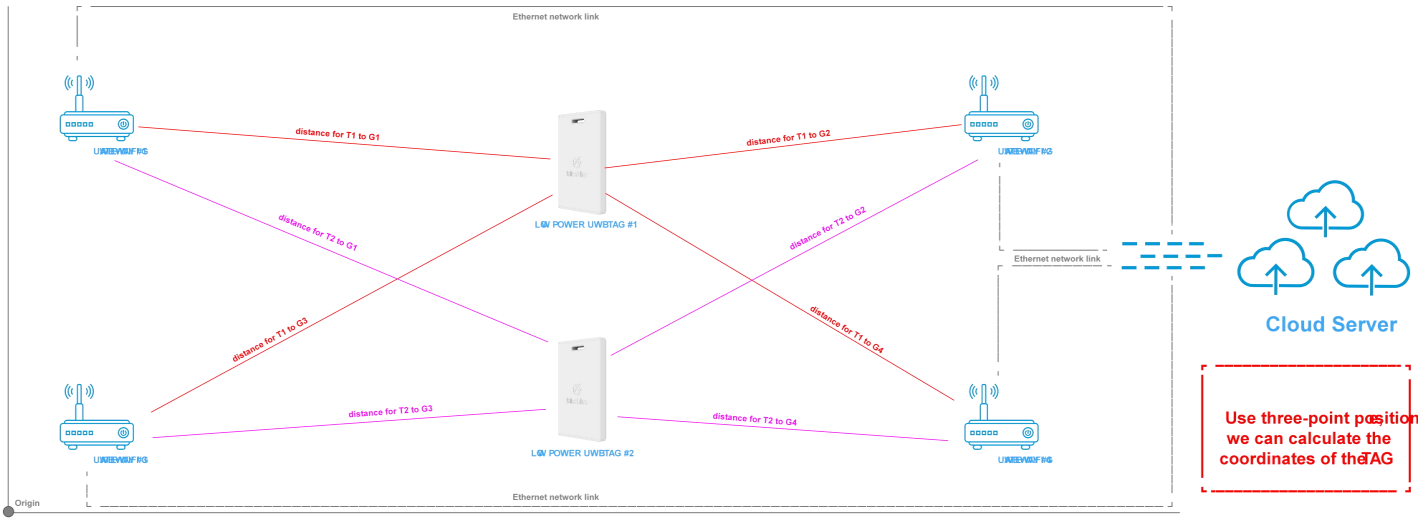
The UWB kits for indoor location

The UWB kits consists of two parts. The first part is UWB Tag, which we call UWB Node, and the second part is UWB Gateway, which is used to measure the distance from Node. At the same time, the measured distance is uploaded to the server for positioning calculation. Here is an example.

