API guide for the BlueNRG-Mesh iOS SDK

Introduction

The BlueNRG-Mesh iOS SDK from ST is based on the BLE Mesh Profile 1.0 connectivity specification from Bluetooth® SIG that extends network reach beyond the BLE point to point range.

The SDK allows iOS devices to communicate with BLE mesh nodes based on BlueNRG-1/2/MS platforms. It provides the functions to provision new devices to the mesh network, and mesh node control and configuration features.

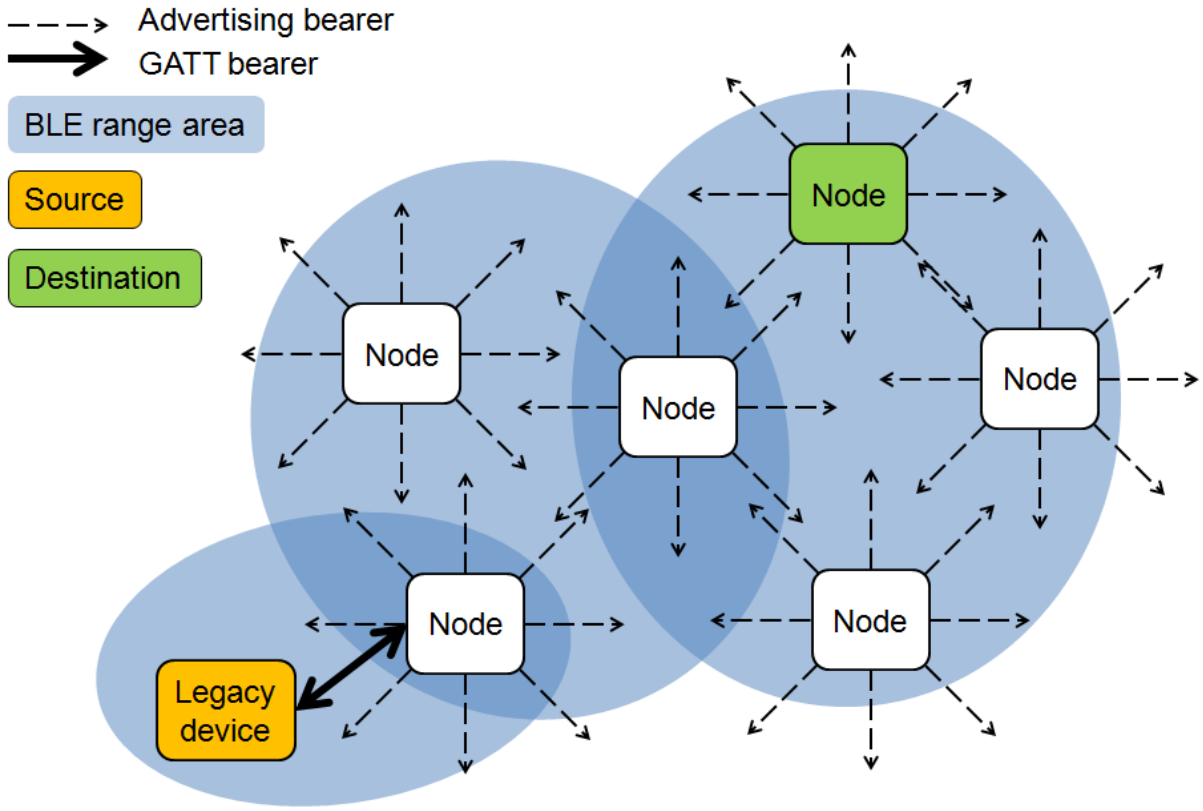
The BlueNRG-Mesh iOS SDK includes iOS static library and demo mesh application sources. The API is implemented in Objective-C and can be called in both Objective-C and Swift applications.

A demo application in Swift 4 is provided for reference and all code snippets in this document are in Swift 4.

The requirements to use the SDK are listed below:

- Tools: XCode 9+
- Operating system: iOS 10.0
- Device: 64 bit capable (iPhone 5s onwards)

Figure 1. Low Energy mesh schematic



1 BlueNRG-Mesh SDK specifications

The Bluetooth® Mesh specifications are defined in two parts:

1. Bluetooth® Mesh Profile specifications for mesh nodes in general
2. Bluetooth® Mesh Model specifications for specific applications like lighting, sensors, etc.

1.1 BlueNRG-Mesh SDK modules

The following BlueNRG-Mesh SDK modules cover various aspects of Bluetooth® Mesh specifications.

1. `MeshManager`: the main module that controls basic mesh network functionality and provides factory methods for other modules.
2. `MeshProvisioner`: provides the functions and callbacks necessary for adding a node to a mesh network (provisioning).
3. `ConfigurationModel`: provides functions defined in Configuration client (Mesh Profile Specifications) to configure a mesh node (e.g., enabling and disabling various features, setting and updating keys, etc.)
4. `GenericModel`: provides functions defined in Generic client (Mesh Model Specifications) for generic control of the mesh nodes.
5. `VendorModel`: provides a vendor-defined (STMicroelectronics) interface to control the mesh nodes. The functionality of the standard Bluetooth® SIG model offers little scope for customization. The vendor model provides the flexibility to define interfaces for specific needs and applications.
6. `Health Model`: provides functions defined in the Health client (Mesh profile specification) to monitor the node health status.
7. `Heartbeat Model`: provides functions and callbacks to check if the nodes are still alive in the network. It also provides functionality to configure the heartbeat functionality.

2 How to set up and use the BlueNRG-Mesh SDK

Mesh stack functionality is accessed through the `STMeshManager` class.

Step 1. First, we need to create an instance of `STMeshManager` class as follows:

Note: The `ViewController` must implement the `STMeshManagerDelegate` protocol to receive important events.

```
let meshManager = STMeshManager.getInstance(self)
```

2.1 How to set up the mesh network

Initializing the library

Step 1. Initialize the library before you call any other function.

If there are multiple provisioners in a network, they must be initialized with unique unicast addresses.

```
/* The unicast address of provisioner is passed as parameter */
meshManager.createNetwork(1)
```

Set the network information

Step 2. The application should retrieve the Network configuration and provide it to the mesh library as soon as it starts.

The demo provides routines to store network data in JSON format. You can also use the JSON format to sync with a cloud application and other provisioners.

```
meshManager.setNetworkData(networkSettings)
```

Note: Any undocumented BlueNRG-Mesh iOS SDK headers you find that are not listed in this document represent future or untested functionality and are not recommended for use.

2.2 How to use the BlueNRG-Mesh library

The BlueNRG-Mesh library can function in Provisioning mode to add nodes to a mesh network and in Network mode to communicate with provisioned nodes in the network. Entering one mode automatically interrupts operation of the other.

2.2.1 How to use the mesh library in Network mode (with Swift 4 code sample)

Step 1. Determine proxy connection method.

