1   COMMODITY FUTURES TRADING COMMISSION

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6   TECHNOLOGY

7   ADVISORY COMMITTEE

8   (TAC)

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12   9:30 a.m. EST

13   Monday, December 14, 2020

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21   TELECONFERENCE

22

1   CFTC COMMISSIONERS

2   Chairman Heath Tarbert

3   Commissioner Brian D. Quintenz (TAC Sponsor)

4   Commissioner Rostin Behnam

5   Commissioner Dawn Stump

6   Commissioner Dan Berkovitz

7

8   TAC CHAIRMAN

9   Richard Gorelick, Director,

10   Eventus Systems, Inc.

11

12   COMMITTEE MEMBERS

13

14   Mayur Kapani, Chief Technology Officer,

15   ICE

16

17   Derek Josef Kleinbauer, Vice President, Bloomberg

18   SEF LLC, and Global Head of Rates and Equities

19   Electronic Trading, Bloomberg L.P., Bloomberg

20

21   Thomas Chippas, Chief Executive Officer,

22   ErisX

1   COMMITTEE MEMBERS [Continued]

2

3   Christopher Chattaway, Managing Director,

4   Goldman Sachs

5

6   Christopher Hehmeyer, Managing Member,

7   Hehmeyer Trading and Investments

8

9   Supurna VedBrat, Global Head of Trading,

10   BlackRock

11

12   Timothy McHenry, Vice President,

13   Information Systems, NFA

14

15   Haimera Workie, Senior Director for Emerging

16   Regulatory Issues,

17   FINRA

18

19   Gary DeWaal, Special Counsel,

20   Katten Muchin Rosenman LLP

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22

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 1                COMMITTEE MEMBERS [Continued]

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 3   John Lothian, Executive Chairman and CEO,

 4   John J. Lothian Co. Inc.

 5

 6   Yesha Yadav, Professor of Law,

 7   Vanderbilt University, Special Government Employee

 8   (SGE) for CFTC

 9

10   Eddie Wen, Global Head of Digital Markets,

11   JP Morgan Chase

12

13   Julie Holzrichter, Chief Operating Officer,

14   CME

15

16   Aaron Wright, Associate Clinical Professor of Law,

17   Cardoza Law School

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1   P R O C E E D I N G S

2   (9:36 a.m. EST)

3   MS. TENTE: Thank you.   Good morning everyone.

4   This is Meghan Tente.   As the TAC Designated Federal

5   Officer I would like to call this meeting to order.

6   We're looking forward to today's presentations and TAC

7   vote.

8   Before we begin we have a few issues to cover

9   related to the teleconference.   TAC members and

10   presenters, please keep your phones on mute when you're

11   not speaking.   If you'd like to be recognized during a

12   discussion, please message myself or TAC Chair Richard

13   Gorelick by the WebEx app.   Chairman of the TAC,

14   Richard Gorelick will lead the meeting today.

15   But first, TAC sponsor Commissioner Quintenz will

16   give his opening remarks.

17   COMMISSIONER QUINTENZ: Thank you, Meghan.

18   Welcome everyone to today's Technology Advisory

19   Committee meeting.   I'm pleased to welcome the chairman

20   and my fellow CFTC commissioners, CFTC staff, and our

21   committee and subcommittee members, and the general

22   public to what will be again, a fascinating and

1   illuminating conversation.

2   This is the seventh meeting of the TAC since I

3   became the sponsor of this prestigious committee back

4   in the fall of 2017. Since then, the TAC formed four

5   subcommittees to assist its work: the Automated and

6   Modern Trading Markets Subcommittee, a Cybersecurity

7   Subcommittee, a Virtual Currencies Subcommittee, and a

8   subcommittee on Distributed Ledger Technology, all of

9   which have been incredibly active. We've received

10   recommendations embraced by the full TAC from the

11   Cybersecurity Subcommittee that the CFTC published a

12   statement recognizing the FSSCC profile, which the

13   agency subsequently did.

14   And today we may receive a second recommendation

15   from the TAC on data protection initiatives in line

16   with the Cybersecurity Subcommittee's presentation from

17   our last meeting.

18   The Algorithmic and Modern Trading Markets

19   Subcommittee has been critical in understanding the

20   implementation of best practices for automated and

21   electronic trading risk controls by both exchanges and

22   firms. Over the course of the past two and a half

1   years, we heard presentations from TAC members, from

2   trading professionals, from FIA, from CME, and from

3   ICE, on how risk controls have continued to evolve and

4   help ensure the integrity of the market and prevent

5   unmitigated losses or uncontrolled trading.

6   We heard our own CFTC market intelligence branch

7   staff present a report on the lack of volatility

8   associated with increased automation of market trading

9   across futures contracts. We also heard feedback from

10   that subcommittee on the risk principles for electronic

11   trading proposal that the Commission published earlier

12   this summer. And in line with that feedback, I'm very

13   pleased the Commission adopted a final rule just last

14   week, making only minor changes to the original

15   proposal, and recognized that regulation around

16   electronic trading risk controls should be wholly

17   principles based.

18   Indeed, prescriptive specific rules in this area

19   are actually providing a disservice to the markets, as

20   opposed to the idea that they actually enhance its

21   resiliency.

22   I would note that it's been 10 years since the

1   last Flash Crash with major material market

2   implications. It hasn't been five years since the last

3   one, it hasn't been one year since the last one, it's

4   been 10. The reason it hasn't been five years, or one

5   year for the last major Flash Crash is not because

6   we've had significant prescriptive risk control

7   regulatory requirements. In fact, we haven't. It also

8   hasn't been because of luck.

9   Rather, it's because throughout that time, of the

10   hard work of technologists and risk management experts

11   in the private sector, from exchanges to trading firms,

12   in following the incentives to manage this risk, which

13   have forcefully and continually promoted answers to

14   prevent what we saw before and might see again in the

15   future.

16   The Virtual Currencies Subcommittee has presented

17   on a host of fascinating talks, proof-of-stake versus

18   proof-of-work consensus mechanisms, the potential

19   foreign development of self-regulatory-like

20   organizations, and rules in the crypto trading space,

21   the scope of Stablecoin products, Central Bank digital

22   currencies, and Bitcoin volatility profiles. The

1   Distributed Ledger Technology Subcommittee has

2   presented on derivative market applications for DLT,

3   the ISDA common domain model, custody of crypto assets

4   using zero knowledge proofs or multi-party computation,

5   AI and machine learning, and quantum computing

6   opportunities and challenges in the current market

7   environment.

8   In fact, it's been such a pleasure to lead and

9   sponsor this committee because of the continual

10   advancement we've seen in the technology space, none

11   more so than in the virtual currencies and DLT

12   environments, and I'm very appreciative to the experts

13   we have in those subcommittees.

14   Throughout the time that I've sponsored the TAC,

15   the TAC has been served admirably by over 25 full-time

16   members, and the subcommittees have had a total of over

17   40 members, an incredibly talented and thoughtful group

18   of market participants, firm executives, exchange

19   operators, lawyers, academics, and thought leaders.

20   These TAC meetings would not take place nor would

21   they be nearly as insightful and purposeful without the

22   astute leadership of our Designated Federal Officer and

1   the Associated Designated Federal Officers coordinating

2   and facilitating the subcommittee discussions. From

3   the ADFOs: Scott Sloane, Phil Raimondi, John Coughlan,

4   and Jorge Herrada, have all been invaluable to our

5   meetings, presentations, and thinking and are the

6   highest quality of experts and thoughtful public

7   servants.

8   Today, I'd just like to say will be Jorge

9   Herrada's last meeting as the ADFO of the Virtual

10   Currency Subcommittee. He's been a huge asset, a

11   wonderful brainstormer, and a happy warrior in the

12   discussion of these critical issues. I'm very pleased

13   to announce that Melissa Netram, the head of LabCFTC

14   will take over Jorge's role.

15   There's long been a strong partnership and synergy

16   between the work of LabCFTC and the TAC. Dan Gorfine,

17   Melissa's predecessor at LabCFTC, was TAC's first

18   Designated Federal officer under my sponsorship. I'm

19   pleased that Melissa is continuing that strong

20   tradition, which will only enhance each group's

21   thinking and work.

22   I'm, of course, very grateful for the work of our

1   current DFO, Meghan Tente, who coordinates,

2   troubleshoots, and provides uncompromising leadership

3   for the TAC. Her hard work, creativity, and spirit are

4   enormous credit to the agency and to this committee.

5   But out of the 65-plus members that I just

6   recognized of the TAC and subcommittees, there is one I

7   would like to recognize in particular, Richard

8   Gorelick, has been the TAC's chairman for over two

9   years, and has always provided a steady hand, a

10 knowledgeable viewpoint, trusted advice, and a quick

11 way to our internal and external discussions. Richard

12 has also served on two subcommittees, the Virtual

13 Currencies and the Automated and Modern Trading Market

14 Subcommittees, and has chaired the first, as well.

15   Richard, it's been a true privilege to have you in

16 this role.

17   And now, I'd like to have the TAC leave us for

18 2020, and perhaps my sponsorship on a very high note,

19 we have a remarkable fascinating and in-depth

20 presentation on the DeFi space today, an area that has

21 seen explosive growth, innovation, and a lot of

22 confusion, as well as a re-presentation and proposal

1   for a vote on its recommendations by the Cybersecurity

2   Subcommittee.

3   I'm very much looking forward to today. And

4   without further ado, I'll send it back to you, Meghan.

5   MS. TENTE: Thanks, Commissioner Quintenz. We'll

6   go to the other commissioners for their opening

7   statements now. We'll start with Chairman Tarbert, if

8   you have any opening remarks.

9   CHAIRMAN TARBERT: Yes, good morning and welcome

10   everyone to this Technology Advisory Committee meeting.

11   I'd, of course, like to thank Commissioner Quintenz and

12   his staff for convening the meeting. I'm also grateful

13   to you, Meghan, for being the Designated Federal

14   Officer for the TAC as well as for your work in support

15   of the committee. And of course, I must thank Richard

16   Gorelick for serving as the TAC Chair, and all TAC

17   members for taking the time to share your powerful and

18   valuable perspectives.

19   In the past 17 months, I set ambitious goals for

20   the CFTC to adopt rules that will help promote the

21   integrity, resilience, and vibrancy of U.S. derivatives

22   markets. I also laid out a plan to provide greater

1   clarity to our innovator community. I'm very proud to

2   say that with the help of my fellow commissioners,

3   members of this advisory committee, and its

4   subcommittees, and so many others, we've met those

5   goals.

6   As Commissioner Quintenz mentioned, just last

7   week, we finalized risk principles for electronic

8   trading. Staff from our Division of Market Oversight,

9   working with many members of this Advisory Committee,

10   including our exchanges and trading firms, crafted a

11   regulation that will set us on the right path to

12   dealing with our ever-changing markets. The

13   principles-based regulation focuses squarely on the

14   risk associated with electronic trading, but it does so

15   in a way that will ensure responses to those risks will

16   evolve as the risks themselves do.

17   In particular, I'd like to thank Commissioners

18   Quintenz and Berkovitz for their work on the Electronic

19   Trading Risk Principles Rule, a bipartisan effort to

20   make our regulations workable, while achieving our

21   important regulatory objectives, is a testament to the

22   cooperative spirit of this agency. It's also a

1   tangible demonstration of the benefits of having an

2   advisory committee like the TAC.

