DISCUSSION

Highlights from Advancing the Business of Health with Blockchain and Frontier Tech at Conv2x Symposium 2023

Tory Cenaj
Founder, Publisher, and Curator of BHTY and ConV2X, Stamford, Connecticut, USA

*Corresponding Author: Tory Cenaj, Email: t.cenaj@partnersindigitalhealth.com

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Abstract

Why are so many in healthcare mistaking a “dirty” crypto asset market with a technology that elevates healthcare administration and interoperability, as well a recovering lost revenue, increasing security and patient safety, and more? We published one open-access keynote Blockchain in Healthcare Today (BHTY) journal addressing overcoming objections in the marketplace (click here for access). I do not know who benefits more listening to it, service providers, or those that need help transforming their business? We already know using the “B” word is a detractor. Those experiencing success are approaching it from other angles. Pearl’s are shared in this review.

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According to a BHTY editor, Anjum Khurshid, MD, PhD, Chief Data Scientist and Lead Informaticist for Sentinel Operations Center, Harvard Pilgrim Health Care, “ConV2X is focused, appropriately, on research related to technical as well as business applications of blockchain technology. We need more conferences like it to bring practitioners, developers, and researchers together.”

ConV2X 2023 produced nearly 20 on demand and CME discussions, not including the live event program sessions. The journal will make only six On Demand recordings open access in 2024. Both CME and On Demand programs are available for purchase. Readers can mark ConV2X 2024 on their calendars to be held in Boston, Massachusetts, USA, in September.

Robert Ratchford, Vice President, Biostatistics and Programming, ProPharma, stated the quality and caliber of attendee and speaker were the highest of any blockchain conference focused on industry adoption he has ever seen.

They must know something others do not. Most healthcare professionals cringe when they hear the word blockchain or mistake it for bitcoin. Perceptions are dated—and others, still, are reticent to embrace a technology that can transform business trust and operations.

The first presenter, and for transparency purposes, Platinum Sponsor, was service provider BurstIQ’s CEO, Frank Ricotta, and President, Brian Jackson. They spoke about market forces, the higher education environment, and the work they are doing with Maryville University building a trusted data ecosystem with data, AI, blockchain, and analytics (Figure 1).

The Maryville Experience

Maryville University was founded the 1877 and has a large remote student network. The president and CEO of the university, Dr. Mark Lombardi is an innovator who set the university on a thriving track. They have not increased tuition in nine years and have NO IT Department.

How much does an IT department cost at a university? It is a cost that drops to the bottom line due to collective technologies and building around person-centric data (Figure 2). These include developing data and communities with diplomas, credentials, and verified skills throughout career paths and across undergraduate, graduate, alumni, and, most particularly, the healthcare workforce.
Universities, like the healthcare marketplace, are siloed, and collective technology breaks that barrier. The “CIO” now becomes a conductor of unified information, experiences at the data level, and empowers the business, which has been transformed to human users that own and operate their own data. This is the same principle Gartner posed about moving data-enabled businesses, data, data access, data usage, and data governance, to an edge where IT becomes an enabler, and no longer a controller. Students now have their “superpower,” their own data, aka digital twin.

Where does blockchain fit in? Blockchain creates the trusted data objects (active metadata), which are treated as digital assets, with ownerships, and permissions featuring three dimensions in one product. One is an exchange, which is the data layer, and how it is connected and unified with a semantic integration—made easy to use in terms of connecting data, understanding it, and using it at an enterprise level, on a personal level.

Q&A post presentation included:

1. How is Burst IQ approaching the education and sales of services to companies or systems that are still in Phase 1 and what about cost?

Executives responded with their focus on the power of connecting data and building data ecosystems. Monetary value to some health systems has unveiled saving up to 9 million in operating costs. They anticipate graph models will emerge very strong products in the market over the next few years.

2. Can you talk a little bit about what types of claims data you have linked to in the past and is that on chain or off chain?

Data lakes and data warehouses—which are turned into smart data. Elements of the claim, claim value, and data around membership are analyzed along with hierarchical condition category (HCC) risk code analysis based on plans, supply chain analysis, and anomalies. One of their partners covers 85% of all US based claims (anonymized), and lets them create data enrichment, identify patterns, and more (Figures 1, 2, 3, 4).

