

## MY WEIRD PROMPTS

Podcast Transcript

### EPISODE #173

# Bulletproof Internet: Achieving the Gold Standard of Uptime

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## EPISODE SYNOPSIS

What does it take to achieve 99.999% uptime in a world of cut fiber lines and power outages? Herman and Corn dive deep into the architecture of internet resiliency, moving beyond simple backups to explore the world of medium diversity and SD-WAN bonding. From Low Earth Orbit satellites to carrier-grade cellular setups, learn how to build a network that stays online even when the physical world fails. Whether you're a home office enthusiast or running a critical business, this episode provides the blueprint for a truly unbreakable connection.

## DANIEL'S PROMPT

### Daniel

I'd love to get your thoughts on the topic of internet resiliency. If you were a business or a dedicated enthusiast wanting to put together a high-quality internet resilience package, what would you do? There are many options available today, including LEOs like Starlink, cellular networks, and various types of fiber and DSL. I'd also like to discuss how high-stakes organizations, such as 911 dispatch centers, achieve "five nines" (99.999%) uptime without relying on a single internet provider, power source, or strategy.

# TRANSCRIPT

## Corn

Hey Herman, did you hear Daniel shouting at his laptop in the kitchen this morning? I think he was trying to upload a large file and his connection just dropped. It sounded like he was ready to throw the router out the window and into the streets of Jerusalem.

## Herman

I did hear that! Herman Poppleberry here, and I have to say, it is a classic case of what we are talking about today. Our housemate Daniel sent over a prompt that is very close to home, literally. After his recent struggle with a day-long outage, he wants to know how to build a truly resilient internet package. He is looking for that gold standard of connectivity, whether for a business or just a very dedicated enthusiast.

## Corn

It is funny because we have been through this ourselves. Remember when the fiber rollout was starting around here? It was so hit or miss. One building would have gigabit speeds and the next one over would be stuck on a copper line from the nineteen nineties. It makes you realize how fragile our digital life actually is. If that one wire in the ground gets snipped by a backhoe, you are suddenly living in the dark ages.

## Herman

Exactly. And Daniel brought up a term that every network engineer loves and fears: five nines. That is ninety-nine point nine nine nine percent uptime. When you do the math, that only allows for about five minutes of total downtime in an entire year. For a 911 dispatch center or a major data center, that is the requirement. But for a home office or a small business in twenty twenty-six, how close can we actually get without spending a million dollars?

### Corn

That is the challenge. I want to dig into the layers of this. Because most people think resiliency just means having a backup, like a second router. But as we saw in episode two hundred seventy-six when we talked about future-proofing home networks, it is way deeper than that. You have to think about diverse paths, diverse mediums, and diverse power. So Herman, if you were building the ultimate resiliency stack today, where do you start?

### Herman

You start with the physical path. This is the thing most people miss. If you have two different internet providers, say one is a fiber company and one is a cable company, but they both enter your building through the same plastic pipe and run to the same utility pole, you do not have true resiliency. That is what we call a single point of failure. If a truck hits that pole, both of your connections are gone.

### Corn

Right, it is the illusion of redundancy. I remember reading about a data center that had three different fiber providers, but they discovered all three providers were leasing space in the exact same physical trench under the street. One construction crew with a jackhammer took out the whole facility. So, for a dedicated enthusiast, how do you solve that?

### Herman

You look for medium diversity. This is where things like Starlink and other Low Earth Orbit satellites come in. If you have fiber coming in through the ground and a satellite dish on your roof, those two signals are coming from completely different directions. One is terrestrial and one is celestial. The chances of a backhoe in your neighborhood and a solar flare hitting at the exact same moment are pretty slim.

### Corn

That is a great point. And in twenty twenty-six, Starlink is not the only player anymore. We have multiple constellations up there now. But what about the latency? If I am a business and my fiber goes down, and I switch to satellite, does everything just crawl to a stop?

