

## Heartbreak in Cyberspace

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Waves of electric blue cascaded over Myunghee Min's eyes. A prodigy of mathematical ciphers, he was doing what he does best, hacking the net. In meatspace, an observer would see a Korean in his mid 20s, dressed in a long violet coat, with glazed eyes. But in cyberspace, Myunghee was Cryptomancer, a hacker without equal. Here in cyberspace, Cryptomancer saw networks of information as they truly are.

Psion, the digital processor implanted behind his ear, was screaming data directly into his brain. Underneath the scream of data, psion was whispering a lead on a new hack, mined from that data. *Something's hot*, Cryptomancer thought. *Someone out there has hacked a big net, and it wasn't me.* His blood began to boil with indignation.

On the netgraph, the CyberStar was hot. Avatars were logging into this net so fast that it was loaded to capacity. But he probed another terminal that wasn't on the netgraph yet. Pleased at his discovery, he spawned an avatar.

The latest news on CyberStar's blog streamed in:

3 April 2050

The first songlist by young Brazilian popstar, Sinner, has just gone platinum. Overnight, it is now the #1 list on the net. Her touching songs, such as 'Heartbreak,' are breaking the hearts of the world, and no doubt breaking the bank account of her publisher.

Not convinced by the media hype, Cryptomancer hacked the CyberStar log files. It was true. Her songlist was being downloaded faster than any list in history.

*Too fast*, Cryptomancer thought, *Sinner, how did you rise to stardom overnight?*

He decided to find out. Within a few seconds he had access to all her assets.

Every song. Every video. He had to admit, despite her sugary pop, she was a world class a performer.

Username: Sinner

Birthname: Sheeva de Santana; Birthday: 3 February 2032.

An archived video from 2040 displayed her dancing on the beach of Rio de Janeiro. Even then she was quite a dancer. But her figure was different. Apparently, in the last decade, she had an aesthetic mod: a total makeover. All next generation musicians did; they had to, just to keep up. As any publisher knew, it wasn't just music they were selling. It was image.

A videostream displayed her in concert, live. Barely 18, Sinner was a goddess onstage. Her pink hair and eyes pierced through the camera and into Cryptomancer's heart. Her legs seemed to fly through the air as she danced a blend of Brazilian capoeira and American contact. All the while, she sang lyrics of love and loss.

Like billions of others in the virtual audience, Cryptomancer admired her fluidity, her form. But foremost, Cryptomancer envied her cybernetics. Not only was she singing, but she was conducting the implant in her brain, a prima donna sound studio, to synthesize music. She had the power of a recording studio, all in a tight little package.

Every client on the net was saturated with her image and song.

*Good song*, Cryptomancer thought, *but no song is that good*. Cryptomancer knew the odds of instant stardom. She couldn't have made fame overnight--unless she had hacked the CyberStar server.

Determined to discover the secret of Sinner's success, he intruded into her private files. It found archives of her security cam:

In a corridor of the DNA Lounge in San Francisco, Sinner was wrapped in a steamy affair with a muscled American. His bulky muscles and cybernetics gave him away: Obviously he was a security guard.

*Wait a sec*, Cryptomancer thought, *An affair with a security guard? The only difference between a security guard and a hacker is which side of the contract you're on*.

Intrigued, Cryptomancer intruded into the employee records on her guard. The data spit out:

Username: Bouncer

Birthname: Jack Daniels; Birthday: 16 May 2016.

A videostream showed him in action: A punk at the nightclub was making a dash for the stage where Sinner was dancing. But Bouncer's fist intercepted him. Lightning sparked from his precise punch.

Cryptomancer thought, *One less punk to worry about*.

Bouncer stood up. He was tall, muscled, and blonde--the prototypical American security guard.

Cryptomancer launched a worm to dig deeper into his background. Apparently Bouncer had been captured in China, so Cryptomancer hacked into the Chinese military POW server.

