## Introduction

BLE gateway is mainly used for communicating with devices with BLE function, and uploading device data to the cloud, or download cloud data to device.

Devices requirements:

- Bluetooth 5.0/4.0/4.2/4.1 and newer, e.g. BLE sensor, iBeacon/Eddystone beacon, smart wristband, smart heart rate band.

- Not support traditional bluetooth(BLE3.0/2.0) devices like bluetooth speaker, bluetooth headset.

## Features for KGateway outdoor



- Water proof-IP54/Sun proof
- BLE5.0 Long distance Feature
- BLE distance: > 300 meters in open space
- Open protocol: Local server or HTTPS/MQTT to cloud
- Bi-directional: reads advertisement data and sends command(update beacon parameters from cloud)
- Configuration: Web portal and phone protal
- Transmit: ETH/Wifi/Wifi-hopping or usb extend(3G/4G module)
- Power: 5V DC or ETH PoE(802.3af)
- Base on latest OpenWrt 18.29
- BLE chip: nRF52840/TI CC2640 R2F
- With 3dBi flexible FPC antenna

- Up to 300 Mbps PHY data rate
- Built-in RTC and NTP support
- 2T2R 2.4GHz frequency band
- IEEE 802.11b/g/n
- Supports 802.3af PoE standard
- Supports firmware upgrade Over-the-Air
- Supports remote configuration
- POE status LED indicator
- Data usage monitoring

## Features for KGateway indoor

- Slim design, easy to install on roof/wall
- BLE5.0 Long distance Feature
- BLE distance: > 300 meters in open space
- Open protocol: Local server or HTTPS/MQTT to cloud
- Bi-directional: reads advertisement data and sends command(update beacon parameters from cloud)
- Configuration: Web portal and phone protal
- Transmit: ETH/Wifi/Wifi-hopping or usb extend(3G/4G module)
- Power: 5V DC or ETH PoE(802.3af)
- Base on latest OpenWrt 18.29
- BLE chip: nRF52832
- With 3dBi flexible FPC antenna

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- Supports firmware upgrade Over-the-Air
- Supports remote configuration
- POE status LED indicator
- Data usage monitoring

## Specifications

BG-TI01
BG-NR01

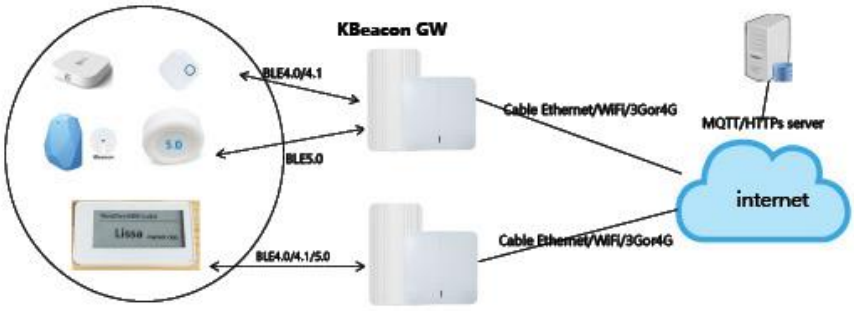
| Item | Description |
|---|---|
| Power | -802.3af PoE<br>-DC 5V |
| Scanning ability | - > 240 beacon per 1 second(nRF52840)<br>- >120 beacons per 1 second (TI CC2640 R2F) |
| Wireless distance | - BLE5.0: > 300 meters<br>- BLE4.0/4.1/4.2 > 100 meters<br>(depends on environment) |
| Transmitting way | -ETH RJ45<br>-WIFI<br>-WIFI hoppen<br>-USB (For 3G/4G dongle) |
| Transmitting protocol | -HTTPS<br>-MQTT |
| Installation way | -Screw |
| Waterproof/Dustproof | -IP54 |
| Size | -173*90*45mm |
| Material | - ABS |

## Specifications

BG-NR02

| Item | Description |
|---|---|
| Power | -802.3af PoE<br>-DC 5V |
| Scanning ability | - > 240 beacon per 1 second |
| Wireless distance | BLE4.0/BLE4.1/BLE4.2/BLE5.0 > 300m<br>(with amplifier)<br>(depends on environment) |
| Transmitting way | -ETH RJ45<br>-WIFI<br>-WIFI hoppen<br>-USB (For 3G/4G dongle) |
| Transmitting protocol | -HTTPS<br>-MQTT |
| Installation way | -Screw |
| Waterproof/Dustproof | -NA |
| Size | -165*165*25mm |
| Material | - ABS |

## Architecture




Connect the BLE device to cloud

# What is BLE5.0

BLE5.0 release at 2017H1, The BLE5.0 protocol is mainly for IOT Scenario, for example, long distance, high data, extend advertisement packet.

