



Bluetooth[®] mesh SDK 2.2.2.0 GA

Gecko SDK Suite 4.0

March 9, 2022

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.

These release notes cover SDK versions:

- 2.2.2.0 released March 9, 2022
- 2.2.1.0 released January 26, 2022
- 2.2.0.0 released December 15, 2021



KEY FEATURES

- EFR32M|BG24 support
- New example embedded Provisioner application
- NCP Commander support for Mesh
- Multiple improvements to the Mesh BGAPI
- Support for Amazon Bluetooth Mesh Simple Setup (BSS)

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 TECH DOCS tab on <https://www.silabs.com/developers/bluetooth-mesh>. 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 8.50.9

- Using wine 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 10.2.1, provided with Simplicity Studio.

Link-time optimization feature of GCC has been disabled, resulting in slight increase of image size

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1 New Items

1.1 New Features

Added in release 2.2.2.0

Added support for controlling the advertising interval for unprovisioned device beacons, GATT provisioning service advertisements, and GATT proxy service advertisements.

Minor API improvements were made and APIs were added; details are in the following sections.

Made a number of small optimizations reducing the flash consumption of projects; exact amount saved depends on the feature set a project uses.

Added in release 2.2.0.0

Support for Amazon Bluetooth Mesh Simple Setup (BSS) added and verified for compatibility.

The length of the GATT proxy filter list can now be configured in the application, instead of being a constant size.

Multiple small API improvements were made; details are in the following sections.

New Example Applications

A Provisioner NCP Host example was added to demonstrate how to create a mesh network, provision and configure nodes.

New Development Tools

Simplicity Studio's NCP Commander supports BT Mesh APIs and a GUI for provisioning and configuration.

Simplicity Studio displays short documentation for each example.

1.2 New APIs

Added in release 2.2.2.0

Added APIs to control unprovisioned device beacon interval and Mesh GATT service advertising interval by adding `sl_btmesh_node_set_unprov_beaconing_adv_interval()`, `sl_btmesh_node_set_proxy_service_adv_interval()`, and `sl_btmesh_node_set_provisioning_service_adv_interval()`.

Extended Scheduler Server model API with diagnostics for reporting when a scheduled action has been triggered by adding `sl_btmesh_scheduler_server_action_triggered()` event.

Added in release 2.2.0.0

Diagnostic APIs for the provisioning process have been added. On the node side, the event `sl_btmesh_node_start_received()` is generated when the node receives the Provisioning Start PDU; the corresponding `sl_btmesh_prov_start_sent()` event is generated on the Provisioner side. Both events record the provisioning parameters the Provisioner has chosen to use for the provisioning session.

Added APIs to track vendor model message delivery by adding `sl_btmesh_vendor_model_send_tracked()` and `sl_btmesh_vendor_model_set_publication_tracked()` as well as `sl_btmesh_vendor_model_send_complete()` event. The APIs provide the application with a handle that can be matched with the event indication message that sending has completed. Note that the stack can only provide the information that the message has been sent; not whether a receiving application has received or processed the message. An application layer protocol message is needed for that.

Test API has been extended by multiple new calls: `sl_btmesh_test_set_beacon()`, `sl_btmesh_test_set_default_ttl()`, `sl_btmesh_test_set_friend()`, `sl_btmesh_test_set_gatt_proxy()`, `sl_btmesh_test_set_identity()`, `sl_btmesh_test_set_nettx()`, and `sl_btmesh_test_set_relay()` which replace the previously existing `sl_btmesh_test_set_local_config()`; and correspondingly `sl_btmesh_test_get_beacon()`, `sl_btmesh_test_get_default_ttl()`, `sl_btmesh_test_get_friend()`, `sl_btmesh_test_get_gatt_proxy()`, `sl_btmesh_test_get_identity()`, `sl_btmesh_test_get_nettx()`, and `sl_btmesh_test_get_relay()` which replace the previously existing `sl_btmesh_test_get_local_config()`. Finally, `sl_btmesh_test_get_model_option()` has been provided as a counterpart to `sl_btmesh_test_set_model_option()`.

Time server model API has been amended by the addition of `sl_btmesh_time_server_publish()` for unsolicited publishing of Time Status messages.

2 Improvements

2.1 Changed APIs

Changed in release 2.2.2.0

Added a new generic model option for allowing Light client model status events to contain the status received over the air for range requests.