The BlueNRG-Mesh Library requires a mesh proxy node to connect to a mesh network. There are two ways to connect to a proxy node:

a. Using **NetworkID**: the BlueNRG-Mesh Library connects to any capable proxy node in the mesh network identified by an 8-octet key.

   proxyAddress = 0

b. Using **Node Identity**: the BlueNRG-Mesh Library connects to a specific node in the mesh network through a 16-octet key. This may be useful when you need to transmit a lot of data to a node directly over the GATT connection.

   proxyAddress = unicast address of a specific proxy node

Note: For this connection method, the target node must be in direct radio range and advertise with Node Identity (refer to Mesh Profile 1.0 specifications).

Step 2. Start in Network mode.

This is the default operation mode used for normal mesh network operations. In this mode we can send and receive messages from mesh nodes.

```
meshManager.startNetwork(proxyAddress)
```

Step 3. Suspend mesh operation.
This command stops the network.

```
meshManager.stopNetwork()
```

The following Swift 4 sample code shows how you can start and stop the mesh network in an application.

```
var currentNetworkDataManager = NetworkDataManager.sharedInstance()
var manager: STMeshManager?

 override func viewDidLoad() {
     super.viewDidLoad()
     manager = STMeshManager.getInstance(self)
     /* All the functions below are to be called only once.*/
     /* Initialize provisioner node with unicast address 1 */
     manager?.createNetwork(1)
     /* Read network settings from storage */
     currentNetworkDataManager.populateNodesFromStorage()
     //provide networkSetting/Provisioning data to library
     manager?.setNetworkData(currentNetworkDataManager.currentNetworkData)
 }

 override func viewWillAppear(_ animated: Bool) {
     /* For the cases when we come back from other screens where stopNetwork
     may have been called. */
     manager = STMeshManager.getInstance(self)
     manager?.startNetwork(0)
 }

/* Sending vendor model commands to mesh node. */
 func switchStateDidChange(index: IndexPath, switchState:Bool) -> Bool {
     let node = currentNetworkSetting.nodes[index.row] as! STMeshNode
     //Send toggle command
       let data = NSData(bytes: [0x03, 0x00] as [UInt8], length: 2)
       letvendorModel = manager?.getVendorModel()
     vendorModel?.setRemoteData(node.unicastAddress , usingOpCode:3,
          send: data as Data!, isResponseNeeded: false)
     return true
 }

 /* Use this call-back instead of using CBCentralManager for BLE status */
 func meshManager(_ manager:STMeshManager!,
              didBTStateChange state:STMeshBleRadioState) {
     if(state != STMeshBleRadioState_PoweredOn) {
         //Display error / prompt user to switch on Bluetooth
     }
 }
```

2.2.2 How to add new nodes in Provisioning Mode (with Swift 4 code sample)

Step 1. Search for unprovisioned devices and add them to the network using the provisioning procedure.
Call the following method(s):

```
let provisioner = STMeshManager.getProvisioner()
//Start scan for unprovisioned devices
//The timeout parameter is passed. Not used in current version 1.01.000
manager.startDeviceScan(0)
```

Step 2. Use the `didDeviceAppearedWithUUID:RSSI` callback when advertisement packets are received.
Your application may update the RSSI values and visibility of the nodes in the user interface.

Once the node to be provisioned is identified through its UUID, provisioning can start.

Step 3. Provide a new instance of `STMeshNode` with the UUID address.

Step 4. Use the `didProvisionStageChanged` callback during provisioning to provide status information regarding the process.

Step 5. Pause scanning for nodes.

This is useful to save power.

```
provisioner.stopDeviceScan()
```

Step 6. Refer to the following Swift 4 sample code to build your own application.

The following Swift 4 sample code shows how you can provision nodes in an application.

```
    var manager: STMeshManager?
    override func viewDidAppear(_ animated: Bool) {
        manager = STMeshManager.getInstance(self)
        provisioner = manager.getProvisioner()
        /* Switch to provisioning mode from proxy mode */
        /* Parameter : scan interval, not used in current SDK 1.01.000 */
        self.provisioner?.startDeviceScan(0);
    }

    /* invoked whenever unprovisioned node's data packet is received
    UI can be updated to show nodes and also update RSSI value */
    func provisioner(_ provisioner:STMeshProvisioner!,
            didDeviceAppearedWithUUID uuid:String, rssi:Int32) {
        /* Update or add new nodes in UI here. */
        addOrUpdateNode(uuid: uuid, rssi: rssi)
    }

    /* Start the provisioning process */
    func startProvisioning(nodeToProvision: STMeshNode) -> Void {
        //Supply instance of STMeshNode, unicast addr, initial subscription addr
        manager?.provisionDevice(nodeToProvision, meshNode: 0, groupAddr: 0,
             identificationTime: 10)
    }

    /* invoked when node capability packet is received */
    func provisioner(_ provisioner:STMeshProvisioner!, didReceiveCapabilitiesElementCount ele
mentCount:UInt8) {
        /* Element count would be required for allocating addresses */
    }

    /* invoked when provisioning status changes */
    func provisioner(_ provisioner:STMeshProvisioner!, didProvisionStageChanged
           percentage:Int32, updateMessage message:String!, hasError error:Bool) {
        /* Update UI to display provisioning progress to user */
    }

    override func viewDidDisappear(_ animated: Bool) {
        /* This may be called when leaving the provisioning screen */
        manager?.stopDeviceScan()
    }
```

3 BlueNRG-Mesh iOS library API: types

Table 1. enum `STMeshStatus` options

Value	Meaning
STMeshStatus_Success = 0	Command completed successfully
STMeshStatus_False = 1	Operation did not occur but no error encountered
STMeshStatus_Fail = 2	General error
STMeshStatus_InvalidArg = 3	Invalid argument supplied
STMeshStatus_OutOfMemory = 4	Lack of memory
STMeshStatus_Timeout = 5	Operation timed out
STMeshStatus_NoConnection = 6	Operation failed as bearer not connected
STMeshStatus_NoBLE = 7	BLE radio is off or not present

Table 2. enum `STMeshMode` options

Value	Meaning
STMeshMode_Provisioner = 0x00	Provisioner mode of the BLE mesh device or node
STMeshMode_ProxyClient = 0x01	Proxy mode of the BLE mesh device or node
STMeshMode_Offline = 0xFF	Offline mode of BLE mesh node. Not connected to any mesh device or node

4 BlueNRG-Mesh iOS library API: functions (Objective-C)

4.1 STMeshManager methods

4.1.1 Create Mesh Manager class object

(instancetype) getInstance
All mesh interaction is done through an instance of STMeshManager class. This function returns a single instance of STMeshManager.

4.1.2 Create network

(STMeshStatus) createNetwork:(uint16_t) address
Initializes the mesh network with given address.

Returns

STMeshStatus
Status of the command

Parameters

address
`Uint16`: Local address of node (usually 1 for smartphones)

4.1.3 Start and stop network processing

(STMeshStatus) startNetwork:(uint16_t) proxyAddress
Mesh network messages cannot be sent or received until this function is called.

Returns

STMeshStatus
Status of the command

Parameters

proxyAddress
`Uint16`: Address of preferred proxy node to connect to.
0 = the iOS device can connect to any proxy capable node in the network.

(STMeshStatus) stopNetwork
This method stops the network processing. It may be called to save power when user is not interacting with the app.

Returns

STMeshStatus
Status of the command.