Just then immunix (his immune system's cybernetic operating system) went offline. *Crippled again?* he thought. *I just reinstalled the software. Always another bug. Oh well, it's not like I'm coding genoware right now.*

Although most hackers in 2050 connected their nervous systems directly to the net, Cryptomancer also connected his immune system. The brain might be the most glamorous organ in the body, but it isn't the only intelligent system. The immune system routinely recognizes advanced patterns and learns from its mistakes. This processing power boost gave him an edge that teams of unwired programmers couldn't match.

Judging by the heat Cryptomancer felt, his immune system was hard at work on the problem at hand. So he offloaded some of his processing directly to his genes. *Risky,* Cryptomancer thought. *But DNA is nanotech, so why not harness it to solve problems in cyberspace?*

Problems like tracking down the source of Sinner's instant popularity. Cryptomancer returned his attention to the dossier on Bouncer, and nodded, *Just as I thought.*

The data stream summarized: Ex-military; Cyberskeleton: Gladiator frame. A rotating cross-section of Bouncer's muscled body revealed most of his bones were

reinforced by carbon and polymers. His right fist was juiced with capacitors capable of bursts of gigawatts.

*A shock fist enhancement, Cryptomancer thought, But why his right? Usually it's the left.*

He cloned his worm and saw why: A military-grade weapon had been installed in Bouncer's left arm. His bone had been sculpted and most of his forearm muscle mass had been replaced by a long cylindrical gun. *Erdos almighty!* Cryptomancer thought, *Bouncer has a forearm cannon?*

Then something went wrong. Deep inside the Chinese military server, Cryptomancer felt sick. Deathly ill. His view of the data was being obscured by assembly instructions for a meatspace virus.

*Lunch gone wrong?* Cryptomancer thought, *Is a new flu hacking my cells?* He disengaged psion, rebooted immunix, and then engaged his antigen A.I.

Intrusion countermeasure bionics flooded his bloodstream. These nanites sought out the foreign machines that were being generated inside of him. They latched onto the virus and identified it: Ebola Berkeley. *A new strain,* Cryptomancer thought, *yet no problem; the antigens can take care of that.*

But on contact, the antigens decomposed. A fullerene lattice had countered them. This nanotech sheath of interlocking molecules prevented the antigens from attaching to the virus.

In Chinese, a chatstream whispered into his ear, "Feeling alright, honey?"

As the dazzling lights of cyberspace spun out of control, Cryptomancer thought, *Oh sweet mother of Erdos.*

The voice replied, “You always were a romantic.” It was joined by a videostream from an adjacent client. The face of Xing Xu, China’s top bioengineer, appeared.

Cryptomancer replied, “Xing, you hacked me!” He couldn’t believe it. The same woman who had nursed him back to health after the motorcycle accident. Having shattered his spine, she had replaced it with a neuroprosthesis, and installed psion to replace the damaged portions of his brain.

She smiled coyly, “All’s fair in love and cyberspace.”

Xing Xu, better known as Bioengineer in cyberspace, had hacked Cryptomancer. Now he was at *her* mercy.

She forced Cryptomancer to log out of the Chinese military server and log into a game terminal. To keep him out, she had Cryptomancer throw up a firewall.

“Leave the military server to me,” she said. “I believe you were looking for *this*.”

She linked Cryptomancer back to Sinner.

Through a videostream, Cryptomancer witnessed Sinner’s concert. Between verses, Sinner smiled into the camera. He struggled to avoid her distracting beauty.

In the videostream, he began to notice a pattern. Underneath her innocent eyes, Sinner’s cybernetic implant was doing much more than composing music in real-time. Her prima donna software was blitzing the media, denying service to all other popstars.

*No wonder Sinner’s song was an instant success, Cryptomancer thought. She hacked the CyberStar server!*

Bioengineer whispered into his ear, “Sweetheart, I’m glad we can finally agree on something. Up for action?”

Cryptomancer cracked his polymer neck and deployed encrypted software. Nothing made him feel more righteous than to hack another hacker. He completed a link, loaded his intrusion software, and said to Bioengineer, “We’ll see how she performs under pressure.”

