

- Demetri Kofinas:** 00:00 Today's episode of Hidden Forces is made possible by listeners like you. For more information about this week's episode or for easy access to related programming, visit our website at [hiddenforces.io](http://hiddenforces.io) and subscribe to our free email list. If you listen to the show on your Apple Podcast app, remember, you can give us your review. Each review helps more people find the show and join our amazing community. With that, please enjoy this week's episode.
- Demetri Kofinas:** 00:31 In the fall of 2008, equity markets were in free fall. The Dow Jones Industrial, S&P 500, and Nasdaq were all on their way towards lows not seen since the mid-1990s. Stock valuations would collapse by more than 50%. Legacy investment banks filed for bankruptcy while others fled into the rapacious arms of their competitors or other the protection of congress and the Federal Reserve. At the same time, as Schumpeter's ghost was rattling his chains on Wall Street, Satoshi's white paper was making the rounds on a cryptography mailing list in some obscure corner of the internet.
- Demetri Kofinas:** 01:13 "I've been working on a new electronic cache system that's fully peer-to-peer with no trusted third-party," he wrote directing the several hundred recipients to his paper, bitcoin, a peer-to-peer electronic cache system. "Merchants must be wary of their customers," he writes. A certain percentage of fraud is accepted as unavoidable but these costs and payment uncertainties can be avoided in person by using physical currency, but no mechanisms exists to make payments over a communications channel without a trusted party. This last bit was only partly true. It was Satoshi's paper after all that made it untrue. Though if you realized it at the time, the bitcoin white paper marked the beginning of the internet's second act. In the 10 years since its publication, we have seen an eruption of interest, development, and investment in protocols built from Satoshi's underlying flawed chain technology, designed to execute commands across a distributed, trustless network of computers. Ethereum led the way with its pioneering virtual machine able to execute smart contracts across a permission list network and since several competing ledgers have cropped up, each claiming some advancement over prior versions.
- Demetri Kofinas:** 02:37 But what if in their bid to create a faster horse, developers and investors alike have missed a crucial turning point in the evolution of the internet? Satoshi's white paper, brilliant as it was, never claimed to be the blueprint for a world computer. As the bitcoin network has grown, so too have the costs of its transactions and this is because adding blocks takes time. Deciding what chain to build on requires the network to agree

on which chain is the longest and when chains are growing too fast, it's hard to tell the difference. In the last several years, we've seen an explosion of brain power devoted towards creating workarounds to the scalability problem, but we've also seen a quiet, committed effort at building alternatives that aren't saddled with blockchain's limitations.

- Demetri Kofinas:** 03:29 Perhaps the most interesting of these alternatives is Hashgraph. Built as a directed acyclic graph, its fundamental innovation is not in its architecture but in its consensus. To the uninitiated, its technology can often seem like magic. One might describe its consensus protocol as nothing more than a compression algorithm for the casting of votes. A voting algorithm for a global network. What we would have once taken an impossible amount of time can now be accomplished in a matter of seconds. It was Claude Shannon, the father of information theory, who stated it most clearly: "The fundamental problem of communication is that of reproducing at one point either exactly or approximately a message created at another."
- Demetri Kofinas:** 04:18 In its first iteration, the Internet solved the problem of communication across the network without the need for a trusted third-party but making definitive statements about that communication has always required an intermediary. In order to harness the full power, we need to do for data processing, computation, and storage what the existing suite of internet protocols have already done for communication. A revolution for a new generation. The internet's second act. This week on Hidden Forces: Tom Trowbridge, Hashgraph, and the second Internet revolution.
- Demetri Kofinas:** 05:16 Tom Trowbridge, welcome to Hidden Forces.
- Tom Trowbridge:** 05:19 Thanks so much for having me.
- Demetri Kofinas:** 05:20 So it's Trowbridge, not Trawbridge, right?
- Tom Trowbridge:** 05:22 Correct.
- Demetri Kofinas:** 05:23 I always want to call you Tom Trowbridge because it sounds like a western. Like a name for a guy coming in...a gunslinger from the west.
- Tom Trowbridge:** 05:29 You wouldn't be the first to make that mistake.
- Demetri Kofinas:** 05:31 So I've completed the circle now. I've had Mance. Well, Mance is on a panel and I've had Leemon obviously a bunch of times

and now I've had you so I've completed the Hedera Hashgraph Circle.

**Tom Trowbridge:** 05:39

Exactly. Well, it's great to be here and we appreciate the support.

**Demetri Kofinas:** 05:42

Yeah. No, and I appreciated also that you came. Actually, this was an opportunity that came out of a few last minute cancellations of some guests that we're going to have on in the future but it was fortuitous because you have some great news to share with our audience and it has to do with the crowd sale that you're doing, accredited crowd sale. But before we talk about that, two things I want to mention. For those who don't know, I'm actually an investor in Hedera. We covered Hedera all long while ago. I actually hope that listeners who aren't aware of that because they haven't heard those episodes on Hashgraph or Hedera Hashgraph, I hope they aren't aware of that because then it means I'm doing my job right, which is covering these bases objectively as I possibly can and we're going to try to do that today also. Another thing I want to say is that nothing we have to say here today should be construed as investment advice in no way whatsoever. I mean, for you, that's fine. I'm saying for me is what I mean.

**Demetri Kofinas:** 06:33

So Tom, first of all, I want to talk about this industry more broadly with you because you have an interesting perspective. I mean, Leemon's a super technical guy. Mance is obviously no-shrinking wall flower when it comes to technical stuff and you, your background is different and I feel like you have a more layman's ability to explain this information and you do a lot of the business development and sales work all around the world for Hashgraph. What is the latest on what Hashgraph is doing?

**Tom Trowbridge:** 06:59

The exciting part is that we launched our accredited investor crowd sale. August 1st, we launched that at 8 am. In 24 hours, we've had just about 3,000 register to participate, which is really exciting, it happened so quickly. We're just using it based on our own lists. We have a provider who's helping us - TokenSoft - go through AML-KYC but it's just people who've registered on our site and our community. So it's great to see that level of involvement so quickly. People are going to the process right now in investing and we think that it shows the support of the community which is something that has been important for us from the very beginning.

**Demetri Kofinas:** 07:37

You know, that just made me remember what it was like when you guys blew up and people started learning about you and everyone was upset that there was no SEO. Remember that?

**Tom Trowbridge:** 07:45 Yeah.

**Demetri Kofinas:** 07:46 It's funny because that was in the early days where there really wasn't an awareness about the way in which companies in this space were shifting their strategy and they're becoming aware and concern about regulations. Now, it's just every sort of interesting company has either a SAFT or some other type of accredited investor arrangement. Can you talk a little bit about that? What's that been like? How have you guys navigated the regulatory space?

