10 Observable Metrics

fiction by Don A. Bailey
from a concept developed with Tamara L. Rhoads and Jaime Cochran
for J. O., A. S., and S. G. S.

Gold from the late November sun washed an otherwise porcelain hallway, as the door to the Vice President of Engineering's office opened. Stepping into this naturally lit office, out of the antiseptic hall, was a reminder of the perks of a hard earned career rolling out next generation Internet of Things technology.

He stood in the center of the room, smiling an inviting smile, while rays of light seemed to flow from the tips of his outstretched arm. He beckoned the engineer to sit. His raised standing-desk was elegantly constructed in a nod to George Nakashima's signature style. Its varnished surface accentuated the tree rings underneath through a translucent hue. The sides of the desktop were kept natural, almost raw. Some of the tree's original bark still proudly masked the unfinished growth hidden below.

To the left of the desk stood a large American flag, whose pole rose to centimeters below the ceiling. Its fabric moved slightly to the rhythm of the office air, which was coaxed around the room by an unseen and unheard ventilation system. The flag seemed to be placed purposefully on this side of the room, at the edge of the wall of windows that faced south San Diego bay, where a battleship sat in the distance. Tiny figures in white were noticeably scurrying around the flat, grey deck, in what seemed to be a concerted effort to clean the behemoth.

She smiled as she sat down. The chair's leather creaked under her slim figure, as her body adjusted to the boxy and industrial shape of the Le Corbusier-style object.

"Thank you for joining me for a quick discussion! I know how busy you are with the final security audit of the new 768 product line," the VP smiled, one arm relaxing on the edge of his standing desk, the other casually half-hanging from his designer jeans pocket.

Before the engineer could comment on the progress of the current audit, the VP questioned her. "How do you feel about the security of the new low-power mesh module? It's pretty robust for being able to fit on the new product line, isn't it?"

She paused before answering, expecting the silence was only a dramatic pause before he continued on with the wireless module he designed himself. Even though it was yet another low-power wireless module, it was designed using transparent silicon, and is able to integrate seamlessly into their new eye-contact heads-up-display line. What was even more impressive was the fact that he designed the module to use a new energy harvesting method that relied on the human eye's restlessness, its constant micro-movements, its tremors, to generate the small bursts of power required to drive the transceiver. It was all very impressive, and very heavily patented.

A new mesh protocol had to be designed, in order for the extremely low-power transceiver to work effectively. The protocol was heavily vetted from a security perspective prior to filing the patents. Even the company lawyers had to get involved by assisting with the high level threat modeling process, especially since weaknesses in this protocol could allow attackers to hijack a victim's imaging data, let alone their vital statistics. She knew this was all done prior to her arrival at the organization, just over a year and a half ago. Obviously, he was looking for a little praise.

"The security architecture is excellent. I don't think there is anywhere that I could add value to the project," she smiled. She wasn't going to drip saccharine words from her mouth. The truth was good enough as a compliment.

"Excellent," he regurgitated with his chin in the air. "Excellent."

He continued, "But you did find the security flaw in our cryptographic key storage chip. That was excellent work. We needed someone with your expertise to help find out how we'd end up hacked."

"Yeah, but to be honest, I'm just following the recommendations of other researchers that have done prior work in this area. Tarnovsky, Nohl, and even Nedospasov have given presentations on strong attacks in this area. It's really just a matter of bypassing the chip's security mesh with existing technology that was designed for complex hardware analysis. Not to mention, you can use similar attacks against Physically Unclonable Functions..." She realized his eyes had glazed over, and looked sheepishly at her feet, which were tapping nervously against the cold, cylindrical legs of the Le Corbusier replica.

Her moment of emotional self-doubt aroused him from his entranced state. He scoffed "Yeah, I'm sure everybody can hack hardware like that, these days." Realizing his eagerness to exploit her humility was

obvious, he regained his composure and ran his hand through one side of his hair and smiled. "You did excellent work, there. I was impressed."

