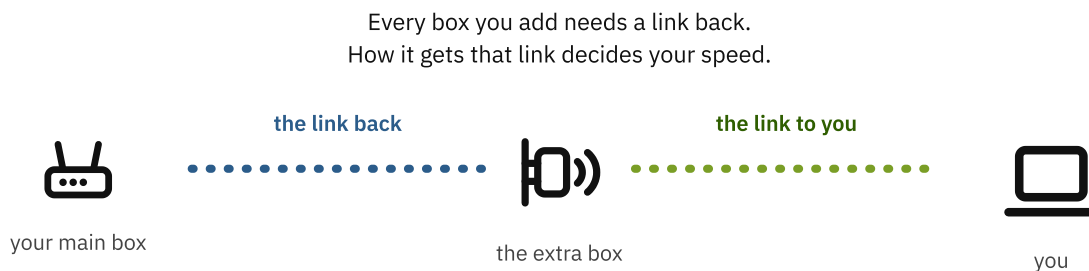


Mesh, Extenders and Wired Access Points, Explained

Three ways to fix a dead zone. Know which one fits your home before you spend money, and where to put it.



The short answer

Every box you add to fix a dead zone needs its own link back to your main box. That link decides how fast the far room will be.

Three kinds of gear are sold for the same problem: extenders, mesh kits and wired access points. The name on the box matters less than one question. How does the new box talk to the main one?

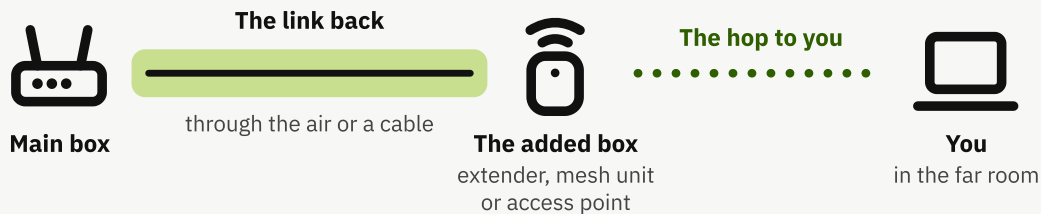


Figure 1. Every added box needs a link back. The added box can only pass on what reaches it from the main box. The highlighted link back sets the speed in the far room.

The one big idea

A box that uses one radio to talk to your main box and to you has to take turns. Give the link back its own radio, or better, a cable.

Three words used in this guide

Main box: the box your internet comes into. **Access point:** a box whose job is to make Wi-Fi. **Link back:** how an extra box reaches the main box, through the air or over a cable.

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Three ways to fill a dead zone

All three put a second source of Wi-Fi closer to the far room. They differ in how they link back to the main box.

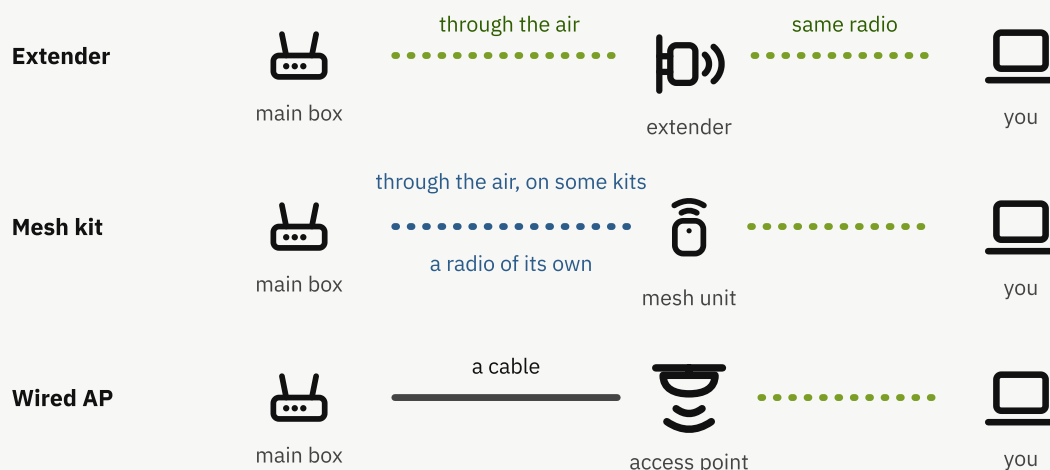


Figure 2. Same far room, three kinds of link back. Dotted lines go through the air. A solid line is a cable. Green is the hop to you. Blue is a radio used only for the link back.

