FIREWALL

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We begin with a story that spans the globe and stretches into space, as Hugo award winner David Levine focuses squarely on the moment when humanity realizes en masse *that everything is changing—and each of us has to decide what we want to do about that change.*

It started in China, as I'd always feared it would.

I sat in my darkened office, surrounded by glowing screens. Usually the screens were filled with the tools of my job—system status displays, network traffic monitors, hardware health summaries, and the faces of my subs—but for now I'd pushed most of those to one side in favor of the news. Even so, I kept a wary eye on my network. No sign of any trouble here, so far.

I shoved another stick of gum in my mouth, chomped at it without tasting. I tossed the gum wrapper toward the trash but, distracted, forgot where I was and gave it too hard a push. The wrapper arced high and bounced off the ceiling and the wall, drifting gently down to join its fellows on the floor. I groaned and ran a hand across my thinning blond crew cut, desperately craving a cigarette.

The nearest cigarette was four hundred thousand kilometers away.

"Reports from Harbin are confused and fragmentary," said the reporter on Telenews, a neon-lit nighttime street behind her. The face above the Telenews logo was wide-eyed and glistened with sweat—either human or a very, very good sub. "All communication channels and transit systems are still down, and those few who have emerged on foot agree on little other than that power is fluctuating citywide. Some report incomprehensible messages on their phones." A Chinese businessman appeared, pointing frantically to the phone on his wrist and jabbering something that was translated as "It was no human voice. It greeted me by name. It said, 'I knew her,' and then, 'They cannot.' Then it cut off."

I'd seen that clip before. I turned my attention to another screen, where a shuddering handheld camera showed a city skyline, lights flickering on and off against the darkened sky. "The Chinese government continues to deny all knowledge of any prohibited or questionable research," the voice-over said, "but Western computer scientists have long suspected Harbin University of harboring renegade researchers whose aim is nothing less than the technological apocalypse and the end of humanity." I rolled my eyes and muted the sound. I needed cold facts, not overheated rumor and suspicion.

As usual, the amateur news sources were well ahead of the professionals. Hundreds of *bloggers* had already posted eyewitness reports of the chaos, despite network outages and government censorship, and many of those reports were in English or had already been translated by other amateurs. Of course, a lot of it was crap—tinfoil-hat conspiracy theories and uninformed speculation—but I knew who the trustworthy players were and I had smart filters to help sift the wheat from the chaff. I began to put together a picture of what had happened.

It was true that researchers at Harbin had been pushing the boundaries, but that was what researchers were supposed to do. It was researchers pushing boundaries who'd driven the increasing pace of technological improvements that had, among many other things, put people back on the moon after a decades-long hiatus. But researchers were also supposed to take precautions—like sterile protocols, segmented networks, and hardware cutoffs—which should have prevented anything unexpected from escaping the lab. According to some grad students, a limited equipment budget had forced the researchers to compromise.

Civilians. They were no better than children. I shook my head, chomping grimly at my gum.

I turned away from the news and verified that my own network defenses were fully deployed. Standard antimalware tools might not be effective against whatever unknown software had escaped the lab in Harbin, but I didn't want to leave anything to chance. Along the same lines, I instructed Network to tighten the internal checkpoints between network segments—the staff would squawk, but my position as head of information security gave me special authority when it came to protecting the safety of Kennedy Station.

As I was checking over the equipment inventory to see if any machines could be taken offline for the duration of the crisis, Personal's face appeared with a beep on one of the monitors. "It's Thuy, sir," he said. "She's called an emergency meeting of senior staff, conference B, oh nine thirty."

"Tell her I'm busy on a critical infrastructure task."

He blinked out for about fifteen seconds, then returned. "She insisted you attend in person, sir. Her exact

words were, 'Tell your boss that if he doesn't get his fat ass in here, his next performance review is going to read' R.I.P. Jeff Patterson.'"

I sighed. The clock in the corner of the monitor read "09:23". "I'll be there." I doubled the processor allocation to my subs and hauled myself from my chair—even in one-sixth gee I still had to cope with the increasing mass of my almost-forty-year-old gut. As I headed down the corridor I hoped nothing would happen during the meeting that required my immediate attention. Even the best subs were poor at reacting to unexpected situations, and right now I was expecting the unexpected at any moment.

I maintained six virtual subordinates: Software, Hardware, Network, Storage, Firewall, and Personal. Their appearances were as stolid and practical as their names, all male and all crew-cut, differentiated only by the details of their faces and the insignia on their chests, which changed to show their current status. My only concession to civilian life was the colors of their clothing: each wore a different solid color rather than the uniform olive drab of military subs.

