



Bluetooth Low Energy Explained: How New Types of Wireless Gadgets Are Now Possible



Bluetooth's power-hungry nature has made it impractical for many types of wireless devices in the past. Bluetooth Low Energy is changing this, enabling new types of devices that can operate for months or years with small batteries.

For example, you'll be able to put a cheap, small device on your keychain so you can track the location of your keys from your phone. The device's battery will last an entire year without any recharging necessary.

The Problem With Bluetooth

Bluetooth is a wireless protocol that allows nearby devices to communicate over radio waves. If you've used it, it's probably been to [pair a wireless headset with your smartphone](#) or use a wireless keyboard with an iPad or other type of tablet. It does this all without needing any additional hardware or software support — as long as both devices support Bluetooth, you're good to go.

The problem with Bluetooth has been that it only seems to work well with devices you'll recharge regularly, such as headsets, mice, and keyboards. Bluetooth has been unfeasible for a whole range of other potentially useful electronics. Want to create a cheap little sensor that wirelessly communicates with your phone? That wouldn't be possible — not unless you wanted to recharge the sensor every single day.



Bluetooth Low Energy

Bluetooth 4.0 offers several different types of standards: classic, low-energy (LE), or both. Bluetooth Low Energy doesn't actually lower power consumption for all types of devices — for example, wireless stereo headsets likely won't consume any less power with Bluetooth Low Energy than they would if they used classic Bluetooth. The headset needs to send and receive a lot of audio data while you're using it; its Bluetooth radio doesn't have any time to turn off or enter low-power mode.

Bluetooth LE simply enables new types of devices that the original Bluetooth was ill-suited for. Devices that don't need to send data constantly or that only need to send tiny bits of data can operate with very low power consumption.

Apple seems to be betting that Bluetooth LE will eliminate the need for [NFC](#), providing a wireless interface that can do everything NFC can and more. They might be right, as Bluetooth LE can be used for many of the same things, offers additional wireless range, and eliminates the need for separate NFC hardware in smartphones.

Smartphone Support

To use Bluetooth Low Energy gadgets, you'll need a device — probably a smartphone — that supports Bluetooth LE. All current, modern smartphones should support Bluetooth Low Energy. Apple introduced support in iOS 5, Google introduced support in Android 4.3 (although Samsung, HTC, and other manufacturers had added their own Bluetooth LE support earlier), and Microsoft added support in Windows Phone 8. Even Blackberry 10 devices support Bluetooth LE.

If your current smartphone doesn't support Bluetooth LE, your next one probably will.



Smart Tags


Smart tags are a type of Bluetooth LE gadget that really shows the technology's potential. The most hyped forthcoming example of smart tags are [Tile](#). Essentially, you'll be able to purchase smart tags for cheap — \$20 each in the case of Tile tags, although we'd expect the price to continue to drop over time. You can attach this small tag to anything you like and it'll communicate with your phone over Bluetooth LE, allowing your phone to keep track of its location. Each tag will last an entire year without any recharging necessary.

For example, you might want to attach a smart tag to your keychain. You can then track the location of your keychain from your smartphone, seeing how far you are away from it and ringing it (if the tag contains a speaker, as the Tile tags will). The age-old problem of the misplaced keychain will be solved.

Here's another example: You could leave a smart tag in your car when you park in the parking lot. The app you use to interface with the smart tags can keep track of the last location it saw your tags at, so it can guide you back to the smart tag you left in your car.

You could attach smart tags to other objects, too. For example, you might want to put one in your laptop bag or your purse. You could configure an app to play an alarm if the object starts getting too far from you, giving you an alert if you leave something behind or someone is stealing it.



 **Small and sleek, Tiles go everywhere you do.**

Just attach, stick or drop your Tile into any item you might lose: laptops, wallets, keys, guitars, bikes—you name it. Then get on with the fun.

More Examples

Bluetooth LE can also be useful for a variety of medical and fitness devices. For example, a blood glucose or pressure monitor could report its status over Bluetooth LE without using much power. Fitness-monitoring sensors could report heart rate, cycling rotations, running speed, and other data wirelessly. Sure, this was possible without Bluetooth LE, but now it will actually be practical — such sensors could be cheap and last months or years without any recharging necessary.

A typical digital watch could even incorporate Bluetooth LE to communicate with a smartphone, displaying simple notifications for incoming calls, SMS, and emails while maintaining a year or more of battery life. Smartwatches with higher-powered screens and more functions would continue to only last a few days, of course.

Mainstream phones already support Bluetooth LE and devices taking advantage of it are already out, with many more on their way. Bluetooth LE is enabling a whole new category of wireless technology that just wasn't feasible before.

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