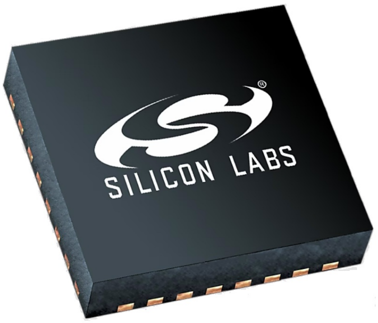

SILICON LABS 6.1.2.0 GA Bluetooth Mesh SDK Instructions

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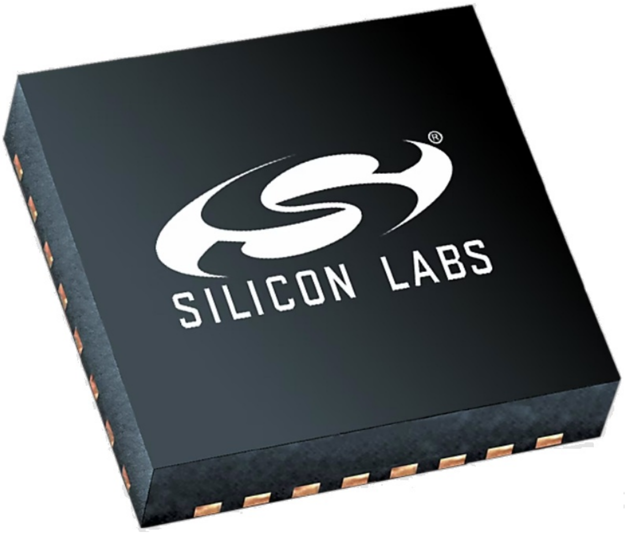


Bluetooth mesh is a new topology available for Bluetooth Low Energy (LE) devices that enables many-to-many (m:m) communication. It's optimized for creating large-scale device networks, and is ideally suited for building automation, sensor networks, and asset tracking. Our software and SDK for Bluetooth development supports Bluetooth Mesh and Bluetooth 5.3 functionality. Developers can add mesh networking communication to LE devices such as connected lights, home automation, and asset tracking systems. The software also supports Bluetooth beaconing, beacon scanning, and GATT connections so Bluetooth mesh can connect to smart phones, tablets, and other Bluetooth LE devices.

This release includes features supported by the Bluetooth mesh specification version 1.1.

These release notes cover SDK versions:

6.1.2.0 released August 14, 2024
6.1.1.0 released May 2, 2024

6.1.0.0 released April 10, 2024
6.0.1.0 released February 14, 2024
6.0.0.0 released December 13, 2023

Contents

BLUETOOTH

KEY FEATURES

- Qualified implementation of Mesh 1.1
- Added Network Lighting Control (NLC) profiles

Compatibility and Use Notices

For more information about security updates and notices, see the Security chapter of the Gecko Platform Release notes installed with this SDK or on the **Silicon Labs Release Notes page**. Silicon Labs also strongly recommends that you subscribe to Security Advisories for up-to-date information. For instructions, or if you are new to the Silicon Labs Bluetooth mesh SDK, see Using This Release.

Compatible Compilers:
IAR Embedded Workbench for ARM (IAR-EWARM) version 9.40.1

- Usingwine to build with the IarBuild.exe command line utility or IAR Embedded Workbench GUI on macOS or Linux could result in incorrect files being used due to collisions in wine's hashing algorithm for generating short file names.
- Customers on macOS or Linux are advised not to build with IAR outside of Simplicity Studio. Customers who do should carefully verify that the correct files are being used.
  GCC (The GNU Compiler Collection) version 12.2.1, provided with Simplicity Studio.
- Link-time optimization feature of GCC has been disabled, resulting in a slight increase of image size.

New Items

New Features

Added in release 6.0.1.0
Changes in SLC components:

A third BT Mesh Role was added beside Provisioned and Provisioned role – a Custom BT Mesh Role, where the application gets the freedom to implement a custom role. For example, the Provisioned or Provisioned role could be selected runtime.

