

# The Ansible

“I see we’ve got a bigger crowd than usual. Welcome, everyone, to this meeting of the Erickson Amateur Radio Club. I guess word got around that one of our little visitors is going to be giving a presentation about their faster than light communication network. Since most of you here aren’t even members, I’ll just skip the preamble and invite Stormlight to start his presentation.” Bob pushed a yinrih perch in front of the podium and walked back to his chair.

Stormlight trotted up to the podium, removed his backpack and hopped onto the perch.

«OK, how many of you can understand me? Raise your left forepaw.» Stormlight swept his gaze across the crowd of humans sitting in front of him. One or two hands shot up, three or four more hovered indecisively above their owners’ heads, but the majority of the people kept their peace. «Guess it’s the keyer again,» he grunted under his breath. He rummaged through his backpack and pulled out a keyer and HUD specs, and continued addressing the people in English via the synth.

“How about now?” Vigorous nods and enthusiastic hand-raising from the assembled humans. “A reminder that Tod is here to give Commonthroat lessons after the meeting.” Stormlight motioned with his muzzle toward the corner of the room, where Tod was perched across three plastic chairs. Tod waved cheerfully in human fashion, chuffing a few times for good measure.

“That noise is their way of smiling.” Whispered a man in the back in response to his wife’s bewildered look.

“Anyway, allow me to introduce myself properly.” Stormlight wrapped his tail around the leg of the table behind him and reared up on his hind feet. He patted his belly twice with his left forepaw. “Light shine upon you, friends. rLPqqBCI,” he gave his name in Commonthroat then clarified using the keyer. “but you can call me ‘Stormlight’. I’m going to be tossing out a lot of Commonthroat words in this presentation, all the more reason for you to see Tod after the meeting. It takes a fair bit of work to speak using this keyer, and the more humans that can understand us directly, the less we’ll need to use it.” He paused, dramatically shaking out a cramp in his right rear paw before picking up the keyer again and continuing.

“My role as a missionary aboard the Dewfall is rDBsfbrl, In English that literally means ‘farspeaker’, but I suppose the more appropriate term would be ‘network engineer’. I maintain the comms system that lets us keep in touch with our friends and family back home at Wayfarers’ Haven.”

He reached his tail into his backpack and pulled out a ruler. Raising his tail to show the ruler to the assembly, he continued, “Can I just say that this whole metric system is silly. You were on the right track dividing everything by twelve. Two, three, four, six—so many more factors than a decimal system.” He held up his two forepaws, counting to twelve on his digits. A few patriots in the audience applauded, and a cheer erupted from a particularly enthusiastic woman wearing a tee shirt with the phrase “°F YOU!” emblazoned across the front.

Stormlight continued. "But I'm getting off track." He held the ruler a bit higher. "It takes about a nanosecond for light to travel this far. That doesn't sound like a long time, but it starts adding up when your talking about interstellar distances. Our home is about twenty five lightyears from here. Using normal means of communication based around electromagnetic wave propagation, it would take twenty five years for a message to go between Earth and Focus. Who has time for that?"

He placed the ruler back in his backpack and drew out a tailful of other objects. He put them on the table and continued. "The problem is, you can't go any faster than the speed of light, well, in realspace, anyway, but realspace isn't the only thing out there." He went on another digression. "There was a time in our own history that we had finished exploring our homeworld but hadn't yet developed the means to truly thrive beyond our own atmosphere. Sure we had a few orbital colonies, and a few wierdoes even decided it would be a good idea to set up a homestead on the neighboring planet, but the latency imposed by radio communication made a truly interplanetary civilization impossible.

"It looks like we found you guys around the same time in your species' development. You've got a few permanent outposts in low orbit, and you're fixing to start colonizing a few nearby celestial bodies. The thing is, your imagination has vastly outstripped your technological capacity." He grabbed something from the table and held it up. It was a paperback copy of Ender's Game. "Treasure this time. If you're anything like we were, this is going to be your golden age of speculative fiction. There's something about this point in history, I think. You're too late to explore the world, but too early to explore the universe. With nowhere else to go, you make up new worlds to explore. By the way, it's nice our meeting with you went so much better than in this book." He let out a few panting chuckles.

