Wi-SUN SDK 1.10.2.0 GA
Gecko SDK Suite 4.4
August 14, 2024

Wireless Smart Ubiquitous Network (Wi-SUN) is the leading IPv6 sub-GHz mesh technology for smart city and smart utility applications. Wi-SUN brings Smart Ubiquitous Networks to service providers, utilities, municipalities/local government, and other enterprises, by enabling interoperable, multi-service, and secure wireless mesh networks. Wi-SUN can be used for large-scale outdoor IoT wireless communication networks in a wide range of applications covering both line-powered and battery-powered nodes.

Silicon Labs' Wi-SUN hardware is certified by the Wi-SUN Alliance, a global industry association devoted to seamless LPWAN connectivity. Wi-SUN builds upon open standard internet protocols (IP) and APIs, enabling developers to extend existing infrastructure platforms to add new capabilities. Built to scale with long-range capabilities, high-data throughput and IPv6 support, Wi-SUN simplifies wireless infrastructure for industrial applications and the evolution of smart cities.

These release notes cover SDK versions:

1.10.2.0 released August 14, 2024.
1.10.1.0 released May 2, 2024.
1.10.0.0 released April 10, 2024.
1.9.0.0 released February 14, 2024.
1.8.0.0 released December 13, 2023.

KEY FEATURES

Wi-SUN Stack
- Added support for LFN multicast reception
- Added support for non-standard PHY configurations
- Added support for blocking sockets

Wi-SUN Applications
- Wi-SUN – SoC Network Measurement improvements
- Wi-SUN – SoC (CoAP) Meter and Wi-SUN – SoC (CoAP) Collector improvements

Compatibility and Use Notices

For 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/wi-sun-protocol-stack. 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 Wi-SUN SDK, 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.

Contents

1   Wi-SUN Stack

1.1   New Items

Added in release 1.10.0.0

- Added a new API `sl_wisun_set_neighbor_table_size()` that sets the neighbor table size. Increasing the table size allows the connection of more routers, and can ease the connection of new devices, depending on the network density. This new API is trading RAM for extended capacities.

Added in release 1.9.0.0

- Added support for ETSI Adaptive Power Control. It is required to comply with Indian regional regulations.
- Improved LFNs clock drift compensation. It reduces the power consumption and the connection stability.
- Dropped the high-reliability transmission mechanism. Its use was not recommended, and it was causing a significant increase of all communications latency

Added in release 1.8.0.0

- Added a new API `sl_wisun_get_stack_version()` that returns the stack version.
- Updated `sl_wisun_join()` to support the customization of PHY configurations. Extended `sl_wisun_phy_config_type_t` and `sl_wisun_phy_config_t` to allow the customization of OFDM, FSK and O-QPSK entries.
- Added support for LFN Timing Offset (LTO). Avoid LFN broadcast and unicast overlaps.
- Added support for LFN multicast reception.
- Added support for SUN DSSS-OQPSK.
- Added support for blocking sockets.
- Added support for the new Indian PHY configurations.

1.2   Improvements

Changed In release 1.10.2.0

- Improved network stability by reducing the number of inappropriate disconnections.
- Does not fragment LPAS transmissions.

Changed In release 1.9.0.0

- Delaying the transmissions of RPL DIO to the join state 5 (Operational). Sending DIOs early was not against the specifications but could fool other joining devices into choosing us as an RPL parent when we were not ready. Upstream RPL registration messages (DAO) were returned to the joining node within an ICMPv6 Destination Unreachable error packet.

Changed in release 1.8.0.0

- Refactored the socket API. The POSIX socket API used to call Silicon Labs socket API. The logic is now reversed. Silicon Labs socket API became a wrapper around the POSIX socket API that is now exposed by the stack.
- Removed the RTOS dependencies from the libraries.

1.3   Fixed Issues

Fixed in release 1.10.2.0

ID #	Description
1301513	Fixed state transition that could skip the joins state 1 during a reconnection.
1324900	Fixed SO_NONBLOCK socket option not being handled correctly.
1322100	Ignored previous RPL parents' information when resetting a router with join state 1 acceleration disabled (discovery.allow_skip=0).

ID #	Description
1322546	Increased timeout for async frames and ensured async fragmentation is reset after a timeout on an abort.
1305036	Accepted downward frame containing an empty source routing header (SRH). Empty SRH can be sent when trying to reach a direct child. Silicon Labs stack is not sending empty SRH. It fixes an interoperability issue with competitors' border routers.
1287317	Fixed an invalid memory access in the timer and event lists.
1301286	Fixed an invalid memory access in the DHCP list in case of error when trying to connect an LFN.
1290741	Fixed RPL global repair. It was mainly visible in certification tests.
1294772	Fixed an invalid manipulation of null dwell intervals. Receiving a dwell interval equal to zero was leading to undefined behaviors.
1275243	Fixed an invalid use of a link-local as a source address in the DAO. On rare occasions, routers were using a link-local source address in the outer IPv6 header.
1258384	Fixed an invalid PAN ID filter configuration that was preventing routers from connecting to a new border router after a PAN timeout.
1255452	Do not forward link-link multicast to LFN.