### Herman

Not anymore. With the latest generation of Low Earth Orbit satellites, we are seeing latencies in the twenty to forty millisecond range. That is plenty fast for Zoom calls, voice over IP, and most business applications. It is not like the old days of geostationary satellites where the signal had to travel twenty-two thousand miles into space and back, causing a half-second delay. Now the satellites are only a few hundred miles up.

### Corn

Okay, so we have fiber and we have satellite. But what about cellular? Daniel mentioned cellular networks in his prompt. We have five G and even early six G deployments happening now. Is a cellular hotspot a viable part of a high-quality resiliency package?

### Herman

Absolutely, but you have to be careful with how you implement it. Most people just think of a little puck or a phone hotspot. But for a serious setup, you want a fixed wireless access terminal with external antennas. If you mount an antenna on your roof, you can pull in a much cleaner signal than your phone can inside the house. And more importantly, you want to look at what is called carrier-grade NAT or CGNAT.

### Corn

Explain that, because that sounds like a technical hurdle that could break things like security cameras or remote access.

### Herman

It definitely can. Most cellular providers do not give you a public IP address. They put you behind a giant wall with thousands of other users. If you are trying to run a server or access your home network from away, it is a nightmare. But in twenty twenty-six, many business-class cellular plans now offer static IP addresses or at least public ones. If you are building a resiliency package, you need to make sure your backup connection actually supports the services you run.

## Corn

So we have the connections, but how do we actually switch between them? Daniel mentioned his experience with failover being clunky. It takes ten seconds to realize the internet is down, another ten seconds to switch, and by then your video call has dropped and your VPN has disconnected. That is not five nines behavior.

## Herman

That is the difference between failover and bonding. This is where it gets really nerdy and exciting. Failover is like having a spare tire in your trunk. You have to stop the car, change the tire, and then start driving again. Bonding is like having a car with six wheels. If one pops, you do not even feel it; the others just keep carrying the load.

## Corn

I love that analogy. So how do we bond a fiber line and a satellite dish?

## Herman

You use a technology called SD-WAN, or Software Defined Wide Area Network. There are companies like Peplink or Open MPTCP Router that allow you to take multiple internet connections and fuse them into one single virtual pipe. It essentially breaks your data into tiny packets and spreads them across all your available connections. If the fiber line gets cut mid-sentence while we are talking, the remaining packets just flow over the satellite or cellular link. The user never even notices. The IP address stays the same, the session stays open.

## Corn

That sounds like magic, but I imagine it requires some sort of server on the other end to stitch those packets back together, right?

### Herman

Exactly. You usually have a small virtual private server in a data center somewhere that acts as the anchor. Your home router sends everything to that server over multiple paths, and the server presents it to the internet as one clean connection. It is the gold standard for resiliency. It is how news crews can broadcast live high-definition video from a moving bus. They have eight different cellular modems all bonded together.

### Corn

It is amazing how that technology has trickled down to the enthusiast level. I remember when that was only for big corporations. But let's talk about the high-stakes side of things, like those 911 centers Daniel mentioned. They are not just worrying about the internet line. They are worrying about the building itself.

### Herman

Right. For them, resiliency is about geodiversity. They often have two identical centers in different parts of a city or even different parts of the country. If a natural disaster hits one, the other can take over the entire load instantly. And they use something called BGP, or Border Gateway Protocol.

### Corn

Ah, BGP. The thing that occasionally breaks the entire internet when someone misconfigures it.

### Herman

Precisely. BGP is the routing protocol of the internet. Big organizations own their own blocks of IP addresses. If their primary data center goes offline, they use BGP to tell the rest of the world, hey, if you want to reach these addresses, send the traffic to our backup site instead. It is a level of control that a home user just cannot get. But we can simulate it with the bonding technology I mentioned.

### Corn

We should probably take a quick break before we get into the power side of this, because all the internet connections in the world do not matter if your router does not have electricity.

### Herman

Good point. Let's see what Larry has for us today.

