

Firmware

3 chapter sample

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STANDALONE NOVELS

The Red Road

Chapter 1

A mild commotion by the entrance to the Workshop's lift caught Daniel Blair's attention as he was packing up and preparing to head off home for the night. He was sure that he had overheard someone say that there were people trying to come in, but had paid little attention. He hadn't even heard the street level buzzer go. He was mildly engrossed in the live Commonwealth Games diving broadcast. There were some impressive feats on display, though Dan might have appreciated them more if the competitors weren't augmented. It was the chips in their heads that were enabling them to spin and twirl so fast. An ordinary, non-chipped person couldn't do that. Not least of all because they would not be allowed to compete in the first place, but also because chip removal was illegal.

Dan turned away from the laptop screen as a man and woman emerged from the lift, carrying the limp form of another man between them. Jack Hill, the head of the Workshop, approached them, Ed, and Vix, the two other members of the group, flanking his sides.

"What's wrong with him?" the woman carrying the man asked immediately. She was quite clearly distressed, looking as though she was in the midst of a panic attack. "Can you help? Please, can you help him?"

"Hold on," Jack said, raising a hand and preventing the three from coming any further than a few metres from the lift. "First, tell me who you are and who sent you."

"Hey, come on, we already did," the other man supporting the limp form started. "He's dying! We need help! Can't we tell you once we get him looked

at?"

"First of all, he's not dying," Jack stated firmly, looking over the man the two were supporting between them. "And secondly, I need to know how you found us and what you can tell me about your friend."

The man made to retort, before the woman gave him a look that silenced him. She took a deep breath to calm herself, exhaled. "My name's Megan Barlow, he's Anton Ring, and this is Dennis Green." She nodded to the man she continued to support. "We were out drinking this afternoon, when Dennis suddenly just ... stopped."

Jack nodded. "He hasn't moved at all?"

"No," Anton said. "He's frozen, just like that."

"For how long?"

"Almost an hour now?" Meg suggested to Anton, who agreed.

Dan left the diving behind and came to join the group by the door. The three that had emerged from the lift were young-looking, probably somewhere in their late teens or very early twenties. He guessed that they were students. Anton was shorter than average height, but other than that there was nothing special about him. He was clean-shaven, spotty, and that was about it. The girl on the other hand was pretty. For a short-haired girl, anyway. She was wearing a tight, pink figure-hugging top that showed off just how trim she was. He looked away as she met his eyes and focused on the man she was holding up.

Dennis Green was long-haired and bearded. His eyes were open and staring vacantly ahead. Had Dan not been familiar with this sort of thing, he might have believed that Green was dead. A simple check for a pulse would have proven that he was still alive, however. That was one of the few things that still worked under these circumstances.

Jack clicked his fingers several times in Dennis Green's face. There was no response from the man. Jack next slapped Dennis' face lightly a couple of times, before attempting to close his eyelids. They sprang open as soon as he removed his fingers. The same occurred as Jack gently and carefully opened the man's mouth, his jaw closing as soon as his fingers were removed.

"He's crashed," Jack declared, looking to Ed, Dan, and Vix, who all agreed with his prognosis.

"He's what?" Anton asked.

"He's crashed," Jack repeated, matter-of-factly. "He's not responding. Either his chip is busted or he's become the victim of a very rare software bug."

Meg looked flabbergasted. "What do you mean? He's just stopped working because of an error in the software? Can that happen?"

"Not usually. There are a number of safety features and that in the official software releases that prevent such extremes. But if he's gone and installed a custom ROM, these sorts of things are a little more common."

Anton looked baffled. "A custom ROM? What do you mean?"

"I'll explain in a moment," Jack said. "But before all that, I want to know who sent you here. Otherwise you're getting back in that lift and can go to A&E and explain things to the NHS."

Meg and Anton looked at each other, apparently unsure if that was a bad thing.

"Yeah, you don't want to do that," Dan said. "You'll get in real shit and could end up going to prison or something. ROM and chip hacking is illegal."

"Okay look," Anton said, keen to move things on. "We were drinking in the pub and Dennis just stopped midway through a pint. He was talking and stuff

and then he just went like this.”

“We then took him to the university doctor and he told us to bring him here, and ask for Jack,” Meg said. “We got in a taxi, and here we are.”

“Which university? What was the name of the doctor?” Jack asked.

“University College London,” Anton said. “The doctor was called ... Look, I don’t remember. Why is it so important?”

“I need a name,” Jack insisted.

“Ken ... Ken Goldman,” Meg said.

“Okay, good,” Jack said, “he’s one of ours. Bring him this way.”

He indicated for the two to follow him, taking them to a small room in one corner of the Workshop. The two hesitated as they entered, seeing the makeshift operating table and the array of instruments and tools that decorated the walls and the shelves. Dan didn’t blame them – that was the normal reaction, quite understandable. You had come here to help your friend and had ended up somewhere that looked like an amateur operating theatre. He eyed the saws, claw hammers and other dubious tools that hung on display, as Meg and Anton did.

“We probably won’t be needing any of that sort of stuff,” Dan said to the pair, who looked ready to drop their friend and bolt back to the lift. They wouldn’t have been the first. Maybe in future Dan or Jack should take those tools down.

“Put him on the table, face down,” Jack instructed Meg and Anton.

They did so somewhat reluctantly, Dan giving them a hand to arrange Dennis’ limbs as best they could. Dennis’ arms and legs were stiff, like the man was suffering from rigor mortis. It was something that Dan was used to seeing and occasionally dealing with. Dennis was thankfully a little more

malleable than most others, his limbs not springing back into place like those that had come before.

“I’m going to leave you boys to it,” Vix said, heading back to her desk. “I want to finish this piece while the ideas are still strong in my head.”

Jack shooed the students away once Dennis was more or less on the table. “Let’s try this the easy way first,” he said, fetching his computer tablet from his desk outside and tapping away at it for a time. “Hmm, well I can see him, so that’s good. He’s still broadcasting his ID and stuff over basic RFID.” More tapping, his expression unreadable. “Not responding to requests for any other information, though. HF-Tech firmware version is saying it’s 11.04, so he’s more than two years behind the latest version.”

“What ROM’s he using?” Dan asked.

“*Thin ICE.*” He looked at Dan and Ed, Dan shrugging his response.

“Never heard of it,” Ed said.

“No, me neither,” Jack said. “Maybe he built it himself.” He returned his attention to the tablet and continued tapping. “I’ll see if any of the other radios are working. Bluetooth, no. Wifi direct, no. NFC, no. No, none of them are working.” He set the tablet aside. “Right, we’re going to have to do this manually.”

“Manually?!” Meg exclaimed. She looked again to the various instruments decorating the wall.

“We can’t talk to the chip in his head via radios because it’s not responding,” Jack said, nonchalantly. “That means we’ll have to deal with this the long way. Dan, get me the multimeter and the beard trimmers.”

Dan first passed Jack the multimeter, a small crude hand tool with an LCD display, and Jack ran the device over the back of Dennis’ head. It emitted a

load of static noise as he did so, that made it sound like a Geiger Counter. Dan studied Meg and Anton as Jack worked, both appearing quite pensive and perhaps wondering if coming here had been such a good idea.

“Jack’s just making sure he knows exactly where the chip is,” Dan explained to them. “It’s not always at the very back of the head. Sometimes it’s closer to the top or the bottom. No idea why. No, you can’t feel it through your skull,” he added, as both the students instinctively felt at the backs of their heads.

Jack did not spend long with the device and soon set it to one side, keeping a finger on the spot where he had located the chip. He wordlessly prompted Dan to fetch him an actuator that was resting on the worktop.

“What are you going to do?” Anton asked, still sounding quite worried. “You’re not going to slice his head open, are you?”

“No, don’t panic. We’re just going to reboot him,” Jack said.

“Reboot him?” Meg said. “You mean, you’re going to switch him off and on again?”

“Precisely.”

“What if he doesn’t come back on?” Anton almost demanded. He moved forward, but Ed stepped in front of him, gently holding him back. “You could kill him.”

“That won’t happen,” Dan assured them, giving Jack the beard trimmers. “So long as he’s alive, it won’t fail to start.”

Jack proceeded to shave a small square of hair off the back of Dennis’ head, before taking the actuator from Dan. The actuator was nothing special – a small black plastic component, about two centimetres square. There were two long pins in the base, which Jack pushed into Dennis’ head, around where he

had shaved off the hair.