Added in release 6.0.0.0

New Networked Lighting Control (NLC) example apps:
btmesh_soc_nlc_basic_lightness_controller for demonstration of the BT Mesh NLC Basic Lightness Controller Profile
btmesh_soc_nlc_basic_scene_selector for demonstration of the BT Mesh NLC Basic Scene Selector Profile
btmesh_soc_nlc_dimming_control for demonstration of the BT Mesh NLC Dimming Controller Profile
btmesh_soc_nlc_sensor_ambient_light for demonstration of the BT Mesh NLC Ambient Light Sensor Profile
btmesh_soc_nlc_sensor_occupancy for demonstration of the BT Mesh NLC Occupancy Sensor Profile (People count)

Changes in example apps:
btmesh_soc_sensor_server was deleted and its functionality was split in 3 examples:

- btmesh_soc_sensor_thermometer for demonstration of Sensor Server Model with a thermometer
- btmesh_soc_nlc_sensor_occupancy for demonstration of the BT Mesh NLC Occupancy Sensor Profile (people count)
- btmesh_soc_nlc_sensor_ambient_light for demonstration of the BT Mesh NLC Ambient Light Sensor Profile

btmesh_soc_switch was renamed to btmesh_soc_switch_ctl, whose purpose is to demonstrate the usage of the Light CTL Client Model. The example no longer controls scenes (Scene Client) btmesh_soc_light was renamed to btmesh_soc_light_ctl
The example no longer demonstrates the LC Server model and Scene Server, Scheduler Server and Time Server Models btmesh_soc_hsl was renamed to btmesh_soc_light_hsl The example no longer demonstrates the LC Server model and Scene Server, Scheduler Server and Time Server Models

Changes in all example apps:
DFU image updates are generated by a Python script instead of create_bl_files.bat/.sh files
Support for Mesh Composition Data Pages 1, 2, 128, 129, 130 was added for all examples, these pages are automatically generated by the BT Mesh Configurator tool.

New SLC components:

btmesh_nlc_basic_lightness_controller for demonstration of the BT Mesh NLC Basic Lightness Controller Profile btmesh_nlc_basic_lightness_controller_profile_metadata for Composition Data Page 2 NLC support for Basic Lightness Controller Profile btmesh_nlc_basic_scene_selector for demonstration of the BT Mesh NLC Basic Scene Selector Profile btmesh_nlc_basic_scene_selector_profile_metadata for Composition Data Page 2 NLC support for Basic Scene Selector Profile btmesh_nlc_dimming_control for demonstration of the BT Mesh NLC Dimming Controller Profile btmesh_nlc_dimming_control_profile_metadata for Composition Data Page 2 NLC support for Dimming Controller Profile btmesh_nlc_ambient_light_sensor for demonstration of the BT Mesh NLC Ambient Light Sensor Profile btmesh_nlc_ambient_light_sensor_profile_metadata for Composition Data Page 2 NLC support for Ambient Light Sensor Profile btmesh_nlc_occupancy_sensor for demonstration of the BT Mesh NLC Occupancy Sensor Profile (People count) btmesh_nlc_occupancy_sensor_profile_metadata for Composition Data Page 2 NLC support for Occupancy Sensor Profile btmesh_generic_level_client_ext for extending the Generic Base component with Generic Move Unacknowledged and Generic Delta Unacknownledged messages ncp_btmesh_ae_server for enabling the Silabs Configuration Server vendor model for the node to allow data transfer over Advertisement Extension ncp_btmesh_ae_server for enabling the Silabs Configuration Client vendor model for the node. ncp_btmesh_user_cmd for demonstrating the communication between an NCP host and NCP target using BGAPI user messages, responses and events.