3   Given how important our five advisory committees

4   are to the work we do here at the CFTC, I'm pleased to

5   announce that we'll be having an open meeting in

6   January, that will focus on each of our five advisory

7   committee chairs presenting their accomplishments

8   during 2020, and their plans for the advisory

9   committees for 2021.

10   Once again, I'm so very grateful to all of you for

11   your help in advising the CFTC on how we can be a more

12   effective regulator. Thank you.

13   MS. TENTE: Thank you, Chairman Tarbert.

14   Commissioner Behnam, do you have any opening remarks?

15   Commissioner Behnam might have an issue of

16   joining. Can we go to Commissioner Stump?

17   COMMISSIONER STUMP: Thanks, Meghan. I don't have

18   any formal remarks. Like Chairman Tarbert, I very much

19   appreciate Richard Gorelick's leadership and

20   Commissioner Quintenz's leadership, and your amazing

21   organizational skills. As we enter 2021, I know that

22   there's much more work to be done. But I do want to

1 reflect on the amount of energy that Commissioner

2 Quintenz has brought to this committee. And I think

3 it's really been a testament to his interest in leading

4 in the innovation space, and that's so important for

5 the CFTC and the industry.

6   And so, I just wanted to take a moment to thank

7 him personally.

8   But I have no formal opening comments. Thank you.

9   MS. TENTE: Thank you, Commissioner Stump. And

10 Commissioner Berkovitz,

11 COMMISSIONER BERKOVITZ: Thank you, Meghan. And

12 good morning to the committee and my fellow

13 commissioners and all the participants in the

14 conference.

15   I, too, don't have any formal remarks. I also

16 would like to express my appreciation to Commissioner

17 Quintenz for his leadership of this committee. This

18 committee is an incredibly important committee. And I

19 very much look forward to the presentations today. I

20 thank the participants in advance for the

21 presentations, which I'm very much looking forward to.

22   Of course, thank you, Meghan, for all the work

1   you've put into this. I know from my work on the

2   Energy and Environmental Markets Advisory Committee,

3   how much work the DFO puts into this, on top of your

4   normal duties. And you've certainly been busy with

5   critical rulemakings, as well as your service to the

6   committee. So thank you for this additional volunteer

7   service. It's a real testament to the spirit of the

8   CFTC staff that despite all the challenges, people step

9   up, above and beyond the call of duty.

10   Thank you, Richard, of course, for your -- Richard

11   Gorelick, for your leadership and chairmanship of the

12   committee.

13   Again, I'm very much looking forward to the

14   presentations. Thank you very much.

15   MS. TENTE: Thanks, Commissioner Berkowitz. We'll

16   now turn the meeting over to Richard Gorelick to start

17   the presentations.

18   CHAIRMAN GORELICK: Thank you Meghan, Commissioner

19   Quintenz, Mr. Chairman, Commissioners, and everyone

20   participating today. I am looking forward to this

21   morning's very timely sessions.

22   To get the meeting started, we will begin with the

1 presentation from the Technology Advisory Committee's

2 Virtual Currency Subcommittee. This subcommittee is

3 presenting on the growth and regulatory challenges of

4 decentralized finance. Specifically, the subcommittee

5 will discuss the growth of DeFi, a broad category of

6 emerging smart contract-based financial services being

7 built on top of blockchains, and we'll highlight areas

8 of development, detail potential regulatory challenges,

9 and think about possible solutions.

10   Presenting for the subcommittee this morning

11 will be Aaron Wright, Clinical Professor of Law at

12 Cardozo Law School, and Gary DeWaal, Special Counsel

13 at Katten, Muchin, Rosenman, LLP.

14   I'll turn it over to Gary and Aaron.

15   MR. DeWAAL: Thank you, Richard. And again,

16 you know, we'd like to just on behalf of all the

17 subcommittee members, thank Commissioner Quintenz

18 for his leadership of the TAC and his support of the

19 TAC. I always will have a warm spot for

20 Commissioner Quintenz as result of his citation of a

21 Kurt Vonnegut short story "Harrison Bergeron," from

22 "Welcome to the Monkey House" is in response to a

1   proposal by a specific exchange to have speed bumps

2   potentially introduced, creative, wonderful, but I

3   think it's a testament to Mr. Quintenz's broad

4   breadth of knowledge, and the kind of leadership

5   he's brought to this role.

6   We'd also like to thank Jorge, who has shepherd

7   us through many, many subcommittee meetings, with

8   wit, with wisdom, and absolute perseverance, and we

9   look forward to working with Melissa in her new

10   capacity.

11   So Aaron, we've got a good topic here today,

12   DeFi. And I'm going to ask you right off the bat,

13   what is DeFi and direct Meghan to page two of the

14   slides.

15   PROFESSOR WRIGHT: That's a great question.

16   And I want to just echo what Gary and Richard said.

17   Thanks so much for the opportunity to go through

18   such an important topic.

19   So DeFi is part of the blockchain ecosystem.

20   It's growing incredibly quick. And at their core,

21   or at its core, DeFi protocols use smart contracts

22   to create financial services and other products that

1   aim to be noncustodial in nature. They ideally don't

2   rely on one central party, but in practice many

3   still do.

4   MR. DeWAAL: And you reference the word smart

5   contract, maybe for everybody, you can just sort of

6   explain what that is.

7   PROFESSOR WRIGHT: Yeah, absolutely, you know,

8   smart contracts, they're a bit of a misnomer. It

9   doesn't necessarily mean, you know, some sort of

10   interactive legal agreement. Instead, you can think

11   of a smart contract as a small bit of computer code

12   or computer script that's running on a blockchain.

13   What's interesting about smart contracts is

14   that each node on a network, blockchain-based

15   network like Ethereum, will execute a portion of

16   smart contracts. So once the computer software or

17   script is deployed onto a blockchain-based network,

18   it's difficult to remove that software from being

19   interacted with with end-users. It's difficult to

20   also stop a smart contract-based system from

21   running, if it's being interacted with by users.

22   MR. DeWAAL: And what's some of the basic

1 jargon associated with DeFi?

2   PROFESSOR WRIGHT: Yeah, let's proceed to the next

3 slide, if we can, please.

4   So like many other areas of blockchain technology,

5 and the there's a lot of jargon that's here. So to set

6 the table and just to level set, we're just going to

7 introduce some terms, which we'll refer through out the

8 rest of that presentation.

9   So DeFi applications are often administered via

10 online portal, developers call these apps. And they're

11 often supported by individuals or entities that pull

12 together assets into what's known as a liquidity pool.

13 And we'll unpack that a bit more over the course of the

14 presentation.

15   Those that deposit assets into a liquidity pool,

16 lock their assets. And they often earn fees and/or

17 automatically received digital assets in the form of

18 governance tokens. And these tokens give the holders

19 the ability to kind of steward and weigh-in on certain

20 aspects of how these protocols operate. The practice

21 of submitting assets to a DeFi protocol is increasingly

22 referred to as liquidity mining. And the process of

 1   earning fees and/or governance tokens or other forms of

 2   assets is referred to as yield farming.

 3   So these are some new terms that you may hear more

 4   and more about, especially as decentralized finance

 5   grows.

 6   MR. DeWAAL: And why are we even here? Why is

 7   DeFi significant?

 8   PROFESSOR WRIGHT: Yeah, absolutely. And if we

 9   can turn to the next slide, that would be appreciated.

10   So the reason that we're thinking about DeFi as a

11   subcommittee and we spend so much time exploring it, is

12   that it's growing incredibly fast. Currently, there's

13   about $14 billion in digital assets locked in various

14   different decentralized financial products and

15   services. And it's growing at an incredibly fast rate.

16   If we thought about or looked at DeFi, even a

17   couple months ago, or a year ago, the amount has

18   ratcheted up from, you know, several million dollars to

19   hundreds of millions of dollars to now over $14

20   billion. And increasingly, we're seeing kind of a

21   dynamic emerge, where over 10 percent of the amount

22   locked in DeFi protocols is actually Bitcoin.

1   So you're seeing Bitcoin being deployed into

2   decentralized financial protocols, other assets being

3   deployed into decentralized financial assets. And in a

4   sense the yield curve is developing around digital

5   assets, where folks can deposit them into decentralized

6   financial products, earn fees, or earn other assets and

7   develop a yield. And some of those yields are

8   exceeding what may be possible to obtain through more

9   traditional financial products and services.

10   MR. DeWAAL: Gotcha. And tell us a bit about some

11   of the products and players involved in the DeFi

12   landscape.

13   PROFESSOR WRIGHT: Yeah, absolutely. And if we

14   can turn to the next slide.

15   So the decentralized financial landscape is

16   growing, and it's growing really fast. And there's a

17   number of smart contract-based protocols and

18   centralized aggregation tools that are beginning to hit

19   the market. So when we're looking at the emerging

20   categories of DeFi protocols, there's a number of them,

21   and we're going to focus in on a handful of them today

22   during the course of the presentation.

1   So in broad buckets, there's decentralized

2   exchanges, or DEXes. DEXes have been around for a

3   number of years now, but there's been some innovations

4   that have led to a broader proliferation of DEXes.

5   There's borrowing and lending protocols. There's

6   derivatives and synthetic asset protocols. There's

7   also insurance prediction markets and a number of

8   others that I imagine we'll start to see emerge over

9   the next six-to-12 months.

10   In addition, and on top of a number of these

11   protocols, we're seeing other services emerge,

12   including like DEX aggregators, and also yield and

13   asset management protocols. And we're going to unpack

14   those in a couple minutes in more detail.

15   And one way to look at it, and if you flip to the

16   next slide, and this is one way to kind of

17   conceptualize what's emerging.

18   So kind of at the base, you have a blockchain,

19   like Ethereum, or another blockchain, although most of

20   the activity currently is happening on the Ethereum

21   blockchain. You have a number of protocols that are

22   smart contract-based that performs certain financial

1 functions like borrowing/lending, like exchanging

2 derivatives and synthetics assets, like prediction

3 markets, like insurance.

4   And some of those protocols generate their own

5 token, that can be a governance token or Stablecoin, or

6 they interact with other digital assets that are

7 tokenized or wrapped. Things like wrapped BTC or

8 wrapped Bitcoin, wrapped Ether, and a handful of other

9 wrapped assets. And then, on top of that, you're

10 seeing services that interact with the below portions

11 of the stack. So those include DEX aggregators, asset

12 managers, yield aggregators.

13   And feeding into this as well are a whole bunch of

14 integration tools, things like crypto to fiat gateways,

15 which enable users to deposit traditional fiat

16 currencies, like U.S. dollars, or euros or another fiat

17 currency, convert that into digital assets, and then

18 onboard user into decentralized finance. We've also

19 seen oracle services emerge that provide data to some

20 of these protocols, which enables more complex

21 protocols to develop, and also enables them to build

22 more complicated things.

1   We're also seeing emerge -- and this is a little

2   bit more nascent, I know your customer and/or identity

3   solutions, which are hoping to either address

4   regulatory concerns or make it easier to interact with.

5   And then there's various different token factories or

6   other smart contract-based systems that enable the

7   creation of assets like governance tokens, Stablecoins,

8   draft assets, et cetera.

