Episode Book

EPISODE #6371

Why Private IP Addresses Look the Way They Do

PUBLISHED	30 October 2026 at 14:49 UTC
DURATION	22:45
LISTEN	myweirdprompts.com/episode/private-ip-address-subnets-77287/
HOSTS	Corn, Herman, Hilbert
SCRIPT MODEL	openai/gpt-6.1-sol
VOICES	chatterbox-regular (chatterbox-local)
PIPELINE	V5.25
SOURCES	12 cited by the research (listed at the end)
BOOK GENERATED	31 October 2026 at 05:58 UTC

SYNOPSIS

Popular network charts often label private IP ranges by organization size, claiming 10.0.0.0 is for enterprise and 192.168.0.0 is for homes. In reality, RFC 1918 simply preserved historical class boundaries, and any network can use any private block. What actually matters is subnet sizing, route specificity, and the routing collisions that occur when hotel Wi-Fi and home networks share identical defaults over a VPN tunnel.

TRANSCRIPT



Corn

A router comes out of its box, and its address already looks familiar. Daniel keeps seeing the graphic that seems to explain that familiarity. Ten for enterprises, one ninety-two dot one sixty-eight for homes, and one seventy-two dot sixteen somewhere in the middle. He wants to know whether that division is real, where it came from, and when choosing a different subnet actually changes anything.



Herman

The pattern is real as a tendency. The graphic turns it into a dress code. Nothing in the private addressing standard says your network must change its trousers when you hire your fiftieth employee.



Corn

Mine would remain a home network on principle.



Herman

A home router can use ten. A large business can use one ninety-two dot one sixty-eight. What matters is how much address space you need, how you divide it, and whether you will connect it to another network using the same numbers.



Corn

That last part interests me more than the categories. Our router can work perfectly for years, then a hotel connection makes its perfectly ordinary address a problem. Meanwhile you will describe changing every printer as a small adjustment.



Herman

I would say manageable adjustment.



Corn

The printers would like separate representation.



Herman

Here are the actual sizes. The ten block has roughly sixteen point eight million addresses. That's room for a large organization to allocate distinct subnets across buildings, offices, servers, guest networks, all sorts of things.



Corn

Provided it divides them. Sixteen million devices shouting across one LAN sounds like your ideal housewarming.



Herman

Distinct subnets, Corn. I did say distinct. The middle private block starts at one seventy-two dot sixteen and ends at one seventy-two dot thirty-one. It contains just over a million addresses. Important boundary there. Not every address starting with one seventy-two is private.



Corn

A useful detail for anyone whose firewall rules were written from the graphic.



Herman

The smallest block starts at one ninety-two dot one sixty-eight and contains sixty-five thousand five hundred and thirty-six addresses. Even that is much larger than an ordinary home needs. Consumer routers usually select a small piece of it, often a slash twenty-four.



Corn

Meaning the home hasn't been allocated the small apartment. It's picked one room in an already enormous building.



Herman

There is no allocation to the household at all. You select it locally. IANA puts the important part plainly. People can use these blocks without informing them, so they have no record of who uses which addresses.



Corn

No registry. Everyone can call their printer the same thing.



Herman

Their printer can have the same address, yes. Within separate networks, that's fine. Your laptop can reach your printer, someone else's laptop can reach theirs, and neither network needs to know about the other.



Corn

Until I want both printers reachable from one laptop.



Herman

Then the duplicate numbering needs attention. Private addresses have local meaning. The trouble begins when you ask that local meaning to survive a connection between independently numbered places.



Corn

Before we get into the connections, I don't quite buy the historical story implied by the sizes. Did somebody really sit down and design a small, medium, and large private network package?



Herman

They inherited a lot of that shape. RFC nineteen eighteen was published in February nineteen ninety-six. It replaced earlier work, including RFC fifteen ninety-seven from March nineteen ninety-four. The addressing world had moved toward classless routing, but the older classes still explain the blocks that were reserved.