New APIs

Added in release 6.1.0.0
BGAPI additions:
New commands have been added to the node class to associate scan response data with Mesh provisioning and Mesh proxy service advertisements. The scan response data associated with Mesh proxy service advertisements can be set individually for each network key, so it can contain data encrypted with that key, but it is up to the application to manage that. The new commands are:

- sl_btmesh_node_set_proxy_service_scan response: Set scan response data for proxy service advertisement
- sl_btmesh_node_clear_proxy_service_scan_response: Clear scan response data for proxy service advertisement
- sl_btmesh_node_set_provisioning_service_scan response: Set scan response data for provisioning service advertisement
- sl_btmesh_node_clear_provisioning_service_scan_response: Clear scan response data for provisioning service advertisement

A new command has been added to the vendor model class to set model behavior options. Currently there is one option that controls whether a work buffer is allocated from the heap for each vendor model for message reception reporting. The default value (1) allocates a buffer, which increases event reporting resilience when a device is under high load at the expense of additional heap memory usage. The new command is:

- sl_btmesh_vendor_model_set_option: Set a vendor model behavior option
  New commands have been added to the diagnostic class to report friendship-related events. The new commands are:
- sl_btmesh_diagnostic_enable_friend: Enable generation of friendship-related diagnostic events
- sl_btmesh_diagnostic_disable_friend: Disable generation of friendship-related diagnostic events
- sl_btmesh_diagnostic_get_friend: Retrieve friendship-related diagnostic counters

New events added to the diagnostic class are as follows:

- sl_btmesh_diagnostic_friend_queue: Event for message being added to friendship message queue
- sl_btmesh_diagnostic_friend_relay: Event for message being relayed to a LPN
- sl_btmesh_diagnostic_friend_remove: Event for message being removed from friendship message queue

Added in release 6.0.0.0

Changes in SLC components:
ncp_btmesh_dfu component's ncp_btmesh_dfu.h has a new API void sl_btmesh_ncp_dfu_handle_cmd(void *data, bool *cmd_handled); btmesh_provisioning_decorator component doesn't restart provisioning after provisioning is failed btmesh_lighting_server's sl_btmesh_lighting_server.h has a new API void sl_btmesh_update_lightness(uint16_t lightness, uint32_t remaining_ms); btmesh_event_log has more granular configurability options btmesh_ctl_client's sl_btmesh_ctl_client.h has an API change instead of void sl_btmesh_set_temperature(uint8_t new_color_temperature_percentage);
the new APi is void sl_btmesh_ctl_client_set_temperature(uint8_t temperature_percent); void sl_btmesh_ctl_client_set_lightness(uint8_t lightness_percent);

BGAPI additions:
A new BGAPI class for device diagnostics has been added. It provides the application with Mesh stack statistics counters and an eventbased reporting of network PDU relaying and proxying, which can be activated and deactivated as needed.

The BGAPI commands in the diagnostic class are:

- sl_btmesh_diagnostic_init: Initialize the diagnostic component
- sl_btmesh_diagnostic_deinit: Deinitialize the diagnostic component
- sl_btmesh_diagnostic_enable_relay: Enable event-based reporting of network PDU relaying/proxying activity
- sl_btmesh_diagnostic_disable_relay: Disable event-based reporting of network PDU relaying/proxying activity
- sl_btmesh_diagnostic_get_relay: Get the number of relayed/proxied network PDUs so far
- sl_btmesh_diagnostic_get_statistics: Get mesh stack statistics counters
- sl_btmesh_diagnostic_clear_statistics: Zero mesh stack statistics counters The BGAPI event in the diagnostic class is:
- sl_btmesh_diagnostic_relay: Event reporting that a network PDU has been relayed or proxied by the stack

Improvements

Changed in release 6.1.0.0
The diagnostic class BGAPI command for retrieving statistics has been changed to retrieve chunks of data instead of retrieving all data at once. The caller should supply the size of the chunk it requests along with the offset of the chunk in the statistics data, and the call will return with as much data as can be supplied, given the request constraints.

Changed in release 6.0.0.0

A provisioner or a node can now configure itself using the configuration client model and its own primary address as the destination for the messages. This can replace self-configuration by test BGAPI commands.

Code optimization can result in slightly smaller firmware images than before, depending on the feature set used.

Code optimization can result in slightly smaller RAM usage than before, depending on the feature set used.