4.1.4 Set network data

(STMeshStatus) setNetworkData:(STMeshNetworkSettings *)networkSettings;
This function is used to provide networkSettings to the BlueNRG-Mesh library. The Network settings contain the data required to communicate with the nodes in the network.
In the application, these settings are used to populate the list of provisioned nodes.

Returns

STMeshStatus
Status of the command.

Parameters

networkSettings
STMeshNetworkSettings: object containing the network information. To be managed by user application.

4.1.5 Get model instances

(STMeshConfigurationModel *) getConfigurationModel;
(STMeshGenericModel *) getGenericModel;
(STMeshVendorModel *) getVendorModel;

(STMeshLightingModel*) getLightingModel;
(STMeshHealthModel *)getHealthModel;
(STMeshHeartbeatModel *)getHeartbeatModel;
These functions are used to get instances of various models to access model specific commands and callbacks.

Returns

STMeshStatus
Status of the command.

4.1.6 Proxy connection

(BOOL) isConnectedToProxyService;
Checks whether the BlueNRG-Mesh Library is currently connected to any proxy nodes. This check is useful before sending commands to nodes to ensure there is a connection.

Returns

BOOL
Status of connection with proxy node.

4.1.7 Dummy mode operation

(void) setDummyMode:(BOOL *)dummyMode;
BlueNRG-Mesh iOS SDK includes Dummy mode functionality that allows app development even without access to actual BlueNRG mesh nodes and is also useful when fine tuning the UI on simulator.
When dummy mode is active, the actual Bluetooth radio is not used and the API simulates the behavior of actual devices. If you call provisioner startDeviceScan() in this mode, you receive callbacks from virtual devices that you can provision normally.

Note: The simulated behaviors are approximated and do not model a real mesh device perfectly. It is provided for convenience but you should not base your developments on them.

Parameters

dummyMode
`BOOL`: true to enable and false to disable dummy mode operation.

4.2 Mesh Manager callbacks

4.2.1 BT State is Changed

(void) meshManager:(STMeshManager *)manager didBTStateChange:(STMeshBleRadioState)status
This is called when local Bluetooth chip has changed state. It indicates to the application whether Bluetooth is supported and switched on.

Parameters

status
STMeshBleRadioState: returns status of the BLE radio.

4.3 Network mode and proxy callbacks

4.3.1 Proxy connection changes

(void) meshManager:(STMeshManager *)manager didProxyConnectionChanged :(BOOL)isConnected
This method is called when a connection to a proxy is made or when it terminates. You can update the UI with this information and perhaps disable commands when there is no connection to a proxy.

Parameters

isConnected
`BOOL`: true if connected, false if disconnected.

4.4 Provisioning methods

4.4.1 Scan for unprovisioned devices

(STMeshStatus) startDeviceScan:(uint32_t)timeOut
Initiates scan of unprovisioned devices. Callback method didDeviceAppearedWithUUID is called by the library when an unprovisioned device is found.

Returns

STMeshStatus
Status of the command.

Parameters

timeOut
Scanning stops after this period (in seconds) expires. This parameter is not used in the current version of the library 1.02.000.

Note: Network operations are stopped while this scan is running and the application must call `meshManager.startNetwork` after provisioning is completed to resume the network processing.

(STMeshStatus) stopDeviceScan
Stops the scanning of unprovisioned devices. This method can be used to save energy.

Returns

STMeshStatus
Status of the command.

4.4.2 Provision a device

(STMeshStatus) provisionDevice:(STMeshNode *)node deviceAddress:(uint16_t)addr identificationTime:(uint32_t)duration
This method starts provisioning the target device. Callback method didProvisionStageChanged is called to report the progress of the provisioning process. 100 % provisioning means that the process has completed successfully.

Returns

STMesh_Status
`STMESH_SUCCESS`: if the provisioning was started.
`STMESH_FAIL`: If the provisioning could not be started.

Note: The return value does not tell us if provisioning has completed successfully, it only tells us whether the process could be started or not. `didProvisionStageChanged delegate`, reports the status of provisioning.

Parameters

node
`STMeshNode`: new instance of STMeshNode with node UUID field filled in.

addr
`uint16_t`: the mesh unicast address to be assigned to the node being provisioned.

duration
`uint32_t`: the duration (in seconds) of the identify state of an unprovisioned device. In this state, the device signals for user attention in order to identify itself; e.g., with a blinking LED or beeping sound. This feature is not available in current release version 1.02.000.

4.5 Provisioning callbacks

4.5.1 Device provisioning updates

(void) meshManager:(STMeshManager *)manager didProvisionStageChanged :(int32_t)percentage updateMessage:(NSString *)message hasError:(BOOL)error
This method is called multiple times during the provisioning process to indicate the progress. Applications can reflect this information in UI (e.g., a progress bar) based on these callbacks.

Parameters

percentage
`int32_t`: provisioning process progress in percent.

message

`NSString`: text message to denote the progress of provisioning process. This field does not provide meaningful information in the current version of SDK (1.02.000)

error

`BOOL`: this flag is true if an error occurs during provisioning process.

4.5.2 New device found

(void): meshManager:(STMeshManager *)manager didDeviceAppearedWithUUID:(NSString*)uuid RSSI: (int32_t)rssi;

This method is called when advertisement packets are received from an unprovisioned device after the meshManager.startDeviceScan is called. Applications can update the UI to display the new node. This callback may be called multiple times for the same node to update RSSI value, for example.

Parameters

uuid

`NSString`: UUID of device

rssi

`int32_t`: RSSI strength

4.5.3 Error

meshManager:(STMeshManager *)manager didErrorOccurred:(NSString *)errMessage;

Called by the mesh library to indicate error condition.

Parameters

errorMessage

`NSString`: error type

4.6 Configuration model methods

These methods are used by configuration client to update configuration of the mesh node.

4.6.1 Unprovision a device

- (STMeshStatus) resetConfigNode:(uint16_t)peerAddress;

This command instructs a mesh node to delete its network information and so become unprovisioned.

4.6.2 Key management

- (STMeshStatus) addConfigAppKeyOnNode:(uint16_t)peerAddress appKeyIndex:(uint16_t)appKeyIndex netKeyIndex:(uint16_t)netKeyIndex;

This method sets an application key on the target node. After provisioning, the app key must be configured before any application commands can be accepted by the node.

Note: In current version 1.02.000 non-zero netKeyIndex is not supported.

4.6.3 Subscription and group management

- (STMeshStatus) addConfigModelSubscriptionToNode:(uint16_t) peerAddress elementAddress: (uint16_t)elementAdrress address:(uint16_t)subscriptionAddress modelIdentifier:(uint32_t) modelIdentifier;

This method is used to subscribe a node to a group address.

- (STMeshStatus) deleteConfigModelSubscriptionFromNode:(uint16_t)peerAddress elementAddress: (uint16_t)elementAddress group:(uint16_t) groupAddress;

This method is used to remove group subscription from a node element.

(STMeshStatus)ConfigSubscriptionDeleteAll:(uint16_t)peerAddress elementAddress: (uint16_t)elementAddress modelIdentifier:(uint32_t)modelIdentifier isVendor:(BOOL)isVendorModelId;

This method is used to remove all group subscribtion from a node element.