Fixed in release 1.10.0.0

ID #	Description
1274619	Fixed an invalid initialization causing the number of retries sent by Wi-SUN RCP to be inconsistent. That behavior was only triggered on the RCP and was not affecting the routers.
1204449	Fixed an error that, in some rare occasions, could cause the IPv6 source routing header corruption. When corrupted, all downstream packets were lost.
1248054	Fixed an error that was causing significant transmissions delays when a multicast packet reception occurred during the transmission of asynchronous packets.
1265640	Fixed LFN clock drift compensation. It sometimes skipped and caused the LFN to disconnect.
1276039	Improved the resilience of 4-way handshake to errors. After a missing packet the joining node and the authenticator ended with a different status. One considered the procedure a success, the other a failure. The keys exchanged during the failed procedure were not deleted.
1272406	Fixed the condition upon which the MAC reset the CCA failures counter. The CCA failures counter is increased after each CCA busy event. Once the counter reaches a value of 8, it increases the retry counter by one. The CCA failures counter was only reset after a successful transmission. It is now reset after every transmission.

Fixed in release 1.9.0.0

ID #	Description
1218436	Fixed an error causing UDP sockets to be closed when receiving packets with an empty payload.
1225947	Fixed an error causing the frequency hopping to be blocked on rare occasions.
1234624	Fixed an error causing LLC messaging allocation to fail. It was caused by an invalid logic in the mac TX queue.
1252174	Fixed an error causing LFNs to use an invalid broadcast schedule after a reconnection.
1246610	Fixed an error causing LFNs reconnection to a router to fail.
1234620	Fixed an error preventing LFNs to send NS(EARO) and thus to reconnect after a given number of non-consecutive unsuccessful connection attempts.
1244154	Fixed an error causing an invalid memory access in dense topologies.
1235265	LUS-IE were sent in all LFN data frames, even when the Listen Interval did not change.
1252134 1235277	Improved the overall stability when disconnecting LFNs.

Fixed in release 1.8.0.0

ID #	Description
1212101	Fixed an error causing an assert when a device connects to network and then later re-join with a different device type.
1220872	Fixed an error causing an LFN parent to hard fault on an LFN disconnection.
1213289	Fixed an invalid variable initialization that could cause a device frame counter to be set to 0 when using IAR.
1205266	Fixed an invalid configuration preventing LFN to connect when using the Balanced or Eco modes.
1204471	Fixed an invalid initialization in MPL that was causing a multicast packet to be considered as old after a router re-connection.
1194355	Fixed an invalid time synchronization between an LFN and his FFN parent. It was causing significant drifts making downstream communications instable after a while.
1187012	The Join Metric IE was not forwarded when the join state 1 was skipped.
1168410	Fixed an error causing a LFN to be out-of-sync when no packet is exchanged for more than 1h10 (uint32 max us)
1132165	Fixed an error causing MAC retries to be skipped on rare occasions.
1014210	Fixed an error causing routers to stay on the wrong channel after performing asynchronous transmissions.
1104667	LFN are now send a Neighbor Solicitation with an EARO with a zero lifetime when disconnecting.
1182578	Wi-SUN OUI was coded with the wrong byte ordering.
1199108	Maintained and restored the DHCP Identity Association ID (IAID) across reboots.
1205932	That stack performed a CSMA/CA on asynchronous frame transmissions. This behavior is specifically forbidden in the FAN TPS.
1223417	The stack occasionally tried to send a Neighbor Advertisement (NA) as a reply to a received Neighbor Solicitation (NS) used for Neighbor Unreachability Detection (NUD). This behavior is specifically forbidden in the FAN TPS.

1.4   Known Issues in the Current Release

Issues in bold were added since the previous release.

ID #	Description	Workaround
1119464	Packets sent when FSK FEC is enabled can infringe ARIB regulation.	Until this problem has been addressed correctly, the stack will refuse to start if both ARIB enforcement and FEC are enabled.
1067978	Packets sent using a PHY with a bandwidth larger than the base PHY's bandwidth can infringe ARIB regulation.	Limit the communications when using mode switch with ARIB enforcement enabled.
1176014	FG25 asserts with a RAIL_ASSERT_FAILED_RTCC_SYNC_STALE_DATA error code when entering EM2.	Do not allow the power manager to go to EM2 by adding a requirement on EM1 in the application.

1.5   Deprecated Items

None.

1.6   Removed Items

None.

2 Wi-SUN Applications

2.1 New Items

Added in release 1.10.0.0

Wi-SUN SoC Border Router CLI

- Added a new command `set_dhcp_vendor_data` that configures vendor-specific information elements for DHCPv6 packets.

