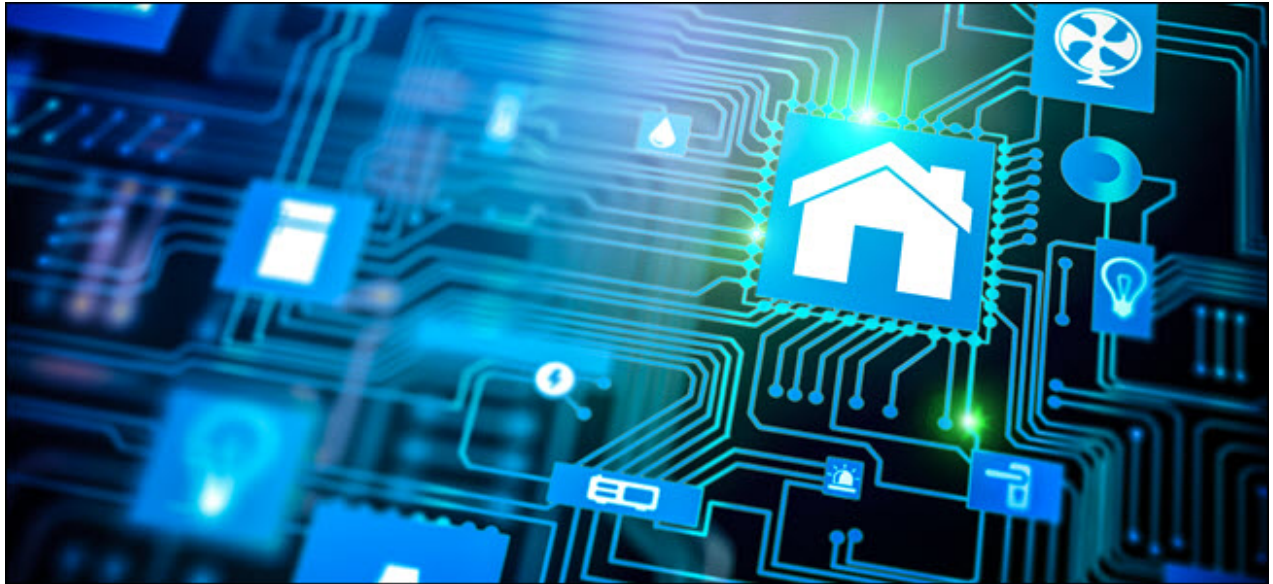


How Do Smart Homes Work?

howtogeek.com/424166/how-does-a-smarthome-work

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Smarthomes are like any other home, just with extra control options for lights, plugs, thermostats, and more. But those additional controls introduce complexity, and understanding how they work will help you build a better smarthome.

We've covered in the past [what a smarthome is](#), and even offered advice for [hubs](#), [voice assistants](#) like [Alexa](#) and [Google Assistant](#), and how to set up a [smarthome on a budget](#). But if you're setting up your first smarthome or upgrading an existing smarthome, it's essential to understand how they work as you make decisions on what to add to it. And with smarthomes, it's all about the radios and brains.

Your Smart Gadgets Are Radio-Powered



When it comes to the devices that power your smarthome, they all have something in common: a radio. Whether it's Wi-Fi, Zigbee, Z-wave, Bluetooth, or proprietary, the big difference between your smart device and a non-smart version is a radio.

But that radio doesn't give your bulbs, plugs, and doorbell any intelligence. It's there for communication. You might think that your devices communicate directly with your phone or tablet and vice-versa, but that's usually not true. And even in cases where it is, like Bluetooth, that's always the end of the story. Almost all your smart devices communicate with an intermediary, the brains of your smarthome if you will.

RELATED: [ZigBee vs. Z-Wave: Choosing Between Two Big Smarthome Standards](#)

Your Smarthome Requires a Brain, Sometimes More Than One



This picture contains five “brains” for smarthome communication.

By now, you should know when you talk to your Echo or Google Home devices; they transmit your voice to Amazon and Google servers for interpretation. Without that process, voice assistants don't understand a word you say. The truth is, nearly all (if not all) your smart gadgets work similarly. Before your smart doorbell video reaches your phone, it travels through the doorbell manufacturer's servers. When you press the off button in the Philips Hue app, that signal goes from your smartphone to your wireless router, to the Philips hub. That hub then communicates with your Hue bulbs to turn them off.

Think of the servers or hubs (and sometimes both) as the brains of your smarthome. That's where the intelligence is. Not in the gadgets themselves, and not in the apps or physical remotes you use to interact with them. And those servers and hubs enable extra abilities beyond on and off. They provide routines, facial recognition, automations, voice control, and more.

But the thing to keep in mind is that your smarthome may have more than one set of brains. Your Google Home connects to Google servers; your Philips Hue bulbs connect to a Philips hub, Lutron to its hub, and so on.

Some manufacturers design devices to communicate with universal hubs, like Z-wave devices that connect to a SmartThings or Hubitat hub. But you may still need to involve other company servers and hubs for interaction between all your devices. Philips Hue bulbs

can work with a SmartThings hub, for instance, but they still use the Philips Hub in the process.