**Tom Trowbridge:** 08:11 It's been an evolution and I think we are based in the US, we are predominantly US citizens. A lot of our governing members are going to be US companies. A lot of DAPs are based in the US. So it's very important for us that we are highly aware of and follow and adhere to the US regulatory regime and that's disappointing to a lot of people overseas and even people in the US is disappointed too sometimes, but that's the reality of the world we live in and we're doing everything to be as compliant as we possibly can and even understanding what's compliant isn't always crystal clear, as I think you've recognized in some of your previous shows. But we've engaged with regulators, we continue to engage with regulators, and part of the reason we've done this sale now as opposed to later is that we want to launch the network pretty soon and we don't think we can actually have an active SAFT after we've launched the network.

**Demetri Kofinas:** 09:07 Why is that?

**Tom Trowbridge:** 09:08 It has to do with how the SAFT will be characterized because the SAFT is a security and we don't want to be offering that when we actually have a token live and the network actually operating.

**Demetri Kofinas:** 09:19 You know, I've looked at a lot of companies in this space and looked at them as an investor as well and I would say you guys are the very top in terms of, from the very beginning, being extra concerned about regulation. Extra concerned.

**Tom Trowbridge:** 09:30 I mean, I think that's the case it comes ...

**Demetri Kofinas:** 09:32 Why though? What made you so ... I'm not saying it's not smart, but what made you so concerned about that?

**Tom Trowbridge:** 09:37 I guess it comes from the top, both Mance and Leemon are ex-military and are highly focused on following the rules and doing the right thing and acting in the most conservative way possible

and I think that has just driven everything we've done at the company. It's also made life harder for us. When we raise money from institutions, we didn't take money from jurisdictions where we felt regulation wasn't clear that we could do so including Japan, China, Russia. So the money we've raised, we took money from any of those areas.

**Demetri Kofinas:** 10:09

You took no money from China?

**Tom Trowbridge:** 10:11

Nope, and we also didn't take syndicates. Actually, we refunded syndicates and shut seven unauthorized syndicates down. So the fact we raised this 100 million without those markets is remarkable I think is missed and in this sale, which is something we're getting some heat in the community for but not only is it accredited investor, we decided to hold all investors to the US accreditation standards, which is not something typically done either and that actually enormously complicates it but we think there are very valid reasons for doing that which had become apparent further down the road. But we have a long game here. Thinking about this from another perspective, almost two-thirds of Leemon and Mance's tokens don't vest until years four, five, and six. Almost all of management tokens vest over a four-year period. So this is a very long duration project and we are investing our time, effort, energy in building a company for that duration. So there isn't an interest in any short-term sacrifice given the long-term horizon we all have.

**Demetri Kofinas:** 11:13

That's actually also for security reasons as well. Because of the way you guys are staking tokens and you're securing the network, having a control over the supply schedule of these tokens is essential. I had something that Leemon and I spoke about on episode 36, which was on camera, for those who want to look that up on YouTube.

**Tom Trowbridge:** 11:30

Yeah. That's definitely the case. It comes into how you want things about this from the investment side but we expect to have only about 10% released in the first year and that goes up to about a third by year five and there are circumstances under which that could be somewhat accelerated but on the current plan it's 10% in the first year and I think that is also lost on a lot of people who are used to seeing full supply in the market or else only look at circulating supply and don't pay attention to the actual total supply and there are a variety of projects where that difference is huge and a variety of projects where the difference is zero and that doesn't seem to be ... I'm not sure that's fully appreciated by everybody out there.

- Demetri Kofinas:** 12:08 That's an interesting point, right, because the way that people usually think about profiting from the success of a company, that's independent from the company's own success. Your ability to monetize your speculation doesn't affect the success of the actual project but because of the fact that this is a token economy and they're staking architecture, releasing those tokens very early can put you at a vulnerable position to be attacked, for example, civil attack or something like that.
- Tom Trowbridge:** 12:35 Certainly. I mean, the way we think about it is that if these were a private permission network, two-thirds of the nodes would generate consensus and with certainty. Ours is token weight voting to prevent civil attacks to your point, but a third plus one in the tokens in the wrong hands of an attacker could jeopardize consensus. So our objective is to wait as long as possible until that third plus is out in the market and ideally, that is when the tokens have a relatively highly value so it's very difficult to actually buy a third of those tokens and disrupt consensus and that's why we have a very slow schedule.
- Tom Trowbridge:** 13:06 It's also interesting because that token, unlike a lot of projects, is critical to the security of our network. And so to the extent we have tokens out and people try to corner it or to disrupt consensus by buying a third, because it's a fixed supply, the more they buy everything, the price will go up and make it increasingly prohibitively expensive to actually effect that type of attack and so that is one of the critical reasons why we actually need to have a native token which isn't the case for every protocol, I would say.
- Demetri Kofinas:** 13:34 What do you think are some of the most challenging technical problems you guys have faced and might face are?
- Tom Trowbridge:** 13:42 Let me put it this way: it's incredibly complex to build this. Leemon is best suited to answer that question, but I will just say from looking at other protocols out there and hiccups that have happened, it's pretty clear that this is not a simple thing to build. You can explain it simply, but getting into the weeds of everything from nodes, turning off and joining and falling of the network and how that works is very complex, but I think that's something that requires significant development. Sharding is an entirely other area of development which we haven't completed yet that's in V2. There's a variety of different technical challenges. Luckily, we have Leemon and Leemon unparalleled his ability to architect and then actually implement these solutions.

- Demetri Kofinas:** 14:27 Again, for listeners who aren't familiar, episode 36, that was essentially a video interview that I did with Leemon at Soho House here in New York. It was the last of three interviews I did with him. The first was just in a podcast. The next two were video and the audio was available on the website, at least for 36. In 36, we talked about the public ledger implementation. We hadn't done that before because it didn't exist or it wasn't something that you guys were talking about openly. We talked about sharding specifically. The challenges normally with sharding a database, particularly a blockchain database that doesn't have finality or a blockchain database that doesn't have an implementation of consensus, I spoke about that with Vitalik and Vlad as well and I do highly suggest anyone who's interested to hear those and to meditate on that because that is a challenge, sharding a database effectively without finality certainly and then how do you do with and then how good is your consensus protocol.
- Demetri Kofinas:** 15:17 I want to go back a little to this ... you guys were talking about the accredited sale. First of all, it sucks that the SEC has those regulations because you have to do what you have to do, but it totally sucks and it's unfair and I totally sympathize and understand why people feel the frustration about that and why they felt it because it prevents people from investing in things that they'd like and it gives an advantage to people who have more money to invest and it's really unfortunate. But the other thing that I've seen that I was concerned about you guys is the faith companies that have been trying to raise money off of Hedera Hashgraph. That's been going on from the very beginning. Initially, it was ICOs. People were saying that it's the Hashgraph ICO. How are people doing that right now because that's concerning if you're raising money online, right?
- Tom Trowbridge:** 16:01 It's a huge concern of ours. We have shut down dozens of scam sites and we continue to do so. One of the reasons that we didn't give any kind of pre-announcements for this crowd sales was to at least mitigate the possibility of the spread of those types of scam sites. It's also why we announced it via video and not via email. They're telling people to type Hedera Hashgraph or just hashgraph.com into their browser and not click on any links because there's a number of links out there that you can click on that actually misdirect you.
- Tom Trowbridge:** 16:34 So we see scams and one thing I'd say, the easiest way to tell a scam, and many of you said this, that it was an ERC-20 token. We're not going to be an ERC-20 token so next time you see that, that's an easy way to know it's not the case. But listen, I've even had an adviser of ours who was helpful in our capital