4.6.4 Publication

- (STMeshStatus) setConfigModelPublicationOnNode:(uint16_t)peerAddress elementAddress: (uint16_t)elementAddress publishAddress:(uint16_t)publishAddress appKeyIndex:(uint16_t) appKeyIndex credentialFlag:(BOOL) credentialFlag publishTTL:(uint8_t) publishTTL publishPeriod:

(uint32_t) publishPeriod retransmitCount:(uint8_t) retransmitCount retransmitInterval:(uint16_t) retransmitInterval modelIdentifier:(uint32_t) modelIdentifier;
This method is used to update publish address of the node. Publish address is used by the node if it initiates communication. This address can be a unicast or a group address.

Note: In current version 1.02.000 appKeyIndex must be 0, also all parameters after appKeyIndex are ignored .

(STMeshStatus)getConfigPublish:(uint16_t)peerAddress elementAddress:(uint16_t)elementAddress modelIdentifier:(uint32_t)modelIdentifier isVendorModelId(BOOL)isVendorModelId;
This method is used to send requests for reading publication status.

4.6.5 Composition

(STMeshStatus)getConfigCompositionData:(uint16_t)peerAddress pageNumber:(uint8_t)pageNumber;
This method is used to send requests for reading composition data.

4.6.6 Relay

(STMeshStatus)getConfigNodeRelay:(uint16_t)peerAddress;
This method is used to send requests for relay status data.

(STMeshStatus)setConfigNodeRelay:(uint16_t)peerAddress relay(BOOL)enableRelay retransmitCount: (uint8_t)count retransmitInterval:(uint16_t)interval;
This method is used to send requests to set relay features.

4.6.7 GATTProxy

(STMeshStatus)getConfigNodeGATTProxy:(uint16_t)peeraddress;
This method is used to send requests for the GATTProxy feature status data.

(STMeshStatus)setConfigNodeGATTProxy:(uint16_t)peerAddress proxyState(BOOL)isEnableProxy;
This method is used to send requests to set relay features.

4.6.8 Node Friend

(STMeshStatus)getConfigNodeFriend:(uint16_t)peeraddress;
This method is used to send requests for the friend feature status data.

(STMeshStatus)setConfigNodeFriend:(uint16_t)peerAddress friendState(BOOL)isEnableFriend;
This method is used to send requests to set the node friend feature.

4.6.9 Node Identity

(STMeshStatus)getConfigNodeIdentity:(uint16_t)peerAddress netKeyIndex:(uint16_t)netKeyIndex identity:(ConfigState)identity;
This method sends requests for enabling/disabling proxy advertisement using node identity.

4.6.10 Beacon

(STMeshStatus)getConfigBeacon:(uint16_t)peerAddr;
This method is used to send requests for Beacon status data.

(STMeshStatus)setConfigBeacon:(uint16_t)peerAddress isEnable:(BOOL)isEnabled;
This method is used to send requests for enabling/disabling secure network Beacon.

4.6.11 TTL

(STMeshStatus)getConfigTTL:(uint16_t)peerAddr;
This method is used to send requests for config TTL status data.

(STMeshStatus)setConfigTTL:(uint16_t)peerAddress ttlValue:(uint16_t)ttlValue;
This method is used to send requests for enabling/disabling secure network Beacon.

4.7 Configuration method callbacks

(void) meshConfigModel:(STMeshConfigurationModel*)configModel didReceiveSubscriptionStatus: (ConfigModelStatus) ConfigurationStatus peerAddress:(uint16_t)peerAddress elementAddress: (uint16_t)elementAdrressmodelIdentifier:(uint32_t)modelIdentifier;
This callback is invoked when subscription status is received from the element.

(void) meshConfigModel:(STMeshConfigurationModel*)configModel didReceivePublishStatus: (ConfigModelStatus) ConfigurationStatus peerAddress:(uint16_t)peerAddress elementAddress: (uint16_t)elementAddress publishAddress:(uint16_t)publishAddress appKeyIndex:(uint16_t)appKeyIndex

credentialFlag:(BOOL)credentialFlag publishTTL:(uint8_t) publishTTL publishPeriod: (uint32_t)publishPeriod retransmitCount:(uint8_t)count retransmitInterval:(uint16_t)interval modelIdentifier:(uint32_t)modelIdentifier;
This callback is invoked when publish status is received from the element.

(void) meshConfigModel:(STMeshConfigurationModel*)configModel didReceiveAppKeyStatus: (ConfigModelStatus)ConfigurationStatus peerAddress:(uint16_t)peerAddress netKeyIndex: (uint16_t)netKeyIndex appkeyIndex:(uint16_t)appKeyIndex;
This callback is invoked when AppKey status is received from the node.

(void) meshConfigModel:(STMeshConfigurationModel*)configModel didReceiveresetStatus: (STMeshStatus)ConfigurationStatus peerAddress:(uint16_t)peerAddress;
This callback is invoked when reset status is received from the node.

(void) meshConfigModel:(STMeshConfigurationModel*)configModel didReceiveCompositionData: (STMeshStatus)ConfigurationStatus peerAddress:(uint16_t)peerAddresspageNumber: (uint8_t)pageNumber ReceivedData:(STMeshCompositionDataModel*)data;
This callback is invoked when composition page 0 data is received from the node.

(void) meshConfigModel:(STMeshConfigurationModel*)configModel didReceiveFriendStatus: (uint16_t)peerAddress proxy:(ConfigState)relay retransmitCount:;
This callback is invoked when friend feature status is received from the node.

(void) meshConfigModel:(STMeshConfigurationModel*)configModel didReceiveConfigRelayStatus: (uint16_t)peerAddress relay:(ConfigState)relay retransmitCount:(uint8_t)retransmitCount retransmitInterval:(uint16_t)interval
This callback is invoked when relay feature status is received from the node.

(void) meshConfigModel:(STMeshConfigurationModel *)configModel didReceiveConfigNodeIdentityStatus:(uint16_t)peerAddress indentity:(ConfigState)indentity;
This callback is invoked when Nodeidentity status is received from the node.

(void) meshConfigModel:(STMeshConfigurationModel *)configModel didReceiveConfigBeaconStatus: (uint16_t)peerAddress status:(ConfigState)status;
This callback is invoked when Beacon status is received from the node.

(void) meshConfigModel:(STMeshConfigurationModel *)configModel didReceiveConfigTTLStatus: (uint16_t)peerAddress status:(ConfigState)status;
This callback is invoked when TTL status is received from the node.

4.8 Arguments used by configuration model methods and callbacks

Parameters

peerAddress
`uint16_t`: address of node which is being configured

Subscription or group address
`uint16_t`: group address to be added subscription list of the node.
The current version supports up to 10 group addresses per node.

Publish address
`uint16_t`: address at which the node should publish its messages.

Element address
`uint16_t`: address of element which is being configured within the node.

App key index
`uint16_t`: global app key Index.
Default value is 0.

Net key index
`uint16_t`: global net key Index.
Default value is 0.