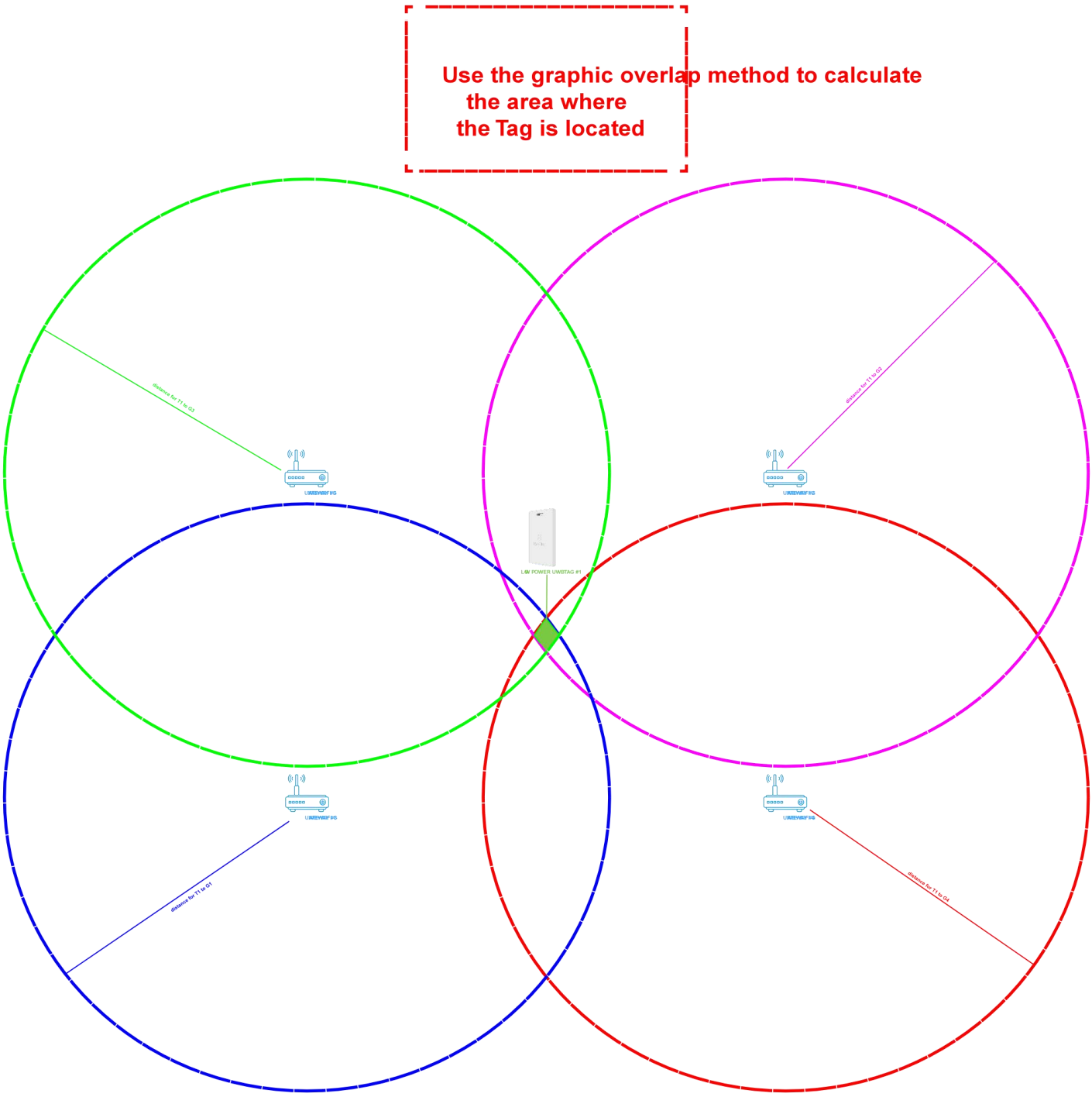


There are some points need to be pointed out

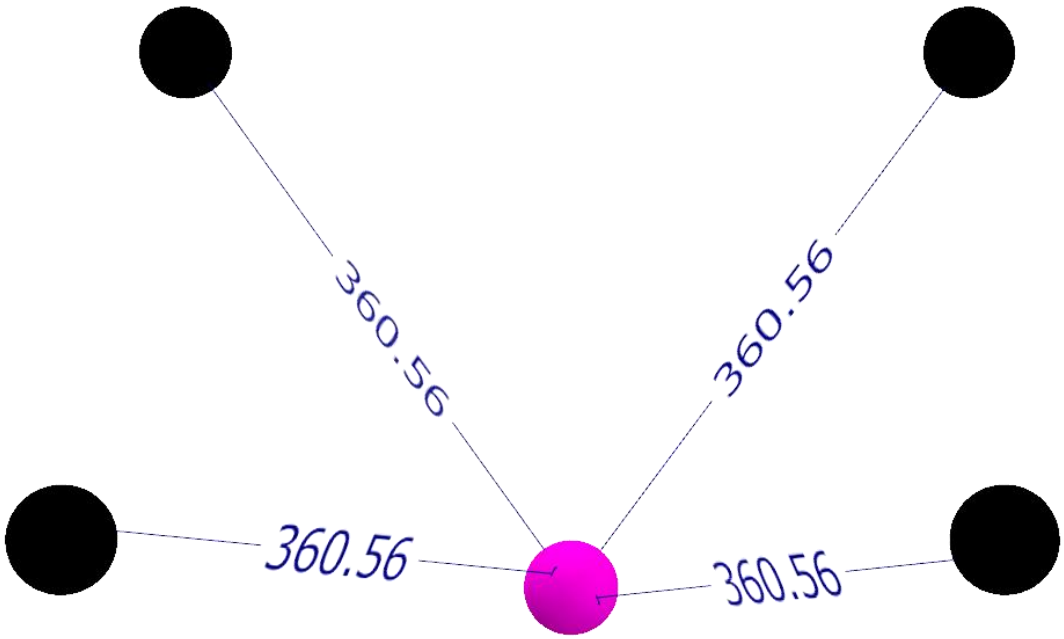
- Each tag can measure the distance from the surrounding Gateway.
- Each Gateway can also get the distance between each Tag and itself.
- Gateway can transmit the distance information to the Server through the WIFI network.
- Tag's position calculation will be done on the server side.
- The document only supplemented the UWB part. For the operation of the WIFI part, please refer to W1-User Guide.

