EPISODE 1012

[INTRODUCTION]

[00:00:00] JM: Cryptocurrencies today serve two purposes; store of value and speculation. The application infrastructure that has been built around cryptocurrencies is mostly to support these use cases. At some point in the future, perhaps cryptocurrencies can be used as a global medium of exchange, a type of currency that's accepted at the grocery store. Perhaps we will use the blockchain for supply chain management and as a universal ledger for real estate ownership.

But today, none of this is a reality. Cryptocurrencies are mostly used for speculative trading. Users buy and sell different cryptocurrencies and stable coins looking to make short-term profits, and the markets for trading cryptocurrencies have evolved to have a sophistication that looks like the centralized markets of derivatives and leverage-based day trading. But in some ways, they are a lot stranger than these centralized markets.

The term decentralized finance refers to this phenomenon of cryptocurrency lending markets. Decentralized finance increases the volume of speculated capital by providing liquidity through smart contracts. This short-term liquidity is often collateralized by a volatile crypto currency such as a theory creating opportunity for a type of market participant called a liquidator.

Tom Schmidt is an investor with Dragonfly Capital, a crypto asset management firm, and Tom joins the show to describe the dynamics of decentralized finance. Tom works with Haseeb Qureshi to make investments in cryptocurrency startups and Cryptocurrencies, and I've had several spirited conversations with Haseeb. It is no surprise that his colleague is also somebody with whom I can have spirited conversations.

The idea of decentralized finance is very interesting and we don't go into the minutia and the complex details. Tom has written some great blog posts about decentralized finance. If you're looking for some of the needier grittier details, you can go to those blog posts. It gets pretty technical if you go too deep down that rabbit hole. I will leave that to the readers. But this

conversation is more for an overview of people who want to know what decentralized finance really even means.

I hope you enjoy the conversation, because I sure did.

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[00:02:28] JM: DigitalOcean makes infrastructure simple. I continue to use DigitalOcean because of the low friction and attention to user experience. DigitalOcean has kept the experience simple and I can spin up a server in less than a minute and get high quality performance for a low price. For an application that needs to scale, DigitalOcean has CPU optimized droplets, memory optimized droplets, managed databases, managed Kubernetes and many more products. DigitalOcean has the flexibility to choose the right instance for the right workload and he could mix-and-match different configurations of CPU and RAM.

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[INTERVIEW]

[00:04:04] JM: Tom Schmidt, welcome to Software Engineering Daily.

[00:04:06] TS: Hey, thanks for having me on, Jeff.

[00:04:08] JM: The idea of decentralized finance, this is a common term in the crypto community today and defi describes the idea that the traditional abstractions of finance can be rebuilt in the crypto world or on top of the crypto world. The most common application today is lending. Describe how loans are made on top of the crypto ecosystem.

[00:04:31] TS: Yeah. Defi, as you mentioned, sort of describes a broad set of different pieces of software, different protocols that run on top of Ethereum today that construct the sort of what we call financial primitives. So things like lending, things like exchange, things like derivatives that can be decomposed and built up and linked together or built into new applications to build products that people like you and I might be more familiar with.

In the context of lending, what we're seeing today are a couple different protocols that also revolve around this core concept of collateralized lending. In collateralized lending on like unsecured lending when you go to a bank today and use your credit score to allow them to loan you money, you place down an asset of value that is greater than the value of the loan and that allows you to, for example, get working capital if you have something that's pretty liquid or something that you don't want to sell, or if you want to lever up on the underlying asset.

Let's say you have a piece of Ether. Let's you have some Ether today. You can deposit that Ether in a smart contract. So it's totally noncustodial. It's totally audible and transparent, and withdraw a small amount of another type of asset. A lot of people will withdraw Dai, which is the Stablecoin that that maker produces, for example, is backed by the US dollar. So it feels like you're trading the US dollar but in a totally trustless way, or something like USDC, which is a centralized Stablecoin produced by Coinbase and Circle which is actually backed with US dollar. Two different types of assets that both trade at the US dollar. I can withdraw a smaller amount than what I deposited using this piece of collateral to incentivize me to repay the loan.

I put down $150 worth of Ether. I withdraw $100 worth of USDC, and then I can use that to, for example, use or potentially buy more Ether if I want to get really long on Ether. That sort of collateralized lending in a nutshell.

[00:06:20] JM: I think it's important to note that we're not talking about – I mean, the first time I heard defi, decentralized finance, I was like, "Okay, these are like permissionless small

business loans for people in Africa who are you know un-banked and they're getting on to the crypto ecosystem because they can get the permissionles finance that they need to start their fruit stand or whatever." That is not what's going on today.

[00:06:47] TS: I would say not. I think there's two real schools of thought when it comes to defi stuff. A lot of people are in the whole bank the un-banked category, where are people who are no fruit farmers in Africa that need a loan to go and make the business more productive. Those other people who I think take the view that I have, which is we're sort of building toys right now. We're building things that are sort of fun that people who are wealthy and basically can subsidize R&D can use. Gradually this stuff will get more usable. It will be applicable to more different use cases, and then we'll have sort of the opportunity for mainstream appeal.

I really don't think that technology today is at the point where it can be accessible from a UX or scalability perspective to some of use cases and some of the people that might benefit most from it, but that is certainly the end goal. There're even people, a couple protocols today, that are experimenting with un-collateralized loans. There is a system that gets using some these developing economies called ROSCA, it's like a rotating saving and credit association, where let's say 10 people will get together and pool their money together. Then as individual people in this sort of lending circle need money, they'll be able to borrow from this collective. So it's sort of a very primitive version of a credit union.

There're people doing that today on Ethereum where you and I can be different people around the world using a smart contract to sort of form a very primitive credit union. I think we're seeing the first sort of steps that this may be approaching something like having mainstream appeal or something that can approach sort of banking the un-banked.

For the most part right now, it's a lot of people who are interested in sort of building interesting toys and then money games and they're very bullish on Ether or some of these other assets and using sort of tools as a way to trade and as supposed to being the primary bank. Though there are people who do that today.

[00:08:28] JM: The idea of collateralized lending. I put up $150 of ether to get $100 of Dai, a Stablecoin, and then I have a stable coin. It's like kind of like having a hundred – How people

think of $100, like a dollar is pretty stable. I can go out that $100 and treat it as working capital. Now I can buy anything with it. Why would I do that though? Why would I put up $150 to get $100?

[00:08:53] TS: Well, a lot of people will use it, again, if they want to – If they have an asset that they don't want to sell, but they have some immediate term need for capital. We've been seeing this in the traditional financial systems day where people will take out an auto title loan. So they'll place up their auto title as collateral and get capital to pay up some immediate term debt while they're getting paid from their paycheck, for example, or they'll take out a reverse mortgage. So they'll put up some equity in their home and take out a home equity line of credit. There're very obvious analogies in our current financial system to some of things that we see in Ethereum today.

I think the idea with a lot of these lending protocols is the quality and diversity in different types of collateral is going to grow overtime. While right now maybe we're using Eth, or Dai, or any of these other types of ERC20 tokens or even non-fungible tokens. So you could use CryptoKitty as collateral, for example. Overtime, the quality and the diversity of the asset is going to grow. So there is a realistic possibility in the future where you'll have a token that represents the deed to your house or the title on your car, and instead of going through a bank and instead of being restricted and who can sort of offer you a loan, a smart contract can just give you a loan with a single transaction in a few seconds.

I think, again, it's sort of in this like toy phase right now where it's something that people who are into the space like they do in their free time on the weekends, it's kind of neat. But gradually, I think we're seeing like the space mature. Even something like Dai has significant real-world appeal today, right? I think a lot of people in some countries that are sort of slowly beginning to dollarize or maybe that have really weak local currencies be interested in buying US dollars. We see US dollars get used as sort of a de facto medium of exchange or traded to premium in some these economies today. I think getting Dai at a US dollar that no one can take from you and maybe no one has to know that you have is extremely valuable.

