



# Bluetooth<sup>®</sup> mesh Introduction

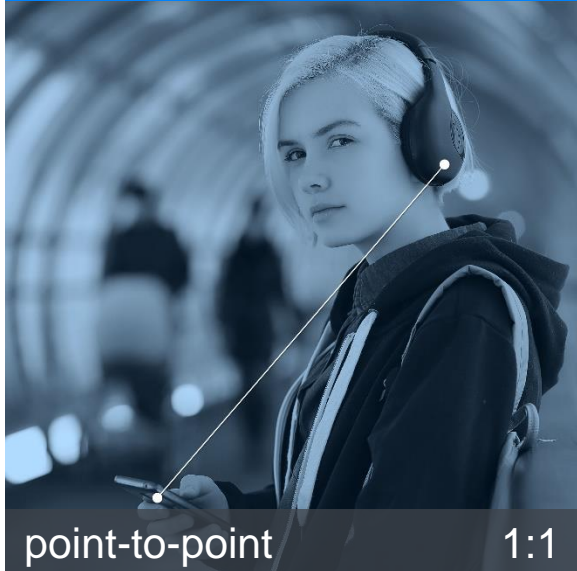
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China IoT Developer Conference, Beijing

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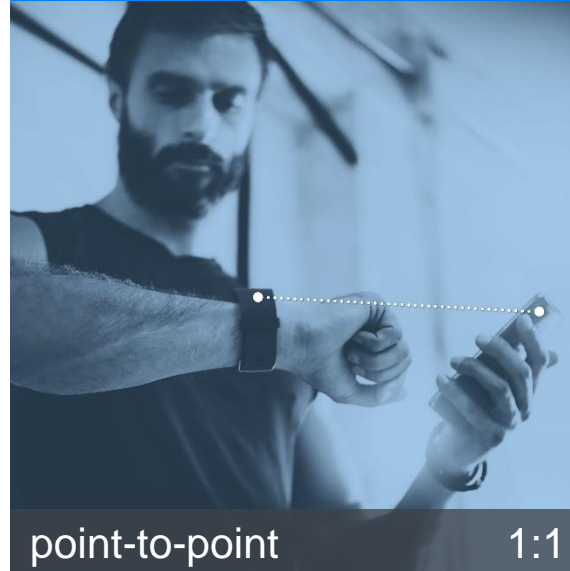
### Bluetooth<sup>®</sup> BR/EDR



audio streaming

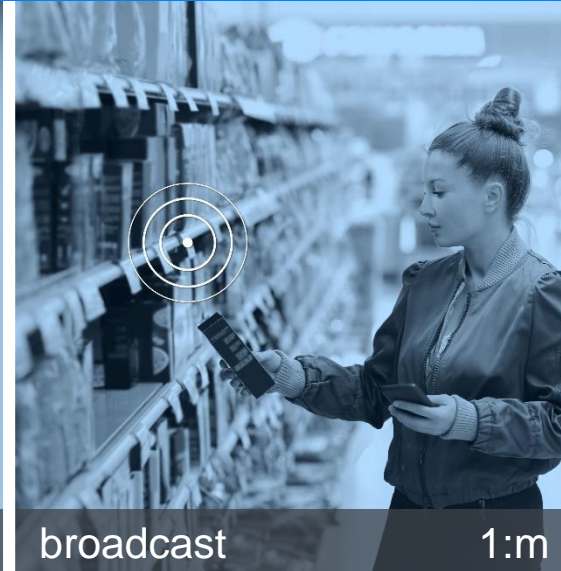
- wireless headsets
- wireless speakers
- in-car audio

### Bluetooth<sup>®</sup> LE



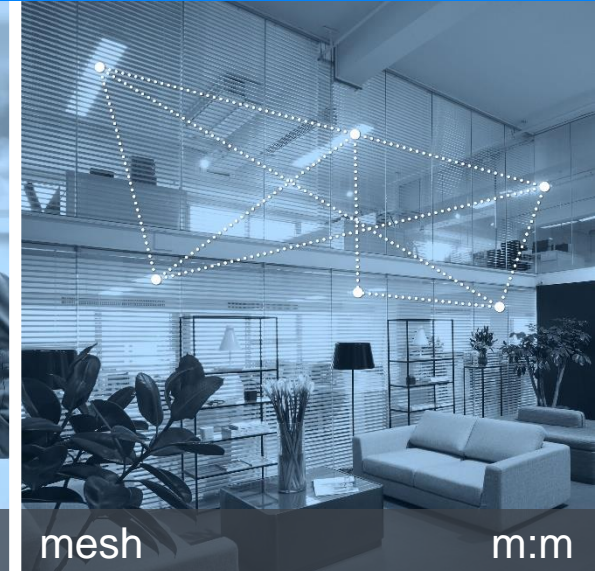
data transfer

- sports & fitness devices
- health & wellness devices
- peripherals & accessories