“There we go,” he said, picking up the tablet once more and looking over the results.

Dan peered over his shoulder, seeing that the actuator was happily talking to the tablet and also interfacing with the chip in Dennis’ head. It was returning more information than before, though the results were still quite minimal. Dan had a hunch that Dennis was one of the more extreme security and privacy conscious of the ROM and chip hackers. Very paranoid, in other words. He had clearly been messing heavily with the software on the chip and had pushed the hardware too hard.

“Quick test,” Jack said, pressing one of the software buttons on the tablet screen. Meg and Anton each gave a small gasp as Dennis’ left hand began to clench and unclench rhythmically. Jack stopped it and did the same with the right hand. He then moved around to look Dennis in the face, commanding his eyes to blink. They were extremely bloodshot.

“Those are going to be very sore when he wakes up,” Dan said.

“Sure will,” Jack said. “He’s not blinked once since coming in here. Okay, I’m going to reset him. Come here,” he prompted Meg and Anton over to the table.

“He might panic when he comes to,” Dan warned Meg and Anton. “If he does, we’ll all have to restrain him. He might not know where he is immediately.” He glanced about the crude surgery. “He might think he’s woken up in an Eli Roth movie.”

The three braced themselves for Dennis’ resurrection as Jack tapped a button on the tablet, and Dennis’ limbs flopped down like those of a puppet that had had its strings cut. The man then exhaled a sigh that sounded as if it

had been held in for quite some time.

“Oh my God, thank you, thank you,” Dennis breathed, heavily. “That was horrible! I never want to go through that again!” He was speaking with a slight slur, one that Dan couldn’t be sure was due to the reset or the beer he had consumed before coming in. Likely, a combination of both.

“Dennis, are you okay?” Meg asked.

“Yes,” Dennis said, starting to sit up. He failed and collapsed back onto the table, threatening to fall off it as he came down close to the edge of one side. Dan, Anton, and Meg caught and righted him, but not before the man vomited loudly all over the floor.

“Nice!” Vix called from the main room.

“Sorry,” Dennis said, once he was done spitting.

“That’s okay,” Jack said. “We’ll just need another ten quid off you, as a fouling charge.”

Only now did it seem to dawn on Meg and Anton that the work that had been carried out here tonight would not be free, and their relieved expressions returned once more to ones of mild panic.

“How much is it?” Meg asked. “Twenty pounds?” she ventured.

“Sixty,” Jack said, setting the tablet aside.

“Sixty quid?!” Anton exclaimed.

“Those actuators aren’t cheap or easy to get hold of,” Jack pointed to the device still embedded in the back of Dennis’ head. He gently pulled it free, Dennis wincing as he did so.

“The sixty also includes the ten for spoiling my pristine floor,” Jack said, his eyes flicking to the not so clean tiles. “No, tell you what - I’ll let you off the fouling charge since this was your first time in here. I do want you to go and

clean it up, though.” He nodded to a mop and bucket, and directed Dennis to where he could fill it, as soon as he was able.

“Hey ... Oh yuck,” the pink-haired Vix said, poking her head around the door of the little surgery, and spotting the chunky, orangy-brown mess on the floor. “Look, I’m going to take off. I’m feeling the need to do some actual painting and I can’t do that here.”

“See you later, Vix,” Dan said, knowing that the woman would disappear anyway, no matter what he, Ed, or Jack said. When the need to be arty grabbed Vix there was little that could stop her.

“So, what’s *Thin ICE* ROM?” Dan asked, as Dennis began to mop up the vomit.

“It’s one I downloaded off a forum,” Dennis said, after a moment’s silence.

“Which forum?”

“It’s called HFX Developers. There’s no domain name, it’s just an IP address and some specially crafted URLs. You need to go through a proxy to access it, as well. It’s pretty well hidden.”

“That’s standard, though,” Jack said. “The government are closing down two or three of those per week at the moment. Was it a beta ROM?”

“I ... don’t know,” Dennis said, squeezing the mop slop into the bucket.

Ed looked incredulous. “You used an untested ROM?! Are you mental?”

“The guy who posted it said that it was forked from another one, called *ICE*,” Dennis started defending himself. “He said that it provided additional security and prevented full disclosure of all your details. It also doesn’t allow incoming traffic, except from a hardware source.” He looked sheepishly at the actuator that was lying on the table, a little bit of blood staining the two prongs that had been embedded in his head.

“Wait, so you *were* fiddling with your chip?” Anton scowled at him.

“Why did you install such an obscure ROM?” Dan asked Dennis, ignoring Anton. “What were you after? Why not stick to the more common ones, like *Rouge*?”

“I don’t trust what HF-Tech are putting into the updates any more,” Dennis almost shouted. “They keep issuing screw-ups constantly, including that sodding eye twitch and the *other problem*. They each only affected less than one in a million of the population, but guess who got both?!”

He slammed the mop into the bucket in anger, causing some of the filthy water to leap out and spill onto the floor again. He glowered and mopped it back up. He was pretty much done now, Dan saw. The air in the surgery was thick with the smell of bleach, as it always was.

Jack said, “*Rouge* basically does everything that the official firmware does, but allows you to choose which updates you apply.”

“I don’t want to use any of them,” Dennis snapped in frustration. “I don’t trust them.”

“Mate, there’s nothing wrong with the chips,” Anton glared at him. “They’re issued by the government; they’re safe.”

“Says who?” Dennis asked. “The government and HF-Tech aren’t exactly transparent with the whole update process. You have no idea what secret tracking systems and other stuff goes into it. The government doesn’t even know, since HF-Tech doesn’t let them see the software, only the hardware.”

“Have you been doing that for long?” Meg asked. She looked as though she was seeing Dennis in a whole new light, after knowing him for a number of years.

“Last eighteen months or so,” Dennis admitted. “I was running on *ICE*

beforehand.”

“What’s wrong with you?” Anton asked Dennis angrily. “Why take something that works perfectly well and *fiddle* with it? I hear about all these geeks and nerds doing that constantly. They can’t just be happy with what’s there, they have to start smashing it up and taking it apart to ‘improve it’.” He motioned between himself and Meg. “Ours work fine. You don’t see us freezing up like what happened to you. Imagine if you were driving a car. You could have killed yourself, or someone else.”

He continued to fume for a time, working internally through his tirade before continuing. “Tell you what, dude, I’m never getting in a car if you’re behind the wheel. The chips are fine. They boost everything, make you smarter and do exactly what they say they do. The athletes in the Commonwealth Games don’t go screwing around with their chips.”

“Well ...” Dan started, but decided not to go down that road. Some of them did, and were quickly disqualified. And those were the ones that actually got caught.

“I’m more bothered about what they *don’t* say they do,” Dennis said.

Anton mumbled something that Dan didn’t quite catch. It sounded like he had made a quip about tinfoil hats.

“Look guys, I’ve got to go,” Anton told Meg and Dennis. “I’m working on the radio show tonight and need to get this done as part of my course. I’ll see you later.”

He turned and started off without looking back, not so much as even a word of thanks for the three men that had helped out his friend. If Dennis and Anton were friends any more, that was. Dan had a hunch that Anton was very much on the side of HF-Tech and the government, as far as the chips were

concerned. To meet people that fiddled with them, and knowing that one of his friends engaged in the practice, must have been like blasphemy to him. Dan never quite understood people like that.

“Whatever,” Jack said. He turned back to Dennis. “Are you feeling better?”

“Much,” Dennis said. “My eyes are sore, though.”

“You weren’t blinking when you came in, probably haven’t done so for a good few hours, so they’ll have dried out.” Jack opened a cupboard and took out a small bottle, handing it to him. “Put a few drops of this in, it will help. There’s not much in there, so you’ll have to get your own and keep putting them in for the next week or so.”

“Thanks.” Dennis squeezed in a few drops there and then.

“Maybe we should revert you back to *ICE* for now,” Dan suggested.

“No, it’s okay. I’ll just look out for updates to *Thin ICE* when I get home.”

“You’re going to keep ... whatever you’ve done?” Meg stared at him in disbelief.

“It’s just a minor problem,” Dennis answered, with a shrug.

“Dennis, you should probably let them fix you,” Meg said.

“How long have you been running *Thin ICE* for?” Dan wanted to know.