raising insists with me that he had received a Hashgraph ERC-20 token in the wallet of his and was convinced that we actually had offered and had distributed ERC-20 tokens and this is someone close to the company who didn't believe me when I said it wasn't in fact the case. So they've gotten to that level of sophistication.

**Demetri Kofinas:** 17:11

That's really upsetting and not just for you guys. I mean in general, these scams are becoming more sophisticated and target also elderly people.

**Tom Trowbridge:** 17:17

Yeah. I mean, I think it generally do, in this environment, I think in this world probably that may or may not be the case. The other thing that I'd say is we're also going to be recording a video announcement closing the sale so that people know it is in fact closed because I think we're going to see more scams after it's closed for people who've missed it and then there's a formal concept. So I expect to see a lot of scams happen at that point.

**Demetri Kofinas:** 17:42

Two questions: one, do you know how much has been stolen or scammed from people? Do you have any idea? Two, how are you on top of shutting these sites down, identifying them and shutting them down?

**Tom Trowbridge:** 17:51

I don't know how much is stolen. I actually think the dollar numbers are not huge, but it is still something that I know Leemon personally gets involved because he cares so much about it and hates to see money taken from people who support our project. So he's gotten more involved than you would expect. We have a process ...

**Demetri Kofinas:** 18:07

I can imagine Leemon getting involved.

**Tom Trowbridge:** 18:09

It's definitely the case.

**Demetri Kofinas:** 18:10

I can imagine him taking moral slight to that.

**Tom Trowbridge:** 18:12

Oh, for sure. So our council is up. We have a variety of providers who are involved and are not only looking for them and the community is a huge help in sourcing them and identifying these scam sites but also in helping shut this down and that involves talking to hosting companies hold a variety of service providers to get them shut down but to continue whack-a-mole battle.

**Demetri Kofinas:** 18:32 So, this should probably be a good time to go back and learn how you got involved in Hashgraph and maybe you can start us off with really the beginning of your professional life. I know you went to Yale. You have a great background in Yale. You also did your MBA at Columbia about 10 years after you graduated and you started Bear, didn't you?

**Tom Trowbridge:** 18:49 Yeah, I started at Bear Stearns.

**Demetri Kofinas:** 18:49 You were at Bear when the LTCM bailout happened? When bear walked out of that meeting?

**Tom Trowbridge:** 18:53 Yeah. I was there right before that. I was there '96 to '98, so pre-that.

**Demetri Kofinas:** 18:56 But wasn't it '98 that they've convened the five families?

**Tom Trowbridge:** 18:56 I guess you're right. I think I left right before that. Exactly. I was fortunate enough to start at Bear Stearns I think it was a terrific learning environment because it's incredibly intense and an incredibly flat organization and so you could get a lot of responsibility as a 21, 22-year-old out of college and work with very senior people across a whole variety of companies and I started off investment banker focused on telecom and technology. So that was the era of telecom deregulation. That was in c-lex, d-lex data providers, cable. Everything was growing enormously and huge amount of financing happening, this telecom access just exploded.

**Tom Trowbridge:** 19:44 So I was a banker but focused on rather technology-intensive businesses which was a great training ground for both the financial side but also the technology side, understanding the difference between CDMA and TDMA and GSM and the very building blocks of telecom infrastructure, which is interesting, and I did that for a couple of years and then we went to private equity for three and a half years in Boston also focused on telecom and technology. We moved into towers and we did some media as well and that got me more interested in the investing side and after business school, moved into asset management, was at Goldman for a couple of years and a variety of hedge funds. But throughout that period, I kept doing seed investing.

**Tom Trowbridge:** 20:26 So rightly or wrongly, I thought I learned something from the days of Bear Stearns and from the private equity days and so I both threw business school contacts, but also just people who I'd worked at Bear Stearns with, would see different

opportunities from time to time, invested in handful of them over the past 15 years. The most recent company I invested in, Swirls, which is the parent company, and that came about another deal I was looking at and a guy who I knew well introduced me to a colleague of his when I was looking at a deal on energy. He then, I understood, knew a great deal about crypto and ...

- Demetri Kofinas:** 20:58 What year was this?
- Tom Trowbridge:** 20:59 This was in ...
- Demetri Kofinas:** 21:00 2014?
- Tom Trowbridge:** 21:01 No, no, no. This was recently because I invested in Swirls in '17, I think it was, or early '17. So he had found Swirls, introduced me to it. I invested in Swirls, got to know Leemon and Mance through that period. This was before we'd clearly announced any public ledger but knew that was coming and after spending more and more time with them and accompanying them on early discussions with some potential council members, I effectively was able to have an introduction with the company and a diligence have all these big companies [crosstalk 00:21:34].
- Demetri Kofinas:** 21:34 You'd already invested though.
- Tom Trowbridge:** 21:35 I'd already invested the time.
- Demetri Kofinas:** 21:37 Was that part of your strategy to say ... so before we continue, I'm curious of your process here. So when you invested in the company, like you said, part of the investment was to get you closer so that you could even make a better assessment about ... what gave you that insight, was it mostly the fact that your friend, you said he was associated with the company or ... ?
- Tom Trowbridge:** 21:55 He'd found the white paper and he had a headstart on me because of finding it before me and knew the space better than I did but didn't know it in much more detail.
- Demetri Kofinas:** 22:05 What was the most compelling thing that got you to invest in the company, initially, Swirls?
- Tom Trowbridge:** 22:10 So this is fascinating, I think, because I also see it from that side and I see it from all the people I talk to about investing in the company and all the people who said no and didn't invest in the company.