### Corn

Let's take a quick break for our sponsors. Larry: Are you tired of your neighbor stealing your Wi-Fi? Or worse, are you tired of your Wi-Fi leaking out of your house where anyone can just grab it? You need the Signal Sponge! The Signal Sponge is a revolutionary high-density foam block that you place next to your router. It uses proprietary molecular magnetism to absorb stray internet waves and focus them directly into your devices. No more wasted bandwidth floating around in your living room! It also works as a great paperweight or a very firm pillow for people who enjoy the smell of industrial adhesive. The Signal Sponge. Keep your internet where it belongs: in the sponge. BUY NOW!

### Corn

Thanks, Larry. I am not sure I want my internet in a sponge, but I appreciate the enthusiasm. Anyway, back to resiliency. Herman, we were just about to talk about power.

### Herman

Right. This is the foundation. If the power goes out in the neighborhood, the local fiber node might stay up for a few hours on its own batteries, but if your house is dark, your router is dead. For a high-quality package, you need more than just a little battery backup from the office supply store.

### Corn

You are talking about those small Uninterruptible Power Supplies, right? The ones that beep incessantly the moment the lights flicker?

### Herman

Yeah, those are okay for saving a document on your desktop, but they usually only last fifteen or twenty minutes. For true resiliency, you want a large-scale lithium iron phosphate battery system, like a Powerwall or a DIY rack-mounted setup. These can run a network stack for days. And if you are really serious, you want an Automatic Transfer Switch connected to a generator.

## Corn

That is what the dispatch centers do. They have massive diesel generators that can run the whole building for a week if they have to. And they test them every single month.

## Herman

Exactly. And they do not just have one. They often have two generators from different manufacturers, using different fuel sources. One might be natural gas and the other diesel. That is the level of thinking required for five nines. They assume every single system will fail at some point.

## Corn

So, for our friend Daniel or someone listening who wants to build this at home, what does the actual shopping list look like? If we are putting together the My Weird Prompts internet resilience package, what are the components?

## Herman

Okay, here is the dream setup for twenty twenty-six. Step one: your primary fiber connection. Try to get a provider that uses a different path than your backup. Step two: a Starlink Flat High Performance dish. This is the one designed for permanent mounting with a wide field of view. Step three: a five G or six G cellular modem with a high-gain directional antenna pointed at a tower that is not on the same fiber backbone as your house.

## Corn

How do you even find that out? How do you know which fiber backbone a cell tower uses?

## Herman

It is tough, but you can usually look up tower ownership and backhaul providers on public databases. It is the kind of rabbit hole our listeners love. Step four: an SD-WAN router, something like a Peplink Balance. This will be the brain that bonds all three connections together. Step five: a large battery backup system, at least five kilowatt-hours of capacity. And step six: a secondary, low-power router that can take over basic functions if the main one fails.

### Corn

That is a serious list. It sounds expensive, but if your livelihood depends on being online, it is probably worth every penny. Think about the cost of a lost day of work for a whole team.

### Herman

Exactly. If you are a business with ten employees and the internet goes down for eight hours, you just lost eighty hours of productivity. That probably costs more than this entire setup. And for enthusiasts, there is a certain peace of mind that comes with knowing you are the only house on the block that is still online during a storm.

### Corn

I remember in episode two hundred seventy-eight when we talked about AI optimization, we touched on how much data these new systems are pulling. If your connection is flaky, your local AI agents start to lose their minds. They cannot reach the models they need to function. So resiliency is becoming a prerequisite for the AI era.

### Herman

It really is. We are moving away from a world where the internet is something you go to, and into a world where the internet is the environment you live in. You do not notice the air until it is gone, and we are getting to that point with connectivity.

### Corn

I want to go back to the 911 centers for a minute. Daniel mentioned they do not rely on a single strategy. What are some of the weird strategies they use that we might not think of?

### Herman

One of my favorites is point-to-point microwave links. If two buildings have a clear line of sight, they can beam a signal between them using high-frequency radio waves. It has nothing to do with the wires in the ground or the satellites in the sky. It is just a private, high-speed link through the air. Many cities have a web of these links connecting hospitals, police stations, and fire departments.

