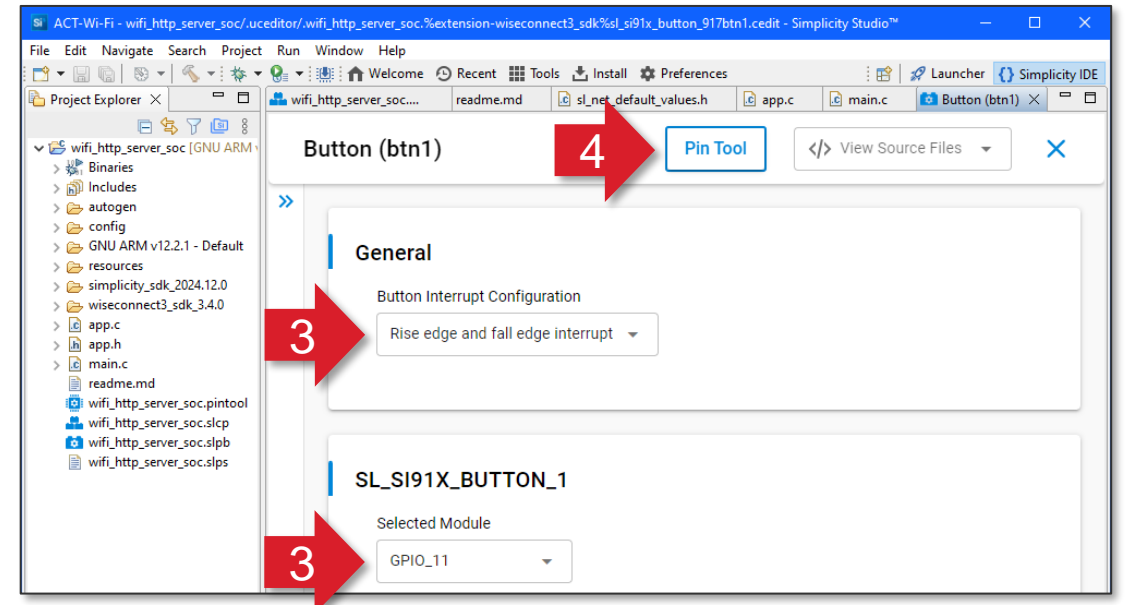
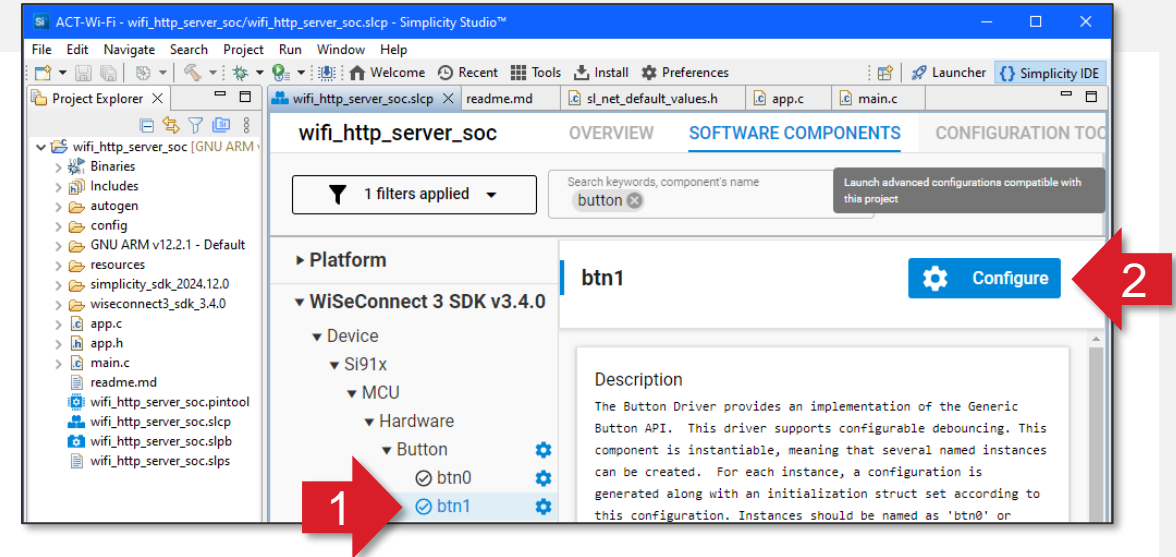
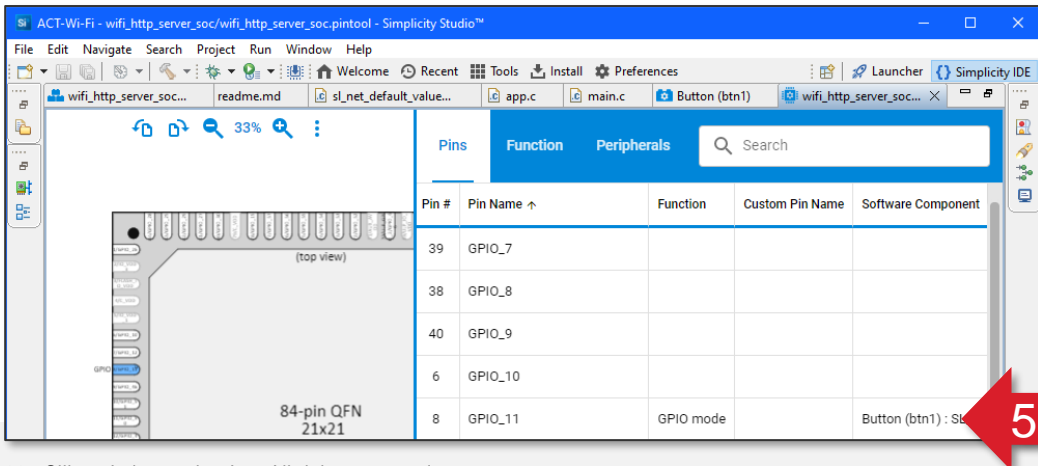
Button 1 Software Component