localized information

- point of interest beacons
- item finding beacons
- way finding beacons



large device networks

- building automation
- wireless sensor networks
- asset tracking

# Bluetooth mesh - the new Bluetooth kid on the block



**smart buildings**

**smart homes**

**sensor networks**

**asset tracking**

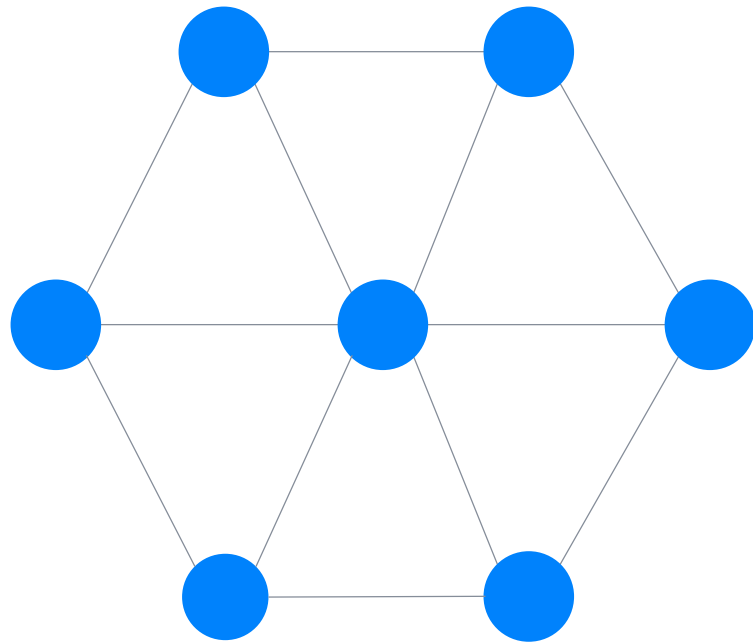
**way finding / indoor navigation**

**more....**



**Bluetooth mesh**

**Fundamentals**

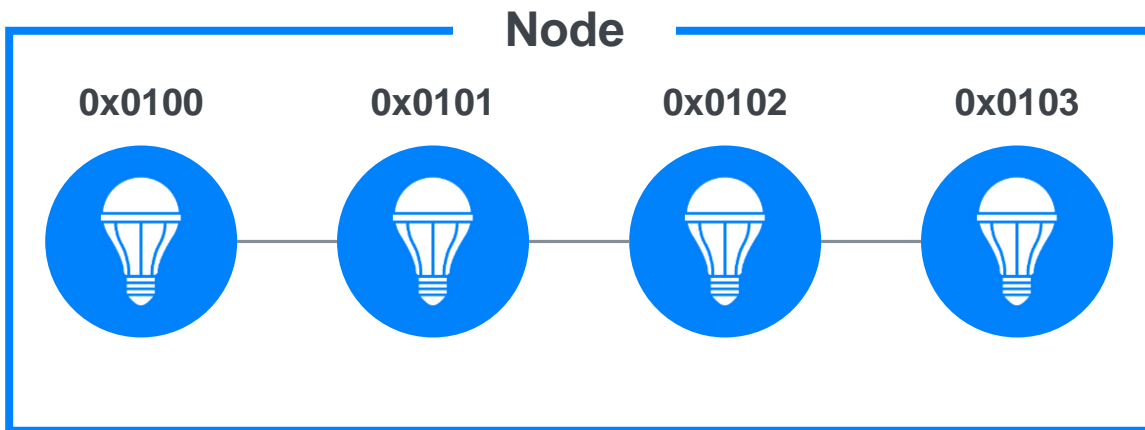


**Device** is now a **node** on the network

# Device and Node

- Device - a Bluetooth LE device which is not yet part of a mesh network;
- Provisioning - The procedure which lets a device join a mesh network;
- Node - A Bluetooth Device which has joined a mesh network becomes known as a Node;