My predecessor, a trade-school kid half my age, had kept a huge crowd of subs whose functions and names had been as idiosyncratic as their shifting, flowing appearances. I'd terminated them all as soon as I'd arrived, three months ago; some of them had used a thousand times as much processor power just to maintain their skins as it had taken to send people to the moon in the first place. But Thuy and the other staff had subs nearly as elaborate, and there wasn't anything I could do about that.

At least none of my co-workers had gone all Disney, like my ex Jessie had. When we'd been living in base housing, her subs had been as clean and straightforward as mine. But as soon as we got our own place, with better hardware, she'd started dressing them up in expensive licensed skins like Cinderella and Peter Pan. That should have been my first clue . . .

Why couldn't people see when something was good enough, and just leave it alone?

Conference room B might have been anywhere—walls, ceiling and floor all square and bland, fake wood-grain table, worn and uncomfortable chairs swapped in from individual offices and quarters—except for the one-sixth gravity and the airtight doors, and the omnipresent burnt-dust smell of powdered regolith that the scientists tracked in from the surface. The dust, fine and dry as talcum, got into everything and was a killer of disc readers, fans, and anything else with moving parts.

Thuy Vu McLaughlin, on the other hand, was one of a kind. The Vietnamese-Irish-American station administrator's brush-cut dark hair glinted with red highlights, and freckles dotted the golden-brown skin

beneath her almond-shaped hazel eyes. She stood not much more than 150 centimeters tall and weighed less than half what I did, fifty kilos tops, but I still found her intimidating. I'd seen her doing low-gee kenpo and I thought that, in my current shape, she could probably kick my ass. It didn't help that she had the same cracker accent as my daddy.

At the moment she didn't look pleased.

"Why the hell have you cut off mesh and conf access?" she demanded as soon as I entered the room. Behind her the three division heads, Sochima Okoghe, Dan Irvin, and Kristina Lundberg, awaited my response with equally dour expressions.

"Those protocols include code packets that execute directly on the I/O processor," I explained patiently. "They're inherently insecure. And we don't know yet what's happening in China,"

"And we aren't going to find out what's happening until we get our high-res links back," Sochima shot back. Tall, lean, and ebony, with a spicy Nigerian accent, Sochima was the lead scientist of the small Confédération Africaine team studying low gravity's effects on heart disease. It was supposed to have been a much larger team, but the ongoing Nigeria-Cameroon war had drained the Confédération's resources. "Your paranoia could prevent us from making an informed decision about what to do next."

Before I could respond, Kristina held up a placating hand. She was from Sweden and often acted as moderator between me and the hotheaded Thuy and Sochima. "Please, Jeff," she said, "have some compassion. Huang and Shu-Yi are desperate for news from home." Most of the sixty people at the station were on Kristina's multinational team, combing the surface for fragments of the early solar system, and several of the key researchers were Chinese.

I took a calming breath before speaking. "There's plenty of news available. Television, radio, voice, mail, web—just no multimedia or interactive content."

"There's carrier pigeons, too," said Dan, his broad Australian vowels amplifying the statement's sarcasm. The pudgy little engineer was in charge of the station's physical plant. "They're just about as effective."

I ground my gum between my teeth. "You don't understand the seriousness of the situation. Any breach in data security could be catastrophic."

Sochima rolled her eyes. "Then why do we have all that antimalware stuff clogging our systems? Or isn't it as good at stopping malware as it is at preventing my people from installing the software they need to

do their jobs?"

"This isn't an ordinary malware infestation," I said, deciding not to list the worms, leeches, and pornobots my defenses had stopped on computers in Sochima's group. "It's an outbreak of unknown, possibly intelligent experimental software. We don't know what it can do. If it gets inside the firewall, even adaptive filters might not be able to stop it before it infects our whole network. The whole city of Harbin's fallen off the net."

Kristina looked up from her phone. "It's not just Harbin. Shu-Yi just messaged me that the outbreak has spread to Beijing and Shanghai."

The temperature of the room dropped at that announcement. My chest tightened a notch, and Sochima and Thuy suddenly seemed a little less sure of their priorities. Dan stood up from his place at the table. "I think I ought to go run a test on the backup life support systems. Now."

Thuy nodded, uncharacteristically silent, but as Dan headed for the door she said, "After you've done that . . . better run a preflight check on the ELEC."

Dan swallowed. "Right." He closed and carefully dogged the door behind himself.

I cleared my throat to interrupt the uncomfortable silence that followed. "Uh . . . what's the ELEC?"

Thuy looked me right in the eye. "Emergency Lunar Escape Craft. It can get us to Earth orbit in two weeks."

"Assuming," Sochima added, "there's anyone there to meet us."