- To add the instance for Button 1:
 1. Make sure you are on the **Software Components** page
 2. Click the **Add New Instances** button
 3. In the **Create a Component Instance** window check the instance name is set to **btn1**
 4. Click the **Done** button



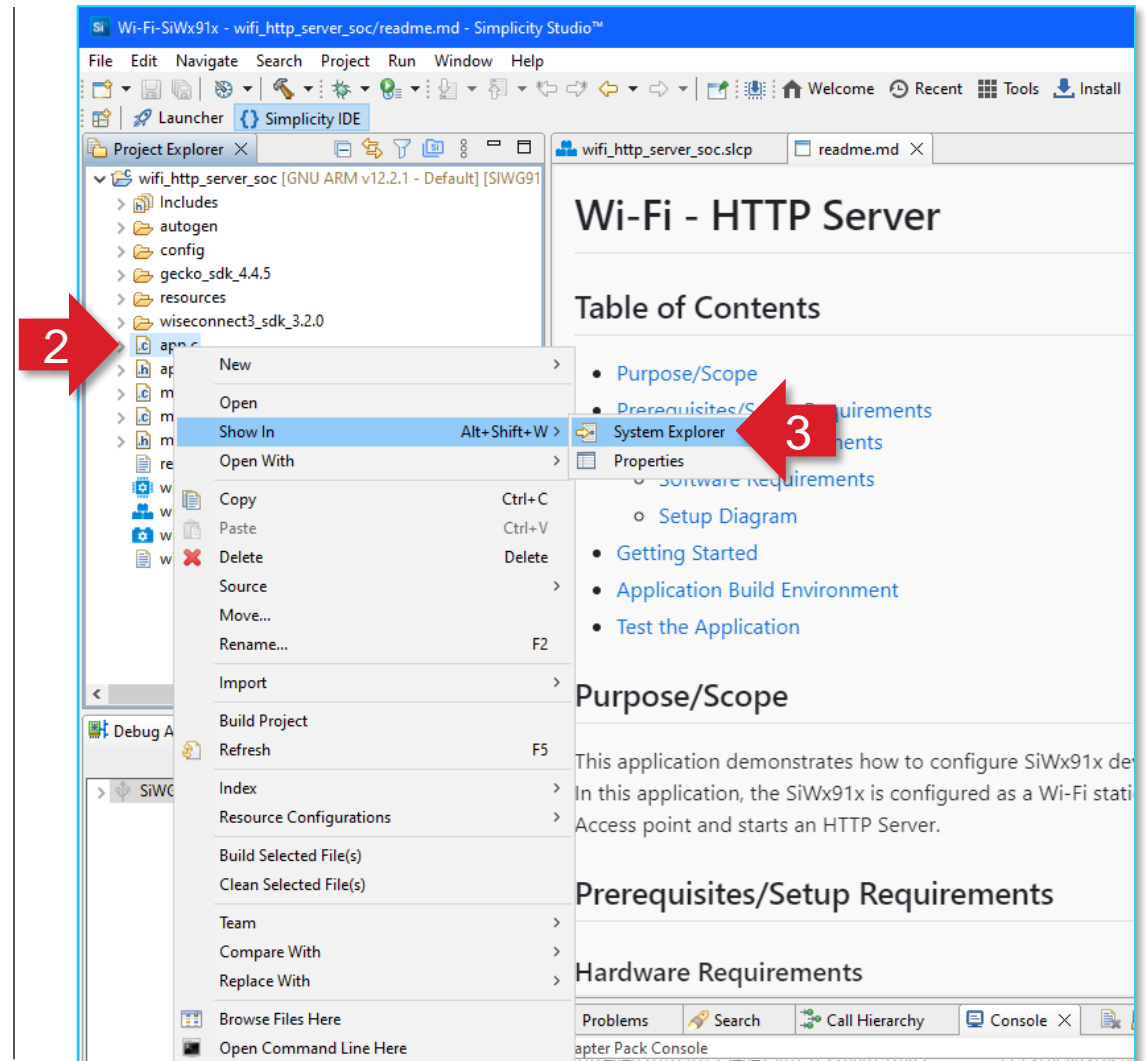
Button Configuration

- We used recommended instance names which are pre-mapped onto the GPIO for the buttons on the board
- We can view this configuration:
 1. Click one of the instances under **Button** in the treeview
 2. Click the **Configure** button
 3. The **Interrupt Configuration** and assigned **GPIO** pin can be viewed and edited in this window
 4. Click the **Pin Tool** button
 5. This tool shows the low-level assignment of pins to peripherals including the **GPIO** assignment for the **Button** instance