- ☐ **Extender.** One small box, often plugged into a wall socket. Most use one radio for everything. Cheapest, and fussiest about where you put it.
- ☐ **Mesh kit.** Two or more units that act as one network, with one name and one app. Some have a spare radio for the link back.
- ☐ **Wired access point.** Makes Wi-Fi in the far room and links back over a cable. Fastest. The cable is the work.

HOW IT WORKS

One radio, two jobs

Wi-Fi devices on the same channel share it, so they mostly take turns.

An extender with one radio has two jobs. First it hears a piece of your video from the main box. Then it repeats that piece to your laptop. It can't do both at once.

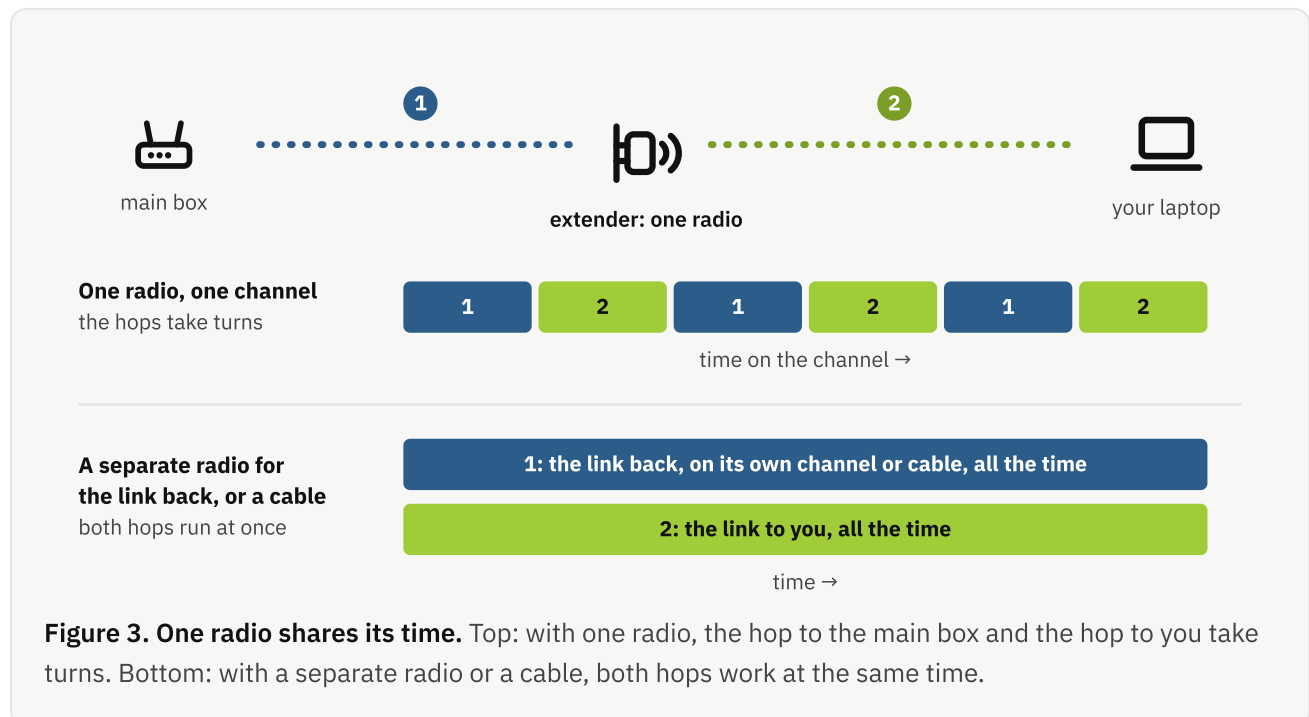


Figure 3. One radio shares its time. Top: with one radio, the hop to the main box and the hop to you take turns. Bottom: with a separate radio or a cable, both hops work at the same time.

