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SILICON LABS Bluetooth Mesh SDK Embedded Software User Guide

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Product Specifications

- **Product Name:** Simplicity SDK Suite
- **Version:** 2024.6.0
- **Release Date:** June 5, 2024
- **Bluetooth Mesh Specification Version:** 1.1

Product Usage Instructions

Bluetooth mesh is a new topology available for Bluetooth Low Energy (LE) devices that enable many-to-many (m:m) communication. It's optimized for creating large-scale de-vice networks and is ideally suited for building automation, sensor networks, and asset tracking. Our software and SDK for Bluetooth development support Bluetooth Mesh and Bluetooth functionality. Developers can add mesh networking communication to LE devices such as connected lights, home automation, and asset tracking systems. The soft ware also supports Bluetooth beaconing, beacon scanning, and GATT connections so Bluetooth mesh can connect to smartphones, 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:
7.0.0.0 released June 5, 2024

Compatibility and Use Notices
For more information about security updates and notices, see the Security chapter of the 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

- 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 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

Simplicity SDK is an embedded software development platform for building IoT products based on our Series 2 and Series 3 wireless and MCU devices. It integrates wireless protocol stacks, middleware, peripheral drivers, a bootloader, and application examples – a solid framework for building power-optimized and secure IoT devices. The Simplicity SDK offers powerful features such as ultra-low power consumption, strong network reliability, support for a large number of nodes, and abstraction of complex requirements like multiprotocol and pre-certification. Additionally, Silicon Labs provides over-the-air (OTA) software and security updates to remotely update devices, minimize maintenance costs, and enhance the end-user product expe-rience. Simplicity SDK is a follow-on from our popular Gecko SDK, which will continue to be available providing long-term support for our Series 0 and Series 1 devices.

For additional information on the Series 0 and Series 1 devices please reference: Series 0 and Series 1 EFM32/EZR32/EFR32 device (**silabs.com**).

New Features

Added in release 7.0.0.0

Support for Clock Manager has been added. The stack components no longer use device_init() for clock initialization. Instead, the application project must now include the clock_manager component which does the clock initialization. Support for Common Memory Manager has been added.

New APIs

Added in release 7.0.0.0 None.

Improvements

- A node BGAPI class command, sl_btmesh_node_test_identity, has been added for checking node identity advertisement sources.
- Low Power Node feature added to Sensor server examples.
- Friend feature added to the sensor server client example.

Changed in release 7.0.0.0

- **BGAPI changes:**
  A node BGAPI class command, sl_btmesh_node_test_identity, has been added to check whether a received node identity advertisement originates from a given node or not.
- **Example application changes:**
  Low Power Node feature has been added to Sensor server examples (btmesh_soc_sensor_thermometer, btmesh_soc_nlc_sensor_oc-cupancy btmesh_soc_nlc_sensor_ambient_light), and Friend feature was added to the sensor server client example (btmesh_soc_sen-sor_client).

Fixed Issues

Fixed in release 7.0.0.0

- Avoid starting advertisement bearer if node is being provisioned using only PB-GATT.
- Improved provisioning event reporting on an overloaded device.
- Improved DFU event reporting on an overloaded device.
- Error reporting added if Blob Transfer configuration on the node is insufficient for DFU Distributor and Standalone Updater models.
- Fixed saving replay protection to NVM3 when using sl_btmesh_node_power_off() API.

ID #	Description
356148	Avoids starting advertisement bearer if node is being provisioned using only PB-GATT.
1250461	Made provisioning event reporting more robust on an overloaded device.
1258654	Made DFU event reporting more robust on an overloaded device.
1274632	DFU Distributor and Standalone Updater models will now report an error if Blob Transfer configuration on the node is not sufficient.
1284204	Fixed saving replay protection to NVM3 when application uses the sl_btmesh_node_power_off() API.

Known Issues in the Current Release
Issues in bold were added since the previous release.

- No BGAPI event for segmented message handling failure.
- Potential flooding of NCP queue with key refresh state change events.
- Slight performance degradation in round-trip latency tests compared to version 1.5.
- Issues with re-establishing connectable advertising if all connections are active and GATT proxy is in use.
- Poor performance of segmented message transmission over GATT bearer.

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.
841360	Poor performance of segmented message transmission over GATT bearer.	Ensure that the underlying BLE connection's Connection interval is short; ensure that ATT MTU is large enough to fit a full Mesh PDU; tune the minimum connection event length to allow multiple LL packets to be transmitted per connection event.
1121605	Rounding errors may cause scheduled events to trigger at very slightly different times than expected.	
1226127	Host provisioner example can be stuck when it starts to provision a second node.	Restart the host provisioner app before provisioning the second node.
1204017	Distributor is not able to handle parallel self FW Update and FW Upload.	Don't run self FW update and FW upload in parallel.
1301325	**Scheduler actions are not correctly stored to persistent storage.**	
1305041	**NCP communication from host to EFR32 may timeout.**	sl_simple_com_usart.c may be edited to correct a timeout value.
1305928	**Setting up 10 or more updating nodes as DFU receivers may fail on the SoC distributor app.**	

Deprecated Items
Deprecated in release 7.0.0.0
The BGAPI command sl_btmesh_prov_test_identity has been deprecated. Use sl_btmesh_node_test_identity instead.

Removed Items
Removed in release 7.0.0.0
Support for Series 1 hardware (xG12 and xG13) has been removed in this release.

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 Simplicity SDK (GSDK), the suite of Silicon Labs SDKs. To quickly get started with the Simplicity SDK, install Simplicity Studio 5, which will set up your development environment and walk you through Simplicity SDK 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, Simplicity SDK may be installed manually by downloading or cloning the latest from GitHub. See **https://github.com/Sili-conLabs/simplicity_sdk** for more information.

Simplicity Studio installs the Simplicity SDK by default in:

- **Windows:**
  - **C:**\Users\<NAME>\SimplicityStudio\SDKs\simplicity_sdk
- **MacOS:** /Users/<NAME>/SimplicityStudio/SDKs/simplicity_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

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 Provisionerr's own device key as well as other devices' keys

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.

- 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.

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
One-click access to MCU and wireless tools, documentation, software, source code libraries & more. Available for Windows, Mac and Linux!

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Frequently Asked Questions (FAQ)

Q: Where can I find more information about security updates?
A: Refer to the Security chapter of the Platform Release Notes or visit the Silicon Labs Release Notes page for detailed security updates.

Q: How do I include the clock_manager component for clock initialization?
A: To include the clock_manager component for clock initialization, make sure to update your application project accordingly as per the provided instructions in the user manual.

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Documents / Resources

SILICON LABS Bluetooth Mesh SDK Embedded Software [pdf] User Guide
Bluetooth Mesh SDK Embedded Software, Mesh SDK Embedded Software, SDK Embedded Software, Embedded Software, Software

References

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