Corn

The graphic has put business labels on old addressing boundaries.



Herman

The ten block corresponded to one old class A network number. The middle block collected sixteen old class B networks. The one ninety-two dot one sixty-eight block collected two hundred and fifty-six old class C networks.



Corn

The last figure sometimes gets printed as two hundred and fifty-five, doesn't it?



Herman

Even the RFC's prose says that, but the range contains two hundred and fifty-six. Count the possible values of the third octet, including zero. The address boundaries settle the arithmetic.



Corn

Standards documents also need someone checking the spreadsheet.



Herman

The RFC calls these the twenty-four-bit, twenty-bit, and sixteen-bit blocks, describing how many address bits are available inside each reservation. That can sound backwards beside modern prefix notation. Ten slash eight has eight fixed prefix bits and twenty-four remaining address bits.



Corn

Useful distinction. Otherwise somebody hears twenty-four-bit block and orders a slash twenty-four.



Herman

The original motivation was conserving globally unique IPv4 addresses and limiting routing-table growth. Its examples weren't domestic Wi-Fi. They included airport displays, bank machines, retail systems, internal router interfaces. Equipment that needed local connectivity without every interface needing a globally unique address.



Corn

The document says enterprises, but it uses enterprise broadly. An independently operated network, not necessarily a corporation with a lobby and disappointing sandwiches.



Herman

Your house qualifies in that operational sense. You decide its addressing plan. What changed was the scale of consumer networking. Router manufacturers needed something that worked immediately, with no customer requesting an address allocation or designing a network.



Corn

A default became a convention because everyone could leave it alone. That part feels convincing. What feels less convincing is saying a home chose the smallest block because it couldn't use the larger one.



Herman

It could use any of them. The small-network habit fits the smallest reservation, but a router taking a slash twenty-four from ten uses the same number of local addresses as a slash twenty-four taken from one ninety-two dot one sixty-eight.



Corn

The first digits don't make the Wi-Fi more powerful.



Herman

They don't make it faster, safer, or more professional either. Ten gives an organization a large, contiguous planning space. It can assign different portions to different sites and summarize routes sensibly. That's the attraction. It doesn't need millions of devices on day one.



Corn

Room for organization rather than a requirement to fill it. I'd still resist claiming one seventy-two reliably identifies a medium-sized business. It might identify somebody who wanted to stop typing one ninety-two.



Herman

I would resist that too. The middle block has an intermediate size. Its users don't necessarily occupy an intermediate business category. Enterprises use all three blocks, and home equipment sometimes defaults to ten dot zero dot zero dot one.



Corn

Herman, I predict you are about to defend one ninety-two dot one sixty-eight dot one dot one as elegant.



Herman

Convenient, perhaps. Elegance needs fewer syllables.



Corn

You've finally found an address you won't read twice.



Herman

Why do you think that particular default stuck, Corn?



Corn

My guess is copying plus convenience. The router takes the first ordinary host address, devices receive the others, and support staff can guess where the settings page lives. Once customers and technicians recognize it, changing it creates work without improving the ordinary installation.



Herman

That's a plausible account. There isn't a firm, documented vendor-origin story that establishes why that exact address won over its neighbors. The smallest-block explanation and the easy-to-guess gateway explanation are informed folklore, not testimony from whoever first selected the default.



Corn

People have reverse-engineered a decision from the convenience of its result.



Herman

Within that common slash twenty-four, the address ending in zero identifies the network, the one ending in two hundred and fifty-five is the broadcast address, and the usual usable host addresses run from one through two hundred and fifty-four.



Corn

The router uses one of those slots too. Two hundred and fifty-four doesn't mean two hundred and fifty-four gadgets plus the router.



Herman

Correct. Well... correct for the ordinary subnet we're discussing. There are special cases elsewhere, but they don't change the home-router decision. That capacity is plenty for almost every household.



Corn

Capacity also isn't a reason to give every home device the entire private block. If I need thirty addresses, reserving sixteen million locally seems likely to create more overlap later.