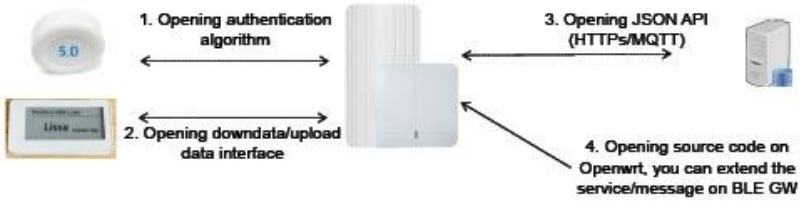
| Feature | BLE4.0 | BLE5.0 | Supported chip |
|---|---|---|---|
| Long distance | ➢ 1Mbps GFSK | ➢ 1Mbps GFSK, Compatible with BLE4.0<br>➢ 2Mbps GFSK (New)<br>➢ SO2 GFSK(New)<br>➢ SO8 GFSK (New): 4x long distance than BLE4.0 | - TI CC2640R2F<br>- TI CC2642<br>- Nordic NRF52840 |
| Data Rate (Highest Speed) | ➢ 1Mbps | ➢ 2Mbps(The same data transfer time is ½ as BLE4.0, and will be more lower power | - TI CC2640R2F<br>- TI CC2642<br>- Nrodic NRF52832<br>- Nordic NRF52840 |

**Some Bluetooth GW claim to support Bluetooth 5.0, but do not support Long distance feature**

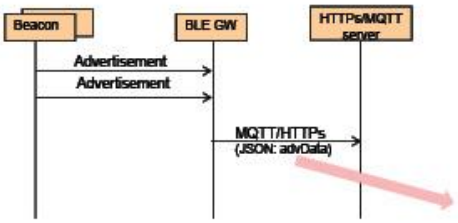
# 1. Opening Design

KBeacon gateway is not just an BLE sniffer/scanner. It's an **open platform to make your IOT device easily connect to cloud.**

All the interface are opening for third part.
- Support third part BLE device connect to the cloud via BLE GW;
- Support third part MQTT/HTTPS server;
- Support your own firmware running on BLE GW;



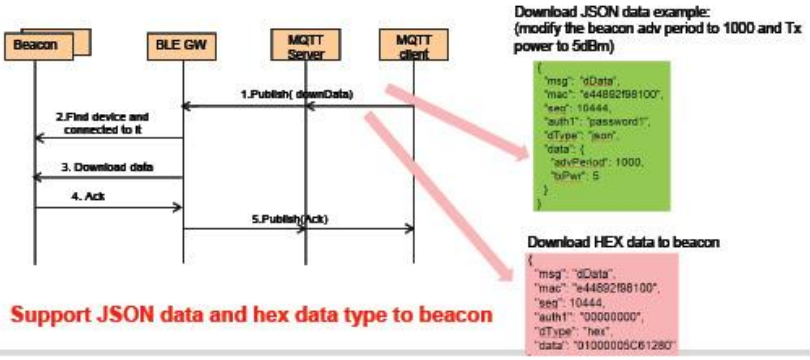

# 1. Open API Example: Scanning data and report to cloud




advData packet example


```
{
 "msg": "advData",
 "gmac": "65E965E28547",
 "adv": [
  {
   "dmac": "B45D0196FFFF",
   "rssi": "-53",
   "data1": "0201060302E0FF03095445"
  },
  {
   "dmac": "BD0389AB78CC",
   "rssi": "-92",
   "data1": "0201060302E0FFAB4D028D0389AB78CC"
  }
 ],
 "seq": 5091
}
```