Update app.c

- To update **app.c** in the project folder:
 1. Locate the **app.c** file downloaded from GitHub (located in the **dev_lab_wifi_http_server/source_1_server** folder) and copy to the clipboard
 2. In Simplicity Studio, locate the **app.c** file in the **Project Explorer** panel
 3. Right-click and select **Show in > System Explorer**
 4. Paste the **app.c** file from the clipboard into the opened folder (replacing the existing file)



HTTP Server Enhancements Review




app.c – Includes, Defines and Global Variables

- New includes, defines and global variables are added to **app.c**:
- Includes to access the button APIs
- An **APP_VERSION** define
- A **HTML_RESPONSE** define containing a formatting string for the HTML response:
 1. The **meta** tag contains browser instructions to request a refresh every 5 seconds
 2. Tokens are in place to include the seconds the application has been running and states of button 0 and button 1
- A **HTML_RESPONSE** define with a maximum size for the HTML response buffer
- Global variables for:
 - Number of seconds the application has been running
 - States for buttons
 - A buffer in which to build the HTML response

```
43 #include "sl_si91x_button.h"
44 #include "sl_si91x_button_pin_config.h"
45 #include "sl_si91x_button_instances.h"
```

```
47 /*****
48  *                               Macros
49  *****/
50 #define APP_VERSION "v0.0.6"
```

```
52 #define HTML_RESPONSE "<!DOCTYPE html>\r\n" \
53 " <html>\r\n" \
54 " <head>\r\n" \
55 "   <title>SiWG917 HTTP Server</title>\r\n" \
56 "   <meta http-equiv=\"refresh\" content=\"5\"> \
57 " </head>\r\n" \
58 " <body>\r\n" \
59 "   <p>SiWG917 HTTP Server " APP_VERSION "</p>\r\n" \
60 "   <pre>seconds = %ld</pre>\r\n" \
61 "   <pre>button0 = %d</pre>\r\n" \
62 "   <pre>button1 = %d</pre>\r\n" \
63 " </body>\r\n" \
64 " </html>"
65 #define HTML_RESPONSE_SIZE 768
```



```
132 uint32_t seconds = 0;
133 int8_t   button0 = BUTTON_STATE_INVALID;
134 int8_t   button1 = BUTTON_STATE_INVALID;
135 char html_response_data[HTML_RESPONSE_SIZE] = "";
```

app.c – buffered_request_handler()

- Changes are made to the response generated in the `buffered_request_handler()` function:

1. The `content_type` is changed to `TEXT_HTML`
2. The current `seconds`, `button0` and `button1` states are formatted into the `html_response_data` buffer
3. The `html_response_data` buffer is added to the response, along with an updated length

```
297 // Set the response code to 200 (OK)
298 http_response.response_code = SL_HTTP_RESPONSE_OK;
299
300 // Set the content type to plain text
301 http_response.content_type = SL_HTTP_CONTENT_TYPE_TEXT_HTML;
302 http_response.headers      = &header;
303 http_response.header_count = 1;
304
305 // Set the response data to "Hello, World!"
306 //char *response_data      = "Hello, World!";
307 sprintf(html_response_data, HTML_RESPONSE, seconds, button0, button1);
308 http_response.data          = (uint8_t *)html_response_data;
309 http_response.current_data_length = strlen(html_response_data);
310 http_response.expected_data_length = http_response.current_data_length;
311 sl_http_server_send_response(handle, &http_response);
312 is_server_running = false;
313 return SL_STATUS_OK;
314 }
```

app.c – application_start()

- Changes are made to the `application_start()` function which runs the application's thread:
 - A debug message, with the version number is output to the serial port
 - The `while` loop is allowed to run forever
 - In the `while` loop, the delay is increased to 1 second (from 100ms)
 - The `seconds`, `button0` and `button1` variables are updated
 - For the buttons, the pins are read directly

```
367 static void application_start(void *argument)
368 {
369     UNUSED_PARAMETER(argument);
370     sl_status_t status = 0;
371     sl_http_server_config_t server_config = { 0 };
372
373     printf("\r\nSiWG917 HTTP Server %s\r\n", APP_VERSION);
```

1

```
4 is_server_running = true;
  while (1) {
421     osDelay(1000);
422     seconds++;
423     button0 = sl_si91x_button_pin_state(SL_BUTTON_BTN0_PIN);
424     button1 = sl_si91x_button_pin_state(SL_BUTTON_BTN1_PIN);
  }
```