“Because that was a pretty bad crash. You were like a statue.”

“Three weeks?” Dennis said. “I think it’s only been out that long, too.”

“Okay, that’s *really* bad,” Dan said. “It sounds pretty unstable. I really, really think you should remove it for now. We’ve got a copy of the latest stable *ICE* ROM here. We can apply it now before you go home. No extra charge.” He glanced to Jack, who gave a detectable nod.

“Maybe you should just go with *Rouge*,” Ed suggested. “We all run it and we’re fine. And you see what we do down here. We’d not be running it if it

could cause us any problems.”

Dennis stared down at the bucket for a time, apparently fighting with the desire to keep his chosen ROM, no matter the consequences. “Okay,” he said. “Put me on *Rouge*.”

Dan felt relief that Dennis had seen sense, but couldn’t help feeling that the man would probably jump straight back onto the internet forum he had acquired the *Thin ICE* ROM from and apply a new update as soon as he was able. He, Ed, Jack, and Vix would likely be seeing Dennis in here again in the coming months.

“Good,” Jack said, pushing off the worktop he had been leaning up against. “Now, if we could settle up?”

Meg and Dennis nodded, mumbling between themselves about who was paying, and when Dennis could return the money if Meg were to pay some of it. There was a brief discussion about the amount spent in the pub, their rent, cost of books, food, nights out, the circle of debt, maxed-out credit cards and overdraft limits, and all the other financial problems that tended to plague students, before Meg opened her bag and pulled out a card from her purse.

Jack shook his head. “Cash only. Sorry.”

“Really?” Meg asked, sounding as if Jack had suggested that she pay them in cheese and pickle sandwiches.

“We’re not exactly above board here, as I’m sure you can appreciate,” Jack smiled. “Cards can be traced.”

“Can I bring it in tomorrow?” Meg asked. She sounded genuine, but Dan already knew what the answer from Jack was going to be.

“No, sorry. We need it tonight, before you go.”

“We can stop you leaving, too,” Ed added.

The two students looked a little freaked out at that.

“With that?” Meg nodded to the tablet on the table.

Dan chuckled. “No. We’ll just lock the doors.”

“Oh.”

“Look, how about I take you to a cash machine and you withdraw the money, while we wait for Jack to flash your mate’s chip?” Dan offered.

“Okay,” Meg said, after a nod of agreement from Dennis, and started out with Dan.

“Sorry for the escort,” Dan said, as the lift began its ascent to street level. “But we just need to make sure people don’t run off without paying.”

“I wouldn’t anyway,” Meg said.

“Good, because we know where you live,” Dan grinned.

Chapter 2

“Sir, sir, could I have a word please?” A man chased after another for a time, before giving up and focusing his attention on other members of the public coming his way. He was a canvasser for one of the major political parties. Dan steered Meg around him, and the rest of his entourage, to continue the search for a cash machine.

There were few available tonight, most of them declaring themselves as empty. That was Thursday night in the capital for you. As was always the way, many chose to spend Thursday night out and about, Friday recovering, and then doing it all over again on Saturday. Better to be hungover on work time than your own time, was the logic behind that move.

Dan and Meg’s feet splished and splashed through small puddles that were gathering, a light drizzle continuing to fall. It had rained heavily a little while ago, the sheen of water on the roads and pavements reflecting the many lights of the city around them. It was early June, but with the cool air and the rain it felt more like October.

“From the minute you walked into the Workshop, we’ve known everything about you,” Dan explained, as he walked with Meg through the London streets.

“How?” Meg asked. “How could you know all that just from me walking in there?”

“Your chip,” Dan tapped his temple. “It broadcasts a lot of information about you constantly. It’s how things like shops and the Oyster cards can determine who you are.”

“Sure, but only my basic identity details,” Meg countered. “It only tells you my name and date of birth, right?” She sounded a little concerned.

“Nope,” Dan said. “It broadcasts a lot more. The rest of it is encrypted, but we know how to get past the encryption. Usually only certain things can get at it, via a white list. However, we have access to it all. We’ve basically got the master key. But don’t worry,” he added quickly, as he saw Meg begin to slow down, “we won’t use it against you or anything. We use it for our own protection. I don’t really care what other people do or what they’re involved in. Unless it’s morally wrong, of course.”

“That one has money,” Meg said, nodding to a large queue that had formed in front of a cash machine.

“What was with that Anton guy?” Dan asked, as the two waited patiently in the queue together.

“He’s basically a tool,” Meg said, scowling a little. “It wasn’t my idea to invite him to the pub. It was just Dennis and I who were going, but we bumped into Anton on the way and he pretty much just invited himself along. I mean, I don’t even know him that well. He’s just someone who I’ve had a few lectures with. Actually, Dennis and I were on the way to the Union, but Anton didn’t want to drink there because it wasn’t classy enough for him.”

“But what made him fly off the handle like that?” Dan asked, as Meg started to ramble.

“He’s something of a fanboy when it comes to certain things. He’s a firm believer in premium goods; only the best will do. He looks down on people who settle for less.”

“You don’t think he’ll report us or anything, do you?” Dan cared little for whether Anton enjoyed paying twice as much for his goods as most other

people. Finding out if Anton would seek to have those involved in the Workshop prosecuted was what he really needed to find out.

“Hmm, I don’t know,” Meg said. “But I wouldn’t put it past him.”

Finally at the front of the queue, Meg pushed her card into the slot and began keying in her PIN. Dan stood to one side, his back to the screen, to give her some privacy.

“So, you’re a student?” Dan asked conversationally.

“Yeah,” Meg said.

“First year? Second year?”

“Second year.”

“What are you studying?”

“Business,” Meg said, continuing to give short answers as she concentrated on the screen.

“What are you going to do when you finish? Start your own business?” Dan asked, as Meg stabbed at various buttons.

“I don’t actually know,” Meg admitted with a chuckle. “I’m not sure if it’s even something I want to do as a career. I think I’d rather teach, to be honest. Did you go to university?” she asked.

“Dropped out of a computer science course, after two terms,” Dan said.

“They weren’t teaching me anything that I didn’t already know, and I wanted to get out into the world and start earning some money, rather than run up three years’ worth of debt.”

Meg nodded but said nothing else, concentrating on the cash machine’s display. She swore lightly under her breath and Dan stole a glance over her shoulder at the screen. £13,491DR the display read, a huge debt already for a second year student. He suspected that she had drunk most of that. He turned

away again as Meg keyed in the amount of money she wanted to withdraw, taking the notes that were dispensed and started to walk back to the Workshop with Dan.

“So, do a lot of people know that you illegally hack the implants?” Meg asked.

“Hey, keep your voice down,” Dan said, catching a handful of eyes that turned in his direction as the woman spoke. “No, no one knows that we do it,” he continued, once they were clear of people and starting down the cobbled street that led to the rows of old warehouses, home to the Workshop. “We keep it to ourselves; I don’t even tell my parents. They think I work for an indie video game studio in my spare time.”

“But the chips works fine,” Meg said. “Why tamper with them?”

“Privacy and control,” Dan shrugged. “That *Rouge* ROM that Jack mentioned works mostly the same as the one you have, including the updates that HF-Tech issued at the beginning of the year. The only difference is that *Rouge* suppresses the automatic updates and is a little more restrictive with the data it can transmit. It also allows for extensions.”

“Extensions?” Meg asked. She looked wary, but also a little intrigued. “Is that the same as the extras they give to pilots and bus drivers to keep them awake longer?” She stifled a yawn.

“Something like that. These are a little more advanced, though. There are things such as balance improvements, language support, additional skills, and stuff like that,” Dan explained.

“Skills?”

“Oh, nothing special. Just basic stuff like cooking, sewing, repair work and that sort of thing. Everyday things that you always wondered how you ever did

without.”

“I could do with cooking,” Meg said. “I only ever eat properly when I go back to my mum and dad’s. Otherwise, it’s toast or a sandwich or a takeaway or something. I can’t even do spag bol.”

Dan couldn’t help but look to the woman’s slender frame again, the tight pink top she wore almost like a second skin. “I can teach you, if you like,” he offered.

“What else is there?” Meg asked, dodging the suggestion.