**DeSci Community**

Next, ConV2X hosted a decentralized science (DeSci) Community talk on incentivization systems within the realm of science. Speakers featured were Jelani Clarke, Executive Lead at DeSciWorld, and Ray Dogum, Manager at Vibe Bio. The discussion revolved around the quest for fairness and equity in scientific endeavors. These innovators are working to bridge the gap, ensuring that everyone involved in scientific research benefits from the incentives. The core concept is the imperative for more equitable and
transparent communication in science, aimed at sharing knowledge across a diverse, decentralized landscape. To connect these elements, blockchain as a platform and infrastructure helps. Much of this paradigm shift is as much technological as it is a socio-psychological revolution. The value is and will be determined by the “value per action” created. Governance frameworks are built on smart contracts (Figure 5).

One example of this decentralized shift is the Vita Decentralized Autonomous Organization (DAO) community, which focuses on longevity research. It operates without a central authority. Instead, a token-based system dictates who can vote on projects to be funded, and the resulting data are immediately shared with the wider community. A specialized team, handpicked by the community, conducts rigorous reviews and is authorized to communicate scientific findings. Similar to the visual representations discussed earlier, this approach offers a coordinated opportunity for participation and incentivizes collective efforts. It is worth noting that open science does not encompass all these features.

Monetary incentives are augmented by reputation, and non-fungible tokens (NFTs) are utilized. In this emerging marketplace, credentialing systems become a necessity. So, how does this differ from LinkedIn? Well, LinkedIn is not built on a blockchain. The potential transformation lies in creating a decentralized, immutable platform, free from control by a centralized corporation. This platform could feature a dashboard with retention of experiences and self-assessment capabilities, setting it apart. Users could showcase their profiles with verified digital research artifacts, creating a repository that captures essential data, including language scripts and metadata, all in one repository. With the addition of moderator Jason Cross, Chief Strategy Officer, Rymedi, the conversation turned to bridging DeSci with legacy health innovation, with, now panelists, Jelani and Ray. Most healthcare organizations run through centralized organizations, having to comply with laws using traditional liabilities and compliance standards to get things accomplished.

Jason adds a new perspective since his past work focused on innovative contracting and partnership models in emerging markets to improve access to affordable breakthrough treatments, diagnostics, and devices. Partners included ministries of health that do not have up-front liquidity to pay for (expensive) treatments. In emerging nations, savings are incurred in budgets. X percent of cures means billions of downstream dollars cost saving. Many initiatives came close
to execution but failed due to the need for multiple organizations to collaborate. They did not trust each other’s data and did not trust each other with each other’s data.

Interesting side note, Jason and his partner and CEO, Dave Stefanich, met at a meeting to make generic manufacturing of essential medicines cheaper by reengineer chemistries. Dave was making a real time antibiotic active pharmaceutical ingredient (API)—typing quality management system documentation on his laptop that was all on chain. What Rymedi essentially does is track steps inside medical manufacturing such as quality management system automation, population screenings, confirmed lab diagnoses, etc. and make a digital workflow and data automation platform. The workflows help multiple organizations deliver higher quality, more efficient care for patients with interoperable data automation, regulatory compliance of processes with data integrity across jurisdictions, including labs, diagnostic manufacturers, pharma companies, device companies, providers and essentially automating test and treat campaigns, workflows for clinical trials at scalable in decentralized ways, improving
patient engagement. With the maturing DeFi space, they have traditional health tech, digital health companies that are building on their platform, and diagnostic manufacturers with cloud solutions porting over on their platform. Some of the most interesting design projects are the ones using DAOs and intellectual property non-fungible tokens (IP NFTs).

According to Jason, “we need to figure out a business model that will undergird the monetizable value that feeds into ecosystems (mentioned above) in a compliant way. What do we need to begin thinking about and building, if platform providers are going to bridge centralized health innovation institution, activity that is decentralized? There is not a lot of attention directed to the compliance issues that will make findings actionable for regulators or replicable from a scientific credibility perspective. There is a wide variety of approaches to managing rights in DeSci, so IP rights in what is created, patient data rights, whether patients might have downstream monetization rights in the value streams created from their data or from biological samples via material transfer agreement rights management, etc.”

