



Zigbee EmberZNet SDK 7.0.2.0 GA

Gecko SDK Suite 4.0

March 9, 2022

Silicon Labs is the vendor of choice for OEMs developing Zigbee networking into their products. The Silicon Labs Zigbee platform is the most integrated, complete, and feature-rich Zigbee solution available.

Silicon Labs EmberZNet SDK contains Silicon Labs' implementation of the Zigbee stack specification.

These release notes cover SDK version(s):

- 7.0.2.0 released March 9, 2022
- 7.0.1.0 released January 26, 2022
- 7.0.0.0 released December 15, 2021



KEY FEATURES

- EFR32MG24 support
- Integrated with Gecko Platform component-based architecture.
- 802.15.4 Radio Co-Processor (RCP)
- RCP Host for Raspberry Pi (Docker image)

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/zigbee-emberznet>. 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 Zigbee EmberZNet 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.

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1 New Items

Along with the release of Simplicity Studio 5, Silicon Labs introduced a complete update to its Simplicity Studio tool suite, as well as a new, component-based Gecko Platform architecture. Version 7.0 of the Zigbee EmberZNet SDK has been updated to take advantage of this new structure. With SSv5 and GSDK v4.0, Zigbee developers will benefit from the following component-based project configuration features:

- Search and filter to find and discover software components that work with the target device
- Automatically pull in all component dependencies and initialization code
- Configurable software components including peripheral inits, drivers, middleware, and stacks
- All configuration settings in C header files for usage outside of Simplicity Studio
- Configuration validation to alert developers to errors or issues
- Easily manage all project source via git or other SCM tools
- Managed migration to future component and SDK versions
- Simplified transitions from Silicon Labs development kits to custom hardware

For Zigbee, instead of configuring project functionality through Application Builder (AppBuilder) plugins, equivalent functionality is now available through Zigbee stack or platform components and configuration tools such as Project Configurator and Zigbee Cluster Configurator.

1.1 New APIs

New in release 7.0.2.0

`emberSetChildData()` and `EZSP_SET_CHILD_DATA`: This API sets the EUI64, node ID, and node type of the child at the provided index in nonvolatile memory.

`emberSetNeighborFrameCounter()` and `EZSP_SET_NEIGHBOR_FRAME_COUNTER` : This API sets the frame counter for the specified neighbor or child.

`emberSetPowerDescriptor()`: This API is added to set the power descriptor to the specified value. The power descriptor is a dynamic value, therefore this function should be called whenever the value changes.

`emberSetRadioIeee802154CcaMode()`: This API configures the CCA mode to one of the following values:

- `RAIL_IEEE802154_CCA_MODE_RSSI = 0`,
- `RAIL_IEEE802154_CCA_MODE_SIGNAL`,
- `RAIL_IEEE802154_CCA_MODE_SIGNAL_OR_RSSI`,
- `RAIL_IEEE802154_CCA_MODE_SIGNAL_AND_RSSI`,
- `RAIL_IEEE802154_CCA_MODE_ALWAYS_TRANSMIT`

New in release 7.0.1.0

`void sl_set_passive_ack_config(sl_passive_ack_config_enum_t config, uint8_t minAcksNeeded);` allows the higher layers to control the broadcast behavior of a routing device. The originating device will rebroadcast the maximum number of times. The configurations below only restrict the number of broadcasts from neighboring routers.

The configuration settings must be done on each node.

Parameters passed to the API:

config of the type `sl_passive_ack_config_enum_t`

`SL_PASSIVE_ACK_DEFAULT_CONFIG` - All non-originating configured nodes check for passive acks from all neighbors. If no passive acks received, they will rebroadcast max times.

`SL_PASSIVE_ACK_DISABLE` - Disable passive ack. All configured nodes rebroadcast the incoming processed broadcast the maximum configured number of times.

SL_PASSIVE_ACK_THRESHOLD_WITH_REBROADCAST - All non-originating configured nodes check for passive acks from `minAcksNeeded` neighbours. They will rebroadcast the received message at least once, even if all passive acks have been received. If no passive acks are received, they will rebroadcast `max` times.

SL_PASSIVE_ACK_THRESHOLD_NO_REBROADCAST - All non-originating configured nodes check for passive acks from `minAcksNeeded` neighbours. They will not rebroadcast the received message if all passive acks have been received. If no passive acks are received, they will rebroadcast `max` times.

`minAcksNeeded` The minimum number of acknowledgments (re-broadcasts) to wait for until deeming the broadcast transmission complete.

New in release 7.0.0.0

For an extensive list of new APIs in this release, refer to Zigbee Stack API documentation and Zigbee Application Framework API documentation on <https://docs.silabs.com/>.

Command Line Interface (CLI)

Zigbee migrated to the new/unified CLI system. All `emberXXXArgument()` APIs are changed to `sl_cli_XXX_argument_XXX()` APIs (e.g., `emberCommandArgumentCount()` → `sl_cli_get_argument_count()`). Refer to the `sl_cli.h` header file and its documentation for available CLI command APIs.

In the newly integrated CLI, hexadecimal string and ASCII string arguments have dedicated types. These arguments can be retrieved using the related APIs `sl_cli_get_command_string()` and `sl_cli_get_argument_hex()`. See `sl_cli.h` for more information.

Event System

A new event queue system has been introduced.

Application event initialization should be initiated using the `sl_zigbee_event_init()` API.