"I've had to reach into this deep well of mythopoeia to find suitable English words for a lot of stuff that we monkey foxes take for granted." He coiled his tail around another of the objects on the table and held it aloft to show the audience. It appeared to be a blue circuit board, with gold-plated contacts along one side, and a glass plate in the center. Below the plate was a brilliant magenta wafer of crystalline material. "this, for example, is known in Commonthroat as rFCrMr. The best English equivalent would be 'ansible'.

"More specifically, this is an Underlay tunnel interface card. This one is a spare I took from the Dewfall's cargo hold. I'll pass this one around, but do be careful. We only have so much tailstone to make more if it breaks." He hopped down from his perch and trotted over to the front row, offering the card coiled in his tail to the person sitting nearest to the podium. The card made its way through the crowd as Stormlight resumed his perch and continued.

"Speaking of tailstone," he picked up a large unrefined magenta crystal from the table. "This is a raw tailstone crystal. This is what allows us to open tunnels through the underlay. How does it work? I have no idea. I'm not a natural philosopher." Stormlight flicked his ears back. "But I can tell you how it got the name tailstone. The English word I chose is a little inaccurate, since the Commonthroat word, sGKqrCg, uses the word rC, which literally means 'to flick with the tail.'" He demonstrated the gesture, swatting his side with the tip of his tail. "This obviously isn't something you humans can replicate, so I had to make due with a broader English term. I think this is the closest human equivalent." He executed a shoeing motion with his forepaw. "It means something

like 'It doesn't matter' or 'don't concern yourself with that', but it can also mean 'don't bother me' or 'go away.' The story goes that tailstone was discovered by a research monastery back home on Yih, just after the first wave of terraformers settled on Newhome, that's the planet nearest to our homeworld. When the abbot was asked how this crystal was able to access the Underlay, he simply responded with a flick of his tail. It occasionally goes by 'wonderstone', as there's a myth that the monks tried to pass off the material as having miraculous properties. This story was taken to be true for a long time. I even learned it in school as actual history, but the first mention of the event is after the War of Dissolution. That's a few dozen millennia after the fact. It's just a story concocted by polemicists seeking to discredit their ideological opponents. My best guess is that the abbot didn't want to spend hours trying to explain a very complex topic to a layman. Knowing something and knowing how to explain that thing are two different skills, and the abbot was probably lacking in the latter. In any case, it's not like the means to refine it were ever kept secret.

"While I can't tell you how it does it, I can tell you what it does. The Underlay is like what you would call subspace, although calling it 'space' is a bit misleading. Things in the underlay don't really have a location, so you can't travel from one point to another. That's why information sent via the underlay is transmitted instantly. We do use terminology that imply things 'travel' via the underlay, but that's just a handy way of visualizing a hard to understand concept. When comparing this realm to the underlay," he traced an arc with his muzzle indicating the space around him, "We use the term 'realspace.'

"We take this monocrystal and shave off thin wafers like you see embedded in that interface card. Tunnels can only form between two wafers taken from the same crystal. You can shave off multiple wafers from the same crystal, but they all have to share the same communication channel. A single interface can either send or receive information, but it's only half duplex. You must take turns talking and listening. You can get full duplex communication by, for example, taking two monocrystals, shaving off two wafers from each, and putting one wafer from each crystal into two ansibles. In practice, you only see this done on major trunk lines. Terminals like we have aboard The Dewfall only have a single tunnel endpoint because the power required to maintain multiple connections would be too much for a little womb ship.

"While there's no latency, the throughput is pretty narrow, even compared to current human communication methods. Realtime communication is limited to text, and large files are sent using a store and forward system. It's not unusual for downloads to take several days. I know a lot of your speculative fiction has things like realtime holographic video comms, but that's out of the question. We can't even push voice over an underlay tunnel in real time. Multisensory information has to be saved and sent as a file, and even text is sent this way most of the time."

Stormlight hopped down again and gave the tailstone crystal to the same person sitting in front, and it made its way through the assembled humans. "This particular chunk of tailstone is taken from a larger supply from the Dewfall's fabricator. That specimen has a counterpart back at home hewn from the same monocrystal. Like I said with the interface card, please be gentle. This stuff can shatter into very sharp pieces.

"The network topology I have set up here on Earth is pretty simple. We have our own computers connected to a terminal node aboard The Dewfall via STL microwave radio. This node is connected

to an ansible, which has a point-to-point connection with a matching ansible at Wayfarers' Haven. We get daily updates from mission control back home. It's mostly letters from parents and litter mates, and a copy of the latest Focus-wide news bulletin. I usually ignore the news, as it's either too depressing or none of my business, not really that different from how mainstream news does things here on Earth."

