Eric: Hi. So today on the podcast, I have Daniella Barbosa of the Hyperledger foundation, she's the Executive Director. Now everybody knows I probably on, on this podcast, at least I like the Hyperledger blockchain ecosystem had a couple of guests on it really provides a window into how enterprise grade blockchain technologies are being actively implemented and the enterprise use cases.

When it comes to digital assets, there are many foundations and trusts that are established in order to achieve decentralization at an early stage level. This can be a little bumpy at times, but as a project evolves so may its foundation. First one that might come to mind is like the Ethereum Foundation

another one is Algorand Foundation. I'm sure there's plenty of others. Sorry if I miss some. But as adoption grows so might the role of a foundation and it may take on different roles than it was intended to at its inception. Hyperledger Foundation is also a bit different due to its extensive enterprise, traditional company membership roster, which I've talked about before on this podcast, including the Ethereum Foundation. Many governments and agencies are likely to deploy Hyperledger open source technologies, adoption by enterprises, governments, and agencies

creates this flywheel that encourages other governments, agencies, and enterprises. So in that case, what is the role of the foundation when it comes to open source technologies that can be adopted without telling anybody, how do you facilitate that flywheel effect and higher quality project adoption?

How do you attract the most talented developers when your ecosystem starts to develop various frameworks with more specific use cases? Hyperledger has like what 14 frameworks, probably more how do you help those communities navigate? How do you approach core concerns like security? This is all critical, nuts and bolt stuff.

It might be a high quality problem if you are a project trying to just establish a community, but critical mass certainly presents its own unique challenges. So obviously this podcast is about Hyperledger and its growth and what it's achieved from the perspective of the foundation. But when you listen to it, don't just listen to the specific content,

also try to listen for the dynamic. So for example, one point I ask about CBDCs in Nigeria. But it's open source tech so no one called up Hyperledger foundation. First about some big licensing deal. Big news, but what do they know about it? It's in, that's the nature of open source technology.

So in that you might say, oh what did you learn? What did you learn? Is this being one of the challenges that foundations or any kind of advocacy group, trying to promote a technology that's open source faces. In addition to learning more about Hyperledger, I

would suggest that you go into this episode thinking about how does a foundation that advocates for open source technologies operate?

What can they do? What can't they do? If you think of the podcast on these two levels, both for the content, learning about Hyperledger more, and also this dynamic of how a foundation can promote in open source technology, I think you're gonna get a lot more out of it. So I'm excited to bring you this podcast.

If you like, share it always. The listenership is growing. Please share it and continue to share it. I wanna keep growing this thing. Thank you so much for listening. And with that, I bring you the podcast.

Welcome to The Encrypted Economy, a weekly podcast featuring discussions exploring the business laws, regulations, security, and technologies relating to digital assets and data. I am Eric Hess founder of Hess Legal Counsel. I have spent decades representing regulated exchanges, broker dealers, investment advisors, and all matter of FinTech companies for all things, touching electronic trading with a focus on new and developing technologies.

Excited to have Daniela Barbosa on the podcast today.

Daniela is the Executive Director within the last year, although she's been with Hyperledger for a while, of Hyperledger, the Hyperledger foundation. So Daniela, welcome to The Encrypted Economy.

Daniela: Thank you, Eric. Very delighted to be here and excited to record the session today.

Eric: And we've had more than one podcast on Hyperledger to date.

So we did some basing. We had Matt Zand, we had Nancy Min on the podcast, and so today we're gonna dive in a little bit more to learn more about Hyperledger and as Executive Director, your unique position. So why don't you tell us a little bit about your background, what brought you to Hyperledger before we start getting into it.

Daniela: Sure. To start off, it's people like Matt Zand and Min who are part of our community that make Hyperledger and the Hyperledger foundation seems so big because we are big. We are a community of thousands and thousands of people around the world that can speak about the Hyperledger technology and what we're here to accomplish.

That is the most important part of, hopefully we can get to the conversation today, but thanks again for having us. Here at the encrypted podcast. I, as you said, I've been here with the Hyperledger foundation since 2017. I joined right before, right in the middle of the ICO craze of 2017.

On my background is I had been at Dow Jones in their data analytics and data aggregation business for about 15 years prior to going to a startup here in Silicon valley that did similar work with data analytics. I happen to be a librarian. I have a masters of librarian information science.

I've always been about the bits and the bites of data. And more importantly, on the democratization of access to data, how I got involved on the internet, of the late nineties and the two thousands was really about making sure that access to information and data was available. How I got involved even in the blockchain world was around digital identity and really trying to get to the basis of what is data portability?

What is my data? How do I own my own data in this. In the web two O world as it was developing. So I've been involved in the space for quite a bit. And in 2017 I joined as vice president of worldwide alliances working side by side with bar Brian Bellor, who was the Executive Director at the time.

And in October of this year, I took over as Executive Director for the Hyperledger foundation. We did some rebranding; we really expanded our scope and what our focus is going forward. And I also took over as the general manager across the Linux foundation for projects that are related to blockchain, healthcare, and identity.

So there's a couple other projects that I am the GM over as well, that are really with the same mission of, decentralized technology and open source moving

forward.

Eric: Excellent. And you said that there were some changes that Hyperledger was undertaking in terms of, branding and I guess maybe working with some of its partners.

Do you want to expand on that a little bit?

Daniela: Sure.