“A bunch of other things, but most are unstable or dangerous. We reckon that the army have been applying combat skills to their recruits for years. Would save a lot on training, and even the most mediocre of soldier could be turned into a killing machine in a matter of days. I’d suggest if you ever do it, it’s best to stick to the basics. Overclocking is one of the most popular of the dangerous features. Don’t ever overclock, by the way. It’s really not a good idea.”

“What does it do?” Meg asked.

“It allows you to react faster. You basically experience the world in slow motion and have a lot longer to deal with things.”

“Sounds quite cool.”

“Except that it has caused people who use it to develop and die of aneurysms,” Dan chuckled without humour.

“Hmm, I think I’ll leave my chip as its meant to be,” Meg smiled. “I don’t want to end up like Dennis. And why would you want balance improvements, anyway?”

Almost on cue, Meg stumbled on the wet cobbles, tottering for a moment, before starting to fall. Dan caught her the same instant, moving quickly and

preventing her from crashing down hard on the ground.

“Because of things like that,” Dan said, setting her straight.

“That was because of the beer. I’m usually more coordinated than that,” Meg giggled.

“Sure,” Dan grinned.

“Not much more, though,” Meg said, stumbling again. She hooked her arm through Dan’s for the remainder of the journey.

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Jack had completed flashing the new ROM into Dennis’ chip by the time they returned. It wasn’t a long or complicated process, only about half an hour or so. Meg paid Jack, and she and Dennis started out together.

“If you have any problems, just come and see us,” Jack said to Dennis as the two got into the lift. “Might not have to charge you the next time, so long as you’re not screwing around with untested ROMs.”

“Where’s Ed?” Dan asked Jack after the two had left, noting that the man had disappeared.

“He’s talking to two guys outside,” Jack said. “Think they’re just snooping around and he’s getting rid of them.”

“Must have missed them when I came in. All right,” Dan said, returning to his desk and powering down his laptop and popping it into his bag. “I’m going to head off. Not in the mood to do any more coding tonight. Are you going to stay?”

“I’m going to continue with my little project for a bit,” Jack said. “I’m also going to look into that Anton guy, quickly. He might turn out to be a squealer.

If that's the case, we'll have to arrange for someone to pay him a quick visit and let him know to keep his mouth shut." He tapped away his tablet. "He's at the university radio station at the moment, as he said. I'm going to track him for a couple of days and see where he goes."

Dan concurred. They had yet to have anyone of authority poking their nose around the Workshop, but the day was sure to come at some point. To say that the Workshop was merely independently investigating and reporting software and security flaws in the chips and firmwares was not as good a cover as they would have liked. If anyone were to snoop about, they would find the reports in plain sight, but would want to know what was held on the encrypted memory cards and hard drives in the safe that was hidden beneath the floor. Jack, Ed, Vix, and Dan could well be facing prison should it be discovered that those drives and cards contained mirrors of the source code of many different ROMs, to which they had contributed. Though they could argue that it was merely software code that had never been applied, lawyers for the government could well counter that it was the equivalent of owning a terrorist training manual.

"Probably best if we need to talk to Anton that we do it ourselves, rather than sending someone else around," Dan said.

Jack nodded. "Yes, those two bruisers I hired the last time did take it a bit far."

The lift gave a gentle ping, Ed returning, accompanied by two other men. As with Anton, Meg, and Dennis, they were both young-looking, in their early to mid twenties Dan judged.

"Jack," Ed called to the man who had settled down at his desk once more. "These two are after some chip-related advice."

Nicely put, Dan thought.

Jack came over to join the four, looking a little irritated by the interruption. He had been getting quite involved in his project lately, although he was also being very secretive about it, only telling Dan that it was something related to dreams and consciousness. Dan had a hunch he was creating a fully immersive gaming experience, that he would likely make him a millionaire overnight. Dan wished his own coding skills were competent enough to do something like that. Maybe he shouldn't have bailed on university, after all?

"What can I do for you?" Jack asked, struggling to keep the annoyance out of his voice.

"We'd like our chips removed," one of the men said, indicating the pair of them.

"Are you police or government?" Jack first asked. "Because if you are, you have to tell me and I can ask you to leave if you don't have a search or access warrant."

"We're not the police, no," the man said. "Just two normal people. We want the chips removed because we don't want to be tracked or traced."

Jack shook his head. "We don't do that any more. It causes too many problems and you will eventually have to have them put back in. Can get very messy if the NHS gets involved. It's also dangerous."

"That's what I told them," Ed commented.

"Do you know anyone who does remove them?" the other man asked.

"I don't, no," Jack said, "and I don't advise it, either. Other than the removal leading to problems in life, such as you being tagged as a potential criminal, terror risk, or things like that, the removal can actually kill you. Oh don't worry," he added, as the men started, "we've never killed anyone

ourselves by doing it, but I know that it's happened to other people."

The two conversed briefly with one another, coming to the conclusion that removal wasn't what they now wanted. "Can you disable it, then?" the first man asked. "So that it doesn't broadcast or whatever, and just stops working?"

"Again, no. But I can flash you a different ROM, that will let you control what goes into the updates, broadcast only a limited set of information, and will basically do everything you're after. It's almost completely undetectable by the authorities, too. We all run it ourselves, and no one's ever been called up on it."

"Sounds good," the first man said, after the two conferred for a bit. "Er ... how much?"

"Let's call it fifty each. It's normally more, but we're doing a two-for-one special right now."

Jack was clearly keen to get back to his little hobby. Dan could help out with the flashing, but he usually had to lean on Jack a little during the process, just to make sure that he didn't mess anything up. Jack was better at the whole deployment phase than he was.

"Can you handle this, Jack?" Dan asked.

"It will only take about thirty minutes or so," Jack said. "You can head home. I'll message you if I need anything."

"I can help, too," Ed offered. "Not meeting Miss America until a little later."

"Still seeing your mystery lady?" Dan asked.

"I think we're breaking up tonight," Ed said dismissively. "She's getting far too clingy."

"What's this new system called?" Dan caught one of the men say as the lift

doors closed. "I heard someone talk about something called '*Thin ICE*'."

Ed chuckled. "Believe you me, you don't want that. You'll find yourself winding up exactly as the name implies ..."

~ ~ ~

Dan strode quickly through the streets of South London, towards London Bridge station, the enormous structure of The Shard looming directly ahead of him.

Originally designed in 2000, The Shard was the tallest building in Europe. Its seventy-two habitable floors had been meant to provide space to offices, restaurants, residential apartments, a hotel, and miscellaneous commerce space, such as bars, gyms, cinemas, and spas. Human Firmware Technology had bought the entire structure in a controversial acquisition in 2003, over nine years before construction was completed. Despite his feeling towards the company, it was a rather spectacular skyscraper and a feat of engineering and architecture, Dan admitted.

The sky had darkened a great deal since he had been to the cash machine with Meg. It looked like a storm was rolling in. The threat of the bad weather was doing nothing to put off the election campaigners, however, the canvassing continuing as just fiercely as before.

The election was set for next month, campaigning in full swing, but Dan had paid little attention to it. As far as he could tell, the current ruling party and the main opposition were neck-in-neck. It was probably going to go to the current party in charge, though, people eager for change, but at the same time wondering whether it was truly a good idea. Better the devil you know

and all that.

“Hello, sir, how are you this evening?” a woman asked. She was carrying a clipboard and some leaflets with her, and covered in badges, rosettes, and a number of other trinkets that showed her support of the Opposition.

Dan carried on walking, avoiding eye contact and pretending that the music he was listening to was so loud that he hadn't heard the woman speak. He didn't want to get involved in this. He knew little about politics and wasn't even sure about the name of the leader of the Opposition. Robert Preston, perhaps. The man was new, having only been elected to lead the party in the past six months or so, and having seemingly come out of nowhere. He had little presence or personality, however, nothing that made him stick out. He needed some controversy to stir things up a little, in Dan's opinion.

He made it to London Bridge just as the heavens opened and began dumping heavy rain all over the capital. He updated his Oyster card, ignoring the warning from the machine that it had been unable to identify him correctly to enable quicker and easier payments, and jumped onto the Northern Line, towards High Barnet. The line was as busy as always but he was lucky enough to get himself a seat. He fished his MP3 player out of his pocket as the carriage doors closed, turning up the volume a little so as to drown out the noise of the Tube.