[00:10:47] JM: What's the best analogy to the conventional finance world? It's basically margin trading, right? Like I want to borrow – I have $50 and I want to trade 4X. I can do margin trading

where I can actually have like whatever, 5X leverage, I can trade $250 worth of my $50. That's the best analogy?

[00:11:12] TS: I think so. I think certainly we see margin trading sort of emerge as the primary use case for a lot of these protocols today. Even something like you dYdX is – Wile it's a lending protocol at its heart where you have lenders place collateral and you have borrowers or you have lenders lend other assets and place collateral to borrow, it's very specifically tailored towards highly leveraged margin trading. With a single transaction, you can take out a 5X leverage long or short position on Ether, on Dai, or USDC, on any of these different types of assets.

I think even with something like Maker DAO, which is sort of the largest and one of the oldest lending protocols, you can put down some Ether, withdraw some Dai and then use that Dai to buy more Ether and to open up another loan and sort of do this recursively a couple times over to get 3X leverage, for example.

Yeah, I would say margin trading does seem to be the most popular use case today. Again, sort of in that we're having fun. We're trading. It's sort of a rich people toys phase, but gradually this sort of subsidizes R&D and sort of helps bootstrap this ecosystem and sort of the whole Tesla Graham plan. We're going to sell [inaudible 00:12:17] lease with an electric engine in it and then we're going to make a very affordable mass-market car that everyone can buy.

[00:12:23] JM: I hear about the speculators, the people who are spending all their time tinkering with these things and writing the ups and downs of the crypto world. Have you met many speculators? Can you take me inside the life of one of the speculators that might actually be utilizing these smart contracts?

[00:12:40] TS: Yeah. I actually know a number of people who are some of the largest traders on decentralized exchanges or on decentralized finance today. A lot of the time it's people who maybe they want to remain anonymous so they don't want to KYC and go through a centralized exchange, and I think that's a totally legitimate use case in some particular jurisdictions. A lot of the time it's people who are getting access to products they can't normally get access to. So maybe they aren't an accredited investor or maybe they don't have a margin trading exchange

in their own jurisdiction. Well, anyone around the world can open up a Maker DAO CDP and margin trade using Maker or Compound or dYdX. I think there's permissionless and sort of borderless element to it too.

I think a lot of people are just fascinated about this space. I think it feels a little bit like seed investing, but open to everyone. I think a lot of people are sort of looking for yield in sort of the current financial ecosystem. Crypto, if you have an edge, is certainly an interesting way to do it. I would say it's not purely sort of speculative investing as well. It's not just I'm buying this asset after the price goes up, which is how we normally think of investing, which is sort of capital gains. There's other ways to take advantage and make money in this space as well.

I just a blog post two weeks ago through Dragonfly Research talking about liquidators. Liquidators are a really important piece of this decentralized lending ecosystem and that they ensure that lenders get repaid if, for example, the value of the borrower's collateral begins to drop. In that scenario that I mentioned earlier, if that $150 worth of Ether drops and $90, well the buyer can just run away with that $100 that they borrowed and leave the lender sort of stiffed.

Liquidators look for loans that are starting to become a little bit risky. Starting to hit that $190 threshold and repay the lenders and take a small fee for doing so. So we see these liquidators who are running these bots, these very sophisticated pieces of code off chain by making millions of dollars a year for doing so. Even people who aren't sophisticated who can't code or don't know how to trade, they can be lenders in these ecosystems.

We see people making 6%, 7% on their Dai on their USDC per year, which is several times more than you get on a high interest bank account in the US just by buying some USDC, buying some Dai and placing it on these smart contracts I' have friends of mine who know nothing about crypto, but they're using products like InstaDApp, or using products like Nua or Argent Wallet which are very user-friendly to use and just going straight from the debit card into Dai into compound and earning 6% or 7%. So it feels like a bank account almost.

[00:15:07] JM: Right. The liquidators posts was interesting to me, and I think liquidators is hard to explain over a podcast, although you did do a show with Laura Shin. That was pretty good. I think your blog post was quite descriptive and you had some nice little animated diagrams and

stuff about these liquidators. I think the best way to explain it is without the liquidators, you would not have liquidity in the market, I mean, because there would just be kind of a fundamental bug in the incentive ecosystem.

The other thing that's interesting about it is like if you think about – Okay. I think about crypto ecosystem, it doesn't take much understanding of crypto to understand that, "Okay. Yeah, it makes sense that lending would take place if we're trying to recreate the financial ecosystem in a decentralized manner. Yeah, lending makes sense."

The idea that if everything is also programmatic from day one, you can have these very low-level participants that are scripts, basically, like financial scripts that have a significant impact over the entire ecosystem. They scale easily. That to me is a new concept, and then that is one thing that the liquidator idea illustrated to me. Is there an analogy to the liquidator? The idea that there is this kind of bot type entity that adds liquidity, that adds, subtracts friction from the lending ecosystem? Is there an analog to that in the traditional financial ecosystem or is the financial ecosystem just so layered with croft that it is much harder to have these kind of just thin permissionless bot type liquidity adders?

[00:17:01] TS: Yeah. It's an interesting question. I think the big thing for me about defi and maybe crypto overall is no one has a legal contract with anyone that is obligating them to these functions, right? No one is going out and signing contracts with liquidators. No one is going out and signing contracts with minors and having some sort of legal repercussion if they don't do their thing. Simply, all these systems do is write pieces of software that anyone can use and create incentives that potentially generate profit if actors realize those incentives and act on them.

I think what's really cool about liquidators is unlike – Probably the closest analogy will be something like a repo man, right? If your auto title is no good or if you default in your loan, they might repossess your car and then liquidate it to repay the lender. But that's a separate company that lender pays money to and there is some sort of real sort of friction-full interaction between. Whereas with liquidators, simply something like compounder dYsX or Maker that is write the code, make it transparent and accessible to anyone, and we've sort of seen this this

blossoming ecosystem of people realize that, “Hey, I can make money doing this,” and then act accordingly and sort of make the whole system work.

Again, maybe similar to how minors and some of these prefer work chains are just finding opportunities to make money using the incentives provided to them and then going out and doing it. In doing so, making the whole system work. Incentive and mechanisms design is really key to making these protocols function, and think we’re seeing it work reasonably well so far in defi.

[00:18:40] JM: Right. I think what you're saying there is there really is no analogy in the traditional financial world. The best analogy is probably large companies of probably 50 at a minimum people, because there is so much croft in the traditional financial ecosystem including like legal contracts, which didn't used to be croft, but now they’re just kind of croft because if you – I mean assuming smart contracts can actually fulfill the interface of financial obligation, then we don't need legal contracts and we don't need a legal department and we don't a bookkeeping or documentation department, because all these stuff is book kept on the blockchain.

[00:19:21] TS: Yeah. I mean, that's sort of the origin of the smart contract concept, is take a maybe somewhat ambiguous, somewhat tricky to actually execute legal contract, codify it in some way, and this is where the whole code is law sort of Ethos comes from. Then this thing will just execute by itself based on predetermined sort of immutable terms that we’ve agreed to. I think defi is just sort of the latest manifestation of this where it’s no longer a will or a trader or something more generalized, but it's loan terms that are now just getting executed automatically without having to go through an intermediary to do so.

[00:19:57] JM: Is all of these stuff built on Ethereum?

[00:19:59] TS: There are a couple sort of burgeoning other ecosystems, but for the most part we’re seeing most things that happen on Ethereum today. I think that's happening for a couple of different reasons. One, just Ethereum had a head start. It was sort of the first legitimate smart contract platform. That sort of inherently gives you a bit of time to sort of build up this ecosystem. But I think also we just see a lot of network effects between these different

protocols. There's a lot of what we call composability, or sort of money Legos between these different protocols, where I'm not just using Maker, I'm not using Compound, I'm not just using dYcX, I'm not just 0x, or Uniswap or any of these protocols. I'm using all of them in tandem and there's a symbiotic relationship between many of them.