I think, the most important thing is just like any organization. In the last six years, we've matured. The organization, the projects, the contributors, the maintainers, the companies involved they've matured because the technology has matured, and the use cases have matured.

As I'm sure, I'm not sure. I know, Eric, because you talked to many of the people implementing these types of technologies. So for us in 2016, the project was really focused on one project, which was Hyperledger fabric that had been contributed initially by IBM and digital asset as they were working on projects.

And then some of their partners came in as well. They were working on these very large projects using Hyperledger fabric. Shortly after a new project came into the, to the

Hyperledger project, which was called Hyperledger saw tooth. And today there's 14 different projects. And there's not just 14 different DLT frameworks like fabric and saw tooth and Besu, but there's also tools in libraries.

Some of them that are being used outside of Hyperledger. Tech, so you are actually running these tools and libraries with other distributed ledgers, whether they're permissioned or permissionless. So the beauty is what, how we, the Hyperledger foundation has developed is how the market has developed.

In October we, we made that change and to really reflect where the community has been building and growing.

Eric: So before we even start to dive into some of these elements, I think probably one of the challenges that you have is when you have open source, that's been widely distributed, widely consumed is, and it is that is communicating that to other participants.

So people can really appreciate the scope of what, where Hyperledger is. Cuz sometimes these things just if it works , then nobody ever has to pay attention to it. Again, it just runs does. What it's supposed to do is that do you find, that's like a challenge, particularly as you become more distributed to actually have that, to communicate the full scope of what Hyperledger does to, to a potentially consuming community.

Daniela: Yeah.

So I always like to break it up into the three aspects of Hyperledger, right? Because Hyperledger, the word means different things to many different people. So one is, and this is why tied to why we rebranded to the Hyperledger foundation because really to understand the complexity.

And you said it the complexity of all the projects and how does one decide which project to choose or which community to get involved with? Really understanding that we are a larger than one project and larger than one community. So the Hyperledger foundation so three parts, the Hyperledger foundation,

which is basically compromised of member companies, and these are companies that come in to support the work of the open source developers that do the second part, which is the Hyperledger projects. And in that project, there's a community governance, which is done by the technical steering committee, which is an open governed community.

That stairs, basically the projects and then the maintainers themselves. They govern their own projects, right? What commits and what pull poll requests are gonna address based on the community that they've built around that code base. And they do have to follow certain project standards to be within the Hyperledger community,

but overall they have control of their code as well. And then there's this hundreds of thousands of people in the community that are participating in special interest groups that are participating in events. Our meetup community has over, I think, close to 90,000 participants worldwide. These are people that showing up to learn about Hyperledger tech to tell the community what they've built with the tech and get some feedback from them.

So the Hyperledger foundation, which is a member foundation member companies joined to support the development of Hyperledger tech, the Hyperledger projects themselves, and then the Hyperledger community. And yeah, so I'll pause there cause I'm sure you have other more questions that we can dig into on that.

Eric: That it, that is a great backdrop. One of the things I wonder, cause I, one of the things we're gonna talk about today is CBDCs and Hyperledger's role. But I wonder to what extent does the foundation move from its communication, like it's organizing and communication role? If that's, maybe I'm misframing it. Like it's Avi, it has an advocacy role,

it has a development role, it, it has an organization standards maintenance. To what extent does it actually get involved in advancing the technology within a particular use case or project beyond advocacy? Do you partner with organizations say, wow, there's this really compelling use case.

CBDC and sorry, bless you. Like CBCs, do you actually go in with a team that might be proposing it because of, the CBDC is obviously a very significant use case.

Daniela: Yeah. So I'll give you some examples and I'll give you one example and then I'll touch on the central bank, digital currencies use cases and why we did invest time and resources from a strategic perspective.

So I'll take you back to 2017 specific to digital identity, right? So in 2017 and 2018, the Hyperledger foundation, blockchain as a whole was very focused on permissioned blockchains, right. Permissioned DLT frameworks. And we had best in class with Hyperledger fabric, for sure. We, as the Hyperledger leadership and this included discussions and strategy discussions with our governing board and our members understood that digital identity and technologies related to digital identity from a blockchain perspective, needed a home to come and work together to collaborate to build communities around working these projects with privacy first initiatives, for example and that it was important.

So the Hyperledger projects, so staff once again, and members led by, our governing board and what we want to see out of the project focused on supporting digital identity projects, which was Hyperledger Indy at the time. And then it came to Hyperledger, Aries and SSO, which are three of the projects within what we call our identity project families.

With that came a lot of funding and strategic work to those projects as well, because they didn't have large member companies that were building and developing and coming in as members. So helping fund the important initiatives within the blockchain, the enterprise blockchain space that was nascent, that it was still in the beginning. Fast forward to 2022, many of these projects are now being implemented in some major digital identity frameworks around Europe and Canada. And we really believe that by putting extra support and guidance and frameworks into those projects, we're able to move

I did digital identity forward.

Eric: Interesting. And so let's stay with digital identity for a second. So you mentioned Europe, you mentioned Canada. To what extent, when there were specific projects, when there were specific business use cases, did you, would the foundation work side by side, would they present to a potential customer in the first instances to say, Hey, listen, the whole foundation supporting you the, or is that overstating the role of the foundation?

Daniela: It's a great question. Cause a lot of people do come to us, like asking for services and help. And the Hyperledger foundation, we don't have. In process, right? We are, we don't have developers. We actually don't have any staff members that are coding and contributing to any of the projects.

