What is Bluetooth 5.3? Bluetooth 5 versions explained

Bluetooth 5.3 is quickly becoming the standard for new devices. But do you really need to upgrade your hardware to keep up with the latest Bluetooth standards?

A device's Bluetooth version determines data transfer speed, power consumption, and connection stability. However, with so many Bluetooth versions, determining whether you are using the best version can be difficult.

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What is Bluetooth 5.3?

Bluetooth 5.3 launches in 2021 and introduces a number of improvements for consumers and developers.

A major improvement is connection classification. Typically, devices operate on a low-power cycling connection to save energy. However, when high bandwidth support is required, the connection parameters will change almost immediately. Otherwise there will be a delay.

Connectivity ratings make transitions between low power and high power modes faster, eliminating latency and providing a better user experience. For example, headphone audio that uses a secondary rating connection will have less latency than headphones that don't, especially if the headphone is not near the host device.

Bluetooth 5.3 also improves Bluetooth BR/EDR, the driver responsible for negotiating the encryption key size during Bluetooth connection establishment. This change allows the host device to determine the minimum acceptable key size, providing greater control and flexibility over the encryption process. This allows the server to determine the level of security it requires based on the sensitivity of the data being exchanged or compliance with security standards.

Two other notable features of the Bluetooth 5.3 update include channel classification and improvements to the periodic notification process. First, channel classification, allows peripheral Bluetooth devices to communicate with the central device based on the actual radio frequency conditions of the peripheral devices, thereby avoiding interference and improving reliability.

Second, improve the periodic notification process, simplifying the way devices share information. Typically, Bluetooth devices continuously send the same data to ensure it is delivered reliably. Devices using Bluetooth 5.3 can now check for duplicates and skip unnecessary repeats, saving power and potentially extending the device's battery life.

Bluetooth 5.0, Bluetooth 5.1, Bluetooth 5.2 and Bluetooth 5.3

Bluetooth version	**5.0**	**5.1**	**5.2**	**5.3**
Year of release	2016	2019	2020	2021
Data transmission	2Mbps	There was no significant improvement	There was no significant improvement	There was no significant improvement
Contact range	Outdoor range 120 feet	Improves indoor positioning accuracy by 1cm.	There was no significant improvement	There was no significant improvement

Bluetooth version	5.0	5.1	5.2	5.3
New features	Message capacity 255 bytes	Enhanced Bluetooth LE audio	EATT - more efficient data transmission, LC3 codec for improved sound quality and CTKD for enhanced security	Channel classification to reduce frequency interference and improve periodic announcements for better network efficiency

Bluetooth 5.3 brings a bunch of new features, but let's see how it differs from previous versions of Bluetooth 5.

Bluetooth 5.0

Bluetooth 5.0 launched in 2016 and is a major improvement over Bluetooth 4.2. It has a message capacity of 255 bytes, 8 times larger than the 31 bytes of Bluetooth 4.2. This doubles data transfer speeds and quadruples communication range while maintaining low power consumption.

Data transfer speeds increase from 1Mbps to 2Mbps, range is up to 120 feet in indoor environments, and devices using Bluetooth 5 can stay on much longer than legacy devices.

Bluetooth 5.1

The Bluetooth 5.1 upgrade was released in January 2019, allowing connected devices to be located over short distances and determine where the signal originated. The enhancement of location-based services has improved the navigation and tracking capabilities of indoor environments.

Other updates include Generic Attribute Profile (GATT) caching, which has changed the way devices handle repetitive data transfers, reduced power consumption, enhanced notifications, and improved performance. coexistence with other wireless technologies. Bluetooth Low Energy (LE) audio has also been improved for better sound quality and synchronization.

Bluetooth 5.2

Bluetooth 5.2 launched in early 2020 focuses on improving sound quality.

Bluetooth Low Energy Power Control is introduced to optimize power consumption in low power devices. It also introduces Low Complexity Communication Codec (LC3), which delivers higher sound quality, enhancing music streaming and gaming experiences. Together, these two components support Auracast Bluetooth, allowing simultaneous audio streaming from one device.

Bluetooth 5.2 also introduces Enhanced Attribute Protocol (EATT). Previously, Bluetooth devices exchanged attribute data inefficiently to convey information about their status and capabilities. EATT streamlines this data exchange process, making it more direct, resource-efficient, and optimizing communication channels.

Bluetooth 5.2 also introduces Cross-Transport Key Derivation, a protocol that simplifies encryption key management on multi-transport devices, thereby enhancing security.

What is Bluetooth 5.4?

Bluetooth 5.4 is the latest version, officially released in early 2023. It has several updates that improve the functionality of Bluetooth by allowing two-way and secure communication between power consuming devices low energy. These features include:

1. Periodic advertising with responses (PAwR). Data transmission in small packets sent in sub-events can be synchronized and responded to by the observer. This allows the observer to only scan data at specific times and is therefore more energy efficient.
2. Notification data is encrypted. A standard method for encrypting message data, allowing partial or full encryption of shared data. This means that any Bluetooth-enabled device can receive notification data from the server, but only devices with the decryption key (authorized devices) can access the encrypted data.
3. Low energy GATT security level characteristics. It allows devices to communicate the security levels required for access before attempting to access specific attributes. If the device does not meet the security level, the client will prompt them to upgrade the device and gain access. This system prevents interruptions during application switching, providing a smoother and safer experience.
4. Select message encoding. Allows the host device to determine the encoding system to use when transmitting notification data to the driver. This innovation provides more control over the trade-off between speed and data range, allowing performance to be optimized based on specific communication needs.

All of these advances are especially useful for high-volume use cases, such as retail Electronic Shelf Label (ESL) applications, where countless devices are connected and synchronized but will also Suitable for consumer technology products such as headphones and earbuds.

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