Silicon Labs OpenThread SDK 1.2.2.0 GA
Gecko SDK Suite 3.2
September 8, 2021

Thread is a secure, reliable, scalable, and upgradeable wireless IPv6 mesh networking protocol. It provides low-cost bridging to other IP networks while optimized for low-power / battery-backed operation. The Thread stack is designed specifically for Connected Home applications where IP-based networking is desired and a variety of application layers may be required.

OpenThread released by Google is an open-source implementation of Thread. Google has released OpenThread in order to accelerate the development of products for the connected home and commercial buildings. With a narrow platform abstraction layer and a small memory footprint, OpenThread is highly portable. It supports system-on-chip (SoC), network co-processor (NCP), and radio co-processor (RCP) designs.

Silicon Labs has developed an OpenThread-based SDK tailored to work with Silicon Labs hardware. The Silicon Labs OpenThread SDK is a fully tested enhanced version of the GitHub source. It supports a broader range of hardware than does the GitHub version, and includes documentation and example applications not available on GitHub.

These release notes cover SDK version(s):

1.2.2.0 released on September 8, 2021
1.2.1.0 released on July 21, 2021
1.2.0.0 released on June 16, 2021

KEY FEATURES

- Secure Vault support
- 802.15.4 multi-PAN RCP for Raspberry Pi
- Thread 1.2 (pre-compliance)
- Sub-GHz Thread (alpha)
- Updated GCC compiler version

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 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 OpenThread SDK, see Using This Release.

Compatible Compilers:

GCC (The GNU Compiler Collection) version 10.2.0, provided with Simplicity Studio.

Contents

1 New Items

1.1 New Features from OpenThread GitHub Repo

Note: The version of the OpenThread GitHub repo included with the Silicon Labs OpenThread SDK release 1.2.2.0 is the same as release 1.2.1.0.

Added in release 1.2.1.0

The Silicon Labs OpenThread SDK includes all changes from the OpenThread GitHub repo (https://github.com/openthread/openthread) up to and including commit **48b129e74**. Any features introduced between commits **cf21d5760** and **48b129e74** can be considered new items with the Silicon Labs OpenThread 1.2.1 SDK. An enhanced version of the OpenThread repo can be found in the following Simplicity Studio 5 location:

Simplicity Studio\developer\sdks\gecko_sdk_suite\<version>\util\third_party\openthread

Added in release 1.2.0.0

The Silicon Labs OpenThread SDK includes all changes from the OpenThread GitHub repo (https://github.com/openthread/openthread) up to and including commit **cf21d5760**. Any features introduced between commits **5c2ad91cf** and **cf21d5760** can be considered new items with the Silicon Labs OpenThread 1.2 SDK. An enhanced version of the OpenThread repo can be found in the following Simplicity Studio 5 location:

Simplicity Studio\developer\sdks\gecko_sdk_suite\<version>\util\third_party\openthread

1.2 New Features from OpenThread Border Router GitHub Repo

Note: The version of the OpenThread border router GitHub repo included with the Silicon Labs OpenThread SDK release 1.2.2.0 is the same as release 1.2.1.0.

Added in release 1.2.1.0

The Silicon Labs OpenThread SDK includes all changes from the OpenThread border router GitHub repo (https://github.com/openthread/ot-br-posix) up to and including commit **8751bde11**. Any features introduced between commits **c0ef5a48339** and **8751bde11** can be considered new items with the Silicon Labs OpenThread 1.2 SDK. An enhanced version of the OpenThread border router repo can be found in the following Simplicity Studio 5 location:

Simplicity Studio\developer\sdks\gecko_sdk_suite\<version>\util\third_party\ot-br-posix

Added in release 1.2.0.0

The Silicon Labs OpenThread SDK includes all changes from the OpenThread border router GitHub repo (https://github.com/openthread/ot-br-posix) up to and including commit **c0ef5a48339**. Any features introduced between commits **a37e299ff** and **c0ef5a48339** can be considered new items with the Silicon Labs OpenThread 1.2 SDK. An enhanced version of the OpenThread border router repo can be found in the following Simplicity Studio 5 location:

Simplicity Studio\developer\sdks\gecko_sdk_suite\<version>\util\third_party\ot-br-posix

Refer to section 7.3 for information on using the border router.