**Demetri Kofinas:** 22:20 You and I have talked about this.

**Tom Trowbridge:** 22:21 It's such an interesting thing to see both sides of it when I saw it and I saw Leemon and Mance, incredibly interesting people with the technology that I couldn't tell if it would win. I didn't know enough to know that and I still don't, but it seemed like it was a totally different approach that I had to see anywhere else but I knew I didn't know a lot. So it's not like I between the farm on it, but it was clearly a technology that was worth an investment because the upside was so significant that if it worked out, it made sense and the downside is always a zero. The downside always is everything goes to zero so you have to do a portfolio of these things, which I did. But what was unusual, I think, is not the investment but the ability to spend more time with the company being a pretty small investor and then the fact that they needed to build out a whole team to execute the public ledger plan and those things worked out together, which was fortuitous.

**Demetri Kofinas:** 23:14 Really amazing. You know, I had a similar experience in so far as I got to spend a lot of time with Leemon, which gave me a really great insight into the technology. Besides the initial encounter with the white paper and seeing and I think similarly, it sounds like what you're saying, which is the unique approach and the simplicity of the consensus protocol and the way that it felt very much like a compression algorithm for a voting protocol. I actually was having a conversation last night. We were eating ... I actually wasn't eating. We were at this apparently was a great Chinese food restaurant with these two brilliant engineers, one who I know ... interestingly enough, the other one I knew from a singing class and I didn't know that they were friends.

**Demetri Kofinas:** 23:55 These are Facebook engineers, an engineer at Facebook, and the guy, also very brilliant, four exits, and we were having a philosophical conversation about consensus in general, which is a really interesting thing because there is no ... now, this is getting a little philosophical, we're going a little off track here, but there's no such thing as objective reality. Reality is a subjective consensus. It's a consensus around ... we come to a communal set of subjective experiences that we share and say, "This is the objective reality," but we come to them with our own subjective perception. It's just interesting thinking about what is consensus and why it's so challenging. There are some interesting philosophical questions that arise when I think about it that make sense in the context of the problem anyway, but that's mixing engineering with philosophy.

**Demetri Kofinas:** 24:44 That's exciting that you got to be in the ground floor like that. What skillset did you bring to the table at that time do you feel like? And it's interesting, it's also cool that you worked with telecommunications technology. I worked for Cable Vision for some years and I found it fascinating because it's this old school legacy stuff and you have constraints that you don't normally have. What was it that made you uniquely qualified to help a company at that stage?

**Tom Trowbridge:** 25:11 I guess there's a couple of things. I wouldn't say that I was uniquely qualified. There's probably a good number of people who could have added value to the company. In fact, they still can add a lot of value to the company. So I'm not going to claim I was the only person who could have joined at the time. But what did the company need then? It needed someone to help drive the initial conversations with a wide number of the Fortune 100 companies to build the council. So those are institutions that I'm quite comfortable dealing with from previous roles and so that was something that I could do quite quickly although it wasn't originally planned, financing was relevant as well. So that's also something that I'm quite comfortable doing as well. Then we'd hired a general counsel but legal is a huge part of this whole area which is also very relevant.

**Demetri Kofinas:** 25:57 That's Natalie.

**Tom Trowbridge:** 25:57 That's Natalie, exactly. So that was something which also became important and I just know enough to be dangerous there. I have two parents who are lawyers and one of my sisters. I'm not a lawyer but it is just having that awareness is also positive and then overlay that with just a different network than Leemon and Mance. Having been based in Texas primarily, they know a very different group of people than I do and so I brought a very complimentary both skillset as well as network, which I think has been very additive to the business.

**Demetri Kofinas:** 26:32 You were touching on something before that you and I have talked about and I'd love to explore it a little bit more before we get to some broader questions about the market, which is how different people confront this technology or see it or relate to it and decide to it and decide whether they want to invest in it or not. You and I have had this conversation before. It's a really fascinating one because you and I, for example, we see something in this that maybe other people don't. Can you elaborate a bit on what that's like for you to see people's approach, why some people decide to invest, why some don't, what the reasons are, and how do you explain that?

**Tom Trowbridge:** 27:06 Well, first of all, a lot of the expressions that I like, one of my favorite ones is there are two reasons people do something, the reason they tell you and then the real reason.

**Demetri Kofinas:** 27:14 Always.

**Tom Trowbridge:** 27:14 So with something like this, what I have been most surprised about is in a technology and in a world which is so new, the way the strict evaluation of every technology through the existing lens of companies and protocols. And so the lack of interest or understanding in something that's new and different and I saw that again and again. We're just explaining how it's different than blockchain. I literally had investors say, a very well-known group on the West Coast say, "We're not bullish on DAGs." You can't even ...

**Demetri Kofinas:** 27:55 What an odd thing to say. That's an odd point. Can you explain to our audience why that's odd? Or I'm happy to tell them why.

**Tom Trowbridge:** 28:01 A DAG, directed acyclic graph, they're all different. It's almost like saying you're not bullish on, I don't know, computers. Like computer is just a program [crosstalk 00:28:10].

**Demetri Kofinas:** 28:09 It's the database ...

**Tom Trowbridge:** 28:11 Yeah, which you can have anything work on you can design it a hundred different ways. So I just found that it's a very indicative of the lack of understanding of the space or their big investor said, "You know, you guys don't have as big a community as Ethereum. We'll wait 'til that happens and look at investing." We haven't even launched our public ledger yet, of course we don't. You're venture investors, you're betting on the technology of the team to get there. It's a whole different game once you actually get there. So there's very specific perceptions of how the world was and that it would stay that way even though it was so new. That's what is so interesting to me. So those are some of the observation that I had.

**Demetri Kofinas:** 28:50 Well, that was something. I remember this also in my first interview with Leemon, I think we discussed it. I don't recall if we did, but it certainly was something that I was speaking about with other people, which is that there was this conflation at that time, and I suppose there still is, but I think Hashgraph's imprint, the time that you guys have spent in the public eye has helped to change its perception. But distributed ledgers were synonymous with blockchain and blockchain is a database architecture and it's not synonymous with DLT. It's not

synonymous with a public ledger. I think that is what you're getting at in a sense that this is how it works, the opensource architecture, the blockchain as the database structure, the way that consensus happens, the real debate was we have to stick at proof of work, it can be moved to proof of stake, things like that. All the limitations around the scalability were really thought about in terms of blockchain, which is very different architecturally.