2

3

4

HTTP Server Enhancements Operation



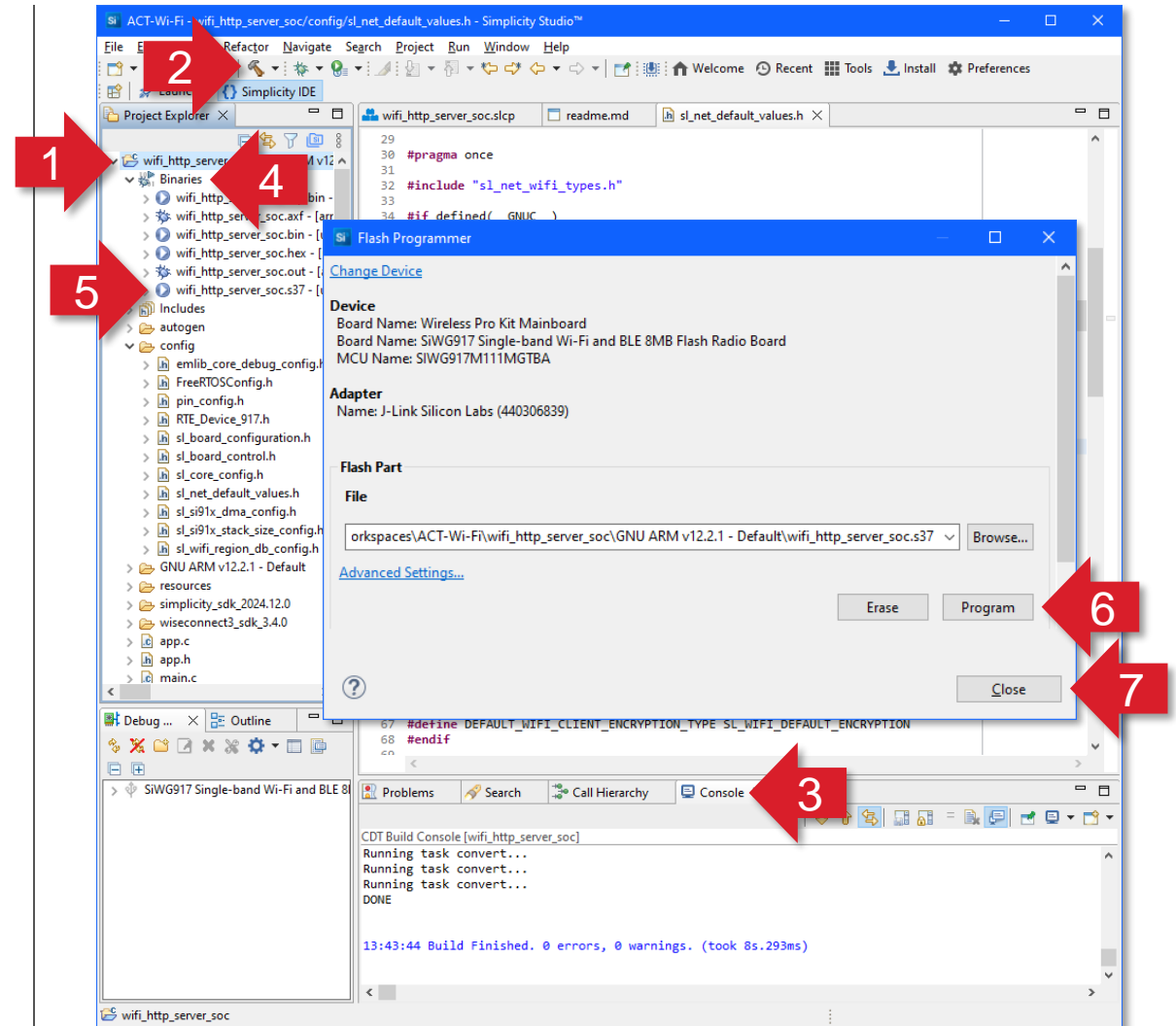
Compile and Flash

- To compile the software:

1. In the **Project Explorer** panel, select the top-level project
2. Click the **Build (hammer)** button on the toolbar
3. Compilation progress is shown in the **Console** panel

- To flash the software:

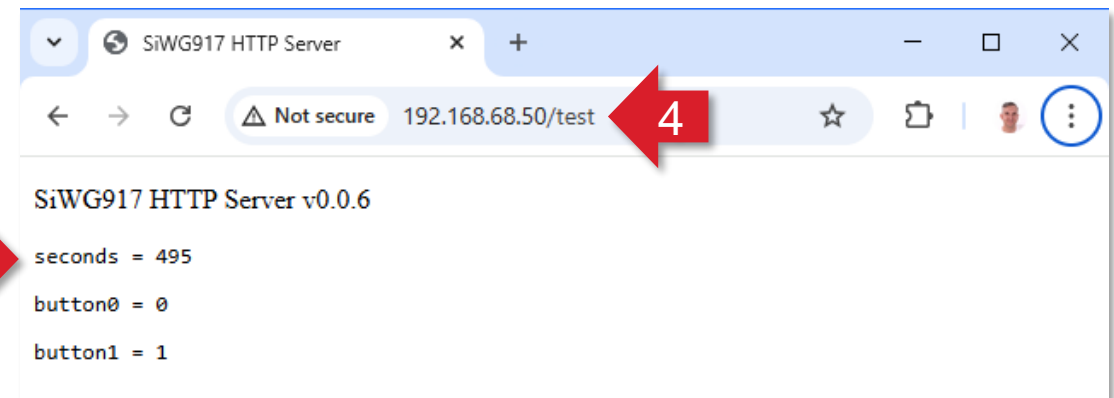
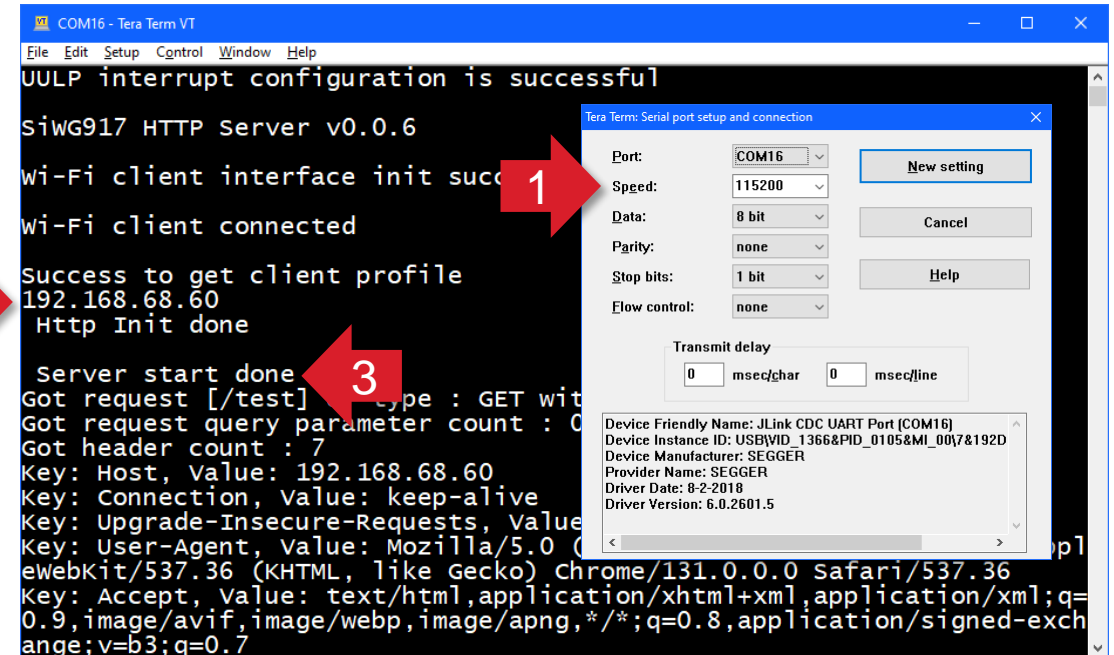
4. In the **Project Explorer** panel, open the **Binaries** folder
5. Locate the **.s37** file, right click and select **Flash to device...**
6. In the **Flash Programmer** window, click the **Program** button
7. When complete, click the **Close** button