For example, in the liquidators blog post, I mentioned that people who liquidate under collateralized loans, for example, won't just hold on to the collateral, which might be Ether or something highly volatile. They'll immediately go and sell bot on a decentralized exchange to sort of lock in their profit. So they'll take that Ether, flip it for Dai or USDC and, "boom!" They've sort of locked in that 5% profit that they were in theory going to get. That is only possible because these different types of actions can be composed atomically in a single transaction.

I can, in one transaction, get a loan myself for Ether. I can liquidate someone's under collateralized Ether loan. I can then get some discounted Ether and go sell that on a decentralized exchange for Dai or USDC and then repay out that additional loan, that original that I took out. That's all happening across many different protocols. If you want to go and re-create that on another chain, it's can be really difficult because you don't have this sort of intertwining effect between all these different protocols.

I think, additionally, the sort of the fundamental basic unit here is you need a good piece of collateral that can sort of roughly help stabilize the entire ecosystem. I think we're seeing Ether emerge as like a reasonably good piece of collateral. It's still somewhat volatile in the grand scheme of things, but less volatile than maybe some other assets and some of these other chains. there is sort of a sense that if Ether can do reasonably well, then this would provide a nice foundation to create other types of tokens and other types of assets and sort of support all these different types of protocols that need to exist.

[00:22:09] JM: The fact that there is some volatility to Ether, is that good? That's drives the market, right? That drives the collateralization market.

[00:22:17] TS: In a sense, yes. I think a lot of people might not talk about this, but I think from my perspective, unless there is a broader belief that people will speculate that the price of Ether will go up, it's hard to see why someone would want to margin up on Ether and take out a loan

against it, right? Why would I margin trade on the price of Ether if I don't think the price of Ether is going to go up in value? There is a little of that fundamental underlying assumption, which is also why see people also look for different types of collateral to potentially use for these loans.

Maker DAO, again, the largest sort of credit facility, lending protocol on Ethereum recently underwent a large upgrade to what they call multi-collateral DAI. No longer can you do only have to use Ether to knit new DAI, but you can also use Brave Token. BAT is the first one that they added as collateral. You can take a loan against your BAT and mint Dai and the plan is to add new types of collateral as well as new types of synthetic assets that you can mint against your underlying.

If we think about why Dai, right? Well, there is an piece of code somewhere off-chain that is constantly reading in the price of US dollars or the price of Ether and Dai on-chain and we're using that to sort of stabilize the peg. Well, you can put in any arbitrary price feed in their and then create a new version of Dai that pegged to this new arbitrary price feed. You could in theory produce a synthetic Bitcoin instead of a synthetic US dollar, or a synthetic S&P 500, or really any type of asset that might not even exist today. You could create a synthetic version of your apartment or your rent. As long as you can create a liquid market around it, in theory, you can create anything you want. I think we're also just starting to see like the market move to broader types of collateral, broader types of synthetics away from just Ether today.

[00:24:09] JM: Providing some salve to people who are afraid of financial abstractions maybe because they read too many Michael Lewis books or something, can you explain why synthetics and derivatives actually serve a useful purpose in the normal financial ecosystem and perhaps how removing frictions from them and having analogues in the crypto ecosystem could have another order of magnitude of usefulness.

[00:24:40] TS: Yeah, definitely. I think there're a couple different reasons why someone might want a synthetic asset. I think at most fundamental level, it's just getting access to an asset that maybe you normally couldn't otherwise get access to. Maybe you're in India or maybe you're in China and you want to buy US stocks. Well, you probably can't unless you're going through some crazy vehicle, but you can probably buy a synthetic version of US stock, right? That

something that is available to everyone and you don't need to be a US citizen to purchase a synthetic asset if it's available in your country. I think just access to these things is one.

I think there's another flavor to that which is just socioeconomic access. Even in the US, I think we've seen a lot of the best-performing assets in the past three years come from early-stage technology investments, which unless – You have to be an accredited investor in order to invest in, and many people aren't. Even then getting access those things is somewhat difficult.

If you're not an accredited investor today, you cannot go out and buy that pre-IPO Stripe stock that maybe you want to buy, or maybe don't have access to these kinds of things. With synthetic assets, as long as you can find new counterparties for both sides of the trade, which generally speaking you can at a certain price point, you can just allow people get access to things that maybe they couldn't otherwise get access to.

I think to that note, I think synthetic assets are also a great way to create hedging opportunities. I also had sort of a – I tweeted about this a while ago, but I think one sort of problem that we see in the US and probably in the world more broadly is sort of the insanity around financing housing decisions. A lot of people don't think about it, but there's sort of naturally short housing, right? You naturally want the price of housing to go down, but generally speaking, the way you purchase housing is by taking out his crazy margin position, which we call a mortgage.

Well, wouldn't it be interesting if there a way to potentially hedge the downside risk of that mortgage, right? What if you could take out a margin position, take out a mortgage in your house, but let's say you want to hedge against downside uncertainty. Maybe take out a short on your house and then you sort of locked-in maybe some home-equity or locked in some value against some of the value that built up, or similarly let's say you're in early startup employee and you have a bunch of options or you have a bunch of RSUs and you're looking for some way to, again, lock-in some of the value that's accrued. Well, a lot of these companies will put locks or restrictions on how those early pieces of equity can be sold or transferred or used.

Well, what if you could take a short on your early-stage equity and then sort of lock-in the price that maybe you really desire to sell at? I think permissionless– I think it's a bit like the early web in a sense, where if you look at what people were doing with the early Internet, everyone

thought there would just be sort of digital versions of what we have in the analog world where the digital newspaper is the classic example, or digital magazine. But I think in reality, what was really cool about the Internet is that we had totally new pieces of content, totally new pieces of way of engaging that previously people didn't even imagine.

I think the current financial system is maybe a bit like sort of the pre-Internet era, where because we don't – We almost don't even really know what we don't know, we sort of have to rely on breaking down these barriers and giving entrepreneurs access to these financial primitives in order to get creative and sort of find that consumer surplus and really let the market speak as supposed to restricting what was available. I think someone once had this this like YouTube versus TV analogy, and I kind of like that quite a bit, where instead of selecting from five different channels and 25 different programs, you can select from a million different programs that anyone around the world can sort of invent.

[SPONSOR MESSAGE]

[00:28:26] JM: You probably do not enjoy searching for a job. Engineers don't like sacrificing their time to do phone screens, and we don't like doing whiteboard problems and working on tedious take home projects. Everyone knows the software hiring process is not perfect. But what's the alternative? Triplebyte is the alternative.

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[INTERVIEW CONTINUED]

[00:30:42] JM: The first job I had out of school was in options trading company and I only spent five months there. So I did not contribute very much or learn very much. But one thing I did learn that was pretty profound is the idea that in traditional finance, almost any thesis you have can be expressed through a combination of derivatives and conventional. If you buy a put plus go long on stock, you cap downside and capture all the upside, and that's something most people don't understand. They think, "Okay, stock market. Pure speculation." But there are ways of doing this that you really cap your downside and can express a thesis in a very comfortable fashion.

Unfortunately, that's pretty hard for the retail investor to do is my understanding. I looked into doing this a little bit, not very significantly. So I'm sure people can correct me if I'm wrong, but it's not like easy to manage options because they had these expiration dates and it's gets very complicated very quickly. It becomes a full-time job very quickly. So you're like, "Forget it. I'll just put my money in Betterment or whatever and earn no money and forget it."

Part of the reason is just because there're tons – I mean, there's not a lot of options, because I think there's just a lot of regulation and like programmers don't really have access for building these kinds of things. You do create a compelling picture, and like I think the example you gave with your mortgage, like today you can take out a reverse mortgage along with your mortgage, but I don't know. I assume I know nothing about getting a mortgage. But I assume that like the mortgage getting experience is pretty terrible and does not include like a very easy like upsell

check a box and get a reverse mortgage for five dollars additional. I don't know if – You can correct me if I'm wrong.