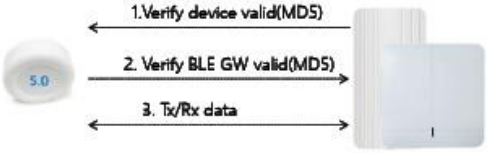
## 1. Open API Example: Down data from cloud to Beacon




**Support JSON data and hex data type to beacon**

## 2. BLE device security

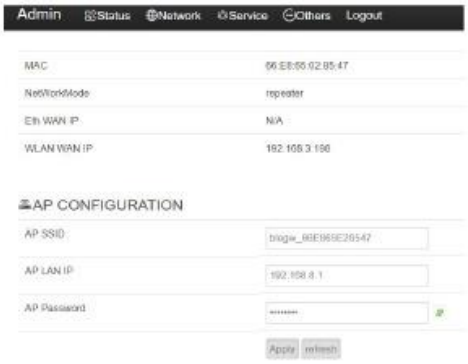
1. To ensure that the devices and gateways are not illegally connected. BLE Gateway and device using Bi-directional MD5 with random authentication.




## 3. Configuration UI

Support Web portal configuration, for example: chrome explore

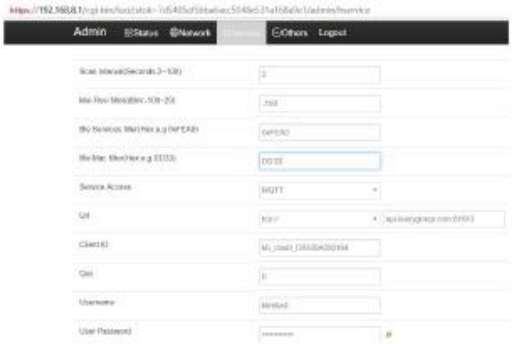
- No need to install app



## 3. Configuration UI: filter device

Multiple filtering methods

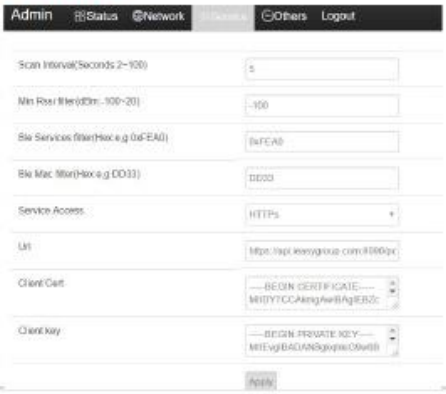
- ✓ Can filter by mac address
  - for example, set to 0x*DD33* to filter all beacon procedure by KKM
- ✓ filter by services ID
  - for example, set to 0xFEA0 to filter ESL type beacon




## 3. Configuration UI : HTTPs

The gateway supports transmitting via HTTPS

- ➢ Server URL
- ➢ Device authentication
  - ✓ Client Cert
  - ✓ Client Key




## 4. BLE5.0 long distance test

## Usage scenario—connect KESL to cloud

ESL Price Tag connect by wireless


## Usage scenario— KESL

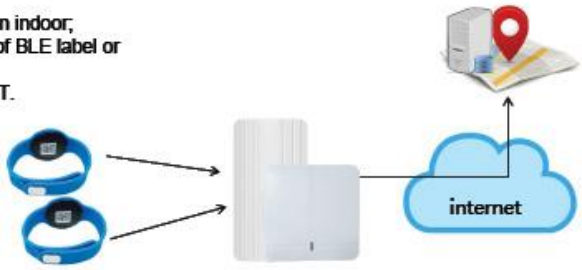

Bluetooth5.0 KESL

| Item | Description |
|---|---|
| Power | - CR2450*2 |
| Wireless distance | - Outdoor around 150 meters<br>- Indoor around 30-50 meters<br>(depends on environment) |
| Screen Size | - 2.9 inch |
| Work time | > 3 yeas, 3 times refresh/day |
| Size | - 93.4*45*11.9mm |
| Material | - ABS |

## Usage scenario---Indoor navigation

Use for staff or asset location indoor;
Scanning the broadcasting of BLE label or wristband;
Uploading to cloud via MQTT.

Product:
- K5 beacon




## Usage scenario ---IOT sensor

Connecting all kinds of sensor to cloud;
Scanning the BLE broadcasting
of temperature/heart rate/
blood pressure devices then upload them
to cloud via MQTT.

BLE gateway for IOT sensor