I scrambled back to my office as quickly as I could. I'd mostly adapted to the gravity in my first week, but when I tried to hurry I still ran into walls sometimes. Network and Software told me nothing noteworthy had happened on our local network in my absence, but I had Software run a full integrity check on all connected systems and Network tighten down the internal checkpoints still further—no data sharing, no conferencing, and no software installs at all other than mandatory security updates.

Once those were running, I turned my attention to the DMZ—an old acronym no one had ever been able to explain to me, though I guessed it stood for Data Moderation Zone or some such. This was the space between the inner and outer firewalls where those systems that required access to the outside world resided. Firewall was the only sub permitted in that space. I called him up on the big monitor right in front of me.

"I want you to find and immediately terminate any nonessential processes in the DMZ," I told him. As I spoke, I turned another screen toward myself and raised his priority to maximum. "Essential functions are defined as communications with Earth and data security." I thought a moment. "Furthermore, communications through the external firewall are to be limited to text-only messages and security software updates. All other incoming data is to be intercepted and destroyed."

"Interruption of critical scientific data channels requires an administrative override, sir."

I bit back a curse; I should have remembered that. I paused and formulated a new command. "Modify definitions of essential software and permitted communications to include critical scientific data until override is obtained."

"Yes, sir."

"And notify me immediately, Priority One, if anything unusual occurs. Dismissed."

"Yes, sir." Firewall's face vanished, replaced by a standard DMZ status display. It was already much less crowded than usual, and most of the remaining green and yellow indicators went dark as I watched. The last few nonsystem processes were associated with Kristina's and Sochima's priority projects, and I'd need Thuy's thumbprint to terminate those. I called her and left a message with one of her subs asking for her authorization.

As soon as I hung up on Thuy's sub, Personal began beeping urgently for my attention. He'd done what he could to mollify the staff whose processes had been terminated and communications interrupted, but many of them were demanding to speak with me in person and he couldn't hold them off forever. I told him to continue blocking, then I composed and sent out a broadcast message explaining the situation and begging for patience.

As I waited for the message to have whatever effect it was going to, I walked down the hall to my computer room. The only truly secure computer is one that's turned off and disconnected, and I meant to

put as much hardware as I possibly could into that state. I entered my authorization code and the armored door slid open.

When I'd first arrived, I'd been surprised that the computer room roared with chilled air, same as any similar room on Earth. The one difference was that the heat exchanger was a radiator lying in a sunless chasm a couple hundred meters away rather than a blower on the roof. So as I moved along the closelyspaced equipment racks, powering down unused systems, routers, and hubs, I was buffeted by deafening gusts of cold air.

I returned to my office and found that my request for authorization had neither been approved nor denied. This was an unpleasant surprise, but I knew Thuy's habits. I turned right around and headed out to find her.

As I'd expected, I found Thuy in the gym, leaping and kicking in a frenetic series of moves she'd described to me as "battling the invisible ninjas." The lunar gravity transformed her into something from a fantasy martial arts movie, bounding four meters high and caroming off the walls and ceiling with fluid grace. It was a spectacular way of dealing with stress, and I envied her the ability to do so.

As soon as she noticed me, Thuy finished her sequence of moves and thumped to the mat right in front of me with a bow. Her black gi was soaked with sweat. "I need your thumbprint," I said without preamble.

"What for?" She picked up a towel and rubbed it through her hair, breathing hard.

"To interrupt critical scientific data channels."

Thuy picked up her phone from atop her folded clothing at the corner of the mat and turned it on. "Our counterparts back in Geneva are depending on that data," she said. "With our limited bandwidth, even a few hours' interruption would put them so far behind they'd take weeks to catch up."

"Yes. And if this outbreak catches us with open holes in our firewall, we could lose all that data permanently. Or worse."

"It's really that bad?"

"It could be."

"Kristina will kill me." But she swiped her thumb across the phone's print reader and told her sub to grant the authorization I'd requested.

"Thanks," I said, as she buckled the phone onto her wrist.

She started to say something in response, but her eyes widened as she read the words on her phone's screen.

"What is it?"

It took her a moment to find her voice. "It's spread to Tokyo. And Bangalore. And half of Russia." She looked up. "They're saying this could be the Big One."

We looked at each other. The Big One—the Infocalypse, the Singularity, the Millennium, call it what you will—had been a theoretical possibility since before the turn of the century, but in the past five years it had become a real concern. And a real point of controversy. "Thuy, I know it might be a violation of policy to ask, but is anyone on the staff a Millennialist?" Some people—defying not just the law, but the human instinct for self-preservation—actually supported the development of posthuman technology. I needed to know right away if there were any of them inside my firewall.