We have a support system that supports our ecosystem. And this is our members and the community members. We have staff that help our members make sure they're connected into the right projects into the right events. And we have a community architect team that is really focused on making sure the maintainers, the contributors those new members that come into our community can be onboarded in a nice, easy way into our community.

And that's the support that we offer the projects. Then we work very closely with the member companies and those companies building with Hyperledger tech to be able to provide a way for commercial ecosystem to flourish and provide those service. And in order to do that, you do have to make a market, right?

So you have to say here's all the use cases. We have events. For example, we have our Hyperledger global forum coming up in September. There are over a hundred speakers talking about what they've built using Hyperledger tech thousands of meetups over the last few years around companies who are presenting their products and services that they built with Hyperledger.

And that helps people who wanna understand why blockchain and how blockchain to understand those use cases. So we publish case studies that we work with our members to publish that, have return on investment for example, and different types of aspects beyond the technical, we are a technical developer community.

We wanna really focus on what developers should know and how developers should do things. But really helping then tell the story of how these technologies are adopted through our case studies, our webinars, and obviously through our events as well.

Eric: Interesting. So I and I'll stay with my questioning for a little bit longer.

Although it makes a lot of sense, you create the community for these business use cases to develop on their own. And you would certainly hope that if you're positioning your project, that you've got the expertise to do it as a business. Let's say that somebody wants to utilize Hyperledger.

They read a case study that they think is on point. Maybe they have an initial conversation. Maybe they want to extend further, but they're still trying to figure out how to actually connect the full import of what Hyperledger has. Like in other words, maybe they're looking across multiple protocols and they're trying to like, make their choice.

Do I go cosmos? Do I do like whatever it is, right? Obviously. So what would be the path of that organization working with the foundation to try to identify what the full capabilities are for that preliminary review? Would it be, Hey, we have a consultant that you should work with to help you out with it, or are there, maybe you could get a little color on how that might work.

Daniela: Yeah, sure. So there's many ways we get that inquiry all the time and I encourage everyone that's listening, who has an inquiry about how I figure out how to engage and how to participate with Hyperledger to reach out to us, go on our website, select the contact form. You'll probably get on the calendar.

We have this calendar that everybody, can schedule on and you'll probably get a call with me or somebody on my team and we can walk you through it. But to answer your question, Eric specifically is, how do people figure out which projects or which things they, they need to do? And this is where I, why we have a tiered level of engagement with the community.

For example, our blockchain 1 0 1 course, we have an edX course that we launched in 2017 that has been revised. It gets updated every few quarters or so with new content that is close to 200,000 people around the world who have taken that course to understand the principal basics of enterprise blockchain

and why use enterprise blockchain. Why use permission network versus a permissionless network? So core principles on it, so that's the first thing, if you're at that level in your career or in your exploration? I suggest taking that course. Some of it might be repetitive, but I think it would be helpful just to ground yourself in the language that the enterprise watching market uses.

Then once you know that if that's already, to, to 1 0 1 or you're already beyond that, Is exploring the use cases. So you mentioned some of our case studies we have case studies that we've published. I think there's 15 to 20 recent case studies, really across different domains, taking a look at those use cases, seeing some of the content webinars panel discussions that maybe those CA those case studies have aligned as well.

And digging in into that coming to events we find that coming to events hopefully as more and more in person, like for example, in September you can sit through a session where a very large company for example CBS, Aetna is going to be presenting on one of the consortiums that they work on.

And they are gonna be talking about lessons learned. And what are the things that they did to implement. Then you can talk to those people as well. When it comes to. To answer your question. I think from a technical perspective is like, how do I look at the, all the projects that the Hyperledger foundation has under their landscape?

The 14 different projects that, that I mentioned before and make a decision. There are some basic things that I think people can start with in regard to what projects they want to focus on. Can I tell you a little bit about that Eric?

Eric: Sure.

Daniela: Okay. So the one thing that we always take a look at, if people are looking for a DLT framework, for example, right?

So we have six in, in our family is what languages do your Lang your developers use and prefer? What is the basis of those developers? Are they Java developers, are they C plus developers are they go programmers? Each distributed ledger framework actually uses different programming languages, and that might be a start for your decision making, because that's important. You wanna, people to onboard very quickly and that might be the other, in, from a

ball.

Eric: Am I right that even rust certain of the, of a Hyperledger also utilizes rust, right? Yes.

Daniela: Correct. Yeah. There's and we're doing some work as staff to help with that onboarding a matrix of how do you decide which projects you want to go and look at first?

So that's an approach. So looking at, smart contracts, so what smart contracts are supported in the different platforms. So if you have solidity con smart contract developers in house, maybe, take a look at Besu right as your starting point what standard support for tokens are in the different DLTs right.

If you're interested in ERC support versus native token or some other, type of support and then last but not least what consensus mechanism is most important for you? And once again, that you feel comfortable, and if you're working in, for example, a regulatory, industry that has, specific security requirements, you might wanna start with those first so that it's not very painful at the end.

So those are the kind of things when we talk to people we give them advice. And then to your point, There is a commercial ecosystem of service providers that can help with those decisions. We do point people to our vendor directory. We point people to our Hyperledger certified service program.

And these are a set of service providers that have been certified to do services and development particularly with Hyperledger fabric. So there are ways to get help in those decisions.

