

Redox Presents

The Adventures of Captain Redox and The Social Defenders of Health

Part 1: Isolation in the towers. Trouble in the streets.

Narrator: A world in disarray. Old, monolithic applications have rendered health systems into a mesh of different competing standards. Confusion and chaos has led to limited communication between providers across health systems and their vendors.

Location: THREE HIGH AND STUFFY HEALTH SYSTEM TOWERS

EHRic from Tower 1: If I stay closed off from the others, at least I'll have a better chance of serving my patients.

EHRic from Tower 2: They just think I'm going to change up *my* communication methods for *them*? Fat chance. I've been at this game for 40 years and I've served my community well enough.

EHRic from Tower 3: Why should I have to change? Just because they made up some new rules and definitions? And what's with these young people...what do they call them...AP...APIs? Bah just lame marketing! Over here we need function. And those damn APIs won't have what it takes.

Narrator: Communication between health systems could lead to greater collaboration and essentially transform the underlying foundation of healthcare itself. But unfortunately those are just the dreams of...

Information for Public Access: It's not the EHRic's fault that they've become such isolated systems! Over time, healthcare systems have stacked on tool on top of tool each with it's own set of servers and databases and, ultimately, data formats. This has resulted in a siloed health system where different monolithic applications and inconsistent data models in different locations have no chance at communicating amongst one another.

Location: ON THE STREETS BELOW

The Commissioner is speaking to the anxious crowd of patients before her.

Commissioner: We have taken your concerns into account and are working on a solution-

Person 1: How much longer can we wait!!

Person 2 (pointing to the towers): They don't care about us! They don't care about our journey.

Person 3: The more of us there are, the less likely their own Monolithic tools work! Their applications are old and stodgy. We need to change!

Commissioner: Please! Stop! Let me address these issues. There is nothing more that these Health Systems want to do than help you! Unfortunately their tools were not designed to work the way modern programmable applications work today. To work on an individual and personal level is my dream but we just aren't there yet!

Information for Public Access: As the population continues to increase, the bandwidth for health applications will need to increase concurrently. Timeout errors and issues await tools that are don't have the capacity to scale out resources as more are needed. Numerous data formats from legacy systems across the entire care continuum has resulted in massive data sets full of extremely complex data. Getting insights from this data will require large amounts of compute storage.

Location: A BAR

We see two monolithic applications sipping on whiskey.

Monolith 1: Are you worried about the new generation?

Monolith 2: Ha...and keep up with the data streams, different communication methods, *and* provider workflows?

He leans back in his chair and takes a sip.

Monolith 2: I ain't worried at all.

Location: BACK TO STREETS

Person 3: So then what are you going to do about it!

Commissioner: We've already given them deadlines to make the changes needed or else...

Person 2: Or else what?

Commissioner: Or else...

The commissioner's Assistant comes to the stage and whispers something in her ear.

Commissioner: I apologize but that is all the time I have for today.

She exits as protests erupt from the crowd.

Information for Public Access: The 21st Century Cures Act put forth by the ONC has set up dates and timelines for when health systems need to enact patient-centric solutions. Because many of these rules are ambiguous, regulatory bodies are essentially relying on the market to adapt to the new rules in order to create the products needed to fulfill their standards. Innovating quickly and often through the technology will be a challenge but will also be a driving factor for the future of healthcare.

Location: BEHIND THE PODIUM

Commissioner: Thanks for getting me out of there.

Captain Redox: Oh that? That ain't changing anytime soon.

The commissioner turns to see a superhero wearing formfitting spandex and cape. Across his waist is a belt buckle with a reactor in the center.

Commissioner: Who are you supposed to be?

Captain Redox: They call me "CaptainRedox". But you can just call me the Translator.

He taps on his belt buckle.

Commissioner: And what do you want from me?

Captain Redox: They say you got connects to the top Health System Towers. You get us in with them and we'll transform your whole world.

Commissioner: Thanks but we already have applications that we have trusted for 40 years. I'd suggest that you-

Captain Redox: Come on out guys!

Two other hero's step out:

EC2Guy - Like the Flash, EC2Guy is a skinnier superhero that is constantly vibrating imperceptibly. He works data in real time.

Lambda Woman - Similar to Wonder Woman but she has powers that manifest themselves similar to Thor and can shoot bolts from her fingers. Unlimited bolts of code that is.

Captain Redox: We are...the Social Defenders of Health!!

Commissioner: I'm sorry but you all need to leave.

Lambda Woman: And not know anything about us? As you can see we aren't exactly like your old monoliths sipping their old whiskey and acquiring more and more services on top of old ones.

Captain Redox: Yet we all work together as a decoupled microservice architecture. All the better for when processing needs to be scalable to match the population.

EC2Guy: And if you're going to go into an event-driven situation, you're gonna need us. Those old guys can't exactly stop at a moment's notice and pick up right in the middle of a data stream.

Commissioner: I'd say you still have another problem on your hands.

Lambda Woman: And what's that?

Commissioner: These systems. They can't communicate with each other. After all these years you think they'll change?

Captain Redox points to the reactor at the center of his belt.

Commissioner: What-what is that?

Captain Redox: It's an MLLP adapter. It allows me to speak the languages of the ancients like HL7v2, CDA, and XML.

Information for Public Access: Legacy health applications where never designed to communicate across different systems. However, the advent of RESTful APIs has opened the door to healthcare's programmable future. The only problem: different data formats across different information systems that can't be programmed against. What is one way to take away that barrier? Using Captain Redox's belt reactor to transmit messages from EHRs over a TCP/IP using the Minimal Lower Layer Protocol (MLLP) through cloud VPN containers.