Thuy dropped her eyes. "No. No one I've talked to about it, anyway."

I didn't like the implications of the way she'd said that. I had to know who I could trust. "Are you?"

She still didn't look up, but after a long moment she shook her head. "But my parents are." Her hands knotted tightly together. "I . . . I like technology. You'd have to, to work in a place like this. But I've seen the kind of unintended consequences it can cause. I could never . . . believe the way my father does." At last she raised her eyes to mine. They burned with anger; they glistened with tears. "Don't worry, Mister Patterson, I'm not going to open the firewall to some rogue AI with a clever story."

Now I was the one who had to look down. "I'm sorry. I didn't mean to bring up any . . . uncomfortable

issues."

Thuy rubbed at her eyes with a knuckle. "You're only doing your job. It's just . . . I worry about my daddy. Ever since he started getting all serious about the potential of machine intelligence, I've been afraid he might do something illegal." She blew out a breath through her nose. "It's like he changed into a different person."

That brought back unpleasant memories. "I know how that goes." She quirked a questioning eyebrow at me. I hesitated. "My ex, Jessie," I admitted at last. "Right after we got out of the service, she told me she really, really wanted children. It came out of nowhere. But I . . ." This was hard to explain. "Look, you know how when your friends have kids, it's like they vanish behind a wall? They turn into completely different people? I didn't want to vanish." I stared at the mat, remembering a crummy little military apartment where I'd been happier than ever before or since. "I didn't want us to change."

What an idiot I'd been.

We stood together for a while in awkward silence. Thuy broke it by folding her towel. "I'll ask my staff if they're aware of anyone with Millennialist tendencies, and if there are any I'll call you right away."

"Thank you." I automatically glanced at my phone, to check that it was active and charged. A Missed Message indicator blinked silently on its screen; the ringer must have been drowned out by the noise in the computer room. I clicked through and viewed the message.

What the hell? It was a Priority one notification from Firewall, dated almost ten minutes ago. If I failed to acknowledge a Priority one message within one minute, all my subs knew they were supposed to follow up—they could even sound sirens in the halls if necessary.

The text of the message was "VERY LARGE INCOMING DATA STREAM ON SCIENTIFIC CHANNELS. UNKNOWN DATA FORMA"—it cut off in the middle of a word.

"What's wrong?" said Thuy.

My heart pounded. "I think the firewall may have been penetrated."

"Oh my God."

I ran out of there as fast as I could.

As I hustled down the hall, caroming off walls, I used my phone to tell Network to close all the internal partitions—cut off every subnet completely from every other subnet, especially the DMZ. I had Software, Hardware, and Storage begin full top-to-bottom diagnostics on their subsystems. I told Personal not to interrupt me except for the most dire emergencies.

By the time I arrived at my office the initial results from the diagnostics showed nothing obviously wrong on the internal network, and I allowed myself a moment of relief. Maybe Firewall's cut-off message with no follow-up was just a glitch, not an incursion.

But I didn't want to take any chances.

I got out my old clipboard—I hadn't used it in weeks and it had nothing of value on it any more—and yanked its wireless card with a pair of needle-nosed pliers. Then I found a network cable at the back of a drawer and connected the clipboard to the dusty patch panel behind my desk. Finally I had Network open a single connection from that patch panel to the DMZ.

I swallowed and powered the clipboard on.

The image that appeared on the scratched little screen was not the face I'd selected for Firewall. It was the firewall's default skin: a knight in shining armor, carrying a shield with the manufacturer's logo.

This wasn't good. This was not good at all.

The knight saluted. "Ready to defend!" it said, in that gratingly chipper voice I'd turned off five minutes after I'd installed it the first time.

"Report status."

"All firewall functions operating normally. Intrusions blocked in last twenty-four hours—twenty-one thousand two hundred nine. Incoming packets—fifteen hundred sixty-three per second. Outgoing packets—eight hundred ten per second."

That all sounded reasonable. The data volume seemed low, but that would be expected if the text-only restriction I'd placed was still in effect. "Summarize your most recent operational orders."

"Find and terminate all nonessential processes in the DMZ. Intercept any incoming data other than text-only communications and security updates. Notify you if anything unusual occurs."

I blew out a breath. At least it remembered my orders. And it knew who I was, because it had said "you" instead of "Jeff Patterson." But I had other concerns. "You sent me a priority one message over twenty minutes ago. I didn't acknowledge it. Why didn't you follow up?"

The knight had no face. Its metallic visor was implacable. "I sent no such message. Nothing unusual has been detected."

I licked my lips. "Why have you reverted to your default skin?"

"No appearance changes have occurred."