Operation

- To operate the HTTP Server:

1. Connect a serial terminal to the board using: 115200 baud, 8 data bits, no parity, 1 stop bit, no flow control
2. Reset the board, when the device joins the network its IP address will be output to the terminal
3. **Server start done** will be output when the HTTP server is running
4. In a web browser enter the IP address followed by **/test**
5. The HTML will be displayed in the browser window, including the seconds, button0 and button 1 values
6. The browser will automatically refresh every 5 seconds (not shown)



Network Join and Rejoin



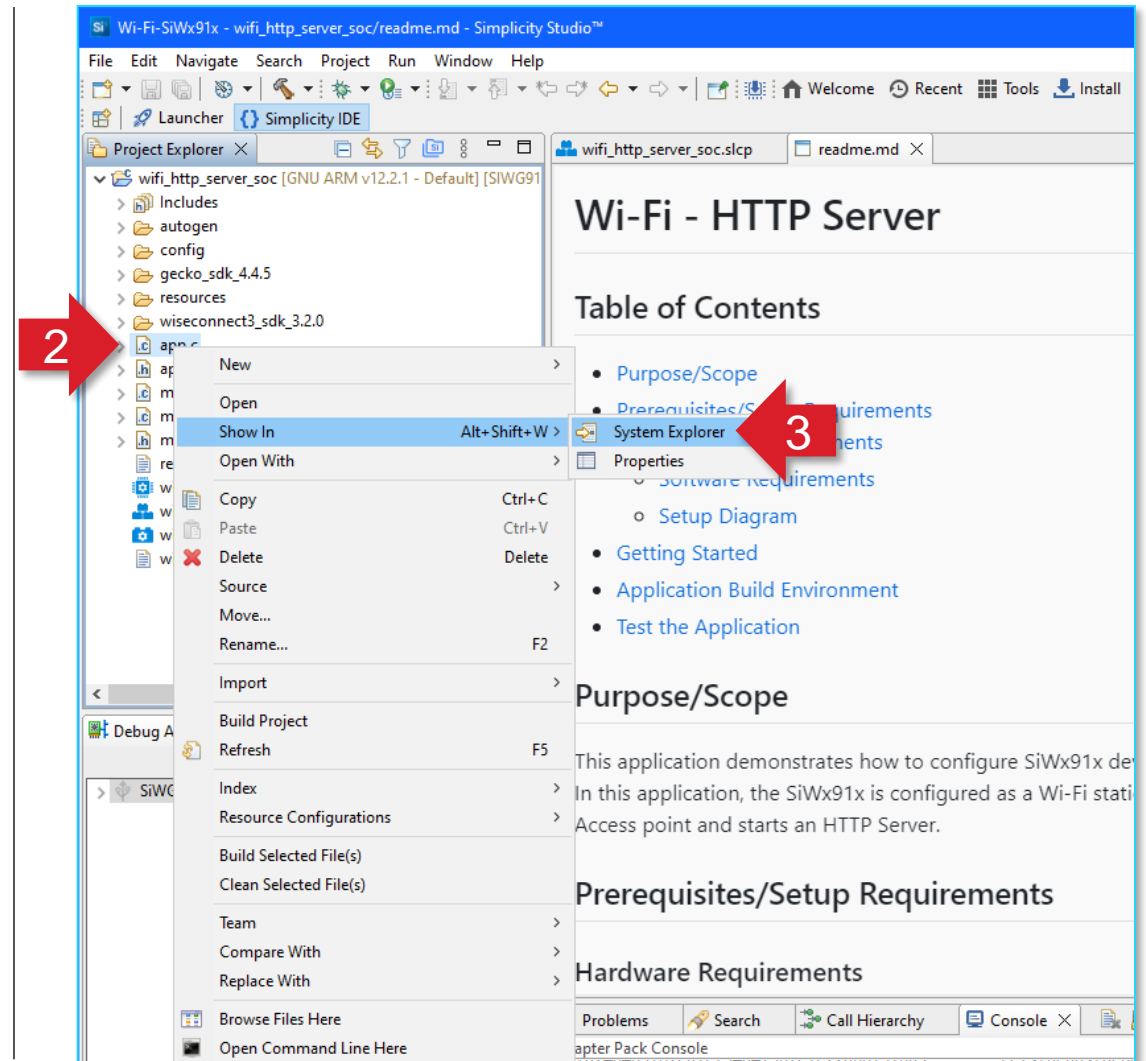
Joining and Rejoining

- The `sl_net_up()` function provides a lot of functionality when joining the network
 - It both scans for and joins the configured access point
- If it fails to join, it will eventually return with a failure status code
 - Currently `app.c` will end processing when this happens
- Similarly, if a joined network is lost:
 - The use of `sl_net_up()` to join will trigger some rejoin attempts
 - The attempts can be configured by calling the `sl_wifi_set_advanced_client_configuration()` function
- If it fails to rejoin, the device will remain unconnected to the network unless further actions are taken
 - Currently `app.c` does not detect or react to entry into this state
- In this section we will address these potential issues in the application

```
380 status = sl_net_up(SL_NET_WIFI_CLIENT_INTERFACE, SL_NET_DEFAULT_WIFI_CLIENT_PROFILE_ID);
381 if (status != SL_STATUS_OK) {