Eric: Excellent. So maybe we'll move to some of the use cases before we get into CBDs, which we will be.

I, one of the use cases that we talked about and again, I'm gonna just take a step back with a lot of these use cases. What's really interesting as I go through it is the dollars that are saved. These aren't speculative use cases. These are big companies that have deployed Hyperledger whether it's fabric or so, or Besu or what have you.

I think fabric is certainly one of the ones that's been around the longest, so probably has the greatest number of use cases. But there have been some significant impacts. Like I, I think Hitachi was one of them that we talked about where it was implemented for procurement processing. A lot of people maybe oh, geez, hold that.

You're not talking about, Degen activity on a token. The procurement processing actually had a significant benefit for Hitachi, the whole organization, which very large dollar impacts. Maybe you want to expand that a little bit.

Daniela: Sure. And you and I talked about this at actually at consensus when we were in person meeting.

And I think, the core thing is some of these use cases are not sexy, right? They're, they're certainly not NFT or D defi sexy, but they're bringing a lot of value to the companies that are implementing these solutions in these networks and these consortiums as well. So the Hitachi use cases is actually one of our newest case studies that we published.

The company Hitachi actually is. A combination of 800 plus companies within the Hitachi main company. And they are across hundreds of companies worldwide and have like close to 400,000 employees, huge company. That if you think about it as, as you think about blockchain networks and having to have many participants in it, if you have 870 companies

participating in a business network servicing hundred, cross jurisdictional countries with over 400,000 employees, that's a pretty large network, right?

So from a scale perspective, it gets those B that big at one company at times. That use case is really about reducing the time to process contracts across the vendors, that those 800 companies in a hundred C a hundred countries work with and really, try to eliminate that paper based system that, these large companies have done for a long time.

I think that they manage, there's the one division that they've piloted this in. They have over 2000 business partners, so then it becomes even greater that network, one company hit Hitachi now has 2000 business partners that are participating in net network. And they're processing.

I think the numbers where they were processing about 333 cases per month on a regular basis in the old system. And they've increased that by 20%. So they're doing 20% more cases, co contractual cases for purchasing than they were doing before. So I'm sure their vendors and their contractors are very happy about that, cuz they're doing those and they're also doing it faster.

So they're able to process those contracts much faster which is a huge a huge thing. The other thing is this really affected and actually accelerated this project accelerated internally due to remote work. Because employees on both the business partners and the Hitachi company itself had to go to remote, do the COVID pandemic in 20 20, 20 21,

and it accelerated out of this, a lot of this development work. It really is a digital transformation and efficiency play not as sexy as, avatar apes or NFTs, but I think, really valuable to the ecosystem as well.

Eric: And in terms of permissioning and being able to even track different projects.

It's just it, I the use the case study is. Is interesting. , even if it's so something that's mundane as procurement , and clearly it had a significant impact, so yeah. It's great to see something

Daniela: like that. Yeah. And, and it's great to see Hitachi publicly talk about this because one of the things is we, we have a lot of different use cases that, very large companies come to us and tell us even at events like consensus, they'll walk up to the booth and say, Hey, I have this project that I built with Hyperledger technology, and here it is, and here, and we're not allowed to talk about it.

We don't wanna publicly make mention of it because every time we talk about blockchain projects, our PR Corp com division says, "Stop that." So I think one of the things is getting the ecosystem in these companies comfortable to start talking about these projects in the public. Also helps.

And that's part of what we do here at the Hyperledger foundation is we help facilitate that knowledge sharing and sharing of those use cases as well. So I'm glad you found that Hitachi one helpful. And I recommend everyone to take a quick look at it.

Eric: Yeah. And I think, one of the things that in the digital asset space, particularly the public one that we continue to talk about is the need for use cases, practical applications.

And it's one of the things that why I've continued to circle around Hyperledger because in, in Hyperledger, there isn't as much hype. But there ISN a lot of use cases and a lot of real dollars in and I also think because it's enterprise grade because of the nature of its development and its very large community for those traditional companies that are looking to leg into the blockchain space, Hyperledger may represent something that's a little more, again, I think that there's varying degrees of comfort and there are, is a lot of exciting technology out there, but Hyperledger has a lot of different use cases.

And I think it's a really good option to try to implement something that is like enterprise grade and has a lot of institutional backing already. Yeah.

Daniela: Yeah we did a brand survey last summer across I think the survey responds were about 300 executive business and it leads and exactly what you said, right?

The brand, the Hyperledger brand is trusted. I am seen as open, right? It's an open, source brand and that people can and participate in it. But it is trusted and, our projects. Implemented, you mentioned before Hyperledger fabric obviously, the oldest of our projects it is now going into V3 this fall.

It has two LTS supports already. And for those who don't know long term support plans, right? So when you are an enterprise and you're using code, you wanna make sure that it's a code that has that has, security checks and it has LTS support, and it has a commercial ecosystem around it.

And really, all our projects lead up to that. And as you see the younger ones mature in our continuum of project, life cycle, you'll see that those happen as well.

Eric: Great. Excellent. We can talk about CBDC, or we can, if you want to pick another use case we could do that too.

Daniela: Yeah, let's talk about central bank, digital currencies. Tell me your interests. What drives you primarily on the topic?

Eric: It, it's certainly, there's a lot of open questions about CBDCs generally, and we don't have to get into it on this episode. But having said that it is a, what I would call an industrial or a very large use case.