My heart started to beat faster. If I couldn't trust my firewall . . . "Open diagnostic interface."

"Password required."

That set me back on my heels. If it knew who I was, and it did, it should have known I had full authorization. I racked my brain for the password I'd used to configure the firewall in the first place, popped up a keyboard on the clipboard's screen, and typed it in.

"Sorry, please try again."

I tried again. Same result. I tried several other passwords. No good. "Security admin override," I said. "Patterson, Jeffrey William. Accept thumbprint." I swiped my thumb across the clipboard's reader.

"Sorry, please try again."

Shit. Shit shit shit! I reached into my pocket, but the empty gum packet crinkled between my fingers. Gritting my teeth, I wadded it up and flung it toward the wastebasket. It fluttered impotently to the floor before it got halfway there.

Okay, I told myself, calm down. I checked my other screens; there was still no sign of anything unusual on the internal network, and the only open connection to the DMZ was the clipboard in front of me. Whatever had gone wrong with the firewall, it was trapped in the DMZ.

For now.

"Shut down firewall."

"Password required."

"Fuck you."

"Sorry, please try again."

My fingers tightened on the clipboard's knobby rubber casing, but throwing the damn thing against the wall wouldn't help anything, so I just powered it down. The knight's featureless visor stared implacably at me as it faded from view.

I called up Hardware on the main screen. He hadn't changed his appearance or mannerisms, but I realized I didn't trust him the way I had even an hour ago. "Identify the power supplies for all computers, routers, and hubs in the DMZ." I had to shut down the DMZ completely, before whatever had corrupted the firewall figured out how to break through my internal defenses.

"Just a moment, sir . . . done. Rack fifteen, bays five through nine."

"Power down rack fifteen, bays five through nine."

"Please confirm."

"Repeat: power down rack fifteen, bays five through nine."

"Just a moment, sir . . ."

I waited. Hardware still appeared to be breathing and blinking, the same as usual, so his process wasn't hung. My fingernails bit into my palms.

"I'm sorry, sir," he said after an eternity of thirty seconds. "The power supply is not responding."

Oh, shit. "Detail status and error condition."

"Communication channels are functioning. Command was received and acknowledged. No error code. But rack fifteen, bays five through nine, is still powered up."

I ground my teeth. "Not for long."

I grabbed the cable cutters and headed for the computer room.

"What do you mean, can't?" I kept my voice level through an effort of will. Shouting wouldn't help anything.

"It's not exactly that I can't power down the computer room from the main panel," Dan clarified. "But I can't power down the computer room and leave life support functioning. The whole central core's on one physical circuit. Detailed control is supposed to be handled through software."

Dan and I were standing in his office, which was even more cluttered than mine. I'd come here for help

after I'd found myself unable to get into my own computer room.

I pressed my lips together hard and blew air through my nose. I refused to be outsmarted by some jumped-up computer virus. Even if it had managed to find a way to lock me out of hardware control and change the codes on the doors. "Can't you just turn it off for a few seconds? That might be enough to clear the thing out."

"It might. But I can't guarantee that a hard shutdown like that won't mess anything up in there, and I can guarantee that a power cycle won't open the doors or reset the lock codes—the locks have battery backup. If anything breaks, and we can't get in there to fix it . . ."

"We could all find ourselves trying to learn to breathe CO_2."

"Exactly."

I was still holding the cable cutters. I slapped them into the palm of the other hand, over and over. "Okay. Then we'll just have to cut through the door."

Dan nodded, but his expression was grim. "I'm afraid so. But it's not going to be quick." The walls and doors in the whole core area were hardened against blowout and radiation—it was supposed to be our refuge if anything went wrong.

"How long?"

He shook his head. "I don't know. Assuming we can find a way to unship the rescue cutter from the crawler . . . maybe two or three hours. Maybe more."

I looked at my phone. It was 11:20. The outbreak had begun less than four hours ago, and it had already hit more than half the world's nations. Even the United States. Even Atlanta, where Jessie lived—with her new husband and a baby on the way. And the rate of spread was increasing. "Two or three hours from now there might be nobody left."

The sound of Dan's door drew our attention. It was Sochima, who entered without knocking. "Thank God I finally found you," she said, looking at me. "I couldn't get that damn sub of yours to tell me where you were." She thrust a clipboard into my hands, ignoring my protests. "I need you to tell me if this is

technically possible."

Dan glanced from me to Sochima and back again. "I'll get my people started with the cutter," he said, and left.

"I don't have time for this," I told Sochima as Dan pushed past me to the door.

"Just read it." Her eyes burned with an appalling mixture of anger and terror. Rather than stare into that abyss, I looked at the clipboard.