382     printf("\r\nFailed to bring Wi-Fi client interface up: 0x%lX\r\n", status);
383     return;
384 }
385 printf("\r\nWi-Fi client connected\r\n");
```

Update app.c

- To update **app.c** in the project folder:
 1. Locate the **app.c** file downloaded from GitHub (located in the **dev_lab_wifi_http_server/source_2_rejoin** folder) and copy to the clipboard
 2. In Simplicity Studio, locate the **app.c** file in the **Project Explorer** panel
 3. Right-click and select **Show in > System Explorer**
 4. Paste the **app.c** file from the clipboard into the opened folder (replacing the existing file)



Joining Updates

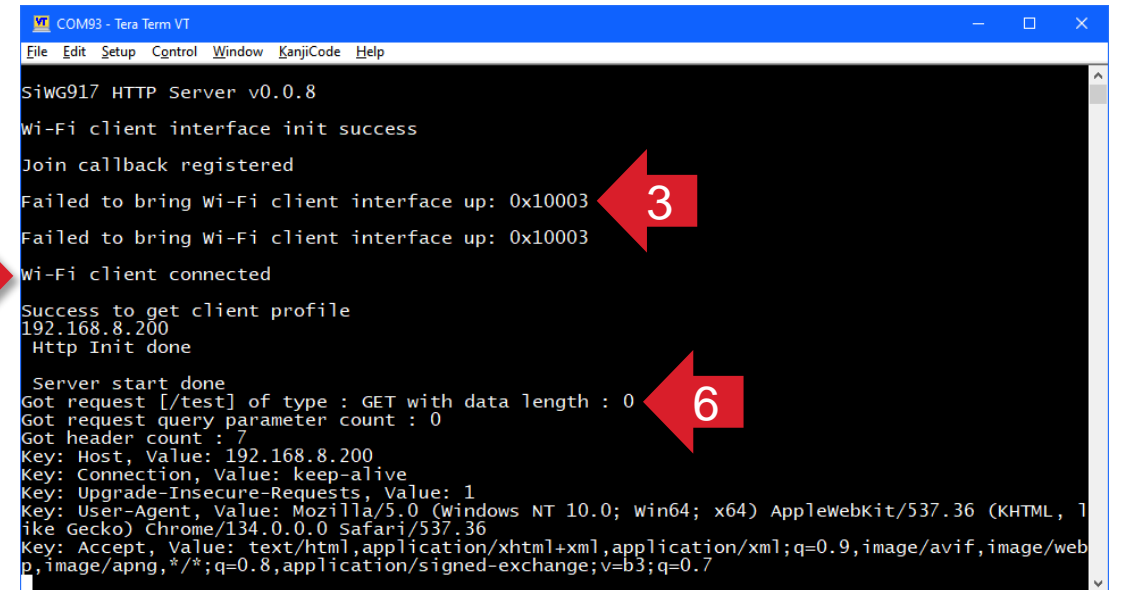
- A new global variable `status_net_up` is added to track the network state
- In the `application_start()` function:
 - The call to `sl_net_up()` is moved inside a loop
 - The code remains in the loop until the network is joined
 - A fixed 10 second delay is applied each time `sl_net_up()` fails to join the network
 - These delays could be increased over time if required
 - The `status_net_up` global variable is used to track the network state

```
137 sl_status_t status_net_up = SL_STATUS_INVALID_STATE;
```

```
393 while (status_net_up != SL_STATUS_OK) {  
394     status_net_up = sl_net_up(SL_NET_WIFI_CLIENT_INTERFACE, SL_NET_DEFAULT_WIFI_CLIENT_PROFILE_ID);  
395     if (status_net_up != SL_STATUS_OK) {  
396         printf("\r\nFailed to bring Wi-Fi client interface up: 0x%lX\r\n", status_net_up);  
397         osDelay(10000);  
398     }  
399 }  
400 printf("\r\nWi-Fi client connected\r\n");
```