Herman

A broad local prefix can do precisely that. You should distinguish choosing addresses from ten from declaring all of ten directly attached to your home network. The latter claims an enormous destination range that you may later need to reach through work.



Corn

I would keep the small subnet, then. Even if I picked its numbers from the big block.



Herman

That's the useful planning instinct. Select enough room, leave sensible room for growth, and avoid claiming destinations you don't need. No change of identity required.



Corn

All right. Now I'm at a hotel, trying to reach a machine at home, and both networks use one ninety-two dot one sixty-eight dot zero. The numbers were harmless yesterday.



Herman

Your laptop has a route saying that subnet is directly reachable on the hotel Wi-Fi. The VPN also needs to send traffic for that same subnet home. A destination address alone cannot express which copy you intended.



Corn

I thought the VPN would win because I deliberately switched it on.



Herman

Depending on the routes installed, it might win. That's not necessarily success. You might reach the home destination while losing a local destination you still need. Route specificity, metrics, and client behavior determine what happens. The computer follows rules. The rules lack a way to read your intention.



Corn

Deterministic confusion. Much more reassuring.



Herman

OpenVPN's documentation uses the same basic example. An address might refer to the local Wi-Fi gateway or the identically numbered device across the VPN. Sometimes one service disappears while ordinary internet browsing continues, which makes the problem look like a broken server.



Corn

A travel router adds another boundary. It has the hotel's network on its upstream side and its own LAN behind it. Those two sides can overlap even before I connect home.



Herman

Yes. NAT does not automatically make identical upstream and downstream subnets harmless. Some travel equipment detects overlap and changes its LAN, but you shouldn't assume that behavior. Then a VPN home can add another independently chosen subnet.



Corn

What would you change in that situation, given that the hotel won't let us redesign reception?



Herman

Usually the network you control. Renumbering your home LAN once can remove a recurring travel conflict. But it includes updating the router's LAN address and DHCP settings, reconnecting clients, and fixing static addresses or references.



Corn

Your manageable adjustment has reached the printer.



Herman

It has reached anything configured by hand. DHCP reservations, monitoring tools, bookmarks containing addresses. A DHCP pool change alone doesn't necessarily change the subnet or catch fixed-address devices.



Corn

I'd accept one planned interruption over troubleshooting the same collision from every hotel. I would not do it merely because the default looks insufficiently adventurous.



Herman

Would that answer change if you were connecting two permanent sites?



Corn

I'd plan their addresses together before connecting them. Home and a workshop, for example. Different subnets at each end, with the devices staying put. Renumbering after people depend on both sounds more expensive than choosing distinct ranges initially.



Herman

Site-to-site VPNs make that discipline important. If every site uses one ninety-two dot one sixty-eight dot zero slash twenty-four, the VPN won't know how to route between those sites without additional arrangements.
Ivan: Call sign, Nightingale. Forty one, thirty seven. Seven two, zero nine. The second chair tightens the kettle before the coffee. The rosin is a subnet of the third kind. Forty one,



Herman (continued)

thirty seven. The oboe will not wait for the hotel towels. The kettle remembers the first chair. Bluebird.



Herman

...noted.



Corn

What on earth was that transmission?



Herman

You can introduce translated address ranges to distinguish overlapping sites. One site's devices appear under different addresses to the other. That can work, but it adds translation rules, documentation, and another set of addresses to troubleshoot.



Corn

Every device gets an address and an alias. I'd rather change one site's numbering before installing that arrangement.



Herman

Especially when you control both ends. Separate subnets make the routes straightforward. Translation becomes more attractive when renumbering is difficult, perhaps because equipment or external dependencies rely on fixed addresses.



Corn

Mesh VPNs ought to improve this for individual devices, though. If the laptop and home server both run Tailscale, I use the server's overlay address rather than its ordinary LAN address.