The Mesh stack no longer requires or supports the deprecated BLE advertiser and scanner components. Instead, it uses the current versions of each (legacy advertiser and legacy scanner for non-extended advertisements, and extended advertiser and extended scanner for extended advertisements). Applications that use both the BLE and the Mesh BGAPIs should no longer use the deprecated BLE advertiser and scanner components either.

Fixed Issues

Fixed in release 6.1.2.0

ID #	Description
1251498	Fixed when a Lighting message, including transition time, leads to an incorrect error message in lo gs.
1284204	Fixed an issue that could prevent saving the replay protection list when using sl_btmesh_node_power_off command.
1325267	Fixed element sequence number writing when the configured write interval exponent is set to zero.
1334927	Fixed an issue that could cause a hard fault when GATT proxy server receives data during resourc e starvation.

Fixed in release 6.1.0.0

ID #	Description
1235337	Made GATT service discovery more robust on an overloaded device.
1247422	Made vendor model reception more robust on an overloaded device.
1252252	Fixed when a Generic Move message leads to a dim up, which could overflow to a dim down.
1254356	Fixed a regression with friend subsystem deinitialization.
1276121	Fixed application key index truncation at BGAPI level when embedded provisioner invokes a key r efresh procedure.

Fixed in release 6.0.1.0

ID #	Description
1226000	Extended Provisioner BGAPI function for checking node identity to also check private node identity.
1206620	Fixed problems caused by missing BGAPI events during high load to correct firmware verification p roblems.
1230833	Fixed friend subsystem deinitialization so that reinitialization works without resetting the device.
1243565	Fixed crash that could occur if provisioner initialization failed, for example because of malformed D CD.
1244298	Fixed reporting of spurious extra octets in the Register Status event of the Scene Client model.
1243556	Automatic node initialization removed for BT Mesh application components. Now all components c an be used also in Provisioner role.

Fixed in release 6.0.0.0

ID #	Description
360955	The interval between first and second attention timer event could be other than one second.
1198887	Private beacon random advertiser address is the same for all subnets while it should be different.
1202073	Btmesh_ncp_empty example does not have enough RAM on BRD4182 with GCC compiler.
1202088	Btmesh_soc_switch example does not have enough RAM on BRD4311 and BRD4312 with IAR compiler
1206714	Proxy server should emit a beacon over proxy connection when a subnet is added to the proxy server
1206715,1211012,1211022	Support for device composition data page 2, 129 and 130 should be present in configuration server model as well as large composition data server model when remote provisioning is supported
1211017	Periodic publishing of location information should alternate between global and local location when both are known
1212373	Resource leak in proxy connection handling after several hundred proxy connections have been opened and closed
1212854	Pull mode MBT transfer to an LPN does not complete successfully
1197398,1194443	DFU distributor application is currently not able to handle more than 60 nodes successfully
1202088	Btmesh_soc_switch_ctl example compiles on all boards with IAR compiler.

Known Issues in the Current Release

Issues in bold were added since the previous release.

ID #	Description	Workaround
401550	No BGAPI event for segmented message handling failure.	Application needs to deduce failure from timeout / lack of application layer response; for vendor models an A PI has been provided.
454059	A large number of key refresh state chan ge events are generated at the end of K R process, and that may flood NCP queue.	Increase NCP queue length in the project.
454061	Slight performance degradation compared to 1.5 in round-trip latency tes ts was observed.	
624514	Issue with re-establishing connectable a dvertising if all connections have been active and GATT proxy is in use.	Allocate one more connection than is needed.
841360	Poor performance of segmented message transmission over GATT beare r.	Ensure that the underlying BLE connection's Connecti on interval is short; ensure that ATT MTU is large eno ugh to fit a full Mesh PDU; tune the minimum connecti on event length to allow multiple LL packets to be tran smitted per connection event.
1121605	Rounding errors may cause scheduled e vents to trigger at very slightly different ti mes than expected.	
1226127	Host provisioner example can be stuck when it starts to provision a second node .	Restart the host provisioner app before provisioning th e second node.
1204017	Distributor is not able to handle parallel s elf FW Update and FW Upload.	Don't run self FW update and FW upload in parallel.