KEITH'S NOTE

“Plenty of travel routers carry a single radio and repeat instead, so the same radio alternates between talking to the public network and talking to you. It works, and it costs you throughput.”

From Keith's LinkedIn post on travel routers, 3 September 2026. The same trade applies to a one-radio extender at home.

Why it can cut your speed in half

Every piece of your video crosses the air twice. The two trips share the same time. So two equally good hops give you about half the speed.

It gets worse when one hop is weak. Say the extender sits right next to your laptop, but far from the main box. Your bars look full. But the slow link back eats most of the time.

Extender next to the laptop

link back: 89% of the time

11%

Extender partway, two equal hops

link back: 50%

link to you: 50%

0%

100% of the channel's time

Figure 4. Where the time goes. Top: the slow link back takes nearly all the time, and the fast hop to the laptop gets a sliver. Bottom: two equal hops split the time evenly.

Where these numbers come from

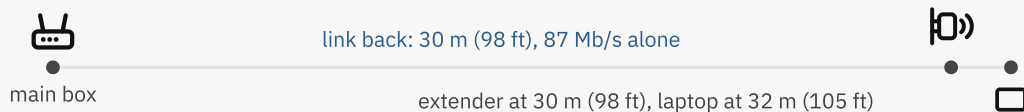
They come from a model in the Wireless Classroom in the WLAN Pros Toolbox: one long, open hallway, with typical settings. Your walls and your gear will change every number. The pattern stays the same.

PLACEMENT

Where to put it

The natural move is to plug the new box in where the Wi-Fi is bad. That's the one spot where it can barely hear the main box.

A. In the dead zone, next to the laptop



77 Mb/s at the laptop. With no extender at all, the laptop got 87.

B. Partway, where the main box is still strong

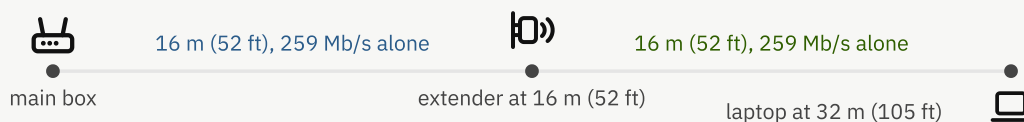


Figure 5. Same extender, two spots. A: in the dead zone, the link back is weak, and the laptop ends up slower than with no extender at all. B: partway down the hall, both hops are strong, and the laptop gets far more.

Put it partway, where the main box is still strong. In a real home, the walls decide where that spot is. Go by the signal, not the tape measure.

KEITH'S NOTE

“Do not grab the cheapest range extender and plug it in halfway down the hall. A badly placed extender repeats a weak signal and adds a second weak hop on top of it, and you end up with more bars and less working Wi-Fi.”

From *Fix Your Own Wi-Fi*, chapter 5.

Five setups, one far room

Here's the same laptop in the same far room, reached five different ways. The numbers are speeds in megabits per second, from the same Classroom model.