Model Identifier
`uint32_t`: Model ID of the model for which the command is being sent.

credentialFlag
`BOOL`: the publish friendship credential flag is a 1-bit state controlling the credentials used to publish messages from a model.
0: master security material is used for publishing
1: friendship security material is used for publishing

Publish TTL
`uint8_t`: TTL of the message published by the element of node.
Value from 0x00-0x7F
0xFF: the messages use the Default TTL.

Publish period
`uint32_t`: the Publish Period state determines the interval (in milliseconds) in which status messages are published by a model.

Retransmit count
`uint8_t`: specifies the number of times that a message published will be retransmitted after the initial send.

Retransmit interval
`uint16_t`: time in milliseconds between each retransmission.

4.9 Generic model methods

These methods are used by the generic client to send generic model commands to the mesh node. The generic model allows nodes to perform generic automation functions while maintaining the highest level of interoperability.

- (STMeshStatus) setGenericOnOff:(uint16_t)peerAddress isOn:(BOOL) isOn transitionTime:(uint8_t) time withDelay:(uint8_t) delay isUnacknowledged:(BOOL) responseFlag;
This method is used to send Generic On/Off commands to an element of a peer node with transition time.

- (STMeshStatus) readGenericOnOff:(uint16_t)peerAddress;
This method is used to read Generic On/Off status information from an element of a peer node.

- (STMeshStatus) setGenericLevel:(uint16_t)peerAddress level:(uint16_t) levelValue transitionTime: (uint8_t) time withDelay:(uint8_t) delay isUnacknowledged:(BOOL) responseFlag;
This method is used to send Generic level commands to an element of a peer node with transition time.

- (STMeshStatus) readGenericLevel:(uint16_t)peerAddress;
This method is used to read Generic level status information from an element of a peer node.

- (STMeshStatus) setGenericDelta:(uint16_t)peerAddress deltaLevel:(uint16_t) deltaValue transitionTime: (uint8_t) time withDelay:(uint8_t) delay isUnacknowledged:(BOOL) responseFlag;
This method is used to send Generic delta commands to an element of a peer node.

- (STMeshStatus) setGenericMove:(uint16_t)peerAddress deltaLevel:(uint16_t) deltaValue transitionTime: (uint8_t) time withDelay:(uint8_t) delay isUnacknowledged:(BOOL) responseFlag;
This method is used to send Generic move commands to an element of a peer node.

4.10 Generic model callbacks

These callbacks are called after receiving generic status messages.

- (void) genericModel:(STMeshGenericModel*)genericModel didReceiveOnOffStatusFromAddress: (uint16_t)peerAddress presentOnOff:(uint8_t) presentState targetOnOff:(uint16_t) targetState remainingTime:(uint16_t) time isTargetStatePresent:(uint16_t) stateFlage;
This callback is called when Generic On/Off status is received from the element of a peer node.

- (void) genericModel:(STMeshGenericModel*)genericModel didReceiveLevelStatusFromAddress: (uint16_t)peerAddress presentOnOff:(uint8_t) presentState targetOnOff:(uint16_t) targetState remainingTime:(uint16_t) time isTargetStatePresent:(uint16_t) stateFlage;
This callback is called when Generic On/Off status is received from the element of a peer node.

4.11 Arguments used by generic model methods and callbacks

Parameters

peerAddress
`uint16_t`: Address of element of the node involved.

isOn
`BOOL`: Requested On/Off state in generic On/Off command.
0x00: Off
0x01: On

transitionTime:time
`uint8_t`: Transition time determines how long an element shall take to transition from a present state to a new state. The parameter has a 6-bit field for the number of steps and a 2-bit field for the time for each step:
Number of steps (6-bit field):

0x00: Immediate transition
0x01-0x3E: number of steps
Time resolution per step (2-bit field):
0b00: Resolution 100ms
0b01: Resolution 1 seconds
0b10: Resolution 10 seconds
0b11: Resolution 10 minutes

withDelay:Delay
`uint8_t`: Message execution delay in 5 millisecond steps.

isUnacknowledged: responseFlag
`BOOL`: Determines whether the command is acknowledged or unacknowledged. Acknowledged requires the receiver to send a response message.
False: Acknowledged
True: Unacknowledged

presentState
`uint8_t /uint16_t`: Current On/Off or level state of the model.

targetState
`uint8_t /uint16_t`: Target level field identifies the target Generic Level state that the element should reach.

remainingTime
`uint8_t`: Remaining time field identifies the time it should take the element to complete the transition to the target Generic Level state of the element. The format of the field is same as transitionTime field.

isTargetStatePresent
BOOL: Target state and remainingTime fields are optional in Generic On/Off and Level status messages.This parameter indicates whether the optional fields are present.
False: Optional fields not present.
True: optional fields are present.

4.12 Vendor model methods

These methods are used to send and receive data from a mesh node.

4.12.1 Send command

(STMeshStatus) setRemoteData:(uint16_t)peerAddress dataMap:(uint32_t)opcode sendData: (NSData*)data isResponseNeeded:(BOOL)responseFlag
This function is used to send a commands (with or without a payload) to a mesh network node with destination address. The user application is responsible for serializing data into the data buffer.

Returns

STMeshStatus
Status of the command

Parameters

peerAddress
`uint16_t`: destination address. May also be set to group address.

opcode
`uint32_t`: opcode of the command being sent. Only 4 LSB bits of opcode are used.

data
`NSData`: data buffer.
To get best results, payload length should be limited to 8 bytes.

responseFlag
`BOOL`: true if a response is requested for the command, false otherwise.

Note: Commands with response flag set are called reliable commands. If a reliable command is sent to a group address, an acknowledgement must be sent by each node in the group, which will cause extra traffic and may degrade network performance if there are many nodes in the group.

4.12.2 Read data

(STMeshStatus) readRemoteData:(uint16_t)peerAddress dataMap:(uint32_t)opcode

Requests data from the given destination address.

Returns

STMeshStatus
Status of the command.

Parameters

peerAddress
`uint16_t`: destination address. It can be a group address also. Use of group addresses in read commands is not advised.

opcode
`uint32_t`: opcode of the read command being sent. Only 4 LSB bits of opcode are used.

4.12.3 Read version data

(STMeshStatus) readDeviceVersionData:(uint16_t)peerAddress usingOpcode:(uint8_t)opcodesendData:(NSData*)data
Returns STMeshStatus, status of the command and parameters.

4.13 Vendor model callbacks

These callbacks are called after receiving vendor model responses.

-(void) meshManager:(STMeshManager *)manager gotResponseFrom:(uint16_t)peerAddress commandStatus:(STMeshCmdStatus)status recvData:(NSData*)data
This methods is called when response of command sent earlier is received.

Parameters

peerAddress
`uint16_t`: address of device that has sent the response.

status
`STMeshCommandStatus`: status of the command.

data
`NSData`: data buffer containing the response payload.

4.14 Lighting model method

4.14.1 Lighting lightness

(STMeshStatus)readLightingLightnessStatus:(uint16_t)peerAddress;
This method is used to read Lighting lightness status from an element of a peer node.

(STMeshStatus)setLightingLightness:(uint16_t)peerAddress lightnessValue:(uint16_t)lightness isUnacknowledged:(BOOL)responseFlag;
This method is used to send Lighting lightness command to element of a peer node.