Captain Redox (cont.): You could say once I'm in the Coordination Zone's EC2 instance, a version of me is there forever.

Commissioner: Coordination Zone?

Lambda Woman: Our home high up in the cloud that gives us the ability to scale our powers according to what you need and a level of security through HIPAA, HITRUST, and SOC that would frankly embarrass your average monolithic application.

Commissioner: I can see you all have thought your pitch through quite a bit. But why all this effort? What are you trying to achieve?

Captain Redox: I've seen the damage the old system has done. Seen what's it's done to entire populations with my own eyes. We believe that if health systems can collaborate with each other, then they can make the best decisions for the patient. None of us have the bandwidth to handle it alone but...

He pauses for a moment...

He looks up into the commissioner's eyes: Together, we can create a new kind of world where the patient care journey is personalized. From intake and monitoring to prescribing and treating, we have the tools and powers to streamline the entire process. I know it won't be easy to achieve it but it's something that's worth fighting for.

The commissioner looks at him for a long moment.

EC2Guy: Do you think it's worth fighting for?

The commissioner nods solemnly.

Commissioner: Just know there won't be much room for error.

Lambda Woman: It's our time.

Together with the Commissioner, the hero's put their arms together and teleport to the Coordination Zone.

Narrator: With the Social Defenders of Health and their component capabilities, the commissioner is on a mission to create a new world for her people. Will they all succeed? Stay tuned to find out as we enter...the Coordination Zone.

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Part 2: Transformation at the Coordination Zone

Location: HIGH UP IN THE CLOUD AND OUTSIDE THE COORDINATION ZONE

Commissioner: I'm happy you've agreed to trying something new.

We can see the top of EHRic 1's tower a little bit below us.

EHRic from Tower 1: I was built on steady ground so this is a bit of a change but if everything you are saying is true, then this could be...*groundbreaking*. But I'm warning you...my patients are priority number one and data comes in quickly and needs to be kept in order. So if they can't keep up, I'm going to shut him out.

Commissioner: I completely understand.

The two look at the cloud before them.

Captain Redox flies into view.

Commissioner (looks to EHRic): Are you ready?

EHRic looks back at the Commissioner. He's a bit unsure.

The clouds part and we can see a huge Data Lake and multiple Event Buses.

Just before EHRic can step forward, the tower below begins to rumble.

EHRic: I can feel something coming on.

He opens his mouth and shoots a steady stream of HL7v2 data right at Captain Redox.

Captain Redox turns on his VPN MLLP belt and absorbs the HL7v2 data, turning it into a newly translated JSON FHIR R4 resource. He pushes the new data into the cloud towards a waiting Event Bus that drives off towards the Data Lake.

EHRic closes his mouth.

Captain Redox smirks.

Captain Redox: All in good timing

The two smile at each other. All is still but then...the ground beneath rumbles again.

It really starts to shake this time. A true earthquake.

EHRic opens his mouth and BLASTS Captain Redox with an exponentially greater amount of HL7v2 data.

Captain Redox: It...just...keeps...coming...

Commissioner (yelling over the quake): You better keep taking it as it comes in. The order of data matters - patient discharge data will include admission data as well!

Captain Redox: No problem there!

Location: COORDINATION ZONE

EC2Guy is taking each event as it comes in and incorporating it into the Data Lake.

Information for Public Access: Health system data doesn't always come out in a steady stream. Sometimes a burst of data will inundate the application. These events, however, must be consumed in pseudo real time. This FIFO (First In First Out) ordering of data requires a parallel processing model that avoids a backlog of upstream events that need to be processed by the application. In this case, EC2Guy uses Kafka to receive many terabytes worth of events and persist them as quickly as possible.

Location: COORDINATION ZONE HEALTHLAKE

Narrator: The Coordination Zone wasn't just a place. It was another core member of the Social Defenders of Health.

We see queue managers of the Coordination Zone place stacks of the translated JSON Code from the Event Buses into LARGE CYLINDRICAL S3 BUCKETS.

Information for Public Access: Think of an S3 bucket in the Coordination Zone as an automatically scalable object storage warehouse from which an application can begin running AI/ML models for insights and power scalable, cloud-native applications.

Those buckets are taken to Lambda Woman. She waves her hands like Thor and code shoots out that triggers multiple Coordination Zone Lambda functions.

Information for Public Access: Lambda Woman has some of the most powerful cloud functionalities to ever exist. Her serverless compute capacity can run across multiple Availability Zones, automatically scales to fit application needs, and can communicate with other microservices through event-driven functions.

Narrator: As each container in the queue was processed through the Lambda Woman's serverless computing functionality, something miraculous started to take place.

Location: OUTSIDE COORDINATION ZONE

EHRic: It's happening!

Narrator: It wasn't long until major changes took place across the world connected to EHRic from Tower 1.

Location: HOSPITAL CLINIC 1

A doctor at one location looks down at his application. Health data about a patient from another location is showing up. She writes down some information and plugs it back into the application.

Location: HOSPITAL CLINIC 2

A doctor from another hospital clinic sees the new data from Hospital Clinic 2. He walks over to his patient and speaks to her.

Location: OUTSIDE THE COORDINATION ZONE

The other Health System EHRic's show come outside of their towers and look up into the cloud where they can see everything going on.

EHRic 3: You can see how it only operates according to how much EHRic 1 is giving Captain Redox!

EHRic 4: It's as if no computing power is wasted!

EHRic 2: And it was all automated right from the beginning with the Coordination Zone!

Narrator: And just like that a new era in digital healthcare was beginning to take shape. While unique challenges may pose as obstacles to a unified application ecosystem across the industry tomorrow, today our friends EHRic, The Commissioner, and the Social Defenders of Health have embarked on a new, digitally transformed mission.