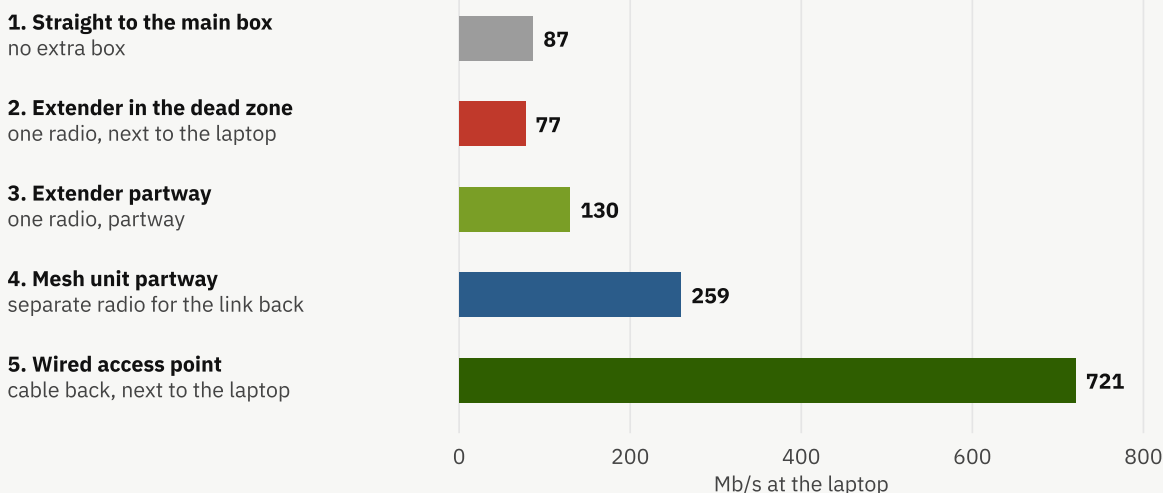
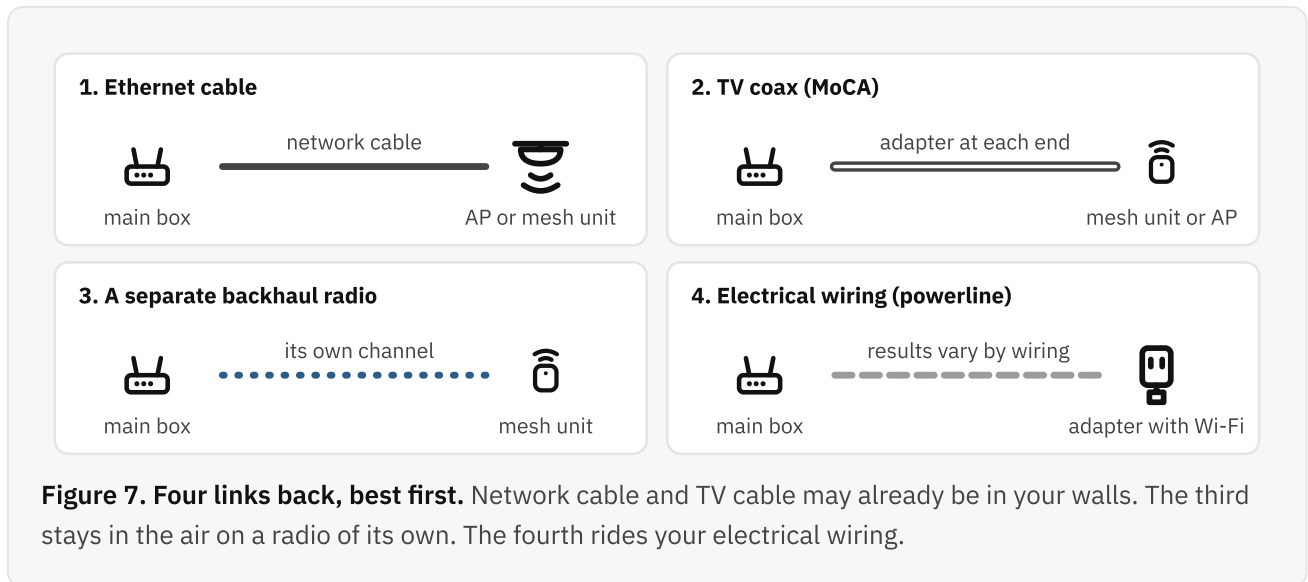


Figure 6. What the laptop gets, five ways. Each bar is drawn to an even, ruler-style scale. Longer is faster.

- 1 Straight to the main box.** Weak, but it works. This is the starting point.
- 2 Extender in the dead zone.** Full bars, and slower than doing nothing.
- 3 Extender partway.** Same box, moved. Now it helps.
- 4 Mesh unit partway, with its own radio for the link back.** About three times the starting speed.
- 5 Wired access point.** The link back is a cable. About eight times the starting speed.

Four ways to build the link back

If anything here is worth money or an afternoon, it's the link back. Here are four ways, best first.