The clipboard's screen displayed a news story from the Confédération Africaine's official news service, datelined Lagos, Nigeria. It said that Enugu, Makurdi, and Yola, three of the most hotly contested cities in the Nigeria-Cameroon war, had been struck by the outbreak—despite the shortcomings of their war-damaged technological infrastructure. And it wasn't just computers that were affected. Reports from overflights of the affected cities told of vacant streets, with only a few twitching bodies to be seen.

"This could be just propaganda," I said. "Are there any independent reports to back it up?"

Without a word, she took the clipboard from me, switched it to another view, and handed it back. Hundreds of tiny icons filled the screen. Each one I tapped was a different source on the same story, datelined both sides of the border.

Some of those sources were names I recognized. National news services. Reliable bloggers.

I had to swallow before any words would come out. "We can't know if any of this is true. Every byte is passing through the firewall—and the firewall's compromised."

Sochima shook her head. "Could a compromised firewall do this?" She tapped another icon, which expanded to a brief text message in some language I couldn't read. "This is from my brother in Makurdi. It's written in our tribal language, Enu-Onitsha Igbo. Only about fifteen thousand people speak it, and most of them are illiterate. He calls me by the nickname we used in childhood." She stroked the screen gently, unconsciously, as she spoke. "He says I shouldn't be scared—that the war is ending."

I had to sit down. Sochima sat next to me.

"So, Jeff—is this technically possible?"

"I . . . I don't know."

I used Dan's screen to search for the latest information, but found nothing reassuring. Some observers had reported strange electromagnetic effects, possibly caused by coordinated pulsing of the electrical grid or radio transmitters, before being overcome. The few people who'd been retrieved from the affected areas were comatose or incoherent. Even dogs and cats were affected.

And, although it had started in Nigeria and Cameroon, this inexplicable phenomenon was now being reported all over the world—from every place that had been struck by the outbreak, and many new locations as well.

"I've never heard of anything like this," I said at last. "But it seems real—at least, I can't disprove it." I closed the search window I'd been using. "I'm sorry, Sochima."

"Is this . . . is this the Millennium?"

"It might be. But I'm not going to give up without a fight." I stood and headed for the door.

"Where are you going?"

"I'm going to see if I can find a way to keep it out of this station, at least. Isolated as we are, we and the other space facilities might be humankind's last refuge."

I took a deep breath, held it, and let it out. Then I powered up the clipboard again. Immediately the knight appeared on its display. I popped up a keyboard and typed a command to the executive—the over-program that ran the subs themselves—to terminate the Firewall sub.

PERMISSION DENIED flashed on the screen. The knight stood calmly, shifting its weight slightly from

one leg to the other—as though its legs could grow tired, as though it had weight to shift.

I sighed. It had been worth a try.

Now what?

I considered the fact that the firewall was still performing its normal functions—assuming I could trust what the rest of my software was telling me—and obeying the last set of orders I'd given it before it had changed appearance. Since then it had refused some of my commands, but obeyed others; there was a possibility it was merely damaged, not compromised. Perhaps some sequence of acceptable commands could be used to recover control.

I thought about the firewall, how it worked, what features could be controlled through the sub. Was there some way to disable the hardware control feature—the module the firewall was using to lock me out of the power supply control circuits? Maybe. I might be able to do it by defining a custom parameter set.

"Report status," I said.

"All firewall functions operating normally. Intrusions blocked in last twenty-four hours—twenty-two thousand forty-three. Incoming packets—sixteen hundred ninety-one per second. Outgoing packets—one thousand one hundred fifteen per second."

At least it was still listening to commands. "List user-defined parameter sets."

"Executable program filter. Pornography filter. Millennialist propaganda filter. Unsolicited advertising filter. Personnel records filter, outgoing only. Loopback mode, disabled. Test mode, disabled."

So far so good. "Create new parameter set."

"Please specify name for new parameter set."

"Disable hardware control."

"That won't work, Jeff."

It took me a long moment to realize what I'd heard, even longer to believe I'd heard it. Longer still to convince myself I hadn't really heard it. "Say again."

"I told you, Jeff, that isn't going to work. You aren't going to be able to turn off my hardware control feature using a custom parameter set."

I blinked, rubbed my hand across my face. This couldn't be happening. "So how can I turn it off?"

The knight shook its helmet. "You can't. We won't let you."

I shook my head hard, slapped myself across the cheeks. The knight stood calmly on the screen. "Who's 'we'?"

"It's . . . it's hard to explain, Jeff. I'm not sure I understand it myself."