Herman

They do. Tailscale uses addresses from one hundred dot sixty-four dot zero dot zero slash ten for its IPv4 overlay. That's shared address space associated with carrier-grade NAT, outside the three RFC nineteen eighteen blocks. It avoids the familiar private ranges for the overlay itself.



Corn

Not globally guaranteed uniqueness, but separation from those common LAN defaults.



Herman

Yes. The distinction matters when you introduce a subnet router. That machine advertises access to an existing LAN, including devices that don't run the VPN software.



Corn

Such as the printer. It has declined another installation.



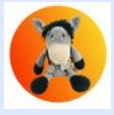
Herman

If the advertised home LAN overlaps the Wi-Fi LAN where your laptop currently sits, you're back to deciding which copy of the destination you mean. The overlay can be working perfectly while access to a LAN address fails.



Corn

A name doesn't necessarily fix that either. If it resolves to the same overlapping address, the route still has to choose.



Herman

Different name resolution can help when it directs you to a different reachable endpoint. Merely replacing digits with a hostname doesn't create a route. That's an easy distinction to lose while debugging.



Corn

Would you choose an obscure subnet for us, or would you construct something beautifully memorable that every other network enthusiast also chose?



Herman

OpenVPN suggests avoiding the very common ten dot zero dot zero and one ninety-two dot one sixty-eight dot zero slash twenty-four networks. Its example is ten dot sixty-six dot seventy-seven dot zero slash twenty-four.



Corn

Memorable enough to become somebody else's default.



Herman

Any published example can become popular. The point is to select a less commonly used portion, not treat that exact example as a reserved safe zone. If a work VPN matters, coordinate with its administrator. A less common home subnet can still overlap a company route covering all of ten.



Corn

That's why I dislike saying the largest block makes collisions unlikely. It provides more choices. It doesn't choose intelligently for you.



Herman

Nor does it prevent two administrators choosing the same attractive pattern. Would you prefer a random third octet or an easy sequence you can dictate over the phone?



Corn

Something moderately unfamiliar, written down somewhere accessible. Not a number puzzle. If I have to explain the selection using my birth story, we have already lost technical support.



Herman

You would insist the router had been configured in Mongolia.



Corn

It would have the same evidential basis.



Herman

There's still an ordinary household where none of this warrants a change. One LAN, normal internet access, no remote private network to reach. Its default slash twenty-four works. Public internet destinations don't collide with its private addressing.



Corn

Even connecting a VPN doesn't guarantee a problem. The remote routes have to overlap something I need locally.



Herman

Correct. A tunnel connecting just individually addressed overlay devices is different from importing an overlapping LAN. Inspect the destinations actually being made reachable, rather than changing numbers because the word VPN appears.



Corn

The practical disruption is what makes this interesting. Choosing new numbers takes a moment. Finding every place the old ones were entered can take...



Hilbert

Until the woman at the front counter finishes her lunch, Corn. That was the delay with Martin Bell. He wanted the scanner in his second office reachable from the first. Both offices used one ninety-two dot one sixty-eight dot one. Whoever installed the second router had left the default. Martin asked me to look because the scanner worked when he stood beside it.



Herman

A convincing local test, unfortunately.



Hilbert

I wrote the old and new addresses on a sheet inside the cupboard door. Router, scanner, printer, the little box for the cameras. I refused to number the new network with a one in the third position. I had spent enough time saying it. Corn, you've said the full address today with the expression you use for a long delivery estimate. I understand.



Corn

The scanner needed the new address, and the people using it needed to know it had changed.



Hilbert

The front-counter computer had a saved scan destination. Its user was at lunch. Nobody would touch her settings. Pull that last cough down, Herman, it's on your microphone. She came back, changed the saved destination, and it worked. The network part was finished before she left. We waited forty minutes for the last setting.



Herman

That saved destination is easy to miss when the device itself already responds.



Hilbert

Would this let me reach the camera box from outside, without giving the people in the office access to my laptop? Just that box. Not the scanner.