All `emberEventControlXXX()` APIs are now removed and `sl_zigbee_event_XXX()` APIs should be used in their place (e.g., `emberEventControlSetActive()` → `sl_zigbee_event_set_active()`). Refer to the `zigbee_app_framework_event.h` header file and its documentation for available event APIs.

All `emberEventXXX()` APIs are now removed and `sl_zigbee_event_XXX()` APIs should be used in their place (e.g., `emberEventSetDelayMs()` → `sl_zigbee_event_set_delay_ms()`). Refer to the `zigbee_app_framework_event.h` header file and its documentation for available event APIs.

Application Framework

All `EMBER_AF_PLUGIN_<PluginName>` (e.g. `EMBER_AF_PLUGIN_ADDRESS_TABLE`) macros are now removed and replaced by `SL_CATALOG_ZIGBEE_<PluginName>_PRESENT` (e.g., `SL_CATALOG_ZIGBEE_ADDRESS_TABLE_PRESENT`).

1.2 New Platform Support

New in release 7.0.2.0

Added support for BRD4186C, BRD4187C, BRD4188B and BRD2601B boards.

New in release 7.0.0.0

Added support for BRD4186B, BRD4187B, and BRD4188A boards.

1.3 New Documentation

All components have documentation available. If you have an issue seeing the documentation when you select the component in Project Configurator, you can find it here: <http://docs.silabs.com/zigbee/7.0>

New in release 7.0.2.0

AN1323: Configuring Antenna Diversity for Zigbee EmberZNet 7.0 and Higher

New in release 7.0.0.0

New software documentation available through Simplicity Studio's Documentation page includes:

- AN1301: Transitioning from Zigbee EmberZNet SDK 6.x to SDK 7.x
- AN1322: Dynamic Multiprotocol Development with Bluetooth and Zigbee EmberZNet SDK 7.0 and Higher
- AN1325: Zigbee Cluster Configurator User's Guide
- AN1333: Running Zigbee, OpenThread, and Bluetooth Concurrently on a Linux Host with a Multiprotocol RCP
- QSG180: Zigbee EmberZNet Quick-Start Guide for SDK 7.0 and Higher
- UG491: Zigbee Application Framework Developer's Guide for SDK 7.0 and Higher

2 Improvements

2.1 Supported Applications

Changed in release 7.0.0.0

The following applications are supported for in the current release:

SoC Applications

DynamicMultiprotocolLight – A light application using dynamic multiprotocol (Zigbee + Bluetooth LE).

DynamicMultiprotocolLightSed – A sleepy end device application using dynamic multiprotocol (Zigbee + Bluetooth LE).

GPD Switch – A Green Power switch application.

GPD Sensor – A Green Power sensor device application.

StandardizedRfTesting – Sample application demonstrating RF testing through TIS (Total Isotropic Sensivity) / TRP (Total Radiated Power) interfaces.

Z3Light – A Zigbee 3.0 Light application.

Z3Switch – A Zigbee 3.0 Switch application

Z3SwitchWithVoice – A Zigbee 3.0 Switch application with extended voice recognition functionality.

Z3LightGPCombo – A Z3light application that demonstrates functionality of a Green Power combo device with proxy and sink instances together in one application.

ZigbeeMinimal – A Zigbee minimal network-layer application suitable as a starting point for new application development.

NCP Applications

NCP UART with HW flow control – Network coprocessor (NCP) application that supports communication with a host application over a UART interface with hardware flow control.

NCP UART with HW flow control for GP Multi-RAIL – NCP UART application with multi-RAIL library enabled for application-specific Green Power gpdf transmission scheduling.

NCP SPI – Network coprocessor (NCP) application that supports communication with a host application over an SPI interface.

Multi-PAN NCP UART with HW flow control – Provides support for forming two personal area networks on the same channel on a single radio. This multi-PAN network coprocessor (NCP) application supports communication with a host application over a UART interface with hardware flow control.

Multi-PAN NCP SPI – Provides support for forming two personal area networks on the same channel on a single radio. This multi-PAN network coprocessor (NCP) application supports communication with a host application over a SPI interface.

xNCP LED NCP – An NCP application for communicating with a UNIX HOST using custom EZSP commands. This application is meant to be used with the HOST sample application XncpLedHost.

Host Applications

XncpHost – Serves as a template for XNCP HOST functionality.

XncpLedHost – A HOST application for communicating with an NCP application using custom EZSP commands. Meant to be used with the **xNCP LED NCP** application.

Z3Gateway – A Zigbee 3.0 Gateway application.

Z3GatewayGPCombo – A Zigbee 3.0 Gateway application with Green Power Combo gateway functionalities.

ZigbeeMinimalHost – The host version of the Zigbee minimal application.

MpZ3TcCustomTcHost – A Multi-PAN application with a Zigbee 3.0 Trust Center with security and a Custom Trust Center without security. Meant to be used with the Multi-PAN NCP application.

2.2 Changed APIs

Changed in release 7.0.0.0

For an extensive list of changed APIs in this release, refer to Zigbee Stack API documentation and the Zigbee Application Framework API documentation.