**Tom Trowbridge:** 29:46

Yup, you're completely right. You hit on something else, which is another area that I think people focused on, which was not being opensource and that continues to be something that we need to explain more fully. I think the knee jerk reaction is if you are not opensource, you are then trying to capture all of the value and you're trying to mask what you've done and hide it. Once you actually explain that you are going to release all of the code and actually publish it so people can see it and as you're being very transparent about it, you just don't want to have authorized forms. That's where it takes the wind out of the sails of most of the opensource criticisms, I would say, but there still were people who just had a very clear, bright line, not opensource, not investing. That's fine, you need to have some rules, but that was something else, I think. Those rules and that philosophy wasn't designed for someone, a group that actually was going to release all of the codes so that it would actually be visible to everybody else.

**Demetri Kofinas:** 30:40

Well, that's also one of the things that's so fun and exciting about this space, which is that the software doesn't operate ... so like Linux is opensource but economics of building an opensource operating system and profiting off that ecosystem are very different than doing that in a crypto space because with Linux, you're happy as developers to support Linux's blossoming as a completely opensource and free software because the vast majority of money was made on the applications that run on top of it and the service and things like that. In this case, the big money is in the base protocol and so there's an incentive to constantly fork, which is the issue of governance which I think has been early on a big part of your concerns, granted. I'm sure, Leemon hasn't said this to me, but I would imagine if I were Leemon that I would also want to have one good shot from a personal standpoint, from an ego personal standpoint, I would want to have a good shot at building out my vision. Ultimately, the patent doesn't protect you guys from having some company rip you off in China or whatever.

**Tom Trowbridge:** 31:44

Correct.

**Demetri Kofinas:** 31:45 But I mean, it's really about having control and being able to execute what you want to execute and do it effectively.

**Tom Trowbridge:** 31:50 Yeah. That is the case when I think that Leemon has a technical roadmap plan and he is a perfectionist and he has this all architected and he wants to implement that. I think that we were going to add the most value to the world by following his plan for the foreseeable future and I think people will rip it off and will try to copy. We've seen some of that happen already. I think we're going to find it much harder to do this than it seems and to your point, I think I've read that there been 44 forks of bitcoin, which is just, you know, remarkable. Of those, I don't know how many of that we could even name right now, maybe three or four, maybe five.

**Demetri Kofinas:** 32:29 The most prominent obviously is bitcoin cash.

**Tom Trowbridge:** 32:31 Correct, exactly, and the bitcoin gold and there's a handful of others, but there's bitcoin pizza.

**Demetri Kofinas:** 32:35 You could say Ethereum is a fork. In a sense, you could say all these are forks really of the original protocol. I mean they're not forks but ...

**Tom Trowbridge:** 32:41 Ethereum, no. But there's a long, long list.

**Demetri Kofinas:** 32:43 Right, right, right. Yeah, I meant that liberally. My point being that there are short of attempts to build off that same ... all that was available, but yes, I mean that's a good point. But speaking of that, because one of the things that people ask me, I meet with people all the time and people ask me about Hashgraph. They ask me. They're fascinated by the technology. They're interested in Leemon. I'm interested in learning more about Leemon always. That's like a big question. They always want to know. One of the questions is it the real deal or is it like is it real? What's he like?

**Demetri Kofinas:** 33:11 What's really also I should say, I think to me, what's most fascinating about Leemon, and I think this is what people are reacting to when they ask about him, is that it's rare, and I've met with many brilliant engineers, it's rare to meet a brilliant engineer who has that type of brain but who also has not just the explanatory power that Leemon has because he's so articulate but also, when you get to know Leemon and he's a very heart centered person. He's very embodied. He's not just this detached brain, you know? Which is what makes him I think really compelling and interesting.

- Demetri Kofinas:** 33:43 But one of the things that I think comes up more and more in my discussions with people is do I think or do they think or is there going to be one distributed ledger, one DLT that's going to win or are there going to be sort of numerous? That's emerging as one of the questions a lot of investors are asking and I think the case for numerous, for example, would be that there are going to be people, let's say the Woznick's, that want to tinker versus the Steve Jobs or the mass consumer who wants the integrated computer doesn't want to fiddle with it, et cetera. Do you think that that's the case?
- Tom Trowbridge:** 34:21 Yeah, a hundred percent agree. We certainly don't think that one ledger will win and we think there's room for multiple, whether they're directed acyclic graphs, whether they're blockchains, we think there's multiple ... for example, I see bitcoin going nowhere. Bitcoin I don't think is going to be disintermediated; I think that's going to be around for a long time and I can see other protocols also existing for a long time as well and I think they will continue to evolve. So I don't see any one of us winning.
- Tom Trowbridge:** 34:46 But I do suspect what you generally see in tech is the top two or three companies take a big proportion of the market share and then the rest of it is between a large number of much smaller firms and that wouldn't surprise me to see here. I don't think you're going to see, and then again, this is just looking at other technology development over time where you see two or three companies take 80% and then the rest or the bottom 20%. That wouldn't surprise me if that falls out in that sort of order of magnitude distribution at some point.
- Demetri Kofinas:** 35:20 You know, something I wanted to ask before forget. This kind of circles back, it doesn't really follow with the flow of this particular point, but it has to do with again with investors when you're speaking with investors. One of the things I think that is challenging for people who have spent a lot of time investing in the space, what you tend to find I think particularly among investment crypto funds or investment shops that are sort of built around this industry, they have a thesis that they've developed that's very focused on blockchain. And they've made a lot of bets on companies that are sort of going to build out the layers based on this database architecture.
- Demetri Kofinas:** 35:57 I think that is investing in Hashgraph I would imagine for them would be challenging and for those who have spoken to, though they haven't said it, I think it's sort of unspoken that it's a challenge for them. It gets back to the original point about having learned this ecosystem in a particular way, learn about it

as block chain equals distributor ledger technology and that's challenging for them to get their heads around because they'd have to adjust their portfolios in such a way that it's problematic.

**Tom Trowbridge:** 36:25 Yeah, it kind of disrupts some of the way they've understood the universe to work and how they understand the technology to work and it questions some of the basic premises, I think, of what's possible, you know. The question I get all the time is, well, if you're fast aren't there is security trade-offs? The answer for us is no or they'll say, "What is the trade-off?" Again and again, I'm saying, "No, this sounds improbable but in fact, there aren't and I can explain to you why that's actually the case." But everyone is conditioned to see security and speed as being opposing and a zero-sum game which Leemon has proved doesn't have to be the case.

**Demetri Kofinas:** 37:02 It's so fascinating that you say that. You know, we don't get to speak that often. We've had a few long conversations but none of them have been in-person. They've usually been like on car rides when I'm on the phone or you're on the phone. I've had this conversation, I don't think I've told this, I've had this conversation with a number of very smart people and one in particular that comes to mind, it was one of these two individuals, and he said, "There's always a trade-off. What's the trade-off?" And I go, "You're thinking about it in the wrong way." That's like saying I have a faster horse than yours so what's the trade-off? The trade-off is like we have to have better hooves or his hooves deteriorate or whatever. Thinking about it as if it's the same thing and it's not.

