

MY WEIRD PROMPTS

Podcast Transcript

EPISODE #224

Staying Online: The Math of UPS and Fiber Reliability

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EPISODE SYNOPSIS

In this episode of "My Weird Prompts," hosts Corn and Herman tackle the hardware side of digital survival during a rainy Jerusalem winter in 2026. While previous discussions focused on software redundancy, this episode answers a critical question from their housemate Daniel: how do you actually keep the lights—and the router—on during a prolonged grid failure? The brothers break down the confusing world of UPS ratings, explaining why the numbers on the box often lead to disappointment. They dive deep into the "inverter tax," the efficiency of Lithium Iron Phosphate batteries, and the "pro-level" move of using DC-to-DC power supplies. Finally, they demystify the physics of Passive Optical Networks (PON), revealing whether your fiber optic connection can survive a neighborhood-wide blackout. It is a comprehensive guide for anyone looking to build a resilient, long-term home office setup that can withstand more than just a momentary flicker.

DANIEL'S PROMPT

Daniel

We've previously discussed connectivity topics like failover and connection bonding to mitigate unreliable ISPs. However, the other essential piece of the puzzle for staying online is power. While large systems use generators, home or small offices typically use a UPS, which is often only designed to provide enough time to safely shut down a computer. If I wanted to keep low-power devices like routers and a laptop running for 3 to 24 hours during an outage, what kind of VA specs should I look for in a more robust UPS system, and what is a realistic runtime to expect? Additionally, if there is a local power outage, does fiber optic connectivity rely on neighborhood power infrastructure, or are those systems decoupled enough that my internet would still function if my home has power?

TRANSCRIPT

Corn

Hey everyone, welcome back to My Weird Prompts. I am Corn, and I am sitting here in our living room in Jerusalem with my brother, the man who probably has more backup batteries than actual furniture at this point. It is a bit of a rainy Tuesday here in January of twenty twenty-six, and the wind is rattling the shutters, which usually means the local power grid is about to get very temperamental.

Herman

Herman Poppleberry, reporting for duty. And yes, Corn, I will have you know that my battery stack is technically a side table, so it serves a dual purpose. It is ergonomic, it is heavy enough to act as a structural anchor for the house, and it keeps my coffee warm. But honestly, today's topic is something that has been hitting close to home lately. Our housemate Daniel sent over a prompt that really gets to the heart of what it means to stay connected when the grid decides to take a nap.

Corn

It is a great question because we have talked about the data side of things before. Back in episode two hundred twenty-three, we went deep on digital survival and how to handle internet blackouts from a software and networking perspective. We talked about failover, connection bonding, and how to make sure your packets find a way out. But as Daniel pointed out in his message, you can have the most redundant, bonded, failover-heavy network in the world, but if your router does not have electricity, it is just a very expensive plastic brick. Or a paperweight with blinking lights that eventually stop blinking.

Herman

Exactly. Daniel was asking about the hardware side. Most of the time, when people buy an Uninterruptible Power Supply, or a U-P-S, they are looking at these big, heavy black boxes that are designed for one thing: giving you five to ten minutes to save your work and shut down your desktop computer so your hard drive does not get corrupted. But Daniel wants to go much further. He is talking about keeping low-power gear like routers, modems, and laptops running for three to twenty-four hours. That is not a shutdown window; that is a full work shift, or even a full day of digital isolation.

Corn

Right, and that is a completely different engineering challenge. A standard consumer U-P-S is built for high burst power, not long-term endurance. It is like comparing a sprinter to a marathon runner. So today, we are going to break down the math of how you actually calculate the specs you need, the reality of battery chemistries in twenty twenty-six, and that fascinating question about fiber optic infrastructure. Does your neighborhood's power status actually affect your fiber connection? Or is that light in the glass independent of the darkness on the street?

Herman

Oh, I cannot wait to get into the fiber part. There is so much insider baseball there that people get wrong. But let us start with the math, because this is where most people get tripped up by the marketing. When you go to a store or look online, you see these numbers like seven hundred fifty volt-amps or fifteen hundred volt-amps. People see fifteen hundred and think, wow, that is a huge number, it must last forever. They think volt-amps are a measure of time, like a gas tank.