(STMeshStatus)setLightingLightness:(uint16_t)peerAddress lightnessValue:(uint16_t)lightness transationTime:(uint8_t)time withDelay:(uint8_t)delay isUnacknowledged:(BOOL)responseFlag;
This method is used to send Lighting lightness command with optional parameters to an element of a peer node.

(STMeshStatus)readLightingLightnessLinearStatus:(uint16_t)peerAddress;
This method is used to read Lighting lightness Linear status from an element of a peer node.

(STMeshStatus)setLightingLightnesslinear:(uint16_t)peerAddress lightnessValue:(uint16_t)lightness isUnacknowledged:(BOOL)responseFlag;
This method is used to send Lighting lightness Linear command to an element of a peer node.

(STMeshStatus)setLightingLightnessLinear:(uint16_t)peerAddress lightnessValue:(uint16_t)lightness transationTime:(uint8_t)time withDelay:(uint8_t)delay isUnacknowledged:(BOOL)responseFlag;
This method is used to send Lighting lightness Linear command with optional parameters to an element of a peer node.

(STMeshStatus)readLightingLightnessLastStatus:(uint16_t)peerAddress;
This method is used to read Lighting lightness Last status from an element of a peer node.

(STMeshStatus)readLightingDefaultStatus:(uint16_t)peerAddress;
This method is used to read Lighting lightness default status from an element of a peer node.

(STMeshStatus)setLightingLightnessDefault:(uint16_t)peerAddress lightnessValue:(uint16_t)lightness isUnacknowledged:(BOOL)responseFlag;
This method is used to send lightness default command to an element of a peer node.

(STMeshStatus)readLightingRangeStatus:(uint16_t)peerAddress;
This method is used to read Lighting lightness range status from an element of a peer node.

(STMeshStatus)setLightingLightnessRange:(uint16_t)peerAddress rangeMinValue:(uint16_t)rangeMin rangeMaxValue:(uint16_t)rangeMax isUnacknowledged:(BOOL)responseFlag;
This method is used to send lightness range command to an element of a peer node.

4.14.2 Lighting CTL

(STMeshStatus)readLightCTLStatus:(uint16_t)peerAddress;
This method is used to read Lighting CTL status from an element of a peer node.

(STMeshStatus)setLightingCTL:(uint16_t)peerAddress lightnessValue:(uint16_t)lightness temperatureValue:(uint16_t)temperature deltaUVValue:(int16_t)deltaUV isUnacknowledged:(BOOL)responseFlag;
This method is used to send Lighting CTL command from an element of a peer node.

(STMeshStatus)setLightingCTL:(uint16_t)peerAddress lightnessValue:(uint16_t)lightness temperatureValue:(uint16_t)temperature deltaUVValue:(int16_t)deltaUV transatimnTime:(uint16_t)time withDelay:(uint8_t)delay isUnacknowledged:(BOOL)responseFlag;
This method is used to send Lighting CTL command with optional parameters from an element of a peer node.

(STMeshStatus)readLightCTLTemperatureStatus:(uint16_t)peerAddress;
This method is used to read Lighting CTL Temperature status from an element of a peer node.

(STMeshStatus)setLightingCTLTemperature:(uint16_t)peerAddress temperatureValue:(uint16_t)temperature deltaUVValue:(int16_t)deltaUV isUnacknowledged:(BOOL)responseFlag;
This method is used to send Lighting CTL Temperature command from an element of a peer node.

(STMeshStatus)setLightingCTLTemperature:(uint16_t)peerAddress temperatureValue:(uint16_t)temperature deltaUVValue:(int16_t)deltaUV transatimnTime:(uint16_t)time withDelay:(uint8_t)delay isUnacknowledged:(BOOL)responseFlag;
This method is used to send Lighting CTL temperature command optional parameters from an element of a peer node.

(STMeshStatus)readLightCTLDefaultStatus:(uint16_t)peerAddress;
This method is used to read Lighting CTL default status from an element of a peer node.

(STMeshStatus)setLightingCTLDefault:(uint16_t)peerAddress lightnessValue:(uint16_t)lightness temperatureValue:(uint16_t)temperature deltaUVValue:(uint16_t)deltaUV isUnacknowledged:(BOOL)responseFlag;
This method is used to send Lighting CTL default command from an element of a peer node.

(STMeshStatus)readLightCTLTemperatureRangeStatus:(uint16_t)peerAddress;
This method is used to read Lighting CTL range status from an element of a peer node.

(STMeshStatus)setLightCTLTemperatureRange:(uint16_t)peerAddress rangeMinValue:(uint16_t)rangeMin rangeMaxValue:(uint16_t)rangeMax isUnacknowledged:(BOOL)responseFlag;
This method is used to read Lighting CTL range command from an element of a peer node.

4.15 Lighting model method callback

(void) lightingModel:(STMeshLightingModel*)lightingModel didReceiveLightnessStatusFromAddress:(uint16_t)peerAddress presentLightness:(uint16_t)presentLightness targetLightness:(uint16_t)targetLightness remainingTime:(uint8_t)time isTargetStatePresent:(BOOL)stateFlag;
This callback is called when lighting lightness status is received from the element of a peer node.

(void) lightingModel:(STMeshLightingModel*)lightingModel didReceiveLightnessLinearStatusFromAddress:(uint16_t)peerAddress presentLighness:(uint16_t)presentLightness targetLightness:(uint16_t)targetLightness remainingTime:(uint8_t)time isTargetStatePresent:(BOOL)stateFlag;
This callback is called when lighting lightness linear status is received from the element of a peer node.

(void) lightingModel:(STMeshLightingModel*)lightingModel didReceiveLightnessLastStatusFromAddress:(uint16_t)peerAddress lightnessValue:(uint16_t)lightness;
This callback is called when lighting lightness last status is received from the element of a peer node.

(void) lightingModel:(STMeshLightingModel*)lightingModel didReceiveLightnessDefaultStatusFromAddress:(uint16_t)peerAddress lightnessValue:(uint16_t)lightness;

This callback is called when lighting lightness default status is received from the element of a peer node.

(void) lightingModel:(STMeshLightingModel*)lightingModel didReceiveLightnessRangeStatusFromAddress:(uint16_t)peerAddress status:(uint8_t)statusCode rangeMinValue:(uint16_t)rangeMin rangeMaxValue:(uint16_t)rangeMax;

This callback is called when lighting lightness range status is received from the element of a peer node.

(void) lightingModel:(STMeshLightingModel*)lightingModel didReceiveCTLStatusFromAddress:(uint16_t)peerAddress presentLightness:(uint16_t)presentLightness presentTemperature:(uint16_t)presentTemperature targetLightness:(uint16_t)targetLightness targeTemperature:(uint16_t)targetTemperature isTargetStatePresent:(BOOL)stateFlag;

This callback is called when lighting CTL status is received from the element of a peer node.

(void) lightingModel:(STMeshLightingModel*)lightingModel didReceiveCTLTemperatureStatusFromAddress:(uint16_t)peerAddress presentTemperature:(uint16_t)presentTemperature presentDeltaVU:(uint16_t)targetDeltaVU targeTemperature:(uint16_t)targetTemperature targetDeltaVU:(uint16_t)targetDeltaVU isTargetStatePresent:(BOOL)stateFlag;

This callback is called when lighting CTL temperature status is received from the element of a peer node.