The following public stack APIs have changed

- `emberMarkApplicationBuffers` to `emberMarkBuffersHandler`
- `emberPacketHandoffIncoming` to `emberPacketHandoffIncomingHandler`
- `emberPacketHandoffOutgoing` to `emberPacketHandoffOutgoingHandler`

Additionally, the following public stack handlers have changed:

- `emberMarkApplicationBuffers` to `emberMarkBuffersHandler`
- `emberPacketHandoffIncoming` to `emberPacketHandoffIncomingHandler`
- `emberPacketHandoffOutgoing` to `emberPacketHandoffOutgoingHandler`

Furthermore, all stack handlers are now consumed by the **Zigbee Application Framework Common** component. For every stack handler a corresponding application-level callback is provided. For example, the application can implement `emberAfScanCompleteCallback` instead of `emberScanCompleteHandler`.

An exception to the rule above is `emberOverrideAppendSourceRouteHandler`: the application can implement `emAfOverrideAppendSourceRouteCallback` instead.

See `zigbee_app_framework_callback.h` for more information on stack callbacks.

Event APIs: A GUI-supported way of adding events at compile time is no longer needed. In this release, the events can be added to the embedded code at runtime through API calls. See `zigbee_app_framework_event.h` for more details.

Command Line Interface (CLI): In the newly-integrated CLI, hexadecimal string and ASCII string arguments have dedicated types. These arguments can be retrieved using the related APIs `sl_cli_get_command_string()` and `sl_cli_get_argument_hex()`. See `sl_cli.h` for more information.

2.3 Other Improvements

Changed in release 7.0.2.0

Configuring CCA mode

- The 802.15.4 CCA mode is now set up at startup by the Zigbee stack. The default CCA mode is defined by `EMBER_RADIO_802154_CCA_MODE`, which defaults to `RAIL_IEEE802154_CCA_MODE_RSSI`. The user may override this value by defining `EMBER_RADIO_802154_CCA_MODE` during compilation. For information on CCA modes, see documentation on `RAIL_IEEE802154_CcaMode_t`.
- A new CLI has been added to configure 802.15.4 CCA mode in the radio. See documentation regarding `config-cca-mode`.
- A new API has been added to configure the 802.15.4 CCA mode in the radio. See documentation regarding `emberSetRadioIeee802154CcaMode`.

Dynamic Multiprotocol-Related Improvements

- DMP Sample applications do not include the stack diagnostics component by default

Changed in release 7.0.0.0

Dynamic Multiprotocol-Related Improvements

- The Bluetooth RTOS task is created independently of the Zigbee RTOS task and therefore, all the former Bluetooth LE plugin options are now under the **Bluetooth Core** RTOS and stack components.
- The ability to enable Application RTOS tasks using the project IDE is no longer provided. For an example of implementing an Application task, see how the Zigbee RTOS task is created in the `zigbee_app_framework_common_rtos.c` file. Caution: Application tasks must have a lower priority than Zigbee and Bluetooth LE tasks to ensure proper functioning.
- These sample applications now support both general radio boards leveraging the LCD support as well as module boards without LCD support.

Stack Callback Subscription

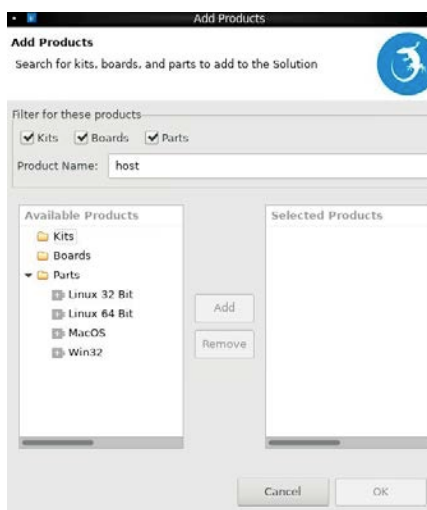
A number of callbacks and handlers have been removed in favor of using the new stack callback subscription mechanism (for an extensive list refer to the [Removed Items](#) section or the **Form and Join Library**, **Network Find** and **ZLL Commissioning Network** component descriptor files).

Trust Center Network Key

The Trust center network key update period is now configurable in minutes and its maximum value is limited to 35791, which is a little more than 24 days.

Host Support

Host device support is now available. An appropriate host device must be selected in Simplicity Studio in order to enable host support for your corresponding host device. In the My Products view, type 'host' or click + to open the Add Products dialog. The host device is now searchable and selectable.



NCP Memory Allocation

The ability to increase NCP memory allocation sizes at run-time with EZSP commands from the host was incompatible with the SLC architecture and has been removed. The sizes may still be decreased at run-time by host in order to adjust the configuration. When configuring the NCP application all settings must be set to the max that the host will require.

The affected configuration items are:

EZSP Configuratio ID	NCP Config #define	#define location
EZSP_CONFIG_BINDING_TABLE_SIZE	EMBER_BINDING_TABLE_SIZE	sl_zigbee_binding_table_config.h
EZSP_CONFIG_KEY_TABLE_SIZE	EMBER_KEY_TABLE_SIZE	sl_zigbee_security_link_keys_config.h
EZSP_CONFIG_SOURCE_ROUTE_TABLE_SIZE	EMBER_SOURCE_ROUTE_TABLE_SIZE	sl_zigbee_source_route_config.h
EZSP_CONFIG_MAX_END_DEVICE_CHILDREN	EMBER_MAX_END_DEVICE_CHILDREN	sl_zigbee_pro_stack_config.h
EZSP_CONFIG_NEIGHBOR_TABLE_SIZE	EMBER_NEIGHBOR_TABLE_SIZE	sl_zigbee_pro_stack_config.h
EZSP_CONFIG_APS_UNICAST_MESSAGE_COUNT	EMBER_APS_UNICAST_MESSAGE_COUNT	sl_zigbee_pro_stack_config.h
EZSP_CONFIG_MULTICAST_TABLE_SIZE	EMBER_MULTICAST_TABLE_SIZE	Project Configuration
EZSP_CONFIG_ROUTE_TABLE_SIZE	EMBER_ROUTE_TABLE_SIZE	Project Configuration
EZSP_CONFIG_DISCOVERY_TABLE_SIZE	EMBER_DISCOVERY_TABLE_SIZE	Project Configuration
EZSP_CONFIG_BROADCAST_TABLE_SIZE	EMBER_BROADCAST_TABLE_SIZE	sl_zigbee_pro_stack_config.h
EZSP_CONFIG_MAC_FILTER_TABLE_SIZE	EMBER_CUSTOM_MAC_FILTER_TABLE_SIZE	Project Configuration
EZSP_CONFIG_ADDRESS_TABLE_SIZE	EMBER_ADDRESS_TABLE_SIZE	Project Configuration
EZSP_CONFIG_TRUST_CENTER_ADDRESS_CACHE_SIZE	included in address table size	see note below
EZSP_CONFIG_SUPPORTED_NETWORKS	EMBER_SUPPORTED_NETWORKS	Project Configuration
EZSP_CONFIG_PACKET_BUFFER_COUNT	EMBER_PACKET_BUFFER_COUNT	sl_zigbee_pro_stack_config.h

Items marked "Project Configuration" are set to defaults in ember-configuration-defaults.h. These can be overridden by adding a #define to the project configuration.

The total space allocated for the sum of EZSP_CONFIG_ADDRESS_TABLE_SIZE and EZSP_CONFIG_TRUST_CENTER_ADDRESS_CACHE_SIZE is EMBER_ADDRESS_TABLE_SIZE + 4.

Smart Energy (2.4GHz Only)

Smart Energy support for 2.4 GHz devices is now available. Smart Energy support for multi-MAC switch coordinator and for multi-MAC selection end devices will be available in the future.

Command Line Password Protection

Password protection for CLI is now available. The feature is not backward-compatible.

Application Framework Improvements

af-main-host.c, *af-main-soc.c* and *af-main-common.c* files are now replaced by *af-host.c*, *af-soc.c* and *af-common.c* files.

Callback selection in a project is no longer done through Simplicity Studio's AppBuilder, but rather relies on direct implementation of the callback functions in the project source files.

Command Line Interface

Idle-Sleep CLI commands now enable overriding sleep mode.

Price Server Tariff Matrix

Price server tariff matrix support is moved to a separate component called **Price Server Tariff Matrix**. Include this component for Price server tariff matrix support and its CLI access.

Simple Metering Server

Test meter and meter error functionalities from the **Simple Metering Server** component are moved to **Simple Metering Server Test Meter** component. Install this component along with the **Simple Metering Server** component to enable those additional functionalities.

3 Fixed Issues

Fixed in release 7.0.2.0

ID #	Description
446827	Fixed issue where code may have gotten stuck in an infinite loop in the function edgeGpioDevice in file spi-protocol-linux.c
483654	This was a cosmetic change to edit a print statement to make it applicable to both centralized and distributed network creator complete callbacks (emberAfPluginNetworkCreatorCompleteCallback).
484812	Resolved issue with joining a distributed network when network steering has "Optimize Scans" and "Try all keys at once" options both enabled.
748846	<p>We now allow the MAC Capability field of Device Announce messages to dynamically update power source-related subfields in device announce. Whereas previously Capability field values were derived with respect to the Zigbee Device type (Coordinator, Router, End Device, Sleepy End Device), now the bit indicating whether the device is connected to a main power supply is updated in response to changes in the ZDO Power Descriptor. When the Power Descriptor is changed (via the new emberSetPowerDescriptor API in stack-info.h) the device checks to see if the state of the "On Main Power" subfield of the descriptor has changed with respect to the corresponding value in the Capability field. If the update to the Power Descriptor changes the state of the On Main Power indication, the updated Device Capabilities will be cached in RAM and returned on subsequent field accesses.</p> <p>These values are not persisted across reboot, and it is the responsibility of the application to ensure that the Power Descriptor is kept up to date to reflect the current device state.</p> <p>The long-term guidance for users developing applications with non-standard power configurations (i.e., non-sleepy devices with battery power) is to use the ZCL Power Cluster and its associated attributes and commands rather than the stack-level messages and ZDO interfaces. Use of the Cluster interfaces to set and a query Power configuration of devices will likely result in a more consistent experience, and a more straightforward path through device testing and certification.</p>
752378 754668	Sending random or custom test messages with the manufacturing library in Host-NCP environment is now stable.
756924	Increased size of SL_ZIGBEE_TRANSIENT_DEVICE_MGMT_MAX_CAPACITY table to 64 from its previous default of 10 to permit more devices to join the network at one time.
757045	Modified certain Green Power messages to adhere to the new specification version that requires setting the "disable default-response" bit. Commands affected include pairing search, tunneling stop, translation table update, pairing configuration, sink table request, proxy table response, notification response, sink table response, and proxy table request command headers.
758132	Fixed issue that would cause Usage fault during the OTA upgrade if EBL verification was enabled.
758183	The slowness issue of OTA updates has been fixed for NCP UART HW.
759731	An issue has been fixed where Host apps can now be built on macOS Version 10.15 and later.
759998	Fixed zone status and zone type variable types in emberAfPluginIasZoneClientReadAttributesResponseCallback from uint8_t to uint16_t.
773901	Machine Learning Depthwise Conv2D MVP kernel will now check input tensor stride to correctly detect out-of-range values.
778787	The CMSIS parser issue while opening the zigbee ncp component configuration is resolved.
811011	The TensorFlow Lite Micro flatbuffer converter now only runs conversion for the alphabetically first model if there are multiple .tflite files in the config/tflite directory. The generated content is prefixed with "sl_tflite_model".
811336	Fixed issue with the configuration of sleep mode when "Stay awake when not joined" is set to false in bare-metal sleepy applications.
811489	Fixed issue where a malformed packet resulted in an assert.
812026	The issue of missing emberGetSenderEui64() and emberAfNcpNeedsReset() for host apps has been fixed.