[00:32:40] TS: I think the process is getting better, but I think ultimately it feels very much like Band-aids. It's like we're sort of piecing together what an ideal system looks like. If you could design everything from scratch today using sort of what we have as supposed to sort of going from first principles and thinking like what would an ideal financial system look like?

I think that was something that kind of really tickled me about the Plaid applied acquisition, which is I think Plaid is a great products. Obviously, they're solving a real problem for consumers. But if you think about what they're doing at the end of the day, it is sort of like hiking together this kind of like really weird reverse engineered API on top of these [00:33:17], which is like why don't we just have an API for the banks. That's goofy.

I think, yeah, I totally agree. I think some of these things are possible today, but it's the permissionless element that is really key. Imagine that sort of in the '90s, early 2000's, you had to go and register your website with the FCC before you could publish it, and that costs thousands of dollars. We would definitely not have Internet that we have today. It's the fact that for five bucks someone can go and spin up an EC2 box and spin up a web application from their dorm room. That's really the key. You can't have – You have to let the market figure out what it wants.

[00:33:56] JM: Talking a little bit about how this makes its way into mainstream, like obviously we can only speculate at this point, but like today I've got the terrible mortgage buying experience. I've got the experience of like buying a flight and like I can one click to buy flight insurance for 1/8th of the cost of the ticket, which makes no sense. Why would I ever buy that insurance? This should be an open market for my flight insurance. It should be much easier to buy. It's impossible to get there in the near future, but someday with decentralized finance, perhaps we get there.

Although even on the road there, there will be regulatory burdens at some level, right? There will be some layer at which the consumer application that is leveraging decentralized finance is going to have to be inserted because we don't want – I mean, for all that you and I love about

the Wild West of the crypto ecosystem, I personally don't want random person in the Midwest buying a bunch of whatever name your terrible token that people lost their shirts on in the speculation days.

I don't know. Do you do have a perspective or how this stuff makes into the mainstream?

[00:35:10] TS: Yeah, I totally agree on – I think a lot of people got burned in like 2017, 2018 in terms of being taken advantage of by I think people who are maybe acting a bit maliciously when they were going out and doing these token sales. I think for the most part, I think we've seen regulators like behave pretty favorably toward some of these stuff that we're seeing in defi as at least in the US. If you think about what the SEC your CFTC or Finsen's job is. It's mostly to make sure that malicious actors are not being able to like terrorists are not being able to get access to financial services.

Then it's mostly consumer protection. So making sure that people are not being defrauded. I can't go out and lie to investors and sell an illegal security. That's when the SEC would step in. But in a scenario like Compound, for example, or Maker DAO, when it's people sort of two actors with their own agency making their own decisions sort of making with some pretty healthy financial transaction, with the limited resources they have, I'm a bit skeptical that they're going to go and try to step.

Even if they could try to shut down something like at least these like credit facilities. I think beyond that, it in my mind I think you will probably see some back and forth in regulation and there's a lot of good people working on educating lawmakers on some of the progress that we've been making in the crypto ecosystem over the past two years. But in many respects, I feel like this is a bit inevitable and it's just a question of will the US be the place where this happens or will those happening in some other jurisdiction?

I think we're seeing your pretty strong appetite for some these products across Asia, some parts of Europe as well. It's almost like this is going to happen and it's a question of what role the US is going to play in it. I think many people saw two months ago, three months ago Xi Jinping's entire speech around blockchain plus and the DECP.

[00:37:05] JM: I did not see that.

[00:37:05] TS: Yeah. Basically, in a nutshell, Xi gave a speech in which he describes blockchain is an essential strategic investment for China. So there's a whole frenzy right now in China trying to figure out how to make blockchain happen. How to make crypto happen in China? I think people are sort of waking up and realizing that this is going to be a thing and trying to figure out where they actually slot in.

[00:37:28] JM: Coming at this from a different angle, the Ethereum question, there is another post in your Dragonfly research blog about Ethereum scalability issues, and I've talked to Haseeb a little bit of that this and done some shows on it too that I had so much trouble understanding what the Ethereum scalability strategy was now. I've had trouble understanding a lot of this stuff in the crypto ecosystem.

If you don't go really deep on this stuff, it becomes very hard to parse what is just like technical reality that's kind of hard to understand and what is like repurposed whitepaper jargon that is total fiction. The Ethereum scalability story seemed like it was somewhere in between – The very thin realm between those two things. For whatever reason, the scalability story has not worked out. Weather for reasons of it's too hard to implement or they did something technically wrong.

Do you have a concise perspective on why the Ethereum – Actually, first of all, I should ask you, what does it mean at this point that Ethereum has not scaled? Is it just very slow? What's the consequence?

[00:38:50] TS: Yeah. First of all, I totally agree with your point, which is it's really difficult in this industry to know what is legit and what's not and what's important and what's not. Even I frankly get it wrong sometimes. It's very tricky.

I think Ethereum is I think fortunate in that it's found a couple use cases today like in defi that sort of work with the current version of Ethereum, which is Ethereum 1, Ethereum 1.0. I think it's probably Devcon 2018, Devcon 4, where there is sort of growing consensus.

First of all, backing up a little bit, I think one thing that we were seeing in crypto is like you're sort of seeing research – You're seeing open-source research. You're seeing research out in the open. A lot of the problems that people are trying to solve today, we don't have answers for and we might not have answers for. I think what we're seeing is people find promising areas of research. Explore it. Find out maybe what isn't so promising and sort of roll back up the decision tree and then we find another area of research.

I think what we're seeing is maybe something that normally takes place in academia sort of behind closed doors for most people, sort of occur out in the open with large financial incentives surrounding the outcome of this research. There is a bit of a weird dynamic around Ethereum research.

I think with respect to Ethereum scalability today, certainly, I'm not an expert and I recommend people read the blog post by [inaudible 00:40:13] who's also on our team. But the current sort of track is basically two different tracks. One is what they call sort of Ethereum 1.x, which has been going on for the past two years or so, which is let's make Ethereum 1.0 work as well as it possibly can. So these include improvements to the EVM and improvements to Ethereum consensus building, improvements to the way state is stored in Ethereum. I think so far the they've been pretty successful in that regard in terms of eking out more efficiency and more success with how Ethereum exists today.

I think Ethereum 2.0, which is what a lot of people spend time talking about and I think what a lot of these sort of third wave blockchains are trying to potentially compete with and misplace mostly compete on new novel methods of creating what they call side chains or layer 2 scanning solutions, which are sort of these separate pieces of code, these separate little mini consensus mechanisms that run and then settle back on the main chain at some point.

You can have hundreds or thousands of these different little mini-consensus mechanisms running off chain that eventually settle back on to the main chain at some point. A lot of the debate, a lot of disagreement around L2 scaling is which method makes the most sense for running these sort of separate chains, these separate consensus of mechanisms off-chain. Zero knowledge groups are quite popular. They have sort of their own pros and cons. What they call optimistic rollup is really getting popular now and that sort of has its own pros and cons.

Plasma was quite popular for a while, but I think we're seeing there're a lot of limitations. A lot of research is being pulled back in that direction. I think ultimately though, like at the day, ideally this stuff, and I think it will, not really matter for end-users, right? It's about finding some sort of end application that allows people to do something that they could normally not otherwise do. I think we're seeing Ethereum find those potential use cases today where it's something that works with the current level of scalability and yet still has mainstream or sort of broad appeal.

One example that sort of came out recently was PoolTogether. PoolTogether is what they call a prizing savings account or call it a no-loss lottery. Unlike with the normal lottery where you buy a ticket for a few bucks. If you win, cool. You get a huge jackpot. If you lose, you've wasted a few dollars. With PoolTogether, it's more like a savings account where you can put 20 bucks in. I can be 20 bucks in. We pool all of our big pot together and then we lend it out on some of these lending protocol. So we're earning 5%, 6% interest on Compound or on dYdX. Over the course of a week, with millions of dollars, that can amount to several thousand dollars. You're earning several thousand dollars a week just on interest.