**Demetri Kofinas:** 37:42 So therefore, thinking about it in terms of trade-offs is wrong because you're shifting the graph. As opposed to moving along the graph, you're shifting it and you're looking at something totally different. I think that is consistently a challenge I run into with people and for a long time, I was constantly trying to pinch myself. What is wrong with me? We've had this conversation before and I'm like, what is ... now I've just accepted that like you know what, maybe I'm right on this, maybe I'm not what I see, you know. But I see what I see, and I understand what I understand, and I did my best with the coverage of this technology to the audience to give them that, all the information I had and let people make up their own mind. I try to do the same thing with everyone else we have on and I want to have everyone on I can possibly have one of the smartest people in the space. We've got a few great people coming up on the show who work in blockchain and people have their own opinions, you know. It's a fascinating thing.

**Tom Trowbridge:** 38:28 Yeah. I mean listen, unfortunately for you and for me, I don't think that question's going to end anytime soon. I think will continue.

**Demetri Kofinas:** 38:35 So another thing before we cap off the specifics and architecture stuff, because then I want to get into distributor applications and what you're seeing there because that's really cool. We haven't had a chance to talk about that much. Not in this conversation, not ever. The difference between DAGs and blockchains and chains is actually significant. Irrespective of, to your original point, those guys out in the West Coast, whoever they were, who said, "We're not bullish on DAGs," obviously, that misses the point of what makes you guys unique. But separate from that whole conversation, DAGs allow for things that blockchains simply don't and there are many use cases that blockchain will never be able to do without the ability to, most importantly, order transactions, right?

**Tom Trowbridge:** 39:18 Order, yeah. Exactly, yeah.

**Demetri Kofinas:** 39:19 What do you think about that and what level of use cases, and one more thing when you answer that question, who do you think are going to be the early adopters of this network, the use cases?

**Tom Trowbridge:** 39:29 So I think that probably one of the more compelling attributes of the technology is obviously its cheapness. It's cheap because it uses very little data which makes it fast. They're all sort of a circular, they're all related and integrated in the same component to it. We think of crypto currency transaction on our ledger takes about a hundred bytes. So that means it's hard to measure what that cost is. We think it's in the millions of a penny. I don't know what the price will be. Maybe a thousandth of a penny that they haven't set that up yet. But that allows for native micropayment transactions. You don't need side chains, you don't need channel chains, you don't need state channels. It can be on graph.

**Tom Trowbridge:** 40:11 And so, we think the opportunity for native micro payments is just enormous and, obviously, IoT use cases are enormous for that. We also see potential use cases for media and for paying for ... this has not happened imminently, but you could have a browser that automatically pays up to a hundredth of a penny per website for example. And so, something that I think is critical to this is Leemon's original vision, which is the Internet should be free, and transparent, and private, and that you shouldn't be the product.

**Demetri Kofinas:** 40:44 You shouldn't be the cattle.

**Tom Trowbridge:** 40:45 Right. And, you know, that's a really critical thing. There's actually a book I'm reading, if you've read George Gilder's new book, it just came out.

**Demetri Kofinas:** 40:53 What's it called?

**Tom Trowbridge:** 40:53 It's called After Google, like The Death of Big Data and the Rise of the Blockchain, and he talks about how we are effectively the product and so Leemon talked about surveillance capitalism.

**Demetri Kofinas:** 41:07 Well, the shit that happened with Facebook recently.

**Tom Trowbridge:** 41:09 Right.

**Demetri Kofinas:** 41:09 That was like ...

**Tom Trowbridge:** 41:10 So we don't know exactly when and how this evolution will shift, but one of Leemon's key points is building an internet where you can control your identity. Identity is critical. Once you get your identity and you control it, then allows you to access and to interact in a way that is free from unwanted advertising. Now maybe you can get it if you opt into it but that it won't be fundamental part of business models unless you just deliberately want it and that's a very big shift from where the Internet is today.

**Demetri Kofinas:** 41:46 Well, both Mance and Leemon did a lot of work in identity before this, right?

**Tom Trowbridge:** 41:49 Yeah.

**Demetri Kofinas:** 41:49 Mance's company was Ping Identity.

**Tom Trowbridge:** 41:51 Yeah, exactly.

**Demetri Kofinas:** 41:52 Yeah, and I know that Leemon spent a lot of time thinking about it. Isn't there a component of Hedera Hashgraph that has to do with forward thinking about controlling your identity?

**Tom Trowbridge:** 42:00 Well, what you might be thinking about is ...

**Demetri Kofinas:** 42:01 KYC maybe?

**Tom Trowbridge:** 42:01 ... something called like opt in identity escrow where it gives every wallet the ability to de-anonymize transaction by

transaction or jurisdiction by jurisdiction at the option of the user. So you can keep it on as well if you want, but if you have to transact in a particular jurisdiction which requires X, Y and Z, you can go to a certificate authority or whatever agency you need to and that gives you a code once you're known, who you are, and then you are de-anonymized for whatever those transactions are. And so, that's a way to again keep identity in the hands of the user and allow them to de-anonymize at their will.

- Demetri Kofinas:** 42:38 I think that also speaks to your approach. I think you guys have been trying to walk this line as effective as you can, right? Between giving the user as much privacy, and autonomy, and freedom as possible but not so much so that they would collapse the function, that the government would step in and say, "This is just done. We're not going to do this, we're not going to allow it at all," right? I think to that particular feature you're describing, it would allow someone to de-anonymize the data in a situation where they need to, for example. Like if they need to actually prove who they are what the transaction is or something.
- Tom Trowbridge:** 43:07 Yeah, and what you wouldn't want is to ... and this comes to the fact of trying to be effectively good being a full stack provider, but what it effectively does is it allows that functionality built in rather than having to go to another application to do that if it's required, which inevitably we think it will eventually in some jurisdictions. And so, this just allows more broader uses to happen natively on the protocol.
- Demetri Kofinas:** 43:32 Mm-hmm (affirmative). And this also feeds back again originally to the other question about will there be multiple chains or multiple ledgers? There are many people that may not want that. Maybe they're going to want to be on a different distributor ledger technology.
- Tom Trowbridge:** 43:45 But they could also just remain anonymous.
- Demetri Kofinas:** 43:47 No, exactly. Well, I don't mean that particular ... yeah, you're right. So not maybe that particular thing, but the point is that there is a case for optionality. But then that goes to the point of who do you think are going to be the biggest beneficiaries of your technology? Let's assume that it works, right? Let's assume you guys are able to come out of the gate.
- Tom Trowbridge:** 44:04 Knocking on wood, but I am confident, yeah.