### Corn

That is fascinating. It is like a private internet just for the city's infrastructure. Could an enthusiast do that? If you had a friend a few miles away with a different ISP, could you beam a signal to each other?

### Herman

You absolutely can. There is some great consumer-grade hardware for this now. You can set up a five-gigahertz or sixty-gigahertz link and get multi-gigabit speeds over several miles. It is a bit of a hobbyist project because you need a clear line of sight, which can be tricky in a place like Jerusalem with all the hills and stone buildings, but it is a very valid resiliency strategy.

### Corn

It really comes down to this idea of diversity, doesn't it? Diversity of hardware, diversity of provider, and diversity of physics.

### Herman

That is the core principle. In the world of high availability, we talk about fate sharing. You want to identify every component that shares the same fate. If your two internet providers both use the same DNS server, they share a fate. If they both use the same power grid, they share a fate. The goal of a five nines system is to eliminate as much fate sharing as possible.

### Corn

This is where the misconception-busting comes in. Most people think that if they have two different Wi-Fi networks in their house, they are redundant. But if both of those Wi-Fi networks are just two different frequencies on the same router, they share a fate. If the router's power supply dies, both networks are gone.

### Herman

Exactly. Or if you have two different routers but they are both plugged into the same cheap power strip, that power strip is your single point of failure. It is about looking at the entire chain from the website you are trying to reach all the way down to the electrons moving in your computer.

### **Corn**

So what is the takeaway for the average person who maybe doesn't want to spend five thousand dollars on a satellite dish and a generator, but wants to be better prepared than Daniel was this morning?

### **Herman**

The simplest, most effective thing you can do is have a dedicated cellular backup that is not just your phone. Get a decent five G router, put a prepaid SIM card in it from a different carrier than your phone, and keep it charged. If your main internet goes down, you have a completely independent path ready to go.

### **Corn**

And maybe a small battery backup for your main router. Even a fifty-dollar UPS will keep your fiber connection alive during those quick power flickers that usually happen during winter storms here.

### **Herman**

Definitely. Those five-second outages are the ones that cause the most frustration because they force everything to reboot, which can take five or ten minutes. A tiny battery prevents that whole cycle.

### **Corn**

This has been a really enlightening deep dive. I think it is easy to take the internet for granted until it vanishes. It is like health; you do not think about it until you are sick.

### **Herman**

Very true. And I think we are going to see more and more people taking this seriously. As more people work from home and our homes become smarter, the cost of being offline just keeps going up.

### **Corn**

Well, I hope Daniel was listening. Maybe we can help him set up a bonded cellular link this weekend so he doesn't have to shout at his laptop anymore. It would certainly make the house a lot quieter.

**Herman**

I am in. I have been looking for an excuse to buy one of those high-gain antennas anyway.

**Corn**

Of course you have. Well, before we wrap up, I want to remind everyone that if you are enjoying our deep dives into the weird and technical, we would really appreciate a review on your podcast app or on Spotify. It genuinely helps other curious people find the show.

**Herman**

It really does. We love seeing the community grow. And remember, you can find all our past episodes and a contact form at our website, [myweirdprompts.com](http://myweirdprompts.com). We are also on Spotify, so make sure to follow us there.

**Corn**

This has been episode two hundred seventy-nine of My Weird Prompts. Thanks to our housemate Daniel for the great prompt. It gave us a chance to really geek out on some networking infrastructure.

**Herman**

It was a blast. I think next time we should talk about the history of those microwave links. There is some really cool Cold War era tech there.

**Corn**

Save it for the next one, Herman. Until then, stay curious and stay connected.

**Herman**

Preferably with ninety-nine point nine nine nine percent uptime.

## Corn

Goodbye, everyone!

## Herman

See ya! Larry: Is your internet too fast? Are you worried that your data is moving so quickly it might cause a friction fire inside your fiber optic cables? You need Ethernet Oil! Just a few drops in your RJ-forty-five port and your packets will slide through the wires with zero resistance. It is organic, non-conductive, and has a pleasant citrus scent. Ethernet Oil. Smooth out your browsing experience today. BUY NOW!