It is definitely gotten a lot of attention and the ability to support a CBDC environment, like you've done in Nigeria, certainly that's a, that, that seems to be a win. And it seems like Cambodia also has an implementation I think that type of use case, obviously that's the, that kind of adoption is going to continue to dominate.

I think the headlines in just basically societal transition over the next, five to 10 years, and then maybe it's just boring again. , remember the time we used to have CA I don't remember that. But I think a lot of these technologies is like that, you basically go through a period of where you do worry about interoperability or, and all these different concerns about integration, but the goal is to make it bore so that nobody is excited about, scrolling down the screen and thinking about the bits, how the bits change at the top and the bits change at the bottom is how you do that.

So that's my interest in CBDC. We also haven't covered it a ton on this podcast, but I am interested in that the , the technologies and implementations that, that support it. And so I think, there's a lot of different frameworks that Hyperledger offers in different capacities to support CBD CS.

Some of the ones that I've noted going through it, I think it seemed like there were three, but I'm sure there are more, cuz you could have different facets. Is Besu of course fabric the standby and Roja And maybe do you wanna just touch on each of those and how each one of those might have a different kind type of implementation use case things that they're trying to achieve?

And then we can talk about maybe some of the actual implementations.

Daniela: Yeah. I think it's important. And some of the CBDCs that you mentioned I think Nigeria, for example these are projects that we don't know are happen. And we see the news, the news article, the same day that you see the news article, and that is the beauty of open source, right?

And the fact that these government nations and the private sector that they're working with are selecting Hyperledger technologies, without having to ask for permission, without having to, basically, make a big deal out of it are able to build and build real solutions that go into production and meet the needs of that local economy is really fantastic.

And this is why I wake up every morning. Cause I, sometimes I wake up in the morning and say, oh, what's it what's gonna happen today? And it's good and bad, but that's the fantastic part of it when it comes to central bank, digital currencies, I think it's really important that if we're going to be building some of these new financial infrastructure and systems that.

The premise of what the Hyperledger foundation and the Linux foundation, right? The Hyperledger foundation is one of hundreds of projects within the Linux foundation. The

Linux hurdle, obviously being the biggest project, but we really are following open source practices around the majority of code that's being used in enterprise use cases everywhere in government use cases for CBDs, primarily in people who have heard me, and my team speak about this.

It's really important that the open source governance of code is for, in the forefront of the development of these CBDs. I think everyone at this point knows, and certainly everyone probably in your audience of this podcast audience knows that it, Open source motivates for higher quality code, and not only does it motivate for holiday quality code, it allows to have that transparency for people to look at how the code is being built, what the code does, and more importantly, be able to contribute to the advancement and, the changes that the code in the future need to do. So I think when you're talking about central bank, digital currencies, and other projects like that, it's important to be open source first.

And it's not just open source, but it's also open governance and this is a really clear need for a distinction specifically in news cases like this, that it's not just about. It's great to see, some organizations open source their code, put it on GitHub, have open community calls for comments have open community calls for participation.

But you also need to have open community calls for governance and for contribution as well. So I think that a lot of the choices that the private sector and the public sector are making specific to central bank, digital currency platforms and what to use is being led by that. And, I have to say that we've had conversations with central banks for the last three years plus that really understand that.

And that's great to see in the market that they do that as well.

Eric: And I would imagine that for central banks looking at this the role of the foundation is probably. As important as like almost any other use case application. Because they're thinking, Hey, I'm putting my whole currency on this system.

So I wanted to ensure that there's like a stable foundation behind it and that there is a commitment to open source go open source and open governance.

Daniela: Correct? Yep. Yeah. And you're right on about that. And it's also a decision point that they don't have to choose if they're going from one, one project to another.

So I'll give you an example. You mentioned Hyperledger fabric, Hyperledger Besu and Hyperledger as three of the leading DLTs within our Hyperledger community that are being used in CBDCs and we just published an ebook that highlights all these use cases and which projects are being used in which use cases that I would recommend your audiences to go look at.

Maybe we can provide the link. But if you think about those three projects fabric Iroha and Besu as selection points all three of them sit under Hyperledger foundation. So all three of them have, are being governed in the same way. From an open governance perspective on the code basis.

All three of them are Apache 2.0 licensed, which is important to understand if you're using open source code, how and what you can do with that code going forward. So one decision doesn't need to be made across every single project. You can say, Apache 2.0 is a license that we can work with. And we know that everything within the Hyperledger foundation, all projects are Apache.

We know that all projects are governed in this open Hyperledger foundation way. And we understand that the process is in it. We understand that it's enterprise grade, to use your language from before. It can be trusted, right? The code goes to rigorous testing and security processes very transparently, right?

EV we just published, for example a security report on Hyperledger Ursa. We did that in the open. We pushed it, published it for the community, and we're working through the questions and the issues that, that security audit raises. And we do that for every single project. And that's important that makes it that confidence level at the central bank, working with their private sector partners to understand, and remove at least one layer of decision process that perhaps they had to make as well.

So I, I think that's an important aspect that a lot of people don't because they're not in, in the open source communities as well.

Eric: Great. Excellent. I guess there's. So we touched on Cambodia, we touched on Nigeria, one thing I find intriguing is a lot of these developing countries for them it's a transition from like a mobile payment system to a CBDC, which is a very different transition than I think we have in the us or many countries in Europe where there's a low penetration of banking services.