**Demetri Kofinas:** 44:06 No, I understand. But you always have to make that point until it's out there and it's functioning in the wild and it's working, right?

**Tom Trowbridge:** 44:12 Mm-hmm (affirmative).

**Demetri Kofinas:** 44:12 So who do you think are going to be the biggest initial beneficiaries and adopters of it? Let's say users and then also maybe developers and that'll give us a chance to get into application development.

**Tom Trowbridge:** 44:25 You know, I think that the large businesses that are joining the council are going to be very big users of this but they will not be user of this 'til 2019 or '20 or '21. And so, we're in discussion with some ...

**Demetri Kofinas:** 44:39 Usually like multinational.

**Tom Trowbridge:** 44:40 Usually multinationals. One of these businesses came to me and said that they themselves think the applications of their business are about a hundred thousand TPS because of all the different projects ...

**Demetri Kofinas:** 44:50 Transactions per second.

**Tom Trowbridge:** 44:51 Exactly, because of all the different things they're working on. Just that one company thinks that they may have that level of volume of transactions across all their manufacturing, all their banking, you know, it's a very large business. So I think that's where a lot of transactions come from and a lot of uses come from down the road. But that's not in the next six months, that's not the next year, that's probably two years from now. So right now, our focus and the interest is on a wide number of DAPs and developers, some of whom have found us and they've built on other platforms that they've been unhappy with and want to shift over to us. Others are people who have raised money and are looking for a scalable solution. Others who are just at the very beginning and contemplating where to build. So it's everything from people who actually actively want to shift.

**Tom Trowbridge:** 45:39 In fact, I think one of the most well-known applications on a well-known ledger supposedly is interested in potentially shifting to us which would be a very big announcement that happened. But it's a wide range and you ask about applications. So we've got a hundred, two hundred groups that we were in active discussions with. We built a developer advocate team that spans three or four continents right now. That's something

we continue to add to. And so, the real focus of the company now is both in the technology side is one focus, obviously, getting that ready is priority number one, building and executing the council is the other and that's going very well and that I hope we'll be able make announcements in September about that, we'll see. And then the third area, if you leave aside financing for second, is on to DAPs and getting DAPs on the network.

- Tom Trowbridge:** 46:27 And so, we've got about a dozen or so who have actually signed them or used them we've announced. We think that once we actually have the network launched and people can test it and see it, I think that number is going to go up dramatically. And so, we plan to have our public APIs ready in the next, you know, month or so, launch the network and gradually open it up for DAPs to begin building on us and 10 will be testing it and gradually open it for six months after we launch it. That period of time I think we'll see the level of interest increase significantly as the performance of the network I think is tested and visible for everybody to see.
- Demetri Kofinas:** 47:05 Walk us through the timeline. Actually, I'm curious, and I think that'll be helpful for the audience. What are the important milestones going forward and when do you think approximately those dates will be if you can give us those things?
- Tom Trowbridge:** 47:15 Yeah. I want to stay away from specific dates just because it's technology and things are always influx. But I think we're getting pretty close with the public APIs and so I'd hope to be able to launch the network in the next couple of months.
- Demetri Kofinas:** 47:28 And that will allow anyone who wants to build on it to build on it?
- Tom Trowbridge:** 47:31 Yes, except that we're not going to release them broadly yet.
- Demetri Kofinas:** 47:34 Right.
- Tom Trowbridge:** 47:34 And so, over a six-month period from when we launch the network, we're going to release the APIs on a gradual basis developer and DAP by DAP, and with an ever-increasing rate as the network shows it's able to handle it. And then six months after we launch the network, we think it'll probably be in good enough place to just have complete broad release availability for anyone to build on it.
- Demetri Kofinas:** 47:55 Yeah, and to be clear there is no license to build on Hedera.

**Tom Trowbridge:** 47:58 Right. You don't even have to talk to us, yeah.

**Demetri Kofinas:** 47:58 Anyone who wants to build on it can build on it.

**Tom Trowbridge:** 48:00 Correct. The other thing I should say, which I should've mentioned earlier on but this is part of the whole schedule here, is that we're also going to be enlisting the community both developers as well as just community members to help test the network and build on it. And so, once we've launched it, we're putting together a testing program where community members will be rewarded for testing it and developers will be rewarded for building on it and we hope that should be ready to go I think in the fall.

**Demetri Kofinas:** 48:25 That's cool.

**Tom Trowbridge:** 48:25 I think it's an important thing that we do and it's a way to get people really involved in ...

**Demetri Kofinas:** 48:30 Who aren't necessarily credit investors, finally, to be able to ...

**Tom Trowbridge:** 48:32 Yeah, and it's for people who are or aren't.

**Demetri Kofinas:** 48:34 Right.

**Tom Trowbridge:** 48:35 We're sort of indifferent to that, but it's a way to get everybody involved in helping the network, yeah.

**Demetri Kofinas:** 48:40 Right. Not the hold your feet to the fire on a date, but if you were being optimistic, when would you hope that let's say you'd be able to be at a place where it's fully open?

**Tom Trowbridge:** 48:49 I think that'll be first half of next year.

**Demetri Kofinas:** 48:51 First half of next year, that's nice. That's pretty ambitious.

**Tom Trowbridge:** 48:54 And I think that you will see real progress and real announcements prior to that. You know, the timeline also, as I mentioned, APIs in development hope to be able to launch the network in next couple of months. We then will probably do the community testing program sometime in the fall. They'll be DAPs steadily building us over this time. We also have had Hedera '18 coming up in Dallas, October 15 to 17, and that's our first developer conference. We're very excited about that. That's a multi-day conference. We're going to have ... obviously, the whole team is going to be presenting. Leemon is going to be giving a variety of talks. We're going to have people who are

building on us give discussions. We're going to be doing a global hackathon and I think it's seven cities around the world the same time simultaneously. We'll have some of the largest companies and the potential council member or council members also be speaking about what they're doing. So I think it's going to be a very significant event to show the level of involvement across different factors of the community.

**Demetri Kofinas:** 49:50

What use cases are you most excited about and not just in general terms but specifically that you think and hope will migrate over to Hashgraph in the next year?

**Tom Trowbridge:** 50:02

Listen, there are so many different ones. I think decentralized exchanges are something super interesting. I also ...

**Demetri Kofinas:** 50:08

That brings us back to the directed acyclic graph.

**Tom Trowbridge:** 50:10

Yup, yup.

**Demetri Kofinas:** 50:11

Fair ordering.