OTA DFU

- `sl_tftp_udp_get_addr_bytes()` is removed. `sl_tftp_udp_get_addr()` and `sl_tftp_udp_free_addr()` are added to allocate and free host address and port.

Added in release 1.9.0.0

Wi-SUN – RCP

- Released RCP v2.0: Must be used in pair with wsbrd v1.9 and more recent. It significantly reduces the memory footprint. The memory required to run the application no longer depends on the number of routers connected to the border router.

Wi-SUN – SoC CoAP Meter and Collector

- LFN Power Optimization: Application level actions (measure, print, RX/TX) are scheduled for the LFN wake-up events exclusively, without delay

Added in release 1.8.0.0

Wi-SUN SoC CLI

- The default values are now coming from the Wi-SUN Configurator
- FAN1.1 PHY nomenclature is now used by default.

Wi-SUN – SoC Network Measurement

- More robust iPerf client algorithm
- iPerf statistics improvement

Wi-SUN – SoC (CoAP) Meter and Wi-SUN – SoC (CoAP) Collector

- Meters now automatically send their measurements to the Collector. In the previous implantation, the Collector was polling the information on a regular basis.
- Meters advanced request modes
  - o Registration and remove request: set the destination of the meter measurements.
- LFN Profile based measurement/report schedule.

Wi-SUN – SoC TCP Server

- The application is now using blocking sockets.

CoAP Notification Service

- App Status Component provides statistic notification about the application.

OTA DFU

- Added a component option to enable or disable the automatic installation of the new firmware.

Configurable LFN Support for all the applications

- An application can be either LFN or FFN
- Documented the process to configure applications to be able to enter EM2 energy mode.

EFR32xG28 Explorer Kit Support

2.2 Fixed Issues

Fixed in release 1.10.0.0

ID #	Description
1272251	Border Router RCP: Fixed the RCP interface with the bootloader. An invalid library build configuration was causing the request to reboot in bootloader mode to be ignored.

ID #	Description
1267669	Border Router RCP: Fixed the channel configuration.
1255197	After a lost ping response, no new ping requests can be issued after recvfrom() blocks until a ping response is received. For all applications except: • Wi-SUN - CLI example • Wi-SUN - LFN CLI example • Wi-SUN - RCP
1271797	Applications using App Core: Fixed join state set to DISCONNECTED after a 'wisun disconnect' call.
1264927	Applications using Trace Util: PHY mode Id is visualized properly for the 1st channel in case of FAN 1.1 - app_wisun_get_phy_list().
1260492	Wi-SUN CoAP Meter: Fixed build issue when Resource Handler Service is enabled.
1258421	OTA DFU: Fixed host_addr misalignment.
1257028	WPC regulation print fix.

Fixed in release 1.9.0.0

ID #	Description
1231539	Border Router RCP: Fixed an error causing an hard fault after failing to decode a broadcast packet.

Fixed in release 1.8.0.0

ID #	Description
1199459	Border Router RCP: Fixed an error causing an invalid memory access. It was leading to a border router reboot and a collapse of the whole network.
1225118	Border Router SoC: Fixed an error preventing the BR to stop when started was an invalid PHY configuration.
1210967	Border Router SoC: Fixed an error causing a hard fault when connecting more than 22 routers directly to the border router SoC.
1212392	LFN Sample Applications can't enter into EM2.
1078443	iperf: Fixed an issue causing the throughput to collapse when targeting a UDP bandwidth greater than the theoretical maximum

2.3   Known Issues in the Current Release

Issues in bold were added since the previous release.

ID #	Description	Workaround
1067236	The border router RCP SPI interface is unstable when used with a throughput higher than 1 Mbytes/s	The use of border router RCP SPI interface is not recommended for the time being.
	Simplicity Studio – Network Analyzer: Wi-SUN Encrypted Packets are not supported Undecoded frames (only after Ack) according to PTI issues on Series 2	

2.4   Deprecated Items

None.

2.5   Removed Items

None.

3 Using This Release

This release contains the following:

- Wi-SUN stack library
- Wi-SUN sample applications
- Wi-SUN border router pre-compiled demos
- Documentation

If you are a first time user, see https://docs.silabs.com/wisun/latest/wisun-getting-started-overview/

3.1 Installation and Use

The Wi-SUN 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.

Simplicity Studio installs the GSDK by default in:

(Windows): C:\Users\<NAME>\SimplicityStudio\SDKs\gecko_sdk

(MacOS): /Users/<NAME>/SimplicityStudio/SDKs/gecko_sdk

Documentation specific to the SDK version is installed with the SDK.

3.2 Security Information

Secure Vault Integration

This version of the stack does not integrate Secure Vault Key Management.

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:

3.3   Support

Development Kit customers are eligible for training and technical support. Contact Silicon Laboratories support at http://www.silabs.com/support.

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