9   MR. DeWAAL: And just so I'm clear in my

10   understanding, we're effectively talking about self-

11   executing applications that solely rely, or mostly rely

12   on software.

13   PROFESSOR WRIGHT: Yeah, exactly at the protocol

14   level. So self-executing is a bit of a misnomer, but

15   they can be triggered by end-users. They can send

16   transactions into a blockchain, interact with these

17   protocols, and these protocols are the ones that are

18   automating the financial function. And in many

19   instances, there's not one central party, or custodian

20   that's managing that process.

21   MR. DeWAAL: Okay, and what are the benefits of

22   these protocols?

1   PROFESSOR WRIGHT: And let's flip to the next

2   slide, please.

3   So, you know, the creators and supporters of DeFi

4   services often cite a number of benefits when

5   describing or thinking about why they're developing

6   these new financial protocols.   One is lower costs.

7   So the fact that you can automate a number of

8   aspects of how a financial service may be delivered,

9   should over time lower costs.   Because it's available

10   via blockchain and via the internet, there's a

11   tremendous amount of accessibility to these tools.   So

12   regardless of where you are, if you're connected to the

13   internet, if you have a wallet installed in your

14   browser, or potentially on your phone, you're able to

15   access a number of these tools and services.   That in

16   turn lead to greater financial inclusion.   And so, the

17   fact that billions of people could potentially and

18   arguably interact with these services, could enable

19   more and more folks to use these financial products and

20   hopefully, make their lives better.

21   At the same time.   You know, to the extent that a

22   decentralized financial protocol has a governance

1   token, it points to a future where you could have

2   community-run financial infrastructure with a number of

3   stakeholders that are involved in that process. So

4   making financial products and services look a little

5   bit more like Wikipedia or a community-run organization

6   as opposed to one run by a central party, or a handful

7   of people to more traditional corporate structure.

8   The permissionless access is also pointed out as a

9   potential benefit, although that obviously cuts both

10   ways, just depending on your perspective. And another

11   interesting benefit of decentralized financial products

12   is that they're composable and interoperable. All of

13   these different services, tools, smart contract-based

14   systems, they're able to talk and interact with one

15   another. They're able to be stacked together in

16   different ways.

17   Developers also oftentimes describe this as

18   financial Lego blocks, where you can begin to, you

19   know, get them together, build new products and

20   services using some of these first emerging

21   decentralized financial products and services, as kind

22   of base blocks to build more complex and interesting

1 and potentially useful things.

2   Also, because blockchains are sitting at the core

3 of many DeFi protocols and blockchains have, at least

4 as of today, fairly high security profile. That means

5 that these services may have a higher degree of

6 security. Also, because blockchains have cryptographic

7 primitives baked into them and because we're seeing

8 more advanced cryptographic primitives interacting with

9 what's potentially going to be deployed on blockchains,

10 they could provide a higher degree of privacy.

11   MR. DeWAAL: And what kind of risks are associated

12 with DeFi?

13   PROFESSOR WRIGHT: Yes, let's turn to the next

14 slide.

15   So like everything, there's lots of benefits, but

16 there's also a number of risks. And these risks are

17 just emerging. I think we're still trying to get a

18 clear pulse on what these risks are. The one risk is

19 that there's a very high barrier to entry here. You

20 know, users need to be tech savvy to even interact with

21 or operate these services safely.

22   The software is very complex, it's more complex

1   than otherwise already complex blockchain-based

2   applications. That means you need to spend some time

3   to understand how they work, you need to spend some

4   time to understand the kind of core technical mechanics

5   of how to interact with them. Although there's some

6   commonality between a number of these services, some of

7   these services enable the use of leverage and leverage

8   obviously creates its own type of risk.

9   There's also questions about if there's runs on

10   liquidity. So the assets that are being deployed into

11   these protocols, if there's a pull, or a withdrawal of

12   a lot of that liquidity, will that create some sort of

13   systemic risk or systemic problem? We're seeing a lot

14   of growth here, so we haven't seen kind of a bear

15   market or where things go wrong, and lots of liquidity

16   is pulled out.

17   The fact that all the different protocols can

18   interact and talk and be used to build more complexity

19   also introduces entropy and some complexity related to

20   the composability, which has led to certain hacks or

21   complicated schemes that that may be concerning and may

22   create risks. And then there's obviously regulatory

1   questions, which is the thrust of what we'll be

2   describing and discussing during the rest of the

3   presentation.

4   There's also -- and if we flip to the next slide,

5   a number of growing pains, right?

6   So DeFi is growing at an exponential rate. But

7   there still are technical and practical barriers that

8   have yet been solved, or have yet to be solved. One

9   is, there's a limited ability of blockchains today to

10   process transactions. Now we're seeing some steady

11   progress here with the, with the big innovations, like

12   Ethereum 2.0.

13   We're also seeing other ways to kind of increase

14   the transactional throughput of blockchains, through

15   things like ZK Rollups, or zero knowledge rollups or

16   other Layer 2 solutions. But there's still a long way

17   to go there and it's not yet able to compete with more

18   traditional, more centralized financial services and

19   companies.

20   There are also comparatively low levels of

21   liquidity, at least when it comes to DeFi and as it

22   compares to more traditional finance. And there's

1   still questions about the security of the smart

2   contracts themselves. So even though blockchain may be

3   fairly secure, this each individual system that relies

4   on a set of smart contracts introduces its own risks

5   and security vulnerabilities. And that also can lead

6   to hacks and other events, and we've seen some early

7   examples of that here, too.

8   MR. DeWAAL: All right, let's dig down a little

9   bit now on some specifics. Let's look at those

10   decentralized exchanges, which you said have been

11   around for a bit. How do they work?

12   PROFESSOR WRIGHT: Yeah, and if we flip to the

13   next slide, and then the slide after that.

14   So DEXes are really interesting, and they've made

15   some steady advances over the past couple of years.

16   And at their core, DEXes rely on an automated market

17   maker's smart contract or set of smart contracts. And

18   what that enables folks to do is trade digital assets

19   without necessarily using the order book. So this is a

20   little bit of a different paradigm that's emerging with

21   decentralized financial protocols.

22   So you can log into a basic website, you can

1   decide which asset you want to trade or purchase or

2   swap. And you don't necessarily need to have that

3   trade routed through an order book. Decentralized

4   exchanges are growing, and they're growing quite fast.

5   So this is not on necessarily every day, but we've seen

6   DEXes or certain large DEXes actually have trading

7   volumes that are beginning to rival custodial

8   exchanges, like Coinbase. And it's raising the

9   question as to whether or not more and more activity

10   related to digital assets will move to these

11   decentralized exchange infrastructures and

12   architectures.

13   If we flip to the next slide, we can just start

14   diving in on some of the technical aspects of

15   decentralized exchanges.

16   So like we described before, the way that these

17   DeFi protocols operate is via smart contracts. And for

18   most popular decentralized exchanges today, they rely

19   on two smart contracts. One is an exchange smart

20   contract, which holds a pool of one or more tokens.

21   Sometimes it's two, sometimes it's more than that, that

22   users can exchange. So this creates a liquidity pool,

1   or kind of a pool of assets that sit there, which

2   different parties can interact with, deposit tokens

3   into and pull out other digital assets when they're

4   executing a trade.

5   There's also a related factory contract, which is

6   a contract that actually creates one or more exchange

7   contracts, and this makes it easy to identify the

8   various different liquidity pools that are going to be

9   available on a decentralized exchange.

10   So these two smart contracts work together. And

11   if we flip to the next slide, we can unpack a little

12   bit about why these are important.

13   So these smart contracts matter, because they

14   enable the creation of these liquidity pools and these

15   liquidity pools lessen the need for an order book. So

16   you're able to deposit assets into this pool, and

17   interact with these assets without the need to match

18   people who want to purchase and resell assets via an

19   order book.

20   And notably, there's no central administrator of

21   the pool, it's maintained by the smart contract. So

22   instead of having a trade or swap cleared through a

1   central party, the smart contract handles many the

2   technical aspects of that trade.

3   These smart contracts are open and permissionless.

4   So the factory and exchange contracts enable anyone to

5   list a token to exchange, there's no central party

6   that's assessing whether or not the token is a security

7   commodity or something else. There's no central party

8   that needs to be interacted with in order to create a

9   new liquidity pool, it can happen in a very

10   permissionless way.

11   And that's why these smart contracts are in many

12   ways "alegal." It doesn't mean that they're illegal,

13   it just means that they've been designed to work at a

14   technical level, to enable the trading or swapping of

15   these assets. They don't necessarily incorporate

16   regulatory compliance into it. And that is a lot like

17   how core blockchains work, in the sense that they work

18   technically, but they may create challenges when it

19   comes to regulation.

20   Next slide.

21   To kind of unpack a little bit more pricing on

22   decentralized exchanges, it occurs algorithmically.

1   So when exchanging one token for another using a

2 DEX, users don't need to be matched with a counterparty

3 via an order book as noted before, instead, a purchaser

4 receives the requested token nearly instantaneously

5 from the underlying liquidity pool.

6   So instead of engaging in a peer-to-peer

7 transaction, you're engaging in a pool-to-peer

8 transaction. So you're interacting with this entire

9 pool. And the exchange smart contract acts in a matter

10 akin to a counterparty. So you're interacting with

11 that smart contract and interacting with a pool of

12 assets instead of an individual peer here.

13   The amount of a token that's returned from

14 exchange is based on this formula, the AMM formula,

15 which often factors in the numbers of tokens in the

16 pool at any given time.

17   Next slide.

18   At least as of today, and because of the way that

19 these DEXes operate, the larger in order relative to

20 the size of a liquidity pool, the worst rate a party

21 will receive under duplicable algorithmic formula.

22 Thus, the larger liquidity pools of a given token pair

1   were set and this allows for bigger trades. And those

2   trades, if there's a large liquidity pool, will have

3   less of an impact on pricing.

4   Next slide.

5   And what's interesting is that we've seen in the

6   DEX ecosystem, a fairly stable pricing emerges. And in

7   part that's occurring because there's third-party

8   arbitrageurs that profit on any price disparity

9   surfacing for a given liquidity pool.

10   So these parties will make trades, that go through

11   different DEXes, and also centralized exchanges, and

12   the process of these third-party arbitrageurs is to

13   create across the ecosystem, a fairly consistent

14   pricing, particularly for widely traded assets.

15   The protocols themselves also incentivize deeper

16   pools of liquidity in a couple of different ways. One

17   is the underlying smart contracts award fees to those

18   that provide liquidity. An example of a fee could be

19   something like 0.3 percent for a trade. They also

20   increasingly award liquidity providers with governance

21   tokens, which again grants those holders the right to

22   weigh-in on decisions related to the protocol's

1   operation.

2   And those could be decisions like setting

3   parameters, setting the fees, setting other aspects of

4   how the protocol and ecosystem may develop.

5   And those governance tokens themselves are traded,

6   sometimes on centralized exchanges, sometimes on DEXes,

7   themselves. And some has a fairly high market caps

8   measured by various different services and tools.

9   Next slide.

10   So interacting with decentralized exchanges, it

11   will look a lot and feel a lot like interacting with

12   any other website that you may view on your browser.