She couldn't help herself from narrowing her eyes. She thought this was just a check-in on the status of the mesh security architecture. But, now, she knew he needed something else. What was bothering her was that this typically direct, type-A male was seemingly taking the round-about in arriving at the real topic.

"So, how can I help you? I'm sure you didn't ask me to your office to discuss research. What's up?" she offered, her right foot still tapping against the chair leg.

"I just got word this morning, entities overseas have recreated your work. I guess I should say they've independently discovered the security flaw." The VP leaned forward, putting the weight of his abs on the standing desk, his thick chest pointed directly toward her. His knuckles whitened, his hands gripped the sides of the desk, as he leaned even further over the desk like a reverend poised at a pulpit, ready to spit out a sermon.

"Those sons of bitches not only have broken this device, but they've broken every one of our products! How are they doing it?!" His oddly calm voice was chilling in contrast to the hulking position his body took behind the pulpit-like desk. "I don't even care how anymore. I really don't."

"The clones they've been building of our products have been flooding the foreign markets for several years." he continued. "Our quarterly earnings are hundreds of millions of dollars short on revenue because of these cheap knock-off items. I don't even want to look some of our investors in the eye because we can't keep these people out of our market."

The man moved out from behind his pulpit and stood in the center of the room, with the rays of the sun behind him. As he leaned in, the angle of the sunlight caused his face to become engulfed in shadow. He spoke so softly now that she had to lean in, making his aggressive posture even more uncomfortable. "It's weak. It's pathetic. I want it stopped".

The young engineer was barely able to contain her sigh of relief. "For a second there, I thought you were going to fire me," she half-joked.

He raised his body into a polite, standing posture and laughed whole-heartedly, "No, no! My apologies! You're imperative to this organization, now! I know how hard you've worked, you should have absolutely no concerns about your performance. The fact is, I need your advice."

She put her hand to her chest. Her foot moved away from the metal chair leg, where it had already began to tarnish the gleaming silver. Her eyes widened as she humbly replied "Thank you, I really appreciate that. Sometimes it's a bit hard, you know, still being 'the new guy' even after a year and a half of effort."

He picked up a white mug half filled with black tea and emblazoned with the company logo from his desk, and took a sip. His eyes affixed somewhere past her, as if he were caught up in another distant conversation she couldn't hear. "Don't be ridiculous, he replied. You're excellent..."

"Unfortunately, sir, I have to tell you what you already know. Unbreakable security is simply impossible. It's just never going to happen. We build effective models so that arbitrary people can't affect the products of millions of people. But, anyone with adequate funding can attack and learn about any given system. No proprietary technology will stop someone from cloning or reproducing someone else's work. Security just can't achieve a goal like that."

Her eyes were light, but serious. She understood his frustration, and even sympathized with him. He had worked so relentlessly for so many years building new and innovative things that leeches just flippantly dressed in cheap 3D plastics and silk screened logos. They had no respect for the artist behind the engineering degree. They only saw a Giovanni Bellini that was finally forgeable, because no one decaps an integrated circuit to see if the eye-contact wearable device was sculpted by the real artist, or by a second-rate hack. They only want to flaunt the logo most recently approved by the hip kids, and the ability to Tweet photos of Bae with a champagne glass balanced on her ass.

"Yeah." He sighed. "Yeah, you're right. I know that better than most. We've lost billions in revenue over the past few years of success. People call us a success. We rang that bell in New York City, and it looked like a success. The world looks at us as if we are a success. They want to use our devices regardless of who actually made it."

He took a long, slow sip of his black tea. When his lips parted from the porcelain, and the mug turned slightly, she could see a single black bead of tea drip lazily down its side. His disposition darkened, seemingly descending as quickly as that tiny drip of tea through the manufactured air and onto the office floor.

"But fuck them. We aren't a success. We can't even keep those people out of our security chips."