Changed in release 2.2.0.0

Defined the *status* parameter for `sl_btmesh_prov_set_provisioning_suspend_event()` to be a bitmask instead of just 0 or 1, in order to allow provisioning suspension at multiple points during the provisioning process.

Corrected the Provisioner APIs `sl_btmesh_prov_send_oob_pkey_response()` and `sl_btmesh_prov_send_oob_auth_response()` to contain the UUID of the device being provisioned, so that these APIs can be used when provisioning multiple devices in parallel.

3 Fixed Issues

Fixed in release 2.2.2.0

| ID # | Description |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| 382482 | Corrected sl_btmesh_prov_scan_unprov_beacons to return an error if Provisioner is not initialized |
| 467819 | Report status received over the air for Light model range requests (application needs to set an option to change from old behavior to new) |
| 628120 | Fixed reply delay behavior for Sensor, Scene, Time, Scheduler, and LC server models |
| 752802 | Added API support for setting advertisement interval for various use cases |
| 754342 | Extended the CMSIS limits for the maximum number of subscriptions configuration item |
| 754910, 754931 | Fixed issues with friend node handling of segmented messages |
| 756963 | Fixed missing message length check in Scene Setup server model |
| 761990 | Fixed an issue with non-default memory configuration for simultaneous GATT connections |
| 811040 | Fixed Configuration Client status reporting problem when Model Publication Status contains default TTL |
| 814249 | Fixed handling of all-friends fixed address when receiving access layer messages |
| 815810 | Fixed Time Server Time Status message formatting issue in the case seconds field is zero |
| 818523 | Fixed Model Publication Status error code for the combination of virtual address and unknown application key |

Fixed in release 2.2.1.0

| ID # | Description |
|----------------|-------------------------------------------------------------------------------------------|
| 739169 | Fixed memory leak when initializing models multiple times instead of only once |
| 748782 | Improved proxy connection stability when transmitting Mesh advertisements at a quick pace |
| 754910, 754931 | Fixed issues with friend node handling of segmented messages |
| 756963 | Fixed missing message length check in Scene Setup server model |
| 761990 | Fixed an issue with non-default memory configuration for simultaneous GATT connections |

Fixed in release 2.2.0.0

| ID # | Description |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 418636 | Fixed issues with mesh_test local configuration state API (node identity, relay, network retransmission) |
| 736054 | Added a check that the key used for publication is bound to the model |
| 739523 | Fixed an issue with inserting segmented multicast messages to the Friend queue |
| 749981 | Corrected parsing and generation of Config Network Transmit Set, Config Network Transmit Status, Config Relay Set, and Config Relay Status messages |
| 752756 | Fixed an issue with SAR timing configuration API |
| 756361 | Fixed Sensor model handling of long messages |
| 756418 | Fixed backward compatibility issue with device key storage when updating firmware from 1.x SDK |
| 756629 | Fixed issue with AID derivation of application keys that are generated from random data on Provisioner; does not affect AID derivation on nodes or keys that are generated from application-supplied data |
| 732312 | Bt Mesh Configurator no longer generates multiple macros for the same model if new elements are added |

4 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 API has been provided |
| 454059 | A large number of key refresh state change events are generated at the end of KR 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 tests was observed | |
| 624514 | Issue with re-establishing connectable advertising if all connections have been active and GATT proxy is in use | Allocate one more connection than is needed |
| 650825 | Issue with retransmissions when a model is publishing periodically | Set up retransmissions in the model state and trigger periodic publishing by an application timer |

5 Deprecated Items

Deprecated in release 2.2.0.0

Two test BGAPI class commands, `sl_btmesh_test_get_local_config()` and `sl_btmesh_test_set_local_config()`, have been deprecated. Replacements are listed in the API reference as well as in section [1.2 New APIs](#) of this document.

6 Removed Items

None

7 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*.

7.1 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, used with this release.

- Windows: C:\Users\\SimplicityStudio\SDKs\gecko_sdk
- MacOS: /Users/<NAME>/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/>.

7.2 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 RAM while network keys are stored on flash |
| Application key | Non-exportable | Exportable | |
| Device key | Non-exportable | Exportable | In Provisioner's case, applied to Provisioner'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.

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7.3 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>.

Simplicity Studio

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