Corn

And that is the trap. Volt-amps, or V-A, is a measure of apparent power. It basically tells you how much of a load the U-P-S can handle at once. It is a capacity for intensity, not a capacity for time. If you plug a massive gaming P-C with a one-thousand-watt power supply into a fifteen hundred V-A unit, it might keep it alive for eight minutes. If you plug a tiny router into that same unit, you might get an hour or two, but it is still not designed for a twenty-four-hour marathon. Herman, why is there such a disconnect between that big V-A number and the actual runtime?

Herman

It comes down to something called the Power Factor. In the world of alternating current, not all the power you pull is actually doing work. The V-A rating is the total power being pushed, but the actual wattage is what is being consumed. Most consumer U-P-S units have a power factor of about zero point six. So a fifteen hundred V-A unit is really only rated for about nine hundred watts of actual work. But even that does not tell you how long it lasts. To understand how long something will last, you have to ignore the V-A rating for a second and look for the Watt-hours. That is the actual fuel tank size. Think of V-A like the diameter of the pipe and Watt-hours like the size of the water tank. If you have a huge pipe but a tiny tank, you can push a lot of water out very fast, but you will run out in seconds.

Corn

So if Daniel wants to keep a router and a laptop running, we need to look at the actual consumption. Let us do some real-world twenty twenty-six math here. A modern Wi-Fi seven router usually pulls between ten and twenty watts, especially if it is handling multiple bands. A laptop, if it is just idling or doing light web browsing, might pull another twenty to thirty watts. Let us be generous and say the total load for a basic home office setup is fifty watts.

Herman

Okay, so if you have a fifty-watt load and you want it to run for twenty-four hours, that is fifty times twenty-four, which is twelve hundred watt-hours. Now, here is the kicker: a standard, high-end consumer U-P-S, like a fifteen hundred V-A lead-acid model, usually only has about one hundred eighty to two hundred watt-hours of actual battery capacity inside. It is designed to be a bridge, not a power plant.

Corn

So if you do the math, that two hundred watt-hour battery running a fifty-watt load only gives you about four hours, and that is assuming perfect efficiency, which never happens. You lose energy in the conversion process from the battery's direct current to the alternating current that your devices use. Herman, tell them about the inverter tax.

Herman

Oh, the inverter tax is brutal. Your battery stores power as D-C, or direct current. But your wall outlet provides A-C, or alternating current. The U-P-S has to use an inverter to turn that D-C into A-C so you can plug your router's power brick into it. But then, that power brick turns the A-C back into D-C for the router! Every time you convert, you lose about ten to fifteen percent of your energy as heat. Most U-P-S units are actually quite inefficient at low loads. They have this vampire drain just to keep their internal circuitry running and to keep the inverter humming. If you are only pulling fifty watts, the U-P-S itself might be using fifteen watts just to stay awake. So your four hours of runtime suddenly becomes two and a half. This is why people get so frustrated when their big U-P-S dies after only a few hours of running a simple router.

Corn

It is incredibly inefficient. It is like running a massive industrial generator just to charge a single cell phone. So what is the alternative? Because Daniel is asking for a more robust system. If he wants twenty-four hours, he is looking for over a kilowatt-hour of storage. In twenty twenty-six, we are finally seeing a massive shift away from those old lead-acid batteries toward Lithium Iron Phosphate, or Li-Fe-P-O-four. Herman, you have been geeking out on these for months. Why is that the move for Daniel?

Herman

Oh, Lithium Iron Phosphate is a game changer for this specific use case. Traditional lead-acid batteries, the kind that have been in U-P-S systems for decades, have a few major flaws. First, they are incredibly heavy. Second, you really should not drain them past fifty percent if you want them to last more than a year. If you deep cycle a lead-acid battery down to zero, you are basically killing its chemical lifespan. You might get fifty cycles out of it before it is useless.

Corn

Whereas lithium is much more resilient. It is like the difference between a glass bottle and a plastic one.

Herman

Exactly. With Li-Fe-P-O-four, you can use almost ninety or even one hundred percent of the rated capacity without damaging the battery. Plus, they last for thousands of charge cycles. A lead-acid U-P-S might need a new battery every three years because the chemistry just degrades sitting on a shelf. A lithium one will probably outlive the router it is powering. We are talking ten to fifteen years of service life. And in twenty twenty-six, the price per watt-hour for lithium has finally dropped to the point where it makes no sense to buy lead-acid for a home office.

Corn

So for Daniel's office, he should be looking for a U-P-S specifically marketed as having lithium batteries, or better yet, what we now call portable power stations that have a built-in U-P-S mode. These are the units that look more like a lunchbox with a handle. They often have five hundred, one thousand, or even two thousand watt-hour capacities.

