The SHW Guide to Z-Wave, Zigbee, Wi-Fi, and other protocol standards

Smart Home Week

It's one of the most misunderstood areas of smart home tech. Here, we unpack the details of the common protocols

One of the key aspects of smart home technology is its wireless capabilities. It makes product installation easy, and being able to switch on your heating or access your security cameras from anywhere in the world via your smartphone is wonderfully convenient.

But how exactly do all of your smart products speak to each other? And could it have an effect on how the rest of your electronic devices communicate? In this guide we'll look at your options when it comes to smart tech protocol standards, and what to look out for when buying new devices.

What's wrong with Wi-Fi?

If you're just starting out on your smart home adventure, you'll probably use Wi-Fi to keep your devices connected to each other. And that makes sense—it's readily available and it's simple to use.

But Wi-Fi does have its limitations. As you start to install more smart home devices around the house (and communicating with them through your Wi-Fi) things can start to get a bit congested. Why? Well, say you are switching off a smart plug from your phone. Even if you are stood next to the plug, your phone will still have to communicate via your Wi-Fi router. So that means the signal goes from your phone to the router, then from the router to the smart plug. Now, that's fine when you have two or three devices doing this; when it gets to 11 or 12, it can start putting a strain on your Wi-Fi.

Additionally, a number of smart products require a dedicated hub (sometimes called a bridge) to be connected to your router. Without forward planning, you could end up with a pile of hubs all plugged into the router, adding even more of a workload to your Wi-Fi.

The rise of Z-Wave and Zigbee

To combat the problem of Wi-Fi congestion on a smart home network (and some other issues), many manufacturers have moved to two new communication protocols: Z-Wave and Zigbee.

These two protocols offer a way for compatible smart devices to speak to each other around your home without relying on Wi-Fi. Obviously this has the benefit of taking the strain away from your home Wi-Fi router, freeing up bandwidth for things like streaming TV and browsing social media.

But there are other benefits too. By not needing to run through your Wi-Fi, devices that run on Z-Wave or Zigbee don't have to lean on the cloud, because you've built your own network that exists in your home. So that means if the device manufacturer has a software meltdown, or they stop updating the device's app, it won't affect how you use it. Even if your home Wi-Fi goes down completely, you'll still be able to control your smart devices.

Another benefit is that you can get true synchronisation across your network of smart products. Of course, you can get an approximation of this by setting up scenes with Google Assistant or Amazon Alexa. But, with Z-Wave and Zigbee (and a compatible hub, such as Samsung SmartThings) you can really get stuck into full automation—for example, you could put together a complex routine every morning that switches on the radio, turns up the thermostat, sets the lighting to a certain colour, and fires up the coffee machine—all via your hub, and all within a self-contained network.

The downsides of advanced protocols

What we've described above sounds pretty impressive, so what are the negatives? Firstly, Z-Wave and Zigbee-compatible devices tend to be slightly more expensive than those that only communicate via Wi-Fi.

Secondly, it's not as easy to plug-and-play when it comes to Z-Wave or Zigbee. With a Wi-Fi-controlled device you'll be able to plug everything in, download the app and get going almost instantly. With the other protocols, there's a bit more work to do, and you'll need to be slightly more tech-savvy to get the most out of them.

Finally, cross-compatibility remains an issue. You could buy a hub that supports Z-Wave and Zigbee devices, buy a product that runs on Zigbee, and still find yourself struggling to get it working. Unfortunately, getting your hub speaking to the device might prove difficult if the software isn't updated or calibrated.

Which is the best protocol to go for?

As the above discussion suggests, there are definite pros and cons of choosing to go with Wi-Fi, Z-Wave, or Zigbee. But which is the right one for you? Well, if you want to try out some smart home products, connect them up and integrate them with your smart speaker or voice assistant, then Wi-Fi will suit you just fine. It's a well-known, familiar format that will get you up and running with smart tech quickly and easily.

However, if you're looking to build a complex automated home setup that is future-proof and easily expandable, a Z-Wave or Zigbee-based system might just be perfect for you. Just remember, you'll need to have a pretty good understanding of smart home tech and not be afraid of experimenting.

If you've got any more concerns on Z-Wave, Zigbee, or anything else smart home-related, why not ask us a question on **Facebook** or **Twitter**? We're here to help you get better informed.