ID #	Description
812041	The issue of missing "endpoint", "security", "interpan" and "events" CLI commands has been fixed with the following changes: <ul style="list-style-type: none"> * The "endpoint" CLI command has been renamed to "endpoints" due to a conflict with another CLI command. * The "security"-related CLI commands remain the same as before. * The "interpan"-related CLI commands are now moved to the zigbee_interpan.slcc component and under the "plugin" CLI group. * The "events" CLI command now outputs a new format due to the new event system. Only scheduled events are shown in the following format: "event_name : nwk_index : endpoint_index : time". nwk_index will be shown for network events and endpoint_index will be shown for endpoint events.
814293	The "Gas Proxy Function" component did not properly subscribe to some ZCL clusters, specifically "Price Client", "Messaging Client" and "Simple Metering Client", resulting in corresponding implemented ZCL commands not being dispatched to the gas proxy component. This is now fixed, the component correctly handles all the ZCL commands it is expected to handle.
815110	Fixed argument type on DMP apps for the CLI command to discover GATT characteristics.
816274	An issue has been fixed where an NCP application with the Debug Extended component calls emberDebugPrintf and no messages are observed in Network Analyzer. Any calls to emberDebugPrintf on the NCP will now be observed in Network Analyzer.

Fixed in release 7.0.1.0

ID #	Description
82569	An issue has been fixed where RAM corruption (in Packet Buffers) could have occurred if MAC Filter Match List Size was non-zero and a list of the maximum size was provided to ezspSetValue for EZSP_VALUE_MAC_FILTER_LIST.
119939	APS ACK for ZDO IEEE request, sent by the parent on behalf of its sleepy end device child, SHALL have the EUI64 of the end device child if the source IEEE address option bit in the header is set. An issue has been fixed where the parent would incorrectly respond with the APS ACK using the short ID of the child but long ID of the parent, which would cause network confusion and a route error.
434616	An issue has been fixed where a Trust Center Link Key between the Trust Center and another device does not match on both devices. This scenario can happen when the Trust Center has no room in the key table and a device requests to update its Trust Center Link Key. The Trust Center would previously send an updated key, but would not save that key, hence the mismatch. The Trust Center now correctly does not answer the request to update the link key when no space is available in the table.
670459	When the mfglibSetSynOffset() API is used, the compilation error about "undefined reference to emSynthFreqOffset" has been fixed.
702666	Fixed issue where a malformed packet resulted in an assert.
722636	Fixed an issue where the mfgLibRxHandler handler was not called upon receiving 802.15.4 ACK.
738100	An issue has been fixed where an array index validation check against the Green Power proxy table size was missing for one of the paths to access the Green Power proxy table member. This led to a crash reported while processing the Green Power Pairing Configuration command with options "Remove Pairing" and when the communication mode was "Derived Group Cast" mode.
740993	Modified Micrium OS Kernel's default configurations in order to reduce the footprint. By default, disabled DWT to reduce the likeliness of it being available as an attack vector.
746353	Fixed an issue with run.sh (e.g. used with MultiPan RCP/Zigbeed containers) in which systemd dependencies were not being started correctly. The fix is to use the 'systemctl' command rather than the 'service' command.
755002	Template revised to ensure that all elements of generated cluster function structure array are fully and explicitly initialized.
755817	CLI command for print-counter-type has been moved from "plugin counter" to "plugin counters" group.
759629	An issue has been fixed whereby the Network Creator component allowed the user to input invalid power values. The user is now warned if the power value is invalid.
760176	An issue was resolved where the Z3Gateway host application experienced high CPU load.

ID #	Description
760323	An issue has been fixed in which zigbeed returned an EZSP error for EZSP_GET_MFG_TOKEN and EZSP_SET_MFG_TOKEN frames. This caused the app framework host applications to send a reset command. In particular, the Z3Gateway 'info' command caused zigbeed to reset.
760785	The ZCL Default Response Policy setting has been changed from "always" to "conditional" for the following Zigbee sample applications, consistent with their configurations prior to SDK 4.0.0 / EmberZNet 7.0.0: Z3ColorControlLight, Z3DoorLockWithWwah, Z3LightWithWwah, Z3SleepyDoorLockWithWwah.
760808	Setting EZSP_CONFIG_RETRY_QUEUE_SIZE to a value larger than the NCP's EMBER_RETRY_QUEUE_SIZE will now explicitly fail with EZSP_ERROR_INVALID_VALUE status.
764613	Added functionality to count MVP programs executed in the MVP driver (sl_mvp.c). The tensorflow_model_profiler application will now also profile MVP program count.
772021	Proactive and defensive code changes to parenthesize arguments of certain function-like macros in the macro expansion. No known adverse behavior.
772252	Machine Learning Conv2D MVP kernel will now work correctly on input tensors with large (>1024) depth.