13   But what's interesting about a number of these

14   decentralized exchanges is that the website itself, or

15   the interface, isn't being served from a central

16   company. Instead, website or interface is stored on

17   decentralized file storage solutions like IPFS. And

18   increasingly over time, things like Filecoin, which

19   means that you may be viewing the interface from data

20   that comes from a number of different people across the

21   internet.

22   So if you go to Google today, and you want to run

1 a search, at some point, Google, Inc. is serving up

2 that website to you with DEXes and a number of other

3 DeFi protocols, it's getting served up from lots of

4 different people potentially, across the internet, and

5 increasingly, in that way.

6   And that's not always the case. There're some

7 decentralized financial products and DEXes that are

8 being served up by the original smart contract

9 developers. But increasingly, that is not the case.

10 And over time, I imagine that will be less the case, as

11 this ecosystem continues to emerge.

12   Next slide.

13   What's also interesting about DEXes is that

14 there's very, very low barriers to entry. So the

15 underlying smart contracts are generally licensed under

16 open source licenses. And what that led to is a number

17 of competing forks or implementations of similar

18 services. So there's some variations between DEXes,

19 but because it's publicly available, the underlying

20 software, and because it's very easy to set up a new

21 DEX, or a DEX with a slightly different implementation,

22 we're seeing a whole ecosystem of them emerge.

1   And that means that liquidity providers are

2   increasingly moving their assets to different DEXes, if

3   one DEX, let's say suffers a hack or has a problem,

4   liquidity providers can move on to another DEX. Let's

5   say that there was an enforcement action or some sort

6   of regulatory against one DEX, it'd be easy to set up

7   another one and assets can kind of move towards these

8   new these new DEXes.

9   What that suggests, at least over time, and time

10 will tell, DEXes may become increasingly commoditized.

11 This may just become kind of a base layer. And we may

12 just see an entire ecosystem emerge around it.

13   MR. DeWAAL: Aaron, do you have an example of a

14 DEX?

15   PROFESSOR WRIGHT: I do. And let's just flip to

16 the next slide, and we can kind of unpack that in a

17 little bit more detail.

18   So one of the most popular indexes today is a

19 service called Uniswap. And Uniswap is really

20 interesting. It's really the pioneer of this mechanism

21 where you can make trades without necessarily using an

22 order book.

1   And just to kind of unpack this a little bit,

2   let's assume that I'm a trader -- I am not a trader,

3   but let's just assume that I am for purposes of this

4   example. And I have a whole bunch of Token A and I'd

5   like to receive back Token B. And I will be able to,

6   you know load up my browser, log on to Uniswap and be

7   able to obtain from this liquidity pool a price. And

8   so, to speak to your question, how is this price

9   calculated? The way it's calculated, and again, is

10   through this automated market maker formula. And for

11   Uniswap, that formula is quite simple. It's x times y

12   equals k. And it uses k, a constant, and the relative

13   weights of the tokens in a pool to determine a price.

14   So let's flip to the next slide. I'll walk

15   through kind of the math.

16   So let's, again, assume that I'm a trader and I

17   want to exchange some of the Token A that I have for

18   Token B in the liquidity pool at the moment, I'd like

19   to make that trade. There's 1,200 units of Token A and

20   400 units of Token B.

21   Under Uniswap's AMM formula, this would be

22   represented as 1,200 Token A (x) times 400 Token B (y)

1   equals a constant of 480,000. If I, as the buyer, want

2   to swap three units of Token A for one unit of Token B,

3   and I'm willing to pay Uniswap's current value of 0.3

4   percent fee, and a new price can be calculated by

5   keeping the variable k constant

6   In other words, the 480,000 (k) can be divided by

7   what was initially in the pool, 1,200 plus the three

8   units that I'm going to be adding plus the fee. And

9   since I'm taking one back, we can see that Token B will

10   be reduced down to 399. The relative pricing between

11   Token A and B before the trade was three. But after

12   the trade, it's going to kick up just a little bit to

13   3.01.

14   And so, this type of dynamic pricing can flow

15   through the entire DEX. And this is how multiple users

16   can begin to deposit and withdraw assets, but also get

17   a bit of fair pricing. And again, that pricing gets

18   impacted by the amount of liquidity in the pool, the

19   size of the trades that individual users want to make

20   and various different other factors in other

21   decentralized exchanges. Uniswap is just one example.

22   MR. DeWAAL: Great. And by the way, we'll have a

1   break in this presentation very shortly to allow for

2   some questions. How about lending protocols? Do you

3   have an example of one of those?

4   PROFESSOR WRIGHT: Yeah, absolutely. Let's flip

5   to the next slide after that.

6   So in addition to DEXes, we're also seeing the

7   emergence of various different DeFi lending protocols

8   and this is a very large category. So these protocols

9   provide lending or borrowing-related functionality.

10   Many of these protocols enable users to deposit digital

11   assets into vaults and borrow another token back. So

12   you can deposit -- let's say, Ether into a vault on a

13   decentralized lending protocol and receive back another

14   token, let's say DAI or cDAI in exchange.

15   Some of these protocols create -- or aim to

16   create, a stable digital token through this borrowing

17   and lending function, and some generate a rate of

18   return. And some examples here are Compound, AAVE, and

19   Maker. There's a whole bunch of other ones.

20   Let's flip to the next slide.

21   The way that these work is fairly simple. So a

22   borrower deposits one digital asset into a smart

1   contract, and receives back another token, usually

2   valued at an amount below what has been provided as

3   initial capital. So the loan that's occurring through

4   these platforms is denominated in another asset. So

5   again, cDAI or DAI, and the amount typically received

6   back by a user is between 50 to 75 percent of the

7   deposited collateral.

8   Let's flip to the next slide.

9   So to ensure that a DeFi lending protocol has a

10   sufficient amount of collateral, deposited collateral

11   is auctioned or otherwise sold if the value of a given

12   borrower's collateral drops below a liquidation ratio.

13   The lending protocol often relies on outside data

14   feeds, and we described those previously known as

15   oracles to determine the value of the collateral

16   deposited by users into the smart contract system. And

17   this liquidation ratio is often set through community-

18   run governance votes. So this kind of creates an

19   incentive to make sure that there's enough -- there's

20   enough assets at their core, at the base, for these

21   protocols to operate.

22   Let's flip to the next slide.

1   Some, you know, decentralized funding protocols

2 are also enabling what are known as flash loans, and

3 flash loans are very interesting, although a bit of a

4 double-edged sword. So it's the loan that's only valid

5 within one blockchain transactions. So on platforms

6 like Ethereum, blockchain transactions can be reverted

7 during its execution if certain conditions are not met.

8 So flash loans take advantage of this functionality and

9 fail automatically if the condition of repayment is not

10 satisfied before the end of a relevant blockchain

11 transaction.

12   So you can take out a loan and repay it all within

13 one blockchain transaction. And that's proved to be

14 pretty useful for folks that want to take advantage of

15 arbitrage opportunities for other types of trading

16 opportunities. So another kind of new innovation

17 that's emerging with some of these DeFi protocols.

18   MR. DeWAAL: Aaron, quick question. How do folks

19 know what the rules -- you talked about mathematical

20 formulas and AMM when you talked about the DEXes.

21   How do folks know what the rules are that are

22 applied to these lending protocols or these DEXes?

1   PROFESSOR WRIGHT: Yeah, well, in many ways, the

2   smart contracts themselves, set the rules to the extent

3   that somebody is sophisticated, technically, they can

4   review and look at the underlying smart contracts and

5   understand how they operate. Many of these projects

6   are open source, if not all of them. And there's

7   robust sets of documentation or other information

8   that's available describing and detailing how they

9   operate.

10   So the rules are kind of there. The interesting

11   thing about smart contracts, because once they're

12   deployed onto a blockchain, they're hard to modify, you

13   can understand the rules pretty quickly. And you know

14   that those rules are not going to change over time,

15   unless there's some ability to upgrade those smart

16   contracts.

17   So the rules of the game are available. And by

18   setting up decent, simple, and/or complex automated

19   systems with rules that you know are not going to

20   change or be modified, folks are able to interact with

21   them with a degree of confidence, and hopefully a

22   degree of security.

1   MR. DeWAAL: All right. Earlier, you referenced

2   derivative and synthetic protocols. Help us understand

3   what these are.

4   PROFESSOR WRIGHT: Yeah, absolutely, if we can

5   flip to the next slide.

6   So there's also -- and this is just beginning to

7   emerge, so I'd say DEXes, and also decentralized

8   borrowing and lending protocols are the most robust,

9   but we're also starting to see new derivatives and

10   synthetic asset protocols emerge. And so, DeFi

11   protocols are not just limited to these exchanging and

12   lending protocols. Some are also enabling the creation

13   of synthetic assets that derive their value from an

14   underlying digital or real-world asset.

15   Many of these protocols rely on over-

16   collateralization. Like what we're seeing with

17   borrowing and lending protocols at the oracle to

18   maintain price stability. In some protocols, synthetic

19   assets can be generated by any users of the platform, a

20   little bit like we saw with DEX -- DEXes, where you

21   could create any sort of liquidity pool to trade any

22   form of assets, we're seeing open and permissionless

1   derivative and synthetic protocols that may enable

2   comparable functionality in this domain.

3   So let's go through an example, if we can flip to

4   the next slide.

5   So one example here is Synthetix. So Synthetix is

6   a protocol that has a native token, SNX, that enables

7   holders to create synthetic assets or synths, which can

8   mimic any asset, but today mostly used to mimic other

9   digital assets and/or fiat currencies.

10   So to generate synths, a user must acquire SNX.

11   And they can do that by participating on the platform,

12   or by acquiring it on an open market. And they can

13   deposit that token into the Synthetix smart contracts

14   and return the Synthetix protocol creates a new synth

15   token of the user's choice.

16   So just by way of an example, let's say that

17   somebody wanted to create a synthetic version of the

18   U.S. dollar, they could deposit $1,000 worth of the SNX

19   cryptocurrency and receive back $133 worth of the sUSD,

20   or synthetic USD.

21   The way that the protocol works now, you need to

22   lock 750 percent more SNX into the smart contracts,

1   then the amount of synth that you receive back. The

2   pricing data is provided by an oracle, a third-party

3   oracle solution. And there's lots of other kind of

4   complex mechanics in how synthetics work, but this is

5   the core of it.

6   If we could flip forward the next two slides.

7   MR. DeWAAL: So that means you're going to tell us

8   about aggregation layers?

9   PROFESSOR WRIGHT: I am. Yes. So that's an

10   overview of some of the emerging -- I'd say the most

11   mature DeFi protocols. But again, things are moving

12   very quickly. So if we gave this presentation in a

13   year, I imagine that we'll start to see even more and

14   increasingly complex DeFi-related protocols and

15   services that are beginning to be developed and have

16   users that are interacting with them.

17   What's also interesting, and this really bleeds

18   down into how decentralized financial products operate,

19   because they're composable, because these services can

20   be easily interacted with, we're starting to see

21   additional tools being built on top and really a whole

22   aggregation layer that's emerging.

1   Let's flip to the next slide.

2   And there's a number of aggregators that we're

3   beginning to see. And so, these aggregators make it

4   increasingly easier for end-users to interact with

5   these new types of services. And they're all being

6   built on top of these other DeFi protocols, as

7   described before. So we're seeing DEX aggregators,

8   yield aggregators, and asset managers.