So really there's multiple aspects to it in Hyperledger forming the backbone of it. There still has to be that that, how the people are going to interact with it. But so there, but you're also in discussions with a number of other countries regarding CBD CS And so to, to what extent again, as your role as ambassador, how do you get involved in these particular countries?

Or is it pretty much projects that are, like to your point, you wake up in the morning, you find out, Hey, Nigeria adopted it. Maybe it's not the tip of the spear for forgetting into these jurisdictions, but do you find you mentioned. There were central banks reaching out and talking to you and trying to get an understanding of the governance and the foundation behind it.

To what extent are you actively involved in those discussions?

Daniela: Sometimes they do just show up on the news and we're like, Hey, this is built using, Hyperledger, Besu, Hyperledger fabric, which is great to see. Other times they do they're already working with a member company in our community or a company that we know well in our community.

And we have those discussions, and we understand where people are building. I think it's really important to just drill in a little bit on the point that you made Eric around trying to boil the ocean, sometimes as I call, right? If CBDs if the first CBDC in production is for an economy like the us.

Versus an economy like the Eastern Caribbean bank use case that they have, it's gonna be very different, and the approaches that you have are gonna be completely different in how they get rolled out, how they get developed how the end users get introduced to the concept.

One of the things that I think is very helpful is to look at those smaller nations and how they have approached their needs. Last year we had a presentation that was focused on the Eastern Caribbean yeah, it was the Eastern, yeah. The Eastern Caribbean use case. We had a company called bit they're the private sector partner of the of the, of that project.

And they came in to talk about specifically. Where, how they engaged with the local communities before even the technology was discussed. How do you get people engaged at the consumer level to understand what a central bank digital currency is and how is it much better or worse or different than what I have today, for example, with Mo mobile money or, Venmo or other types of systems as well.

So I think it's important to tell those stories and look at those lessons and then apply it to the much bigger use cases. And we see this all around in blockchain, right? If you think about, a couple years ago, what is it Estonia? Everybody was talking about Estonia and all these digital frameworks and blockchain.

And how Estonia is blockchain enabled blockchain, blockchain enabled. There are a million residents there. You can experiment with a million residents at a much different rate than you can at a large, in a large company or, or even a large organ government,

obviously. Yeah.

Eric: Estonia is interesting cuz every citizen has a digital identity from birth, much in the way that we might have a social security number granted to us, they have, they all have a digital identity, so that follows them forever. Yeah. And in those discussions regarding CBDC and backbones, when you are being engaged in those discussions, like what types of

like at the foundation level, what types of, what is the subject matter of those discussions at the foundation level?

Like when partners bring you in, is it like providing assurances and open governance? Are there enough materials out there for people to facilitate it on their own? What's the foundation's role behind that?

Daniela: So the foundation's role is really to create a place where these organizations can convene together and have these discussions as much in the open as possible, right.

Is really important for us to for example, make sure that our special interest groups when they have presentations, we had the Boston fed come in and do a presentation. Recently, the Boston fed has been members of the Hyperledger foundation since 2017, I believe. As does, the bank of England and MAs, which the Monetary Authority of Singapore having those conversations in an open is important.

So convening panels on the discussion points that incorporate both the private sector the government organizations and, consumer aspects of it as well. So for example, we were in Davos in May we had a panel that had Hyperledger, the digital dollar project pheno, which is the financial open source consortium here at the Linux foundation, as well as, and BIS, which obviously is the central bank of central banks,

really talking about the top, the topic of open source development for central bank, digital currencies, whether it's a DLT or something else. So having those conversations, our job is to convene and to connect people and indirect them in your, in your question or your comment about making sure documentation is available making sure that people can easily find a path into the answers that they need,

that is something that staff works on as well. Making sure the website or the Wiki or other resources that we have are easy to consume is important as. And obviously the technical documentation, making sure that's up to speed as much as possible. But it's hard. It's a hard job because as an open source community every single person that's participating is a volunteer.

They might work for a company, which is paying them to do the work, but ultimately they're volunteers in our community. And they, they, they will work together and collaboratively to do the best that they can for that project. And that

use case.

Eric: Excellent. So before we move off of CBD CS some of the discussions that have been had involving Hyperledger, I'll just highlight a couple ECB, France, Thailand project Inthenon, which is lion rock, Spain, Australia, and Saudi Arabia.

Some name brand countries there, yeah, and

Daniela: There's a couple other ones, as I said, we have an ebook and you can, see and follow the links. There's a lot of recordings back to my, we do this all in the open, anything that we can publish and share openly, we do.

And we recommend doing it and we already on V4 cause we keep updating it with new use cases. It's definitely a lot of work happening there.

Eric: Excellent. I'm gonna touch on consensus relationship with Hyperledger . Do you want to expand on the nature of consensus relationship with Hyperledger?

Daniela: Sure. And just to clarify the consensus with the, why the company consensus as well. We consensus is a member of the Hyperledger foundation. They've been members and sitting on our governing board since 27 20. And Joe Lubin is actually one our board representative for consensus.

The consensus organization has actually been participating in Hyperledger since 2017 or 2016 when it was launched. There were one of the original companies that joined forces with IBM and SAP and JP Morgan, and all the other digital asset are initial companies that joined that created the Hyperledger foundation at the time.