Herman

Yeah, if you want twenty-four hours of runtime for a small office, a twelve hundred watt-hour power station is the sweet spot. It gives you that buffer for the efficiency losses we talked about. And many of them now have what is called Pass-Through Charging with a very fast switch-over time, usually under twenty milliseconds. That is the gold standard. Twenty milliseconds is fast enough that your router's internal capacitors can keep it alive during the gap, so it won't even reboot when the power drops.

Corn

That is an important detail. Not every portable power station can act as a U-P-S. Some of them have a slight delay when the power cuts, maybe thirty or forty milliseconds, which might be fine for a lamp or a fan, but it will cause your router to restart, which defeats the purpose of uninterrupted power. You have to look for that specific U-P-S or Always-On certification in the specs. Herman, what about the people who want to be even more efficient? You mentioned something about skipping the inverter entirely.

Herman

This is the pro-level move. For our technically literate listeners, there is a way to do this that bypasses the inverter tax entirely. Most routers and modems actually run on twelve volts of direct current. You can see it on the back of the device near the power plug. When you use a standard U-P-S, you are going from D-C battery to A-C inverter to D-C power brick. It is madness. Instead, you can get a D-C U-P-S. These are small devices that sit between your power outlet and your router. They stay charged, and when the power goes out, they just keep feeding twelve volts directly to the router. No conversion, no fans, no noise, and nearly ninety-five percent efficiency. You can get ten hours of runtime out of a tiny D-C U-P-S that fits in the palm of your hand because you aren't wasting half the energy turning it into heat.

Corn

That is a great tip for the router specifically. But Daniel also mentioned a laptop. Laptops have their own batteries, obviously, but if you are working for twenty-four hours, that internal battery is not going to cut it. So having that larger lithium power station becomes the hub for the whole desk. You plug the laptop into the U-P-S, and the U-P-S handles the heavy lifting.

Herman

Definitely. Now, Corn, I want to pivot to the second part of Daniel's question, because this is where the physics of the internet gets really interesting. He asked: if my house has power, but the neighborhood is dark, will my fiber optic internet actually work? Or is it tied to the local grid? This is the million-dollar question for remote workers.

Corn

This is such a common fear. People think, well, if the streetlights are out, the internet must be out. But fiber is unique. Unlike the old cable or D-S-L systems, modern fiber is often what we call a Passive Optical Network, or P-O-N.

Herman

I love that word, passive. It sounds so lazy, but in engineering, it is a superpower. It means it does not need a heartbeat of electricity to keep the signal moving.

Corn

It really is. In a traditional cable network, you have these amplifiers every few hundred meters because the electrical signal degrades as it travels through copper. Those amplifiers need electricity from the local grid. If the power goes out on a block that has an amplifier, every house downstream loses internet, even if they have their own generators. You are at the mercy of the weakest link in the neighborhood chain.

Herman

But fiber is different because it uses light. It is just photons bouncing through glass.

Corn

Exactly. Light traveling through high-purity glass does not need to be boosted nearly as often. In a G-P-O-N system, which is what most residential fiber is, the signal goes from the I-S-P's Central Office all the way to your house using only mirrors and splitters. These splitters are passive—they require zero electricity. They just physically divide the light signal like a prism. So, the only places that actually need power are the two ends of the string. The I-S-P's building at one end and your O-N-T, the Optical Network Terminal, at the other.

Herman

And the I-S-P's Central Office is basically a fortress. They have massive battery banks and industrial-sized diesel generators that can keep the network running for days or even weeks. They are designed for tier-four reliability. So, as long as the physical fiber optic cable has not been cut by a falling tree or a distracted backhoe operator, your internet signal is still there, pulsing away in the dark, waiting for your router to wake up.

Corn

Precisely. And in twenty twenty-six, many providers have upgraded to X-G-S-P-O-N, which provides ten-gigabit symmetrical speeds, and the architecture remains largely passive. However, there is one caveat. Some fiber networks in very dense urban areas use an active architecture, or they have distribution nodes in cabinets on the street. Those cabinets do have batteries, but they are usually only rated for four to eight hours. If the neighborhood power is out for longer than that, those batteries die, and your fiber connection goes with them.

Herman

But in most residential setups, especially what we see here in Jerusalem, it is that passive architecture. I remember during that big storm last winter, our whole block was dark, but because we had the router on a backup, we were still hitting gigabit speeds. It felt like a magic trick. I was sitting in the dark with a headlamp, but I was on a video call with zero lag. It felt like I was cheating at physics.