9   Let's got to the next slide.

10   So the first category are these DEX aggregators.

11   And what DEX aggregators enables folks to do, is access

12   liquidity pools found on multiple different

13   decentralized exchanges. And some examples here are

14   1inch and also Paraswap.

15   Let's flip to the next slide.

16   What's interesting about DEX aggregators is that

17   they're aiming to provide end-users with better

18   pricing. So instead of having to go to individual

19   DEXes, you can go to a DEX aggregator, and look across

20   the whole ecosystem of DEXes to find the best price.

21   So instead of other internet services today that

22   aggregates -- let's say, like news content or social

1   media accounts, or other types of information. DEX

2   aggregators combine all this token pricing information

3   across multiple DEXes and aim to provide the best price

4   possible.

5   They're able to do this without actually touching

6   any assets. They don't rely on any custodianship of

7   underlying assets by end use-s, the end-users keep

8   their assets in their individual wallets, they connect

9   to these DEX-related services, they're able to find the

10   best pricing, and then they'll interact directly with

11   the DEX.

12   These DEXes over time, and it's still too early to

13   tell, but they could, in effect, serve as kind of a

14   search function for DeFi. If you want to go into DeFi,

15   if you want to interact or trade one token for another,

16   you may increasingly go to a DEX as opposed to going to

17   an individual decentralized exchange. Although there's

18   a possibility that the aggregators themselves may be

19   decentralized, it looks like these may be centralized

20   services that have emerged.

21   Another form of aggregate -- if we could flip to

22   the next slide, are yield aggregators.

1   So we're starting to see users of DeFi protocols

2   look to maximize their total digital asset returns

3   after yield farming. And they're turning to yield

4   aggregators to streamline the provision of liquidity

5   and the earning of tokens or other fees.

6   One example here is Yearn Finance. Let me unpack

7   that a bit on the next slide.

8   So Yearn Finance is a very interesting DeFi

9   protocol and service that's emerging. Participants

10   deposit digital assets into the protocol smart

11   contracts, and they receive back a governance token,

12   YFI. The token provides holders with the ability to

13   vote and invest in digital asset strategies through

14   community generated ideas. People post up ideas they

15   vote on which ideas to engage in, and then the entire

16   protocol helps facilitate that.

17   The smart contract collects the proceeds from any

18   of those investment strategies, and then will deposit

19   that back to the YFI holders minus a fee. There's also

20   a small group of folks that are called multi-

21   stakeholders that kind of ensure the security of all

22   the proceeds that are collected. And they need to sign

1   off on certain things before they're distributed.

2   So it's a really interesting setup. It's kind of

3   a community-run asset manager run in a very

4   decentralized way without one party that's really

5   handling either the generation of the ideas,

6   implementation of the ideas, with only a handful of

7   folks that are sitting in the background, just making

8   sure that things are secure.

9   MR. DeWAAL: And before break for some questions

10   on this section, how about some -- how about the

11   decentralized asset managers? How do they work?

12   PROFESSOR WRIGHT: Yeah, so this is also emerging.

13   We're starting to see a handful of asset managers also

14   popping up on the DeFi landscape. So because we've

15   seen DeFi protocols grow, because we've seen a whole

16   range of opportunities to begin to interact with these

17   different DeFi protocols, tools are being developed to

18   give people a way to track, manage, or hedge exposure

19   to various different tokens.

20   Some of these protocols bundle together different

21   assets, so they will take entire sets of assets and

22   bundle them together and help manage them. Or they

1   just simplify the interaction with the underlying smart

2   contracts. So you could, let's say, purchase an entire

3   set of token, or begin to kind of manage that process

4   in a more streamlined way.

5   So let me just describe in the next slide a couple

6   of the core characteristics, and then we can just take

7   a quick break to see if there's any questions.

8   So a lot like DEX aggregators, what's interesting

9   about decentralized asset managers is that they're non-

10   custodial in nature, the control of the underlying

11   asset is never transferred. It can interact with a

12   user's wallet, it's composable. And these services

13   also take advantage of the composability of these

14   decentralized financial products. They can connect to

15   a wide number of different DeFi products. Ultimately

16   creating an end-to-end user experience.

17   So for end-users, these decentralized asset

18   managers may be the front page, this may be one way

19   that users interact with it just because they simplify

20   it down. The user experiences are a bit cleaner,

21   easier to interact with. You know, some of these

22   services automatically rebalance and liquidate assets

1   without additional user interaction. And they're

2   globally accessible, right?

3   These are tools that are available to anyone

4   connected to an internet wallet.

5   So that's a bit of a picture of kind of the

6   emerging decentralized financial landscape, some of the

7   core services and products that we're seeing emerge,

8   and also some of the aggregation that we're seeing on

9   top of it.

10   We wanted to just take a quick break, I don't know

11   if there's any questions or we can dive into the next

12   area. We know that that was quite a bit to run through

13   in a very short amount of time.

14   CHAIRMAN GORELICK: Okay, we'll open it up for

15   questions.

16   Aaron, I'll take the prerogative and ask one

17   question here. This is Richard Gorelick. You noted

18   early on in your presentation that these DeFi projects

19   ideally do not rely on a central party but in practice

20   many still do.

21   What, from a governance standpoint, are some of

22   these projects doing to ensure that they become or

1   remain truly decentralized?

2   PROFESSOR WRIGHT: Yeah, so that's a great

3   question, Richard. In many ways, they're pushing

4   towards taking control these protocols and providing

5   them to the users of the platform through a governance

6   token. So even though they may have initially created

7   it, maybe they were making decisions on how these DeFi

8   protocols would operate. They're hoping that in the

9   long run that the community of users, supporters, folks

10   that are interested in the core underlying mechanics

11   that that's being facilitated by the underlying smart

12   contract-based protocols will be managed by folks that

13   hold these governance tokens.

14   And over time, instead of it being managed by one

15   single party, it may be managed by thousands, if not

16   tens of thousands of different individuals. And

17   there's been robust tooling that's emerged to make it

18   easier to understand information related to how these

19   protocols are governed, to weigh-in if there's a vote

20   or an issue that's up for discussion, and manage kind

21   of the creation and maintenance of the protocols.

22   MR. WEN: I have a question. What mechanism

1   exists to kind of govern sort of the -- these protocols

2   on things like traditional -- like leverage ratios, as

3   well as kind of implementing excessive fees?

4   How do you -- what governs sort of how people

5   behave in the implementation of these contracts?

6   PROFESSOR WRIGHT: That's a great question. It's

7   going to really depend on the protocol. So different

8   protocols enable governance token holders to set

9   certain parameters. Sometimes the smart contracts

10   themselves don't enable any flexibility when it comes

11   to certain parameters. So it's really going to depend

12   on a case-by-case basis.

13   Another thing that's playing into governance,

14   although it's not necessarily traditional governance,

15   is some of these DeFi protocols, or almost all of them

16   are open source. And the fact that they're open source

17   means that everybody kind of understands the core smart

18   contracts that are being used. So if, let's say, one

19   DeFi protocol is charging too high of a fee or if one

20   DeFi protocol doesn't enable a community to set those

21   parameters, then we're seeing the DeFi protocol become

22   forked or a new version gets created. And then

1   liquidity providers or other folks that want a lower

2   fee, want more community participation, move into into

3   this forked version of it.

4   So, in a sense, even if the governance is not

5   provided directly by the construction of the DeFi

6   protocol, the community is forking its way to something

7   that gives more community participation, and/or

8   potentially over time could lower fees.

9   CHAIRMAN GORELICK: Thank you. For the

10 transcript, that question came from Eddie Wen and if

11 anyone else has questions, please announce yourself so

12 that it can be appropriately recorded for the

13 transcript. Thank you.

14   MR. McHENRY: So this is Tim McHenry, I have a

15 question.

16   CHAIRMAN GORELICK: Go ahead.

17   MR. McHENRY: Since these systems, like the DEX is

18 open source. How do operators prevent code

19 manipulation or how do they prevent others from taking

20 advantage of the vulnerabilities? Is there some peer

21 review? Is that sufficient? Are there other controls

22 in place? Or is it just like you said, do users just

1   move on to another service after a hack emerges?

2   PROFESSOR WRIGHT: That's a great question. So

3   depending on the protocol, and again, this is on a

4   case-by-case basis. Many of the software developers

5   that initially create them will have the software

6   audited, by a smart contract auditor. So these are

7   folks that get paid and will do a security review and

8   audit, try to find vulnerabilities and assess for

9   potential weaknesses.

10   If there's a vulnerability that occurs, and either

11   people are impacted by that in some negative way, or

12   there's sometimes opportunity to upgrade it, and to

13   address that issue. And if there is an issue that

14   emerges or a pattern that creates a security

15   vulnerability, people then try to improve it or kind of

16   create another version that patches up that issue.

17   So it's a -- there are some teams that go through

18   this auditing process. There are other teams that

19   don't, they just release it. And they kind of figure

20   out if there's an issue in the wild. And then if

21   there's issues that emerge, improvements are either

22   made directly by upgrading the underlying smart

1   contracts, or by creating a new version that may patch

2   up that issue.

3   MR. McHENRY: Thank you.

4   MR. WORKIE: This is Haime Workie. I had a

5   question -- from FINRA. I had a question regarding, I

6   guess, the use of the governance tokens.

7   I believe I heard someone say that the governance

8   tokens could potentially have a secondary market.

9   Isn't it a potential for the governance tokens are

10   taken by parties other than the ones that are actually

11   participating in the decentralized process, for there

12   to be a misalignment of interests, such that those who

13   are purchasing the governance tokens could do something

14   nefarious.

15   PROFESSOR WRIGHT: Thanks so much for the question

16   Haime. That's also a great question. And that is

17   conceivably possible that many of these tokens are

18   trading on various different secondary exchanges,

19   they're often times awarded to users of the platform.

20   So off the bat, those users are the ones that are

21   weighing in on these governance related questions.

22   Some teams will allocate a portion of those tokens

1   to the initial software developers themselves, whether

2   or not software developers weigh-in on decisions is

3   still emerging. But to the extent that a party

4   acquires a material position of a governance token,

5   they'll be able to weigh-in on these decisions.

6   CHAIRMAN GORELICK: Okay, are there any more

7   questions at this point?

8   (No response.)

9   CHAIRMAN GORELICK: Okay, Aaron and Gary, it looks

10   like we can move forward to the rest of the

11   presentation.

12   PROFESSOR WRIGHT: All right. And so, I'm going

13   to start to ask Gary some questions about this. And

14   let's turn to the regulatory and legal side of DeFi, if

15   we could just flip to the next slide.

16   So Gary, you know, so we've talked about the

17   overview of decentralized finance, how it works on a

18   technical level. Let's begin to dive into some

19   regulatory questions.

20   So in the U.S. you know, what regulators and laws

21   -- you know, may be implicated by DeFi?

22   MR. DeWAAL: Well, there's -- and thank you Aaron,

1   there's nothing unique about DeFi as far as the

2   applicability of applicable laws and regulations. So

3   you know, the common denominator of most things out

4   there is that it's the same business, the same risk,

5   you typically get the same laws apply. And that's

6   exactly the case in DeFi.