Deprecated Items

Deprecated in release 6.0.0.0

The BGAPI command sl_btmesh_node_get_networks() has been deprecated. Use sl_btmesh_node_key_key_count() and sl_btmesh_node_get_key() instead.

The BGAPI commands sl_btmesh_test_set_segment_send_delay() and sl_btmesh_test_set_sar_config() have been deprecated. Use sl_btmesh_sar_config_set_sar_transmitter() and sl_btmesh_sar_config_server_set_sar_receiver() instead.

Removed Items

Removed in release 6.0.0.0

The BGAPI commands sl_btmesh_test_set_local_config() and sl_btmesh_test_get_local_config() have been removed.

The BGAPI commands sl_btmesh_node_get_statistics() and sl_btmesh_node_clear_statistics() have been removed.

Using This Release

This release contains the following

- Silicon Labs Bluetooth mesh stack library
- Bluetooth mesh sample applications If you are a first time user, see QSG176: Silicon Labs Bluetooth Mesh SDK v2.x Quick-Start Guide.

Installation and Use

The Bluetooth mesh SDK is provided as part of the Gecko SDK (GSDK), the suite of Silicon Labs SDKs. To quickly get started with the GSDK, install Simplicity Studio 5, which will set up your development environment and walk you through GSDK installation. **Simplicity Studio 5** includes everything needed for IoT product development with Silicon Labs devices, including a resource and project launcher, software configuration tools, full IDE with GNU toolchain, and analysis tools. Installation instructions are provided in the online Simplicity Studio 5 User's Guide. Alternatively, Gecko SDK may be installed manually by downloading or cloning the latest from GitHub. See https://github.com/SiliconLabs/gecko_sdk for more information. The GSDK default install location has changed with Simplicity Studio 5.3 and higher.

- **Windows: C:**\Users\\SimplicityStudio\SDKs\gecko_sdk
- **MacOS:** /Users//SimplicityStudio/SDKs/gecko_sdk

Documentation specific to the SDK version is installed with the SDK. Additional information can often be found in the knowledge base articles (KBAs). API references and other information about this and earlier releases is available on https://docs.silabs.com/.

Security Information

Secure Vault Integration

This version of the stack is integrated with Secure Vault Key Management. When deployed to Secure Vault High devices, mesh encryption keys are protected using the Secure Vault Key Management functionality. The table below shows the protected keys and their storage protection characteristics.

Key	Exportability on a node	Exportability on Provisioner	Notes
Network key	Exportable	Exportable	Derivations of the network key exist only in R AM while network keys are stored on flash
Application ke y	Non-exportable	Exportable	
Device key	Non-exportable	Exportable	In Provisioner's case, applied to Provisionerr's own device key as well as other devices' keys

Keys that are marked as "Non-Exportable" can be used but cannot be viewed or shared at runtime.

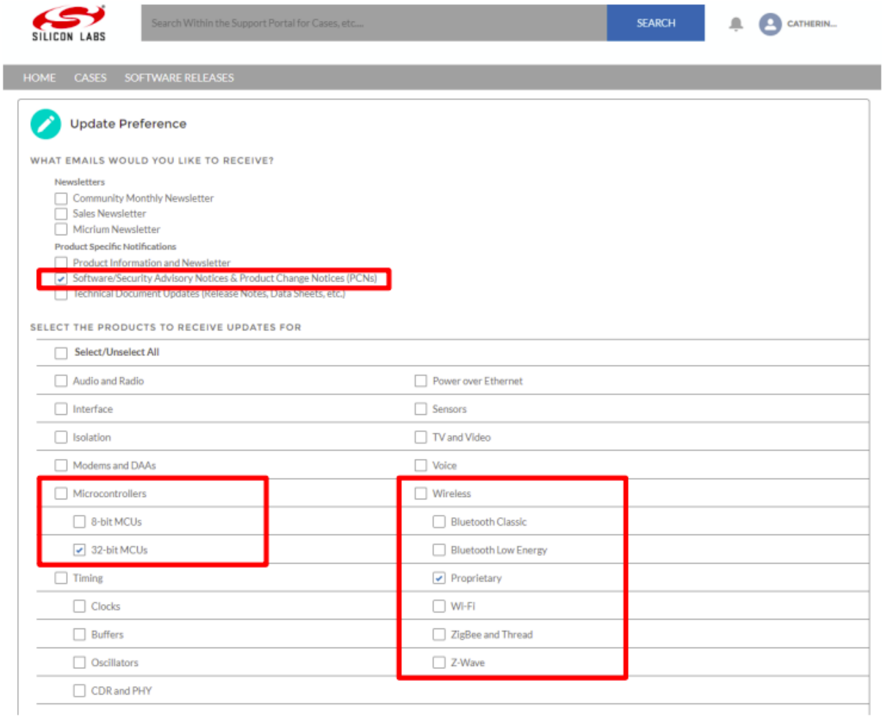
Keys that are marked as "Exportable" can be used or shared at runtime but remain encrypted while stored in flash.