He goes on to add, “If you’re going to interact with legacy health innovation institutions, everyone needs to know who they sue if something goes wrong, or what phone number to call for customer support when something goes wrong. That is one of the big challenges. Then, there are organizational and business scale issues. If I am part of a DAO with 10,000 patients, I am going to have a hard time negotiating with the general counsel of Kaiser Permanente over patient cut and data monetization than if I was negotiating on behalf of 10 million patients. Entities that are pulling patient rights alone have poor organizational and business scale. A solution may be coming up with standards to enable bargaining power that would radically democratize visions for the future.

What about liability issues of referring individuals? There is no legal infrastructure around to make it safe for those individuals coming in or from my own DAO. When you try to merge that with traditional legacy pharma or legacy health innovation, there is no corporate structure, no employment structure, no structure to preserve or keep the data and movement in a certain format or between any guardrails that are more open.

There are still too many questions with no answers—yet. This discussion will be continued...
Keynote

Sathya Krishnasamy, former Senior Director, Technology, Elevance Health—Blockchain, Innovation, presented an eye-opening keynote from his personal experiences in payor, provider, consortiums, and running independent provider front office functions (Figure 6).

Sathya addressed the value for enterprise blockchain moving beyond proof of concept (POC) and pilots and focused on mainstream adoption at scale presenting methods and lessons. Text from several of his slides highlighting salient points that resonated with the audience along with his comments appear below.

The Real Phenomenon to Understand

- Blockchain technology is a global phenomenon. It is here to stay and deliver. Just a matter of time. There are now many blockchain implementations that have run successfully for years
  - Many consensus mechanisms—Many flavors (proof of authority (POA), Fast Byzantine Fault-Tolerance (FBFT), proof of space (POS/dpos)) that have shown fast-finality
  - The underlying L1 security—permissioned and permission-less—Both getting there
  - Clearly moving to Layered Architectures—Each with its own focus—It is a sign of Maturity—Promising

- Blockchain does NOT automate the periphery, it automates the Center.\(^2\) That is disruptive.
- Anything that can conceive of as a supply chain, blockchain can vastly improve its efficiency—it does not matter if its people, numbers, data, money.\(^3\)
- What the ERC 20 / ERC 721 token standards have achieved in a short time is Noteworthy. That is a pattern for Application Interoperability. Thousands of dApps talk to each other—Self-organizing.
- Blockchain has a global self-organizing developer base—much more than what a company or companies can achieve. Whether we like it or not—they are solving for what enterprises have long wrestled with and spent.
- Reconciliation of data (what is meaningfully important for multiparty collaborations) at the source—including full provenance, non-repudiation, and agreements cryptographically secured—is powerful. Addresses many enterprise inefficiencies at its heart. Single Source of Truth is getting more and more possible.
- Yes, the technology has yet to mature, but the pace of maturity is high and we are nearing inflection points in Privacy and Scale. What we need to really talk about now—are enterprises ready to meet blockchains?

Opportunities for Healthcare—At the Next Level of Advancement Admin, Clinical, Contracts

- Consumer Ownership of Data has always been a web3 mainstay theme
  - DeSci, clinical trials recruitment, health consumer engagement
  - Now we can understand backend costs for specific processes
  - Use them to drive healthcare consumer engagement
- Data Quality—New opportunities (many inefficiencies can be removed)
  - With careful counter-party sensitive data aggregation with on/off-chain designs
- Business Decision Convergence: Multi-lateral versus unilateral and agreed on
  - In reference implementations/use-cases of business process convergence: up to 50–70% seems possible
- For the rest—Full provenance and incremental data exposure/zero knowledge proof (ZKP) (on demand) can induce another 20–30%. Small and medium-sized enterprises (SMEs) can focus on the last mile (10–20%)