7   So in theory, to the extent that anything that

8   DeFi touches is governed by an applicable law or rule

9   today, then obviously, the regulator that's responsible

10 for enforcing that law is obviously involved in the

11 process.

12   You know, it's interesting, if you go back to one

13 of the first, you know, regulatory looks in the DeFi

14 space, it was actually one of the most famous reports -

15 - it's called the 21(a) report issued by the SEC, in

16 connection with a DAP known as The DAO, that was issued

17 in July 2017. And effectively, The DAO was a, was a

18 DAP that was going to effectively, you know, reward or

19 pay for projects that were going to be funded by

20 persons.

21   I'm not going to get into the, into the whole gist

22 of that, which is that the DAO token itself was deemed

1   to be a security by the Securities and Exchange

2   Commission. But you know, right in the first sentence,

3   or the second sentence of The DAO report, was a

4   discussion of who might be responsible for a regulatory

5   breach.

6   The DAO, itself, was an unincorporated

7   organization. There was a corporation that introduced

8   The DAO, known as Slock.it UG, which was a German

9   Corporation, and it was identified as a potential

10   person responsible. There were cofounders, three

11   cofounders of Slock.it. They were considered to be

12   potentially responsible. And there were a bunch of

13   unnamed intermediaries, folks known as curators, who

14   would actually be potentially looking at some of the

15   projects that might be funded by The DAO.

16   And, you know, because it was a report and not a

17   enforcement action, the SEC never really gave its view

18   on actual liability there. But it was the first effort

19   to try to figure out who would be responsible, who

20   could be responsible for effectively an unincorporated

21   entity. And that's really what a smart contract is all

22   about.

1   A smart contract isn't -- it's just code. And

2   typically, it's the smart contract, that's the actor

3   that's potentially violating or doing something to

4   contrary rules.

5   So if we just look at the CFTC, the Commodity

6   Exchange Act and the CFTC rules, obviously, you know,

7   if they were unregistered FCMs or DCMs or SEFs or DCOs,

8   you know, theoretically that that's a, those are

9   regulatory issues. If there was fraud, that's a

10 regulatory issue. If there was, you know, manipulation

11 or deceptive devices, that's a regulatory issue. CPO

12 and CTAs are rules -- are touched by potentially some

13 of the activities of DeFi protocols.

14   You know, and then, you know, as we saw in a

15 recent complaint against BitMEX, the CFTC has basically

16 said, if you were supposed to be registered as an FCM,

17 then you have a duty to supervise.

18   So, all these issues under the CFTC are touched by

19 DeFi, you know, elsewhere and indirectly under the

20 CFTC, potentially Bank Secrecy Act, state money

21 transmittal laws, other state laws such as the New York

22 BitLicense. So the soon-to-be fully rolled out,

1   Louisiana Virtual Currency Act, these are these are

2   also laws and rules that can be touched by DeFi. And

3   then again, looking over at the SEC lens, you've got

4   Securities Exchange Act, Securities Act, Investment

5   Advisor Act, all the rules that apply, again, to

6   ordinary issues, you know, DeFi does not get a safe

7   harbor.

8   Now, we can just turn the page. You know, the

9   issue, though again, the difficulty is -- one more page

10 if we could turn -- the difficulty is imputing

11 liability to somebody. You know, the somebody could be

12 the initial drafter of the source code. Generally in

13 the United States, software development is a protected

14 activity under the First Amendment.

15   You know, unless there's absolutely no lawful

16 purpose to the software, but that's not the case here

17 as Aaron has eloquently shown. You know, there's many,

18 many valid uses for DeFi.

19   Now, the First Amendment is not an absolute bar.

20 There's case law precedent, United States v.

21 Mendelsohn, is a good example, where software was sent

22 from Las Vegas to California, effectively was sourced

1   -- it was effectively code on a floppy disk that

2   related to sports bookmaking. And that was held so

3   integrally related to the bad egg, that folks were held

4   liable for that.

5   But you know, in general, again, you know, just

6   providing -- just writing source code is -- it's

7   protected, it is considered protected speech.

8   The other issue is that if you were to do

9   something against a developer, the code's still -- it's

10 out there, it doesn't go away. The smart contract is

11 still running. And as Aaron has mentioned, you know,

12 it's subject to forking, copying its source code so

13 somebody else can take it and run with it. So you

14 know, it is a difficult issue if there is something

15 that's a problem, who is potentially liable?

16   You know, and as Commissioner Quintenz himself has

17 noted, you know, enforcing CFTC regulations against

18 smart contracts does not immediately stop activity from

19 occurring, because individual users can continue to use

20 the software that's on the next slide.

21   And, you know, the only potential here is that if

22 and one more slide through, if developed, as

1　Commissioner Quintenz has also noted that if, you know,

2　developers can reasonably foresee at the time they

3　create a code that it might be used by persons

4　violative of CFTC's regulations, then you might have

5　some potential of liability there.

6　　　　There's also, you know, ancillary action. There's

7　ancillary actors that somehow maybe, you know, part of

8　the original, you know, uploading of the, of the source

9　code and running of the source code. There may be some

10　folks who, you know, maintain the sole interface, the

11　underlying smart contract. There are folks that

12　maintain control over core mechanics of how the service

13　operates. You know, and then there's potential

14　deployment of the source code itself. And, you know,

15　obviously, those are the folks that might be looked at

16　by regulators.

17　　　　PROFESSOR WRIGHT: Yeah. And so, this, I guess,

18　raises the question, right?

19　　　　If something goes wrong, how does this kind of

20　overview -- how would the government or the CFTC

21　prosecute a code and raises the question, you know,

22　where may liability lie? And so, the question could be

1   direct liability, like Gary, investing against software

2   developers. There's challenges there. But besides

3   direct liability, Gary, is there anything else that

4   could be considered?

5   MR. DeWAAL: Sure. I mean, there's obviously --

6   there's obviously other things -- I just want to say

7   one other thing on direct liability, because there has

8   been one interesting case brought by the SEC. It was a

9   case brought by an individual, Zachary Coburn, this

10 happened, you know, this is against Zachary Coburn. He

11 was the one who wrote then deployed the smart contract

12 on Ethereum and exercised complete control over it

13 known as EtherDelta.

14   And EtherDelta basically operated as a DEX without

15 requiring registration. You know, EtherDelta, as I

16 said, was a smart contract. It executed orders. It

17 did a lot of the things that you described. But

18 according to the SEC -- a key it wasn't registered as

19 an exchange. And that was a big -- that was a that was

20 a major, major problem because Mr. Coburn presumably

21 was so involved in the rollout and running of this

22 smart contract, you know, he, himself personally was

1   named.   EtherDelta was not even named in the caption of

2   the case, because it didn't exist as a legal entity.

3   He was required to disgorge as part of a

4   settlement -- he was required to disgorge theoretical

5   profits, fees that he had made, and sustained a fine.

6   But that's a good -- that's an example where somebody

7   was so individually identified with a smart contract

8   that allegedly had, you know, volatile qualities that

9   it was -- that it was easy to go after.

10   In other cases, there's potential secondary

11   liability and this is where things get a little more

12   difficult.   Under the Commodity Exchange Act as this

13   audience well knows, there are two key elements aiding

14   and abetting liability.

15   And we can turn the page on that.   Two pages, I

16   think.

17   PROFRSSOR WRIGHT: Two slides, yeah.

18   MR. DeWAAL: Yep.   One more slide.   One more

19   slide, still.   Sorry.   All right.

20   There's aiding and abetting liability, and a

21   controlling person liability.   Let's turn to the next

22   page.

1   Sort of as a refresher, I mean, aiding and

2   abetting, you know, if a person commits or willfully

3   aids or abets the violation of the Commodity -- of any

4   Commodity Exchange Act provision, or CFTC rule, or acts

5   in combination or concert with any other person in such

6   violation, or who willfully causes an act to be done or

7   omitted, which if directly done would be a violation.

8   Then that person could be held liable as a principal,

9   this is a provision of law that the CFTC often relies

10   on.

11   And then, there's also obviously the next page --

12   13(b) which is controlling person liability. Any

13   person who directly or indirectly controls any person

14   who has violated any Commodity Exchange Act, provision,

15   or rule may be held liable for such violation to the

16   same extent as such controlled person.

17   Now, there's a little trickier, the CFTC has the

18   burden of proof on this, and they have to show the

19   controlling person did not act in good faith and

20   knowingly induced directly or indirectly, the act

21   constituting the violation, but these are two very,

22   very strong provisions.

1   Next page.

2   You know, recently, this, the CFTC settled in

3   action -- Edge Financial Services. And this was a case

4   in which a company and its employees, you know, were

5   held or, you know, there was a settlement, it was an

6   action where the charge was that the company aided and

7   abetted an individual who had had engaged in spoofing

8   by programming, you know, back of the book

9   functionality that enabled that spoofing. That was the

10 allegation.

11   Ultimately, the CFTC charged aiding and abetting

12 for spoofing and aiding and abetting for manipulative

13 and deceptive device provisions of the law and the

14 rule. So, you know, this is obviously a tool that the

15 CFTC has.

16   PROFESSOR WRIGHT: There's obviously different

17 theories of secondary liability that could attach here,

18 but where would that secondary liability attach Gary?

19 And how do you assess the costs and benefits of

20 extending secondary liability to be factors?

21   MR. DeWAAL: Well, you know, there, as you

22 mentioned, you know, there are a lot of folks that are

 1   involved in the DeFi universe. There are the liquidity

 2   providers, the end-users that participate or

 3   potentially facilitate conduct. There's the holders of

 4   governance tokens, who might be construed to have a

 5   controlling interest over the direction of the

 6   underlying software.

 7   Otherwise -- we're on the next slide.

 8   You know, there again, there are multi-

 9   stakeholders, for certain applicable projects that have

10   the ability to control activity. And then, none of --

11   any of this stuff occurs without the validators or

12   miners on the blockchain systems that actually formally

13   execute the smart contract by validating all the

14   transactions and letting them proceed.

15   So there's a large group of persons that are

16   involved in in the DeFi ecosystem that can potentially

17   be brought into the process. But again, the problems

18   with all with naming any of these persons, is that

19   there we go to the next slide. They're incomplete

20   solutions. Secondary liability may only serve as a

21   deterrent, but will not stop the use of the DeFi

22   protocol due to the nature of smart contracts and the

1   difficulty of modifying let alone stopping their

2   running once they're started.

3   The other thing is that you know the cure may, you

4   know, the supposed to cure may cause unintended

5   consequences. You know it may encourage developers to

6   use more advanced forms of cryptography to obscure

7   transactional records and likewise the enforcement

8   costs can be very, very great. You know, depending on

9   the legal theory and a lot of this stuff will be

10   untested, there could be great cost to go after a

11   particular defense.

12   Now, you know, there's also a certain fairness

13   element in it. You know miners and validators are

14   likely the folks that make the system go, but they are

15   probably in the least good position to actually

16   understand and assess the legality of each particular

17   transaction because the miners or validators are mining

18   -- are validating old transactions on the blockchain.

19   And they're just looking to see that certain technical

20   rules are being complied with that allows blocks to be

21   closed and added to the existing blocks, so that's a

22   sort of a very, very difficult situation.