He glanced about the carriage. Most others here were doing the same as he - listening to music on their phones or other devices. Some were reading newspapers or books. One woman was knitting. Children were excitedly pointing at things and asking their parents to explain what they could see. The parents were largely ignoring them, probably tired of answering today's 399th question about how the world worked.

Dan watched the people coming and going as the train stopped at each station, keeping an eye out for that blank expressions and glazed looks in people's eyes that would hint that they were running a hacked ROM and were either listening to music, reading a message or even watching a film.

The official firmware didn't let you do anything like that, not any more. The most it provided was what could be best described as navigation and maps (known as "Navi"), via an augmented reality system that was overlaid within the user's vision. All the other features had been pulled after only a couple of years, as they resulted in far too many accidents with people being distracted. Stick to your phones, books, and media devices, HF-Tech had said. At least they were being responsible, Dan thought.

~ ~ ~

The rain appeared to be tapering off as he exited Woodside Park station. Dan hovered at the entrance of the station for a time, watching the drops continuing to fall and contemplating whether or not to walk the remaining distance to his parents' house or get on the bus. He normally walked each night, a journey of about twenty minutes on foot. He had no umbrella with him tonight, though, and knowing his luck would probably get drenched in an intense follow-up downpour, if the clouds weren't quite done ringing themselves out. After some hesitation and the certainty that the rain was thinning, he decided to risk walking it.

The rain didn't thin any further, but luckily he was spared a soaking. He felt a gentle purring in his head just as he turned up the road to his parents' house, translucent, yet readable words starting to fill his vision.

3 New Updates Available (13.04)

As much as he didn't trust HF-Tech or the government, he had to hand it to them for delivering such messages in an unobtrusive manner. It was easy to dismiss them, too - you just had to think about getting rid of them and they vanished. Few hackers had been able to replicate the functionality, and even when they did their implementations were buggy and not at all user friendly. He, Jack, Vix, and Ed had attempted to create their own messaging system for private communication, but had fallen at every hurdle. Oh well, a phone wasn't exactly a burden.

With the road ahead clear, he slowed to receive the update log. The initial message slid out of view, to be replaced by the summary. The words floated in his vision as though suspended by invisible strings in front of him.

+ Turn by turn navigation improvements (Navi)

+ Improved language support

+ Date of birth now excludes year, for non-approved requesters

+ Privacy updates

Think 'More' for detailed information. This update will be applied while you sleep.

Well, Dan thought to himself, *it would be for most people*. For him, it would sit in a staging area of his chip until he chose to apply it. That was one of the great things about *Rouge*. He thought "More". More information swam into

his vision, a near wall of text. Two lines caught his attention as he moved to dismiss it completely.

+ *Eye twitch fix (trace population)*

+ *Premature ejaculation fix (trace population)*

There was another great thing about *Rouge*. He could well have dodged one of those last two problems by not using official firmware updates. As he understood it, the update was long overdue. It would please one of his work colleagues, for sure. The poor woman sometimes looked as though she was suffering from a seizure when you were talking to her, her left eye bouncing and jumping all over the place at times.

It was clear to him as he inserted his key into the front door of the house that Dennis must have been suffering from both the eye twitch and the premature ejaculation issue. How long had it taken HF-Tech to issue a fix for that? About six months? The diligent hackers and contributors to *Rouge* tended to fix such issues within just twenty-four hours.

“Hello, dear,” Dan’s mother said to him as he walked into the lounge. She and his father were curled up together on the sofa, looking to be getting quite comfortable. His mother was running her hand gently up and down his father’s chest. Dan recognised that motion and what it implied for later. He might need his earplugs.

“Did you have a good day at work?” his mother wanted to know.

“Nothing special,” Dan shrugged. “Just dealing with calls and trying not to hang up on irate customers.”

“Daniel, when are you going to get yourself a proper job?” his father asked.

His tone wasn't condescending, but one of mild disappointment.

"When I find something that I want to get involved in," Dan said. "I've been out with Ed, Vix, Jack, and the others tonight, working on the game again."

"And how is that going?" The same tone of disappointment remained, though now coupled with scepticism.

"Fine," Dan said. "We had a design meeting tonight, to work out where we want to go from here. We're changing some of the gameplay mechanics and that. Vix is experimenting with a new art style, to widen the game's appeal. I'll show you when we've got something more concrete put together."

He was keen to move the conversation on now, in case one of the two caught him out. His parents seemed to take everything he said as read, but he knew they were no fools. A doctor and a nurse tended not to be.

"There's some cottage pie left in the oven, if you want it," his mother said. "Won't take long to warm up."

"It's okay," Dan said, "I had something earlier." He looked at the TV, seeing that the news was coming on. The lead story was, of course, the upcoming election. The next two involved the Commonwealth Games, and then there was the almost obligatory report about trouble in the Middle East. HF-Tech's chips didn't appear to have done anything to ease tensions over there. There was a good chance that they had in fact made matters worse.

His mother leaned over to his father and whispered something in his ear. Dan didn't catch it, but it caused his father to grin. Dan decided not to hang around and retreated up to his room, popping his laptop on the bed, slinging his bag into a corner, tugging off his clothes and heading for the shower, to wash away the grime of the day.

He saw his phone light up as he returned, a message from Vix.

~ *Hey, what are you doing?* Vix asked.

~ *Just got home,* Dan tapped out a reply. *Was going to just chill out here.*

You?

~ *Didn't get much painting done. Only worked for about an hour or so. I'm actually feeling a bit wired at the moment and need something else.*

~ *Maybe I can help?* Dan asked, after pausing to consider how to phrase his response.

~ *Maybe you can. Fancy a shag? :)*

Dan glanced at his watch. Quarter to ten, the Tubes would be running for hours still.

~ *Absolutely,* he replied. And what else was he going to say? Vix was cute and excitable, and both of them were young. He never ever passed up an opportunity to get with her. She had other lovers he was sure, female ones for certain, though she tended to see him more often than them. He was mostly happy with the arrangement.

~ *Good,* Vix said.

~ *Is it cool if I stay over?* he wrote back. He didn't fancy an early morning

walk of shame or coming back to the house tonight.

~ No problem.

~ Cool. I'll bring a bag.

~ I've got tea, by the way. Early morning energy for you. I might want to do it again first thing in the morning ;)

Dan heard the giggles of his mother drifting up from downstairs, over the sound of the TV. He wondered very, very briefly if his father had been afflicted by that problem that had been fixed in tonight's firmware update. It would appear so from the way his mother was acting. He decided that he would rather not be in the house tonight in that case.

~ Okay, he texted Vix back. See you in a bit.

~ ~ ~

Vix lived in a studio flat in Camden Town, not a long way for Dan to go, thankfully. She buzzed him into the building, met him at the front door and thrust herself upon him immediately, kissing him eagerly. She handed him a glass of wine which Dan sipped briefly, before Vix led him over to the bed. She pushed him down, straddling and resuming kissing him as they undressed one another. She was keen tonight, very keen. This was pure Vix, Dan knew, no chip-assistance boost needed to get her in the mood.

They lay together after they were spent, cuddling one another, Vix smiling contentedly.

“Good?” Dan asked, as he always did for reasons that continued to escape him.

“Very,” Vix grinned, taking her wine from the bedside table and sipping it. “Just what I needed.” She was gripping his still-hard member in one hand, rubbing it up and down occasionally. Dan wondered if she might leap back on him at any moment.

He looked about her studio apartment. For the most part it was tidy, although one corner was quite a mess, paint having found its way onto just about every surface. That was Vix’s painting and sculpting corner. A canvas with the beginnings of some kind of oil or watercolour sat on an easel, while a few other canvases with various fantasy-inspired works rested up against the wall. A desktop computer sat on a desk in another corner, the monitor streaming various photos and other images from Vix’s collection.

“Did you see the update?” Dan asked.

“Yes,” Vix said. “I added in the mapping and navigation stuff, but didn’t bother with the rest. You?”

“Haven’t done any of it yet. I’ll probably do the same.”

Vix rose from the bed, walking over to the window and picking up a cigarette and lighter from the window sill. She lit one of the cigarettes and pushed aside the corner of the curtain to puff the smoke out. She held the cigarette itself outside, to prevent the smoke from filling the flat. She was a light smoker, and didn’t much like the smell getting into everything.

“Do you know anything about Jack’s game?” Dan asked.

Vix shook her head. “Probably only the same as you - that it’s either a

dream recorder or some virtual world thing.”