**Tom Trowbridge:** 50:11

Fair ordering is really important. I think there are some exciting projects talking to us in that area. Something that I love and just to be clear, it's not being built on this yet, but there are potentials for decentralized versions of some of the most common applications that we know like Uber, like Airbnb, et cetera. And so, I'd love to see ... I think there's a test pilot for the decentralized Uber happening in Auckland but that's not built on us, to be clear. But I think that type of thing that effectively could and we're well-suited for, that I get very excited about. I basically think that there's applications for validating sharing medical credentials across jurisdictions. I think that could be incredibly helpful to people but it's not going to be as widely used and is not as sort of sexy as some of the other ones but it's still helpful. There's chat applications that incorporate all the different chats you have on your phone already. There are too many to even talk about.

**Demetri Kofinas:** 51:01

You know, that brings us to the question of how do you, as an investor, think about the space and what are you looking for, right? I mean, that's something I ask myself and the way I see it, there are three types of applications that I see. One is the one where it's just like we're just going to build on our blockchain. So it just sounds sexy and it sounds interesting and we can just raise some money. Total bullshit, totally useless, you would never invest in it.

**Demetri Kofinas:** 51:27 Then you got the cases like Uber that you're talking about where they look at the server side equation and they say how are the middleman equation. And they say, "Okay, how do we cut out costs so that we make the separation more profitable?" Those are great and very interesting and if they're good, they're worth investing in. Then I think the optimal, optimal investment is the one where the technology makes possible a use case that wasn't previously available, right? And those are the most interesting. Those I think, as an investor, they offer one, the opportunity to be most creative and to be challenged to find something really unique.

**Tom Trowbridge:** 52:05 Yup. And listen, that is something that I couldn't agree with you more and it's almost like thinking about the Internet back in 1990, there were 10 websites. Now, there are 1.9 billion and the interesting thing is the average of the top 20 most visit websites right now, the average start date of those was I think July of 2002. Why 2002? There's no special reason, but '99 is when broadband became widely available. And so, I think broadband bringing this capacity will help accelerate use cases that weren't even possible back when blockchain was first conceived. And so, when the Internet started no one thought about the use cases that we just mentioned. No one thought about Airbnb. No one thought about YouTube. It wasn't even possible. You couldn't conceptualize that back then.

**Tom Trowbridge:** 52:52 And so, I agree with you in terms of the type of application to be most compelling. I have trouble imagining what some of those might be at this early stage. But the other thing we're doing is we are going to launch an ecosystem fund that is going to invest in some the applications, building our network that we find most compelling. And so, that's the next sort of step in our evolution so that we and some of our partners can help these businesses in terms of financing and also take advantage of the access that we have to some these great businesses.

**Demetri Kofinas:** 53:22 That makes sense. I mean, that sounds very exciting. I wonder if 2002 is not because it coincided with cheaper bandwidth because there was all this dark bandwidth that was built out and then there was the market crash.

**Tom Trowbridge:** 53:31 It's using that bandwidth.

**Demetri Kofinas:** 53:32 Right.

**Tom Trowbridge:** 53:33 It's a combination both as broadband being available whether it's DSL, cable modems, two-ones, et cetera. It certainly couldn't have happened with just 56k.

**Demetri Kofinas:** 53:42 Tom, it was great having you on, man. All I had here was a little notepad with my pencil and I was literally just writing it down as we're talking. I normally have giant notes, but this was a last-minute thing. You came through. It's great having you on, man.

**Tom Trowbridge:** 53:54 Listen, thank you for having me. It's great to see you and it's really fun and I appreciate your support. So, thanks a lot.

**Demetri Kofinas:** 53:59 Yeah. No, I wish you the best of luck in your travels. Where are you going next?

**Tom Trowbridge:** 54:03 I am headed to Europe next and then there might be a trip to Australia ...

**Demetri Kofinas:** 54:09 What are you doing on all of these trips, are you working or is this like ... ?

**Tom Trowbridge:** 54:11 Yeah. I mean, these trips are a combination of everything. We will be meeting both investors, meeting exchanges, meeting council members, doing meet ups, meeting the community. There is just a wide ... it's a global business and so, every dimension of this business is global and it's happening everywhere. So, you know, you wake up on the phone and you put your head on the phone because there's always time zones that you need to talk to. I've been around the world twice since March. Taking it a little bit easier right now as we do this crowd sales thing local for a while but then, there's a lot of pent up meetings to be had.

**Demetri Kofinas:** 54:43 And Leemon for the most part is in Dallas?

**Tom Trowbridge:** 54:45 Yes. It has to be extraordinarily important to get Leemon to leave. We need him in there and focused and he's very happy to be there and to be as not distracted as possible. You know, the one thing I should say that I didn't get a chance to is the unique thing you mentioned with Leemon and Mance, at one point, the lucky piece here is they are both professors and so, they're technologists first and foremost but they were both taught for years. And so, working with them is effectively like being in school and that's why it's so easy for you and also for me to interact because they're accustomed to teaching. Leemon loves telling people and educating them on what he's doing and why it's important, what his vision is and even getting to very technical details and he has so much patience for it. And so, that is I think not a characteristic common among many entrepreneurs.

**Demetri Kofinas:** 55:37 He loves it.

**Tom Trowbridge:** 55:38 Yeah, he loves it and that is a real ...

**Demetri Kofinas:** 55:40 My engineer is laughing here because he's had the privilege also of having been a part of all of this from the beginning. He's had a chance to listen to all these interviews and it's quite a journey. I mean, I actually was speaking to a bunch of other entrepreneurs who are doing their own thing, they're based out of California. They were here like a week of you and they asked to be with me and I was speaking with them and they again, they asked about Leemon. And I said, "You know, one of the things that differentiates Leemon from other people let's say you say to Leemon, 'You know, this seems very challenging for you to do this, but it's an enormously challenging, that's why it's fun.'"

**Tom Trowbridge:** 56:12 Yes. Yes. Yes. Exactly right. Exactly right.

**Demetri Kofinas:** 56:16 All right, well best of luck and again thanks for coming on.

**Tom Trowbridge:** 56:19 Excellent. Well, thanks a lot, Demetri. I appreciate it.

**Demetri Kofinas:** 56:20 And that was my episode with Tom Trowbridge. I want to thank Tom for being on my program. For more information about today's episode or if you want easy access to related programming, visit our website at [hiddenforces.io](http://hiddenforces.io) and subscribe to our free email list. If you're a regular listener to the show take a moment to review us on Apple Podcasts. Each review helps more people find the show and join our amazing community. Today's episode was produced by me and edited by Stylianos Nicolaou. For more episodes, you can check out our website at [hiddenforces.io](http://hiddenforces.io). Join the conversation at Facebook, Twitter and Instagram at [@HiddenForcesPod](https://www.instagram.com/HiddenForcesPod) or send me an email. As always, thanks for listening. We'll see you next week.