1. Positioning display in two-dimensional form

The below picture shows the positioning method of two-dimensional graphics. Through the Gateway, the distance information between the Tag and each Gateway can be collected, and then draw a circle with the distance as the radius. The overlapping area of the circle is the range where the Tag is located.



However, the environment we are in is a three-dimensional space, so this requires that the location of the Gateway is always higher than that of the Tag, thus we can determine the height difference between the Tag and the Gateway from the two space points.



- **UWB Gateway product introduction**

UWB Gateway is a product that integrates Bluetooth 5.0, WIFI and UWB functions. Through Bluetooth 5.0, we can set and modify some basic parameters of the product, and at the same time, we can upgrade the firmware of the product through Bluetooth 5.0. Through the integrated WIFI function, the data collected by UWB can be transmitted locally or remotely. It is easy to use. Simply configure the network of the product and and it can start to work.

- **UWB Tag product introduction**

UWB Tag integrates two parts, Bluetooth 5.0 and UWB. Through Bluetooth 5.0, some parameters of the product can be set and modified, and it also supports adjusting the frequency of positioning to reduce the power consumption and increase the service life of the product. Under the default settings, it can be used for about 200 days after a single full charge. There is a built-in button for turning the device on and off. The user only needs to press the button to set the device to the ON state and it will work normally.

● How to set up UWB Gateway

The parameter settings of the Gateway include the SSID and Password of the WIFI, and the Host, Path, and Port of the Server. It supports both http and https protocols. When the port is set to 433, the https protocol is automatically used. For other ports, it uses the http protocol by default.

● How to activate and deactivate UWB Tag

1. Turn on

Long press the button located in the middle position at the bottom of the Tag, the green light is on and it indicates that the product is in sleep mode. When the green light is off and the red light starts to flash, it means that the product has been activated.

2. Turn off

Long press the button located in the middle position at the bottom of the Tag, the red light is on and it indicates that the product has been activated already. When the red light is off and the red light starts to flash, it means that the product has been turned off.

About Upload Data to Server

Protocol: HTTP/HTTPS

Method: POST

Parameters:

[apiKey: [CustomConfiguredKey]

Body (JSON):

```
{
  "transmitterSerialNumber" : "ABAB12", // UWB Gateway Hex ID
  "nodeType": "UWBReader",
  "nodeSerialNumber": "3", //
  "reads": [
  {
  "timeStampUTC": 1615194125,
  "deviceUID": "ABAB52", //   UWB Tag Hex ID
  "manufacturerName": "MeeBlue"
  }
  ]
}
```

● Services Introduction

The Base UUID of MEEBLUE Beacon is D35B0000-E01C-9FAC-BA8D-7CE20BDBA0C6, all UUID is a 128bit representation. When we say that the UUID is 0x9000, the actual UUID is

D35B9000-E01C-9FAC-BA8D-7CE20BDBA0C6

This point will not be described later.

Service 0x9000

Characteristic	Property	Value Length	Function
0x900A	Read/Write	64 Bytes	Configure apiKey
0x900B	Read	4 Bytes	Read "transmitterSerialNumber"

● Use meeblue server to test UWB Gateway

1. Server Configure Information

Host: meeblue.com
Path: /meeblue/gateway/uwb/debug
Port: 443

2. Check the data upload to meeblue server

Check Link: https://meeblue.com/meeblue/gateway/debug?id=transmitterSerialNumber

The transitterSerialNumber can be found under the characteristic values 0x9000->0x900B, See the above table for details.

Please note that the data encoding format under this characteristic is Little-Endian, and the ID in the link is Big-Endian. At the same time, it is necessary to remove the data with header of zero.

3. example:

The hexadecimal data read under the characteristic 0x9000->0x900B is 0xE0001000

It needs to be converted to Big-Endian data: 0x001000E0

Therefore, the corresponding request link is: https://meeblue.com/meeblue/gateway/debug?id=1000E0

Revision history

Date	Revision	Changes
2022-06-29	1.0.0	First release
2023-03-28	1.0.1	Add characteristic & Test method