“I’d like to get involved in that,” Dan said.

“No chance of that,” Vix said, growing serious for a moment. “He says he can handle it all on his own, but I know that that basically means he doesn’t want to have to share his fortune with anyone else, should it become popular. I like Jack, but he can be a little selfish and greedy.”

“Have you asked if he wants you to do anything for it?” Dan asked, rearranging the duvet a little, to guard against the draught feeding in through the open window.

“I offered to help model some outfits, people or monsters and stuff, for a fantasy theme, but he said no. He said he’s just going to use assets from the public domain to begin with.” Vix shrugged, as if to say, oh well.

“Shame. It could end up being really big. Even a small share in something like that could set you up for life.”

“If Jack can get around some of the inherent issues,” Vix said, tossing her cigarette out of the window and closing it so that only a small gap remained. “He’s got to figure out a way of distributing it and getting people to part with their money. If he can’t, I don’t see him being able to sell it to more than the underground hackers at the moment. You can’t load games or anything like that onto the official chips and when his project becomes more visible it will probably end up being shut down.” She wandered into her bathroom and Dan heard her sloshing mouthwash for a time, before rinsing the sink.

“Hmm,” Dan said, as she returned and slipped back under the duvet with him. He put an arm around her and she snuggled up to him. She was a nice girl and sometimes he wished she could be more to him than what they had together. The sex was great, but other than that they felt too much like friends

that kissed.

“Maybe he’ll hash out some sort of deal with HF-Tech or the government or something?” Dan suggested.

“Doubt they’ll go for it. He can’t have been the first to have tried,” Vix said. Her hand was back around his member again. “Put a lot in tonight?” she asked.

“I put nothing in tonight,” Dan said. “Nothing to do with *Rouge* at all.”

Vix grinned at that, and Dan prepared to suggest they think about making their arrangement a little more permanent.

“What’s the time?” Vix asked before he could say anything.

Dan looked at his watch. “Twenty past eleven.”

“Right.” Vix leaned over to her bedside table and clicked the little lamp off, plunging her studio flat into darkness. “Get some sleep, big boy. I need you well rested for first thing tomorrow morning.”

Chapter 3

Work the following day was uneventful. Dan made his way from Vix's flat to the office, negotiating the streams of other early morning commuters throughout the London Underground, picking up a jam scone on his way in. The journey was much easier than usual, far quicker, too. Maybe he would try and stay at Vix's place a little more often in future.

The support calls for the day were the same as always - some people wanting to cancel their internet package, others wanting to know why they weren't getting the speeds promised, some moaning about the restrictions to adult websites and wanting to opt in to the access. Only once that day was he shouted at by an irate customer. That was a first. The day would come when he made it from eight till four without being shouted at at all, he was certain.

"Looking good there, Jen," he heard as he went about his calls.

"How is it? It must be a relief," someone else asked the woman.

"It is!" Jen said. "I don't look like I'm trying to wink at someone constantly now when I'm talking to them. What's weird though is that it almost feels like something's missing. I got so used to the damn thing being there that now it feels a little odd that it's stopped. Not that I want it back! Finally going on that date tonight that I've been putting off."

Dan looked over the top of his computer monitor, to the woman standing not far away. She was in her early to mid-forties, mousey brown hair and a thin figure. She was quite attractive for an older woman, Dan thought, but he generally didn't have much to do with her. She was always chatting up men in their twenties in the pub, whenever the office went out together after work.

She had most probably been holding off on her date until her little firmware-induced condition cleared up. She looked in his direction, mouthed “Hi” and then carried on with whatever it was she did about the office.

Dan wondered about heading to the Workshop after work. The new firmware had dropped last night and so there would be some work to do around that, dissecting and disassembling the binaries, for cataloguing purposes. Some of the updates were useful to ROMs such as *Rouge*. His phone lit up and buzzed on his desk as he considered what time to head down that way. He picked it up, seeing a message from Jack.

~ Are you coming along tonight? I noticed something odd in the deployment last night. There appears to be some sort of anomaly.

The message was generic enough that Jack could be talking about any old software deployment. The four tended to keep such messages that way, just in case. Dan tapped out his reply.

~ I finish here at 4, so I was going to get there before 5. What sort of anomaly?

~ Something inconsistent in the security blob, Jack replied. I'll explain more in person.

~ ~ ~

“What have you noticed?” Dan asked Jack, dropped his bag next to his desk

and pulling out his laptop.

Jack led him over to his own machine, pointing out some of the code he had managed to extract from the firmware update. “That update is doing exactly what it says on the tin,” Jack started, demonstrating the date of birth restriction. It only returned the day and month now, holding back the year, causing some of Jack’s regression tests to fail. He was in the process of amending them to fit the current firmware version.

Jack continued, “What’s strange, though, is this ...” He tapped away at the keyboard, bringing up some more test results. Other than additional failures and a raft more data and details than might have been expected, Dan wasn’t immediately sure what he was looking at. He shrugged as Ed came over to join the two by the screen.

“I ... can’t see the problem,” Dan admitted. “You’re just dumping the test data to the screen, right?”

“No,” Jack said. “I have root access to the chip. I haven’t attempted to exploit it or escalate user-space privileges. It’s like that out of the box.”

Dan felt his jaw flap open. “It’s what?” he asked, in case he had misheard.

“HF-Tech distributed it like that last night,” Ed confirmed, indicating the screen. “We’re not doing anything special to get that.”

“Basically,” Jack said, “the firmware has been issued with full access to everything. I didn’t have to do anything special to get this - No SSH, no IP address or subnet filtering. Nothing.” He pointed at the screen. “All that test is meant to do is request all the personal information on the chip and expect a limited subset. The test is failing because *everything* is coming back.”

“Well, almost everything,” Ed amended. “The only thing its doing correctly is withholding the year in the date of birth.”

Dan saw that one of the tests was indicating that it was expecting twelve pieces of information, but was failing as it had received over one hundred and twenty. “And you’ve done nothing else?” he asked. “Didn’t accidentally run something on the firmware dump that has caused it to start acting like that?”

“I’m still trying to make absolutely sure,” Jack said. “But right now, the situation is that I can walk around all the chip’s security and know everything about anyone.”

Dan thought about it for a moment. “Bootloader?”

“Still locked,” Ed said. “There’s no redirects or anything. It’s exactly as you see there.”

Dan folded his arms. “So, looks like all our hacking and fiddling has actually paid off and ended up being useful. We should probably report this. Have you talked to anyone else about it?”

“Not yet,” Jack said. “I wanted to make sure that I’ve got this all correct before I report it. I don’t want it to actually be some sort of flaw in our own test suite.”

“How many times have you checked?” Dan asked.

“Three, so far.”

A buzzer sounded as someone opened the street level door of the warehouse, to access the lift leading down to the Workshop, a security camera tracking them. The three men confirmed that it was Vix, the pink-haired woman waving to the camera before pressing the call button to summon the lift. Jack looked back to Dan and Ed.

“I think we should all get on this tonight. This is our number one priority. Once we’re all satisfied, I’ll put a report together and send it out to HF-Tech first thing tomorrow morning.”

“Maybe we should do it sooner?” Ed suggested.

Jack waved him down. “I want to be absolutely sure of our findings and be able to document it with one hundred percent reproducible steps.”

“Have any of the other groups said anything?” Dan asked.

“I’m just about to talk about it on the IRC gold channel,” Jack said, sitting down in his chair and starting to tap away at his keyboard. “Let’s keep this away from the main channel for the moment; we should let only the trusted into this. Otherwise, we could end up being responsible for a zero-day attack.”

“Got it,” Dan said as Vix stepped out of the lift, all smiles.

“Hey, guys, what’s happening?” she asked.

“A lot,” Dan told her. “Maybe even more if we don’t get cracking on this problem.” Vix frowned, and so Dan explained the issue as he started to work on it.

~ ~ ~

The four worked late into the night, clearing down their datasets and re-dumping the latest version of HF-Tech’s firmware multiple times, gathering distributions from every corner of the globe, to find out if it was an isolated issue or if it was something that affected the whole planet. The results were the same every time, the latest software update happily handing over all the data that was requested. None of the other underground tinkering teams had discovered the flaw so far, however. At least for them, the chips and software were behaving as expected.