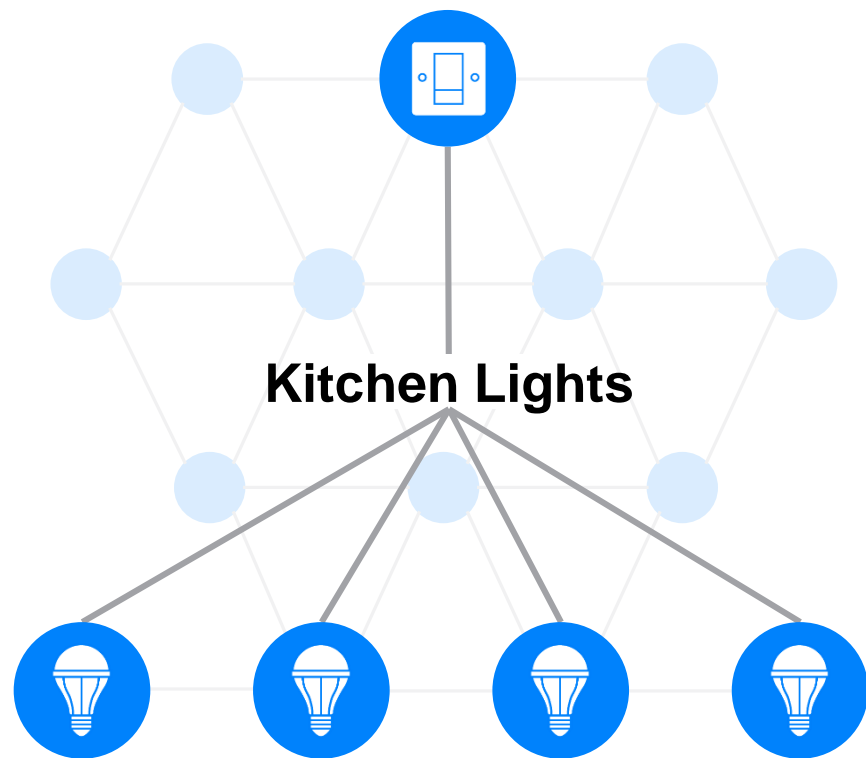


## addresses

messages are sent to a **destination address** and from a **source address**

several types of address are defined:

Unicast  
Group  
Virtual



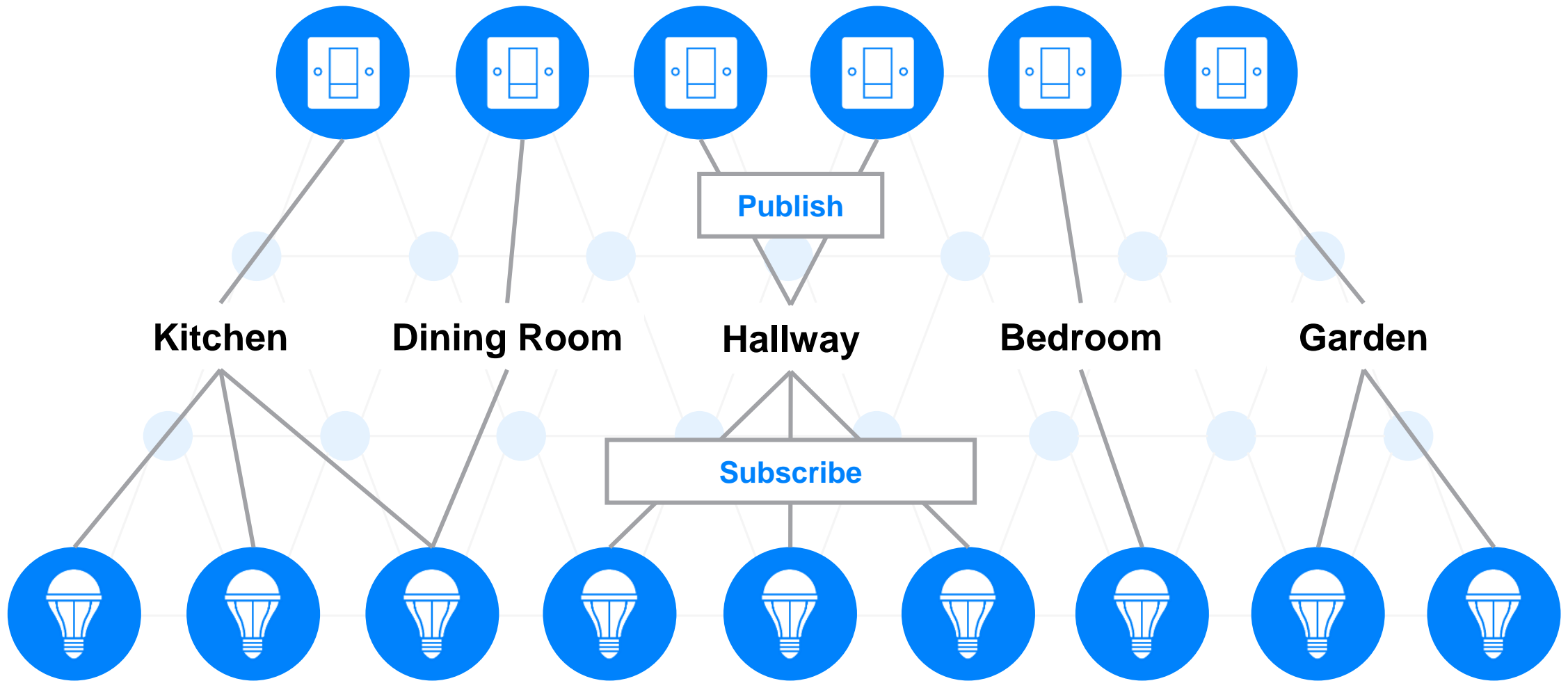
## addresses - group

a **group** address is a multicast address which represents one or more nodes

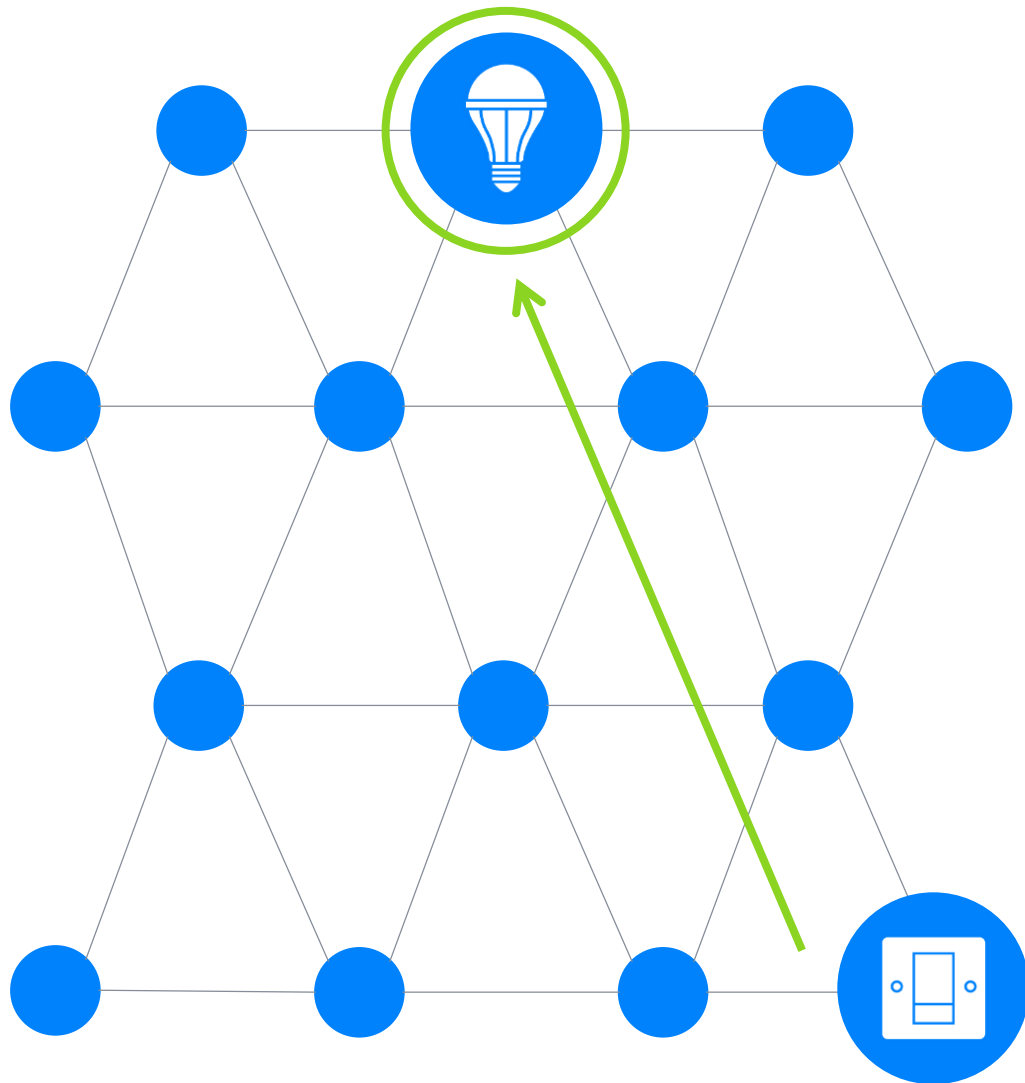
usually corresponds to something structural like a particular room in a building