They are a member company happen to be a premier member. So they sit on our board. They also contributed a project called Hyperledger Besu, which Eric you've mentioned previously and Hyperledger Besu was contributed to the Hyperledger foundation in 2019. So that code base came in as a contribution to the Hyperledger foundation.

And since then we've been building a community around Hyperledger Besu which is an Ethereum execution client. And so that Hyperledger Besu can be run both as a permissioned network or a public network on the main net on the Ethereum main net as. But before that, cuz consensus is a company, but there's two organizations that are aligned with the Ethereum ecosystem that Hyperledge has been working on since 2017.

So since very early on, so the Ethereum foundation and the Ethereum enterprise Alliance, those are both independent organizations. But obviously very focused on the Ethereum ecosystem. They have both been associate members of our community since 20 17, 20 18. And we've been working with them very closely because we felt that the Ethereum ecosystem and basically our members and the community that we're we were talking to at the time would be interested in making sure the Ethereum ecosystem was part of Hyperledger as well.

So we used to have a project called Hyperledger Burrow. If you're familiar with it, it has a cute little, had a cute little icon as this project logo. And Hyperledger Burrow was the first

Ethereum BA Ethereum project in Hyperledger. And it had the Ethereum, it supported the Ethereum virtual machine based on the tenement framework.

And it actually was adopted some work was done to adopt the EVM for Hyperledger fabric and Hyperledger saw tooth once burrow came in. So this was in 20 17, 20 18. So there was already interest in building compatibility with Ethereum main net back then and then in 2019, a consensus came to us with Hyperledger Besu.

It was a product that they were called Pegasus. I don't know if you're familiar with the Pegasus product line that consensus had and that turned into Hyperledger Burrow where it is now, growing and maturing as well.

Eric: Excellent. So actually, so which is a segue into something we've noted a couple of times, which is the consensus conference in Austin, which we were both at.

What kind of discussions were you having there? What did you bring back that maybe was new information or would be interesting to. Listeners. Yeah.

Daniela: First the first thing was getting to see people in person. Again, it was great getting to see you and many others cuz we haven't had those discussions.

And we had a booth at the consensus floor and the conversations. We're very consistent to what we've seen in 20 17, 20 18, 20 19, 20 20, is the Hyperledger brand, people know the Hyperledger brand. There are questions around, what does the Hyperledger foundation do? What do you guys really do?

Or can I need some help with Hyperledger, Hyperledger, cactus, who should I talk to? So people are asking the kind of questions that very often they would ask of the vendor. Eric but the reality is that people when they came to us, and they weren't.

Building using Hyperledger tech, they got hopefully an understanding based on our conversations with them, that at the Hyperledger foundation, there are a lot of project code bases, and a lot of communities like for example, are special interest groups that are focused on sectors capital markets supply chain, trade, finance, healthcare, et cetera of people that they can come and engage.

To understand and to really drive their development on it. So I'll pause there cause I know you and I had a couple of conversations, so you probably wanna ask me about those as well.

Eric: Yeah, maybe you could expand on, on, on that a little bit more, the types of projects, that where you saw maybe even a different from 20, 20 to 20, 22 or 2019, like any trends, direction where you think it's maybe the uptake or the, there's a difference.

Daniela: Yeah. So I think the, obviously the crowd, the attendees at consensus, the conference are very focused on public permissionless. Use cases. Although, many people came by and told us about their, permission networks that they built using Hyperledger tech, but overall people obviously, and especially on, in the sessions and in the events themselves.

So a couple of things that I think key themes that came out of consensus 20, 22 for us this year. Number one is interoperability. People are very interested in what is happening with interoperability. People understand that it is not one network to rule them all. It is networks of networks.

Everyone understands that they've lost the battle of just being one blockchain that everybody needs to use. So interoperability becomes more and more important as these systems and these networks are deployed and then need to expand beyond other networks, right? Networks of networks. So interoperability becomes an important project discussion.

So we have projects within the Hyperledger foundation that are really focused on interoperability, one Hyperledger cactus, all actually came out of very specific needs in 2020 that companies got together and said, Hey, we are building this network. And it's being, this network is being built with, for example R threes Coda.

And we have this network that's being built with Hyperledger fabric. But these networks need to talk to one another. So how do we go about doing that? And Hyperledger cactus is the answer to that question and really supports now Hyperledger fabric Hyperledger Besu. R threes, Coda other projects like quorum, which is the other, the consensus quorum project, the go quorum project that JP Morgan U uses.

And there's some work with IBC, for cosmos support and on, because that is where the market and these networks are going. So interoperability is number one, but maybe you have some questions on that one. We can dig into that one and then I'll go to the other two

Eric: With regards to the interoperability, Hyperledger doesn't necessarily get into cross chain.

Meaning it can connect to other change. It doesn’t obviously wrap tokens. That's not really its objective. But what it does do is it provides; it does interconnect through. I think through I think 17 different public blockchains was that somehow that number

stick in my head.

Daniela: Yeah. Yeah. That number is too high. So like I mentioned, there are, and you can go to the documentations, think of Hyperledge CTA as an SDK of SDKs as how that, the

main project maintainers are describing it. And there's yeah it's its goal is to really solve a lot of the interoperability between, permission networks and then permission is networks as well.

It's we call it, it's an SDK of SDKs primarily and making it pluggable because we know that these things change and how do you just plug in, if you wanna build a plugin for Hyperledger cactus for any platform you can pretty much it's well documented. You can get in there and go do it.