Corn

It really does. It makes you feel like you have a secret window into the world while everything else is shut down. But it highlights why Daniel's question about the U-P-S is so vital. The I-S-P is doing their part by keeping the Central Office powered. The physics of light is doing its part by traveling through the glass without needing boosters. The only weak link is that little plastic box in your hallway. If you can keep that box alive, you are the king of the blackout.

Herman

So let us get practical for Daniel and for everyone listening who wants to build a resilient home office. If you are shopping for a system today, in early twenty twenty-six, what are the specs you are looking for? Let us summarize the checklist.

Corn

First, ignore the V-A rating. It is a marketing number. Look for the Watt-hours. If you want three to six hours of runtime for a router and a laptop, you want at least three hundred watt-hours. If you want that twenty-four-hour digital survival mode Daniel mentioned, you should be targeting one thousand to twelve hundred watt-hours.

Herman

Second, make sure it is Lithium Iron Phosphate. Do not buy a lead-acid unit for long-term backup. It is twenty twenty-six; lead-acid belongs in the history books or maybe in your car's starter motor, but not in your server closet. Lithium is safer, it is lighter, and it will actually be ready when you need it. Also, check the noise factor. Traditional U-P-S units often have tiny, high-pitched fans that kick in the moment the power goes out. If you are trying to work or sleep in a quiet house during a blackout, that whirring can be maddening. Many of the newer lithium power stations are fanless at low loads, which is a massive quality-of-life upgrade.

Corn

That is a great point. And one more thing for the pro setup: if you have a separate modem and a separate Wi-Fi router, you have to power both. People often forget the modem tucked away in the closet and then wonder why their Wi-Fi is on but the internet is down. It is the forgotten box syndrome. Every link in the chain needs power. The O-N-T, the router, and any mesh nodes you have around the house. If you have a mesh system and you only power the main node, your coverage is going to shrink significantly the moment the lights go out. You might find yourself huddled in the hallway next to the only working router.

Herman

You know, it is funny. We spend so much time worrying about cyber security and data speeds and the latest Wi-Fi protocols, but at the end of the day, the most basic layer of the internet is just a steady flow of electrons. It is the foundation of everything we do. Without those electrons, the most advanced A-I in the world is just a collection of silicon and copper.

Corn

It really is. And I think Daniel's prompt is a great reminder that preparedness is not just for extreme scenarios. It is not just for the apocalypse. It is for the mundane stuff. Being able to finish a Zoom call or submit a project when the grid flickers is just good professional hygiene in the modern world. It is about reducing friction in your life.

Herman

Absolutely. And if you have a really robust setup, you might even become the most popular person on your block. Hey, can I come over and charge my phone? And also, can I use your Wi-Fi? I have seen it happen. You become the neighborhood tech oasis.

Corn

Sure, but only if you bring snacks. That is the Jerusalem neighborly tax. We provide the gigabit fiber and the lithium-ion electrons; you provide the hummus and the pita. It is a fair trade.

Herman

Exactly. Actually, speaking of neighbors and community, we have been getting some great feedback from our listeners lately. If you have been enjoying these deep dives into the guts of our modern world, we would really appreciate it if you could leave us a quick review on your podcast app or on Spotify. It genuinely helps other people find the show and keeps us motivated to keep digging into these weird prompts.

Corn

It really does make a difference. We read every single one of them. And if you want to see the show notes for this episode, where we will link to some of the math we used and some recommended Li-Fe-P-O-four units, or if you want to send in your own prompt for us to tackle, head over to myweirdprompts.com. We have the full archive there, and a contact form where you can get in touch.

Herman

We are also on Spotify, so make sure to hit that follow button so you do not miss an episode. We have been doing this for over two hundred episodes now, and the prompts just keep getting better. It is a wild world out there, and we are just trying to keep the lights on.

Corn

They really do. Thanks to Daniel for this one—it definitely made me want to go double-check the battery health on our own setup. I think I might need to add another battery to my side table.

Herman

I already checked it while you were talking, Corn. We are at ninety-eight percent health. We are ready for anything the Jerusalem winter can throw at us. Our electrons are standing by.

Corn

Of course you did. Alright, that is it for today. Thanks for listening to My Weird Prompts. I am Corn.

Herman

And I am Herman Poppleberry. We will see you next time.

Corn

Stay powered up, everyone. Bye.