Then that 20 bucks that you put in now buys you the opportunity to potentially that interest. So instead of earning maybe a million dollars, you could potentially win several thousand dollars this week for that $20 deposit. That $20 still comes back to you. You can still withdraw it. It's like a savings account in that regard.

This is something that was built by a small team using, again, sort of these primitives and piecing it up together and do a simple application. They're growing reasonably well and they've added several thousand users over the past few weeks. Something that works today, something that is sort of this primitive high-latency low-throughput product but that can still get mainstream appeal today.

[00:43:27] JM: One of the things I have had trouble understanding. At this point, I'm content to note that there is a rational explanation for this that has more to do with community, but like what I never understood is why didn't everybody just treat Bitcoin as the assembly language of the crypto ecosystem and do all the layer 2 stuff on top of that? You could've done that or you

still could do that, or I think some people are doing that. I think that's what Rootstock does, but like why doesn't that happen?

[00:44:00] TS: Yeah. This is a very popular piece of debate, which is why isn't there defi on Bitcoin or why aren't there some of these other things happening on Bitcoin? What's interesting is, I mean, Vitalik originally –

[00:44:10] JM: Colored coins.

[00:44:11] TS: Yes, there is colored coins on Omni and there are all of these sort of attempts to make this thing work. But I think ultimately – I'm trying to remember. There's one specific debate on Bitcoin. It was not the – I forgot the exact sort of upgrade, but I think it is sort of cemented Bitcoin's ethos, which is we are robust and we are decentralized pretty much at all cost. We optimize for decentralization. We optimize for robustness. We are not going to break. We're not going to have bugs. We're not going to have a Dao style hack that we have to fork out, which is what happened with Ethereum. We are hard money.

I think obviously that has a lot of benefits, right? I think that's sort of why Bitcoin has been able to submit its store of value narrative. That's why a lot of people choose the whole Bitcoin because it's a scarce asset that is not going to change its cap in theory and it's not going to break. But that comes with a downside, which is it's somewhat inflexible. I think, simultaneously, the community that's been built around Bitcoin sort of also is sort of in line with is this ethos.

From a technical perspective, there are companies that are trying to do. You mentioned Rootstock, but we haven't seen much traction. It's less of a technical issue and more like a political issue almost. That's part of the reason why Ethereum was sort of formed, because Vitalik realized he couldn't build what he wanted to build on top of Bitcoin, so Ethereum sort of came out of that.

[00:45:37] JM: Right. I mean, it just looks like the perfect base layer to build on top of. Like, "Okay. Yeah, it's inflexible. That's fine." We build all of our software out of zeros and ones. No longer do we have people advocating let's do the Ternary system. Let's have 0, 1 and 2. Maybe

it's better. We've decided we're not going there. We're just not. That didn't happen with Bitcoin, but maybe it will in the future. Who knows?

[00:46:02] TS: Yeah. Who knows? It's still so early in this space. I think someone is tweeting the other day like the market cap for like Bitcoin is less than the value of cash that like Apple has on-hand. It's very, very early days and I don't think Ethereum's battle for smart contract supremacy has been won. I don't think Bitcoin not having any smart contract language is definite.

But as I think these things sort of come from people and the political climates that form around these different projects sort of produce what sort of the next evolution of that project is going to look like. I think for Bitcoin, they've really gone after this really hard store of value and now beginning to sort of develop on privacy use cases as well.

[00:46:46] JM: Today's applications of Ethereum, were you saying that like basically where Ethereum is today scalability-wise, that is bottlenecking maybe the next phase of applications?

[00:47:02] TS: People have different views on this. Personally, I think when you look at the transaction fee marketplaces and the block utilization on Ethereum, it's not so congested today that ideally what you want to see is tons of latent demand. You have people banging on your door, trying to get in and then it's clearly of a supply and scalability problem, and then you sort of focus on that.

I think with Ethereum today, we saw that in certain periods, for example, when CryptoKitties launched in 2017. Blockchain was massively congested because people were trying to buy CryptoKitties, auction CryptoKitties, breed CryptoKitties. Then we were seeing people spend tens of dollars per transaction and it would take hours to get mined. That's true demand. We don't see that today. You can get mined pretty quickly for a few cents.

I think really what the L2 stuff is about is about capacity building. It's something that we know is going to happen if we want to sort of realize the vision for Ethereum from this global financial ecosystem, but in my opinion I don't think we're seeing so much demand today that like that is definitely the bottleneck. I think it's a lot more about can we build applications that people

actually want such that we can get to that point where we have people banging on the door like we did with CryptoKitties.

[00:48:15] JM: You worked at 0x. We've been talking about the lending platforms. Decentralized exchanges are another area of – I guess that gets categorized as defi. What is the purpose of a decentralized exchange?

[00:48:33] TS: Yeah. I joined Dragonfly somewhat recently, but I used to lead product at 0x, which is a decentralized exchange protocol on Ethereum for about two years. I think the narrative around dex has shifted around a lot over the past 2, 3 years. Decentralized exchange used to be – Well, first of all, the nature of decentralized exchange has changed pretty dramatically.

There used to be – There are still are decentralized exchanges that are designed for trading Bitcoin peer-to-peer. Instead of sending your Coinbase into your Bitcoin into Coinbase and my Bitcoin into Coinbase and your ether into Coinbase and having Coinbase basically give us IOUs and having to trust Coinbase to perform the trade correctly, you and I can just trade directly peer-to-peer without a middleman [inaudible 00:49:15] our funds by ourselves the entire time.

That is sort of the genesis of decentralized exchange, which is its peer-to-peer exchange without a middleman and this was for good reason, right? I think a lot of people in their crypto community were personally hurt or scarred by the Mt. Gox collapse in 2011 where they maybe lost thousands or millions of dollars in Bitcoin in this defunct insolvent exchange. That sort of spurred this idea which is what if we didn't have to trust an exchange to hold on to a Bitcoin for us? What if you and I could just trade peer-to-peer like email? We can just – That's sort of the purpose of the Internet to a certain extent.

That I think was a really popular line of thinking and a really popular source of demand through 2016, through 2017, through 2018. But I think around 2018 we saw the centralize exchange market mature a lot. We saw a lot fewer hacks. We saw a lot of legit exchanges get insurance or have some sort of repayment policy and even something like Binance, which did suffer a hack in, I believe, 2018, repaid everyone. Exchanges are sort of self-regulating. They're getting a lot more legit. Now you could make the case that for a lot of retail users, it might be safer to hold

your crypto assets on something like Coinbase or on Binance or using a using a custodian that it is to just like keep it in your meta-mask or keep it on like a paper wallet in your house.

I think self-custody, it's a bit of a hard sell when you think about it to reach mainstream appeal. It's, "Hey, for this thing that is very, very unlikely to happen, we made it 100 times even less likely to happen." It's like telltale risk insurance. It's really difficult for humans of relative to think about tail risk insurance. That is also just a really difficult selling point.

In sort of 2018, the narrative started to shift a lot more to this permissionless innovation concepts. So we can create exchanges for any different at the market that might not get listed or might not make sense for a centralized exchange. Things like video items or synthetic assets or sort of long-tail tokens that are maybe too small to warrant trading on a centralized exchange, as well as this programmability element, which I think is really key, where as I sort of mentioned in the liquidations example, we can in a single transaction go from liquidating, to getting an asset, to selling it immediately all atomically without having to go to a central party to actually do that trade.

I think programmatic access to exchange without having to go through a custodian is really novel and really sort of a key selling point of decks and something that a centralized exchange can really never do when you think about how they're architected and how they're built. I think these two things have really started the propel the dex narrative going into 2019 where it's much more about – I think Uniswap has done a really good job at this where people can do personal token sales.