Onstage at the CyberStar concert, Sinner’s heart skipped a beat. An avatar of Cryptomancer had just connected. Sinner thought, *Cryptomancer, the world’s greatest hacker, here? Upstaging my show?*

Cryptomancer had intruded. But Sinner was quick on her feet, and on her hands. Without missing a beat of her song, she planted her hands and fended him off his avatar with her legs. They swiped the air, nearly kicking his pretty face.

Billions of captivated fans across the globe were stunned by this sudden twist in her act. They cheered her on, and her ratings rose even higher.

Cryptomancer shook his head, “Not everything is as it seems, Sinner.” As he thrust his arm forward, a brilliant blue halo of cryptograms appeared. This geometrically precise pattern of information streamed into Sinner’s ears.

Cryptomancer said, “Nice smile. But you forgot about my encrypted malware.”

Sinner’s body convulsed, and billions of virtual onlookers convulsed with her. Although she had been hacked, she hadn’t lost her sense of humor, “What’dya want, cripple-mancer?”

Cryptomancer winced, and twisted his arm, which caused the myofibrils in her muscles to spasm. “Oh, I just wanted to know how you hacked CyberStar. But while I have your attention, why don’t you do me a favor, okay?”

Sinner licked her teeth and clenched her fists, “Like I have a choice.”

Having been hacked, Sinner had no choice but to do as he programmed.

Cryptomancer smirked, “First, let’s logout of this server. And then let’s remove your links to the other nets. There. Much better.”

The concert went offline. Billions of netsurfers blinked. They silently blamed their cyberspace service providers, and then all of them randomly searched for the next big distraction on the net.

All of them, except Bouncer. He established a chatstream directly to Sinner and shouted, “Babe! What’s wrong?”

Sinner shared her videostream, and said through gritted teeth, “Got an unexpected fan.”

Bouncer slapped his forearm, with a resounding click, “On my way.”

She smiled, “You’re so cute when you’re mad.”

Bouncer took advantage of the ports that Cryptomancer had opened. He linked and then logged in to a client one hop from the CyberStar server.

Cryptomancer was on the server, deploying encrypted software as quick as he could load it.

*You jealous cypherpunk, Bouncer thought. When I’m done with you, they’re gonna have to decrypt your face.* Bouncer used his security clearance to convert the stage into a security checkpoint.

In the middle of his network topology analysis, Cryptomancer was taken by surprise. Having caught his attention, Bouncer spoke up: “Hey, bub. Got clearance?”

Cryptomancer had just enough time to say, “Uh oh.”

Panels on Bouncer's right arm slid away and peeled back, revealing the shining barrel of a forearm cannon. The room lit up in orange-red flames as Bouncer unloaded the cannon into Cryptomancer's face.

But nothing happened. The data-destructive bullets went straight through his petite jaw without even a flinch. Cryptomancer had just executed the access denial software that he had secretly deployed. "Hey, *dude*," he added for sardonic emphasis, "Got access?"

Bouncer paused, and then he jabbed. "Access, this!"

Cryptomancer was stunned by how fast the fist came at him. Although he had read the dossier, he forgot that Bouncer's muscles had been subjected to hypertrophic surgery. Cryptomancer only saw the blur of Bouncer's bloodied fist as it was retracted from his precious nose.

*Blast! Hacked again.*

"You betcha," Bouncer said, "And I'm logging your cyberpunk-ass out." Streams of digital light flew by as Cryptomancer was ejected from the server and into a terminal on the same net. "And since you're so hungry for nets, why don't you have your own." He probed a client, and then remapped the network topology to isolate Cryptomancer on a lonely net.

Cryptomancer's heart sank, "There's no server here."

Bouncer smiled, "That's the point."

The voice of Bioengineer whispered into Cryptomancer's ear, "We haven't lost just yet."

Cryptomancer said, "I've got no server."

Bioengineer's face appeared in videostream, "But I do. And I've got a little something to get under his skin." She winked, and held up a vial. The vial was glowing with yellow-green genograms, which meant that the contents of the vial could hack the operating software of a cybernetic immune system.

On Cryptomancer's netgraph of cyberspace he could see that Bioengineer was spawning onto another client in China's military net. From there, she logged into CyberStar, beside Bouncer.