He placed an elbow on his standing desk, resting his hair in his hand. "I'm done caring about how to solve security. It's just a god damned cat and mouse cycle of nonsense." He looked her straight in the eyes. "Nonsense!" he loudly snarled. He looked downward, his other hand still attached to the vessel holding the blackened liquid. He continued more calmly.

"They forge our logos. They recreate our software. They steal our customers. We have a right to protect ourselves. Technically, if they use our trademarks, their devices are ours. We just didn't make them. If they're ours, we have a right. We have a god damned right to do with them as we please."

His eyes tightened as he stood up as straight as the flagpole next to him. "We have a god damned duty to our employees, our investors, and our country, to protect what's ours. If they're going to produce technology that they claim is ours, we have the right to take that technology. We have a right to destroy that technology."

He looked over at his standing desk, and hit a key on his laptop's keyboard. He glanced at the screen for a brief moment, then continued.

"I need a way to stop this nonsense. I'm sick of worrying about someone hacking into this or hacking into that. We need this game finished. No more cold war bullshit with fake engineers and shell companies overseas. I'm done. I'm fucking done. I need a way to brick every single device that claims it's one of ours. If it connects to the Internet and sends a message saying it's owned by Fit'd, Inc., I want it bricked. If it connects to a computer and identifies itself as Fit'd, Inc., I want it bricked. If it peers with another mesh device and claims it's Fit'd, Inc., I want it bricked. They're done. These people are fucking done. And you? You're going to write the exploit."

Her eyes widened again, this time in discomfort. She understood why he seemed so unable to hold back these worsening emotions. He was on the edge, if not slightly beyond it.

"But, we have absolutely no way of knowing how this will affect the end users!" Her right foot began tapping madly again, as she leaned forward in her chair. Her body barely hung on to the edge of her seat, practically mirroring how his mind must be teetering on its ethical edge, half ready to give itself to the wind, leaping recklessly into the abyss. "We can't possibly put people's lives at risk like that! You realize how many infinite scenarios there are for people using our technology! Think of how people are using wearables to monitor and control their pacemakers, their insulin pumps, their seizure reducers... There are people who could die if their products are suddenly unable to function!"

The VP briskly walked the few steps toward the shaken woman, with a pointed finger and furrowed eyebrows, "These people are putting themselves at risk by knowingly purchasing cloned technology! You said it yourself in your security review of a third-party clone: there was no guarantee that reproduced work could even come close to ensuring the confidentiality, integrity, or availability of a consumer's data! No guarantee!" he barked.

"But, sir!" her body was pinned against the back of the chair, as if forced there by a sudden atmospheric microburst. "The impoverished buy these knock-offs because they can't afford the real thing. There is a user base of millions in foreign countries that depend on this technology for their basic communication needs. It isn't about protecting our product, our trademark, or even our corporate persona." She calmed down as she heard the sensible words starting to emanate from her mouth.

"It's about a worldwide phenomenon that this company has created. That you've helped create! People want to participate, they want to be in this brave new world, but it's just a fact that not everyone can afford what we sell."

"By arbitrarily disabling these devices you're widening the communication gap between the have's and have-not's. Think about how clones of this company's technology are used to connect millions of people to the world. People in oppressive governments, people in religiously strict societies, people without access to broadband in their region. It's their only method for keeping up with worldwide evolution in culture. You're risking sending a large portion of the Internet back into the technological stone age. If you destroy these people's tools, they're going to have to essentially uplink other modern mesh devices, dependent on clones of our technology, to the Internet using the equivalent of ancient serial-port speeds. For what? Ten percent of what this company makes in revenue per quarter?"

The VP sat his mug down on the desk, his brow still furrowed. Half of his hair, where one hand had been nervously running its fingers, was sticking out sideways, in some laughable nod to a Hollywood mad man. The other side was eerily plastic, like some bizarre executive Ken doll. As he turned to the side, the rustled hair disappeared, and the words that came out of his mouth seemed even more despicable while rolling out of what seemed like a perfectly coiffed, button-downed executive.