“Ah! I’ve got it!” Ed finally exclaimed. “It *is* something we’re doing! It’s a cumulative result of our tests. If you request all the information off the bat, it

will only return the limited subset, as expected.” He pointed to his screen, where the unaltered tests were passing and no additional personal details were being offered.

“So, only if you do X, Y, and Z will it show up?” Dan asked.

“Yes,” Ed said. “Hacking one-oh-one. Specially crafted attack vectors and all that.”

“I suppose it’s not that bad, then,” Vix said.

Ed chuckled. “Oh, but it gets much worse.” He tapped away at his keyboard, adding some new functions to the testing framework code, before running it again.

“What did you do?” Dan asked, as every test of the software returned with a red flag next to it.

“I’ve just changed our test guy’s identity,” Ed explained. “He’s no longer Mr Tommy Test, born on 1st January 2000, living in London, registered under NHS number 123456789. He’s now Tammy Quiz, born on 25th December 1990, living in Ipswich and registered to the NHS under 987654321. No, not rooted or anything,” he added, as Dan, Jack, and Vix made to ask.

“You have *write* access?” Dan’s eyes widened.

Ed nodded.

“Shit,” Dan said.

“Shit indeed,” Ed said.

“This is bad,” Jack said. “This is very, very bad. Anyone can change their identity and it won’t flag up. You can now be anyone you like.”

The four looked at each other, as if waiting for someone to disprove Ed’s finding. No one did.

“Okay, let’s check this all through again,” Jack said, starting back to his

seat. "We need to prove this with a one hundred percent success rate."

~ ~ ~

Around half eleven, Jack was convinced that they had proven the flaw in the system. He had spent a lot of time on the invite-only IRC gold channel, discussing the findings and confirming that those he was talking to were seeing the same thing.

"I know you said you wanted to do it tomorrow," Dan said, packing away his laptop and putting on his coat, "but I think we should send the report right now."

"Yes," Jack said, "it's a little more serious than I thought it was going to be."

"Let's just hope that they don't ignore it because it's been sent in anonymously," Vix commented.

For a moment, Dan considered walking up to The Shard and banging on the front door of HF-Tech's global headquarters, demanding that he speak to the CEO and chief architect immediately. Hell, it was right outside London Bridge station, where he took the Tube home from the Workshop. He dismissed the idea quickly. The consequences to the Workshop would be dire, regardless of his good intentions. He couldn't even just drop it off at the front desk. Like the systems employed by the Workshop, HF-Tech would know everything about him the moment he stepped into the lobby.

"Okay, let's see how it pans out," Dan said. "If they've not responded to it by tomorrow morning, we should probably send it in again."

~ ~ ~

Dan experienced a lot of broken sleep that night. He would wake up every couple of hours, looking to the news widget on his phone, to see if there had been any public statements issued by HF-Tech. There were none, and neither had any firmware updates arrived to his chip overnight. The most recent update was still sitting in the staging area, waiting to be applied.

He got up earlier than usual and made his way to work, closely watching everyone he passed by. He was feeling paranoid for some reason. Any of these people could now have changed their identities overnight. He forced himself to forget the whole idea as he logged onto his computer at work. No one would have found out about this yet. Most people barely knew what technology was powering their mobile phones, let alone the exploits that were possible with them. To the general public, the firmware updates to HF-Tech's chips were simply a number and a feature set; they didn't look any further into it than that.

Neither Jack, Vix or Ed had news of a reaction from HF-Tech, and so Jack had issued the report to them twice more. As the morning went on, Dan felt himself starting to relax. Clearly, the problem wasn't as bad as they thought. Identity changes were possible through ROMs such as *Rouge*, the only difference being that it would be obvious it had been done to those in the know, such as police, boarder agencies, and other government sanctioned bodies.

During a lull in the calls, Dan went to the kitchens to prepare himself a cup of tea and buy a bar of chocolate from the vending machine.

"Hello," Jen smiled at him as he walked in.

“Hi,” Dan said, before doing his best to avoid prolonged conversation with the woman. He found it impossible, however, Jen positioning herself purposely in front of the kettle, forcing him to make eye contact with her. She was wearing a mischievous smile on her face.

“Um ... sorry, Jen, but could I just get to the kettle?” Dan asked.

Jen lingered a little longer before slinking aside, though she did not take her eyes off him. “So lucky to be young and able to eat chocolate whenever you like,” she commented, as Dan keyed in the code to purchase a Kit Kat from the vending machine.

“It’s not like you’re fat, Jen,” Dan almost responded, but managed to bite his tongue in time. He presented her with a smile instead, hoping that his lack of engaging conversation might cause her to grow bored and return to work.

“Oh, and a Kit Kat,” Jen observed. “Those were once my favourite. Can only have the smaller ones, now. Then again, four fingers was always a bit much, don’t you think? Two is just right.”

Dan chuckled a little nervously. “Just an occasional treat,” he said. “How was your date?” he asked, hoping to change the subject.

“Disappointing,” Jen continued to smile. “He was good-looking, but didn’t have much up here.” She tapped her head. “I can’t imagine his chip did much for him. If it had, I dread to think what he was like before.”

“Oh well,” Dan shrugged. “Plenty of fish in the sea.”

“Might stick to some local fishing for a while,” Jen purred.

Dan saw that she had once again positioned herself in front of the kettle, not moving even as it clicked off. He wondered how long this little game might go on for. He then became aware of a small commotion out in the open plan office. Someone was talking quickly and excitedly. There was something else

in their voice, though – distress.

The mischievous look had slipped a little from Jen's face, and Dan moved from the kitchen back out into the main office space, where he could see several people crowded around one other employee's computer screen. All five men looked deeply concerned and in shock.

"What's going on?" Dan asked.

"There's been an explosion in Canary Wharf," Patrick, one of those standing, said.

"A big one?"

"A very big one," the man seated in front of the computer replied, without taking his eyes off the screen. "It's hit the main Canary Wharf building."

"One Canada Square, you mean?" Dan asked.

"The tall one, whatever; the one with the pointy top, with the blinking light on it."

Dan moved around to the computer screen, seeing a live streaming report from the BBC News website. The footage appeared to be being captured from a helicopter that was circling the area, from a distance. It was just as the worker in front of the computer had described, thick black smoke belching from the side of Canary Wharf's most iconic building, about three quarters of the way up.

Memories of September 11th formed in Dan's mind. He had been thirteen when that had happened. His afternoon classes had been interrupted by the school headmaster, who had announced that a terrorist attack had occurred in America and that he was sending everyone home for the day, in case London should be targeted next. For the next month, all Dan had seen on TV and in newspapers were the images of those two towers smoking. This looked in

every way similar.

“Do you think a plane hit it?” Dan asked.

“Don’t know,” the group answered. It sounded more like they were actually very certain of it, but simply didn’t want to admit it.

Dan left the five men to it, returning to his desk and accessing the BBC News site himself. His call board was lit up with customers waiting to have their problems dealt with, but he chose to completely ignore them for now. There was little information available via the BBC, the incident having only just occurred in the past ten minutes or so. Other than the video, there was only a paragraph of text about what had happened. It speculated at nothing and simply said that more information would be made available soon.

With his place of work having blocked access to social networks and most other non-work related sites, Dan picked up his phone to see what the buzz was on Twitter. The feed refused to load, even after several refresh attempts. Facebook, WhatsApp, and others were suffering similar errors. It was only after sometime that Dan noticed that he had no internet connection on his phone. He tapped out a text to Jack, Vix, and Ed, only for the phone to tell him that there was no service. His phone was completely dead. He stared at it for a moment, turning it off and on, but still he saw the ‘No Service’ message.

“Hey, has anyone got a phone signal?” he heard someone call across the office, just as he made to do so himself. Answers of *no* came back from all those in the immediate area, some picking up their phones and walking around with them, to try to locate an area with better reception. It proved worthless.

“They’ve shut down the phone networks,” Dan said, as he made eye contact with Jen, and another woman named Claudia.

“Who have? The terrorists?” Jen sounded scared.

“No, the government,” Dan shook his head. “It’s something they can do when stuff like this happens.”

“What?” several people asked, all staring at him, quite incredulous.

“They can do that? Why?” Charlie Young, his line manager, asked.

“To stop terrorists from communicating with one another, and to prevent them from remotely detonating bombs and that,” Dan said. “They did it during July 7th. Everyone said that the phone networks were overloaded, but they had actually been shut down on purpose.”