(void) lightingModel:(STMeshLightingModel*)lightingModel didReceiveCTLTemperatureRangeStatusFromAddress:(uint16_t)peerAddress status:(uint8_t)statusCode rangeMinValue:(uint16_t)rangeMin rangeMaxValue:(uint16_t)rangeMax;

This callback is called when lighting CTL temperature range status is received from the element of a peer node.

(void) lightingModel:(STMeshLightingModel*)lightingModel didReceiveCTLDefaultStatusFromAddress:(uint16_t)peerAddress presentLightness:(uint16_t)presentLightness presentTemperature:(uint16_t)presentTemperature;

This callback is called when lighting CTL default status is received from the element of a peer node.

4.16 Arguments used by configuration model methods and callbacks

peerAddress

uint16_t: Address of element of the node involved

lightness

uint16_t: lightness of light

transitiontime:Time

uint8_t: Transition time determines how long an element shall take to transition from a present state to a new state. The parameter has a 6-bit field for the number of steps and a 2-bit field for the time for each step.

Number of steps (6-bit field):

- 0x00: Immediate transition
- 0x01-0x3E: number of steps

Time resolution per step (2-bit field):

- 0b00: Resolution 100ms
- 0b01: Resolution 1 second
- 0b10: Resolution 10 seconds
- 0b11: Resolution 10 minutes

withDelay:Delay

uint8_t: Message execution delay in 5 millisecond steps.

isUnacknowledged: responseFlag

BOOL: Determines whether the command is acknowledged or unacknowledged. Acknowledged requires the receiver to send a response message:

- False = Acknowledged
- True = Unacknowledged

TemperatureValue:temperature

Uint16_t: color temperature of tunable white light emitted by an element.

DeltaUVValue:deltaUV

Uint16_t: deltaUV value of from CIE 1976 curve, it determines the distance from the black body curve.

4.17 Health model methods

4.17.1 Get Faults

(STMeshStatus)healthModelGetFaults:(uint16_t)peerAddr companyIdentifier:(uint16_t)cid;
This method is used to read all the present faults related to the peer node.

4.17.2 Clear Faults

(STMeshStatus)HealthFaultClear:(uint16_t) peerAddr companyIdentifier:(uint16_t) cid isUnacknowledgedCommand:(bool) isUnacknowledged;
This method is used to clear all the faults from the fault register without waiting for an acknowledgement message.

(STMeshStatus)HealthFaultClear:(uint16_t) peerAddr companyIdentifier:(uint16_t) cid;
This method is used to clear all the faults from the fault register (by default Acknowledge message).

4.17.3 Get Health Period

(STMeshStatus)HealthPeriodGet:(uint16_t) peerAddr;
This method is used to get the health period from a respective peer node.

4.17.4 Set Health Period

(STMeshStatus)HealthPeriodSet:(uint16_t) peerAddr fastPeriodDivisor:(uint8_t)fastPeriodDivisor isUnacknowledgedCommand:(bool) isUnacknowledged;
This method is used to set the health period by passing the fastPeriodDivisor argument without waiting for an acknowledgement message.

(STMeshStatus)HealthPeriodSet:(uint16_t) peerAddr fastPeriodDivisor:(uint8_t)fastPeriodDivisor;
This method is used to set the health period by passing the fastPeriodDivisor argument (by default Acknowledge message)

Note: FastPeriodDivisor splits the current health period value.

The response to Health Period get/set message is Health Period status message.

4.17.5 Get Health Attention

(STMeshStatus)HealthAttentionGet:(uint16_t) peerAddr;
This method is used to get health attention from a respective peer node.

4.17.6 Set Health Attention

(STMeshStatus)HealthAttentionSet:(uint16_t) peerAddr attention:(uint8_t)attention isUnacknowledgedCommand:(bool) isUnacknowledged;
This method is used to set the health attention by passing the attention argument (without waiting for the acknowledgement message).

(STMeshStatus)HealthAttentionSet:(uint16_t) peerAddr attention:(uint8_t)attention;
This method is used to set the health attention by passing the attention argument (by default Acknowledge message).

Note: The response to Health Attention get/set messages is Health Attention status message.

@property(weak, nonatomic) id<STMeshHealthModelDelegate> delegate;
This delegate must be confirmed to get the callbacks of the methods.

4.17.7 Health Status

(void) healthModel:(STMeshHealthModel*)healthModel didReceiveHealthStatusFromAddress: (uint16_t)peerAddr withPresentsFaults:(NSArray*)faultsArray;
This callback is called when register fault status is received from the peer node. All the present fault will be present in faultsArray.

4.17.8 Health Period Status

(void) healthModel:(STMeshHealthModel *)healthModel didReceiveHealthPeriodStatusResponseFromAddress:(uint16_t)peerAddr WithFastPeriodDivisor: (uint8_t)fastPeriodDivisor;
This callback is called when the Health Period Status is received from the peer node.

4.17.9 Health Attention Status

(void) healthModel:(STMeshHealthModel *)healthModel didReceiveHealthAttentionStatusResponseFromAddress:(uint16_t)peerAddr WithAttention:(uint8_t)attention;
This callback is called when Health Attention Status is received from the peer node.

4.18 Heartbeat model methods

4.18.1 Get Heartbeat Publication

(STMeshStatus)heartbeatPublicationGet:(uint16_t)peerAddress;
This method is used to get the Heartbeat Publication from a peer node.

4.18.2 Set Heartbeat Publication

(STMeshStatus)heartbeatPublicationSet:(uint16_t) peerAddr destinationAddress:(uint16_t) destinationAddress countLog:(uint8_t)countLog periodLog:(uint8_t)periodLog TTL:(uint8_t)TTL features:(uint16_t)features netKeyIndex:(uint16_t)netkeyIndex;
This method is used to set the Heartbeat Publication from a peer node.

Note: The response to Heartbeat Publication get/set message is Heartbeat Publication status message.

4.18.3 Get Heartbeat Subscription

(STMeshStatus)heartbeatSubscriptionGet:(uint16_t) peerAddr;
This method is used to get the Heartbeat Subscription from a peer node.

4.18.4 Set Heartbeat Subscription

(STMeshStatus)heartbeatSubscriptionSet:(uint16_t) peerAddr sourceAddress:(uint16_t)sourceAddress destinationAddress:(uint16_t)destinationAddress periodLog:(uint8_t) periodLog;
This method is used to set the Heartbeat Subscription from a peer node.

Note: The response to the Heartbeat Subscription get/set message is Heartbeat Subscription status message.

@property(weak , nonatomic) id<STMeshHeartBeatModelDelegate> delegate;
This delegate must be confirmed to get the callbacks of the methods.

4.18.5 Heartbeat Publication Status

(void) heartbeatModel:(STMeshHeartbeatModel *)heartbeatModel didRecieveHeartbeatPublicationsStatusFromAddress:(uint16_t)peerAddress statusCode:(uint8_t)status destinationAddress:(uint16_t)destinationAddress countLog:(uint8_t)countLog periodLog:(uint8_t)periodLog TTL:(uint8_t)TTL features:(uint16_t)features netKeyIndex:(uint16_t)netKeyIndex;
This callback is called when Heartbeat Publication Status is received from a peer node.