She said, "Hey, tough guy," and held up her gloved hand.

Yellow-green genograms oozed from her nanoglove. The artifex nanoglove, her glove, was the best that engineering could create. In the right hands, it was capable of manipulating molecules, constructing nanites, or even hacking the molecules of a user connected to cyberspace. Now, she was about to trigger an ancient virus that has lain dormant in Bouncer's genome.

At the touch of her glove, genograms fused into Bouncer's skin. The yellow-green double helices bored into his skin. Deep within the cells of his body they began to take effect. His DNA, the molecular code that programs all living creatures on earth, had just ordered an ancient bit of legacy code to execute--code that hadn't been used in 10,000 years. This was a human endogenous retrovirus. It hadn't been pathogenic in millennia, but with the right bioware to activate the code, it had the potential to become lethal. Like now.

Bouncer doubled over. His gladiator frame crippled, he was unable to stand. He was in shock. This was the same bioengineer who had installed this cyberskeleton after

the tank explosion in the Chinese-American war. Back in 2042, she had made him. And now, she had crippled him. “Dr. Xu. But how could you?”

“You better sit this one out.” She shook her finger for effect, “Doctor’s orders.”

Constructing that retrovirus had drained most of Bioengineer’s energy. Through her bespoke monocle, she stared into her library of genetic designs. From this ocular disc, a head’s up display reflected an entire medical library onto her cornea.

*Just the thing*, she thought. *Bioremediation*. That cleared her bioware. Wiping the sweat from her brow, she recycled the retrovirus.

On his knees, Bouncer pleaded, “Not again, lady.”

She activated a second retrovirus to cripple his subdermal stimpack, too. As they both knew, with his gladiator frame offline and his stimpack offline, he was like a tank with no guns and no treads. As the stream of stimulants and pain-killers trickled off, his muscles slackened.

*Damn*, Bouncer thought. *No more juice*.

“Now, Mr. Daniels,” she said while holding up a syringe filled with Ebola Berkeley. “We wouldn’t want you to overexert yourself.”

Into his chatstream he whispered, “Sinner, Babe. I need you.”

That was the last chatstream Bouncer sent before he was hacked. Dominated by Bioengineer, Bouncer did as he was programmed: He logged out and set up a firewall. That simultaneously cut his connection to Bioengineer and deleted his link to Sinner.

“No worries, doll,” Sinner replied, “You sit tight, and leave the legwork to me.” She linked to China’s milnet and logged in beside Bioengineer.

Bioengineer's brow was covered in sweat. It had taken all her energy to bring Bouncer to his knees. Breathing heavily she turned to Sinner.

She turned just in time to see Sinner's pink boot slip under her own white dress. Sinner ducked and pulled, executing a flawless negativa. The next thing Bioengineer saw was the white light of cyberspace. Rendered helpless by Sinner's hack, she couldn't act; she couldn't program, except by Sinner's will.

“Work, work, work. Bio'neer. All you do is work. Time for a vacation.” She logged Bioengineer out of the server and into a terminal on China's space lab, far, far away.

Looking around at the military net's sterile environment, Sinner shook her head, “This milnet is so drab. I know just the thing.” She logged into the server and began to reprogram its command and control communications. Instead of military orders, instead of sitrep reports, and instead of medevac requests, the entire military network of China was now broadcasting a single song, the number one song in cyberspace, “Heartbreak.”

Each in their own isolated client, Bioengineer and Cryptomancer squeezed their eyes shut. They tried to disable their audio input.

Back on CyberStar's server, Bouncer rebooted and dusted himself off. An urgently marked bank statement brought a smile to his face.

He spawned next to Sinner, and squeezed her close, “Sinner, you did it!”

“We did it, doll.” She kissed him on the neck and said, “Couldn't have hacked CyberStar without you shutting down their security system.”

As the digits of the bank statement were streaming in, Bouncer couldn't believe the success: fame and fortune. His face close to hers, a grin came over him. "I'm going to have to upgrade my account," he said, "and raise my fee."