Fixed in release 7.0.0.0

ID #	Description
488977 702802	An issue has been fixed where the Slot Manager utility would fail to boot Zigbee applications from storage slots on EFR series 2 devices. A previous workaround existed for changing the SLOT_MANAGER_VERIFICATION_CONTEXT_SIZE macro, but that workaround is no longer needed with this fix.
687144	When selecting the "Record LQI and RSSI for each neighbor" option in the Stack Diagnostics component, the Packet Handoff component is enabled before LQI and RSSI values are recorded.
742744	Zigbee host applications now show by default in Studio.
754282	Fixed an issue to automatically enable command discovery when enabling a new ZCL cluster component.
760759	An issue has been fixed where certain modules, such as MGM210, can be used to generate and build an application that uses LEDs and buttons, such as DynamicMultiprotocolLight. Apps that use these peripherals are not supported for modules that lack dedicated lines for using both buttons and LEDs.

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.silabs.com/developers/zigbee-emberznet> in the Tech Docs tab.

ID #	Description	Workaround
N/A	The following apps/components are not supported in this release <ul style="list-style-type: none"> Smart Energy multi-MAC switch coordinator Smart Energy multi-MAC selection NCP UART with SW flow control NCP Sleepy EM4 support 	Features will be enabled in subsequent releases.
135649	Multi-networking can cause APS frame counter confusion between networks.	Use <code>emberAfSecurityInitCallback</code> to add <code>EMBER_NO_FRAME_COUNTER_RESET</code> to <code>EmberInitialSecurityBitmask</code> .
266341	Z3 Light sample app has two endpoints that support similar cluster commands, so duplicate responses may be generated for certain commands.	No known workaround
271644	A device that performs a classic join to a legacy ZLL gateway may eventually leave the network on its own initiative.	No known workaround
278063	Smart Energy Tunneling plugins have conflicting treatment/usage of address table index	No known workaround
281832	Green Power Common plugin incorrectly formats <code>groupList</code> and <code>groupListCount</code> parameters of GP Pairing Configuration frame.	No known workaround
289569	Network-creator plugin power level picklist doesn't offer full range of supported values for EFR32	No known workaround
295498	UART reception sometimes drops bytes under heavy load in Zigbee+BLE DMP use case	Use hardware flow control or lower the baud rate.
312291	EMHAL: The <code>halCommonGetIntxxMillisecondTick</code> functions on linux hosts currently use the <code>gettimeofday</code> function, which is not guaranteed to be monotonic. If the system time changes, it can cause issues with stack timing.	Modify these functions to use <code>clock_gettime</code> with the <code>CLOCK_MONOTONIC</code> source instead.
331438	Service discovery may time out too quickly in busy networks.	Define <code>EMBER_AF_DISCOVERY_TIMEOUT_QS</code> to customize the timeout period.
356937	Read/write attribute CLI commands do not support manufacturer-specific ZCL attributes. Some implementations may allow local CLI debug access to display or modify these attributes.	Access the attributes from a remote device in the network via ZCL global <code>Read/WriteAttributes</code> commands.
363162	There is a bug in <code>emberAfAddAddressTableEntry</code> which could allow for duplicate entries in the address table	Under Investigation
387750	Issue with Route Table Request formats on end device.	Under Investigation
398694	Disabling endpoint 2 (Touchlink) in the Z3Light sample app causes high <code>emberRunTask</code> execution time.	Under Investigation
400418	A touchlink initiator cannot link to a non-factory-new end-device target.	Under Investigation
424355	A non-factory-new sleepy end device touchlink target-capable initiator is not able to receive a device information response in certain circumstances.	Under Investigation