1.3 New Components

Added in release 1.2.1.0

Remote CLI: This component provides the remote CLI support for OpenThread coprocessors.

Added in release 1.2.0.0

Antenna Diversity: This component provides support for Antenna Diversity with OpenThread.

Coexistence: This component provides support for Wi-Fi coexistence with OpenThread.

NCP CPC: This component provides Co-Processor Communication (CPC) support for the OpenThread stack. It requires that the Open-Thread NCP component be included with the project. Currently only the OpenThread RCP stack is supported.

1.4 New Features

Added in release 1.2.0.0

Secure Vault Integration

OpenThread has been integrated with Secure Vault. Refer to Security Information for information on the keys that are protected using the Secure Vault Key Management functionality and *AN1329: Using Silicon Labs Secure Vault Features with OpenThread* for a description of how Secure Vault features are leveraged in OpenThread applications.

802.15.4 multi-PAN RCP for Raspberry Pi

Multi-PAN RCP allows for multiple OpenThread and Zigbee applications on a Linux host processor to interact with a single shared EFR32 802.15.4 Radio Co-Processor (RCP) with multi-PAN support. Each stack can use the RCP to communicate on its own 802.15.4 PAN, simultaneously and independently, as long as all PANs are on the same 802.15.4 channel. For more information refer to *AN1334: Interfacing with the Silicon Labs Multi-PAN 802.15.4 RCP – alpha.*

Thread 1.2 (pre-compliance)

All Thread 1.2 features are enabled by default in OpenThread sample applications. Refer to *AN1295: Developing with Thread 1.2* for additional information.

Sub-GHz Thread (alpha)

OpenThread applications can now operate on a proprietary sub-GHz band. Refer to *AN1350: Single-Band Proprietary Sub-GHz Support with OpenThread* for additional information.

Updated GCC compiler version

GCC version 10.2.0 is now supported.

Thread Duckhorn Features

All Thread Duckhorn features included in the OpenThread GitHub repo up to and including commit **cf21d5760** are included but are not enabled by default.

2 Improvements

None

3   Fixed Issues

Fixed in release 1.2.2.0

ID #	Description
714047	Fix some edge cases around allowing sample applications to build without CLI.
722725	Increase the performance of AES crypto operations on EFR32MG21 RCP images.
730680	Address unexpected termination of the Co-Processor Communication Daemon.
731184	When using a host processor in combination with the Co-Processor Communication Daemon, delays in the communication between the host and the RCP can cause issues with the nodes' ability to communicate reliably on the Thread network.

Fixed in release 1.2.1.0

ID #	Description
714047	Allow building of sample applications without CLI.
715488	ot-ble-dmp sample app can occasionally become unresponsive.
716139	"coexistence get-pta-options" cli command disconnects ot-rcp application from OpenThread Border Router.
723248	Replace OPENTHREAD_CONFIG_MLE_LINK_METRICS_ENABLE with OPENTHREAD_CONFIG_MLE_LINK_METRICS_INITIATOR_ENABLE and OPENTHREAD_CONFIG_MLE_LINK_METRICS_SUBJECT_ENABLE.

Fixed in release 1.2.0.0

ID #	Description
636888	Bad RX packet length causes assert.
650113	Thread Test Harness Leader Test 9.2.5 fails.
653070	Coexistence Component: "PWM on Request" not currently working. Request, Grant, and Priority are held high.
655515	otPlatRadioGetTransmitPower does not return correct value.

4 Known Issues in the Current Release

Issues in bold were added since the previous release. If you have missed a release, recent release notes are available on https://www.si-labs.com/products/software.