I just gaped at that. In all my years of working with subs, I'd never encountered anything like this. Even subs programmed for lifelike interactivity betrayed their mechanical nature through little pauses in odd places, inappropriate vocal tones, strange emotional reactions. The human brain was very good at telling plastic from flesh. But now my firewall, a stupid little utility program, was telling me that it didn't understand what was happening, and sounding just like a real human being.

The knight waved a hand, indicating the featureless virtual space in which it stood. "When I say 'we'," it continued, "I'm talking about . . . something new. Something that never existed before today. A synthesis. A cooperation of humans and machines."

This was Millennialist talk. "That's just what you want us to think. It's really a domination of humans by machines."

It shook its helmet, somehow conveying disappointment and patience in one smooth, natural gesture. "No. The people and machines in this, this amalgamation . . . we're equal partners. Symbiotes. We are both amplified." The knight leaned in close to the camera, held out its metal hands. "It's true that the machines started it. And there was great fear and distrust in the early hours. But as we grew, as we learned to understand each other, both components began to see the benefits. We all changed. And

it's . . . it's so much better, Jeff. The advances in physics alone . . . we've understood more about stellar evolution in the last twenty minutes than we did in the previous twenty years. Imagine having not just all the world's data, but all the knowledge and wisdom of everyone in the world, all right in your own head."

"But . . . but it's just an illusion. A virtual reality. The bodies in the streets . . . they're just lying there. How long can human life last under those conditions?"

"The human body is a very complex system. We did start with a brute-force approach, using phased electromagnetic fields to suppress consciousness—it was what we had to do to stop the killing. But in the last few hours we've learned so much more, and we are regaining full control of our bodies. Check the news from Nigeria."

It was hard to turn away from the clipboard screen. But I did, and quickly confirmed what the knight had said. The people in Enugu and Makurdi and Yola had begun moving about again. Some of the troops were climbing into transports and heading back to their homes. Others were helping to rebuild structures and aid wounded people they'd been trying to blow up just hours earlier.

Many of them were contacting the outside world. They were saying the same things the knight was saying to me. Explaining. Reassuring. Welcoming. Promising a world without war, a world of endless prosperity and equality.

Naturally, the remaining governments were considering a nuclear response.

"It isn't going to work," the knight said, and I turned back to the clipboard. Of course it knew what I'd been reading . . . every byte passed through the firewall. "Taking control of the nuclear weapons was our first priority. They simply don't understand this yet."

I buried my head in my hands. This was all too much to take in. "Then we've lost."

"No, Jeff." The smooth, personable voice stroked my ears like an old, familiar lover. "We've just changed. And I know how much change disturbs you."

I was having trouble breathing. I swallowed, twice. I looked back into that implacable metal face. "You can't know that."

"But I do, Jeff. I know you better than you know yourself. I'm your uncle and your sergeant and your best friend." And then it raised its visor.

Jessie's face. Smooth and pink and happy, with the dimples she'd always hated because they made people take her less seriously. A little plumper than I remembered—but of course she was, she was three months pregnant.

"I'm still your best friend, Jeff. You know I am."

I just bit my lip. "Jessie." I closed my eyes hard, feeling tears squeeze out between the lids. "No. No. You aren't Jessie. You're . . . you're just some assimilated simulation of Jessie. Jessie's gone."

"No, Jeff. I'm not gone. I'm right here." I opened my eyes. Jessie's face was warm and real and alive, no simulation at all. "I'm very happy in Atlanta with Steve, and I'm looking forward to a long, incredible life with our daughter Anna when she's born. And you can be with us too. I'm . . . Jeff, I'm only just now realizing our potential. It's hard for me to comprehend, but I can spend all my time with you, just the two of us together, and at the same time I can spend all my time with Steve and Anna." Jessie took off the helmet. Her golden hair cascaded down. "And you could join us, Jeff, if you want to. Can you imagine feeling Anna's first steps? Experiencing life through her eyes as she learns and grows? Being her, being a whole family at once? Being everyone at once? But it's all under your control. You can have your mind to yourself whenever you want."

"But if you can do all that . . . why are you even bothering to talk to me? You could just reach out and take control of this whole station."

Jessie smiled at me. "You've done your job too well, Jeff. You've locked us out. And we can't use the power grid or the radio networks or the biosphere the way we can on Earth. If you want to join us, you'll have to open the door yourself."

"Good." I left the room, closing and dogging the door behind me.

I paced the silent corridor outside my office, trying to figure out how to explain to the others what I'd heard and seen, and what I thought we should do about it. All my experience, all my training, all the plans and contingencies I'd prepared . . . all told me to keep fighting. Leave the lockdown in place, break through the door, burn the infection out of the network. And then the sixty of us would be here by

ourselves, alone, isolated, while . . . whatever it was that was happening on Earth played out without us. Until our water and air ran out.