For example, I can mint a token that's worth one hour of my time and I can put into a Uniswap liquidity pool and then anyone can buy it. Anyone can sell it. I don't have to go through a listing process on a centralized exchange. Then simultaneously, I can, for example, but that and then send it to you in one single transaction to sort of do a purchase of your one hour of time. Something that again is not really feasible with a centralized exchange architecture. Those two things really our sort of guiding dex coming in 2020. I think we'll see who is getting traction. Who's going to get adaption in this year.

[00:52:37] JM: But it's all way too early, right? That's application. Unfortunately, I am sorry to indict your two years of 0x effort. I mean, Bitcoin isn't even decentralized, right? The binding pools are centralized. We don't even have insurance against tail risk at the base layer. Why would we build entire pieces of infrastructure that are decentralized when we don't even have the base layer figured out?

[00:53:06] TS: Yeah. I think some people would contest that Bitcoin is centralized thing. I think you dig into it. It is a bit more decentralized than people would give it credit for.

[00:53:14] JM: Sure, you can fork it and like that's great.

[00:53:17] TS: I think if anything, decentralized exchange is the area where it's traditionally an action that is somewhat frequent that people used to getting for really cheap. So you can go on Binance today and make thousands of trades and it's really inexpensive and it's really fast and it's really convenient. It's using something even like Robin Hood for retail traders is really slick.

In a decentralized exchange, I would say even today it's not super slick. You're paying a few cents. Maybe worst case you're paying a dollar to trade when you're waiting for that transaction to get mined. I think decentralized exchange is an area that definitely suffers from sort of a lack of scalability today where the current solution is, in many respects, inferior from a UX perspective to using a centralized product and so it's had to really lean into these other two elements, which are permissionless market access as well as programmability.

I agree, like I don't expect to see a dex kill Coinbase in 2020 or 2021 even. But ultimately it sort of comes back to this question, which is sort of like what defi and crypto are doing overall, which is do we think that payments and exchange and lending should be free public services and goods the same way many of the protocols in the internet are today, or should they be companies that we pay for? I think now we have the technology to build these as free open source utilities that are open to the public.

I think if you come at this again from first principles, that is very obviously like how this thing is going to go. There's no reason the like this current financial system is like the optimal solution.

This is clearly the endgame for finance. It seems way more likely that this will just be sort of this in omnipresent part of our lives as supposed to a separate thing that a separate company runs.

[00:54:59] JM: It's just unfortunately taking the base case too far too fast. It's like saying Larry Page has flying car companies. Shouldn't we have flying parking lots? Probably not yet.

[00:54:59] TS: Yeah. A lot of people in crypto I think have a struggle with timing. A lot of companies –Even a lot of things that we're talking about now, people were talking about Bitcoin talk back in 2013, 2014 or they were early the central change. Yet timing is really hard. You don't know how the market is going to react. You don't know what macroeconomic conditions are going to look like. You don't know how the underlying technology is going to progress.

Again, this is a bit of a research project where some of the cryptography and some of the consensus mechanisms that are being used have been invented in the past few years. It's interesting to see sort of this connection between finance, computer science, products all sort of converge and different threads sort of pull at different points.

[00:55:52] JM: Yeah, and sorting through the truth and the reality is such interesting. I think we should get to the crypto investing side of things, because that's an entirely new field in and of itself and it gets us a little bit closer to what you're doing today. Tell me something about crypto startup investing that's not true about traditional investing.

[00:56:13] TS: There are so many things. I'm thinking about what is going to be most digestible for the audience. I think a lot of what we see so many crypto projects that have gone invested in or trying to get pitched are trying to build money. They are trying to build the core currency that they envision is going the like power everyone's lives 10 years from now, which is really, really, really, really, really hard to do.

If you think about why something like Bitcoin or something like Ethereum seems pretty legitimate, right? I don't think anyone would say that like, "Oh! Bitcoin can never be money, or Ether could never be money." It's because they've been able to build a really strong community and that's been able to help them decentralize and really feel more like public good or like a public service as supposed to being something that's owned by a company.

I think for companies that are trying to do what we call L1 or sort of core new blockchains, a lot of what to think about is how do you build a community and then how do you sufficiently decentralize to, A, avoid a lot of regulatory burden? You can't just go out and like print new shares and sort of have everyone get them. But also have people actually like believe in your meme and believe that what you've created is money. That is a really tricky. I don't think many people have been able to do it successfully outside of Bitcoin and Ethereum today.

Bitcoin is never really crazy Genesis story, right? It's anonymous piece of code. We don't know who the founder is, and this thing is just had this sort of grassroots buildup and today it seems like a legit – I mean you can buy Bitcoin futures on the CME, which is insane. Going from a company raising seed capital from top Silicon Valley VC funds to being the money is a path that few have navigated so far. I think it's one that's actually really difficult to do. That's one thing that we look at when we think about one investment is go-to-market, which in this case mostly means how can they build a community and how can they really turn the sort of build belief in what they're doing beyond sort of this core team. It's not just – You can't succeed just being a small company. You can't just succeed being totally centralized. That's one thing.

I think another thing obviously is regulation. One interesting thing about Dragonfly is we're a cross-border fund. So we have about half the team in Beijing. We have half the team in San Francisco. We invested in Chinese companies and help them think about how to expand globally. We invest in US companies and help them think about how to expand into China. I think one thing that we've seen is while the US regulatory environment is not atrocious, crypto is not banned. People aren't getting thrown into jail for buying Bitcoin or something like that. It is a bit onerous if you're trying to do some of these more sophisticated financial products and especially if you're trying to sell them to consumers.

A lot of what we look for I think is teams that have really good regulatory go-to-markets. Are they expanding outside the US and are actually going to markets that are more favorable for doing lending protocols? Do they have a clear path to decentralization so they can get escape velocity and then decentralize such that it's going to be very difficult for regulators to maybe seize control and shut the thing down?

I think that is another big thing that we look at, which I don't think many startups have to worry about. Either what you're doing is legal in the US or it's not. There isn't sort of this this gray area where you can do sort of regulatory arbitrage, which is what see some of the successful crypto projects due today to a certain extent.

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[INTERVIEW CONTINUED]

[01:01:41] JM: What about crypto infrastructure companies? So like the StarkWare? I heard about one recently called – This is not even like a crypto – I mean it's kind of some crypto API company. I can't even remember what the name of it is.

[01:01:57] JR: Alchemy maybe?

[01:01:58] JM: Alchemy. That's it. That's it. Yeah. Do you guys look at any of these crypto infrastructure companies? Any lessons there?

[01:02:03] JR: Yeah. I mean we're investors in StarkWare. We're investors in Coin Metrics, which is again a data API company. I think a lot of people when they see a new paradigm shift in technology, their immediate gut reaction is, "Well, I'm going to sell picks and shovels. It's a gold rush. I'm going to sell jeans?" I think normally that's a good idea.

Normally that's a way to sort of capture a market data without taking a very opinionated risk. I think in crypto, it's been a bit tricky for some of these companies to really get great revenue streams and hit good profitability. Because the market is such that there aren't so many profitable businesses that can sort of pay large amounts of sums to pay for your business, it feels a bit early where like the market size for people who might need to generate as your knowledge pretty far might need to pay for an Ethereum node is not gigantic today. I think there're huge opportunities for it to grow and it probably will grow in the coming years.

Again, from a timing perspective, picks and shovels works really well when the market is booming and there is a gold rush, but maybe when there's only 10 miners, that's actually kind of a tough business. You need sort of volume and you need a lot of customers for these things to be sustainable if you're aiming for like a SaaS model, for example.

I think we believe in crypto infra and I think as any industry, infra is generally a good bet. I think with crypto, it's been a bit tricky because there aren't that many firms that can actually go out and pay for some of these services or that actually need to go and pay for some of these services. I think also at infra, we're always just looking for companies that have interesting edges. Companies that actually are building a differentiated non-commoditized service, and I think that has also been tricky.

I think a lot of companies went out and sort of saw this coming wave of sticking. A lot of what they call proof of stake blockchains have been launching recently and a lot of companies will stake your assets for you and take maybe a small cut of your staking rewards.