For more information on Secure Vault Key Management functionality, see **AN1271: Secure Key Storage.**

Security Advisories

To subscribe to Security Advisories, log in to the Silicon Labs customer portal, then select Account Home. Click HOME to go to the portal home page and then click the Manage Notifications tile. Make sure that ‘Software/Security Advisory Notices & Product Change Notices (PCNs)’ is checked, and that you are subscribed at minimum for your platform and protocol. Click Save to save any changes.

The following figure is an example:



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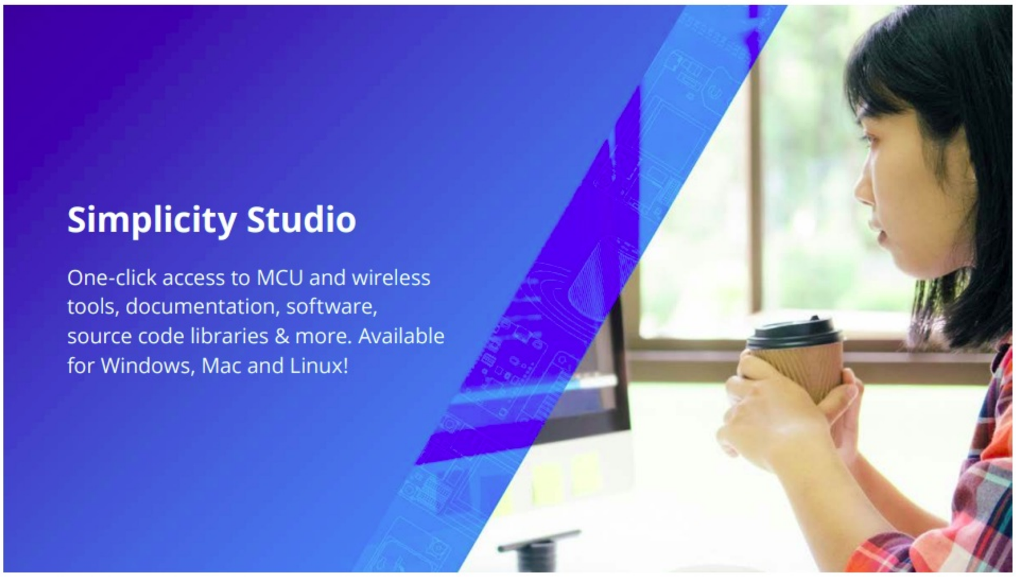
Support

Development Kit customers are eligible for training and technical support. Use the **Silicon Labs Bluetooth mesh web page** to obtain information about all Silicon Labs Bluetooth products and services, and to sign up for product support.
Contact Silicon Laboratories support at http://**www.silabs.com/support**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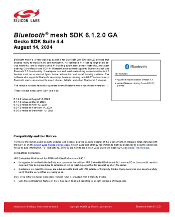

Bluetooth® mesh SDK 6.1.2.0 GA
Gecko SDK Suite 4.4
August 14, 2024

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Bluetooth
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6.1.2.0 GA Bluetooth Mesh SDK, 6.1.2.0 GA, Bluetooth Mesh SDK, Mesh SDK, SDK

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