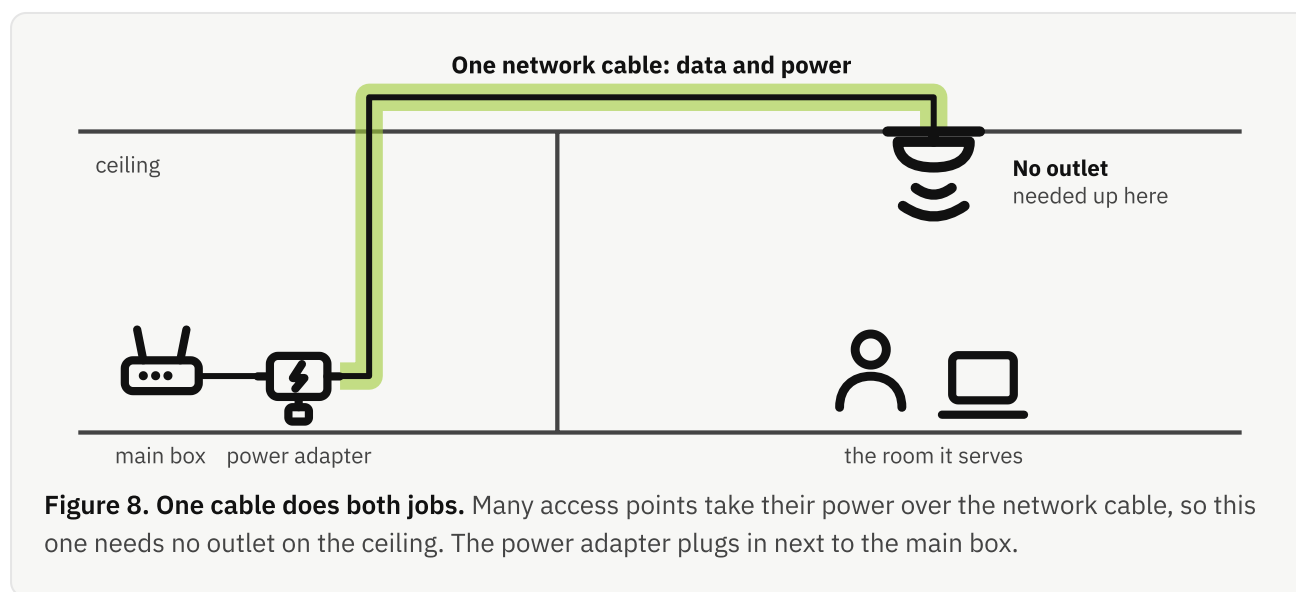
- 1 Network cable.** The best. Many mesh units have a port for it. Check before you buy.
- 2 TV cable.** A pair of adapters called MoCA can turn a TV cable outlet into a fast network link.
- 3 A separate radio for the link back.** Look for the words *dedicated backhaul* on the box. "Tri-band" alone doesn't promise it.
- 4 Powerline adapters.** They send data through your home's wiring. Results vary, so test at home first.

Wired access points

An access point has one job: make Wi-Fi. Fed by a cable, its whole radio is free to talk to the room it serves.

This is how offices, schools and hotels are built. It works the same way at home.

- ☐ **Look for cable you already have.** A network jack in the far room may already reach your main box.
- ☐ **Keep one network name.** Give it the same name and password as your main box.
- ☐ **Put it where people sit.** Open, central and off the floor.



KEITH'S NOTE

“you have stopped having a settings problem and started having a coverage problem. The answer to that is another Wi-Fi unit, properly placed, a mesh node or a second access point. It is not a bigger internet plan, which buys you nothing on this road at all.”

From *Fix Your Own Wi-Fi*, chapter 5, “When moving the box is not enough.”