set during configuration, meaningful to humans

# the publish/subscribe communication model



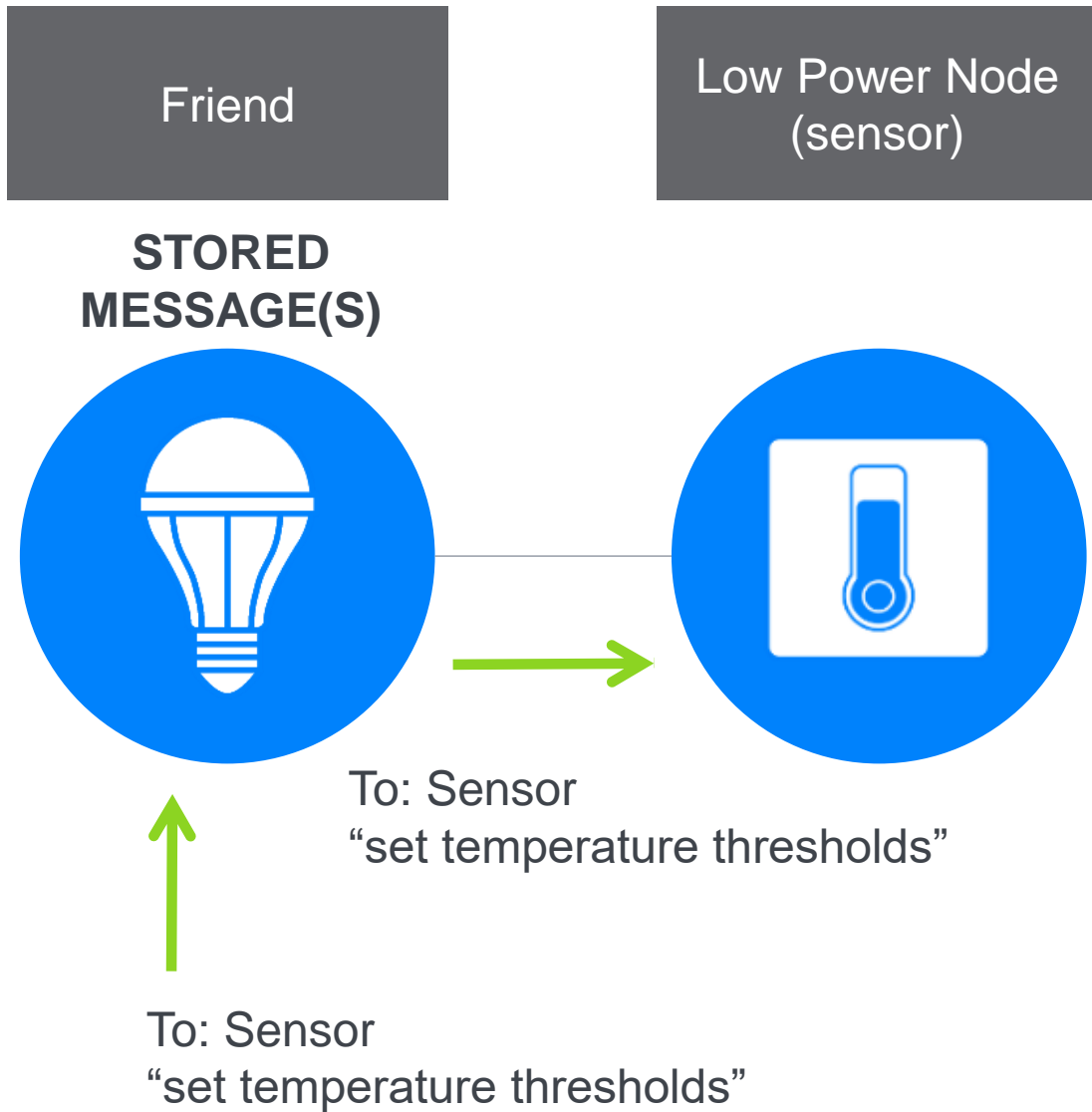




# Managed Flooding

- Mesh networks which use the flooding technique;
- It avoids single node failure;
- No need routing table maintain;
- Rapid message response;