ID #	Description	Workaround
437704	The OccupiedCoolingSetpoint attribute should be optional by default in Appbuilder.	Modify the "optional" flag from false to true in the OCCUPIED_COOLING_SETPOINT attribute in app/zcl/ha.xml
442664	In a dense network with many devices joining simultaneously, a packet buffer assert is sometimes seen when collecting beacons during network steering.	No known workaround
456350	"emberAfPluginIasZoneClientReadAttributesResponseCallback" in "ias-zone-client.c" incorrectly sets the type of "zoneStatus" and "zoneType" attributes to uint8_t. The correct type should be uint16_t.	Modify the type of these two attributes to "uint16_t" in "emberAfPluginIasZoneClientReadAttributesResponseCallback".
465180	The Coexistence Radio Blocker Optimization item "Enable Runtime Control" may block proper Zigbee operation.	Optional 'Wi-Fi Select' Control of Blocker Optimization should be left "Disabled".
468581	ZCL attribute tokens creator codes are likely to change if you add or remove one or more attributes. For instance, if you add an attribute whose cluster ID or attribute ID is not the largest numerically, then this attribute gets inserted into a list of creator codes and makes all creator codes after it to be different (shifted).	Use the script at https://github.com/SiliconLabs/IoT_Utility_Scripts/tree/master/token_preserver to fix this issue.
480550	The OTA cluster has its own built-in fragmentation method, hence it should not use APS fragmentation. Although, in case APS encryption is enabled it grows the payload of the ImageBlockResponses to a size where the APS fragmentation is activated. This could lead to the OTA process failing.	No known workaround
481128	Detailed Reset Cause and crash details should be available by default via the Virtual UART (Serial 0) on NCP platforms when Diagnostics plugin and Virtual UART peripheral are enabled.	Since Serial 0 is already initialized in the NCP, customers can enable the emberAfNcpInitCallback in the Zigbee NCP Framework and call the appropriate diagnostic functions (halGetExtendedResetInfo, halGetExtendedResetString, halPrintCrashSummary, halPrintCrashDetails, and halPrintCrashData) in this callback to print this data to Serial 0 for viewing in the Network Analyzer capture log. For an example of how to use these functions, refer to the code included in af-main-soc.c's emberAfMainInit() when EXTENDED_RESET_INFO is defined.
481618	The "Network Open Time" option of the Network Creator Security plugin may not work as expected when you open network if the time does not match the transient key timeout.	Set the Network Open time to the same value as the Transient Key Timeout.
486369	If a DynamicMultiProtocolLightSoc forming a new network has child nodes remaining from a network it has left, emberAfGetChildTableSize returns a non-zero value in startIdentifyOnAllChildNodes, causing Tx 66 error messages when addressing the "ghost" children.	Mass-erase the part if possible before creating a new network or programmatically check the child table after leaving the network and delete all children using emberRemoveChild prior to forming a new network.
495563	Joining SPI NCP Sleepy End Device Sample App doesn't short poll, therefore the joining attempt fails at the state of Update TC Link Key.	The device that wishes to join should be in Short Poll mode before attempt to join. This mode can be forced by End Device Support plugin.
497832	In Network Analyzer the Zigbee Application Support Command Breakdown for the Verify Key Request Frame mistakenly references the part of the payload that indicates the frame Source Address as the Destination Address.	No known workaround
498094	In function checkForReportingConfig() in metering-server.c, the second input parameter of the invoked function emberAfContainsServer() incorrectly references the attribute ID instead of the cluster ID.	Change the 2nd input parameter from the attribute ID (ZCL_CURRENT_SUMMATION_DELIVERED_ATTRIBUTE_ID) to the cluster ID (ZCL_SIMPLE_METERING_CLUSTER_ID).

ID #	Description	Workaround
519905	Spi-NCP may very rarely fail to start up bootloader communication using the 'bootload' CLI command of the ota-client plugin.	Restart the bootload process
521706	A duplicated attribute ID is assigned in the altConsumptionMonthAttrIds[] array of the gas-proxy-funxion plugins in gpf-structured-data.c.	Change the second ZCL_PREVIOUS_MONTH6_ALTERNATIVE_CONSUMPTION_DELIVERED_ATTRIBUTE_ID to ZCL_PREVIOUS_MONTH7_ALTERNATIVE_CONSUMPTION_DELIVERED_ATTRIBUTE_ID.
620596	NCP SPI Example for BRD4181A (EFR32xGMG21) nWake default pin defined cannot be used as a wake-up pin.	Change the default pin for nWake from PD03 to a EM2/3 wake-up-enabled pin in the NCP-SPI Plugin.
621144	GP on/off switch example cannot be compiled for the BRD4183A board.	The sample has to be manually modified to use only one button.
631713	A Zigbee End Device will report address conflicts repeatedly if the plugin "Zigbee PRO Stack Library" is used instead of "Zigbee PRO Leaf Library".	Use the "Zigbee PRO Leaf Library" instead of the "Zigbee PRO Stack Library" plugin.
648906	emberChildId API was accidentally removed in EmberZNet 6.8.0.2.	Call sl_mac_child_short_id instead.
659010	emberChildIndex API was accidentally removed in EmberZNet 6.8.0.2.	Call sl_mac_child_index instead.
661214	Upgrading NCP from the host side will fail if the communication port between host and NCP is not USART0.	Use USART0 as the communication port.
748977	4158a SPI-EZSP bootloader is not able to launch rcp-spi-802154.scp. This only occurs when using the spi-ezsp bootloader.	No known workaround.
754865	Device may not be able to receive in mfglib mode after network steering is performed.	No known workaround.
757775	All EFR32 parts have a unique RSSI offset. In addition, board design, antennas and enclosure can impact RSSI.	When creating a new project, install the RAIL Utility, RSSI component. This feature includes the default RSSI Offset Silabs has measured for each part. This offset can be modified if necessary after RF testing of your complete product.
759512	Building Zigbee Host Applications with Cygwin under Windows systems is not currently supported.	Use Linux based systems for building Host applications.
760811	In the CPCd configuration, if STDOUT_TRACE and TRACE_TO_FILE are both disabled, a timing issue with CPC causes the Zigbee endpoint to close on some setups.	For a short-term workaround, enable traces using either STDOUT_TRACE or TRACE_TO_FILE.

5 Deprecated Items

None

6 Removed Items

Removed in release 7.0.0.0

For an extensive list of all removed items in this release refer to Zigbee Stack API documentation and Zigbee Application Framework API documentation on <https://docs.silabs.com/zigbee/latest/zigbee-af-api/>.