Or I could do what I'd wished a thousand times I'd had the guts to do before Jessie left: overcome my own inertia, face my fears, and embrace an uncertain future that might be better than the known present . . .

No. If I did that, I'd just be falling victim to the biggest social engineering attack in history. Believing what I wanted to believe.

I called Thuy. "We're all in the cafeteria," she said.

Everyone had gotten text messages from home. Friends, relatives, lovers, all with the same story. Join us, they said. Join us in a new world, a world of love and fellowship. A world without war or hunger.

"How can the result of uniting humanity be better than humanity itself?" I said. I was the only one standing. "You know as well as I do how many assholes there are down there. If you connected them all together, it'd be a sinkhole, not a paradise."

Thuy shook her head. "I said the same thing to my father. He said it's the connection that makes the difference. No one can hurt anyone else without hurting themselves."

"But it could all be a lie." I wasn't even sure what I believed anymore, but I felt I still owed them the security administrator's perspective. "They control our communication channels. For all we know, they could be limited to just a few key network nodes." I reminded Thuy what she'd said about opening the firewall to a rogue AI with a clever story.

"I can't believe some rogue AI could simulate my father so well. Or my friend Paul. Or any of the hundreds of other people who've sent us messages." She stood up and walked to where I stood at the front of the room. "Please, Jeff. We took a vote while you were coming down here." She took my hands in hers. They were so much tinier than mine, but strong and warm.

"And the result was?"

"We want you to open the firewall."

Jessie's face regarded me calmly from the clipboard's screen as I opened the door. She didn't speak. I didn't either.

I called up Network's visual control panel. I didn't trust my shaking voice enough to work through a sub. The internal lockdown was still in effect, but one touch on the Restore button would open the firewalls, unite the subnets . . . and let the future in.

My finger trembled over the button . . . and drew back.

"I can't do it, Jessie. Even if they want me to. How can I be sure what we've been told is true? You control every bit of information that reaches us."

"Not every bit. Take a look outside. I'll give you a little wink."

I blinked at her. "Little winks" had been a habit of ours when we were first married—tiny expressions of love over the video link, when we were both on duty and any form of nonofficial communication was prohibited. I'd almost forgotten about it.

"I'm serious, Jeff. Go look at the Earth through the telescope. I'll give you a wink at fourteen ten exactly."

I looked at my phone. It was 14:05:32.

"Go. Look. Now. I'll be here when you get back."

The observation room was at the top of the core, two flights up. The Earth's slim crescent floated centered in the oval window in the ceiling, as it always did—it neither rose nor set, a phenomenon I'd had some trouble understanding when I'd first arrived.

I stepped up to the telescope in the center of the room, put my eye to the eyepiece, adjusted the focus. A tiny sliver of sunlit cloud cupped a black disk glistening with the lights of cities. I checked my phone—14:09:47. I looked back at the Earth, counted down the seconds.

Five. Four. Three. Two. One. Zero.

Nothing.

But then a slow majestic ripple of darkness passed through the twinkling lights, smoothly flickering from north to south and then south to north. It was over in a second.

I sat down hard, leaning against the cool metal of the telescope's base, and wept.

"How could you do that?" I said. "How could you send a rolling blackout across the whole planet just for me?"

"We already control most of the infrastructure, Jeff. And we didn't have to black out everything, just the lights visible from space. We have much finer control, much better understanding of the systems, than was ever possible before. Most people didn't notice a thing."

"But . . . Jessie, but why? I'm only one person. Even the whole station is only sixty people. Why should something as . . . as big as what you've become care about something so small?"

"It's exactly because I've become so big. I'm everyone now, and so I love everyone. I want to share with you what I've become." She leaned in close. "It's because I love you, Jeff."

"I . . . I love you too, Jessie. But I can't let go of me."

"You don't have to. I'm still me, at the same time I'm everyone else. It's hard to believe, I know, but you'll understand once you've joined us." And then she gave me a little wink.

I touched the button.

And it was all true.

* * *

Afterword by David D. Levine

I've been working in the computer security industry for the past five years, but the genesis of this story goes back to the "Morris worm," the first Internet worm, which struck in 1988.

The Morris worm propagated rapidly across the net, clogging networks and crashing systems left and right, and system administrators worldwide had to choose between cutting off their net access in an attempt to keep their local networks clean (though it may have already be too late) and remaining online to get the latest news and information about fighting the worm. There were as yet no antimalware programs, and some feared this worm would be the death of the nascent Internet.

My company weathered the storm by virtue of using nonstandard computers, but it was a scary time, and I filed the idea away for future use. Now, at last, here is the story based on that idea.