And we see a lot of those contributions already coming in.

Eric: Excellent. So interoperability was one what's. What are some of the other ones that were top of mind for people?

Daniela: Identity. Our digital identity projects primarily Hyperledger Aries and as cuz I think that's important.

And once again, Hyperledger Aries is a project within the Hyperledger foundation that doesn't just work with Hyperledger tech, you can implement Hyperledger Aries with other blockchain DLTs as well. Doesn't have to be in the Hyperledger family. Did support the decentralized identity support is also conversations that people who have

come to us.

Eric: So we, at the conference, there was discussions about interoperability. There were questions about D I D what was the third thing that yeah,

Daniela: interoperability identity and adoption, right? The conversations, people who have heard about Hyperledger who have heard, big news stories about Hyperledger in 2016 and 2017 and 2018 asked, is Hyperledger tech being adopted and used and put into production?

Do you have use cases that you do that you have? And we started, the top of the hour talking about those use cases and talking about how we help here at the foundation. We help tell that story through case studies and presentations and panels and discussions and webinars. But ultimately there are

many use cases using Hyperledger technology. You mentioned Hyperledger Fabric being one of the most adopted fabric continues in surveys for enterprise users when asked what DLT they have. The block recently put out a report think was in the fall of last year. That said that of the top a hundred, large companies in the world using distributed ledger technologies as part of their enterprise.

I think it was 70 of them had Hyperledger. So yeah, Hyperledge Fabric use cases there. And I can share that report with you. So I think, fabric is being used, but we're seeing adoption

of many of the different use cases. And as I mentioned before, having people being able to talk about them, that Hitachi case study, the use case is very interesting. They've been at it for long, but the fact that a company like Hitachi is publicly talking about it, makes it more mainstream and it helps us tell the story. There are also numbers that are starting to come out very specific to scalability.

Right to, how big these networks can get how with the number of transactions that are being run on these networks getting that data and people come to us and ask all the time they wanna know, is this scalable? Yes, it's scalable. We have use cases that, show the scalability of it.

And yeah, so that, that adoption question is still one that we have, and we hope as a foundation that we can help tell. And for those of them that visited the consensus booth we had a lot of use cases that we were able to share with them.

Eric: Excellent. So it's exciting. And would you say in terms of the acceleration across the larger enterprises is that

do you see that acceleration occurring, like more institutions coming to Hyperledger because it's that enterprise grade , DLT technology?

Daniela: Yeah. I think if you look at any projects especially in the open source in the open source world is that there is a level of growth, right?

That goes like this. And then you see from a participation perspective in the foundation itself, you might see a leveling off, but that doesn't mean that the adoption. That the company's building solutions are not building using the technology in this case, the Hyperledger technology projects. So I think that acceleration needs to be defined as what do you see acceleration.

If you go to our it's called Linux foundation insights, you can see every single metric of all our projects in regard to contributions, and to pull requests into a number of contributors, to the number of companies and what companies are contributing to these code bases. This is all open. Anyone can take a look at it, and it really shows how the projects have evolved and continue to grow right there in the data.

So I encourage anyone who's interested to go to Linux foundation insights, dashboard, and look up at the Hyperledger projects. See what companies are involved, how the maintainers are growing. And what kind of activity on these open source code bases?

Eric: Excellent. So Danielle, thanks so much for coming on the podcast before we break anything else that maybe I should have asked you that I didn't ask you, that you wanted.

Daniela: Yeah no. I'll do a big pitch for our Hyperledge global forum. And Hyperledge global forums, our annual gathering of community members. This year we're gonna be meeting in Dublin, Ireland on September 12, 13th, and 14th. There'll be two days of keynotes and business and technical tracks. Lots of opportunities for networking.

With the maintainers and other contributors in our community we're going to have a great event on Tuesday night at the Guinness storehouse where we'll be parting it up with hopefully lots of pints in our hands and alongside with the Linux foundation open source summit that is at the same time in Dublin as well.

But that event is gonna be a great place for newcomers to really understand who is building what with Hyperledger technologies for developers to come and do hands on. For example, on day three, we have workshops, we have a workshop on CBDCs. We have a workshop on digital identity. We have a workshop on interoperability and that is half day workshops hands on for developers to get up to speed with the project.

Come join us. Hyperledger global forum, September 12, 13th, and 14th in Dublin. We're excited to get everybody together. Over a hundred speakers will tell you why it's great to build using Hyperledger tech.

Eric: Great. And if there's any, if there's any one resource you wanna direct people to, on the website, cuz I'm not gonna say, where should we find you?

Cuz we know where to find you Hyperledger Hyperledger's main website any particular resource that you would say, Hey, if you're starting out, you should go here.

Daniela: The in the Hyperledger website, hyperledger.org, there's a participate tag. In that tab, you'll find ways to engage with our community, whether it's through our discord channels with the, which is our chat channels or our weekly calls.

We have community calls every week. We have, 20, 30 calls that you could attend depending on the topic that you're interested in. So hyperledger.org and then go to participate and you'll see the entry point into our communities there. But if anyone wants to connect, you can connect with me personally on LinkedIn.

And I'd be happy to have a chat and get everyone involved.

Eric: Excellent. So thanks so much for coming on and keeping us up to date on Hyperledger and all the exciting things that are going on.

Daniela: Excellent. Thank you, Eric. Thank you.