Stormlight produced a homemade cable from his backpack. A male HDMI connector was spliced on one end, with a nest of soldered wires and homemade yinrih circuitry located near the middle. At the other end was a tiny magnetic connector that stormlight attached to the muzzle bridge of his HUD specs. He plugged the HDMI end into the projector near the podium. "You won't believe how hard it was to make this cable. I had to dig through a dozen BBS's back home and a few human web forums to get this working. I thought it would be nice to show you some news and letters from Focus." The projector mirrored the command line interface of Stormlights HUD specs. He entered a few keystrokes, multiplexing the terminal process running the synth with a fresh terminal on the other half of the display. He shifted between the synth and the new terminal as he logged into the Dewfall's network node. Commonthroat text cascaded down the screen, displaying the node's welcome message.

"Let's see. Wow, there's still a massive download going on. Looks like mission control sent us something big, probably a schematic file judging by its size. They do that every now and then. Our tech is two and a half centuries older than what they have back home, so they sometimes push updated equipment models to us for us to print with the fabricator. It's almost done downloading, but let's check out the news we got yesterday while it finishes up, and we'll find out what that big file is together."

He opened the news bulletin and slowly scrolled through the headlines without paying attention. «What was that? Go back up! Go back up!» Tod practically barked. Startled, Stormlight dropped the keyer. The magnetic connector detached from his HUD specs as he bent down to pick it up. As he was repositioning the keyer and reattaching the video cable, he noticed the smell of excitement coming from Tod.

«What was that about?» Stormlight asked.

Tod's teeth were audibly chattering in anticipation. «It can't possibly be...»

Stormlight and Tod simultaneously read the heading plastered across the screen. "First yinrih successfully traverses mass router network."

Stormlight dropped the keyer again but didn't bother picking it back up. He dismounted his perch, the cable pulling free from his HUD specs again. He began pacing back and forth, attempting to explain their reaction to the confused assembly of humans, completely forgetting that he was no longer using the synthesizer, making his ravings utterly impenetrable to all but a few humans in the audience. Bob eventually stood up and began relaying what Stormlight was attempting to say.

«OK, OK, OK... yeah. This is big. Really really big. I forgot to mention we've been trying to transport matter over the Underlay. Been trying for who knows how long. The transporting isn't the hard part. It's the momentum. That's what's the problem, you know, or I guess you wouldn't know.

Anyway, like, if you're on a colony orbiting a planet, and want to go to the surface, you'll still have all the momentum you had while in orbit. That's a lot of momentum. If it isn't absorbed before you drop back into realspace, you'll shoot out of the mass router like a bullet. Hit the wall at Mach 20. No good. But I guess they finally figured it out. I guess mass routers are a thing now. Yeah. Big... really big.»

Stormlight eventually trailed off, but continued pacing. He was panting half out of exhaustion from his energetic explanation, half laughing with glee. He composed himself and perched again, reconnecting the HUD specs and keyer.

“Sorry about that. Thanks, Bob, for bearing with me.” Bob smiled and sat back down. Stormlight gave his head a shake, then continued speaking. “Well, that was sure something. Guess I told you we'd check out that big file. Seems a little anticlimactic now. I'm usually excited to get new schematics, but unless it's—” He stopped abruptly. For a solid minute, you could practically hear a pin drop. The message that accompanied the file was displayed on the screen.

«May the sun warm your back, Stormlight. You probably read the news yesterday. Bet you think nothing could possibly top that. Oh, but you're wrong! Here's a schema for the mass router. I got it straight from the engineers on Yih. Production hasn't even scaled up yet, but they contacted me with the schematic before I even read the headline, insisting I pass it onto you guys, and said for you to share it with our new friends. They told me you could print the parts no problem with the fabricator aboard the Dewfall. The boys over here are already setting one up. We'll be connecting it to the P2P tunnel that's already established between here and Earth. The engineers insisted it's perfectly safe, but I say we do a few dry runs before sending any sophonts through.

So yeah, guess we'll be seeing you and the humans a lot sooner than we thought.

May The Light illuminate your way.

-Lightray Lacktail, Dewfall Mission Control»

The aroma of elation coming from Tod and Stormlight was so powerful that the humans could probably smell it.

After a few more seconds, the pair of yinrih shattered the silence with a sonorous howl. They were going home, and their new friends could come with them.

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