1   So, let me turn to you, Aaron and ask you, is

2   there a path forward to address these regulatory

3   concerns and concerns about, you know, liability on

4   potential actors?

5   PROFESSOR WRIGHT: Yeah, that's a great question.

6   And we can flip forward two slides.   One more.

7   And one idea that we discussed in the subcommittee

8   was a potential safe harbor.

9   If we could flip to the next slide.

10   So, an alternative approach or one that can

11 complement potential actions brought against actors for

12 secondary liability, could be a safe harbor and the

13 notion here is that a safe harbor could potentially

14 create a regulatory incentive to build and support

15 compliance.   So it could excuse either direct liability

16 against software developers or potentially other DeFi

17 participants.   If, as an example, the protocol has a

18 lawful purpose and entails no fraud.   It interacts or

19 exclude addresses and/or jurisdictions, encouraging

20 OFAC compliance, and limits or bars margin trading.

21   These are just some examples.   There could be

22 other, you know, other factors that need to be

1   addressed in order for safe harbor to apply. But this

2   is just a couple ideas that could occur here. And in

3   many ways this notion of using a safe harbor is

4   grounded in the past, but I just wanted to flip to the

5   next slide and just address one of the points that's

6   worthy of consideration.

7   So the safe harbor also could contemplate

8   requiring that protocols are able to implement any

9   future CFTC-authorized software systems to enforce

10   commodities related laws. So this is an interesting

11   concept, a concept I've written about in the past and

12   other folks are beginning to contemplate, but it's

13   actually using software that's provided by a regulatory

14   body like the CFTC to enforce laws.

15   So using software systems as law, as opposed to

16   only letting the rules embedded in these smart

17   contract-based systems dictate how they operate. So, a

18   safe harbor could also encapsulate that, while

19   regulatory bodies today may not be ready to implement

20   some other rules as software over the longer arc, my

21   sense is they may see more and more regulatory bodies

22   moving in this direction.

1   And this notion of a safe harbor is grounded in

2   history. In many ways we began to discuss this as a

3   subcommittee, due to some lessons from the copyright

4   wars that occurred during the first wave of the

5   internet, we can flip to the next slide.

6   And with these copyright laws we saw during the

7   first wave of the internet, copyright law evolved via

8   the common law to grapple with peer-to-peer networks.

9   What happened was when it came to copyright

10   jurisprudence we saw courts create and articulate

11   expanded theories of secondary copyright liability.

12   And in many ways the media and entertainment industry

13   were the first industry to grapple with peer-to-peer

14   networks and peer-to-peer technology, which is roughly

15   analogous to what's happening in the blockchain

16   ecosystem.

17   Let's just unpack what happened there.

18   If we could turn to the next slide.

19   So through various decisions at both the Supreme

20   Court and the Circuit Courts around the country,

21   vicarious liability or secondary liability, is now

22   imputed on online platforms that exercise requisite

1   control over direct copyright infringement. And also

2   derives a direct financial benefit from that

3   infringement.

4   Requisite control has been determined to be a

5   "legal right to stop or limit the directly infringing

6   conduct, as well as the practical ability to do so."

7   It attaches, even if a platform lacks knowledge of the

8   direct infringement -- flip to the next slide.

9   We've also seen a new theory of contributory

10 liability that attaches online platforms that induce or

11 encourage intentionally copyright infringement. We've

12 also seen contributory liability attached when

13 operators have actual knowledge of copyright

14 infringement and fail to take simple measures to

15 prevent further damage.

16   So, between vicarious and contributory liability,

17 we've seen courts be able to grapple with some of the

18 complexity of peer-to-peer platforms like Napster, like

19 Grokster, like LimeWire and all those others by handing

20 liability to the folks that are running these online

21 platforms, if they have the ability to actually take

22 simple measures to prevent further damage, if they're

1   intentionally encouraging infringing behavior, or if

2   they have the ability to profit and can kind of control

3   the entire ecosystem in some sort of way.   Let's flip

4   to the next slide.

5   At the same time and this kind of complemented

6   what occurred in the courts with expanded theories of

7   secondary liability through a treaty, the Digital

8   Millennium Copyright Act was the method, and the DMCA

9   does lots of different things. But one thing that it

10   does do, which resulted in the development of a notice

11   and takedown regime and its notice and takedown regime

12   encourages online platforms to respect copyright

13   holders' rights if they are notified by a copyright

14   holder of potentially infringing content that's on the

15   platform, and to expeditiously move that work, then

16   they're able to avoid potential copyright liability.

17   And this notice and takedown regime, while there's

18   issues with it. At its core, it's enabled large

19   platforms like YouTube, Spotify, Wikipedia, and other

20   services to grow, while attempting to balance copyright

21   owners' concerns. So it's been in the sense, able to

22   thread the needle were completely infringing platforms

 1   or peer-to-peer networks that are not trying to respect

 2   copyright owners' rights are able to be addressed at

 3   the courts or through other actions, while at the same

 4   time, a company's products and services that are trying

 5   to respect copyright owners' right like YouTube,

 6   Spotify, and also Wikipedia are able to flourish and

 7   have some clarity as to what their liability may be.

 8   Maybe we can flip to the next slide.

 9   On thought here is a similar approach could be

10   adopted, like decentralized finance could be regulated

11   using a series of secondary liability under the

12   Commodity Exchange Act or other related financial

13   statutes. At the same time, a safe harbor is

14   implemented can ensure responsible development to

15   protect consumers' interests, to make sure that folks

16   are not being harmed without limiting innovation, so

17   that the U.S. can make sure it remains on top when it

18   comes to building and developing and supporting new

19   financial innovation.

20   So we thought that this lesson from history was

21   interesting something worthy of consideration, kind of

22   the scope of what a safe harbor could be. It would

1   obviously require a lot of thought and a lot of input

2   before implemented. But we think it's potentially a

3   fruitful path forward.

4   I know Gary you have some thoughts here so, I

5   don't know if you wanted to weigh-in.

6   MR. DeWAAL: Yeah, I do think this is a -- I mean,

7   this is sort of a Scylla and Charybdis, the difficult

8   navigation, because obviously there are a lot of folks

9   -- and I hate to use the word, the bricks and mortar

10   enterprises in the blockchain ecosystem, you know, that

11   has spent a fair amount of resources, trying to get it

12   right from the beginning, and making sure proactively

13   they, you know, they did what they needed to do to

14   comply with applicable rules and law. And there's also

15   folks who have absolutely avoided, you know, certain

16   markets, including the US, because they recognized that

17   there were, you know, difficult issues and they didn't

18   want to deal with them, and so, they avoided the

19   marketplace and avoided opportunity for revenue in

20   order to not get in trouble with the regulators.

21   You know, what's challenging here and what makes

22   this thing so difficult, is that it is effectively non-

1   legal entities that are ultimately doing whatever the

2   activity is that may be adjudged incorrect. And so, at

3   the end of the day it mostly will be secondary actors

4   that are potentially liable. And it's a challenge to

5   get at them and it raises issues of a fundamental

6   fairness, in my view.

7   But that being said, you know, the difficulty here

8   it's the same issue of granting, you know, someone an

9   opportunity to work in a sandbox. As they have in the

10   UK or some other jurisdictions. If you give folks a

11   safe harbor, you're effectively penalizing people who

12   have incurred the costs of compliance and/or avoided

13   the situation of non-compliance.

14   You know, there are ways in my view that the CFTC

15   doesn't have the authority to issue something like a

16   21a order. But they do they can do a combination of No

17   Action Letter and a public solicitation of comments in

18   connection with a proposed guidance as much as they did

19   with the actual delivery guidance recently issued,

20   where they solicited a wide range of input to figure

21   out, you know, a way to go forward. But, you know,

22   Aaron I think, you know, you are right and many, many

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1   members of the committee are very sympathetic to the

2   issue is that, you know, this is an important

3   development. This is a game changer.

4   The idea of having non-incorporated entities and

5   non-legal persons, not actual persons, you know,

6   engaging in the activity that might be problematic.

7   You know, is a relatively significant game changer,

8   that hopefully as we've made clear has lots of benefits

9   out there, lots of potential benefit, but obviously has

10   a lot of risk. And we need to tread cautiously in this

11   area, but we don't want to inhibit this important

12   development.

13   So what's our final thoughts, Aaron?

14   PROFESSOR WRIGHT: Yeah, let's flip to the last

15   slide. And thanks so much for everybody's time and

16   attention.

17   So, in kind of conclusion some further

18   considerations. Now, given the emergent nature of

19   DeFi, given the fact that it's grown significantly over

20   the past year, and we have yet to see any signs that it

21   will stop growing, the subcommittee is considering

22   future recommendations to the TAC to recommend to the

1   CFTC various different things. In our view that

2   subcommittee's current thoughts include, you know,

3   adopting a wait and see approach to see where risk

4   manifests with these protocols. To carefully consider

5   whether to impose direct liability on smart contract

6   developers and/or miners or validators to prevent

7   spillover effects, and also as Gary noted, to just

8   consider with those types of actions the level of

9   fairness that would be applied particularly if there's

10   a thought to apply liability on minors and validators,

11   and to research and explore theories of secondary

12   liability.

13   While, while it's been used in the past, I do

14   think that as applied to decentralized finance and

15   thinking about ways in which these theories can

16   develop, more thought needs to be applied there.

17   Obviously, continuing to engage with blockchain

18   developers to stay up-to-date on new services and

19   ongoing innovation. The presentation today outlined a

20   handful of protocols that are emerging and are becoming

21   a bit more mature, but there are new DeFi protocols

22   being deployed that folks are interacting with on a

1   near-daily basis. And I don't think we're just seeing

2   the endpoint of DeFi, but rather just the beginning.

3   So there's going to be a number of new services,

4   including new services that expand into options and a

5   whole bunch of other financial products.

6   And as Gary mentioned before, consider having the

7   staff memorialize a safe harbor in a No Action Letter

8   to the extent that that seems like a fruitful direction

9   to go.

10   So that is kind of our conclusions and

11 considerations.

12   Thanks so much for everybody's attention. And we

13 thought we'd open it up to see if there were any

14 further questions.

15   CHAIRMAN GORELICK: Thank you, Aaron and Gary for

16 your presentation, I'd now like to open the floor for

17 questions and discussion regarding the presentation.

18   (No response.)

19   CHAIRMAN GORELICK: Okay, maybe you've answered

20 everybody's questions. I'll make one last call and

21 then we'll move on if there are no questions.

22   (No response.)

1   CHAIRMAN GORELICK: Let's move ahead then. Thank

2   you everyone. Let's take a quick break, I think we'll

3   take about a five-minute break here before the TAC vote

4   on a recommendation from the Cybersecurity

5   Subcommittee.

6   Once again, I'd like to thank Aaron and Gary, that

7   was a fascinating presentation I learned a lot, and I'm

8   sure everyone else did as well thanks guys. We'll take

9   a quick break and be back in five minutes.

10   (Recess.)

11   MS. TENTE: Okay, thanks everyone Richard Gorelick

12 can open up the TAC vote and introduce the presenters.

13   CHAIRMAN GORELICK: Perfect. Thank you, Meghan,

14 as our last matter for the morning, the Technology

15 Advisory Committee is going to vote on a recommendation

16 from the Cybersecurity Subcommittee.   The

17 Cybersecurity Subcommittee is going to be recommending

18 that the full Technology Advisory Committee makes their

19 recommendation to the CFTC that it provide clear,

20 concise, and up-to-date guidance on how the CFTC

21 reviews highly sensitive cybersecurity artifacts and

22 sensitive intellectual property.