His colleagues exchanges disquieted looks, seemingly unsure whether or not to believe him. Dan was about to add something else, when he saw people suddenly becoming distracted, focusing on something directly in front of them. He knew that somewhat zombified look. It meant that a chip message had just come in, filling people’s vision, and causing them to stop what they were doing and take note. He felt the soft purring himself a few seconds later, and the words and letters swam into view.

Emergency Broadcast System

We are currently investigating an incident in East London. More information will be made available soon. Keep calm and carry on.

As if he was going to do any work now. Dan looked to the call board, seeing that a number of the callers had dropped off.

“What do we do, Charlie?” Claudia asked.

“Do as the message said and carry on,” Charlie answered her. “I will go and talk to Mike and see what he says.”

“Are they going to send us home?” Claudia again wanted to know.

“I’ll find out,” Charlie repeated, standing up and making his way over to the manager’s office. “Please could everyone get back to answering calls. We still have a business to support. I will be back shortly. Come on people, this needs to be done. We’ve got lots of people waiting,” he added as staff dithered, indicating a counter on a wall that displayed the total number of calls waiting to be handled.

The workers did so, somewhat reluctantly returning to their desks and carrying on with their tasks. Dan closed the BBC News website for the moment, putting his headset back on and answering the next call in the queue.

“Hello, you’re through to Daniel Blair, how can I help you?”

“Yes, look,” the angry-sounding man on the other end said, launching immediately into a tirade that had likely been building for several minutes. “I called you last week about my mobile and that my service was patchy. My phone keeps dropping calls and it’s causing my business to suffer. I rely on it for work and it’s no good if I can’t call my bloody customers. Now the damn thing has stopped working altogether and the SIM won’t even work in my backup handset. I’m now at home and am having to use my landline, which is not exactly useful for someone who has to be out in a van all day. I don’t suppose you’ve got an excuse this time for why that might be?”

Dan glanced to Claudia and Jen, who were wandering back and forth across the floor, attempting to get a reception, pawing and tapping at the screens of their phones as they fiddling with settings. “You’re at home?” Dan asked the caller.

“Yes, I just said so,” the man snarled. “Why?”

“You might want to turn on a TV ...”

~ ~ ~

Charlie returned an hour later, telling the floor that Mike was working with his seniors, and getting advice from the police and local authorities. Just after lunch - in which Dan made a very rare visit to the firm's canteen, rather than leave the building - Charlie told the staff that they were being sent home for the day. They could pick things up again tomorrow morning, so long as nothing else went wrong.

Dan discovered as he left the office that most of the rest of London had been given similar instructions. He was reminded of July 7th, when the Underground had been attacked. The Tube lines had been shut back then, forcing people to make their way home by alternative means, such as getting taxis, buses, walking or even taking boats along the Thames. His phone still wasn't working by the time he reached Charing Cross station and neither, it seemed, was anyone else's.

The station was clogged full of people trying to get onto trains. If there was to be another attack, surely places as packed as this would be prime targets. He fought his way through the crowds, making for the entrance to the Tube station itself, a member of staff stepping in his way as he attempted to get through the gate.

“Sorry, sir, you can't go this way,” the man said.

“I just want to get on the Tube,” Dan protested.

“Tube's closed. Tube's closed, everyone!” the man shouted to a large group that was approaching. “It's been shut as a safety precaution. Your Oyster

cards and tickets will be accepted on local buses.”

“But I live in Woodside Park,” Dan said. “That’s miles from here.”

“Sorry,” the Underground worker shook his head. “Nothing I can do, I’m afraid. Try a bus. You should be able to use your Navi to help you get where you want to go. Those are still working.”

Dan knew there was no point in arguing and started out of the station, finding a safe place to stand while he pulled up HF-Tech’s navigation service. He thought about where he was and where he wanted to go, selecting the ‘Local Transport’ option. The words and images hovered before his eyes, Dan dismissing the Tube options and selecting buses. There was only one route to chose from, and so Navi began leading him to the bus stop he needed.

He saw even before he arrived that the stop was swamped with waiting passengers. He had a feeling he wouldn’t be getting on the first bus. Regardless, he waited.

After close to twenty minutes, the bus managed to crawl its way through the gridlocked London traffic. It was so packed that it did not even stop to pick up any more passengers, those inside pressed firmly up against the doors. When a second bus came by that was equally as full, Dan returned to his Navi and opted to walk.

~ ~ ~

After over two and a half hours of walking, he succeeded in getting on a bus for the final ten minutes of his journey. He was grateful for the chance to sit down, even for that short period of time. The bus pulled up a short way down from his parents’ house and he walked up to the front door, shoving the key in

the lock and deciding that he would be spending the rest of the day flopped out on the couch.

The door was flung open as he started to turn the key, causing it to snap off in the lock, and Dan was greeted by the anxious look on his mother's face.

"Daniel!" she cried, looking as though she was about to burst into tears.

"Mum, you've just snapped the key," he started to say, before she flung her arms around him and hugged him tightly to her.

"I was so scared," she said, ignoring him. "We've not been able to call you, and I didn't know where you were. I tried the offices, but no one was answering. I thought something had happened to you."

Dan spied his father coming out of the living room, looking quite serious. "Are you okay, Daniel?" he asked.

"I'm okay, Dad," Dan said. "Just had to walk from work. Took about three hours." He broke his mother's embrace and went into the living room, taking off his shoes and hurling them into a corner, his feet giving a sigh of relief.

The TV was on, switched to BBC News 24. It was still streaming footage from Canary Wharf, taken at various angles. One Canada Square was a mess. Most of the top quarter was missing, apparently having collapsed in on itself and fallen down. It must have done so as he was walking home. Whatever had caused the explosion, it must have been big.

"It was a plane," Dan's father told him, as Dan stared at the screen.

"Really?" Dan asked. His father nodded solemnly. "How big?"

"One of the business aircraft. They think whomever did it took it from London City Airport and flew it straight into Canary Wharf tower. They still don't know if there were any passengers on board. Lucky it wasn't an Airbus. That would have probably taken the whole tower down in one go."

A banner at the bottom of the news report cycled to say that a number of terrorist organisations were claiming responsibility. They would all be doing that, Dan thought. They would all be clamouring to be the ones to have carried out one of the most serious terror assaults England had ever seen.

“They’ve hit the phone networks, too,” Dan’s father added.

Dan corrected him on that point, telling him what he had told his work colleagues, and that the services would be restored later on, as soon as those in charge had determined the cause of the attack and decided it was now safe to do so.

“You’re both okay?” he asked his parents.

“Fine, fine,” his father said, looking to Dan’s mother, who still appeared a little shaken. Recovering, though.

“Are you here for dinner, tonight?” his mother asked.

“Yes, don’t worry,” Dan said. “I won’t be going anywhere.”

~ ~ ~

The internet was incredibly slow that evening for some reason, throttled down to near dial-up speeds. Dan wondered whether that was on purpose or if their service provider was simply overloaded. He caught up with all those he cared about, sending them short emails along the lines of, “Are you okay?”. The answers all came back as “Yes, you?”.

His mobile phone’s service restored around eight o’clock in the evening and Dan moved from sending emails to exchanging text messages with Jack, Ed, and Vix. He remained in the living room with his parents for most of the rest of the day, the TV remaining fixed on News 24, until Dan’s mother

decided she wanted to catch up with *Eastenders*.

~ *Everyone says it's Al Qaeda, Dan texted Jack.*

~ *It could be, Jack answered. But I don't think that they're the ones that we should be focusing on.*

~ *What do you mean?*

~ *Well, no one's ever been able to carry out any terror attacks in the US or Europe very easily, because of the improvements in security, thanks to the chips. At least until recently, he added, as Dan started to tap out another response.*

Dan paused before replying, his thoughts aligning with Jack's.

~ *Which means that there is only one organisation we should be blaming,*

Dan wrote.

~ *Exactly. HF-Tech.*

About the Author

Stephen J Sweeney was born in Brighton, UK, in 1977. FIRMWARE is his six full-length novel. He attended Worth School in West Sussex between the ages of ten and eighteen, after which he went on to study environmental biology at Oxford Brookes University. Somehow, he ended up working in IT in London (although he's worse than useless if you ask him to help fix your computer). You can find him online in various different places -

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