Joining Operation

- To see these changes in action:
 1. Turn off the router being used or disable the Wi-Fi through its interface
 2. Compile and flash the updated application
 3. The **Failed to bring Wi-Fi client interface up: 0x10003** debug message will be repeated whilst the device is unable to join the network
 4. Turn on the router or enable the Wi-Fi
 5. The **Wi-Fi client connected** debug message will be displayed when the device joins the network
 6. The webpage can be loaded in a browser to check the HTTP server operation



```
COM93 - Tera Term VT
File Edit Setup Control Window KanjiCode Help

SiWG917 HTTP Server v0.0.8
Wi-Fi client interface init success
Join callback registered
Failed to bring Wi-Fi client interface up: 0x10003
Failed to bring Wi-Fi client interface up: 0x10003
Wi-Fi client connected
Success to get client profile
192.168.8.200
Http Init done

Server start done
Got request [/test] of type : GET with data length : 0
Got request query parameter count : 0
Got header count : 7
Key: Host, Value: 192.168.8.200
Key: Connection, Value: keep-alive
Key: Upgrade-Insecure-Requests, Value: 1
Key: User-Agent, Value: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/134.0.0.0 Safari/537.36
Key: Accept, Value: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7
```

Rejoining Updates

- In the `application_start()` function:
 - The `sl_wifi_set_join_callback()` function is called to configure a callback to `join_callback_function()` when a join event occurs
- In the `join_callback_function()`:
 - The global `status_net_up` variable is set to **FAIL** if the event indicates the automatic rejoin attempts have failed
- In the main loop section of the `application_start()` function
 - If the `status_net_up` variable is not set to **OK**, looping code that calls the `sl_net_up()` is added to attempt to rejoin the network
 - Each time `sl_net_up()` fails a fixed 10 second delay is applied
 - ▶ In this case the seconds counter is also updated
 - After a successful rejoin the IP Address of the device is output as it may change
- Note there is no need to restart the HTTP Server when the device rejoins, it continues to run

```
385 // Register the join callback
386 status = sl_wifi_set_join_callback(join_callback_function, NULL);
387 if (status != SL_STATUS_OK) {
388     printf("\r\nFailed to register join callback: 0x%lx\r\n", status);
389     return;
390 }
391 printf("\r\nJoin callback registered\r\n");
```

```
470 sl_status_t join_callback_function(sl_wifi_event_t event, char *data, uint32_t data_length, void *optional_arg)
471 {
472     UNUSED_PARAMETER(data);
473     UNUSED_PARAMETER(data_length);
474     UNUSED_PARAMETER(optional_arg);
475
476     // Network join fail ?
477     if ((SL_WIFI_EVENT_FAIL_INDICATION | SL_WIFI_JOIN_EVENT) == event) {
478         // Flag network is down
479         status_net_up = SL_STATUS_FAIL;
480     }
481
482     return SL_STATUS_OK;
483 }
```

```
441 if (status_net_up != SL_STATUS_OK) {
442     printf("Network lost, attempting rejoin\r\n");
443     // Attempt rejoin ?
444     while (status_net_up != SL_STATUS_OK) {
445         status_net_up = sl_net_up(SL_NET_WIFI_CLIENT_INTERFACE, SL_NET_DEFAULT_WIFI_CLIENT_PROFILE_ID);
446         if (status_net_up != SL_STATUS_OK) {
447             printf("\r\nFailed to rejoin network: 0x%lx\r\n", status_net_up);
448             osDelay(10000);
449             seconds += 10;
450         }
451     }
452     printf("\r\nWi-Fi client rejoined\r\n");
453
454     status = sl_net_get_profile(SL_NET_WIFI_CLIENT_INTERFACE, SL_NET_DEFAULT_WIFI_CLIENT_PROFILE_ID, &profile);
455     if (status != SL_STATUS_OK) {
456         printf("Failed to get client profile: 0x%lx\r\n", status);
457         return;
458     }
459     printf("\r\nSuccess to get client profile\r\n");
460
461     ip_address.type = SL_IPV4;
462     memcpy(&ip_address.ip.v4.bytes, &profile.ip.v4.ip_address.bytes, sizeof(sl_ip_v4_address_t));
463     print_sl_ip_address(&ip_address);
464     printf("\r\n");
465 }
466 }
```

Rejoining Operation

- To see these changes in action:
 1. Turn off the router or disable the Wi-Fi
 2. The **Network lost, attempting rejoin** debug message will be output when the device is unable to rejoin the network automatically
 3. The **Failed to rejoin network: 0x10003** debug message will be repeated whilst the application code attempts to rejoin
 4. Turn on the router or enable the Wi-Fi
 5. The **Wi-Fi client rejoined** debug message will be output when the device rejoins
 6. The webpage can be reloaded in a browser to check the HTTP Server is still operating

```
COM93 - Tera Term VT
File Edit Setup Control Window KanjiCode Help
Key: Upgrade-Insecure-Requests, Value: 1
Key: User-Agent, Value: Mozilla/5.0 (Windows NT 10.0; win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/134.0.0.0 Safari/537.36
Key: Accept, Value: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7
Network lost, attempting rejoin
Failed to rejoin network: 0x10003
Failed to rejoin network: 0x10003
Wi-Fi client rejoined
Got request [/test] of type : GET with data length : 0
Got request query parameter count : 0
Got header count : 9
Key: Host, Value: 192.168.8.200
Key: Connection, Value: keep-alive
Key: Upgrade-Insecure-Requests, Value: 1
Key: User-Agent, Value: Mozilla/5.0 (Windows NT 10.0; win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/134.0.0.0 Safari/537.36
Key: Sec-Purpose, Value: prefetch;prerender
```