Unfortunately, there isn't a huge edge to be gained in that industry. There's only so good of a staker you can be. Ultimately, in any industry that becomes a commodity, there's margin compression. If you count for the same service that I can, then sort of a raise zero when it comes to fees. I think it's another thing that we look at when we look at infra is what is this company's edge or are they just a commodity and then are they going to receive huge margin compression? I would say those are the two things that we look at when we look at infra companies specifically.

[01:04:26] JM: As you were talking, I was thinking of – I swear I talked to some infrastructure companies or infrastructure systems or whatever during the ICO boom that had some kind of infrastructure piece and then they kind of backward engineered having a token involved or a – I think it was like a CDN+ token company, like, "We're going to accelerate everything and just take our token and you'll like it. It's going to be great." It just made me think of like the ICO boom. I was kind of thinking of a where are they now kind of thing. It's been like a couple of years since I did a show within these ICO companies. A lot of them were drunk on the ICO boom. Maybe they got rich on the ICO boom. What's the state of the aftermath of all that stuff?

All these companies that like were doing tokens and like they sold their tokens. Made a bunch of money and then kind of woke up the next morning in bed with a situation that they were perhaps somewhat regretful of or could just dry their tears with their money. I have no idea. Tell me what is the state of – I'm sure you must see these people at crypto conferences or wherever you spend your time. The ICO Schiller's, the ICO charlatans, where are they now?

[01:05:43] JR: I was actually just talking about this with Haseeb this morning, talking about what happened to some of these companies that not even ICO. Maybe they raised hundreds of millions of dollars from VC funds and then where are they now? I think there isn't a one story fits all when it comes to this. I think we've seen some companies that maybe raised money with not the best intentions go into settlements with the SEC. This is someone like EtherDelta or

someone like Block.one, which is the US token sale. They received a lot of regulatory pressure and ultimately had to do some sort of settlement.

I think in my opinion, the settlements were quit mild and someone like Block.one, which raised $4 billion have like a $250 million settlement, which if anything sort of feels like a green light if you want to do a crazy token sale, which is – I think a lot of teams, maybe they did a legit token sale, but again they were sort of drunk on ether, and if they raised an ether and they didn't do appropriate treasury management and they just held the ether through sort of the downturn, maybe aren't able to keep funding themselves and they had to close up shop.

Treasury management is also really key when it comes to ICOs. Did you like keep stuff in USD, or did you hedge your risk appropriately, or did you just go super long on crypto and sort of like suffer a little bit of that burn? But there are still teams like 0xm, for example, that are still out there doing really great work. There was just a big 0x V3 announcement a couple of months ago and launch of 0x API this week that are still plugging along, still making great products, still getting a little traction every single week, every single month. I think it's always hard to, again, sort of do timing correctly to do go-to-market correctly, but there are a lot of people out there still working on the initial projects that they set out to raise funds for and the idea is that technology is maturing. The market is maturing and at some point the stuff will sort of come to fruition.

I think much in the same way that a lot of startups had slow burns for 5, 6 years and then, oh, suddenly becomes sort of an overnight "success" in Silicon Valley, when in reality they were going from a thousand customers, to 2000 customers, to 3000 customers sort of every single month. I think a lot of crypto projects are sort of in a similar boat where they're just sort of slowly burning behind-the-scenes. Yeah.

[01:07:56] JM: I mean, that's not going to happen with like the Bloomberg for crypto companies or the –

[01:08:00] JR: Yeah. I mean, I can't speak to everyone. I think a lot of people probably they didn't do the best job when it comes to raising an appropriate amount of fund.

[01:08:09] JM: The thing that was the dead giveaway were the vesting schedules where like, "Yeah, we're vesting weekly." Like, "What?" I get it that Silicon Valley 10-year vesting schedules are outdated, or what is it? The 18-month vesting schedule, whatever. We should have 10-year vesting schedules, but you do not get to vest S-coin overnight.

[01:08:28] JR: Yeah, definitely. I think there were unfortunately a lot of actors like that who saw gold rush opportunity, raised some funds that they probably weren't going to use with the best intensions and then dump their token on regional investors and it's kind of unfortunate, I think.

ICOs are – If you think about it, really fucking cool, right?

[01:08:47] JM: Sure.

[01:08:47] JR: It's decentralized capital formation. That's really, really breakthrough. I think the problem is it was very much abused, and as a result, a lot of people who've gotten turned off on crypto have really negative connotations when it comes to crypto. The industry I think has spent the better part of the past three years trying to really legitimize itself and pay down the debt basically that was accrued during this 2017 ICO boom.

I think we're seeing – When it comes to capital formation today, a lot of people going the SAFT route, so sort of similar to a safe. Well, they'll all raise equity and distribute tokens on a later date or even just go straight equity and then at some point when they get big enough, use tokens as a way to create a liquidity event for investors. That is a way to decentralize control or decentralize ownership in what they're building.

I think things have gotten a lot more sober in a good way in the past two years or so, and even a lot of teams just forgo tokens entirely and just go straight equity, which is a very legit approach and I think probably something that we'll keep seeing going forward.

[01:09:51] JM: I don't know about you, but the crypto boom for me was this crazy moment where I had to come to terms with my own humanity because I bought in. I mean, not financially. I didn't buy a bunch of terrible – I did buy some Bitcoin, Ethereum and – I don't know. I didn't do fantastically well and I didn't buy early enough. I didn't ride the waves super tightly,

but I bought some and I watched the market. I remember checking my Coinbase app occasionally.

But emotionally, like getting sucked into a herd mentality and like going to a crypto meet-up at a bar in San Francisco and seeing people everywhere and just like talking to people and like, "Oh! Have you heard about the latest DAG system?" Like, "No. I haven't. Can I get in? Should I get in? Have they solved the – Oh! They implemented a new distributed systems thing and like –" I don't know about you. You said it could be your science, right?

The hardest class I took in college was distributed systems class and you had to read these whitepapers. I could not get through them. They were so boring. I mean, I shouldn't say they're boring. They're extremely important, like we have distributed databases and cloud computing and stuff, but it was very hard, and you read through these things. You read through Paxos and you're like, "Okay. This is very, very hard. There're a lot of diagrams. There're a lot of like difficult things," and it convinces you and then you implement it. It's really hard, but it works. Then the crypto whitepapers looked this way, and then the market is going up and up and up and up and you get sucked into it and you believe like, "Is this happening? Is this happening right now? Is it a reality?" Then I would talk to Haseeb and he would say, "No, it's going to crash, for sure."

What was your psychology through that period?

[01:11:36] JR: Yeah. I mean, I've been following crypto for quite a while. I sort of got into Bitcoin during college. As part of the like graduation requirements for my CS program, you have to do a class and a paper on some interesting element of I think some computer science. I didn't mind on Bitcoin regulation back in 2012. Basically trying to look at existing legal president and see how the US legal system look at Bitcoin and how might this thing go about being taxed and how might finsen look at this thing.

That's sort of really when I got into it, but I didn't – I sort of was paying attention during 2013. Sort of fell out of it after I graduated and sort of went to work full-time and wasn't really able to focus on this interesting side project. I think I really got back into it after I left Instagram, I mean, sort of the end of 2016, 2017. Some friends of mine were sort of talking about it and sort of following it. I think, for me, again with a computer science background, a lot of it was more the

technology to a certain extent, right? Being able to deploy smart contract that anyone can use and anyone can build on is really cool.

Certainly, the investing wave and sort of the hype wave I also felt to a large extent. I saw friends of mine get hooked in and whatnot. I think obviously there're sort of human bubble mentality and this sort of a lot of papers that have been written about that. But I think to a certain extent, I think it even happens for VCs in crypto, which is a bit like Pascal's mugging, where if you're doing like a really naïve expected value calculation, maybe the probability that when these projects' succeeds is really low. But the payoff, the benefit of this succeed is so extraordinarily high, right? It's like, "Well, maybe this team has a .01% chance of succeeding. But if they win, it's money."