- **DMPSwitch** sample app has been removed. **Z3Switch** should be used in its place.
- **emberAfPluginIdleSleepRtosCallback** has been removed.
- **emberAfPluginIdleSleepActiveCallback** has been removed.
- **emberAfPluginBleGetConfigCallback** has been removed.
- **emberAfPluginBleEventCallback** has been removed and **sl_bt_on_event** should be used in its place.
- All `emberEventXXX()` APIs are now removed and `sl_zigbee_event_XXX()` APIs should be used in their place. See the [New Items](#) section for more information.
- All `emberEventControlXXX()` APIs are now removed and `sl_zigbee_event_XXX()` APIs should be used in their place. See section [1 New Items](#) for more information.
- All cluster action callbacks of the following form are removed: **emberAf<ClusterName>ClusterServer<ActionName>Callback** where **ActionName** is *Init*, *AttributeChanged*, *DefaultResponse*, *MessageSent*, *MfgSpecificAttributeChanged*, *PreAttributeChanged*. For example: **emberAfIdentifyClusterServerInitCallback**, **emberAfBasicClusterServerAttributeChangedCallback**. Equivalent global callbacks can be used instead, for example **emberAfPostAttributeChangeCallback** can be used in place of all **emberAf<ClusterName>ClusterServerAttributeChandedCallback**.
- All `EMBER_AF_PLUGIN_<PluginName>` (e.g., `EMBER_AF_PLUGIN_ADDRESS_TABLE`) macros are now removed and replaced by `SL_CATALOG_ZIGBEE_<PluginName>_PRESENT`. For example: `SL_CATALOG_ZIGBEE_ADDRESS_TABLE_PRESENT`.
- The **Standalone Bootloader Client** plugin has been removed. The feature was limited to EM3xx devices only. The Standalone Bootloader Server and Standalone Bootloader Common components are still supported.
- The following callbacks and handlers have been removed and changed to use the new architecture stack callback subscription mechanism (refer to **Form and Join Library**, **Network Find** and **ZLL Commissioning Network** components): **emberFormAndJoinScanCompleteHandler**, **emberFormAndJoinNetworkFoundHandler**, **emberFormAndJoinEnergyScanResultHandler**, **emberFormAndJoinUnusedPanIdFoundHandler**, **emberAfScanErrorCallback**, **emberAfUnusedPanIdFoundCallback**
- All endian APIs have been removed from the unix-library component.
- The heartbeat component is no longer included in the supported sample applications. The component can still be enabled.
- The newly-integrated CLI does not provide support to accept flexible arguments and multiple optional arguments.

7 Multiprotocol Gateway and RCP

7.1 New Items

None

7.2 Improvements

Changed in release 7.0.2.0

The CPC secondary UART driver has been improved to use HW Flow Control.

The default flow control value for *rcp-uart-802154.slcp* and *rcp-uart-802154-blehci.slcp* has been changed to `usartHwFlowControlCtsAndRts`. The default `UART_HARDFLOW` value in *cpcd.conf* has been changed to `true` to match. Silicon Labs recommends use of hard flow control when using CPC over UART.

The CPC daemon can now be configured to restart the secondary in bootloader using pins `nRESET` and `nWAKE`. *cpcd.conf* has been modified; `SPI_WAKE_GPIO` has been removed and replaced by 3 configurations: `BOOTLOADER_RECOVERY_PINS_ENABLED`, `BOOTLOADER_WAKE_GPIO`, and `BOOTLOADER_RESET_GPIO`

7.3 Fixed Issues

Fixed in release 7.0.2.0

ID #	Description
759772	Fixed an issue in which turning CPCd tracing off caused communication issues between host applications, such as OTBR and zigbeed, and the multiprotocol RCP.
759780	Fixed issue where restarting the multi-PAN RCP would cause CPC-enabled host apps such as zigbeed, otbr-agent, and ot-cli to disconnect from CPCd.
774747	Fixed a bug in the CPC UART driver that caused OTBR to lose its CPC connection to the multi-PAN RCP, especially at higher baud rates and at startup.
812170	Increased default zigbeed table sizes.
813499	Fixed a bug introduced in GSDK 4.0.1 that prevented CPCd from connecting to the multiprotocol RCP (<i>rcp-uart-802154-blehci</i> and <i>rcp-spi-802154-blehci</i>)
814284	Fixed an issue where the multi-PAN RCP could assert in <code>radioProcessTransmitSecurity</code> under certain circumstances. This was causing intermittent failure of host applications such as OTBR and zigbeed.
815222	Zigbeed now correctly picks the custom MFG EUI64 if one exists on the chip.
817692	Fixed a zigbeed issue in which join attempts were causing an assert on a 64 bit machine (Raspberry Pi OS).

7.4 Known Issues in the Current Release

None

7.5 Deprecated Items

None

7.6 Removed Items

None

8 Using This Release

This release contains the following:

- Zigbee stack
- Zigbee Application Framework
- Zigbee Sample Applications

For more information about Zigbee and the EmberZNet SDK see [UG103.02: Zigbee Fundamentals](#).

If you are a first-time user, see *QSG180: Z Zigbee EmberZNet Quick-Start Guide for SDK 7.0 and Higher*, for instructions on configuring your development environment, building and flashing a sample application, and documentation references pointing to next steps.

8.1 Installation and Use

The Zigbee EmberZNet 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. 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/>.

8.2 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.

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<input type="checkbox"/> Timing	
<input type="checkbox"/> Clocks	
<input type="checkbox"/> Buffers	
<input type="checkbox"/> Oscillators	
<input type="checkbox"/> CDR and PHY	

8.3 Support

Development Kit customers are eligible for training and technical support. Use the [Silicon Laboratories Zigbee web page](#) to obtain information about all Silicon Labs Zigbee 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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