- Counter-party sensitive decisions can be pushed to the blockchain node edges AND need NOT take compute and human cycles
  - Agreed-upon details or programmable agreements can be made available on the edge: claims rejected on gateway/limits reached, etc.
  - Agreements (ex primacy) were deemed possible to be pushed to the nodes where the provider can connect (claim, encounter, registration)

- Maturity in Privacy Enhancing Tech (PET)
  - Moves the curve along to solve for use-cases involving increasing friction

- Blockchain opens up distributed AI (moving vector features on models instead of moving data—provenanced by blockchains)
  - Opens up many collaborative use-cases for sharing data
  - Collaborative risk stratification, collaborative discharge planning

**Blockchain: New Architecture for Internet and Human Data**

Robert Rachford (Figure 7) serves as the Vice President of Biostatistics and Statistical Programming for a midsized Crono (CRO) called ProPharma. The company helps small to midsize biotech and pharma companies conduct clinical trials (specifically through the collection and analysis of clinical data) to demonstrate safety and effectiveness to Food and Drug Administration (FDA) and regulatory authorities.

Robert sees blockchain as more than a method of payment rails and finance. Rather, he views blockchain as the new architecture for the internet and human data. His work helps guide new regulations governing the technology with a specific focus on healthcare and life sciences data.

His lively participatory Q&A session unveiled several curious responses to moving blockchain technology adoption forward.

1. What regulatory challenges have service providers had in implementing a blockchain solution?” A response for a successful outcome included tackling the guardrails of a risk-based organization. Risk mitigation, real-world evidence, digital signatures, and being able to demonstrate it opened new markets (and news cycles), for those companies. Solutions can include multi-jurisdictional clinical trials, and the word blockchain is never mentioned, rather, a global date, time stamp, and serialization of a clinical trial overtime is what the potential client can digest. This approach has worked across the globe.

Using the word “blockchain” also signals specific data architecture that needs to be provided to regulators and governments. One company took the bull by the horns and wrote the 178 employee share ownership plan (ESOP) quality management system. At present, they have three sponsors that have filed tokenization protocols to the FDA under review. Their perspective is to introduce tech within guardrails, for example, staying within computer system validation processes. They cautioned other platform providers “if an algorithm is changed, you have to revalidate the algorithm and show it. You have to think about what’s responsive, and what you can control versus what you can install. You don’t want to invalidate your stack because you’re losing real world evidence, so the rule is stay within the guardrails.”
2. Are there regulations or guardrails that we need today? Yes, transferring digital records, digital copies of pictures of people. All of these things incorporate digital identities or “ambient identity.”

Decentralization of CoinPark Token (CPT) codes. One thing that is missing is regulation of CPT code process or some alternative to it in the marketplace. That would enable more people and more progress in the healthcare data ecosystem.

The future appears bright for blockchain’s adoption within these industries and regulatory guidance seems to be a welcomed guidepost for the journey.

There were two book signings at the event. The author of “Wealthcare,” by Dr. Brigette Pineiwski, emphasized that although using blockchain-based solutions is increasing, investors are not investing in areas that they do not understand, so education programs are critical to understand how blockchain technology will make money for investors and businesses (Figure 8).

As a physician, her point of view is that individuals need a place where their identity can coexist with their data to develop longitudinal data streams. Details of the minutiae of what goes on in individual’s lives driving their health outcomes exist in the community of the household and not in current EMRs. She wants the market to figure out how to digitize our physical lives as physical health expression. For her, the level-setting zone where data should be captured and insights gleaned is the home.

She presented a hypothetical individual, Tom, in his 50s, who just started Lipitor. He had high cholesterol, and recently his friend, Jack, a friend from high school, had also been diagnosed with high cholesterol, but instead of going for a lipid-lowering agent, Jack put his money in hair replacement therapy. Tom opted for the meds path, going to regular office visits, getting labs, standing in pharmacy lines, etc. His self-concept turned into “I’m an old man. I don’t do much anymore.” Eventually, he had mild muscle aches and pains. Over the space of a decade, he turned into an “old” man, whereas Jack, the friend who opted for hair placement, felt 10 years younger, changed his diet, and was exercising.