"If we don't hit these companies where they hurt the most, the end users, we won't ever hurt them. We need to show them that it's their fault people are dying. We need to prove to them that what they are doing can hurt actual people." He turned to face her, his unkempt hair appearing as he further proclaimed his righteousness. Again, he glanced back at his laptop, gauging something, then quickly looked away.

"These companies are risking lives as it is. They make an inferior product that lacks the guarantees that we can make. People will get hurt eventually, and what if it's in the millions? We can put a stop to it now, and maybe only a couple thousand get hurt. If we act today, we can potentially save millions later. You can help me put an end to this. You can help me save those millions of lives. You can help save this company, if we can build the perfect remote exploit."

His disregard for human life was somehow not shocking to her. She wasn't sure why. Maybe it was always there, under the surface of his skin, hidden behind that natural hippy-turned-professional vibe. Maybe it was the fact that he claimed to care about the ecosystem, posturing with the Boulder, Colorado mindset, while driving a gas guzzling Porsche, and flying in a private jet whose pollution costs were offset by carbon credits. She didn't know why it made sense. It just did.

It wasn't shocking, but it was terrifying to her. Even if she quit, if he was this far gone, how could she trust him not to hurt her? Did anyone else even know about this? Was she the only one he told? Would he hurt her to keep this psychotic rant from going beyond these walls? Was this a test? It sure as hell didn't feel like a test. It felt real. It felt dangerous.

Suddenly, a pop-up appeared in her line of vision. Her own eye-contact heads-up-display was notifying her that she was perspiring and had an elevated heart rate, but didn't seem to be moving in any particular direction. "Are you feeling okay?" the artificial intelligence asked in a little text pop-up box, as her fitness statistics hovered in little graphic-user-interface clouds throughout her field of vision. "I can sense that you seem to be running, but our movement mesh shows you aren't moving. Would you like to recalibrate?"

The intrusion of these observable metrics into this ridiculously cartoonish scenario simply furthered her disbelief that any of this was actually happening. This began to seem more and more like a bizarre and belated Halloween prank. As her heart thumped louder and louder, she couldn't help but break into a humiliatingly inappropriate grin. Was he crazy? Was she? Was any of this happening?

The eye-contact queried again: "Would you like to recalibrate?"

"Yes, this is real." he stated with an absurd calm that sent chills down her spine. He instantly seemed more in control than ever. He was almost gloating! Whatever he kept glancing at on his laptop screen was reassuring him. "This is very real."

"How did you know that's what I was thinking?! You're putting me through some kind of fucked up joke, right? Some kind of loyalty test? This isn't funny. I don't think it's funny." She tried to gather herself. She stood up, but seemed frozen by his lack of reaction. "I quit. I have to quit. Even if this is a joke or a test, it's too fucked up. I can't..."

"You can't?" he said. He grabbed his standing desk and twisted it back, flattening the desktop surface before hitting a switch with his foot that enabled the surface to be lowered, then loudly slammed the desk down into its sitting position. The shotgun-like boom of the thick, flat, cherry wood smacking more thick flat wood was unbearable! He slowly wheeled the desk over to the center of the room, in front of a setting San Diego sun. "You can't what? Change the world? You're afraid of the cost of change. I get it. It takes a lot of bravery to do what we do here, to make real, tangible change. Sometimes, that cost is unthinkable. But, we do it, because we can aff...."

"Because you fucking can!" she exclaimed, infuriated by his sudden calm. "Say it! Because you fucking can! Knock it off with the perpetual rhetoric nonsense! You do it because you fucking can!" Tears began to well up in her eyes, still waiting for the rest of the executive team to burst through the doorway exclaiming this horrible test of will and ethics was over.