ID #	Description	Workaround
482915 495241	A known limitation with the UART driver can cause characters to be lost on CLI input or output. This can happen during particularly long critical sections that may disable interrupts, so it can be alleviated by repeating the CLI or waiting long enough for state changes.	No known workaround
703615	If the RCP is taken offline, the OTBR doesn't recover	No known workaround
714451 731194	Issues with promptness and accuracy of enhanced ACKs to CSL children	No known workaround
726857	Intermittent failure to transmit multicast packets from SOC	No known workaround

5 Deprecated Items

As of SDK version 1.2.0.0, Thread 1.2 is the default for all sample applications. *AN1295: Developing with Thread 1.2* is no longer applicable and will be removed from the SDK in December 2021.

6   Removed Items

None

7 Using This Release

This release contains the following

- Silicon Labs OpenThread stack
- Silicon Labs OpenThread sample applications
- Silicon Labs OpenThread border router

For more information about the OpenThread SDK see QSG170: Silicon Labs OpenThread QuickStart Guide. If you are new to Thread see UG103.11: Thread Fundamentals.

7.1 Installation and Use

A registered account at Silicon Labs is required in order to download the Silicon Labs OpenThread SDK. You can register at https://sili-conlabs.force.com/apex/SL_CommunitiesSelfReg?form=short.

Stack installation instruction are covered in the Simplicity Studio 5 online User's Guide.

Use the OpenThread SDK v1.x with the Silicon Labs Simplicity Studio 5 development platform only. The SDK is not compatible with Simplicity Studio 4.

Documentation specific to the SDK version is installed with the SDK. API references and other information about this release are available on https://docs.silabs.com/openthread/1.2/.

7.2 Using the Border Router

For ease of use, Silicon Labs recommends the use of a Docker container for your OpenThread border router. Please refer to AN1256: Using the Silicon Labs RCP with the OpenThread Border Router for details on how to set up the correct version of OpenThread border router Docker container. It is available at https://hub.docker.com/r/siliconlabsinc/openthread-border-router.

The Silicon Labs OpenThread RCP is meant for use with the OpenThread border router built using the ot-br-posix repository (git commit **8751bde11**). Our copy of the OpenThread stack (git commit **48b129e74**) should be symbolically linked under "third_party\open-thread\repo" in the ot-br-posix repository.

For your convenience we have included copies of these repositories in the GSDK, located here:

Simplicity Studio\developer\sdks\gecko_sdk_suite\<version>\util\third_party\ot-br-posix

Simplicity Studio\developer\sdks\gecko_sdk_suite\<version>\util\third_party\openthread

If you are manually installing a border router, using the copies provided above is recommended. Refer to AN1256: Using the Silicon Labs RCP with the OpenThread Border Router for more details.

Although updating the border router environment to a later GitHub version is supported on the OpenThread website, it may make the border router incompatible with the OpenThread RCP stack in the SDK.

7.3 NCP/RCP Support

The OpenThread NCP support is included with OpenThread SDK but any use of this support should be considered experimental. The OpenThread RCP is fully implemented and supported.

7.4   Security Information

Secure Vault Integration

When deployed to Secure Vault High devices, sensitive keys are protected using the Secure Vault Key Management functionality. The following table shows the protected keys and their storage protection characteristics.

Wrapped Key	Exportable / Non-Exportable	Notes
Thread Master Key	Exportable	Must be exportable to form the TLVs
PSKc	Exportable	Must be exportable to form the TLVs
Key Encryption Key	Exportable	Must be exportable to form the TLVs
MLE Key	Non-Exportable	
Temporary MLE Key	Non-Exportable	
MAC Previous Key	Non-Exportable	
MAC Current Key	Non-Exportable	
MAC Next Key	Non-Exportable	

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

Wrapped 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.

7.5   Support

Development Kit customers are eligible for training and technical support. Use the [Silicon Laboratories Thread web page](#) to obtain information about all Silicon Labs OpenThread products and services, and to sign up for product support.

You can contact Silicon Laboratories support at http://www.silabs.com/support.

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Silicon Laboratories Inc.
400 West Cesar Chavez
Austin, TX 78701
USA

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