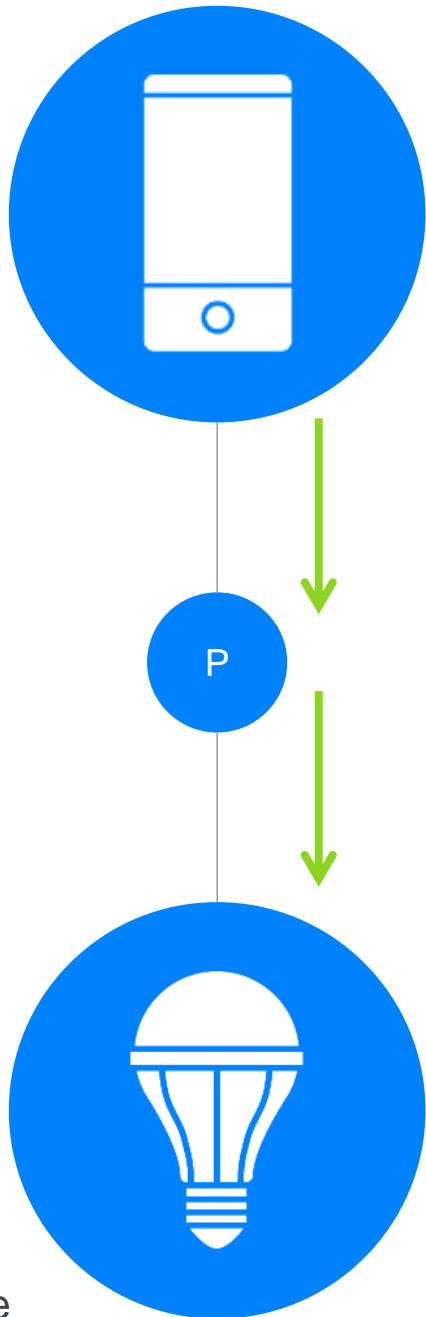




# Friend and Low Power Node

- Low power nodes (LPNs) are highly power constrained;
- LPN reduce the duty cycle to saving power;
- LPN needs Friend node to store messages addressed to LPNs
- LPN uses polling mechanism to get stored message(s);





P = Proxy node

# Proxy

- Proxy Nodes allow standard, in-market Bluetooth low energy devices to communicate with a mesh network;
- Proxy Nodes implement 2 GATT services :
  - Mesh Provisioning Service;
  - Mesh Proxy Service;





# Security

- Mesh security is mandatory;
- Ellipse Curve Diffie-Hellman(ECDH) for key distribution protection;
- AES128-CCM for encryption and authentication;
- Network key and application key is separated;
- Message obfuscation;
- Against replay attacks and trashcan attacks;



## Bluetooth mesh resource

- Specification, <https://www.bluetooth.com/specifications/mesh-specifications>
- Blog post, <http://blog.bluetooth.com/category/bluetooth-mesh>
- Bluetooth mesh FAQ, <https://www.bluetooth.com/what-is-bluetooth-technology/how-it-works/le-mesh/mesh-faq>
- Paving the Way for Smart Lighting, <https://www.bluetooth.com/what-is-bluetooth-technology/how-it-works/le-mesh/mesh-paving>
- Bluetooth Mesh Glossary of Terms, <https://www.bluetooth.com/what-is-bluetooth-technology/how-it-works/le-mesh/mesh-glossary>



# Bluetooth World Series 2018



## **Bluetooth Asia 2018**

27-28, March

Shenzhen Convention &  
Exhibition Center

Shenzhen China

## **Bluetooth World 2018**

18-19, Sep

Santa Clara Convention Center  
California USA

<https://bluetoothworldevent.com/>



# Social Media



官方微信



官方微博



thank you



Unthinkably Connected