Brigette’s point was that none of this is discussed in the doctor’s office because the data are not collected presently, but in a Web3 world, all data are collected for the benefit of one and all, where we can begin to ask more insightful questions. Not everyone is a Tom or Jack. We are all versions of an in between, but we should be able to view potential outcomes decades into the future. Lipitor has been prescribed for decades, with nearly 144 million patient-years of experience, so patients should be able to glean how lives and lifestyles are impacted.

There are strong models in the cannabis space, sleep, and high-performance athletes are already using wearables and power devices to track their training. Athletes need to have training information available as they seek out opportunities to join teams. PlayWize is a site they use. In Sweden, Australia, and other places, they have co-occurrences that improve their sleep data. She believes we are looking at a future whereby people can start to define what is researchable. Strava, an internet service for tracking physical exercise, is a good example of where an individual health segment, can obtain insights. Data can be gleaned on types of runners and how fast it can be done segmenting data. We need that same type of data aggregation for sleep data and others. What is achievable for sleep for a person in the 50 percentile, and what would allow her to achieve a better level than the average percentile? This is what I store for patients and people.

Holographic Teleportation

The CEO of Axea, Dr. Fernando De La Peña, demoed a holographic teleportation technology for patients at the space station and around the globe (Figure 9). At 17,500 mph, patient care occurs in a tough environment. Requirements such as one camera allows more bandwidth like 5 megabits per second. Pushing technology to the next level is constant. Seeing a patient with volume is analogous to 3D printing with a lot of “slices,” with options for making videos or photographs. With teleportation imagine 10,000 slices of video to see what appears to be a real person with volume.
Aexa is the company that successfully followed Dr. Josef Schmid from NASA Mission Control to the space station, in October 2021, and performed multiple holographic teleportations. Then NASA asked to design a two-way protocol patient. Sure enough, in 2022, they performed a two-way graphical quotation. Microsoft created the technology with a studio with 109 cameras. It takes 1–2 weeks to process the hologram and then you can play that photograph using special glasses—expensive tools to develop and market. Aexa, on the other hand, does this with the equipment you already likely own.

Google is doing something similar called Starline, with something that looks like a telephone booth that costs around $1 million. A startup just received an investment of $25 million. Glasses cost $4,000. At Apple with the new iPhone 15, you can capture video by Vision Pro, where you can view some videos with volume. This is all expensive and people may not be willing to invest or spend their money on these high-tech “toys.” Remote technology is important to have, connect, and deploy, and this is where Aexa steps in developing HoloConnect. Their HoloLens, according to Dr. De La Peña, is the best experience. The reason he was invited to ConV2X is because they promote low-cost access for all for remote health care—telehealth. The application can be downloaded for $9 a month using your smartphone. They are making this agnostic technology accessible for anyone and anywhere—a far cry from $1M.

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A Historic First

At ConV2X, Maj. Gen (ret). (Dr.) Josef Schmid III, NASA Flight Surgeon, was projected from Russia to the stage in New Orleans, Louisiana, USA—a historic first on earth at a conference. Figure 9 shows the test conducted September 21st where he appears at the podium. If you are fans of Star Trek, it is similar, but better. You can see the hologram without any glasses.

HoloConnect Color is available on the Android store. It is encrypted, and Aexa does not monitor what is happening. You can have a conversation, create a room, password, and account. There are four layers of communication: text message, telephone call, voice, and video conference. Color protection is what creates volume to project applications.

Fernando believes this market will become go from academic to multibillion consumer and game industry. In three to five years, this will be the tool that everyone will use. Both users need to have an iOS device right now. There is no other application that is required, just download the application and go!

Streaming Audio Transcription App

Finally, ConV2X was extremely pleased to pilot a new 140 multilingual streaming audio transcription app created by the team headed by Dan Scarfe, CEO at XRAI Glass. It worked beautifully and the team at ConV2X thoroughly appreciated his patience and generosity in providing the hardware and tutelage for setup. It is simple to use. The discussion recaps for this article were derived with the assistance of the app transcription, in English, September 21, 2023.

To view the ConV2X Blockchain in Healthcare 2023 website visit https://conv2xsymposium.com.

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