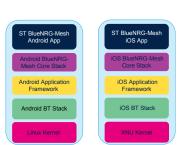## Mesh over Bluetooth low energy

Features

- Mesh network with Bluetooth low energy (BLE) nodes enabling communication between a BLE device and a Smartphone
- Control and monitor applications involving short packets
- Advertising packets used for data communication using managed flooding method
- Multi-hop data transmission up to 126 hops
- Network node support up to 32,767 nodes
- Multiple communication scenario
  - Smartphone to node communication with unicast addressing
  - Smartphone to node communication with multicast (Group) addressing
  - Smartphone to node communication with broadcast addressing
  - Node to node communication
- Secure communication
  - Devices added to a network are provisioned using proven security algorithms using 256-bit elliptic curves
  - All messages in the network are encrypted with AES-128 CCM mode
  - Privacy through obfuscation
  - Protected against security attacks like Brute-force, Bit-Flipping, Eaves Dropping, Replay, Trashcan, Man in the middle and physical insecure device attacks
- Supported features
  - Publish-subscribe paradigm (up to 6 groups)
  - Node UUID configurable by user
  - Transport layer handling up to 384-byte packets
  - Provisioning and network layer based on Mesh profile v1.0.1
  - Heartbeat
  - Provisioned node database transfer among smartphones via e-mail and cloud applications
  - Multiple element per node support
  - Key refresh
  - Initialization vector (IV) update procedure
  - Whitelist and blacklist filtering
  - Provisioning over advertising (PB-ADV)
  - Output OOB, Input OOB, Public Key OOB Provisioning
  - Single callback for multiple AD types in custom beacon
  - Firmware name shown in the BLE scanner
  - Multiple network and application key support
  - Friendship and low power implementation
  - New security algorithm BTM_ECDH_P256_HMAC_SHA256_AES_CCM integrated for provisioning

Product summary	
Mesh over Bluetooth low energy	STSW-BNRG-Mesh
STEVAL-IDB008V2 evaluation platform based on the BlueNRG-2	STEVAL-IDB008V2
Evaluation platform based on the BlueNRG-2	STEVAL-IDB009V1
Applications	BLE Connected Nodes
	Smart Home
	Smart City
	Smart Street Lighting

- Supported models
  - Configuration model
  - Health model
  - Generic model on-off, level example
  - Generic Power on-off server
  - Generic Transition time server
  - Lighting model example (Lightness, CTL, HSL)
  - Light LC Server Models
  - Light LC controller
  - Vendor model
  - Sensor model
  - Model Client APIs
  - Config Model API callbacks added to the application layer
  - Template for Time and Scene model
- Embedded SDK available
  - Demo Application source code for user application development
  - Mesh stack provided as precompiled/object library
  - Support for BlueNRG product family
  - Ready examples for STEVAL-IDB008V2, STEVAL-IDB009V1, STEVAL-BCN002V1B (BlueTile), STEVAL-BLUEPLUG1
- Android and iOS SDK available
  - Demo App source code available
  - Mesh implementation provided as library
  - Android App available on Google Play Store
  - iOS App available on iTunes
- Supported devices:
  - BlueNRG-2
  - Module support for BlueNRG-M2 (BlueNRG-2)
  - Embedded SDK is easily portable on other evaluation boards using BlueNRG family of products by modifying the board support package (BSP)
- ST BLE Mesh library compliant with Bluetooth SIG Mesh Profile Specifications v1.0.1 (QDID:146387)
- Mesh Models Client Server compliant with Bluetooth SIG Mesh Model Specifications v1.0.1 (QDID = 151209)

Description

BlueNRG-Mesh is a software solution for connecting multiple BLE (Bluetooth low energy) devices in Mesh networks for Internet of Things (IoT) solutions. It enables true two-way communication between Bluetooth-enabled devices in powerful, secure, integrated and range-extending Mesh networks.

Applications

- Smart home (lighting, HVAC, security and access control, healthcare)
- Asset tracking
- Assisted living
- Smart city (street lighting, general purpose messaging)

1 Licensing and other information

Developer-friendly license terms

The initial BlueNRG-Mesh is built over Motorola's Mesh Over Bluetooth Low Energy (MoBLE) technology.

The present solution involving both the Mesh library and applications is developed and maintained solely by STMicroelectronics.

Revision history

Table 1. Document revision history

Date	Version	Changes
21-Sep-2017	1	Initial release
14-Jun-2018	2	Updated cover page image, features and description Added cover page product summary table. Removed Section 1: Evaluation board compatibility.
02-Aug-2018	3	Updated cover page features.
28-Feb-2019	4	Updated cover page features and product summary table.
26-Jul-2019	5	Updated cover page features.
27-Oct-2020	6	Updated cover page image, features and product summary table.
06-Sep-2021	7	Updated cover page image, features and product summary table.
01-Jul-2024	8	Updated cover image, product summary table, Section Features and Section Description.

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