I think that sort of broke a lot of people's way of thinking about valuing these companies, like you would never go into a crazy – I bet like the early internet, right? You would never go into a crazy frenzy if we think about how to value some like legal document and management SaaS company because there's only so big that market can be and we sort of know how to value that. But if I tell you, "Hey, when this company succeeds, it's going to be the currency that everyone uses out on the world and it's also going to power every single loan that ever existed in the entire world." People aren't used to thinking about how to value the expected value there. I think that also sort of contributed to the frenzy, which is like this thing is going to replace money, which is fucking crazy.

I think, 2017, it felt like so long ago, but at the same time it was not that long ago.

[01:14:08] JM: No, it wasn't.

[01:14:10] JR: Yeah. I don't even know what to say that hasn't already been said.

[01:14:13] JM: Did you get sucked in? Were you an acolyte? Were you a religious acolyte studying whitepapers at 2 in the morning?

[01:14:17] JR: I do think that was actually another very funny thing that you mentioned, which is like people pretending to understand and care about the latest like technical developments.

[01:14:24] JM: This just became cool.

[01:14:26] JR: Yeah. I sit inside in those distributed systems classes. There's like 10 people attending even in the classes.

[01:14:31] JM: It's brutal.

[01:14:32] JR: Yeah. It's ridiculous. Yeah, I mean, I invested in the 0x ICO, for example, or token sale, which is one of the more legitimate in my opinion that they actually used the product to sell the tokens. It was like functional at the time. But I definitely think everything goes crazy as a lot of people. I think I'm inherently a bit of a skeptic at heart, I guess. Yeah, it did sort of hurt seeing some of these crazy returns and shit, but something about it, the whole like just crazy influencer, like the whole sphere about it really turned me off to a certain extent.

Yeah, I mean, again I think we'll see a return of decentralized capital formation. I think that's just like two valuable a service to give up. But it will probably return in a lot saner ways. It'd be something like people shares into a treasury, and that treasury is controlled by the people who contribute to it and that slowly joules out funds overtime as supposed to maybe more like kickstarter as supposed to like having some random token that you have to like ascribe value to or maybe teams do a more auction-based approach.

Let's hope the market dictate what this thing is going to be worth. What our asset is going to be worth as supposed to putting some price on it and then trying to like pump it by getting listed on a bunch of different exchanges and things like that. I think we'll see decentralized capital formation return, but probably it won't like what we saw in 2017.

[01:15:54] JM: All right. Great stuff wrapping up the crypto world. We should definitely do another show at some point if you want to.

[01:16:00] JR: Yeah, that would be fun.

[01:16:02] JM: I'm wanting to ask you a little bit about – A couple of years ago, I guess probably 3 or 4 years ago at this point. I was doing a lot of shows on advertising fraud. You're someone who spent a lot of time in the ads world. You worked on Facebook ads. You worked on Instagram monetization, and the thing about the ad world that is weird if you look into it in depth is it's very hard to know who is a bot and who is a human, basically impossible.

Therefore it's very questionable why we're framing everything in terms of CPM, in terms of consumption of the content, because if I ran an ad on Twitter and I know that there is some unknown numerator of bots, then therefore I also don't know the denominator, because it's very hard to know what is my reach even. I just like somebody who spent a lot of time in the ads world and who is also skeptical debunk my paranoia or validate it.

[01:17:05] JR: Yes. This has certainly taken a big left turn, but I do like talking about it.

[01:17:09] JM: Absolutely. We're wrapping up. We're wrapping up. We got the last stragglers in the stadium who are still paying attention.

[01:17:13] JR: Yeah, thanks for tuning in. I mean, it's funny, like I think – I was working on ads for about three years across Facebook and IG and I think during that time we saw a lot of demand and narrative shift in terms of advertisers. I agree that, traditionally, the way most types of media gets sold including some of the first digital ads, billboards, TV, print, whatever, they get sold through reach and impression, right? It's how many people see this and how many unique people am I actually going to reach with this particular product?

There's a very famous quote in advertising, which is I waste 50% of my ads. I just don't know which. Really, the breakthrough, it was sort of like double click, for example, back in like '05 was the ability to more accurately measure the result of these ads. It's no longer just a bunch of people see my ads and then maybe I see my sales improve or some sort of if you're a brand advertiser, some sort of magical brand affinity score goes up. You don't really know.

I spent most of my time working on as direct response advertising. If you click through on the ad and you buy my product, well, you can't falsify that. That's like money in my pocket. There was a shift away from just CPM to CPC. So how many people are clicking through? To CAC, or CDR.

How much is it going to cost me to actually install this app to sign up for this newsletter to buy this thing? I think over my time at Facebook we saw that was sort of the big transition, is helping these sort of legacy advertiser think more tactically about conversions and think about measuring the value that they're getting out of their ads. Ultimately, it's kind of – I don't want to say simple, because there's a lot of very smart, hard people working on it. But it's like a machine learning optimization problem. It's, "Hey, here are all the things that are good. Here're the value scores I'm assigning to them. Here are all the inputs. Go create some crazy black box that's going to maximize my value on the other side."

Then really the question becomes, "Well, how can we more accurately measure that value?" That is sort of the Holy Grail for advertisers and that's sort of we're seeing more and more people go to which is we're not just looking at installs. We're looking at return on ad spent. We're looking at the lifetime value of the people that we're signing up. A single install is not really worth the same. Someone might sign up and be retained for a year or years. Someone might sign up and uninstall. Someone might click in on my website and buy a shirt. Someone might click in on my website and buy 10 shirts.

Passing all that data back as well as metadata about these transactions to Facebook, to Google and then allowing them to ingest that information, look at all these other advertisers' information in sort of an abstract way and use that to power their machine learning algorithms was really sort of the big trend while I was there. I think that's impart why when you look at year over year growth and digital ad spend, I think it's like literally 99% of it really goes to either Facebook or Google. It's because they have this big data mote. They're just better at doing these sort of recommendations and measurement than anyone else.

That was sort of Facebook's whole thing when they started doing digital ads back in probably like '08, '09 when they were trying to like prove that they can monetize, which is maybe Google has intent. Google has search. But Facebook has identity, and identity is really key for measurement, right? I can track your identity across all these different services. I know that you're a real person because fake people, in theory, get blocked from Facebook all the time. But with identity, I can more accurately measure the results of my ads, and that was sort of their go-to-market selling point and that was sort of like Google to play catch up when it came to measurement and came to identity.

I think that is really like the trend of digital advertising over the past 3 or 4 years, which is like how can we basically get as much transparency and inspect this entire like conversion flow as deploy as possible? How can we measure every single person at every single touch point and know and quantify their value as much as possible? Spit all these data into some huge, crazy machine learning pipeline and then spit out better ads on the other end? Which is why like people say, “Oh, Instagram ads are so good,” or “Facebook ads are so good or so tailored.” It’s because they have crazy data about you from all the websites that you visit, the purchases that you make, the apps you install, the things you do in those apps. Of course, anyone with all that data is going to be able to like recommend you reasonably good ads.

[01:21:30] JM: All right. You have assuaged my paranoia.

[01:21:32] JR: We can get into it. I do like talking about advertising. It’s still a really interesting topic.

[01:21:36] JM: I mean, the ad fraud stuff that actually does exist is hilarious and malicious and it’s still widespread, I’m sure, but that’s for another show.

[01:21:43] JR: Yeah.

[01:21:43] JM: Tom, thanks for coming on the show. Great talking.

[01:21:44] JR: Hey, thanks for having me. This was fun.

[END OF INTERVIEW]

[01:21:55] JM: As a company grows, the software infrastructure becomes a large complex distributed system. Without standardized applications or security policies, it can become difficult to oversee all the vulnerabilities that might exist across all of your physical machines, virtual machines, containers and cloud services. ExtraHop is a cloud-native security company that detects threats across your hybrid infrastructure. ExtraHop has vulnerability detection running

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