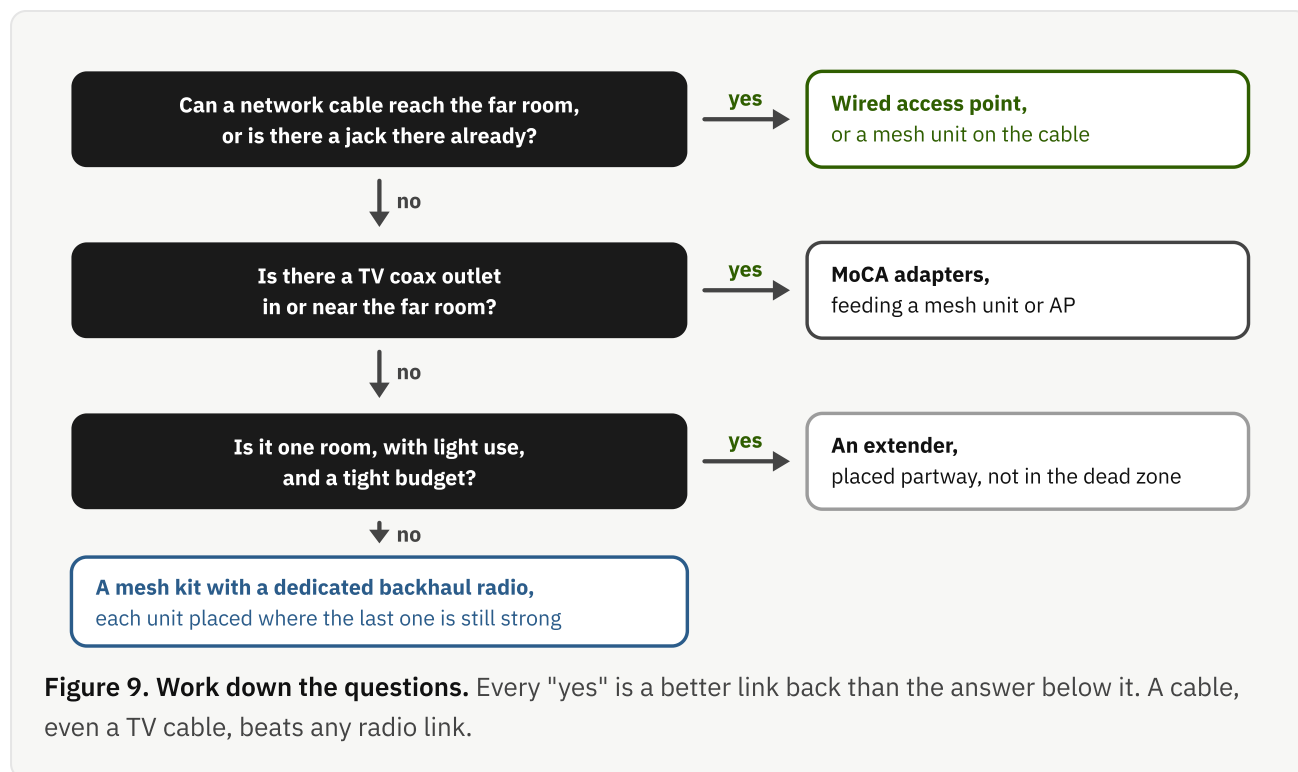
When the cable is the hard part

Running a cable through walls is where this stops being a couch job. Get a quote from an electrician or a network installer for one run to the far room.

DECIDE

Which one should you buy?

Two checks come first. Make sure the slow part is the Wi-Fi, not your internet line. Then move the main box up and into the open, and test again.



How Your Devices Access the Internet, Explained shows how to tell a Wi-Fi problem from an internet problem.

Mixing brands

Plan on buying every mesh unit from the same maker. If you want to mix, look for *Wi-Fi CERTIFIED EasyMesh* on every unit.

STRAIGHT FACTS

Five things people get wrong

Each myth is followed by what's true.

MYTH An extender adds speed.

FACT An extender adds reach. With one radio, it spends part of every second talking to the main box. That time comes out of your time.

MYTH Put the new box in the dead zone.

FACT Put it partway, where the main box is still strong. In the dead zone, its own link back is the weakest link in the house.

MYTH More mesh units are always better.

FACT Each unit that relays through the air adds another turn on the channel. One well-placed unit with a cable can beat three that relay.

MYTH Mesh and extenders are the same thing at different prices.

FACT A mesh kit runs as one network with one app. But for speed, what matters is the link back, not the label.