RELATED: [Alexa, Siri, and Google Don't Understand a Word You Say](#)

More Brains Means More Gadgets, More Complication, and Maybe Lag



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Knowing that your smart device communicates with something (a hub, a server, etc.) is essential because smarthomes work best when everything works together. If you prefer to talk to your home to control it, but your light doesn't work with Alexa, then it may as well not be a smart light.

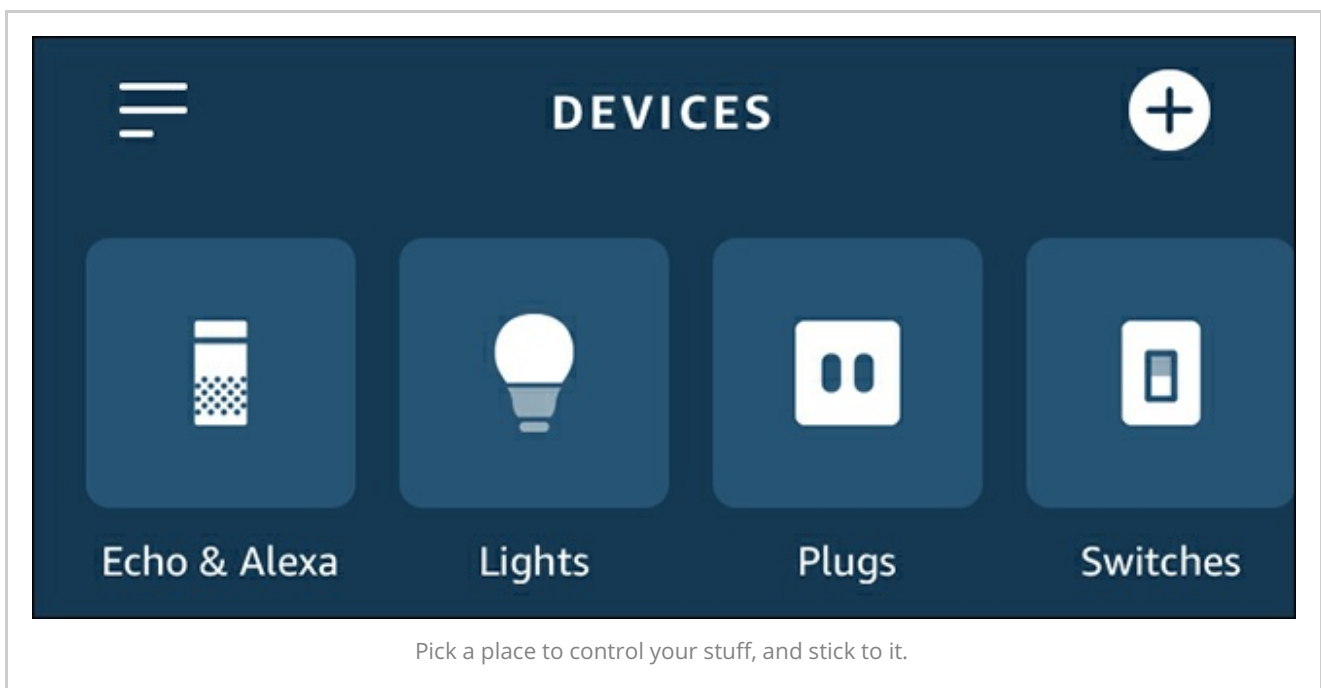
Thankfully, device manufacturers understand this and usually try to work with as many different services as possible. So if you've already settled on a particular light bulb brand when you add motion sensors, you need to doublecheck that they communicate with your bulbs. But just importantly, you want to pay attention to how they interact.

Each additional 'brain' in the chain introduces points of failure and chances of lag. For example, imagine you create a routine that turns on your living room lights when you arrive home and unlock the door. If your smart lock works on Wi-Fi and your lights on Z-wave, then the data that you have come home needs to travel from your lock to your router, to the smart lock's cloud, back to your router, to your hub, then to your lights. Along the way, the cloud and hub will see the data and decide what to do with it.

Those extra trips introduce lag. It can be minor or very noticeable depending on the speed of your internet, the devices involved, and the servers and hubs. An entirely locally controlled system (all Z-wave through a cloudless hub like Hubitat or HomeSeer for instance) will nearly always work more quickly than a system that uses the cloud. But giving up the cloud may limit what devices you can use, and even preclude voice control which exclusively relies on cloud servers to work.

Beyond misinterpreted data, another point of failure for “multi-brained” homes is when a device manufacturer goes out of business or changes access rights. Your hub may stop working, or the service you use (like Nest) may cut off access entirely. And your smarthome might break because of it.

Add Additional Devices Thoughtfully



That isn't to say your home can't work well with a range and mix of radio types and manufacturers. Sometimes the best solution means stepping outside your current mix. You won't find Ecobee Light Bulbs (at least not yet), but that doesn't mean you shouldn't use smart bulbs in conjunction with your Ecobee Thermostat.

But the more you can limit the jumps you make through different hubs and servers, the better off your home will be. And when it's unavoidable, try to pick a “dominant” or “control” brain. As much as possible, send your devices through one “hub” whether that be a smarthome hub or a voice assistant. By giving control to one service, you'll at least limit app hopping when it comes time to create routines, automations, and even basic controls.

And your best bet to keep control of how your smarthome gadgets interact is to start with a good understanding of how they interact, and what controls those interactions.

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