The screenshot shows a terminal window with network debug logs. Red arrows indicate the following sequence of events:

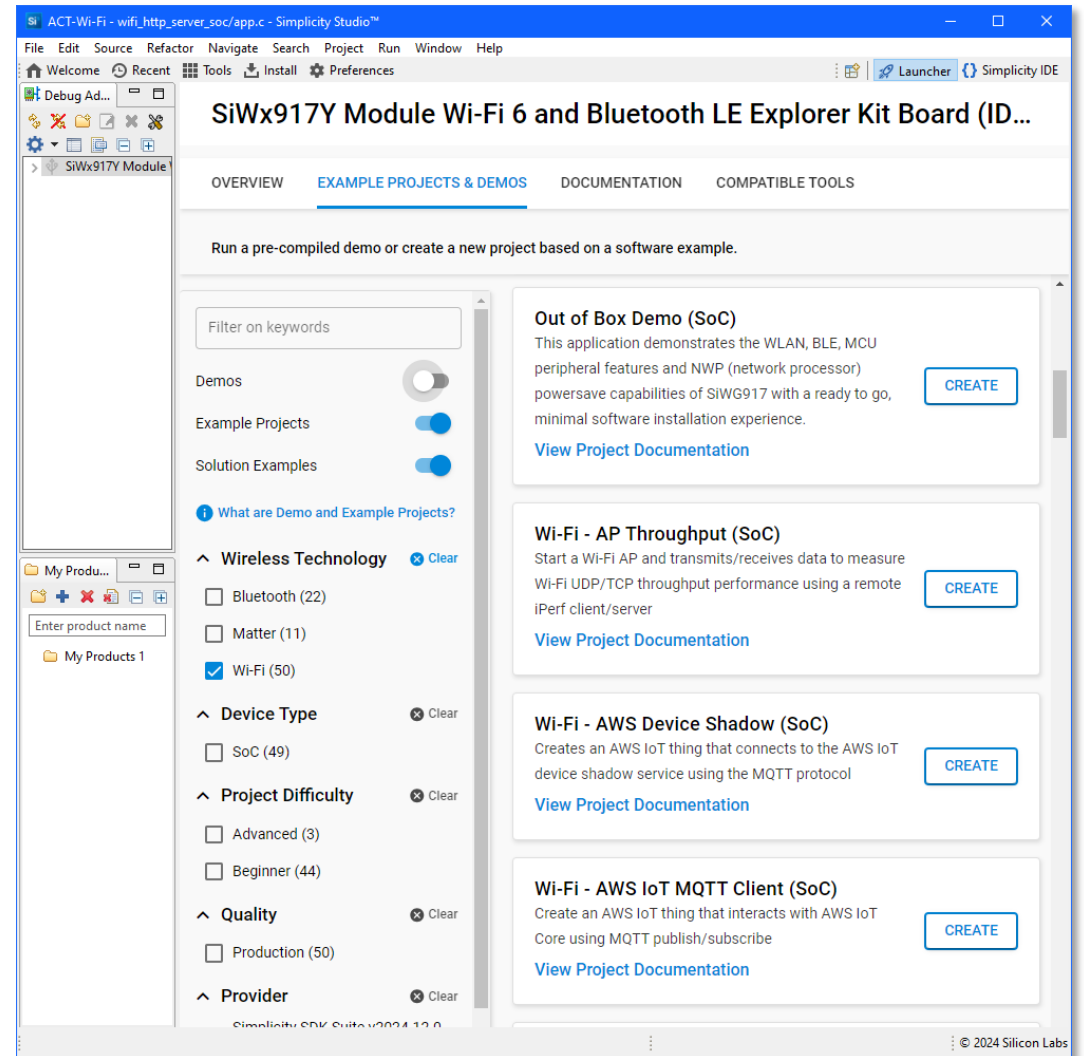
- Arrow 2 points to "Network lost, attempting rejoin".
- Arrow 3 points to the first "Failed to rejoin network: 0x10003" message.
- Arrow 5 points to the second "Failed to rejoin network: 0x10003" message.
- Arrow 6 points to the "Wi-Fi client rejoined" message.

Next Steps



Next Steps

- There are lots more Wi-Fi examples available in Simplicity Studio
 - Choose the one closest to your final application as your starting point
 - The Out of Box Demo (SoC) provides a good overview showing how to join a Wi-Fi network by providing the SSID and password over Bluetooth, pinging and MQTT data transfer
 - There are many Matter over Wi-Fi examples
- For more fully-featured examples check the Silicon Labs Wi-Fi Examples repository on GitHub:
https://github.com/SiliconLabs/wifi_applications
- Documentation on the Wi-Fi APIs is available from the Documentation page in the Launcher and also online:
<https://docs.silabs.com/wisconnect/latest/wisconnect-developing-with-wisconnect-sdk>
- Subscribe to the Silicon Labs YouTube channel, where we will be adding Wi-Fi tutorials in the future:
<https://www.youtube.com/@ViralSilabs/videos>



Thank You

Questions?