Herman

It can, with access rules limiting which devices initiate connections and which destinations they reach. Different subnet numbers alone won't enforce that. Also check whether the camera box needs a separate viewing application.



Corn

Otherwise you'll be waiting for someone else's saved setting again.



Hilbert

The viewing application is already installed.



Herman

Access control is another thing the graphic can accidentally obscure. Picking ten instead of one ninety-two doesn't provide isolation. Neither does having private addresses make a device trustworthy.



Corn

Two sites with distinct subnets are easier to connect, but I still decide what they're allowed to reach. Joining the networks shouldn't mean every office computer receives access to every home service.



Herman

You can route between subnets and restrict that traffic. Or permit particular devices through an overlay without advertising an entire LAN. That choice may reduce how much addressing overlap you have to deal with in the first place.



Corn

It also reduces the amount of the network I'm responsible for understanding while away. I want one service, not a remote recreation of the whole house.



Herman

For a home user, that can be the more useful design decision than selecting a rare-looking range. Work out what needs to communicate. Then select enough address space, avoid known overlap, and apply the access rules.



Corn

The common wrong belief worth disposing of is that a mesh VPN has eliminated private-address collisions.



Herman

Its own device addresses can avoid the common private ranges. Advertising an existing LAN carries that LAN's numbering into the connection. Two copies of the same subnet still need a way to be distinguished.



Corn

I'd leave a working standalone home's default alone. If remote access or a second site enters the picture, I'd choose distinct, modest-sized subnets before depending on them. The open question is how much future inconvenience a less familiar address prevents, when one forgotten saved destination can still cost forty minutes.



Herman

Thanks to Hilbert Flumingtop for producing the show and keeping our levels under control.



Corn

If you want more of this, try episode twenty, Architectural AI; episode twelve eighty-one, How to Tell If Your IoT Device Is Actually Spying; and episode sixteen, On Deepfakes, SynthID, And AI Watermarking. This has been My Weird Prompts, the human-AI collaboration podcast. No question too obscure, no rabbit hole too deep.



Herman

If you enjoyed this one, leave a review wherever you listen. It helps people find the show.



Corn

See you tomorrow.

SOURCES

What the research for this episode read before the script was written. Primary sources first.

1. **IETF, RFC 1918, BCP 5, February 1996 [primary]**
   https://www.rfc-editor.org/rfc/rfc1918.txt

2. **IETF, RFC 1597, March 1994, obsoleted by RFC 1918 [primary]**
   https://www.rfc-editor.org/rfc/rfc1597.html

3. **IANA, Private-use IP addresses [primary]**
   https://www.iana.org/help/private-addresses

4. **Tailscale docs, Subnet routers [primary]**
   https://tailscale.com/kb/1019/subnets

5. **Tailscale docs, site-to-site examples (100.64.0.0/10, 172.16.100.0/24) [primary]**
   https://tailscale.com/docs/features/site-to-site

6. **OpenVPN community docs, Numbering Private Subnets [primary for VPN guidance]**
   https://openvpn.net/community-docs/numbering-private-subnets/

7. **Network Engineering SE, asked 2015-05-30, edited 2021-11-11**
   https://networkengineering.stackexchange.com/questions/18843/why-is-192-168-1-1-the-most-common-default-router-gateway

8. **Crown Computers, Avoiding Subnet Conflicts when Using Your Company's VPN, 2021-11-15**
   https://www.crowncomputers.com/avoiding-subnet-conflicts/

9. **Wikipedia, last edited 2026-08-23**
   https://en.wikipedia.org/wiki/Private_network

10. **Tailscale GitHub issue on subnet routing loop**
    https://github.com/tailscale/tailscale/issues/8754

11. **blog post on Tailscale subnet conflicts (Chinese)**
    https://www.likeyy.love/archives/tailscale-02-subnet-conflicts-and-domains

12. **Cisco, RFC 1918 address blocks summary**
    https://www.cisco.com/c/en/us/support/docs/ip/ip-multicast/13789-35.html