1   TAC members were provided with the materials for

2   the vote in advance of today's meeting. In addition,

3   the Cybersecurity Subcommittee presented on the

4   background to this recommendation at the last TAC

5   meeting in July of this year.

6   Before I open the vote, two Cybersecurity

7   Subcommittee members are going to briefly reiterate,

8   and explain the recommendation. They are Jerry

9   Perullo, the Chief Information Security Officer at ICE

10 and Hunter Landrum, the Government Affairs Counsel at

11 Two Sigma. Jerry and Hunter, I'll turn it over to you.

12   MR. LANDRUM: Thank you very much. We greatly

13 appreciate the opportunity to speak today to briefly

14 recap our discussion from the TAC meeting in July.

15   As we discussed at that meeting in July, regulated

16 financial institutions, including providers of critical

17 national economic infrastructure, have identified

18 significant risk in the collection, concentration,

19 storage, and securing of highly sensitive cybersecurity

20 artifacts and sensitive intellectual property during

21 regulatory examination procedures.

22   In recent years, these concerns have been buoyed

1   by actual breaches that have occurred at several

2   national regulatory agencies. Now to-date, various

3   national and international regulators have taken

4   different stances toward the collection of this data.

5   Jerry could you discuss a bit more?

6   MR. PERULLO: Sure. Thank you, Hunter.

7   Yeah, so being a large multinational and dealing

8   with many different regulatory jurisdictions and

9   different regulators around the world, we really get to

10   compare the way the behaviors vary, including here

11   within the United States. And so, I wanted to flag

12   that the Commission, in particular, has actually been

13   very agreeable and very practicable when it comes to

14   dealing with this issue, and we deal with both on the

15   clearing side as well as the market side.

16   And what I mean by that is that when asking for

17   particularly sensitive data such as penetration test

18   results that may show our vulnerabilities, or inventory

19   systems and diagrams. The Commission has been very

20   agreeable to view those artifacts at a shared location

21   and take all the notes they want that sort of thing,

22   versus taking them away. And we enjoy that.

1   And the real push here is to say let's codify

2   that. It's to protect you know both the critical

3   infrastructure entities as well as the Commission

4   itself when it comes to housing these artifacts.

5   And by way of contrast, I'll note that other

6   agencies have asked firms like ours to produce and

7   transmit over into their care things such as not only

8   the diagrams and vulnerabilities I mentioned, but even

9   things like the usernames of individuals or privileged

10 access to systems, and things can get pretty forceful,

11 pretty quickly in a regulatory relationship. And that

12 jeopardizes really the whole ecosystem.

13   So, all this vote is really asking for is to have

14 a review performed and to codify some of those

15 behaviors and practices, so that things don't change in

16 the future. And that examiners are still able to

17 access the data that they need. We don't want to lose

18 that in any way, but they're able to do in a secure

19 manner by minimizing taking possession of any of these

20 artifacts where it doesn't directly contribute to the

21 cause here.

22   And then lastly, I'll mention just for the sake of

1   a quick update, you know, many of us in the

2   cybersecurity world especially in financial services

3   overnight have been working on a breaking breach at a

4   third party. And it's a vendor that apparently was

5   compromised during the year. And we're learning that

6   led to the compromise of additional vendors as well as

7   U.S. government agencies, specifically.

8   So a lot of you will have woken up to this news

9   this morning, and I think this is just the exactly

10   illustrative of what we're talking about here with

11   third party risk, and it's just near impossible to

12   secure every single avenue and rather the tact that all

13   of us take in the private sector is to just simply

14   limit the amount of data that needs to live outside of

15   our walls to avoid these issues where it's really not

16   directly helping relationship.

17   And so, we're just asking the Commission, as well

18   as other regulators, you know, value that approach and

19   support it, where it doesn't get in the way of their

20   examination responsibilities.

21   But thanks again for hearing us out.

22   MR. LANDRUM: Well, thanks Jerry. As Jerry noted,

1   the CFTC has dedicated itself to this concern and

2   continues to be a leader in addressing this issue

3   through the TAC and through Commissioner Stump's

4   initiative on data protection.

5   But as we said, the lack of policies and

6   procedures today to determine when and how sensitive

7   information is securely reviewed continues to make the

8   process ad hoc and more difficult both for CFTC staff

9   and market participants, so we would urge you to take

10   this vote today to provide clear and concise, as well

11   as up-to-date guidance on how the CFTC should interact

12   with the cybersecurity artifacts and sensitive

13   intellectual property. And we would also encourage the

14   Commission to move forward on the topic to provide

15   clarity and reassurance to the marketplace.

16   So thank you very much for the time and attention

17   on this issue, and we're happy to answer any questions

18   if there are any before the vote.

19   CHAIRMAN GORELICK: Thank you Hunter and Jerry.

20   Do any TAC members have issues to discuss with respect

21   to the vote at this point?

22   (No response.)

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1   CHAIRMAN GORELICK: Okay. Hearing none, with that

2 I now move that the TAC adopt the recommendation from

3 the Cybersecurity Subcommittee on making a

4 recommendation to the CFTC that it provide clear,

5 concise, and up-to-date guidance on how the CFTC

6 reviews highly sensitive cybersecurity artifacts and

7 sensitive intellectual property.

8   Is there a second?

9   MR. DeWAAL: Second, DeWaal.

10   CHAIRMAN GORELICK: Okay, thank you, Gary.

11   I now will call for a vote on the motion. I'll

12 ask all TAC members to unmute themselves at this point.

13   All those in favor of approving the subcommittee

14 recommendation, please say aye.

15   (Ayes.)

16   CHAIRMAN GORELICK: All those opposed please say

17 nay.

18   (None.)

19   CHAIRMAN GORELICK: Any abstentions?

20   MR. McHENRY: Yes. Richard, NFA-- this is Tim

21 McHenry. I have to abstain because of our regulatory

22 capacity.

1   CHAIRMAN GORELICK: Okay, great. Duly noted.

2   Thank you.

3   MR. McHENRY: Thank you.

4   CHAIRMAN GORELICK: The motion carries. And thank

5   you everyone for the work on that, that will be very

6   helpful.

7   Okay, so now we will move to closing remarks.

8   MS. TENTE: Thanks Richard.

9   CHAIRMAN GORELICK: Yep. Go ahead, Meghan.

10   MS. TENTE: Okay, so now that concludes the

11 presentation the vote for the TAC meeting, we're going

12 to move on to the closing remarks like Richard noted.

13   Commissioner Quintenz would you like to go first?

14   COMMISSIONER QUINTENZ: Thank you, Meghan I don't

15 have any official closing remarks, other than to

16 specifically thank Aaron and Gary for the great

17 presentation that they gave us; lengthy, in-depth,

18 insightful, helpful, very clear.

19   Hopefully, it will be a springboard for anyone who

20 wasn't very familiar with DeFi before that, to further

21 educate and update themselves in this fascinating and

22 fast growing area that's obviously providing value and

1   excitement, but is posing questions that would better

2   be cleared up and ensure does not jeopardize that value

3   and growth.

4   So specifically, I'd like to thank them. Thanks

5   again to all the TAC members and subcommittee members.

6   Richard, thank you for your leadership and thanks to

7   all of our CFTC staff, Meghan in particular, and I

8   appreciate my fellow Commissioners joining us. Thank

9   you.

10   MS. TENTE: Thanks Commissioner Quintenz.

11   Chairman Tarbert, so you have any closing remarks?

12   (No response.)

13   MS. TENTE: Chairman Tarbert might have had to

14   leave the meeting. Commissioner Benham?

15   (No response.)

16   MS. TENTE: Commissioner Stump?

17   COMMISSIONER STUMP: Thanks Meghan. I just wanted

18   to echo the things that Commissioner Quintenz said. I

19   personally always find these meetings to be extremely

20   beneficial, and in particular the two subcommittees

21   that presented today, have been tasked with providing

22   input on things that I personally have found to be a

1   struggle over the past couple of years and it is just a

2   result of the fact that our markets are constantly

3   changing and evolving and -- well, I'll start with the

4   second presentation first.

5   Data protection is extremely important to me and I

6   thank the subcommittee for all of their efforts to try

7   and help us as an agency to ensure that we have all of

8   the right metrics in place to ensure that the data we

9   take in or the data we require is properly protected.

10   With regard to the first presentation, I just

11   wanted to say I found it extremely timely. There was

12   discussion about the manner in which we apply

13   regulations in this vast new world, which is not how we

14   would traditionally have applied our regulations. And

15   each year when I'm considering a number of unfortunate

16   cases, I often find myself thinking through some of the

17   questions that were raised in today's presentation with

18   regard to secondary liability and the manner in which

19   we exercise the authorities we have to ensure market

20   integrity, but also preserving innovation.

21   So I just thought it was tremendous -- a really

22   great presentation. I wanted to thank the presenters

1   and the subcommittee, and again wanted to thank

2   everyone who had a hand in organizing today's meeting.

3   Thanks.

4   MS. TENTE: Thank you so much Commissioner Stump.

5   And Commissioner Berkowitz, any closing remarks?

6   COMMISSIONER BERKOVITZ: Thank you.   Thank you,

7   Meghan.   And, I too, would like to thank the

8   participants for their very informative presentations.

9   I would just note I'm very much looking forward to

10   the Committee's further thoughts on the issues, such as

11   you were talking about safe harbors and what the

12   Commission's regulatory responsibilities should be in

13   this area.   So I very much appreciate the Committee

14   taking the initiative on this.

15   I'd just note that Section 3 of the Commodity

16   Exchange Act which outlines the findings and purposes

17   of the Commodity Exchange Act.   One of the -- in

18   addition to promoting market integrity, one of the

19   fundamental purposes is to promote responsible

20   innovation and fair competition.   And I think the

21   presentation, in one of the slides, it was talked about

22   how to balance those or maximize both of those

1   objectives.

2   We want to encourage innovation, some of the

3   technologies described here today really are at the

4   forefront of the markets, at the same time we want to

5   maintain fair competition among all market

6   participants, those who have new methods of competition

7   as well as those who are employing the traditional

8   methods of competition.

9   So, how we achieve and maximize those objectives

10   is, it's something we must always try to do and I look

11   forward to the Committee's further advice and

12   recommendations and information on that matter.

13   So again, I would like to thank all the

14   participants for today's excellent presentations.

15   MS. TENTE: Thanks Commissioner Berkovitz. And

16   Commissioner Behnam is having an issue with his line,

17   so we're going to give him one more minute to hopefully

18   get on.

19   (Pause.)

20   MS. TENTE: Okay, he can't get the line to work so

21   he'll pass.

22   But with that, thank you everybody, once again,

1   thank you Richard, and this meeting is now adjourned.

2   (Whereupon, at 11:30 a.m. EST, the Technical

3   Advisory Committee meeting was adjourned.)

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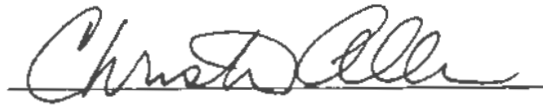
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