4.18.6 Heartbeat Subscription Status

(void) heartbeatModel:(STMeshHeartbeatModel *)heartbeatModel didRecieveHeartbeatSubscriptionStatusFromAddress:(uint16_t)peerAddress statusCode:(uint8_t)status destinationAddress:(uint16_t)destinationAddress periodLog:(uint8_t)periodLog countLog:(uint8_t)countLog minHops:(uint8_t)minHops maxHops:(uint8_t)maxHops
This callback is called when Heartbeat Subscription Status is received from a peer node.

5 BlueNRG-Mesh iOS Library API: classes

`NetworkSettings` object contains the provisioning data required by provisioner to manage and control the nodes on the network. It can also be used by user application to display a list of nodes in UI.

Types used in the API are defined as below.

```
@class STMeshNode;
@class STMeshElement;
@class STMeshProvisionerData;
@class STMeshModel;
@class ProvisioningRangeObjects;
@class STMeshNodeFeatures;

@interface STMeshGroup:NSObject
@property(nonatomic) NSString *groupName;
@property(nonatomic) uint16_t groupAddress;
@property(nonatomic) BOOL switchState;
@property(nonatomic) NSMutableArray<STMeshElement*> *subscribersElem;

@end

@interface STMeshNode:NSObject
@property(nonatomic) NSString *nodeName;
@property(nonatomic) NSString *nodeUUID;
@property(nonatomic) NSString *deviceKey;
@property(nonatomic) BOOL isProxyNode;
@property(nonatomic) BOOL switchState;
@property(nonatomic) uint16_t publishAddress;
@property(nonatomic) uint16_t unicastAddress;
@property(nonatomic,strong) id publishTarget;
@property(nonatomic) BOOL configComplete;
@property(nonatomic) BOOL blacklisted;
@property(nonatomic) NSString * cid;
@property (nonatomic) NSString * pid ;
@property(nonatomic) NSString * vid;
@property (nonatomic) NSString * crpl;
@property (nonatomic) STMeshNodeFeatures * features;
@property(nonatomic) NSMutableArray<STMeshElement *> *elementList;
@property(nonatomic) NSMutableArray<STMeshElement*> *subscribedGroups;

@end


@interface STMeshElement : NSObject
@property (nonatomic) uint8_t index;
@property (nonatomic) NSString *elementName;
@property (nonatomic,strong) id  publishTarget;
@property (nonatomic) uint16_t unicastAddress;
@property (nonatomic) NSMutableArray<STMeshModel*> *modelList;
@property(nonatomic) BOOL configComplete;
@property (nonatomic) NSMutableArray<STMeshGroup*> *subscribedGroups;
@property(nonatomic) STMeshNode * parentNode;
@end

@interface ProvisioningRangeObjects : NSMutableDictionary

-(id)initRangeObjectsWithMinValue:(NSString*)lowRange maxValue:(NSString*)highRange;

@end


@interface STMeshProvisionerData : STMeshNode
@property (nonatomic) NSString *provisionerName;
@property (nonatomic) NSString *provisionerUUID;
```

```
@property (nonatomic) NSMutableArray<ProvisioningRangeObjects*> *marrProvisionerAllocatedUnic
astRange;
@property (nonatomic) NSMutableArray<ProvisioningRangeObjects*> *marrProvisionerAllocatedGrou
pRange;

@end


@interface STMeshNetworkSettings : NSObject

@property(nonatomic) uint32_t iVindex;
@property(nonatomic) NSString *netKey;
@property(nonatomic) NSString *appKey;
@property(nonatomic) NSString *devKey;
@property(nonatomic) NSString *meshName;
@property(nonatomic) NSString *meshUUID;

@property BOOL useDefaultSecuritiesCredential;
@property(nonatomic) NSMutableArray<STMeshNode*> *nodes;
@property(nonatomic) NSMutableArray<STMeshGroup*> *groups;
@property (nonatomic) NSMutableArray<STMeshProvisionerData*> *provisionerDataArray;
@property (nonatomic) NSMutableArray<STMeshProvisionerData*> *onlyProvisionerArray;

+ (instancetype) initAsNewNetwork;
- (void)reinitNetworkDataList;
@end

@interface STMeshModel: NSObject
@property(nonatomic) uint32_t modelId;
@property(nonatomic) NSString * modelName;
@property(nonatomic) NSMutableArray<STMeshGroup*> *subscribeList;
@property(nonatomic) id publish;

@end

@interface STMeshNodeFeatures :NSObject
@property(nonatomic) uint8_t relay;
@property(nonatomic) uint8_t proxy;
@property(nonatomic) uint8_t friendFeature;
@property(nonatomic) uint8_t lowPower;

@end
```

6 Notes for developers

1. The library is compiled with iOS 11 as the base SDK
2. The minimum deployment target is iOS 10.2
3. The library is provided as a (arm64+x86) fat binary.
4. The library includes a Dummy mode to debug app UI functionality with a simulator (where BLE is not available).
5. The client application should use –ObjC flag in “other linker settings” to allow XCode to import categories used by demo application. If you decide not to use these categories, skipping the flag may result in a slightly smaller app archive.
6. The client application should include a dummy/empty C++ file to indicate to XCode to use C++ bindings if you encounter linking errors.

Revision history

Table 3. **Document revision history**

Date	Version	Changes
21-May-2018	1	Initial release.
21-Sep-2018	2	Updated all content to reflect BlueNRG-Mesh version 1.05.000.

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BlueNRG-Mesh iOS SDK glossary

(Mesh) Address

Mesh addresses are used to uniquely identify nodes or groups of nodes.

(Mesh) Element

An addressable unit within a node; e.g., a single socket on a switchboard with multiple sockets. Each element has its own unicast address.

(Mesh) Node

A device that is registered on a mesh network.

Generic attributes

Generic Attributes (GATT), define a hierarchical data structure used to expose data fields and their properties in BLE devices. In a mesh network, GATT is a bearer used to communicate in the mesh network. GATT bearers send and receive mesh packets via a proxy node over a BLE connection.

JavaScript Object Notation

JavaScript Object Notation is a lightweight data exchange format.

Local data

Data stored on a node is called local data.

Opcode

The vendor data consists of opcode and corresponding parameters.

Provisioner

An entity that adds an unprovisioned device to a network by allocating security information necessary for communicating in the mesh network. It also configures new nodes and sends commands to the mesh nodes.

Proxy node

Currently, nodes receive and transmit BLE Mesh messages in a mesh network through a special proxy node, and smartphones communicate with proxy node over a GATT connection.

Universally Unique ID

Universally Unique ID is the standard way to identify mesh devices on a mesh network.

Unprovisioned device

A device that is not yet registered on a mesh network.

Vendor model

Bluetooth® Mesh Profile defines models to represent node states and messages to operate on these states. The BlueNRG-Mesh SDK provides a vendor model that allows data to be sent and received in a vendor defined format.