

Bluetooth Overview Standards & Applications

Introduction

Bluetooth, commercially launched in 1999, is a wireless technology that allows electronic devices to transmit data over short distances, using the 2.4 GHz frequency band. At first, Bluetooth made its name in audio, but it has evolved and is now used for everything from smart homes and cars to asset tracking and patient monitoring.

Bluetooth Classic vs. BLE

Bluetooth is divided into two different radio classes with very specific characteristics and application areas:

Bluetooth Classic is the name of the older legacy version, which includes versions 1.0 through 3.0 (including EDR). It was originally developed for wireless point-to-point transmission of data between a headset and a phone. Whereas new Bluetooth standards are now available, Bluetooth Classic is still used in many applications that require constant streaming of data such as barcode scanning and music as well as by computer peripherals such as wireless keyboards and mice.

Low-energy Bluetooth (BLE) is the second generation Bluetooth, introduced in 2010 and it includes versions 4.0, 4.1, 4.2, 5 and 5.1. Energy efficiency is a key differentiator for BLE and it works the best for transmission of shorter data bursts. Unlike Bluetooth Classic, BLE remains in sleep mode unless data is transmitted, drawing little or no power while idle.

The higher energy efficiency provided by BLE is critical

KOAMTAC - A Bluetooth Pioneer

KOAMTAC has been in the forefront of the adoption of Bluetooth and was the first company to develop Bluetooth scanners for use with both Apple iOS and Samsung mobile devices, including the Tizen OS that runs on the Samsung Gear smartwatch.

for wearables and other devices that use a button battery or have limited charging capability. Some applications demand a device that runs for months or years without battery replacement and BLE makes that possible.

Multiple Ways to Connect

Whereas Bluetooth Classic only supports point-to-point connections, BLE supports multiple network types, including a point-to-point for data transfers, broadcasting for location-based services, and mesh networking for creating large-scale networks where tens, hundreds, or thousands of devices can securely communicate.

Broadcasting makes it possible to broadcast messages from one to many devices and in recent years, the use of Bluetooth beacons has gained traction and are used for everything from helping visitors find their way at airports and museums to enabling retailers engage with shoppers and keeping track of cargo and assets. A beacon is a small radio transmitter that broadcasts messages to other Bluetooth-enabled devices within the proximity of the beacon.

Applications



Inventory

Check
Verify
Adjust



Customer Service

Review
Place Order
Process Payment



Picking

Select
Verify
All Hands-Free



Warehousing

Check In
Check Out
Verify

Topologies



point-to-point



broadcast



mesh

BLE 5, released in 2016, offers four times the range (up to 800 feet), two times speed, and eight times the broadcasting capacity than previous BLE versions. With support for data rates up to 2 megabits per second, BLE 5 is capable of handling much more data intense applications than other BLE versions and it is morer reliable. The extended range makes entire home and building coverage feasible.

The latest update, **BLE 5.1** came out in 2019 and includes accurate positioning that makes it possible to pinpoint the location of the Bluetooth device, down to the centimeter or inch. This opens up many new opportunities for location-based services such as indoor navigation and asset tracking.

Compatibility

Today, Bluetooth is standard in all phones, tablets, and laptops, ensuring interoperability with consumer and enterprise-grade devices and peripherals. Bluetooth is backwards compatible, but the full benefit of an upgrade will only be realized if all the peripherals support the new version. Consequently, old peripherals will still work, but once upgraded they will work even better.

The Future of Bluetooth

Increased power efficiency and lower cost are opening up many new markets for Bluetooth technology. From smart homes and buildings to smart industries and cities,

Bluetooth is thriving in the emerging markets and recent data from ABI Research forecasts that the Bluetooth technology will continue to thrive in these areas over the next five years.

- ▶ 1 billion annual shipments of Bluetooth connected devices by 2023
- ▶ 360 million Bluetooth network devices will ship annually by 2023

KOAMTAC - Everything Bluetooth

KOAMTAC offers a broad selection of Bluetooth-enabled scanners, RFID readers, wearables, and mPOS devices. Several new product releases with BLE5.0 are planned for the end of 2019 and next year. The KDC280 BLE4.1 scanner is scheduled to upgrade to BLE5.0 by the end of 2019. All other classic Bluetooth devices will be upgraded to BLE5.0 and new products will be introduced as such. These cutting-edge solutions make it possible to quickly, securely, and affordably add high performance, enterprise-grade bar code scanning, RFID reading, and payment processing to a regular smartphone.