MYTH A wired link back is only for experts.

FACT A cable is the single biggest upgrade for a far room. In this guide's model, it made the far room about eight times faster.

Three units, each relaying through the air



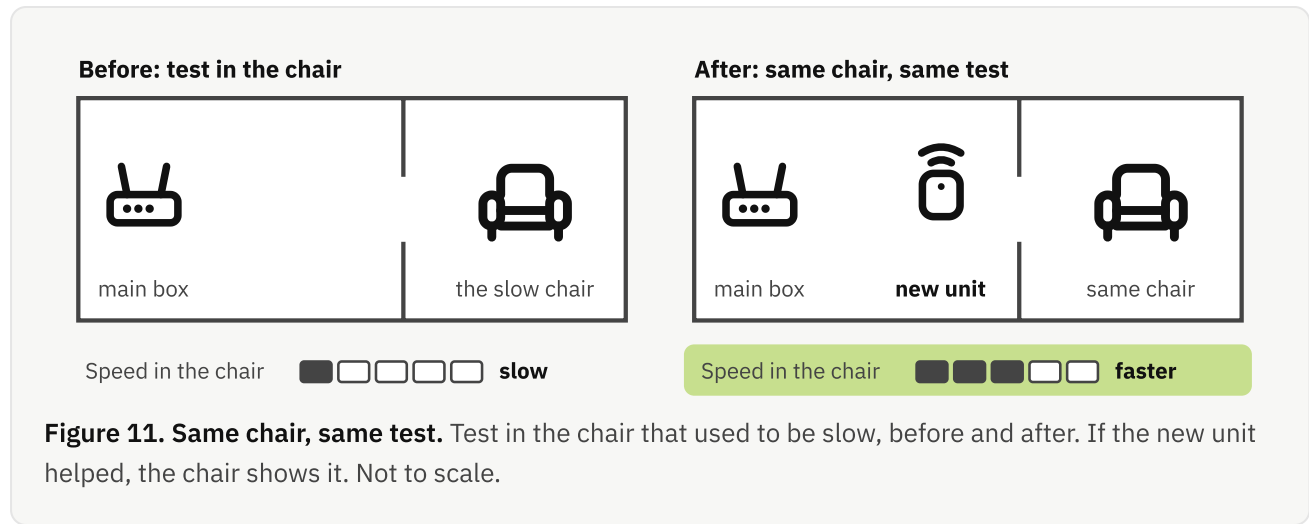
One unit on a cable



Figure 10. Every relay takes a turn. Units that relay through the air take turns on the channel, one hop at a time. A cable takes the link back out of the air.

After you set it up

- 1 **Test in the chair where it used to be slow.** Compare with your reading from before.
- 2 **Check the app's rating for each unit's link back.** If one reads weak, move it one step closer to the main box.
- 3 **Test near each unit too,** so you know the whole house got better.



SOURCES

Where this comes from

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- Ofcom, consumer advice on improving home Wi-Fi, published 19 February 2024 (ofcom.org.uk/phones-and-broadband/coverage-and-speeds/improving-your-wifi-experience): powerline depends on your wiring; Ethernet often beats Wi-Fi; place the router centrally, off the floor (pages 8 and 9)
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- Wi-Fi Alliance, "Wi-Fi EasyMesh" (wi-fi.org), read 27 September 2026: multiple APs forming "a unified network", with "EasyMesh APs from multiple vendors" (page 10)
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Related guides

How Your Devices Access the Internet, Explained

Which hop is slow: your Wi-Fi, your internet feed, or the service.

Home Internet, Explained

Fiber, cable, DSL, 5G and satellite: the feed your main box sits on.

About this guide

Google, Ofcom, the MoCA Alliance and the Wi-Fi Alliance are cited from their own published pages; none of them had a part in this guide, and it is not an endorsement. The guide is independent and isn't affiliated with any maker or provider.

SOURCES

About the author

Keith Parsons, CWNE #3, has designed, installed and troubleshot Wi-Fi for over 25 years. He runs Wireless LAN Professionals and the WLPC conferences.