The sun finally lowered over the late afternoon horizon, sending a green flash, and pink hues barreling into the suddenly quiet office room. The flat gray surface of the battleship was devoid of little men in

white. The barrel of the turret they were polishing earlier now seemed to be pointed in her direction. Was it pointing this way earlier? She couldn't remember. It must have been.

She felt her temperature rising, even with the sun disappearing. Her HUD popped up another little text box into her field of vision exclaiming that her core temperature has elevated to 99 degrees Fahrenheit. She wanted desperately to run out of the office. But where would she go? And would the guards at the building exits stop her? Or would there be little men in white to cleanse this building of her presence?

"If you run, that will be a big problem for you," he smirked. "Please, sit back down. We have much to discuss."

"How the fuck?" Suddenly, she saw it. He wasn't glancing at instant messages. It wasn't stock prices he had been monitoring throughout the discussion. As the sun set, the world outside darkened almost in parallel with the tone in the office. And it was there, a clear reflection in the wall of windows in front of her. As her vital statistics updated in real time on her HUD, she could see the updates slightly delayed on the screen of his laptop. He had been playing with her emotions the entire time! He was watching how she would react, how she would process what he told her, whether she was a threat to him... He could predict what she was thinking by analyzing all the sensors in their wearable mesh network: the heart rate sensor, the perspiration sensor, 3D body positioning, mouth dryness, blink-rate analysis, muscle tension monitoring... He couldn't read her mind, but his machine learning software was analyzing what she was most likely thinking, and it was god damned close...

She recklessly shoved a black painted fingernail into her eye, nearly scratching her retina as she dug out the wireless-enabled contact. Her teeth clenched as she tried to stop herself from reacting from the pain. "Mother fucker!!! Fuck you!"

He laughed casually, motioning again to the chair. "Please, take a seat."

"Why should I! You're fucking insane!"

"Why? Because everyone you know and love wears these sensors now. Not the cheap knock offs. The real ones. And we can access them all remotely thanks to the security architecture that you signed off on. Not to mention, someone told those people how to break these security chips, and that report was for internal use only. Someone will get blamed. We both know it wasn't you, but how can you prove it wasn't?"

She almost spoke the obvious...

"Yes, you could tell them all about the so-called evil we can do here. Blah, fucking blah. You'll just sound like another pressured paranoid security engineer that finally snapped, gone schizophrenic, thinking trojan horses are communicating to the devices in your SCIF using sound waves projected through your own body. You'll be another fucking psychotic loser that no one gives a shit about because no one is strong enough to be comfortable around your Enemy Of The State, Three Days of the Condor, stereotypical bullshit."

"They will listen to me..."

"Listen to a blue haired ex-punk rock wannabe corporate security fuck? The door is right behind you. There are lots of people in the building right now. Want to give it a shot? Go for it." his smile was almost razor-thin. "Go ahead. See what they think."

Her eyes were blood red from anger, humiliation, her fingertip, and a feeling of complete loss of control. As she stood in the center of the room, her foot began to twitch, tapping out some unheard, emotionally exhausting, industrial-rock song.

"Now, then. Why don't you sit down. We have much to discuss."

Her body shook as she sat back down in the L3 reproduction. She could feel the noiseless ventilation system come back on. As her hands touched the cold metal frame of the chair underneath her, the frigid air slid like unwanted fingers down the back of her neck. In silence, she watched the American flag in the corner wave hypnotically to the oscillation of the hidden fans, as the fluorescent lights flickered above the darkened crescent skin under the man's machinated, inanimate eyes.

The world outside had fully relinquished what was left of its grip on the evening sun, as if it had given up its fight against the incessant hum of the digitally controlled fluorescent lighting. A pulsing, flickering, buzzing, manufactured light which bullied its way through these office windows and outside, into the uncertain San Diego streets. A reflection in the windows shone a familiar pop-up flashing on the man's laptop's screen.

"Would you like to recalibrate?"